State Conservation Commission Meeting
Pennsylvania Farm Show Complex (Maclay Street Entrance)

May 10, 2022

Hybrid Meeting

Agenda – SCC COPY

Briefing Session – 10:00am – Susquehanna Room

Executive Session – 11:30am – Delaware Room

Business Session – 1:00PM – 3:00PM – Susquehanna Room

A. Opportunity for Public Comment

B. Business and Information Items

1. Approval of Minutes
    a. March 8, 2022 Public Mtg.(A)
    b. April 12, 2022 Conference Call (A)
2. Proposed Update to Policy on Utilizing Technology to Facilitate Conservation District Business Meetings (11-15-11), Karl Brown, SCC (A)
3. Nutrient and Odor Management Program
    a. Nutrient Management (NM) and Manure Management (MM) 5 year Delegation Agreement - Frank Schneider, SCC (A)
    b. Penn State University, Proposals for Education and Technical Support Activities (FY2022-23 Work Plans and Budgets) - Johan Berger, SCC (A)
        (i) Nutrient Management Specialist (Act 38),
        (ii) Odor Management Specialist (Act 38) and Commercial Manure Hauler & Broker (Act 49) certification, education and technical support programs, and Assessment of Animal Production Sites program.
    c. Nutrient Management Plan (NMP) - Emanuel Lapp, Northumberland County - Brady Seeley, SCC (A)
4. Proposed Revisions to the FY2022-23 REAP Guidelines and Application - Joel Semke, SCC (A)
5. Proposed Revisions to the FY2022 Conservation Excellence Grant Program Guidelines – Eric Cromer, SCC (A)
6. Dirt, Gravel and Low Volume Road (DGLVR) Program
    a. Center for Dirt and Gravel Road Studies, Education and Technical Assistance Agreement Proposed 2022-23 Scope of Work annual budget - Roy Richardson, SCC; Steve Bloser, CDGRS (A)

b. Proposed FY2022-23 DGLVR Allocations to Conservation Districts - Roy Richardson, SCC (A)

c. Proposed changes to Driving Surface Aggregate (DSA) Standard and Specification – Roy Richardson, SCC (A)

d. DGLVR Proposed Stream Crossing Documents- Roy Richardson, SCC (A)

   i. Stream Crossing Replacement Policy (revisions to 7.1 of DGLVR Administrative Manual)

   ii. Stream Crossing Design and Installation Standard (new)

   iii. Stream Crossing Replacement Technical Manual (new)

e. Proposed changes to DGLVR Administrative Manual (revisions) – Roy Richardson, SCC (A)

C. Written Reports

1. Program Reports
   a. Nutrient and Odor Management Program Measurables Report
   b. Nutrient Management Plan Update Report: Dallas Equine Center, LLC – Pinewood Acres – Lauren Swicklik – Luzerne County
   c. Nutrient Management Plan Update Report: Pine Hurst Acres, LP – Northumberland County
   d. 2022 Status Report on Facility Odor Management Plan Reviews/OMP Actions
   e. 2022 Odor Management Plan Self Certification Update
   f. REAP 2021/2022 Accomplishment Report
   g. Conservation Excellence Grant Program Accomplishment Report
   h. Certification and Education Program Accomplishment Report

2. Ombudsman Program Reports – Southern Allegheny Region (Blair County Conservation District) and Lancaster County Conservation District.

D. Cooperating Agency Reports Adjournment

Next Public Meetings/Conference Calls:

June 14, 2022 - Conference Call

July 20, 2022 – Public 'Hybrid' Meeting at the Red Lion Hotel, Harrisburg, PA

STATE CONSERVATION COMMISSION
MEETING

PA Department of Agriculture, Harrisburg, PA

In-Person and Zoom Webinar System

Tuesday, March 8, 2022 - 1:00 p.m.

Draft Minutes

Members Present: Secretary Russell Redding, PDA; Secretary Patrick McDonnell, DEP; Mike Flinchbaugh; MaryAnn Warren; Ron Rohall; Don Koontz; Denise Coleman, NRCS; Drew Gilchrist, DCNR; Jessica Passiment, DCED; Brent Hales, PSU; Kelly Stagen, PACD.

A. Public Input – No public comment.

B. Business and Information Items

Karl G. Brown, Executive Secretary, noted that an Executive Session was held to address existing legal issues.

1. Approval of Minutes – January 18, 2022 - Public Meeting and February 15, 2022 – Conference Call.

   Ron Rohall moved to approve the January 18, 2022 *public meeting minutes and the* February 15, 2022 *conference call minutes. Motion seconded by Don Koontz. Motion carried.*

2. Nutrient and Odor Management Program - Act 38 Odor Management Program Compliance Policy and "After the Fact" Strategy - Frank Schneider, SCC stated Commission program staff have been working on a compliance policy and strategy for Act 38 Odor Management (OM) Plans for two scenarios: 1) where an OM plan is required by a CAO but not submitted, and 2) where an OM plan is submitted for approval 'after-the-fact' (e.g. regulated facilities built and plan submitted after construction). The 2-part policy utilizes a 3 step compliance strategy similar to the Nutrient Management Program compliance strategy. Frank briefly reviewed the compliance policy and recommended approval of the policy by the Commission.

   Michael Flinchbaugh moved to approve the Act 38 Odor Management Program Compliance Policy and 'After the Fact' Strategy as presented for approval. Motion seconded by Brent Hales. Motion carried.

3. REAP Introduction to FY 2022-23 Guidelines and Application Revisions – Joel Semke, SCC stated that each year the Commission reviews and updates the guidelines and forms for the REAP Tax Credit Program. These updates are based on staff experience with the program, recommendations of program participants and consultants and the public at large. Joel presented several concepts for changes in FY 2022-23 REAP program guidelines. Areas identified for potential change include waste storage facility eligibility and clarification on waste storage facilities expansions criteria; cover crops; no-till equipment; precision nutrient application equipment; nitrogen stabilizers; and others. Joel extended an invitation to Commission members and other organization to provided

comments on the proposed concept. A proposed guidelines and application packet will be presented to the Commission for approval at the May 2022 public meeting.

Action: No action required at this time.

4. 2022 Conservation District Director Appointment Update. Karl Brown, SCC, reported as of February 24, 2022, 61 counties (92%) have submitted their 2022 director nominations to the Commission. Counties which have not submitted director nominations as of that date include Allegheny; Columbia; Lackawanna; Luzerne; and Wyoming. Letters were sent in February to counties that did not submit their director nominations. A follow-up letter will be sent in late March to any county that has not submitted director appointments for 2022. Karl did note that any district director whose term expired in December 2021 may only serve until June 30, 2022. After that date, those directors with expired terms may no longer serve as district directors, until appointed or re-appointed.

   Action: No action required at this time.

5. FY2022-23 Governor's Proposed State Budget Update – Karl G. Brown, SCC reported on February 8th, Governor Wolf presented his FY 2022-23 proposed state budget to a joint session of the House and Senate. Major line items for conservation districts within PDA and DEP were funded at the same funding level as last year's budget line items. Commission members were provided pertinent portions of FY2022-23 Summary of Fund and Appropriation for both PDA and DEP. Secretary Redding and Secretary McDonnell provided some positive perspectives on their respective agency's proposed budget. Karl did note that county conservation districts have asked legislative leaders for an increase of 20% in the PDA and DEP line items labeled "For Transfer to Conservation Districts (CDFAP line items). While the Governor did not include the requested increases in these line items, the Conservation District Fund does generally have sufficient fund balance and EA allocated to it to allow an increase in allocations to districts under the CDFAP beyond the line item appropriations. Karl also noted that there are several legislative initiatives linked to the budget discussions that may offer increased funding opportunities for the Commission DEP, PDA and conservation districts.

   Action: No action required at this time.

6. 2022 Envirothon Update - Karen Books, DEP reported the State Envirothon Program will once again offer a "hybrid" State Envirothon event in May 2022. This event will feature Oral Presentations on a regional basis in Monroe (May 17th), Indiana (May 18th), Cumberland (May 19th) and Snyder (May 20th) counties, followed by a single day field event on May 25, 2022 at Camp Mount Luther, Union County. In addition, the State Envirothon Board is also in search of a new Envirothon Executive Director for the program.

   Action: No action required at this time.

7. Pennsylvania Invasive Species Council PRISM Initiative Update – Kris Abel, PISC Coordinator reported the Pennsylvania Invasive Species Council (Council) has been working to develop and implement a partnership concept for "regional invasive species management" across Pennsylvania. The "Partnerships for Regional Invasive Species Management" (PRISM) concept is a public private partnership designed to encourage cooperation among private land owners, governments, businesses, and other entities to coordinate efforts to address invasive species management on a local and regional basis.

Governor Wolf included funding in the proposed FY 2022-23 state budget to support the implementations of the PRISM concept in Pennsylvania. If funding is provided under the FY2022-23 state budget, PDA in cooperation with PISC will likely issue Requests for Proposals for organizations to host the PRISM cooperatives.

Action: No action required at this time.

7. Request for Volunteers – SCC Annual Awards Committee – Karl Brown reporter that each year the Commission presents awards for Distinguished Service and Leadership Excellence, and recognizes conservation district anniversaries. These awards are normally presented at the July Joint Annual Conference. As in previous years, Commission staff is looking for several Commission members willing to serve on the Awards Committee. The following Commission members volunteered to serve on the Awards Committee: Michael Flinchbaugh, Ron Rohall, MaryAnn Warren and Drew Gilchrist.

Action: No action required at this time.

C. Written Reports

1. NM/OM Program Reports
   a. Nutrient and Odor Management Program Measurables Report
   b. NMP Update Report – Joe Jurgielewicz & Son, Ltd. – Sunbury Farm – Northumberland County
   c. 2022 Status Report on Facility Odor Management Plan Reviews/OMP Actions
2. REAP 2021 Accomplishment Report
3. Conservation Excellence Grant Program Accomplishment Report
4. Certification and Education Program Accomplishment Report
5. Ombudsman Program Reports – Southern Allegheny Region (Blair County Conservation District) and Lancaster County Conservation District.

D. Cooperating Agency Reports – PACD, NRCS, PSU, DEP, DCNR, DCED, PDA

SCC – Karl Brown announced his likely retirement at the end of calendar year 2022. PDA and DEP will be engaging in a search for a new Executive Secretary for the Commission anticipating have an individual in that position to by September of October 2022.

PACD – Kelly Stagen reported the PACD/SCC Joint Annual Conference will be held 'in person' on July 20-21, 2002 at the Red Lion Inn in Harrisburg. The Spring Regional PACD Meetings will begin in March and continue through April 2022.

NRCS – Denise Coleman reported that the USDA Cover Crop Initiative sign-up period recently closed. Over 100 applicants applied for over $2.0 million in funds. However, only $1.0 million is available for award. The application period for Conservation Initiative Grants will be open from March 17, 2022 through April 14, 2022. Application evaluation will focus on project areas such as carbon sequestration, legacy sediment , soil health and urban farming.

PSU – Brent Hales reported that the Agricultural BMP Surveys are continuing to be submitted to the Cooperative Extension. It is anticipated that the survey deadline will be extended to the end of April 2022. Cooperative Extension staff is beginning the verification

process of reported voluntary BMP implementation.

DEP – Secretary McDonnell reported that 2022 'Virtual' Agricultural Agency annual meeting was held on February 23 and 24, 2022. Recording form the event will be available for view on the Clean Water Academy. DEP recently announced that $18.2 million in Growing Greener were awarded to 65 projects across the commonwealth. EPA Region III has been conducting interviews with state agencies and local county conservation district in as part of an evaluation of agricultural program implementation and success. Regarding ePermiting – PAG01 is now available on-line and under full implementation and several of the Chapter 105 general permits will be transitioning to electronic submission beginning in May 2022.

DCNR – Drew Gilchrist reported that an important funding source of funding for DCNR is the federal Land and Water Conservation Fund which was established to create and maintain a nationwide legacy of high quality recreation areas and facilities. Since the fund's inception, LWCF has channeled more than $16.7 billion to state and local governments nationwide thru the National Park Service. In Pennsylvania, DCNR has in turn awarded over 1,600 projects totaling more than $178 million in LWCF grants and helped to protect more than 33,000 acres of local park land. With the Passage of the Great American Outdoors Act in 2020 congress authorized permanent full funding of the LWCF, This translates into about $9 mil/yr. for PA. Last year projects awarded LWCF funding included park projects in Lebanon, Allegheny, and Butler Counties, Pool rehabilitations in Scranton and Greene Counties and a new community park in Chester County.

DCED – Jessica Passiment, reported that the Center for Local Government Services has renewed their participation with Pennsylvania's Chesapeake Bay Program in regards to local governments initiative discussions.

PDA – Secretary Redding reported that much of the nation is on high alert regarding Highly Pathogenic Avian Influenza (HPAI) which has been positively documented in 13 states. HPAI is a lethal disease that affects poultry and related species (both wild and domestic) and can be transmitted through migrating wild waterfowl. As of this date, Pennsylvania has not reported a positive incidence of the HPAI. Secretary Redding also announced Dep. Secretary Greg Hostetter has transition into the Executive Dep. Secretary position after the transfer of Michael Hanna to DCED.

Adjournment: Meeting adjourned at 2:50 p.m. by motion of Mike Flinchbaugh and Ron Rohall.

Next Public Meetings/Conference Calls:
April 12, 2022 - Conference Call
May 10, 2022 – 'Hybrid' Public Meeting

STATE CONSERVATION COMMISSION CONFERENCE CALL
Microsoft Teams Conference Call
Tuesday, April 12, 2022 @ 8:30 am

DRAFT MINUTES

Members Present: Secretary Russell Redding, PDA; Secretary Patrick McDonnell, DEP; Mike Flinchbaugh; Ron Rohall; Ron Kopp; Don Koontz; MaryAnn Warren; Drew Gilchrist for Secretary Cindy Adams Dunn, DCNR; Denise Coleman, NRCS; Chris Houser, Penn State; and Kelly Stagen, PACD.

A. Public Input: None.

B. Agency/Organization Updates

1. DCNR – Drew Gilchrist

Drew reported that DCNR's Bureau of Recreation recently closed its grant funding program, known as the Community Conservation Partnership Program for the development of parks, trails, open space preservation, and green infrastructure. DCNR received the second highest total of grant requests that were ever received. There were 427 applications submitted with a request of $143.8 million in funding, producing an additional $179.9 million in match funding. It is not known exactly how much funding will be applied to the program this year. Revenues are up from our largest funding pool, Growing Greener 1, and are based on a 0.25% of 1% fee from the Real Estate Transfer tax.

2. DEP – Secretary Patrick McDonnell

Secretary McDonnell reported that program and grant center staff are updating Chesapeake Bay contract documents. Renewals and agreements will be coming to conservation districts soon. Growing Greener Plus will be announced soon. The Chesapeake Bay office is working with PACD to plan Section 319 Virtual Watershed Planning and Implementation meetings on May 18 and 19, 2022. The 105 General Permit is transitioning to completely paperless (e-permitting) but is currently delayed due to technical issues. The Conservation District Support Section is working to fill vacant positions. There will be a new Water program specialist in the DEP Central Office and two new Conservation District Field Representatives.

3. NRCS – Denise Coleman

Denise reported that NRCS is continuing to do work as it relates to the Emergency Watershed Protection Program. NRCS recently had a meeting with the National NRCS office regarding a new urban office in Philadelphia. The NRCS budget was passed on March 11, 2022. There is an increase in funding in the federal infrastructure bill, that will provide funding for twelve current dam projects and seven new dam projects. Regarding the Farm Bill, rankings are in process. There are 2,000 active contracts with 500 more being added.

4. Penn State University – Chris Houser

Chris reported that the Ag BMP Farmer Survey is currently in progress. Reminders were sent at the end of March 2022, and the deadline to participate is April 30, 2022. Because current fertilizer prices are high, farmers are being encouraged to test their own soil with soil test kits. This could reduce costs and help with cleaner water.

5. PACD – Kelly Stagen

Kelly reported that Conservation District week is being celebrated from April 10-16, 2022. Conservation districts are holding special events during this week. Thank you to Secretary Redding for holding a Spotted Lanternfly event at the Indiana County Conservation District. PACD is looking for TAG employees in Columbia and Lebanon Counties. PACD Spring Regional meetings are currently occurring.

6. DCED – Jessica Passiment

No report.

7. PDA – Secretary Russell Redding

Secretary Redding thanked Indiana County for their hospitality during his recent visit. Thanks, too, to Denise Coleman at NRCS, PACD, and the SCC for holding/organizing Boot Camp. It is budget season, so please advocate when you can for conservation districts. Executive Deputy Secretary Hostetter reported that High Pathogenic Avian Influenza (HPAI) is currently a major issue, and please be vigilant. There have been weekly and bi-weekly meetings regarding preparedness, prevention, response, and recovery. Three states were recently added to the list for HPAI: Texas, Montana, and Colorado – making for a total of 25 states. Pennsylvania is coming up on planting season.

C. Information and Discussion Items

1. **AgriSafe Network (Mark Critz, Exec. Dir. Rural Development Council, PDA) –** Mark provided information on the AgriSafe Network, a non-profit organization, representing health professionals and educators who strive to reduce health disparities found among the agricultural community. The mission of the Network is to support a growing network of trained agricultural health and safety professionals that assure access to preventative services for farm families and the agricultural community through the delivery of agricultural occupational health services.

2. *(Please Note … Action requested on this agenda item.)* **Recommendation for Approval for Northumberland County Conservation District Building Project (Johan Berger, SCC) -** The Northumberland County Conservation District has begun the process to find a new office location for its operations and Environmental Education Center due to financial impacts surrounding rental arrangements for its current office space. The District has been offered a residential property adjacent to the Little Shamokin Creek Watershed Association property for relocation of its offices. Under current policy regarding powers and duties granted to the State Conservation Commission (Commission) under the Conservation District Law (Act of May 15, 1945, P.L. 217), certain matters require approval by the Commission or the Executive Secretary, as authorized by the Commission. When conservation districts enter into contracts, where the estimated project cost exceeds $250,000, the conservation district must seek approval from the Commission to enter into such contracts. Johan Berger and Nathan Brophy, District Manager for the Northumberland County Conservation District, presented a proposal regarding the District's building project requesting permission from the Commission to enter into appropriate contracts for completion of the project. Staff recommended that the Commission consider a motion to approve the Northumberland Conservation District's request to enter into an agreement that exceeds $250,000 for the purpose of purchasing the property and structures described in order to renovate this property and structures for their offices. This approval is contingent on the District obtaining a special exception for the zoning and building certification changes approval for the property, and other approvals deemed necessary by their solicitor in order to relocate their offices to this property.

   Mike Flinchbaugh made a motion to approve the Northumberland Conservation District's request to enter into an agreement that exceeds $250,000 for the purpose of purchasing the property and structures described in order to renovate this property and structures for their offices. Motion seconded by MaryAnn Warren. Motion carried.

3. **FY 2022-23 REAP Program Guidelines Update (Joel Semke, SCC) -** Every year, the Commission staff reviews the REAP Program guidelines and solicits input from partners on how to improve the program year-to-year. The annual changes to the guidelines range from minor revisions that are intended to improve the administration of the program, to major changes that address what is eligible for REAP tax credits. Joel Semke provided an update on proposed changes to the FY 2022-23 REAP Program guidelines. These proposed changes will be presented to the Commission for approval at the May 2022

Commission meeting after a final legal and policy review. A memo outlining the proposed changes to the FY 2022-23 REAP Program Guidelines was provided.

4. **FY 2022-23 Conservation Excellence Grants (CEG) Guideline Revision Concepts Update (Johan Berger, SCC)** – Similar to the REAP Program, the CEG Program is authorized to operate based upon "guidelines" issued by the Commission. Staff, in cooperation with participating conservation districts, has reviewed the FY 2021-22 guidelines and is recommending several changes including language updating the allocation of program funds that were recently adopted by the Commission and several other minor modifications. Johan Berger presented this information to the Commission. A memo with additional information was provided. Final revised language for the guidelines will be presented for Commission consideration at the May 2022 meeting.

5. **Dirt, Gravel Road and Low Volume Program Allocation Update (Roy Richardson, SCC) –** Each year the Commission allocates state funding to county conservation districts under the Dirt, Gravel and Low Volume Road (DGLVR) Program. These county allocations are "formula" driven and include "spending" requirements for districts that define their eligibility for funding each fiscal year. Commission staff anticipate presenting these DGLVR Program funding allocations at the May 2022 business meeting. Staff will review the process for this funding allocation and will update Commission members on the number of districts they anticipate will be eligible for DGLVR Program funding allocations in FY 2022-23.

6. **Proposed Update to Policy on Utilizing Technology to Facilitate Conservation District Business Meetings (11-15-11) (Karl Brown)** – In November 2011, the Commission adopted a policy regarding utilizing technology to facilitate conservation district business meetings. Given the significant challenges presented during the COVID pandemic for in person meetings and the dramatic improvements in telecommunication platforms, Commission staff is proposing this policy to encourage districts to consider adopting a hybrid meeting format to improve access to their monthly business meetings. A copy of the proposed changes was provided. Commission staff anticipate presenting this information to the Commission at the May 2022 meeting.

7. **Statement of Financial Interests (Karl Brown) –** State Conservation Commission members are reminded that as "Public Officials" they are required to complete their Statements of Financial Interest forms as required by state ethics laws. Information will be sent to members in late February and members must complete these forms (online) no later than May 1, 2022. Conservation District Directors are also considered Public Officials and most District Employees are considered Public Employees. Any Conservation district employee that meets one or more of the criteria in the definition below **MUST** fill out a Statement of Financial Interest. Completing a statement is not optional. It is required by law. For district directors and district employees,

statements are to be completed and filed with the Conservation District no later than May 1, 2022. The general rule with this form is "when in doubt, fill it out".
"Public Official" includes any person (*such as a conservation district director*) appointed by a governmental body (such as the board of county commissioners or the county council). "Public Employee" includes any individual employed by the Commonwealth or a political subdivision (*like a conservation district*) who is responsible for taking or recommending official action of a non-ministerial nature with regard to: Contracting or procurement; Administering or monitoring grants or subsidies; Planning or zoning; Inspecting, licensing, regulating, or auditing any person; or Any other activity where the official action has an economic impact of greater than a de minimis nature on the interests of any person.

8. **2022 Dates to Remember**

SCC Meetings – 1:00 PM

Hybrid Meeting May 10
In-person (w PACD, location TBD) July 20

SCC Conference Calls – 8:30 – 10:00 AM

Conference Call June 14
Conference Call August 16

PACD Spring Regional Meetings – All will be Virtual 10:00 am -12:00 pm

South East Region March 24
North East Region March 25
North Central Region March 31
South Central Region April 8
South West Region April 21
North West Region April 27

Agricultural Technician Training

Boot Camp I – 'Basic' April 4 - 8, 2022 (Classroom)
Boot Camp II – 'Advanced' April 19 , 2022 (virtual)
April 25 -29, 2022 (Classroom/ Field)

Also, check the Conservation District Training/Special Events Calendar at, www.PACD.org. Select the "Events" tab and then the "Training Calendar" tab.

9. **Next Meeting –** May 10, 2022 (hybrid meeting format)

10. **Adjournment –** 9:52 a.m.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

April 29, 2022

To: Members
State Conservation Commission

From: Karl G. Brown
Executive Secretary

RE: Update to Policy on Utilizing Technology to Facilitate Conservation District Business Meetings

In November 2011 the Commission adopted a policy regarding utilizing technology to facilitate conservation district business meetings. Conservation districts originally requested guidance from the Commission concerning the legality of board members participating in conservation district business meetings using telephone conference calls or other appropriate communication technologies.

Given the significant challenges presented during the COVID pandemic for in person meetings and the dramatic improvements in telecommunication platforms, Commission staff recommends amending this policy to encourage districts to consider adopting a hybrid meeting format to improve access to their monthly business meeting.

Commission staff have discussed this with the Conservation District Advisory Committee (CDAC) on two different occasions and have incorporated suggestions from Advisory Committee members.

A copy of the proposed changes to Policy on Utilizing Technology to Facilitate Conservation District Business Meetings is attached.

Commission staff recommends adoption of this policy amendment.

State Conservation Commission

Policy on Utilizing Communications Technology to Facilitate Conservation District Business Meetings

(Adopted November 15, 2011, Revised _____)

Background:

Under the Conservation District Law, conservation districts are a "public body corporate and politic exercising public powers of the Commonwealth as an agency thereof." As subdivisions of state government, districts may establish reasonable rules for the conduct of their business meetings, provided these meeting are conducted consistent with any law or regulations that may govern these meetings. As subdivisions of state government, districts are considered agencies under Pennsylvania's "Sunshine Act" and must comply with its provisions regarding public meetings and public participation.

In 2011, conservation districts requested guidance from the State Conservation Commission (Commission) concerning the legality of board members participating in conservation district business meetings using telephone conference calls or other appropriate communication technologies. The Commonwealth's Office of General Counsel advised the Commission that the Pennsylvania Supreme Court *in Babac v. Pa. Milk Marketing Board*, 531 Pa. 391 (1992) ruled that participation in a business meeting via telephone conference call does not violate the Sunshine Act, provided that the members who are physically present and absent can communicate with each other during the business session.

In 2011, the Commission adopted a policy recognizing that situations may arise that necessitate the use of appropriate and effective electronic communication methods to facilitate business meetings and ensure that a quorum of members are available to conduct these meetings.

In 2020, the emergence of the COVID-19 virus and pandemic caused conservation districts to adopt and/or revise their Continuity of Operations Plans (COOPs) so they could continue their operations under the significant COVID-19 restrictions. While these unique operating restrictions created significant challenges for districts, they also demonstrated the value and benefit of communicating electronically.

Also in 2020, the Legislature passed Act 15 of 2020 in response to the Governor's COVID-19 Emergency Declaration. Part of the act addressed public meetings by allowing the use of internet-based platforms and social media to facilitate electronic or virtual gatherings. Upon

lifting the COVID-19 mask and occupancy restrictions, the Pennsylvania Office of Open Records directed all agencies to return to pre-COVID status with respect to public meetings and the expectation that meetings will include a physical gathering that allows for public attendance and comment.

In 2022, the Commission revised this policy based on the requirements of the Sunshine Act and the demonstrated value and benefit of a technology based "hybrid" meeting model.

Policy:

1. The Commission encourages all conservation districts to conduct monthly business meetings and other public meetings of the district in person, face-to-face whenever possible.
2. If a conservation district chooses to allow board members to participate in monthly board meetings or other public meetings of the district (i.e. committee meetings) through a conference call connection or other appropriate electronic communications technology, they shall ensure that they consistently comply with all of the parameters listed in (3) below.
3. In order to ensure compliance with the open meeting provisions of the Sunshine Act, any conservation district board allowing a voting member(s) to participate in a business meeting remotely via telephone conference call or other appropriate electronic communications technology must adopt policies and procedures to ensure that the member(s) participating remotely is able to:
    a. Hear and be heard by all individuals participating in the business meeting.
    b. Actively participate in any and all deliberation and discussion leading up to a formal decision by the board, including any executive session held as a part of the discussion and deliberation that leads up to a formal decision by the board.
    c. Access to all information that members attending the meeting in person would have access to during the meeting, including handouts, memos, background information, power point presentations, written testimony, etc.. These materials may be provided as hard copies in advance of a meeting, or in an electronic format in advance of a meeting. All material should be provided to members participating remotely in a timeframe that is consistent with the distribution of the same information to members who will participate in the meeting in person.
    d. Be polled individually (roll call vote) regarding any vote that is not unanimous in nature.

e. Properly record and file an abstention due to a potential conflict of interest in a manner consistent with the provisions of Pennsylvania's Public Official and Employee Ethics Act ("Ethics Act"). The Ethics Act requires any public official who would be required to vote on a matter that would result in a conflict of interest to abstain from voting on the matter and, prior to a vote being taken, to publicly announce and disclose the nature of their interest as a public record in a written memorandum filed with the person responsible for recording the minutes of the meeting at which a vote is taken.

4. The Commission also encourages all conservation districts to consider adopting a hybrid meeting format (where feasible) that combines the benefits of an in-person public meeting with an appropriate electronic communications method to allow board members and the public to participate from a remote location.

a. Any hybrid meeting option must comply with the provisions applicable to board member participation outlined in 3(a) – (e) above, and;
b. Ensure that the public can participate in a manner consistent with the Sunshine Act requirements (e.g. opportunity for public comments).

End.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 7, 2022

TO: Members
State Conservation Commission

FROM: Frank X. Schneider
Director, Nutrient and Odor Management Programs

THROUGH: Karl G. Brown
Executive Secretary

SUBJECT: Nutrient Management and Manure Management Delegation Agreement

Action Requested

Staff is requesting the State Conservation Commission (SCC) approved the proposed Act 38 Nutrient Management / Chapter 91 Manure Management Program Fiscal Year 2022 – 2027 Delegation Agreement.

Background

The Commission and the Pennsylvania Department of Environmental Protection (DEP) are currently in a joint five (5) year delegation agreement with select conservation districts for Fiscal Years 2017-2022 for Nutrient Management (NM) and Manure Management (MM). That delegation agreement concludes on June 30, 2022.

The intent of both the Commission and DEP is to enter into another joint 5-year delegation agreement for NM and MM with select conservation districts for Fiscal Years 2022-2027.

In July 2021, the SCC approved the formation of a Nutrient Management (NM) and Manure Management (MM) Delegation Agreement Workgroup to work on a new five (5) year delegation agreement.

The workgroup has meet three times by conference call/webinar. The workgroup has agreed to a final form delegation agreement that includes the following:

1. Conservation Districts/Agencies/Organizations agree that a joint delegation agreement for NM and MM makes sense and should be continued.
2. The Required Output Measures (ROMs) have stayed consistent with the current delegation agreement, for the most part, with the following exceptions:
   a. Nutrient Management Program:

i. Removed the requirements for an annual planning meeting with partners.
ii. Provided clarifying language on what can constitute informal education events and whom DEP and SCC consider consultants for educational training session, etc.
iii. Removed the requirement that reciprocal agreements between counties needs to be sent to the SCC.
iv. Added that the task of identifying potential CAOs shall be a priority of the District. Districts shall develop a specific county procedure on how they plan to identify existing CAOs that have not yet been identified, as well as, new CAOs resulting from new construction, expansion, or loss of land.
v. The District shall identify potential CAOs in the non-traditional Act 38 livestock industry activities such as equine, along with the traditional livestock/poultry industry activities, such as dairy, poultry, swine, beef, sheep, goats, etc., on an ongoing basis

b. Manure Management Program:
i. Added that the District's developed and adopted outreach strategy should include inspection ("status review") criteria.
ii. Added that Inspection ("status reviews") of MMPs should be consistent with guidelines provide by the DEP.
iii. Added that the District will inspect ("status reviews') a minimum of 10 agricultural operations, such status reviews will be conducted consistent with guidelines or Standard Operating Procedures (SOPs) provided by DEP.
iv. Changed "may" to "will" for the following:
- Provide full plan development for operators consistent with the District's Manure Management Program strategy and priorities, as resources permit.
- Perform quality assurance of the accuracy of MMPs and the implementation of plans, when District verification is requested by an operator consistent with the District's Manure Management Program strategy and priorities, as resources permit.
- Assist operations determined to be out of compliance based on an inspection or implementation of the BMPs required for or identified in their MMP.
- Assess an operator's implementation of the Operation and Maintenance Plan for the BMPs included in the MMP.

The draft Delegation Agreement and Required Output Measures are made part of this approval package.

The draft delegation agreement was open for a 64-day public comment period. The SCC received 11 comments from 4 commentators. Some comments had merit and changes

were made as appropriate. A comment/response document is made part of this approval package.

The draft delegation agreement has been reviewed by both PDA and DEP policy offices with all comments addressed. The draft delegation agreement has also been thru a first and second legal review by contacting, compliance and regulatory attorneys at DEP.

The workgroup has also started to look at the financial aspects of funding for the new FY22-27 delegation agreement. The financial/workload information and staff determinations on funding will be a separate SCC action item.

ATTACHMENTS:

Draft Final Delegation Agreement (Including Required Output Measures)
Comment / Response Document

Final Draft
May 2022

AGREEMENT FOR DELEGATION OF
ADMINISTRATIVE RESPONSIBILITIES
FOR THE PENNSYLVANIA
NUTRIENT MANAGEMENT
AND
MANURE MANAGEMENT PROGRAMS

THIS DELEGATION AGREEMENT is made this _____day of _____, 2___, by and between the Commonwealth of Pennsylvania (“Commonwealth”) through its Pennsylvania State Conservation Commission ("Commission") and its Pennsylvania Department of Environmental Protection (“DEP”), and the _____ County Conservation District ("District").

WITNESSETH:

WHEREAS, the Commonwealth’s Nutrient Management Program (“Act 38 program”) and Odor Management Program implement the Nutrient and Odor Management regulations at 25 Pa. Code, Chapter 83 as authorized by the Nutrient and Odor Management Act, 3 Pa. C.S.A. §§ 501 et seq. (“Act 38”), which includes provisions for nutrient and odor management, the Clean Streams Law, 35 P.S. §§ 691.1 et seq. and the Conservation District Law, 3 P.S. §§ 849 et seq. The District will be the Commission's designee/agent in administering the Act 38 Program and Odor Management Program, as further outlined in this agreement;

WHEREAS, the Commonwealth’s Manure Management Program (“Chapter 91 program”) implements the provisions of 25 Pa. Code § 91.36 of the Clean Streams Law regulations, relating to pollution control and prevention at agricultural operations, 1920-A of the Administrative Code of 1929, 71 P.S. § 510-20, and the Conservation District Law, 3 P.S. §§ 849 et seq. The District will be the DEP’s designee/agent in administering Pennsylvania’s Manure Management Program, and the public notice requirements for Concentrated Animal Feeding Operations (“CAFOs”) under the Clean Streams Law;

WHEREAS, the Commonwealth’s Manure Hauler and Broker Program (“Act 49 program”) implements the provisions of the Commercial Manure Hauler and Broker Certification Act, 3 P.S. § 2010.1 et seq. (“Act 49”) which establishes a program to certify commercial manure brokers to develop Nutrient Balance Sheets (“NBSs”) related to exporting and importing manure, and requires brokers to submit copies of the NBSs to county conservation districts (“districts”). The District will be the Commission's designee/agent in administering certain duties and responsibilities of Pennsylvania's Commercial Manure Hauler and Broker Program, as further outlined in this agreement;

WHEREAS, § 850 of the Conservation District Law, 3 P.S. § 850, declares the policy of the Commonwealth to provide for the conservation of soil, water, and related resources of the Commonwealth;

WHEREAS, the Commission is authorized to delegate regulatory and enforcement functions to districts pursuant to § 859(2)(b) of the Conservation District Law, 3 P.S. § 859(2)(b);

WHEREAS, the Commission is authorized to delegate administrative or enforcement authority, or both, to districts that have an adequate program and sufficient resources for Act 38 program implementation pursuant to § 504(9) of Act 38, 3 Pa. C.S.A. § 504(9);

WHEREAS, the program and policies of the District are acceptable to the Commission;

WHEREAS, DEP is authorized to delegate regulatory and enforcement functions to districts under the Clean Streams Law and the rules and regulations promulgated thereunder, including the Chapter 91 program, pursuant to § 859(2)(a) of the Conservation District Law, 3 P.S. § 859(2)(a);

WHEREAS, the administration of program funding under this agreement will be consistent with the statement of policy titled, "Nutrient Management Funding Program," 25 Pa. Code, Chapter 83, Subchapter E; and

WHEREAS, such laws, regulations, programs and policies provide for the execution of this agreement for the delegation by and between the District, DEP and the Commission for the accomplishment of work by conducting District activities and completing required output measures as described in Attachment A attached hereto.

NOW, THEREFORE, in consideration of the foregoing and the mutual promises contained herein, the parties intending to be legally bound agree as follows:

1. **GENERAL CONDITIONS:**

DELEGATION:

a. The Commission and DEP hereby delegate to the District certain responsibilities of the Act 38 program and Chapter 91 program, and Act 49 program, in the respective county for program implementation in accordance with all applicable state statutes, rules, regulations, and the requirements set forth in Attachment A;

WORK ELEMENTS:

b. The District must obtain prior written approval from the Commission and DEP, of changes or additions to the General and Special Conditions of this agreement, including but not limited to the program required output measures contained in Attachment A:

INDEMNIFICATION:

c. The Commonwealth will defend and indemnify District directors, associate District directors, and District employees when performing delegated duties or functions to the same extent as it defends and indemnifies Commonwealth employees; and all directors and employees shall have all immunities afforded by law to Commonwealth employees, 3 P.S. § 852(2);

d. At the request of the Commission, the Attorney General and/or Office of General Counsel will provide legal services to districts as required in relation to the duties and functions outlined in the agreement, 3 P.S. § 852(2);

ADDITIONAL TERMS AND CONDITIONS:

e. The District shall comply with the terms and conditions of Attachment B, Provisions for Commonwealth Contracts; Attachment C, Staff Resources; Attachment D, Proposal; and Attachment E, Federal Requirements, all attached to this agreement. For purposes of Attachment B, all references to the "Contractor" are references to the "District;"

SUSPENSION OF DELEGATION:

f. When the terms and conditions of the agreement are not materially being met, the Commission and DEP, whichever is the appropriate delegating agency, may, after a 30-day notice, suspend the District's authority under this agreement until corrective action has been taken to the satisfaction of the Commission or DEP, whichever appropriate, or until the agreement is terminated;

TERMINATION:

g. This agreement may be terminated by either the District or the Commission or DEP, whichever agency is appropriate, upon thirty (30) days prior written notice to the other parties. Within 10 days of such termination, the District shall release to the Commission or DEP, whichever agency is appropriate, all files, records, and unspent funds pertaining to this agreement;

EXAMINATION OF RECORDS;

h. The Commission and DEP, or its agent, shall have access to and the right to examine any pertinent books, documents, letters, and reports or records involving transactions relating to the District's delegated authorities; and

NO FINANCIAL INTEREST:

i. No District Director, District employee, Commission member, or staff of the Commission or DEP, is permitted to obtain financial benefits for himself/herself, a member of their family, or a business with which they are associated, though, or as a result of, work under this agreement. This shall not preclude the participation of the above individuals in the financial and technical assistance programs developed under Act 38, as long as their participation follows those procedures outlined in the "Pennsylvania Nutrient Management and Manure Management Manual Program Act 38 and Chapter 91 Administrative Manual" and is in accordance with applicable law, including the Public Official and Employee Ethics Act, 65 Pa. C.S. §§ 1101 et seq.

TERM:

j. This agreement shall become effective on the date it is fully executed by the Commonwealth. The term of this agreement shall be for five (5) years from the effective date.

2. **SPECIAL CONDITIONS:**

a. Duties and Responsibilities of the District. The District shall:

(1) Employ or retain certified employees as identified in Attachment C that are necessary to carry out the District's responsibilities as specified in this agreement. If a position becomes vacant due to a change in employment status or job responsibilities, the District shall, without delay, take all necessary actions to fill the vacancy;

(2) Perform all administrative functions in conformance with the "Pennsylvania Nutrient Management and Manure Management Manual Program Act 38 and Chapter 91 Administrative Manual" distributed by the Commission;

(3) Approve and implement written polices as directed by the Commission or DEP, whichever agency is appropriate, including those related to public access, public comment, conflict of interest, and administration of the programs. The Commission will provide sample policies for the District to consider in their efforts to develop these guidance documents;

(4) Provide consultative assistance to the Commission and DEP, and shall make available to the Commission or DEP, all pertinent files and records pertaining to appeals and enforcement cases that the Commission or DEP is handling within the county; and

(5) Follow the guidance of the Commission or DEP on proper biosecurity measures when carrying out their activities under the Act 38, Act 49, or Chapter 91 programs respectively.

b. Duties and Responsibilities of the Commission Relating to the Act 38 and Act 49 Program. The Commission shall:

(1) Provide technical oversight and training to the District on Act 38;

(2) Provide the "Pennsylvania Nutrient Management and Manure Management Manual Program Act 38 and Chapter 91 Administrative Manual" to the District, which shall include hard copies of the required reporting forms, and electronic files containing these standardized forms;

(3) Provide financial assistance to the extent funds are available, to the District for execution of the duties and responsibilities described herein, according to the "Pennsylvania Nutrient Management and Manure Management Manual Program Act 38 and Chapter 91 Administrative Manual" and the statement of policy titled, "Nutrient Management Funding Program (25 Pa. Code, Chapter 83, Subchapter E)."

(4) Be available to the District for consultation on matters relating to the programs, provide program information regularly and timely through Commission staff, including related correspondence or publications to ensure adequate communications concerning program changes;

(5) Provide for administrative, technical, and appropriate computer training to the District staff, and be available, as resources allow, to attend District meetings and participate in other circumstances as requested by the District;

(6) Ensure an adequate enforcement program is in place to process enforcement actions that the District transmits to the Commission;

(7) Provide to the District informational materials developed for the programs to assist the District in informing the interested public;

(8) Be responsible to perform those duties required by Act 38 that have not been delegated to the District;

(9) Provide technical oversight and training to the District for execution of the duties and responsibilities described in Attachment A for Act 49;

(10) Be available to the District for consultation on matters relating to Act 49; and

(11) Be responsible to perform enforcement under Act 49 for non-compliant haulers or brokers.

c. Duties and Responsibilities of the DEP Relating to the Chapter 91 Program. The DEP shall:

(1) Provide technical oversight and training to the District for execution of the duties and responsibilities described in Attachment A;

(2) Provide financial assistance to the District for execution of the duties and responsibilities described in Attachment A;

(3) When requested by the District, consult with the District on matters relating to the program;

(4) Provide to the District informational materials developed for the program to assist the District in informing the interested public; and

(5) Be responsible to perform enforcement under 25 Pa. Code § 91.36 for non-compliant operations.

d. Project Monitoring.

(1) The District, Commission Staff, and DEP staff, whichever agency is appropriate, shall meet at the request of any of the parties to discuss the progress of work under this agreement and any related issues.

(2) The District, Commission staff, and DEP staff, whichever agency is appropriate, shall immediately notify the other parties, in writing, of any unusual development or circumstance which could significantly change or otherwise affect the responsibilities outlined in this agreement.

e. Payment:.

(1) Upon full execution of this agreement, delegation work (a) may, at the discretion of the Commission or DEP, be reimbursed from July 1, 2022 through the date of full execution and (b) shall be paid from the date of full execution through June 30, 2027 (the completion date). All work under this agreement shall be completed no later than the completion date. This agreement can be terminated through the arrangement described in Section 1.g.

(2) An application for available funds shall be in writing on forms approved by the Commission. The application shall be received by the deadline established by the Commission. The application shall include a budget outlining anticipated expenses.

(3) The approved application and budget for the first agreement year is attached to and made part of this agreement as Attachment D. Applications and budgets for subsequent contract years shall be submitted by the District for the review and approval by the Commission without the need to amend this agreement.

(4) Claims for reimbursement and associated quarterly reports must be submitted to the Commission, or its designated agent, within twenty-five (25) days of the end of each quarter. The submission deadlines for quarterly claims and reports are as follows: April 25, July 25, October 25, and January 25. Reimbursement shall be in accordance with the attached budget. All claims must include all appropriate reports required by the Commission and DEP.

(5) The Commission will suspend claim processing until receipt of required reports or the completion of all conditions of the agreement.

(6) Budget modifications between the categories of an approved budget for up to 10 percent of the total annual budget amount must be approved in writing by the Commission prior to expenses being incurred. All other budget modifications shall require the submission of Attachment D with amendments to the district line items. .

f. Advance Payments

(1) Advance payments may be requested in accordance with procedures set forth in the statement of policy titled, “Nutrient Management Funding Program” (25 Pa. Code, Chapter 83, Subchapter E).

(2) All requests for advance payments shall be made on forms approved by the Commission.

(3) Advance payments to cover expenses for the first quarter of each year may be requested of the Commission. Advance payments will be based on demonstrated need in accordance with the Commission approved District budget submitted with the application.

(4) Advance payments and unspent funds shall be placed in an insured, interest bearing account. To document the amount of interest to be paid or credited to the Nutrient Management Fund, the District may use methods that are equal to the method used by the account holding the unspent program funds that follow generally accepted accounting principles.

(5) Requests for advance payments to cover expenses for the first quarter of each year must be submitted to the Commission by January 15, or as established by the Commission.

(6) Claims may be filed for reimbursement for the first and second quarter. Claims must be submitted to the Commission within fifteen (15) days of the end of the quarter.

(7) Expenses for the third quarter will be submitted, but no payments will be processed until final claims are submitted at the end of the fourth quarter. A final yearly payment will be made after balancing money provided in the initial advanced payment with claims for the third and fourth quarter. No advancement of funds will be made until final approval of the previous quarterly report of expenditures is given by the Commission.

(8) The Commission will suspend advance payment processing until receipt of required reports or the completion of all conditions of the agreement.

g. Miscellaneous

(1) Changes – The parties agree to execute minor adjustments to this agreement through a fully executed letter of mutual consent and significant adjustments to this agreement through a fully executed written amendment. Minor adjustments shall include changes to the Required Output Measures in Attachment A. Significant adjustments shall include:

A. Changes to the scope of work involving the addition of specific work tasks.

B. Changes in payment terms. However, reallocation of budget category dollar amounts to and from other budget categories shall be considered minor adjustments, provided the maximum contract dollar amount payable by the Commission or DEP to the District is not exceeded.

C. Increase in the maximum dollar reimbursement amount to be paid by the Commission or DEP to the District.

(2) This agreement embodies the entire understanding among the parties with respect to the subject matter hereof, and replaces any and all prior understandings, representations, and discussions relating to the subject matter of this agreement.

(3) The parties will receive any notice, in writing, to the following individuals at the following addresses:

Commission: Executive Secretary

2301 N Cameron Street, Room 311
Harrisburg, Pa 17110

DEP: Director, Chesapeake Bay Program Office
Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17105

District:_____

Final Draft
May 2022

IN WITNESS WHEREOF, the parties herto have caused the agreement to be executed on the effective date as define herein:

State Conservation Commission

X_____ _____
Signature of Executive Secretary Date
State Conservation Commission

Department of Environmental Protection

X_____ _____
Department of Environmental Protection Date

Conservation District

_____ County _____ _____
Conservation District Vendor Id. No. Federal ID No.

X_____ _____ X_____ _____
Signature of the Secretary of the Date Signature of the Chairman of the Date
Conservation District Conservation District

State Contractual Approving Authorities

Approved as to legality and form:

X_____ _____ X_____ _____
Signature of Office of Date Signature of Office of Chief Counsel Date
Attorney General Department of Environmental Protection

X_____ _____
Signature of Office of General Counsel Date

I hereby certify funds in the amount of _____ are available under appropriation
7025800000 – 2017 – 3533830000 – V14922000000 - 6600300 (CFDA# 66.466)_____
2009800000 – 2017 – 3533830000 – V14922000000 - 6600400 _____
2009800000 – 2017 – 3533809000 – 3537039001 - 6600400 _____

Commented [SF1]: DEP will need to update

X_____ _____
Comptroller Date

Doc. No. _____

Final Draft
May 2022

ATTACHMENT A

REQUIRED OUTPUT MEASURES

PROGRAM EDUCATION AND OUTREACH:

A. The conservation district will provide education and outreach on the Nutrient and Odor Management Programs ("Act 38"), encourage participation from the public and expect participation from agricultural operations within their county.

***REQUIRED OUTPUT MEASURES*:**

1. The District will coordinate nutrient management education and outreach activities with other relevant cooperating agencies and organizations in the county, such as the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA), Pennsylvania State University (PS"). This coordination may take place using a more informal one-on-one or small-group process for discussing education and outreach needs and activities with these parties outside of a formal meeting.
2. The District will participate in a minimum of two informational, educational and/or training programs per calendar year (this could take place through local "crop days," "dairy days," etc.). These programs are to provide information on the Nutrient Management Program and incentives provided to support and encourage program participation (both Concentrated Animal Operations ("CAOs") and Volunteer Animal Operations ("VAOs"). The District may cooperate with other appropriate agencies and/or other conservation districts to sponsor. Joint programs will count as one program for each sponsoring district.
3. Separately or in cooperation with other agencies, the District will develop a minimum of three informal educational efforts per calendar year (e.g. newsletters, newspaper articles, brochures, digital media (social media), presentations, TV and radio public announcements, etc.). These efforts are to provide appropriate information to individuals that operate agricultural operations ("operations"), certified Nutrient Management Specialists ("NMSs") developing nutrient management plans ("NMPs") for operations within the county, and the general public.
4. The District will provide information to interested persons on Act 38 financial assistance programs supporting NMP development and implementation and advise agricultural operators ("operators") of alternative funding sources for nutrient management plan implementation. If funds become available, the State Conservation Commission ("Commission or SCC") will provide additional information.
5. The District, consistent with the Nutrient Management Program Compliance Strategy, will identify operations which the District believes may be CAOs, and target program outreach and information to these operators. The District will retain a copy of the animal density status for all of the identified operations . The District will assist these operators, when requested, in determining their animal density status. When a district cannot obtain cooperation from potential CAOs or those determined to be CAOs, the district will carry

out the provisions of the Commission's enforcement strategy contained in the Administrative Manual.

a. The task of identifying potential CAOs shall be a priority of the District. Districts shall develop a specific county procedure on how they plan to identify existing CAOs that have not yet been identified, as well as, new CAOs resulting from new construction, expansion, or loss of land.

b. The District shall identify potential CAOs in the non-traditional Act 38 livestock industry activities such as equine, along with the traditional livestock/poultry industry activities, such as dairy, poultry, swine, beef, sheep, goats, etc., on an ongoing basis.

6. The District will provide information on the Odor Management Program to all identified CAOs and Concentrated Animal Feeding Operations ("CAFOs"), on the requirement for an Odor Management Plan for the new or expanded construction of animal housing or manure storage facilities.

a. This information may be provided through paragraphs 5(a) and (b), above.

b. The District will notify the SCC regional coordinator, in writing (electronic message is acceptable), when they receive a NMP for a new CAO or CAFO and/or when a CAO or CAFO NMP is amended that shows construction of new or expanded animal housing facilities or manure storage facilities.

B. The conservation district will assist agricultural operators and Nutrient Management Specialists with implementing the provisions of Act 38 Program and corresponding regulations.

REQUIRED OUTPUT MEASURES:

1. The District will provide assistance to agricultural operators within the county and private sector NMSs preparing NMPs for use in the county. This will include providing available preprinted resource materials (e.g. manure management manuals, fact sheets, record keeping forms, etc.) to all persons requesting information to develop a NMP within the county.
2. Districts will provide technical assistance as described in Section E below.
3. The District will assist operators of animal operations in determining if they meet the mandatory provisions of the nutrient management program in Act 38 at 25 Pa. Code, Chapter 83.

C. The conservation district is to provide the Commission with the appropriate reports to document efforts planned or completed in the Act 38 Program..

REQUIRED OUTPUT MEASURES:

The District will provide the Commission with quarterly reports that list, at a minimum: number of meetings held, number of people trained, number of educational efforts completed, number of CAO and VAO plans received, number of on-site status reviews

completed, and number of complaints received. Reports will be submitted on forms or databases supplied by the Commission.

PROGRAM COMPLIANCE:

D. The conservation district shall provide the lead role in evaluating Nutrient Management Plans ("NMPs") to ensure they comply with the Nutrient Management regulations.

REQUIRED OUTPUT MEASURES:

1. The District will review and approve/disapprove submitted NMPs, plan amendments, plan updates, and plan transfers in accordance with those procedures outlined in the Nutrient Management regulations, the Administrative Manual, the Technical Manual and policies and guidelines established by the Commission.

    a. In relation to reviewing owned and rented lands included in a NMP, the District will perform a site visit to all owned and rented land (crop management units ("CMUs"), included in the plan) to determine if the plan includes all the required information and that the information in the plan adequately represents the operation.

    b. In relation to Nutrient Balance Sheets ("NBSs") submitted as part of a NMP, the District will, based on their working knowledge of the importing operation, determine if the NBSs adequately represent the importing lands. If the District does not have a working knowledge of the importing operation, nor other agency staff who can provide this information to the District, the District will perform a site visit to assess the importing site to ensure the accuracy of the NBSs.

    c. If NBSs for importing operations span multiple counties, the county that is reviewing the NMP shall ask for, and the importing counties shall assist, with the review and verification of the NBSs' accuracy. The county that is reviewing the NMP will take the lead role in the development of technical comments pertaining to the accuracy of the NBSs in accordance with those procedures outlined in paragraph 1, with the importing county providing input.

    d. The District Nutrient Management Specialist will coordinate their NMP review effort with District staff involved with the Chapter 102 program, to verify that the operation under review has a current Agricultural Erosion and Sediment Control Plan under 25 Pa. Code § 102.4(a) in accordance with the Act 38 timeframe provided for this requirement

    e. Where a NMP is submitted for Act 38 review and approval, and that plan will also be used to meet the NRCS Comprehensive Nutrient Management Plan ("CNMP") or 590 standard or the DEP CAFO program requirements, the District will notify the other relevant agencies of their review and coordinate their review with that agency.

f. Where a NMP for an agricultural operation identified as a CAFO is received by the District, the District shall submit the required Pennsylvania Bulletin notices to DEP, following the program guidance contained in the Administrative Manual. The District will communicate and cooperate with the DEP in the review of those plans.

2. NMPs and plan amendments developed by the District's personnel will be reviewed by a Publicly Certified Nutrient Management Specialist employed by another district. Two or more districts may enter into a reciprocal cooperative agreement whereby they will each review and comment on the other's plans. The Board of the county where the operation is located will act on the plan for approval or disapproval. Alternatively, the Commission may assist by reviewing plans for those rare instances where the district developing the plan cannot obtain plan review assistance from another district.

3. The District will review all information submitted to implement approved plans, and to assess compliance with approved plans and the regulations. The District shall perform on-site visits at those operations thought to be out of compliance with their approved plan or the regulations based on the review of these submitted materials. Where this visit indicates that the operation is out of compliance with the approved plan or regulations, the District shall attempt to get the operator to voluntarily comply in accordance with the Administrative Manual.

4. The District Board will, based on the District Specialist's recommendation, and in accordance with the Administrative Manual, submit to the Pennsylvania Department of Agriculture (PDA), the names of those NMSs meeting the criteria established for nutrient management specialist certification revocation. These criteria are contained in the Nutrient Management Certification regulations at 7 Pa. Code Chapter 130b. The District will also submit to the PDA any supporting documentation that verifies the basis for submitting these names.

5. The District will provide the Commission with quarterly reports that summarize those activities performed during the report period. Reports will be submitted on forms or databases supplied by the Commission and according to the schedule approved by the Commission.

E. The conservation district will provide technical assistance in accordance with Commission guidelines and consistent with the Pennsylvania Technical Guide published by the USDA Natural Resource Conservation Service.

REQUIRED OUTPUT MEASURES:

1. In accordance with that section of the Administrative Manual regarding Act 38 NMP development for CAOs and CAFOs and Act 38 NMP development for Voluntary Animal Operations VAOs, the District will, to the extent possible, provide technical direction or assistance to private sector specialists and agricultural operators in the development of NMPs or portions of NMPs.

   a. The Administrative Manual section labeled Act 38 NMP development for CAOs and CAFOs and Act 38 NMP development for VAOs, describes the

policy concerning the District's limited involvement in writing NMPs plans, and the Commission's strong direction to districts to assist operators, their private sector specialists, as well as individually certified agriculture operators in their development of those portions of the plan which the District has expertise. This may include assisting others with developing the Stormwater or Manure Management sections of plans, when requested.

Full plan development by District staff (where the District staff is the person listed in the plan as the planner) is considered a low priority, except for certification purposes. Plan development activities may be provided if the conservation district board of directors approves, resources permit and when all other delegated activities, including assistance with plan implementation, are satisfied. Districts are encouraged to enact a technical assistance policy consistent with the duties described in this section.

b. The District will complete an animal equivalent unit ("AEU")/acre calculation sheet for any individual requesting that the District write their NMP. This calculation sheet will be signed by the agricultural operator and retained at the District office to document the CAO status of those individuals requesting plan writing assistance from the District.

c. The District will provide a letter, within 10 business days, to all applicable agricultural operators who request the District to write their NMP, indicating that the District cannot author NMPs unless extenuating circumstances exist, and recommends utilizing the services of a private sector specialist or becoming certified to develop their own plan. A listing of available certified commercial nutrient management specialists should be provided with this correspondence.

2. To assist in NMP implementation, the District will provide or facilitate, as resources allow, general technical assistance to program participants with approved NMPs. Technical assistance may include inventory and evaluation; developing or assisting in the development of designs; cost estimates; construction monitoring; and certification of the proposed project(s). District technical assistance must be consistent with authority provided under the USDA NRCS Job Approval Rating System or a Pennsylvania professional engineering certification. Where District staff do not hold appropriate authority for a particular project, the District may assist the appropriate agency staff but may not provide final approval for certification of the project.

3. The District will provide technical assistance, as resources allow, consistent with paragraph 2, above for the Agriculture Linked Investment Program (AgriLink) and the Nutrient Management Plan Implementation Grant Program (Grant Program) where funding for implementation of financial assistance programs is available to the Commission. Additional details will be provided if funding becomes available.

F. The conservation district will perform status reviews on Concentrated Animal Operations, Concentrated Animal Feeding Operations, and Volunteer Animal Operations with approved NMPs to assess plan implementation efforts.

REQUIRED OUTPUT MEASURES:

1. The District will assess NMP implementation by performing annual on-site status reviews on all CAOs and CAFOs with approved plans. All CAOs and CAFOs are to be visited each year according to a formalized process for status reviews established by the Commission. Districts unable to meet this delegation requirement must contact the Commission to discuss a possible alternative schedule.
2. For those operations that are CAFOs, districts are encouraged to coordinate joint inspections with DEP to efficiently utilize program resources.
3. The District shall assist CAOs and CAFOs determined to be out of compliance based on an on-site status review, with the implementation of Best Management Practices ("BMPs") identified in their approved plan and to comply with the Nutrient Management regulations. Operations that fail to come into compliance under the District's efforts shall be referred to the Commission for further action, as directed in the Administrative Manual.
4. The District shall perform status reviews on VAOs (non-CAO, non-CAFO) with approved NMPs at least once every 3 years. These site visits should be structured as informal education visits to educate the operator on the advantages of implementing the plan.
5. As part of the status review for an operation the District will assess an operator's implementation of the Operation and Maintenance plan for the BMPs included in the approved NMP. Additionally, the District will assess an operator's Operation and Maintenance on existing BMPs that were not contained in the implementation schedule of the NMP.

G. The conservation district will investigate complaints and other instances of non-compliance submitted to the District as they relate to the provisions of the Nutrient Management regulations, and attempt to bring the operation into compliance.

REQUIRED OUTPUT MEASURES:

1. Within 7 business days of receipt of a complaint, the District will either refer the complaint to the appropriate agency if it is outside of this delegation, or if it is a complaint dealing with Act 38, the District will schedule and make a site visit to assess the issue in cooperation with other appropriate agencies or organizations. Complaints and site visits will be documented on forms provided by the Commission, with an account of the visit conveyed back to the complainant. The complaint and the site visit forms shall be retained in the District files.
2. The District will work with those operators found to be in violation of the Nutrient Management regulations to obtain voluntary compliance with these provisions in a timely manner, as specified in the Administrative Manual: SCC

Compliance and Enforcement Strategy. The District shall record any contact with these operators to document attempts to bring the areas of the operation into compliance.

3. For sites involving continued violations, the District will use the criteria established by the Commission for documentation and preparation of enforcement actions. If the District is not able to achieve compliance, it should report those instances to the Commission for further action. All actions, reports and other forms of documentation including personal observations may be used as evidence during any subsequent enforcement actions by the Commission.
4. The District will provide the Commission with quarterly reports detailing accomplishments under this agreement that list at a minimum: number of complaints, and the number and status of complaint related site visits. Reports will be submitted on forms or databases supplied by the Commission.
5. The District will conduct follow up activities consistent with the Commission's compliance and enforcement strategies on operations that the District believes to be CAOs. Activities will include assuring that the CAO status of the operation has been determined, assisting the operator with program requirements, and referring non-compliant CAOs to the Commission for enforcement action.
6. The District will refer all odor management complaints to the Commission, except for an odor management complaint arising from the spreading of manure.

H. The conservation district will be the lead agency in reviewing proposed NMP implementation extensions.

REQUIRED OUTPUT MEASURES:

1. The District will acknowledge receipt of proposed extensions to the implementation schedule of approved NMPs through written correspondence to the operator, within 5 business days of receipt.
2. The District will evaluate the proposed extensions and determine if they are acceptable based on the Nutrient Management regulations and guidance outlined in the Administrative Manual.
3. The District will correspond with the operator proposing the extension, indicating the findings of the evaluation.
4. The District will coordinate with or consult with DEP if the operation is a CAFO or coordinate with or consult with the appropriate agency if an enforcement action has been taken or is being considered.

I. The conservation district will review and approve/disapprove waivers to the manure storage setback requirements in the Nutrient Management regulations.

REQUIRED OUTPUT MEASURES:

1. The District will acknowledge receipt of proposed waivers through written correspondence to the operator requesting the waiver, within 5 business days of receipt of the request.
2. The District will file a copy of the proposed waiver with the operator's approved plan.
3. The District will provide an on-site evaluation of the proposed waiver, within 20 business days of receipt of the request, utilizing the general criteria outlined in the Administrative Manual.
4. The District will, based on the above evaluation and the guidance provided by the Commission, approve/disapprove the proposed waiver, within 90 calendar days of receipt of the request.
5. The District will inform the operator requesting the waiver, in writing, of its decision to approve/disapprove the request, within 95 calendar days of receipt of the request.

J. The conservation district will be involved in the monitoring of NMP implementation in those situations where the emergency criteria are to be used. The district will administer the processing of plan amendments due to unforeseen circumstances.

REQUIRED OUTPUT MEASURES:

1. The District will cooperate with the PDA to assure that those operations subject to Act 38 and quarantined by PDA due to a contagious disease, follow those emergency criteria outlined in the Nutrient Management regulations.
2. The District will process and file all NMP amendments developed due to unforeseen circumstances in accordance with the Administrative Manual.

K. The conservation district will assist the Commission in the administration of financial assistance programs developed by the Commission to support NMP development and implementation where funding for implementation of financial assistance programs is available to the Commission.

REQUIRED OUTPUT MEASURES:

When funding for NMP development and implementation is available to the Commission, additional details will be provided to the District for program implementation and administration..

L. The conservation district will assist the Commission in the implementation of the Act 49 Commercial Manure Hauler and Broker Certification program.

REQUIRED OUTPUT MEASURES:

1. The District will administer the Level 2 Commercial Manure Hauler test to those individuals requesting to take the test at their location. The District will only be

expected to provide this service as the request conforms to their District office hours, and only if the District has staff and room availability to provide this service. All testing materials will be provided by the SCC/PDA.

2. When performing periodic status reviews, or site visits relating to complaints, the District will determine from the operator or from records on site if commercial manure haulers or brokers are used at the operation. If commercial haulers or brokers are used, the District will determine based on Act 49 program certification listings, whether the commercial haulers or brokers used are properly certified under Act 49.
    a. Act 38 operations determined by the District to not be following this requirement will be addressed by the District in accordance with the guidance outlined in the Administrative Manual.
    b. Where the District finds a commercial manure hauler or broker who is found to be in violation of certification requirements established under Act 49, the District will contact the SCC/PDA to address the issue.
    c. The District will submit to the SCC/PDA any supporting documentation that verifies the basis for identifying a commercial manure hauler or broker under paragraph b, above.
3. The District will review at a minimum 10% of NBSs that are submitted to the District consistent with the provisions of Act 49. The District should only be reviewing NBSs submitted for the application of manure imported into their county and not NBSs for the export of manure out of their county.
    a. The District will work with the manure broker that authored the NBS to correct any identified deficiencies. Additional information regarding these procedures is found in the Administrative Manual
    b. Where the District identifies a commercial manure broker who demonstrates activities inconsistent with the provisions of Act 49 (i.e. lack of submission of NBS where appropriate; continued deficiencies in the content of submitted NBS) the District will contact the SCC/PDA to address the issue. The District will submit to the SCC/PDA any supporting documentation that verifies the basis for identifying these individuals.
4. The District will provide the Commission with quarterly reports that summarize the NBSs that were received from manure brokers and the activities related to receipt and review performed by the District during the reporting period. Reports will be submitted on forms or databases supplied by the Commission and according to the schedule approved by the Commission.

M: The district will assist the Pennsylvania Department of Environmental Protection (DEP) in the implementation of the Manure Management Program under 25 Pa. Code § 91.36 and The Clean Streams Law.

REQUIRED OUTPUT MEASURES:

1. Overall program development efforts – The District will develop and adopt a strategy to carry out its duties relating to its Manure Management Program outreach, education,

training, planning compliance and, if applicable, agricultural operation inspection, which covers the following:

a. Identification of assistance efforts the District can provide to operators. Assistance efforts should include but, are not limited to Manure Management Plan (MMP) development, technical assistance for plan implementation and verification of accuracy of MMPs.

b. Identification and prioritization of types of agricultural operations the District will support with MMP development and implementation assistance efforts and services.

c. A written and District approved fee schedule that will be charged for Section 91.36 services performed by the District, which are beyond the required minimum outreach, education or training output measures.

d. Coordination of Section 91.36 Manure Management Program and Act 38 Nutrient Management Program outreach and education efforts described in paragraphs A.1 through A.3 as they pertain to overall Manure and Nutrient Management Program compliance strategies in the county.

e. Complaint response and referral activities, consistent with guidance provided by the DEP.

f. Identification of procedures to inspect agricultural operations inspection, if performed by the District, that are consistent with guidelines provide by the DEP.

2. Outreach – The District will take the lead role in the coordination of outreach activities providing general awareness on Section 91.36 requirements to the agricultural community and the general public.

   a. Activities must include a minimum of 3 outreach activities per calendar year (e.g. farmer meetings, displays at local events, publication mailings, digital media (social media) etc.).

   b. Activities will include distribution of materials developed by the District, the DEP or other cooperating agencies or organizations.

3. Education – The District will take the lead role in the coordination of education activities to provide appropriate information pertaining to manure management planning principles and compliance with the requirements under Section 91.36 to the agriculture community.

   a. Activities must include a minimum of 2 education or training activities per calendar year (e.g. farmer meetings or workshops etc.).

   b. Activities will include distribution of materials developed by the District, the DEP or other cooperating agencies or organizations.

4. Training – The District will facilitate workshops for agricultural operations in the development and the implementation of MMPs separately or in cooperation with other districts or agencies.

   a. The District will conduct a minimum of 1 technical training program per calendar year for operators to guide operators through the development of a MMP for the

operator's operation. Trainings could include electronic/virtual platforms or include one-on-one training opportunities to assist operators in plan development.

b. The District will conduct a minimum of 1 technical training program targeting consultants assisting operators in the development of a MMPs or providing planning services to operators for MMP development. The target audience of the training program may include certified nutrient management specialists, manure haulers and brokers, and any individual offering manure management planning assistance, such as 4-H educators or students, FFA educators or students, private crop or pesticide consultations, etc., regardless of certification status. The implementation of this activity may be coordinated with technical trainings for operators.

5. Planning and implementation assistance.

a. The District will provide technical assistance to operators and their consultants in developing MMPs consistent with priorities established in the District's program implementation strategy.

b. The District will provide technical assistance to operators and their consultants in implementing their MMP consistent with priorities established in the District's program implementation strategy, as resources permit.

c. The District may provide full plan development for operators consistent with the District's Manure Management Program strategy and priorities, as resources permit.

d. The District may perform quality assurance of the accuracy of MMPs and the implementation of plans, when District verification is requested by an operator consistent with the District's Manure Management Program strategy and priorities, as resources permit.

6. Farm Inspection Activities:

a. The District shall inspect agricultural operations ("status reviews") that use or produce manure to assess compliance with 25 Pa. Code § 91.36.

b. The District will inspect ("status reviews') a minimum of 10 agricultural operations, such status reviews will be conducted consistent with guidelines or Standard Operating Procedures (SOPs) provided by DEP.

7. Complaint Response and referral

a. Within 7 business days of receipt of a complaint, the District will either refer the complaint to the appropriate agency if it is outside of this delegation, or if it is a complaint dealing with Section 91.36 activities, the District will schedule and make a site visit to assess the issue in cooperation with other appropriate agencies or organizations. Complaints and site visits will be documented on forms provided by the DEP, with an account of the visit conveyed back to the complainant. The complaint and the site visit forms shall be retained in the District files.

b. The District will work with agricultural operators found to be in violation of Section 91.36 to obtain compliance with its provisions as specified in guidance provided by the DEP. The District shall record any contact with agricultural operators to document attempts to bring the operation into compliance.

c. Agricultural operations involving continued violations and where compliance cannot be obtained by the District are to be reported to the DEP for further action. The District will use the criteria established by the DEP for documentation and preparation of enforcement actions. All actions, reports and other forms of documentation including personal observations may be used as evidence during any subsequent enforcement actions by the DEP.

8. The District will provide the DEP with quarterly reports detailing accomplishments under this agreement that includes, outreach and educational efforts completed, trainings and workshop provided to operators and consultants, technical assistance activities provided to operators, the number of complaints, and the number and status of complaint related site visits. Reports will be submitted on forms or databases supplied by the Department.

9. Compliance Inspections - The District may perform inspections of any agricultural operation to assess compliance with Section 91.36 and review MMP implementation efforts.

   a. The District may assess compliance with Chapter 91 and the MMP requirements by performing on-site inspections of any non-CAO, non-CAFO agricultural operation.

   b. The District may assist operations determined to be out of compliance based on an inspection or implementation of the BMPs required for or identified in their MMP. The District shall follow its agricultural complaint response policy and the guidelines or SOPs provided by DEP for operations that fail to come into compliance through the District's efforts.

   c. As part of the District's inspection, the District may assess an operator's implementation of the Operation and Maintenance Plan for the BMPs included in the MMP.

10. Recordkeeping. – The District will retain as separate files: the quarterly reports required by the Department; the District's Manure Management Program outreach, education and training, and compliance implementation strategy, including the date when this strategy was adopted; the District's approved fee schedule, including the date when this fee schedule was adopted; and MMP development and verification information, as required by the DEP.

Final Draft
May 2022

ATTACHMENT B

Commonwealth Terms and Conditions (April, 2019)

1. COMMONWEALTH HELD HARMLESS

a. The Contractor shall hold the Commonwealth harmless from and indemnify the Commonwealth against any and all third party claims, demands and actions based upon or arising out of any activities performed by the Contractor and its employees and agents under this Contract, provided the Commonwealth gives Contractor prompt notice of any such claim of which it learns. Pursuant to the Commonwealth Attorneys Act (71 P.S. Section 732-101, et seq.), the Office of Attorney General (OAG) has the sole authority to represent the Commonwealth in actions brought against the Commonwealth. The OAG may, however, in its sole discretion and under such terms as it deems appropriate, delegate its right of defense. If OAG delegates the defense to the Contractor, the Commonwealth will cooperate with all reasonable requests of Contractor made in the defense of such suits.

b. Notwithstanding the above, neither party shall enter into any settlement without the other party's written consent, which shall not be unreasonably withheld. The Commonwealth may, in its sole discretion, allow the Contractor to control the defense and any related settlement negotiations.

2. NONDISCRIMINATION/SEXUAL HARASSMENT CLAUSE

The Contractor agrees:

a. In the hiring of any employee(s) for the manufacture of supplies, performance of work, or any other activity required under the contract or any subcontract, the Contractor, each subcontractor, or any person acting on behalf of the Contractor or subcontractor shall not discriminate by reason of race, gender, creed, color, sexual orientation, gender identity or expression, or in violation of the *Pennsylvania Human Relations Act* (PHRA) and applicable federal laws, against any citizen of this Commonwealth who is qualified and available to perform the work to which the employment relates.

b. Neither the Contractor nor any subcontractor nor any person on their behalf shall in any manner discriminate by reason of race, gender, creed, color, sexual orientation, gender identity or expression, or in violation of the PHRA and applicable federal laws, against or intimidate any employee involved in the manufacture of supplies, the performance of work, or any other activity required under the contract.

c. Neither the Contractor nor any subcontractor nor any person on their behalf shall in any manner discriminate by reason of race, gender, creed, color, sexual orientation, gender identity or expression, or in violation of the PHRA and applicable federal laws, in the provision of services under the contract.

d. Neither the Contractor nor any subcontractor nor any person on their behalf shall in any manner discriminate against employees by reason of participation in or decision to refrain from participating in labor activities protected under the *Public Employee Relations Act*, *Pennsylvania Labor Relations Act* or *National Labor Relations Act*, as applicable and to the extent determined by entities charged with such Acts' enforcement, and shall comply with any provision of law establishing organizations as employees' exclusive representatives.

e. The Contractor and each subcontractor shall establish and maintain a written nondiscrimination and sexual harassment policy and shall inform their employees in writing of the policy. The policy must contain a provision that sexual harassment will not be tolerated and employees who practice it will be disciplined. Posting this Nondiscrimination/Sexual Harassment Clause conspicuously in easily-accessible and well-lighted places customarily frequented by employees and at or near where the contracted services are performed shall satisfy this requirement for employees with an established work site.

f. The Contractor and each subcontractor shall not discriminate by reason of race, gender, creed, color, sexual orientation, gender identity or expression, or in violation of PHRA and applicable federal laws, against any subcontractor or supplier who is qualified to perform the work to which the contract relates.

g. The Contractor and each subcontractor represents that it is presently in compliance with and will maintain compliance with all applicable federal, state, and local laws, regulations and policies relating to nondiscrimination and sexual harassment. The Contractor and each subcontractor further represents that it has filed a Standard Form 100 Employer Information Report ("EEO-1") with the U.S. Equal Employment Opportunity Commission ("EEOC") and shall file an annual EEO-1 report with the EEOC as required for employers' subject to *Title VII* of the *Civil Rights Act of 1964*, as amended, that have 100 or more employees and employers that have federal government contracts or first-tier subcontracts and have 50 or more employees. The Contractor and each subcontractor shall, upon request and within the time periods requested by the Commonwealth, furnish all necessary employment documents and records, including EEO-1 reports, and permit access to their books, records, and accounts by the contracting agency and the Bureau of Diversity, Inclusion and Small Business Opportunities for purpose of ascertaining compliance with provisions of this Nondiscrimination/Sexual Harassment Clause.

h. The Contractor shall include the provisions of this Nondiscrimination/Sexual Harassment Clause in every subcontract so that those provisions applicable to subcontractors will be binding upon each subcontractor.

i. The Contractor's and each subcontractor's obligations pursuant to these provisions are ongoing from and after the effective date of the contract through the termination date thereof. Accordingly, the Contractor and each subcontractor shall have an obligation to inform the Commonwealth if, at any time during the term of the contract, it becomes aware of any actions or occurrences that would result in violation of these provisions.

j. The Commonwealth may cancel or terminate the contract and all money due or to become due under the contract may be forfeited for a violation of the terms and conditions of this

Nondiscrimination/Sexual Harassment Clause. In addition, the agency may proceed with debarment or suspension and may place the Contractor in the Contractor Responsibility File.

3. CONTRACTOR INTEGRITY PROVISIONS

It is essential that those who seek to contract with the Commonwealth of Pennsylvania ("Commonwealth") observe high standards of honesty and integrity. They must conduct themselves in a manner that fosters public confidence in the integrity of the Commonwealth contracting and procurement process.

a. DEFINITIONS. For purposes of these Contractor Integrity Provisions, the following terms shall have the meanings found in this Section:

1) "Affiliate" means two or more entities where (a) a parent entity owns more than fifty percent of the voting stock of each of the entities; or (b) a common shareholder or group of shareholders owns more than fifty percent of the voting stock of each of the entities; or (c) the entities have a common proprietor or general partner.

2) "Consent" means written permission signed by a duly authorized officer or employee of the Commonwealth, provided that where the material facts have been disclosed, in writing, by prequalification, bid, proposal, or contractual terms, the Commonwealth shall be deemed to have consented by virtue of the execution of this contract.

3) "Contractor" means the individual or entity, that has entered into this contract with the Commonwealth.

4) "Contractor Related Parties" means any affiliates of the Contractor and the Contractor's executive officers, Pennsylvania officers and directors, or owners of 5 percent or more interest in the Contractor.

5) "Financial Interest" means either:

a) Ownership of more than a five percent interest in any business; or

b) Holding a position as an officer, director, trustee, partner, employee, or holding any position of management.

6) "Gratuity" means tendering, giving, or providing anything of more than nominal monetary value including, but not limited to, cash, travel, entertainment, gifts, meals, lodging, loans, subscriptions, advances, deposits of money, services, employment, or contracts of any kind. The exceptions set forth in the *Governor's Code of Conduct, Executive Order 1980-18*, the *4 Pa. Code §7.153(b)*, shall apply.

7) "Non-bid Basis" means a contract awarded or executed by the Commonwealth with Contractor without seeking bids or proposals from any other potential bidder or offeror.

b. In furtherance of this policy, Contractor agrees to the following:

1) Contractor shall maintain the highest standards of honesty and integrity during the performance of this contract and shall take no action in violation of state or federal laws or regulations or any other applicable laws or regulations, or other requirements applicable to Contractor or that govern contracting or procurement with the Commonwealth.

2) Contractor shall establish and implement a written business integrity policy, which includes, at a minimum, the requirements of these provisions as they relate to the Contractor activity with the Commonwealth and Commonwealth employees and which is made known to all Contractor employees. Posting these Contractor Integrity Provisions conspicuously in easily-accessible and well-lighted places customarily frequented by employees and at or near where the contract services are performed shall satisfy this requirement.

3) Contractor, its affiliates, agents, employees and anyone in privity with Contractor shall not accept, agree to give, offer, confer, or agree to confer or promise to confer, directly or indirectly, any gratuity or pecuniary benefit to any person, or to influence or attempt to influence any person in violation of any federal or state law, regulation, executive order of the Governor of Pennsylvania, statement of policy, management directive or any other published standard of the Commonwealth in connection with performance of work under this contract, except as provided in this contract.

4) Contractor shall not have a financial interest in any other contractor, subcontractor, or supplier providing services, labor, or material under this contract, unless the financial interest is disclosed to the Commonwealth in writing and the Commonwealth consents to Contractor's financial interest prior to Commonwealth execution of the contract. Contractor shall disclose the financial interest to the Commonwealth at the time of bid or proposal submission, or if no bids or proposals are solicited, no later than Contractor's submission of the contract signed by Contractor.

5) Contractor certifies to the best of its knowledge and belief that within the last five (5) years Contractor or Contractor Related Parties have not:

   a) been indicted or convicted of a crime involving moral turpitude or business honesty or integrity in any jurisdiction;

   b) been suspended, debarred or otherwise disqualified from entering into any contract with any governmental agency;

   c) had any business license or professional license suspended or revoked;

   d) had any sanction or finding of fact imposed as a result of a judicial or administrative proceeding related to fraud, extortion, bribery, bid rigging, embezzlement, misrepresentation or anti-trust; and

   e) been, and is not currently, the subject of a criminal investigation by any federal, state or local prosecuting or investigative agency and/or civil anti-trust investigation by any federal, state or local prosecuting or investigative agency.

If Contractor cannot so certify to the above, then it must submit along with its bid, proposal or contract a written explanation of why such certification cannot be made and the Commonwealth will determine whether a contract may be entered into with the Contractor. The Contractor's

obligation pursuant to this certification is ongoing from and after the effective date of the contract through the termination date thereof. Accordingly, the Contractor shall have an obligation to immediately notify the Commonwealth in writing if at any time during the term of the contract if becomes aware of any event which would cause the Contractor's certification or explanation to change. Contractor acknowledges that the Commonwealth may, in its sole discretion, terminate the contract for cause if it learns that any of the certifications made herein are currently false due to intervening factual circumstances or were false or should have been known to be false when entering into the contract.

6) Contractor shall comply with the requirements of the *Lobbying Disclosure Act (65 Pa.C.S. §13A01 et seq.)* regardless of the method of award. If this contract was awarded on a Non-bid Basis, Contractor must also comply with the requirements of the *Section 1641 of the Pennsylvania Election Code (25 P.S. §3260a).*

7) When Contractor has reason to believe that any breach of ethical standards as set forth in law, the Governor's Code of Conduct, or these Contractor Integrity Provisions has occurred or may occur, including but not limited to contact by a Commonwealth officer or employee which, if acted upon, would violate such ethical standards, Contractor shall immediately notify the Commonwealth contracting officer or the Office of the State Inspector General in writing.

8) Contractor, by submission of its bid or proposal and/or execution of this contract and by the submission of any bills, invoices or requests for payment pursuant to the contract, certifies and represents that it has not violated any of these Contractor Integrity Provisions in connection with the submission of the bid or proposal, during any contract negotiations or during the term of the contract, to include any extensions thereof. Contractor shall immediately notify the Commonwealth in writing of any actions for occurrences that would result in a violation of these Contractor Integrity Provisions. Contractor agrees to reimburse the Commonwealth for the reasonable costs of investigation incurred by the Office of the State Inspector General for investigations of the Contractor's compliance with the terms of this or any other agreement between the Contractor and the Commonwealth that results in the suspension or debarment of the Contractor. Contractor shall not be responsible for investigative costs for investigations that do not result in the Contractor's suspension or debarment.

9) Contractor shall cooperate with the Office of the State Inspector General in its investigation of any alleged Commonwealth agency or employee breach of ethical standards and any alleged Contractor non-compliance with these Contractor Integrity Provisions. Contractor agrees to make identified Contractor employees available for interviews at reasonable times and places. Contractor, upon the inquiry or request of an Inspector General, shall provide, or if appropriate, make promptly available for inspection or copying, any information of any type or form deemed relevant by the Office of the State Inspector General to Contractor's integrity and compliance with these provisions. Such information may include, but shall not be limited to, Contractor's business or financial records, documents or files of any type or form that refer to or concern this contract. Contractor shall incorporate this paragraph in any agreement, contract or subcontract it enters into in the course of the performance of this contract/agreement solely for the purpose of obtaining subcontractor compliance with this provision. The incorporation of this provision in a subcontract shall not create privity of contract between the Commonwealth and any such subcontractor, and no third party beneficiaries shall be created thereby.

10) For violation of any of these Contractor Integrity Provisions, the Commonwealth may terminate this and any other contract with Contractor, claim liquidated damages in an amount equal to the value of anything received in breach of these Provisions, claim damages for all additional costs and expenses incurred in obtaining another contractor to complete performance under this contract, and debar and suspend Contractor from doing business with the Commonwealth. These rights and remedies are cumulative, and the use or non-use of any one shall not preclude the use of all or any other. These rights and remedies are in addition to those the Commonwealth may have under law, statute, regulation, or otherwise.

4. CONTRACTOR RESPONSIBILITY PROVISIONS (Rev. March 2021)

For the purpose of these provisions, the term Contractor is defined as any person, including, but not limited to, a bidder, offeror, loan recipient, grantee or lessor, who has furnished or performed or seeks to furnish or perform, goods, supplies, services, leased space, construction or other activity, under a contract, grant, lease, purchase order or reimbursement agreement with the Commonwealth of Pennsylvania (Commonwealth). The term Contractor includes a permittee, licensee, or any agency, political subdivision, instrumentality, public authority, or other public entity in the Commonwealth.

1. The Contractor certifies, in writing, for itself and its subcontractors required to be disclosed or approved by the Commonwealth, that as of the date of its execution of this Bid/Contract, that neither the Contractor, nor any such subcontractors, are under suspension or debarment by the Commonwealth or any governmental entity, instrumentality, or authority and, if the Contractor cannot so certify, then it agrees to submit, along with its Bid/Contract, a written explanation of why such certification cannot be made.

2. The Contractor also certifies, in writing, that as of the date of its execution of this Bid/Contract it has no tax liabilities or other Commonwealth obligations, or has filed a timely administrative or judicial appeal if such liabilities or obligations exist, or is subject to a duly approved deferred payment plan if such liabilities exist.

3. The Contractor's obligations pursuant to these provisions are ongoing from and after the effective date of the Contract through the termination date thereof. Accordingly, the Contractor shall have an obligation to inform the Commonwealth if, at any time during the term of the Contract, it becomes delinquent in the payment of taxes, or other Commonwealth obligations, or if it or, to the best knowledge of the Contractor, any of its subcontractors are suspended or debarred by the Commonwealth, the federal government, or any other state or governmental entity. Such notification shall be made within 15 days of the date of suspension or debarment.

4. The failure of the Contractor to notify the Commonwealth of its suspension or debarment by the Commonwealth, any other state, or the federal government shall constitute an event of default of the Contract with the Commonwealth.

5. The Contractor agrees to reimburse the Commonwealth for the reasonable costs of investigation incurred by the Office of State Inspector General for investigations of the Contractor's compliance with the terms of this or any other agreement between the Contractor and the Commonwealth that results in the suspension or debarment of the contractor. Such costs

shall include, but shall not be limited to, salaries of investigators, including overtime; travel and lodging expenses; and expert witness and documentary fees. The Contractor shall not be responsible for investigative costs for investigations that do not result in the Contractor's suspension or debarment.

6. The Contractor may search the current list of suspended and debarred Commonwealth contractors by visiting the eMarketplace website at http://www.emarketplace.state.pa.us and clicking the Debarment List tab.

5. AMERICANS WITH DISABILITIES ACT

a. Pursuant to federal regulations promulgated under the authority of The Americans With Disabilities Act, 28 C.F.R. § 35.101 et seq., the Contractor understands and agrees that it shall not cause any individual with a disability to be excluded from participation in this Contract or from activities provided for under this Contract on the basis of the disability. As a condition of accepting this contract, the Contractor agrees to comply with the "General Prohibitions Against Discrimination," 28 C.F.R. § 35.130, and all other regulations promulgated under Title II of The Americans With Disabilities Act which are applicable to all benefits, services, programs, and activities provided by the Commonwealth of Pennsylvania through contracts with outside contractors.

b. The Contractor shall be responsible for and agrees to indemnify and hold harmless the Commonwealth of Pennsylvania from all losses, damages, expenses, claims, demands, suits, and actions brought by any party against the Commonwealth of Pennsylvania as a result of the Contractor's failure to comply with the provisions of subparagraph a above.

6. APPLICABLE LAW

This Contract shall be governed by and interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania (without regard to any conflict of laws provisions) and the decisions of the Pennsylvania courts. The Contractor consents to the jurisdiction of any court of the Commonwealth of Pennsylvania and any federal courts in Pennsylvania, waiving any claim or defense that such forum is not convenient or proper. The Contractor agrees that any such court shall have in personam jurisdiction over it, and consents to service of process in any manner authorized by Pennsylvania law.

7. RIGHT TO KNOW LAW

a. The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104, ("RTKL") applies to this Contract. For the purpose of these provisions, the term "the Commonwealth" shall refer to the contracting Commonwealth agency.

b. If the Commonwealth needs the Contractor's assistance in any matter arising out of the RTKL related to this Contract, it shall notify the Contractor using the legal

contact information provided in this Contract. The Contractor, at any time, may designate a different contact for such purpose upon reasonable prior written notice to the Commonwealth.

c. Upon written notification from the Commonwealth that it requires the Contractor's assistance in responding to a request under the RTKL for information related to this Contract that may be in the Contractor's possession, constituting, or alleged to constitute, a public record in accordance with the RTKL ("Requested Information"), the Contractor shall:

1) Provide the Commonwealth, within ten (10) calendar days after receipt of written notification, access to, and copies of, any document or information in the Contractor's possession arising out of this Contract that the Commonwealth reasonably believes is Requested Information and may be a public record under the RTKL; and

2) Provide such other assistance as the Commonwealth may reasonably request, in order to comply with the RTKL with respect to this Contract.

d. If the Contractor considers the Requested Information to include a request for a Trade Secret or Confidential Proprietary Information, as those terms are defined by the RTKL, or other information that the Contractor considers exempt from production under the RTKL, the Contractor must notify the Commonwealth and provide, within seven (7) calendar days of receiving the written notification, a written statement signed by a representative of the Contractor explaining why the requested material is exempt from public disclosure under the RTKL.

e. The Commonwealth will rely upon the written statement from the Contractor in denying a RTKL request for the Requested Information unless the Commonwealth determines that the Requested Information is clearly not protected from disclosure under the RTKL. Should the Commonwealth determine that the Requested Information is clearly not exempt from disclosure, the Contractor shall provide the Requested Information within five (5) business days of receipt of written notification of the Commonwealth's determination.

f. If the Contractor fails to provide the Requested Information within the time period required by these provisions, the Contractor shall indemnify and hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor's failure, including any statutory damages assessed against the Commonwealth.

g. The Commonwealth will reimburse the Contractor for any costs associated with complying with these provisions only to the extent allowed under the fee schedule established by the Office of Open Records or as otherwise provided by the RTKL if the fee schedule is inapplicable.

h. The Contractor may file a legal challenge to any Commonwealth decision to release a record to the public with the Office of Open Records, or in the Pennsylvania Courts, however, the Contractor shall indemnify the Commonwealth for any legal expenses incurred by the Commonwealth as a result of such a challenge and shall hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor's failure, including any statutory damages assessed against the Commonwealth, regardless of the outcome of such legal challenge. As between the parties, the Contractor agrees to waive all rights or remedies that may be available to it as a result of the Commonwealth's disclosure of Requested Information pursuant to the RTKL.

i. The Contractor's duties relating to the RTKL are continuing duties that survive the expiration of this Contract and shall continue as long as the Contractor has Requested Information in its possession.

8. OFFSET PROVISION

The Contractor agrees that the Commonwealth of Pennsylvania (Commonwealth) may set off the amount of any state tax liability or other obligation of the Contractor or its subsidiaries to the Commonwealth against any payments due the Contractor under any contract with the Commonwealth.

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May 2022

ATTACHMENT C

Staff resources of the county conservation district to be committed to completion of all Nutrient Management and Manure Management program requirements and responsibilities specified in the delegation agreement executed _____, 2_____, between the _____ County Conservation District and the Pennsylvania State Conservation Commission and the Pennsylvania Department of Environmental Protection.

A. Name:_____ Title: _____

1. Education: _____ Year: _____
2. List License And/or Certification: _____

_____

3 License/Certification Expiration Date: _____
4. Years In Current Position: _____

B. Listing of Act 38/Chapter 91 Work Assignments in Percentage (%) Of Total Employee Work Time:

1. Administration (General) :_____%
2. Education (To Others) :_____%
3. Training (By Others) :_____%
4. Technical Assistance :_____%
5. Review Of Plans :_____%
6. Approval Of Plans :_____%
7. Program Compliance & Inspections:_____%

C. Other: List Any Other Pertinent Information, Work Experience and Training On Separate Sheets of Paper And Attach To This Sheet:

Final Draft
May 2022

ATTACHMENT D

Date: _____

NUTRIENT MANAGEMENT / MANURE MANAGEMENT PROGRAM
DELEGATION AGREEMENT
PROPOSAL FORM

_____
CONSERVATION DISTRICT

I. Delegation Option:
_____ Single District or _____ Multi-district

(List Districts Involved)

_____ Host District

_____ Associate District

_____ Associate District

_____ Associate District

II. Time Period Covered by the Proposal: July 1, 2022 to June 30, 2023

III. Technical Staff Working for the Nutrient and Manure Management Programs

A. _____ Number of Conservation District Staff providing all their time to these programs

B. _____ Number of Conservation District Staff providing a portion of their time to these programs

C. _____ Number of the above staff currently certified under the Act 38 Program

D. _____ Total hours/week doing Nutrient Management/ Manure Management Program work (total for all staff above)

E. _____ Total hours/week the staff included in "A" and "B" above is doing other work (List other work being carried out by these staff)
_____
_____
_____

F. Please complete the following table for each relevant staff person including the name of the staff person, **total** salary and benefits cost for the position, name of the program funding source (list all sources, including Act 38, ACT, county funding, district fees, Chesapeake Bay Program, NRCS cooperative agreements, etc.) and the program funding amount.

Staff Person Name	**Total Salary and Benefits Cost**	**Program or Funding Source Name (use multiple lines or sheets if necessary)**	**Salary and Benefits Amount Funded**

(Use additional page(s) if necessary)

IV. Narrative Description of the Proposal
(Add or modify the description if necessary)

We agree to carry out the responsibilities relating to the Nutrient Management and Manure Management programs and regulations in accordance with the conditions and duties as described in the delegation agreement and appropriate guidelines in the "Pennsylvania Nutrient Management and Manure Management Manual Program, Act 38 and Chapter 91 Administrative Manual", in accordance with conditions and duties described in the delegation agreement and guidance provided by the State Conservation Commission and the Department of Environmental Protection. Claims for reimbursement will be for the performance of the duties listed in Attachment A in accordance with the approved budget.

V. Budget Proposal
(Please complete the attached budget sheets)

Final Draft
May 2022

VI. Authorization

Action was taken by the _____District Board on _____
to approve this proposal.

Representative of the Conservation District

Name (type or print) _____

Signature _____

Title _____

Grantee agrees to provide their signature and accept the SCC's and DEP's electronic signatures on the agreement making it a legally binding contract.

Representative of the Conservation District

Name (type or print) _____
Signature _____
Title _____

State Conservation Commission

X_____
Karl G. Brown
Executive Secretary
State Conservation Commission

Department of Environmental Protection

X_____
Jill Whitcomb
Director, Chesapeake Bay Program Office
Department of Environmental Protection

I hereby certify funds in the amount of _____ are available under appropriation
Bay counties (split funded):
7025800000 – 2021 - 3533020000 - V14953000000 - 6600300 (CFDA# 66.466) _____
2009800000 – 2021 - 3533020000- V14953000000 - 6600400 _____
Non-Bay counties
2009800000 – 2021 - 3533020000 – 3530239001 - 6600400 _____

Commented [SF2]: DEP to update

X_____
Comptroller

SAP Doc. No. _____

Final Draft
May 2022

BUDGET WORKSHEET

FOR

July 1, 2022 - June 30, 2023

DISTRICT _____

Salaries	$_____
Benefits	$_____
Travel Costs	$_____
Equipment Costs	$_____

Administrative Costs

_____ County	$_____
_____ County	$_____
_____ County	$_____
_____ County	$_____
_____ County	$_____

Administrative Subtotal *$*_____

Other/Miscellaneous (list budget items from approved categories)

_____	$_____
_____	$_____

Budget Total **(transfer this total figure to the Budget Sheet page)** $_____

Final Draft
May 2022

NUTRIENT MANAGEMENT (ACT 38) and MANURE MANAGEMENT (25 Pa. Code § 91.36) PROGRAM DELEGATION AGREEMENT BUDGET SHEET

FOR

Fiscal Year: July 1, 2022 - June 30, 2023

CONSERVATION DISTRICT: _____

Delegation Agreement Budget Request $_____

Final Draft
May 2022

ATTACHMENT E

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FEDERAL REQUIREMENTS

If this Agreement is funded in whole or in part with funds from the Federal Government, or by non-Federal funds used to match a Federal grant, the following provisions apply:

1. All work under this Agreement shall be performed in accordance with applicable statutes, rules and regulations of the Federal Government. All applicable Federal statutes and provisions of the Code of Federal Regulations (CFR) in effect on the date of execution of this Agreement are an integral part of this Agreement.

2. All applicable contract provisions specified by the Federal Government are an integral part of this Agreement.

3. If this Agreement is funded in whole or in part by a grant from the United States Environmental Protection Agency (EPA), all applicable provisions of 40 CFR Parts 31 and 35 (Subpart O), in effect on the date of the Assistance Award for this project, are an integral part of this Agreement. Further, Contractor shall comply with the provisions pertaining to conflict of interest set forth at 40 CFR §35.6550(b)(2)(ii).

4. Rights to Inventions Made Under a Contract or Agreement – Contracts or agreements for the performance of experimental, developmental, or research work shall provide for the rights of the Federal Government and the recipient in any resulting invention in accordance with 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the Federal Grantor Agency. Further this Agreement is subject to Federal Grantor Agency requirements and regulations pertaining to reporting and patent rights if the Agreement involves research, developmental, experimental or demonstration work with respect to any discovery or invention which arises or is developed in the course of or under this Agreement, as well as Federal Grantor Agency requirements and regulations pertaining to copyrights and rights in data.

5. Equal Employment Opportunity – All contracts shall contain a provision requiring compliance with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR Part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

6. Audit/Compliance Review Requirements

Audit Requirements

The Contractor must comply with all Federal and State audit requirements including: the Single Audit Act Amendments of 1996; Office of Management and Budget (OMB) Circular A-133, "Audits of States, Local Governments and Non-Profit Organizations," as amended; and any other applicable law or regulation and any amendment to such other applicable law or regulation which may be enacted or promulgated by the Federal government.

If the Contractor is a local government or non-profit organization and expends total Federal awards of $500,000 or more during its fiscal year, received either directly from the Federal Government or indirectly from a recipient of Federal funds, the Contractor is required to have an audit made in accordance with the provisions of OMB Circular A-133.

If the Contractor expends total Federal awards of less than $500,000 during its fiscal year, it is exempt from these audit requirements, but is required to maintain auditable records of Federal awards and any State funds which supplement such awards, and to provide access to such records by Federal and State agencies or their designees.

Submission of Audit Information to the Commonwealth

The Contractor shall submit copies of the audit report package to the Commonwealth, which shall include:

1. Data Collection Form.

2. Financial statements and schedule of expenditures of Federal awards.

3. Auditor's reports on the financial statements and schedule of expenditures of Federal awards, internal control, and compliance as well as a schedule of findings and questioned costs.

4. Summary schedule of prior audit findings.

5. Corrective action plan.

6. Management letter comments.

The number of copies to be submitted shall equal one for the Bureau of Audits (archival copy) plus one for each Commonwealth agency which provided Federal pass-through awards to the entity, as reflected in the entity's Schedule of Expenditures of Federal Awards. The audit report package should be submitted to:

Office of the Budget/Bureau of Audits
Division of Subrecipient Audit Review
Verizon Tower - 6th Floor
303 Walnut Street
Harrisburg, PA 17101
Phone: 717-783-9120 Fax: 717-783-0361

In instances where a Federal program-specific audit guide is available, the audit report package for a program-specific audit may be different and should be prepared in accordance with the audit guide and OMB Circular A-133.

General Audit Provisions

The Contractor is responsible for obtaining the necessary audit and securing the services of a certified public accountant or other independent governmental auditor. Federal regulations preclude public accountants licensed in the Commonwealth of Pennsylvania from performing audits of Federal awards.

The Commonwealth reserves the right for Federal and State agencies or their authorized representatives to perform additional audits of a financial or performance nature, if deemed necessary by Commonwealth or Federal agencies. Any such additional audit work will rely on work already performed by the Contractor's auditor, and the costs for any additional work performed by the Federal or State agencies will be borne by those agencies at no additional expense to the Contractor.

Audit documentation and audit reports must be retained by the Contractor's auditor for a minimum of five (5) years from the date of issuance of the audit report, unless the Contractor's auditor is notified in writing by the Commonwealth or the cognizant or oversight Federal agency to extend the retention period. Audit documentation will be made available upon request to authorized representatives of the Commonwealth, the cognizant or oversight agency, the Federal funding agency, or the Government Accountability Office.

7. Clean Air Act (42 U.S.C. 7401 *et seq.)* and the Federal Water Pollution Control Act (33 U.S.C. 1251 *et seq.)* - Contracts and subgrants of amounts in excess of $100,000 shall contain a provision that requires the recipient to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401 *et seq.*) and the Federal Water Pollution Control Act (33 U.S.C. 1251 *et seq.*). Violations shall be reported to the Regional Office of the EPA.

8. Contractor shall comply with mandatory standards and policies relating to energy efficiency in compliance with the U.S. Energy Policy and Conservation Act (Pub. L. 94-163).

9. Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333) – Where applicable, all contracts awarded by recipients in excess of $100,000 for construction contracts and in excess of $2500 for other contracts that involve the employment of mechanics or laborers shall include a provision for compliance with sections 102 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333), as supplemented by Department of Labor regulations (29 CFR Part 5). Under section 102 of the Act, each contractor shall be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than ½ times the basic rate of pay for all hours worked in excess of 40 hours in the work week. Section 107 of the Act is applicable to construction work and provides that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

10. Copeland "Anti-Kickback" Act (18 U.S.C. 874 and 40 U.S.C. 276c) – All contracts and subgrants in excess of $100,000 for construction or repair awarded by recipients and subrecipients shall include a provision for compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. 874), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each contractor or subrecipient shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he is otherwise entitled. The recipient shall report all suspected or reported violations to the Federal Grantor Agency.

11. Davis-Bacon Act (40 U.S.C. 276a to a-7) – When required by Federal program legislation, all construction contracts awarded by the recipients and subrecipients of more than $2000 shall include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 276a to a-7) and as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction"). Under this Act, contractors shall be required to pay wages to laborers and mechanics at a rate not less than the minimum wages specified in a wage determination made by the Secretary of Labor. In addition, contractors shall be required to pay wages not less than once a week. The recipient shall place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation and the award of a contract shall be conditioned upon the acceptance of the wage determination.

The recipient shall report all suspected or reported violations to the Federal Grantor Agency.

12. Byrd Anti-Lobbying Amendment (31 U.S.C. 1352) – Contractors who apply or bid for an award of more than $100,000 shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient.

13. Debarment and Suspension (Executive Orders 12549 and 12689) - No contract shall be made to parties listed on the General Services Administration's List of Parties Excluded from Federal Procurement or Nonprocurement Programs in accordance with Executive Orders 12549 and 12689, "Debarment and Suspension." This list contains the names of parties debarred, suspended, or otherwise excluded by agencies, and contractors declared ineligible under statutory or regulatory authority other that Executive Order 12549. Contractors with awards that exceed the small purchase threshold shall provide the required certification regarding its exclusion status and that of its principal employees.

14. This commitment is contingent upon funds being appropriated by the legislature for each succeeding fiscal year and Federal funds being provided to the Commonwealth for the contract purpose.

15. Federal Funding Accountability and Transparency Act (FFATA or Transparency Act)

For all federally funded grants that DEP issues (except ARRA grants):

16. Registration and Identification Information

Grantee must maintain current registration in the System for Award Management (www.sam.gov) at all times during which it has active federal awards funded pursuant to this agreement. A Dun and Bradstreet Data Universal Numbering System (DUNS) Number (www.dnb.com) is one of the requirements for registration in the System for Award Management.

Grantee must provide its assigned DUNS number, and DUNS + 4 number if applicable, to the Commonwealth along with Grantee's return of the signed grant agreement. The Commonwealth will not process this grant until such time that Grantee provides this information.

17. Primary Location

Grantee must provide to the Commonwealth the primary location of performance under the award, including the city, State, and zip+4. If performance is to occur in multiple locations, then Grantee must list the location where the largest amount of the grant award is to be expended pursuant to this grant agreement.

Grantee must provide this information to the Commonwealth along with Grantee's return of the signed grant agreement. The Commonwealth will not process this grant until such time that Grantee provides this information.

18. Compensation of Officers

Grantee must provide to the Commonwealth the names and total compensation of the five most highly compensated officers of the entity **if**—

(i) the entity in the preceding fiscal year received—
(I) 80 percent or more of its annual gross revenues in Federal awards; and
(II) $25,000,000 or more in annual gross revenues from Federal awards; and

(ii) the public does not have access to information about the compensation of the senior executives of the entity through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986.

If the Grantee does not meet the conditions listed above, then it must specifically affirm to the Commonwealth that the requirements of this clause are inapplicable to the Grantee.

Grantee must provide information responding to this question along with Grantee's return of the signed grant agreement. The Commonwealth will not process this grant until such time that Grantee provides the information responding to this question.

Final Draft
May 2022

ATTACHMENT F

WORKER PROTECTION AND INVESTMENT CERTIFICATION FORM

A. Pursuant to Executive Order 2021-06, *Worker Protection and Investment* (October 21, 2021), the Commonwealth is responsible for ensuring that every worker in Pennsylvania has a safe and healthy work environment and the protections afforded them through labor laws. To that end, contractors and grantees of the Commonwealth must certify that they are in compliance with Pennsylvania's Unemployment Compensation Law, Workers' Compensation Law, and all applicable Pennsylvania state labor and workforce safety laws including, but not limited to:

1. Construction Workplace Misclassification Act
2. Employment of Minors Child Labor Act
3. Minimum Wage Act
4. Prevailing Wage Act
5. Equal Pay Law
6. Employer to Pay Employment Medical Examination Fee Act
7. Seasonal Farm Labor Act
8. Wage Payment and Collection Law
9. Industrial Homework Law
10. Construction Industry Employee Verification Act
11. Act 102: Prohibition on Excessive Overtime in Healthcare
12. Apprenticeship and Training Act
13. Inspection of Employment Records Law

B. Pennsylvania law establishes penalties for providing false certifications, including contract termination; and three-year ineligibility to bid on contracts under 62 Pa. C.S. § 531 (Debarment or suspension).

CERTIFICATION

I, the official named below, certify I am duly authorized to execute this certification on behalf of the contractor/grantee identified below, and certify that the contractor/grantee identified below is compliant with applicable Pennsylvania state labor and workplace safety laws, including, but not limited to, those listed in Paragraph A, above. I understand that I must report any change in the contractor/grantee's compliance status to the Purchasing Agency immediately. I further confirm and understand that this Certification is subject to the provisions and penalties of 18 Pa. C.S. § 4904 (Unsworn falsification to authorities).

Signature	***Date***
Name (Printed)	
Title of Certifying Official (Printed)	
Contractor/Grantee Name (Printed)	

Final Draft
May 2022

BOP-2201
Published: 02/07/2022

Draft Fiscal Year 2022 – 2026 Nutrient and Manure Management Delegation Agreement
Required Output Measures
Comment and Response
March 31, 2022

Commentator:

1. Rachel Onuska
   Agricultural Conservation Technician
   Bucks County Conservation District
   1456 Ferry Road, Suite 704
   Doylestown, PA 18901
   ronuska@bucksccd.org

2. Tim Heyler
   Ag Conservation Technician/Remote Pilot
   Lycoming County Conservation District
   542 County Farm Rd # 202
   Montoursville, PA 17754
   THeyler@lyco.org

3. Jennifer Bratthauar
   Ag Conservation Technician
   Franklin County Conservation District
   185 Franklin Farm Lane
   Chambersburg, PA 17202
   jbratthauar@franklinccd.org

4. Vy Trinh
   Nutrient Management Technician
   Adams County Conservation District
   670 Old Harrisburg Rd
   Suite 201
   Gettysburg, PA 17325
   vtrinh@adamscounty.us

Comment / Response
Draft Fiscal Year 2022 – 2026 Nutrient and Manure Management Delegation Agreement Required Output Measures

1. **Comment:** *Removed the requirements for an annual planning meeting with partners* – Historically the conservation districts in the Natural Resources Conservation Service's (NRCS') Southeast 6 Field Team would all meet to discuss major resource concerns we were seeing, sharing opportunities for addressing these concerns. This meeting let us meet our delegation agreement requirement, and it helped NRCS meet their local ranking priority meeting requirements. I believe NRCS no longer has the local ranking priorities requirement since they have moved to CART software for ranking.

In a time when Districts/ NRCS / PSU Extension/ Ag Preservation seem to be drifted into more separate work channels, I think it is a mistake to remove this requirement. I realize we can still meet without it being a requirement, however it seems like without it being a requirement, it will get forgotten. I have found this meeting to be helpful in the past in sharing what NRCS/ Districts/ PSU/ Ag Preservation are all working on, struggling with, and ways to complement each other. We are a field team where nobody is co-located. (1)

Response: The State Conservation Commission (SCC) appreciates this comment. As mentioned in the comment, although an annual planning meeting is no longer required under the agreement, the conservation district and other partners may meet voluntarily. The SCC is no longer requiring the meeting since not all conservation districts have adequate resources to participate in such a meeting.

2. **Comment:** Section E 1 a says the District should have "limited involvement" in writing plans, E 1 a I says it's a "low priority" and E 1 c says to write a letter saying Districts "cannot" write plans. I know what you're trying to say, but these three statements don't quite mesh. (2)

   Response: The SCC appreciates this comment and appropriate edits have been made to this section of the agreement.

Comment / Response
Draft Fiscal Year 2022 – 2026 Nutrient and Manure Management Delegation Agreement Funding Formula

1. **Comment:** The formula factors seem appropriate, clarity on where the data is pulled from and the actual formula would be helpful. (1)

   Response: The SCC appreciates this comment and will provide the data sources when asking for approval by the SCC

2. **Comment**: How are number of animal farms in a county counted? Just wondering if equine farms are being counted. (1)

   Response: The number of animal farms comes from the 2017 United States Department of Agriculture (USDA) National Agriculture Statistic Service (NASS) Census of Agriculture. This category includes horses, ponies, mules, burros, and donkeys.

3. **Comment:** Formula factors weight - When comparing Bucks' 0.25 Full Time Equivalent (FYE) Nutrient Management (NM) rate to other counties with the same 0.25 FTE rate, it seems like Bucks have [sic] a much higher Act 38 Nutrient Management / Chapter 91 complaints workload. Not sure if all the formula factors are weighted equally? (1)

Draft Fiscal Year 2022 – 2026 Nutrient and Manure Management Delegation Agreement
Required Output Measures
Comment and Response
March 31, 2022

Response: Complaint workload was not included in the funding formula. Since the number and complexity of complaints received by a district depends on several factors and the workload necessary to respond to these complaints cannot be predicted, workload was not included in the formula.

4. **Comment:** Even though the total number of NMPs provides a significant workload, it should not be the only determining factor for funding. Total number of animal operations should also play a role in this determination as this is an indication of how much NM/MM work there should be in a county. (3)

   Response: The SCC appreciates this comment. The number of animal operations is part of the funding formula.

5. **Comment:** Total number of horse/pony farms may be misleading based on the amount of NM/MM work they require. For example, does the number of horse farms in Lancaster County include all the Amish farms that are dairy (or poultry) operations with 4 work horses? Do these horse operations include all the backyard horse owners with 1-2 horses on an acre? In addition, most horse operations do not have a large amount of crop fields (with multiple crops and multiple manure applications). Horse operations will typically have grass hay fields and pastures, but may have a number of Nutrient Balance Sheets for exporting their manure. (3)

   Response: The SCC appreciates this comment and has removed the number of equine operations for the funding formula.

6. **Comment:** Dairy operations with MMPs and NMPs tend to be more work due to multiple manure groups and a large amount of double cropping.
   a. If NMPs no longer have to be amended due to adding new acreage, the workload for dairy NMPs may be a little less.
   b. Most dairies do not export a lot of their manure, which means each of their fields is listed separately in Appendix 4 (not in NBSs where 1,000 acres can be combined together under one crop group). A lot of dairies in the southern part of the state double crop and have multiple manure groups, which means that each field has numerous entries into Appendix 4. (3)

   Response: The SCC appreciates this comment. At this time, one of the only matrices that could be used to compare counties would be the number of acres subject to NMPs and MMPs. It would not be appropriate to simply consider acres that are part of agricultural operations within the county since districts must utilize additional resources for those subject to NMP and MMP requirements. .

Additionally, if the formula was altered to only consider acres, the work associated with the number of NMPs for operations within an integrated industry would be discounted since these operations are located on smaller acreages.

7. **Comment:** If two counties have the same amount of NMPs, but one has mostly CAFOs/CAOs and the other has mostly VAOs, the county with the higher number of CAFOs/CAOs is going to have a larger workload.
    a. VAOs only require a status review once every 3 years, and CAOs/CAFOs require a status review every year.
    b. VAOs typically have smaller NMPs and do not take as much time to review when they are amended and updated. (3)

    Response: The SCC appreciates this comment. The number of CAOs, CAFOs, and VAOs are accounted for separately, with VAOs receiving the least amount of credit as one of the three types of operations factored into the formula.

8. **Comment:** Using Nutrient Balance Sheet reviews as a guide to determine the level of NM funding may not be the most accurate.
    a. If NBSs are produced by brokers under Act 49, only 10% of those NBSs must be reviewed (not all of them).
    b. Act 49 NBSs are supposed to be reviewed by the importing county, not the exporting county (according to the NM Administrative Manual).
    c. Act 38 NBSs will be part of the overall NMP and will be reviewed by the county where the operation is located (which could increase the workload). (3)

    Response: The SCC appreciates this comment and was not included in the workload analysis. In regards to a., although only 10% of the NBSs must be reviewed, all NBSs are entered into PracticeKeeper. In regards to b., the exporting county's workload is minimal since they only need to file the NBSs in the exporter's file. In regards to c., the commentator is correct that NBSs are part of the NMP, which will be reviewed by the county where the operation is located. However, the funding formula takes the manure broker's workload into account, not the county's workload in reviewing the NMP, which contains the NBS.

9. **Comment:** If Districts do not write Manure Management Plans (MMPs), maybe they should not receive as much MMP funding. Completing a MMP for 2 horses is going to be a lot less work than completing a MMP for a dairy operation with 800 acres. (3)

    Response: The SCC acknowledges this comment. MMP instances and acres were not part of the workload analysis

10. **Comment:** Are Animal Equivalent Units (AEUs) considered when you look at CAOs and CAFOs? For example, Hillandale with 21,241.89 AEUs isn't

Draft Fiscal Year 2022 – 2026 Nutrient and Manure Management Delegation Agreement
Required Output Measures
Comment and Response
March 31, 2022

comparable with Mason Dixon (3,446.00 AEUs) which isn't comparable to a small CAFO with 300 AEUs. All 3 would operate under one CAFO permit and one NM plan each. If AEUs aren't part of the funding equation, we wonder if it should?

Response: The SCC appreciates this comment. At this time, number of AEUs is not part of the funding formula. The relevant workload factor is the number of NMPs and MMPs within the district since the work associated with NMPs and MMPs requires additional resources from districts.

11. **Comment:** Explain or give an example of what a manure management plan activity is

    Response: The draft Required Output Measures (ROMs) provide detail on MMP activities and provide examples and guidance.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 30, 2022

TO: Members
State Conservation Commission

FROM: Johan E. Berger, Director
Financial Administration, Certification & Conservation District Programs

RE: Proposed annual work plans and budgets for educational and technical support activities for the Nutrient Management Specialist; Odor Management Specialist and Commercial Manure Hauler/Broker certification and education programs.

Action Requested

Approve annual work plans and proposed budgets for the period of July 1, 2022 through June 30, 2023 for the continuation of existing services provided by Pennsylvania State University, College of Agricultural Sciences (PSU CAS) staff.

Background

In July 2020, the Commission entered into three-year contracts with PSU providing continued financial support for educational and technical activities performed by PSU CAS staff for the Act 38 and Act 49 certification and education programs, administered by the Commission and the Pennsylvania Department of Agriculture (PDA). The attached annual work plans and budgets describe educational and technical activities to support these programs and, education and training support for the Pennsylvania Department of Environmental Protection (DEP) Manure Management Program (Pa Clean Streams Law, Chapter 91.36).

Proposal Summary

The following summarizes education and certification program activities outlined in the respective work plans for FY2022-23 (July 1, 2022 – June 30, 2023).

Nutrient Management (NM) Education & Certification:

1. Assist PDA and the Commission in the planning, development and delivery of mandatory nutrient management specialist certification and continuing education workshops.
2. Develop and support spreadsheet versions of the nutrient management plan, nutrient balance sheet and P-Index planning tool, including instructional training on the use of these planning tools.
3. Assist PDA and the Commission in distribution of Nutrient Management Program information through newsletters, factsheets, technical guidance and maintenance of the Pa Nutrient Management Program website.
4. Provide technical and education support for the DEP Manure Management Manual education program as requested.
5. Provide scientific and technical support to the Nutrient Management Advisory Board and associated subcommittees as appropriate.

Odor Management (OM) Education & Certification; Animal Production Site Assessment:

1. Assist PDA and the Commission in the planning, development and delivery of mandatory odor management specialist certification and continuing education workshops.
2. Develop and support the Odor Site Index and Odor BMP Reference List planning tools.
3. Serve in an advisory capacity to the SCC and PDA for reviewing plans and new odor remediation technologies.
4. Conduct assessments of potential large scale animal production operations for siting recommendation and identification of potential conflicts in the community as requested by animal production integrators.

Commercial Manure Hauler & Broker (MHB) Education & Certification:

1. Assist PDA and the Commission in the planning, development and delivery of mandatory certification and continuing education programs and workshops.
2. Assist PDA and the Commission in the development of educational materials, (i.e. certification workbooks) and outreach through periodic distribution of newsletters.

Manure Management Program

1. Provide technical and educational support for the DEP Manure Management Manual documents and materials in consultation with DEP, SCC and the Nutrient Management Educational Workgroup.
2. Maintain a Manure Management Education Program webpage content on the Act 38 Nutrient Management Program Website.

A review of projected costs by PSU for program year 2022-23 for all projects resulted in no changes to the projected annual costs to support contracted activities for the 2022-23 program year, as noted below:

1. Nutrient Management Education & Certification: $231,752 (No Change)
2. Odor Management/Animal Production Site Assessment/Manure Hauler Education & Certification: $152,920 (No Change).

Recommendation

Staff recommends approval of the annual work plans and proposed budgets for the Nutrient Management Education and the Manure Hauler Broker Certification/Odor Management Support/Site Assessment Program work plans for FY2022-23 as allocated under the proposed Nutrient Management Program budget and described under this memo. Funding of the projects is contingent on the availability of funds appropriated to the Nutrient Management Fund, and submission of a final budget proposal by Penn State University.

Thank you for your consideration of these annual work plans and budget proposals. The Inter-agency and University partnership that has grown around this contract over the years has been the key to developing and implementing sound nutrient management. odor management, and manure hauling training and education standards in Pennsylvania.

Attachments (2)

Nutrient Management Education Program

Annual Workplan

July 1, 2022 - June 30, 2023

Submitted to: Pennsylvania State Conservation Commission (SCC)

Submitted by: Department of Plant Science
Penn State University (PSU)
116 ASI Building
University Park, PA 16802

Project Leader: Charles M. White, Ph.D., Assistant Professor of Agronomy

Annual Nutrient Management Education Workplan

Conduct annually the following mandatory commercial and public certification workshops and trainings:

- Two (2) Managing Manure Nutrients Workshop training courses on basic soil fertility concepts and management manure nutrients as part of nutrient management planning.
- Two (2) Plan Writing Workshop training courses to teach participants how to develop nutrient management plans and nutrient balance sheets using the program spreadsheet planning tools.
- Two (2) P Index Workshop training courses to introduce the Pennsylvania Phosphorus Index and learn how to complete the Index as part of nutrient management planning.

Conduct annually the following basic and advanced workshops and trainings to provide background training in the required competencies. Conduct and participate in additional trainings to address specific educational needs as determined by program staff based on evaluation of program needs.

- One (1) Introduction to Livestock Production Systems training course to learn about housing and manure handling and management systems for dairy, swine, poultry and veal operations.

Participate annually in the planning, instruction, and support of the following mandatory commercial and public certification workshops and trainings:

- Two (2) Nutrient Management Orientation training courses to familiarize participants with the requirements within the Act 38 regulations and components of an Act 38 nutrient plan. This training is coordinated by SCC staff.
- Two (2) Plan Review Workshop training courses to teach participants how to review nutrient management plans submitted under the Act 38 regulations. This training is coordinated by SCC staff.
- Two (2) ACA & Manure Storage Workshop training courses to train participants how to identify, evaluate, and make recommendations for manure management practices related to

manure storages and animal concentration areas. This training is coordinated by Natural Resources Conservation Service (NRCS) staff.
- Two (2) Stormwater & Soil Loss Workshop training courses to train participants to identify, evaluate, and make recommendations for critical runoff problem areas and to provide a demonstration of how PAOneStop can be used to determine soil loss for nutrient management planning. This training is coordinated by NRCS staff.

Develop and support spreadsheet versions of the Nutrient Management Plan, Nutrient Balance Sheets, and Phosphorus Index along with supporting tools and documents.
- Develop revised versions of the spreadsheets to facilitate and streamline the planning process, including data entry, and to incorporate changes to the Nutrient Management Program.
- Provide NMP and NBS Spreadsheet support to commercial and public nutrient management specialists, Act 49 manure brokers, and state agency staff.
- Conduct computer lab NMP and NBS spreadsheet trainings as needed.
- Conduct periodic online Spreadsheet Assistance Sessions and Spreadsheet Webinars to provide instruction and support for spreadsheet tools.
- Explore and evaluate alternative planning tool options to Excel spreadsheets to better serve program planning requirements and interface with other programs.

Provide for the distribution of Nutrient Management Act information to the general public and specific audiences as needed. This will include the:
- Production and distribution annually of at least two (2) issues of the Pennsylvania Nutrient Management Program Newsletter.
- Coordinate and maintain the Pennsylvania Nutrient Management Program website.
- Reprint current Nutrient Management Act related factsheets as necessary.
- Publish new Nutrient Management Act related factsheets as necessary.

Provide relevant nutrient management educational outreach efforts determined by SCC to be necessary to support Pennsylvania's Nutrient Management Act program.
- Provide relevant presentations and materials at Nutrient Management Program conferences, webinars and trainings.
- Provide educational support for locally conducted nutrient management education programs.
- Provide technical and educational support to Act 49 Manure Haulers Certification Program.
- Provide input for the Phosphorus Index review and revision process.

Provide technical and educational support for the Department of Environmental Protection (DEP) Manure Management Manual (MMM) education program in consultation with SCC and the Nutrient Management Educational Workgroup.
- Develop, in consultation with DEP, updates of the MMM documents and materials as necessary.
- Coordinate and maintain a MMM education program webpage on the Act 38 nutrient management program website.

Provide technical support to SCC and DEP staff.

- Serve as the liaison between the SCC and PSU extension specialists and other PSU professional staff on information requests to support nutrient and manure management.

Provide University representation in an advisory role to the Nutrient Management Advisory Board and its associated committees and workgroups.

- Provide scientific and technical support to the Nutrient Management Advisory Board and associated subcommittees as appropriate.

Provide extension support to nutrient management related workshops and conferences.

Develop a detailed annual workplan of proposed workshop topics, educational materials, newsletters, etc., in consultation with SCC staff, prior to the beginning of the fiscal year each year of the contract.

- Submit written reports quarterly, including copies of any educational materials developed, to SCC staff.

Agenda Item B.3.b.i

Plant Science (Agricultural Sciences) / The Pennsylvania State University
Nutrient Management Education Program
COP: Department of Agriculture
Project Dates: 07/01/2020 - 06/30/2023

	07/01/2020 - 11/30/2020	12/01/2020 - 06/30/2021	07/01/2021 - 06/30/2022	[redacted]	Total
Direct Costs					
Salaries (Category I)					
White, Charles Macaulay (Principal Investigator)	4,393	6,151	15,670		42,276
8.3% year 1, ~12% years 2-3					
Martin, Gerald Lee (Other)	30,023	42,031	73,856	75,70	221,612
100% effort					
Orner, Donald G (Technician)	26,163	36,629	64,360	65,970	193,122
100%					
Total Salaries	60,579	84,811	153,886	157,734	457,010
Total Salaries and Wages	60,579	84,811	153,886	157,734	457,010
Fringe					
Category I @ 34.88%	21,131	29,583	53,674	55,018	159,406
Total Fringe	21,131	29,583	53,674	55,018	159,406
Total Salaries, Wages and Fringe	81,710	114,394	207,560	212,752	616,416
Modified Total Direct Costs					
Materials and Supplies	1,458	2,042	7,500	7,500	18,500
Travel - Domestic	4,167	5,833	10,000	10,000	30,000
Publications	210	290	500	50	1,500
Analysis Fees	210	290	500		1,500
Land and Greenhouse Rental Fees	210	290	500		1,500
Computers $4,999 & Less	1,680	2,320	0		4,000
Total Modified Total Direct Costs	89,645	125,459	226,560		673,416
Total Direct Costs	89,645	125,459	226,560		673,416
F&A Costs (TDC basis)					
Total Requested From Sponsor	89,645	125,459	226,560		673,416
Total Project Costs	89,645	125,459	226,560		673,416
Year 1 split					

Proposal: 69989
Generated by cmw5044 on: 08/25/2020
Created on 08/18/2020 and last updated on 08/25/2020

Delivery of Manure Hauler & Broker Certification, Odor Management Support, and Site Assessment Programs

Annual Work Plan
July 1, 2022 – June 30, 2023
Submitted to the Pennsylvania State Conservation Commission

By
Robert J. Meinen and Robert E. Mikesell
The Pennsylvania State University

Odor Management Regulatory Support

Background: The SCC's Odor Management Planning Regulations and PDA's Odor Management Certification Regulations require the development and review of odor management best management practice (BMP) technology and criteria and, the development and implementation of training and education activities for the certification of individuals to develop and review odor management plans. Penn State University provides support in these key program elements as the agencies continue to implement Pennsylvania's Odor Management Program. The most significant time investment includes training, educational support, and advisory responsibilities.

Objectives: To facilitate the implementation of the Odor Management Planning Regulations and the Odor Management Certification Regulations, Robert Mikesell, with assistance from Robert Meinen (as needed) will provide the following services to SCC and PDA:

1. Collaborate with agency professionals from the SCC and PDA in the implementation of regulations, review of odor management BMP criteria and the development and delivery of certification training and general education of the agriculture community and the general public.

2. Maintain and update the PA Odor Best Management Practice Reference List.

3. Provide support in the development and delivery of education materials via written and web-based formats.

Annual Work Plan:

Odor Management Certification training support

1. Develop and deliver certification training courses for certified odor

management plan writers and reviewers. This training will include use of the Odor Site Index and the mapping elements of a plan, as well as, the selection of appropriate odor BMPs. Up to two orientation and plan writing training sessions per year will be offered, depending on demand. Trainings will serve prospective plan writers and/or reviewers.

2. Assist the SCC and others in the development and delivery of a minimum of two continuing education programs for certified odor management specialists, with a minimum of 3 Continuing education credits (CEC's) offed between the 2 trainings. Provide relevant educational and technical assistance efforts in order to assist the Commission in administering the Odor Management Regulations.
3. Develop and maintain the Pennsylvania Odor BMP Reference List.
4. Serve in an advisory capacity to the SCC and PDA for reviewing plans and new odor remediation technologies.
5. Provide technical support to the SCC on the use, further development, and clarification and review of the Odor Site Index and odor management plans, including on-farm accompaniment of SCC personnel to plan Level II BMPs at farms.
6. Assist with the development and printing of educational materials and fact sheets relating to odor management.
7. Participate in research projects with Penn State's Odor Laboratory to identify and screen Odor BMPs.

Commercial Manure Hauler Certification Program

Background: The Commercial Manure Hauler and Broker Certification Act (Act 49 of 2004) requires that all commercial haulers and brokers must be certified under the program prior to engaging in transport or application of manure on behalf of an agricultural operation. The use of certified commercial manure haulers and brokers is a requirement of certain agricultural operations in the Nutrient Management Regulations. Training materials have already been developed and delivered for current manure hauler participants. Individuals new to the industry will be trained and certified depending on demand.

Objectives: To provide professional resources and coordination for the development and conduct of education programs for certification of individuals in the industry. The objectives will be carried out by a project coordinator (Robert Meinen) through the following activities:

1. Collaborate with an interagency workgroup consisting of other professionals at Penn State, the Pennsylvania Department of Agriculture, the State Conservation Commission and representatives

from the industry to develop and deliver education and certification program content.

2. Develop and conduct certification-training programs and assist in continuing education programming for participants who have completed certification requirements.

Annual Work Plan:

1. Participate annually in the planning and the instruction of mandatory workshops and training:
   - Two or three orientation training courses for Level 3 Commercial Manure Hauler and Level 1 and Level 2 Broker certification, depending on demand.
   - Two or three Nutrient Balance Sheet training courses for Level 2 Commercial Manure Broker certification, depending on demand.
2. Assist in the review and development of education materials and exams for appropriate certification levels. Assist in development of on-line tools in conjunction with PaOneStop programmers, as needed.
3. Participate in the development and distribution of program information:
   - Develop and distribute program newsletter or informational bulletin. Issues of the newsletter will be produced as necessary. Newsletters and bulletins will be emailed whenever possible. Hard copies will be mailed by the PA Department of Agriculture to individuals without access to email.
   - Develop and publish program related factsheets and other education materials.
4. Assisting in the planning and delivery of continuing education programs and workshops in consultation with the Department of Agriculture or other organizations, using webinars and online training whenever practical.

Assessment of Potential Animal Production Sites

Background: This program is essential in helping the livestock industry avoid conflicts by carefully considering the size and location of proposed livestock facilities and providing education and assistance in selecting appropriate sites. The criteria for establishing a viable site are more rigorous than the Act 38 odor regulations. Several integrators continue to demand this program as part of their selection process for new operations. The site assessment program will remain a valuable tool and will potentially preclude the need for elaborate and possibly ineffective odor management plans.

Objectives:

1. Conduct assessments of potential large-scale animal agriculture sites for the potential for conflicts in the community.
2. Use assessment information to further refine the Odor Site Index.
3. Interact with and provide progress reports (as needed) to relevant agencies and partners including, but not limited to:
    - Pennsylvania Department of Agriculture (PDA).
    - State Conservation Commission (SCC).

Annual Work Plan

The program coordinator (Robert Mikesell) will administer and coordinate the site assessment process and work closely with industry contacts and allied industry professionals to maintain awareness and viability of the program. During the contract period, the coordinator will:

1. Review all site evaluation requests and plan to conduct the assessments. Coordinator is expected to conduct approximately 30 site assessments per year, depending on demand.
2. Promote the program appropriately by meeting with integrators and industry leaders, and by summarizing and publishing program results in selected media outlets.
3. Provide a quarterly summary of site assessment program.

Animal Science (Agricultural Sciences) / The Pennsylvania State University
Delivery of Manure Hauler & Broker Certification, Odor Management Support, and Site Assessment Programs
COP: Department of Agriculture
Project Dates: 07/01/2020 - 06/30/2023

	07/01/2020 - 11/30/2020	12/01/2020 - 06/30/2021	07/01/2021 - 06/30/2022	[redacted]	Total
Direct Costs					
Salaries (Category I)					
Meinen, Robert James (Principal Investigator) 85% effort per year	25,954	36,336	63,848	[redacted]	191,584
Mikesell, Robert Eugene (Co-Investigator) 33% effort per year	14,891	20,847	36,634	37,550	109,922
Total Salaries	40,845	57,183	100,482	102,996	301,506
Total Salaries and Wages	40,845	57,183	100,482	102,996	301,506
Fringe					
Category I @ 34.88%	14,247	19,947	35,048	35,924	105,166
Total Fringe	14,247	19,947	35,048	35,924	105,166
Total Salaries, Wages and Fringe	55,092	77,130	135,530	138,920	406,672
Modified Total Direct Costs					
Domestic Travel	2,917	4,083	7,000	7,000	21,000
Materials and Supplies	2,500	3,500	6,000	6,00	18,000
Meeting Expenses	417	583	1,000		3,000
Total Modified Total Direct Costs	60,926	85,296	149,530	1	448,672
Total Direct Costs	60,926	85,296	149,530		448,672
F&A Costs (TDC basis)					
Total Requested From Sponsor	60,926	85,296	149,530		448,672
Total Project Costs	60,926	85,296	149,530		448,672

Proposal: 65930
Generated by lrm5219 on: 08/18/2020
Created on 02/24/2020 and last updated on 08/18/2020

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 26, 2022

TO: Karl G. Brown, Executive Secretary
State Conservation Commission

FROM: Brady Seeley, Conservation Program Specialist
State Conservation Commission

SUBJECT: Nutrient Management Plan Review and Requested Action
Emanuel Lapp, Northumberland County, Pennsylvania

Action Requested

Action is requested on the Emanuel Lapp Nutrient Management Plan for his Concentrated Animal Feeding Operation (CAFO) and Concentrated Animal Operation (CAO) located in Northumberland County.

Background

I have finalized the required review of the subject Nutrient Management Plan (NMP, or plan) listed above. Final corrections to the plan were received at the State Conservation Commission's (SCC) Harrisburg office on April 26, 2022. As of that date, the plan was considered to be in its final form. The operation is considered to be a Concentrated Animal Operation (CAO) under the PA Nutrient and Odor Management Act (Act 38 of 2005). Emanuel Lapp's animal operation is also considered a Concentrated Animal Feeding Operation (CAFO) under DEP authority and is required to obtain an approved Act 38 NMP. The Commission is the proper authority to take action on this plan, because Northumberland County Conservation District is not a delegated to perform plan review and action responsibilities under the Act 38 program.

A brief description of the operation, including my staff recommendation, is attached. Also attached is a copy of the complete Nutrient Management Plan for the operation.

Thank you for considering this plan for Commission action.

Farm Description

Emanuel Lapp an existing duck operation in Northumberland County. Mr. Lapp's operation consists of a total of 41.98 acres with 18.4 acres of pasture, 23.58 acres of farmstead and associated agland. Animals raised on the operation are 18,800 ducks, 1 horse, 1 cow, 1 heifer, 5 beef finishing, 15 ewes, 30 lambs, and 1 ram. Total animal equivalent units (AEUs) housed at Mr. Lapp's operation is 105.71 AEUs. With 18.4 acres available for manure application, Mr. Lapp's animal density calculation works out to 5.75 AEUs / acre, classifying the operation as a Concentrated Animal Operation (CAO) under Act 38 of 2005. The number of duck's classifies Mr. Lapp's operation as a CAFO.

Approximately 1,950,000 gallons of duck manure and 196.2 tons horse, sheep, and cattle manure is generated per year on the operation. Manure is stored in an HDPE lined manure storage. Duck manure is exported through a broker, Jeff Martin, during the spring and fall. The horse, sheep, and cattle manure is exported using small quantity manure importers. All duck mortalities are incinerated, and the ash is added to the manure storage. All large animal mortalities are composted. The NMP does include the proper signed Exporter / Broker Agreement.

The receiving stream for the operation is an unnamed tributary to Mahantango Creek, which is a Warm Water Fishery.

There are no Best Management Practices listed to be implemented on Mr. Lapp's animal operation.

Based on my review, the NMP developed for the Emanuel Lapp animal operation meets the requirements of the PA Act 38 Nutrient Management Regulations, and I therefore recommend Commission approval.

Nutrient Management Plan

For Crop Year(s)

2022 2023 2024

Prepared For

Operator's Name, Mailing Address, Telephone Number(s)

Emanuel Lapp, 322 Hatchery Road, Dalmatia, PA 17017, 570-495-0270

NON-FINAL FORM
Version 1
This NMP may be revised prior to a formal action by the Conservation District Board. The final form of the plan will be available at least 7 days prior to Board action. You may contact the Conservation District to determine the current status of the NMP
March 14, 2022
Year

Operation's Location Address (if different than above)

Same

Site Name (CAFOs)

Emanuel L. Lapp Farm CAFO

NON-FINAL FORM
Version 2
This NMP may be revised prior to a formal action by the Conservation District Board. The final form of the plan will be available at least 7 days prior to Board action. You may contact the Conservation District to determine the current status of the NMP
April 26, 2022
Year

Prepared By

Nutrient Management Specialist's Name, Address, Telephone Number(s)

Todd C. Rush, 190 Tyson School Road, Catawissa, PA 17820
570-809-1174

Nutrient Management Specialist's Program Certification Number

#988-NMC

Administratively Complete Date

March 14, 2022

Plan Approval Date

Plan Update Submission Date(s)

(updates to the approved plan not requiring board action)

FINAL FORM
This version of the plan will be considered for action by the Conservation District Board at their May 10, 2022 meeting
April 26, 2022
MONTH, DAY AND YEAR

Table of Contents

Nutrient Management Plan Summary

Total acres reported in NMP Summary: 18.4 **Crop Year(s)** 2022

Whole Farm Note: None

If manure runs out for any field, consult Appendix 4 of the plan for that field. The fertilizer required on any part of the field that does not receive manure can be determined from the 'Net Nutrients Required' for that field.

Fall manure applications require at least 25% cover unless the crop management unit is planted to a cover crop in time to allow for appropriate growth to control runoff until the next growing season, or the manure is injected or mechanically incorporated within 5 days using minimal soil disturbance techniques consistent with no-till farming practices.

Operation Acres:

Total Acres: 41.98 **Total Acres Available For Nutrient Application Under Operator's Control: Owned:** 18.4 **Rented:** 0

Animal Equivalent Units: 97.99 **Animal Equivalent Units Per Acre:** 5.33

								Starter/Other Fertilizer (lb/A)			Supplemental Fertilizer (lb/A)			Nutrient Balance (lb/A)[2]		
CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
EL1	10.1	Planting Pasture (without legume)				No Manure Applied		0	0	0	0	0	0	115	0	80
EL2	6.2	Planting Pasture (without legume)				No Manure Applied		0	0	0	0	0	0	115	0	0
EL3	2.1	Established Pasture (without legume)	Field EL3 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes	0	0	0	0	0	0	96	-36	-74

[1] See rate calibration table (Nutrient Management Plan Summary Notes).

[2] Positive numbers = nutrient deficit; Negative numbers = nutrient excess

NMP Summary Notes

Crop Years 2022

CMU/Field ID	Notes
EL1	
EL2	
EL3	The grazing group includes the following animals on pasture: 1 milk cows from the Milk Cow animal group,18 hours per day for 244 days,from Apr. to Nov. 1 dairy heifers from the Heifer animal group,18 hours per day for 244 days,from Apr. to Nov.

[1] See rate calibration table (Nutrient Management Plan Summary Notes).

[2] Positive numbers = nutrient deficit; Negative numbers = nutrient excess

Manure Spreader Calibration Notes

1

Crop Years 2022

Manure Application Rate	Manure Spreader Used	Spreader Settings	Tractor Used (if applicable)	Tractor Settings (speed, gear, rpm, pto, etc.)
This operation does not mechanically apply manure				

Nutrient Management Plan Summary

Total acres reported in NMP Summary: 18.4 **Crop Year(s)** 2023

Whole Farm Note: None

If manure runs out for any field, consult Appendix 4 of the plan for that field. The fertilizer required on any part of the field that does not receive manure can be determined from the 'Net Nutrients Required' for that field.

Fall manure applications require at least 25% cover unless the crop management unit is planted to a cover crop in time to allow for appropriate growth to control runoff until the next growing season, or the manure is injected or mechanically incorporated within 5 days using minimal soil disturbance techniques consistent with no-till farming practices.

Operation Acres:

Total Acres: 41.98 **Total Acres Available For Nutrient Application Under Operator's Control: Owned:** 18.4 **Rented:** 0

Animal Equivalent Units: 105.71 **Animal Equivalent Units Per Acre:** 5.75

								Starter/Other Fertilizer (lb/A)			Supplemental Fertilizer (lb/A)			Nutrient Balance (lb/A)[2]		
CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
EL1	10.1	Established Pasture (without legume)	Field EL1 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes	0	0	0	0	0	0	104	-20	41
EL2	6.2	Established Pasture (without legume)	Field EL2 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes	0	0	0	0	0	0	104	-20	-39
EL3	2.1	Established Pasture (without legume)	Field EL3 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes	0	0	0	0	0	0	104	-21	-39

[1] See rate calibration table (Nutrient Management Plan Summary Notes).

[2] Positive numbers = nutrient deficit; Negative numbers = nutrient excess

NMP Summary Notes

Crop Years 2023

CMU/Field ID	Notes
EL1	The grazing group includes the following animals on pasture: 1 milk cows from the Milk Cow animal group,18 hours per day for 134 days,from Apr. to Nov. 1 dairy heifers from the Heifer animal group,18 hours per day for 134 days,from Apr. to Nov. 5 beef finishers from the Finisher Cattle animal group,24 hours per day for 200 days,from Jan. to Dec. 15 sheep from the Ewe animal group,18 hours per day for 134 days,from Apr. to Nov. 30 sheep from the Lamb animal group,18 hours per day for 134 days,from Apr. to Nov. 1 sheep from the Ram animal group,18 hours per day for 134 days,from Apr. to Nov. This field will receive manure from the Small Quantities Manure Group.
EL2	Grazing group includes the following animals on pasture: 1 milk cows from the Milk Cow animal group,18 hours per day for 82 days,from Apr. to Nov. 1 dairy heifers from the Heifer animal group,18 hours per day for 82 days,from Apr. to Nov. 5 beef finishers from the Finisher Cattle animal group,24 hours per day for 123 days,from Jan. to Dec. 15 sheep from the Ewe animal group,18 hours per day for 82 days,from Apr. to Nov. 30 sheep from the Lamb animal group,18 hours per day for 82 days,from Apr. to Nov. 1 sheep from the Ram animal group,18 hours per day for 82 days,from Apr. to Nov. This field will receive manure from the Small Quantities Manure Group.
EL3	Grazing group includes the following animals on pasture: 1 milk cows from the Milk Cow animal group,18 hours per day for 28 days,from Apr. to Nov. 1 dairy heifers from the Heifer animal group,18 hours per day for 28 days,from Apr. to Nov. 5 beef finishers from the Finisher Cattle animal group,24 hours per day for 42 days,from Jan. to Dec. 15 sheep from the Ewe animal group,18 hours per day for 28 days,from Apr. to Nov. 30 sheep from the Lamb animal group,18 hours per day for 28 days,from Apr. to Nov. 1 sheep from the Ram animal group,18 hours per day for 28 days,from Apr. to Nov. This field will receive manure from the Small Quantities Manure Group.

[1] See rate calibration table (Nutrient Management Plan Summary Notes).

[2] Positive numbers = nutrient deficit; Negative numbers = nutrient excess

Manure Spreader Calibration Notes

1

Crop Years 2023

Manure Application Rate	Manure Spreader Used	Spreader Settings	Tractor Used (if applicable)	Tractor Settings (speed, gear, rpm, pto, etc.)
This operation does not mechanically apply manure				

Nutrient Management Plan Summary

Total acres reported in NMP Summary: 18.4 **Crop Year(s)** 2024

Whole Farm Note: None

If manure runs out for any field, consult Appendix 4 of the plan for that field. The fertilizer required on any part of the field that does not receive manure can be determined from the 'Net Nutrients Required' for that field.

Fall manure applications require at least 25% cover unless the crop management unit is planted to a cover crop in time to allow for appropriate growth to control runoff until the next growing season, or the manure is injected or mechanically incorporated within 5 days using minimal soil disturbance techniques consistent with no-till farming practices.

Operation Acres:

Total Acres: 41.98 **Total Acres Available For Nutrient Application Under Operator's Control: Owned:** 18.4 **Rented:** 0

Animal Equivalent Units: 105.71 **Animal Equivalent Units Per Acre:** 5.75

								Starter/Other Fertilizer (lb/A)			Supplemental Fertilizer (lb/A)			Nutrient Balance (lb/A)[2]		
CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
EL1	10.1	Established Pasture (without legume)	Field EL1 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes	0	0	0	0	0	0	104	-20	41
EL2	6.2	Established Pasture (without legume)	Field EL2 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes	0	0	0	0	0	0	104	-20	-39
EL3	2.1	Established Pasture (without legume)	Field EL3 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes	0	0	0	0	0	0	104	-21	-39

[1] See rate calibration table (Nutrient Management Plan Summary Notes).

[2] Positive numbers = nutrient deficit; Negative numbers = nutrient excess

NMP Summary Notes

Crop Years 2024

CMU/Field ID	Notes
EL1	The grazing group includes the following animals on pasture: 1 milk cows from the Milk Cow animal group,18 hours per day for 134 days,from Apr. to Nov. 1 dairy heifers from the Heifer animal group,18 hours per day for 134 days,from Apr. to Nov. 5 beef finishers from the Finisher Cattle animal group,24 hours per day for 200 days,from Jan. to Dec. 15 sheep from the Ewe animal group,18 hours per day for 134 days,from Apr. to Nov. 30 sheep from the Lamb animal group,18 hours per day for 134 days,from Apr. to Nov. 1 sheep from the Ram animal group,18 hours per day for 134 days,from Apr. to Nov. This field will receive manure from the Small Quantities Manure Group.
EL2	Grazing group includes the following animals on pasture: 1 milk cows from the Milk Cow animal group,18 hours per day for 82 days,from Apr. to Nov. 1 dairy heifers from the Heifer animal group,18 hours per day for 82 days,from Apr. to Nov. 5 beef finishers from the Finisher Cattle animal group,24 hours per day for 123 days,from Jan. to Dec. 15 sheep from the Ewe animal group,18 hours per day for 82 days,from Apr. to Nov. 30 sheep from the Lamb animal group,18 hours per day for 82 days,from Apr. to Nov. 1 sheep from the Ram animal group,18 hours per day for 82 days,from Apr. to Nov. This field will receive manure from the Small Quantities Manure Group.
EL3	Grazing group includes the following animals on pasture: 1 milk cows from the Milk Cow animal group,18 hours per day for 28 days,from Apr. to Nov. 1 dairy heifers from the Heifer animal group,18 hours per day for 28 days,from Apr. to Nov. 5 beef finishers from the Finisher Cattle animal group,24 hours per day for 42 days,from Jan. to Dec. 15 sheep from the Ewe animal group,18 hours per day for 28 days,from Apr. to Nov. 30 sheep from the Lamb animal group,18 hours per day for 28 days,from Apr. to Nov. 1 sheep from the Ram animal group,18 hours per day for 28 days,from Apr. to Nov. This field will receive manure from the Small Quantities Manure Group.

[1] See rate calibration table (Nutrient Management Plan Summary Notes).

[2] Positive numbers = nutrient deficit; Negative numbers = nutrient excess

Manure Spreader Calibration Notes

1

Crop Years 2024

Manure Application Rate	Manure Spreader Used	Spreader Settings	Tractor Used (if applicable)	Tractor Settings (speed, gear, rpm, pto, etc.)
This operation does not mechanically apply manure				

Additional Nutrient Management Plan Requirements

Manure Management and Stormwater BMP Implementation Summary

Best Management Practice	NRCS Practice Code [1]	BMP Location	Implementation Season & Year
None	N/A	N/A	N/A

1 If applicable, enter USDA-NRCS Practice Code. For other non-technical BMPs, leave blank.

In-Field Manure Stacking Procedures

Manure must be applied to the field within 120 days of stacking or the stacks must be covered. Stacks must be implemented and maintained according to sound BMPs, addressing concerns such as soil type, soil slope, shape of the pile, setbacks, and rotation of piles.

This operation does not field stack manure.

Additional CAFO Requirements

In-field stacking criteria, winter storage requirements, and other issues identified by DEP's review of the nutrient management plan.

1. No Concentrated Animal Feeding Operation (CAFO) may stack manure on site at the CAFO operation for greater than 14 days unless the stack is properly located and covered or otherwise stored/protected to prevent discharge to surface water during a storm event.
2. No CAFO may land apply manure within 100 ft, of a surface water or conduit to surface water (such as, but not limited to, a sink hole, tile drain inlet, or irrigation well), unless a permanent 35 ft vegetated buffer is present between the surface water or conduit to surface water. Importers utilized by the CAFO operation should use the setbacks identified in their Nutrient Management Plan or the Nutrient Balance Sheet provided by the CAFO operator. These setbacks requirements may be greater than 100 foot in some cases.
3. CAFO operators are advised to have their manure storage facilities near empty by December 15th, in order to provide as much manure storage time during winter months. This operation should have at least a minimum of 6.8 vertical feet of space or 13.6 feet of slope distance from the top of the embankment to the top of the manure level in the HDPE lined manure storage pond on December 15th. This will allow for 456,000 gallons of storage in addition to the 1 foot of freeboard in the structure over the 76 day winter period. The storage should be emptied so that the operator has at least the minimum vertical or slope space listed above available on December 15th. See Appendix 10 for required winter storage volume calculations.
4. Measures taken to prevent a discharge to surface water from the storage of raw materials such as feed and supplies, is as follows: Duck feed is stored in sealed bins. Cattle and sheep feed is stored indoors. Other raw materials such as chemicals or fuels are discussed in the farm's Pollution Prevention and Contingency Plan (PPC Plan).

Proposed Manure Storage Description

Type, dimensions, volume, freeboard and location on map.

There are no manure storage structures proposed for this operation.

Description of Planned Alternative Manure Technology Practices

Type of practice, volume of manure addressed, and result of practice.

There are no alternative manure technology practices planned for this operation.

Exported Manure Summary

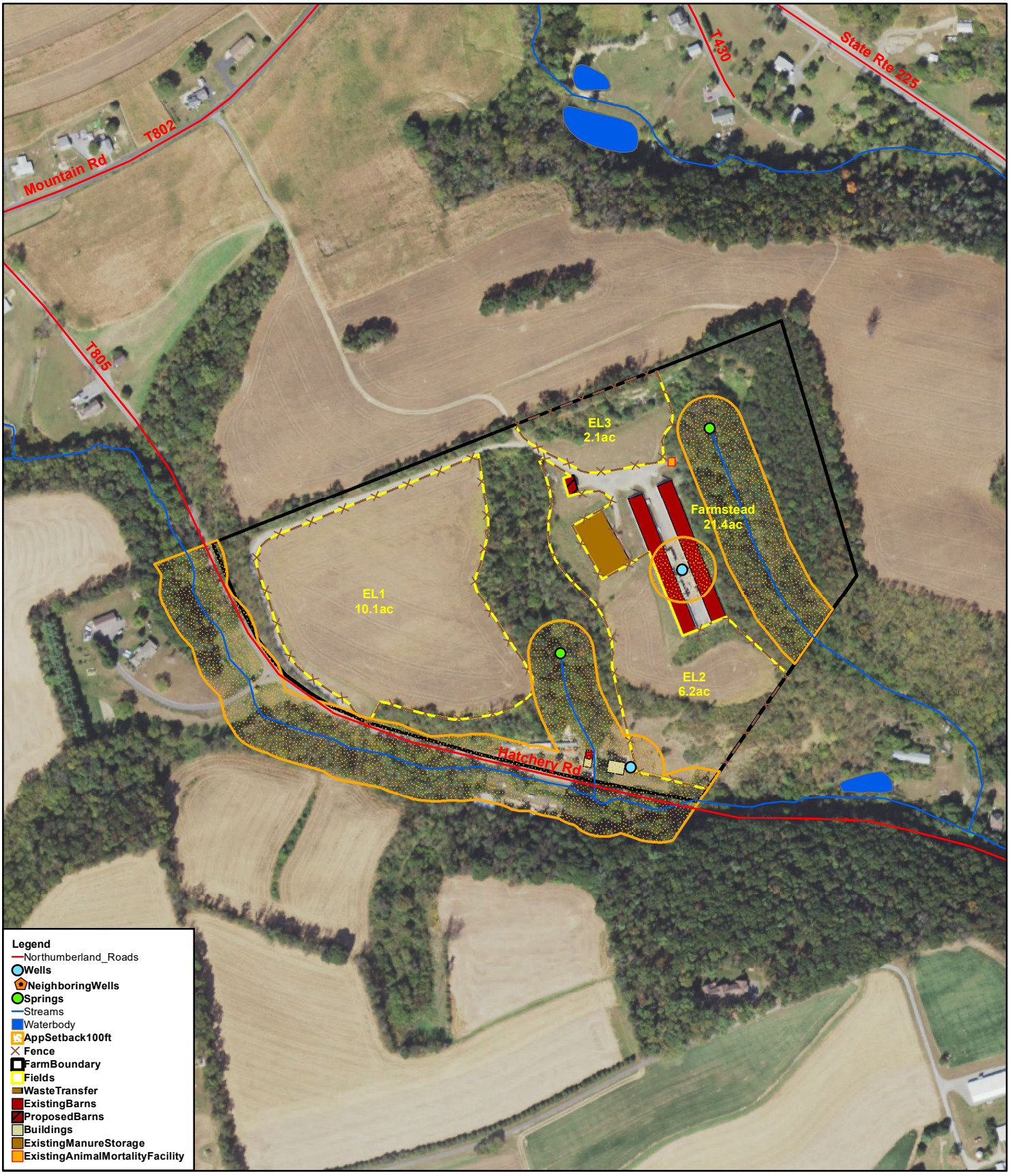
Summarize in a short paragraph the arrangements proposed for the manure to be exported from the operation. This information is described in more detail in Appendix 8 of this plan.

All duck manure generated on this operation is exported to a certified manure broker. See Appendix 8 for details. Small quantity importers will be used to as a means to export bedded pack manure. Records will be maintained to document these small quantity exports using Supplement 19: Small Quantity Manure Importer List included in Appendix 10 of this plan.

Operator Management Map

Three types of maps are required for an Act 38 Nutrient Management Plan: 1) Topographic Map, 2) Soils Map, and 3) Operator Management Map. The **Operator Management Map** is to be included here in the Nutrient Management Plan Summary and must include field identification, acreage and boundaries, manure application setback areas and buffers and associated landscape features (streams and other water bodies, sinkholes and active water wells), location of existing and proposed structural BMPs (including manure storage facilities), location of existing or proposed emergency manure stacking areas and in-field manure stacking areas, and road names adjacent to and within the operation. All features on the map must be clearly identified and include a legend for setback areas and other features. The Topographic Map and Soils Map must be included in Appendix 9.

Emanuel Lapp Operator Management Map



0 200 400 800 1,200 Feet

N W E S

Field verification of application setbacks and buffers is required prior to land application of manure.

Appendix 1

Nutrient Management Plan Agreement & Responsibilities

Plan Implementation Requirements

This nutrient management plan has been developed to meet the requirements of the following programs:

X	Pennsylvania Act 38 of 2005	X	CAO		VAO (check one)
X	Pennsylvania CAFO (Concentrated Animal Feeding Operation) program				
	Other program:				

Plans developed under these programs are required to be implemented as approved in order to maintain compliance with the specific law or program. Implementation includes adherence to manure and fertilizer application rates, timing, setbacks and conditions; installation of listed BMPs within implementation timeframes; and record keeping obligations of the program.

The nutrient management plan has been developed as a: (check one)

	1-Year Plan for Crop Year			(annual updates will be completed)
X	3-Year Plan for Crop Years	2022	2023	2024

Records required to be maintained include the following:

1) Annual crop yields
2) Manure and fertilizer application rates, locations and date of application
3) Manure production figures for the various manure groups listed in your plan
4) Soil test reports (testing required every 3 years per crop management unit)
5) Manure test reports (testing required once a year for each manure group)
6) Number of animals on pasture, number of days on pasture, and hours per day on pasture
7) For operations exporting manure, Manure Export Sheets
8) BMP designs and certification for new liquid and semi-solid manure storage facilities

The following has been confirmed:

X	Verification of Ag E&S Plan		No Ag E&S Plan Required
X	Verification of Existing Site Specific Emergency Response Plan		

Verification that owners of rented/leased lands have been notified that a nutrient management plan has been developed which calls for manure to be applied to their lands and that they have no objections to the plan requirements.

	Owners Notified	X	No Rented/Leased Lands

Specialist Signature

I affirm that the information contained in this nutrient management plan is true, accurate and complete to the best of my knowledge and belief, based on information provided by the operator; that this plan has been developed in accordance with the criteria established for the program(s) indicated above; and that I have presented the final complete plan to the operator and discussed the content and implementation of this plan with the operator, subject to the penalties of 18 Pa.C.S.A. § 4904, relating to unsworn falsification to authorities.

Specialist Signature 

Date 3/1/22

Operator Signature

I understand and agree that I will implement the practices, procedures and record keeping obligations as outlined in this plan in order to protect water quality and address the nutrient needs of the crops associated with the operation. I agree that if I use a commercial hauler or broker for the application or export of manure, that only haulers or brokers that hold a valid certification issued by the Pa Department of Agriculture, under Act 49 of 2004, will be used. I affirm that all information provided in this nutrient management plan is true, accurate and complete to the best of my knowledge and belief, and reflects the current and planned activities of the operation; and that, if this plan was completed by a nutrient management specialist, I have reviewed the final completed plan and the specialist has discussed the content and implementation of this plan with me, subject to the penalties of 18 Pa.C.S.A. § 4904, relating to unsworn falsification to authorities.

Operator Signature 

Operator Title Owner

Date 3-11-22

Appendix 2

Operation Information

Operation Description

Animal types and numbers; cropland, hayland and pastureland acreage; farmstead acreage; crop rotation (crops, sequence of crops, and number of years for each crop); manure group management (contributing animal groups, collection, storage and handling procedures); each animal group on pasture (animal numbers, grazing season, hours per day on pasture, fields grazed, type and description of grazing management – continuous or rotational) composting (including mortality) management.

Emanuel Lapp operates a duck farm in Northumberland County, PA. The operation consists of 0 acres of cropland, 0 acres of hayland, 18.4 acres of pasture and 21.4 acres of farmstead. The balance of the deeded acres are treated as woodland. The operation's cropland is in the process of being converted to permanent pasture. This will be the crop rotation moving forward. Pasture is being established using no-till planting methods. The duck operation consists of a total of 18,800 ducks housed in two barns (9,400 ducks per barn). The ducks are split into a starter group and a finisher group. Each group of 18,800 starter ducks are housed in the starter side of the barn for 14 days and then moved to the finisher side of the barn for an additional 25 days. A new group of starter ducks is brought onto the operation after the previous group is moved to the finisher side of the barn. The starter ducks are on the operation for a total of 182 days per year and the finisher ducks are on the operation for a total of 325 days per year. All duck manure is handled as a liquid, collected together in the duck barns and gravity transferred to an existing HDPE lined earthen manure storage pond. All duck manure is exported off of the operation through a certified Manure Broker. Mr. Lapp also has 1 milk cow, 1 heifer and 1 horse on the operation. The milk cow and heifer are housed in a former storage building located next to the duck barns that has been converted into a barn. Mr. Lapp will be adding an average of 5 beef finishing cattle, 15 ewe sheep, 30 lambs and 1 ram to his operation in crop year 2023. The beef cattle will be kept on pasture year round. The milk cow, heifer and sheep will have access to pasture from April through November. Sheep will be housed in the barn with the milk cow and heifer when not on pasture. Manure collected from the cattle and sheep will be handled as a bedded pack and exported off of the farm using small quantity manure importers. The horse is housed in a stall located in a garage next to Mr. Lapp's house. The horse is currently confined year round but will begin to have access to pasture in crop year 2023 once the existing crop fields have been converted to pasture. A small quantities manure group has been established in the plan for the horse manure. Collected horse manure is utilized on the family garden. Duck mortalities are disposed of on-site in a mortality incinerator. Ash from the mortality incinerator is added to the HDPE lined earthen manure storage pond. Cattle and sheep mortalities are composed in bedded pack manure. Mortality compost is mixed with and exported off of the farm with the bedded pack manure.

County(s)

Northumberland County / Lower Mahanoy Township

Name of Receiving Stream(s)/Watershed(s)

Unnamed tributary to Mahantango Creek – WWF

Notation of Special Protection Waters

None

Operation Acres

Total Acres: 41.98 acres

Total Acres Available for Nutrient Application Under Operator's Control

Owned: 18.4 acres

Rented: 0.0 acres

Names & Addresses of Owners of Rented or Leased Land and/or Facilities

None

Existing Manure Storages & Capacity

Type of storage, dimensions, useable capacity, freeboard, top or bottom loaded, dimensions and description of contributing runoff area, description of wastewater additions, types and amounts of bedding. Briefly describe, for each manure group, manure storage management during removal (degree of agitation, method of manure removal, extent the storage is emptied, type of unremoved manure, etc.) and manure sampling procedures.

A 100' x 185' x 14' HDPE lined earthen manure storage pond is located at the operation west of the duck barns. The structure has a usable capacity of 995,528 gallons of manure generation when accounting for a 1 foot freeboard and the volume of a 100 year / 24 hour storm event. The storage is bottom loaded using a gravity transfer system. The gravity transfer systems consists of a 45' x 450' x 1.5' reception pit under each barn that collects both starter and finisher duck manure. Each reception pit has a usable capacity of 227,205 gallons. Barn wash water is added to the storage. No bedding is added to the storage. Ash from the on-site mortality incinerator is added to the storage. The manure storage is completely agitated prior to beginning manure removal and periodically agitated throughout the manure removal process. A manure pump is used to transfer manure from the storage to manure hauling and application equipment. The majority of the manure is removed in both the spring and fall. Manure samples are taken directly from the storage during manure removal and combined into one representative sample.

Manure Application Equipment Capacity & Practical Application Rates

Description of application equipment, practical application rates based on calibration and calibration method used, the data recorded during equipment calibration is to be retained on the farm. If applicable, name and Act 49 certification number of custom applicator.

This operation does not mechanically apply manure.

Appendix 3 Manure Group Information Crop Yrs. 2022	Bedded Pack Manure		Small Quantity Manure		Duck Manure Spring		Duck Manure Fall		Field EL3 - Grazing Calculator	
Manure Report Date (note if averaging several reports)	1/31/2022		Book Value		5/11/2021		5/11/2021		Uncollected Book	
Laboratory Name	Spectrum Analytic, Inc.		Penn State Agronomy Guide		Waypoint		Waypoint		PSU Agronomy Guide	
Manure Type	Dairy		Other		Poultry		Poultry		Other	
Manure Unit (lbs/ton or 1000 gal)	lb/ton		lb/ton		lb/1000 gal		lb/1000 gal		lb/ton	
Total Nitrogen (N) (lbs/ton or 1000 gal)	10.6		12		30		30		10	
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	1.2		Complete NH4-N		23		23		0	
Total Organic N (lbs/ton or 1000 gal)	9.40		Check N values in Manure Avg Input		7.00		7.00		10.00	
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	10.8		5		17.8		17.8		3.73	
Total Potash (K_2O) (lbs/ton or 1000 gal)	4.2		9		14.1		14.1		7.73	
Percent Solids	26.94		20		2.8		2.8		0	
PSC Value (analytical or book value)	0.64		0.8		0.8		0.8		0.8	
Percent Moisture	73.06		80.00		97.20		97.20		100.00	
Manure Group AEU's	2.45		1.10		47.35		47.09		0.00	
Description: Site & Season Applied	Cattle & Sheep Barn	Spring & Fall	Horse Stalls	Spring	HDPE Lined Earthen Pone	Spring	HDPE Lined Earthen Pone	Fall	Records	Grazing
Inventory Method	Calculated		Calculated		Records		Records		Records	
	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.
Manure Group Identification	Bedded Pack Manure	Bedded Pack Manure - uncollected	Small Quantity Manure		Duck Manure Spring		Duck Manure Fall		Field EL3 - Grazing Calculator	
CALCULATED: Total Manure Collected Per Manure Group	22.1	20.2	12.0		0.0		0.0		0.0	
Units	Tons	Tons	Tons		gallons		gallons		Tons	
RECORDS: Total Manure Collected Per Manure Group					975,000.0		975,000.0		20.2	
Unit					Gallons		Gallons		Tons	
	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected
Manure Used On-Farm	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	20.2	0.0
Units	Tons	Tons	Tons		Gallons		Gallons		Tons	
Manure Exported	22.1		12.0		975,000.0		975,000.0		0.0	
Units	tons		tons		gallons		gallons			
Manure Allocation Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Units	Tons	Tons	Tons		Gallons		Gallons		Tons	
Manure Balance as a Percent of Total Manure Collected	0.0%		0.3%		0.0%		0.0%		0.0%	
Total Rainfall and Runoff										

Appendix 3 Manure Group Information Crop Yrs. 2022	Bedded Pack Manure		Small Quantity Manure		Duck Manure Spring		Duck Manure Fall			
	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values
Animal Group 1	Milk Cow	Milk Cow - uncollected	Horse		Starter Duck		Starter Duck			
Animal Type	Holstein Lactating Cow	Total Nitrogen (N) lbs/ton	Light Horse Mature		Duck, starter: 0–17 days		Duck, starter: 0–17 days			
Animal Number	1	10.00	1		18800		18800			
Animal Weight	1450 lbs	Total Phosphate (P2O5) lbs/ton	1100 lbs		1.36 lbs		1.36 lbs			
Animal Group AUs	1.45 AUs	4.00	1.10 AUs		25.57 AUs		25.57 AUs			
Animal Group AEUs	1.45 AEUs	Total Potash (K2O) lbs/ton	1.10 AEUs		6.37 AEUs		6.37 AEUs			
Daily Manure Production per AU	111.0 lb	8.00	55.0 lb		13.0 gal		13.0 gal			
Total Days Manure Produced	365 days	PSC Value	365 days		91 days		91 days			
Total Manure Produced	29.37 tons	0.80	11.04 tons		Records		Records			
Days On Pasture	244 days		0 days		0 days		0 days			
Hours Per Day On Pasture	18 hrs		0 hrs		0 hrs		0 hrs			
Total Bedding	1.00 tons		1.00 tons		Records		Records			
Total Washwater	0.00 tons		0.00 tons		Records		Records			
CALCULATED - Total Uncollected Manure Per Animal Group	14.73 tons	14.73 - Tons								
CALCULATED-Total Manure Collected Per Animal Group	15.65 tons		12.04 tons		Records		Records			

Animal Group 2	Heifer	Heifer - uncollected			Finisher Duck Spring		Finisher Duck Fall			
Animal Type	Holstein Heifer:1 -2 yr.	Total Nitrogen (N) lbs/ton			Duck, finisher: 17-38 days		Duck, finisher: 17-38 days			
Animal Number	1	10.00			18800		18800			
Animal Weight	1000 lbs	Total Phosphate (P2O5) lbs/ton			4.88 lbs		4.88 lbs			
Animal Group AUs	1.00 AUs	3.00			91.74 AUs		91.74 AUs			
Animal Group AEUs	1.00 AEUs	Total Potash (K2O) lbs/ton			40.97 AEUs		40.72 AEUs			
Daily Manure Production per AU	60.0 lb	7.00			13.0 gal		13.0 gal			
Total Days Manure Produced	365 days	PSC Value			163 days		162 days			
Total Manure Produced	10.95 tons	0.80			Records		Records			
Days On Pasture	244 days				0 days		0 days			
Hours Per Day On Pasture	18 hrs				0 hrs		0 hrs			
Total Bedding	1.00 tons				Records		Records			
Total Washwater	0.00 tons				Records		Records			
CALCULATED - Total Uncollected Manure Per Animal Group	5.49 tons	5.49 - Tons								
CALCULATED-Total Manure Collected Per Animal Group	6.46 tons				Records		Records			

Appendix 3 Manure Group Information Crop Yrs. 2023	Bedded Pack Manure		Small Quantity Manure		Duck Manure Spring		Duck Manure Fall		Field EL1 - Grazing Calculator	
Manure Report Date (note if averaging several reports)	1/31/2022		Book Value		5/11/2021		5/11/2021		Uncollected Book	
Laboratory Name	Spectrum Analytic, Inc.		Penn State Agronomy Guide		Waypoint		Waypoint		PSU Agronomy Guide	
Manure Type	Dairy		Other		Poultry		Poultry		Other	
Manure Unit (lbs/ton or 1000 gal)	lb/ton		lb/ton		lb/1000 gal		lb/1000 gal		lb/ton	
Total Nitrogen (N) (lbs/ton or 1000 gal)	10.6		12		30		30		14.23	
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	1.2		Complete NH4-N		23		23		0	
Total Organic N (lbs/ton or 1000 gal)	9.40		Check N values in Manure Avg Input		7.00		7.00		14.23	
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	10.8		5		17.8		17.8		5.09	
Total Potash (K_2O) (lbs/ton or 1000 gal)	4.2		9		14.1		14.1		9.7	
Percent Solids	26.94		20		2.8		2.8		0	
PSC Value (analytical or book value)	0.64		0.8		0.8		0.8		0.8	
Percent Moisture	73.06		80.00		97.20		97.20		100.00	
Manure Group AEU's	10.18		1.10		47.35		47.09		0.00	
Description: Site & Season Applied	Cattle & Sheep Barn	Spring & Fall	Horse Stalls	Spring	HDPE Lined Earthen Pone	Spring	HDPE Lined Earthen Pone	Fall	Records	Grazing
Inventory Method	Calculated		Calculated		Records		Records		Records	
	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.
Manure Group Identification	Bedded Pack Manure	Bedded Pack Manure - uncollected	Small Quantity Manure	Small Quantity Manure - uncollected	Duck Manure Spring		Duck Manure Fall		Field EL1 - Grazing Calculator	
CALCULATED: Total Manure Collected Per Manure Group	35.9	73.6	9.4	3.7	0.0		0.0		0.0	
Units	Tons	Tons	Tons	Tons	gallons		gallons		Tons	
RECORDS: Total Manure Collected Per Manure Group					975,000.0		975,000.0		40.4	
Unit					Gallons		Gallons		Tons	
	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected
Manure Used On-Farm	0.0	73.6	0.0	0.0	0.0	0.0	0.0	0.0	40.4	0.0
Units	Tons	Tons	Tons	Tons	Gallons		Gallons		Tons	
Manure Exported	35.9		9.4		975,000.0		975,000.0		0.0	
Units	tons		tons		gallons		gallons			
Manure Allocation Balance	0.0	0.0	-0.1	3.7	0.0	0.0	0.0	0.0	0.0	0.0
Units	Tons	Tons	Tons	Tons	Gallons		Gallons		Tons	
Manure Balance as a Percent of Total Manure Collected	0.1%		-0.5%		0.0%		0.0%		-0.1%	
Total Rainfall and Runoff										

Appendix 3 Manure Group Information Crop Yrs. 2023	Bedded Pack Manure		Small Quantity Manure		Duck Manure Spring		Duck Manure Fall			
	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values
Animal Group 1	Milk Cow	Milk Cow - uncollected	Horse	Horse - uncollected	Starter Duck		Starter Duck			
Animal Type	Holstein Lactating Cow	Total Nitrogen (N) lbs/ton	Light Horse Mature	Total Nitrogen (N) lbs/ton	Duck, starter: 0–17 days		Duck, starter: 0–17 days			
Animal Number	1	10.00	1	12.00	18800		18800			
Animal Weight	1450 lbs	Total Phosphate (P2O5) lbs/ton	1100 lbs	Total Phosphate (P2O5) lbs/ton	1.36 lbs		1.36 lbs			
Animal Group AUs	1.45 AUs	4.00	1.10 AUs	5.00	25.57 AUs		25.57 AUs			
Animal Group AEUs	1.45 AEUs	Total Potash (K2O) lbs/ton	1.10 AEUs	Total Potash (K2O) lbs/ton	6.37 AEUs		6.37 AEUs			
Daily Manure Production per AU	111.0 lb	8.00	55.0 lb	9.00	13.0 gal		13.0 gal			
Total Days Manure Produced	365 days	PSC Value	365 days	PSC Value	91 days		91 days			
Total Manure Produced	29.37 tons	0.80	11.04 tons	0.80	Records		Records			
Days On Pasture	244 days		244 days		0 days		0 days			
Hours Per Day On Pasture	18 hrs		12 hrs		0 hrs		0 hrs			
Total Bedding	1.00 tons		2.00 tons		Records		Records			
Total Washwater	0.00 tons		0.00 tons		Records		Records			
CALCULATED - Total Uncollected Manure Per Animal Group	14.73 tons	14.73 - Tons	3.69 tons	3.69 - Tons						
CALCULATED-Total Manure Collected Per Animal Group	15.65 tons		9.35 tons		Records		Records			

Animal Group 2	Heifer	Heifer - uncollected			Finisher Duck Spring		Finisher Duck Fall			
Animal Type	Holstein Heifer:1 -2 yr.	Total Nitrogen (N) lbs/ton			Duck, finisher: 17-38 days		Duck, finisher: 17-38 days			
Animal Number	1	10.00			18800		18800			
Animal Weight	1000 lbs	Total Phosphate (P2O5) lbs/ton			4.88 lbs		4.88 lbs			
Animal Group AUs	1.00 AUs	3.00			91.74 AUs		91.74 AUs			
Animal Group AEUs	1.00 AEUs	Total Potash (K2O) lbs/ton			40.97 AEUs		40.72 AEUs			
Daily Manure Production per AU	60.0 lb	7.00			13.0 gal		13.0 gal			
Total Days Manure Produced	365 days	PSC Value			163 days		162 days			
Total Manure Produced	10.95 tons	0.80			Records		Records			
Days On Pasture	244 days				0 days		0 days			
Hours Per Day On Pasture	18 hrs				0 hrs		0 hrs			
Total Bedding	1.00 tons				Records		Records			
Total Washwater	0.00 tons				Records		Records			
CALCULATED - Total Uncollected Manure Per Animal Group	5.49 tons	5.49 - Tons								
CALCULATED-Total Manure Collected Per Animal Group	6.46 tons				Records		Records			

Appendix 3 Manure Group Information Crop Yrs. 2023	Bedded Pack Manure		Small Quantity Manure		Duck Manure Spring		Duck Manure Fall			
	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values
Animal Group 3	Finisher Cattle	Finisher Cattle - uncollected								
Animal Type	Beef Finishing: 8–24 mo.	Total Nitrogen (N) lbs/ton								
Animal Number	5	14.00								
Animal Weight	950 lbs	Total Phosphate (P2O5) lbs/ton								
Animal Group AUs	4.75 AUs	5.00								
Animal Group AEUs	4.75 AEUs	Total Potash (K2O) lbs/ton								
Daily Manure Production per AU	49.0 lb	8.00								
Total Days Manure Produced	365 days	PSC Value								
Total Manure Produced	42.48 tons	0.80								
Days On Pasture	365 days									
Hours Per Day On Pasture	24 hrs									
Total Bedding	0.00 tons									
Total Washwater	0.00 tons									
CALCULATED - Total Uncollected Manure Per Animal Group	42.48 tons	42.48 - Tons								
CALCULATED-Total Manure Collected Per Animal Group	0.00 tons									
Animal Group 4	Ewe	Ewe - uncollected								
Animal Type	Smaller Breed Ewe	Total Nitrogen (N) lbs/ton								
Animal Number	15	23.00								
Animal Weight	100 lbs	Total Phosphate (P2O5) lbs/ton								
Animal Group AUs	1.50 AUs	8.00								
Animal Group AEUs	1.50 AEUs	Total Potash (K2O) lbs/ton								
Daily Manure Production per AU	40.0 lb	20.00								
Total Days Manure Produced	365 days	PSC Value								
Total Manure Produced	10.95 tons	0.80								
Days On Pasture	244 days									
Hours Per Day On Pasture	18 hrs									
Total Bedding	1.00 tons									
Total Washwater	0.00 tons									
CALCULATED - Total Uncollected Manure Per Animal Group	5.49 tons	5.49 - Tons								
CALCULATED-Total Manure Collected Per Animal Group	6.46 tons									

Appendix 3 Manure Group Information Crop Yrs. 2023	Bedded Pack Manure		Small Quantity Manure		Duck Manure Spring		Duck Manure Fall			
	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values
Animal Group 5	Lamb	Lamb - uncollected								
Animal Type	Smaller Breed Lamb: 0–1 yr.	Total Nitrogen (N) lbs/ton								
Animal Number	30	23.00								
Animal Weight	45 lbs	Total Phosphate (P2O5) lbs/ton								
Animal Group AUs	1.35 AUs	8.00								
Animal Group AEUs	1.35 AEUs	Total Potash (K2O) lbs/ton								
Daily Manure Production per AU	40.0 lb	20.00								
Total Days Manure Produced	365 days	PSC Value								
Total Manure Produced	9.86 tons	0.80								
Days On Pasture	244 days									
Hours Per Day On Pasture	18 hrs									
Total Bedding	1 tons									
Total Washwater	0.00 tons									
CALCULATED - Total Uncollected Manure Per Animal Group	4.94 tons	4.94 - Tons								
CALCULATED-Total Manure Collected Per Animal Group	5.91 tons									
Animal Group 6	Ram	Ram - uncollected								
Animal Type	Smaller Breed Ram	Total Nitrogen (N) lbs/ton								
Animal Number	1	23.00								
Animal Weight	125 lbs	Total Phosphate (P2O5) lbs/ton								
Animal Group AUs	0.13 AUs	8.00								
Animal Group AEUs	0.13 AEUs	Total Potash (K2O) lbs/ton								
Daily Manure Production per AU	40.0 lb	20.00								
Total Days Manure Produced	365 days	PSC Value								
Total Manure Produced	0.91 tons	0.80								
Days On Pasture	244 days									
Hours Per Day On Pasture	18 hrs									
Total Bedding	1.00 tons									
Total Washwater	0.00 tons									
CALCULATED - Total Uncollected Manure Per Animal Group	0.46 tons	0.46 - Tons								
CALCULATED-Total Manure Collected Per Animal Group	1.46 tons									

Appendix 3 Manure Group Information Crop Yrs. 2023	Field EL2 - Grazing Calculator		Field EL3 - Grazing Calculator	
Manure Report Date (note if averaging several reports)	Uncollected Book		Uncollected Book	
Laboratory Name	PSU Agronomy Guide		PSU Agronomy Guide	
Manure Type	Other		Other	
Manure Unit (lbs/ton or 1000 gal)	lb/ton		lb/ton	
Total Nitrogen (N) (lbs/ton or 1000 gal)	14.23		14.23	
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	0		0	
Total Organic N (lbs/ton or 1000 gal)	14.23		14.23	
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	5.09		5.09	
Total Potash (K_2O) (lbs/ton or 1000 gal)	9.7		9.7	
Percent Solids	0		0	
PSC Value (analytical or book value)	0.8		0.8	
Percent Moisture	100.00		100.00	
Manure Group AEU's	0.00		0.00	
Description: Site & Season Applied	Records	Grazing	Records	Grazing
Inventory Method	Records		Records	
	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.
Manure Group Identification	Field EL2 - Grazing Calculator		Field EL3 - Grazing Calculator	
CALCULATED: Total Manure Collected Per Manure Group	0.0		0.0	
Units	Tons		Tons	
RECORDS: Total Manure Collected Per Manure Group	24.8		8.5	
Unit	Tons		Tons	
	Collected	Uncollected	Collected	Uncollected
Manure Used On-Farm	24.7	0.0	8.5	0.0
Units	Tons		Tons	
Manure Exported	0.0		0.0	
Units				
Manure Allocation Balance	0.0	0.0	0.0	0.0
Units	Tons		Tons	
Manure Balance as a Percent of Total Manure Collected	0.1%		0.0%	
Total Rainfall and Runoff				

Appendix 3 Manure Group Information Crop Yrs. 2024	Bedded Pack Manure		Small Quantity Manure		Duck Manure Spring		Duck Manure Fall		Field EL1 - Grazing Calculator	
Manure Report Date (note if averaging several reports)	1/31/2022		Book Value		5/11/2021		5/11/2021		Uncollected Book	
Laboratory Name	Spectrum Analytic, Inc.		Penn State Agronomy Guide		Waypoint		Waypoint		PSU Agronomy Guide	
Manure Type	Dairy		Other		Poultry		Poultry		Other	
Manure Unit (lbs/ton or 1000 gal)	lb/ton		lb/ton		lb/1000 gal		lb/1000 gal		lb/ton	
Total Nitrogen (N) (lbs/ton or 1000 gal)	10.6		12		30		30		14.23	
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	1.2		Complete NH4-N		23		23		0	
Total Organic N (lbs/ton or 1000 gal)	9.40		Check N values in Manure Avg Input		7.00		7.00		14.23	
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	10.8		5		17.8		17.8		5.09	
Total Potash (K_2O) (lbs/ton or 1000 gal)	4.2		9		14.1		14.1		9.7	
Percent Solids	26.94		20		2.8		2.8		0	
PSC Value (analytical or book value)	0.64		0.8		0.8		0.8		0.8	
Percent Moisture	73.06		80.00		97.20		97.20		100.00	
Manure Group AEU's	10.18		1.10		47.35		47.09		0.00	
Description: Site & Season Applied	Cattle & Sheep Barn	Spring & Fall	Horse Stalls	Spring	HDPE Lined Earthen Pone	Spring	HDPE Lined Earthen Pone	Fall	Records	Grazing
Inventory Method	Calculated		Calculated		Records		Records		Records	
	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.
Manure Group Identification	Bedded Pack Manure	Bedded Pack Manure - uncollected	Small Quantity Manure	Small Quantity Manure - uncollected	Duck Manure Spring		Duck Manure Fall		Field EL1 - Grazing Calculator	
CALCULATED: Total Manure Collected Per Manure Group	35.9	73.6	9.4	3.7	0.0		0.0		0.0	
Units	Tons	Tons	Tons	Tons	gallons		gallons		Tons	
RECORDS: Total Manure Collected Per Manure Group					975,000.0		975,000.0		40.4	
Unit					Gallons		Gallons		Tons	
	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected	Collected	Uncollected
Manure Used On-Farm	0.0	73.6	0.0	0.0	0.0	0.0	0.0	0.0	40.4	0.0
Units	Tons	Tons	Tons	Tons	Gallons		Gallons		Tons	
Manure Exported	35.9		9.4		975,000.0		975,000.0		0.0	
Units	tons		tons		gallons		gallons			
Manure Allocation Balance	0.0	0.0	-0.1	3.7	0.0	0.0	0.0	0.0	0.0	0.0
Units	Tons	Tons	Tons	Tons	Gallons		Gallons		Tons	
Manure Balance as a Percent of Total Manure Collected	0.1%		-0.5%		0.0%		0.0%		-0.1%	
Total Rainfall and Runoff										

Appendix 3 Manure Group Information Crop Yrs. 2024	Field EL2 - Grazing Calculator		Field EL3 - Grazing Calculator	
Manure Report Date (note if averaging several reports)	Uncollected Book		Uncollected Book	
Laboratory Name	PSU Agronomy Guide		PSU Agronomy Guide	
Manure Type	Other		Other	
Manure Unit (lbs/ton or 1000 gal)	lb/ton		lb/ton	
Total Nitrogen (N) (lbs/ton or 1000 gal)	14.23		14.23	
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	0		0	
Total Organic N (lbs/ton or 1000 gal)	14.23		14.23	
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	5.09		5.09	
Total Potash (K_2O) (lbs/ton or 1000 gal)	9.7		9.7	
Percent Solids	0		0	
PSC Value (analytical or book value)	0.8		0.8	
Percent Moisture	100.00		100.00	
Manure Group AEU's	0.00		0.00	
Description: Site & Season Applied	Records	Grazing	Records	Grazing
Inventory Method	Records		Records	
	Collected Calc.	Uncollected Calc.	Collected Calc.	Uncollected Calc.
Manure Group Identification	Field EL2 - Grazing Calculator		Field EL3 - Grazing Calculator	
CALCULATED: Total Manure Collected Per Manure Group	0.0		0.0	
Units	Tons		Tons	
RECORDS: Total Manure Collected Per Manure Group	24.8		8.5	
Unit	Tons		Tons	
	Collected	Uncollected	Collected	Uncollected
Manure Used On-Farm	24.7	0.0	8.5	0.0
Units	Tons		Tons	
Manure Exported	0.0		0.0	
Units				
Manure Allocation Balance	0.0	0.0	0.0	0.0
Units	Tons		Tons	
Manure Balance as a Percent of Total Manure Collected	0.1%		0.0%	
Total Rainfall and Runoff				

Manure Analysis 5 Year Running Average

Manure Average for Crop Years. 2022	Bedded Pack Manure					
	Average	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
Manure Report Date	**Jan 31 2022**	Jan 31 2022				
Laboratory Name	**Spectrum Analytic, Inc.**	Spectrum Analytic, Inc.				
Manure Type	**Dairy**	Dairy				
Manure Unit (lbs/ton or 1000 gal)	**lb/ton**	lb/ton				
Total Nitrogen (N) (lbs/ton or 1000 gal)	**10.60**	10.60				
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	**1.20**	1.20				
Total Organic N (lbs/ton or 1000 gal)	**9.40**	9.40				
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	**10.80**	10.80				
Total Potash (K_2O) (lbs/ton or 1000 gal)	**4.20**	4.20				
Percent Solids	**26.94**	26.94				
PSC Value (Enter analytical or book value)	**0.64**	0.64				

Manure Average for Crop Years. 2022	Small Quantity Manure					
	Average	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
Manure Report Date	**Book Value**	Book Value				
Laboratory Name	**Penn State Agronomy Guide**	Penn State Agronomy Guide				
Manure Type	**Other**	Other				
Manure Unit (lbs/ton or 1000 gal)	**lb/ton**	lb/ton				
Total Nitrogen (N) (lbs/ton or 1000 gal)	**12.00**	12.00				
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	**Complete NH4-N**					
Total Organic N (lbs/ton or 1000 gal)		**12.00**				
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	**5.00**	5.00				
Total Potash (K_2O) (lbs/ton or 1000 gal)	**9.00**	9.00				
Percent Solids	**20.00**	20.00				
PSC Value (Enter analytical or book value)	**0.80**	0.80				

Manure Analysis 5 Year Running Average

Manure Average for Crop Years. 2022	Duck Manure Spring					
	Average	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
Manure Report Date	**May 11 2021**	May 11 2021				
Laboratory Name	**Waypoint**	Waypoint				
Manure Type	**Poultry**	Poultry				
Manure Unit (lbs/ton or 1000 gal)	**lb/1000 gal**	lb/1000 gal				
Total Nitrogen (N) (lbs/ton or 1000 gal)	**30.00**	30.00				
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	**23.00**	23.00				
Total Organic N (lbs/ton or 1000 gal)	**7.00**	**7.00**				
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	**17.80**	17.80				
Total Potash (K_2O) (lbs/ton or 1000 gal)	**14.10**	14.10				
Percent Solids	**2.80**	2.80				
PSC Value (Enter analytical or book value)	**0.80**	0.80				

Manure Average for Crop Years. 2022	Duck Manure Fall					
	Average	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
Manure Report Date	**May 11 2021**	May 11 2021				
Laboratory Name	**Waypoint**	Waypoint				
Manure Type	**Poultry**	Poultry				
Manure Unit (lbs/ton or 1000 gal)	**lb/1000 gal**	lb/1000 gal				
Total Nitrogen (N) (lbs/ton or 1000 gal)	**30.00**	30.00				
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	**23.00**	23.00				
Total Organic N (lbs/ton or 1000 gal)	**7.00**	**7.00**				
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	**17.80**	17.80				
Total Potash (K_2O) (lbs/ton or 1000 gal)	**14.10**	14.10				
Percent Solids	**2.80**	2.80				
PSC Value (Enter analytical or book value)	**0.80**	0.80				

Manure Analysis 5 Year Running Average

Manure Average for Crop Years. 2022	Field EL3 - Grazing Calculator					
	Average	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
Manure Report Date	**Uncollected Book**	Uncollected Book				
Laboratory Name	**PSU Agronomy Guide**	PSU Agronomy Guide				
Manure Type	**Other**	Other				
Manure Unit (lbs/ton or 1000 gal)	**lb/ton**	lb/ton				
Total Nitrogen (N) (lbs/ton or 1000 gal)	**10.00**	10.00				
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)						
Total Organic N (lbs/ton or 1000 gal)	**10.00**	**10.00**				
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	**3.73**	3.73				
Total Potash (K_2O) (lbs/ton or 1000 gal)	**7.73**	7.73				
Percent Solids						
PSC Value (Enter analytical or book value)	**0.80**	0.80				

App. 4: Crop Yrs. 2022	EL1			EL2			EL3		
CMU/Field ID									
Acres	10.1			6.2			2.1		
Soil Test Report Date	January 31, 2022			January 31, 2022			January 31, 2022		
Laboratory Name	Spectrum Analytic, Inc.			Spectrum Analytic, Inc.			Spectrum Analytic, Inc.		
Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH	ppm P	ppm K	pH	ppm P	ppm K	pH
(Show conversions to ppm in Appendix 10)	401	124	5.6	450	220	5.9	421	220	6.4
P Index Part A Evaluation	Farm Mgmt Change <150ft Soil Test P			Farm Mgmt Change <150ft Soil Test P			Farm Mgmt Change Soil Test P		
Part A Result	Part B			Part B			Part B		
Crop	Planting Pasture (without legume)			Planting Pasture (without legume)			Established Pasture (without legume)		
Planned Yield	2.5 ton/A			2.5 ton/A			2.5 ton/A		
PSU Soil Test Recommendation (lb/A)	**N**	**P2O5**	**K2O**	**N**	**P2O5**	**K2O**	**N**	**P2O5**	**K2O**
	150	0	80	150	0	0	150	0	0
User Soil Test Recommendation (lb/A)									
Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0	0	0	0	0	0	0
P Index Application Method									
Double Crop CarryOver N (lb/A)	0			0			0		
Manure History Description Residual Manure N (lb/A)	35	Continuously - Summer Crop		35	Continuously - Summer Crop		35	Continuously - Summer Crop	
Legume History Description Residual Legume N (lb/A)	0	No Legume Residual N Credit		0	No Legume Residual N Credit		0	No Legume Residual N Credit	
Net Nutrients Required (lb/A)	115	0	80	115	0	0	115	0	0
Manure Group							Field EL3 - Grazing Calculator		
Application Season: Management (Incorporation, cover crops, etc.)							Grazing anytime with nutrient uptake during growing season		
Availability Factors (Total N or NH4-N & Organic N)	**Total N**	**NH4-N**	**Org. N**	**Total N**	**NH4-N**	**Org. N**	**Total N**	**NH4-N**	**Org. N**
							0.20		
P Index Application Method							Nov - Mar: No incorp or incorp > 1 wk.		
N Balanced Manure Rate (ton; gal/A)							57.5 tons/A		
P Removal Balance Manure Rate (ton or gal/A; If required by P Index)								10.1 tons/A	
	Crop P Removal (lb/A) 37.5			Crop P Removal (lb/A) 37.5			Crop P Removal (lb/A) 37.5		
P Index Value	70			65			78		
Planned Manure Rate (ton or gal/A)	**No Manure Applied**			**No Manure Applied**				**9.63 tons/A**	
Nutrients Applied at Planned Manure Rate (lb/A)	0	0	0	0	0	0	19	36	74
Nutrient Balance after Manure	115	0	80	115	0	0	96	-36	-74
Supplemental Fertilizer (lb/A)	0	0	0	0	0	0	0	0	0
P Index Application Method									
Final Nutrient Balance (lb/A)	**115**	**0**	**80**	**115**	**0**	**0**	**96**	**-36**	**-74**
Multiple Application									
Manure Utilized on CMU	0			0			20 tons		

App. 4: Crop Yrs. 2023	EL1			EL2			EL3		
CMU/Field ID									
Acres	10.1			6.2			2.1		
Soil Test Report Date	January 31, 2022			January 31, 2022			January 31, 2022		
Laboratory Name	Spectrum Analytic, Inc.			Spectrum Analytic, Inc.			Spectrum Analytic, Inc.		
Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH	ppm P	ppm K	pH	ppm P	ppm K	pH
(Show conversions to ppm in Appendix 10)	401	124	5.6	450	220	5.9	421	220	6.4
P Index Part A Evaluation	Farm Mgmt Change <150ft Soil Test P			Farm Mgmt Change <150ft Soil Test P			Farm Mgmt Change Soil Test P		
Part A Result	Part B			Part B			Part B		
Crop	Established Pasture (without legume)			Established Pasture (without legume)			Established Pasture (without legume)		
Planned Yield	2.5 ton/A			2.5 ton/A			2.5 ton/A		
PSU Soil Test Recommendation (lb/A)	**N**	**P2O5**	**K2O**	**N**	**P2O5**	**K2O**	**N**	**P2O5**	**K2O**
	150	0	80	150	0	0	150	0	0
User Soil Test Recommendation (lb/A)									
Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0	0	0	0	0	0	0
P Index Application Method									
Double Crop CarryOver N (lb/A)	0			0			0		
Manure History Description Residual Manure N (lb/A)	35	Continuously - Summer Crop		35	Continuously - Summer Crop		35	Continuously - Summer Crop	
Legume History Description Residual Legume N (lb/A)	0	No Legume Residual N Credit		0	No Legume Residual N Credit		0	No Legume Residual N Credit	
Net Nutrients Required (lb/A)	115	0	80	115	0	0	115	0	0
Manure Group	Field EL1 - Grazing Calculator			Field EL2 - Grazing Calculator			Field EL3 - Grazing Calculator		
Application Season: Management (Incorporation, cover crops, etc.)	Grazing anytime with nutrient uptake during growing season			Grazing anytime with nutrient uptake during growing season			Grazing anytime with nutrient uptake during growing season		
Availability Factors (Total N or NH4-N & Organic N)	**Total N**	**NH4-N**	**Org. N**	**Total N**	**NH4-N**	**Org. N**	**Total N**	**NH4-N**	**Org. N**
	0.20			0.20			0.20		
P Index Application Method	April - Oct: No incorp or incorp > 1 wk.			Surface app. when frozen/snow covered			Surface app. when frozen/snow covered		
N Balanced Manure Rate (ton; gal/A)	40.4 tons/A			40.4 tons/A			40.4 tons/A		
P Removal Balance Manure Rate (ton or gal/A; If required by P Index)	7.4 tons/A			7.4 tons/A			7.4 tons/A		
	Crop P Removal (lb/A) 37.5			Crop P Removal (lb/A) 37.5			Crop P Removal (lb/A) 37.5		
P Index Value	79			77			74		
Planned Manure Rate (ton or gal/A)	**4 tons/A**			**3.99 tons/A**			**4.03 tons/A**		
Nutrients Applied at Planned Manure Rate (lb/A)	11	20	39	11	20	39	11	21	39
Nutrient Balance after Manure	104	-20	41	104	-20	-39	104	-21	-39
Supplemental Fertilizer (lb/A)	0	0	0	0	0	0	0	0	0
P Index Application Method									
Final Nutrient Balance (lb/A)	**104**	**-20**	**41**	**104**	**-20**	**-39**	**104**	**-21**	**-39**
Multiple Application									
Manure Utilized on CMU	40 tons			25 tons			8 tons		

App. 4: Crop Yrs. 2024	EL1			EL2			EL3		
CMU/Field ID									
Acres	10.1			6.2			2.1		
Soil Test Report Date	January 31, 2022			January 31, 2022			January 31, 2022		
Laboratory Name	Spectrum Analytic, Inc.			Spectrum Analytic, Inc.			Spectrum Analytic, Inc.		
Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH	ppm P	ppm K	pH	ppm P	ppm K	pH
(Show conversions to ppm in Appendix 10)	401	124	5.6	450	220	5.9	421	220	6.4
P Index Part A Evaluation	Farm Mgmt Change <150ft Soil Test P			Farm Mgmt Change <150ft Soil Test P			Farm Mgmt Change Soil Test P		
Part A Result	Part B			Part B			Part B		
Crop	Established Pasture (without legume)			Established Pasture (without legume)			Established Pasture (without legume)		
Planned Yield	2.5 ton/A			2.5 ton/A			2.5 ton/A		
PSU Soil Test Recommendation (lb/A)	**N**	**P2O5**	**K2O**	**N**	**P2O5**	**K2O**	**N**	**P2O5**	**K2O**
	150	0	80	150	0	0	150	0	0
User Soil Test Recommendation (lb/A)									
Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0	0	0	0	0	0	0
P Index Application Method									
Double Crop CarryOver N (lb/A)	0			0			0		
Manure History Description Residual Manure N (lb/A)	35	Continuously - Summer Crop		35	Continuously - Summer Crop		35	Continuously - Summer Crop	
Legume History Description Residual Legume N (lb/A)	0	No Legume Residual N Credit		0	No Legume Residual N Credit		0	No Legume Residual N Credit	
Net Nutrients Required (lb/A)	115	0	80	115	0	0	115	0	0
Manure Group	Field EL1 - Grazing Calculator			Field EL2 - Grazing Calculator			Field EL3 - Grazing Calculator		
Application Season: Management (Incorporation, cover crops, etc.)	Grazing anytime with nutrient uptake during growing season			Grazing anytime with nutrient uptake during growing season			Grazing anytime with nutrient uptake during growing season		
Availability Factors (Total N or NH4-N & Organic N)	**Total N**	**NH4-N**	**Org. N**	**Total N**	**NH4-N**	**Org. N**	**Total N**	**NH4-N**	**Org. N**
	0.20			0.20			0.20		
P Index Application Method	April - Oct: No incorp or incorp > 1 wk.			Surface app. when frozen/snow covered			Surface app. when frozen/snow covered		
N Balanced Manure Rate (ton; gal/A)	40.4 tons/A			40.4 tons/A			40.4 tons/A		
P Removal Balance Manure Rate (ton or gal/A; If required by P Index)	7.4 tons/A			7.4 tons/A			7.4 tons/A		
	Crop P Removal (lb/A) 37.5			Crop P Removal (lb/A) 37.5			Crop P Removal (lb/A) 37.5		
P Index Value	79			77			74		
Planned Manure Rate (ton or gal/A)	**4 tons/A**			**3.99 tons/A**			**4.03 tons/A**		
Nutrients Applied at Planned Manure Rate (lb/A)	11	20	39	11	20	39	11	21	39
Nutrient Balance after Manure	104	-20	41	104	-20	-39	104	-21	-39
Supplemental Fertilizer (lb/A)	0	0	0	0	0	0	0	0	0
P Index Application Method									
Final Nutrient Balance (lb/A)	**104**	**-20**	**41**	**104**	**-20**	**-39**	**104**	**-21**	**-39**
Multiple Application									
Manure Utilized on CMU	40 tons			25 tons			8 tons		

Appendix 5 - P Index

Crop Yrs. 2022 Pennsylvania P Index Version 2

PART A: SCREENING TOOL CMU/Field ID		PART A: SCREENING TOOL	CMU/Field ID	EL1	EL2
Is the CMU in a Special Protection watershed?		Is the CMU in a Special Protection watershed?	If the answer is Yes to any of these questions, Part B must be used.	**No**	**No**
A significant farm management change as defined by Act 38?		Is there a significant farm management change as defined by Act 38?		**Yes**	**Yes**
Soil Test Mehlich 3 P greater than 200 ppm P?		Is the Soil Test Mehlich 3 P greater than 200 ppm P? (enter soil test value in ppm P)		**401**	**450**
Contributing Distance from CMU to receiving water <150 ft.?		Is the Contributing Distance from this CMU to receiving water less than 150 ft.?		**Yes**	**Yes**
Is winter manure application planned for this field ?		Is winter manure application planned for this field ?		**No**	**No**
Run P Index Part B voluntarily? (No to all Part A questions.)		Run P Index Part B voluntarily? (Answers are No to all Part A questions.)		**No**	**No**

PART B: SOURCE FACTORS: Mehlich 3 Soil Test P (ppm P)	Mehlich 3 Soil Test P (ppm P)					401	450
Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)						80	90
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)					Fertilizer P (lb P2O5/acre)	0	0
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARDLESS OF MANURE[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-	-
SUPPLEMENTAL P FERTILIZER					Fertilizer P (lb P2O5/acre)	0	0
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-	-
Fertilizer Rating = Fertilizer Rate x Fertilizer Application Method						0	0
MANURE P RATE					Manure P (lb P2O5/acre)	0	0
MANURE APPLICATION METHOD[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-	-
P SOURCE COEFFICIENT[3]	Refer to: Test results for P Source Coefficient OR Book values from P Index Fact Sheet Table 1					-	-
Manure Rating = Manure Rate x Manure Application Method x P Source Coefficient						0	0
Source Factor Sum						80	90
PART B: TRANSPORT FACTORS EROSION	Soil Loss (ton/acre/yr)					0.54	0.68
RUNOFF POTENTIAL	0 *Drainage Class is* Excessively	2 *Drainage Class is* Somewhat Excessively	4 *Drainage Class is* Well/Moderately Well	6 *Drainage Class is* Somewhat Poorly	8 *Drainage Class is* Poorly/Very Poorly	4	2
SUBSURFACE DRAINAGE	0 None		1 Random		2 [1] Patterned	0	0
CONTRIBUTING DISTANCE	0 > 500 ft.	2 350 to 500 ft.	4 200 to 349 ft.	6 100 to 199 ft. OR < 100 ft. with 35 ft. buffer	9 [2] < 100 ft.	6	6
Transport Sum = Erosion + Runoff Potential + Subsurface Drainage + Contributing Distance						11	9
MODIFIED CONNECTIVITY	0.85 50 ft. Riparian Buffer APPLIES TO DIST < 100 FT		1.0 Grassed Waterway or None	1.1 Direct Connection APPLIES TO DIST > 100 FT		1	1
Transport Sum x Modified Connectivity / 24						0.44	0.36
P Index Value = 2 x Source x Transport						**70**	**65**

Low: 59 or less
Nitrogen based management

Medium: 60 to 79
Nitrogen based management

High: 80 to 99
Phosphorus limited to crop removal

Very High: 100 or greater
No Phosphorus applied

1 OR rapidly permeable soil near a stream
2 "9" factor does not apply to fields receiving manure with a 35 ft. buffer.
3 Error Note: if there is a manure or fertilizer rate and there is no corresponding method factor or PSC, it will display an "E".

Appendix 5 - P Index

Crop Yrs. 2022

PART A: SCREENING TOOL CMU/Field ID	EL3
Is the CMU in a Special Protection watershed?	**No**
A significant farm management change as defined by Act 38?	**Yes**
Soil Test Mehlich 3 P greater than 200 ppm P?	**421**
Contributing Distance from CMU to receiving water <150 ft.?	**No**
Is winter manure application planned for this field ?	**No**
Run P Index Part B voluntarily? (No to all Part A questions.)	**No**
PART B: SOURCE FACTORS: Mehlich 3 Soil Test P (ppm P)	421
Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)	84
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)	0
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARDLESS OF MANURE[3]	-
SUPPLEMENTAL P FERTILIZER	0
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[3]	-
Fertilizer Rating = Fertilizer Rate x Fertilizer Application Me	0
MANURE P RATE	36
MANURE APPLICATION METHOD[3]	0.8
P SOURCE COEFFICIENT[3]	0.8
Manure Rating = Manure Rate x Manure Application Metho	23
Source Factor Sum	107
PART B: TRANSPORT FACTORS EROSION	0.72
RUNOFF POTENTIAL	4
SUBSURFACE DRAINAGE	0
CONTRIBUTING DISTANCE	4
Transport Sum = Erosion + Runoff Potential + Subsurface I	9
MODIFIED CONNECTIVITY	1
Transport Sum x Modified Connectivity / 24	0.36
P Index Value = 2 x Source x Transport	**78**

Low: 59 or less
Nitrogen based management

1 OR rapidly permeable soil near a stream
2 "9" factor does not apply to fields receiving manure with a 35 ft. buffer.
3 Error Note: if there is a manure or fertilizer rate and there is no correspondin

Appendix 5 - P Index

Crop Yrs. 2023 Pennsylvania P Index Version 2

PART A: SCREENING TOOL CMU/Field ID		PART A: SCREENING TOOL	CMU/Field ID	EL1	EL2
Is the CMU in a Special Protection watershed?		Is the CMU in a Special Protection watershed?	If the answer is Yes to any of these questions, Part B must be used.	**No**	**No**
A significant farm management change as defined by Act 38?		Is there a significant farm management change as defined by Act 38?		**Yes**	**Yes**
Soil Test Mehlich 3 P greater than 200 ppm P?		Is the Soil Test Mehlich 3 P greater than 200 ppm P? (enter soil test value in ppm P)		**401**	**450**
Contributing Distance from CMU to receiving water <150 ft.?		Is the Contributing Distance from this CMU to receiving water less than 150 ft.?		**Yes**	**Yes**
Is winter manure application planned for this field ?		Is winter manure application planned for this field ?		**No**	**No**
Run P Index Part B voluntarily? (No to all Part A questions.)		Run P Index Part B voluntarily? (Answers are No to all Part A questions.)		**No**	**No**

PART B: SOURCE FACTORS: Mehlich 3 Soil Test P (ppm P)	Mehlich 3 Soil Test P (ppm P)					401	450
Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)						80	90
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)					Fertilizer P (lb P2O5/acre)	0	0
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARDLESS OF MANURE[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-	-
SUPPLEMENTAL P FERTILIZER					Fertilizer P (lb P2O5/acre)	0	0
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-	-
Fertilizer Rating = Fertilizer Rate x Fertilizer Application Method						0	0
MANURE P RATE					Manure P (lb P2O5/acre)	20	20
MANURE APPLICATION METHOD[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	0.6	1
P SOURCE COEFFICIENT[3]	Refer to: Test results for P Source Coefficient OR Book values from P Index Fact Sheet Table 1					0.8	0.8
Manure Rating = Manure Rate x Manure Application Method x P Source Coefficient						10	16
Source Factor Sum						90	106
PART B: TRANSPORT FACTORS EROSION	Soil Loss (ton/acre/yr)					0.54	0.68
RUNOFF POTENTIAL	0 *Drainage Class is* Excessively	2 *Drainage Class is* Somewhat Excessively	4 *Drainage Class is* Well/Moderately Well	6 *Drainage Class is* Somewhat Poorly	8 *Drainage Class is* Poorly/Very Poorly	4	2
SUBSURFACE DRAINAGE	0 None		1 Random		2 [1] Patterned	0	0
CONTRIBUTING DISTANCE	0 > 500 ft.	2 350 to 500 ft.	4 200 to 349 ft.	6 100 to 199 ft. OR < 100 ft. with 35 ft. buffer	9 [2] < 100 ft.	6	6
Transport Sum = Erosion + Runoff Potential + Subsurface Drainage + Contributing Distance						11	9
MODIFIED CONNECTIVITY	0.85 50 ft. Riparian Buffer APPLIES TO DIST < 100 FT		1.0 Grassed Waterway or None	1.1 Direct Connection APPLIES TO DIST > 100 FT		1	1
Transport Sum x Modified Connectivity / 24						0.44	0.36
P Index Value = 2 x Source x Transport						**79**	**77**

Low: 59 or less
Nitrogen based management

Medium: 60 to 79
Nitrogen based management

High: 80 to 99
Phosphorus limited to crop removal

Very High: 100 or greater
No Phosphorus applied

1 OR rapidly permeable soil near a stream
2 "9" factor does not apply to fields receiving manure with a 35 ft. buffer.
3 Error Note: if there is a manure or fertilizer rate and there is no corresponding method factor or PSC, it will display an "E".

Appendix 5 - P Index

Crop Yrs. 2023

PART A: SCREENING TOOL CMU/Field ID	EL3
Is the CMU in a Special Protection watershed?	**No**
A significant farm management change as defined by Act 38?	**Yes**
Soil Test Mehlich 3 P greater than 200 ppm P?	**421**
Contributing Distance from CMU to receiving water <150 ft.?	**No**
Is winter manure application planned for this field ?	**No**
Run P Index Part B voluntarily? (No to all Part A questions.)	**No**
PART B: SOURCE FACTORS: Mehlich 3 Soil Test P (ppm P)	421
Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)	84
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)	0
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARDLESS OF MANURE[3]	-
SUPPLEMENTAL P FERTILIZER	0
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[3]	-
Fertilizer Rating = Fertilizer Rate x Fertilizer Application Me	0
MANURE P RATE	21
MANURE APPLICATION METHOD[3]	1
P SOURCE COEFFICIENT[3]	0.8
Manure Rating = Manure Rate x Manure Application Metho	17
Source Factor Sum	101
PART B: TRANSPORT FACTORS EROSION	0.72
RUNOFF POTENTIAL	4
SUBSURFACE DRAINAGE	0
CONTRIBUTING DISTANCE	4
Transport Sum = Erosion + Runoff Potential + Subsurface I	9
MODIFIED CONNECTIVITY	1
Transport Sum x Modified Connectivity / 24	0.36
P Index Value = 2 x Source x Transport	**74**

Low: 59 or less
Nitrogen based management

1 OR rapidly permeable soil near a stream
2 "9" factor does not apply to fields receiving manure with a 35 ft. buffer.
3 Error Note: if there is a manure or fertilizer rate and there is no correspondin

Appendix 5 - P Index

Crop Yrs. 2024 Pennsylvania P Index Version 2

PART A: SCREENING TOOL CMU/Field ID		PART A: SCREENING TOOL	CMU/Field ID	EL1	EL2
Is the CMU in a Special Protection watershed?		Is the CMU in a Special Protection watershed?	If the answer is Yes to any of these questions, Part B must be used.	No	No
A significant farm management change as defined by Act 38?		Is there a significant farm management change as defined by Act 38?		Yes	Yes
Soil Test Mehlich 3 P greater than 200 ppm P?		Is the Soil Test Mehlich 3 P greater than 200 ppm P? (enter soil test value in ppm P)		401	450
Contributing Distance from CMU to receiving water <150 ft.?		Is the Contributing Distance from this CMU to receiving water less than 150 ft.?		Yes	Yes
Is winter manure application planned for this field ?		Is winter manure application planned for this field ?		No	No
Run P Index Part B voluntarily? (No to all Part A questions.)		Run P Index Part B voluntarily? (Answers are No to all Part A questions.)		No	No

PART B: SOURCE FACTORS: Mehlich 3 Soil Test P (ppm P)	Mehlich 3 Soil Test P (ppm P)					401	450
Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)						80	90
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)					Fertilizer P (lb P2O5/acre)	0	0
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARDLESS OF MANURE[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-	-
SUPPLEMENTAL P FERTILIZER					Fertilizer P (lb P2O5/acre)	0	0
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-	-
Fertilizer Rating = Fertilizer Rate x Fertilizer Application Method						0	0
MANURE P RATE					Manure P (lb P2O5/acre)	20	20
MANURE APPLICATION METHOD[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	0.6	1
P SOURCE COEFFICIENT[3]	Refer to: Test results for P Source Coefficient OR Book values from P Index Fact Sheet Table 1					0.8	0.8
Manure Rating = Manure Rate x Manure Application Method x P Source Coefficient						10	16
Source Factor Sum						90	106
PART B: TRANSPORT FACTORS EROSION	Soil Loss (ton/acre/yr)					0.54	0.68
RUNOFF POTENTIAL	0 *Drainage Class is* Excessively	2 *Drainage Class is* Somewhat Excessively	4 *Drainage Class is* Well/Moderately Well	6 *Drainage Class is* Somewhat Poorly	8 *Drainage Class is* Poorly/Very Poorly	4	2
SUBSURFACE DRAINAGE	0 None		1 Random		2 [1] Patterned	0	0
CONTRIBUTING DISTANCE	0 > 500 ft.	2 350 to 500 ft.	4 200 to 349 ft.	6 100 to 199 ft. OR < 100 ft. with 35 ft. buffer	9 [2] < 100 ft.	6	6
Transport Sum = Erosion + Runoff Potential + Subsurface Drainage + Contributing Distance						11	9
MODIFIED CONNECTIVITY	0.85 50 ft. Riparian Buffer APPLIES TO DIST < 100 FT		1.0 Grassed Waterway or None	1.1 Direct Connection APPLIES TO DIST > 100 FT		1	1
Transport Sum x Modified Connectivity / 24						0.44	0.36
P Index Value = 2 x Source x Transport						**79**	**77**

Low: 59 or less
Nitrogen based management

Medium: 60 to 79
Nitrogen based management

High: 80 to 99
Phosphorus limited to crop removal

Very High: 100 or greater
No Phosphorus applied

1 OR rapidly permeable soil near a stream
2 "9" factor does not apply to fields receiving manure with a 35 ft. buffer.
3 Error Note: if there is a manure or fertilizer rate and there is no corresponding method factor or PSC, it will display an "E".

Appendix 5 - P Index

Crop Yrs. 2024

PART A: SCREENING TOOL CMU/Field ID	EL3
Is the CMU in a Special Protection watershed?	**No**
A significant farm management change as defined by Act 38?	**Yes**
Soil Test Mehlich 3 P greater than 200 ppm P?	**421**
Contributing Distance from CMU to receiving water <150 ft.?	**No**
Is winter manure application planned for this field ?	**No**
Run P Index Part B voluntarily? (No to all Part A questions.)	**No**
PART B: SOURCE FACTORS: Mehlich 3 Soil Test P (ppm P)	421
Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)	84
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)	0
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARDLESS OF MANURE[3]	-
SUPPLEMENTAL P FERTILIZER	0
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[3]	-
Fertilizer Rating = Fertilizer Rate x Fertilizer Application Me	0
MANURE P RATE	21
MANURE APPLICATION METHOD[3]	1
P SOURCE COEFFICIENT[3]	0.8
Manure Rating = Manure Rate x Manure Application Metho	17
Source Factor Sum	101
PART B: TRANSPORT FACTORS EROSION	0.72
RUNOFF POTENTIAL	4
SUBSURFACE DRAINAGE	0
CONTRIBUTING DISTANCE	4
Transport Sum = Erosion + Runoff Potential + Subsurface I	9
MODIFIED CONNECTIVITY	1
Transport Sum x Modified Connectivity / 24	0.36
P Index Value = 2 x Source x Transport	**74**

Low: 59 or less
Nitrogen based management

1 OR rapidly permeable soil near a stream
2 "9" factor does not apply to fields receiving manure with a 35 ft. buffer.
3 Error Note: if there is a manure or fertilizer rate and there is no correspondin

Appendix 6

Manure Management

Date of Site Evaluation: January 20, 2022

Statement Documenting Areas Evaluated During Site Evaluation

List and clearly identify each of the specific areas evaluated.

The following areas were evaluated: duck barns, HDPE lined earthen manure storage pond, cattle and sheep barn, horse stalls, mortality incinerator

Identification of Inadequate Manure Management Practices and Conditions

List of each specific inadequate manure management practice or condition identified.

No inadequate manure management practices or conditions were identified at the time of the site visit.

BMPs to Address Manure Management Problem Areas

List of specific BMPs (including PA Technical Guide standard name and number) and management changes that will be implemented to address each of the inadequate practices listed above.

None

Appendix 7

Stormwater Control

Date of Site Evaluation: January 20, 2022

Statement Documenting Areas Evaluated During Site Evaluation

List and clearly identify each of the specific areas evaluated.

The following areas were evaluated: crop fields, specifically areas near surface water in fields EL1, EL2 and EL3

Identification of Critical Runoff Problem Areas

List of each specific critical runoff problem area identified.

No critical runoff problem areas were identified at the time of the site visit.

BMPs to Address Critical Runoff Problem Areas

List of BMPs (including PA Technical Guide standard name and number) and specific management changes that will be implemented to address each of the critical runoff problem areas listed above.

None

Appendix 8

Importer/Broker Agreements & NBSs

Nutrient Balance Sheets are not required for importers that have an approved Nutrient Management Plan.

Exporter/Broker Agreement

Developed consistent with the PA Nutrient and Odor Management Act Program

1) This agreement is entered into on October 11, 2021, by Emmanuel Lapp (the "exporter") who will supply manure, and Jeff Martin (the "broker") who will receive the manure from the exporter.

2) The purpose of this agreement is to set forth the mutual responsibilities and understanding of the parties with respect to the export of manure from the exporter to the broker.

3) The exporter is located at (county, twp, and address): 322 Hatchery Road, Dalmatia, PA 17017, Northumberland County, Lower Mahanoy Township

4) The exporter will, as the supply of manure allows, provide the following amounts of manure during the seasons outlined below:

Tons of N/A *(Species)* manure, per season:
Spring _____ Summer _____ Fall _____ Winter _____

Gallons of Duck manure *(Species)* manure, per season:
Spring 975,000 Summer 975,000 Fall 975,000 Winter _____

Total planned manure exported: (supply of manure may be less than what is planned)
Tons of N/A *(Species)* manure: _____
Gallons of Duck manure *(Species)* manure: 1,950,000

If multi-species are planned, please add additional lines:

5) The broker's contact information is as follows:

a) **Name:** Jeff Martin
b) **Address:** PO Box 23, Pillow, PA 17080
c) **Telephone number:** 570-758-4356
d) **PDA Manure Broker Certification number:** 2083-MB2

6) The Broker agrees to maintain their status as a certified Commercial Manure Broker as provided under Pa's Commercial Manure Hauler and Broker Certification Program (7 Pa Code Chapter 130e).

7) The Broker agrees to comply with all requirements established by section 5 of the Commercial Manure Hauler and Broker Certification Act regarding the development and distribution of nutrient balance sheets to importing operations and conservation districts when handling manure from a CAO, CAFO or volunteer operation. Specifically, where a broker under this agreement, makes arrangements for land application of the manure on an importing agricultural operation, the broker must:
   a. Provide a NBS to all importing operations receiving manure for land application, no later than the time of manure transfer

b. Provide copies of the NBS, no later than the time of manure transfer, to the county conservation district where the manure originated (exporting operation county)
c. Provide copies of the NBS, no later than the time of manure transfer, to the county conservation district where the manure is being applied (importing operation county)

Where a broker under this agreement, arranges for the use of manure for purposes other than land application, the broker is not required to supply a NBS to the importing operation

8) The exporter will use a Manure Export Sheet to record all manure exported to the broker. These Manure Export Sheets are available from the county conservation district or the State Conservation Commission. Computer generated forms other than the manure export sheet may be used if they contain the same information as, and are reasonably similar in format to, the forms available from the State Conservation Commission or the conservation district.

9) This agreement shall remain in full effect unless terminated by either party upon thirty days prior written notice to the other party. If this agreement is terminated, the exporter shall notify the county conservation district office that approved their nutrient management plan, of the termination.

10) By signing this agreement, the broker accepts full responsibility for the manure received from the exporter as long as the manure is under the broker's control, including handling, storage and land application.

Exporter Signature, Name and Date

_____ (signature)

Emmanuel Lapp (name)

October 11, 2021 (date)

Broker Signature, Name and Date

_____ (signature)

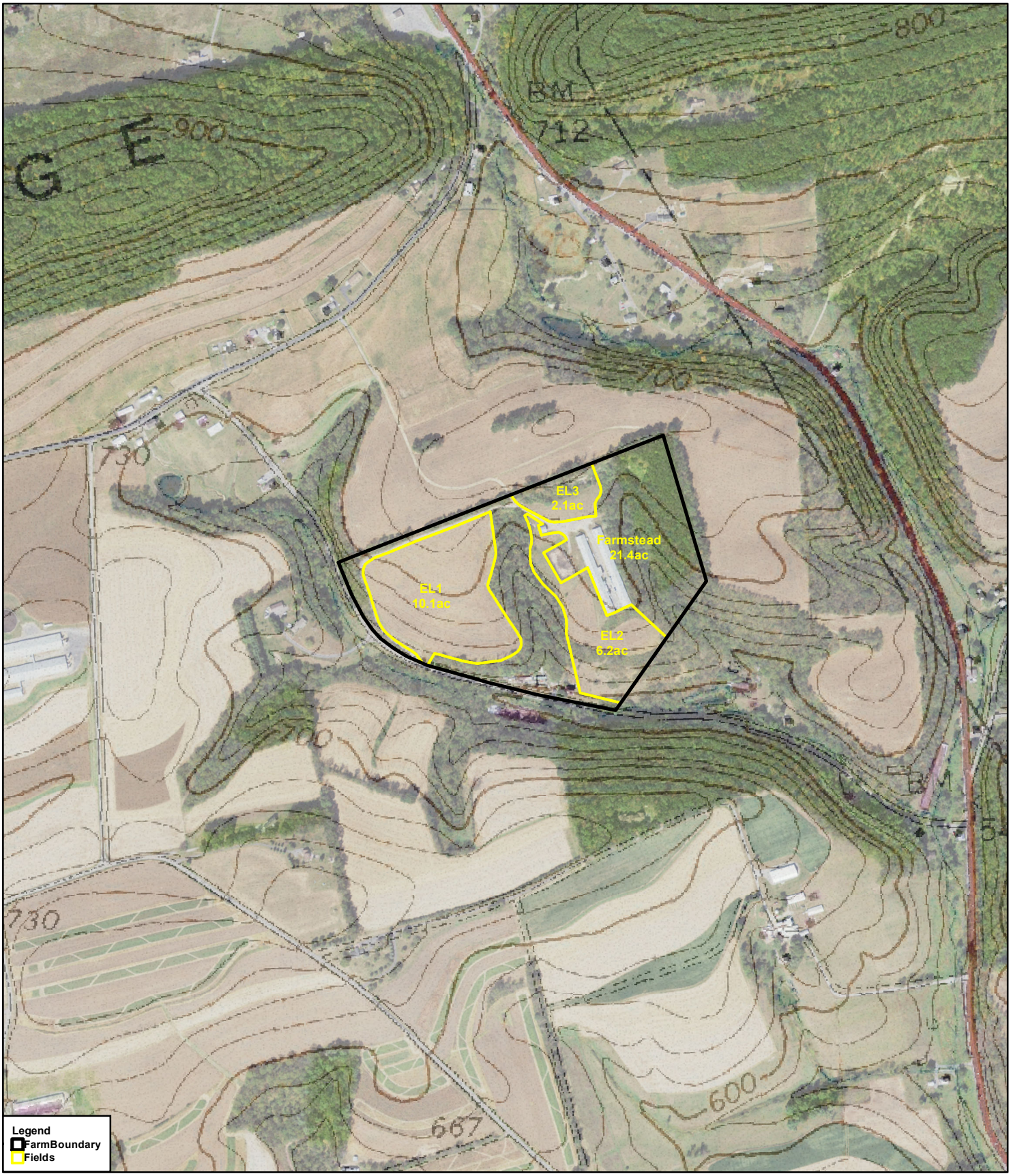
Jeff Martin (name)

October 11, 2021 (date)

Appendix 9
Operation Maps

Three types of maps are required for an Act 38 Nutrient Management Plan: 1) Topographic Map, 2) Soils Map, and 3) Operator Management Map. The **Topographic Map and Soils Map** must be included here. The Topographic map must be drawn to scale and identify the land included in the plan with operation boundaries. The Soils Map must include the field identification and boundaries, soil types and slopes with soil legend. Adding P Index lines can be helpful on the Topographic or Soils map but are not required. The Operator Management Map must be included in the Nutrient Management Plan Summary.

Emanuel Lapp Topographic Map



Emanuel Lapp Soils Map

Northumberland County Soils Legend

AbB	ALBRIGHTS SILT LOAM, 3 TO 8 PERCENT SLOPES
AnA	ALLENWOOD GRAVELLY SILT LOAM, 0 TO 3 PERCENT SLOPES
AnD	ALLENWOOD GRAVELLY SILT LOAM, 15 TO 25 PERCENT SLOPES
AoB	ALLENWOOD AND WASHINGTON SOILS, 3 TO 8 PERCENT SLOPES
AoC	ALLENWOOD AND WASHINGTON SOILS, 8 TO 15 PERCENT SLOPES
ArA	ALVIRA SILT LOAM, 0 TO 3 PERCENT SLOPES
ArB	ALVIRA SILT LOAM, 3 TO 8 PERCENT SLOPES
ArC	ALVIRA SILT LOAM, 8 TO 15 PERCENT SLOPES
AsB	ALVIRA VERY STONY SILT LOAM, 0 TO 8 PERCENT SLOPES
Ba	BARBOUR SOILS, FREQUENTLY FLOODED
Bb	BARBOUR-LINDEN COMPLEX, RARELY FLOODED
Bc	BASHER SOILS
Bd	BASHER SOILS, FREQUENTLY FLOODED
BeB	BEDINGTON SILT LOAM, 3 TO 8 PERCENT SLOPES
BeC	BEDINGTON SILT LOAM, 8 TO 15 PERCENT SLOPES
BeD	BEDINGTON SILT LOAM, 15 TO 25 PERCENT SLOPES
BkB	BERKS SHALY SILT LOAM, 3 TO 8 PERCENT SLOPES
BkC	BERKS SHALY SILT LOAM, 8 TO 15 PERCENT SLOPES
BkD	BERKS SHALY SILT LOAM, 15 TO 25 PERCENT SLOPES
BuB	BUCHANAN GRAVELLY LOAM, 3 TO 8 PERCENT SLOPES
BuC	BUCHANAN GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES
BxB	BUCHANAN VERY STONY LOAM, 0 TO 8 PERCENT SLOPES
BxD	BUCHANAN VERY STONY LOAM, 8 TO 25 PERCENT SLOPES
CaB	CALVIN-KLINESVILLE SHALY SILT LOAMS, 3 TO 8 PERCENT SLOPES
CaC	CALVIN-KLINESVILLE SHALY SILT LOAMS, 8 TO 15 PERCENT SLOPES
CaD	CALVIN-KLINESVILLE SHALY SILT LOAMS, 15 TO 25 PERCENT SLOPES
DAM	DAMS
DeB	DEKALB EXTREMELY STONY SANDY LOAM, 0 TO 8 PERCENT SLOPES
DeD	DEKALB EXTREMELY STONY SANDY LOAM, 8 TO 25 PERCENT SLOPES
DeF	DEKALB EXTREMELY STONY SANDY LOAM, STEEP
Du	DUMPS, MINE
Dy	DYSTROCHREPTS, BOULDERY
EdB	EDOM COMPLEX, 3 TO 8 PERCENT SLOPES
EdC	EDOM COMPLEX, 8 TO 15 PERCENT SLOPES
EdD	EDOM COMPLEX, 15 TO 25 PERCENT SLOPES
EsB	ELLIBER CHERTY SILT LOAM, 3 TO 8 PERCENT SLOPES
EsC	ELLIBER CHERTY SILT LOAM, 8 TO 15 PERCENT SLOPES
EsD	ELLIBER CHERTY SILT LOAM, 15 TO 25 PERCENT SLOPES
EtB	ELLIBER VERY CHERTY SILT LOAM, 3 TO 8 PERCENT SLOPES
EtC	ELLIBER VERY CHERTY SILT LOAM, 8 TO 15 PERCENT SLOPES
EtD	ELLIBER VERY CHERTY SILT LOAM, 15 TO 25 PERCENT SLOPES
EtF	ELLIBER VERY CHERTY SILT LOAM, 25 TO 70 PERCENT SLOPES
EvB	EVENDALE CHERTY SILT LOAM, 3 TO 8 PERCENT SLOPES
HaB	HAGERSTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES
HaC	HAGERSTOWN SILT LOAM, 8 TO 15 PERCENT SLOPES
HaD	HAGERSTOWN SILT LOAM, 15 TO 25 PERCENT SLOPES
HtB	HARTLETON CHANNERY SILT LOAM, 3 TO 8 PERCENT SLOPES
HtC	HARTLETON CHANNERY SILT LOAM, 8 TO 15 PERCENT
HtD	HARTLETON CHANNERY SILT LOAM, 15 TO 25 PERCENT SLOPES
HuB	HAZLETON AND CLYMER EXTREMELY STONY SANDY LOAMS, 0 TO 8 PERCENT SLOPES
HuD	HAZLETON AND CLYMER EXTREMELY STONY SANDY LOAMS, 8 TO 25 PERCENT SLOPES
HuF	HAZLETON AND CLYMER EXTREMELY STONY SANDY LOAMS, 25 TO 80 PERCENT SLOPES
Hv	HOLLY SILT LOAM
Hy	HOLLY SILT LOAM, PONDED
Hz	HOLLY SILT LOAM, RARELY FLOODED
KmB	KREAMER CHERTY SILT LOAM, 3 TO 8 PERCENT SLOPES
KmC	KREAMER CHERTY SILT LOAM, 8 TO 15 PERCENT SLOPES
LaB	LAIDIG GRAVELLY LOAM, 3 TO 8 PERCENT SLOPES
LaC	LAIDIG GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES
LbB	LAIDIG EXTREMELY STONY LOAM, 0 TO 8 PERCENT SLOPES
LdD	LAIDIG AND MECKESVILLE EXTREMELY STONY SOILS, 8 TO 25 PERCENT SLOPES
LdF	LAIDIG AND MECKESVILLE EXTREMELY STONY SOILS, STEEP
LkB	LAKIN LOAMY FINE SAND, 3 TO 8 PERCENT SLOPES
LkC	LAKIN LOAMY FINE SAND, 8 TO 15 PERCENT SLOPES
LnB	LECK KILL SHALY SILT LOAM, 3 TO 8 PERCENT SLOPES
LnC	LECK KILL SHALY SILT LOAM, 8 TO 15 PERCENT SLOPES
LnD	LECK KILL SHALY SILT LOAM, 15 TO 25 PERCENT SLOPES
Lw	LINDEN SILT LOAM
MkB	MECKESVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES
MkC	MECKESVILLE SILT LOAM, 8 TO 15 PERCENT SLOPES
MkD	MECKESVILLE SILT LOAM, 15 TO 25 PERCENT SLOPES
MoA	MONONGAHELA SILT LOAM, 0 TO 3 PERCENT SLOPES
MoB	MONONGAHELA SILT LOAM, 3 TO 8 PERCENT SLOPES
OpB	OPEQUON SILTY CLAY LOAM, 3 TO 8 PERCENT SLOPES
OpD	OPEQUON SILTY CLAY LOAM, 8 TO 25 PERCENT SLOPES
OpE	OPEQUON SILTY CLAY LOAM, 25 TO 50 PERCENT SLOPES
Pa	PITS
Qu	QUARRIES
RwB	RUSHTOWN VERY SHALY SILT LOAM, 3 TO 8 PERCENT SLOPES
RwC	RUSHTOWN VERY SHALY SILT LOAM, 8 TO 25 PERCENT SLOPES
ShA	SHELMADINE SILT LOAM, 0 TO 3 PERCENT SLOPES
ShB	SHELMADINE SILT LOAM, 3 TO 8 PERCENT SLOPES
SmB	SHELMADINE VERY STONY SILT LOAM, 0 TO 8 PERCENT SLOPES
Uf	UDIFLUVENTS, COAL OVERWASH
Ug	UDIFLUVENTS AND FLUVAQUENTS, GRAVELLY
Uh	UDORTHENTS, SANDSTONE AND SHALE
UnB	UNADILLA SILT LOAM, 3 TO 8 PERCENT SLOPES
UnC	UNADILLA SILT LOAM, 8 TO 15 PERCENT SLOPES
UnD	UNADILLA SILT LOAM, 15 TO 25 PERCENT SLOPES
Ur	URBAN LAND
W	WATER
WaB	WASHINGTON SILT LOAM, WET SUBSTRATUM, 3 TO 8 PERCENT SLOPES
WbA	WATSON SILT LOAM, 0 TO 3 PERCENT SLOPES
WbB	WATSON SILT LOAM, 3 TO 8 PERCENT SLOPES
WbC	WATSON SILT LOAM, 8 TO 15 PERCENT SLOPES
WeB	WEIKERT SHALY SILT LOAM, 3 TO 8 PERCENT SLOPES
WeC	WEIKERT SHALY SILT LOAM, 8 TO 15 PERCENT SLOPES
WeD	WEIKERT SHALY SILT LOAM, 15 TO 25 PERCENT SLOPES
WkE	WEIKERT AND KLINESVILLE SHALY SILT LOAMS, STEEP
WsA	WHEELING SOILS, 0 TO 3 PERCENT SLOPES
WsB	WHEELING SOILS, 3 TO 8 PERCENT SLOPES
WsC	WHEELING SOILS, 8 TO 15 PERCENT SLOPES
WyA	WYOMING GRAVELLY SANDY LOAM, 0 TO 3 PERCENT SLOPES
WyB	WYOMING GRAVELLY SANDY LOAM, 3 TO 8 PERCENT SLOPES

Appendix 10
Supporting Information & Documentation

Includes if applicable the Rainfall Additions Worksheet, Winter Application Matrix, Residual N Calculation Worksheet and other supplemental worksheets included in the NMP Spreadsheet. Attach information and documentation necessary to support plan content not included elsewhere in the NMP Spreadsheet or appendices. Examples include, but are not limited to, documentation of animal weights if Agronomy Facts 54 is not used, bedding calculations, or calculations for irrigation rates.

MANURE STORAGE WINTER CAPACITY PLANNING LEVEL DETERMINATION SPREADSHEET
for Sloped Waste Storage Facilities

This spreadsheet is one option to solve for the required Vertical storage depth for CAFO's going into the winter storage period. Sloped interiors result in a variation of capacity per unit of depth. Using four inputs, the program generates a set of data for the facility volume. Additional data determines the vertical depths and volumes to be subtracted from the total storage depth. The final step is a simple trial and error input to develop the vertical depth required. Outputs include a summary planveiw, x-section, and a Stage-Storage curve.

Note: User to fill in all Blue cells

Operator or Farm Name:	Emanuel Lapp	**Storage ID or Name:**	HDPE Lined Pond
Completed by:	Todd C. Rush	**County:**	Northumberland
		Date:	3/1/22

Data Input

(Enter data in light blue cells)

Storage Pond Dimensions being Evaluated

Width of Storage	"W"	100	Feet	(Measured at inside top of slope)
Length of Storage	"L"	185	Feet	(Measured at inside top of slope)
Depth of Storage	"D"	14	Feet	(Measured from top of embankment to pumpout depth)
Interior Side Slope		2	:1	(Commonly 2.5, but can be 2.0 or 3.0)

Freeboard	1	Feet	(See Guidelines: Either 1' or 2' for all sites)
25yr or 100 yr 24 hr rainfall	7.05	Inches	(See Table 5 and use value or highest in range or Go to NOAA 14)

Net Rainfall over pit	Dec Net	3.44	inches	**Paved Lot runoff**	Dec Net	0	inches
(From Supplement 7	Jan Net	3.01	inches	(If paved area drains into	Jan Net	0	inches
Assume evap.)	Feb Net	2.37	inches	storage)	Feb Net	0	inches

NOTE: The Dec Net value will be prorated 17/31 to reflect partial value for Dec.)

Paved Drainage Area into storage	0	Square Feet	(Enter Zero if none)
Manure, washwater, bedding excluding any outside drainage areas over 76 days	456,000	Gallons	(This is derived from data in Appendix 3 by getting daily production and multipling by 76.) (Dec 15 thru Feb 28 or 76 Days)

Note: User to use Trial and Error in Olive Green Cell to find minimum Depth

Outputs & Results

(Yellow cells auto-filled)

Emanuel Lapp
HDPE Lined Pond

Depth from top of storage	14 Feet		
Depth after subtracting Freeboard	13.0 Feet	1,076,965	Gallons of storage at this depth
Combined volume of wastes over 76 days, paved lot, 24 hr and net rainfall over storage	621,093 Gallons		
Maximum Volume entering winter period	455,873 Gallons		

Vol. of wastes over 76 days	456,000 Gallons
Vol. of runoff from paved lot	0 Gallons
Vol. of 24hr event over top area	81,298 Gallons
Vol. of Net rainfall over top area	83,794 Gallons
Vol. of 24hr event over drainage area	0 Gallons

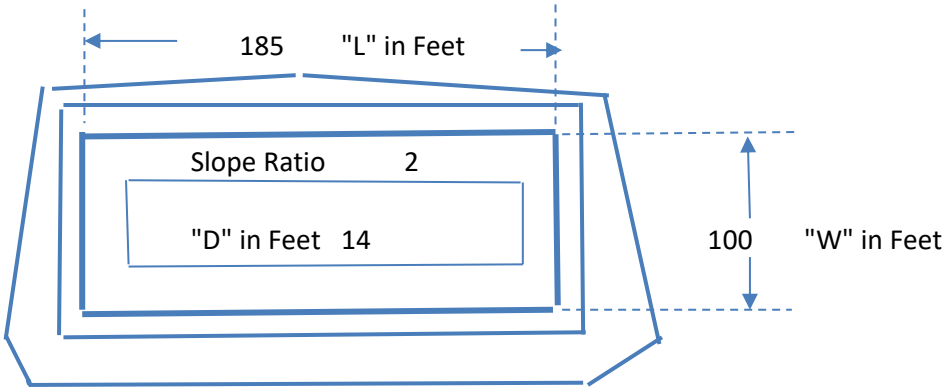
Enter the highest value that does not exceed Maximum Volume shown above. Watch corresponding volume for selected depth, shown to left to assist you in the process.	7.2 Feet	454,743 **Gallons**	Shows Volume at your selected depth

Depth selected gets as close to Maximum volume without going over

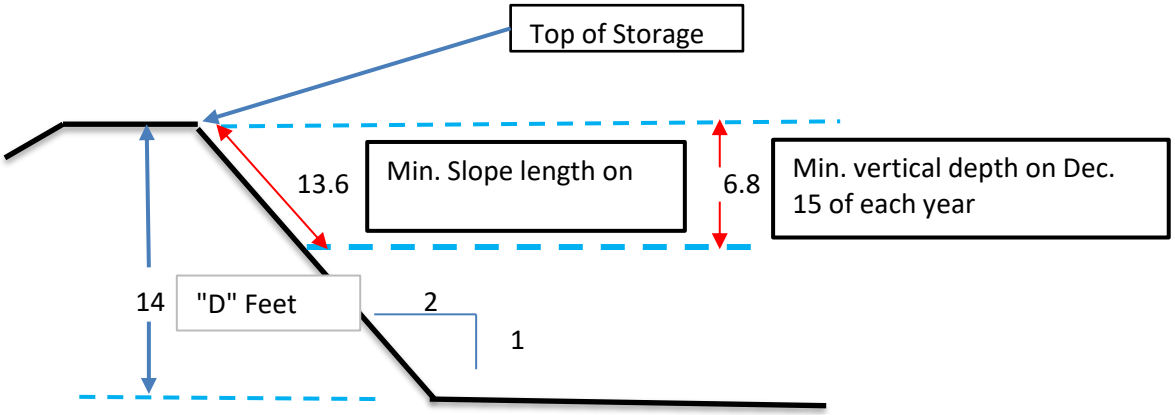
This is the minimum vertical distance from the top of the embankment to the top of the manure level on Dec. 15	6.8 Feet
or	
The equivelant slope distance from top of embankment to manure level on Dec. 15	13.6 Feet

or

Emanuel Lapp | **HDPE Lined Pond** | **Pg 3 of 4**



PLANVIEW OF SITE

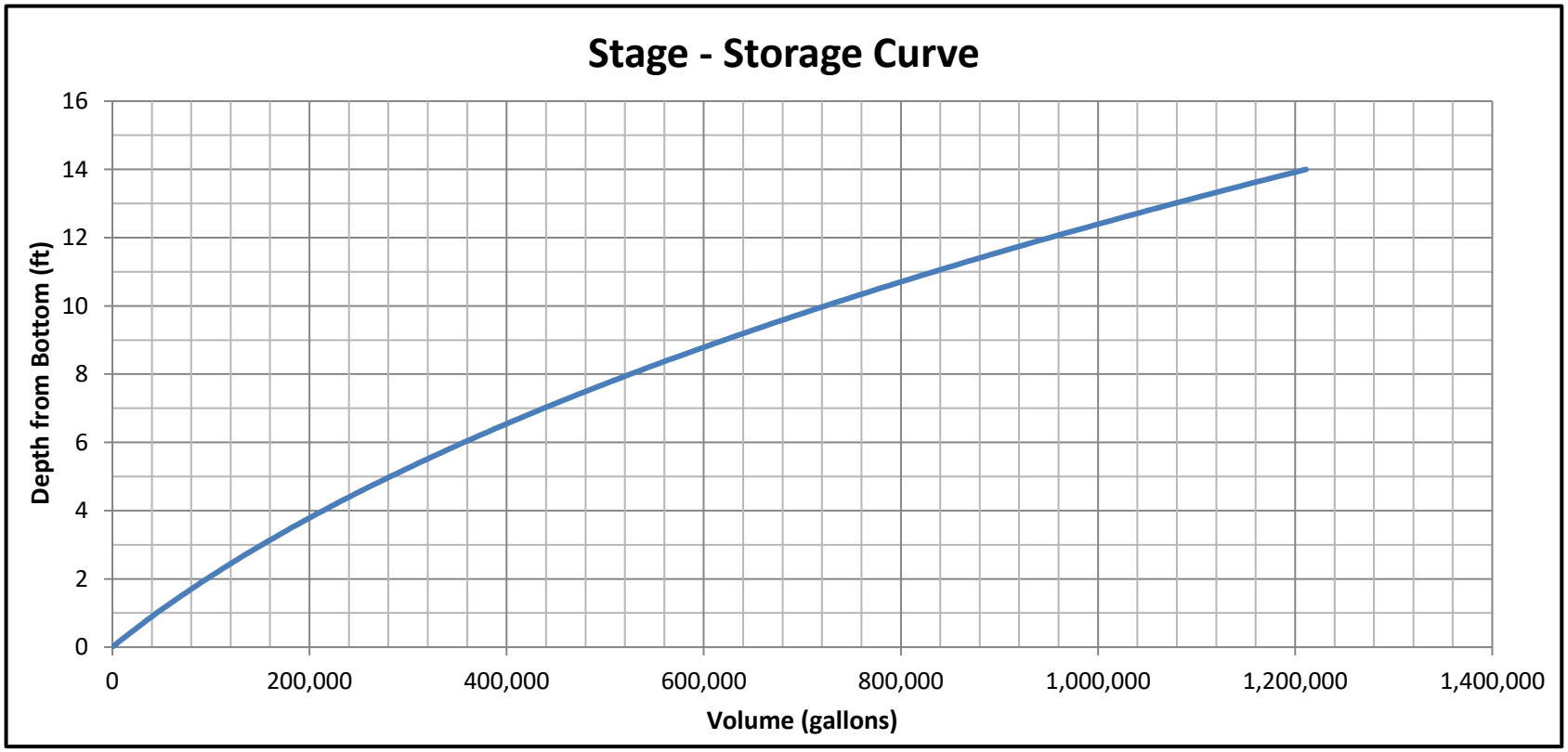


OUTPUT SUMMARY X-SECTION

(Includes runoff from a **0** Square foot paved lot)

Emanuel Lapp

HDPE Lined Pond



This chart shows capacity at any depth starting from bottom

Disclaimer: This program assumes constant interior slopes and a flat bottom. No credit is given for sloped bottoms or ramp volumes. Therefore the use of a Stage Storage Curve generated from "As-built" data is recommended, if available from your Engineering Consultant.

Small Quantity Manure Importer List

Name of operator exporting manure: _____

Time frame for this list: From _____to_____

Export Date	Name of Importer	Type of Manure*	Amount Exported (Tons)

* i.e. dairy, beef, broiler, swine, horse, etc.

Emergency Response Plan

If an emergency spill or leak should occur you need to take the following actions:

1) **Ensure that you and other people are safe. If the spill or leak involves a public road:**
   a. Contact the police for traffic control: *PA State Police - 911*
   b. Use flares, safety cones, etc. to warn approaching motorists

2) **Stop the leak or spill:**
   a. If the leak or spill occurs while emptying the storage:
      i. Stop pumps, close valves and / or stop siphoning of manure
      ii. Park on top of the flexible piping to pinch it closed
      iii. If necessary, direct manure to another storage structure
      iv. Plug holes in the impoundment, build dams to capture the leak and either pump the manure back into the storage or spread it on crop fields according to your nutrient management plan

   b. If the spill happens while on the road:
      i. Pull off to the side of the road
      ii. Plug the leak or otherwise stop the flow of manure from the tank
      iii. Build a berm or dike to keep manure from flowing into streams, ditches, etc.
      iv. Call the police for traffic control: *PA State Police - 911*

3) **Contain and control the leak or spill:**
   a. Build a containment dam to capture the manure using soil, gravel, hay bales, etc. Provide an area for the impounded manure to run into and be temporarily stored. Limit the area in contact with manure. Local individuals with excavation and manure hauling equipment are:
      i. *Jeff Martin – 570-758-4356*

   b. Prevent manure from running into streams, ditches, waterways, etc.

   c. Use absorbent materials such as straw, hay, sawdust, animal feed or soil to soak up the manure and to limit or stop manure flow.

   d. Check for contaminated subsurface tile lines and divert manure flow from inlet structures

4) **Notify the proper authorities:**
   Pennsylvania Department of Environmental Protection Emergency Response – 570-327-3636
   Northumberland County Conservation District – 570-495-4665
   PA Fish & Boat Commission Northcentral Regional Office – 814-359-5250
   Nutrient Management Specialist – 570-809-1174

   a. Make a record of the details of the spill and the actions you took to remedy the situation. Take pictures of the extent of the spill as well as your containment and cleanup practices.

   b. If a spill enters a sinkhole or otherwise has the potential to enter groundwater, notify adjacent landowners who use private wells for their water supply.

5) **Clean up the leak or spill:**
   a. Clean up procedures may be directed by the authorities listed above.

   b. Pick up absorbent materials you used and properly dispose of the material.

   c. Restore damaged areas if necessary.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 28, 2022

TO: State Conservation Commission

FROM: Joel Semke – REAP Coordinator

SUBJECT: Proposed changes to the FY 2022 REAP Program

Every year, the State Conservation Commission reviews the REAP Program and welcomes input from partners on how to improve the program. The changes range from minor revisions that are meant to improve the administration of the program to major changes that address what is eligible for REAP tax credits. Staff invites suggestions and comments regarding potential changes to the 2022-23 REAP program.

Listed below is a summary of topics that were introduced at the Commission meeting in March 2022. The proposals listed in this memo reflect suggestions from staff and partners regarding the proposals. Each proposal is subject to legal review prior to being incorporated into the 2022-23 REAP Guidelines and Application packet. It is the intent of Commission staff to present final versions of the proposed 2022-23 REAP Guidelines and Application at the May 2022 meeting of the State Conservation Commission. Staff welcomes further comments and suggestions regarding the following proposals:

1. OPERATION EXPANSION POLICY

   ***Proposal*:** Amend REAP Guidelines for Waste Storage Facility and Heavy Use Area Protection to state that expansions of animal operations in excess of 25% will be subject to a 50% reduction in REAP- Eligible costs.

   The intent of the proposal is to limit the amount of REAP tax credits awarded to new animal operations and/or expansions.

   The proposed changes to the REAP Guidelines will be found in Section C (p2) and in Attachment I (p6). The changes to the REAP Application will be found in the instructions and on a revised version of the Roofed Manure Storage/ACA worksheet (p11-see attached). The worksheet will be revised to gather more information and context about the applicant's project.

2. WASTE STORAGE FACILITY

   ***Proposal*:** Amend the REAP Guidelines for Waste Storage Facility to state that under-barn manure storages are ineligible for REAP tax credits; except for under-barn manure storages which NRCS verifies are necessary to treat a documented existing resource concern.

The intent of the proposal is to limit the amount of REAP tax credits awarded to new animal operations. The exception to the proposed rule will allow REAP tax credits to be awarded to projects that NRCS deems necessary to address resource concerns. The proposal will also serve to provide clarity to REAP applicants; and provide clarity to application reviewers.
The proposed changes to the REAP Guidelines will be found in Section C (p2) and in Attachment 1 (p6). The changes to the REAP Application will be found in the instructions and on a revised version of the Roofed Manure Storage/ACA worksheet (p11-see attached). The worksheet will be revised to gather more information and context about the applicant's project.

3. COVER CROPS

***Proposal*:** Revise the minimum standard for **multi-species** cover crop from 2 species (one grass plus one broadleaf) to 3 species (one small grain plus 2 broadleaf).

The intent of the proposal is to incentivize greater soil health efforts by reserving the 90% REAP tax credit for cover crops that have more diversity.

***Proposal*:** Set a cap on REAP-eligible planting costs at $25/ac; and at $12/bu for the farmer's own seed (wheat or rye).

The intent of the proposal is to address uncertainty in the program regarding how much farmers may charge for their own planting costs; and the cost of their own seed.

The proposed changes to the REAP Guidelines will be found in Attachment I (p6) and Attachment 6 (p19). The changes to the REAP Application will be found on a revised version of the Cover Crops worksheet (p12-see attached).

4. NO-TILL EQUIPMENT

***Proposal*:** Set a cap of $300,000 on the REAP-eligible costs for no-till planters and drills.

The intent of the proposal is to maintain REAP's ability to fund approx. 350 farmers per year. In addition, the high cost of the largest no-till planters and drills has begun to erode REAP's ability to help farmers implement a diverse set of water quality conservation projects. The proposed $300,000 cap would result in a maximum REAP tax credit of $150,000 for planters and drill. The cap will be revisited each year to determine its effect.

The proposed changes to the REAP Guidelines will be found in Attachment 1 (p6) and Attachment 5 (p17). The changes to the REAP Application will be found on a revised version of the No-Till Equipment Purchase Certification form (p8).

5. PRECISION NUTRIENT APPLICATION EQUIPMENT

***Proposal*:** Amend the REAP Guidelines for Precision Nutrient Application Equipment to state that annual subscription services are eligible for REAP tax credits with the purchase of the new equipment; for the initial year only.

The intent of the proposal is to allow for greater efficiency in administering the REAP tax credit for precision nutrient application equipment and to clarify to applicants what is eligible for the REAP tax credit.

***Proposal*:** Amend the REAP Guidelines for Precision Nutrient Application Equipment to set a cap of $60,000 of REAP-eligible costs for eligible equipment.

The intent of the proposal is to allow for greater efficiency in administering the REAP tax credit for precision nutrient application equipment and to clarify to applicants what is eligible for the REAP tax credit.

Proposal: Amend the REAP Guidelines for Precision Nutrient Application Equipment to state that components on spinner-type and/or beater-type manure spreaders; and components on spinner-type dry fertilizer spreaders are not eligible for REAP tax credits. In addition, flow valves and scales on liquid manure spreaders are not eligible for REAP tax credits.

The intent of the proposal is to focus the REAP tax credit on the most precise and capable equipment. REAP program staff intends to revisit the issue for future inclusion of the components in question while dedicating time over the next year to study the technology further. In addition, the proposal intends to clarify to applicant, equipment dealer, and REAP application reviewers what is eligible for the REAP tax credit.

The proposed changes to the REAP Guidelines will be found in Attachment1I (p6) and Attachment 5 (p17). The changes to the REAP Application will be found on a revised version of the Precision Nutrient Application Equipment Certification form (p9).

6. PACS Program

***Proposal*:** Add CAPS Program verification to the list of BMPs that are eligible for REAP tax credits.

The intent of the proposal is to provide a funding resource for the verification of farmer's ag compliance status when working with the new CAPS Certification Program. The REAP BMP would be initially designed as a 2-year pilot effort that would be available to qualified technical service providers (TSP). The REAP tax credit would be used to reimburse the TSP for up to $500 per ag operation of REAP-eligible costs associated with the PACS application process. See below for the proposed addition to the Attachment 1 of the REAP Guidelines (the list of REAP-eligible BMPs):

PACS Verification *(Pilot)*	
REAP Lifespan:	3 years
Tax Credit Rate	75%; **90% when applicant is in an ag-impaired TMDL watershed**
Additional Information:	Reimburses costs associated with assisting a farm participating in the PACS Certification Program. Eligible costs include: PACS application, farm inspections, and verification of compliance with PA Clean Streams Law. Available to private-sector Technical Service Providers only.
REAP Conditions:	2-yr pilot program; $50,000 total cost/year cap; REAP-eligible costs capped at $500 per operation
Certification Requirements:	Individual must be PA Act-38 certified and/or qualified to write Ag E&S Plans

RECOMMENDATION:

Staff recommends approval of the proposed changes to the REAP Program 'Fiscal Year 2022 Guidelines' and 'Application' as presented pending final review by department legal counsel. Upon final legal review, program staff will finalize all pertinent documents, webpage content and correspondence to reflect the changes adopted by the Commission.

REAP Waste Storage Facility and Animal Heavy Use Area Worksheet

****For more information, refer to REAP Guidelines Att 1****

Waste Storage Facility BMP

ANIMAL TYPE: _____

ANIMAL AEUs: Current* _____ Proposed*: _____
*prior to construction of BMP *if BMP is part of an operation expansion

1	Is the Waste Storage Facility BMP listed in your current Ag E&S Plan as necessary to resolve an existing resource concern.	YES	NO
2	Is the Waste Storage Facility roofed?	YES	NO
3	Is the Waste Storage Facility under-barn?	YES	NO
4	Has a USDA/NRCS technician determined that the under-barn manure storage is necessary to resolve an existing resource concern?	YES	NO

Additional notes:

NRCS Technician Certification *(only necessry for under-barn manure storage)*

I certify that USDA/NRCS has determined that the under-barn manure storage referenced above is necessary to adequately treat an existing resource concern on the agricultural operation listed in this REAP application. I certify that I have the appropriate job approval authority from NRCS to certify this project.

Name (printed) _____ Title/County _____

Signature _____ Date _____

Animal Heavy Use Area Protection BMP (HUAP)

ANIMAL TYPE: _____

ANIMAL AEUs: Current* _____ Proposed*: _____
*prior to construction of BMP *if BMP is part of an operation expasion

1	Is the HUAP roofed?	YES	NO
2	Is the HUAP BMP listed in your current Ag E&S Plan as necessary to resolve an existing resource concern.	YES	NO

Applicant Certification

I certify that I understand the following:

1. A roofed BMP under the REAP Tax Credit Program may only be used for its intended purpose as defined by the Commission. It may not be converted to any other use for the entire REAP lifespan (10 years) of the practice.
2. REAP-eligible costs may be reduced for expansions over 25%.
3. Under-barn waste storages are not eligible for REAP tax credits unless certified by NRCS as necessary to adequately address existing resource concerns

I have read and understand the information on this worksheet. I affirm the foregoing to be true and correct, and make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

Applicant Name _____ Signature _____ Date _____

REAP Cover Crop Worksheet

****For more information, refer to REAP Guidelines Att 6****

1	To qualify as a multi-species cover crop, the seed mix must consist of grass species plus a minimum of 2 broadleaf species; in which the **seeding rate of the grass species does not exceed 1.5 bu/ac.**
2	REAP - eligible costs for planting are capped at $25/ac.
3	REAP - eligible costs for seed grown on the applicant's operation are capped at $12/bu.
4	Crops harvested for grain are not eligible for REAP tax credits.

Single-Species: Yr 1 _____ ac. Yr 2 _____ ac Yr 3 _____ ac.

Multi-Species: Yr 1 _____ ac. Yr 2 _____ ac. Yr 3 _____ ac.

Planting Information: (for proposed plantings, provide estimates in the space below for the first year only)

Acres planted	Species	Seeding Rate	Planting Date	Termination Method/date (estimated)

Additional Notes (if necessary):

Applicant Certification: *(subject to spot-check by State Conservation Commission)*

1. _____ acres (total) of cover crops were planted on the locations covered by this job sheet.
2. I certify that no nutrients - manure or fertilizer - have been or will be applied to this cover crop

   Yes

   No

   **answer does not impact the REAP application process*
3. I affirm the information provided on this form is true and correct, and make these statements subject to the penalties of 18 PA.C.S.A 4904, relating to unsworn falsification to authorities

_____

Signature Date

Resource Enhancement and Protection Program

Guidelines

Fiscal Year 2022

(July 1, 2022 – June 30, 2023)

State Conservation Commission
2301 North Cameron Street
Harrisburg, PA 17110

Phone: (717) 787-8821
Fax: (717) 705-3778

Resource Enhancement and Protection (REAP) Program Guidelines 2022-23

A. Introduction

The Resource Enhancement and Protection Program (REAP) was created in 2007 (P.L. 373, No. 55, July 25, 2007) and amended in 2019 (P.L., No. 13, June 28, 2019).). The REAP program is designed to enhance farm production and protect natural resources by enabling farmers, landowners, and businesses to earn Pennsylvania state income tax credits in exchange for implementing "Best Management Practices" (BMPs).

Thirteen million dollars in REAP tax credits is available in FY 2021 to individuals and businesses that meet the eligibility requirements for the program. Guidelines for the program are established and administered by the State Conservation Commission.

Eligible applicants receive 50%-90% of out-of-pocket project costs in the form of state tax credits. The amount of REAP credits available to an eligible applicant depends on the type of BMP implemented and the geographic location of the operation (for 90% tax credits). Applicants are eligible for a maximum of $250,000 in any 7-year period, per agricultural operation. See Attachment 1 for a list of REAP Eligible BMPs.

B. Applicant Eligibility

To be eligible for the REAP program, an applicant must meet the following criteria:

1. The applicant must be an individual or business who is subject to taxation by the Commonwealth of Pennsylvania under the following state taxes: Personal Income Tax, Corporate Net Income Tax, Capital Stock and Franchise Tax, Bank Shares Tax, Title Insurance Company Tax, Insurance Premiums Tax, and Mutual Thrift Institutions Tax.
2. The agricultural operation must be in compliance with the PA Clean Streams Law. As such, the operation must have the following:

   i) A current **Agricultural E&S Plan** or **Conservation Plan** that meets the requirements found in Chapter 102.4 of the PA Clean Streams Law for all acres operated by the applicant. The applicant must be on-schedule for full implementation of the plan.

   ii) A current **Nutrient Management Plan**; as required by Chapter 83 of the PA Clean Streams Law and Act 38; or **Manure Management Plan**; as required by Chapter 91 of the PA Clean Streams Law for all other operations that have animals and/or import manure; for all acres operated by the applicant. The applicant must be on-schedule for full implementation of the plan.

3. An agricultural operation with animal concentration areas (ACAs) on any portion of the operation under its management control must first implement all BMPs necessary to abate nutrient, sediment, and storm water runoff from these areas prior to receiving tax credits for other REAP-eligible BMPs. Any REAP-approved BMPs necessary to properly treat an ACA are eligible for REAP tax credits. REAP credits may be awarded for development of Nutrient/Manure Management & Ag E&S/Conservation Plans prior to full implementation of ACA-related BMPs.
4. If the applicant does not have up-to-date Plans on all acres operated, the REAP application must include documentation of the development of these plans. No REAP credits will be awarded for any other eligible BMP or equipment until plans are complete and certified.

Applicants to the REAP program must have their eligibility verified on page 4 of the REAP application. Please see Attachment 4 of the REAP Guidelines for more information on who is qualified to provide the necessary verification signatures.

C. Project Eligibility

Applications are accepted on a first-come, first-served basis. The following are considered eligible costs of a project:

- Project management costs - including design, engineering, and associated planning
- Project construction or installation – including labor provided by the applicant
- Post construction certifications

All REAP-eligible BMPs must be necessary to reduce pollution from nitrogen, phosphorus, or sediment runoff into surface waters.

Applicants may apply for proposed projects; or completed projects; or mixed. Proposed projects must be based on a reasonable cost estimate and a current site Inventory and Evaluation (I&E) that has been developed by a person with appropriate NRCS job approval authority or equivalent experience/training. Applications for proposed projects must include an estimated timeline for completion. REAP tax credits are awarded upon completion of the project.

Projects are eligible for REAP tax credits for up to 3 years after the completion of the practice (date of completion for constructed BMPs; date of purchase for equipment). Projects must also be within their REAP life span. REAP life spans have been established by the Commission for all eligible practices and are listed in Attachment 1 of the REAP Guidelines. Installation costs for annual practices are eligible for REAP tax credits only within the fiscal year (July 1 – June 30) in which they are incurred. All projects must be maintained for their entire REAP life spans.

The Commission will consider applications for BMPs on existing agricultural operations. Projects involving an expansion of an agricultural operation by greater than 25% will be subject to a 50% reduction of REAP-eligible costs. Under-barn manure storages – unless certified by NRCS to be necessary for the treatment of an existing resource concern – are not eligible for REAP tax credits. All REAP applications that include manure storage, animal heavy use area protection, or roofed projects must include a completed (p11 of the REAP application).

Projects involving other public funding programs (i.e. EQIP, Chesapeake Bay, Growing Greener) are eligible to receive REAP credits. However, no tax credit will be provided for a publicly funded portion of a project.

An agricultural operation is eligible for a maximum of $250,000 of REAP tax credits in any consecutive 7-year period as calculated from the fiscal year in which the credit is issued.

REAP tax credits are awarded at either 50%, 75%, or 90% of out-of-pocket costs. In general, high priority BMPs such as plan writing; or projects that treat runoff from animal concentration areas are eligible for the 75% rate. Please refer to Attachment 1 for information regarding the REAP tax credit rate for eligible BMPs.

Agricultural operations (and landowners) located within a watershed that has a written TMDL listing impairment from agricultural sources are eligible to receive REAP tax credits equal to 90% of out-of-pocket installation costs for a select list of BMPs. Projects completed after July 1, 2021 that meet the Commission's requirements for the 90% credit rate will be considered eligible. The following BMPs are eligible for the 90% REAP tax credit on eligible operations:

1. Riparian buffers greater than 50 ft in width.
2. Multi-species Cover Crops (see Attachment 6)
3. Cover Crop roller/crimpers

4. Stream crossings and livestock exclusion from streams. BMPs used in conjunction with stream crossings and livestock exclusion are also eligible for 90% REAP tax credit (e.g. Animal Trails & Walkways, Fence, and off-stream watering facilities)
5. Soil Health Tests – A producer must be involved with a partner organization's soil health program (e.g. PASA's soil health benchmark study, USDA NRCS Soil Health Conservation Activity Plan, etc.).

The REAP tax credit must be returned if the BMP is not maintained and managed for the life span of the practice. If the BMP is not maintained for the required period, the operator shall return to the Department of Revenue or the Department of Treasury the full amount of the REAP tax credit awarded. If the recipient of the REAP tax credit provides prior written notification to the Commission that the BMP will not be maintained due to the sale of the property, cessation of an agricultural operation, or other factors, the Commission may direct the Department of Revenue or the Department of Treasury to prorate the amount of the REAP tax credit that shall be returned based on the remaining lifespan of the BMP.

The Commission has established a trade-in policy for no till equipment (and other equipment) for trade-ins that occur before the established lifespan of the equipment has expired. See Attachment 5 of the REAP Guidelines for more information on this policy.

REAP-eligibility verification fees are not eligible costs; nor are fees charged by consultants to complete a REAP application.

The Commission reserves the right to deny an application for any BMP and/or equipment if the cost is not within reasonable and fair market value as determined by the Commission. The Commission reserves the right to deny an application for any BMP and/or equipment that does not meet the intent of the standards set forth by the Commission.

The Commission reserves the right to exclude individuals from the REAP program who are found to knowingly engage in fraudulent activity. For example: fraudulent verification signatures, fraudulent BMP certification, fraudulent and/or altered receipt and invoices.

D. Sponsorship

An eligible applicant (individual or business entity) may act as a sponsor of a REAP-eligible project. A sponsor provides funding to an eligible ag operation for the REAP-eligible BMPs and the REAP tax credits are awarded directly to the sponsor. The sponsor is the REAP applicant. Eligibility for the REAP project is determined by the compliance of the owner/operator of the ag operation with the PA Clean Streams Law (see section B, above). A sponsor is defined in Attachment 7.

Sponsorship of REAP projects is reserved for proposed projects; projects currently under construction (not-yet completed and certified by an engineer); and for equipment purchased within the previous 6 months (from the time of application). All projects must meet the definitions and standards of an eligible BMP on an agricultural operation (except for Streambank and Shoreline Protection, Riparian Buffer, and Riparian Buffer Maintenance – for which non-agricultural landowners are eligible) as set forth by the Commission.

Typical examples of sponsors include: banks, businesses, and individuals/family trusts. For projects involving a sponsor, the Commission requires a signed written agreement between the sponsor (applicant) and the owner/operator of the property on which the project will be completed, certifying that the operator will comply with all the requirements associated with the REAP tax credit. A sample Sponsor agreement is available upon request. Please contact the Commission for more information regarding Sponsorship.

The Commission reserves the right to limit the amount of REAP funds approved for a single sponsor in any given round of the REAP program.

E. Application Procedures

Applications will be accepted for projects that are **proposed** or **completed** (or mixed) at the time of application. Applications are accepted on a first-come, first-served basis.

Projects that include the proposed purchase of equipment must be completed by **June 30, 2023**. Projects involving the implementation of structural BMPs must be completed by **June 30, 2024** to be eligible. Applicants may apply for proposed cover crop planting through **June 30, 2024**. If the approved projects are not completed within the specified time frames, the proposed projects may be removed from the program. Implementation schedules may be extended on a case-by case basis at the discretion of the Commission if the applicant notifies the Commission of the delay.

Tax credits are awarded upon completion of the approved project. The applicant must provide to the Commission paid receipts for the project and signed project certification information from a qualified individual. All projects must meet the design and certification standards established by the Commission.

The Commission will process all applications within 60 days of receipt of a complete application, and will notify the applicant, in writing, if the application meets the requirements for an eligible project. An approved project is authorized to receive REAP tax credits.

For all issues not specifically addressed by these guidelines, please refer to the provisions of Act 13 of 2019, Section 1701-E to Section 1710-E, or contact the Commission at 717-787-8821. Questions regarding tax implications for individual applicants should be directed to an accountant or other tax professional.

2022-23 REAP Applications will be accepted beginning August 1st, 2022. Applications may be mailed or hand-delivered to the Commission office at the following address:

State Conservation Commission
REAP Program
2301 North Cameron Street
Harrisburg, PA 17110

E-mailed applications should be sent to: jsemke@pa.gov.

F. REAP Tax Credit Information

The PA Department of Revenue will review an approved applicant's compliance with the Commonwealth's tax laws and regulations prior to awarding REAP tax credits. The year of the clearance approved by the Department of Revenue and communicated to the Commission will be the effective date of the credit. If an applicant is found to be non-compliant by Revenue, the tax compliance issue must be resolved first; then the Commission may resubmit the applicant's information to Revenue to award the REAP tax credit. The resubmittal date will become the new effective date on the REAP tax credit.

REAP tax credits can be used to pay PA income tax, dollar for dollar. The tax credit may be used for up to 15 years from the date it is awarded - applying the credit on each annual PA tax return until it is depleted. The REAP tax credit can be claimed against all income on a separately-filed or jointly-filed PA return.

A tax credit awarded in accordance with the guidelines of the REAP program must first be applied against the awardee's: Personal Income Tax, Corporate Net Income Tax, Bank Shares Tax, Title Insurance Company Tax, Insurance Premiums Tax, and Mutual Thrift Institutions Tax for the taxable year during which the credit is awarded (the effective date on the credit certificate). The unpaid tax liability must be satisfied before any portion of the credit can be carried forward to satisfy the tax liabilities for future years; or be sold; or passed-through.

To claim the REAP tax credit, the recipient must file the tax credit claim form found on the reverse of the REAP tax credit certificate prior to filing the annual PA income tax return. Recipients should use the PA Schedule OC to determine how much of the REAP tax credit to claim for the year. PA Dept of Revenue recommends filing the tax claim form 90 days in advance of filing the yearly tax return. Failure to submit the tax claim form 90 days prior to the filing of the annual PA income tax return may result in delays in the processing of the annual income tax return. After the tax credit claim form has been submitted, REAP tax credit recipients may file their annual PA income tax return with the PA Schedule OC.

The remainder of the original tax credit may be carried over by the tax credit award recipient and applied to succeeding taxable years - up to 15 years from the effective date of the REAP tax credit.

Pass-through entities: *To pass through the REAP tax credit to shareholders, members, or partners of the entity, the award recipient must file the tax credit claim form found on the reverse of the credit certificate 90 days in advance of the shareholders, members, or partners claiming the REAP tax credit on their PA income tax returns.*

The REAP tax credit may be sold or transferred to another PA income taxpayer. To sell this credit, an awardee must apply to the Commission to sell/assign, in whole or in part, unused REAP tax credits to a buyer/assignee. To be eligible to sell/assign a REAP tax credit, the REAP credit recipient must:

1. Use the REAP credit in the effective year of the credit against the entire PA income tax liability. If the REAP credit recipient owes no income tax for that year, this requirement is waived.
2. Wait one calendar year from the effective date of the REAP credit prior to selling/assigning any of the credit.

Before an application to sell or assign tax credits will be approved, the Department of Revenue must find that the applicant has filed all required state tax reports and returns for all applicable tax years and paid any balance of state tax due as determined by the Department of Revenue.

Effective immediately, entities that are no longer subject to filing the RCT-101 Corporate Tax Report as per the phase out of the Capital Stock & Foreign Franchise Tax are required to file the PA- 20S/PA-65, S Corporation/Partnership Information return prior to selling a REAP credit. Every domestic or foreign PA S corporation (72 P.S. § 7330.1), partnership (72 P.S § 7335(c)), or entity formed as a limited liability company that is classified as a partnership or S corporation for federal income tax purposes, must file the PA- 20S/PA-65 Information Return.

Single-Member Limited Liability Companies with an individual, partnership or corporation as the single member are required to file the specified returns: An individual as the single member, must file a PA-40 Individual Tax Return. If the single member is a corporation or partnership the return of the owner (RCT-101 Corporate Tax Report or PA 20S/65 Information Return) must be filed.

The assignee or purchaser of tax credits shall immediately claim the credits in the taxable year in which the purchase or assignment is made. The purchaser/assignee may not pass-through, resell, or reassign REAP tax credits. The purchaser/assignee may not carry forward, carry back, or obtain a refund of the tax credit.

Individuals who have been awarded REAP credits may directly arrange the sale/assignment of REAP credits to any eligible PA taxpayer. In addition, a list of private brokers who can assist with the sale of tax credits is found on the REAP webpage; or by contacting the State Conservation Commission.

The **REAP Tax Credit Sale/Assignment Application** packet is available on the REAP webpage or by calling the Commission at 717-787-8821. Please refer to the packet for additional details regarding the sale of REAP tax credits.

The following is a list of the most-commonly used REAP-eligible BMPs. Please contact the SCC if you have questions regarding a specific BMP or water-quality project that is not listed below.

Planning BMPs

Agricultural Erosion & Sedimentation Plan (Ag E&S)

REAP Lifespan:	3 years
Tax Credit Rate:	75%
Additional Information:	Refer to Attachment 2
REAP Conditions:	The plan must meet the requirements of Chapter 102.4 of the PA Clean Streams Law.
Certification Requirements:	The Ag E&S Plan shall be prepared by a person trained and experienced in Agricultural E&S control methods and techniques applicable to the size and scope of the project being designed.

Conservation Plan

REAP Lifespan:	3 years
Tax Credit Rate:	75%
Additional Information:	Refer to Attachment 2
REAP Conditions:	The plan must meet the requirements of Chapter 102.4 of the PA Clean Streams Law.
Certification Requirements:	The plan must be written by a NRCS-certified conservation planner.

Manure Management Plan (MMP)

REAP Lifespan:	3 years
Tax Credit Rate:	75%
Additional Information:	Refer to Attachment 3. See also: DEP Land Application of Manure – Manure Management Plan Guidance
REAP Conditions:	The plan must meet the standards of Chapter 91 of the PA Clean Streams Law

Nutrient Management Plan (NMP)

REAP Lifespan:	3 years
Tax Credit Rate:	75%
Additional Information:	Refer to Attachment 3.
REAP Conditions:	The plan must meet Act 38 Standards.
Certification Requirements:	The plan must be written by an Act 38-certified specialist.

Soil Health Tests

REAP Lifespan:	3 years
Tax Credit Rate	75%; **90% when applicant is in an ag-impaired TMDL watershed AND is involved with a partner organization's soil health program**
Additional Information:	Any of the widely-available complete comprehensive soil health tests are eligible. Examples include, but are not limited to: Cornell, Haney, Solvita. Traditional soil fertility tests are eligible for REAP tax credits as part of the Nutrient Management Plan or Manure Management Plan.

PACS Verification *(Pilot)*

REAP Lifespan:	3 years
Tax Credit Rate	75%; **90% when applicant is in an ag-impaired TMDL watershed**
Additional Information:	Reimburses costs associated with assisting a farm participating in the PACS Certification Program. Eligible costs include: PACS application, farm inspections, and verification of compliance with PA Clean Streams Law. Available to private-sector Technical Service Providers only.
REAP Conditions:	2-yr pilot program; $50,000 total cost/year cap; REAP-eligible costs capped at $500 per operation
Certification Requirements:	Individual must be PA Act-38 certified and/or qualified to write Ag E&S Plans

Equipment BMPs

Composting Equipment

REAP Lifespan: New Equipment - 7 years, Used Equipment - 3 years
Tax Credit Rate: 50%
Additional Information: Compost screeners, turning equipment, baggers, etc. as approved by the Commission
REAP Conditions: Composting must be included in the operation's Nutrient/Manure Management Plan.

Cover Crop Equipment

REAP Lifespan: New Equipment - 7 years, Used Equipment - 3 years
Tax Credit Rate: 50%; **90% for Cover Crop Rollers in an ag-impaired TMDL watershed**
Additional Information: Refer to Attachment 5. Equipment used to enhance the use of cover crops on an ag operation.
REAP Conditions: The equipment's primary use must be the establishment and management of cover crops.

Manure Injection Equipment – Low Disturbance

REAP Lifespan: New Equipment - 7 years, Used Equipment - 3 years
Tax Credit Rate: 50%
Additional Information: Refer to Attachment 5
REAP Conditions: Equipment must be capable of shallow injection of manure and/or must be a contiguous part of a manure injection system. Manure injection equipment that utilizes new technology will be evaluated by the Commission on a case by case basis.
Certification Requirements: Requires Equipment Dealer Certification

No-Till Planting Equipment – Planter or Drill

REAP Lifespan: New Equipment - 7 years, Used Equipment - 3 years
Tax Credit Rate: 50%; REAP-eligible cost capped at $300,000 per planter/drill
Additional Information: Refer to Attachment 5
Certification Requirements: Requires Equipment Dealer Certification

Precision Nutrient Application Equipment

REAP Lifespan: 3 years
Tax Credit Rate: 50%; REAP-eligible cost capped at $60,000 per purchase
Additional Information: Refer to Attachment 5
REAP Conditions: Components of Nutrient Application Equipment that enable base equipment (new or existing) to perform with automatic variable rate application capabilities.
Certification Requirements: Requires Equipment Dealer Certification

Constructed BMPs

Access Road

NRCS Practice Code: 560
REAP Lifespan: 5 years
Tax Credit Rate: 50%
REAP Conditions: This practice shall only be applicable to those locations on the farm where an improved travel-way is needed to access newly established BMPs. REAP tax credits will not be authorized for any construction or portion thereof exceeding 14 feet in width or 500 feet in length.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Animal Mortality Facility

NRCS Practice Code: 316
REAP Lifespan: 10 years
Tax Credit Rate: 50%; REAP-eligible costs may be reduced by 50% for new animal operations
REAP Conditions: The animal mortality composting facility must be part of a Manure/Nutrient Management Plan. The dead animals must come from the producer's operation and may not come from outside sources.
Certification Requirements: Any Conservation district or NRCS employee, or NRCS Certified Technical Service Provider, or private sector engineer or technician who has appropriate training and experience in the BMP planning, design and installation methods and techniques applicable to the size and scope of the BMP being certified.

Animal Trails and Walkways

NRCS Practice Code: 575
REAP Lifespan: 5 years
Tax Credit Rate: 75%; **90% - with livestock exclusion from streams in an ag-impaired TMDL watershed**
REAP Conditions: Eligible in conjunction with Prescribed Grazing (528) only. REAP tax credit not authorized for any construction or portion thereof that is greater than 12 feet in width.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Closure of Waste Impoundments

NRCS Practice Code: 360
REAP Lifespan: Operator must agree to permanently abandon the designated existing structure and the appropriate component practices of the structure.
Tax Credit Rate: 50%
REAP Conditions: BMP must be identified in operator's Nutrient/Manure Management Plan.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Composting Facility

NRCS Practice Code: 317
REAP Lifespan: 10 years
Tax Credit Rate: 50%
REAP Conditions: The composting facility must be part of a Manure/Nutrient Management Plan. For composting of animal mortalities, please see **Animal Mortality Facility**. The composting operation must meet the PA-DEP criteria for on-farm composting. Production of mushroom compost does not apply.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Constructed Wetland

NRCS Practice Code: 656
REAP Lifespan: 5 years
Tax Credit Rate: 50%
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Cover Crop

NRCS Practice Code: 340
REAP Lifespan: Annual
Tax Credit Rate: 50%; **90% for multi-species Cover Crop in an ag-impaired TMDL watershed**
Additional Information: Applicants must complete Cover Crop Worksheet (p12 of the REAP Application)
REAP Conditions: Please refer to Attachment 6. Applicants may include 3 years of proposed plantings. Sponsored applications are limited to 1 year only.
Certification Requirements: Subject to random spot check by SCC staff; Applicants must complete Cover Crop Worksheet (p12 of the REAP Application);

Critical Area Planting

NRCS Practice Code: 342
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75% ACA treatment
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Diversion

NRCS Practice Code: 362
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75% ACA treatment
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Fence

NRCS Practice Code: 382
REAP Lifespan: 10 years
Tax Credit Rate: 50%; 75% - in conjunction with 50+ ft buffer; **90% - in conjunction with 50+ ft buffer from streams in an ag-impaired TMDL watershed**; REAP-eligible costs capped at $5.00/ft
Additional Information: Fence that is part of an ACA-related BMP; or is Waste Storage safety fence; should be submitted as part of those BMPs.

REAP Conditions: Used in conjunction with Prescribed Grazing (528) Plan only. REAP tax credits will be authorized for establishing permanent fence; utilizing new materials – unless otherwise justified by Prescribed Grazing. Fencing must not have indirect negative environmental impacts on adjacent areas, such as allowing uncontrolled livestock access to sensitive areas such as stream corridors, steep areas subject to erosion, or woodland subject to overgrazing. REAP tax credit not authorized for removal and/or upgrade of existing fence. Fence surrounding Equine riding rinks is not eligible for REAP tax credits.

Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer

Grassed Waterway

NRCS Practice Code: 412
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75% ACA treatment
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Heavy Use Area Protection

NRCS Practice Code: 561
REAP Lifespan: 10 years
Tax Credit Rate: 50%; 75% - ACA treatment
Additional Information: Applications must include p11 of the REAP Application.
REAP Conditions: SCC staff site visit may be required prior to BMP approval for the roof structure component. Projects involving an operation expansion of greater than 25% are subject to a reduction in eligible costs of 50%.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Lined Waterway or Outlet

NRCS Practice Code: 468
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75% - ACA treatment
REAP Conditions: Used where vegetation alone will not provide adequate stabilization.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Manure Incineration

REAP Lifespan: 10 years
Tax Credit Rate: 50%; **REAP-eligible costs capped at $500,000**
Additional Information: Please contact the Commission for more information.
REAP Conditions: Incineration must be included in the operator's Nutrient/Manure Management Plan.

Manure Separation

REAP Lifespan: 7 years
Tax Credit Rate: 50%
REAP Conditions: Manure separation must be included in the operation's Nutrient/Manure Management Plan.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Obstruction Removal

NRCS Practice Code: 500
REAP Lifespan: 5 years
Tax Credit Rate: 50%
REAP Conditions: Eligible when existing obstructions interfere with other planned BMPs. REAP tax credits not authorized to remove brush in order to install fence; or for expansion of crop fields.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Pipeline

NRCS Practice Code: 516
REAP Lifespan: 5 years
Tax Credit Rate: 50%
REAP Conditions: Eligible as a component of livestock watering systems in conjunction with Prescribed Grazing (528) only. REAP tax credits not authorized when the pipeline will be used in conjunction with a domestic water supply or irrigation.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Poultry/Livestock Housing Vegetative Buffers

NRCS Practice Code:	380 (Windbreak/Shelterbelt Establishment)
REAP Lifespan:	10 years
Tax Credit Rate:	50%
Additional Information:	Plantings must conform to USDA/NRCS Windbreak/Shelterbelt Establishment (380)-Technical Note No. 1, SCC Odor Management BMP Guide
REAP Conditions:	Establishment costs only. Plantings must be within close proximity to livestock housing and exhaust fans
Certification Requirements:	Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Pumping Plant for Waste Water Control

NRCS Practice Code:	533
REAP Lifespan:	10 years
Tax Credit Rate:	50%
Certification Requirements:	Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Riparian Forest Buffer

NRCS Practice Code:	391
REAP Lifespan:	15 years
Tax Credit Rate:	50% rate when used in conjunction with the minimum width of the practice (35 feet); 75% in conjunction with 50+ foot width; **90% for 50+ foot width in an ag-impaired TMDL watershed.**
Additional Information:	NRCS Practice Guide for Riparian Forest Buffers, PA DEP Riparian Forest Buffer Guidance
REAP Conditions:	Riparian buffer establishment only (see below). This practice is available to agricultural and non-agricultural operations.
Certification Requirements:	Any Conservation district or NRCS employee, or NRCS Certified Technical Service Provider, or private sector engineer or technician who has appropriate training and experience in the BMP planning, design and installation methods and techniques applicable to the size and scope of the BMP being certified.

Riparian Forest Buffer Maintenance

NRCS Practice Code:	391
REAP Lifespan:	annual
Tax Credit Rate:	50% rate when used in conjunction with the minimum width of the practice (35 feet); 75% when used with 50 foot or greater width; **90% for 50+ foot width in an ag-impaired TMDL watershed.**
Additional Information:	NRCS Practice Guide for Riparian Forest Buffers, DEP Riparian Forest Buffer Guidance (pp10-11)
REAP Conditions:	Maintenance activities performed to ensure the survival and growth of riparian buffer plantings, in accordance with a long-term buffer operation and maintenance plan, are eligible. Examples include: mowing, applications of herbicide, vegetation removal, control of noxious weeds, protections from competing plants/animals. Sample long-term maintenance agreement available upon request. This practice is available to agricultural and non-agricultural operations.
Certification Requirements:	Any Conservation district, NRCS employee, NRCS Certified Technical Service Provider, DEP employee, or private sector technician who has appropriate training and experience in the BMP planning, design and installation methods and techniques applicable to the size and scope of the BMP being certified. Riparian Forest Buffer Maintenance Worksheet (available upon request) is required.

Riparian Herbaceous Cover

NRCS Practice Code:	390
REAP Lifespan:	5 years
Tax Credit Rate:	50%
REAP Conditions:	Buffer establishment only. This practice is available to agricultural and non-agricultural operations.
Certification Requirements:	Any Conservation district or NRCS employee, or NRCS Certified Technical Service Provider, or private sector engineer or technician who has appropriate training and experience in the BMP planning, design and installation methods and techniques applicable to the size and scope of the BMP being certified.

Roof Runoff Structure

NRCS Practice Code: 558
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75% - ACA treatment
REAP Conditions: This practice includes roof gutters and downspouts and shall only be applied to locations where runoff from farm buildings is causing severe erosion and/or transporting pollutants from animal wastes. Practice must include establishment of a stable outlet (see Underground Outlet). Repairs to a roof in preparation for this practice are not eligible for REAP tax credits.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Roofs and Covers

NRCS Practice Code: 367
REAP Lifespan: 10 years
Tax Credit Rate: 50%; 75% - ACA treatment
Additional Information: The Roofed Storage/Roofed ACA worksheet (p 11 of Application) must be completed
REAP Conditions: Practice applies to construction of roofing over Waste Storage Facility (313) and/or Heavy Use Area Protection (561). SCC staff site visit may be required. Projects involving an operation expansion of greater than 25% are subject to a reduction in eligible costs of 50%. Roofs over new permanent animal housing (barns) are not eligible for REAP credits.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Silage Leachate Management

Practice Code:
REAP Lifespan: 10 years
Tax Credit Rate: 50%
Certification Requirements: Any Conservation district or NRCS employee, or NRCS Certified Technical Service Provider, or private sector engineer or technician who has appropriate training and experience in the BMP planning, design and installation methods and techniques applicable to the size and scope of the BMP being certified.

Spring Development

NRCS Practice Code: 574
REAP Lifespan: 5 years
Tax Credit Rate: 50%; **90% - with animal exclusion from streams in an ag-impaired TMDL watershed**
REAP Conditions: Eligible in conjunction with Prescribed Grazing (528) only. Subsurface drainage (606) is authorized for supplying a viable water source needed for the livestock and in conjunction with providing a stable outlet. Practice may include a maximum of 1,200 feet of 4-inch collection line only. For collection systems greater than 1,200 feet, SCC staff approval is required. All Federal, State, and Local laws and regulation pertaining to wetlands must be followed.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Stream Crossing

NRCS Practice Code: 578
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75%; **90% - in conjunction with animal exclusion from streams in an ag-impaired TMDL watershed**
Additional Information: Applicant is responsible for all local, state and federal permits and approvals that may be required.
REAP Conditions: Eligible for animal and agricultural equipment crossing in conjunction with Prescribed Grazing (528) only. REAP tax credits not authorized for any construction or portion thereof that is greater than 14 feet in width.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Streambank and Shoreline Protection

NRCS Practice Code: 580
REAP Lifespan: 5 years
Tax Credit Rate: 50%
Additional Information: Applicant is responsible for all local, state and federal permits and approvals that may be required.

REAP Conditions: Used to stabilize stream banks eroded due to excessive water flow or livestock activity.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Structure for Water Control
NRCS Practice Code: 587
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75% - ACA treatment
REAP Conditions: REAP tax credits not authorized for the installation of structures designed to impound water for irrigation, recreation, household water, or to create ponds.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Subsurface Drain
NRCS Practice Code: 606
REAP Lifespan: 5 years
Tax Credit Rate: 50%
REAP Conditions: Subsurface drainage is eligible only as a companion practice for primary structural BMPs. REAP tax credits are not authorized for non-structural or vegetative practices such as Conservation Cover (327), Contour Farming (330), Cover Crop.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Terrace
NRCS Practice Code: 600
REAP Lifespan: 5 years
Tax Credit Rate: 50%
REAP Conditions: The practice is to be applied where: water erosion is a resource concern, the soils and topography are such that terraces can be constructed and farmed with a reasonable effort, and a stable outlet can be provided.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Underground Outlet
NRCS Practice Code: 620
REAP Lifespan: 5 years
Tax Credit Rate: 50%; 75% - ACA treatment
REAP Conditions: This practice is to be used as a supporting practice to outlet water from other conservation practices such as roof runoff structure, terrace, and watering facilities. Pipes greater than 12” in diameter may require SCC site visit.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Waste Storage Facility
NRCS Practice Code: 313
REAP Lifespan: 10 years
Tax Credit Rate: 50%; REAP-eligible costs may be prorated for new-animal operation.
Additional Information: The Roofed Storage/Roofed ACA worksheet (page 11 of Application) must be submitted along with the application. Applicant is responsible for all local, state and federal permits and approvals that may be required.
REAP Conditions: SCC staff site visit may be required prior to BMP approval for the roof structure component. Projects involving an operation expansion of greater than 25% are subject to a reduction in eligible costs of 50%. Under-barn storages are not eligible for REAP tax credits unless certified by NRCS to be necessary for the treatment of an existing resource concern.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Waste Transfer
NRCS Practice Code: 634
REAP Lifespan: 10 years
Tax Credit Rate: 50%
REAP Conditions: Eligible in conjunction with Waste Storage Facility. REAP tax credits are not authorized for: Portable pumps, pumping equipment or other portable equipment for removing, distributing, or applying animal waste on the land.
Certification Requirements: Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Waste Treatment

NRCS Practice Code:	629
REAP Lifespan:	Annual
Tax Credit Rate:	50%
Additional Information:	Only completed projects are eligible
REAP Conditions:	Use of the Waste Treatment practice must be included in the operation's Nutrient/Manure Management Plan.
Certification Requirements:	Any Conservation district or NRCS employee, or NRCS Certified Technical Service Provider, or private sector engineer or technician who has appropriate training and experience in the BMP planning, design and installation methods and techniques applicable to the size and scope of the BMP being certified.

Water Well

NRCS Practice Code:	642
REAP Lifespan:	5 years
Tax Credit Rate:	50%
REAP Conditions:	Eligible in conjunction with Prescribed Grazing (528) only. REAP tax credits not authorized for: providing water for the farm headquarters; domestic use.
Certification Requirements:	Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Watering Facility

Practice Code:	614
REAP Lifespan:	5 years
Tax Credit Rate:	50%; **90% - in conjunction with animal exclusion from streams in an ag-impaired TMDL watershed**
REAP Conditions:	Eligible in conjunction with Prescribed Grazing (528) only. REAP tax credits authorized for permanently located facilities within grazing paddocks or pastures. REAP tax credits not authorized for providing water for the farm headquarters; domestic use.
Certification Requirements:	Individual with appropriate NRCS Job Approval Authority or Registered Professional Engineer.

Attachment 2

Conservation Plan and Agricultural E&S Plan Policy

An agricultural operation that is an applicant for the REAP Tax Credit Program for any BMP or equipment must first have in place a current Conservation Plan and/or Ag E&S Plan for all acres plowed and or tilled that are under their management control (owned or rented or leased or utilized) in the year that they are applying for REAP Tax Credits to be eligible for the program. The Conservation and/or Ag E&S Plan must meet the requirements of Chapter 104.2 of the Pennsylvania Clean Streams Law.

For the purposes of REAP, a Conservation Plan and/or Ag E&S Plan is defined as "current" if the plan accurately reflects the existing operation; including correct and current number of acres, crop rotations, tillage, and animal concentration areas. The applicant must be on-schedule for full implementation of the plan. In addition, all BMPs to address ACA-related resource concerns must be fully implemented; or the costs associated with implementing them must be included in the REAP application.

A current Conservation Plan/Ag E&S Plan must address the following soil, water, and nutrient resource concerns on the agricultural operation with the identified quality criteria:

Resource Concern	Description of Concern	Quality Criteria	Assessment or Evaluation Tools
Soil Erosion – Sheet & Rill	Detachment and transport of soil particles degrade soil quality.	Sheet and Rill erosion does not exceed "T" over the crop rotation.	Visual, RUSLE hard copy, RUSLE2
Soil Erosion – Ephemeral & Classic Gully	Small and large channels degrade soil quality.	Conservation Practices or BMPs stabilize the small and large channels.	Visual, volume calculation
Water Quality – Excessive Suspended Sediment in Surface Water	Cropping system includes crops with <25% *cover** adjacent to *surface water***, which degrades *surface water*** quality.	Cropland with <25% *cover** within 100' of *surface water*** are treated with additional Conservation Practices or BMPs to mitigate adverse effect.	Visual, transect measurement
Water Quality – Excessive Nutrients & Organics in Surface Water and Groundwater	Pollution from human-induced nutrients (N, P and Organics) degrades *surface water***/groundwater.	Nutrients and organics are stored, handled and applied to mitigate adverse effect.	

* The term *cover* includes living plant cover and post- harvest crop residue.

** The term *surface water* is limited to: perennial and intermittent streams, lakes, ponds and existing open sinkholes.

*** The term *MMP* denotes the requirements of the DEP Manure Management Plan.

Attachment 3

Nutrient Management/Manure Management Policy

Proposed and existing CAOs and CAFOs are required to have an approved Nutrient Management Plan under the State Conservation Commission's (SCC) Nutrient Management Program (Act 38) in order to be eligible for REAP tax credits. If these operators do not have a plan, they may submit a REAP application to support their efforts to get a plan developed for their farm. Likewise, all farming operations (Non-CAO and Non-CAFO) may also apply for REAP tax credits to develop a nutrient management plan meeting the SCC's Act 38 criteria.

All farming operations that generate or utilize manure, other than CAO's and CAFOs, are required to have a Manure Management Plan (MMP) under the Department of Environmental Protection (DEP) Chapter 91 regulations or a voluntary Act 38 Nutrient Management Plan in order to be eligible for REAP tax credits.

Nutrient Management Plans written under Natural Resources Conservation Service (NRCS) Comprehensive Nutrient Management Plans (CNMPs) or NRCS 590 standard, as part of the operations conservation plan meet the criteria of DEP's Chapter 91 MMP.

MMPs can be prepared by the farmer although the farmer may benefit from obtaining assistance from individuals trained and experienced in developing these plans. The Best Management Practices (BMPs) applied for through the REAP Tax Credit program must be consistent with the MMP.

This Nutrient/Manure Plan (NMP, MMP) must address the owned and rented fields where manure from the operation is planned to be mechanically applied. For grazing operations, a grazing plan that meets NRCS P.C. 528 standards will meet this requirement.

To be considered a current NMP or MMP, the operator must be on-schedule for full implementation of the plan. The NMP must meet the requirements of Act 38 of 2005. The MMP must meet the requirement of the DEP Manure Management Manual and the Chapter 91 of the Pennsylvania Clean Streams Law. The operator must fully implement the NMP/MMP and keep it current with the farming operation for the lifespan of any BMP for which REAP tax credits have been approved.

Attachment 4

Verification Signatures

Verification Signatures for REAP Eligibility

Applies to: REAP Application Section 2 (signature on p4)

The individual signing the Verification Page in Section 2 of the REAP application is verifying that the applicant's answers to questions on pp2-3 of the REAP application are accurate and true.

For example, if the applicant indicates that plans exist on all acres operated and are fully implemented, the verifier is certifying that to be true. If the applicant indicates that plans do not exist or are not fully implemented, the verifier is certifying that the answer is true, and that the applicant is applying for cost associated with plan writing; does not need the plans in question; or the applicant's explanations regarding development of plans and timeline of implementation is true. **If an applicant's answers are not accurate or true, the verifier should not certify (by signing p4) the REAP application.**

The individual signing the Verification Page must not have a potential conflict of interest with the applicant. The individual shall not verify an application pertaining to their own farming operation, an application for immediate family members (parent, spouse, child, brother, or sister), or a business with which the individual or a member of their immediate family is associated.

IMPORTANT: Please note that **BOTH** Section 2A and Section 2B must be verified on p4 of the application by a qualified individual, even if there are no animals present on the operation. If an applicant answers "NO" to question B1. on p2, the accuracy of that answer must be verified on p4.

The following individuals are qualified under REAP to provide the necessary verification signatures:

- Conservation District employees with appropriate training and experience in PA Clean Streams Law compliance.
- USDA/NRCS employees who are certified in conservation planning or working under the supervision of a certified individual with appropriate training and experience in PA Clean Streams Law compliance.
- Qualified Technical Service Providers (TSPs) – those in the TSP registry and certified to write conservation plans. Also, individuals with current certification under Act 38 of 2005 are qualified to provide verification signatures.

Verification signatures provided by qualified staff at the County Conservation District do not require an action of the District Board.

The Commission reserves the right to disqualify any individual from providing a Verification Signature.

Verification Signatures for Equipment Purchases

Applies to: REAP Application pp8-10

For equipment purchases, equipment dealers and others as determined by the Commission (on a case-by-case basis) are qualified under the REAP program to sign the "Dealer Certification" forms in the REAP Application.

The individual signing on the Dealer Certification forms must not have a conflict of interest with the applicant. The individual cannot certify their own equipment, equipment purchased by an immediate family member, or a business with which the individual or a member of immediate family is associated.

The Commission reserves the right to disqualify any individual from providing a Verification Signature.

Attachment 5

REAP Equipment Guidelines

Applies to: No-Till Planting Equipment, Precision Nutrient Application Equipment components, Manure Injection Equipment, Cover Crop Equipment

Applications for equipment must meet **ALL** other REAP eligibility requirements.

The Commission will not approve applications for tax credits for any equipment that was purchased more than 3 years prior to the submission of the application.

For the FY 2022 REAP program, delivery of all equipment must take place by **June 30, 2023.**

All equipment must be designed and commercially manufactured for the specific purpose and intent as listed below; and the applicant must agree to not alter the intended use.

All projects must meet the definitions and standards of an eligible BMP on an agricultural operation. As such, eligible owner/operators listed in the application must meet the definition of an Agricultural Operation found in Attachment 7 of the REAP Guidelines.

The SCC reserves the right to deny an application for equipment if the cost of the equipment is not within reasonable and fair market value as determined by the Commission. The SCC reserves the right to deny an application that does not meet the intent of the standards set forth for the equipment by the SCC.

see below for the **REAP Equipment Trade-In/Trade-Up Policy**

No-Till Planting Equipment:

- **Intent:** The no-till planter or drill must be capable of placing seeds at the optimum depth for germination and growth in untilled soil with residue cover. Used equipment must also be in good-working order without excessive wear.
- A completed REAP No-Till Equipment Purchase Certification form (p8 of the REAP application) must be submitted by the applicant. The equipment must be certified that it meets the above criteria by a qualified farm equipment dealer authorized by the Commission.
- Used equipment sold privately must be certified by a dealer representative to meet the above used equipment criteria using p8 of the REAP Application
- All wear items must meet or exceed manufacturer's guidelines for wear replacement parts as certified by a qualified equipment dealer.
- New equipment shall have a REAP lifespan of 7 years. Used equipment's REAP lifespan is 3 years.
- The cost of operator-installed parts, repair, or refurbishing of existing equipment is ineligible for REAP tax credits
- REAP-Eligible costs are capped at $300,000 per planter/drill.

Precision Nutrient Application Equipment:

- **Intent:** The equipment must be capable of applying nutrients at variable rates across a crop field according to automatic data input from computerized maps or optical sensors.
- Only the components necessary to apply nutrients at variable rates are eligible REAP tax credits. Examples include: hydraulic motors, variable rate drives, section control, scales, nozzle controls, metering devices.
- Monitors and displays necessary to control the components are eligible.
- Components necessary to upgrade application equipment to variable rate capabilities are eligible.
- REAP-eligible costs will be capped at $60,000 per equipment purchase.

- Components on manure spreaders and spinner-type granular fertilizer spreaders are not eligible for REAP tax credits.
- Costs of subscription services are eligible only in the initial year of the purchase of REAP eligible precision nutrient application equipment and are limited to 1 year in duration.
- A completed REAP Precision Application Equipment Certification (p9 of the REAP Application) must be submitted by the applicant. The equipment must be certified that it meets the above criteria by a qualified farm equipment dealer authorized by the Commission.
- Used equipment sold privately must be certified by a qualified farm equipment dealer to meet the above used equipment criteria. (p9)
- All wear items must meet or exceed manufacturer's guidelines for wear replacement parts as certified by a qualified equipment dealer.
- Precision Nutrient application equipment shall have a REAP lifespan 3 years.
- The cost of operator-installed parts, repair, or refurbishing of existing equipment is ineligible for REAP tax credits

Low Disturbance Manure Injection Equipment:

- **Intent:** The equipment is capable of injecting manure effectively at a shallow depth (approx. 4" maximum) while creating minimal surface disturbance.
- The equipment must be used in a manner consistent with the provisions of a current Conservation Plan/Ag E&S Plan and a current Nutrient Management Plan/Manure Management Plan.
- The purchase of equipment must include field setup by an equipment dealer.
- A completed REAP Low Disturbance Manure Injection Equipment Certification form (p10 of the REAP Application) must be submitted by the applicant. The equipment must be certified that it meets the above criteria by a qualified farm equipment dealer authorized by the Commission.
- Used equipment sold privately must also be certified by a dealer representative to meet the above equipment criteria (p10).
- All wear items must meet or exceed manufacturer's guidelines for wear replacement parts as certified by a qualified equipment dealer.
- New equipment shall have a REAP lifespan of 7 years. Used equipment's REAP lifespan is 3 years.
- The costs of operator-installed parts, repair, or refurbishing of existing equipment is ineligible for REAP tax credits

Note: Manure transport tanks, drag line, and pumping equipment are not eligible.

Cover Crop Equipment:

- **Intent:** Eligible equipment's primary use is for the establishment and management of cover crops.
- Cover crop rollers are eligible for REAP tax credits. Rollers must be designed with chevron-shaped crimper blades to be eligible for REAP tax credits.
- Cover crop spinners attached to harvesting equipment are eligible for REAP tax credits
- Seed boxes attached to vertical tillage equipment that are used for planting cover crops are eligible for REAP tax credits.
- Equipment that is capable of spreading both nutrients and seed is eligible under the Precision Nutrient Application Equipment guidelines (see above).
- New equipment shall have a REAP lifespan of 7 years. Used equipment's REAP lifespan is 3 years.
- Equipment utilizing new technology or new methodology may be eligible for REAP credits on a case-by-case basis, as determined by the Commission.

REAP Equipment Trade-In/Trade-Up Policy

This policy applies to the following: No-Till Planters and Drills, Low Disturbance Manure Injection Equipment, Precision Nutrient Application Equipment, Cover Crop Equipment

In some circumstances, an applicant may wish to sell or trade in a piece of equipment for which the applicant has received a REAP tax credit prior to the expiration of the required lifespan under the REAP program (7 years for new equipment, 3 years for used equipment). The Equipment may be traded for a comparable or larger piece of eligible equipment under the following conditions:

- The applicant must immediately make a request to the Commission.
- The applicant is trading or selling the original equipment for another piece of equipment which will allow the farmer to utilize the equipment on a comparable or larger number of acres.
- An "Equipment Certification Form" must be submitted for the new piece of equipment.
- The applicant will be eligible for a REAP tax credit, up to the maximum allowed per applicant, based on the difference between the purchase price of the original equipment and the purchase price of the new equipment. The applicant must submit a new application for these costs.
- If the applicant receives REAP tax credits for the difference between the cost of the original equipment and the cost of the new equipment, the lifespan requirement resets with the new piece of equipment.
- If the applicant does not wish to apply for additional REAP tax credits, the remaining years of the lifespan for the original equipment will transfer onto the new equipment. The new equipment must be used until the lifespan requirement of the original piece of equipment has been met.
- If the recipient of a REAP tax credit sells or trades equipment prior to the expiration of its REAP lifespan without replacing it with a comparable piece of REAP-eligible equipment, the recipient may be required to repay a prorated portion of the tax credit.
- If the recipient of a REAP tax credit sells or trades equipment prior to the expiration of its REAP lifespan without notifying the State Conservation Commission, the recipient is subject to the provisions of the REAP statute which require the recipient to return to the Department of Revenue the full amount of the tax credit originally granted.

***See REAP Application p12 of the REAP Application for the Cover Crop Job Sheet**

Cover Crop

Reportable Units: Ac.
Lifespan: Annual
Tax Credit Rate: 50%; **90% for multi-species cover crop in an ag-impaired TMDL watershed**
REAP Conditions as follows:

- Applicants may apply for up to 3 years of proposed cover crop plantings. Invoices must be submitted at the end of each year's cover crop establishment. Sponsored applicants are limited to 1 year of cover crops.

- Cover crops harvested for grain are not eligible for REAP tax credits.

- Completion of the **REAP Cover Crop Worksheet** (p12 of the REAP Application) is required.

- Total REAP-Eligible costs are capped at $50/acre for single-species plantings and $80/acre for multi-species plantings.

- Multi-species cover crop is defined as: A cover crop mix that consists of a grass/small grain species plus 2 broadleaf species; **in which the seeding rate of the grass/small grain species may not exceed 1.5 bu/ ac.**

- REAP-eligible planting costs are capped at $25/ac

- REAP-eligible costs for seed grown by the REAP applicant is capped at $12/bu.

- Fertilizer, lime, and/or herbicide costs are not eligible for REAP tax credits.

- All seed used for cover crops must be tested and properly labeled in accordance with the PA Seed Law and regulations. If the grower elects to use home-grown seed, it must be tested for purity, germination, and absence of noxious weeds by a recognized seed laboratory prior to seeding.

- Spreading of manure on the cover crop must be consistent with a current Nutrient Management Plan or Manure Management Plan.

Attachment 7

Definitions

Act 13 of 2019 (Section 1702-E)

AGRICULTURAL EROSION AND SEDIMENTATION CONTROL PLAN - A site-specific plan that:
(1) meets the requirements of the act of June 22, 1937 (P.L. 1987, No. 394), known as The Clean Streams Law, and 25 Pa. Code Ch. 102 (relating to erosion and sediment control); and
(2) identifies best management practices to minimize accelerated erosion and sediment from an agricultural operation.
AGRICULTURAL OPERATION - The property on which occur the management and use of farming resources for the production of crops, livestock or poultry or for equine activity.
ANIMAL CONCENTRATION AREAS - An exterior area of an agricultural operation subject to rainfall where livestock congregate, including a barnyard, a feedlot, a loafing area, an exercise lot or other similar animal confinement area that will not maintain a growing crop, or where deposited manure nutrients are in excess of crop needs. The term does not include areas managed as a pasture or other cropland and pasture accessways if they do not cause direct flow of nutrients to surface water or groundwater.
BEST MANAGEMENT PRACTICE - A practice or combination of practices determined by the State Conservation Commission or United States Department of Agriculture Natural Resources and Conservation Service to be effective and practical, considering technological, economic and institutional factors, to manage nutrients and sediment to protect surface water and groundwater.
BUSINESS FIRM - An entity authorized to do business in this Commonwealth and subject to the taxes imposed by Article III, IV, VI, VII, VIII, IX or XV.
COMMISSION - The State Conservation Commission.
CONSERVATION DISTRICT - A county conservation district established under the act of May 15, 1945 (P.L. 547, No. 217), known as the Conservation District Law.
CONSERVATION PLAN - A United States Department of Agriculture Natural Resources Conservation Service plan, including a schedule for implementation, that identifies site-specific conservation best management practices on an agricultural operation.
DEPARTMENT - The Department of Revenue of the Commonwealth.
ELIGIBLE APPLICANTS - Any of the following subject to the taxes imposed by Article III, IV, VI, VII, VIII, IX or XV:
(1) A business firm.
(2) An individual.
(3) Individuals filing jointly.
EQUINE ACTIVITY - The term includes the following activities:
(1) The boarding of equines.
(2) The training of equines.
(3) The instruction of people in handling, driving or riding equines.
(4) The use of equines for riding or driving purposes.
(5) The pasturing of equines.
The term does not include activity licensed under the act of December 17, 1981 (P.L. 435, No. 135), known as the Race Horse Industry Reform Act.
INDIVIDUAL - A natural person.
LEGACY SEDIMENT - Sediment that meets all the following conditions:
(1) Was eroded from upland areas after the arrival of early Pennsylvania settlers and during centuries of intensive land use.
(2) Was deposited in valley bottoms along stream corridors, burying presettlement streams, floodplains, wetlands and valley bottoms.
(3) Altered and continues to impair the hydrologic, biologic, aquatic, riparian and water quality functions of presettlement and modern environments.
MANURE MANAGEMENT PLAN - A written site-specific plan that:
(1) outlines practices for the land application of manure and agricultural process wastewaters acceptable to the commission; and
(2) is developed to meet the requirements of 25 Pa. Code § 91.36(b) (relating to pollution control and prevention at agricultural operations).
NUTRIENT MANAGEMENT PLAN - As defined under 3 Pa.C.S. Ch. 5 (relating to nutrient management and

odor management).
NUTRIENT MANAGEMENT SPECIALIST - As defined under 3 Pa.C.S. Ch. 5 (relating to nutrient management and odor management).
PASS-THROUGH ENTITY - A partnership as defined in section 301(n.0) or a Pennsylvania S corporation as defined in section 301(n.1).
QUALIFIED TAX LIABILITY - The liability for taxes imposed upon an eligible applicant under Article III, IV, VI, VII, VIII, IX or XV. The term shall not include any tax withheld by an employer from an employee under Article III.
RIPARIAN FOREST BUFFER - An area of mostly trees or shrubs which is adjacent to and up-gradient from watercourses or water bodies and which meets standards established or adopted by the commission.
TECHNICAL SERVICE PROVIDER - An individual, entity or public agency certified by the United States Department of Agriculture Natural Resources Conservation Service and placed on the approved list to provide technical services to program participants or to the United States Department of Agriculture program participants.
TOTAL MAXIMUM DAILY LOAD or (TMDL) - The sum of individual waste load allocations for point sources, load allocations for nonpoint sources and natural quality and a margin of safety expressed in terms of mass per time, toxicity or other appropriate measures.
USDA-NRCS - The United States Department of Agriculture Natural Resources and Conservation Service.

Terms not found in Act 55, as defined by the Commission:

SPONSOR- A business subject to the following Pennsylvania Taxes (personal income tax, corporate net income tax, capital stock and franchise tax, bank shares tax, title insurance company premiums tax, insurance premiums tax, and mutual thrift institutions tax) which receives a REAP Tax Credit based on the amount of funding it contributes toward eligible farm conservation projects. The business is the direct recipient of the REAP tax credits.

AGRICULTURAL OPERATION: as it relates to the $250,000/7-yr credit limit.

For purposes of evaluating REAP applications and applying tax credit limits prescribed in Section 1703-E (B) of the Act, the Commission will consider an eligible applicant as a single "agricultural operation" where …

all tracts of land, whether contiguous or non-contiguous,

are under the common ownership and or common management control of the person, whether as an individual, corporation, partnership or other legal entity, applying for the REAP tax credit and have organizational structures that include or retain the same or significantly similar ownership, management, directors, officers or shareholders

or which utilize substantially common management or production resources such as land, equipment, labor, accounting and business systems to support one or more farm enterprises, partnerships, corporations or other farm related entity.

Entities with significantly similar organizational structures or which utilize substantially common management or production resources will be considered a single "agricultural operation" for purposes of REAP tax credits.

Please note: For REAP purposes, the operator of the agricultural operation receiving REAP tax credits is considered the property owner.

Attachment 8

Map Requirements

The REAP application must include*:

- A 1:24,000 scale USGS Topographic quad map showing an outline of your home farm and any other parcels that contain the BMPs requested in your application.
    - An 8.5" X 11" black and white photocopy of a USGS Quad map at 1:24,000 scale is acceptable provided it includes the name of the Quad, and a major cultural feature or map feature that is readily identifiable.
    - Be sure to include the name of the 1:24,000 Quad maps.
- Other maps or aerial photographs may be accepted at the discretion of the Commission provided that the map is of sufficient scale and clarity to clearly identify the location of the BMPs for which tax credits are sought.

*Maps are not required if applying only for equipment.

If you have any questions about where to obtain the required map, please contact:

- Your technical service provider
- The County Conservation District
- The State Conservation Commission at 717-787-8821

Frequently Asked Map Questions

Q. All I want to do is buy a no-till drill. Do I still have to provide all this mapping information?
A. No. You are exempt from this requirement.

Q. As a sponsor what do I have to submit?
A. Requirements for sponsored applications are the same as those for any other applicant. A map of the operation is required.

Q. My agricultural operation consists of five separate parcels? How should I draw them?

A. Draw them as five separate parcels unless they have common boundaries. Those parcels may be drawn with a common exterior perimeter if you desire.

Resource Enhancement and Protection Program

APPLICATION

Fiscal Year 2022

(July 1, 2022 – June 30, 2023)

State Conservation Commission
2301 North Cameron Street
Harrisburg, PA 17110

Phone: (717) 705-4032
SCC Main office: (717) 787-8821

REAP APPLICATION INSTRUCTIONS
FY 2022

SUBMISSION INFORMATION

The Commission will accept FY 2022 REAP application beginning **August 1st, 2022**. Please send applications to the following address:

State Conservation Commission
REAP Tax Credit Program
2301 North Cameron Street
Harrisburg, PA 17110-9408

Applications must be typed or neatly printed. **Emailed applications should be sent to**: jsemke@pa.gov
Faxed applications cannot be accepted.

Applications are accepted on a first-come, first-served basis. Applications will be accepted for projects that are proposed or completed (or mixed) at the time of application. Completed projects are eligible for REAP tax credits for 3 years after completion and certification.

All applications, regardless of the project, must include pp 1-4. Applicant eligibility is determined by answers to the questions on pp 2-3. Applicant eligibility is verified on p4 by a qualified individual. *Please refer to p1 (Sec B.) of the REAP Guidelines for more information regarding applicant eligibility*. **Please note:** Section 2A and Section 2B on p4 must be verified by a qualified individual; even if there is no livestock present on the operation.

Please refer to p5 of this application for additional instructions on completing the application.

Please refer to p5 of this application for information regarding BMPs that are eligible for a REAP tax credit of 90% of out-of-pocket costs.

Please refer to p3 (Sec D.) of the REAP Guidelines for more information on sponsorship of REAP projects.

Please refer to pp 4-5 of the REAP Guidelines for information regarding the use of REAP tax credits.

Please refer to Att 1 of the REAP Guidelines for additional information regarding eligible projects.

Important note regarding operation expansions: Projects involving an expansion of an agricultural operation by greater than 25% will be subject to a 50% reduction of REAP-eligible costs. Under-barn manure storages – unless certified by NRCS to be necessary for the treatment of an existing resource concern – are not eligible for REAP tax credits. All REAP applicants that include manure storage and/or animal heavy use area protection costs must complete p11 of this application.

Parts of this Application may require the assistance of your local Conservation District, USDA/NRCS office, or a qualified private-sector technical service provider. Some sections require a signature of one of these parties for verification. See Attachment 4 of the Guidelines for a list of organizations who are qualified under the REAP tax credit program to provide verification signatures.

Please remove the cover page and instruction pages before submitting the application.

REMINDERS

Before you submit the REAP Application, make sure you have….

- √ Provided contact name, mailing address, ag operation address, and one Social Security Number and/or EIN number for the applicant. Please note that the tax credit will be awarded to the Social Security Number or EIN number that you submit.
- √ Answered all eligibility questions on pp 2-3.
- √ Had your application eligibility verified by a qualified person on p4.
- √ Completed the REAP Project Cost/Funding Summary Table (p6). Please refer to the instructions on p5 before completing p6.
- √ Signed and dated the application on p7.
- √ For sponsored applications, please ensure that: the sponsor has completed their information on p1; page 7 is signed in the correct areas; you have included the sponsorship addendum page.

If you are applying for Plans, please provide the following:

- √ For proposed Plans: a cost estimate and a total acreage on p6. Please see below for information regarding the appropriate plan(s) for your operation.
- √ For completed Plans: copies of receipts with date completed, total cost, and acreage data.

If you are applying for Equipment, please provide the following:

- √ For proposed purchases: A cost estimate, price quote, or purchase order.
- √ For completed (delivered) purchases: the corresponding equipment dealer certification form (pp 8, 9, 10) and a copy of the dated sales receipt/invoice.

If you are applying for a constructed BMP project, please provide the following:

- √ For proposed projects: cost estimates, estimated other public funding at time of application (if applicable), estimated project completion date on p6.
- √ For completed projects: copies of all receipts (including any of your own labor), all records of other public funding associated with the project, and appropriate certification data (p13).

If you are applying for a manure storage facility or animal heavy use area, please provide the following:

- √ Roofed Waste Storage/Roofed Animal Concentration Area Evaluation Worksheet (p11).

If you are applying for cover crops, please provide the following:

- √ Cover Crop Worksheet (p12) and receipts for completed plantings. If applying for proposed plantings*, estimate future years at the top of p12. When completing p6 (cost summary table), please complete a separate row for each year of plantings. Please refer to Att 6 of the REAP Guidelines for more information regarding planting seed costs.

If you are applying for riparian buffer installation and/or maintenance costs, please provide the following:

- √ Riparian Forest Buffer Maintenance Worksheet (available upon request). The form must be completed for all projects involving a buffer.

REAP Planning Questionaire

****must be completed with all REAP applications for Nutrient Management Plans and/or Manure Management Plans****

"My operation generates or utilizes manure. What type of manure plan do I need?"

1. Is your operation a CAO or CAFO?

   YES → Your operation needs an approved Act 38 Nutrient Management Plan (NMP).

   NO ↓

2. Are you interested in participating in Act 38 as a volunteer (VAO)? VAOs can benefit from the limited legal protections provided by an approved Act 38 NMP.

   YES → Your operation needs an approved Act 38 Nutrient Management Plan (NMP).

   NO ↓

3. Are you interested in applying for funding from USDA/NRCS to help install ag BMPs?

   YES → It could benefit you to have NRCS 590 Standard NMP developed as part of your NRCS Conservation Plan. NRCS 590 Standard Plans are written to Act 38 standards. NRCS Plans must be approved by NRCS. (*see footnote)*

   NO ↓

4. Are you interested in the additional crop-year-specific agronomic information that an NMP contains?

   YES → It could benefit your operation to have an NMP developed by an Act 38 certified specialist. An NMP written to Act 38 standards will contain more information for your operation than a DEP Manure Management Plan (see below).

   NO ↓

A PA DEP Chapter 91 Manure Management Plan (MMP) will meet your needs.

Types of operations best-served by an MMP:

1. Operations with few animals
2. grazing-intensive operations
3. Operations with large acreage available for manure spreading

Footnote: NMPs that do not go through the Act 38 approval process (see questions 3 and 4) do not confer any of the limited legal protections provided by Act 38.

REAP ID Number 22 -

For Commission use only

SECTION 1A - APPLICANT INFORMATION

APPLICANT NAME/BUSINESS NAME:

MAILING ADDRESS:

street:

TOTAL REAP REQUEST: (sum p6)

city *state* *zip*

phone : *email* :

CONTACT NAME: (If different than applicant name)

The ***applicant*** is:

☐ The owner/operator of the property on which the project will be completed

☐ A sponsor of the project*

**For projects where the applicant is a sponsor, a signed written agreement between the sponsor (applicant) and the owner/operator of the property on which the project is located must be completed, attesting that the owner/operator will comply with all the requirements associated with the award of the REAP tax credit, including the obligation to maintain the sponsored BMP(s). A sample agreement is available upon request. Both the sponsor's and the property owner's signature must appear in the appropriate sections of this application (p7 & addendum).*

Section 1B - TAX INFORMATION

REAP Tax Credit will be issued under the SSN for Individuals or Sole Proprietorship. REAP Tax Credits will be issued under the FEIN for the business or pass-through entity.

SSN:

Federal Employer Identification Number(FEIN): *PA Revenue ID:*

Please check which type of business entity

Individual ☐	LLC ☐	S Corp ☐	Partnership ☐	C Corp ☐
Bank ☐	Limited Partnership ☐	Other entity (please list):		

Has this applicant received a REAP tax credit in a previous program year? ☐ Yes ☐ No

Section 1C: OPERATION INFORMATION *(if different than Sec 1A)*

OPERATOR NAME: *Operator SSN or FEIN:*

phone: *email:*

OPERATION ADDRESS:

street:

city: *state* *zip*

county: *township:*

Section 1D: GENERAL PROJECT INFORMATION

This application is for projects which include: (check all that apply)

☐ Planning *(Conservation Plan, Ag E&S Plan, Nutrient Management Plan, Manure Management Plan)*

☐ Best Management Practices (BMPs)

☐ Purchase of Equipment

for constructed BMP projects*:

Yes ☐ No ☐ Have you **applied** for funding from any other source? (EQIP, CBP, Growing Greener,etc.)

Yes ☐ No ☐ Are you planning to apply for funding from any other source?(EQIP, CBP, Growing Greener,etc.)

**Answers do not impact the REAP application process and are used solely for record keeping purposes.*

SECTION 2 - REAP Eligibility

Refer to Attachment 2 &3 of the REAP Guidelines for more information regarding this section.

A. Conservation and Agricultural E&S (Ag E&S) Plans

1. Do you have current and up-to-date **Ag E&S Plans** or **NRCS Conservation Plans** for <u>all acres owned or operated</u> that meet the requirements of DEP regulations found in **Chapter 102.4(a) of the PA Clean Streams Law**? These include:

- Cropland must be treated to eliminate ephemeral or classic gullies
- Cropland must be treated to T (tolerable soil loss) over the crop rotation
- Cropland with less than 25% cover within 100 feet of a body of water must be treated with additional BMPs
- Animal Heavy Use Areas (AHUAs) must be treated to eliminate pollution runoff
- If you do no plowing or tilling, a Prescribed Grazing (528) Plan (where approprate) or Mushroom Management Plan (where appropriate) meets the requirements of bullets 1-3 above.

Yes ☐ If you answered Yes, proceed to Question A.2

No ☐ If you answered No, you must include the development of Plans in this application for REAP tax credits on p5; **<u>OR</u>** use the space provided below to list the entity assisting you with Plan development and an estimated date of completion of the Plans.

REAP credits may be awarded for Plans prior to implementation of ACA BMPs. However, all ACA-related BMPs in the new plan must be fully implemented prior to receiving any non-Plan REAP credits.

2. If you answered Yes to Question A.1 above, is your plan fully implemented?

Yes ☐

No ☐ If you answered No, list BMPs yet to be completed and an implementation schedule below:

Please do NOT attach a copy of the plan

B. Nutrient/Manure Management Plans

1. Do you have livestock, poultry, or equine on your operation; <u>AND/OR</u> import manure?

Yes ☐ If you answered Yes, proceed to **Question B.2**

No ☐ If you answered No, proceed to **page 4 (Verification Page)**

2. Is your operation a Concentrated Animal Operation (CAO) or Concentrated Animal Feeding Operation (CAFO)

Yes ☐ If you answered Yes, proceed to **Question B.3**

No ☐ If you answered No, proceed to **Question B.4**

3. Do you have a current Act 38 Nutrient Management Plan (NMP) for your CAO or CAFO operation?

Yes ☐ If you answered Yes, proceed to **Question B.5**

No ☐ If you answered No to Question B.3, you must include development of the NMP in this application for REAP tax credits. REAP credits may be awarded for the NMP prior to implementation of ACA BMPs. However, all ACA-related BMPs in the new plan must be fully implemented prior to receiving any other REAP credits.

4. If your operation is not a CAO or CAFO, do you have a Manure Management Plan that meets the requirements of the DEP regulations found in Chapter 91 of the PA Clean Streams Law?

Yes ☐ If you answered Yes, specify which plan below, then proceed to **Question B.5**

voluntary Act 38 NMP or NRCS 590 Plan ☐ **DEP Manure Management Plan** ☐

No ☐ If you answered No, you must include the development of Plans in this application for REAP tax credits on p5; **OR** use the space provided below to list the entity assisting you with Plan development and an estimated date of completion of the Plans.

5. If you answered Yes to Question B.3 or B.4, is the Plan fully implemented?

Yes ☐

No ☐ If you answered No, list the BMPs yet to be completed and an implementation schedule below:

6. Does this application cover REAP-eligible BMPs necessary to implement the Nutrient/Manure Management/NRCS 590 Plan?

Yes ☐

No ☐

Please do NOT attach a copy of the plans.

C. Animal Concentration Areas

7. Does your operation have any Animal Concentration Areas (ACAs) as defined below?

- Livestock confinement areas other than indoor facilities and true pastures
- Barnyards, feedlots, loafing areas, exercise lots and similar animal confinement areas that will not maintain a growing pasture
- Heavily stocked livestock areas where nutrients are applied by animals in excess of crop removal rates
- Animal congregation areas within pastures that meet the above descriptions, e.g.: supplemental feeding areas, shade and/or watering areas, congested travel areas

Yes ☐

No ☐

8. Does your operation have any untreated ACAs? Use the evaluation below to determine whether you have an untreated ACA (there is a negative impact to surface water and groundwater).

- Does untreated, unfiltered runoff from area enter the surface water?
- Does runoff from the areas present a significant negative impact to groundwater?
- Is the area within 50 feet of a well, spring, or sinkhole?

Yes ☐

No ☐

9. Does this application cover planning costs and/or installation costs for REAP-eligible BMPs to address the ACA?

Yes ☐

No ☐

REAP ELIGIBILITY VERIFICATION PAGE

See Attachment 4 of the Guidelines for information on individuals who are qualified to provide this verification

Verifiers are attesting to the accuracy of the answers in Sec 2.
PLEASE NOTE: Sections 2B and 2C must be verified below by a qualified individual, even if there is no livestock and/or manure handling on the operation.

Sec 2A: Conservation and Agricultural E & S Plans

I affirm that I have reviewed the responses made **by the applicant** in **Section 2A**, and after due diligence and inquiry, I hereby affirm the foregoing to be true and correct to the best of my knowledge. I make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

NAME: (print)

TITLE:

ORGANIZATION OR BUSINESS:

PHONE:

VERIFICATION SIGNATURE: DATE:

Sec 2 B & C: Nutrient/Manure Management Plans and Animal Concentration Areas

I affirm that I have reviewed the responses made **by the applicant** in **Section 2B and 2C**, and after due diligence and inquiry, I hereby affirm the foregoing to be true and correct to the best of my knowledge. I make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

NAME: (print)

TITLE:

ORGANIZATION OR BUSINESS:

PHONE:

VERIFICATION SIGNATURE: DATE:

Important Additional Information

1. Acres operated by the applicant - and therefore covered by the verification signatures above. _____

2. For constructed BMP projects that do not include other public funding, has the project been included in any reporting to DEP or NRCS? **Yes** ☐ **No** ☐

Section 3: REAP Project Cost Summary Table - Instructions

Please refer to Attachment 1 of the REAP Guidelines for a list of all REAP-eligible BMPs, equipment, and plans.

Please refer to Attachment 1 of the REAP Guidelines for a list of the units of measurement to use when completing the "Units Installed or Proposed" column on p6.

The following plans and corresponding costs should be entered in the "Planning BMPs" section: Ag E&S Plan, Conservation Plan, Nutrient Management Plan, DEP Manure Management Plan.

The following equipment and corresponding costs should be entered in the "Equipment BMPs" section: No-Till Planters and Drills, Manure Injectors, Precision Nutrient Application components, Cover Crop Equipment

All other BMPs, cover crops, soil health tests - any project not specifically mentioned above - and corresponding costs should be entered in the "All other BMPs" section.

Please enter the total cost of the project in the "Total Cost" column - prior to accounting for elements of the projects that were paid for by other grants/funding sources.

Please answer "yes" or "no" as to whether the specific BMP is treating an ACA-related resource concern. For more information about ACAs and BMPs typically used to treat runoff from ACAs, please refer to questions 7 & 8 on p3 of this application.

In any watershed with an agriculturally impaired TMDL*, the following BMPs are eligible for a REAP tax credit of 90% of out-of-pocket implementation costs:

~ Riparian forest buffers that are 50+ ft wide.

~ Multi-species cover crop: please see cover crop job sheet (p11) for more information.

~ Stream crossings and livestock exclusion from streams. BMPs used in conjunction with stream crossings and livestock exclusion are also eligible for 90% REAP tax credit (e.g. Animal Trails & Walkways, Fence, and off-stream watering facilities)

~ Soil health tests will be reimbursable at 90% when a producer is involved with a partner organization's soil health program (e.g. PASA's soil health benchmark study, USDA NRCS Soil Health Conservation Activity Plan (CAP), etc.)

~ Cover Crop Roller/Crimpers: please see Attachment 5 of the REAP Guidelines (p18) for more information.

Please answer "yes" or "no" in the checkboxes regarding "TMDL?" if you are applying for REAP tax credits for one of the BMPs listed above.

Please answer "90%" in the "REAP Rate" column if your operation is located in an ag impaired TMDL watershed <u>AND</u> the BMP you are applying for is listed above.

For all BMPs not listed in the TMDL section above, the "REAP Rate" column is completed according to your answers in the preceding checkboxes. You will enter 75% if you answered "yes" to the "ACA?" question. You will enter 50% if you answered "No" to the "ACA?" question. Please note: Manure Storages are not considered ACA treatments.

For proposed projects, please provide an estimate of when the project is scheduled to be complete (or the equipment delivered). An estimated date of completion is not necessary if the project is complete and the application includes all receipts and appropriate engineer certifications.

*Please contact the Conservation District in your County for more information regarding TMDL watersheds

REAP Project Cost Summary Table

*****Please refer to Attachment 1 of the REAP Guidelines for the complete list of REAP-eligible BMPs. Please attach duplicate pages, if necessary.*****

Eligible BMP	Units Installed or Proposed	**Total Cost ($)**	**Other Public Funds ($)**	Source *(NRCS, CBP, Growing Greener, etc.)*	**Total Cost Minus Other Public Funds($)**	ACA Treatment? (check one)	TMDL Watershed (check one)	REAP Rate	**REAP Request ($)**	Complete (C) or Proposed (P)	Proposed Date of Completion
ex: Ag E&S Plan	*300 ac.*	*4000*	*1500*	*DEP*	*2400*			*75%*	*1800*	*C*	
PLANNING BMPs											
	ac.							75%			
	ac.							75%			
	ac.							75%			
EQUIPMENT BMPs											
	no.							50%			
	no.							50%			
	no.							50%			
ALL OTHER BMPs						ACA? YES	ACA? NO	TMDL? YES	TMDL? NO	REAP Rate	
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
TOTAL											

SECTION 4 - Signature Page

Owner/Operator Signature

I affirm the foregoing to be true and correct. I make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

I affirm that I am authorized to legally bind the company, corporation, partnership or other legal entity whose name appears as the applicant and/or owner/operator (for projects involving a sponsor).

I hereby give permission for the State Conservation Commission, its staff and/or its agents to review my Conservation Plan, Ag E&S plan and/or my Nutrient/Manure Management Plan, and all relevant records pertaining to these plans, as required as part of the application review process.

I understand that any project receiving REAP credits is subject to on-site inspection by SCC staff and/or a representative of the SCC.

I agree to permit the State Conservation Commission, its staff and/or its agents to conduct site visits of the project location and to monitor the project for the lifespan of the project.

I understand that if a BMP is not maintained and properly managed for the required lifespan, as defined by the REAP Guidelines, I will be required to return the full amount of the tax credit originally granted for the BMP. I understand that if I provide prior written notification to the Commission that I am unable to maintain the BMP due to the sale of the property, cessation of an agricultural operation, or other factors, the Commission may direct the Department to prorate the amount of tax credit that shall be returned. I understand these provisions apply to any violations of the of the REAP Program Guidelines.

I understand and acknowledge that approved REAP applications are a “public record” under the Pennsylvania Right-To-Know Law (65 P.S. §§ 66.1 *et seq.* , as amended).

Print Name(s) of Project Owner/Operator	Printed Title or Affiliation to a Business (if applicable):
Project Owner/Operator Signature	Date

For Projects Involving a Sponsor

I hereby affirm that I am authorized to legally bind the company, corporation, partnership or other legal entity whose name appears as the applicant and sponsor.

I hereby affirm that there is a signed written agreement certifying that the project owner/operator will comply with all of the requirements associated with the award of the REAP tax credit. I hereby affirm that there is a signed written agreement between the sponsor and the owner/operator of the project regarding financial details of the sponsorship. I make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

Print Name(s) of Sponsor	
Sponsor Signature	Date
Owner/Operator Signature	Date

If this application is prepared by someone other than the applicant, please provide the following:

NAME:	
ORGANIZATION:	
PHONE:	EMAIL:

REAP No-Till Equipment Purchase Certification

****For more information, refer to REAP Guidelines Att 5****

Dealer Certification

I certify that the no-till planting equipment described below is sold under the following conditions:

1. The equipment is capable of placing seeds at the optimum depth for germination and growth in untilled soil with crop residue cover.

2. The purchase agreement includes field setup by a qualified representative of the dealership.

3. For used equipment, all wear items meet or exceed manufacturer's guidelines for replacement parts.

4. I have no conflict of interest as defined by the REAP Guidelines.

Note: Used equipment sold privately must also be certified by a dealer representative or other persons approved by the Commission.

_____	for	_____
Dealer Representative Printed Name		Company Name
_____		_____
Dealer Representative Signature		Phone Number

Equipment Information

Equipment Make, Model and Year:

Planter Drill

Serial Number: Check if serial number is not yet available

The equipment is: New Used	Purchase Price: $

Check here if equipment has already been delivered. Date of Delivery/Expected Delivery:

Applicant Certification

I certify that the no-till equipment described above will be:

1. Utilized in untilled soil consistent with the provisions of a current Conservation/Ag E&S plan.

2. Maintained for the designated lifespan of the equipment, which is 7 years for new equipment and 3 years for used equipment.

3. Utilized on an agricultural operation that is identified in this application.

* I understand that REAP-eligible cost will be capped at $300,000 per planter/drill.

* I agree to allow inspections by the State Conservation Commission, its staff, or agents therof to ensure that my operation is maintaining the equipment for its REAP lifespan; and is utilizing the equipment as intended by the Commission.

* I agree to provide to the SCC the information requested below concerning my operation.

* I affirm the information on this form to be true and correct, and make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

Please provide the following:

Number of acres planted no-till on my operation annually:	_____ acres
Number of acres of cover crops planted annually:	_____ acres
Acres that receive automated precision application of nutrients annually:	_____ acres

_____	_____	
Applicant Name	Signature	date

REAP Precision Nutrient Application Equipment Certification

****For more information, refer to REAP Guidelines Att 5****

Dealer Certification

I certify that the precision application equipment described below is sold under the following conditions:

1. The equipment is capable of applying nutrient at variable rates based on automatic data input from maps or optical sensors.
2. The purchased components are necessary for variable rate spreading of nutrients.
3. The purchase agreement includes setup by a qualified representative of the dealership.
4. I have no conflict of interest as defined by the REAP Guidelines.

Equipment Information

Equipment Make, Model:

Serial Number(if applicable):

****Please note: Only the precision ag* ***components*** *are eligible for REAP tax credits. Check all that apply:****

displays, monitors, controllers	variable rate drives, hydraulic motors
GPS	metering devices
section/swath control	nozzle controls

The equipment is: New Used

Purchase Price (components): $

****If possible, please itemize receipt****

Dealer Representative Printed Name for Company Name

Dealer Representative Signature Phone Number Date

Note: Used equipment sold privately must also be certified by a dealer representative or other persons approved by the Commission.

Applicant Certification

I certify that the precision fertilizer application equipment described above will be:

1. Utilized to apply nutrients at variable rates across crop fields in accordance with data input from maps or optical sensors.

2. Maintained for the designated lifespan of the equipment, which is 3 years.

3. Utilized on an agricultural operation that is identified in this application.

***** I understand that REAP-eligible costs will be capped at $60,000 per purchase. I understand that components on manure spreaders and spinner-type granular fertilizer carts are not eligible for REAP tax credits.

***** I understand that costs for subscription services are eligible only in the initial year of the purchase of REAP eligible precision nutrient application equipment and are limited to 1 year in duration.

* I agree to allow inspections by the State Conservation Commission, its staff, or agents therof to ensure that my operation is maintaining the equipment for its REAP lifespan; and is utilizing the equipment as intended by the Commission.

* I agree to provide to the SCC the information requested below concerning my operation.

* I affirm the information on this form to be true and correct, and make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

Please provide the following information:

Number of acres planted no-till on my operation annually: _____ acres

Number of acres of cover crops planted annually: _____ acres

Acres that receive automated precision application of nutrients annually: _____ acres

Applicant Name Applicant Signature date

Manure Injection Equipment Certification

****For more information, refer to REAP Guidelines Att 5****

Dealer Certification

I certify that the low-disturbance manure injection equipment described below meets the standards set forth in Attachment 6 of the REAP Guidelines and is sold under the following conditions:

1. The equipment is in good working order and is capable of injecting manure at a shallow depth with minimal soil disturbance.
2. The equipment is capable of injecting manure at a max depth of approximately 4 inches.
3. *For used equipment:* The equipment meets or exceeds the standards set forth above.
4. I have no conflict of interest as defined by the REAP Guidelines.

Note: Used equipment sold privately must also be certified by a dealer representative or other persons approved by the Commission.

	for	
Dealer Representative (print)		Company Name
Dealer Representative Signature		Phone Number

Equipment Information

Equipment Make, Model and Year:	
Serial Number: ☐ Check if serial number is not yet available	
The equipment is: New ☐ Used ☐	Purchase Price: $
Order Date:	Expected Delivery Date:
☐ Check here if equipment has already been delivered. Date of Delivery:	

Applicant Certification

I certify that the equipment described above will be:

1. Utilized in a manner consistent with the provisions of a current Conservation/Ag E&S Plan and Nutrient/Manure Management Plan.
2. Adjusted to leave a minimum of 60% of crop residue on the surface.
3. Not altered in any way that increases soil disturbance beyond the original design of the equipment.
4. Maintained by the applicant for the designated lifespan of the equipment - 7 years for new equipment and 3 years for used equipment.
5. Utilized by the applicant on an agricultural operation that is identified in this application.

I agree to allow inspections by the State Conservation Commission, its staff, or agents therof to ensure that my operation is utilizing this equipment for low disturbance manure incorporation. I affirm the foregoing to be true and correct, and make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

Number of acres of manure injection on my operation annually: _____ **acres**

Applicant Name (print)	
Applicant Signature	Date

REAP Waste Storage Facility and Animal Heavy Use Area Worksheet

****For more information, refer to REAP Guidelines Att 1****

Waste Storage Facility BMP

ANIMAL TYPE: _____

ANIMAL AEUs: Current* _____ Proposed*: _____

*prior to construction of BMP *if BMP is part of an operation expansion

1	Is the Waste Storage Facility BMP listed in your current Ag E&S Plan as necessary to resolve an existing resource concern.	YES	NO
2	Is the Waste Storage Facility roofed?	YES	NO
3	Is the Waste Storage Facility under-barn?	YES	NO
4	Has a USDA/NRCS technician determined that the under-barn manure storage is necessary to resolve an existing resource concern?	YES	NO

Additional notes:

NRCS Technician Certification *(only necessry for under-barn manure storage)*

I certify that USDA/NRCS has determined that the under-barn manure storage referenced above is necessary to adequately treat an existing resource concern on the agricultural operation listed in this REAP application. I certify that I have the appropriate job approval authority from NRCS to certify this project.

Name (printed) _____ Title/County _____

Signature _____ Date _____

Animal Heavy Use Area Protection BMP (HUAP)

ANIMAL TYPE: _____

ANIMAL AEUs: Current* _____ Proposed*: _____

*prior to construction of BMP *if BMP is part of an operation expasion

1	Is the HUAP roofed?	YES	NO
2	Is the HUAP BMP listed in your current Ag E&S Plan as necessary to resolve an existing resource concern.	YES	NO

Applicant Certification

I certify that I understand the following:

1. A roofed BMP under the REAP Tax Credit Program may only be used for its intended purpose as defined by the Commission. It may not be converted to any other use for the entire REAP lifespan (10 years) of the practice.
2. REAP-eligible costs may be reduced for expansions over 25%.
3. Under-barn waste storages are not eligible for REAP tax credits unless certified by NRCS as necessary to adequately address existing resource concerns

I have read and understand the information on this worksheet. I affirm the foregoing to be true and correct, and make these statements subject to the penalties of 18 PA.C.S.A §4904, relating to unsworn falsification to authorities.

Applicant Name _____ Signature _____ Date _____

REAP Cover Crop Worksheet

****For more information, refer to REAP Guidelines Att 6****

1	To qualify as a multi-species cover crop, the seed mix must consist of grass species plus a minimum of 2 broadleaf species; in which the **seeding rate of the grass species does not exceed 1.5 bu/ac.**
2	REAP - eligible costs for planting are capped at $25/ac.
3	REAP - eligible costs for seed grown on the applicant's operation are capped at $12/bu.
4	Crops harvested for grain are not eligible for REAP tax credits.

Single-Species: Yr 1 _____ ac. Yr 2 _____ ac Yr 3 _____ ac.

Multi-Species: Yr 1 _____ ac. Yr 2 _____ ac. Yr 3 _____ ac.

Planting Information: (for proposed plantings, provide estimates in the space below for the first year only)

Acres planted	Species	Seeding Rate	Planting Date	Termination Method/date (estimated)

Additional Notes (if necessary):

Applicant Certification: *(subject to spot-check by State Conservation Commission)*

1. _____ acres (total) of cover crops were planted on the locations covered by this job sheet.
2. I certify that no nutrients - manure or fertilizer - have been or will be applied to this cover crop

   Yes

   No

   **answer does not impact the REAP application process*
3. I affirm the information provided on this form is true and correct, and make these statements subject to the penalties of 18 PA.C.S.A 4904, relating to unsworn falsification to authorities

_____

Signature Date

REAP Project Completion Certification for BMPs

APPLICANT NAME:	REAP ID *#(if applicable)* :

Completion: List approved eligible BMP(s) certified as complete for the REAP Program:

For reporting purposes, for each BMP Certified, estimate approximate "units" of measure. (i.e. linear, square, cubic feet, acres of BMPs installed, etc.)

BMP:	**Number/Unit:**	**BMP:**	**Number/Unit:**

List additional BMPs, if necessary, on a separate sheet.

Certification: Complete the appropriate certification below:

Project Designer/Engineer Certification of BMPs

I certify that, to the best of my knowledge, the BMP(s) listed above have been installed to meet the requirements of REAP program guidelines, and that the project design meets or exceeds the design standards and specifications of the "Pennsylvania Technical Guide." I certify that I have the appropriate job approval authority from NRCS to certify this project.

Name (printed)	Title/Organization
Signature	Date

~OR~

Registered Professional Engineer Certification

I certify that, to the best of my knowledge, the BMP(s) listed above have been installed to meet the requirements of REAP program guidelines, and that the project design meets or exceeds the design standards and specifications of the "Pennsylvania Technical Guide."

Name (printed)

Title/Organization

Signature Date

Registered Professional Engineer's Seal

Sample REAP Project Invoice/Receipts Summary

Name: _____ Date: _____

List each completed BMPs below. Use additional sheets if necessary. Use REAP ID if known

REAP ID#	BMP Name	Total Cost	Contractor Receipt	Other Public Funding	Total Cost minus Other Funding	REAP Request

Are all invoices/receipt attached? Yes ☐ No ☐

Is a signed Engineer Certification attached? Yes ☐ No ☐

Is documentation of all other public funding attached? Yes ☐ No ☐

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 30, 2022

TO: State Conservation Commission

FROM: Eric Cromer – CEG Program Coordinator

SUBJECT: Proposed changes to the Conservation Excellence Grant Program '2022-2023 Program Guidelines' and 'Applicant Guidance and Expectations'.

Commission staff and a small workgroup, consisting of a representative from each participating CEG Program conservation district, reviewed the current CEG Program guidelines for potential revisions to the guidelines. This process assists the Commission on improvements to the program year-to-year. Potential revisions range from minor to major issues that are meant to improve the administration and implementation of the program.

Listed below are proposed revisions to the CEG Program Guidelines and an accompanying informational document, 'Applicant Guidance and Expectations' for the 2022-2023 CEG Program. The proposed revisions are provided to the Commission for input in preparation for consideration and adoption at its May 2022 public meeting. The items list the specific section of the CEG Program Guidelines or Applicant Guidance document that will be affected. Each proposal is subject to legal review prior to being incorporated into the 2022-23 CEG Program Guidelines and Applicant Guidance document.

1. **CEG PROGRAM GUIDELINES:** Section 5 - Allocation of Available Funds.

Background: Commission staff evaluates and determines the expansion of the CEG Program to conservation districts and allocation of available funds following the CEG Funding Allocation Strategy adopted by the Commission. For FY2022-2023 the CEG Program is currently budgeted for $2.0 million as part of the Nutrient Management Program budget. However, if the Commission should choose to incorporate a formula/ranking based allocation option due to a significant increase of funding available to the program, nothing exists in our guidelines to justify such action.

***Current Allocation Strategy**:*

Where funds are made available annually to the Commission for the CEG Program, the allocation of funds to conservation districts will be considered in the following manner:

(a) CEG Program funding will continue to be prioritized, consistent with the enabling legislation, based on the county's "Tier" classification in the Phase 3 WIP.

(b) As additional state and federal funds become available, priority consideration will be given to funding participating conservation districts that:

i. have demonstrated the ability to consistently commit and expend CEG funds allocated in a timely fashion for eligible CEG applications; and

ii. can reasonably document a projected commitment of CEG funds to eligible applicants/projects for approval in the next 6 to 12 months.

(c) As state and federal funding allows, the Commission will consider the expansion of the CEG Program into other counties (Tier 2, 3 and others) based on:

i) the county's demonstrated need for agricultural BMPs as documented in their County Action Plan (CAP) or other similar planning document;

ii) other state and federal grant funds currently available within the county; and

iii) demonstration of agricultural producer interest and readiness (i.e. project planning and design activities are underway or completed; projects are ready for construction) for implementation of best management practice projects on agricultural operations in their counties.

The Commission may initially advance 50 percent of allocated funds to delegated conservation districts, for the Program, which may be used for grants to eligible applicants and to cover administrative and technical assistance expenses to delegated conservation districts.

Proposed Addition:

(d) *As state and federal funding allows, the commission may consider the allocation or expansion of the CEG Program funds to counties using a formula/ranking criteria matrix that is developed and adopted by the Commission.*

2. **CEG PROGRAM GUIDELINES:** Section 7 - Application Evaluation Criteria

Background: The Commission has been in discussion with participating districts for input on applications where the applicant may be under active compliance or enforcement action for a violation (e.g. Act 38 or Clean Streams Law/Chapter 102). Participating conservation districts are concerned with maintaining consistency with other cooperating agencies regarding eligibility polices that consider this potential issue. The Commission understands that active compliance and enforcement actions have many different stages and may need to be evaluated on a case by case basis. Districts state that USDA-NRCS will fund projects that are under certain stages of active enforcement but will deem a project ineligible for funding once a Court Order has been issued.

Current Application Evaluation Criteria:

(a) Priority locations as follows and in this order…

(b) Priority practices as follows, in no particular ranking order…

(c) The level and extent of planning and technical assistance, such as inventory and evaluation, design work, permits and similar types of assistance, already completed to allow for accurate estimates of project costs and timely completion of the project.

(d) The extent to which an applicant is willing to accept a reasonable mix of grants, loans and tax credits or to supply nongovernmental matching funds for the project, except for small projects with a total project cost under $25,000.

(e) Any other criteria that is consistent with the criteria in (a)-(d) and approved by the Commission.

Proposed Addition:

(f) The Commission or conservation district reserves the right to deny an application due to active compliance and/or enforcement actions, or a court order issued by or on behalf of the Commission or cooperating agency for violations of Act 38 of 2005, the Clean Streams Law or other program administered by the Commission or any other criteria established by the Commission.

3. **CEG PROGRAM APPLICANT GUIDANCE AND EXPECTATIONS** - Application Review, Approval, Project Cost Eligibility - Funding Projects Under Active Enforcement

Background: The Commission has been in discussion with participating districts for input on applications where the applicant may be under active compliance or enforcement action for a violation (e.g. Act 38 or Clean Streams Law/Chapter 102). Participating conservation districts are concerned with maintaining consistency with other cooperating agencies regarding eligibility polices that consider this potential issue. The Commission understands that active compliance and enforcement actions have many different stages and may need to be evaluated on a case by case basis. Districts state that USDA-NRCS will fund projects that are under certain stages of active enforcement but will deem a project ineligible for funding once a Court Order has been issued.

Current 'Applicant Guidance and Expectations' - Application Review, Approval, Project Cost Eligibility:

The Commission or conservation district will review complete applications based upon the CEG Priority Criteria, . . . on an ongoing basis and in the order received. . . . [end paragraph].

The Commission or conservation district reserves the right to deny an application for any BMP if the cost is not within reasonable and fair market value as determined by the Commission.

The Commission or conservation district reserves the right to deny an application for any BMP that does not meet the intent of the standards and guideline of the CEG Program established by the Commission. . . . [end paragraph].

Proposed Addition*:*

The Commission or conservation district reserves the right to deny an application if the applicant is subject to a current active enforcement action, or a final court or agency order resulting from an enforcement action, initiated by the Commission or a cooperating agency for violations of Act 38 of 2005, the Clean Streams Law or any other program administered by the Commission or other cooperating agency.

RECOMMENDATION

Staff recommends approval of the proposed changes to the Conservation Excellence Grant Program '2022- 2023 Guidelines' and 'Applicant Guidance and Expectations' as presented pending final review by department legal counsel. Upon final legal review, program staff will finalize all pertinent documents, webpage content and correspondence to reflect the changes adopted by the Commission.

STATE CONSERVATION COMMISSION
Conservation Excellence Grant Program

2022-2023 Program Guidelines

The State Conservation Commission (Commission) announces the program requirements and application process for grants under the Conservation Excellence Grant Program (Program). The Program is authorized by the act of July 1, 2019, 3 Pa.C.S. §§ 3101-3110 (CEG Program Act).

1. Program Objective.

The purpose of the Program is to provide financial and technical assistance for the implementation of best management practices (BMPs) on agricultural operations in high-priority locations within this Commonwealth through grants, loans and tax credits, or a combination of all three, as authorized under § 852(7) of the Conservation District Law, 3 P.S. § 852(7).

2. Definitions.

"Accelerated erosion." The removal of the surface of the land through the combined action of human activities and the natural processes, at a rate greater than would occur because of the natural process alone.

"Agricultural Erosion and Sedimentation Plan." A site-specific plan consisting of both drawings and a narrative that: (1). identifies best management practices to minimize accelerated erosion and sediment before, during and after earth disturbance activities when plowing or tilling activities or animal heavy use areas disturb 5,000 square feet (464.5 square meters) or more of land, and (2). is in compliance with 25 Pa. Code § 102.4(a).

"*Agricultural operation*." The management and use of farming resources for the production of crops, livestock or poultry.

"Agricultural plowing or tilling activity." Earth disturbance activity involving the preparation and maintenance of soil for the production of agricultural crops. The term includes no-till cropping methods, the practice of planting crops with minimal mechanical tillage.

"Animal Heavy Use Area." Barnyard, feedlot, loafing area, exercise lot, or other similar area on an agricultural operation where due to the concentration of animals it is not possible to establish and maintain vegetative cover of a density capable of minimizing acceleration erosion

and sedimentation by usual planting methods. The term does not include entrances, pathways and walkways between areas where animals are housed or kept in concentration.

"*Best management practice*." A practice or combination of practices determined by the State Conservation Commission or United States Department of Agriculture Natural Resources and Conservation Service to be effective and practical, considering technological, economic and institutional factors, to manage nutrients and sediment to protect surface water and groundwater.

"*Commission*." The State Conservation Commission established under section 4 of the act of May 15, 1945 (P.L.547, No.217), known as the Conservation District Law.

"Conservation District." A county conservation district established under the Act of May 15, 1945 (P.L. 547, No.217) known as the Conservation District Law.

"Conservation Plan." A US Department of Agriculture Natural Resources Conservation Service plan, including a schedule for implementation, that identifies site specific conservation best management practices on an agricultural operation.

"Earth disturbance activity." A construction or other human activity which disturbs the surface of the land, including land clearing and grubbing, grading, excavations, embankments, land development, agricultural plowing or tilling, operation of animal heavy use areas, timber harvesting activities, road maintenance activities, oil and gas activities, well drilling, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock or earth materials.

"Eligible Applicant." Any person, individual, partnership, corporation or legal entity that engages in an agricultural operation in this Commonwealth and has legal or financial responsibility for the agricultural operation.

"Eligible Project Costs." Project design, engineering and associated planning; project management costs, including contracting, document preparation and applications; project construction and installation; equipment and materials; post-construction inspections.

"Manure Management Plan." A written site-specific plan that: (1) Identifies current standards to manage nutrients for water quality protection from the land application of manure and agricultural process wastewaters that is acceptable to the Commission; and (2) is developed to meet the requirements of 25 Pa. Code § 91.36(b)(1)(i) (relating to land application of animal manure and agricultural process wastewater; setbacks and buffers).

"Nutrient Management Plan." A written site-specific plan which incorporates best management practices to manage the use of plant nutrients for crop production and water quality protection consistent with the criteria established in § 504 (relating to powers and duties of

commission) and § 506 (relating to nutrient management plans).

"*Program*." The Conservation Excellence Grant Program established and implemented under the act of July 1, 2019, 3 Pa.C.S. §§ 3101-3110.

"*Tier One Chesapeake Bay Counties.*" Lancaster and York Counties.

"*Tier Two Chesapeake Bay Counties.*" Franklin, Lebanon, Cumberland, Centre, and Bedford Counties.

"Tier Three Chesapeake Bay Counties." Adams, Northumberland, Perry, Snyder, Huntingdon, Columbia, Mifflin, Lycoming, Schuylkill, Bradford, Juniata, Clinton, Tioga, Susquehanna, Clearfield, and Fulton Counties.

"Technical Service Provider." An individual, entity or public agency certified by the USDA-NRCS and placed on the approved list to provide technical services to program participants or to USDA program participants or any other entity approved by the Commission.

"*USDA-NRCS*." The United States Department of Agriculture Natural Resources and Conservation Service.

"Watershed Implementation Plan." The Commonwealth of Pennsylvania's Phase 3 Chesapeake Bay Watershed Implementation Plan (WIP), final dated August 2019. https://www.dep.pa.gov/Business/Water/Pennsylvania%e2%80%99s%20Chesapeake%20Bay%20Program%20Office/WIP3/Pages/Phase-III-WIP-(Watershed-Implementation-Plans).aspx

3. Role of Conservation Districts.

(a) Under § 852(3) of the Conservation District Law, 3 P.S. § 852(3), and § 3109 the CEG Program Act, the Commission may delegate certain duties and responsibilities under the Act to conservation districts that are willing to enter into an agreement to carry out these duties and responsibilities.

(b) Under § 852(7) of the Conservation District Law, 3 P.S. § 852(7), and § 3110 of the CEG Program Act, the Commission may advance funds to conservation districts for the purposes of the Act.

(c) Under § 3107 of the CEG Program Act, priority must be given for certain locations in the Commonwealth when approving applications for eligible projects. The first priority locations are counties designated by the Department of Environmental Protection (DEP) as Tier 1 Chesapeake Bay counties in the Phase 3 Chesapeake Bay Watershed Implementation Plan (WIP). The next priority locations are counties designated by DEP as Tier 2 and 3 Chesapeake Bay counties. The last priority locations include all other counties.

(d) To the extent authorized by a delegation agreement, conservation districts shall review and approve applications for eligible projects under the Program and satisfy other duties and responsibilities delegated by the Commission, including:

(i) Developing ranking criteria with guidance from the Commission.

(ii) Provide general technical assistance in the implementation of nutrient management, manure management, agricultural erosion and sedimentation and conservation plans, as resources allow, in accordance with Commission guidelines. .

(iii) Coordinating with the Commission on the award of tax credits and/or low interest loans

4. Delegation Agreement.

The delegation agreement will:

(a) Be for a term of up to five (5) years.

(b) Specify the duties and responsibilities of the delegated conservation districts.

(c) Provide for the commitment of sufficiently trained staff and available resources for conservation districts to satisfy delegated duties and responsibilities.

(d) Require the conservation district to maintain records of activities performed in carrying out delegated duties and responsibilities.

(e) Provide for the Commission and conservation districts to work cooperatively in developing and implementing guidelines and policies related to the CEG Program.

(f) Provide for the Commission to monitor and supervise the conservation district's performance of delegated duties and responsibilities.

5. Allocation of Available Funds.

Where funds are made available annually to the Commission for the CEG Program, the allocation of funds to conservation districts will be considered in the following manner:

(a) CEG Program funding will continue to be prioritized, consistent with the enabling legislation, based on the county's "Tier" classification in the Phase 3 WIP.

(b) As additional state and federal funds become available, priority consideration will be given to funding participating conservation districts that:

i. have demonstrated the ability to consistently commit and expend CEG funds allocated in a timely fashion for eligible CEG applications; and

ii. can reasonably document a projected commitment of CEG funds to eligible applicants/projects for approval in the next 6 to 12 months.

(c) As state and federal funding allows, the Commission will consider the expansion of the CEG Program into other counties (Tier 2, 3 and others) based on:

i) the county's demonstrated need for agricultural BMPs as documented in their County Action Plan (CAP) or other similar planning document;

ii) other state and federal grant funds currently available within the county; and

iii) demonstration of agricultural producer interest and readiness (i.e. project planning and design activities are underway or completed; projects are ready for construction) for implementation of best management practice projects on agricultural operations in their counties.

(d) *As state and federal funding allows, the commission may consider the expansion of the CEG Program and the allocation of CEG Program funds to counties using a formula/ranking criteria matrix that is developed and adopted by the Commission.*

The Commission may initially advance 50 percent of allocated funds to delegated conservation districts, for the Program, which may be used for grants to eligible applicants and to cover administrative and technical assistance expenses to delegated conservation districts.

6. Application.

(a) Application process. A person may apply to a delegated conservation district for a grant for an eligible project under the program with an application created by the Commission. The application will include all of the following:

(i) The location of the project.

(ii) The type of the project.

(iii) The status of the project.

(iv) The type and combination of funding requested under the Program.

(v) The total cost of the project.

(vi) Verification that an agricultural Erosion and Sedimentation Plan, or a Conservation Plan, A Manure Management Plan, or a Nutrient Management Plan has been developed and is available.

(vii) Any other information required by the Commission, including the source and amount of other funding sources utilized for the project.

(b) Applications shall be submitted to delegated conservation districts.

(c) Application Review--The delegated conservation district shall review complete applications based upon the criteria established in Section 7 of these Guidelines (relating to criteria for evaluation of applications) on an ongoing basis and in the order complete applications are received. In all cases, delegated conservation districts will review complete applications and approve projects, at a minimum, on a quarterly basis.

7. Application Evaluation Criteria.

In approving applications for eligible projects under the program, priority will be given to complete applications based upon the following criteria:

(a) Priority locations as follows and in this order:

(i) Counties designated by the Department of Environmental Protection as Tier 1 Chesapeake Bay counties.

(ii) Counties designated by the Department of Environmental Protection as Tier 2 and 3 Chesapeake Bay counties.

(iii) All other counties.

(iv) Specific watershed locations within a county consistent with a County-Wide Action Plan developed under the Phase III WIP.

(b) Priority practices as follows, in no particular ranking order:

(i) Livestock exclusion fencing.

(ii) Stream-side buffers.

(iii) Streambank restoration.

(iv) Barnyard and feedlot runoff abatement.

(v) Stream crossings.

(vi) Off-stream watering.

(vii) Manure storage facilities.

(viii) Nutrient management plans and manure management plans.

(ix) Conservation plans or agricultural erosion and sedimentation plans.

(x) Cover crops.

(xi) Any other priority practices approved by the Commission, including any

practices determined by the delegated conservation district and approved by the Commission to be consistent with a County-wide Action plan under the Phase III WIP. This may include practices approved under the Resource Enhancement and Protection (REAP) program.

(c) The level and extent of planning and technical assistance, such as inventory and evaluation, design work, permits and similar types of assistance, already completed to allow for accurate estimates of project costs and timely completion of the project.

(d) The extent to which an applicant is willing to accept a reasonable mix of grants, loans and tax credits or to supply nongovernmental matching funds for the project, except for small projects with a total project cost under $25,000.

(e) Any other criteria that is consistent with the criteria in (a)-(d) and approved by the Commission.

(f) *The Commission or conservation district reserves the right to deny an application if the applicant is subject to a current active enforcement action, or a final court or agency order resulting from an enforcement action, initiated by the Commission or a cooperating agency for violations of Act 38 of 2005, the Clean Streams Law or any other program administered by the Commission or other cooperating agency.*

8. Project Certification.

(a) If a project's BMPs require review and certification by a registered professional engineer under the applicable laws or regulations of this Commonwealth, the BMP shall be certified by a registered professional engineer.

(b) Any other BMP shall be certified by a technical service provider, staff from the delegated conservation district having the appropriate job approval authority, the USDA-NRCS, or any other qualified person who has appropriate training and expertise and is approved by the Commission.

(c) Costs incurred to satisfy the certification requirements of this section are deemed eligible project costs up to 2% of the total costs of the approved project, unless otherwise approved by the Commission.

9. Funding Limitations.

(a) A single grant awarded by the delegated district to an eligible applicant may not exceed $250,000.

(b) The delegated district may award a grant to an eligible applicant for a small project that is less than $25,000.

(c) A grant amount for an eligible project shall be based on the estimated costs, project description, level of planning completed, and the type of funding requested in the application, as determined appropriate by the Commission.

(d) The Commission may choose to reimburse grant recipients based on eligible actual project costs, incentive payments for completed BMPs or any other method deemed appropriate by the Commission.

(e) Updated nutrient management plans, manure management plans, conservation plans or agricultural erosion and sedimentation plans on operations that have received prior funding from the Program or any other funding source for the previously stated plans are not eligible for Program grant funds .

10. Notice of Determination.

(a) Within 60 days of receipt of a complete application, the delegated conservation district shall notify the applicant of all of the following:

(1) Whether the project is approved for funding under the Program.

(2) The total amount of funds approved for the project.

(3) The amount of each type of funding approved for the project.

(b) The district shall notify the applicant of an incomplete application with 10 business days of receipt of the application.

11. Documentation

Upon approval of an application, the delegated conservation district will enter into a contract with the applicant for a term not to exceed two (2) years.

12. Notice and Verification of Completion.

Upon completion of a project funded under the Program, the approved applicant shall notify the delegated conservation district within 30 days that the project has been completed on forms approved by the Commission. The notice under this Section shall include the required certification under Section 8 (relating to project certification).

13. Inspection.

Projects funded under this program may be subject to inspection by the Commission or the Commission's delegated conservation district.

14. Recordkeeping.

All successful applicants are required to maintain on site all records and receipts for all funded project costs for the longest lifespan of any installed BMP under the CEG Program and for a minimum of 5 years.

15. Questions and additional information.

Questions on this program may be directed to Eric Cromer, Conservation Program Specialist, State Conservation Commission @ ecromer@pa.gov.

CONSERVATION EXCELLENCE GRANT (CEG) PROGRAM

Applicant Guidance and Expectations

Introduction

- Act 39 of 2019 created the Conservation Excellence Grant (CEG) Program. The purpose of the Program is to provide financial and technical assistance for the implementation of best management practices (BMPs) on agricultural operations in high-priority locations within this Commonwealth through grants, loans and tax credits, or a combination of all three.
- The program is administered by the State Conservation Commission (Commission). In FY 2022-23, the Commission will be partnering with all Tier 1 and Tier 2 county conservation districts for local implementation of the CEG program.
- A single grant awarded by the delegated district to an eligible applicant may not exceed $250,000.

CEG Priority Criteria

In approving applications for eligible projects under the CEG program, the Commission and the conservation district will give priority to complete applications based upon the following criteria:

I. Priority locations as follows and in this order:
   1. Tier 1 (Lancaster and York)
   2. Tier 2 (Bedford, Centre, Cumberland, Franklin and Lebanon) and Tier 3 (Adams, Bradford, Clearfield, Clinton, Columbia, Fulton, Huntingdon, Juniata, Lycoming, Mifflin, Northumberland, Perry, Schuylkill, Snyder, Susquehanna and Tioga)
   3. All Other Counties

II. Priority best management practices as follows (in no particular order):
   1. Livestock exclusion fencing.
   2. Stream-side buffers.
   3. Streambank restoration.
   4. Barnyard and feedlot runoff abatement.
   5. Stream crossings.
   6. Off-stream watering.
   7. Manure storage facilities.
   8. Nutrient management plans and manure management plans.
   9. Conservation plans or agricultural erosion and sedimentation plans.
   10. Cover crops.
   11. Any other priority practices approved by the commission.
      - These practices (BMPs) may include those BMPs currently identified in the *CEG/REAP Best Management Practice* list provided by the Commission.

III. The level and extent of planning and technical assistance, such as inventory and evaluation, design work, permits and similar types of assistance, already completed in preparation for implementation of the project. Technical assistance should allow for accurate estimates of project costs and for completion of the project in a timely fashion.

IV. The extent to which an applicant is willing to accept a reasonable mix of grants (e.g. CEG or other), loans (e.g. AgriLink or other commercial loan) and tax credits (e.g. REAP) or to supply nongovernmental matching funds for the project.

Application Requirements

An applicant may apply to the participating county conservation districts for a grant for an eligible project under the CEG program.

The application must include the following project information:

1. The location of the project.
2. The type of the project.
3. The status of the project (e.g. planning and/or design).
4. The type and/or combination of funding requested for the project.
5. The total cost of the project.
6. Verification that one or more of the following plans has been developed and are available:
    a. Agricultural Erosion and Sedimentation Plan, or a Conservation Plan;
    b. A Manure Management Plan, or
    c. A Nutrient Management Plan.
7. Any other information required by the Commission, including the source and amount of other funding sources utilized for the project.

Application Review, Approval, Project Cost Eligibility,

The Commission or conservation district will review complete applications based upon the CEG Priority Criteria, stated above, on an ongoing basis and in the order received.

The Commission or conservation district shall notify the applicant, in 60 days, of all the following:

1. Whether the project is approved for grant funding under the CEG program.
2. The total amount of grant funds approved for the project.
3. The next steps to process the Grantee-District Agreement

The following are considered eligible costs of a project to which a grant may be applied:

1. Project design engineering and associated planning
2. Project construction or installation – including labor provided by the applicant
3. Equipment, materials and other components of eligible projects
4. Post construction inspections

Any of the above costs for services that may be provided by a Conservation District or private sector technical service provider through a fee or charge are eligible costs and may be included in the CEG application.

Note: : Each participating district, in consultation with the Commission has determined to award cost-share up to certain percentages of the estimated construction cost of the project. . Please consult with the participating districts on what the cost-share rate is before completing the application. Engineering and associated planning cost for the project may also be included as an eligible cost of up to an additional 10% of the estimated construction cost.

Any costs that are not covered with CEG grant funds or other public funds may be eligible for REAP tax credits. These costs are eligible for tax credits up to 50% or 75% of eligible costs depending on the type of BMP.

The Commission or conservation district reserves the right to deny an application for any BMP if the cost is not within reasonable and fair market value as determined by the Commission.

The Commission or conservation district reserves the right to deny an application for any BMP that does not meet the intent of the standards and guideline of the CEG Program established by the Commission.

The Commission or conservation district reserves the right to deny an application if the applicant is subject to a current active enforcement action, or a final court or agency order resulting from an enforcement action, initiated by the Commission or a cooperating agency for violations of Act 38 of 2005, the Clean Streams Law or any other program administered by the Commission or other cooperating agency.

When an application is approved, the applicant will be required to enter into an agreement with the Commission or conservation district for implementation of the approved projects.

1. Approved project(s) must be completed by the applicant within the timeframe of the agreement but, no longer than 2 years from signature of the agreement.
2. The applicant shall provide and pay for all material, labor, equipment, tools, water, power, and other items necessary to complete the work.
3. The applicant may be reimbursed for the cost of the project up to the allowable grant amount permitted under the CEG program.

Project completion, Certification , Inspection and Other Program Conditions

Upon completion of a project funded under the CEG Program, the applicant/grantee shall notify the Commission or conservation district of the completion of the project.

- This notification can be completed by filling out the *CEG Program Certification Form*.

The completed project must be certified by a qualified individual in order for payment of the grant funds allocated for the project. A qualified individual may be:

- a registered professional engineer under the applicable laws of the Commonwealth;
- a technical service provider or a conservation district staff person having the appropriate job approval authority assigned by USDA-NRCS, or
- a person having appropriate training and expertise as approved by the Commission.

Best Management Practices (BMPs) must be maintained and managed for the life span of the practice.

- Life spans established by the Commission for specific practices are found in the *CEG/REAP BMP List*.
- If the BMP is not maintained for the required period, the applicant/grantee may be required to return a portion or full amount of what was originally granted.
- If the applicant provides prior written notification to the Commission or conservation district that the applicant/grantee will be unable to maintain a BMP due to the sale of the property, cessation of an agricultural operation or other factors, the Commission or the conservation district may prorate the amount of the granted funds that shall be returned based on the remaining lifespan of the BMP in question.

Projects funded under this program may be subject to inspection by the Commission or the conservation district.

- An applicant shall permit the Commission, the Conservation District, its authorized agents, and public authorities who have interest in the successful completion of the work to enter the Project Location or premises to inspect and observe CEG Project activities,

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

Agenda Item: 6.A

Date: **April 27, 2022**

To: **State Conservation Commission**

From: **Roy Richardson, Dirt and Gravel Roads Program Coordinator**

Through: **Karl G. Brown, Executive Secretary**

RE: **Penn State Center for Dirt and Gravel Road Studies (Center): Scope and budget for FY 2022-23**

Penn State Center for Dirt and Gravel Road Studies (Center): Scope and budget for FY 2022-23

The Center provides education, outreach, and technical assistance to entities involved in Pennsylvania's Dirt, Gravel, and Low Volume Road Maintenance Program. The Center is funded primarily through the PA State Conservation Commission and PA Bureau of Forestry through Dirt, Gravel, and Low Volume Road Maintenance Program funds. FY 2022-23 represents the fourth year of a five-year contract between the Center and the SCC established in 2019 to provide these services. The scope of work and budget for FY 2022-23 remains similar to year three, with the Center providing a variety of training and technical assistance events, in addition to maintaining the GIS project tracking system and working with SCC staff closely on a variety of issues. Note that the budget assumes a relatively "business as usual year" and does not attempt to anticipate future impacts from the Coronavirus shutdown of projects or trainings. Highlights of the scope and budget for 2022-023 include:

- Continuation of established training events such as the two-day ESM training, Boot Camps for conservation districts, administrative trainings, and new hire trainings.
- Continued support and development of the Customized GIS and financial tracking system used to track over $26 million in annual spending by Conservation Districts
- Stream Crossing Trainings
- Continued support of Trout Unlimited to provide technical assistance to Conservation Districts on stream crossing replacements.
- Continuation of other outreach efforts in support of the program including technical assistance, aggregate testing, webinars, QAQC visits, additional written technical guidance, and more.

- The continuation of the “other tasks as assigned and agreed upon” clause in the scope that provides flexibility in adapting this scope and budget as issues arise

The scope of work and summary budget for FY 2022-23 is attached for SCC approval, pending state budget approval.

4/25/22

Scope of Work
(July 1, 2022 – June 30, 2023)

Submitted To:
Dirt, Gravel, and Low-Volume Road Maintenance Program (Program)
Pennsylvania State Conservation Commission (SCC)
Pennsylvania Department of Agriculture

Performing Organization:
Center for Dirt & Gravel Road Studies (Center)
The Pennsylvania State University (Penn State)
201 Transportation Research Building
University Park, PA 16802-4710

Principal Investigator: Steven M. Bloser, 814-865-6967
Administrative/Contractual Contact: Jamie Ross, 814.865.1893

FY 2022-23 represents year four of an existing five-year contract between the Center and the SCC. The Scope of Work below for approval is for FY 2022-23 only. Also included are estimated Scope of Work plans for the remaining fiscal year of the contract. Before each successive fiscal year begins, an updated Scope of work will be revised and presented to the SCC for approval along with a budget.

The Center provides education, outreach, and technical assistance to Conservation Districts and local road owning entities throughout Pennsylvania as part of the PA Dirt, Gravel, and Low Volume Road Maintenance Program (Program).

NOTE: The Coronavirus shutdown has impacted deliverables in 2022-21 and may also impact this scope of work for 2022-23, namely in the ability to hold in-person training events. The Center will continue to work with the SCC to adjust deliverables as needed to meet changing limitations and Program needs.

1) ENVIRONMENTALLY SENSITIVE MAINTENANCE (ESM) TRAINING COURSE

a) **Description**: The two-day ESM training course focuses on the connection between road maintenance activities and surface water quality, and covers all of the road maintenance practices promoted by the Program. It also covers the basics of Program functionality and how to apply for Program funding. Municipalities or other road-owning entities who wish to apply for Program funding must have attended the ESM training within the previous 5 years in order to be eligible for funding.

b) **FY 2022-23:** The Center will:

(1) Continue to provide ESM trainings throughout the state. The annual number to be based on requests for trainings by eligible entities and the recommendations of the SCC. It is estimated that 12 ESM trainings will be held in FY 2022-23 for approximately 700 attendees.

(2) Be responsible for training scheduling, logistics, publicity, registration, provision of continuing education units upon request, and attendee certification tracking and verification.

(3) Provide at least 2 trainers per session along with all necessary classroom equipment.

(4) Provide for training facility and necessary meals for attendees.

(5) Provide attendees with printed material related to the ESM training and instructions on applying for funds

(6) Update ESM training with new material and field project experience.
(7) COVID NOTE: in 2020 and 2021, the Center shortened the training to one day in length, and held both in-person and, for the first time, remote sessions. We plan to return to a normal 2-day in-person format for FY 2022-23 but will re-evaluate this approach with the SCC as necessary due to COVID conditions and restrictions.

c) **FY 2023-24**: The Center plans to:
(1) Provide trainings with similar deliverables described above for FY 2022-23.
(2) The number and size of trainings to be held will be determined based on
(i) demand from local entities.
(ii) the recommendations of the SCC and Program advisory groups

2) **ANNUAL MAINTENANCE WORKSHOP**

a) **Description**: Annual conference focusing on current issues and new practices related to the Program practices, procedure, and projects. This is a 2-3 day event with concurrent classroom session, invited speakers, and multiple field trips. It is held at a different location within PA each year.

b) FY 2022-23: After the cancelation of the 2020 and 2021 workshop due to COVID restrictions, preliminary planning is underway to hold the 2023 workshop in-person in State College in September.

c) **FY 2023-24**: The Center plans to continue to conduct the Annual Maintenance Workshop at a different region in Pennsylvania in the fall 2024. The Center will make adjustments to the workshop duration and format to accommodate attendance and subjects to be addressed. It is anticipated that a workshop will continue to be held every fall at a different location in Pennsylvania. Any potential changes to the workshop format, timing, etc. will be made through recommendations by the Program's advisory groups, in which both SCC and Center staff participate.

3) FIELD OPERATIONS AND TECHNICAL ASSISTANCE

a) **Description**: The Center provides a wide range of technical assistance education to Conservation Districts and local public road owners statewide regarding road projects funded by the Program. Technical assistance on road projects can include, but is not limited to:
(1) E-mail and phone response to specific project questions with varied levels of response required.
(2) Walkthrough of potential projects to assist in work plan development.
(3) Review and improvement suggestions for project applications.
(4) Pre, during, and post-project site visits to address specific project issues or questions.
(5) Detailed project walkthroughs for educational purposes, involving multiple site visits, especially in cases where there is new staff at the local Conservation District.
(6) Visits to assess post-project performance issues and remediation actions.
(7) More in-depth project oversight and on-site training in some cases.

b) FY 2022-23 through FY 2023-24: The Center will:
(1) Handle daily support via phone and e-mail regarding project technical assistance throughout the counties involved in Program.
(2) Handle an estimated 300+ on-site technical assistance visits and at least 20 "in-depth" project oversight visits annually. The amount and type of technical assistance will be based on demand.
(3) Continue to utilize the tech-assist tracking system that will allow better summary of technical assistance efforts and direct access by SCC staff.

(a) Staff will document technical assistance visits within two weeks of the date of visit.
(b) Staff will make a schedule of upcoming tech assists available to the Commission.

4) PROGRAM TECHNICAL ASSISTANCE

a) Description: In addition to technical assistance related to "field operations" described above, the Center also provides a wide range of other technical assistance to entities involved in the Program. These services include but are not limited to:
(1) General e-mail and phone support on a wide variety of Program-related questions (project eligibility, spending issues, Program policy questions, GIS issues, etc.)
(2) On-site walkthrough of programmatic issues at county offices when issues arise or when new staff comes on board with the District.

b) **FY 2022-23 through FY 2023-24**: The Center will continue to serve as the "help desk" for general program questions and issues from participants. Office visits to Conservation Districts will be conducted on an as needed basis to address issues or to assist new District staff.

5) GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND REPORTING

a) **Description**: Since the Program began, the Center has maintained a customized GIS system is used by County Conservation Districts throughout Pennsylvania to track location, project data, and spending information on the inventory of over 17,000 designated project sites currently identified throughout the state. In 2015-16, the Center developed a new expanded online version of the GIS system that also tracks LVR projects. The system was expanded in 2018 to include more detailed financial tracking and quarterly reporting. The system was used to generate the Program's Annual Summary Report for calendar years 2016 through 2021.

b) **FY 2022-23 through FY 2023-24**: The Center will continue to work closely with the SCC to continue quarterly reporting and financial tracking. The Center will work with sub-contractors on maintenance and any changes and upgrades determined necessary. Regular training and webinars will be available to Conservation District users. The Center plans to continue to support the new GIS and Annual Summary Report process throughout the life of the Program. Advisory workgroups and SCC involvement will guide the development, upgrades, and trainings necessary for the GIS system.

6) MISCELLANEOUS (FY 2022-23 through FY 2023-24):

a) **Advisory Workgroups**: The Center and Program have relied on advisory workgroups to make programmatic recommendations since before the Program began in 1997. These workgroups meet on an as needed basis. The Center works closely with Program staff to schedule and chair workgroup meetings. The Center will continue to coordinate with SCC staff in order to schedule these workgroup meetings as needed. Currently active workgroups include:
(1) **Policy and Planning**: Deals with program policies, allocations, and administration.
(2) **Education and Outreach**: Deals with trainings and workshops
(3) **Product and Process**: Deals with approval of products such as dust suppressants for the Dirt and Gravel Road Program.

b) **Administrative Manual**: The Center worked closely with SCC staff to write the Program's Administrative Manual in 2014, and implemented significant edits to the manual in 2017, 2019, 2020, and early 2022. The Center will continue to work with SCC staff to on corrections, additions, and clarifications to the manual as necessary.

c) **Stream Crossing Technical Manual and Training:** The Center worked closely with the SCC in 2021 and 2022 to develop **proposed** new policy, standard, and a technical manual related to stream crossing replacements. We will continue to work with the SCC on implementation of the new standard. The Center is also developing a comprehensive multi-day training for conservation districts in support of these new documents, and plans to hold six sessions in FY 2022-23.

d) **Administrative Training**: The Center worked with the SCC to develop a one-day administrative training directed at Conservation Districts. The Center will continue to work with SCC staff to schedule additional trainings and edit the training material as needed.

e) **Quality Assurance / Quality Control (QAQC)**: The QAQC effort visits individual Conservation Districts to evaluate how they are administering the Program within their county and make recommendations for improvement. While the QAQC effort is driven by the SCC, the Center is part of the QAQC team and typically assists with visit data preparation, evaluation of field sites, and review of the field sites with Conservation District staff during the visit. The Center will continue to assist the SCC in these QAQC visits, which are expected to be held in approximately 22-23 counties each year.

f) **Research and PSU Class**: Working in conjunction with the PA Bureau of Forestry and other outside contracts, the Center will continue to conduct and promote research that will be of direct value to participants in the Program. Research findings will be incorporated into the ESM trainings annually to strengthen the practices promoted by the Program. The Center will continue to offer, through other funding sources, an "Environmentally Sensitive Road Maintenance" focused course for graduate and undergraduate students at Penn State University.

7) **COMMUNICATIONS AND REPORTS:**

i) **Webinars:** The Center will provide a variety of short webinars on various Program topics for Conservation Districts

ii) **Fact Sheets/Technical Bulletins**: The Center will continue to revise and publish new information bulletins on specific maintenance practices.

iii) **Website**: Continued maintenance and expansion of the Center and Program website will occur throughout the contract year. The website typically experiences approximately 650 "hits" per month from all over the world.

iv) **Reporting**: The Center will submit quarterly activity reports along with invoices.

8) OTHER TASKS AS ASSIGNED AND AGREED UPON

The Center will, on occasion, provide other products and/or services to SCC under this agreement provided that funds to do so are available. It is expressly understood by both parties that this section is intended to allow flexibility in carrying out the annual work plan to address items unexpected or unforeseen at the time of adoption. In all cases, such additional products and/or services will be undertaken based on mutual agreement of SCC and the Center. This flexibility has worked well between the SCC and Center over the past decade. Office and field supplies are required for assigned projects. Purchase of field equipment, including but not limited to safety equipment, paint, flagging, survey equipment, and testing equipment may be required to fulfill contract obligations. Purchase of office equipment including but not limited to laptops, projectors, screens, cameras, copiers, software, printers, and other office or computer equipment, may be required to fulfill contract obligations.

PA State Conservation Commission - Dirt, Gravel, and Low-Volume Road Maintenance Program

Penn State Center for Dirt and Gravel Studies (Center)

4/22/2022

Summary Budget for FY 2022-23

- FY 2022-23 represents year four of an existing five-year contract between the Center and the SCC.
- Projected budget for all FY's are provided below.
- **Approval is only being requested for FY 2022-23 budget at this time.**
- Future budgets will be brought to the SCC for approval before each FY.
- This is a summary budget only, detailed budget was reviewed with SCC staff.

Center Budget 5-year Projection Estimates Provided in April 2019

SUMMARY BUDGET	projected Year 1 7/1/2019 - 6/30/2020	projected Year 2 7/1/2020 - 6/30/2021	projected Year 3 7/1/2021 - 6/30/2022	projected Year 4 7/1/2022 - 6/30/2023	projected Year 5 7/1/2023 - 6/30/2024	projected Total 7/1/2019 - 6/30/2024
TOTAL PERSONNEL	$ 891,504	$ 912,662	$ 934,348	$ 956,577	$ 979,361	$ 4,674,452
TOTAL TRAVEL	$ 213,000	$ 213,000	$ 213,000	$ 213,000	$ 213,000	$ 1,065,000
TOTAL OPPERATIONAL	$ 137,496	$ 116,338	$ 94,652	$ 72,423	$ 49,639	$ 470,548
TOTAL SUB-CONTRACT	$ 130,000	$ 130,000	$ 130,000	$ 130,000	$ 130,000	$ 650,000
TOTAL DIRECT COSTS	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 6,860,000
Admin Fee (0$)	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL COSTS	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 6,860,000

Center Actual Budget for Approval 5/10/22

SUMMARY BUDGET	SCC Approved Year 1 7/1/2019 - 6/30/2020	SCC Approved Year 2 7/1/2020 - 6/30/2021	SCC Approved Year 3 7/1/2021 - 6/30/2022	FOR SCC APPROVAL Year 4 7/1/2022 - 6/30/2023	Year 5 7/1/2023 - 6/30/2024	Total 7/1/2019 - 6/30/2024
TOTAL PERSONNEL	$ 891,504	$ 902,744	$ 882,034	$ 908,412	Future budgets will be adjusted and brought to the SCC for approval on an annual basis.	
TOTAL TRAVEL	$ 213,000	$ 213,000	$ 223,000	$ 218,000		
TOTAL OPPERATIONAL	$ 137,496	$ 71,256	$ 76,966	$ 75,588		
TOTAL SUB-CONTRACT	$ 130,000	$ 185,000	$ 190,000	$ 170,000		
TOTAL DIRECT COSTS	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 6,860,000
Admin Fee (0$)	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL COSTS	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 1,372,000	$ 6,860,000

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

Agenda Item: 6. B

Date: April 27, 2022

To: State Conservation Commission

From: Roy Richardson, Dirt and Gravel Roads Program Coordinator

Through: Karl G. Brown, Executive Secretary

RE: Dirt, Gravel, and Low Volume Roads Program Allocations

Background

DGLVR funding recommendations have traditionally been taken to the Commission at the May business meeting each year pending state budget approval. This allows conservation districts time to budget for the allocations which take effect on July 1 or after the state budget is approved. Conservation districts have two years to spend funds that are allocated to them. Districts that do not meet the two-year spending requirement are not eligible for an allocation until the funds have been spent. Dirt and gravel spending requirements are tracked separately from low volume. A district that is not eligible for a dirt and gravel allocation may still be eligible for low volume. Likewise, a district that did not meet the spending requirements for low volume may still be eligible for a dirt and gravel allocation.

For FY 22-23, 64 of 65 contracted conservation districts are eligible for a dirt and gravel allocation, and 64 of 66 contracted conservation districts are eligible for a low volume allocation.

Paved Low Volume Road (LVR) Conservation District Allocations.

Allocations for both LVR and DGR are formula driven. For Low Volume Roads, the formula is as follows:

Miles Urban Road > 500' to Stream X 1 = A *(urban, no stream)*

Miles Urban Road < 500' to Stream X 3 = B *(urban, stream)*

Miles Non-Urban Road > 500' to Stream X 3 = C *(non-urban, no stream)*

Miles Non-Urban Road < 500' to Stream X 4 = D *(non-urban, stream)*

new for FY 18-19 ***Miles of road near HQ/EV stream X 1 = E*** *(HQ/EV "bonus")*

$$\text{County Allocation} = \left(\frac{\text{A + B + C + D + E for County}}{\text{A + B + C + D + E for State}} \right) \text{X Total to be distributed to Counties}$$

Note the total LVR funds allocated annually to conservation districts have remained constant since the funding increase in FY 2014-15.

Allocation Factors: Each year, the data layers used for allocation factors are updated to the most recently available data. Changes for FY 2022-23 included an update of the census data used to determine urban/rural areas, and an update to the PennDOT paved roads data layer. These two updates had a modest effect on several conservation districts' allocations.

Staff recommends approval of the conservation district allocations for Low Volume roads, based on the allocation formula approved by the SCC shown above, pending state budget approval.

Dirt and Gravel Road (DGR) Conservation District Allocations

Allocations for both LVR and DGR are formula driven. For Dirt and Gravel Roads, the formula is as follows:

Worksites Factor	**50%**	=	County Miles of Worksites / State Miles of Worksites	+	**X** (SEE NOTE BELOW) County # of Worksites / State # of Worksites	
Unpaved Road Factor	**45%**	=	Miles of Unpaved Road in County	+	Miles of Unpaved Road in County within 1,000' of HQ/EV stream	
Stone Cost Factor	**5%**	=	(Stone Cost in County (minus)- Minimum Stone cost in State) / Minimum Stone cost in State			

Note the total DGR funds allocated annually to Conservation District has remained constant since the funding increase in FY 2014-15.

Allocation Factors: Each year, the data layers used for allocation factors are updated to the most recently available data. Changes for FY 2022-23 were very modest, with a general slight decrease in allocations compared to last FY due to more districts being eligible for funding.

Staff recommends approval of the conservation district allocations for Dirt and Gravel Roads, based on the allocation formula shown above, pending state budget approval.

PA State Conservation Commission - Dirt, Gravel, and Low-Volume Road Maintenance Program

DIRT AND GRAVEL Proposed Conservation District FY 22-23 Allocations

4/27/2022

pending state budget approval

County	for comparison 2021-22	FINAL 2022-23	notes
Adams	$ 100,000	$ 100,000	min
Allegheny	$ 100,000	$ 100,000	min
Armstrong	$ 799,281	$ 788,919	
Beaver	$ 107,594	$ 106,708	
Bedford	$ 255,794	$ 265,504	
Berks	$ 100,000	$ 100,000	min
Blair	$ 100,000	$ 100,000	min
Bradford	$ 1,375,000	$ 1,375,000	max
Bucks	$ 100,000	$ 100,000	min
Butler	$ 155,103	$ 154,072	
Cambria	$ 117,614	$ 114,615	
Cameron	$ 115,898	$ 114,171	
Carbon	$ 100,000	$ 100,000	min
Centre	$ 146,802	$ 142,310	
Chester	$ 100,000	$ 100,000	min
Clarion	$ 367,404	$ 356,574	
Clearfield	$ 506,263	$ 516,021	
Clinton	$ 179,194	$ 178,336	
Columbia	$ 362,569	$ 364,869	
Crawford	$ 759,010	$ 743,851	
Cumberland	$ 100,000	$ 100,000	min
Dauphin	$ 100,000	$ 100,000	min
Elk	$ 235,790	$ 235,580	
Erie	$ 531,151	$ 523,080	
Fayette	$ 226,185	$ 223,575	
Forest	$ 158,558	$ 154,216	
Franklin	$ 100,000	$ 100,000	min
Fulton	$ 172,908	$ 168,511	
Greene	$ 416,673	$ 407,833	
Huntingdon	$ 320,324	$ 313,379	
Indiana	$ 586,052	$ 571,957	
Jefferson	$ 509,627	$ 500,273	
Juniata	$ 118,998	$ 117,491	

County	for comparison 2021-22	FINAL 2022-23	notes
Lackawanna	$ 114,049	$ 109,380	
Lancaster	$ -	$ 100,000	1
Lawrence	$ 100,000	$ 100,000	min
Lebanon	$ 100,000	$ 100,000	min
Lehigh	$ 115,680	$ 138,426	
Luzerne	$ 197,697	$ 187,822	
Lycoming	$ 436,827	$ 428,891	
McKean	$ 238,816	$ 238,467	
Mercer	$ 172,742	$ 169,163	
Mifflin	$ 100,000	$ 100,000	min
Monroe	$ 100,000	$ 100,000	min
Montgomery	$ 100,000	$ 100,000	min
Montour	$ 100,000	$ 100,000	min
Northampton	$ -	$ -	1
N'uberland	$ 202,633	$ 197,205	
Perry	$ 161,726	$ 160,052	
Pike	$ 102,128	$ 100,000	min
Potter	$ 842,490	$ 827,372	
Schuylkill	$ 184,602	$ 180,175	
Snyder	$ 129,744	$ 128,761	
Somerset	$ 471,953	$ 458,079	
Sullivan	$ 326,723	$ 321,027	
Susquehanna	$ 1,252,611	$ 1,221,316	
Tioga	$ 996,279	$ 975,474	
Union	$ 100,000	$ 100,000	min
Venango	$ 529,717	$ 512,142	
Warren	$ 499,237	$ 505,414	
Washington	$ 374,284	$ 350,832	
Wayne	$ 482,191	$ 472,625	
Westmoreland	$ -	$ 137,906	
Wyoming	$ 322,155	$ 325,975	
York	$ 241,924	$ 236,651	
TOTAL	**$ 18,620,000**	**$ 18,620,000**	

NOTES:

min = minimum DGR allocation ($100,000)

max = maximum DGR allocation ($1,375,000)

1 = ineligible for 2022-23 DnG Allocation

PA State Conservation Commission - Dirt, Gravel, and Low-Volume Road Maintenance Program

LOW VOLUME ROAD Proposed Conservation District FY 22-23 Allocations

4/27/2022

pending state budget approval

County	for comparison 2021-22	FINAL 2022-23	notes
Adams	$ 118,847	$ 115,261	
Allegheny	$ 273,862	$ 259,594	
Armstrong	$ 135,029	$ 133,689	
Beaver	$ 102,857	$ 97,176	
Bedford	$ 178,561	$ 184,111	
Berks	$ 257,046	$ 253,354	
Blair	$ 83,883	$ 84,590	
Bradford	$ 102,220	$ 108,921	
Bucks	$ 202,920	$ 192,831	
Butler	$ 187,394	$ 184,896	
Cambria	$ 112,008	$ 116,119	
Cameron	$ 40,000	$ 40,000	min
Carbon	$ 51,787	$ 51,747	
Centre	$ 105,785	$ 105,759	
Chester	$ 234,363	$ 222,806	
Clarion	$ 91,636	$ 90,039	
Clearfield	$ 116,245	$ 120,477	
Clinton	$ 57,856	$ 57,484	
Columbia	$ 82,462	$ 84,718	
Crawford	$ 102,351	$ 106,239	
Cumberland	$ 128,066	$ 127,049	
Dauphin	$ 124,602	$ -	1
Delaware	$ 84,943	$ 84,492	
Elk	$ 40,000	$ 40,000	min
Erie	$ 128,598	$ 131,376	
Fayette	$ 148,146	$ 149,469	
Forest	$ 40,000	$ 40,000	min
Franklin	$ 122,388	$ 116,179	
Fulton	$ 61,644	$ 64,137	
Greene	$ 104,840	$ 125,452	
Huntingdon	$ 106,493	$ 108,825	
Indiana	$ 170,438	$ 166,138	
Jefferson	$ 97,872	$ 101,647	

County	for comparison 2021-22	FINAL 2022-23	notes
Juniata	$ 66,672	$ -	1
Lackawanna	$ 84,925	$ 80,819	
Lancaster	$ 151,237	$ 273,802	
Lawrence	$ 101,429	$ 97,943	
Lebanon	$ 83,439	$ 82,804	
Lehigh	$ 130,880	$ 128,436	
Luzerne	$ 155,686	$ 148,641	
Lycoming	$ 130,042	$ 133,728	
McKean	$ 62,706	$ 65,101	
Mercer	$ 130,642	$ 133,640	
Mifflin	$ 56,359	$ 56,833	
Monroe	$ 129,087	$ 127,001	
Montgomery	$ 177,556	$ 171,340	
Montour	$ 40,000	$ 40,000	min
Northampton	$ 124,225	$ 124,893	
N'uberland	$ 101,613	$ 101,651	
Perry	$ 104,049	$ 104,623	
Pike	$ 40,000	$ 40,000	min
Potter	$ 60,527	$ 61,272	
Schuylkill	$ 150,440	$ 152,240	
Snyder	$ 64,599	$ 64,673	
Somerset	$ 175,294	$ 180,579	
Sullivan	$ 40,000	$ 40,000	
Susquehanna	$ 68,434	$ 69,892	
Tioga	$ 60,007	$ 63,315	
Union	$ 45,948	$ 46,247	
Venango	$ 71,258	$ 73,191	
Warren	$ 55,798	$ 57,215	
Washington	$ 207,238	$ 205,005	
Wayne	$ 97,006	$ 96,753	
Westmoreland	$ 183,785	$ 260,280	
Wyoming	$ 43,283	$ 44,872	
York	$ 258,694	$ 256,636	
TOTAL	$ 7,448,000	$ 7,448,000	

NOTES:

min = minimum LVR allocation ($40,000)

1 = ineligible for 2022-23 DnG Allocation

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

Agenda Item: 6.C

Date: **April 27, 2022**

To: **State Conservation Commission**

From: **Roy Richardson, Dirt and Gravel Roads Program Coordinator**

Through: **Karl G. Brown, Executive Secretary**

RE: **Proposed changes to Driving Surface Aggregate (DSA) Standard and Specification**

Background

The State Conservation Commission (Commission) approves the standard and specifications for Driving Surface Aggregate (DSA), which is the only approved surfacing material for unpaved roads funded by the DGLVR Program. The last update to the DSA specification was approved at the July 2020 meeting. Staff recommends the following changes:

Abrasion Resistance: Criteria in the current standard is as follows:
The loss of mass (LA Abrasion) shall be less than 40%. Determine the resistance to abrasion using the Los Angeles Abrasion test, ASTM C131.

Abrasion resistance quantifies the ability of an aggregate to withstand abrasion from traffic and maintenance activities without breaking down into smaller aggregate. Staff proposes changing the maximum LA Abrasion percentage loss from 40% to 45%. This represents a slight "loosening" of the standard. The reason for the change is to be consistent with PennDOT standard used for certifying quarries for other common aggregates. This minor change would simplify record keeping for the aggregate industry without significantly impacting aggregate quality.

- Placement (IV D) - The criteria in the current standard is as follows:
The use of a motorized paver is highly recommended for all DSA placements. For projects and/or contracts including over 1,000 tons of DSA, a motorized paver is required. ……..

Staff proposes changing the minimum requirement for requiring paver-placement from 1,000 tons to 500 tons. Experience has shown that paver placement of DSA is the best

method of placement. Paver placement helps to avoid segregation of materials and provides the most compact, durable surface. A 500-ton placement of DSA is a significant amount of material (~ ¼ mile). For placements under 500 tons, the proposed changes would also require the use of a carbide grader blade to spread the tailgated aggregate and shape the road with minimal aggregate separation.

The proposed new standard and specification is attached with the changes highlighted.

Staff recommends approval of the changes to the DSA standard and specifications as outlined above.

Proposed effective date 7/1/2022

PA State Conservation Commission
Driving Surface Aggregate Standard and Specification

I. **Definition -** This document is for the purchase and placement of Driving Surface Aggregate (DSA) for the Pennsylvania State Conservation Commission's Dirt, Gravel, and Low-Volume Road Maintenance Program (DGLVRMP). DSA is an aggregate mixture of crushed stone designed specifically as a surface-wearing course for unpaved roads. DSA provides a durable road surface with longer maintenance cycles than conventional road surface aggregates.

II. **Use -** For the purposes of funding under the DGLVRMP, DSA must be used in areas where it will have an environmental benefit (reduced erosion, reduced runoff). DSA shall only be placed after drainage and subgrade issues have been addressed by utilizing practices that promote Environmentally Sensitive Maintenance. DSA was originally designed to reduce erosion and runoff on road segments close to streams where drainage improvements were limited. Surface aggregate is not required on every project.

III. **Material -** DSA to be used on DGLVRMP projects shall be tested prior to delivery by an independent lab that has no affiliation with the source quarry. Samples tested using DGLVR funds must be performed by a lab that is certified by AASHTO, USACE, or PennDOT. Samples shall be obtained by Conservation District (CD) staff, Center for Dirt and Gravel Road Studies (CDGRS) staff, or otherwise approved by the SCC. Material must meet the following requirements:

Gradation: The required sieve sizes and allowed ranges, determined by weight, for DSA components are shown in Table 1. Submit actual sieve passing values to one decimal. Values will not be rounded to whole numbers.

Sieve Size	Percent Passing
1.5”	100
0.75”	65 – 97
#4	30 – 65
#16	15 – 30
#200*	10 – 15

*If the Plasticity Index for the material is 2 or below, then the #200 sieve is permitted to be 10-17% passing.

Table 1 – DSA Gradations

A. **Abrasion Resistance**: The loss of mass (LA Abrasion) shall be less than ~~40%~~ 45%**.** Determine the resistance to abrasion using the Los Angeles Abrasion test, ASTM C131.

B. **pH**: Aggregate shall be in the range of pH 6 to pH 12.45 as measured by ASTM D4972.

C. **Moisture**: Upon delivery to the site, material shall be well mixed and placed at optimum moisture content or up to 2% below that value as determined for that particular source. The optimum percentage moisture is to be determined using Proctor Test ASTM D698, Procedure C, Standard. Aggregate provider is encouraged to perform moisture testing prior to loading

material for delivery.

D. **Plasticity**: Material shall not exceed a Plasticity Index (PI) of 4. The laboratory test required for these results is ASTM D4318 – Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. If Plasticity Index for material is 2 or below, the #200 sieve is permitted to be 10-17% passing.

E. **Soundness**: Determine the percentage of mass (weight) loss of each fraction of the coarse aggregate after five cycles of immersion and drying using a sodium sulfate solution according to PTM No. 510. The maximum weighted percent loss allowed is 20%.

F. **Aggregate**: All DSA shall be derived from natural rock formations that meet program specification for abrasion resistance, pH and freedom from contaminants.

G. **Fines**: If fines need to be added to the aggregate to meet DSA gradation requirements, the added material passing the #200 sieve must be derived from rock material that conforms to program specifications. No mineral clay or silt soil may be added. The amount of particles passing the #200 sieve shall be determined using the washing procedures specified in PTM No. 100.

H. **Mixing**: DSA shall be properly mixed and at the proper moisture content before it is loaded onto the transport vehicles.

IV. Delivery and Placement

A. **Preparation of Subgrade**: Unsatisfactory drainage and subgrade conditions shall be corrected prior to placement by scarifying, reshaping, and re-compacting, or by replacing or importing subgrade/sub-base. The subgrade/subbase shall be crowned or side-sloped to ½ to ¾ inch per foot (4%-6% slope). Beginning and ending of DSA placements shall include a paving notch across the width of the subgrade. The paving notch shall have a minimum depth equal to the compacted DSA placement, and a sufficient length to facilitate transition into existing road surface, or a minimum of 4’ in length.

B. **Transport**: Tarps shall be used to cover 100% of the load’s exposed surface from the time of loading until immediately before placement.

C. **Certification**: A properly executed SCC DSA Certification Form shall be provided at the time of initial delivery and subsequent certification forms shall be provided if quarry conditions change. This Certification Form is to apply to the specific stockpile of DSA material being delivered from the source. The form certifies that the DSA material meets all of the specifications and requirements.

D. **Placement**: The use of a motorized paver is highly recommended for all DSA placements. For projects and/or contracts including over ~~1,000~~ 500 tons of DSA, a motorized paver is required. Paver must be in good working order and be of sufficient horsepower to be capable of pushing loaded trucks uphill while placing material in a full width pass at the required minimum depth stipulated in the contract. If the total tonnage is less than 500 tons, the DSA must be paver placed or placed by tailgating and groomed with a road grader equipped with a carbide-tipped grader blade. A track mounted paver is preferred. DSA shall be placed in a single pass across the width of the road. The crown or cross slope must range from ½ to ¾ inch per foot (4-6%).

Material shall be placed in a single 6-8 inch loose lift or layer. This lift is to be compacted with a vibratory roller as specified in Section V - Compaction. If freezing temperatures or precipitation are forecast that may cause the material to freeze, or prevent the material from drying out, placement shall be postponed at the discretion of the road owner, Conservation District, or aggregate supplier. DSA shall not be placed before April 1st or after September 30th unless otherwise approved by the SCC.

V. Compaction

A. **Vibratory Roller:** After placement, the material shall be compacted using a minimum ten-ton vibratory roller. DSA shall be compacted to a minimum of 95% of the dry-mass (dry-weight) density according to ASTM D698, Procedure C, Standard as determined by pre-sampling (refer to Materials, Section III.D). The road owner, or its designated representative, reserves the right to determine the in-place moisture and density according to ASTM D6938.

VI. Maintenance -

Properly placed and compacted DSA provides a durable road surface with longer maintenance cycles than traditional aggregates, but it is not maintenance free. Refer to the Center for Dirt and Gravel Roads "Driving Surface Aggregate Handbook" for additional guidance on DSA maintenance.

VII. References:

A. State Conservation Commission Driving Surface Aggregate Certification Form. http://www.dirtandgravel.psu.edu/sites/default/files/General%20Resources/DSA/SCC_DSA_Spec_2014.pdf
B. Penn State Center for Dirt and Gravel Road Studies "Driving Surface Aggregate Handbook" http://www.dirtandgravel.psu.edu/general-resources/driving-surface-aggregate-dsa
C. ASTM C131 [AASHTO T96] - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine. http://www.astm.org/Standards/C131
D. ASTM D4972 - Standard Test Method for pH of Soils. http://www.astm.org/Standards/D4972
E. ASTM D698, Procedure C, Standard [AASHTO T99] – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3). http://www.astm.org/Standards/D698
F. ASTM D4318 [AASHTO T89/90] – Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. http://www.astm.org/Standards/D4318
G. Pennsylvania Test Method No. 100. - Method of Test for amount of material finer than 75 µm (no. 200) sieve in aggregate. http://www.dot.state.pa.us/public/pdf/BOCM_MTD_LAB/PUBLICATIONS/PUB_19/PTM-100.pdf
H. Pennsylvania Test Method No. 510 – Method of Test for soundness of aggregate by use of sodium sulfate. http://www.dot.state.pa.us/public/pdf/BOCM_MTD_LAB/PUBLICATIONS/PUB_19/PTM-510.pdf
I. ASTM D6938 [AASHTO T310] – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth). http://www.astm.org/Standards/D6938

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

Agenda Item: 6. D

Date: **April 27, 2022**

To: **State Conservation Commission**

From: **Roy Richardson, Dirt and Gravel Roads Program Coordinator**

Through: **Karl G. Brown, Executive Secretary**

RE: **Dirt, Gravel, and Low Volume Roads Program: Proposed changes to stream crossing policy, proposed new stream crossing design and installation standard, proposed new stream crossing replacement technical manual.**

Background: The State Conservation Commission (Commission) adopted a stream crossing replacement policy in 2014. The goal of this policy was to limit the replacement of stream crossing structures to those which are negatively impacting streams. It was determined that the best quantification of stream impact is the size of the existing structure related to the bankfull width of the channel. The current policy limits paying for structural replacement on pipes over 4' in diameter to only those locations where the existing structure is less than 75 percent of the bankfull channel width. Under the current policy, replacement structures must meet 4 criteria:

1. Have a structure width at least equal to bankfull width (100 percent ratio).
2. Be properly aligned with the channel when possible.
3. Consider additional floodplain connectivity when possible.
4. Be designed and constructed to accommodate the passage of aquatic organisms through the structure.

Proposed changes – Commission and Center staff have been working with the Policy and Planning workgroup as well as the Education and Outreach workgroup, PA Fish and Boat Commission, DEP, DCNR, and the U.S. Forest Service to find ways to improve the Program's stream crossing projects and have proposed three major changes as follows:

1. Changes to the Program's stream crossing replacement policy
    - Requirement to follow new proposed Stream Crossing Design and Installation Standard (see below)
    - Provide for exemptions for small streams
    - Require longitudinal profile survey prior to approval

- Require district review of designs and bid packages
- Require on site meetings
- Education/training requirement for stream crossing replacements

2. Stream crossing design and installation standard (new)
    - Establishes minimum structure size, bury depth, and flow capacity
    - Establishes design criteria engineers must use
    - Provides criteria to be used in structure selection
    - Identifies required drawings for construction plans
    - Requires engineers inspect critical stages of construction
    - Requires engineers to certify project after completion
3. Stream crossing replacement technical manual (new)
    - Step by step "how to" manual for stream crossing replacements
    - Introductory chapter outlines the need for better stream crossings, and details what other states are doing
    - Chapters 2 through 11 chronologically walk through the stream crossing replacement process from a conservation district perspective.
    - Chapter 12 is written for design engineers as a technical reference to the standard.
    - Includes various attachments including standard drawings, checklists, technical bulletins, and more.

The documents above were sent out to conservation districts and others for a review and comment period in December 2021 through January 2022. All comments were reviewed with advisory workgroups and significant changes were made based on comments from conservation districts, PACD, US Forest Service, PA Fish and Boat Commission, PA DEP, PA DCNR, and several private engineers. SCC staff also contacted conservation districts and other agencies who provided comments to address individual concerns. Two comment response documents are attached:

- The PA Association of Conservation Districts submitted a compiled list of comments from conservation districts and PACD staff on 2/9/22. A comment response document was written by Commission and Center staff and is attached.
- The Commission and Center received over 450 individual comments from 22 conservation districts and other entities. The comments were compiled into categories, and a comment response document to these general comment categories is also attached.

The proposed stream crossing policy changes, new Stream Crossing Design and Installation Standard, new Stream Crossing Replacement Technical Manual, and both comment response documents have been reviewed by PDA legal staff.

Staff recommends approval of the revised stream crossing policy, new Stream Crossing Design and Installation Standard, and new Stream Crossing Replacement Technical Manual.

Attachments:

1. Proposed Stream Crossing Replacement Policy (revision to 7.1 of DGLVR Admin Manual)
2. Proposed Stream Crossing Design and Installation Standard (new)
3. Proposed Stream Crossing Replacement Technical Manual (new)
4. Comment response document to PACD comment (new)
5. Comment response document to CD comments submitted during review period (new)

The proposed stream crossing replacement policy below will replace the current policy in section 7.1 of the DGLVR Administrative Manual

7.1 Stream Crossing Structural Replacements

This section applies to stream crossing replacements (not road drainage "cross pipes") funded by the Dirt, Gravel, and Low-Volume Road (DGLVR) Program on both Low-Volume and Dirt and Gravel roads. Refer to Chapter 1 of the DGLVR Stream Crossing Replacement Technical Manual for additional discussion of the background, purpose, and intended benefits of the policies detailed here.

7.1.1 Background

Replacement Structures: One of the DGLVR Program's major goals of stream crossing replacements is to ensure that structures that are funded by the DGLVR Program are designed and implemented properly to achieve stream continuity through the roadway. Stream continuity refers to the connectivity and continuation of typical streambed features (profile, slope, width, composition, grade controls, pools) along its length upstream, downstream, and through a road crossing structure. DGLVR projects often reconnect segments of stream that have been disconnected and vertically offset by an undersized road crossing. New structures funded by the DGLVR Program must be wide enough to allow for construction of a functional stream channel through the crossing. This includes bank margins, low flow channel, grade controls, and other stream features. Construction of a bankfull-width stream channel through wider-than-bankfull-width structures will not only accommodate the hydraulic capacity of the stream but will also allow for better stream function through the road regarding flood resiliency, sediment and debris transport, and aquatic organism passage.

Existing Structure Eligibility for Replacement: Another major goal of the DGLVR stream crossing replacements is to limit paying for replacement of stream crossing structures to locations which are negatively impacting streams and the aquatic environment. The best overall approximation of environmental impact from a crossing is the width of the existing structure opening related to the bankfull width of the channel. A channel's bankfull width is the width of flow at a "dominate channel forming flow stage" where sediment and bed material is moved most effectively through the stream system, typically associated with a one-to-two-year recurrence interval for Pennsylvania. Stream crossing structures that are significantly less than the channel's bankfull width are typically associated with many problems, including gravel deposition upstream of the road, excessive stream scour and erosion downstream of the road, flooding, and washouts. DGLVR site eligibility policy (detailed in section 7.1.2.2) limits paying for structural replacement on existing pipes over 4' in diameter to only those locations where the existing structure is less than 75 percent of the bankfull channel width. These structures are most likely to be causing negative stream impacts and are most likely to be sources of perpetual maintenance and road impacts to road owners (gravel bar removal, erosion, etc.).

7.1.2 DGLVR Stream Crossing Replacement Policy

This section details the DGLVR Stream Crossing replacement policy for eligibility, new structures, and details additional responsibilities of the conservation district.

7.1.2.1 Policy for Structure Installation

All stream crossing replacements funded in whole or in part with DGLVR funds, or listed as in-kind on a DGLVR Project, must follow the DGLVR Stream Crossing Design & Installation Standard, unless an "Exemption from DGLVR Stream Crossing Standard" (see section 7.1.3) is applicable. The Standard and its attachments are available online at https://www.dirtandgravel.psu.edu/ For projects receiving an Exemption from DGLVR Stream Crossing Standard, other site-specific requirements apply (see section 7.1.3).

7.1.2.2 Policy for Stream Crossing Eligibility for Replacement

Eligibility criteria for replacing stream crossings, in whole or in part, with DGLVR funds:

- **Small Pipes:** Existing stream crossing structures with an opening width less than or equal to 48" are automatically eligible for replacement regardless of their relationship to the bankfull channel width, as long as they are replaced according to DGLVR Policy.
- **Multiple Pipes:** Existing stream crossings consisting of multiple (side-by-side) pipes are automatically eligible for replacement regardless of their relationship to the bankfull channel width, as long as they are replaced according to DGLVR Policy. This automatic eligibility applies to multiple pipes only, not multi-cell or multi-opening bridges.
- **All Other Structures:** For existing single-opening structures with an opening width over 48", only structures with a "structure opening width to bankfull channel width" ratio of 75% or less are eligible for replacement with DGLVR Program funds.
- **SCC Notification**: Conservation districts are required to notify the State Conservation Commission (SCC) of proposed stream crossing replacements as soon as practical before a contract is signed. An online notification system is available by logging in to the Center for Dirt and Gravel Road Studies' website (same log-in as accessing the GIS system) at www.dirtandgravelroads.org.

Note: When measuring the width of an existing structure, measure the most limiting width (for example: the narrowest pipe in a series of "necked-down" pipes, or the narrowest point perpendicular to the flow between abutments of a skewed bridge).

7.1.2.3 Where the DGLVR Stream Crossing Policy Applies

All stream crossing replacements funded in whole or in part with DGLVR funds, or listed as in-kind on a DGLVR Project, must follow the DGLVR Stream Crossing Design & Installation Standard, unless an "Exemption from DGLVR Stream Crossing Standard" (see section 7.1.3) is applicable. The Standard and its attachments are available online at https://www.dirtandgravel.psu.edu/. For projects receiving an Exemption from DGLVR Stream Crossing Standard, other site-specific requirements apply (see section 7.1.3).

For DGLVR Program purposes, the stream crossing policy outlined here applies to situations where streams, including intermittent channels, with identified bed and banks are flowing into the road or the uphill ditch. See section 7.1.3 for more information on Automatic and SCC-requested exemptions from the DGLVR Stream Crossing Standard. Contact the State Conservation Commission in questionable circumstances.

Routine maintenance of stream crossing structures is not eligible for DGLVR funding. This applies both to stream crossing structures that are ineligible to be replaced with DGLVR funds or are eligible for replacement with DGLVR funds but are not being replaced. For these structures, no work may be performed directly on the stream crossing structure or its components unless the structure is replaced according to DGLVR Program Policy. "Work" includes, but is not limited

to, culvert lining, extending undersized stream crossings, bridge deck repairs, and adding or replacing headwalls and endwalls to an existing stream crossing structure. The policies and qualifications for replacement with DGLVR Program funds outlined here and in the DGLVR Stream Crossing Design & Installation Standard **do not exempt projects from any permitting or engineering requirements**.

7.1.2.4 Policy Limiting Engineering and Consulting Costs

As outlined in section 3.7.4.7, Program funds can be used to cover engineering, permitting, or similar consultant costs, but such costs are limited to a combined maximum of 20 percent of the total contract amount between the district and the grant recipient, not to exceed $25,000. A Request for Proposal (RFP) is available on the Center for Dirt and Gravel Road Studies' website. This document is highly recommended for use in hiring an engineer/consultant for stream crossing projects.

7.1.2.5 Conservation District Education Requirements

Education Requirements for Conservation Districts: Effective July 1, 2023, at least one conservation district staff member must have completed the DGLVR Program's "Stream Crossing Replacement Certification Training" and received a certificate of completion before the QAB can recommend or the conservation district Board can approve a contract for a project involving a stream crossing replacement. A Stream Crossing Replacement Re-Certification Training must be taken once every three years to maintain staff certification. This training requirement does not apply to crossings that qualify for an automatic exemption from the DGLVR Stream Crossing Standard (see section 7.1.3.1).

7.1.2.6 Conservation District Requirements

- **Conservation Districts are required to hold meetings including:**
  - **Pre-application:** Meeting, typically held with grant applicant before application submittal.
  - **Pre-design:** If an engineer is required by permitting or DGLVR standard, then a pre-design meeting must be held. On-site meeting, typically held with grant applicant and project engineer, occurs after the grant applicant signs a contract with the conservation district for DGLVR funding and hires an engineer, and before design and permitting.
  - **Pre-construction:** On-site meeting, typically held with grant recipient,
  - project engineer, and sub-contractor (if applicable), prior to starting construction.

- **Conservation Districts are required to attend a bid site showing (if held):** On-site meeting, typically held with grant recipient, project engineer, and potential bidders/contractors, for structure installation before bids are due. These meetings are highly recommended but at the discretion of the grant recipient.

- A "Stream Crossing Evaluation Form" (Attachment E) must be completed by the conservation district and kept in the project file for all stream crossing replacements, even those with an exemption from the DGLVR Stream Crossing Standard. This form requires

measurement of the bankfull channel and existing structure to determine DGLVR Program eligibility.

- Stream crossing replacements nearly always extend outside the road right-of-way. Applicants are strongly encouraged to get verbal permission from landowners for off right-of-way work before contracting. Before working outside the right-of-way, the grant recipient must obtain written permission from the landowner. Landowner permission should be sought as early as possible in the funding process, ideally before contracting, to ensure the project can be implemented as planned. A sample landowner agreement is provided at www.dirtandgravelroads.org. Districts and grant recipients can use their own landowner agreements as long as they are in a form and manner similar to the sample provided. Districts must keep a copy of the signed landowner consent form with the project file for any work performed off the right of way. If landowner permission is required to achieve stream continuity and meet DGLVR Stream Crossing Standard, but cannot be obtained, the project cannot be completed. Contact the SCC in questionable circumstances. This off-ROW policy is detailed in section 3.7.4.8 of the DGLVR Administrative Manual.

- A site assessment must be completed for each stream crossing prior to the QAB recommending the project for funding. This site assessment must be completed by the conservation district or their designee and must be used to support development of cost estimates and the grant application. A site assessment includes obtaining a longitudinal profile and a minimum of two cross-sections of the existing stream channel. The longitudinal profile and cross sections can be used by the conservation district to review future surveys and project plans to ensure they meet DGLVR Program policies and Stream Crossing Standard. The longitudinal profile and cross sections must be completed in accordance with section IV. K of the DGLVR Stream Crossing Replacement Standard. Additional details for completing longitudinal profiles and cross sections are available in X.X of the technical manual and in the attached technical bulletin. If, later in the design process, the design engineer completes their own site assessment to support their project design, the conservation district staff is required to be on-site while the site assessment is being performed by the engineer and/or surveyor. The conservation district's role during the engineer's site assessment is to observe and assist with the longitudinal profile and cross sections and ensure all important data points are obtained. The site assessment requirement does not apply to sites that are eligible for an automatic Exemption from DGLVR Stream Crossing Standard but does apply to sites that may later receive an Exemption from DGLVR Stream Crossing Standard through the SCC (see 7.1.3.1).

- If a project is required to be designed by an engineer, the grant recipient or engineer must provide all permit applications, Site Assessment, design plans and specifications, (per DGLVR stream crossing replacement standard), to the conservation district. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that these submitted documents comply with DGLVR policy and Stream Crossing Standard before they are submitted (or resubmitted) for permit review. The purpose of this review is to verify consistency with DGLVR policies and Stream Crossing Standard, not to review engineering calculations or permit completeness. "Consistency" and "deficiency" form letters for conservation district use can be found on the Center's website.

- If a project is required to be bid out for construction, the grant recipient or engineer must provide all draft bid packages to the conservation district. The conservation district must review the draft documents and provide written confirmation to the grant recipient or engineer that those draft bid documents comply with DGLVR policy and Stream Crossing Standard before they are provided to potential bidders. This purpose of this review is to verify consistency with DGLVR policies and Stream Crossing Standard, not to review engineering calculations or bidding requirements. It is up to the grant recipient to comply with applicable bidding requirements. "Consistency" and "deficiency" form letters for conservation district use can be found on the Center's website.

- Conservation districts must be on-site regularly during construction to ensure DGLVR Program policies and the Stream Crossing Standard are being met. At minimum, the conservation district must be onsite during the installation of "Critical Stages of Construction" as defined in the DGLVR Stream Crossing Standard.

- In situations where no current stream crossing exists and a new crossing is to be installed, DGLVR Program policy must still be followed. The conservation district must contact the SCC for eligibility guidance. This requirement does not apply to sites that receive an exemption from the DGLVR Stream Crossing Standard (see 7.1.3.1).

- Conservation districts must complete the "Project Lifecycle Checklist" during the planning and implementation of stream crossing replacements, and the form must be kept in the project file. This requirement does not apply to sites that receive an exemption from the DGLVR Stream Crossing Standard (see 7.1.3.1).

7.1.3 Exemptions from DGLVR Stream Crossing Standard: Site-specific Exemptions to Following the Standard

The State Conservation Commission (SCC) recognizes that it is not always practical, cost effective, or biologically beneficial to complete a comprehensive stream continuity project in certain situations. Stream crossing replacements vary drastically around the state, and this section on exemptions from DGLVR Stream Crossing Standard is designed to provide maximum leeway for the conservation district and SCC to adapt to unique situations. The exemptions from DGLVR Stream Crossing Standard discussed in this section only exempt projects from DGLVR requirements, and do not exempt projects from any applicable permit requirements from DEP or other entities.

7.1.3.1 Automatic Exemptions from DGLVR Stream Crossing Standard

The following existing conditions may be, at the discretion of the conservation district, considered "Exempt from DGLVR Stream Crossing Standard" without SCC approval for channels with a bankfull width of 4' or less and:

- The defined bed and bank coming to the road does not extend more than 500' upslope of the road ditch, or,

- The drainage area of the bed and bank coming to the road is 20 acres or less

Complete the "Automatic Exemption from the DGLVR Stream Crossing Standard" form (attachment J) and keep it in the project file. Automatic exemptions still need to be reported in the SCC notification system.

7.1.3.2 SCC Approval for Exemptions from DGLVR Stream Crossing Standard

Occasionally, circumstances may exist where a conservation district would like to request an exemption from the DGLVR Stream Crossing Standard from the SCC on a larger stream that does not qualify for an automatic exemption as outlined in 7.1.3.1. These situations must be handled individually, and a signed "SCC Exemption from the DGLVR Stream Crossing Standard" form must be obtained from the SCC and kept in the project file. Examples of some conditions where an exemption from the DGLVR Stream Crossing Standard may be requested:

- Small channels that fall outside the automatic exemptions above
- Crossings with extensive outlet drops that would make establishing connectivity impossible or prohibitively expensive for the amount of habitat improvement it would provide.
- Other stream crossings with special circumstances.

A signed "SCC Approval for Exemption from the DGLVR Stream Crossing Standard Request" form (attachment K) must be kept in the project file.

7.1.3.3 Details for Exemptions from DGLVR Stream Crossing Standard

What is waived with an Exemption from DGLVR Stream Crossing Standard (either automatic or SCC):

- The need to follow the DGLVR Stream Crossing Design and Installation Standard,
- The need to achieve stream continuity as it relates to slope, streambed material depth, and establishing grade control within the structure, and
- The need to establish a low-flow channel and bank margins through the structure.

Requirements for projects covered by an Exemption from DGLVR Stream Crossing Standard (either automatic or SCC).

If continuity cannot be achieved, the following steps must be taken to ensure stream crossings that receive an exemption from the DGLVR Stream Crossing Standard will still result in a stable crossing that will not lead to accelerated erosion or other issues.

- Any requirements from local, state and federal laws and all applicable permits are **not** waived as part of this exemption and must be followed.
- New structures must still be a single span at a minimum of 1.25 times or 125% of the bankfull channel width unless otherwise approved by the SCC.
- Ensure the stability of the channel upstream and downstream. Grade controls must be shown on plan drawings if drawings are required.
    - Upstream: Grade control(s) are required immediately (between one and two bankfull widths) upstream of the inlet of the new structure to prevent headcutting (headward erosion lowering channel elevation that moves upstream over time). These grade

controls are typically installed at the existing streambed elevation. If a larger structure is installed in a channel with road height limitations, installing a larger structure below the existing streambed elevation without grade control(s) will likely cause a headcut.
    - Downstream: Outlet stabilization is required in the form of grade controls, bank armoring, and/or filling in scour holes. Any grade controls are typically installed at the existing streambed elevation. Pipes may need to be extended further off the road, and the erosion potential caused by any elevation drops must be considered.
- New structures must be properly aligned with the channel, unless not feasible due to permitting restrictions or other constructability restraints.
- Consider floodplain connectivity when necessary (e.g., high water by-pass, overflow pipes, etc.).
- If permits and engineered plans are required, conservation districts are required to review all plans and specifications to ensure the project complies with DGLVR policy and requirements before they are submitted for permit review.
- Divert surface runoff and road drainage away from the stream and structure in a manner that prevents erosion and prevents discharges to the stream.
- For projects receiving an exemption from the DGLVR Stream Crossing Standard, other site-specific requirements may apply. If applicable, these will be identified by the SCC on a project-specific basis.

DRAFT 4/27/2022.

PA STATE CONSERVATION COMMISSION
DIRT, GRAVEL AND LOW VOLUME ROAD PROGRAM

STREAM CROSSING DESIGN & INSTALLATION STANDARD

I. DEFINITIONS

Aggradation: Deposition of sediment and corresponding increase in streambed elevation, often due to inability of the stream to adequately convey its sediment load during flood.

Anticipated Scour Depth: Depth of expected scour used to determine structure bury depth based on observed maximum reference reach pool depth and a factor of safety.

Aquatic Organism Passage: Unimpeded movement of aquatic organisms through the road/stream crossing.

Bankfull Elevation: In non-confined channels, the elevation point at which the stream typically accesses the floodplain. Channel dimensions at the bankfull elevation convey the channel-forming or dominant discharge.

Bankfull Width: A site-specific, field-derived measurement of channel width at the bankfull elevation.

Bank Margins: Large rock placed along the outside edges of the reconstructed bankfull channel within the stream crossing structure. Placement of the bank margins define bankfull channel width and bank margin (bankfull) elevation / height through the structure.

Bedform: Typical sequence of streambed features through the project reference reach (riffles/pools, step/pool, etc.).

Channel Continuity: Relative consistency and connectivity of a stream channel upstream, through, and downstream of a road/stream crossing, in regard to physical characteristics of the channel such as slope, planform, dimensions, profile, and bedforms.

Continuity Slope: Slope of the reconstructed section of streambed necessary to re-establish a relatively-continuous slope, profile and bedforms (channel continuity) along the entire length of stream extending upstream, through, and downstream of the new crossing.

Crossing: Refers to the location of a road/stream crossing structure.

Cross-Section Survey: A survey conducted across the channel (perpendicular to the thalweg) to produce a graphical representation of channel dimensions including shape, depth and width.

Degradation: Accelerated erosion and transport of sediment from the streambed and banks, and corresponding lowering of the streambed elevation. Often associated with increased scour potential due to channel constriction or abrupt increase in channel slope.

Finished Opening Area: The unobstructed area within the structure after accommodating for stream bed material, low flow channel, and bank margins.

Finished Opening Height: Vertical distance measured from the thalweg elevation at the crest of a constructed grade control feature inside the replacement structure, upward to the top of the culvert opening or bottom of bridge beam.

Flood Resiliency: Reducing the risk of flood damages to people and infrastructure by planning and implementing measures that improve floodwater conveyance and provide for long-term stability of a self-maintaining stream corridor.

Grade Control: Natural or manmade structures that control channel elevation, dictate channel slope and maintain bedforms. Common types include riffles, cascades, steps, rock clusters and large wood features.

Intermittent Watercourse: A stream or waterway with surface flow during various times of the year when groundwater inputs are sufficient to provide streamflow. At other times of the year, when there is insufficient groundwater input, the stream channel may be dry.

Invert: Interior bottom elevation of stream crossing structure.

Key Pieces: Largest rocks in the reconstructed streambed substrate. Often these can be clustered to provide areas of minor, frequent grade control along the length of the channel bed in-between more robust constructed grade control features.

Longitudinal Profile Survey: Survey of the stream channel, typically measured from upstream to downstream along the channel thalweg, to capture prominent features such as channel elevations, depths, and slopes at bedform features such as riffles, pools, runs, glides, and step/pools.

Low Flow Channel: Portion of the channel commonly wetted during stream base flow.

Outlet Scour Pool: An overly-widened and deepened pool bedform feature often (but not always) located immediately downstream of an undersized crossing.

Perennial Watercourse: A stream or waterway with surface flow throughout the entire calendar year.

Q100: The 100-year recurrence interval of stream flow. In any given year, there is a 1% probability that a flow of that magnitude or greater would occur.

Reconstructed Reach: Section of stream to be constructed upstream, through, and downstream of the new structure to re-establish channel continuity between the tie-in points.

Reference Reach: Section of stream channel that best reflects the “typical” natural, minimally-impacted physical characteristics (profile, dimension, planform and dominant bedform) of the channel. For stream crossing projects, the reference reach is located beyond the extent channel impacts associated with the existing structure. Site Assessment (survey) of the reference reach is used as a blueprint for design of the reconstructed reach.

Site Assessment: Survey of longitudinal profile and cross-sections through, and adjoining to, the project site used to inform project design.

Structure: A road/stream crossing structure, such as a culvert or bridge, constructed across a stream to provide controlled access for vehicles.

Substrate: Mixture of rock that composes the streambed.

Thalweg: The line of lowest elevation along the flowpath of a stream channel. Dimensionally, this is reflected as the lowest point of elevation in the channel cross-section.

Tie-in Points: Locations of existing- or constructed grade control features where the upstream- and downstream limits of the reconstructed reach transition to the existing stream channel. Tie-in points define the limits of the reconstructed reach necessary to achieve channel continuity upstream, through, and downstream of the crossing**.**

II. PURPOSE

This standard is applied for the purposes of:

A. Providing greater flood resiliency at road stream crossings and reducing maintenance of undersized crossings.
B. Improving water quality by reducing sediment and erosion occurring at the road and stream interface.
C. Reducing streambed and streambank degradation.
D. Constructing & maintaining stream channel continuity through the road profile.
E. Accommodating aquatic organism passage upstream, downstream, and through the road crossing.
F. Repairing and stabilizing stream channels damaged by undersized stream crossings.

III. CONDITIONS WHERE PRACTICE APPLIES

This practice applies to stream crossing structure replacements and installations on state or local publicly owned roads where:

A. DGLVR funding is used, in whole or in part, to fund a stream crossing replacement.
B. An intermittent or perennial watercourse exists.
C. A defined bed and bank convey water to a roadway.

IV. GENERAL CRITERIA APPLICABLE TO ALL STREAM CROSSING INSTALLATIONS

A. Refer to the Dirt, Gravel, and Low-Volume Roads (DGLVR) Program "Stream Crossing Replacement Technical Manual" for additional design and construction guidance and details regarding implementation of the standards and requirements listed below.
B. All stream crossing projects shall be authorized in accordance with local, state and federal laws. All applicable permits must be obtained prior to construction.
C. All stream crossing structures shall be comprised of one single-opening structure installed at each crossing. Projects shall not utilize multi-opening structures or the placement of multiple single-opening structures at any one crossing location. Additional floodplain conveyance structures may be installed a minimum of one bankfull-width distance outside of the bankfull channel.
D. New stream crossing structures shall be designed to pass, at a minimum, the 100-year discharge (Q100) at a water surface elevation not to exceed 80% of the finished opening height.

   A Hydrologic and Hydraulic (H&H) Study is required that includes:

   1. finished thalweg elevations, and
   2. clearly labeled discharge values and water surface elevations at the proposed crossing inlet for Q2, Q10, Q25, Q50, and Q100.

E. Grade controls, bank margins and key pieces shall, at a minimum, be designed to be stable at Q100.
F. Structures must be of adequate width to accommodate the bankfull width of the stream at the final bankfull elevation with stable bank margins. Once these design criteria are met, the structure width shall not be less than 1.25x the bankfull width of the stream at the bankfull elevation.
G. In project design and construction, bankfull channel dimensions must be based upon project site-specific field measurements. Channel dimensions derived from other methods, such as modeling of estimated bankfull discharge, shall not be utilized.
H. New structures must be properly aligned with the channel, unless not feasible due to permitting restrictions or other constructability restraints. See Attachment A and the SCC GP-11 Permit Memo (Appendix E of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification of permitting, including minor channel realignments that might be authorized with a GP-11 for stream crossings designed to this Standard.
I. Consider floodplain connectivity when necessary (e.g., high water by-pass, overflow pipes, etc.). Floodplain- or overflow pipes must be placed a minimum of one bankfull-width distance outside of the bankfull channel.
J. Structures must be designed and constructed to accommodate the passage of aquatic organisms through the structure.
K. Round pipes over 36" in diameter may not be utilized for stream crossings.
L. Low flow channels with well-defined bank margins must be built through the structure.
M. Site Assessment:

1. A longitudinal profile survey is required for each site prior to project design and/or permitting. The surveyed stream segments must extend far enough to capture existing channel slopes upstream and downstream of the crossing and must include an appropriate reference reach to support project design. To determine applicability, reference reach slope must be +/- 25% of the proposed continuity slope of the reconstructed streambed, unless otherwise approved by the SCC. If an appropriate reference reach is not located near the crossing, a separate survey may be conducted on an appropriate reference reach further upstream or downstream of the crossing. The reference reach must begin and end at existing grade control features and must, at minimum, include two consecutive sequences of repeating bed features (ex. riffle/pool/riffle/pool/riffle). A longer reference reach including additional bedform sequences is encouraged in order to provide more reliable design criteria.
    i. The longitudinal profile survey must extend both upstream and downstream of the crossing and include data points associated with the existing structure and roadway surface.
    ii. Sufficient number and locations of data points must be collected to determine the stream channel features that are critical to a successful structure replacement. These include:
        1. channel and structure slope
        2. grade control types, lengths, and spacing,
        3. pool scour depth,
        4. potential tie-in points,
        5. aggradation wedges,
        6. plunge pools,
        7. vertical offset of the streambed adjacent to the structure,
        8. available roadway cover.
    iii. The longitudinal profile survey must extend a minimum of 150’ upstream and 150’ downstream of the existing crossing. Additional length of survey may be necessary to capture a suitable reference reach to support project design. Actual length of the longitudinal profile survey is dependent upon the site conditions, availability of a suitable reference reach, channel size and distance necessary to accurately capture existing channel slopes both upstream and downstream of the crossing. The longitudinal profile survey must extend from an existing grade control upstream of the crossing feature to an existing grade control feature downstream of the crossing.
2. Cross-section surveys are required at a minimum of two locations. At minimum, surveys must be completed at a grade control crest within the reference reach and at the deepest point in the outlet scour pool (if present). If no outlet scour pool exists, this survey should capture the maximum depth of a pool feature from the reference reach. At minimum, each surveyed cross section must include data points on both streambanks capturing top-of-bank, bankfull, and right/left edge of water. Instream data points must include a minimum of three streambed points, including the thalweg (low-flow channel).
3. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on Site Assessment requirements.

N. The engineer is responsible for the Site Assessment data they use. If conservation districts provide Site Assessment data, the engineer has discretion to use the provided data or conduct their own surveys. If a Site Assessment is completed by the design engineer to support their project design, the conservation district technician is required to be on-site while the surveys are being performed by the engineer and/or surveyor. The engineer shall provide the completed survey and Site Assessment data to the conservation district technician. The Site Assessment data provided to the conservation district shall include stationing, elevations, and notations of key stream features as outlined in (M.) above.

O. The Site Assessment data (from longitudinal profile and cross section surveys) described above shall be used to inform project design considerations, including the following:

1. Minimum stream substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) is to be based on the maximum pool depth in the reference reach with a minimum safety factor multiplier as listed in Table 1. Alternatively, minimum bury depth can be determined using industry accepted scour analysis and modeling tools for stream system analysis and/or bridges (storm sewer models are not acceptable for stream crossing scour analysis).

Table 1: Pool Depth Safety Factor Multiplier to establish Anticipated Scour Depth

Continuity Slope	Pool Depth Multiplier
0% - 2.0%	1.5
2.1% - 4.0%	2.0
> 4.0%*	2.5

* Structures installed on reconstructed reach stream slopes >4.0% must be bottomless. The 2.5 safety factor multiplier is to establish the recommended minimum bottom of footing buried depth. The final footing buried depth is to be determined by the Engineer in project design.

2. Minimum substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) shall be 24-inches, or the depth determined with scour analysis models or the Anticipated Scour Depth, whichever is greater.
3. The design shall identify stable tie-in points at grade control features (either existing or to be constructed). The distance between the upstream- and downstream tie-in points must extend far enough in both directions to restore channel continuity upstream, through, and downstream of the structure.
4. In-stream channel grade control(s) are required for re-constructing the stream channel and/or stabilizing the stream bed and channel through the reconstructed stream reach. Types of grade control features utilized must be the same type as those within the appropriate reference reach. Design of grade control feature length and spacing shall be based upon the Site Assessment data.
5. Design of the cross-sectional shape of the reconstructed reach must be based on Site Assessment data.

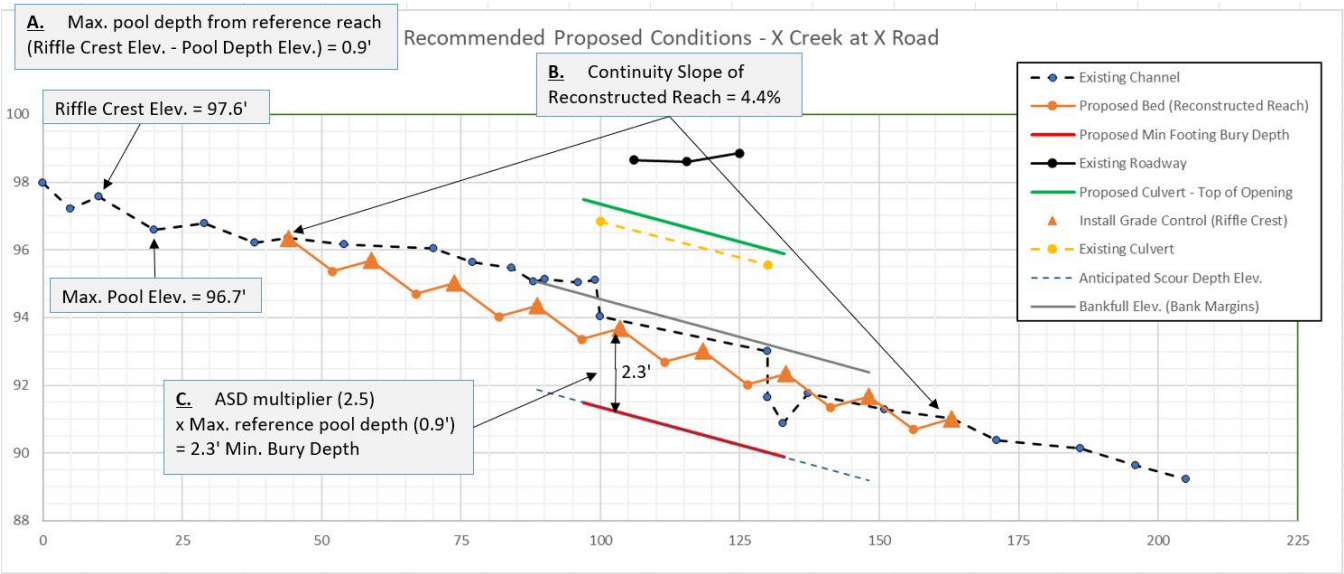


Figure 1. Determining Minimum Bury Depth through the Anticipated Scour Depth / Pool Depth Multiplier Method. **A.** Maximum reference reach pool depth is defined as the greatest vertical difference between each pool bottom elevation and the elevation of the corresponding grade control crest immediately upstream (in this example, 0.9'). **B.** The slope of the stream segment to be reconstructed in order to reestablish channel continuity upstream, through, and downstream of the replacement crossing ("continuity slope") determines the multiplier value to be applied. In this example, a continuity slope of 4.4% corresponds to a pool depth multiplier value of 2.5 (see Table 1, above). **C.** Minimum bury depth is the product of the maximum reference pool depth x pool depth multiplier. In this example, 0.9' x 2.5 = 2.3' minimum bury depth. The minimum bury depth defines the minimum depth to which the bottom of footings (or structure invert) must be installed. This depth is measured downward from the thalweg elevation at the crest of a constructed grade control feature within the replacement structure.

P. Stream crossing projects will likely require work outside of the right-of-way to re-construct the stream channel, install grade controls, and/or allow for construction access to the stream and structure. Before working outside the right-of-way, the grant recipient must obtain written permission from the landowner(s). In instances when written off right-of-way permission cannot be obtained to do work necessary to achieve channel continuity, the project cannot be completed with DGLVR funds.

Q. The grant recipient or engineer must provide all plans and specifications to the conservation district. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that those plans and specifications comply with DGLVR policy and the Stream Crossing Standard before they are submitted (or resubmitted) for permit review.

R. Side Slopes: Make all finished cut and fill road slopes stable for the materials involved. Make the side slopes in soil materials no steeper than 2 horizontal to 1 vertical (2:1) in cut slopes or 3 horizontal to 1 vertical (3:1) for fill slopes. Make rock cuts or fills no steeper than 2 horizontal to 1 vertical (2:1).

S. All stream crossing replacement structures must include a headwall and endwall.

T. Quarried aggregate rip-rap for use as grade control, bank margins, or bank stabilization: Use only rock that is sound, durable, and able to withstand exposure to air, water, and freezing and thawing. Aggregate must be obtained from a Pennsylvania Department of Transportation approved source, or must be tested and meet the following criteria:

1. Abrasion Resistance: The loss of mass (LA Abrasion) shall be less than 45%: Determine the resistance to abrasion using the Los Angeles Abrasion test, ASTM C131.
2. Soundness: Determine the percentage of mass (weight) loss of each fraction of the coarse aggregate after five cycles of immersion and drying using a sodium sulfate solution according to PTM No. 510. The maximum weighted percent loss allowed is 20%.

U. Vegetation: Revegetate and permanently stabilize all disturbed areas as soon as practical after construction activities are complete. Revegetation and site stabilization shall comply with the PA Chapter 102 Erosion Control requirements (See the PA Erosion and Sediment Pollution Control Program Manual for additional guidance).

V. Road Approaches to Stream Crossings: Ensure that the roadway approaches are stable and road drainage systems have been addressed and are adequate to divert road drainage (e.g., ditches, turnouts, etc.) away from the stream and structure in a manner that prevents erosion.

W. Project work cannot start until all Federal, State, and Local permits are obtained, if needed. In particular, any required DEP 102/105 permits must be obtained before construction may begin. See the SCC GP-11 Permit Memo (Appendix E of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification.

V. STRUCTURE SELECTION

A. Bottomless structures shall be used for all structure replacements where the continuity slope of the channel to be reconstructed through the project area will be greater than 4.0% or the bankfull width is over 20', as determined by the longitudinal survey.

B. Structures with inverts / bottoms may be used for structure replacements where the continuity slope of the channel to be reconstructed will be 4.0% or less (as determined by the longitudinal survey) or on sites over 4.0% where it is determined by a geotechnical investigation report that soil bearing pressure cannot support structure abutments or footings.

VI. CONSTRUCTION PLANS AND SPECIFICATIONS

A. The grant recipient must provide all permit applications, Site Assessment data, design plans and specifications (per DGLVR stream crossing replacement standard) to the conservation district for review. The conservation district must review the documents and provide written confirmation to the grant recipient that these submitted documents comply with DGLVR policy and the Stream Crossing Standard before they are submitted (or resubmitted) for permit review.

B. Construction plans and specifications shall be designed and prepared in accordance with this Stream Crossing Standard. Construction plans and specifications shall be prepared for all stream crossing projects, regardless of who the contractor or installer may be (applies to projects installed by the grant recipient, such as a municipality). Clearly describe the requirements for applying the practice to achieve its intended purpose in the plan and specifications. At a minimum, the plan and specifications must include the following:

1. Existing conditions of the project site, including but not limited to the full longitudinal profile survey and cross sections of the stream, existing stream crossing, stream crossing and channel slope, road approaches, and delineated wetlands (if applicable).
2. Geographic location and bankfull width of stream.
3. Proposed stream crossing structure width, length, and height with profile and typical cross sections.
4. Elevations and locations of abutments, footings, wingwalls and other associated appurtenances.
5. Details for stream bed re-construction (e.g., channel width, proposed channel alignment, channel side slopes, stream bed slope and location of tie-in points). See Attachment A and the SCC GP-11 Permit Memo (Appendix E of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification of permitting, including minor channel realignments that might be authorized with a GP-11 for stream crossings designed to this Standard.
6. Location and details for low flow channel width, depth, and material size and types.

7. Locations and construction details, including rock sizing, in-stream structures, grade controls, and/or bank stabilization structures (if applicable).
8. Depth, gradation, and composition of material for streambed restoration. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on determining substrate gradation and composition.
9. Specification for compaction of placed streambed material.
10. Details for scour hole restoration and reestablishing channel cross section.
11. Structure manufacturer's details, specifications, and installation instructions.
12. Thickness, compressive strength, reinforcement, testing, and other special requirements for concrete according to the manufacturer specifications, if applicable.
13. Load limits for bridges and/or culverts including signage and guide rail per state or local codes.
14. Location of all utilities and notification requirements (PA One Call).
15. Location and elevation of survey benchmarks.
16. Method of surface water diversion and dewatering during construction.
17. Erosion and Sedimentation Control Plan, if applicable.
18. Vegetative requirements that include seed and plant materials to be used, establishment rates, and season of planting.
19. Cross section view of the proposed structure that clearly notes proposed streambed thalweg elevation (at the crest of a constructed grade control feature), Q100 water surface elevation, and top of structure opening elevation.
20. Additional site-specific requirements.

VII. CONSTRUCTION

A. The grant recipient or engineer must provide all draft bid packages (if applicable) to the conservation district. The conservation district must review the draft bid documents and provide written confirmation to the grant recipient or engineer that those draft bid documents comply with DGLVR policy and Stream Crossing Standard before they are provided to potential bidders. All bid documents and practices must conform with municipal codes and other standard procurement requirements of the grant recipient.

B. Final construction documents shall include, at a minimum, the following items:
   1. Bidding Documents (if applicable).
   2. Construction Plan.
   3. Erosion and Sedimentation Control Plan.
   4. Construction Specifications.

C. At a minimum, two benchmarks must be set by the engineer or surveyor in an area outside of the zone of construction and disturbance.

D. Critical Stages of Construction to be inspected by the Engineer (and/or Engineer's designee) at the time of installation is required. Critical Stages include, but are not limited to, the following:
   1. Installation of structure subgrade and bedding materials and establishing inverts/elevations.
   2. Installation of footings, abutments and structure appurtenances.
   3. Installation of grade control features, bank margins, and streambed substrate.
   4. Installation or placement of stream crossing structure.
   5. Compaction and backfill of stream crossing structure.

E. Conservation districts must be on-site regularly during construction to ensure that DGLVR Program Policy and Stream Crossing Standard are being met. Conservation Districts must be onsite during installation of the Critical Stages of Construction defined in VII. D, above.

F. Certification and Documentation of Critical Stages of Construction: The Engineer shall provide the project owner a signed and sealed certification form (Attachment B) indicating that the critical stages of construction outlined in Section VII.D were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard. The engineer must also provide the project owner with red-lined construction documents that indicate any changes in the as-built conditions of the project compared to the design plans.

References:

1. Dirt, Gravel, and Low Volume Road Maintenance Program Administrative Manual. May 2022.
2. Dirt, Gravel, and Low Volume Road Stream Crossing Technical Manual. May 2022.
3. U.S.D.A. Forest Service Stream Simulation Manual: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings. May 2008.
4. Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual. Technical Guidance Number 363-2134-008. March 2012.

Attachments:

Attachment A: Chapter 105 General Permit Types Most Applicable to Stream Crossing Replacements

Attachment B: Inspection and Documentation of Critical Stages of Construction Certification Form

Attachment C: Typical Detail Drawings

Attachment A:

Chapter 105 Permits that are Most Applicable to Stream Crossing Replacements

Attachment A:

Chapter 105 Permits that are Most Applicable to Stream Crossing Replacements

- GP-1 Fish Habitat Enhancement Structures, 3150-PM-BWEW0501
- GP-3 Bank Rehabilitation, Bank Protection, and Gravel Bar Removal, 3150-PM-BWEW0503
- GP-7 Minor Road Crossings, 3150-PM-BWEW0507
- GP-11 Maintenance, Testing, Repair, Rehabilitation or Replacement of Water Obstructions and Encroachments, 3150-PM-BWEW0511

Additional information on PA Chapter 105 permitting can be found at
https://www.dep.pa.gov/Business/Water/Waterways/Pages/ePermitting.aspx

See the SCC GP-11 Permit Memo (Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification on potential stream realignments and increasing road elevations.

Consult with DEP as needed on permitting questions, as well as with other entities involved in any required Federal, State, or Local permits that may be needed.

Attachment B:

Inspection and Documentation of Critical Stages of Construction Certification Form

Attachment B:

DGLVR Stream Crossing Replacement

Inspection and Documentation of Critical Stages of Construction Certification Form

Project Title: _____

Road Name: _____

Municipality, County: _____

Professional Engineer Certification

I hereby certify that the Critical Stages of Construction were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard:

_____, _____
Signature of Professional Engineer *Date*

Professional Engineer Seal

Notes:_____
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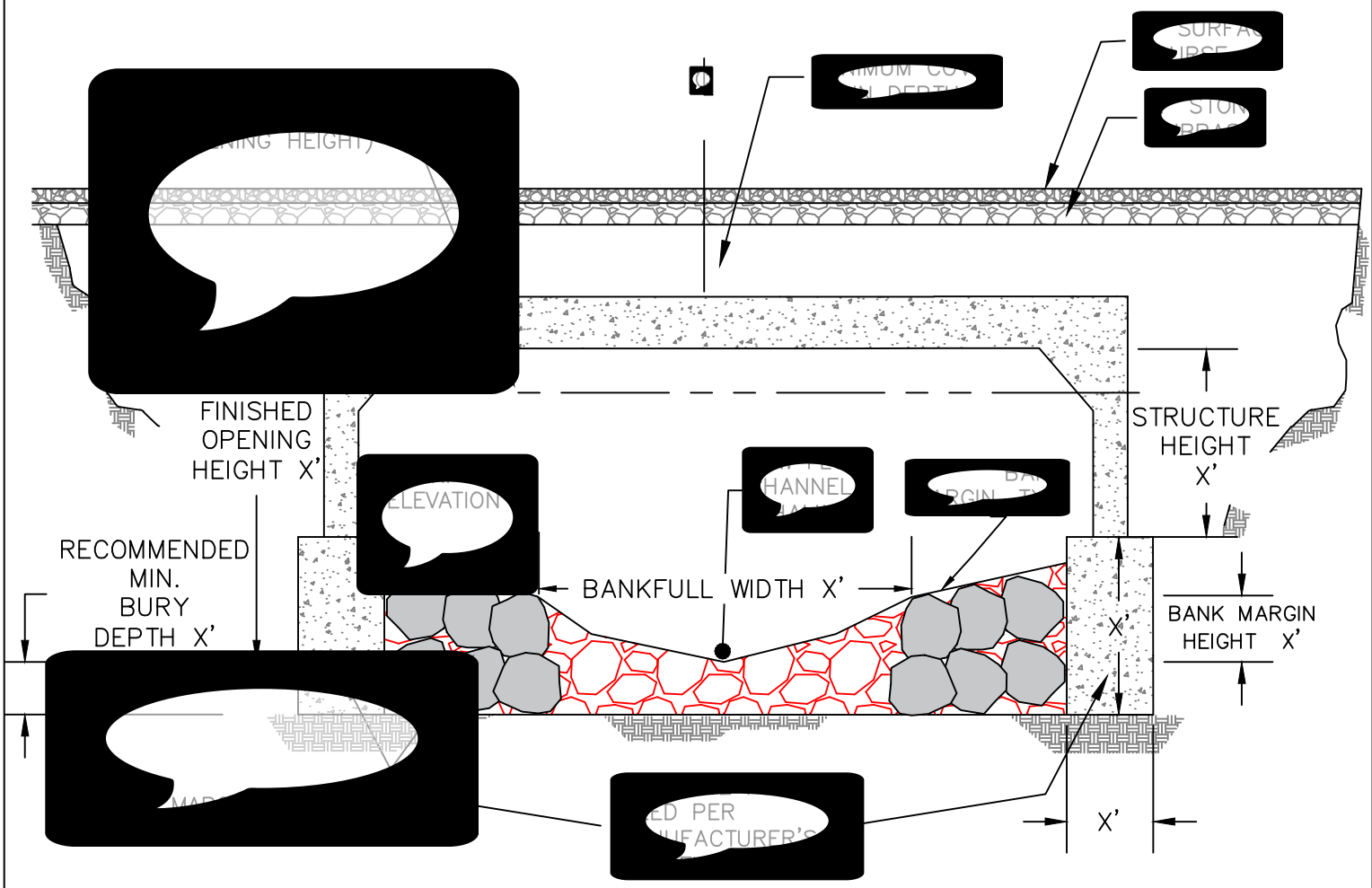
Attachment C:

Typical Detail Drawings



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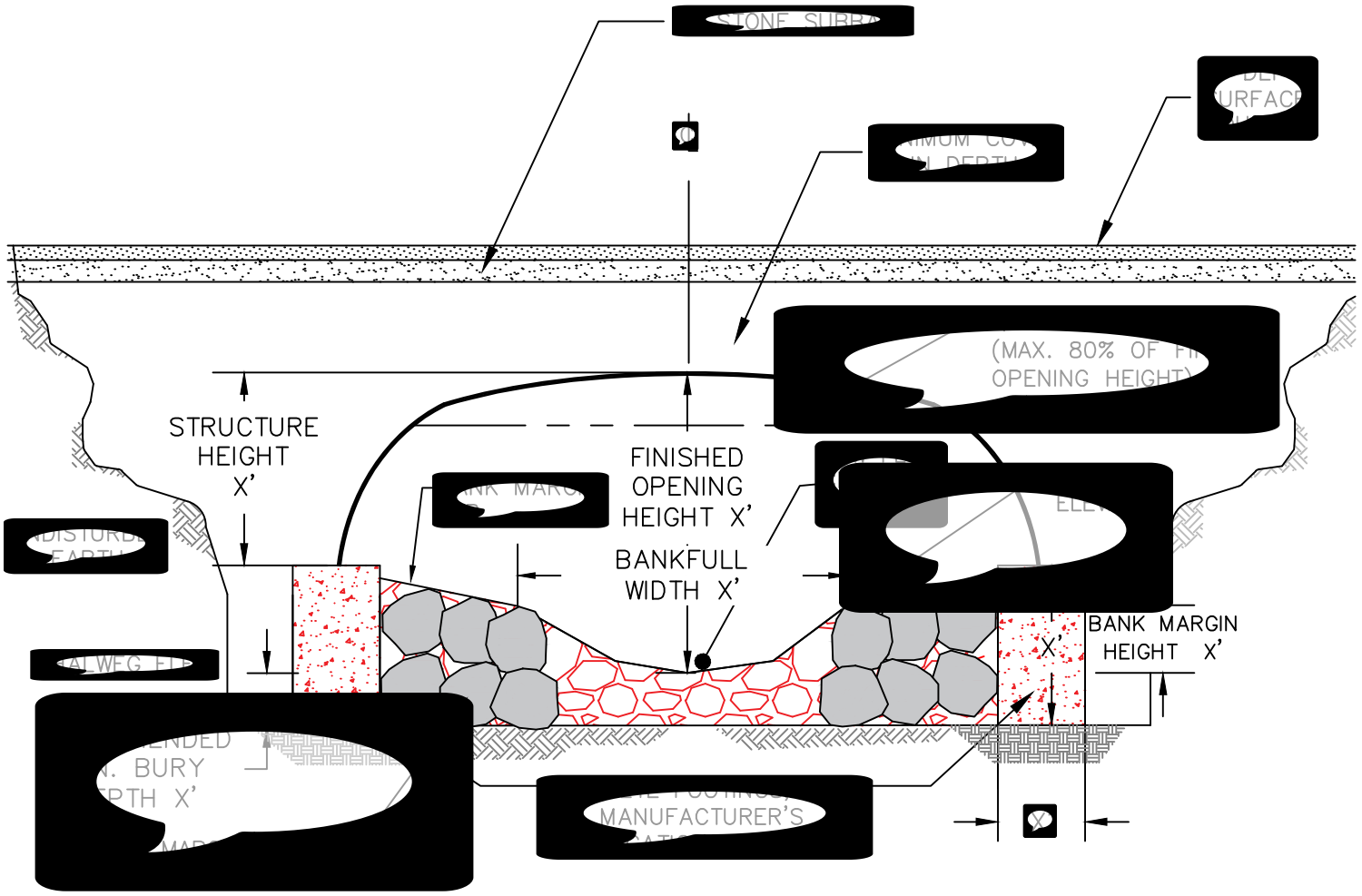

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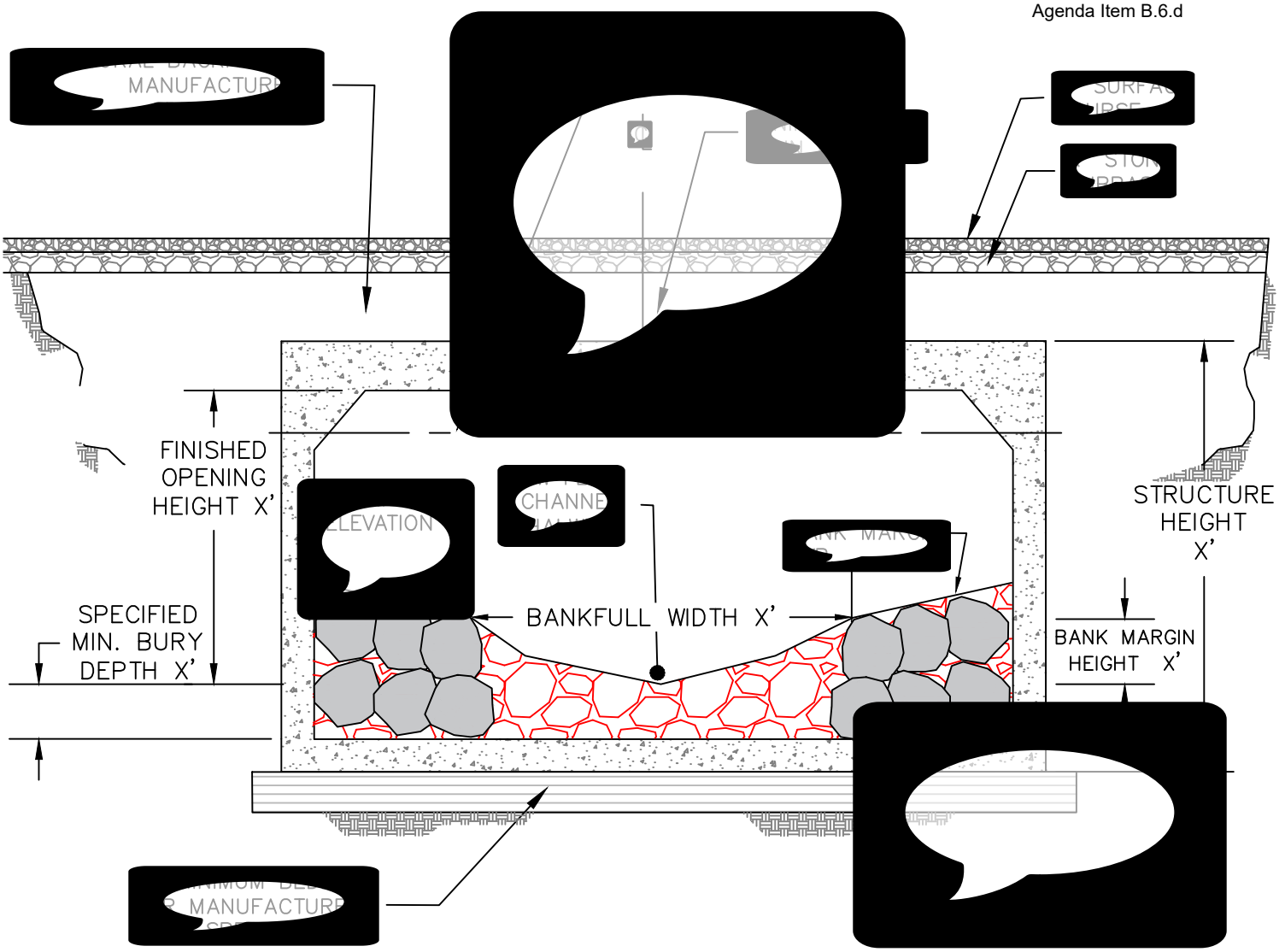

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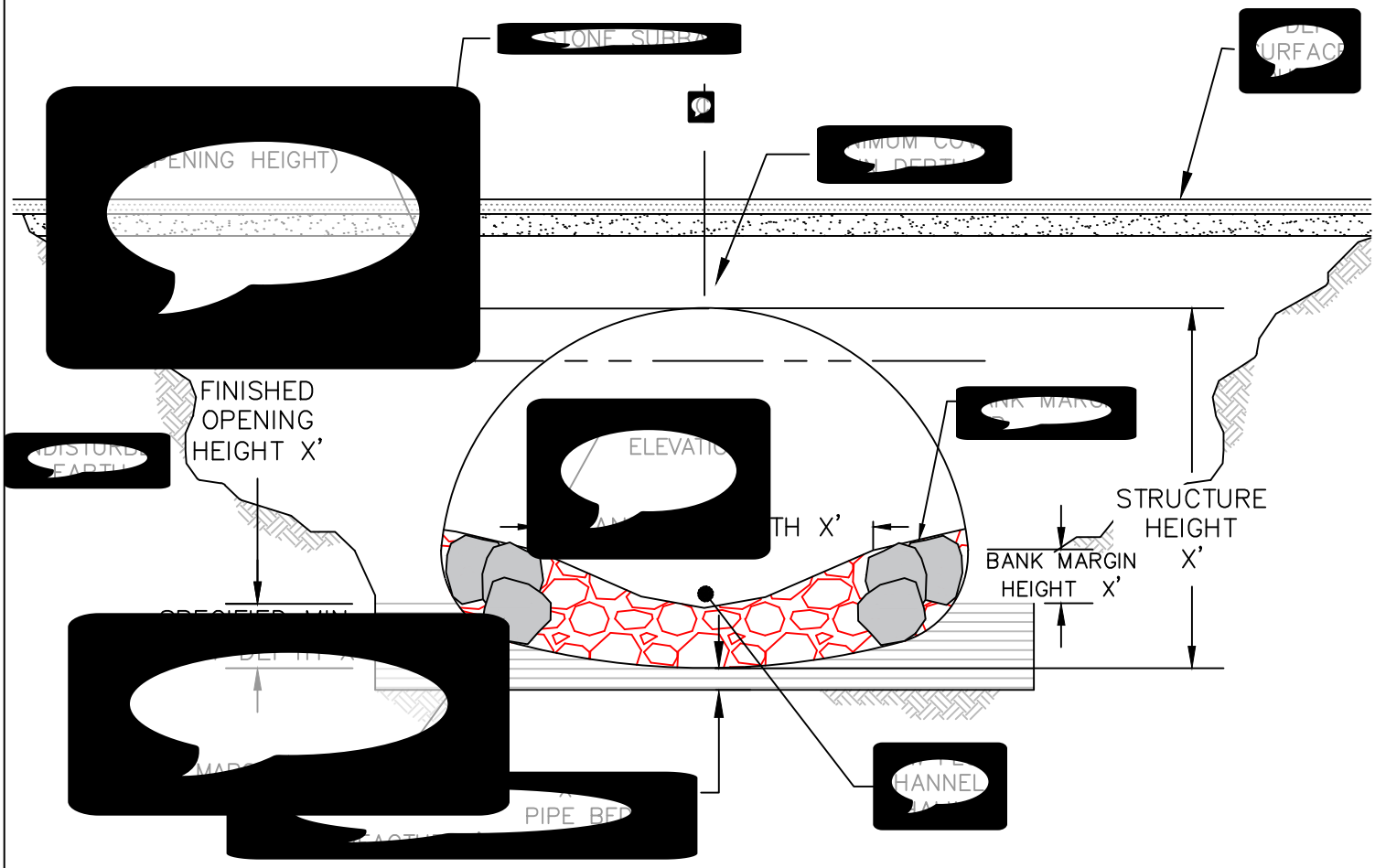

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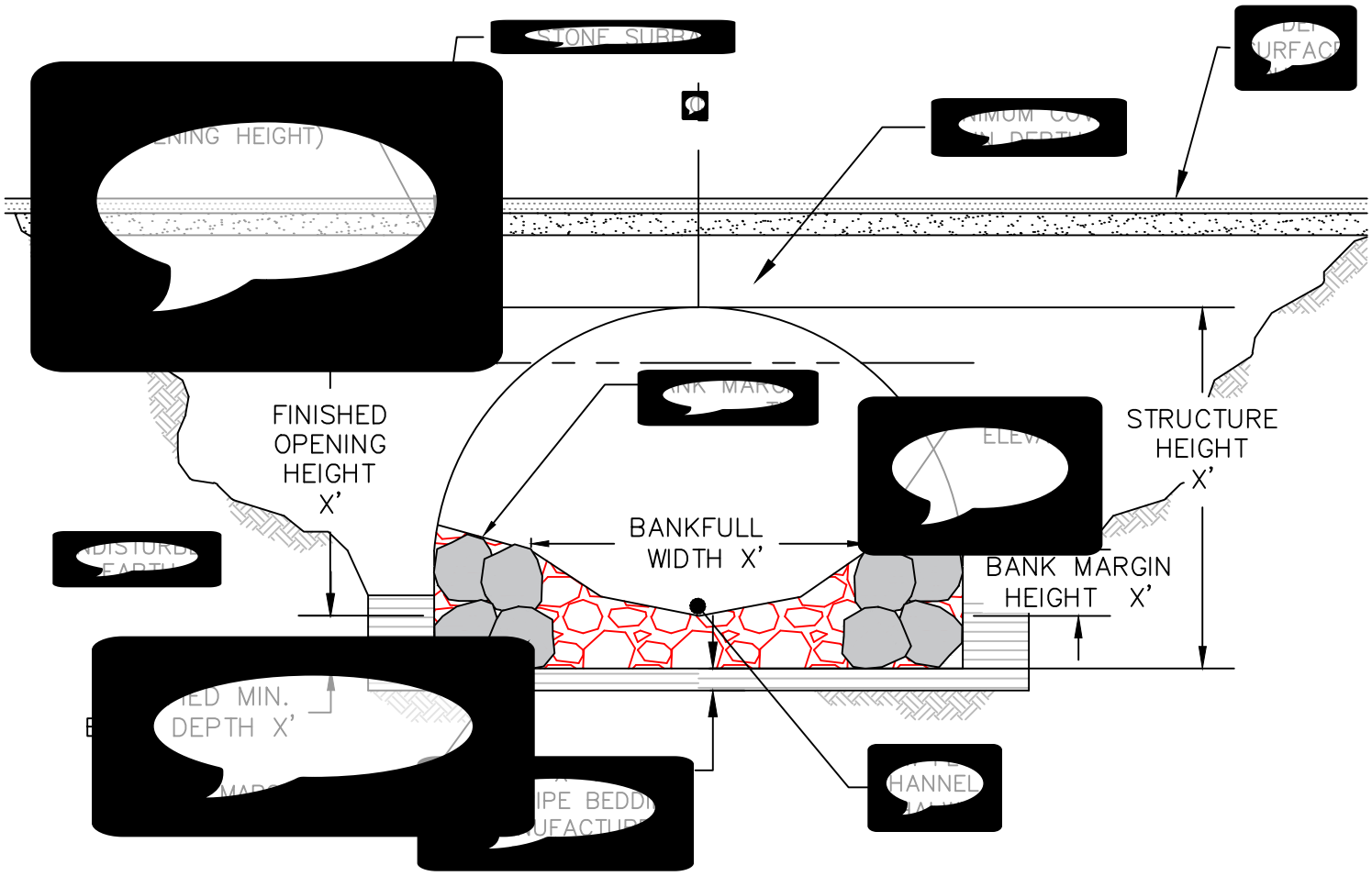

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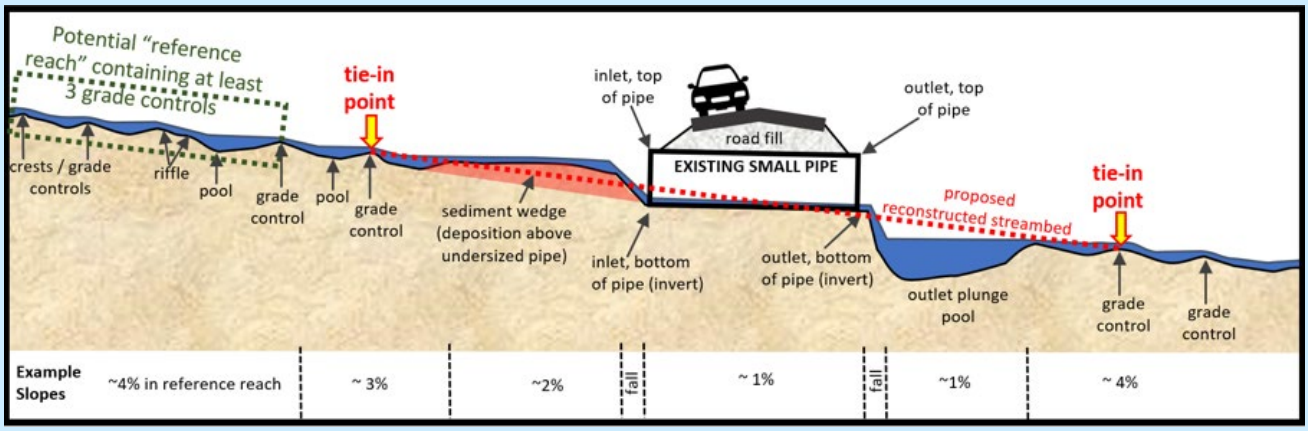
Pennsylvania Dirt, Gravel, and Low Volume Road Maintenance Program

Stream Crossing Replacement Technical Manual

Provided by:

The Pennsylvania State Conservation Commission

and the Penn State University Center for Dirt and Gravel Road Studies



DRAFT 4/27/2022.

This has NOT been approved by the PA State Conservation Commission.

Acknowledgements

Information in this Stream Crossing Replacement Technical Manual has been complied and created by the PA State Conservation Commission and the Penn State University Center for Dirt and Gravel Road Studies. Thanks to other entities who were involved in the development and review process, including: Trout Unlimited, many of Pennsylvania's county conservation districts, several DGLVR Program Advisory Workgroups, the PA Department of Environmental Protection, and the Pennsylvania Fish and Boat Commission.

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- **Shaun McAdams**, *Penn State Center for Dirt and Gravel Road Studies*
- **Roy Richardson**, *PA State Conservation Commission*

Many of the concepts and the overall approach utilized in this manual are based on practices employed and taught by the United States Forest Service as part of their comprehensive "*Designing for Aquatic Organism Passage at Road-Stream Crossings*" methodology to achieving channel continuity and aquatic passage through road stream crossings. Thanks to USFS personnel for their support and review. More information:
https://www.fs.fed.us/biology/education/workshops/aop/ **.**

Several sections of this manual were modeled after publications from the Vermont Department of Fish and Wildlife (*Guidelines for the Design of Stream/Road Crossings for Passage of Aquatic Organisms in Vermont*) and the Massachusetts Department of Fish and Game (*Massachusetts Stream Crossings Handbook*). Thank you to those entities for their support.

Vermont Guidelines: https://vtfishandwildlife.com/conserve/aquatic-habitat-conservation/aquatic-organism-passage-at-road-stream-crossings

Massachusetts Handbook: https://www.mass.gov/doc/massachusetts-stream-crossing-handbook/download

For more information on the Pennsylvania's Dirt, Gravel, and Low Volume Road Maintenance Program see the following websites.

- https://www.agriculture.pa.gov/Plants_Land_Water/StateConservationCommission/DGRMP/Pages/default.aspx
- https://www.dirtandgravel.psu.edu/

Please contact the Pennsylvania State Conservation Commission with issues or comments related to this manual at 717-787-2103.

Preface

This manual is intended for use for stream crossing replacement projects funded by the PA Dirt, Gravel, and Low-Volume Road Maintenance Program (DGLVR Program). The key to a successful stream crossing replacement project is a well-defined plan with a series of steps that occur in a certain order. The chapters in this manual are intended to walk all parties involved in a DGLVR grant funded stream crossing replacement through the optimal lifecycle of a project. **Chapters 1 through 11 are written with conservation district staff in mind. Chapter 12 is written with designers and engineers specifically in mind**. Some of the language presented in Chapter 12 is repeated from other preceding sections of this Manual.

Manual Overview:

Chapter 1: Introduction: Provides the background, goals, and purpose of replacing stream crossings under the DGLVR Program, including background on channel continuity and aquatic organism passage.

Chapter 2: DGLVR Stream Crossing Standard Details: provides detailed walkthrough, background, and explanation of the DGVLR Stream Crossing Design & Installation Standard.

Chapter 3: Initial Site Assessment and Project Planning: Includes guidance for initial site evaluations such as eligibility for funding, determining bankfull, and initial considerations for discussion with the potential applicant.

Chapter 4: Site Assessment: Highlights the importance of the initial longitudinal profile and cross section assessments and analysis of field data in understanding the existing conditions and determining a plan for replacement.

Chapter 5: Grant Application: Provides guidance for estimating costs to create a grant application, including structure selection, aggregate selection, and streambed material.

Chapter 6: QAB Ranking and Review: Reviews considerations for the process that conservation districts and their Quality Assurance Board use to rank projects for funding.

Chapter 7: Contracting: Discusses key elements to consider before a conservation district and grant recipient sign a contract for DGLVR funding.

Chapter 8: From Contract to Construction: Covers key components that should occur once a contract for DGLVR funds is signed by a conservation district and grant recipient but before construction begins, such as bidding and pre-construction meetings.

Chapter 9: Construction and Inspection: Details the responsibilities of conservation districts for inspection and oversight during the stream crossing replacement.

Chapter 10: Final Inspection and As-builts: Provides guidance on "project closeout" after the new structure has been installed, including final inspections, payments, and dealing with deficiencies.

Chapter 11: Monitoring and Maintenance: Discusses post-project considerations to monitor and maintain connectivity through the crossing.

Chapter 12: Engineering Design Considerations: While the previous chapters are intended for conservation district use (but would also be helpful to others), **this chapter is written with the project Engineer in mind**. The repetition in this chapter from previous chapters is intentional. The purpose of this chapter is to provide an overview of the process from the engineer's perspective, with links to where more information can be found if needed.

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Table of Contents

List of Figures

1. INTRODUCTION:

Terms defined in **Appendix B** are in **bold text** the first time they appear in this manual. Click on these terms to view the definition in Appendix B.

Although public awareness of environmental issues is high in Pennsylvania, few people consider the effects of road **Crossing** and other road infrastructure on the quality of stream habitat. Stream conditions may be quite different upstream and downstream of a road crossing, and a crossing may look different during low or high water. The design and condition of a stream crossing determines whether a stream behaves naturally and whether animals, both aquatic and terrestrial, can migrate along the stream channel. **Channel Continuity** has not often been considered in the design and construction of stream crossings (culverts and bridges). Many crossings are barriers to fish and wildlife. Even crossings that were not barriers when originally constructed may now be barriers because of stream channel erosion, mechanical breakdown of the crossings, or changes in the upstream or downstream channel shape. Undersized or deteriorating stream crossings can also cause significant issues with erosion, maintenance, flooding, and even road washouts.

Fortunately, options exist to design stream crossings that allow wildlife unrestricted access to a **Watershed**, maintain natural stream conditions, and help protect roads and property from some of the damaging effects of floods (Figure 1.1). This DGLVR Stream Crossing Replacement Technical Manual is intended to summarize DGLVR Policy and provide additional guidance related to stream crossing replacements funded through the PA Dirt, Gravel, and Low-Volume Road Maintenance Program (DGLVR Program).

Figure 1.1 Example Stream Crossing

A 13' diameter pipe arch with a low flow channel and bank margins through the structure provides long-term channel stability, reduced road erosion and maintenance, and aquatic organism passage.

1.1 PA Dirt, Gravel and Low-Volume Road (DGLVR) Program

The PA Dirt, Gravel, and Low-Volume Road (DGLVR) Program is a statewide $28 Million annual grant program that is administered by the PA State Conservation Commission (SCC) under the PA Department of Agriculture. The DGLVR Program is administered at the local level by county conservation districts in 66 of Pennsylvania's 67 counties. Local public-road owning entities, largely townships, apply to their conservation district for grant funding to make road and environmental improvements on specific sections of their roads. The DGLVR Program, born out of an initiative from Trout Unlimited (TU) in 1997, focuses grant funding on projects that provide environmental benefits to the waters of the commonwealth of Pennsylvania. For more information about the DGLVR Program visit https://www.dirtandgravel.psu.edu/pa-program-resources/scc-program-overview. The Pennsylvania State University Center for Dirt and Gravel Road Studies (**CDGRS**) provides technical guidance and education for the DGLVR Program.

The majority of projects funded by the DGLVR Program focus on sediment reduction from road surfaces and ditches. Undersized stream crossings also generate excessive erosion and sediment in large flow events. These undersized crossings can also lead to plugging and catastrophic loss of the road surface and the surrounding fill material. More frequent high flow events that do not overtop the **structure** can still cause erosion and sedimentation issues related to the downstream streambed and banks. Additionally, undersized

crossings can cause significant sediment delivery when the hydraulic capacity is exceeded and water is diverted down adjacent ditches, causing gullying and road edge erosion. These failures lead not only to disruptions due to loss of the road, but also to significant sediment inputs to the downstream system (Furniss et al., 1998). Undersized stream crossings also lead directly to sediment deposition at the inlet of a structure as water velocity slows due to backwatering. These sediment deposits, often mislabeled as "gravel bars", can clog stream crossing structures and create the need for frequent maintenance and dredging to keep the structure open. Restoring a stable stream channel and re-establishing channel continuity upstream, through, and downstream of bottomless and properly designed full-**invert** structures can reduce bed and bank sediment erosion to natural background levels. Reducing overtopping, structure loss, road closures by upsizing is the best way to reduce large sediment inputs to the downstream system. Sediment impacts from roadway issues such as this are the core issues the DGLVR Program seeks to mitigate.

The majority of the 6,000+ grants that the DGLVR Program funded prior to 2014 have not been for stream crossing replacements. Most DGLVR Program grant projects focus on road drainage, base, and surface improvements to reduce the impact of road runoff while providing improvement to the road itself. After a significant increase in funding to the DGLVR Program in 2014, many entities began requesting grant funding for culvert and bridge replacement projects. In order to ensure funding is focused on crossing replacements that provided environmental improvements, the DGLVR Program implemented several policies limiting which crossings could be replaced and defining considerations for newly installed structures.

1.2 Consequences of Poor Stream Crossings

The most common cause for "poor" stream crossings is undersized structures. Culverts and bridges that are undersized for the stream channel width create a wide variety of additional problem for both the road and the stream. Additional concerns such as structure type, elevation, skew, and slope also come into play, but good stream crossings are almost impossible without an adequately sized structure.

Traditionally, the structures used for stream crossings in Pennsylvania have focused on ease of installation, ability to quickly move water through the roadway, and reducing the up-front cost of installation. This has resulted in decades of undersized structures that are typically installed at 90-degree angles to the road to reduce overall length. While this mentality may save money during installation, **undersized or poorly installed stream crossings often have much higher costs, both environmentally and financially, over the long term** (See Figure 1.2 and Figure 1.3) from various entities in other regions of the United States).

Scour of Pipe Bottom

Pipes without a natural streambed create a variety of issues. The lack of streambed often creates velocity barriers for aquatic organisms. The life expectancy of these structures is also significantly reduced because the pipe is "sandblasted" with the rocks and debris that move in every large storm event.

Perched Outlets:

Crossings with significant outlet drops create complete aquatic barriers in the stream. It is a classic symptom of a significantly undersized pipe. This can also create a significant scour hole that can eventually threaten to undermine the structure and the road itself.

Erosion / Scour Hole

Large plunge pools or erosion/scour holes are often present at the outlet of undersized crossings due to the severely increased flow velocity caused by the structure. In addition to being constant sources of sediment, they can grow to threaten the structure, road, and nearby property.

Road Washouts

In the worst-case scenarios, at least for the road and nearby property owners, structures can overtop and completely wash the road out. This is typically due to undersized structures either becoming clogged with debris or being overwhelmed by large storm events.

Backwatering / Ponding

Undersized structures are often prone to clogging or filling in, sometimes causing ponding and backwatering above the road. This can lead to saturated road bases, deposition of gravel bars, and eventually road overtopping and washout.

Flow Barriers

Flow barriers prevent organisms from using the structure, typically because flow is too shallow and/or too fast. These same structures are usually a barrier at higher stream flows, too, since velocity is significantly increased.

Gravel Deposition

At high flows, undersized pipes often backwater which causes the bedload they naturally carry to drop out above the pipe inlet. This "gravel bar" is a constant source of maintenance, since it is often removed by the road owner after each large storm, only to be re-deposited after the next high flow event. *Photo: Bradford County Conservation District*

Clogging

Undersized pipes are prone to clogging during large events. Once a single log spans the opening of a pipe, subsequent logs and streambed material will start to deposit and potentially completely clog and burry the inlet of the structure.

Channel Erosion

Undersized pipes can scour and lower streambed elevation for hundreds of feet downstream of the structure. Water downstream of an undersized crossing is often moving unnaturally fast and can cause erosion to the stream bed and banks. Eventually, it can even lead to the failure of the stream crossing itself.

Figure 1.2 Issues Associated with Undersized or Poorly-Installed Road-Stream Crossings

The nine photos above show various problems caused by road-stream crossing structures that are too small for their respective streams.

Environmental costs of undersized stream crossing structures include barriers to aquatic connectivity and accelerated erosion and sedimentation and. Undersized stream crossings typically create a partial or complete barrier to the natural movement of aquatic organisms as well. When thinking about aquatic organisms, be sure to consider species beyond fish, such as amphibians, reptiles, small mammals, crayfish, and other macroinvertebrates. Undersized and poorly installed structures can also cause excessive erosion to the area around the crossing due to the unnatural increase in flow velocities. They can also cause stream bed and bank erosion for hundreds of feet up and down the stream channel.

Undersized stream crossing structures are much more likely to fail than structures greater than **bankfull width** that accommodate continuous stream channels (USFS 2008). A failed stream crossing structure inputs a huge sediment load into the stream, can accelerate stream bed and bank erosion, causes a road closure that interrupts business, can damage adjacent and downstream properties, and can create public safety hazards.

From a financial standpoint, undersized and poorly installed structures can increase the long-term cost of maintaining the crossing, despite being cheaper for the initial installation. Severely undersized structures often cause gravel deposits to form upstream which must be constantly maintained by the road owner to keep the crossing functioning. The same erosion that causes environmental issues can also cause financial issues when they begin to threaten the crossing. For example, if metal-bottomed structures are installed without streambed material, then streambed movement through the structure during large flow events will "sandblast" the pipe bottom, which will significantly decrease the lifespan of the structure. Catastrophic failures like clogging and road washouts are very costly and are most common in structures that are significantly undersized.

Cost-benefit analyses from multiple states and the U.S. Forest Service show that modest increases in the initial investment of road-stream crossing structures designed to achieve channel continuity yield substantial economic and societal benefits in the long term (Levine, 2013). These benefits include cost reductions associated with increased **flood resiliency** and fewer catastrophic failures, reduced annual maintenance costs to the road owner, reduced erosion and sedimentation, and improved habitat conditions and stream health. Because of this, many US states and organizations, including most New England states, have been incorporating channel continuity into stream crossing guidance and standards in the previous decades, as shown in figure 1.3.

State	Type	Entity	Year	Min Structure Width	Min Embedment (material in structure)
PA	Guidance	PA DCNR	2022	1.25 Bankfull Channel Width	20%
PA	Regulation	PA DEP	2013	x	6" or 1' depending on permit
CT	Guidance	CT DEP	2008	1.2x Bankfull	1', or 20% if over 10'
MA	Regulation	Riverways Prog.	2012	1.2x Bankfull, + dry passage	2', or 25% for round pipes
ME	Regulation	ME DEP	2008	25-year flow	
ME	Guidance	USFWS	2017	1.2x Bankfull	2' or 20% (salmon areas only)
NH	Regulation	NH DES	2009	1.2x Bankfull +2' (bridge over 16')	1' – 2', 25% for round pipes
NY	Guidance	NY DEC	?	1.25x Streambed Width	20%
VT	Guidance	VT FWD	2007	Bankfull + size of bank rocks	
GA	Guidance	GA DNR	2012	Average channel width	20%
NC	Standard	NC DOT	2003	x	1', or 20% if under 4'
SD	Guidance	SD DOT	2011	1.2 Bankfull	1'
CA	Regulation	CA F&G	2007	1.5x Active Channel Width	20%
OR	Standard	OR DOT	2014	1.25 Ordinary High Water Width	20%
WA	Regulation	?	?	1.2x Bankfull +2'	20%
AZ	Guidelines	AZ F&G	?	Span floodplain with dry passage	17% (1/6 structure height)
RI	Guidance	RI DOT	2019	1.2x Bankfull	2' or 20%
FHWA	Guidelines	US FHWA	2010	X	Structure dependent (2', 20%, 30%)

Figure 1.3 Minimum Structure Size and Minimum embedment (depth of material) from various entities in other regions of the United States

Information compiled by the U.S. Fish and Wildlife Service, Chesapeake Bay Field Office (Leah Franzluebbers) and the Maryland Fish and Wildlife Conservation Office (Julie Devers) in March of 2019, updated in September of 2020.

1.3 Benefits of Good Stream Crossings:

A "good" stream crossing is one that is adequately sized and installed to be resilient and maintain channel continuity through large storm events. The importance of channel continuity and **aquatic organism passage** are described in the next section. In addition to these environmental benefits, installing larger, more stable structures makes more financial sense in the long term. While larger structures may cost more up front when installed, they are much more resilient to larger flows over the lifespan of the structure. Climate change means that storms are increasing in both frequency and intensity (Hayhoe, 2018). The flood resiliency of these larger

structures means that over the lifespan of the structure, which may be 50 to 100 years, structure owners will realize long-term cost savings.

The benefits of greater than bankfull width structures and channel continuity were clearly seen in New England following Tropical Storm Irene in 2011 when "damage was largely avoided at two road–stream crossings where stream simulation design was implemented and extensive at multiple road–stream crossings constructed using traditional undersized hydraulic designs." (Gillespie et al., 2014).

An analysis of stream crossing replacement data supplied by State Departments of Transportation, Federal agencies, and non-governmental agencies from across the country showed that there are significant long-term savings from stream crossings designs that are designed to achieve channel continuity and provide Aquatic Organism Passage (AOP) vs. traditional hydraulic design. Despite the increased upfront cost of channel continuity designs, over a 50-year lifecycle they are less expensive than traditional hydraulic designs because the increased flood resiliency reduces maintenance needs and saves on costs associated with road closures and catastrophic failures (NCHRP, 2017).

1.4 Importance of Channel Continuity and Aquatic Organism Passage

The goals of "Channel Continuity" and "Aquatic Organism Passage" are to allow the stream to function as naturally as possible through the road corridor, as it would if the road were not present.

1.4.1 Channel Continuity

Achieving channel continuity means passing a stream through a road crossing while keeping all of the functional features of the stream system the same upstream, downstream, and through the structure. See Figure 1.4 for examples of stream crossing structures that achieve channel continuity. Maintaining channel continuity through a road crossing will create lasting environmental improvements and financial savings.

Figure 1.4 Channel Continuity Example Photos

Two examples of stream continuity through a road crossing with adequate size, slope, and channel characteristics. 19' aluminum box in

- **Stream width:** A natural stream has a **low flow channel**, a bankfull channel (see Section 1.5 for more details on Bankfull), and access to a floodplain where floodwaters can spread out and reduce velocity. By their nature, road crossings often create a bottleneck for flood flows where water velocities are artificially increased. Providing channel continuity through a road crossing requires larger structures with an opening wide enough to accommodate a low flow channel, the bankfull stream channel, and **bank margins** along the edges of the crossing.
- **Stream slope:** The slope of the stream should be maintained as consistently as possible above, below, and through the structure. A crossing that is installed at a lower-gradient slope than the adjoining stream channel will often tend to accumulate material and require maintenance to prevent plugging or loss of capacity. A crossing that is installed at a steeper slope than the adjoining channel will often cause erosion and **headcutting** issues and make it impossible to maintain a stable stream channel through the crossing. Establishing the proper **continuity slope** through a new structure may require instream work upstream and downstream of the crossing and right-of-way, especially in areas where the existing crossing has caused extensive streambank erosion, gravel deposition upstream, or a large plunge pool and lowering of the channel elevation downstream.
- **Grade control and streambed:** The material that makes up the streambed should be relatively continuous above, below, and through the structure. **Grade control** refers to very large "**key pieces**" of streambed that serve as long term elevation controls that prevent the stream from downcutting or headcutting. Grade controls as large or larger than those naturally existing in the channel should be

installed through a structure and at a similar spacing to naturally existing grade controls. Streambed material composition should be adequately sized to withstand higher erosion (scour) potential inside of the structure. In a properly constructed stream crossing, the grade control will set the elevation of the channel.

- **Aquatic Organism Passage (AOP):** Aquatic Organism Passage refers to the ability of a road stream crossing to convey a wide variety of aquatic and semi-aquatic species, both upstream and downstream. Aquatic Organism Passage is typically achieved when channel continuity is reestablished and maintained through a crossing. The next section provides additional details on the importance of Aquatic Organism Passage.

The concepts of channel continuity and aquatic organism passage are being pushed more to the forefront in recent years. While initial concerns revolved around salmon passage in the Pacific Northwest, the many environmental and long-term cost-saving benefits of designing for channel continuity quickly helped the concepts and practices spread nationwide. To increase flood resiliency and AOP, states such as Massachusetts, New York, Maryland, and Connecticut require new or replacement stream crossing structures to be at least 1.2 times bankfull width or greater (USFWS, 2019). While the United States Forest Service (USFS) Stream Simulation does not specify a minimum width, it states that the "*first estimate of culvert width is simply the width needed to span the simulated bankfull channel plus the size of the rocks used to construct the banks* (USFS, 2008)." Additionally, many states and the USFS require that stream bed material in the structure be designed to accommodate the maximum scour depth of the channel or greater to prevent loss of material and potential failure of the structure.

1.4.2 Aquatic Organism Passage

Many species inhabit streams and adjacent forests and wetlands. Effective stream protection requires considering the needs of all species, including invertebrates such as crayfish and insects, fish such as brook trout and eels, amphibians such as spring salamanders, reptiles such as turtles, and mammals such as muskrats and otters. Streams, and the interconnectedness of different parts of a stream or watershed, are essential to these animals. Many riparian animals that inhabit riverbanks, such as amphibians and reptiles, are more tolerant of stream discontinuity, yet may be affected by road crossings, especially if forced to cross roads where they are vulnerable to traffic and other dangers. For various reasons, including maintaining genetic diversity, animals living in or along streams need to be able to move unimpeded both upstream and downstream through the watershed. This collective need for habitat corridors that extend beyond just fish is referred to as "Aquatic Organism Passage".

Benefits of maintaining Aquatic Organism Passage (AOP)

- **Access to stream habitats:** Small streams with groundwater seeps and springs provide thermal refuge during the summer. Species such as brook trout will travel to these areas and congregate there. Fish that cannot make it there, perhaps because of road crossing barriers, may be more susceptible to heat stress and mortality. If barriers restrict the size of a refuge, then animals may be overcrowded and vulnerable to disease, predators, and even anglers.
- **Access to feeding areas:** Different habitats provide different feeding opportunities throughout a day or season, and species regularly travel to exploit these resources. Both coldwater and warmwater species will take advantage of different areas of the watershed in different times of the year. Insect communities in small ponds and riparian wetlands can be abundant at times, and stream fish will move into these habitats to feed. Restricting access to prime feeding areas will ultimately hurt the fishery.
- **Access to breeding and spawning areas:** Some species travel miles to reach spawning areas in streams. Fish may encounter many barriers when adults travel to spawning areas, offspring disperse into juvenile and eventually adult habitat, and juvenile anadromous (live at sea but spawn in freshwater) species swim to the ocean.
- **Natural dispersal:** Some salamanders, turtles and frogs spend most of their lives near streams and travel in and along a stream's length. Poorly designed crossings may force them to climb over an

embankment and cross a road, where they are vulnerable to road mortality and predators. Freshwater mussels disperse by having larvae that attach to the fins of a fish, so if a stream crossing blocks fish then it may also prevent upstream dispersal of mussels.

Impacts of poor crossings on Aquatic Organism Passage (AOP)

- **Excessive water velocity:** Water velocities can be too high to pass fish or other organisms during some or all of the year. As stream-discharge increases, velocities within culverts increase accordingly. Average velocities can easily exceed 10 fps, which is far too fast for the prolonged swim speed of most fish. Additionally, poorly installed culverts usually contain no rest areas for aquatic species attempting to pass through them, thus causing them to swim the entire length of the structure at burst speeds, which often creates an aquatic organism barrier or filter (selective barrier).
- **Absence of bank margin areas:** Certain organisms utilize the edges of stream banks for movement in stream channels. If those bank margins are absent, it may inhibit or even prevent passage by the weak-swimming or crawling organisms.
- **Excessive turbulence:** A typical corrugated bottom structure can create more turbulence than is found in a natural channel. The aeration and chaotic flow pattern can disorient aquatic species, inhibit their swimming ability, and block their passage. These turbulence barriers are also often found downstream of perched culverts and prevent some species from even approaching the culvert. If improperly installed, baffles, rip-rap, or other roughness elements that are typically used to reduce water velocity can create turbulence that blocks movement as well. This turbulence can also be found at inlets of structures.
- **Insufficient water depth:** The lack of a defined low-flow channel can result in water depth too shallow to allow for aquatic organism passage. For streams with highly variable flows, it can be challenging to select a structure capable of passing high flows while still maintaining a defined low flow channel similar to the natural streambed.
- **Discontinuity of channel substrate:** Crossings that lack natural stream **substrate** or have substrates that contrast with the natural channel (rip-rap, baffles) can create discontinuities in streambed habitat if poorly installed. Many stream dwelling organisms are confined to the streambed and can only move through or over the surface of appropriate substrates. Saturated stream sediments below the surface of the streambed typically support a host of invertebrate species. These species are an important contributor to nutrient cycling and food-chain support in river and stream systems. (USFS Stream Simulation)
- **Habitat loss and disconnection:** The sum of all of these issues with undersized pipes can lead to complete habitat disconnection for many species. This disconnection can cut migratory species off from breeding and feeding areas and can create different types and populations of organisms above and below crossings.

1.5 "Bankfull Width" of a Stream

The DGLVR Program uses the "bankfull width" of a channel as the major factor in determining the eligibility of a structure for replacement and for informing the size of the new structure. The bankfull width of a stream is determined by the elevation point at which the stream accesses the floodplain (Figure 1.5). This point is typically indicated by deposits of sand or silt at the active scour mark, a break in stream bank slope, perennial vegetation limit, rock discoloration, or root hair exposure. The bankfull flow is also known as the channel-forming or dominant discharge, which is the flow that transports the most sediment over time and is the most effective in shaping and maintaining the

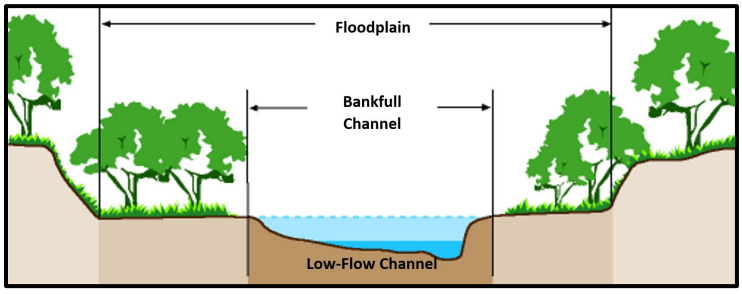


Figure 1.5 Bankfull Width
The bankfull width of a stream is typically equivalent to the width at the elevation where water begins to access its floodplain, and is usually associated with a 1.5 to 2 year recurrence interval for PA. (Graphic: US Forest Service)

natural stream channel. In general, floods greater than the bankfull flow will start to access their floodplain and the amount of further in-channel erosion compared to a bankfull event is minimal. The bankfull flow roughly corresponds to a 1.5-2 year recurrence interval for most of Pennsylvania. For more information on determining and measuring bankfull channel widths, see the "Bankfull Width Determination" Technical Bulletin in Appendix H.

1.6 Replacing a Stream Crossing with DGLVR Funding

The DGLVR Program has established a set of policies and procedures for replacing stream crossings with DGLVR Program funds. Any stream crossing replacement funded in whole or in part with DGLVR Funds or counted as in-kind towards DGLVR projects must follow these policies and procedures. The purpose of these policies and procedures is to ensure DGLVR funds are focused on replacing stream crossings with the maximum environmental benefit and reestablishing channel continuity through the road. The information below is provided as a summary/overview of the entities involved and documents and policies available pertaining to DGLVR funded stream crossing replacements:

DGLVR Program: Overview of Roles

- **Local Entities**
  - **Conservation District (conservation district):** Provides grant funding and administers DGLVR Program within each County. The conservation district is the main point of contact for review of project documents and project oversight.
  - **Grant Recipient:** Road-owning entity that receives DGLVR grant funds from the conservation district and performs or sub-contracts work to be done. All grant recipients are public entities, and most are townships or boroughs.
  - **Contractor:** (if applicable) Contracts with the grant recipient to perform project work.
  - **Engineer:** (if applicable) Contracts with the grant recipient to perform project design and inspection.
- **Statewide Supporting Entities**
  - **State Conservation Commission (SCC):** Entity at the PA Department of Agriculture who administers the DGLVR Program statewide.
  - **Penn State University Center for Dirt and Gravel Road Studies (CDGRS):** Provides education and technical support to all entities of the DGLVR Program.
  - **Trout Unlimited (TU):** Provides education and technical support to all entities of the DGLVR Program.

DGLVR Program: Overview of Documents and Policies

- **DGLVR Administrative Manual (Admin Manual)**
  - This manual sets statewide policy requirements for the PA Dirt, Gravel, and Low-Volume Road Program. Section 7.1 of this manual sets statewide DGLVR Program Policy for Stream Crossing Structural Replacements.
  - When the DGLVR Stream Crossing Replacement Technical Manual references "DGLVR Policies" or "DGLVR Policy," the referenced policy/policies include everything in the Administrative Manual.
  - The Administrative Manual is available online at https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/administrative-guidance-manual.
- **DGLVR Stream Crossing Design & Installation Standard (DGLVR Stream Crossing Standard):**
  - The DGLVR Stream Crossing Standard lists requirements for any new stream crossing structures funded in whole or in part by DGLVR funds or counted as in-kind on a DGLVR Project. In-kind contributions refer to costs incurred by the grant recipients for a project that are not reimbursed as part of the grant.
  - When the DGLVR Stream Crossing Replacement Technical Manual references "standards" or "Stream Crossing Standards," those refer to the DGLVR Stream Crossing Design & Installation Standard.

- The DGLVR Stream Crossing Standard is incorporated by reference in Section 7.1.2 of the Administrative Manual and can be found in Appendix A of this DGLVR Stream Crossing Replacement Technical Manual.

- **County-Specific DGLVR Policies:**
  - Each county conservation district has a set of local policies for their county DGLVR Program set by their Quality Assurance Board (QAB) and conservation district Board. The local county DGLVR Policy may be more strict than statewide DGLVR Policy and must be considered for all DGLVR projects based on the county funding the project.
  - Contact the relevant county conservation district for their local policies.

1.6.1 DGLVR Stream Crossing Replacement Policy

The DGLVR Program's full stream crossing replacement policies can be found in chapter 7.1 of the DGLVR Administrative Manual. A brief overview of the purpose and highlights of the policy is below:

Eligibility: The policy limits funding stream crossing replacements to structures that are undersized for the stream channel they convey (existing opening of 75% bankfull channel width or less). Existing crossing structures that are 4' or less in width or that consist of multiple (side-by-side) pipes are also eligible for replacement. The impacts of these undersized crossing are outlined above in the introduction. Since Pennsylvania has tens of thousands of road stream crossings, this part of the policy was intended to focus DGLVR Program funding on crossings that were more likely to be causing environmental (and flooding and maintenance) issues.

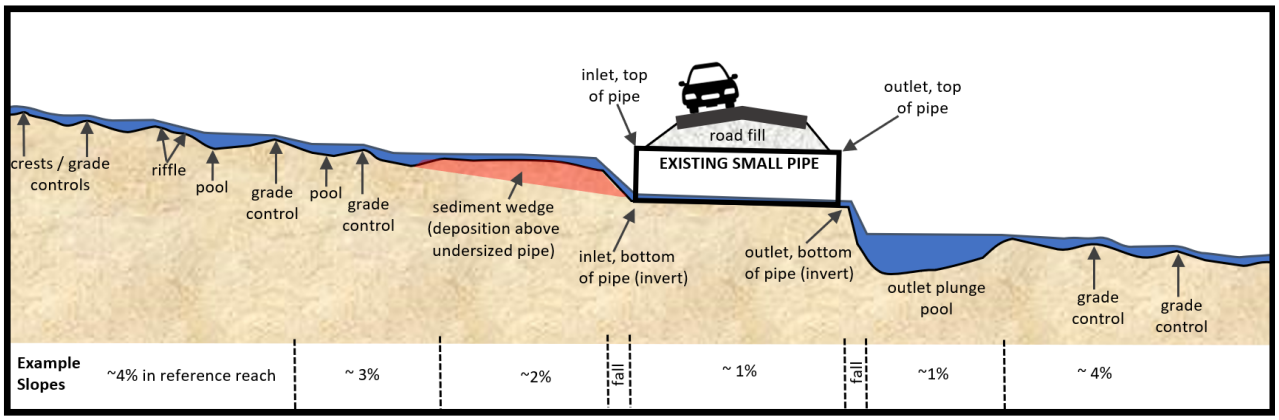
Replacement Guidance: When a new structure is installed with DGLVR funds, it must meet the DGLVR Program's Stream Crossing Design and Installation Standard to ensure long term stability and channel continuity through the road. These requirements are outlined in the DGLVR Stream Crossing Standard described in Chapter 2.

Exemptions from the DGLVR Stream Crossing Standard: The DGLVR Program may fund a stream crossing without following the full DGLVR Stream Crossing Standard if specific criteria are met (see Section 3.3 of this Manual). This occurs most often on very small headwater streams or on crossings with significant **vertical offset** that make channel reconnection unreasonably challenging. The policy outlines the case for some "automatic" exemptions from the DGLVR Stream Crossing Standard for small channels and provides a mechanism to request exemptions from the DGLVR Stream Crossing Standard for other structures as well.

1.6.2 DGLVR Stream Crossing Design and Installation Standard

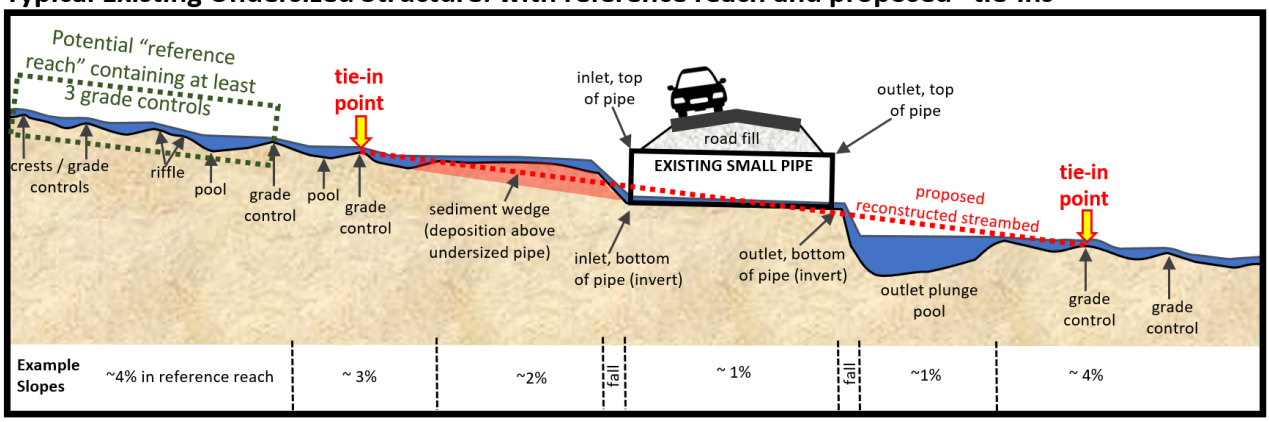
All new stream crossings installed with DGLVR funds or counted as in-kind on a DGLVR project must adhere to the DGLVR Stream Crossing Design & Installation Standard (DGLVR Stream Crossing Standard) unless the site qualifies for an exemption from the DGLVR Stream Crossing Standard as mentioned in section 3.3 and detailed in the DGLVR Policy. The purpose of the DGLVR Stream Crossing Standard is to ensure structures funded by the DGLVR Program are adequately designed and constructed to reestablish and maintain channel continuity and a stable, continuous streambed through the life of the structure. See Figure 1.6 for example channel continuity sketches and see Chapter 2 for a complete discussion of the DGLVR Stream Crossing Standard.

Typical Existing Undersized Structure



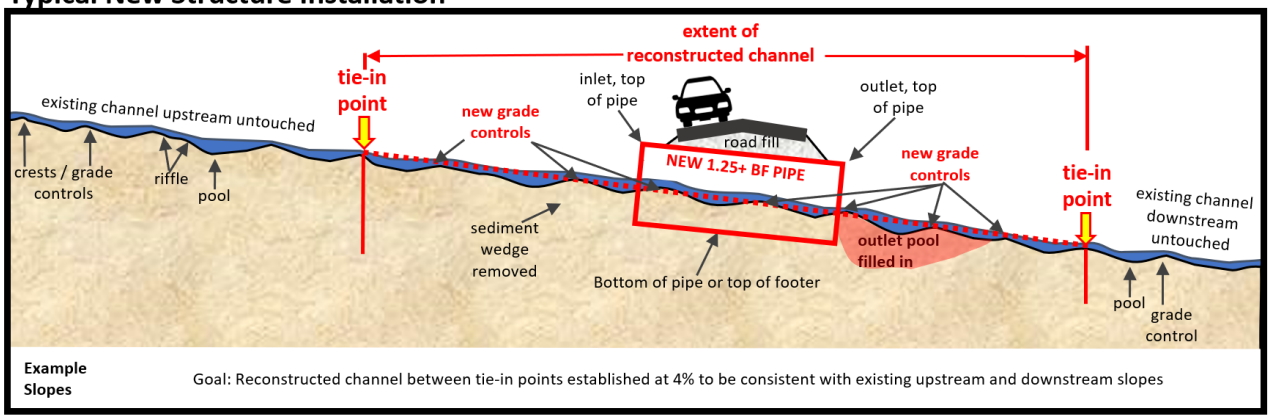
A "typical" undersized culvert will cause **Aggradation** (**Sediment Wedge**/ gravel deposition) upstream and a scour hole / plunge pool downstream. It will also alter the slope of the channel, making it flatter near the structure and often causing a vertical offset or drop at the outlet.

Typical Existing Undersized Structure: with reference reach and proposed "tie-ins"



A "reference reach" should contain at least three grade controls and be located outside of the influence of the culvert. Determent tie-in points that provide the best continuity of slope through the structure, upstream and downstream.

Typical New Structure Installation



The new larger structure contains sufficient streambed material. The channel between the tie-in points and through the structure is reconstructed to restore channel continuity through the entire stream reach. Grade controls are established in the new channel at a frequency that matches the reference reach.

Figure 1.6 Stream Continuity Sketches

The three sketches above show a "typical" undersized structure replacement before and after replacement. The middle sketch shows the before or existing condition, but identifies a reference reach, tie-in points, and the proposed reconstructed channel segment (reconstructed reach) through the crossing.

2. DGLVR STREAM CROSSING DESIGN AND INSTALLATION STANDARD

All stream crossing replacements funded in whole or in part with DGLVR funds, or listed as in-kind on a DGLVR Project, must follow the DGLVR Stream Crossing Design & Installation Standard (DGLVR Stream Crossing Standard) unless an exemption from the DGLVR Stream Crossing Standard is applicable (see section 3.3). This chapter of the manual walks through the DGLVR Stream Crossing Design and Installation Standard and provides additional background and guidance.

Italicized shaded text **below is quoted directly from the DGLVR Stream Crossing Design & Installation Standard. Additional explanation and background are provided on the major points.**

IV. B*. All stream crossing projects shall be authorized in accordance with local, state and federal laws and all applicable permits must be obtained prior to construction.*

Most stream crossing projects funded by the DGLVR Program will require a permit. The type of permit required will vary from one project to another. Conservation district staff should know who to consult to assure the proper permits are obtained. Conservation district DGLVR technicians are required to review permit applications and/or site plans for stream crossings to ensure the application complies with the DGLVR Program requirements before they are submitted to the PA Department of Environmental Protection (DEP) or the conservation district for permit review.

Achieving channel continuity will typically require some channel work upstream and downstream of the replacement structure. Large vertical offsets caused by the previous structure may require extensive work up and down the channel. For many replacements, work may extend upstream or downstream of the new structure more than 50 feet. Additional permits may be required to authorize in-stream grade control and streambank restoration efforts. Conservation districts should look at the recommendations developed from the **Site Assessment longitudinal profile** data produced before contracting to determine the anticipated reach of restoration. This will aid in determining if a meeting with additional conservation district or DEP staff is necessary to discuss additional permit authorizations such as GP1, GP3, GP11 or a Joint Permit.

Because the DGLVR Program's requirements can be more stringent than permit requirements, it is possible to have a project with an approved permit that will not meet the DGLVR Stream Crossing Standard. Therefore, it is very important to have a good understanding of the DGLVR Stream Crossing Standard and to review the design before a permit application is submitted. An approved permit is not a guarantee that a project can be paid for with DGLVR Program funds. A project may only be paid for with DGLVR Program funds when it meets the DGLVR Program Policy and Stream Crossing Standard.

IV. C. *All stream crossing structures shall be comprised of one single-opening structure installed at each crossing. Projects shall not utilize multi-opening structures or the placement of multiple single-opening structures at any one crossing location. Additional floodplain conveyance structures may be installed a minimum of one bankfull-width distance outside of the bankfull channel.*

When stream flow is directed through multiple structures, channel continuity is interrupted and debris can clog the inlet more easily. Installing additional floodplain conveyance structures too close to the stream crossing structure can act in a similar way to interrupt channel continuity and increase maintenance needs. Such practices do not meet DGLVR Program goals and are not eligible for installation with DGLVR funds.

IV. D. *New stream crossing structures shall be designed to pass, at a minimum, the 100-year discharge (Q100) at a water surface elevation not to exceed 80% of the finished opening height.*
A Hydrologic and Hydraulic (H&H) Study is required that includes:
1. Finished thalweg elevations, and
2. Clearly labeled discharge values and water surface elevations at the proposed crossing inlet for Q2, Q10, Q25, Q50, and Q100.

This defines the flow capacity requirements for newly designed stream crossing structures. By limiting the 100-year discharge to 80% of the **finished opening height**, the structure should also maintain some capacity for passing debris. The finished opening height is defined as the vertical distance measured from the **thalweg** elevation at the crest of a constructed grade control feature inside the replacement structure, upward to the top of the culvert opening or bottom of bridge beam. In some cases, structures may need additional width, and/or the road elevation may need to be raised to accommodate this requirement.

One of the purposes of this requirement is to discourage the use of lower-profile structures, which are poorly suited to natural stream systems. This is due to difficulty placing adequate streambed in the structure without compromising the hydraulic capacity of the structure. In other words, there is not enough room for both streambed and water flow in lower-profile structures.

An H&H Study is required to clearly demonstrate that the **Q100** water surface elevation does not exceed 80% of the finished opening height. Additionally, it must be demonstrated that any necessary raising of the roadway elevation will not result in a corresponding increase in flood elevations.

IV. E. *Grade controls, bank margins and key pieces shall, at a minimum, be designed to be stable at the 100-year discharge.*

The purpose of this requirement is to ensure that grade controls, bank margins, key pieces, and low flow channels remain intact after a large storm event. Even structures that are wider than the bankfull width still restrict the channel and have higher velocities and scours during high flow events than sections of the stream that have floodplain access. This often means that grade control within a structure must be sized larger than normally-occurring grade control outside of the structure. These requirements are intended to ensure the streambed, bank margins, and grade controls will remain stable through a large flow event. Sometimes this will mean choosing a larger or different structure to accommodate the stability of the bank margins and/or grade controls. For more details on grade control, refer to Section 12.1.6 and the Grade Control Technical Bulletin.

IV. F*. Structures must be of adequate width to accommodate the bankfull width of the stream at the final bankfull elevation with stable bank margins. Once these design criteria are met, the structure width shall not be less than 1.25x the bankfull width of the stream at the bankfull elevation.*

The width of new structures must take into account the need for a low flow channel and bank margins within the structure. This often requires structures that are significantly wider than the bankfull channel width. The width of the structure should be determined based on the site conditions that allow a stable channel and bank margins to be created through the crossing, but in no circumstances can the structure width be less than 1.25x the bankfull width of the stream at the **bankfull elevation**. The "at the bankfull elevation" language comes into play for structures with sides that slope in such as arch pipes. When sizing structures with sides that slope inward immediately from the bottom, remember to account for the depth of fill in the pipe when figuring opening widths. An 18' wide arch pipe may only have a finished opening width of 15' once 2' of streambed material is established at the thalweg elevation through the structure, and may only have 14' of width at the bankfull (bank margin) elevation. In this example, the latter width (14', measured at the bankfull elevation) must not be less than 1.25-times the project bankfull width. Each site is unique, and while the DGLVR Stream Crossing Standard states that under no circumstance can the structure be less than 1.25x the bankfull width of the stream at bankfull elevation, there will be many instances where the design will require a structure greater than 1.25x the bankful width in order to meet the requirements of the DGLVR Stream Crossing Standard. See Figure 2.1 for an example detail showing the bankfull width channel, bank margins, and minimum 1.25x bankfull width structure.

IV. G. *In project design and construction, bankfull channel dimensions must be based upon project site-specific field measurements. Channel dimensions derived from other methods, such as modeling of estimated bankfull discharge, shall not be utilized.*

In order to restore continuity with the existing stream channel up- and downstream of the **reconstructed reach**, dimensions of the reconstructed reach must be based on measurements from the **reference reach**.

IV. H. *New structures must be properly aligned with the channel, unless not feasible due to permitting restrictions or other constructability restraints.*

Alignment refers to the layout of the structure in relationship to the stream channel as seen from a plan (overhead) view. Historically, stream crossings were often installed at a 90-degree angle to the road in an effort to save money by using the shortest structure possible. Unless the stream and road are perpendicular, this often forces the flow to turn at the inlet, outlet, or both, causing stability and erosion issues. Proper alignment of structures can reduce long term maintenance and erosion issues caused when flow is turned at sharp angles. To the greatest extent possible, new structures should be aligned with the flow of the stream to minimize hard turns at the inlet or outlet. This often requires purchasing longer structures that are placed at an angle through the road. The DGLVR Program has discussed permitting of stream crossing replacements designed to meet the DGLVR Standard. The SCC GP-11 Permit Memo (Appendix E) clarifies when stream realignment can be authorized under a DEP GP-11. Contact DEP to discuss any proposed realignments and permitting requirements.

IV. I. *Consider floodplain connectivity when necessary (e.g., high water by-pass, overflow pipes, etc.). Floodplain- or overflow pipes must be placed a minimum of one bankfull-width distance outside of the bankfull channel*

In most cases, a wider-than-bankfull width structure will be sufficient to accommodate high flow events. There are situations, however, such as wetland complexes and braided channels, where additional floodplain connectivity should be implemented. This could be accomplished using additional pipes (floodplain pipes, not a multiple pipe crossing), a French mattress, a highwater bypass, or other conveyance. However, it is important that such structures are not placed close enough to the new stream crossing structure to function as a multiple-opening stream crossing structure, which is why the DGLVR Stream Crossing Standard specifies a minimum distance from the bankfull channel for installed floodplain- or overflow pipes.

IV. J. *Structures must be designed and constructed to accommodate the passage of aquatic organisms through the structure.*

In most cases, aquatic organism passage will be obtained by achieving channel continuity upstream, through, and downstream the structure by following the requirements of the DGLVR Stream Crossing Standard related to reestablishing slope, low-flow channels, bank margins, grade control, and **bedforms** reflective of the reference reach.

IV. K. *Round pipes over 36" in diameter may not be utilized for stream crossings.*

Round plastic pipes, by design, are intended to move water rapidly and flush the pipe clean. While this is ideal for stormwater pipes and road drainage cross pipes, it is the opposite of what the DGLVR Program is trying to accomplish with stream crossings. Larger round pipes also have the disadvantage of having the widest part of the pipe elevated above the bankfull channel unless they are buried halfway into the stream channel. Round pipes are not recommended for any stream crossings, regardless of size, but round pipes over 36" in diameter are not allowed for purchase or use for stream crossings in the DGLVR Program. Consider oval ("squash") pipes or pipe-arches for small crossings, and consider plate arch pipes or other alternatives for larger crossings. See additional discussion on structure types in Chapter 5 and in the Structure Selection for Stream Crossings Technical Bulletin in Appendix H.

IV. L. *Low flow channels with well-defined bank margins must be built through the structure.*

The low-flow channel is the portion of the channel commonly wetted during stream base flow. See Figure 2.1 for an example detail showing a low-flow channel to be constructed within a stream crossing structure. If a structure is installed without a low-flow channel, the stream will likely be over widened as it enters the structure. This will cause it to lose energy and begin dropping bedload causing deposition issues inside the structure. The size and shape of the low-flow channel is determined by surveying cross-sections of the stream channel as described in Sections 4.2 and 12.1.2.2, as well as the Site Assessment Technical Bulletin (Appendix H).

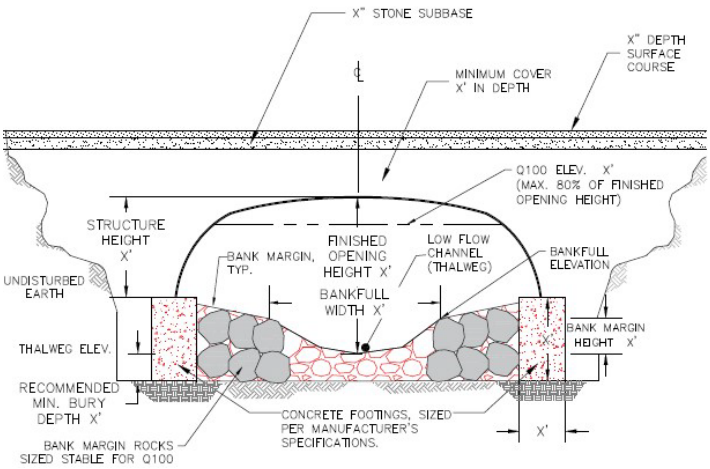


Figure 2.1 Bottomless Culvert Example Detail

Example detail of a bottomless arch culvert showing low flow channel and structure-to-bankfull ratios. Additional Standard Drawings of culvert cross sections are available in Appendix A. and at [https://www.dirtandgravel.psu.edu/general-resources/stream-crossing-replacements.](https://www.dirtandgravel.psu.edu/general-resources/stream-crossing-replacements)

IV. M. Site Assessment:

*1. A longitudinal profile survey is required for each site prior to project design and/or permitting. The surveyed stream segments must extend far enough to capture existing channel slopes upstream and downstream of the crossing and must include an appropriate reference reach to support project design. To determine applicability, reference reach slope must be +/- 25% of the proposed continuity slope of the reconstructed streambed, unless otherwise approved by the SCC. If an appropriate reference reach is not located near the crossing, a separate survey may be conducted on an appropriate reference reach further upstream or downstream of the crossing. The reference reach must begin and end at existing grade control features and must, at minimum, include two consecutive sequences of repeating bed features (ex. **riffle/pool**/riffle/pool/riffle). A longer reference reach including additional bedform sequences is encouraged in order to provide more reliable design criteria.*

i. The longitudinal profile survey must extend both upstream and downstream of the crossing and include data points associated with the existing structure and roadway surface.

ii. Sufficient number and locations of data points must be collected to determine the stream channel features that are critical to a successful structure replacement, such as:

1. channel and structure slope,
2. grade control types, lengths, and spacing,
3. pool scour depth,
*4. potential **tie-in points**,*
*5. **Aggradation** wedges,*
6. plunge pools,
7. vertical offset of the streambed adjacent to the structure,
8. available roadway cover.

iii. The longitudinal profile survey must extend a minimum of 150' upstream and 150' downstream of the existing crossing. Additional length of survey may be necessary to capture a suitable reference reach to support project design. Actual length of the longitudinal profile survey is dependent upon the site conditions, availability of a suitable reference reach, channel size and distance necessary to accurately capture existing channel slopes both upstream and downstream of the crossing. The longitudinal profile survey must extend from an existing grade control upstream of the crossing feature to an existing grade control feature downstream of the crossing.

2. Cross-section surveys are required at a minimum of two locations. At minimum, surveys must be

completed at a grade control crest within the reference reach and at the deepest point in the ***outlet scour pool*** *(if present). If no outlet scour pool exists, this survey should capture the maximum depth of a pool feature from the reference reach. At minimum, each surveyed cross section must include data points on both streambanks capturing top-of-bank, bankfull, and right/left edge of water. Instream data points must include a minimum of three streambed points, including the thalweg (low-flow channel).*

3. *Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on Site Assessment requirements.*

IV. N. The engineer is responsible for the Site Assessment data they use. If conservation districts provide Site Assessment data, the engineer has discretion to use the provided data or conduct their own surveys. If a Site Assessment is completed by the design engineer to support their project design, the conservation district technician is required to be on-site while the surveys are being performed by the engineer and/or surveyor. The engineer shall provide the completed survey and Site Assessment data to the conservation district technician. The Site Assessment data provided to the conservation district shall include stationing, elevations, and notations of key stream features as outlined in (M.) above.

The design Site Assessment is a critical step that must be used to guide project design. It is described in Chapters 4 and 12. Detailed guidance for completing a Site Assessment can be found in the Site Assessment Technical Bulletin (Appendix H). Engineers may choose to use data from the preliminary Site Assessment performed by the conservation district (if provided), but in many cases may want to conduct their own survey. If an engineer or surveyor is going to conduct their own design survey, the conservation district must be on site when the survey is being performed. The technician should ensure that the survey is of adequate length, and include important survey points (grade controls, inlet, outlet, road profile) etc.

IV. O. *The Site Assessment data (from longitudinal profile and cross section surveys) described above shall be used to inform project design considerations, including the following:*

1. Minimum stream substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) is to be based on the maximum pool depth in the reference reach with a minimum safety factor multiplier as listed in Table 1. Alternatively, minimum bury depth can be determined using industry accepted scour analysis and modeling tools for stream system analysis and/or bridges (storm sewer models are not acceptable for stream crossing scour analysis).

Table 1: Pool Depth Safety Factor Multiplier to establish Anticipated Scour Depth

Stream Slope	Pool Depth Multiplier
0% - 2.0%	1.5
2.1% - 4.0%	2.0
> 4.0%*	2.5

** Structures installed on reconstructed reach stream slopes >4.0% must be bottomless. The 2.5 safety factor multiplier is to establish the recommended minimum bottom of footing buried depth. The final footing buried depth is to be determined by the Engineer in project design.*

Adequate substrate (streambed) depth within a structure is critical to provide long term stability. Simply meeting permit requirements, which are typically only 6-12" of material, is not sufficient to ensure long term stability of substrate through the structure. There are two options to determine the substrate depth for stream crossing structures with a bottom or invert: "**Anticipated Scour Depth (ASD)**" or Industry Accepted Scour Analysis.

The "Anticipated Scour Depth" (ASD) of the stream using information from the longitudinal profile survey, follow the following steps:

- Determine the maximum pool depth within the surveyed stream reach, exclusive of the outlet scour pool, as determined from the longitudinal profile survey.
- Determine the factor of safety multiplier from the table above based on the planned slope of the

reconstructed reach of stream through the structure.

- Multiply the maximum pool depth by the factor of safety to get the Anticipated Scour Depth.

Example: a site with a channel continuity slope of 2.5% and a maximum pool depth in the reference reach of 1.2' would use the multiplier 2.0 (from table above) for a minimum bury depth of 2.4' below the low flow channel at a grade control crest, to the structure invert (or bottom of the footings).

If the ASD method is used, the value returned (2.4' in the above example) is the minimum bury depth of the invert (or bottom of footings) of the new structure below the low-flow channel (thalweg) of the reconstructed channel at a grade control crest. The ASD therefore also represents the minimum amount of streambed that must be established between the structure invert and the bottom of the low flow channel. Note that all bury depths are measured from the bottom of the low-flow channel (thalweg), so additional material above the ASD value will need to be imported to establish the bankfull channel and bank margins.

Bottomless structures shall be used for all structure replacements where the continuity slope of the channel through the project area will be greater than 4.0% or the bankfull width is over 20', as determined by the longitudinal survey. As the slope increases, it becomes increasingly difficult to maintain streambed long-term through structures with inverts. The engineer may consider the Anticipated Scour Depth method as a starting point for designing depth of footings or may utilize another applicable method. The engineer of record is ultimately responsible for final design of footing depths and placements.

Scour analysis can be conducted by an engineer to determine the depth of scour that can be expected within the structure. The substrate depth must be sufficient to withstand that amount of scour without exposing the structure invert or bottom of footings. Engineers must use models and analysis designed for streams and bridges, as they differ from models for other civil engineering uses such as storm sewers or drinking water.

See Chapter 12 for additional details.

IV. O. 2. *Minimum substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) shall be 24-inches, or the depth determined with scour analysis models or the Anticipated Scour Depth, whichever is greater.*

In no case will less than 24" of material (between the pipe invert and the bottom of the low flow channel at a grade control crest) be used inside a pipe with an invert. If industry-accepted scour analysis or ASD calculations above return a value of less than 24", 24" of material is still required.

IV. O. 3. *The design shall identify stable tie-in points at grade control features (either existing or to be constructed). The distance between the upstream- and downstream tie-in points must extend far enough in both directions to restore channel continuity upstream, through, and downstream of the structure.*

Channel continuity is achieved by reconnecting the disconnected segment of stream far enough upstream and downstream of the crossing to eliminate the vertical offset caused by the existing undersized structure. This reconstructed reach needs to extend far enough in both directions to reconnect the adjoining channel segments at a relatively consistent slope. The tie-in points where this reconstructed reach begins and ends (connects with the adjoining stream channel) must be at existing grade control locations. If these existing grade control features are stable, they can be left as-is. If they are unstable, or potentially not substantial enough to prevent eventual headcut development, constructed grade control features should be installed at these tie-in locations.

IV. O. 4: *In-stream channel grade control(s) are required for re-constructing the stream channel and/or stabilizing the stream bed and channel through the reconstructed stream reach. Types of grade control features utilized must be the same type as those within the appropriate reference reach. Design of grade control feature length and spacing shall be based upon the Site Assessment data.*

Grade controls are permanent features placed at certain intervals in the channel to control streambed elevation and slope and hold the stream substrate in place. Grade controls are discussed in Section 12.1.6 and are discussed extensively in the Grade Control Technical Bulletin (Appendix H).

IV. O. 5: *Design of the cross-sectional shape of the reconstructed reach must be based on Site Assessment data.*

The design **cross sections** are essential to project design. Cross sections are described in Chapter 4 and 12, and detailed guidance for completing the cross sectional assessments can be found in the Site Assessment Technical Bulletin (Appendix H). Engineers may choose to use cross section data from the preliminary Site Assessment performed by the conservation district, if provided, but in many cases may want to conduct their own survey. If an engineer or surveyor is going to conduct their own design survey, the conservation district representative must be on site when the survey is being performed. The conservation district's role during the engineer's site assessment is to observe and assist with the longitudinal profile and cross sections and ensure all important data points are obtained.

IV. P*. Stream crossing projects will likely require work outside of the right-of-way to re-construct the stream channel, install grade controls, and/or allow for construction access to the stream and structure. Before working outside the right-of-way, the grant recipient must obtain written permission from the landowner(s). In instances when written off right-of-way permission cannot be obtained to do work necessary to achieve channel continuity, the project cannot be completed with DGLVR funds.*

Nearly every stream crossing replacement will involve work in the stream channel outside the road right of way. Written off-right of way permission should be sought early in project design, as it may impact the ability to implement a successful project. Written off-right of way permission is required before work can begin outside of the right-of-way. More details on off-ROW in Section 3.4.3.

IV. Q. *The grant recipient or engineer must provide all plans and specifications to the conservation district. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that those plans and specifications comply with DGLVR Policy and Stream Crossing Standard before they are submitted (or resubmitted) for permit review.*

Historically, permit registrations or applications, and associated design plans, are often submitted to DEP without a consultation or review by the conservation district. This can result in a host of miscommunication issues and permits being issued for project designs that do not meet DGLVR Program Policy and Standard. This requirement ensures that conservation districts are given the opportunity to ensure the proposed project plans and specifications meet the requirements of the DGLVR Stream Crossing Standard before submittal for permit approval. A "Design Package Review Checklist for Stream Crossings" is in Appendix G. Contact the SCC or CDGRS for assistance in reviewing plans, either in-person or remotely, if necessary.

IV. R. *Side Slopes: Make all finished cut and fill road slopes stable for the materials involved. Make the side slopes in soil materials no steeper than 2 horizontal to 1 vertical (2:1) in cut slopes or 3 horizontal to 1 vertical (3:1) for fill slopes. Make rock cuts or fills no steeper than 2 horizontal to 1 vertical (2:1)).*

These requirements are consistent with common practice to ensure the long-term stability of final cut and fill road slopes established during structure replacement.

IV. S. *All stream crossing replacement structures must include a headwall and endwall.*

Headwalls and endwalls are essential to support and protect the road edge, backfill areas and the ends of the structure.

IV. T. *Quarried aggregate rip-rap for use as grade control, bank margins, or bank stabilization: Use only rock that is sound, durable, and able to withstand exposure to air, water, and freezing and thawing. Aggregate must be obtained from a Pennsylvania Department of Transportation approved source, or must be tested and meet the following criteria:*

- *Abrasion Resistance: The loss of mass (LA Abrasion) shall be less than 45%: Determine the resistance to abrasion using the Los Angeles Abrasion test, ASTM C131.*
- *Soundness: Determine the percentage of mass (weight) loss of each fraction of the coarse aggregate after five cycles of immersion and drying using a sodium sulfate solution according to PTM No. 510. The maximum weighted percent loss allowed is 20%.*

Large, quarried rock that is imported for use as grade control, bank margins or bank stabilization must meet these requirements in order to resist breakdown over time. These requirements do not apply to material imported for streambed substrate, or to on-site materials that are reused as part of the project. These requirements only apply to materials imported for grade controls, bank margins, and bank stabilization. Rock with a high abrasion resistance will be less likely to breakdown under the high sheer stresses often seen in stream channels. Rock that is of sufficient soundness will be resistant to breakdown under repeated freeze thaw cycles. Because rock used for bank stabilization and grade control are specified at a certain size, these requirements ensure they will remain at the appropriate size and not be broken down over time.

IV. U. *Vegetation: Revegetate and permanently stabilize all disturbed areas as soon as practical after construction activities are complete. Revegetation and site stabilization shall comply with the PA Chapter 102 Erosion Control requirements (See the PA Erosion and Sediment Pollution Control Program Manual for additional guidance).*

In addition to seed and mulch, conservation districts should consider native plantings such as live stakes, fascines, live crib walls, and brush mattresses as additional vegetative bank stabilization methods.

IV. V. *Road Approaches to Stream Crossings: Ensure that the roadway approaches are stable and road drainage systems have been addressed and are adequate to divert road drainage (e.g., ditches, turnouts, etc.) away from the stream and structure in a manner that prevents erosion*.

Conservation districts are encouraged to make stream crossing replacements part of a more comprehensive drainage project on the surrounding road. When possible, redirect drainage away from the stream or provide additional drainage outlets. At a minimum, ensure road ditch drainage does not pose a threat to the new structure and contribute accelerated erosion to waters of the commonwealth.

IV. W. *Project work cannot start until all Federal, State, and Local permits are obtained, if needed. In particular, any required DEP 102/105 permits must be obtained before construction may begin.*

Most DGLVR Stream Crossing projects will likely utilize a DEP Chapter 105 GP-11 or GP-7. Depending on the scope of work, additional authorizations under GP-1, GP-3, and GP-5 may be needed. See the SCC GP-11 Permit Memo (Appendix E) for additional clarification. Consult with DEP as needed on permitting questions, as well as with other entities involved in any required Federal, State, or Local permits that may be needed.

V. *STRUCTURE SELECTION*
A. *Bottomless structures shall be used for all structure replacements where the continuity slope of the channel to be reconstructed through the project area will be greater than 4.0% or the bankfull width is over 20', as determined by the longitudinal survey.*
B. *Structures with inverts / bottoms may be used for structure replacements where the continuity slope of the channel to be reconstructed will be 4.0% or less (as determined by the longitudinal survey) or on sites over 4.0% where it is determined by a geotechnical investigation report that soil bearing pressure cannot support structure abutments or footings.*

As stream slope increases, so does potential scour, requiring larger grade control and additional streambed material in the structures to prevent washouts. Bottomless structures shall be used for all structure replacements where the continuity slope of the channel through the project area will be greater than 4.0% or the bankfull width is over 20', as determined by the longitudinal profile. The stream slope that determines this is the "continuity slope" that connects the upstream and downstream tie-in points through the structure. This is determined from the longitudinal profile.

VI. *CONSTRUCTION PLANS AND SPECIFICATIONS*
Construction plans and specifications shall be designed and prepared in accordance with the Stream Crossing Standard. Construction plans and specifications shall be prepared for all stream crossing projects, regardless of who the contractor or installer may be (applies to projects installed by the grant recipient, such as a municipality). Clearly describe the

requirements for applying the practice to achieve its intended purpose in the plan and specifications. At a minimum, the plan and specifications must include the following:…

Section VI outlines the requirements for plans and specification for project design by engineers. These specifications apply to both contractor-installed and grant recipient-installed structures. These requirements are detailed in the "engineering section" of this manual in Section 12.2.1.

VII*. CONSTRUCTION*
A. *The grant recipient or engineer must provide all draft bid packages (if applicable) to the conservation district. The conservation district must review the draft bid documents and provide written confirmation to the grant recipient or engineer that those draft bid documents comply with DGLVR policy and Stream Crossing Standard before they are provided to potential bidders. All bid documents and practices must conform with municipal codes and other standard procurement requirements of the grant recipient.*

Bid packages have often been released without a consultation or review by the conservation district. This can result in a host of miscommunication issues and bids for practices that may not align with DGLVR Program Policy and Stream Crossing Standard. This requirement ensures that conservation districts are given the opportunity to ensure the draft bid document meet the DGLVR Policy and Stream Crossing Standard. Also, this allows districts to ensure that the draft bid document adequately addresses aspects of construction that might not typically apply to a more traditional crossing replacement. These might include reconstruction of a streambed with bank margins, grade control features and defined thalweg through the crossing, or extension of instream work upstream and downstream beyond the right-of-way to reestablish channel continuity. Review of the bid documents before they are shared with interested bidders can often save a lot of time and expense caused by change orders to inadequate bids. Contact the SCC or CDGRS for assistance in reviewing bid documents, either in-person or remotely, if necessary.

VII. B. *Final construction documents shall include, at a minimum, the following items:*
1. *Bidding Documents (if applicable).*
2. *Construction Plan.*
3. *Erosion and Sedimentation Control Plan.*
4. *Construction Specifications*

This section outlines the minimum **construction documents** required for DGLVR projects. These requirements are detailed in the "engineering section" of this manual in Chapter 12.

VII. C. *At a minimum, two benchmarks must be set by the engineer or surveyor in an area outside of the zone of construction and disturbance.*

This section requires the design engineer or surveyor to establish two benchmarks outside of the work zone. This will allow the contractor/engineer/installer to re-establish stakeouts and elevations if they are disturbed during construction. The benchmarks provide reference points to allow for spot-checking of critical elevations during construction.

VII. D. *Critical Stages of Construction to be inspected by the Engineer (and/or Engineer's designee) at the time of installation is required. Critical Stages include, but are not limited to, the following:*
1. Installation of structure subgrade and bedding materials and establishing inverts/elevations.
2. Installation of footings, abutments and structure ***Appurtenances****.*
3. Installation of grade control features, bank margins, and streambed substrate.
4. Installation or placement of stream crossing structure.
5. Compaction and backfill of stream crossing structure.

This section requires the design engineer or their designee to be on site at critical stages of project installation to ensure key aspects of the project are installed as designed, or to be able to modify the design as issues arise. These requirements are detailed in the "engineering section" of this manual in Chapter 12.
Any changes to the scope of work of the construction plans must meet DGLVR Policy and Stream Crossing Standard and be approved by the engineer and road owner before implementation. Keep in mind that changes to construction plans may also require approval from DEP and/or landowners.

VII. E. *Conservation districts must be on-site regularly during construction to ensure that DGLVR Program Policy and Stream Crossing Standard are being met. Conservation Districts must be onsite during installation of the Critical Stages of Construction defined in VII. D, above.*

Conservation district involvement throughout the process is key to successful installations. Conservation district staff best understand DGLVR Policy, and often serve as the central point of contact for the many entities involved in a project. At a minimum, conservation districts must be onsite during installation of Critical Stages of construction. Additionally, the conservation district should be on site whenever the project begins a new phase of installation, as well as whenever the engineer is on site. Conservation districts are recommended to be on site as much as possible during construction.

VII. F. *Certification and Documentation of Critical Stages of Construction: The Engineer shall provide the project owner a signed and sealed certification form (Attachment B) indicating that the critical stages of construction outlined in Section VII.D were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard. The engineer must also provide the project owner with red-lined construction documents that indicate any changes in the as-built conditions of the project compared to the design plans.*

Attachment B to the DGLVR Stream Crossing Standard is a signed and sealed document to be provided by the engineer at project closeout. It allows the engineer to supply notes on the critical stages of construction and the overall project. The "red-lined" construction drawing is typically a set of plans with red ink used to identify things that were not implemented according to the design plan. These documents will help provide an "as-built" picture of the project for review in the future should issues arise.

3. Initial Site Assessment and Project Planning

Typically, a stream crossing replacement project starts with the applicant contacting the conservation district well in advance of their county's grant application cycle. Each conservation district should clearly communicate their own local policies and deadlines and make them easily accessible to applicants. It is very important that conservation districts and potential applicants build a working relationship and understand local funding priorities well in advance of developing a grant application.

Once contact is made by a potential applicant, the conservation district should schedule a site visit at the potential project location to review existing site conditions. During this meeting, conservation district staff should determine the road owner's eligibility and road eligibility for DGLVR Program funds. Applicant and road eligibility are covered in the DGLVR Administrative Manual in section 3.7, "Program Eligibility".

When working with an applicant, it is important to have a candid conversation early during the initial site assessment about the Stream Crossing Replacement Policy as well as the DGLVR Stream Crossing Standard. The policy can be found in chapter 7.1 of the DGLVR Administrative Manual, and the Stream Crossing Standard can be found in Appendix A of this document. Not only does this policy limit the replacement of stream crossings to those which are negatively impacting streams, but it also sets the minimum requirements for the replacement structure. This process is specific to the DGLVR Program and frequently differs from traditional recommendations received from engineers, particularly regarding the need to rebuild and reconnect the stream channel through, and beyond, the replacement crossing. Conservation district staff should study the requirements for eligibility and new structure replacement and be able to explain to the potential applicant the details, requirements, and the benefits of this design approach.

3.1 Stream Specific Discussion Points

When talking with applicants, it is important to convey the benefits of flood resiliency, optimal structure lifespan, and reduced maintenance requirements of properly installed structures. These projects also represent a large time investment for the applicant to see a successful project through to completion.

Conservation district staff should talk with the applicant to understand the history of the existing stream crossing and what occurs at the site during high flow events. Undersized structures eligible for replacement may not be the initial cause of roadway flooding. Occasionally, streams breach their streambanks upstream of the structure. Taking the time to understand the site-specific history and constraints will provide insight in developing the project.

3.2 Stream Measurements and Structure Eligibility

Before entering the stream channel to take bankfull measurements, verbal permission should be sought from the adjacent landowner(s) to avoid potential trespassing issues that could sour relationships and make the landowner less likely to agree to the eventual project.

During the initial site visit, conservation district staff should measure the width of the existing structure(s) with the applicant and record it on the Stream Crossing Evaluation Form (Appendix C). When measuring the width of an existing structure, measure the most limiting width (for example: the narrowest pipe in a series of "necked-down" or "end-to-end" pipes, or the narrowest point between abutments of a skewed bridge perpendicular to the flow). If the existing crossing is less than 4' wide or consists of multiple side-by-side structures, the structure is automatically eligible for replacement. Conservation district staff should record the type and opening width of the multiple structures for reference on the evaluation form and keep it in the project files.

The group should walk the stream corridor upstream and downstream of the existing structure to determine the optimal location to take bankfull width measurements outside of the influence of the existing crossing. Bankfull width is measured perpendicular to the channel thalweg at bankfull elevation. In unconfined channels, bankfull elevation is the point where water fills the channel just before beginning to spill onto the floodplain. This elevation and break-point onto the floodplain typically corresponds to the 1.5 – 2-year recurrence streamflow event. For full explanation and details on how to measure bankfull width, refer to the Bankfull Width Determination Technical Bulletin in Appendix H.

3.2.1 Stream Crossing Evaluation Form

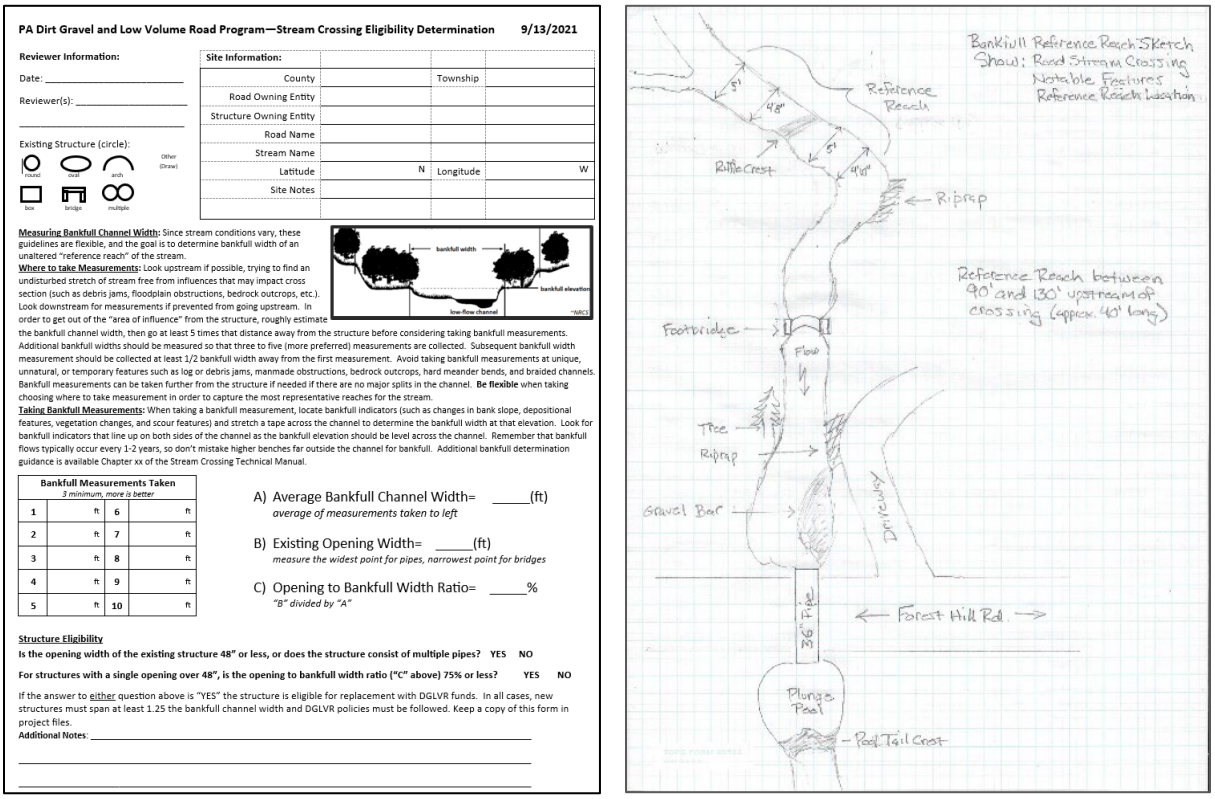
A Stream Crossing Evaluation Form must be completed for each stream crossing to be replaced with DGLVR funds. The Stream Crossing Evaluation form is used to record the bankfull width measurements taken at the project site, and to identify the type and width of the existing structure. It also contains the qualifications for project eligibility for DGLVR funding. This form must be completed by the conservation district and kept in the project file for every stream crossing, even those that receive an exemption from the DGLVR Stream Crossing Standard (section 3.3).

The back of the Stream Crossing Evaluation Form contains room for an aerial sketch of the stream. The sketch should show the layout of the crossing, any significant features (bedrock, side channels, houses, etc.), and indicate where bankfull measurements were taken. Often, bankfull measurements are recorded significantly in advance of an application or contract, and this detailed information will help in the event of turnover in staff that collected the original data.

3.2.2 Determining Structure Eligibility

After staff have completed existing structure measurements and recorded bankfull width measurements, follow the instructions on the Stream Crossing Evaluation Form to determine the "Opening to Bankfull Width Ratio". An image of the Stream Crossing Evaluation Form is provided in Figure 3.1, and the form is available in Appendix C. From the information gathered up to this point, structure eligibility for replacement can be determined. As defined in DGLVR Policy, a structure is eligible for replacement if:

- The opening width of the existing structure is 48" or less
- The structure consists of multiple side-by-side pipes or openings.
- A structure with a single opening over 48" has an opening to bankfull width ratio of 75% or less (letter "C" on the Stream Crossing Evaluation Form).



PA Dirt Gravel and Low Volume Road Program—Stream Crossing Eligibility Determination 9/13/2021

Reviewer Information:

Date: _____

Reviewer(s): _____

_____

Existing Structure (circle):

round | oval | arch | Other (Draw) | box | bridge | multiple

Site Information:			
County		Township	
Road Owning Entity			
Structure Owning Entity			
Road Name			
Stream Name			
Latitude	N	Longitude	W
Site Notes			

Measuring Bankfull Channel Width: Since stream conditions vary, these guidelines are flexible, and the goal is to determine bankfull width of an unaltered "reference reach" of the stream.

Where to take Measurements: Look upstream if possible, trying to find an undisturbed stretch of stream free from influences that may impact cross section (such as debris jams, floodplain obstructions, bedrock outcrops, etc.). Look downstream for measurements if prevented from going upstream. In order to get out of the "area of influence" from the structure, roughly estimate the bankfull channel width, then go at least 5 times that distance away from the structure before considering taking bankfull measurements. Additional bankfull widths should be measured so that three to five (more preferred) measurements are collected. Subsequent bankfull width measurement should be collected at least 1/2 bankfull width away from the first measurement. Avoid taking bankfull measurements at unique, unnatural, or temporary features such as log or debris jams, manmade obstructions, bedrock outcrops, hard meander bends, and braided channels. Bankfull measurements can be taken further from the structure if needed if there are no major splits in the channel. **Be flexible** when taking choosing where to take measurement in order to capture the most representative reaches for the stream.

Taking Bankfull Measurements: When taking a bankfull measurement, locate bankfull indicators (such as changes in bank slope, depositional features, vegetation changes, and scour features) and stretch a tape across the channel to determine the bankfull width at that elevation. Look for bankfull indicators that line up on both sides of the channel as the bankfull elevation should be level across the channel. Remember that bankfull flows typically occur every 1-2 years, so don't mistake higher benches far outside the channel for bankfull. Additional bankfull determination guidance is available Chapter xx of the Stream Crossing Technical Manual.

Bankfull Measurements Taken *3 minimum, more is better*			
1	ft	6	ft
2	ft	7	ft
3	ft	8	ft
4	ft	9	ft
5	ft	10	ft

A) Average Bankfull Channel Width= _____(ft)
average of measurements taken to left

B) Existing Opening Width= _____(ft)
measure the widest point for pipes, narrowest point for bridges

C) Opening to Bankfull Width Ratio= _____%
"B" divided by "A"

Structure Eligibility

Is the opening width of the existing structure 48" or less, or does the structure consist of multiple pipes? YES NO

For structures with a single opening over 48", is the opening to bankfull width ratio ("C" above) 75% or less? YES NO

If the answer to either question above is "YES" the structure is eligible for replacement with DGLVR funds. In all cases, new structures must span at least 1.25 the bankfull channel width and DGLVR policies must be followed. Keep a copy of this form in project files.

Additional Notes: _____

_____

_____

Figure 3.1 Stream Crossing Evaluation Form

This form is to be completed by the conservation district to quantify the bankfull measurements taken and determine project eligibility. This form is available in Appendix C, and must be kept in project files.

This form must be completed and kept in the project file for every stream crossing, even those that receive an exemption from the DGLVR Stream Crossing Standard.

3.3 Exemptions from the DGLVR Standard

The SCC has created an "exemption" process that may apply to very small channels or to channels where achieving continuity is not possible. This exemption applies to DGLVR Policy only. It does not exempt any project from following any local, state, or federal permit or other requirements. The exemption process is detailed in section 7.1 of the DGLVR Administrative Manual.

Automatic Exemption: Streams with a bankfull width of four feet or less and a drainage area less than 20 acres or a bankfull width of four feet or less and a defined "bed and bank" channel coming to the road of less than 500 feet can be automatically exempted from following the DGLVR Stream Crossing Standard by the conservation district. The conservation district must complete the "Automatic Exemption from the DGLVR Stream Crossing Standard" form in the DGLVR Administrative Manual and keep it in the project file.

SCC-Approved Exemption: Stream crossings that do not meet the automatic exemption criteria above may still be given an exemption, but the exemption must come from the State Conservation Commission. The "SCC Approval for Exemption from the DGLVR Stream Crossing Standard Request" form in the DGLVR Administrative Manual must be completed and submitted to the SCC. If approved, the signed exemption form must be kept in the project file.

Requirements for exempt crossings: Projects receiving an exemption from the DGLVR Stream Crossing Standard still require consideration to be given to streambed and streambank stabilization. Even if channel continuity cannot be achieved, steps must still be taken to ensure stream crossings that receive an exemption from the DGLVR Stream Crossing Standard will result in a stable crossing that will not lead to accelerated erosion or other issues.

- Any requirements from local, state and federal laws and all applicable permits are not waived as part of this exemption and must be followed.
- New structures must still be a single span at a minimum of 1.25 times or 125% of the bankfull channel width unless otherwise approved by the SCC.
- Ensure the stability of the channel upstream and downstream. Grade controls must be shown on plan drawings if drawings are required.
    - Upstream: Grade control(s) are required above the inlet of the new structure to prevent headcutting (headward erosion lowering channel elevation that moves upstream over time). If a larger structure is installed in a channel with road height limitations, installing a larger structure below the existing streambed elevation without grade control(s) will likely cause a headcut.
    - Downstream: Outlet stabilization is required in the form of grade controls, bank armoring, and/or filling in scour holes. Pipes may need to be extended further off the road, and the erosion potential caused by any elevation drops must be considered.
- New structures must be properly aligned with the channel, unless not feasible due to permitting restrictions or other constructability restraints.
- Consider floodplain connectivity when necessary (e.g., high water by-pass, overflow pipes, etc.).
- If permits and engineered plans are required, conservation districts are required to review all plans and specifications to ensure the project complies with DGLVR Policy and Stream Crossing Standard before they are submitted for permit review.
- Divert surface runoff and road drainage away from the stream and structure in a manner that prevents erosion and prevents direct discharges to the stream.
- All stream crossings must include a headwall and endwall.

3.4 Proposed Project Scope of Work

Stream crossing replacements are complex and time-consuming projects. Discussing many of these potentially complex logistics early in the process, before a grant application is even developed, is the best way

to prevent unforeseen future problems. Some highlights of important discussion topics during the initial site visit are listed below. Refer to the "Pre-Application Meeting Checklist for Stream Crossings" in Appendix G.

3.4.1 Potential Project Timeline

Conservation district staff should clearly discuss realistic expectations for a potential project timeline if funded. Stream crossing replacements can take significantly longer to plan and implement than drainage projects. Some factors influencing the potential project timeline that should be discussed with the applicant include:

- Local factors such as application deadlines and the conservation district's application review, ranking, and contracting process.
- Permit requirements, including time to prepare and submit, and time for required reviews (conservation district and DEP)
- Allowing time for bidding, and material acquisition (especially the structure itself)
- Contractor availability and scheduling
- Regulatory restrictions prohibit instream work on streams that support natural reproduction of trout (wild trout streams) between October 1 and December 31. This restriction includes tributaries to wild trout streams.
- Regulatory restrictions prohibit instream work on stocked trout streams between March 1 and June 15.
- Regulatory restrictions prohibit instream work on Class A Wild Trout Waters October 1 – April 1.
- Depending on stream and site conditions, it may be advisable to schedule construction during times of typical seasonal low-flow conditions.
- Avoid scheduling construction during times where freezing temperatures can complicate excavation and make accurate stream channel reconstruction very difficult.
- Other complicating factors such as utility re-location, potential threatened or endangered species conflicts, especially as identified by the Pennsylvania Natural Diversity Inventory (PNDI), or lack of landowner consent for off-right of way work.

3.4.2 County Specific Policies

Applicants should be informed of county-specific policies, such as required in-kind contributions or paying for the road surface over the crossing, before they develop their application.

3.4.3 Off Right-of-Way (off-ROW) Permissions

Before working outside the road right-of-way, the grant recipient must obtain written permission from the landowner. The full DGLVR off-ROW policy can be found in the DGLVR Administrative Manual Section 3.7.4. With typical rights-of-way of 33' in Pennsylvania, nearly all stream crossing replacements will require channel work outside the ROW to be successful. It is important to have the conversation with the applicant very early in the process about obtaining these off-ROW permissions. This written off-ROW permission should be obtained before the project is contracted and designed, as it may impact the design considerations or even the ability to successfully implement the project. An (editable) example off-ROW consent form to obtain permission from a landowner to perform work and/or outlet water onto their property can be found here: https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/blank-forms.

Where off-ROW permission is needed to achieve channel continuity and meet DGLVR Stream Crossing Standard, landowner permission must be obtained in order to fund the project. If landowner permission is required but cannot be obtained, the project cannot be funded. Contact the SCC in questionable circumstances where a lack of landowner permission may hinder successful project implementation.

3.4.4 Prevailing Wage

When developing the grant application, it is also important to determine early on if the project will be implemented by the applicant, subcontracted, or completed through a mix of a contracted and in-house labor/equipment. The DGLVR Program is subject to the Pennsylvania Prevailing Wage (PW) Act (1961, August 15, P. L. 987, No. 442), 43 P.S. Section 165-1 et seq. Prevailing Wage Rates apply to DGLVR Projects when the total estimated or actual project cost is $25,000 or more (not $100,000). If federal funds are also involved in the project, the project may also be subject to the Davis-Bacon Act. Additional details on PA prevailing wage can be found in the DGLVR Administrative Manual Section 3.7.4 or through the PA Department of Labor and Industry at: https://www.dli.pa.gov/Individuals/Labor-Management-Relations/llc/prevailing-wage/Pages/default.aspx

3.4.5 Professional Design Services

Not all engineers share the same background and specialties. When possible, seek out an engineer or design firm with experience in stream environments as opposed to more urban disciplines such as stormwater and wastewater management. Many grant applicants such as municipalities have engineers they typically use on retainer. Having an engineer on retainer is a commitment to that engineer but does not obligate the municipality to use that engineer for every project. Just like a municipality would not hire a nuclear engineer to design their new municipal building, an urban stormwater engineer may not the best choice for designing stream restorations and stream crossings. Ensure the applicant understands that the requirements of the DGLVR Program exceed those associated with traditional crossing-replacement practices. The applicant needs to be aware of the corresponding increase in the engineer's scope of work. Additionally, the applicant needs to be aware of how DGLVR grant funding can be utilized to help pay for engineering, permitting, and similar consulting costs:

- Engineering costs paid with DGLVR grant funds are limited to 20% of the total contract, up to a cap of $25,000. More details can be found in Sections 3.7.4.7 and 7.1.2.4 of the DGLVR Administrative Manual.
- Any engineering costs above that limit will be the responsibility of the grant recipient and can be counted as in-kind towards the project.
- Engineering costs incurred before a contract is signed with the conservation district cannot be paid with DGLVR funds (but can count towards in-kind).
- Refer to Chapter 12 of this document for more details on engineering requirements.

When is an Engineer Needed?

- An engineer is needed for all stream crossing replacement projects subject to the requirements of the DGLVR Stream Crossing Standard.
- An engineer is needed for all projects that will require a GP-7 or GP-11 permit on a publicly-traveled roadway. The plans specification and reports must be sealed by a professional engineer (P.E). This includes any project that may be covered by an exemption from the DGLVR Stream Crossing Standard, but still requires a PA DEP permit.
- Any project that will be authorized under a PA DEP/USACE Joint Permit will required an engineer.

When is an Engineer Not Needed?

- An engineer may not be needed if the project is covered by an exemption from the DGLVR Stream Crossing Standard *AND* requirement of a GP-7, GP-11 or Joint Permit has been waived by PA DEP.

3.4.6 The Engineer's Scope of Work

The engineer's scope of work must be consistent with the requirements of the DGLVR Policy and the Stream Crossing Standard. It will be beneficial for the conservation district to provide these documents to the grant recipient as early in the project lifecycle as possible to assist the grant recipient and engineer in defining a scope of work and fee for the engineering services needed. While not required for use, the template Request for Proposals (RFP) form provides the framework for a generalized scope of work that should fit most stream

crossing replacement projects funded through the Program. Additional scope items, to be added at the discretion of the grant recipient, might include construction survey stakeout or additional meetings and plan revisions during the conservation district plan review process. These work elements are not required by the Program but contribute greatly to project success and are strongly recommended.

3.4.7 Permitting

The DGLVR Stream Crossing Standard requires that the engineer submit design plans and specifications to the conservation district for review (see Chapter 12 for more information). This review must be completed by the conservation district to ensure the plans and specifications comply with DGLVR policy and the requirements of the Stream Crossing Standard. The grant recipient (or their engineer) may not submit materials for permit review and issuance until written notification is received from the conservation district that a satisfactory review has been completed by the conservation district and all DGLVR Program requirements have been met. Upon receipt of this notification, the grant recipient (or their engineer) may then submit to the appropriate regulatory agencies for the permits needed to authorize the project.

Any required project permits must be obtained by the grant recipient before site / installation work (construction) can begin on the portion of the project related to the permit. The DGLVR Program does not have any special permits or permit exemptions, and all applicable permit requirements must be followed (even for sites given an exemption from the DGLVR Stream Crossing Standard described in 3.3).

3.4.8 Local Ranking and Evaluation

Applicants should also be notified of the evaluation and ranking process completed by the quality assurance board and conservation district staff. If the scope of work an applicant is proposing would benefit from revisions such as addressing other roadway base and stormwater drainage improvements, staff should make these recommendations. Stream crossing projects should not only address the stream but should address all drainage and roadway base problems that contribute to the sedimentation of the water resource at that proposed project location. If the scope of work is too great for one funding cycle, conservation districts should consider in their local policy how to handle phased projects and provide that information to the applicant.

3.5 SCC Notification

Conservation districts are required to notify the SCC of proposed stream crossing replacements as soon as practical before a contract is signed. An online notification system is available by logging in to the CDGRS website (same log-in as accessing the GIS system) at www.dirtandgravelroads.org. For projects covered by an exemption from the DGLVR Stream Crossing Standard, an online notification is still required.

4. SITE ASSESSMENT

This chapter concerns the preliminary Site Assessment that is typically conducted by the conservation district and is used to determine details for the grant application. The conservation district's Site Assessment also provides a valuable tool for later review of the engineer's design plan for consistency with DGLVR Program Policy and the Stream Crossing Standard.

The DGLVR Stream Crossing Standard also requires the design engineer to either utilize the Site Assessment completed by the conservation district (if provided) or conduct their own separate Site Assessment (after a contract is established) to inform stream crossing replacement design. The conservation district must be on-site while the Site Assessment is being performed by the Engineer and/or Surveyor. The conservation district must observe and assist with the Site Assessment and ensure all important field data is obtained. More information on the design survey requirements for engineers can be found in Chapter 12 of this document.

A Site Assessment (longitudinal profile (long-pro) and cross sections) must be collected from the project site by the conservation district before QAB recommendation for funding. This site assessment is necessary to develop an accurate grant application, including scope of work and materials list.

A longitudinal profile involves an elevation survey along the length of the stream channel thalweg (lowest point of streambed) upstream, downstream, and over the existing structure/roadway. The long-pro guides a variety of decisions from structure selection, to determining the length of stream to be restored (reconstructed reach) to the amount and type of streambed material and grade control features needed. The long-pro includes a "reference reach", representative of the typical, relatively-unimpacted condition of the stream channel beyond the immediate influence of the existing undersized structure. Cross-sections collected from the reference reach provide guidance on the shape and dimensions of the channel to be reconstructed. Cross sections from the outlet scour pool help determine the amount of material and labor needed to restore a stable stream channel downstream of the crossing outlet.

This chapter provides a brief overview of the Site Assessment and its importance. Comprehensive instructions for completing the Site Assessment can be found in the Site Assessment Technical Bulletin (Appendix H).

The Site Assessment should be done as early in the project lifecycle as possible and must be completed by the conservation district prior to the QAB recommending projects for funding. Once a site is determined to be eligible and the road owner has expressed interest in applying for a grant, the Site Assessment should be completed. The Site Assessment can be completed by conservation district staff or their designee. A Site Assessment must be completed for every prospective stream crossing project for which a grant application will be submitted. Projects where an SCC Approval for exemptions from the DGLVR Stream Crossing Standard is requested must also have a Site Assessment completed to assist the SCC in the decision-making process. Staff from the SCC or CDGRS are available to assist with Site Assessments as needed. Stream crossing replacement projects for which an Automatic exemption from the DGLVR Stream Crossing Standard apply do not require a Site Assessment to be performed.

4.1 Longitudinal Profile

A longitudinal profile (long-pro) can usually be collected with two 300' tapes, a laser level/stadia (survey rod), field book, flagging and stakes. If available, other equipment such as total station or survey-grade GPS could be used. These tools will allow you to record distance and elevation data points defining key elements of the streambed, existing structure, and roadway that can later be plotted on a graph.

The longitudinal profile survey captures important data points along the channel thalweg that define existing channel slope and bedform. Critical data to be collected include start and end of grade control features, deepest point of pools, existing structure elevations (invert and top), and profile of the roadway. The longitudinal profile is used to determine the extent of instream work (length of reconstructed reach) necessary to reestablish channel continuity through the project site. Materials, quantities, labor, and equipment needed to complete the anticipated instream work can then be reflected in the grant application. Aspects of the project that directly influence structure selection (size and type) such as width, rise, and minimum required bury depth are derived from the longitudinal profile (and cross sections, see below). Reference Chapter 5 for more information on the grant application process.

Figure 4.1 shows a graphical representation of a longitudinal profile at a project site. While DGLVR Policy requires that the longitudinal profile assessment must extend a minimum of 150' upstream and 150' downstream of the crossing, the actual extent needed may be greater, in order to capture an appropriate reference reach and to establish start/end points at grade control crests. Consider determining the length of the longitudinal profile as a function of the stream size (20-30 bankfull-widths, for example). This will help make the assessment more site-specific and applicable and help ensure that the needed types of field data are collected. More detailed information regarding the methods for completing a longitudinal profile assessment can be found in the Site Assessment Technical Bulletin and in Chapter 12 of this manual.

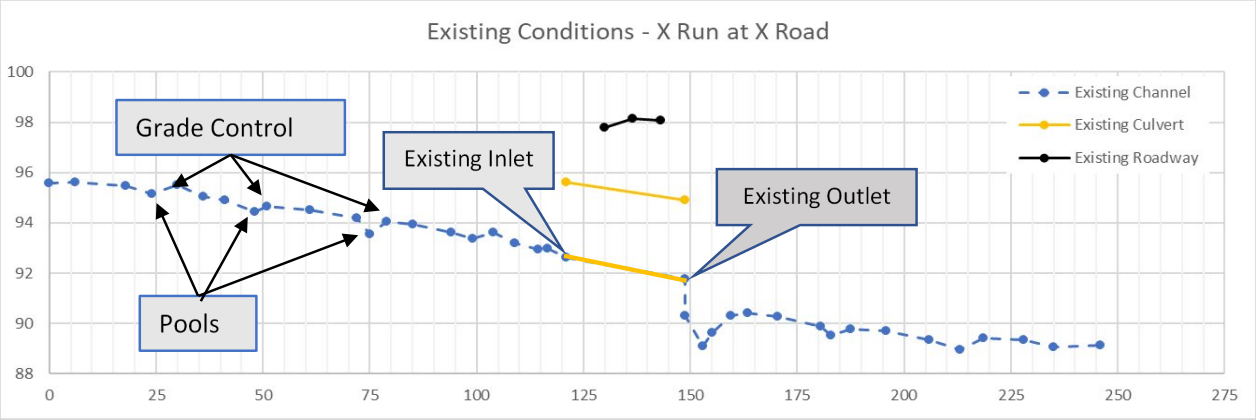


Figure 4.1 Longitudinal Profile Example Graph

An example of a long-pro survey plotted in Microsoft Excel. Stream features such as slope, grade control spacing, and average pool depths can be obtained from the data in this long-pro.

4.2 Cross Sections

As part of the Site Assessment, at least 2 cross-sectional surveys must also be completed. A cross-sectional survey is run perpendicular to the channel thalweg. At minimum, these cross sections should be located at a grade control crest within the reference reach and across the deepest part of the outlet scour pool. If no outlet scour pool is present, locate this cross-section through a pool in the reference reach. The cross-section assessment will identify features defining channel width and depth such as the thalweg, bankfull elevations, and bankfull width. See Figure 4.2. In the grant application process, this information is used to estimate materials, labor, etc. necessary to address project needs such as construction of bank margins and reclamation of channel width and depth through the outlet scour pool (and in some instances, further downstream).

For consistency in sharing and evaluating Site Assessment data, cross-sections should be surveyed starting from the left bank (facing downstream) and moving across the channel toward the right bank. More information regarding cross-section assessments, including field methods and critical data points to be captured, are included in Chapter 12 of this manual and in the Site Assessment Technical Bulletin (Appendix H).

Existing Conditions - X Creek at X Road

XS #	1		
LP STA	46		
HI (ft)	103.7		
STA	FS	NOTE	ELEV
0	5.13	Top of Left Pin	98.57
0	5.66	Base of Left Pin	98.04
5	5.86	Floodplain	97.84
8	5.9	Bankfull	97.8
13	6.62	Left Edge of Water	97.08
13.9	6.94	Bottom of Left Bank	96.76
20.3	7.34	Thalweg	96.36
23	7.08	Bottom of Right Bank	96.62
25	6.64	Right Edge of Water	97.06
30	5.62	Top of Right Bank	98.08
34	5.51	Floodplain	98.19

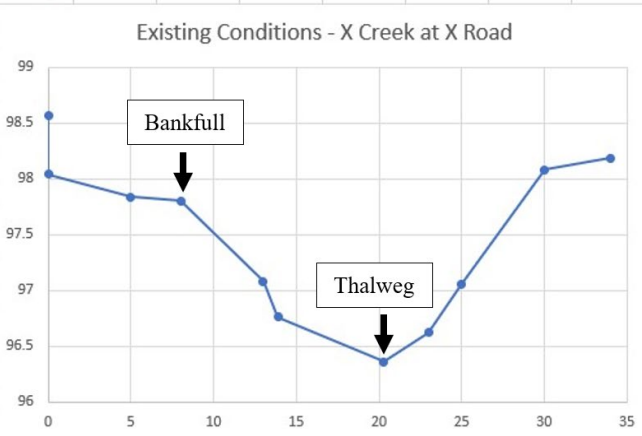


Figure 4.2 Cross Section Example Graph

An example plot of a surveyed stream channel cross-section. Surveyed sections at the reference reach inform elements of reconstructed reach design such as bankfull (bank margin) height and thalweg depth.

4.3 The Reference Reach

The reference reach serves as a representation of the 'typical' physical characteristics of the stream channel beyond the area impacted by the existing undersized crossing. These impacts may include excessive sediment deposition or bed / pool scour, channel braiding, increased bank erosion, and/or over-widening of the channel. As long as the slope of the reference reach is relatively similar (+/-25%) to that of the stream reach to be constructed for channel continuity, aspects of the reference reach such as grade control feature type, length, and spacing can be copied from the reference reach to the design and construction of the reconstructed reach. Cross-sectional dimensions such as bankfull width, bankfull depth, and cross-sectional shape in the reference reach can also be applied to the reconstructed reach.

To find an appropriate reference reach, look both upstream and downstream of the area where impacts associated with the undersized crossing are evident. During the site walkthrough, look far enough upstream and downstream of the impacted area to determine what 'typical', relatively unimpacted conditions look like. Using the upper and lower limits of the impacted stream segment as an initial guide, estimate the approximate slope of the reconstructed reach necessary to reconnect those two potential tie-in points upstream and downstream of the roadway. An appropriate reference reach will have a slope that approximates the estimated slope of the reconstructed reach (+/- 25%). In instances where a reference reach with the appropriate slope cannot be identified within reasonable proximity to the project site, contact CDGRS for assistance.

Width and depth of the reference reach channel, both at grade control locations and the pools in between, will be reflective of the 'typical' pattern of widths and depths through the unimpacted portions of the stream channel. Similarly, the reference reach should exhibit the same dominant bedforms and grade control types as those present through the overall unimpacted stream reach. As a rule, avoid selecting a reference reach that will include anomalies or deviations from the 'typical' character of the portion of stream channel not impacted by the crossing.

Extending the length of the longitudinal profile provides opportunity to include multiple potential reference reaches, which can help choose the best-applicable reference data for developing the grant application. If an appropriate reference reach is not located in proximity to the crossing, one could be established at a separate location on the same stream. In this case, a separate reference reach survey may be conducted that is not continuous with the longitudinal profile survey at the project site. An appropriate "disconnected" reference reach must still meet the criteria listed above.

Additional information regarding reference reach selection and data collection can be found in the Site Assessment Technical Bulletin (Appendix H) and in Chapter 12 of this manual.

4.4 Recording Site Assessment Data

When conducting the longitudinal profile and cross-section assessments, three pieces of information should be recorded for each data point collected. These include:

- *Station*: the distance along the transect being assessed. If a laser level and measuring tape is being used, this would be the tape reading. The assessment typically begins at Station "0" (the start of the tape).
- *Foresight*: if using a laser level, this is the reading taken from the stadia rod. If using more-advanced survey equipment, this might be recorded as an actual elevation. Foresight readings collected in the field can be translated to elevations later, based on the benchmark and laser (height of instrument) elevations.
- *Notes*: a brief description of the feature of interest where the data point is being collected.

Consistency in the way field data is recorded by the conservation district, CDGRS, and the engineer/surveyor can go a long way in streamlining communication and the sharing of information among the project participants. Clarity and consistency of field notes and good organization of Site Assessment data can greatly assist the conservation district in completing the required design plan review in a timely manner. Specifically, using a standardized system for noting typical features collected during the Site Assessment will help understand how the field data translates to the recommendations prepared by the conservation district for grant estimating, as well as to the design criteria developed by the engineer. The Site Assessment Analysis Tool (Section 4.5, below) utilizes a standardized list of notations for designating common features collected in the field. Utilizing this same notation system when recording field notes during the Site Assessment will streamline use of the Tool and collaboration between partners.

The Site Assessment Technical Bulletin (Appendix H) provides more information on recording field data and includes the standardized list of notations referenced above.

4.5 Site Assessment Analysis Tool

The CDGRS has worked with Trout Unlimited to develop a Site Assessment Analysis Tool for entering and analyzing site assessment information. Based on the field data entered into the tool, recommendations are generated for reestablishing channel continuity through the project site by predicting the necessary length and slope of the reconstructed reach. From the reference reach assessment data, the tool can predict grade control feature spacing through the reconstructed reach and the minimum bury depth of the invert or bottom of footings. This information can be used to estimate materials, quantities, and labor/equipment needed for streambed reconstruction. The tool will also produce a graph similar to the one in Figure 4.1 that displays the relationship between streambed, invert/footing, and roadway elevations. This information can be used to estimate approximate dimensions of a replacement structure that meets the DGLVR Stream Crossing Standard. This preliminary estimate of structure size is intended to support the cost estimation for the grant application. It is understood that in most cases, final structure selection and dimensions will be determined by the engineer during project design. The final structure selection often may vary slightly in size and cost from the preliminary estimate derived from the conservation district's site assessment.

The Site Assessment Analysis Tool includes detailed instructions for its use. The Stream Crossing Certification Training provided by CDGRS provides in-depth guidance regarding use of the tool. Additionally, assistance is available for project-specific use of the tool through CDGRS.

5. Grant Application for Replacement Structures

The previous two chapters walk through how to collect site-specific assessment data and generate site recommendations from the data. Stream crossing projects typically require much more pre-application and pre-ranking work than a typical DGLVR project. The Site Assessment results inform structure selection, depth of burial, structure width, proposed replacement slope, roadway cover, and grade control type (step, **riffle**, etc.) and suggested spacing. The results also account for maximum scour depth for pool features to provide for the stream channel to naturally adjust, regardless of the structure having an invert or not. This chapter provides additional context for grant applications and cost estimates. Additional training and guidance are available through the CDGRS and SCC for assistance with cost estimates.

5.1 Structure Selection

The type and size of the new stream crossing structure is a major cost and logistical factor in developing the grant application.

5.1.1 Opening Width

Per DGLVR Program Stream Crossing Standard, structures must be of adequate width to accommodate the following:

- Construction of a parabolic-shaped, bankfull-width channel within the structure that includes a defined low-flow channel (thalweg), measured at the bankfull (bank margin) elevation.
- Installation of robust bank margins, comprised of rock sufficiently-sized to be stable at the Q100.

Additionally, the replacement structure must have sufficient rise (must be "tall" enough) to allow for the minimum bury depth of the invert and ensure that the Q100 water surface elevation does not exceed 80% of the finished opening height. The fact that manufacturers provide structures in a range of standardized "height-x-width" sizes may also influence final structure width in order to ensure the rise height needed. Once these sizing criteria are met, the **effective structure width** must be no less than 1.25-times the bankfull width of the stream at the bankfull (bank margin) elevation. In design, the shape of the selected structure and required bury depth (Section 12.1.12) both influence the effective structure width. In most instances, effective structure width (at the bankfull elevation) will be narrower than the vendor's listed structure width, which is commonly measured at the widest point of the structure. Effective structure width and the various sizing criteria to be met must be considered whenever a conservation district discusses potential structure size requirements with the grant recipient or engineer for a given project. In most instances, structures greater in width than the minimum 125% bankfull width will be necessary in order to meet all sizing requirements. Figure 5.1 shows the difference between a structure's effective width at bankfull elevation and the width listed by the manufacture.

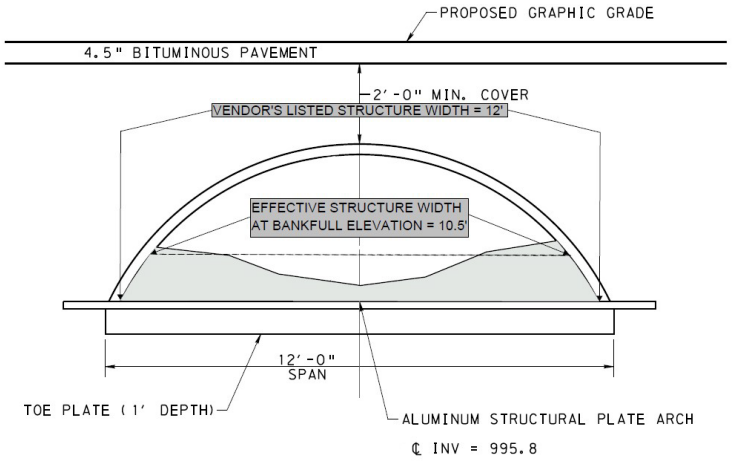


Figure 5.1 Effective Structure Width

This figure shows the difference between the manufacturer's listed structure width (12', measured at the plate invert) versus "effective" structure width (10.5', measured at the design bankfull channel / bank margin elevation). To meet DGLVR Program Policy, the effective structure width cannot be less than be 1.25x the bankfull channel width.

Some consideration should also be given to constructability when determining a structure size. Wider structures allow for increased streambed stability by reducing flow depth and velocity at a given discharge. Wider structures with a corresponding "taller" rise may also make construction of grade controls, streambed, and bank margins easier by allowing the use of larger equipment.

The DGLVR Stream Crossing Standard also requires that "New stream crossing structures shall be designed to pass the 100-year discharge at a water surface elevation not to exceed 80% of the finished opening height " See Figure 5.2 for a visual representation.

The conservation district and grant recipient are not expected to calculate the 100-year discharge or rock sizes stable at Q100 during the grant application phase. At this point in the grant application process, the estimated structure dimensions will be based largely off the bankfull channel width, estimated rock size for stable bank margins, minimum bury depth required, and existing streambed and roadway elevations. Once the 100-year discharge calculations are provided by the engineer, adjustments to structure size (width, height, or both) may be necessary. The engineer will typically specify a final structure size during project design.

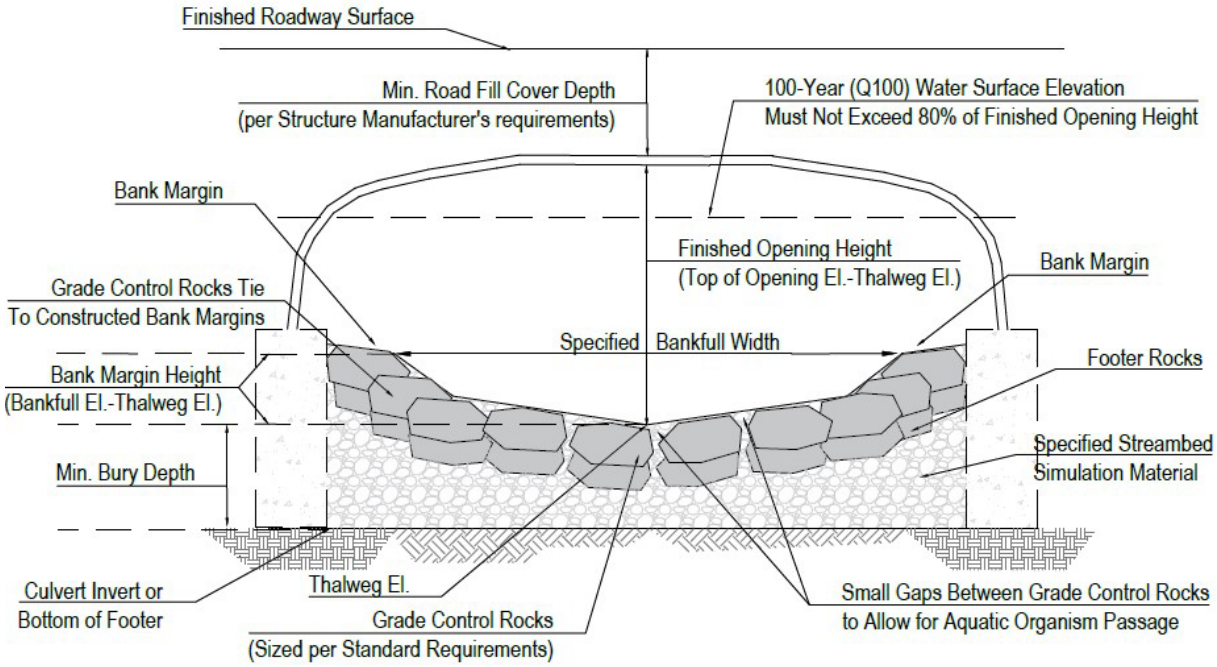


Figure 5.2 Example Structure Cross Section showing the 100-year (Q100) discharge at 80% of the finished opening height

*A typical cross section **at a grade control crest inside the replacement structure**, showing channel shape through a culvert. The bottom line represents invert or recommended bottom of footing burial depth. The dashed line shows the water surface elevation of the 100-year discharge.*

5.1.2 Other Considerations affecting Structure Selection

In addition to the information gathered from the Site Assessment and subsequent design recommendations, applicants should take into consideration any factors in addition to the site data that might influence stream crossing structure selection, such as:

- Applicants may be guided by local municipal policy that encourages the use of concrete structures due to lifespan estimates.
- An applicant may propose completing the work in-house (such as with a municipal workforce) and may have equipment or skilled labor limitations.
- Often, sites considered for a grant application are remote and have weight restrictions, limited turn radius, or other impediments to access to the site for oversized deliveries.
- Material selection also considers the cost and time to manufacture, acquire and install a structure.
- Dead-end roads may warrant consideration of structures that can be installed quickly, such as structures delivered in place, or that can be assembled adjacent to the project site and lifted into place.

Applicants and conservation districts should become familiar with structure material suppliers or distributors in their local area and utilize sales consultants for structure estimates. Often, recommendations developed from a Site Assessment may reference a product number from a catalog with span, rise and length information that can be cross referenced to structures offered by various manufacturers. Applicants should discuss with manufacturers the minimum and maximum road cover requirements of the suggested structure and inform the manufacturer of the proposed cover recommended from the Site Assessment and design recommendations. Per the DGLVR Stream Crossing Design Standard, bottomless structures shall be used for all structure replacements where the continuity slope of the channel through the project area will be greater than 4.0% or the bankfull width is over 20', as determined by the Site Assessment.

If a structure, regardless of type (metal pipe, concrete box, bridge), exceeds 20 feet of clear span opening (measured along the centerline of the road), the structure is subject to Federal Highway Administration inspection requirements. Local ordinances may require inspection for structures less than 20 feet of clear span opening as well. Often the inspection entity will request computations for all commonly accepted design loads to report to PennDOT in their Bridge Management System (BMS). HS20, HS25, PHL93 are all acceptable load ratings, but the most current rating is PHL93. Calculations for ML-80 and TK-527 ratings may also be required for the BMS. The structure manufacturer can often provide these rating factors as part of their engineer-sealed shop drawing and supporting calculations. These calculations may add additional cost to the structure, but this often offsets greater costs than if ratings were to be developed by the project engineer. If load calculations are going to be required, indicate this when obtaining an estimate. For more information about federal highway inspection, contact the county's Municipal Services Representative or the PennDOT District Area Bridge Department.

Headwalls, endwalls, and wingwalls are key components of a successful stream crossing replacement. These appurtenances to the replacement crossing structure should not be underestimated for their importance in guiding stream flow into the structure during high flow events and their role in protecting the structure backfill from being eroded. Headwall and endwall materials that closely fit the curvature or angles of the replacement structure have the greatest chance of preventing stream flow from piping between the structure and the backfill. Headwalls and endwalls can be pre-fabricated, cast-in-place, or can be constructed from native rock or other materials so long as adequate measures are taken to prevent the loss of backfill material. Because they are required for all DGLVR stream crossing replacement projects, applicants should include a headwall and endwall in their cost estimate for their grant application. Wingwalls should also be included, if project needs warrant their use. During the design phase of a project, final details of height, length or angle of wing wall departure can be modified by the engineer as needed.

Some manufacturers also offer pre-assembly or on-site assembly of their product. Often, there is also an option for on-site assistance provided by the manufacturer to help the local or subcontracted labor with product assembly and backfill. With a structure cost estimate, manufacturers can also provide an estimated weight of the structure based on its width and length. This is helpful during the development of a grant application to determine if a crane or other specialized piece of equipment is required to set the structure in place.

Additional structure material options may include utilizing baffles, toe plates, polymer coatings, etc. to address various site conditions. Utilizing these types of additional features should be discussed thoroughly with the manufacturer. Additionally, CDGRS or Trout Unlimited (TU) staff can help determine the applicability of these options to a project. For additional information on structure types and selection, see the Structure Selection for Stream Crossings Technical Bulletin in Appendix H.

5.1.3 Baffles

In some situations, baffles can be used to enhance streambed retention within the replacement structure. When properly applied, baffles can increase the long-term persistence of the streambed within the structure by bolstering the ability of constructed grade controls, key pieces, and larger foundational components of the streambed material to withstand higher flood flows. This can be especially beneficial in smaller structures, where optimal placement of these stream restoration components is often more logistically challenging. The use and application of baffles should be considered on a project-by-project basis. Baffles, if used, should be designed to supplement, and not replace, the functions provided by constructed grade controls, key pieces, and other essential components of proper streambed reconstruction through the structure. Applied correctly, baffles serve to hold grade control and streambed material in the pipe. Properly applied baffles should not be visible in the finished channel. When applied incorrectly, baffles can lead to problems such as increased streambed scour downstream and/or excessive accumulation of sediment upstream. These issues can significantly disrupt channel continuity and aquatic organism passage through the crossing and can contribute to further channel adjustments upstream and downstream of the culvert.

5.2 Aggregates

Aggregate is often a significant component of a grant application budget. Various types of aggregate may be used for a range of applications during a stream crossing replacement project. Aggregates can be referred to using different standardized classification systems or by local terminology. For a breakdown of aggregate gradations and reference to the AASHTO and PA Specification System, see the Technical Bulletin: Aggregates 101 – Common Aggregates in PA at www.dirtandgravel.psu.edu.
Cost estimates should include aggregate proposed for:

- Foundation bedding material (PennDOT 2A, 2RC, etc.)
- Structure backfill (2A, 2RC, etc.). Aggregate must meet manufacturer's recommendations for backfill requirements.
- Grade Control material (rock, native stone, etc.)
- Materials to fill plunge pools (rock rip-rap, bankrun gravel, native excavation, etc.)
- Streambank stabilization material (rock rip-rap, logs, mud sills, root wads, large woody additions, etc.)
- Roadway surface material (Driving Surface Aggregate (DSA), 2A, asphalt, etc.)
- Backfill material for other drainage practices such as road fill for entrenchment, stormwater cross pipes, underdrains, French mattresses, high water bypasses, etc.

Quarried rip-rap for use as grade control, bank margins, or bank stabilization shall be sound, durable and able to withstand exposure to air, water, freeze and thaw as outlined in the DGLVR Stream Crossing Standard. This requirement is in place because rock used as stabilization, bank margins, or grade control is specified by the engineer to be a minimum stable size and should not break down to smaller sizes over time.

In many cases, material excavated during construction can be reused on the project. However, the viability of such material is often not known until construction begins. When preparing a grant application, the grant applicant should assume all new material will need to be purchased when developing cost estimates. This will help avoid cost overruns during project construction.

Compaction is an important consideration when estimating aggregate quantities. Aggregates that are well-graded, which contain multiple particle sizes and smaller "fines," will compact. Open-graded or "clean" aggregates with little to no fines will not compact. When developing material quantities for grant application development, remember that field measurements are often taken in feet or meters and will produce a volume of aggregate needed, but aggregate is typically sold by the ton. When converting between volume and weight, it is important to know whether the aggregate will be compacted or not.

CDGRS maintains an online material calculator on its website that can be used to estimate quantities and costs: https://www.dirtandgravel.psu.edu/general-resources/dglvr-materials-calculator This calculator can be used to determine volumes of compacted or uncompacted aggregates.

5.3 Streambed (Substrate)

Streambed material is a critical component of a successful stream crossing. As part of the grant application, it is important to estimate the potential volume of material to be purchased. As noted above, in many cases, material excavated during construction can be reused on the project. However, the viability of such material, especially for use in the stream bed, is often not known until construction begins. At best, this material may be useful as an added component to the substrate used to reconstruct the stream channel. In most cases, native streambed material alone (excavated from the project site) should not be the sole component of the substrate specified by the engineer. For this reason, assume new material will need to be purchased when developing cost estimates to avoid cost overruns, and to prevent the use of undersized substrate material for streambed reconstruction.

An initial estimate of streambed material quantity can be derived from the Site Assessment Analysis Tool, once the length of reconstructed reach, preliminary structure dimensions and minimum structure bury depth have been determined.

- Compare the average difference in elevations between the existing and proposed streambeds to determine an estimated depth of streambed material needed
- Multiply by the estimated structure width and length of the reconstructed reach to estimate a conservative volume of streambed material needed.

When reconstructing the streambed through the structure and reconstructed reach, it is critical to estimate materials needed not only for the low flow and bankfull channels, but also the bank margins. The size and composition of the material will vary from site to site, but a good starting point for estimating the size of material needed is by replicating what is observed within the reference reach. This will provide a good initial estimate that will help avoid cost overruns during construction. In final design, the project engineer will specify material sizes and substrate gradations necessary to meet the requirements of the DGLVR Stream Crossing Standard. Be sure to account for compaction of streambed materials in the volume estimate. If use of excavated native streambed material might be considered for a project (depending on the quality of the material), plan accordingly by arranging for onsite stockpiling of the material so the material is not taken to an off-site location. Additionally, during development of the grant application, careful consideration should be given to specialized equipment needs that may be required to place material within the proposed structure. For more specific guidance on streambed materials and placement, refer to Section 12.1.8 and the Streambed Restoration Technical Bulletin in Appendix H.

5.4 Erosion and Sediment Control Materials

Unless determined early in the project lifecycle that the applicant's local work force will construct the stream crossing replacement project, it is often difficult to anticipate an engineer or a contractor's preferred methods for erosion and sediment (E&S) controls. However, the conservation district's familiarity with common E&S methods and Best Management Practices (BMPs) for stream projects should help guide development of the grant application.

Many times, an engineer will provide options for managing stream flow during construction, which will include bypass pumping, fluming through or around the project work area, or some combination of these. Applicants should make an educated estimate of the types of materials that may be needed for E&S and the length of time they may be needed. The cost of using a 6" bypass pump 24 hours a day for three weeks is very different from fluming through the site with a cofferdam and plastic pipe.

Applicants should include anticipated materials needed as part of the grant application. If the project will be subcontracted, at a minimum a line item for E&S controls should be provided in the grant application that shows the conservation district and QAB that a budget consideration has been made for this component of the project. A list of the following items to consider for E&S controls are:

- Flume pipes (bypass pipe free-flowing through or around crossing)
- Bypass pumps and trash pumps

- Cofferdam materials (sandbags, jersey barriers, plastic sheeting, sheet pile, etc.)
- Silt fence, super silt fence, compost filter sock, drop inlet bags, filter bags, rock filters, energy dissipaters, etc.
- Topsoil, soil amendments, seed and mulch or hydroseeding, reinforced vegetation matting, etc. (PA Erosion & Sediment Control Manual)

5.5 Drainage and Other Support Materials

Applicants are encouraged to look beyond the immediate area of a stream crossing replacement and determine if the scope of work should include additional ESM practices to disconnect stormwater from directly discharging to a stream without a buffer. Materials that might also be included in the cost estimate include:

- Stormwater pipe (HDPE smooth bore, concrete, etc.)
- SDR 35 or SCH 40 underdrain (perforated and solid sections as needed)
- Pipe couplers, bands, pipe cleaner and glue, animal guards etc.
- Drop boxes, bicycle or leaf grates, hydraulic cement, etc.
- Flared end sections, geotextile fabrics, geogrids, geo cells
- Guide rails, posting signage and delineators
- Traffic control, barricades, road construction notification signs

5.6 Equipment

Estimates for equipment to complete a project are also subject to the decision of who will complete the project (in-house workforce, subcontractor or combination). Depending on the complexity of the project, the equipment required, and skilled operators available, the equipment detailed in the grant application may vary greatly. Often for a subcontracted project, a preliminary estimate which includes equipment, labor and materials can be obtained by providing a qualified contractor with a brief description of the project. Applicants may also be able to use actual costs from similar projects completed in the area to estimate equipment (or equipment and labor).

If an applicant intends to complete the project on their own, the use of applicant equipment can be reimbursed at the FEMA rates. Those rates can be found at https://www.fema.gov/assistance/public/schedule-equipment-rates. Specialized equipment that is rented by the applicant to complete the project can be reimbursed based on the rental rate. Reimbursement must be limited to the time the rental equipment is utilized on the project site.

As discussed in the structure section, specialized equipment such as a crane may be required. The need to utilize a crane on site should be determined early and reflected in the project budget. A list of equipment to consider is:

- Excavator(s), crane (depending on site conditions and structure type/size)
- Compaction equipment (vibratory plates, jumping jacks, rollers, etc.)
- Water pumps (bypass pumps, trash pumps, etc.)
- Air compressors, or generators for hand tools required for structure assembly
- Trucking (spoils material, backfill, etc.)
- Specialized equipment to place stream bed substrate (motorized wheel barrel, skid steer, conveyor belt, fire hose, etc.)

5.7 Labor

When developing the grant application, it is also important to determine early if the project will be implemented by the applicant, subcontracted, or completed through a mix of contracted and in-house labor/equipment. The DGLVR Program is subject to the Pennsylvania Prevailing Wage (PW) Act. If federal funds are also involved in the project, the project may also be subject to the Davis-Bacon Act. Prevailing wage applies to subcontracted labor. Prevailing Wage Rates apply to DGLVR Projects when the total estimated or actual project cost is $25,000 or more (not $100,000). Prevailing wage estimates for grant application purposes can be determined by submitting a PW determination to the PA Department of Labor and Industry or by

looking at recently submitted projects in your area. Note that a Prevailing Wage Rate determination is only good for 120 days from the date of issuance. If there is no signed contract within 120 days between the applicant and the contractor, a new project serial number must be requested. A "Prevailing Wage & the Dirt, Gravel, and Low-Volume Road Program Frequently Asked Questions for Municipalities" document is available at: https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/reference-material.

5.8 Engineering

Engineering costs paid with DGLVR grant funds are limited to 20% of the total contract, up to a cap of $25,000. More details can be found in section 3.7.4.7 of the DGLVR Administrative Manual.

- Any engineering costs above the limit will be the responsibility of the grant recipient and can be counted as in-kind towards the project.
- Engineering costs incurred before a contract is signed between the grant recipient and the conservation district cannot be paid with DGLVR funds (but can count towards in-kind).
- Refer to Chapter 12 of this document for more details on engineering requirements.

Applicants are encouraged to utilize the Stream Crossing Request for Proposal (RFP) for Design Services to solicit cost proposals for all DGLVR Projects. In the case where an applicant has an appointed engineering firm or in house engineer staff member, the RFP and the DGLVR Stream Crossing Standard should be carefully reviewed to determine the scope of engineering services required to meet DGLVR Program Policy for an accurate budget number. See Appendix F for the Request for Proposals.

5.9 Budgeting for Cost Increases

There are several reasons why actual project costs may be more than the estimate in the DGLVR grant application, such as:

- Inflation of material, equipment, and labor costs in the time between grant application preparation and project construction.
- Changes between the grant application and final project design. Successfully achieving stream continuity through road-stream crossings requires significant design by an engineer. However, in most instances there is no engineer involvement in the development of the grant application since engineering costs incurred before a DGLVR grant contract is signed are not eligible for reimbursement. All parties involved in DGLVR stream crossings should understand that once an engineer begins design work for a funded DGLVR project, aspects of the design may differ from the preliminary recommendations used to develop the grant application. In this regard, project design may incur additional, unanticipated costs.
- Changes to the project plan may be needed at any point in the project due to unforeseen circumstances, such as complications encountered during construction or material shortages. Changes needed to adapt to such circumstances may incur additional costs.

While it is impossible to predict exactly how project costs may change during project design and implementation, conservation districts and grant applicants can plan for some potential cost increases. Conservation districts and grant applicants can prepare for cost increases by discussing potential contingencies and how they might be handled. Conservation districts may choose to add contingencies of potentially 5%-15% to grant applications, either as a standard practice (such as local policy) or on a project-by-project basis.

Before and during application development, conservation districts should clearly discuss the timeline and complexities of stream crossing projects with applicants. See Section 3.4.1 for information about project timelines.) They should also discuss local funding availability and grant amendments. Statewide DGLVR Policy allows conservation districts to add up to 40% of the total contract amount to a DGLVR contract, but conservation districts may have local amendment policies or limited funding availability for amendments. It is important that conservation districts and grant applicants understand the availability (or lack thereof) of additional DGLVR grant funds and the potential ability of the applicant to cover cost overruns.

6. Quality Assurance Board (QAB) Ranking and Review

The QAB is an advisory group impaneled to advise the local conservation district board on matters related to the DGLVR Program. Chapter 4 of the DGLVR Administrative Manual details the QAB and their role in the conservation district DGLVR Program. Stream crossing replacement projects are ranked and reviewed by the QAB like all other DGLVR projects and contracts. The QAB will determine project eligibility, rank projects for funding, and make recommendations to the conservation district Board of Directors on project funding and local policies. Each QAB should determine a procedure to rank stream crossing projects effectively.

While the procedures are the same as other DGLVR projects, stream crossing replacements are often more expensive and much more complicated and time consuming for conservation district staff than typical drainage improvement projects. The project ranking process is locally controlled, and the ideas presented below are suggestions and are not required.

6.1 Considerations for Ranking Stream Crossing Projects

Stream crossing replacements can be funded as stand-alone projects or can be part of a larger DGLVR road project. It can be difficult to rank stand-alone stream crossing replacement applications against other projects since they do not fit into the ranking criteria that many counties have adopted. It is up to individual counties to decide how much emphasis they want to put on stream crossing replacements and how to rank them against drainage projects. Ranking stream crossing projects separately (from drainage/road projects) could be effective to identify which crossings would provide the most environmental benefit. QAB's can choose to rank stream crossing projects along with their normal drainage-style DGLVR Projects as well. Either way, the QAB decides what local factors are important in their county and develop an appropriate ranking procedure based on those factors.

6.1.1 Potential Local Policies Regarding Stream Crossing Replacements

Conservation districts may enact policies at the county level that are more restrictive and do not conflict with statewide policies. Some examples of potential local policies include:

- Stream crossing replacements typically require a larger investment of conservation district staff time than drainage projects. For this reason, conservation districts may consider reducing or limiting the number of stream crossing projects. The number of projects funded can be limited in a number of ways such as: only a certain number of crossings over a certain size will be funded per year; only a certain percentage of a county's allocation will be used to fund stream crossings; etc.
- The QAB may choose to enact a policy to not accept grant applications for stream crossing replacement projects.
- Consider using established aquatic connectivity standards to rank stream crossings against each other. The North Atlantic Aquatic Connectivity Collaborative (NAACC) has an approach that can be used to quantify an "aquatic passability score" on existing steam crossings. More info available at: https://streamcontinuity.org/naacc/assessments/aquatic-connectivity-non-tidal
- Conservation districts that receive a high number of stream crossing replacement applications may consider implementing a "pre-screening" as described in Section 6.2 below.

6.1.2 Other Project Evaluation Tools

A wide variety of tools and resources exist that conservation districts may want to consider using in project rankings such as:

- **PNDI:** search for endangered species (https://conservationexplorer.dcnr.pa.gov/)
- **Chapter 93 Stream Designation:** Lists waters by their designated use (coldwater fishery, warmwater fishery, etc.) (https://gis.dep.pa.gov/emappa/)
- **Stocked or Wild Reproducing Trout:** Identifies waters where seasonal restrictions are in place for in-stream construction activities: (https://pfbc.maps.arcgis.com/apps/webappviewer/index.html?id=65a89f6592234019bdc5f095eaf5c6ac)
- **Stream Stats:** Estimates watershed area, average bankfull width, and average bankfull elevation

(https://streamstats.usgs.gov/ss/)

- Evaluation of Potential for Acid Mine Drainage (AMD) Impacts
- **DEP eMap:** GIS application with a wide variety of information from the PA Department of Environmental Protection (https://gis.dep.pa.gov/emappa/)
- **DGLVR GIS system:** a wide variety of information and mapping tools are available in the DGLVR GIS system (https://www.dirtandgravel.psu.edu/general-resources/cdgrs-mapper-geographic-information-system-gis)

6.2 Pre-screening Stream Crossing Replacements (optional)

Stream crossing projects require much more pre-application and pre-ranking work than a typical DGLVR project. Stream crossing projects are often very detailed and require close review by conservation district technicians to ensure DGLVR Program Policy and Stream Crossing Standard are being met appropriately. An effective pre-screening of stream crossing projects may help reduce the amount of time spent on each potential application. This process involves pre-screening potential projects to determine which ones have a high likelihood of funding. Moving only those projects to the application phase could save time and effort for both applicants and the conservation district by focusing on projects that are more likely to be funded.

7. CONTRACTING

When an application has been approved by a conservation district board, the conservation district will enter into a contract with the successful applicant. The contract with the attachments, when signed by both parties, is a legally binding document between the applicant and the conservation district that describes in detail the responsibilities of both parties. No funding transfers can take place with grant applicants, and no project work can begin, without a signed contract. Any work or engineering costs incurred before a contract is signed are not eligible for reimbursement with DGLVR funds. The contract states the terms and conditions for the project. For more information on contracting, see the DGLVR Program's Administrative Manual at (https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/administrative-guidance-manual)

7.1 Prior to Contracting

Prior to entering into a contract, there are several things for the conservation district and the project participant to consider. Applications and workplans will typically change from the original draft to the final version that will be included in the contract. The final workplan and application for funding must accurately reflect how the project will be completed. The conservation district and project participants should work together to ensure the application and workplan that are included with the contract are the version that will be legally binding in the contract. Any edits or changes discussed during the pre-application and pre-design meetings must be included in the final workplan.

A full engineering design plan is usually not needed to get a potential project through the application and contract phase. Remember that engineering done before a contract is signed cannot be paid for with DGLVR grant funding (it could count as in-kind). The data gathered from longitudinal surveys and discussions with the applicant (and if necessary, their engineer or other outside assistance) should be enough to determine the basic project design parameters such as structure type and size. A simple project sketch and estimation of structure and material costs is usually sufficient to get a project through the application phase and ready to contract. Assistance in providing cost estimates can usually be obtained from structure manufacturers, or with assistance from the SCC or CDGRS.

7.2 Writing a Contract

All contracts must be made using the "Dirt, Gravel, and Low-Volume Road Maintenance Program Contract Agreement" form that has been approved by the SCC. When a contract is signed, the attachments listed on the contract and described below become a legally binding part of that contract. The contract and project-specific attachments must be retained with project files. The contract and attachments can be found at https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/blank-forms.

More information regarding proper contracting procedures is available in the PA DGLVR Administrative Manual Section 3.8.

7.3 Reviewing and Signing a Contract

After the contract has been written and reviewed for accuracy, the contract should be reviewed with the grant recipient. The purpose of this review is for both the conservation district and the grant recipient to fully understand the roles of the conservation district and the grant recipient. It is imperative that the Conservation District clearly explain the requirements of the DGLVR Program and the DGLVR Stream Crossing Standard to the grant recipient and their engineer (if one has already been selected). Once the grant recipient and conservation district have reviewed the contract with attachments, and both entities agree to enter into the agreement, the contract may be signed by both parties. The conservation district and the grant recipient must keep a copy of the final version of the complete contract.

7.4 Amending a Contract

In some cases, the grant recipient may request an amendment to the original contract for additional time and/or additional funding. The DGLVR program allows for contracts to be amended. Amendments up to 40% of the original contract value can be approved at the discretion of the conservation district Board of Directors. Contract amendments over 40% of the original contract value require SCC approval. More information on contracting amendments can be found in the DGLVR Program's Administrative Manual Section 3.5.3.

8. From Contract to Construction

Once a DGLVR contract is signed, there are a variety of tasks to be completed before breaking ground on the project. This chapter outlines the major steps in taking a project from contract to construction.

8.1 Request for Proposal for Engineering / Design

It is the responsibility of the grant recipient to solicit and obtain the necessary engineering and design work for stream crossing replacement projects. Grant recipients may use their appointed engineers or advertise for proposals from other engineering firms. To assist in this process, a model Stream Crossing Request for Proposal (RFP) is available on the CDGRS website at https://www.dirtandgravel.psu.edu/general-resources/stream-crossing-replacements. This model RFP is in Microsoft Word format and must be customized to fit individual grant recipient and project needs. The RFP specifically communicates the scope of work to the engineer and the required deliverables to meet the DGLVR Stream Crossing Standard. This allows for the grant recipient to solicit more competitive pricing by allowing multiple engineering firms the opportunity to offer their services. The RFP also establishes clear expectations of the engineering work to be performed. The template RFP form can be modified for individual projects. The following modifications are highly recommended:

- Request a project schedule from the bidding engineer, which helps ensure the deliverables will be provided in a timely manner
- Require the engineer to attend the pre-design and pre-construction meetings that the conservation district is required by DGLVR Policy to hold.
- Require the engineer to attend the bid site showing if the grant recipient chooses to hold one.
- Require the engineer to cover additional meetings and revisions, such as during the conservation district review process when multiple iterations of review, comment and plan edits might be necessary.

The conservation district can assist the grant recipient with modifying the RFP form to best fit the needs of their project. CDGRS is available to provide technical assistance to the conservation district and grant recipient to help develop a project-specific RFP.

The template RFP form is structured to request itemized fees from the bidding engineer for each of a series of listed engineering tasks. The RFP advertisement can be modified to also request a statement of qualifications as part of the engineer's proposal. Use of the RFP is encouraged for all stream crossing replacement projects but is not required. All bidding practices must comply with the grant recipient's procurement policies and requirements. Engineering costs paid with DGLVR grant funds are limited to 20% of the total contract, up to a cap of $25,000.

8.2 Pre-Design Meeting

After the grant recipient selects an engineer, a pre-design meeting must be held. The purpose of this meeting is for the engineer, grant recipient, municipality, and conservation district to discuss the requirements of the DGLVR Program Policy and Stream Crossing Standard, and how these apply to the specific details and needs of the stream crossing replacement project. This should include whether the grant recipient intends to complete the installation using their own workforce or subcontract the work out. The pre-design meeting should be held before the engineer begins any permitting or design work for the project.

During the pre-design meeting, the preliminary Site Assessment data already collected by the conservation district and the recommendations from that data used to develop the grant application should be reviewed and discussed. Conservation districts may choose to provide their written Site Assessment data to the design engineer at their discretion. The engineer is responsible for the Site Assessment data they use, whether provided by the conservation district or collected through their own Site Assessment. Should the engineer choose to conduct their own Site Assessment to support their design of the project, it is required that the conservation district technician be on-site while the engineer's Site Assessment is performed.

During the pre-design meeting, conservation districts should again discuss with the engineer and grant recipient that the conservation district is required to review all plans and specifications prepared by the engineer. The engineer may not submit materials to regulatory agencies for permit review and approval until

the conservation district has provided written confirmation to the grant recipient that the reviewed plans and specifications meet DGLVR Policy and the Stream Crossing Standard Details about draft submittals, including electronic or hard copy, should be discussed during the pre-design meeting. All parties should leave the meeting with a clear understanding of deliverables and a timeline for completing design plans, permit applications or registrations, and bid packages (if applicable). A checklist has been developed to assist with facilitating a pre-design meeting agenda and can be found in Appendix G.

The engineer is solely responsible for the content of the final design product and corresponding Construction Documents. Throughout the lifecycle of the project, the conservation district is responsible for determining that the project administration, design and implementation are consistent with DGLVR Program Policy and Stream Crossing Standard.

8.3 Design Site Assessment (Survey)

Chapter 4 of this manual provides details on the Site Assessment that is completed by conservation districts before an application is developed. For most crossings, the project engineer or their designee will also conduct a detailed survey of the worksite as part of the design process after a contract is in place. This usually includes surveying site elevations, wetland delineation if needed, etc. The DGLVR Stream Crossing Standard requires that a Site Assessment, including a longitudinal profile and cross sections, be conducted for all stream crossing replacements.

If the engineer chooses to conduct their own Site Assessment, the conservation district is required to be on-site while the Site Assessment is being performed by the engineer and/or surveyor to ensure all important data points are obtained. The engineer shall provide their completed Site Assessment to the conservation district. This can be done at the time the design plans are submitted to the conservation district for review, or any time prior. The conservation district should take the initiative to request the Site Assessment data from the engineer once it has been collected, and then check to see if it is consistent with their Site Assessment. If the conservation district provided their Site Assessment to the design engineer, then the engineer should also see if their Site Assessment is consistent with the district's Site Assessment. The conservation district and engineer should also check to see if their subsequent recommendations / design criteria are consistent, including bedform, grade control characteristics, reference reach selection and applicability to the design (slope), and potential tie-in locations for reestablishing channel continuity.

Chapters 4 and 12 provide more information on the types of field data to be collected during a Site Assessment. The DGLVR Stream Crossing Standard establishes various criteria required in the Site Assessment.

8.4 Conservation District Review of Plans and Specifications

Most commonly, stream crossing replacements funded through the DGLVR Program can be authorized through registration of a PADEP General Permit (GP) #7 or #11. The requirements of the DGLVR Program are generally more stringent that PADEP permit requirements. As such, DGLVR Program requirements meet, and often exceed, the required conditions of the General Permits. In no instance should the issuance of a regulatory permit serve as assurance that DGLVR Policy and Stream Crossing Standard are adequately addressed in the project design. The conservation district review process outlined here is intended to provide that assurance.

The DGLVR Program requires that the engineer provide the conservation district with all plans and specifications for review before submitting for permit approval. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that these submitted documents comply with DGLVR Policy and Stream Crossing Standard before they are submitted (or resubmitted) for permit review. If during the conservation district's review, deficiencies or questions arise, they must be communicated to the design engineer and the grant recipient in writing. Template deficiency letters are available for conservation district use (see Appendix F). Conservation districts should consider providing red-line markups on proposed plan drawings and standard details to help illustrate points documented in writing. Some reviews may prompt a design meeting with the applicant and engineer to discuss complex deficiencies or concerns.

Checklists have been developed to assist conservation districts in reviewing design packages and bid packages (if applicable). These checklists can be found in Appendix G. Once conservation district comments have been satisfactorily addressed to meet DGLVR Policy and the Stream Crossing Standard, the conservation district will notify the grant recipient in writing that their review for DGLVR Policy compliance is satisfied. Template cover letters are available for conservation district use (see Appendix F).

NOTE: It is strongly recommended that the replacement structure not be purchased until the conservation district review of the design package has been satisfactorily completed and a permit has been received. Purchase of a structure prior to satisfactory completion of the conservation district design review and permit approval may lead to the purchase of an improper structure and potential non-payment with DGLVR funds.

8.5 Bidding for Materials and Project Implementation

Stream crossing installations that will be completed by a contractor will most likely require bidding. The threshold for formal bidding for municipalities in PA is adjusted annually. The 2022 bidding threshold in PA is $21,900 (as of 4/2022- check PA Department of Labor and Industry for current rates). DGLVR projects do not have any special bidding requirements or exemptions and must follow standard bidding practices based on the requirements of the grant recipients such as municipal codes, etc. It is the responsibility of the grant recipient to adhere to their bidding requirements.

Bid documents may be prepared by the grant recipient, their engineer, solicitor, a PennDOT municipal service representative, county conservation district, etc. Bid documents do not require a PE seal. Bid documents, in addition to contract terms and conditions, should clearly detail the scope of work and the requirements to meet the DGLVR Stream Crossing Standard and Policy. Specific to DGLVR stream crossing replacements, it is critical that aspects of the construction work not typical of more 'traditional' crossing replacement projects (such as stream channel restoration beyond the right-of-way, detailed reconstruction of the stream channel inside of the structure, etc.) are clearly identified and explained in the bid documents.

A single bid or multiple bids may be utilized to complete one project. Grant recipients may bid materials and placement together in one bid, or they may choose to bid for materials directly from a manufacturer and advertise a separate bid for equipment and labor to implement a project. Municipalities may also utilize the Commonwealth of Pennsylvania's cooperative purchasing program (COSTARS) and state contract programs to obtain materials for DGLVR projects.

The grant recipient or engineer must provide all bid packages (if applicable) to the conservation district. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that those bid documents comply with DGLVR Policy and Stream Crossing Standard before they are advertised to potential bidders.

In some cases, the grant recipient may have materials on hand from a bulk purchase, such as 2A stone or pipes. These materials can be utilized on DGLVR projects as long as documentation of the cost/value can be provided to the conservation district.

8.6 Site Showing for Installation

A pre-bid site showing involves the grant recipient, potential bidders, and the conservation district to ensure all parties are aware of DGLVR Policy and Stream Crossing Standard. Pre-bid site showings are required for DGLVR stream crossing replacements. Conservation districts are required to participate in these site showings. The grant recipient may determine whether contractor attendance at site showings is mandatory to submit bids. Requiring contractors to attend the pre-bid site showing in order to be eligible to submit a bid can help identify oversights in the plan details, cover project expectations and reduce the potential for change orders (edits to the scope of work often including additional financial compensation) after a bid has been awarded. It should also ensure more accurate and competitive bidding since bidders will have a better knowledge of project requirements. Be sure to remind grant recipients and potential bidders of Prevailing Wage requirements. A "Bid Site Showing Checklist for Stream Crossings" is available in Appendix G.

8.7 Grant Recipients Replacing a Structure Using Their Own Workforce

Grant recipients may elect to install as stream crossing using their own workforce. These installations must also follow the DGLVR Stream Crossing Standard. The DGLVR Program may reimburse the grant recipient for materials, equipment, and labor. This may include rented equipment. The municipal workforce is not subject to prevailing wage regulations, but all contracted labor may be.

It is important to have detailed discussions with the grant recipient to ensure they understand the details of the DGLVR Stream Crossing Standard. They need to understand the appropriate materials, equipment and labor needed to complete the project (structure replacement and instream work) to meet DGLVR Stream Crossing Standard and Policy. Many applicants overlook the specialized equipment or manual labor necessary to establish streambed through new structures, or the attention to detail needed to restore channel continuity beyond the footprint of the structure and the right-of-way.

8.8 Pre-Construction Meeting

After a construction contract is awarded, the conservation district is required to hold an on-site pre-construction meeting. Pre-construction meetings typically involve the grant recipient and any contractors and engineers. This on-site meeting provides an opportunity to review the construction plans, specifications and sequence. The meeting should include a walkthrough of the site and discuss schedules, permit requirements, limits of work and disturbance, etc. The group should attempt to identify any potential issues before work begins. During the pre-construction meeting it is important that the conservation district, contractor, engineer and grant recipient establish roles, responsibilities and a clear chain of communication to last through the construction process. If the engineer has developed a plan for concrete inspection and testing, responsibilities for this should be discussed in advance. A "Pre-Construction Meeting Checklist for Stream Crossings" is available in Appendix G to assist conservation districts in conducting a pre-construction meeting.

8.9 Traffic Control

The requirements and responsibility of traffic control will be determined during the planning and design phases of a project and will be included in the bid document if applicable. Road closures or restricted travel lanes are disruptive to normal traffic patterns and may affect local business or public services such as busing, garbage pickup or mail delivery. It is important that the municipality and/or the contractor notify all emergency services of the closure or restricted access. To help alleviate frustration, notification to the public with posts in the newspaper, through social media, door hangers or roadside signage can help the public prepare for a disruption. These notifications should be made as far in advance as possible. Immediately after the pre-design meeting is a good time to plan for detours or road closures, and to start notifying the local community. However, definitive timing of traffic disruptions may not be fully known construction schedules are set during the pre-construction meeting.

9. CONSTRUCTION AND INSPECTION

Conservation districts are required to be on-site regularly during construction of a stream crossing replacement project to ensure DGLVR Program Policy and Stream Crossing Standard are being met. At minimum, conservation districts are required to be onsite during installation of the critical stages of construction outlined in the DGLVR Stream Crossing Standard and Chapter 2 of this manual.

9.1 General Inspection & Contract Authority

Routine site inspection is an important aspect of a successful DGLVR stream crossing replacement project. Through careful consideration of the plan and detail drawings, specifications, observation of site conditions, photo documentation, elevation checks, and detailed field note recordings, conservation district technicians can often bring to light potential problems before they occur.

During the planning phases of the project lifecycle it is important that the conservation district, contractor, engineer and grant recipient develop a good working relationship. Conservation districts should understand their contract authority for the project. In many instances, unless the grant recipient is installing the project with their own workforce, conservation districts will have no contract authority on site with a contractor. If a circumstance arises where modifications are required or site work needs to stop in order to provide time to address a critical situation, conservation districts should discuss their concerns with the onsite contractor and then immediately notify the grant recipient and the project engineer. In a subcontracted project, only the grant recipient or the project engineer acting as the grant recipient's designee have the contractual authority to change a contract for project construction. Change orders often include an increase in payment to the contractor, so careful consideration should be given to any changes that arise for budget purposes.

Any changes proposed to a plan or specification must be reviewed and agreed upon by all parties and must be approved by the design engineer. Any changes to plans that alter permit acknowledgments must also be submitted to the reviewing entity for revised approval. It is the responsibility of the conservation district to ensure that any proposed changes to a plan or specification meet DGLVR Program policy and the requirements of the DGLVR Stream Crossing Standard. In questionable situations, consult immediately with the SCC before implementing changes.

9.2 Engineers' Inspection Requirements

As required by the DGLVR Stream Crossing Standard, the design engineer or their designee must be present onsite to inspect critical stages of construction. The engineer shall provide the project owner a signed and sealed certification form indicating that the critical stages of construction outlined in Section VII.D of the DGLVR Stream Crossing Standard were inspected and installed in accordance with the construction documents and DGLVR Stream Crossing Standard. The engineer must also provide the project owner with red-lined construction documents that indicate any changes in the as-built conditions of the project compared to the design plans. At a minimum, the following must be inspected:

- Installation of structure subgrade and bedding materials and establishing inverts/elevations.
- Installation of footings, abutments and structure appurtenances.
- Installation of grade control features, bank margins, and streambed substrate.
- Installation or placement of stream crossing structure.
- Compaction and backfill of stream crossing structure.

The requirement for construction inspection by the engineer or the engineer's designee does not minimize the importance of the conservation district being on-site regularly during construction. For more details on these engineering requirements, refer to Section 12.6.1.

9.3 Safety

While safety measures are not the inspection responsibility of the conservation district, it is important to be observant of job surroundings, especially on an active construction site. Conservation district staff should be equipped with the appropriate Personal Protective Equipment (PPE) required by their employer and/or by

the project owner or their contractor. Conservation district staff who arrive on site for inspection should make their presence known to the construction crew and stand in a visible location out of the way of active equipment. Conservation district staff should also announce when they are leaving the site.

If conservation district staff observe unsafe working conditions, such as a potential for an excavated trench side slope failure, conservation district staff should speak up and alert the on-site work crew and project engineer. Consider written notification to the grant recipient regarding any safety issues on site.

At the end of each active workday, the project owner or their contractor should adequately secure the construction site to ensure traffic or the public does not access the road-closed areas.

9.4 Erosion and Sedimentation Control

Each construction plan must provide for erosion and sedimentation (E&S) control best management practices (BMPs) during and after construction. After mobilization on-site, the construction crew should install initial E&S BMPs before earth work begins. Conservation district staff should compare E&S BMP placement throughout the construction sequence to the details on the E&S plan and evaluate the overall effectiveness on-site during construction. If an E&S BMP is not effectively addressing erosion or sedimentation during construction, conservation district staff should bring this to the on-site crew's attention and note it in their field notes. Often the on-site crew can make minor adjustments or improvements to the existing E&S BMPs to improve their effectiveness. Sometimes the contractor may need to consult with the owner, the project engineer, and/or regulating authorities for alternative E&S BMPs that go beyond what is in the scope of work in the E&S Plan. Significant changes such as this may result in a change order to the contract with the contractor. For additional guidance on E&S BMPs, see Pennsylvania Department of Environmental Protection (DEP)'s Erosion and Sediment Pollution Control Program Manual at http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4680.

9.5 Dewatering

Dewatering is a critical component of a stream crossing replacement project. E&S BMPs include detailed plans for handling stream flow as well as water that collects in the project area, such as around footings. Stream water and site-collected water should be handled separately. Stream flow is often coffer dammed and either flumed (gravity flowed) through/around the worksite or pumped around the worksite. Water collected from the excavation area is often pumped through a filtration bag and discharged separately away from stream flow to a vegetated or stabilized area.

Once construction begins, it is important to remain mindful of the weather forecast and be prepared for precipitation events. Conservation district technicians should routinely discuss with the on-site construction crew their schedule, upcoming weather forecasts, and dewatering materials and equipment staged on site to ensure enough equipment and capacity is available.

Depending on how long the installation will take, the crew may need to make improvements or adjustments to the dewatering BMPS to maintain their effectiveness. Conservation district staff should look for large leaks in cofferdam materials that may jeopardize footing construction or bedding material for the new structure or may negatively impact backfill material and they should report it to the construction crew. In some stream systems comprised of coarse bed material, it can be difficult to contain all of the stream flow with a cofferdam. This makes BMPs such as sumps and pump systems more critical to the construction sequence. Over-saturated material cannot meet optimal compaction and can threaten the structural integrity of a new stream crossing replacement. For detailed information on individual E&S BMPs and their inspection, refer to The Pennsylvania DEP Erosion and Sediment Pollution Control Program Manual (BMP Standards) https://www.dep.pa.gov/Business/Water/CleanWater/StormwaterMgmt/Stormwater%20Construction/Pages/E-S%20Resources.aspx

9.6 Excavation

One of the stages of construction is excavation of the existing structure and preparation of the opening for the new structure. Because of the DGLVR Stream Crossing Replacement Policy requirements, excavation for

the replacement structure will be much wider than the original structure width. The engineer is required to be onsite to ensure the new structure, headwall, endwall, and wingwalls are installed per the locations, alignment, and elevations provided in the design plans and specifications. It is important that the excavation is wide enough to accommodate the structure, planned backfill, and required compaction equipment between the side walls of a structure and the native material. Due to the depth of excavation for some structures, the width of excavation may need to be increased to provide stable side-slopes and safe working conditions for any crew within the excavation area.

9.7 Construction Survey Stakeout and Accurate Surveys

An accurate construction survey stakeout is critical to ensuring site excavation and installations are consistent with the construction plans and is strongly recommended. This should be identified in the engineer's scope of work prior to the engineer being contracted. It may be most effective for a surveyor to stake out the project site once the existing crossing structure has been removed, in order to lay out design elevations, cuts, fills, etc. to be constructed.

Survey benchmarks should be well marked and protected from construction equipment or traffic. If a benchmark has been impacted by construction, alert the construction crew, project owner and project engineer immediately so it can be reset. A survey error can lead to inadequate structure cover, shallow foundations, exposed pipe inverts, reduced hydraulic capacity, etc.

During the project, conservation district staff should check elevations of the critical stages of construction, such as the subgrade and bedding materials, footings, abutments and in-ground appurtenances, grade control and streambed substrate, bridge decking or stream crossing structure placement, and backfill/roadway final elevation.

Conservation district staff should have a good working knowledge of survey equipment and be capable of checking elevations in the field as part of their inspection duties. If conservation district staff determine there may be an elevation or field placement issue, they must alert the construction crew, project owner, and project engineer immediately. The final responsibility of field placement or elevation accuracy rests with the construction crew and the project engineer, but through the checks and balances of conservation district inspection, potential problems may be brought to light before they occur. The mandatory Stream Crossing Certification Training to be completed by conservation district staff provides in-depth guidance on how to perform spot-checks of critical stages of construction. Additional assistance in this process is available to conservation districts on a project-specific basis through CDGRS.

9.8 Structure Foundation / Bed Preparation

As excavation for the structure foundation nears final depth, conservation district staff should pay particular attention to the quality of materials coming from the excavation and the saturation level of the base material. If subgrade materials are heavily saturated and pumping water, additional dewatering measures may be warranted. If unsuitable materials are encountered, the conservation district should consult with the engineer to develop a remedial plan for foundation material. Routine survey checks should be done by the contractor during the placement and shaping of foundation bedding material to insure correct grade and cross-sectional shape. The engineer is required to provide inspection and certification of the structure subgrade and bedding materials in accordance with the construction documents and per the DGLVR Stream Crossing Standard.

9.9 Streambed Reconstruction

Reestablishing channel continuity upstream, through, and downstream of the roadway is the means by which stream crossing replacement projects meet the DGLVR Program's goals and objectives. In order to achieve continuity, reconstruction of the streambed through the project site is essential. This includes reconstructing the streambed within the replacement structure. The criteria and requirements of the DGLVR Stream Crossing Standard list the steps and elements to be addressed through design and installation of the reconstructed portion of the stream channel.

Placement method of stream bed material depends on structure size (dimensions), material, and type. Specialized equipment such as a conveyor belt, a wheelbarrow, or a walk-behind loader may be required to convey material into the structure. Hand placement of grade controls, bank margins, and key pieces may be necessary to achieve the specified streambed profile (step/pool, riffle run, etc.) and cross-section shape (bank margins, bankfull-width channel, defined thalweg). For structural-plate structures, leaving select panels disassembled from the top may provide openings through which material can be placed from above.

Streambed reconstruction is typically easier with bottomless structures than those with an invert. By setting the top of footing elevation higher than the bankfull (bank margin) elevation, the streambed can be reconstructed between the structure's footings after they are set in place. After the streambed is constructed, the superstructure (typically aluminum plate or concrete) can be set upon the footings to complete the structure installation. During project design, the engineer should consider constructability when selecting a replacement structure and corresponding opening height (rise) to allow for ease of access into the structure for installation of the streambed.

Stream bed material should be placed and compacted in lifts to maximize compaction and minimize void space. Stream Crossing replacements regularly include both mechanical and hydraulic compaction. Mechanical compaction techniques include plate compactors, sheepsfoot rollers, vibratory rollers, and static rollers. Hydraulic compaction typically means using pressurized water, such as from a pump or fire hose, to wash finer material into the void spaces in coarser aggregate. Construction crews should make a practice of marking structures for locations of the channel and bank margin elevations as well as grade control features. Constructed bank margins within the structure should be tied into the existing bank margins outside of the structure.

Quarried aggregate rip-rap for use as grade control, bank margins or bank stabilization may only be rock that is sound, durable, and able to withstand exposure to air, water and freezing and thawing. Quarried rock used for grade control, bank margins or bank stabilization must be obtained from a PennDOT approved source or be tested and meet the criteria in the DGLVR Stream Crossing Standard. These requirements do not apply to material imported for streambed substrate, or to on-site materials that are reused as part of the project.

Conservation district staff should become familiar with the streambed material (substrate mix) specified by the engineer for the project. As a general rule, the material should be reflective of the existing streambed composition within the reference reach but will often be sized slightly larger to help it persist longer within the crossing structure. In the engineer's specifications, the streambed material may be expressed as a thickness, gradation, and type of rock or stone rather than an AASHTO Standard. Salvaged materials from the site may be utilized for streambed material if they meet the design specifications. This would have to be determined by the project engineer on a project-by-project basis. Materials for streambed reconstruction must be of the gradation specified by the engineer and should be uniformly mixed to avoid segregation before placing inside the replacement structure.

Installation / reconstruction of the streambed is an identified Critical Stage of Construction, during which the engineer and conservation district are required to be onsite for inspection. The conservation district should work with the engineer to inspect this aspect of project construction. Additional information about streambed material and placement can be found in the Streambed Restoration and Grade Control Technical Bulletins in Appendix H.

9.10 Material Inspection

As materials are delivered to the site, conservation district staff should make a general observation and note of quantities arriving and their condition. Often, materials such as pipe may be delivered to a site before the contractor has been mobilized. This may result in materials being unloaded through the use of gravity rather than carefully lifted and placed in the staging area. Damage to materials such as cracking, denting, or removal of protective coatings such as galvanization can reduce material life span and overall affect the quality of a project. Materials found to be damaged should be reported to the project engineer and addressed.

Stream crossing replacement projects often require on-site assembly of structure materials. The seam between overlapping, or 'shingled,' joints will typically face downstream. If any joints face upstream, consult manufacturer's plans and recommendations. Pipe materials requiring bands to join pipe sections should have as tight of a seal as possible. This may require the use of watertight gasket seals such as mastic. Bands should

be fit to the corrugations of the pipe. Bands should be tightened evenly and not over-tightened such that they cause deflection in the structure or break the band closures. It is anticipated that some small gaps may be present in some pipe shapes. To the best extent possible, these should be filled with gasket material or buried under the reconstructed streambed if located within the streambed establishment area. Ultimately, construction crews should follow the manufacturer's recommendations for addressing any pipe gap areas to prevent piping failures.

Structural Plate (multiplate pipe) assembly requires careful study of assembly shop drawing details. Often manufacturers will provide onsite assembly guidance for a fee. Smaller structures may be assembled at the factory and delivered in one piece. The seam between overlapping, or 'shingled,' joints will typically face downstream. If any joints face upstream, consult manufacturer's plans and recommendations. The use of pry bars is often required to align multiple plates for assembly. Attention to the length of bolts used for multiple plate junctions is also critical. Often, manufacturers recommend keeping all bolts loose for structure flexibility until all plates are assembled. Once fully assembled, bolts are required to be torqued to manufacturer's specifications. Occasionally, minor misalignments may require a slight reaming of the stamped holes. If major misalignments are observed, stop and study the shop drawings. Often this is an indication that the wrong plates have been utilized in the wrong locations.

More structure installations will involve concrete work for footings or abutments due to the DGLVR Stream Crossing Standard. Installation of footings or abutments is a Critical Stage of Construction, during which the conservation district is required to be on site with the engineer or their designee. Conservation district staff should be familiar with the crossing's concrete structures' standard details and compare on-site forming and reinforcement placement with the plan drawings. Forms should be free of standing water and have good soil contact to prevent seepage from the base of the form. Just before concrete placement, it is advisable that elevations are checked one final time before the commitment to pouring is made. Concrete shall comply with the mix design (compressive strength and other special requirements) specified in the construction plan drawings. Concrete must be installed according to the structure manufacturer or design engineer's specifications. Concrete cure times for form removal, backfilling, and load testing should be specified in the design plans. Once forms are removed, conservation district staff should work with the project engineer to perform a visual inspection of the structures and note any spauling, honeycomb or other defects and bring it to the attention of the construction crew, project owner, and design engineer to determine if remedial action is needed.

9.11 Backfill for the Replacement Structure

Backfill for stream crossing replacement structures shall comply with the manufacturer's recommendations. Backfill material around the replacement structure should be placed and compacted in a series of lifts, instead of a single, full-depth placement. Lift depth is typically 12" or less, but may also be driven by manufacturer requirements, soil types, or other considerations.

Conservation district staff should be familiar with the aggregates specified in the construction plans and manufacturer's shop drawings for backfill. Placement of backfill around the replacement structure is an identified Critical Stage of Construction, during which the engineer and conservation district are required to be onsite for inspection. The conservation district should work with the engineer to inspect this aspect of project construction.

9.12 Restoring Stream Flows to the New Structure

After the stream channel and structure have been installed and the streambed has been re-established, the cofferdam or stream channel diversion may be removed. Re-watering the structure with stream flow should be a slow release for larger streams to prevent any undesired erosion from a quick breach of the coffer dam. Conservation district staff and others involved in construction should look for indications of stream flow going subsurface in the restored stream channel reach. Pay particular attention to areas immediately upstream and downstream of the structure inlet/outlet, and around constructed grade control features. In some stream systems, subsurface channel flow may be a naturally occurring condition. However, in most locations, subsurface flow is an indication of improperly placed and compacted stream bed material. If conservation

district staff observe subsurface stream flow, excessive erosion of the reconstructed stream channel, increased footing exposure from design plan specifications, or **degradation** of stream bed material (rock or stone failure), immediately notify the construction crew, project owner, and design engineer.

9.13 Headwall, Endwall, and Wingwall Installation

Headwalls, endwalls, and wingwalls are integral components of a stream crossing replacement. These structures help to direct high flows through the crossing while protecting the stream crossing structure's backfill from erosion. Headwalls and endwalls should closely fit the crossing structure's shape or otherwise protect any embankments from erosion. Headwalls, endwalls, and wingwalls often need to be assembled on the stream crossing before or during the backfill process to attach soil anchors and tie-backs. Often these materials come from the manufacturer with some "fit in the field" instructions as their degree of departure from the structure may need to be adjusted. Per the DGLVR Stream Crossing Standard, headwalls and endwalls are required for all stream crossing replacement structures. Constructed bank margins within the structure should be tied into the existing bank margins outside of the structure.

9.14 Site Restoration and Clean Up

In addition to the stream crossing replacement installation and stream reconstruction, the scope of work may include additional road fill, drainage, or stabilization work in order to address contributing stormwater and sedimentation issues.

Conservation district staff should continue to provide routine on-site inspection until the entire scope of work is complete. There may be other aspects of the project included in the contract that go beyond the structure installation and instream restoration work. The site must remain protected by temporary E&S BMPs until the site has reached a uniform 70% vegetated cover. Once permanent stabilization is achieved, the construction crew or grant recipient is responsible for removing and recycling or disposing of any temporary E&S BMPs.

9.15 Federal Highways Structure Inspection (>20 Feet Clear Span Opening)

Sales consultants may inquire what load rating the structure should be designed for. HS20, HS25 and PHL93 are all acceptable load ratings, but the most current rating is PHL93. If a structure, regardless of type (metal pipe, concrete box, bridge) exceeds 20 feet of clear span opening, the structure is subject to Federal Highway Administration inspection requirements. Local ordinances may require inspection for structures less than 20 feet of clear span opening as well. Often, the inspection entity will request computations for all commonly accepted design loads to report to PennDOT in their Bridge Management System (BMS). This includes H20, HS20, ML-80, TK-527 and PHL-93. The structure manufacturer can often provide these rating factors as part of their PE sealed shop drawing and supporting calculations. These calculations may add a nominal additional cost to the structure but is often cheaper to be developed by the manufacturer than by the project engineer. If load calculations are going to be required, indicate this at the time of obtaining an estimate. For more information about federal highway inspection, contact the county's Municipal Services Representative or the PennDOT District Area Bridge Department. More information regarding Penn DOT design guidelines including design loads can be found in Publication 15M Design Manual, Part 4 https://www.dot.state.pa.us/public/PubsForms/Publications/PUB%2015M.pdf.

10. Final Inspection and As Built Notes

This section contains a summary of guidance for closing out a project and final payment, including some items that are specific to stream crossing replacements. For more guidance on final inspections and closing out DGLVR projects, see section 3.8 of the DGLVR Administrative Manual.

10.1 Final On-site Inspection

Prior to final payment, the conservation district and grant recipient must conduct a final onsite inspection. The contractor may be asked to be present at this meeting. Grant recipients are encouraged to schedule a final inspection immediately after work is complete, so any remediation can be done while equipment is still on site if needed. During this final inspection, the conservation district may find aspects of the project that were not installed, or not installed according to DGLVR Program Policy and Stream Crossing Standard and/or Construction Documents. If this occurs, the conservation district must discuss any project shortcomings and potential remediations, then provide the grant recipient with a list of the items that need to be completed prior to making final payment. A second site inspection may be required to ensure any outstanding issues have been resolved. If the project is acceptable to the conservation district during the final inspection, the Project Completion Report can be completed (see Section 10.2).

10.2 Project Completion Report

Once the project is acceptable to the conservation district, the conservation district and grant recipient should complete the "Project Completion Report" together. Stream crossing replacement projects have a stand-alone location on the form for recording project details. Once the form is completed, both the conservation district and the grant recipient must sign it to verify the project is satisfactorily completed. The Completion Report must be filled out in the DGLVR Program's online GIS reporting system.

10.3 Habitat Re-connectivity

While not a required reporting element for DGLVR Program, conservation districts may wish to quantify the length of restored or reconnected habitat (i.e. "stream miles") that was achieved by replacing (and restoring aquatic organism passage (AOP) through) a structure that was formerly an AOP barrier. In some cases, miles of stream habitat may be reconnected by replacing a single crossing. There are many factors that influence the length of reconnected habitat such as:

- What was the level of AOP barrier that existed with the old crossing?
- How far upstream or downstream is it to the next AOP barrier (manmade or natural), and what is the extent of that barrier?
- How far upstream or downstream does usable habitat extend for the species of interest?

The "North Atlantic Aquatic Connectivity Collaborative" (NAACC) has developed a protocol for assessing road/stream crossings and quantifying the level of connectivity that exists. For more information see www.streamcontinuity.org

10.4 Final Engineering Documentation

Prior to final payment, the project engineer is required to provide the project owner with a signed and sealed "Inspection and Documentation of Critical Stages of Construction Certification Form" indicating that the critical stages of construction were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard (Appendix A). The engineer must also provide the project owner with red-lined construction documents that indicate any changes in the as-built condition of the project compared to the design plans (field changes).

10.5 Final Project Payment

DGLVR Policy requires that at least 30% of the grant amount be withheld until satisfactory project completion. The final payment can be made by the conservation district once all of the following conditions are met:

- Construction is complete and the conservation district verifies this during a final inspection
- The conservation district has satisfactorily completed the Final Project Inspection and Project Completion Report
  - The Completion Report must be filled out in the DGLVR Program's online GIS reporting system
  - The Completion Report must be signed by the grant recipient and conservation district
- The engineering documentation (Inspection and Documentation of Critical Stages of Construction Certification Form and red-line drawings) is received
- Financial documentation (receipts) for all grant expenses are received
- Required documentation as per the SCC's Hard File Project Checklist is received
  - The Completion Report and Hard File Project Checklist are available online at https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/blank-forms

11. MONITORING AND MAINTENANCE

There are no statewide DGLVR Program requirements for monitoring or maintenance after projects have been completed. Conservation districts, however, may set local policy on maintenance requirements for completed projects in their county. Maintenance of past projects may also factor into a conservation district's application ranking criteria.

Stream crossing projects implemented according to the DGLVR Stream Crossing Standard may eventually need maintenance. Instances may occur both before and after large storm events where maintenance should be completed to ensure the full lifespan of the crossing and associated project elements. A successful monitoring plan highlights items that need to be evaluated (and potentially maintained) in order to meet DGLVR Program Policy and Stream Crossing Standard over the long-term.

11.1 Monitoring the Crossing

Streams are dynamic systems and will continue to change and evolve over time. Conservation districts and project participants should consider routine post-construction monitoring of stream crossing projects implemented by the DGLVR Program. Routine monitoring of the project site provides important insights into how the crossing is functioning and changing over time. Monitoring also helps to identify any repair measures that may be needed to keep the project functioning properly. Each conservation district / project participant should determine what level of monitoring is needed. Monitoring should include evaluation of both the crossing structure and the stream channel throughout the reconstructed reach. Failures in the streambed can lead to failure of the structure, particularly if footings are undermined or structural plates are exposed to elements, causing corrosion.

11.2 Monitoring the Physical Structure

One method available for monitoring the condition and function of the stream crossing structure is to utilize PennDOT's template bridge inspection forms. These forms can be found at http://www.dot.state.pa.us/public/Bureaus/BOMO/BMS2/Templates/FormsTemplateList.pdf

Forms are available for monitoring of both bridges and culverts. The forms list specific "red-flag" items to be evaluated, such as changes in the culvert shape, settlement in the roadway surface, headwall and endwall defects, and corrosion of metal surfaces. The forms also provide guidance for establishing maintenance priorities. These forms are largely for evaluating the structural integrity of the crossing, not for evaluating continuity, streambed, or aquatic passage.

11.3 Monitoring the Streambed

The project design, built upon the requirements of the DGLVR Stream Crossing Standard, is intended to provide the best-informed framework for restoring a stable channel and continuity through the reconstructed stream reach. Post-construction, the restored channel reach will change and evolve towards a stable condition through a series of adjustments to its width, depth, slope, and alignment after each high-water event. These adjustments may occur in small increments over time, or all at once due to an abnormally large event. The degree to which these adjustments occur depends on how closely the design and construction of the project were able to match the 'stable' condition. Minor adjustments are natural and expected. Major adjustments are usually more problematic.

The goal of a successful post-construction monitoring or maintenance plan should be to evaluate whether the stream restoration component of the project continues to meet the requirements of the DGLVR Stream Crossing Standard, even if some minor post-construction adjustments have occurred. Instances where channel adjustments have caused aspects of the reconstructed stream reach to no longer meet these requirements may trigger a discussion on repair options.

Post-construction monitoring does not need to be complex or time consuming. However, it should be comprehensive enough to adequately determine if the project continues to meet the requirements of the DGLVR Stream Crossing Design and Installation Standard.

When evaluating the post-construction condition of a project, consider the following:

- Has the reconstructed channel already "stabilized", even after some initial adjustments following the first few high-flow events, or is the channel continuing to adjust with each new flood?
- Has slope continuity been maintained through the project reach? (Is there a continuous channel through the culvert, without excessive jumps or velocity barriers?)
- Has a bankfull-width channel been maintained, with defined bank margins and low-flow thalweg?
- Do the reconstructed channel and the tie-in points to adjoining upstream/downstream channels allow for aquatic organism passage (AOP) across the full range of stream flows?
- Are the constructed grade controls, bank margins and key pieces intact, stable, and functional?
- Is streambed material present through the entire structure? Is it aggrading or degrading compared to the initial placement?

A more detailed and in-depth monitoring protocol can provide a better picture of how the crossing is performing, and how post-construction adjustments are trending over time. This can be useful for quantifying channel changes or for identifying and proactively correcting progressive issues early before they devolve into failures. Elements of a more comprehensive monitoring plan might include replicate survey of longitudinal profile and cross sections through the project reach, replicate photos taken at key locations, and measurements of streambed material depth within the structure. The US Forest Service culvert-assessment procedure (Clarkin et al. 2005) provides a template for more in-depth post-construction monitoring.

11.4 Maintenance and Repair

The goal of the DGLVR Program is to implement stream crossing projects that require very minimal maintenance. However, over the long lifespan of an average stream crossing, maintenance or repair may become necessary.

11.4.1 Regular Maintenance

Once a project has been completed and the contract is closed out, regular maintenance of the structure and crossing is the responsibility of the road owner (grant recipient). Regular maintenance may include activities such as debris removal, fixing fallen bank protection, and minor channel work. PA Department of Environmental Protection (DEP) Permits allow maintenance within 50 feet upstream and downstream of structures. If stream work is needed outside the 50' limit, additional permits could be required. Maintenance of the stream crossing structure, road approaches, and streambed may be necessary to avoid long term problems. Regular maintenance is a cost-effective way to ensure the lifespan of the structure and ensure its flood resiliency. Simple items like removing debris from the stream could save thousands of dollars of future maintenance costs after a large storm event. Maintenance activities should not cause the constructed aspects of the project to no longer comply with DGLVR Policy or requirements or to no longer function properly.

11.4.2 Repair

In some circumstances, such as after extremely large flow events, repair of the project may be necessary. Repair work may include activities such as repairing or replacing grade control, adding grade control or bank stabilization, or significant alterations to the streambed. Early repair of small issues could prevent future failures, for example: the partial loss of a grade control feature could lead to a cascading set of failures of adjacent streambed and grade control if not addressed. The road owner may wish to apply for a DGLVR grant for more significant repair tasks such as reestablishing grade control or bank stabilization. Applications to address these repair issues may be submitted to the conservation district. It is up to individual conservation districts to determine policies and priorities for repair work to completed projects. Repair projects funded by the DGLVR program must comply with the requirements of the DGLVR Stream Crossing Standard.

Repairs should be considered to correct aspects of the completed project that have deviated from the designed and constructed condition over time and is trending toward or no longer meeting DGLVR Program goals or requirements. Some potential repair items might include, but are not limited to:

- Adding or repairing scour protection for headwalls and endwalls
- Restoring streambed material and/or re-constructing the streambed shape due to excessive post-flood scour or deposition
- Improving, rebuilding, and/or increasing the number of grade control features through the reconstructed reach
- Channel modifications to address head cut development at the upstream or downstream tie-in points.

Note that additional permitting may be needed depending on the scope of repair work.

12. ENGINEERING DESIGN CONSIDERATIONS

Terms defined in **Appendix B** are in **bold text** the first time they appear in this manual. Click on these terms to view the definition in Appendix B.

The principal objective of **stream crossing** replacement projects funded through the Dirt, Gravel, and Low Volume Road Program (DGLVR Program) is to reconnect and stabilize the stream segments immediately upstream and downstream of the roadway. Design of stream crossing replacement projects funded by the DGLVR Program must provide for the reestablishment, restoration, and long-term maintenance of **channel continuity** and **aquatic organism passage (AOP)** upstream, through, and downstream of the replacement **crossing**. This will maximize the environmental benefits and improve **flood resiliency**. For more information on the goals and objectives of DGLVR stream crossing replacements, see Chapter 1.

Stream systems are, by their very nature, dynamic and diverse. No single guidance document or set of standards or specifications can provide a comprehensive and concise 'roadmap' for optimal design of a successful road/stream crossing replacement at every project site. The technical guidance provided in this Chapter is intended to establish the fundamental framework and lay out the critical steps for successful design of projects that meet (or exceed) the DGLVR Program Policy and Stream Crossing Standard.

Ultimately, the project engineer is solely responsible for the content of the final design product. The engineer, conservation district, and the grant recipient are responsible for determining that the project design and implementation is consistent with DGLVR Program Policy. In addition to the guidance provided in this Chapter, the Penn State Center for Dirt and Gravel Road Studies is available to provide technical assistance to the conservation district, grant recipient, and the engineer through the design process.

This Chapter is written to provide detailed design guidance, primarily for engineers. Some of this information is replicated from other sections of this manual. Likewise, other parts of this manual provide additional information regarding various stages of a typical project lifecycle.

DGLVR Program: Overview of Roles

- **Local Entities**
  - **Conservation District (district):** Provides grant funding and administers DGLVR Program within each County. The conservation district is the main point of contact for review of project documents and project oversight.
  - **Grant Recipient:** Road-owning entity that receives DGLVR grant funds from the conservation district and performs or sub-contracts work to be done. All grant recipients are public entities, and most are townships or boroughs.
  - **Contractor:** (if applicable) Contracts with the grant recipient to perform project work.
  - **Engineer:** (if applicable) Contracts with the grant recipient to perform project design and inspection.
- **Statewide Supporting Entities**
  - **State Conservation Commission (SCC):** Entity at the PA Department of Agriculture who administers the DGLVR Program statewide.
  - **Penn State University Center for Dirt and Gravel Road Studies (CDGRS):** Provides education and technical support to all entities of the DGLVR Program.
  - **Trout Unlimited (TU):** Provides education and technical support to all entities of the DGLVR Program.

DGLVR Program: Overview of Documents and Policies

- **DGLVR Administrative Manual (Admin Manual)**
  - The Admin Manual sets statewide policy requirements for the PA Dirt, Gravel, and Low-Volume Road (DGLVR) Program. Section 7.1 of the Admin Manual sets statewide DGLVR Program Policy for Stream Crossing Structural Replacements.
  - When the DGLVR Stream Crossing Technical Manual references "DGLVR Policies" or "DGLVR Policy," the referenced policy/policies include everything in the Administrative Manual.

- The Administrative Manual is available online at https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/administrative-guidance-manual.

- **DGLVR Stream Crossing Design & Installation Standard (DGLVR Stream Crossing Standard):**
  - The DGLVR Stream Crossing Standard lists requirements for any new stream crossing structures funded in whole or in part by DGLVR funds or counted as in-kind on a DGLVR Project. In-kind contributions refer to costs incurred by the grant recipients for a project that are not reimbursed as part of the grant.
  - When the DGLVR Stream Crossing Replacement Technical Manual references "standards" or "Stream Crossing Standards," those refer to the DGLVR Stream Crossing Design & Installation Standard.
  - The DGLVR Stream Crossing Standard is incorporated by reference in Section 7.1.2 of the Administrative Guidance Manual and can be found in Appendix A of this DGLVR Stream Crossing Replacement Technical Manual.
- **County-Specific DGLVR Policies:**
  - Each county conservation district has a set of local policies for their county DGLVR Program set by their Quality Assurance Board (QAB) and conservation district Board. The local county DGLVR Policy may include requirements that exceed statewide DGLVR Policy and must be considered for all DGLVR projects based on the county funding the project.
  - Contact the relevant county conservation district for their local policies.

12.1 Project Design

Successful design of a stream crossing replacement project is based upon information obtained from a **Site Assessment** of existing site conditions, to include longitudinal profile and **cross sections**. The steps listed below provide a chronological approach to collecting and applying the site-specific data needed to produce a project design that meets DGLVR Program Policy and the Stream Crossing Standard.

12.1.1 Pre-Design Meeting

Pre-design meetings are required to be held at the project site prior to design and permitting. At a minimum, the grant recipient, the engineer and the conservation district should attend. The pre-design meeting is a chance for the engineer to get background information on the site and better understand DGLVR Program requirements before beginning the design process.

The conservation district will have performed a preliminary Site Assessment prior to the grant application. The conservation district may choose to make this Site Assessment information available to the engineer. If provided, the engineer will have discretion to use the Site Assessment data provided by the conservation district or conduct a new assessment of their own. During the pre-design meeting the engineer and the conservation district should review data collected by the district and determine if an additional Site Assessment will be performed by the engineer.

A walkthrough of the project reach upstream and downstream of the roadway crossing is recommended. Identify survey bounds for data collection and potential project / construction limits, including possible stream channel **tie-in points** upstream and downstream of the road. Determine dominant **grade control** feature type. Reference Chapter 3 in this manual for more detailed guidance on Site Reconnaissance / Walkthrough. A "Pre-Design Meeting Checklist for Stream Crossings" is available in Appendix G.

12.1.2 Site Assessment

A Site Assessment is used by the engineer to inform various aspects of stream crossing replacement design. If an additional Site Assessment will be conducted by the engineer to support project design, conservation district staff are required to be on site during field data collection. Regardless of the source of site assessment data, the engineer is responsible for the data they base their design upon.

For the DGLVR Program, a Site Assessment consists of longitudinal profile and cross-section surveys. To adequately support the project design, these surveys must capture essential aspects of the road-stream crossing and the adjoining upstream- and downstream channel segments. Reference the DGLVR Standard (Appendix A) for site assessment requirements, and Chapter 4 of this manual for additional information on Site Assessments.
At a minimum, two benchmarks must be set by the engineer or surveyor in an area outside of the zone of construction and disturbance.

12.1.2.1 Longitudinal Profile Survey (Long-Pro):

The **longitudinal profile survey** :

- captures data points along the channel **thalweg**, at the **invert** and top of the existing **structure**, and across the roadway.
- begins upstream of the crossing and continues in the downstream direction, extending far enough upstream and downstream of the roadway to identify prevailing channel slopes beyond the portions of the channel impacted by the effects of the undersized structure.
- extends far enough upstream or downstream to capture an appropriate '**reference reach**' (see below) which provides a blueprint for reconstruction of channel profile through the project site (including upstream, through, and downstream of the replacement crossing).
- begins and ends at the crest of a grade control feature
- records and notes, at minimum, the following key data points:
    - crest of grade control feature (**riffle** crest, for example)
        - for each grade control crest, note a relative stability rating that compares the stability of each grade control to the other grade control features present within the surveyed reach. (good, moderate, or poor, for example)
    - end of grade control feature (end of riffle, for example)
    - bed at maximum **pool** depth
    - streambed at structure inlet
    - invert at structure inlet
    - top of structure inlet
    - upstream, centerline, and downstream edges of roadway
    - top of structure outlet
    - invert at structure outlet
    - streambed at structure outlet

See Figure 12.1 for a graphical representation of a longitudinal profile survey. While DGLVR Policy requires that the longitudinal profile survey must extend a minimum of 150' upstream and 150' downstream of the crossing, the actual extent of survey needed may be greater, in order to capture an appropriate reference reach and to establish start/end points at grade control crests. Consider determining the length of the longitudinal profile as a function of the stream size (20-30 bankfull-widths, for example). This will help make the assessment more site-specific and applicable and help ensure that the needed types of field data are collected.

The Reference Reach

The reference reach is a section of the stream channel that best reflects the typically, natural, minimally-impacted characteristics (profile, dimension, planform and dominant **bedform**) of the channel. For stream crossing projects, the reference reach is located beyond (upstream- or downstream of) the extent of channel impacts associated with the existing structure. These impacts may include excessive sediment deposition or bed / pool scour, channel braiding, increased bank erosion, and/or over-widening of the channel. During the site walkthrough, identify the limits of these immediate impacts, and consider the 'typical' condition of the

stream channel beyond these. As part of the walkthrough, identify one or more "preliminary" or "potential" reference reaches. An appropriate reference reflects the general character of these typical conditions.

Site assessment (survey) of the reference reach is used as a blueprint for design of the **reconstructed reach**. The reference reach:

- is located beyond the extent of evident channel impacts associated with the undersized structure
- begins and ends at the crest of a grade control feature and includes a minimum of two bedform sequences (i.e. riffle/pool, riffle/pool, riffle).
- must have a slope of +/- 25% of the proposed **continuity slope** of the reconstructed streambed, unless otherwise approved by the SCC. In instances where a reference reach with the appropriate slope cannot be identified within reasonable proximity to the project site, contact CDGRS for assistance.
- must reflect the overall typical condition of the natural, minimally-impacted channel, and should not include significant anomalies in width, depth, slope, or bed features.
- should exhibit the same dominant bedforms and grade control types as those present through the overall project reach
- should be in a location that contains reliable bankfull indicators
- should not be located within braided channel segments or the confluence of tributaries. The reference reach should be located on the same single-thread channel as the crossing.
- should generally reflect the same sizes and distribution of bed materials visible in sections of the streambed located beyond the extent of immediate impacts.
- locations, sizes and composition of individual (or clusters) of **key pieces** that provide periodic grade control along the length of the reference reach between more-pronounced grade control features.

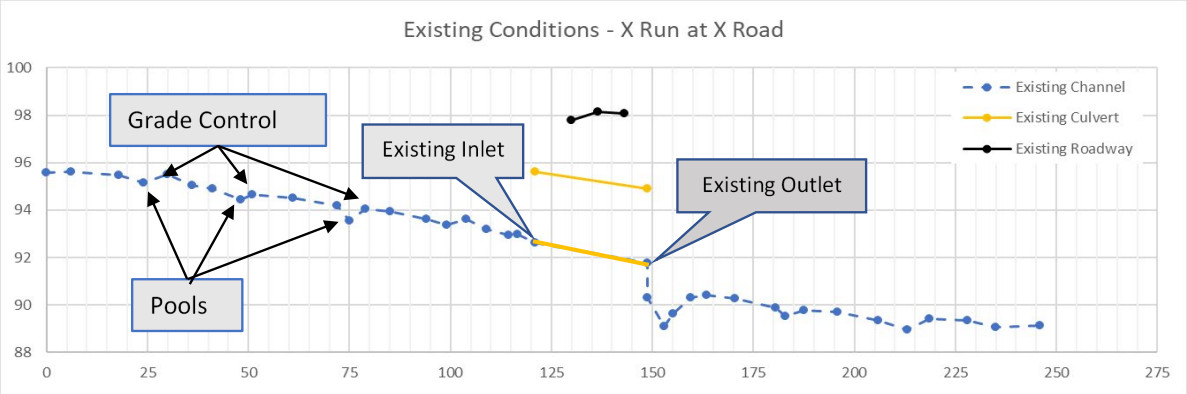


Figure 12.1 Longitudinal Profile Example Graph

An example of a long-pro survey plotted in Microsoft Excel. Stream features such as slope, grade control spacing, and average pool depths can be obtained from the data in this long-pro.

Extending the length of the longitudinal profile provides opportunity to include multiple potential reference reaches, which can help choose the best-applicable reference data during the design criteria process (see Section 12.1.3) Extending the length of the reference reach survey to include additional bedform sequences will better represent typical stream conditions and provide more reliable design criteria.

If an appropriate reference reach is not located in proximity to the crossing, one could be established at a separate location on the same stream. In this case, a separate reference reach survey may be conducted that is not continuous with the longitudinal profile survey at the project site. To be applicable to the project design, an appropriate "disconnected" reference reach must still meet the criteria listed above.

Comprehensive instructions for completing a long-pro and collecting key measuring points can be found in the Site Assessment Technical Bulletin (Appendix H). A comprehensive long-pro survey provides the information that will be used in project planning, design and permitting as described throughout this chapter, including:

- existing slopes of upstream- and downstream channel segments

- locations of tie-in points (upstream and downstream limits) and overall length of the reconstructed reach
- existing and proposed structure dimensions and slopes
- replacement structure selection
- grade control type, length and spacing
- existing pool depths
- anticipated pool scour depths within the replacement structure
- restoration of plunge pools and **vertical offsets**
- materials estimation (streambed, road fill, etc.)
- existing and proposed roadway elevations

12.1.2.2 Cross Sectional Survey:

When completing the Site Assessment, at least 2 cross sectional surveys must also be conducted. These cross-sections should be collected at the crest of a grade control feature within the reference reach, and at the maximum depth of the **outlet scour pool**. If no significant outlet scour pool is present, a cross-section should be surveyed at the deepest point of a reference reach pool. For cross sections surveyed at grade control crests, try to situate these in locations where reliable bankfull indicators are visible. See Figure 12.2 for a graphical representation of a channel cross section. If more than one "potential" reference reach is identified during the walkthrough, survey a cross section at grade control crest in each.

A cross-section is a survey conducted across the channel (perpendicular to the thalweg) to produce a graphical representation of channel dimensions including shape, depth and width. Typically, cross-sections are stationed from left bank to right bank (left to right, facing downstream). At minimum, each surveyed cross section must include data points on both streambanks capturing top-of-bank, bankfull, and right/left edge of water. Instream data points must include a minimum of three streambed points, including the thalweg (low-flow channel). Key measurement points that should be collected and noted during the cross-section survey include:

- **Floodplain:** Collect one or more data points along the floodplain extending beyond the tops of both banks. These should capture inflection points where noticeable changes in elevation or slope occur.
- **Top of Banks:** Take a reading at the top of both streambanks.
- **Bankfull Elevation:** Take a reading at the bankfull elevation, using the best-available bankfull indicator on the survey transect. Each cross-section surveyed should include at least one bankfull data point. See the Bankfull Width Determination Technical Bulletin for additional information on identifying bankfull elevation (Appendix H).
- **Edges of Water:** Take a reading at the water's surface where it meets both streambanks.
- **Bottom of Banks:** collect a data point along the toe of both banks, where the streambank transitions to the stream bed.
- **Streambed:** Take a reading at three or more locations within the wetted portion of the stream channel. Include a point representing the thalweg, along with two or more additional points. These points should be positioned to best depict the general shape of the streambed.

The surveyed cross section should contain sufficient data points to reflect channel dimensions and shape. Depending on site conditions, additional points may need to be collected. Comprehensive instructions for completing a cross sectional survey and collecting key measuring points can be found in the Site Assessment Technical Bulletin (Appendix H).

Existing Conditions - X Creek at X Road

XS #	1
LP STA	46
HI (ft)	103.7

STA	FS	NOTE	ELEV
0	5.13	Top of Left Pin	98.57
0	5.66	Base of Left Pin	98.04
5	5.86	Floodplain	97.84
8	5.9	Bankfull	97.8
13	6.62	Left Edge of Water	97.08
13.9	6.94	Bottom of Left Bank	96.76
20.3	7.34	Thalweg	96.36
23	7.08	Bottom of Right Bank	96.62
25	6.64	Right Edge of Water	97.06
30	5.62	Top of Right Bank	98.08
34	5.51	Floodplain	98.19

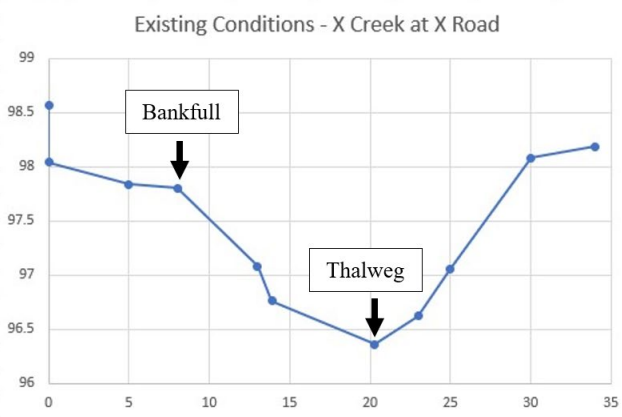


Figure 12.2 Cross Section Example Graph

An example plot of a surveyed stream channel cross-section. Surveyed sections at the reference reach inform elements of reconstructed reach design such as bankfull (bank margin) height and thalweg depth.

Recording Site Assessment data

When conducting longitudinal profile and cross-section surveys, three pieces of information should be recorded for each data point collected. These include:

- *Station*: the distance along the transect being assessed.
- *Foresight*: if using a laser level, this is the reading taken from the stadia rod. If using more-advanced survey equipment, this might be recorded as an actual elevation. Foresight readings collected in the field can be translated to elevations later, based on the benchmark and laser (height of instrument) elevations.
- *Notes*: a brief description of the feature of interest where the data point is being collected. These should be standardized to assist the conservation district during their required review of the design plans.

Consistency in the way field data is recorded by the conservation district, CDGRS, and the engineer/surveyor can go a long way in streamlining communication and the sharing of information among the project participants. Clarity and consistency of field notes and good organization of Site Assessment data can greatly assist the conservation district in completing the required design plan review in a timely manner. Specifically, using a standardized system for noting typical features collected during the Site Assessment will help understand how the field data translates to the design criteria developed by the engineer. The Site Assessment Analysis Tool (Section 4.5 of this manual) utilizes a standardized list of notations for designating common features collected in the field. While use of this Tool by the engineer is not a DGLVR Program requirement, utilizing this same notation system when recording field notes during the Site Assessment will streamline collaboration between project partners.

The Site Assessment Technical Bulletin (Appendix H) provides more information on recording field data, and includes the standardized list of notations referenced above.

Supplementary Survey Data:

Collect supplemental survey data as needed to satisfy any other project-specific design needs. These might include:

- Topographic survey of cross-sections to support flood modeling / H&H analysis
- Topographic survey to identify roadway profiles, drainage, etc.
- Topographic survey of roadway embankments to determine headwall / wingwall configurations
- Topographic survey to support cut/fill or other materials estimates, proposed channel realignments, etc.
- Wetland determination, if applicable, to determine project impacts.

12.1.3 Site Assessment Data Analysis

Stream channel continuity is obtained by basing project design on data derived from longitudinal profile survey of the stream segments adjacent to the crossing to be replaced.

Reference Reach: A relatively natural section of channel outside the impact of the crossing used to determine stable slope, grade control and more.
Reconstructed Reach: The section of channel between the tie-in points that is to be modified as part of the crossing replacement to achieve continuity. This reach extends upstream, downstream, and through the structure.
Channel Continuity: Reestablishing connectivity and consistent channel profile, slope, and bedform upstream, though, and downstream of the replacement structure. This provides for aquatic organism passage and meets DGLVR Program Policy and objectives.

- Determine existing channel slopes upstream and downstream of the existing crossing, excluding areas immediately impacted by the undersized structure.
- Determine tie-in points upstream and downstream of the roadway that establish the limits of stream channel reconstruction ("reconstructed reach"). The slope between tie-in points must be consistent with prevailing slopes of the existing channel segments upstream and downstream in order to achieve channel continuity. If necessary, extend the distance between tie-in points to obtain the continuity slope needed.
- Tie -in points must be situated at the location of existing grade control crests. Depending on the relative stability rating assigned during the longitudinal profile survey, these tie-in points might consist of existing, stable grade control elements or could be constructed.
- Identify a 'reference reach' from the longitudinal profile survey data. The reference reach should be located outside of the bounds (tie-in points) of the reconstructed reach. Design criteria derived from the reference reach will be used to design the reconstructed reach to be restored upstream, through, and downstream of the roadway crossing. The slope of the reference reach must be +/-25% of the reconstructed reach slope. Including additional bedform sequences in the reference reach will better represent typical stream conditions and provide more reliable design criteria.
- Determine the following stream design criteria from the 'reference reach' portion of the Site Assessment (longitudinal profile and cross section surveys):
  - Minimum, maximum, and typical (average) spacing of grade control features
  - Typical longitudinal length of grade control features (riffle length, for example)
  - Maximum and typical pool depths
- From the cross-section survey data, identify average bankfull max depth at a grade control feature

12.1.4 Stream Channel ('Reconstructed Reach') Design

The "reconstructed reach" of the stream is the section of the stream between the tie-in points with the natural channel upstream and downstream, including the section through the new structure. The overall goal is for the reconstructed reach to achieve continuity with the adjoining upstream and downstream channel segments in terms of stream slope, grade control type and spacing, and streambed material through the new crossing. See Figure 12.3.

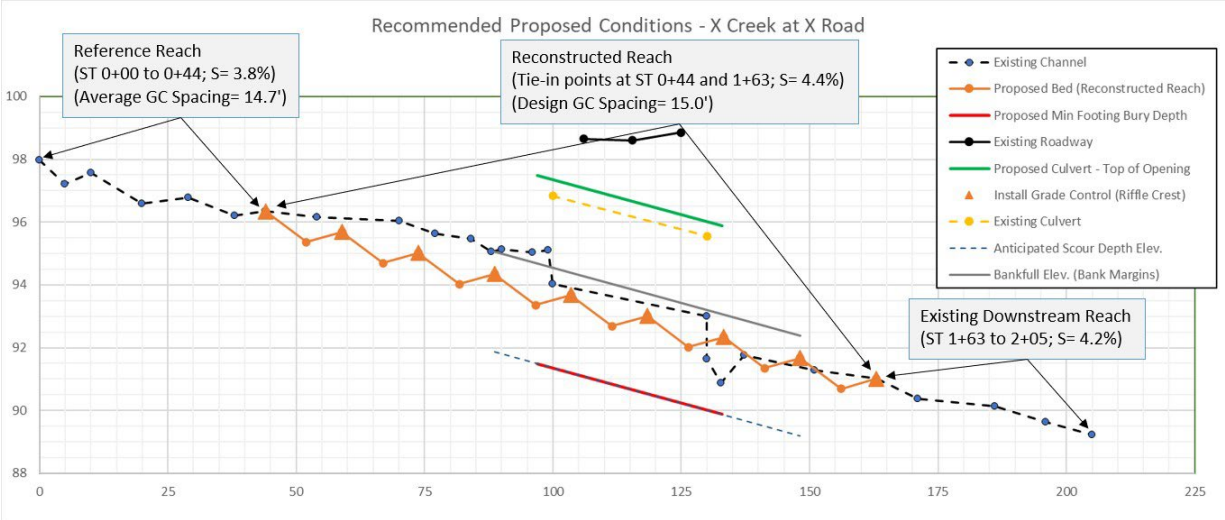


Figure 12.3 Longitudinal Profile with Proposed Reconstructed Reach
Grade control type, length, and spacing from the reference reach inform design of grade control placement through the reconstructed reach. Slope continuity and channel reconnection is achieved when the reconstructed reach extends far enough to establish relatively consistent channel slopes upstream, through, and downstream of the replacement crossing. The orange line shown reflects the thalweg elevation of the proposed reconstructed reach.

12.1.5 Slope Design in the Reconstructed Reach

The slope of the reconstructed reach must be +/- 25% of the reference reach slope. Slope of the reconstructed reach should achieve continuity between slopes of the natural channel segments upstream and downstream of the project area. Abrupt changes in channel slope produce significant impacts to streambed and bank stability, triggering increases in erosion and sedimentation. A sudden decrease in stream slope is likely to result in material being deposited as water velocity decreases, while a sudden increase in stream slope is likely to result in excessive erosion and scour as water velocity increases.

12.1.6 Grade Control Design in the Reconstructed Reach

Grade Control: Natural or manmade structures that control channel elevation and channel slope such as riffles, steps, rock clusters or large wood features.

The type, length, and spacing of grade control features in the reconstructed reach are determined from design criteria derived from the reference reach. They must be constructed of suitably sized rock to ensure long-term immobility, and keyed into adjacent streambanks/**bank margins**. Sufficient burial depth and/or placement of footing rocks must be considered to prevent the likelihood of undermining and failure. Stable grade controls are essential to minimizing scour potential, both within the replacement structure and through the adjoining project reach. Failure of one or more grade control features through the reconstructed reach can trigger vertical adjustment of the adjoining streambed, particularly upstream (i.e., **headcutting**). This can greatly enhance scour potential and scour depth. This can create vertical obstructions to AOP at the upstream limit of the headcut. Grade control spacing is typically a function of channel slope; as stream slope increases, the spacing between grade control features typically decreases.

- Design a channel profile through the reconstructed reach that mimics that of the reference reach to the greatest extent possible. Specify the installation of grade control features of the typical reference reach type, length, and spacing through the full length of the reconstructed reach. Typical spacing from the 'reference reach' may need to be adjusted slightly to fit the length of the reconstructed reach and ensure that the start- and end points fall at the locations of existing grade

control crests. Unless representative of the reference reach conditions, avoid using grade control types that may induce excessive bed scour (namely drop structures) inside the structure since this can increase risk of **substrate** loss through the crossing. Drop-type structures will likely be limited to bottomless structures on projects with relatively steeper reference / reconstructed reach slopes.

- To meet the DGLVR Program Stream Crossing Standard, instream grade control features, bank margins and key pieces of the substrate must be designed to be stable at the 100-year discharge. In design, the engineer must use an appropriate method for calculating a stable rock size for construction of grade control features, bank margins and key pieces through the reconstructed reach, including within the replacement structure. A variety of methods are available to calculate stable rock size in stream channels. The engineer should evaluate which method is most applicable to the specific project elements and conditions being designed for.
- Construction details for grade control sizing are required as part of the DGLVR Stream Crossing Standard. Stable rock size should be specified as a "minimum diameter" (such as "24-inches") instead of a gradation class (such as "R-6", for example). The engineer may specify a gradation class of rock to be used to simplify estimates, procurement, etc., but additional guidance should be provided in the Project Specifications instructing the contractor to select rocks of the specified minimum diameter from the gradation for use.
- If quarried rock is used for construction of instream features (grade controls, bank margins, key pieces), the material must be sourced from a Penn DOT-approved quarry, or otherwise tested per DGLVR Stream Crossing Standard requirements.
- In locations where exposed bedrock is the dominant grade control feature, design and placement of additional constructed grade control structures may not be necessary. The extent and locations of bedrock control will dictate the need for supplemental grade control features on a site-by-site basis.

See the Grade Control Technical Bulletin in Appendix H for additional information.

12.1.7 Channel Shape (Cross Section) in the Reconstructed Reach

In order to achieve continuity through the project reach, designed channel dimensions through the reconstructed reach and the new structure should be similar to the surveyed reference reach and cross sections in regard to the following:

- Parabolic shape to define a low-flow channel, including at and between grade control locations (Figure 12.4 and Figure 12.5).
- Define bank margins to establish and maintain bankfull channel width and depth through the crossing for the entire length of the structure. Bank margin height should be consistent with the constructed bankfull elevation through the structure. Bank margin height information can be derived from cross-section survey of a grade control crest in the reference reach.
- A minimum stable rock size should be specified for construction of the bank margins through the crossing.

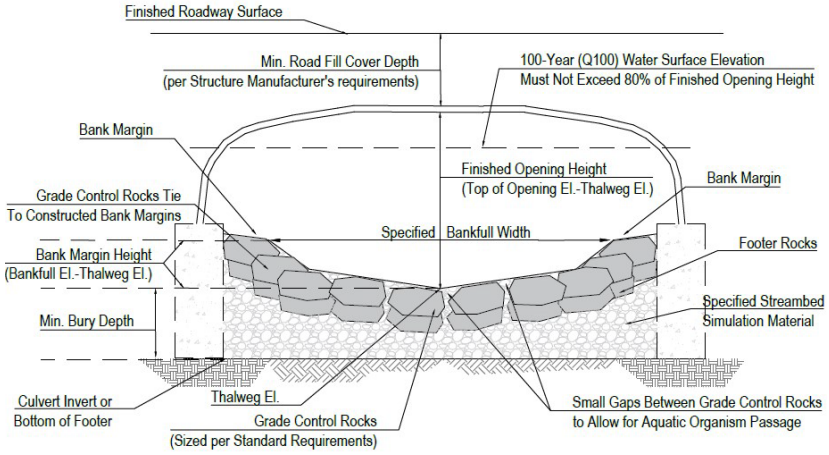


Figure 12.4 Typical Cross Section at a Grade Control

*A typical cross section **at a grade control** showing channel shape through a culvert. The bottom line represents invert or recommended top of footing depth. The dashed line shows the water surface elevation of the 100-year discharge.*

Additional Considerations for Channel Shape

- Additional streambank restoration may be necessary upstream and downstream of the crossing to establish and maintain the project **bankfull width** through the reconstructed reach, and/or transition between existing channel width and the width of the bankfull channel to be constructed through the structure.
- Placement of inlet / outlet protection (such as rip-rap) should not constrict or reduce the bankfull width of the channel.
- At a minimum, constructed grade controls and key pieces of the substrate, including constructed bank margins within the structure, shall be designed to be stable at the 100-year discharge.
- Bank margins within the structure should transition to existing upstream and downstream streambanks. If a structure must be placed on a meander bend in the stream, the thalweg of the channel will tend to be on the outside of the bend. Consider designing a channel through the structure with the thalweg on the outside bend (not in the middle of the structure), to accommodate this natural tendency. Design of bank margins in these cases should account for any additional scour potential along the outside of the bend to protect structure wall, footings, etc. Consider further expanding the structure width to accommodate the curvature of the stream and the need to construct and maintain defined bank margins.
- The width and depth of the existing outlet scour pool should be reclaimed to better reflect those of the reference reach. Restoring appropriate channel depth typically requires placement of fill to elevate the streambed. Restoring appropriate channel width can be accomplished through installation of wood structures such as root wads or mud sills to define the new bank margins. In some situations, placement of rock can be used to adjust the channel width as needed.

12.1.8 Substrate Design in the Reconstructed Reach (Streambed Reconstruction)

Specification of a suitable substrate mix through the reconstructed reach should consider the natural tendency of streams to move bedload as well as the need to maintain material in the structure over time. Streambed reconstruction should utilize a specified substrate mix that provides the functionality of a natural streambed, with a gradation that provides for both mobility of finer particles and persistence of larger pieces that are more resistant to higher flows. As per the DGLVR Stream Crossing Standard, the constructed grade controls, bank margins and key pieces of the substrate in the structure shall be designed to be stable at the 100-year discharge. When specifying a substrate mix for the reconstructed reach, the engineer should consider and account for confinement of the channel through the structure and any corresponding increases in velocity and bed shear.

In most stream settings, a well-graded mixture of very fine, fine, and coarse bed material provides for both sediment transport and bed resiliency. Although substrate mix design will be site specific, the engineer might consider the following three-part mix as a framework for specifying a suitable substrate for the reconstructed reach:

1. **The large component of the substrate that is stable at higher flows**. Consider the size of the rock and corresponding void spaces between them. While larger rock is more stable, the larger voids between them are more difficult to fill with smaller material, which is necessary to provide adequate compaction and prevention of sub-surface streamflow.
2. **A smaller, well-graded aggregate to fill voids in larger pieces.** Consider an imported aggregate that fills voids in the larger pieces and approximates the range and variety of gravels and finer particles that comprise the natural streambed.
3. **Natural ("native") streambed material.** Consider the composition of the native material that will be excavated from the site during construction. This material can often be included in the mix to provide additional size variability and to incorporate sufficient fine materials to aid in compaction and subsurface flow prevention.

Methods for Specifying a Substrate Gradation

In most situations, the substrate size distribution in the reference reach provides the best site-specific indication of a suitable substrate mix for the prevailing stream setting, and should serve as a starting-point for specifying a design streambed material gradation. The reference reach provides a picture of substrate gradation that is relatively stable and functional in unconfined, open-channel conditions through the project site. Due to a variety of factors however, including increased bed shear and scour potential within the confined conditions of the replacement crossing structure, bed material gradation derived from the reference reach should be adjusted to provide additional resistance and longevity through the reconstructed reach. The methods listed below provide a range of approaches that can be used to determine moveable substrate particle sizes, develop appropriate gradations for stream crossing replacements, and 'upsize' gradations to provide enhanced stability through crossing structures.

Many predictive methods for specifying a substrate gradation rely on comparison with the streambed composition in the reference reach. The most common and reliable method for characterizing the streambed surface is by conducting a pebble count. Wohlman (1954), and Bunte and Abt (2001) provide guidance on for conducting and recording a pebble count. Similar guidance is also available through a wide variety of other technical sources, including the USFS Stream Simulation document referenced below.

The DGLVR Program requires that the engineer specify a suitable streambed material composition. To meet DGLVR Program objectives, the substrate placed must provide a persistent streambed that supports the same surface flow regime as the reference reach. However, the DGLVR Program does not identify any particular method that must be used. Common accepted methodologies include:

1. **US Forest Service method**: the USFS provides a methodology (modified critical shear stress method) for determining streambed mobility and stability based upon particle distribution (pebble counts) from the reference reach. The substrate size distribution from the reference reach is used as a starting point and evaluated for stability. If needed, the reference gradation is adjusted until calculated stability is achieved.
   Appendix E of the USFS Stream Simulation document outlines the process for specifying a suitable substrate gradation using this method. More information is available at https://www.fs.fed.us/eng/pubs/pdf/StreamSimulation/

2. **Washington Department of Fish & Wildlife Methods**: WDFW provides three methods for determining a streambed substrate gradation. These include the reference reach method (similar to the USFS method above), the unit-discharge method, and the paleohydraulic analysis method. All three methods are described in the *2013 WDFW Water Crossing Design Guidelines*. This document also provides guidance for developing a bed material gradation from a single known particle size/gradation class (D_{100}, D_{50}, etc.).
   Chapter 3 of this WFDW document contains guidance regarding determination of a suitable substrate gradation. More information available at https://wdfw.wa.gov/sites/default/files/publications/01501/wdfw01501.pdf

   Overall, both documents listed above serve as a good general resources for understanding many of the concepts described in this Technical Manual and the criteria required in the DGLVR Stream Crossing Standard. It is strongly recommended that practitioners review both documents to better understand the application of these concepts to stream crossing replacement projects funded through the DGLVR Program.

Material Placement Specification

Proper placement and compaction of the specified substrate mix is critical to project success. Streambed construction methods (especially through the replacement structure) will vary from project to project. Preparation of bid documents, pre-bid site showings for contractors, and project contracting should

clearly identify the importance of placing and compacting the streambed through the reconstructed reach as being an essential aspect of the project.

See Chapter 8 and the Streambed Restoration Technical Bulletin in Appendix H for further guidance and information.

12.1.9 Structure Selection

The emphasis of the DGLVR Program is to restore channel continuity through the roadway. Primary consideration in structure selection should be dictated by the need to reestablish channel continuity upstream, through, and downstream of the roadway. Additionally, the engineer must evaluate opportunities to improve flood resiliency and compatibility with the roadway by considering existing site conditions and constraints that might include:

- Roadway profile and elevations
- Stream/road alignments (planform)
- Required structure width to accommodate channel continuity
- Constructability concerns
- Other adjoining or nearby infrastructure
- Minimum cover requirements over the replacement structure

Replacement structures must be sized to accommodate the following:

- Construction of a bankfull-width channel through the structure
- Construction of bank margins along both edges of the bankfull-width channel. Bank margins must be comprised of rock sized for stability at the 100-yr discharge (**Q100**)
- Conveyance of the 100-yr discharge at an elevation not to exceed 80% of the **finished opening height** (measured from the thalweg elevation of the reconstructed streambed at the crest of a grade control structure to the top of the structure opening)
- Upon meeting the three criteria above, the resultant structure must not be less than 125% of the bankfull width. Structure opening width must be measured at the bankfull (bank margin) elevation. Bottomless structures are required for all structure replacements where the continuity slope of the channel through the project area will be greater than 4.0%, or the bankfull width is over 20', as determined by the Site Assessment. For general information on different types of structures, consult the Structure Selection for Stream Crossings Technical Bulletin in Appendix H or structure manufacturers. It is strongly recommended that the replacement structure not be purchased until the conservation district review of the design package has been satisfactorily completed and a permit has been received. Purchase of a structure prior to receipt of the conservation district consistency letter and permit acknowledgement may lead to the purchase of an improper structure and potential non-payment with DGLVR funds.

In some situations, baffles can be used to enhance streambed retention within the replacement structure. When properly applied, baffles can increase the long-term persistence of the constructed streambed within the structure by bolstering ability of constructed grade controls, key pieces, and larger components of the streambed material to withstand higher flood flows. Baffles can be especially beneficial in smaller structures where placement of grade controls, streambed, and streambanks is often more difficult. Baffles should always be intended to supplement, and not replace, the functions provided by constructed grade controls, key pieces, and other essential components of proper streambed reconstruction through the structure. Applied correctly, baffles serve to hold grade control and streambed material in the pipe and are not visible in the finished channel. When applied incorrectly, baffles can lead to problems such as increased streambed scour downstream and/or excessive accumulation of sediment upstream. These issues can significantly disrupt channel continuity and aquatic organism passage through the crossing and can contribute to further channel adjustments upstream and downstream of the culvert. The use and application of baffles should be considered on a project-by-project basis.

12.1.10 Structure Opening Width

Per DGLVR Program Stream Crossing Standard, structures must be of adequate width to accommodate the following:

- Construction of a parabolic-shaped, bankfull-width channel within the structure that includes a defined low-flow channel (thalweg), measured at the bankfull (bank margin) elevation.
- Installation of robust bank margins comprised of rock sufficiently-sized to be stable at the Q100.

Additionally, the replacement structure must have sufficient rise (must be "tall" enough) to allow for the minimum bury depth of the invert and ensure that the Q100 water surface elevation does not exceed 80% of the finished opening height. The fact that manufacturers provide structures in a range of standardized "height-x-width" sizes may also influence final structure width in order to ensure the rise height needed. Once these sizing criteria are met, the **effective structure width** must be no less than 1.25-times the bankfull width of the stream at the bankfull (bank margin) elevation. In design, the shape of the selected structure and required bury depth both influence the effective structure width. In most instances, effective structure width (at the bankfull elevation) will be narrower than the vendor's listed structure width, which is commonly measured at the widest point of the structure. Effective structure width and the various sizing criteria to be met must be considered whenever a conservation district discusses potential structure size requirements with the grant recipient or engineer for a given project. In most instances, structures greater in width than the minimum 125% bankfull width will be necessary in order to meet all sizing requirements. Figure 12.5 shows the difference between a structure's effective width at bankfull elevation and the width listed by the manufacture.

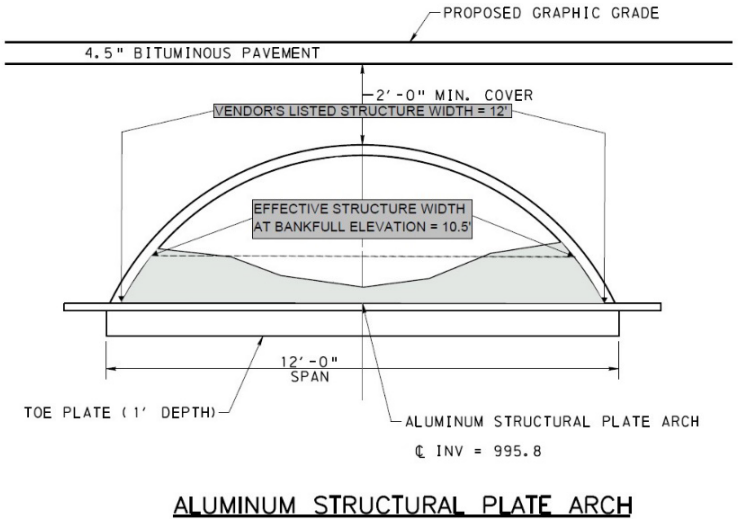


Figure 12.5 Effective Structure Width

This figure shows the difference between the manufacturer's listed structure width (12', measured at the plate invert) versus "effective" structure width (10.5', measured at the design bankfull channel / bank margin elevation). To meet DGLVR Program Policy, the effective structure width cannot be less than be 1.25x the bankfull channel width.

Some consideration should also be given to constructability when determining a structure size. Wider structures allow for increased streambed stability by reducing flow depth and velocity at a given discharge. Wider structures with a corresponding "taller" rise may also make construction of grade controls, streambed, and bank margins easier by allowing the use of larger equipment.

The DGLVR Stream Crossing Standard also requires that "New stream crossing structures shall be designed to pass the 100-year discharge at a water surface elevation not to exceed 80% of the finished opening height " See Figure 5.2 for a visual representation.

The conservation district and grant recipient are not expected to calculate the 100-year discharge or rock sizes stable at Q100 during the grant application phase. At this point in the grant application process, the estimated structure dimensions will be based largely off the bankfull channel width, estimated rock size for stable bank margins, minimum bury depth required, and existing streambed and roadway elevations. Once the 100-year discharge calculations are provided by the engineer, adjustments to structure size (width, height, or both) may be necessary. The engineer will typically specify a final structure size during project design.

12.1.11 Structure Alignment and Length

If the alignment of the existing culvert provides for relatively uninterrupted channel continuity in the plan view (aerial view) upstream, through, and downstream of the roadway, consider utilizing the existing alignment for the new structure.

Many older structures were placed perpendicular to the road to save on costs. In such instances, the engineer must evaluate opportunities to restore proper channel alignment by positioning the new structure accordingly (See Figure 12.6). In this case, consultation with the conservation district and PA **DEP** will be necessary to address regulatory concerns and permitting requirements prior to advancing with design.

Depending on the degree of skew at the roadway and increased width of the replacement structure, structure length may need to be increased to locate the inlet, outlet and any headwall / wingwall features sufficiently off the roadway edges. Structure length should be limited to what is necessary to adequately restore planform continuity, support the roadway and embankment, provide for public safety and accommodate reconstruction of the stream channel upstream, through, and downstream of the crossing. See Figure 12.6.

The SCC GP-11 Permit Memo (Appendix E) clarifies when stream realignment can be authorized under a DEP GP-11. Contact DEP to discuss any proposed realignments and permitting requirements.

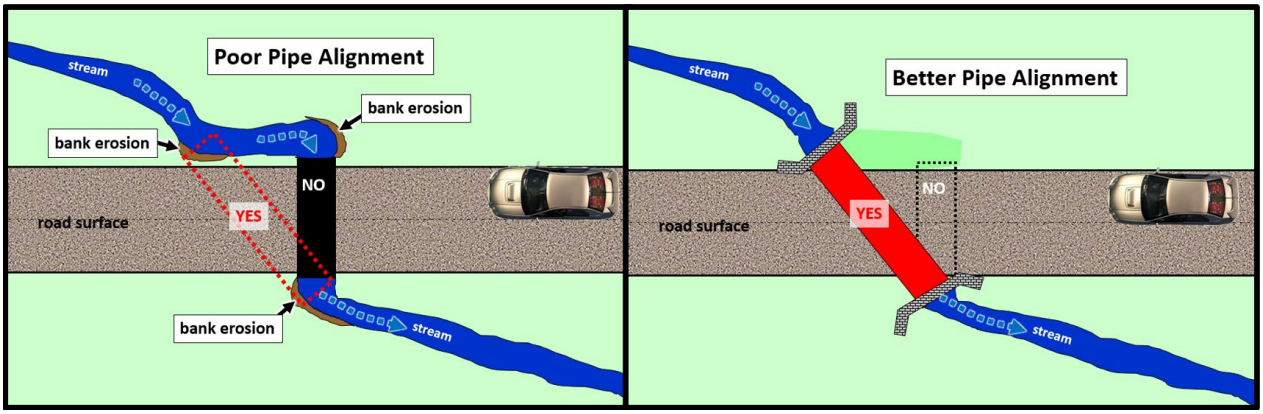


Figure 12.6 Structure Alignment

New crossings should be properly aligned with stream channel if possible.

12.1.12 Structure Embedment (Bury Depth)

The potential for bed scour and pool formation varies from project to project and is influenced by a variety of site-specific factors. Per the DGLVR Stream Crossing Standard, bottomless structures shall be used for all structure replacements where the continuity slope of the channel will be greater than 4.0%, or the bankfull width is over 20', as determined by the Site Assessment.

The engineer may use the **Anticipated Scour Depth (ASD)** approach or another industry-accepted method to determine the minimum substrate (bury) depth for stream crossing structures: Regardless of the method used, the minimum substrate depth requirement of 24" will apply if ASD or scour analysis returns a lower value. All bury depths listed below are to be measured from the bottom of the **low flow channel** or thalweg at the grade controls, to the structure invert or bottom of footings.

The DGLVR Stream Crossing Standard states that:

A. *(IV. O. 1) "Minimum stream substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) is to be based on the maximum pool depth in the reference reach with a minimum safety factor multiplier as listed in Table 1. Alternatively, minimum bury depth can be determined using industry accepted scour analysis and modeling tools for stream system analysis and/or bridges (storm sewer models are not acceptable for stream crossing scour analysis)."*

B. *(IV. O. 1) Structures installed on reconstructed reach stream slopes >4.0% must be bottomless. The 2.5 safety factor multiplier is to establish the recommended minimum top of footing buried depth. The final footing buried depth is to be determined by the Engineer in project design.*

C. *(IV. O. 2) "Minimum substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) shall be 24-inches, or the depth determined with scour analysis models or the Anticipated Scour Depth, whichever is greater."*

Anticipated Scour Depth (ASD)

Maximum Pool Depth

Using the longitudinal profile survey, calculate the maximum pool depth in the reference reach of the stream. Pool depth is measured from the bed elevation at the deepest part of a pool to the crest of the grade control feature immediately upstream.

Factor of Safety

Because structures confine stream flow, increasing velocity and shear stress compared to the natural channel, the DGLVR Program applies a factor of safety to maximum pool depth based on the slope of the stream to calculate the Anticipated Scour Depth. This factor of safety will allow for deeper pool formation than is seen in the reference reach without exposing the invert of the structure or bottom of the footings. Using the "continuity slope" of the reconstructed reach, select the corresponding minimum Pool Depth Multiplier from the table below (from the DGLVR Stream Crossing Standard Section IV. O.). The values in this table represent the minimum multipliers required by the DGLVR Program.

Stream Slope	Pool Depth Multiplier
0% - 2%	1.5
2.1% - 4.0%	2.0
> 4.0%*	2.5

Structures installed on stream slopes >4.0% must be bottomless. The 2.5 safety factor multiplier is to establish the recommended minimum bottom of footing buried depth. The final footing buried depth is to be determined by the Engineer in project design.

Calculating Anticipated Scour Depth (ASD)

Multiply the "Maximum Pool Depth" from the reference reach by the "Pool Depth Multiplier" determined in the table above. For example, a site with a continuity slope of 2.5% and a maximum pool depth in the reference reach of 1.2' would use the multiplier 2.0 (from table above) for a minimum bury depth of 2.4' (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings).

If the ASD method is used, the value returned (2.4' in the above example) is the minimum bury depth of the invert or bottom of footings of the new structure below the low-flow channel (thalweg) of the reconstructed channel. The ASD therefore also represents the minimum amount of streambed that must be established between the structure invert or bottom of footings and the bottom of the low flow channel during streambed reconstruction. Note that all bury depths are measured from the bottom of the low-flow channel (thalweg) at the crest of a grade control feature to the structure invert or bottom of the footings.

Industry Accepted Scour Analysis

Scour analysis can be used to determine the bury depth of structures. Industry accepted scour analysis and modeling tools for stream system analysis and/or bridges must be used. Models designed for storm sewer analysis are not acceptable for scour analysis in natural stream systems.

Bottomless Structures

The engineer may consider the Anticipated Scour Depth approach as a starting point for designing depth of footings or may utilize another applicable method. The engineer of record is ultimately responsible for final design of footing depths and placements.

12.1.13 Structure Height (Rise) and Roadway Elevation

Consider opportunities for further increasing conveyance capacity and flood resiliency by maximizing structure height (open rise) wherever possible. The DGLVR Stream Crossing Standard requires new stream crossing structures to be designed to pass the 100-year discharge at an elevation not exceeding 80% of the finished opening height (see Section 12.1.9). The engineer needs to consider minimum required bury depth of the invert, the effective width of the structure at the bankfull elevation, the elevation of the reconstructed streambed, minimum road fill cover requirement, and finished road surface elevation when determining structure height.

In situations where available cover height over the new structure is limited due to site constraints, it may be necessary and advisable to raise the elevation of the road over the stream crossing. Where necessary and possible, the engineer should consider raising the roadway elevation over the crossing to improve conveyance and meet the DGLVR Stream Crossing Standard. In many situations, raising of the roadway elevation can be authorized, so long as no increase in flood elevation occurs (typically the use of a larger structure can reduce existing flood elevations). The engineer should consult with PA DEP about raising the road elevation where necessary on DGLVR projects. An H&H analysis report, as required by the DGLVR Stream Crossing Standard, may prove beneficial in consulting with DEP regarding allowances for raising the roadway elevation. The SCC GP-11 Permit Memo (Appendix E) clarifies when road elevation raises can be authorized under a DEP GP-11. Contact DEP to discuss any proposed elevation changes and permitting requirements.

12.2 Construction Documents

The engineer must provide a set of construction plans for the project. All critical locations and elevations should be clearly noted on the drawings, not left to be scaled or interpreted. Include sufficient notations or narrative to ensure proper installation.

Because the DGLVR Stream Crossing Standard is more stringent and expansive than the minimum PA DEP permit requirements, design plans must not only satisfy regulatory criteria but must also include sufficient detail to ensure DGLVR Program Policy is met. The *DGLVR Stream Crossing Design & Installation Standard* provides a list of specific elements to be included in the plan drawings (See Appendix A).

12.2.1 Plan Drawings and Specifications

Construction plans and specifications shall be prepared for all stream crossing projects, regardless of who the contractor or installer may be (applies to projects installed by the grant recipient, such as a municipality). At a minimum, the plan and specifications must include the following per the DGLVR Stream Crossing Standard Section VI:

Note: *shaded italic text* is directly from DGLVR Stream Crossing Standard

VI. B. 1. *Existing conditions of the project site, including but not limited to the full longitudinal profile survey and cross sections of the stream, existing stream crossing, stream crossing and channel slope, road approaches, and delineated wetlands (if applicable).*

Construction plans should include clear and concise depiction of all existing conditions on plan, section, and profile drawings.

- Profile drawings should show the existing streambed profile along the thalweg, extending beyond the upstream and downstream project limits (tie-in points). Indicate existing channel slopes upstream and downstream of the existing culvert, beyond the areas impacted by the undersized structure.
- Plan view should clearly show the existing structure, structure alignment, dimensions, road approaches, cross section locations and any wetlands.
- Section drawings should show the existing structure dimensions, elevation, and depth of road cover.
- Provide existing roadway elevation, and elevation and location of benchmarks.

VI. B. 2. *Geographic location and bankfull width of stream.*

The plan view drawings should note and depict the bankfull width of the stream, bankfull elevation(s) and the location of cross-sectional measurements.

VI. B. 3. *Proposed stream crossing structure width, length, and height with profile and typical cross sections.*

- Provide proposed structure dimensions and elevations, including inlet and outlet invert elevations and locations, on the plan, section and profile views.
- Provide proposed alignment of replacement structure on the plan view.
- If applicable, provide footing dimensions, elevations and depth of bury.
- Provide finished roadway elevation over structure on profile and section views.

VI. B. 4. Elevations and locations of abutments, footings, wingwalls and other associated appurtenances.

On the proposed conditions drawings, provide the locations and elevations of all structure features such as abutments, footings, wingwalls and other associated **appurtenances**.

VI. B. 5. *Details for stream bed re-construction (e.g., channel width, proposed channel alignment, channel side slopes, stream bed slope and location of tie-in points).*

The proposed-conditions plan view and profile drawings should adequately inform reconstruction of a stable stream channel that reestablishes and maintains longitudinal continuity upstream, through, and downstream of the replacement crossing.

- Clearly show on the profile drawing the design slope and depth of streambed material in the proposed reconstructed reach.
- Provide design of streambed and bank margin, including rock sizing and elevations at structure inlet and outlet and extending upstream and downstream of the crossing as needed to tie into existing streambed and banks.
- Show locations and elevations of tie-in points at upstream- and downstream limits of the reconstructed reach. These should occur at existing grade control features.
- The proposed bankfull width of the reconstructed reach should be shown to scale, with design bankfull width noted.
- Identify method for stabilizing transition areas at upper and lower project limits.
- Type, locations, lengths and elevations of grade control features. Stationing and elevations for grade control crests (at the thalweg) should be noted on the plan drawings.

VI. B. 6. *Location and details for low flow channel width, depth, and material size and types.*

On the proposed section view, provide low flow channel dimensions from the cross-sectional surveys. This should include the width and depth of the channel and information on the stream bed materials used in constructing the low flow channel.

VI. B. 7. *Locations and construction details, including rock sizing, in-stream structures, grade controls, and/or bank stabilization structures (if applicable).*

- Provide plan, section and profile drawings where applicable for all grade control features and instream structures, including locations and elevations of grade control features (at crest / thalweg) through the reconstructed reach.

- Provide indication of whether grade control features at the tie-in points will be maintained as existing (stable) or will be reconstructed. For constructed grade control features, indicate the design feature length.
- Detail drawings for grade control structures should clearly indicate material type, minimum (stable) material size, installation slopes and overall structure length.

VI. B. 8. *Depth, gradation, and composition of material for streambed restoration. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on determining substrate gradation and composition.*

- On the proposed section and profile view, provide the streambed material thickness and inlet and outlet bed elevations.
- Note material gradation and composition. Note any existing onsite rock materials to be repurposed.
- Include gradation, composition, and guidance for proper placement and compaction of materials used to construct the low flow channel, bankfull channel, and the bank margins.
- See Section 12.1.8 for additional guidance on substrate design in the reconstructed reach.

VI. B. 9. *Specification for compaction of placed streambed material.*

- Provide details on compaction (mechanical or hydraulic) of materials used to construct the streambed through the reconstructed reach to prevent subsurface flow down through the substrate.
- Note that substrate is thoroughly compacted when water stays on top of the newly constructed stream bed and does not go subsurface.

VI. B. 10. *Details for scour hole restoration and reestablishing channel cross section.*

- If applicable, provide details to indicate material type, size, and depth to restore the scour hole to width, depth and profile that is consistent with dimensions of proposed reconstructed reach.
- Reconstruction of the channel cross section through the scour hole should be shown to tie into the existing or reconstructed stream bed and banks.

VI. B. 11. *Structure manufacturer's details, specifications, and installation instructions.*

- Typically in the form of manufacturer's shop drawings and specifications for the replacement structure.
- Typically include but not limited to: applicable structural details of all components; reinforcing steel, type of materials, thickness, anchorage requirements, backfill lift thickness, etc.

VI. B. 12. *Thickness, compressive strength, reinforcement, testing, and other special requirements for concrete according to the manufacturer specifications, if applicable.*

- If applicable, provide concrete specifications and manufacturer's requirements.
- Include details for concrete sampling and testing as required by the manufacturer.

VI. B. 13. *Load limits for bridges and/or culverts including signage and guide rail per state or local codes.*

Provide all details related to structure load limits, related signage, guide rail, etc. per municipal and PA code.

VI. B. 14. *Location of all utilities and notification requirements (PA One Call).*

Provide detailed locations of all utilities on the plan drawings and specify contractor notification requirements for PA One Call.

VI. B. 15. *Location and elevation of survey benchmarks.*

- Provide the elevations and locations of benchmarks, including a written description of the location to assist others in finding the benchmark in the field at a later date.
- Note all locations and elevations on the design plans.

VI. B. 16. *Method of surface water diversion and dewatering during construction.*

- Provide clear detail drawings for diversion of the stream flow and dewatering of the construction site.
- Provide details for control of sediment during diversion and dewatering.

VI. B. 17. *Erosion and Sedimentation Control Plan, if applicable.*

- Include an E&S Plan with detail drawings for all BMPs to be used during construction.
- For additional details see section 12.2.2 below and reference the *PA DEP Erosion and Sediment Pollution Control Program Manual* for guidance on preparation of the E&S Plan.

VI. B. 18. *Vegetative requirements that include seed and plant materials to be used, establishment rates, and season of planting.*

Provide details on reseeding and establishment rate. Note if any specialized bank stabilization or soil amendments will be needed to ensure establishment.

VI. B. 19. *Cross section view of the proposed structure that clearly notes proposed streambed thalweg elevation (at the crest of a constructed grade control feature), Q100 water surface elevation, and top of structure opening elevation.*

- Sample standard drawings for various structures are provided in Attachment C to the Stream Crossing Replacement Standard in Appendix A.

VI. B. 20. *Additional site-specific requirements.*

- Because stream crossing replacements through the DGLVR Program include many aspects that differ from more basic culvert replacement projects, project specifications should be included with the bid package.
- If not provided as notations to the detail drawings, separate site-specific specification documents should be provided for unique construction elements. This allows prospective contractors a clear sense of the project goals and needs, establishing a clear understanding of construction requirements.

12.2.2 Erosion & Sediment Pollution Control (E&S) Plan

Construction documents will include preparation of an E&S Plan. Reference the *PA DEP Erosion and Sediment Pollution Control Manual* for guidance on preparation of the E&S Plan. Consider the following when developing an E&S Plan for a stream crossing replacement project:

- Streambed compaction (washing the streambed material): From the E&S perspective, this can create increased discharge of sediment downstream if not adequately addressed. To do so may require creative sequencing of work and placement of additional BMPs (pumps, filters, etc.) to reduce sedimentation to the adjoining waterway.
- Bank stabilization: Consider method and extent of placement for bank stabilization features, including instream structures that might be specified to reclaim appropriate channel width. Ensure

adequate BMPs are specified to reduce discharge of sediment to the stream during installation, including equipment access needed to do the work.

- Stockpiling of materials: Consider designating material staging and stockpile areas, especially for rock material to be used in reconstruction of the streambed through the project reach. This will likely include stockpiling of native fill / streambed material excavated from the site that will later be added into the substrate mix. Depending on the work schedule, additional BMPs may be needed to stabilize stockpiled materials.
- Use of equipment in stream: Consider a construction sequence, dewatering plan, and construction access routes that limit the need for equipment in the flowing stream channel. Plan the sequence, dewatering and access to accommodate use of equipment for installing grade controls and substrate within the replacement structure.

12.3 Design Submittal for Conservation District

The DGLVR Program requires that the engineer provide the conservation district with the plans and specifications for review before submitting for permit approval. The conservation district will review the package to determine whether the design, as presented, meets the DGLVR Program Policy and Stream Crossing Standard. If discrepancies exist within the design package that do not align with the DGLVR Program Policy and Stream Crossing Standard, these must be corrected. Upon completion of the review, the conservation district will notify the grant recipient in writing that this review has been satisfactorily completed. The engineer may not submit to regulatory agencies for permit approval(s) until the conservation district review is completed.

12.4 Permitting

Most commonly, stream crossing replacements funded through the DGLVR Program can be authorized through registration of a PA DEP Chapter 105 General Permit (GP) #7 or #11. The requirements of the DGLVR Program are generally more stringent that PA DEP permit requirements. As such, DGLVR Program requirements meet, and often exceed, the required conditions of the General Permits. In no instance should the issuance of a regulatory permit serve as assurance that DGLVR Program Policy and Stream Crossing Standard are adequately addressed in the project design. The conservation district review process outlined above is intended to provide that assurance. Once the conservation district reviews the plans and specifications and is satisfied that they meet DGLVR Policy and Stream Crossing Standard, the district will provide the engineer with a consistency letter (Appendix F). Per DGLVR Program Policy, the permit application shall not be submitted for permit review until this consistency letter is received.

When planning and designing a project, the project scope and extent should not be minimized for the sole purpose of fitting the thresholds allowable under a general permit. Project scope, extent and design should be driven by what is necessary and essential to achieve project success and should not be limited by the type of permit(s) needed. **Some examples where additional permits (aside from GP #7 or 11) may be needed include:**

- Significant channel modifications may be necessary to reestablish proper stream/structure alignment, resulting in "retiring" and filling of a small section of the existing stream channel. This might occur where a stream is realigned from an existing perpendicular crossing to its historic diagonal alignment through the roadway.
- Permits required when work involves disturbance of jurisdictional wetlands.
- Channel modifications beyond the permit-allowed distance upstream and downstream of the crossing
  - For the GP #11, PA DEP may consider channel modifications beyond the conditional threshold of 50' upstream and downstream of the crossing inlet/outlet, so long as the modifications can be justified as essential to the performance and stability of the crossing.
  - For channel modifications beyond 50' upstream and downstream of the inlet/outlet that are limited to grade control construction and do not involve substantial channel fill or excavation (beyond that incidental to installation of grade controls), PA DEP may consider the use of an additional GP-1 to authorize placement of these features.

See the SCC GP-11 Permit Memo (Appendix E) for additional clarification. Consult with DEP as needed on permitting questions, as well as with other entities involved in any required Federal, State, or Local permits that may be needed.

The attachments to the standard include drawings showing a range of "typical" installations for a variety of structure types. These drawings are avilable on the CDGRS website as CAD drawings for use and customization https://www.dirtandgravel.psu.edu/general-resources/stream-crossing-replacements.

12.5 Bid Documents

DGLVR stream crossing replacement projects emphasize reestablishing channel continuity through reconstruction of a stable stream channel through the new crossing and modification of adjoining upstream and downstream channel segments. This may require specific items to be added to bid documents that may not typically be associated with more traditional crossing replacement projects.

12.5.1 Project Narrative

Consider including a narrative or cover letter in the bid documents to highlight some of the special considerations for the DGLVR Program that may not be seen in typical stream crossing replacements, such as:

- The degree of instream work required outside of the structure, which may extend a substantial distance upstream and downstream through the reconstructed reach.
- The need to place a large amount of rock and aggregate inside of the structure to construct a streambed, grade control features and bank margins to specified dimensions. This often requires working within a confined space using manual labor or specialized low-profile equipment.
- The need for hydraulic washing of fine material to fill voids and establish a compacted streambed through the structure. This includes considerations for time and labor, water supply, pumping, and additional E&S controls.
- The completed streambed (including inside of the structure) should have:
  - a parabolic cross-sectional shape that defines a low-flow channel (thalweg),
  - defined bank margins that establish the specified bankfull channel width,
  - a finished slope consistent with the specified continuity slope, per the project design, and
  - grade control elements constructed of the specified minimum stable rock size.

12.5.2 Roles and Responsibilities

The bid documents should clearly define roles and responsibilities of all parties through the construction phase of the project. These parties might include the engineer, grant recipient (typically a municipality), conservation district, and contractor. In some instances, technical assistance and oversight may be provided by CDGRS during construction. Outlining roles and responsibilities in the bid documents becomes important in situations where the grant recipient will be contributing part of the construction labor, materials, and/or equipment.

12.5.3 Project Schedule

Bid documents should clearly define the project schedule and establish timetables and deadlines to be met in consideration of the following:

- Construction sequencing should be coordinated with the project engineer and conservation district to allow them to fulfill required oversight and inspection requirements as outlined in the DGLVR Stream Crossing Standard.
- Regulatory restrictions prohibit instream work on streams that support natural reproduction of trout (wild trout streams) between October 1 and December 31. This restriction includes tributaries to listed wild trout streams.

- Regulatory restrictions prohibit instream work on stocked trout streams between March 1 and June 15.
- Regulatory restrictions prohibit instream work on Class A Wild Trout Waters Oct 1 – April 1.
- Depending on stream and site conditions, it may be advisable to schedule construction during times of typical seasonal low-flow conditions.
- Avoid scheduling construction during times where freezing temperatures can complicate excavation and make accurate stream channel reconstruction very difficult.

12.5.4 Prevailing Wage

The DGLVR Program is subject to the Pennsylvania Prevailing Wage (PW) Act (1961, August 15, P. L. 987, No. 442), 43 P.S. Section 165-1 et seq.". Prevailing Wage Rates apply to DGLVR Projects when the total estimated or actual project cost is $25,000 or more (not $100,000). Most stream crossing replacement projects funded by the DGLVR Program will exceed this threshold. The need to meet and document the Prevailing Wage requirement should be clearly outlined for prospective bidders in the bid documents. If federal funds are also involved in the project, the project may also be subject to the Davis-Bacon Act. Additional details on PA prevailing wage can be found in the DGLVR Administrative Guidance Manual Section 3.7.4 or through the PA Department of Labor and Industry at: https://www.dli.pa.gov/Individuals/Labor-Management-Relations/llc/prevailing-wage/Pages/default.aspx

12.5.5 Providing the Structure

The bid documents should clearly outline who is responsible for structure delivery, assembly, and placement, including:

- Purchase of structure
- Delivery of structure: fully assembled, partially assembled, or unassembled
- Storage of structure (if applicable)
- Assembly of structure
- Placement of structure (large or fully assembled structures may require specialized equipment)
- Coordination with subcontractors and vendors

12.5.6 Bid Site Showing

Bid meetings (site showings) are highly recommended for DGLVR stream crossing replacements, but are left at the discretion of the grant recipient. Schedule the bid meeting in consideration of all parties vested in the project. Attendance by the grant applicant and engineer is strongly recommended. Participation and assistance from CDGRS can be of benefit in describing some of the more detailed aspects of construction. These meetings are essential to ensuring that prospective bidders clearly understand the scope of work and additional requirements to meet DGLVR Policy and Stream Crossing Standard, and can account for these in preparing a bid.

12.5.7 Bond Requirements

Bond requirements (if any) must be clearly defined for prospective bidders in the bid documents. Ensure that bond requirements meet the project owner's procurement guidelines and requirements. These guidelines may require a bid bond, payment bond, and/or performance bond executed by an authorized surety company.

12.5.8 Fee Proposal

All bidding procedures must conform with the project owner's procurement guidelines and requirements. Where allowable, consider structuring the fee proposal to request unit costs, not just lump sum bids.

12.6 Construction Inspection and Certification

The engineer (or their designee) is required to be present onsite during critical aspects of construction (detailed in 12.6.1). They must also verify that these critical aspects are completed according to the final Construction Documents and the DGLVR Stream Crossing Standard. Installations that deviate from the Construction Documents ("field changes") must be noted in the certification red-line plan set provided by the engineer at project closeout (see Section 12.6.2). The engineer is responsible for ensuring that any field changes made comply with DGLVR Program Policy and Stream Crossing Standard in consultation with the conservation district.

12.6.1 On-Site Inspection

At a minimum, aspects of construction to be inspected by the engineer at critical stages are identified in the DGLVR Stream Crossing Standard and described below (See DGLVR Stream Crossing Design & Installation Standard Section VII.D. in Appendix A). Inform the conservation district of any changes made to the plan during implementation to ensure that DGLVR Policy and Stream Crossing Standard are still being met.

Note: *shaded italic text* is directly from DGLVR Stream Crossing Standard

VII. D. *Critical Stages of Construction to be inspected by the Engineer (and/or Engineer's designee) at the time of installation is required. Critical Stages include, but are not limited to, the following:*

1. *Installation of structure subgrade and bedding materials and establishing inverts/elevations.*
Recommendations: Check that the excavated subgrade is suitable for placement of the specified bedding materials and ensure that the finished surface of the bedding is adequate to allow for design elevations and slope of invert or footings to be met per construction documents.

2. *Installation of footings, abutments or in-ground appurtenances.*
Recommendations: Check that final design elevations are met once these features are installed. For structures that include toe plates at the inlet and/or outlet, ensure that trenches are deep enough to allow for proper installation and that backfill is properly placed and compacted per the construction documents and manufacturer's specifications.

3. *Installation of grade control features, bank margins, and streambed substrate.*
Recommendations: Confirm grade control features are constructed of the stable minimum rock size, and that thalweg elevations, locations, slopes and lengths specified in the construction documents and detail drawings are met. For the reconstructed reach, ensure that the specified substrate mix is used and that substrate depth and compaction methods follow the construction documents.

4. *Installation or placement of stream crossing structure.*
Recommendations: Ensure that the structure is set in accordance with the construction documents, shop drawings, manufacturer's specifications and other governing standards that may apply, and that final design elevations and slopes are achieved.

5. *Compaction and backfill of stream crossing structure.*
Recommendations: Ensure that the structure is backfilled in accordance with the construction documents, shop drawings, manufacturer's specifications and other governing standards that may apply.

12.6.2 Certification

Per the DGLVR Stream Crossing Standard, the engineer must provide the project owner a signed and sealed certification form("Inspection and Documentation of Critical Stages of Construction Certification Form") and a red-line set of construction drawings (See Appendix A).

The Certification indicates that the critical stages of construction were inspected and installed in accordance with the construction documents and DGLVR Stream Crossing Standard. See Section 12.6.1 above and Section VII. D. of the DGLVR Stream Crossing Standard for details on the inspection requirements.

Red-lined construction documents indicate any changes in the as-built conditions of the project compared to the design plans. Field changes must be clearly noted as such, including revised elevations, etc. that deviate from the Construction Documents. The red-line plan set submitted with the final engineering certification serves as the engineer's documentation of the finished project conditions. For field changes that result in notable deviation from the Construction Documents, a brief written description of cause, justification and changes made should be provided. Certain changes may warrant a pause in construction until those changes can be verified as being consistent with DGLVR Program Stream Crossing Standard and Policy.

REFERENCES

Bunte, Kristin; Abt, Steven R. 2001. Sampling surface and subsurface particle-size distributions in wadable gravel- and cobble-bed streams for analyses in sediment transport, hydraulics, and streambed monitoring. Gen. Tech. Rep. RMRS-GTR-74. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 428 p.

Furniss, M. J., T. S. Ledwith, M. A. Love, B. McFadin, and S. A. Flanagan. Response of road–stream crossings to large flood events in Washington, Oregon, and Northern California. USDA Forest Service, Technology and Development Program. 9877-1806- SDTDC. San Dimas Technology & Development Center, San Dimas, California. 1998.

Gillespie, N., A. Unthank, L. Campbell, R. Gubernick, D. Cenderelli, M. Weinhold, P. Anderson, D. McKinley, S. Roy, B. Austin, S. Wells, J. Rowan, C. Orvis, R. Kirn, M. Hudy, A. Bowden, J. Levine, A. Singler, and E. Fretz. 2014. *Flood Effects on Road-Stream Crossing Infrastructure: Economic and Ecological Benefits of Stream Simulation Designs*. Fisheries Vol 39(2): 63-76.

Hayhoe, K., D.J. Wuebbles, D.R. Easterling, D.W. Fahey, S. Doherty, J. Kossin, W. Sweet, R. Vose, and M. Wehner, 2018: Our Changing Climate. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 72–144. doi: 10.7930/NCA4.2018.CH2

NCHRP 25-25 Task 93: Long Term Construction and Maintenance Cost Comparison for Road Stream Crossings: Traditional Hydraulic Design vs. Aquatic Organism Passage Design. March 2017.

Levine, J. 2013. *An Economic Analysis of Improved Road-Stream Crossings*. The Nature Conservancy, Adirondack Chapter, Keene Valley, NY.

Pennsylvania State Conservation Commission Dirt, Gravel, and Low-Volume Road Maintenance Program Administrative Manual. July 2020.

Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual. Technical Guidance Number 363-2134-008. March 2012.

Singler, A., Graber, B., and Banks, C. 2012. Massachusetts Stream Crossings Handbook. Division of Ecological Restoration, Massachusetts Department of Fish and Game.

Table: Minimum structure size and minimum embedment (depth of material in structure) from various entities in other regions of the United States. Data Summarized from USFWS. Information compiled by the U.S. Fish and Wildlife Service, Chesapeake Bay Field Office (Leah Franzluebbers) and the Maryland Fish and Wildlife Conservation Office (Julie Devers) in March of 2019, updated in September of 2020.

U.S. Fish and Wildlife Service, Chesapeake Bay Field Office (Leah Franzluebbers) and the Maryland Fish and Wildlife Conservation Office (Julie Devers). Road Stream Crossing State Comparison. March 2019.

U.S. Forest Service Stream Simulation Working Group. Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road–Stream Crossings. Publication 0877-1801. San Dimas Technology and Development Center, U.S. Department of Agriculture, Forest Service. 2008.

Vermont Department of Fish and Wildlife (VT DFW). 2009. Guidelines for the Design of Stream/Road Crossings for Passage of Aquatic Organisms in Vermont.

Washington Department of Fish and Wildlife (WDFW). 2013. Water Crossing Design Guidelines.

Wolman, M.G. (1954) A Method of Sampling Coarse River-Bed Material. Transactions—American Geophysical Union, 35, 951-956.

APPENDICES

Appendix A. DGLVR Stream Crossing Design and Installation Standard
Appendix B. Definitions and Acronyms
Appendix C. Stream Crossing Evaluation Form
Appendix D. Stream Continuity Sketches
Appendix E. SCC GP-11 Permit Memo
Appendix F. Editable Forms and Templates
Appendix G. Checklists
Appendix H. Technical Bulletins

Appendix A. DGLVR Stream Crossing Design and Installation Standard

All stream crossing replacements funded in whole or in part with DGLVR funds, or listed as in-kind on a DGLVR Project, must follow the DGLVR Stream Crossing Standard, unless an exemption from the DGLVR Stream Crossing Standard (see section 3.3) is applicable. This appendix includes the DGLVR Stream Crossing Design and Installation Standard with attachments.

DRAFT 4/13/2022. This has not been approved by the SCC.

PA STATE CONSERVATION COMMISSION
DIRT, GRAVEL AND LOW VOLUME ROAD PROGRAM

STREAM CROSSING DESIGN & INSTALLATION STANDARD

I. DEFINITIONS

Aggradation: Deposition of sediment and corresponding increase in streambed elevation, often due to inability of the stream to adequately convey its sediment load during flood.

Anticipated Scour Depth: Depth of expected scour used to determine structure bury depth based on observed maximum reference reach pool depth and a factor of safety.

Aquatic Organism Passage: Unimpeded movement of aquatic organisms through the road/stream crossing.

Bankfull Elevation: In non-confined channels, the elevation point at which the stream typically accesses the floodplain. Channel dimensions at the bankfull elevation convey the channel-forming or dominant discharge.

Bankfull Width: A site-specific, field-derived measurement of channel width at the bankfull elevation.

Bank Margins: Large rock placed along the outside edges of the reconstructed bankfull channel within the stream crossing structure. Placement of the bank margins define bankfull channel width and bank margin (bankfull) elevation / height through the structure.

Bedform: Typical sequence of streambed features through the project reference reach (riffles/pools, step/pool, etc.).

Channel Continuity: Relative consistency and connectivity of a stream channel upstream, through, and downstream of a road/stream crossing, in regard to physical characteristics of the channel such as slope, planform, dimensions, profile, and bedforms.

Continuity Slope: Slope of the reconstructed section of streambed necessary to re-establish a relatively-continuous slope, profile and bedforms (channel continuity) along the entire length of stream extending upstream, through, and downstream of the new crossing.

Crossing: Refers to the location of a road/stream crossing structure.

Cross-Section Survey: A survey conducted across the channel (perpendicular to the thalweg) to produce a graphical representation of channel dimensions including shape, depth and width.

Degradation: Accelerated erosion and transport of sediment from the streambed and banks, and corresponding lowering of the streambed elevation. Often associated with increased scour potential due to channel constriction or abrupt increase in channel slope.

Finished Opening Area: The unobstructed area within the structure after accommodating for stream bed material, low flow channel, and bank margins.

Finished Opening Height: Vertical distance measured from the thalweg elevation at the crest of a constructed grade control feature inside the replacement structure, upward to the top of the culvert opening or bottom of bridge beam.

Flood Resiliency: Reducing the risk of flood damages to people and infrastructure by planning and implementing measures that improve floodwater conveyance and provide for long-term stability of a self-maintaining stream corridor.

Grade Control: Natural or manmade structures that control channel elevation, dictate channel slope and maintain bedforms. Common types include riffles, cascades, steps, rock clusters and large wood features.

Intermittent Watercourse: A stream or waterway with surface flow during various times of the year when groundwater inputs are sufficient to provide streamflow. At other times of the year, when there is insufficient groundwater input, the stream channel may be dry.

Invert: Interior bottom elevation of stream crossing structure.

Key Pieces: Largest rocks in the reconstructed streambed substrate. Often these can be clustered to provide areas of minor, frequent grade control along the length of the channel bed in-between more robust constructed grade control features.

Longitudinal Profile Survey: Survey of the stream channel, typically measured from upstream to downstream along the channel thalweg, to capture prominent features such as channel elevations, depths, and slopes at bedform features such as riffles, pools, runs, glides, and step/pools.

Low Flow Channel: Portion of the channel commonly wetted during stream base flow.

Outlet Scour Pool: An overly-widened and deepened pool bedform feature often (but not always) located immediately downstream of an undersized crossing.

Perennial Watercourse: A stream or waterway with surface flow throughout the entire calendar year.

Q100: The 100-year recurrence interval of stream flow. In any given year, there is a 1% probability that a flow of that magnitude or greater would occur.

Reconstructed Reach: Section of stream to be constructed upstream, through, and downstream of the new structure to re-establish channel continuity between the tie-in points.

Reference Reach: Section of stream channel that best reflects the "typical" natural, minimally-impacted physical characteristics (profile, dimension, planform and dominant bedform) of the channel. For stream crossing projects, the reference reach is located beyond the extent channel impacts associated with the existing structure. Site Assessment (survey) of the reference reach is used as a blueprint for design of the reconstructed reach.

Site Assessment: Survey of longitudinal profile and cross-sections through, and adjoining to, the project site used to inform project design.

Structure: A road/stream crossing structure, such as a culvert or bridge, constructed across a stream to provide controlled access for vehicles.

Substrate: Mixture of rock that composes the streambed.

Thalweg: The line of lowest elevation along the flowpath of a stream channel. Dimensionally, this is reflected as the lowest point of elevation in the channel cross-section.

Tie-in Points: Locations of existing- or constructed grade control features where the upstream- and downstream limits of the reconstructed reach transition to the existing stream channel. Tie-in points define the limits of the reconstructed reach necessary to achieve channel continuity upstream, through, and downstream of the crossing**.**

II. PURPOSE

This standard is applied for the purposes of:

A. Providing greater flood resiliency at road stream crossings and reducing maintenance of undersized crossings.
B. Improving water quality by reducing sediment and erosion occurring at the road and stream interface.
C. Reducing streambed and streambank degradation.
D. Constructing & maintaining stream channel continuity through the road profile.
E. Accommodating aquatic organism passage upstream, downstream, and through the road crossing.
F. Repairing and stabilizing stream channels damaged by undersized stream crossings.

III. CONDITIONS WHERE PRACTICE APPLIES

This practice applies to stream crossing structure replacements and installations on state or local publicly owned roads where:

A. DGLVR funding is used, in whole or in part, to fund a stream crossing replacement.

B. An intermittent or perennial watercourse exists.

C. A defined bed and bank convey water to a roadway.

IV. GENERAL CRITERIA APPLICABLE TO ALL STREAM CROSSING INSTALLATIONS

A. Refer to the Dirt, Gravel, and Low-Volume Roads (DGLVR) Program "Stream Crossing Replacement Technical Manual" for additional design and construction guidance and details regarding implementation of the standards and requirements listed below.

B. All stream crossing projects shall be authorized in accordance with local, state and federal laws. All applicable permits must be obtained prior to construction.

C. All stream crossing structures shall be comprised of one single-opening structure installed at each crossing. Projects shall not utilize multi-opening structures or the placement of multiple single-opening structures at any one crossing location. Additional floodplain conveyance structures may be installed a minimum of one bankfull-width distance outside of the bankfull channel.

D. New stream crossing structures shall be designed to pass, at a minimum, the 100-year discharge (Q100) at a water surface elevation not to exceed 80% of the finished opening height.

A Hydrologic and Hydraulic (H&H) Study is required that includes:

1. finished thalweg elevations, and
2. clearly labeled discharge values and water surface elevations at the proposed crossing inlet for Q2, Q10, Q25, Q50, and Q100.

E. Grade controls, bank margins and key pieces shall, at a minimum, be designed to be stable at Q100.

F. Structures must be of adequate width to accommodate the bankfull width of the stream at the final bankfull elevation with stable bank margins. Once these design criteria are met, the structure width shall not be less than 1.25x the bankfull width of the stream at the bankfull elevation.

G. In project design and construction, bankfull channel dimensions must be based upon project site-specific field measurements. Channel dimensions derived from other methods, such as modeling of estimated bankfull discharge, shall not be utilized.

H. New structures must be properly aligned with the channel, unless not feasible due to permitting restrictions or other constructability restraints. See Attachment A and the SCC GP-11 Permit Memo (Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification of permitting, including minor channel realignments that might be authorized with a GP-11 for stream crossings designed to this Standard.

I. Consider floodplain connectivity when necessary (e.g., high water by-pass, overflow pipes, etc.). Floodplain- or overflow pipes must be placed a minimum of one bankfull-width distance outside of the bankfull channel.

J. Structures must be designed and constructed to accommodate the passage of aquatic organisms through the structure.

K. Round pipes over 36" in diameter may not be utilized for stream crossings.

L. Low flow channels with well-defined bank margins must be built through the structure.

M. Site Assessment:

1. A longitudinal profile survey is required for each site prior to project design and/or permitting. The surveyed stream segments must extend far enough to capture existing channel slopes upstream and downstream of the crossing and must include an appropriate reference reach to support project design. To determine applicability, reference reach slope must be +/- 25% of the proposed continuity slope of the reconstructed streambed, unless otherwise approved by the SCC. If an appropriate reference reach is not located near the crossing, a separate survey may be conducted on an appropriate reference reach further upstream or downstream of the crossing. The reference reach must begin and end at existing grade control features and must, at minimum, include two consecutive sequences of repeating bed features (ex. riffle/pool/riffle/pool/riffle). A longer reference reach including additional bedform sequences is encouraged in order to provide more reliable design criteria.
    i. The longitudinal profile survey must extend both upstream and downstream of the crossing and include data points associated with the existing structure and roadway surface.
    ii. Sufficient number and locations of data points must be collected to determine the stream channel features that are critical to a successful structure replacement. These include:
        1. channel and structure slope
        2. grade control types, lengths, and spacing,
        3. pool scour depth,
        4. potential tie-in points,
        5. aggradation wedges,
        6. plunge pools,
        7. vertical offset of the streambed adjacent to the structure,
        8. available roadway cover.
    iii. The longitudinal profile survey must extend a minimum of 150' upstream and 150' downstream of the existing crossing. Additional length of survey may be necessary to capture a suitable reference reach to support project design. Actual length of the longitudinal profile survey is dependent upon the site conditions, availability of a suitable reference reach, channel size and distance necessary to accurately capture existing channel slopes both upstream and downstream of the crossing. The longitudinal profile survey must extend from an existing grade control upstream of the crossing feature to an existing grade control feature downstream of the crossing.
2. Cross-section surveys are required at a minimum of two locations. At minimum, surveys must be completed at a grade control crest within the reference reach and at the deepest point in the outlet scour pool (if present). If no outlet scour pool exists, this survey should capture the maximum depth of a pool feature from the reference reach. At minimum, each surveyed cross section must include data points on both streambanks capturing top-of-bank, bankfull, and right/left edge of water. Instream data points must include a minimum of three streambed points, including the thalweg (low-flow channel).
3. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on Site Assessment requirements.

N. The engineer is responsible for the Site Assessment data they use. If conservation districts provide Site Assessment data, the engineer has discretion to use the provided data or conduct their own surveys. If a Site Assessment is completed by the design engineer to support their project design, the conservation district technician is required to be on-site while the surveys are being performed by the engineer and/or surveyor. The engineer shall provide the completed survey and Site Assessment data to the conservation district technician. The Site Assessment data provided to the conservation district shall include stationing, elevations, and notations of key stream features as outlined in (M.) above.

O. The Site Assessment data (from longitudinal profile and cross section surveys) described above shall be used to inform project design considerations, including the following:

1. Minimum stream substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) is to be based on the maximum pool depth in the reference reach with a minimum safety factor multiplier as listed in Table 1. Alternatively, minimum bury depth can be determined using industry accepted scour analysis and modeling tools for stream system analysis and/or bridges (storm sewer models are not acceptable for stream crossing scour analysis).

Table 1: Pool Depth Safety Factor Multiplier to establish Anticipated Scour Depth

Continuity Slope	Pool Depth Multiplier
0% - 2.0%	1.5
2.1% - 4.0%	2.0
> 4.0%*	2.5

* Structures installed on reconstructed reach stream slopes >4.0% must be bottomless. The 2.5 safety factor multiplier is to establish the recommended minimum bottom of footing buried depth. The final footing buried depth is to be determined by the Engineer in project design.

2. Minimum substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) shall be 24-inches, or the depth determined with scour analysis models or the Anticipated Scour Depth, whichever is greater.
3. The design shall identify stable tie-in points at grade control features (either existing or to be constructed). The distance between the upstream- and downstream tie-in points must extend far enough in both directions to restore channel continuity upstream, through, and downstream of the structure.
4. In-stream channel grade control(s) are required for re-constructing the stream channel and/or stabilizing the stream bed and channel through the reconstructed stream reach. Types of grade control features utilized must be the same type as those within the appropriate reference reach. Design of grade control feature length and spacing shall be based upon the Site Assessment data.
5. Design of the cross-sectional shape of the reconstructed reach must be based on Site Assessment data.

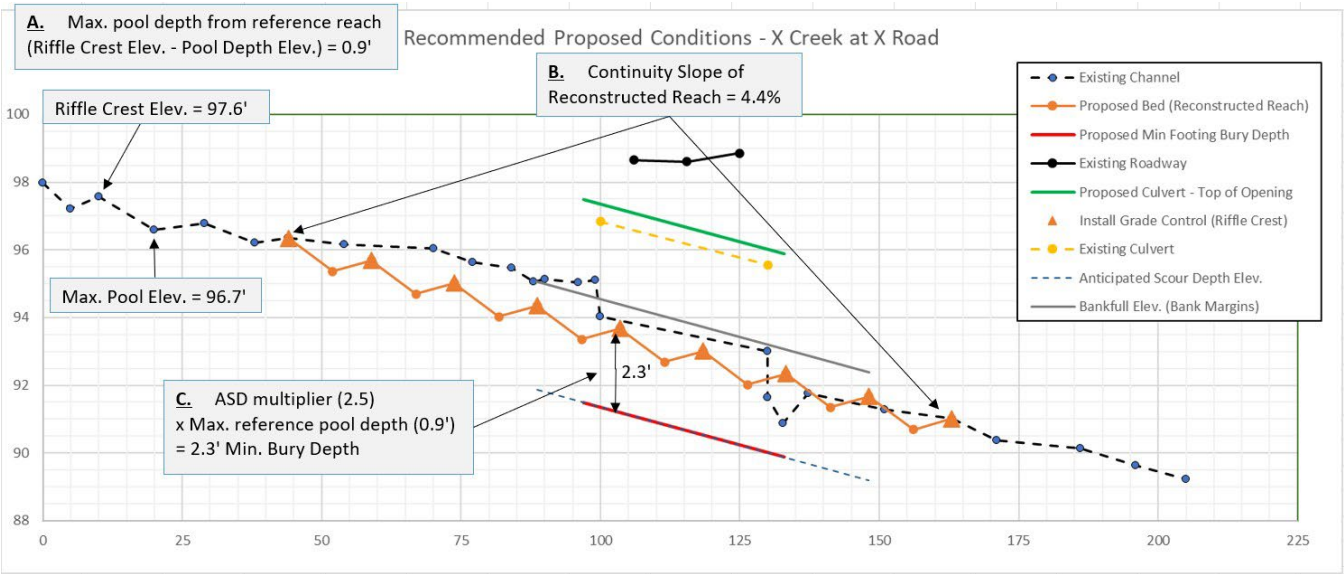


Figure 1. Determining Minimum Bury Depth through the Anticipated Scour Depth / Pool Depth Multiplier Method. **A.** Maximum reference reach pool depth is defined as the greatest vertical difference between each pool bottom elevation and the elevation of the corresponding grade control crest immediately upstream (in this example, 0.9'). **B.** The slope of the stream segment to be reconstructed in order to reestablish channel continuity upstream, through, and downstream of the replacement crossing ("continuity slope") determines the multiplier value to be applied. In this example, a continuity slope of 4.4% corresponds to a pool depth multiplier value of 2.5 (see Table 1, above). **C.** Minimum bury depth is the product of the maximum reference pool depth x pool depth multiplier. In this example, 0.9' x 2.5 = 2.3' minimum bury depth. The minimum bury depth defines the minimum depth to which the bottom of footings (or structure invert) must be installed. This depth is measured downward from the thalweg elevation at the crest of a constructed grade control feature within the replacement structure.

P. Stream crossing projects will likely require work outside of the right-of-way to re-construct the stream channel, install grade controls, and/or allow for construction access to the stream and structure. Before working outside the right-of-way, the grant recipient must obtain written permission from the landowner(s). In instances when written off right-of-way permission cannot be obtained to do work necessary to achieve channel continuity, the project cannot be completed with DGLVR funds.

Q. The grant recipient or engineer must provide all plans and specifications to the conservation district. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that those plans and specifications comply with DGLVR policy and the Stream Crossing Standard before they are submitted (or resubmitted) for permit review.

R. Side Slopes: Make all finished cut and fill road slopes stable for the materials involved. Make the side slopes in soil materials no steeper than 2 horizontal to 1 vertical (2:1) in cut slopes or 3 horizontal to 1 vertical (3:1) for fill slopes. Make rock cuts or fills no steeper than 2 horizontal to 1 vertical (2:1).

S. All stream crossing replacement structures must include a headwall and endwall.

T. Quarried aggregate rip-rap for use as grade control, bank margins, or bank stabilization: Use only rock that is sound, durable, and able to withstand exposure to air, water, and freezing and thawing. Aggregate must be obtained from a Pennsylvania Department of Transportation approved source, or must be tested and meet the following criteria:

1. Abrasion Resistance: The loss of mass (LA Abrasion) shall be less than 45%: Determine the resistance to abrasion using the Los Angeles Abrasion test, ASTM C131.
2. Soundness: Determine the percentage of mass (weight) loss of each fraction of the coarse aggregate after five cycles of immersion and drying using a sodium sulfate solution according to PTM No. 510. The maximum weighted percent loss allowed is 20%.

U. Vegetation: Revegetate and permanently stabilize all disturbed areas as soon as practical after construction activities are complete. Revegetation and site stabilization shall comply with the PA Chapter 102 Erosion Control requirements (See the PA Erosion and Sediment Pollution Control Program Manual for additional guidance).

V. Road Approaches to Stream Crossings: Ensure that the roadway approaches are stable and road drainage systems have been addressed and are adequate to divert road drainage (e.g., ditches, turnouts, etc.) away from the stream and structure in a manner that prevents erosion.

W. Project work cannot start until all Federal, State, and Local permits are obtained, if needed. In particular, any required DEP 102/105 permits must be obtained before construction may begin. See the SCC GP-11 Permit Memo Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification.

V. STRUCTURE SELECTION

A. Bottomless structures shall be used for all structure replacements where the continuity slope of the channel to be reconstructed through the project area will be greater than 4.0% or the bankfull width is over 20', as determined by the longitudinal survey.

B. Structures with inverts / bottoms may be used for structure replacements where the continuity slope of the channel to be reconstructed will be 4.0% or less (as determined by the longitudinal survey) or on sites over 4.0% where it is determined by a geotechnical investigation report that soil bearing pressure cannot support structure abutments or footings.

VI. CONSTRUCTION PLANS AND SPECIFICATIONS

A. The grant recipient must provide all permit applications, Site Assessment data, design plans and specifications (per DGLVR stream crossing replacement standard) to the conservation district for review. The conservation district must review the documents and provide written confirmation to the grant recipient that these submitted documents comply with DGLVR policy and the Stream Crossing Standard before they are submitted (or resubmitted) for permit review.

B. Construction plans and specifications shall be designed and prepared in accordance with this Stream Crossing Standard. Construction plans and specifications shall be prepared for all stream crossing projects, regardless of who the contractor or installer may be (applies to projects installed by the grant recipient, such as a municipality). Clearly describe the requirements for applying the practice to achieve its intended purpose in the plan and specifications. At a minimum, the plan and specifications must include the following:

1. Existing conditions of the project site, including but not limited to the full longitudinal profile survey and cross sections of the stream, existing stream crossing, stream crossing and channel slope, road approaches, and delineated wetlands (if applicable).
2. Geographic location and bankfull width of stream.
3. Proposed stream crossing structure width, length, and height with profile and typical cross sections.
4. Elevations and locations of abutments, footings, wingwalls and other associated appurtenances.
5. Details for stream bed re-construction (e.g., channel width, proposed channel alignment, channel side slopes, stream bed slope and location of tie-in points). See Attachment A and the SCC GP-11 Permit Memo (Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification of permitting, including minor channel realignments that might be authorized with a GP-11 for stream crossings designed to this Standard.
6. Location and details for low flow channel width, depth, and material size and types.

7. Locations and construction details, including rock sizing, in-stream structures, grade controls, and/or bank stabilization structures (if applicable).
8. Depth, gradation, and composition of material for streambed restoration. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on determining substrate gradation and composition.
9. Specification for compaction of placed streambed material.
10. Details for scour hole restoration and reestablishing channel cross section.
11. Structure manufacturer's details, specifications, and installation instructions.
12. Thickness, compressive strength, reinforcement, testing, and other special requirements for concrete according to the manufacturer specifications, if applicable.
13. Load limits for bridges and/or culverts including signage and guide rail per state or local codes.
14. Location of all utilities and notification requirements (PA One Call).
15. Location and elevation of survey benchmarks.
16. Method of surface water diversion and dewatering during construction.
17. Erosion and Sedimentation Control Plan, if applicable.
18. Vegetative requirements that include seed and plant materials to be used, establishment rates, and season of planting.
19. Cross section view of the proposed structure that clearly notes proposed streambed thalweg elevation (at the crest of a constructed grade control feature), Q100 water surface elevation, and top of structure opening elevation.
20. Additional site-specific requirements.

VII. CONSTRUCTION

A. The grant recipient or engineer must provide all draft bid packages (if applicable) to the conservation district. The conservation district must review the draft bid documents and provide written confirmation to the grant recipient or engineer that those draft bid documents comply with DGLVR policy and Stream Crossing Standard before they are provided to potential bidders. All bid documents and practices must conform with municipal codes and other standard procurement requirements of the grant recipient.

B. Final construction documents shall include, at a minimum, the following items:
   1. Bidding Documents (if applicable).
   2. Construction Plan.
   3. Erosion and Sedimentation Control Plan.
   4. Construction Specifications.

C. At a minimum, two benchmarks must be set by the engineer or surveyor in an area outside of the zone of construction and disturbance.

D. Critical Stages of Construction to be inspected by the Engineer (and/or Engineer's designee) at the time of installation is required. Critical Stages include, but are not limited to, the following:
   1. Installation of structure subgrade and bedding materials and establishing inverts/elevations.
   2. Installation of footings, abutments and structure appurtenances.
   3. Installation of grade control features, bank margins, and streambed substrate.
   4. Installation or placement of stream crossing structure.
   5. Compaction and backfill of stream crossing structure.

E. Conservation districts must be on-site regularly during construction to ensure that DGLVR Program Policy and Stream Crossing Standard are being met. Conservation Districts must be onsite during installation of the Critical Stages of Construction defined in VII. D, above.

F. Certification and Documentation of Critical Stages of Construction: The Engineer shall provide the project owner a signed and sealed certification form (Attachment B) indicating that the critical stages of construction outlined in Section VII.D were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard. The engineer must also provide the project owner with red-lined construction documents that indicate any changes in the as-built conditions of the project compared to the design plans.

References:

1. Dirt, Gravel, and Low Volume Road Maintenance Program Administrative Manual. May 2022.
2. Dirt, Gravel, and Low Volume Road Stream Crossing Technical Manual. May 2022.
3. U.S.D.A. Forest Service Stream Simulation Manual: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings. May 2008.
4. Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual. Technical Guidance Number 363-2134-008. March 2012.

Attachments:

Attachment A: Chapter 105 General Permit Types Most Applicable to Stream Crossing Replacements

Attachment B: Inspection and Documentation of Critical Stages of Construction Certification Form

Attachment C: Typical Detail Drawings

Attachment A:

Chapter 105 Permits that are Most Applicable to Stream Crossing Replacements

Attachment A:

Chapter 105 Permits that are Most Applicable to Stream Crossing Replacements

- GP-1 Fish Habitat Enhancement Structures, 3150-PM-BWEW0501
- GP-3 Bank Rehabilitation, Bank Protection, and Gravel Bar Removal, 3150-PM-BWEW0503
- GP-7 Minor Road Crossings, 3150-PM-BWEW0507
- GP-11 Maintenance, Testing, Repair, Rehabilitation or Replacement of Water Obstructions and Encroachments, 3150-PM-BWEW0511

Additional information on PA Chapter 105 permitting can be found at
https://www.dep.pa.gov/Business/Water/Waterways/Pages/ePermitting.aspx

See the SCC GP-11 Permit Memo (Appendix E of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification on potential stream realignments and increasing road elevations.

Consult with DEP as needed on permitting questions, as well as with other entities involved in any required Federal, State, or Local permits that may be needed.

Attachment B:

Inspection and Documentation of Critical Stages of Construction Certification Form

Attachment B:

DGLVR Stream Crossing Replacement

Inspection and Documentation of Critical Stages of Construction Certification Form

Project Title: _____

Road Name: _____

Municipality, County: _____

Professional Engineer Certification

I hereby certify that the Critical Stages of Construction were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard:

_____, _____
Signature of Professional Engineer *Date*

Professional Engineer Seal

Notes:_____

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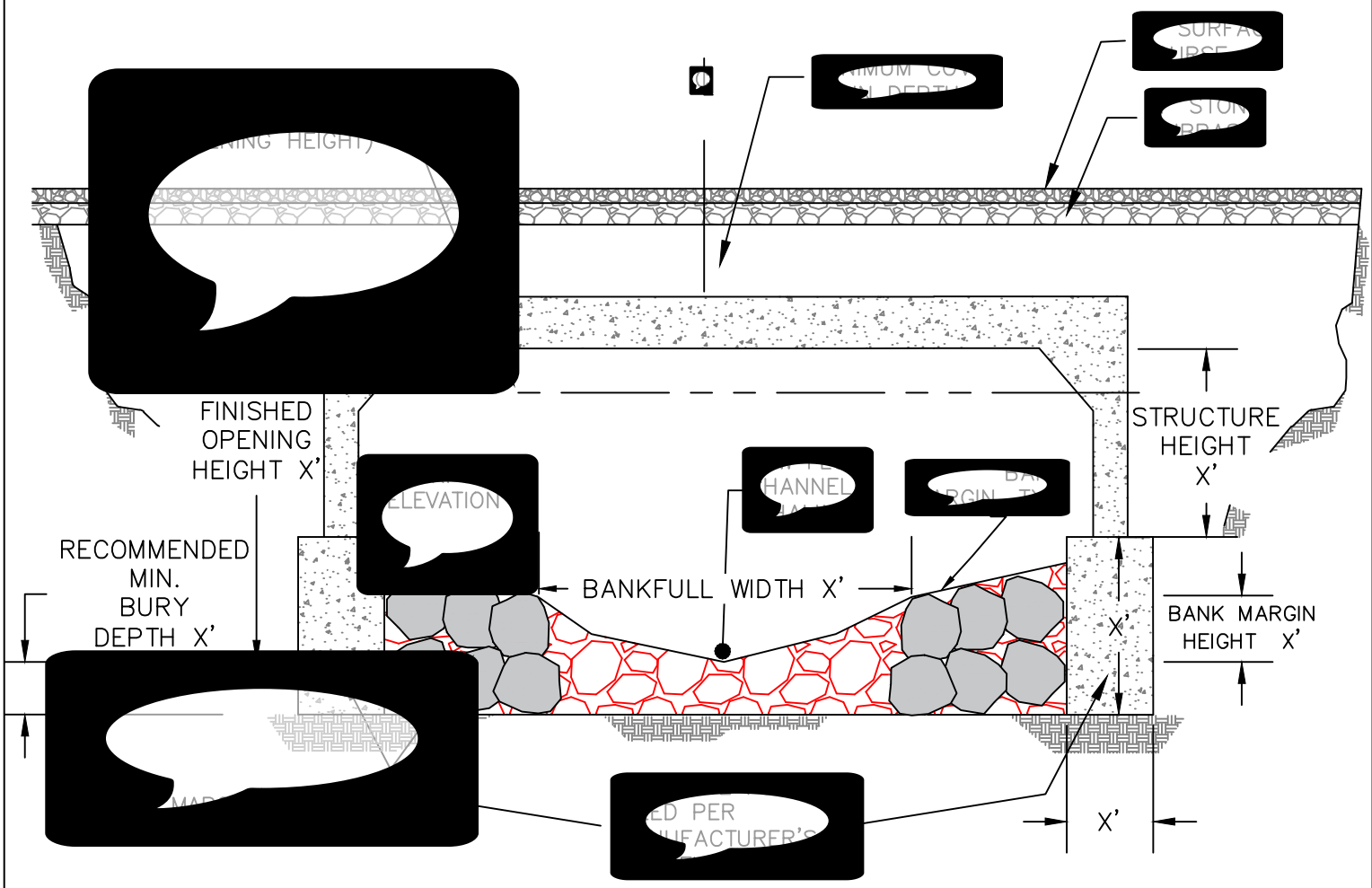
Attachment C:

Typical Detail Drawings



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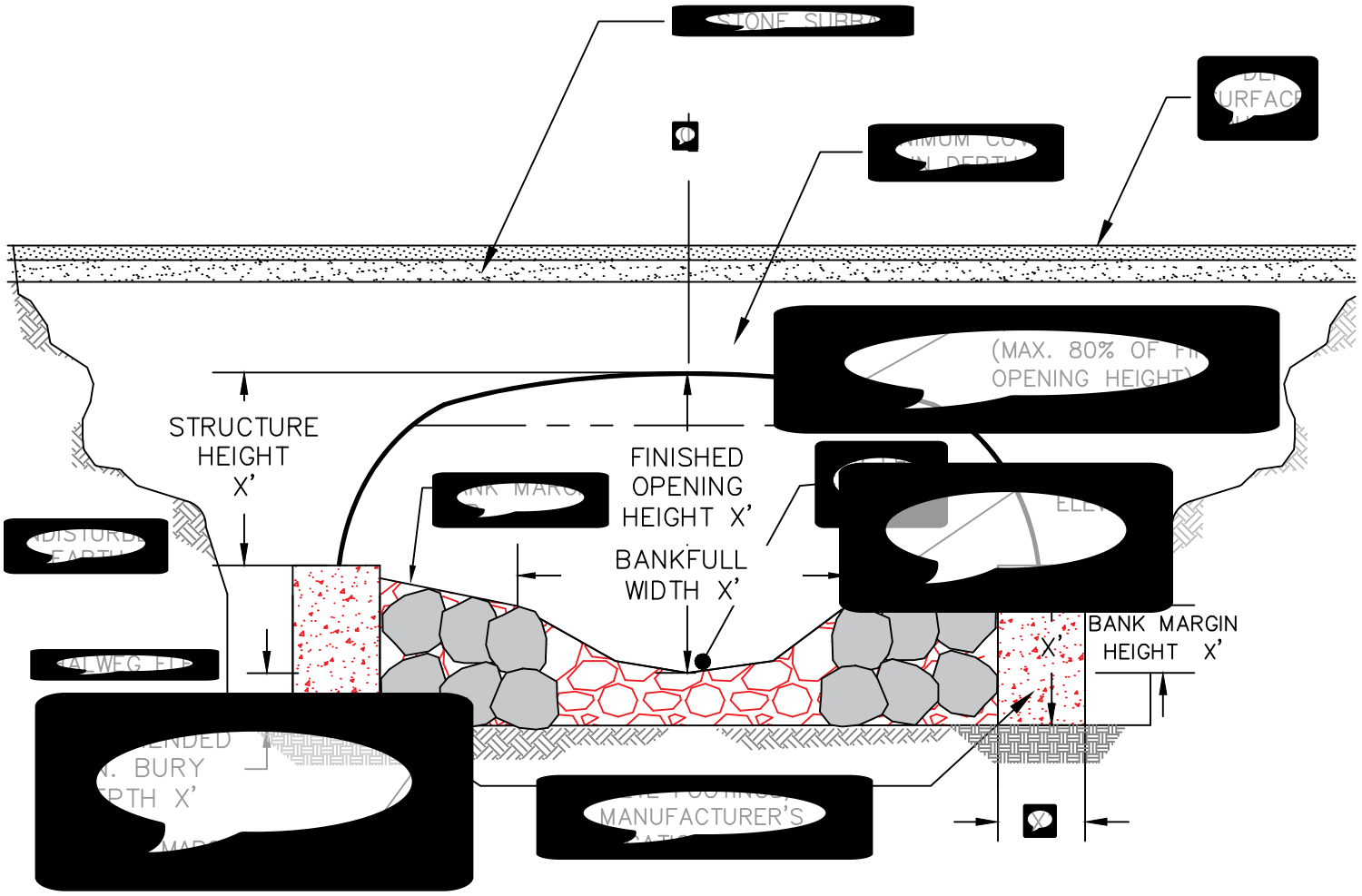

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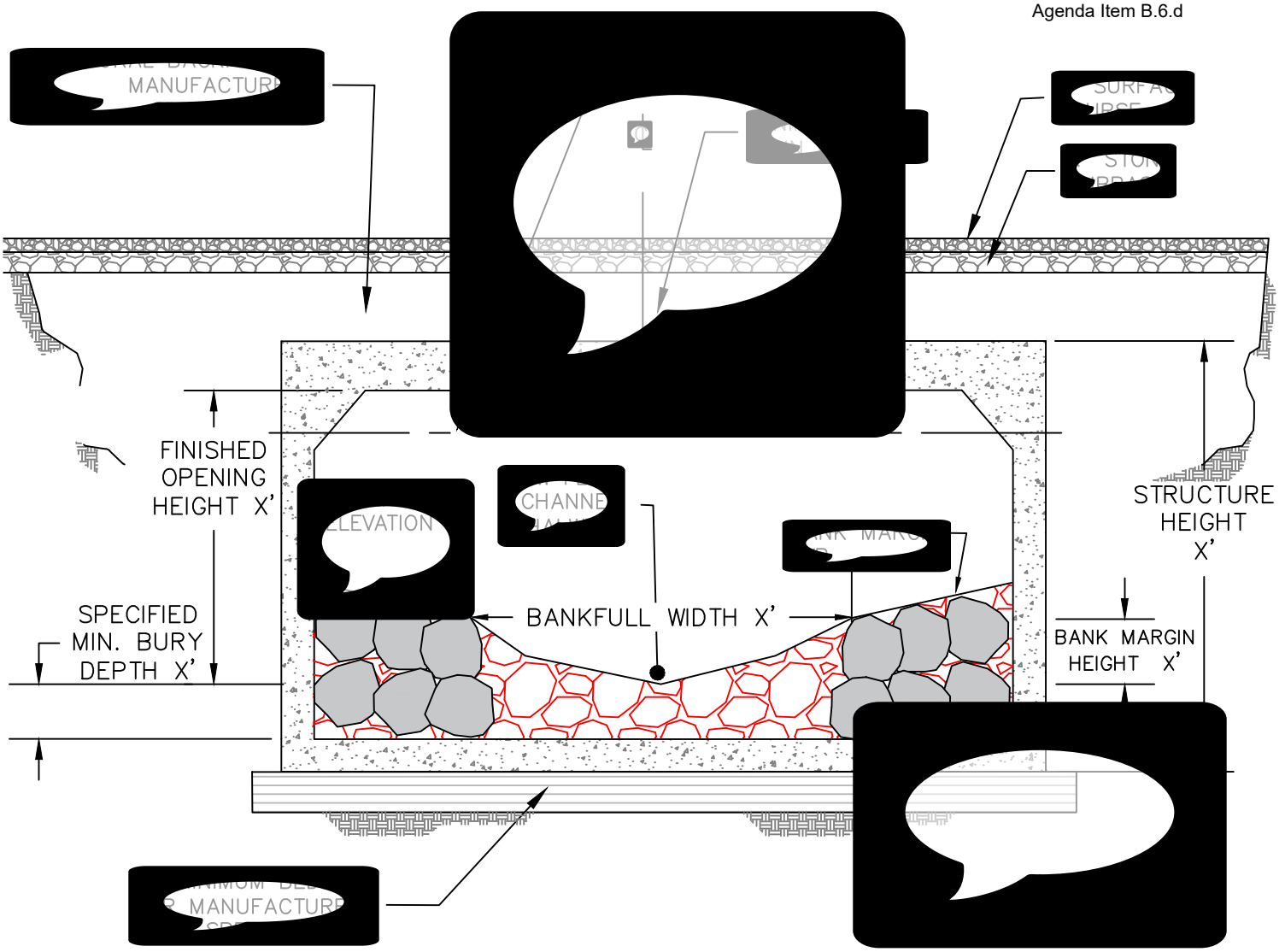

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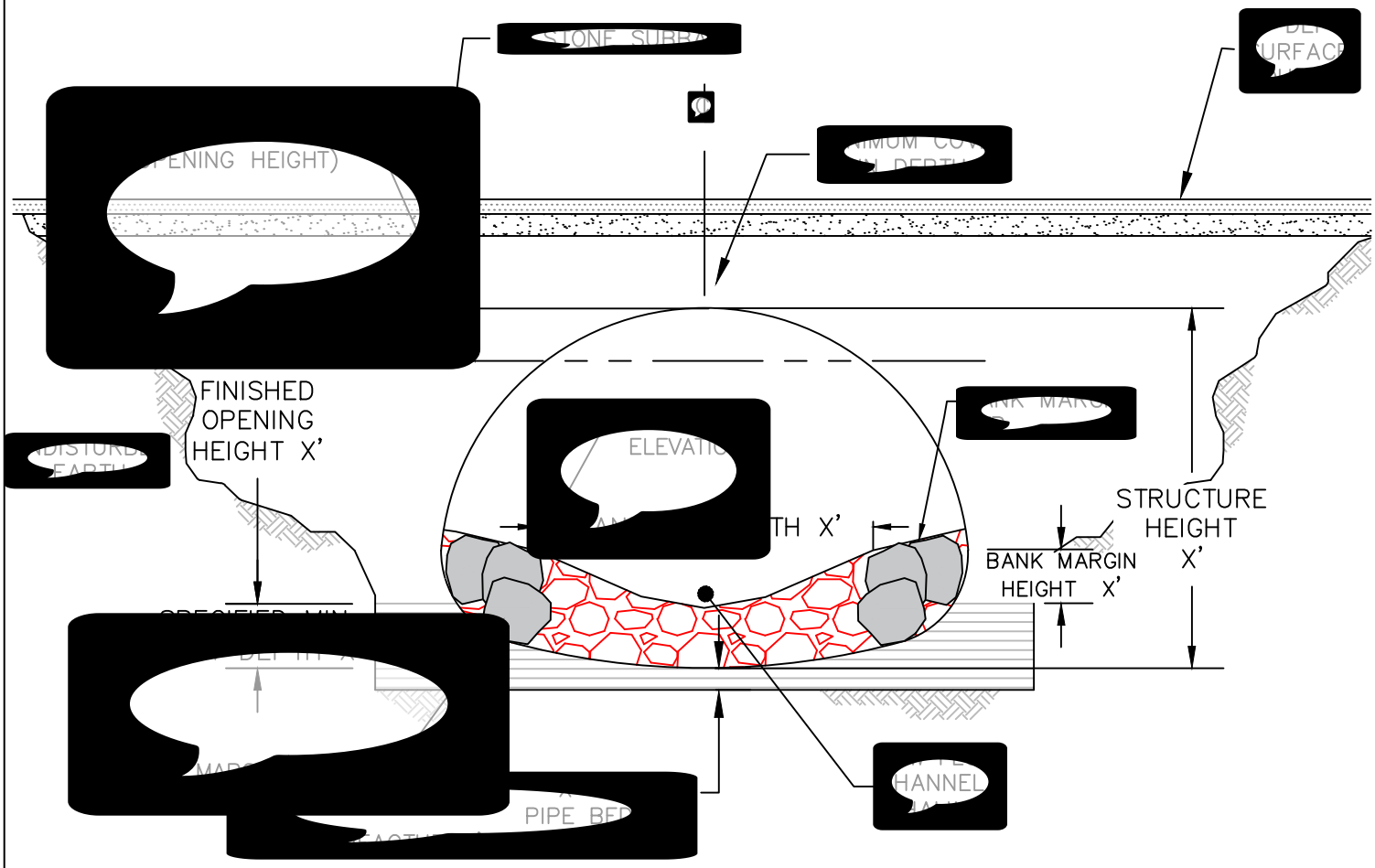

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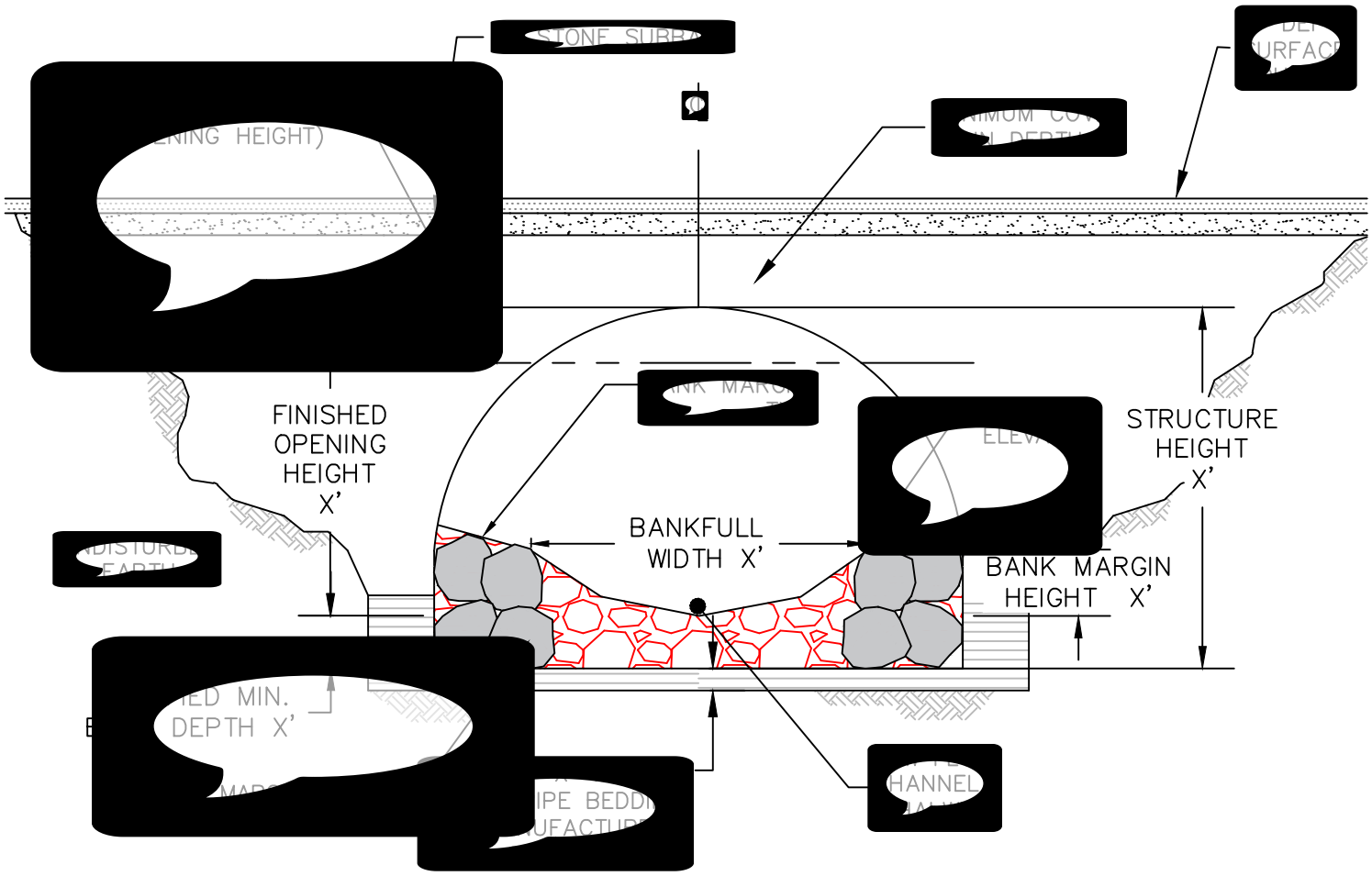

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Appendix B. Definitions and Acronyms

Aggradation: Deposition of sediment and corresponding increase in streambed elevation, often due to inability of the stream to adequately convey its sediment load during flood.

Anticipated Scour Depth (ASD): Depth of expected scour used to determine structure bury depth based on observed maximum reference reach pool depth and a factor of safety.

Appurtenances: accessory components to a stream crossing structure, such as headwall, endwall, wingwalls, toe plates or bank protection features.

Aquatic Organism Passage (AOP): Unimpeded movement of aquatic organisms through the road/stream crossing.

Bankfull Elevation: In non-confined channels, the elevation point at which the stream typically accesses the floodplain. Channel dimensions at the bankfull elevation convey the channel-forming or dominant discharge.

Bankfull Width: A site-specific, field-derived measurement of channel width at the bankfull elevation.

Bank Margins: Large rock placed along the outside edges of the reconstructed bankfull channel within the stream crossing structure. Placement of the bank margins define bankfull channel width and bank margin (bankfull) elevation / height through the structure.

Bedform: Typical sequence of streambed features through the project reference reach (riffles/pools, step/plunge pool, etc.)

CDGRS: Penn State University Center for Dirt and Gravel Road Studies. Provides education, outreach, and technical assistance to all entities involved in the DGLVR Program.

Channel Continuity: Relative consistency and connectivity of a stream channel upstream, through, and downstream of a road/stream crossing, in regard to physical characteristics of the channel such as slope, planform, dimensions, profile, and bedforms.

Construction Documents: typically consists of the plan drawings, detail drawings, specifications and bid documents prepared for a project.

Continuity Slope: Slope of the reconstructed section of streambed necessary to re-establish a relatively-continuous slope, profile and bedforms (channel continuity) along the entire length of stream extending upstream, through, and downstream of the new crossing.

Crossing: Refers to the location of a road/stream crossing structure.

Cross Section Survey: A survey conducted across the channel (perpendicular to the thalweg) to produce a graphical representation of channel dimensions including shape, depth and width.

Degradation: Accelerated erosion and transport of sediment from the streambed and banks, and corresponding lowering of the streambed elevation. Often associated with increased scour potential due to channel constriction or abrupt increase in channel slope.

DEP: Pennsylvania Department of Environmental Protection

Effective Structure Width: the width of a replacement stream crossing structure, measured at the bankfull elevation of the stream channel to be reconstructed through the structure. The bankfull elevation inside the structure corresponds to the elevation of the constructed bank margins along the immediate edges of the bankfull channel.

Finished Opening Height: Vertical distance measured from the thalweg elevation at the crest of a constructed grade control feature inside the replacement structure, upward to the top of the culvert opening or bottom of bridge beam.

Flood Resiliency: Reducing the risk of flood damages to people and infrastructure by planning and implementing measures that improve floodwater conveyance and provide for long-term stability of a self-maintaining stream corridor.

Grade Control: Natural or manmade structures that control channel elevation, dictate channel slope and maintain bedforms. Common types include riffles, cascades, steps, rock clusters and large wood features.

Headcut: headward erosion lowering of channel elevation that moves upstream over time.

Invert: Interior bottom elevation of stream crossing structure.

Key Pieces: Largest rocks in the reconstructed streambed substrate. Often these can be clustered to provide areas of minor, frequent grade control along the length of the channel bed in-between more robust constructed grade control features.

Longitudinal Profile Survey (Long-Pro): Survey of the stream channel, typically measured from upstream to downstream along the channel thalweg, to capture prominent features such as channel elevations, depths, and slopes at bedform features such as riffles, pools, runs, glides, and step/pools.

Low Flow Channel: Portion of the channel commonly wetted during stream base flow.

Outlet Scour Pool: An overly-widened and deepened pool bedform feature often (but not always) located immediately downstream of an undersized crossing.

Pool: An area of the stream characterized by deeper depths and slower current. Pools are typically created by the vertical force of water flowing over logs, boulders, or other grade control structures. The movement of the water carves a deeper indentation in the stream bed. Pools typically occur between grade control features along the length of the channel.

Q100: The 100-year recurrence interval of stream flow. In any given year, there is a 1% probability that a flow of that magnitude or greater would occur.

Reconstructed Reach: Section of stream to be constructed upstream, through, and downstream of the new structure to re-establish channel continuity between the tie-in points.

Reference Reach: Section of stream channel that best reflects the "typical" natural, minimally-impacted physical characteristics (profile, dimension, planform and dominant bedform) of the channel. For stream crossing projects, the reference reach is located beyond the extent channel impacts associated with the existing structure. Site Assessment (survey) of the reference reach is used as a blueprint for design of the reconstructed reach.

Riffle: The shallower, faster moving sections of a stream. Look for areas with a fast current where rocks break the water surface. In channels dominated by riffle/pool bedforms, the upstream crest (high point) of the riffle represents the dominant grade control type.

Sediment Wedge: Deposited material upstream of an undersized crossing caused by water backing up and dropping material. Commonly mistakenly called a "gravel bar" and frequently removed by road owners.

SCC: State Conservation Commission. Entity housed at the PA Department of Agriculture that administers the Dirt, Gravel, and Low-Volume Road Program statewide.

Site Assessment: Survey of longitudinal profile and cross-sections through, and adjoining to, the project site used to inform project design.

Stream Crossing: A structure that conveys streamflow through the roadway.

Structure: A road/stream crossing structure, such as a culvert or bridge, constructed across a stream to provide controlled access for vehicles.

Substrate: Mixture of rock that composes the streambed.

Thalweg: The line of lowest elevation along the flowpath of a stream channel. Dimensionally, this is reflected as the lowest point of elevation in the channel cross-section.

Tie-in Points: Locations of existing- or constructed grade control features where the upstream- and downstream limits of the reconstructed reach transition to the existing stream channel. Tie-in points define the limits of the reconstructed reach necessary to achieve channel continuity upstream, through, and downstream of the crossing**.**

Vertical Offset: An unnatural and abrupt change in streambed elevation sometimes caused by undersized culverts, often characterized by sediment wedges upstream and plunge pools downstream.

Watershed: A region or area contributing to the supply of a stream or lake; drainage area, drainage basin or catchment area.

Appendix C. Stream Crossing Evaluation Form

This form is to be completed by the CD to record the bankfull measurement and structure size to determine eligibility for replacement. See section 3.2 of this Manual, or Chapter 7.1 of the DGLVR Administrative Manual (stream crossing policy) for more details on eligibility determination. This form must be kept in project files.

DRAFT for review 4/2022. *This has not been approved by the SCC.*

PA Dirt Gravel and Low Volume Road Program—Stream Crossing Evaluation Form 4/8/2022

Reviewer Information:

Date: _____

Reviewer(s): _____

_____

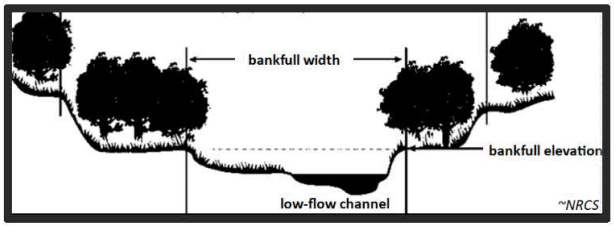
Existing Structure (circle):

round oval arch Other (Draw)

box bridge multiple

Site Information:

County		Township	
Road Owning Entity			
Structure Owning Entity			
Road Name			
Stream Name			
Latitude	N	Longitude	W
Site Notes			



Measuring Bankfull Channel Width: Since stream conditions vary, these guidelines are flexible, and the goal is to determine bankfull width of an unaltered "reference reach" of the stream.

Where to take Measurements: Look upstream if possible, trying to find an undisturbed stretch of stream free from influences that may impact cross section (such as debris jams, floodplain obstructions, bedrock outcrops, etc.). Look downstream for measurements if prevented from going upstream. In order to get out of the "area of influence" from the structure, roughly estimate the bankfull channel width, then go at least 5 times that distance away from the structure before considering taking bankfull measurements. Additional bankfull widths should be measured so that three to five (more preferred) measurements are collected. Subsequent bankfull width measurement should be collected at least 1/2 bankfull width away from the first measurement. Note that it is important to measure bankfull where the best indicators and these locations may be much greater than ½ bankfull width apart. Avoid taking bankfull measurements at unique, unnatural, or temporary features such as log or debris jams, manmade obstructions, bedrock outcrops, hard meander bends, and braided channels. Bankfull measurements can be taken further from the structure if needed if there are no major splits in the channel. **Be flexible** when choosing where to take measurements in order to capture the most representative reaches of the stream.

Taking Bankfull Measurements: When taking a bankfull measurement, locate bankfull indicators (such as changes in bank slope, depositional features, vegetation changes, and scour features) and stretch a tape across the channel to determine the bankfull width at that elevation. Look for bankfull indicators that line up on both sides of the channel as the bankfull elevation should be level across the channel. Remember that bankfull flows typically occur every 1-2 years, so don't mistake higher benches far outside the channel for bankfull. Additional bankfull determination *guidance is available in the Stream Crossing Technical Manual and the Bankfull Width Determination Technical Bulletin.*

Bankfull Measurements Taken *3 minimum, more is better*			
1	ft	6	ft
2	ft	7	ft
3	ft	8	ft
4	ft	9	ft
5	ft	10	ft

A) Average Bankfull Channel Width= _____(ft)
average of measurements taken to left

B) Existing Opening Width= _____(ft)
Measure the most limiting width. For example: the narrowest pipe in a series of "necked-down" pipes, or the narrowest point between abutments of a skewed bridge perpendicular to the flow.

C) Opening to Bankfull Width Ratio= _____%
"B" divided by "A"

Structure Eligibility

Is the opening width of the existing structure 48" or less, or does the structure consist of multiple pipes? **YES** **NO**

For structures with a single opening over 48", is the opening to bankfull width ratio ("C" above) 75% or less? **YES** **NO**

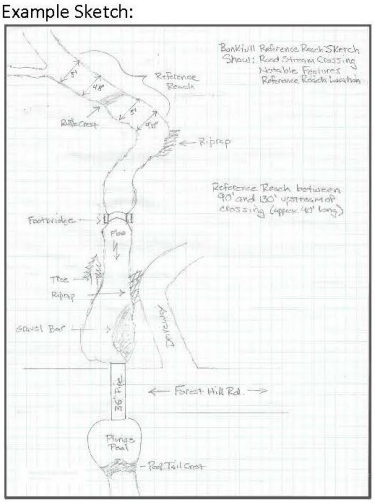
If the answer to either question above is "YES," the structure is eligible for replacement with DGLVR funds. In all cases, new structures must follow the DGLVR Stream Crossing Design & Installation Standard unless it qualifies for an exemption from the DGLVR Stream Crossing Design & Installation Standard. Keep a copy of this form in project files.

Additional Notes: _____

_____

Optional: provide an aerial sketch of the existing conditions and the locations where bankfull measurements were taken.

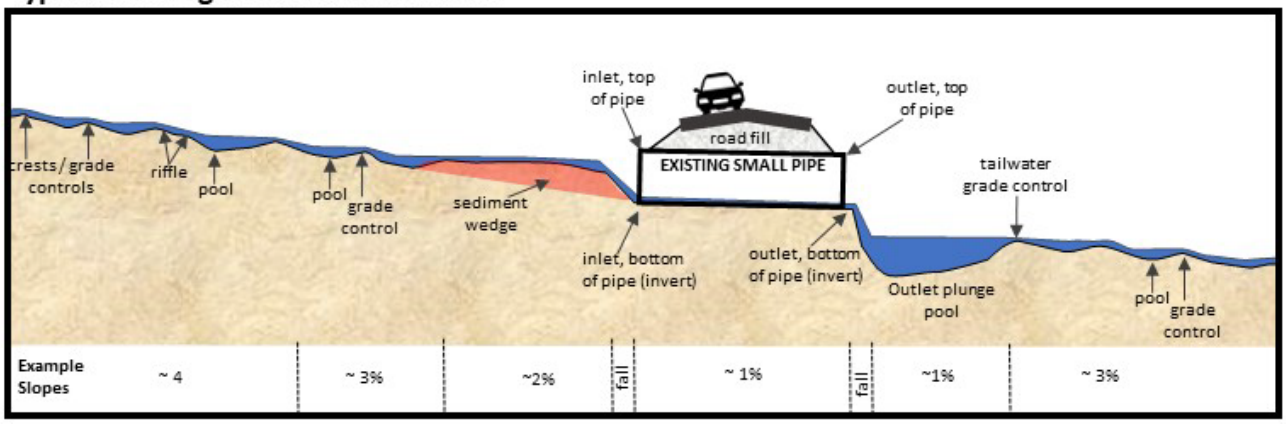
Example Sketch:



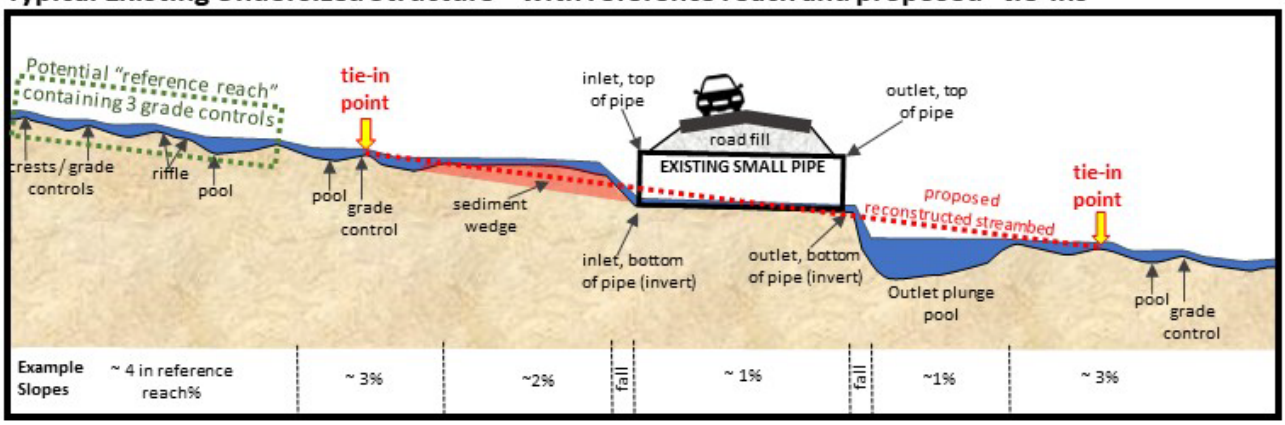
Appendix D. Stream Continuity Sketches

The sketches below show a "typical" undersized structure replacement before and after replacement. The middle sketch shows the before or existing condition, but identifies a reference reach, tie-in points, and the proposed reconstructed channel slope through the crossing.

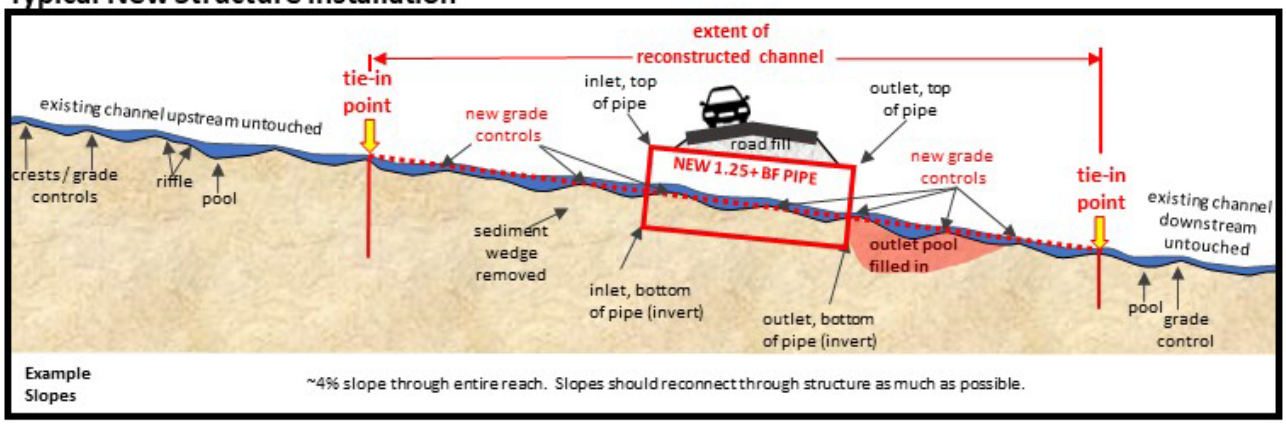
Typical Existing Undersized Structure



Typical Existing Undersized Structure – with reference reach and proposed "tie-ins"



Typical New Structure Installation



Appendix E. SCC GP 11 Permit Memo

PA State Conservation Commission staff, working in conjunction with Department of Environmental Protection staff, have developed this clarification letter related to DGLVR-funded projects receiving a General Permit 11. The letter clarifies the ability to address structure skew (alignment changes) and raise the road elevation over the crossing in certain circumstances.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

April 8, 2022

RE: Clarification of Authorization of General Permit No. 11 (GP-11) for Bridge and Culvert Replacement Projects Receiving Dirt, Gravel & Low Volume Road (DGLVR) Program Funding

Design Engineers,

Many of the Stream crossing projects funded by the DGLVR program will require a PA Chapter 105 permit and can seek authorization under a GP-11. The Department of Environmental Protection is the agency with the authority to review and acknowledge these permits. After coordination with DEP Bureau of Waterways Engineering and Wetlands, it has been determined that DGLVR stream crossing replacement projects consistent with the DGLVR Stream Crossing Design and Installation Standard (Standard) are consistent with design techniques utilized under a GP-11 with specific consideration of design methodologies. The intent of this memo is to clear up some misunderstandings as to what design techniques may or may not be utilized under the GP-11. These clarifications are provided with specific consideration of the design methods utilized in the DGLVR Stream Crossing Standard.

Specifically, changes in the skew of bridges and culverts can be authorized under GP-11 in conjunction with associated stream realignments immediately upstream and downstream of the structure. The change in skew and associated incidental stream realignment associated with the change in skew, may be authorized in circumstances where:

1. The culvert or bridge skew changes maintain or re-establish stream flow patterns consistent with the natural regime upstream and downstream of the road or bridge/culvert.
2. The proposed structures maintain either the inlet or outlet at the same location as the existing structure, or the location of both the inlet and outlet change but the proposed structure rotates on a horizontal axis of the existing structure, or the proposed structure is immediately adjacent to the existing structure.
3. Stream realignments associated with the new structure are incidental and are generally limited to 50 feet upstream and downstream of the structure. DEP may consider realignments a limited distance beyond 50 feet in special circumstances, but any realignments must still be incidental and necessary to support the structure.

In accordance with the Standard and with DEP's design criteria, please note that the skew changes must maintain or re-establish stream flow patterns consistent with natural regime upstream and downstream of the bridge or culvert, and that the conditions of GP-11 must still be met.

Also, changes in roadway approach grades and overtopping characteristics can be authorized by

GP-11, provided that the changes do not result in significant risk to public safety, structural stability and/or the environment. In coordination with DEP Bureau of Waterway Engineering and Wetlands, no additional information will be required if it is obvious that the proposed change to the approach grades and overtopping characteristics do not result in significant risk (e.g. by observation, a substantial increase in the hydraulic conveyance of the structure may obviously compensate for an increase in the approach grade elevation needed to accommodate the larger structure). When the proposed changes to the approach grades and overtopping characteristics are not obviously insignificant, the Hydrology and Hydraulic analysis required by the design standard is acceptable documentation to show that the proposed changes do not result in a significant risk.

The following list depicts the minimum items specific to this design approach that should be included with most GP-11 registrations for the DGLVR Program utilizing the Standard. Additional site-specific requirements may also be required.

1. A description of the proposed work, existing structure, and purpose of proposed structure changes and any minor channel realignments.
2. A scaled plan showing the existing and proposed structures including any proposed channel realignments.
3. Scaled cross section(s) of the existing and proposed culvert structures depicting dimensions of the existing and proposed waterway opening, and the existing and proposed depth of fill and roadway elevations in the approaches and over the existing and proposed structures.
4. Scaled cross sections of streams in any areas of proposed minor stream realignments.
5. Photographs of proposed stream realignments depicting areas of proposed work, channel and geomorphic conditions, eroded banks, deposition, etc.
6. Scaled drawings for any proposed grade control structures in and/or upstream and downstream of the proposed structure, if applicable.
7. Scaled cross sections of any reference reach data (upstream or downstream of proposed work) collected to determine bankfull characteristics or reference reach information, if applicable.
8. Scaled profiles of the existing and proposed culvert structures and a stream channel section extending sufficiently up and down stream to show proposed minor channel realignments, if applicable. When possible, it is recommended the length of the realigned channel be comparable to the length of the existing channel. However, where the project is correcting a ninety-degree bend in the stream, the realigned channel will likely have a shorter length than the existing channel and is therefore still permissible.
9. Details on the proposed stream bed material.
10. If applicable, a hydraulic analysis demonstrating that the changes in the approach grades or overtopping characteristics will not increase the risk of flooding.
11. A P.E. Seal and certification provided on the hydrologic and hydraulic report and on plans and specifications for proposed structures on public roads.

It is important that the plans, profiles, cross sections, description, and other information contain sufficient details and plans depicting the existing and proposed conditions, stream bed,

stream banks, bankfull elevation, low flow channel and overall geomorphic conditions and other details as appropriate for DEP to review, consistent with the proposed activities. The coordination between the State Conservation Commission, DEP's Bureau of Waterways Engineering and Wetlands and regional DEP Waterways and Wetlands Programs has identified criteria for most projects to qualify for GP-11 authorization. Questions should be directed to the DEP regional offices for clarity.

While most projects designed under the Standard should qualify for a GP-11, every project will not fit into this category. The SCC has coordinated with DEP Central office staff and the DEP regional staff. If there are questions about a permit review, DEP regional staff should be contacted. The SCC and local conservation districts are also available to discuss or assist when needed.

Sincerely,

Roy Richardson
Program Manager
Dirt, Gravel, and Low Volume Roads Program

Appendix F. Editable Forms and Templates

These documents are <u>not provided</u> in this appendix because they need to be modified for use. They are templates or samples and must be edited by the PA county conservation districts to meet local conditions and individual projects. Microsoft Word versions of all of these forms can be found at https://www.dirtandgravel.psu.edu/general-resources/stream-crossing-replacements.

A. **<u>Conservation District Cover Letter for Permit Review Consistency</u>**: Sample letter for conservation district to acknowledge that the permit application is consistent with DGLVR Policy and Stream Crossing Standard. Use of this letter is not required, but some form of written acknowledgement to grant recipient is required.

B. **<u>Conservation District Cover Letter for Permit Review Deficiencies</u>**: Sample letter for conservation district to list changes needed for the permit application to meet DGLVR Policy and Stream Crossing Standard. Use of this letter is not required, but some form of written acknowledgement to grant recipient is required.

C. **<u>Conservation District Cover Letter for Bidding Review Consistency</u>**: Sample letter for conservation district to acknowledge that bid documents are consistent with DGLVR Policy and Stream Crossing Standard. Use of this letter is not required, but some form of written acknowledgement to grant recipient is required.

D. **<u>Conservation District Cover Letter for Bidding Review Deficiencies</u>**: Sample letter for conservation district to list changes needed for the bid documents to meet DGLVR Policy and Stream Crossing Standard. Use of this letter is not required, but some form of written acknowledgement to grant recipient is required.

E. **<u>DEP GP-11 Permit Memo Cover Letter</u>:** Optional cover letter when applying for GP-11 that references both the DGLVR Program.

F. **<u>DEP GP-7 Permit Memo Cover Letter</u>**: Optional cover letter when applying for GP-7 that references both the DGLVR Program.

G. **<u>Request for Proposal (RFP)</u>**: Template RFP for use in bidding for engineering services. The RFP is fully customizable and must be adapted to individual projects. Use of the RFP is encouraged for all projects but is not required.

Appendix G. Checklists

The checklists contained in this appendix are provided as tools for conservation districts to use when implementing stream crossing replacement projects.

Required

- **Project Lifecycle Checklist:** Overall checklist with notes on major milestones throughout project. This checklist is required and must be kept in the project file.

Optional: the checklists below are optional for use by the conservation district

- **Pre-Application Meeting Checklist for Stream Crossings:** Summary of points to discuss with potential grant applicant on initial site visit.
- **Pre-Design Meeting Checklist for Stream Crossings:** Summary of points to discuss with grant applicant and engineer prior to project design.
- **Design Package Review Checklist for Stream Crossings:** Guide to use when reviewing drawings and plans before permit submittal.
- **Bid Package Review Checklist for Stream Crossings:** Guide to use when reviewing drawings and plans before bid package advertisement.
- **Bid Site Showing Checklist for Stream Crossings:** Summary of points to discuss with potential bidders during site showing.
- **Pre-Construction Meeting Checklist for Stream Crossings:** Summary of points to discuss with grant recipient, engineer, and contactor prior to starting work.
- **Construction Inspection Checklist for Stream Crossings:** Summary of things for conservation districts to look for onsite visits during construction.
- **Completion / Final Inspection Meeting Checklist for Stream Crossings:** Summary guide to final inspection and project closeout.

Stream Crossing Replacement Project: Lifecycle Checklist

☐ DGR Agenda Item 3.6.d ☒ LVR

Applicant: _____ Road Name: _____ Crossing Identifier:_____

This checklist is meant to summarize the major events in development and implementation of a stream crossing replacement. This form (but not individual checklists) is required to be completed and kept in project file.

☐ **Pre-Application Meeting:** The District is required to hold a preapplication meeting prior to a grant recipient applying for program funds for a stream crossing project. Initial site visit and subsequent follow up visits for project planning. See *Pre-Application Meeting Checklist* for meeting talking points. As a reminder, a longitudinal profile / cross-section survey must be completed prior to QAB recommendation for funding (see below). Submit online notification to SCC if project is likely to be funded.

- **Initial Site Visit Date:_____**
- **Attendees: _____**
- **Notes: _____**

  _____

☐ **Longitudinal Profile Survey:** A longitudinal profile survey must be conducted for each stream crossing prior to the QAB recommending the project for funding. Engineer may utilize the District survey for design or conduct another survey, in concert with the District. Refer to DGLVR Program's Stream Crossing Standard for survey requirements. See *Chapter 4 of Stream Technical Manual* and *Longitudinal Profile Technical Bulletin* for guidance.

- **Initial Survey Date:_____**
- **Participants: _____**
- **Notes: _____**

  _____

Was a second (engineer's) survey completed (in concert with the District)? YES NO

- **Engineer's Survey Date:_____**
- **Participants: _____**
- **Notes: _____**

  _____

☐ **Contract and Attachments:** Grant recipient reviews the contract and attachments. Acknowledge attachments and sign contract. Return to the County Conservation District.

- **Application Submitted Date: _____ Request: $_____**
- **Contract Date:_____ Contract Amount: $_____**
- **Notes: _____**

  _____

☐ **Professional Design Services**: Program funds can be used to cover engineering, permitting, or similar consultant costs, but such costs are limited to a maximum of 20% of the total contract amount between the district and the grant recipient, with a maximum of $25,000 total. The use of the DGLVR Program's *Stream Crossing Replacement Request for Proposal Template* or an alternative which incorporates the required service details is highly recommended. Preparation or design costs such as engineering or surveying that are incurred before the contract is signed are not eligible for grant reimbursement but can be counted as in-kind.

- **Project Engineer: _____**

- ☐ **Pre-Design Meeting**: The District, Project Participant, and Engineer/Consultant of record for the project are required to meet on site prior to the start of the design. District staff may ask technicians from TU, CDGRS or others to attend and provide assistance. See *Pre-Design Meeting Checklist* for meeting talking points.
  - **Pre-Design Meeting Date:_____**
  - **Attendees: _____**
  - **Notes: _____**

    _____

- ☐ **Pre-Permit/Design Submittal Review:** The DGLVR Program's Stream Crossing Standard requires that draft final project design package (permit, E&S Plan, construction drawings, etc.) be submitted (or resubmitted) to the conservation district for review prior to permit submittal. The district may ask for assistance in reviewing the plans from outside sources such as the SCC, CDGRS, and TU. This package must include all drawings necessary for construction. See *Design Plan Review Checklist* for review guidance.
  - **Date of plan submission:_____ Date of Review:_____**
  - **Plan Reviewers:_____**
  - **Notes: _____**

    _____

- ☐ **Bid Package Review**: If any subcontracted work is needed, grant recipients should follow their own bidding requirements. Bid packets or purchase orders and associated shop drawings for made to order products (ex. Stream crossing structures) must be provided to the conservation district for review and approval that they meet program policy and the DGLVR Standard prior to acknowledging an order or advertising the bid. See *Bid Package Review Checklist* for review guidance.
  - **Date of bid package submission:_____ Date of Review:_____**
  - **Bid package reviewer:_____**
  - **Notes: _____**

    _____

- ☐ **Bid Site Showing:** It is recommended that the Grant Recipient hold a bid site showing and invite the engineer, district, any potential bidders. The district is required to attend if a bid site showing is held. The purpose of the meeting is to walk through the project plan and allow potential bidders to ask questions in order to receive better bids for project work. See *Bid Site Showing Checklist* for meeting talking points.
  - **Bid Site Showing date:_____**
  - **Attendees:_____**

    _____
  - **Notes: _____**

    _____

- ☐ **Construction Notification:** The project participant is required to notify the Conservation District ____ days prior to the start of construction.
  - **Date of notification:_____ Proposed Start Date:_____**

- ☐ **Pre-Construction Meeting:** The District is required to hold an on-site meeting prior to project work beginning and should include the grant recipient, contractor (if applicable), and the project engineer. The purpose of this meeting is to ensure all parties understand the construction plans and to answer any questions before project work begins. See *Pre-Construction Meeting Checklist* for meeting talking points.
  - **Pre-Con Meeting date:_____ Proposed Start Date:_____**
  - **Attendees:_____**

    _____

- **Notes: _____**

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- **Project Inspection:** District must be on site regularly to ensure program policies and standard are being met. Ensure any proposed "field changes" to what is on the plan are approved by the design engineer. See *Construction Inspection Checklist* for guidance. Note inspection visits on the log on this form.

- **Project Completion:** District and the grant recipient must meet onsite for a final project walkthrough. It is advantageous to do this immediately following construction with the contractor and engineer, so that minor issues can be addressed while equipment is still on site. See *Project Completion Checklist* for guidance.
  - **Completion date:_____ Inspection Date:_____**
  - **Attendees:_____**
  - **Notes: _____**
  - **_____**

EVENT LOG (Log phone calls, site visits, inspections, etc.)		
DATE	**EVENT**	**NOTES**

Pre-Application Meeting Checklist for Stream Crossings ☐ DGR ☐ LVR Date: _____

Applicant: _____ Road Name: _____ LAT/LONG:_____

Applicant Reps: _____

CD Reps: _____

Additional Attendees: _____

Summarizes discussion points for an initial on-site meeting prior to application. More information in Chapter 3 of the DGLVR Stream Crossing Technical Manual.

Site Eligibility

- ☐ **Publicly owned road** (Is road open to public vehicles at least 2 weeks per year?)
- ☐ **LVR** <500 ADT (count required before contract can be signed)
- ☐ **ESM certification** (person in charge of project for applicant has recent (last 5 years) ESM certification)
- ☐ **Stream Crossing Eligibility**
  - **Complete stream crossing evaluation form and keep copy in file**
  - Automatically eligible (Existing Structure under 4', see section 7.1.2.2)
  - Existing Structure over 4' equivalent
    - Structure opening to bankfull channel width ratio of 75% or less?
      - Structure Width: _____Ft
      - Bankfull Width: _____Ft
      - Structure to Bankfull Width Ratio:_____%
- ☐ **DGLVR Standard Exemptions (section 7.1.3)**
  - Automatically Exempted if a bankfull width of 4' or less and:
    - Defined bed and bank not more than 500' upslope of the road, or,
    - 20 acres or less drainage area
  - SCC DGLVR Standard Exemption available on a case by case basis for crossings that don't meet automatic exemption criteria

Logistical Discussion Points

- ☐ **Timelines** (application deadline, permits, bidding, contracting, and construction)
- ☐ **Ranking** (discuss ranking process with applicant)
  - If you know this project will/will not be competitive based on-site conditions or budgets, be realistic with potential grant applicant.
- ☐ **Phased Projects** (large projects may be funded in separate phases (road fill, drainage, DSA))
- ☐ **County-specific policies** (ranking criteria, in-kind, maintenance policies, paying for asphalt, etc.)
- ☐ **Work performed by?** Applicant ___ Contractor ___
- ☐ **Reminders** (standard bidding**,** prevailing wage ($25,000 project value threshold), PA One-Call, Utilities)

Project-Specific Discussion Points

- ☐ **Discuss/Introduce Goals & Objectives of DGLVR Program Stream Crossings**
  - Restore stream through road profile
  - Protects structure and ensure lifespan
  - Flood Resiliency
  - Reduced Maintenance
  - Full Aquatic Organism Passage
  - Ensure applicant understands level of effort and equipment to get material into crossing structure and extent of work upstream and downstream
- ☐ **Professional Design Services**
  - See predesign meeting checklist
  - Discuss DGLVR Stream Crossing Standard (see checklist):
    - opening size
    - streambed work needed, (grade controls, low flow channel, bank margins)
    - streambed material needs to be specified (replicate size of natural streambed)

        - continuity and reconstructed reach length
    - Provide DGLVR Stream Crossing Replacement Technical Manual
    - The cost of engineering is limited 20% of the contract amount, with a maximum amount of $25,000
    - engineering inspection and finalization requirements
- **Off-ROW Permission**
    - Written Landowner agreements **recommended** prior to contracting and design
    - Written Landowner agreements **required** prior to beginning work
        - Applicant and/or conservation district may need to meet with landowners to discuss project benefits
    - Determining how far off ROW and what needs to be done off ROW. May need to do Long Pro first.
    - **SCC approval required?** (>500' off road or off-ROW cost is over 35% of project value?)
- **Permitting**
    - Discuss chapter 105 permitting
        - Waived activity: <100 acres, reviewed case by case
        - GP-7,
        - GP-11,
        - Other GPs, as needed
        - Joint Permit, etc. Add general info on permit triggers
- **Additional drainage improvements** (Disconnect direct drainage from stream around crossing)
- **Optional outside assistance** (CDGRS, TU, SCC, PAFBC, etc.)
- **Discuss next steps if applicant wants to proceed**
    - Longitudinal Profile Survey
    - Structure and cost estimates
    - Outside assistance

Meeting Notes:

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Pre-Design Meeting Checklist for Stream Crossings ☐ DGR ☐ LVR Date: _____

Applicant: _____ Road Name: _____LAT/LONG:_____

Applicant Reps: _____

CD Reps: _____

Additional Attendees: _____

Summarizes discussion points for an on-site meeting prior to project design. More information in Chapter 12 of the DGLVR Stream Crossing Replacement Technical Manual.

Project-Specific Discussion Points

- ☐ **Discuss/Introduce Goals & Objectives of DGLVR Program Stream Crossings**
  - Restore stream through road profile (stream continuity)
  - Flood resiliency and ensures lifespan
  - Reduced Maintenance
  - Full Aquatic Organism Passage
- ☐ **Provide Design Engineer with a copy of:**
  - Stream Crossing Design & Installation Standard
  - Stream Crossing Replacement Technical Manual

Project Management and Meetings

- ☐ **Design engineer is required to attend the pre-design meeting at the location of the road/stream crossing replacement project**
- ☐ **Design engineer may be required to attend the following additional meetings by the conservation district:**
  - Bid site showing
  - Bid selection / award meeting
  - Pre-construction meeting
  - Others: _____
- ☐ **Communications from the grantee or Design engineer may be directed to:**
  - Contact Information: _____

Off Right of Way (ROW)

- ☐ **Discuss who will obtain permission for project related Off ROW work**
  - Grantee _____ Design Engineer _____
  - Stream channel modifications including reference reach survey work
  - E&S controls areas and staging areas
  - Template Off ROW Consent Form on website

Site Survey & Mapping

- ☐ **Must provide sufficient topographic survey and mapping to define or support the following:**
  - Project boundaries and disturbance areas
  - Existing roadway elevations, grades and profiles
  - Wetlands and other jurisdictional or regulated resource areas
  - Design of replacement structure and appurtenances
- ☐ **Must establish two permanent benchmarks, located outside of disturbance area**
- ☐ **Must collect sufficient site survey to support H&H analysis**

Hydraulic Analysis

- ☐ **Must prepare an Hydrologic and Hydraulic (H&H) study that includes:**
  - Finished thalweg elevations and
  - Clearly labeled discharge values and water surface elevations at the proposed crossing inlet for Q2, Q10, Q25, Q50, and Q100
- ☐ **Provide any additional H&H analysis necessary for applicable regulatory / permit requirements**

Geomorphic Assessment

- ☐ **Required to base the project design on a longitudinal profile survey and cross-sectional surveys of existing conditions.**
  - Conservation district completed longitudinal profile and cross sections may be provided
  - Design Engineer may conduct their own longitudinal profile and cross sections
    - Conservation district must be present during engineer/surveyor collected long-pro
  - Details to be collected in the longitudinal profile and cross sections listed in the Stream Crossing Design & Installation Standard

Channel Design

- ☐ **Using the longitudinal profile survey of existing site conditions, must provide a stream channel design extending upstream, through, and downstream of the replacement crossing that achieves the following:**
  - Provides long-term channel continuity and aquatic organism passage
  - Specifies essential channel features based upon survey of a reference reach condition
    - Bankfull width and cross-sectional shape with well-defined low flow channel (thalweg) and bank margins
    - Specified streambed material composition and placement thickness through the structure
    - Type, number, length, location and elevations of grade control features. A minimum rock size for grade controls must be specified

Structure Design

- ☐ **Structure must be of adequate width to accommodate the bankfull width of the stream at the final bankfull elevation with stable bank margins.**
  - Typical bankfull channel width is _____feet
- ☐ **Replacement structure must be properly aligned with the stream channel**
- ☐ **Must include types and placements of all associated structure appurtenances such as abutments, footings, wingwalls, etc.**
- ☐ **Headwalls and Endwalls are required on all stream crossing structures**
- ☐ **Sizing and installation of the structure and its appurtenances must provide long-term channel continuity and AOP and shall not reduce the minimum effective opening to less than 125% bankfull width at the structure inlet or outlet**
- ☐ **Structure must pass the Q100 flow at an elevation not to exceed 80% of the finished opening height at the structure inlet**

Roadway Design

- ☐ **Must provide design services as needed to address any change to roadway elevations and drainage patterns**
  - Stream Crossing Design & Installation Standard may require increasing the existing roadway elevation. See GP11 DEP Permit Memo for additional guidance
- ☐ **Must consider additional floodplain connectivity (high-water bypass, floodplain pipes, etc.) where necessary**

Permitting & Construction Documents

- ☐ **This project is located in HQ, EV, CWF, or WWF _____**
- ☐ **The drainage area for this project location is _____**
- ☐ **Design engineer must complete all required permit registrations and application materials needed to meet all State, Local and Federal requirements**
- ☐ **Design engineer must prepare a set of construction documents meeting the DGLVR Stream Crossing Design & Installation Standard.**
  - Detailed drawings
  - Technical specifications for project implementation
  - Existing and proposed conditions comparison
  - Erosion and sediment control plan including dewatering measures
  - All critical elevations, grades, slopes and other design criteria
- ☐ **Design engineer must provide all plans and specifications to the conservation district for consistency review with the DGLVR Policy and Stream Crossing Standard before submitting (or resubmitting) materials to regulatory agencies for permit registration / authorization.**

- Submitted materials will be reviewed by the conservation district for consistency with the Stream Crossing Design and Installation Standard
- All comments must be addressed to the satisfaction of the conservation district prior to receiving a consistency letter and a cover letter for submission to the regulatory reviewing entity.

Bid Documents and/or Shop Drawings

- **Conservation district must be provided any bid documents or shop drawings associated with the project before advertisement or acknowledgement for fabrication of materials**
  - Conservation district will review for consistency with permit and construction drawings and with the Stream Crossing Design and Installation Standard
  - If needed a list of deficiencies will be provided to the applicant and their design engineer to address
  - All comments must be addressed to the satisfaction of the conservation district prior to receiving a consistency letter. A consistency letter must be granted before advertisement of a bid or acknowledgement of shop drawings for material fabrication
- **Grantee or Design Engineer must coordinate with the conservation district to be present at the mandatory bid site showing meeting (if applicable).**

Construction Inspection and Certification

- **Design Engineer is required to provide onsite inspection of critical aspects of construction which include but are not limited to:**
  - Installation of structure subgrade and bedding materials and establishing inverts/elevations
  - Installation of footings, abutments or in-ground appurtenances
  - Installation of grade control features, bank margins, and streambed substrate.
  - Installation or placement of stream crossing structure
  - Compaction and backfill of stream crossing structure
- **Conservation districts must be on-site regularly during construction to ensure DGLVR Policy and Stream Crossing Standard are met.**
- **Design engineer shall provide a signed and sealed certification form (attachment B)**

Meeting Notes:

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Design Package Review Checklist for Stream Crossings ☐ DGR ☐ LVR

Applicant:_____ Road Name:_____ LAT/LONG:_____

Engineer: _____ Reviewer:_____ Date:_____

The DGLVR Program requires that all plans and specifications be submitted to the conservation district for review prior to permit submittal. The conservation district review is to confirm that DGLVR Policy and Stream Crossing Standard are met. The conservation district may ask for assistance in reviewing the plans from outside sources such as the SCC, CDGRS, and Trout Unlimited (TU). This package must include all drawings necessary for permitting and construction.

Documents submitted for this review shall include, at a minimum, the following items:

- ☐ **Construction Drawings** including plan, profile, cross-section and detail drawings.
- ☐ **Hydrologic and Hydraulic (H&H) Study**
- ☐ **Proposed E&S Plan**
- ☐ **Construction Specifications**

At a minimum, the plans must include the following per the DGLVR Stream Crossing Standard section VI:

☐ ***A. Existing conditions of project site, including but not limited to the full longitudinal profile survey and cross sections of the stream, existing stream crossing, stream crossing and channel slope, road approaches and road fill cover, and delineated wetlands (if applicable).***

- Construction detail drawings include clear and concise depiction of all existing conditions on plan, section, and profile drawings.
- Profile drawings show the existing streambed profile along the thalweg, extending beyond the upstream and downstream project limits (tie-in points). Existing channel slopes noted upstream and downstream of the existing culvert.
- Plan view should clearly show the existing structure, structure alignment, dimensions, road approaches, cross section locations and any wetlands.
- Section drawings should show the existing structure dimensions, elevation, and depth of road cover.
- Drawings include existing roadway elevation, and elevation and location of benchmarks.

☐ ***B. Location and bankfull width of stream.***

- The plan view drawings note and depict the bankfull width of the stream, bankfull elevation(s) and the location of all cross-sectional measurements.

☐ ***C. Proposed stream crossing structure width, length and height with profile and typical cross sections.***

- Plans show structure dimensions and elevations, including inlet and outlet invert elevations and locations, on the plan, section and profile views.
- Proposed alignment of replacement structure is shown on the plan view.
- If applicable, footer dimensions, elevations and depth of bury are provided.
- Finished roadway elevation over structure depicted on profile and section views.
- Clearly labeled discharge values and water surface elevations at the proposed crossing inlet for the Q2, Q10, Q25, Q50, and Q100.

☐ ***D. Elevations and locations of abutments, footings, wingwalls and other associated appurtenances.***

- The proposed conditions drawings show the locations and elevations of all structure features such as abutments, footings, wingwalls and other associated appurtenances.

☐ ***E. Details for stream bed re-construction (e.g. channel width, proposed channel alignment, channel side slopes, stream bed slope and location of tie-in points).***

- The proposed-conditions plan view and profile drawings adequately inform reconstruction of a stable stream channel that reestablishes and maintains longitudinal continuity upstream, through, and downstream of the replacement crossing.
- Clearly shows on the profile drawing the design slope and depth of streambed material in the proposed reconstructed reach.

- Shows design of streambed and bank margin including rock sizing and elevations at structure inlet and outlet and extending upstream and downstream of the crossing as needed to tie into existing streambed and banks.
- Notes locations and elevations of tie-in points at upstream- and downstream limits of the reconstructed reach (these should occur at existing grade control features).
- The proposed bankfull width of the reconstructed reach shown to scale, with design bankfull width noted.
- Identifies method for stabilizing transition areas at upper and lower project limits.

☐ ***F. Location and details for low flow channel width, depth, and material size and types.***

- Low flow channel dimensions from the cross-sectional surveys are shown on the section view.
- Details should include the width and depth of the channel and information on the stream bed materials used in constructing the low flow channel.

☐ ***G. Locations and construction details, including rock sizing, of in-stream structures, grade controls, and/or bank stabilization structures (if applicable).***

- Plan, section and profile drawings clearly show all grade controls and instream structures, including locations and elevations of grade control features (at crest / thalweg) through the reconstructed reach.
- Plans should note whether grade control features at the tie-in points will be maintained as existing (stable) or will be constructed. For constructed riffles, the design riffle length should be specified.
- Detail drawings for grade control structures should clearly indicate material type, size, installation slopes and overall structure length.

☐ ***H. Thickness, gradation and composition of material for streambed restoration.***

- On the proposed section and profile view the streambed material thickness, inlet and outlet bed elevations should be shown.
- Material gradation and composition should be specified. Note if native material onsite will be reused or if material will need to be imported.
- Gradation, composition and construction details included for the low flow channel, bankfull channel and the bank margins.

☐ ***I. Specification for compaction of placed streambed material.***

- Details provided on compaction (mechanical or hydraulic) of materials used to construct the streambed through the reconstructed reach to prevent subsurface flow down through the substrate.
- Note that substrate is thoroughly compacted when water stays on top of the newly constructed stream bed and does not go subsurface.

☐ ***J. Scour hole restoration details and reestablishing channel cross section.***

- If applicable, details are provided to indicate material type, size, and depth to reconstruct the scour hole.
- Reconstruction of the channel cross section through the scour hole should be shown to tie into the existing or reconstructed stream bed.

☐ ***K. Structure manufacturer's specifications, details, and installation instructions.***

- Submittal includes all structure specification drawings, including applicable structural details of all components, including but not limited to reinforcing steel, type of materials, thickness, anchorage requirements, backfill lift thickness, etc.

☐ ***L. Thickness, compressive strength, reinforcement, testing, and other special requirements for concrete according to the manufacturer specifications, if applicable.***

- If applicable, concrete specifications and manufacturer's requirements are provided.
- Includes details for concrete sampling and testing as required.

☐ ***M. Load limits for bridges and/or culverts including signage per local codes.***

- All details related to structure load limits and related signage per Township and PA code are provided.

☐ ***N. Location of all utilities and notification requirements (PA One Call).***

- Drawings show locations of all utilities and specifies contractor notification requirements for PA One Call.

☐ ***O. Location and elevation of survey benchmarks.***
- Elevations and locations of benchmarks are clearly shown on design plans.

☐ ***P. Method of surface water diversion and dewatering during construction.***
- Submittal includes detail drawings for diversion of the stream flow and dewatering of the construction site.
- Provides details for control of sediment during diversion and dewatering.

☐ ***Q. Approved Erosion and Sedimentation Control Plan.***
- Construction documents will include an approved E&S Plan with detail drawings for all BMPs to be used during construction.

☐ ***R. Vegetative requirements that include seed and plant materials to be used, establishment rates, and season of planting.***
- Plans include details on reseeding and establishment rate. Should note if any specialized bank stabilization or soil amendments will be needed to ensure establishment.

☐ ***S. Additional site-specific requirements.***
- Stream crossing replacements through the DGLVR Program include many aspects that differ from more basic culvert replacement projects, therefore project specifications should be included with the bid package.
- If not provided as notations to the detail drawings, separate site-specific specification documents should be provided for unique construction elements. This allows prospective contractors a clear sense of the project goals and needs, establishing a clear understanding of construction requirements.

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Bid Package Review Checklist for Stream Crossings ☐ DGR ☐ LVR

Applicant: _____ Road Name: _____ LAT/LONG: _____

Engineer / Consultant / Bid Preparer: _____ Date: _____

Conservation district Reviewer: _____

Administrative

- ☐ Project Name provided
- ☐ Project Location provided
- ☐ Project Owner listed
- ☐ Contact person(s) identified
- ☐ Bid Advertisement release date listed
- ☐ Brief project narrative provided, including general scope of work
- ☐ How, when and where prospective bidder can obtain Construction Documents and Bid Forms
- ☐ Proposal submittal deadline (date and time)
- ☐ Method of delivery accepted (mail, email, fax, hand-delivered, etc.)
- ☐ Bid withdrawal limitations
- ☐ Bid type (lump sum, unit cost, not to exceed, etc.) is listed
  - ☐ If unit cost, unit cost form is provided
- ☐ Statement that submittal of bid acknowledges full knowledge of site conditions, content of construction documents and understanding of scope of work.
- ☐ Bid opening / award date is listed

Bid Site Showing

- ☐ Bid Site Showing information is provided, including date, time and location
- ☐ Note whether or not attendance is mandatory.

Provisions and Requirements

- ☐ Notice of Road Bonds (if applicable)
- ☐ Notice of Project Bonds (if applicable)
  - ☐ Payment Bond
  - ☐ Performance Bond
- ☐ Prevailing Wage requirements are provided

General Conditions

- ☐ General Work Items (scope of work) to be completed by successful bidder are listed
- ☐ General work items to be completed or provided by others are listed
- ☐ Contract Time (start/end date) is stated
- ☐ List any seasonal work restrictions
- ☐ Engineer, conservation district, CDGRS, TU and project owner will have full access to the construction site.
- ☐ References portions of Construction Documents specifying “critical aspects of construction” that must be completed under direct oversight

Proposal Form provides for the following information from the bidder:

- ☐ Name, contact information, bid price and signature
- ☐ Written acknowledgement of construction documents and addenda (if applicable)
- ☐ Statement of Qualifications (if required)
- ☐ References to similar services rendered or projects completed (if required)

Unit Cost Sheet (if applicable)

- ☐ Lists pay items, units, and estimated quantities
- ☐ Provides space for bidder to enter unit cost and total item bid price

Notes:

Bid Site Showing Checklist for Stream Crossings ☐ DGR ☐ LVR Date: _____

Applicant: _____ Road Name: _____LAT/LONG:_____

Applicant Reps: _____

CD Reps: _____

Engineer Present: ☐ Yes ☐ No Engineer Rep: _____

Is prospective bidder attendance mandatory for eligibility to submit a bid?: ☐ Yes ☐ No

Summarizes discussion points for bid advertisement meeting and site showing held prior to receiving bids. More information in Chapter 8 of the DGLVR Stream Crossing Replacement Technical Manual.

Administration

- ☐ **Provide sign-in sheet** (all attendees provide contact info)
- ☐ **Write down questions / points for clarification** (for preparing Addendum)
- ☐ **Designate a contact person and provide contact information** (for bidders to submit additional questions)

Discussion Points

- ☐ **Bid submittal deadline: _____ Bid award date:_____**
- ☐ **General scope of work:** (excavation, structure removal / installation, stream restoration, rebuild stream through culvert, etc.)
- ☐ **Roles and Responsibilities**
  - **In-kind contributions:** (labor, equipment, materials from applicant/owner)
  - **Sub-contractor work:** (subbed to the project owner, if applicable)
  - **Successful bidder's responsibilities**
- ☐ **Emphasize instream aspects of work**
  - **Dewatering Plan:** (method, timing, E&S, etc.)
  - **Stream Continuity:** (reconstructed slope, tie in points, grade control details, instream structures, etc.)
  - **Structure:** (elevations, backfill / road fill cover requirements, bury depth, headwall/endwall/wingwalls)
  - **Streambed:** (material, methods, and equipment for placement, shaping and compaction within structure)
- ☐ **Project limits:** (how far upstream / downstream, extent of roadway/drainage work, etc.)
- ☐ **Notification requirements:** (when to notify CD and project owner/applicant prior to start of work)
- ☐ **Project schedule and timeline:** (expected start/completion dates, project phases, structure delivery, road closure duration, seasonal / regulatory time restrictions, etc.)
- ☐ **Traffic control**: (road closure, lane closure, signage, etc.)
- ☐ **Oversight:** (CD involvement (regularly during construction), CDGRS, SCC, TU, others that may oversee / inspect)
- ☐ **Engineer inspection requirements and timing:** ("critical stages of construction" from DGLVR Stream Crossing Standard and/or Construction Documents)
- ☐ **Prevailing wage requirements**
- ☐ **Permits:** (status/issuance, permit conditions addressed in the Construction Documents)
- ☐ **Erosion and sediment controls** (overview of plan, sequence, BMPs, etc.)
- ☐ **Landowner agreements** (written approval prior to work outside the ROW)
- ☐ **Staging areas, storage areas, and proposed construction access routes**
- ☐ **Structure delivery and assembly** (who is responsible; when will it be delivered; where will it be stored; will it be delivered pre-assembled; who will assemble; will it be assembled in-place, or outside of the road cut and then installed)
- ☐ **Road drainage improvement locations** (review location and installation of other drainage BMPs)

Meeting Notes:

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Pre-Construction Meeting Checklist for Stream Crossings ☐ DGR ☐ LVR Date: _____

Applicant: _____ Road Name: _____LAT/LONG:_____

Applicant Reps: _____

CD Reps: _____

Additional Attendees: _____

Summarizes discussion points for an on-site meeting prior to construction. More information in Chapter 8 of the DGLVR Stream Crossing Replacement Technical Manual.

Logistical Discussion Points

- ☐ **Proposed start date: _____ Proposed completion date: _____**
- ☐ **CD Notification:** _____days before project work begins by applicant
- ☐ **Timelines** (mobilization, demobilization, project phases)
    - Deadlines for instream work restrictions
- ☐ **Project Overview / Changes:** (overview workplan, procedures for changes in project scope, timeline, cost)
- ☐ **Notifications:** (PA One-Call, 911 services, notify impacted landowners, road closures, signage)
- ☐ **Site Marking**: (Considerer painting or flagging features on the road before or during the meeting)
- ☐ **Oversight:** Level of on-site CD involvement (at a minimum, the CD must be on site regularly during construction)
- ☐ **Engineer inspection requirements and timing:**
    - Installation of structure subgrade
    - Installation of footings, abutments, etc.
    - Installation of grade control features, bank margins, and streambed substrate.
    - Installation or placement of stream crossing structure
    - Compaction and backfill of stream crossing structure
- ☐ **Discuss chain of contact between all entities:**
    - Point of contact for each entity
    - Who initiates each step or verifies each step prior to moving forward
- ☐ **Receipts:** (receipts, invoices, or other appropriate proof of expenses)
- ☐ **Prevailing wage:** (copy of certified payroll needed prior to making final payment)
- ☐ **Permits:** (in place before work begins, meet any seasonal restrictions)
- ☐ **Final inspection:**
    - The design engineer must provide the project owner with a signed and sealed certification for that certifies the critical stages were inspected and installed in accordance with the DGLVR Stream Crossing Design and Installation Standard and construction documents.
    - Engineer must provide red-lined construction document indicating the as-built conditions

Project-Specific Discussion Points

- ☐ **Erosion and sediment controls** (what is needed and who is responsible)
    - Review the approved plan and discuss provision for any necessary changes
- ☐ **Landowner agreements** (written approval prior to work outside the ROW)
- ☐ **Staging or storage areas** (for equipment and materials storage if necessary)
- ☐ **Waste sites**
- ☐ **Structure**
    - Delivery: when, where
    - Assembly: when, where (in channel or out), who
    - Installation: when, who, equipment needed
- ☐ **Stream Crossing Construction Plans**
    - **Stream Continuity**
        - Reconstructed slope
        - Tie in points
        - Grade control details
        - In stream structures

        - Etc.
    - **Structure**
        - Elevations
        - Backfill / Cover over new structure
        - Transitions
        - Headwalls / endwalls
    - **Streambed**
        - Filling in scour hole / streambank stabilization
        - Streambed material reconstruction (composition, equipment)
        - Compaction and washing fines (how, water source)
- **Road drainage improvement locations** (review location and installation of other drainage BMPS)

Meeting Notes:

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Construction Inspection Checklist for Stream Crossings ☐ DGR ☐ DLVR

Applicant: _____ Road Name: _____ LAT/LONG: _____

Applicant Reps: _____

CD Reps: _____

Contractors Present: _____

Others Present: _____

- ☐ Conservation districts must be on-site regularly during construction to ensure DGLVR Policy and standards are being met
- ☐ Safety: Wear proper PPE and follow standard safety practices on site
- ☐ Ensure all local, state, and federal requirements must be met before starting construction
  - Permits, PA One-Call, written landowner permission for off-ROW work, etc.
- ☐ Verify 2 benchmarks were set by the engineer or surveyor in an area outside of the zone of construction and disturbance
- ☐ Survey Stakeout for critical stages of installation
- ☐ Inspection of critical stages of construction by Engineer and/or Engineer's designee. Critical Stages include, but are not limited to, the following:
  - Installation of structure subgrade and bedding materials and inverts/elevations.
  - Installation of footings, abutments or in-ground appurtenances.
  - Installation of grade control features, bank margins, and streambed substrate
  - Installation or placement of stream crossing structure.
  - Compaction and backfill of stream crossing structure.
- ☐ Changes: If any party believes modifications are required or site work needs to stop to address a critical situation, they should discuss their concerns with the onsite contractor and then immediately notify the road owner, project engineer, and conservation district.
  - Proposed changes to a plan or specification should be reviewed and agreed upon by all parties and must be approved by the design engineer.
  - Any changes to plans that alter permit acknowledgments must also be submitted to the reviewing entity for revised approval.
- ☐ Follow manufacturer's recommendations for structure installation, including assembly, bedding, and backfill.
- ☐ Verify the project is being constructed in accordance with the approved bids and plans
  - Verify appropriate structure is being utilized as per approved plans
  - Structure properly aligned with channel
  - floodplain connectivity
  - Project will be constructed to accommodate AOP
  - Low flow channel with well-defined bank margins must be constructed through the structure
  - Minimum substrate depth is installed through the structure
  - Restore Stream Continuity through the structure and extend as far as needed to reconnect with the natural channel and, to the greatest extend possible, match existing stream bed slope
    - In-stream channel grade controls installed at proper location, elevation, and spacing to reconstruct the stream channel
  - Stable Side Slopes per DGLVR Stream Crossing Standard
- ☐ Quarried aggregate was tested and meets requirements of the DGLVR Stream Crossing Standard
- ☐ Vegetation Standard Requirements in DGLVR Stream Crossing Standard Met
- ☐ Road Approaches Requirements in DGLVR Stream Crossing Standard Met
- ☐ For additional guidance, see the PA DGLVR Program Stream Crossing Design & Installation Standard, Stream Crossing Technical Replacement Manual and Technical Bulletins

Notes:

Completion/Final Inspection Meeting Checklist for Stream Crossings ☐ DGR ☐ LVR

Applicant: _____ Road Name: _____ LAT/LONG:_____

Applicant Reps: _____ Date: _____

CD Reps: _____

Additional Attendees: _____

Summarizes discussion points for an on-site closeout meeting. More information in Chapter 10 of the DGLVR Stream Crossing Replacement Technical Manual, and 3.8.9 of the DGLVR Administrative Guidance Manual.

Final Site Inspection

- ☐ **All stream crossing components properly installed**
  - See Site Inspection Checklist
  - Stream crossing structure and appurtenances installed according to plan, permit requirements, and DGLVR requirements
  - Stream restoration completed according to plan, permit requirements, and DGLVR requirements: including low flow channel, stream banks, and grade control structures, continuity
- ☐ **Other ESM Practices** –all other ESM Practices installed according to plan and DGLVR requirements
  - Cross pipes, ditch disconnection, French mattress, underdrain, Driving Surface Aggregate, etc.
- ☐ **Engineer Certification**
  - Signed and sealed by the engineer
  - Includes redline mark-of construction documents or as-built drawings
  - Provided to conservation district and grant recipient
- ☐ **Erosion and Sedimentation (E&S) controls**
  - E&S controls such as pumps, dams, filter bags, and silt fence are removed and properly disposed of
  - Disturbed earth is stabilized (minimum 70% uniform vegetative cover, rip-rap, etc.)
- ☐ **General Site Clean Up**
  - Equipment and excess material are removed from (or planned to be removed from) the site
  - Note: It is helpful to complete the final site inspection while equipment is still on site in case touch-ups are needed. It is also good to remind the grant recipient and contractor that they are responsible for cleaning up and stabilizing the site upon completion.
- ☐ **Follow Up Inspection** – (if applicable) Issues identified in the final inspection are corrected.

File Requirements

- ☐ **Completion Report:** filled out appropriately and signed by conservation district and grant recipient
- ☐ **Financial Documentation:** provided and matches the Completion Report
- ☐ **PA One-Call Number**
- ☐ **Prevailing Wage Weekly Payroll and Certified Statement of Compliance (if applicable)**
- ☐ **Other paperwork: See "Hard File" Project Checklist** for full list of required and recommended documentation
- ☐ **Final Payment** cannot be made until the site and file meet all requirements
  - If applicable, provide local maintenance policies or recommendations with payment to grant recipient
- ☐ **Copy of Checks:** included in the conservation district project file
- ☐ **Update CDGRS Mapper -** enter the payment, fill out the completion report, and mark the project as "complete"

Meeting Notes:

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Appendix H. Technical Bulletins

The technical bulletins provide additional details to specific topics contained in the DGLVR Stream Crossing Replacement Technical Manual.

- **Bankfull Width Determination:** Guidance and examples for determining the bankfull width of a variety of stream types in Pennsylvania.

- **Site Assessment - Longitudinal Profile & Cross-Section**: Guidance for conducting a longitudinal stream survey to determine channel slope and other characteristics to guide project design.

- **Structure Selection for Stream Crossings**: Guidance and "pros and cons" of various common stream crossing structure types.

- **Grade Control**: Guidance on the use, design, and installation of large rock or other structures that are immobile in the channel and set the slope and form of the stream.

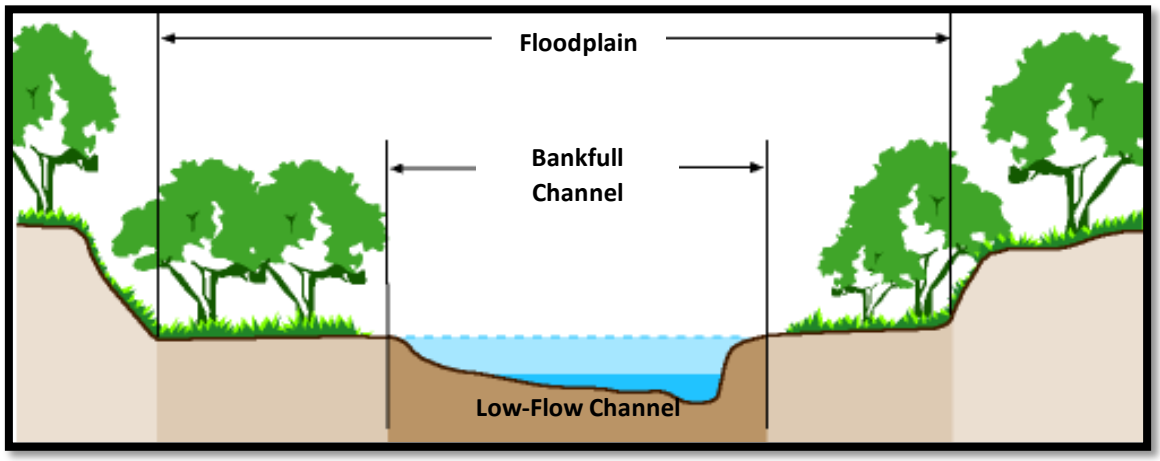
- **Streambed Restoration**: Guidance on the re-establishment of streambed material through a new crossing structure and the reconstructed reach of the stream.

Technical Bulletin

Bankfull Width Determination

PENNSTATE
Center for Dirt and Gravel Road Studies

BANKFULL FLOW (STAGE OR ELEVATION) – This flow stage is determined by the elevation point at which the stream accesses the floodplain. This point is typically indicated by deposits of sand or silt at the active scour mark, a break in stream bank slope, perennial vegetation limit, rock discoloration, and root hair exposure. The bankfull flow is also known as the channel-forming or dominant discharge, which is the flow that transports the most sediment over time and is the most effective in shaping and maintaining the natural stream channel. The bankfull flow roughly corresponds to a 1.5-2 year recurrence interval. The **BANKFULL CHANNEL WIDTH** is the width of the channel at the bankfull flow elevation.



Bankfull Width: The average width of the channel at the bankfull elevation. (image credit USFS)

Finding the Natural Channel of a Stream:

Because streams vary widely in composition, slope, and manmade impacts, it is impossible to create a set of "instructions" for determining bankfull that will work on every channel. The goal when determining bankfull flow is to find an area that represents natural channel conditions either upstream or downstream of the crossing. This sometimes means moving further upstream or downstream away from the structure, or skipping sections of stream that are unnaturally widened or constricted. **Be flexible and think logically in choosing your bankfull measurement stream section in order to get the best representation of the natural channel.**

Procedure for Determining Bankfull Width Near a Road / Stream Crossing Structure:

Location: Start at a location away from the influence of any culvert or bridge, since they often impact channel width. To do this, roughly estimate bankfull channel width, then go at least 5 times that distance away from the structure. Looking upstream is preferred, but downstream reaches can be used if necessary *(see locations to avoid below).* **Be sure to notify landowners and receive permission before entering private property.**

Determine Bankfull: Because the bankfull flow does the greatest amount of work forming the channel, the bankfull stage is identifiable in the field. Using the indicators listed below, begin by looking up in the floodplain and then work down toward the stream. Using both sides of the channel find the elevation of the best bankfull indicators and mark those locations, using flags if necessary. Stretch a measuring tape across the stream at your bankfull mark(s), noting that the tape should be level, to measure the bankfull channel width. Continue moving upstream or downstream, taking successive measurements that are at least 1/2 bankfull width apart (for example, if the first bankfull measurement is 16 feet, move at least 8 feet away before taking another measurement). Collect at least 5 measurements and average them together. More than 5 bankfull measurements can be used to obtain a better average if needed. This is only a general guide, note the "locations to avoid" section that follows.

Be flexible and think logically in choosing the best indicators for your bankfull measurement locations.

Field Indicators of Bankfull Flow: *(listed in order from most to lease reliable indicators)*

1. Change in Bank Slope: Bankfull flows are often associated with "benches" or the top of the stream bank, unless the stream is entrenched or has been altered in the past.

2. Depositional Features: The top of features such as point bars and mid-channel bars are often indicators of the bankfull flow elevation. Use these elevations to look for additional clues on each bank at the same elevation.

3. Changes in Particle Size: Streams drop sediment when they start accessing their floodplain. A Change in particle size along a stream bank (from gravelly, to silty or sandy) often indicates bankfull elevation.

4. Vegetation Changes: Although not as reliable, changes in vegetation can indicate bankfull elevation.

5. Scour Features: Erosion and scour lines can be used if other features cannot be located.

Locations to Avoid in Determining Bankfull Flow: *(if possible)*

Logjams or Fallen Trees: These structures tend to increase the bankfull width in their immediate vicinity.

Manmade Impacts: Avoid locations with wall, weirs, dams, rip-rap, pipes. etc.

Bedrock Outcroppings: Bedrock can hide indicators of bankfull flow and alter channel width.

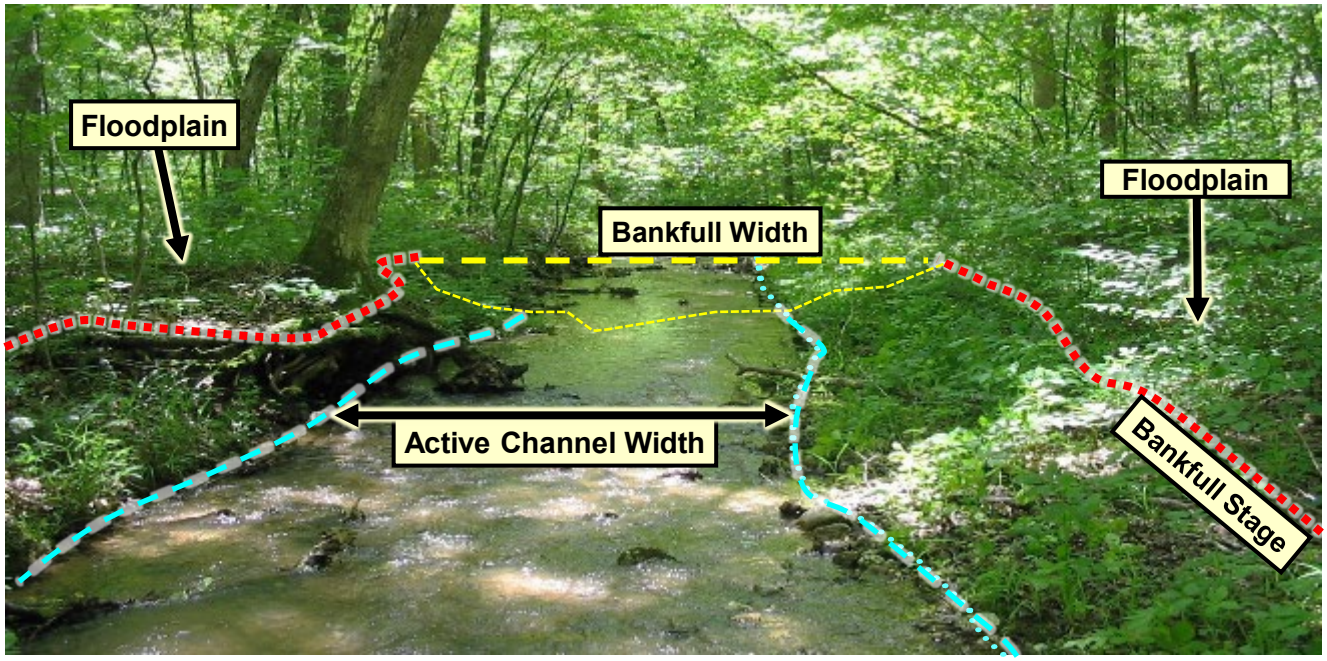
Braided Channels: Measure upstream or downstream of any braided channels if at all possible.

Tributaries/Springs: Measure bankfull between road crossing and any incoming flows that may increase width.

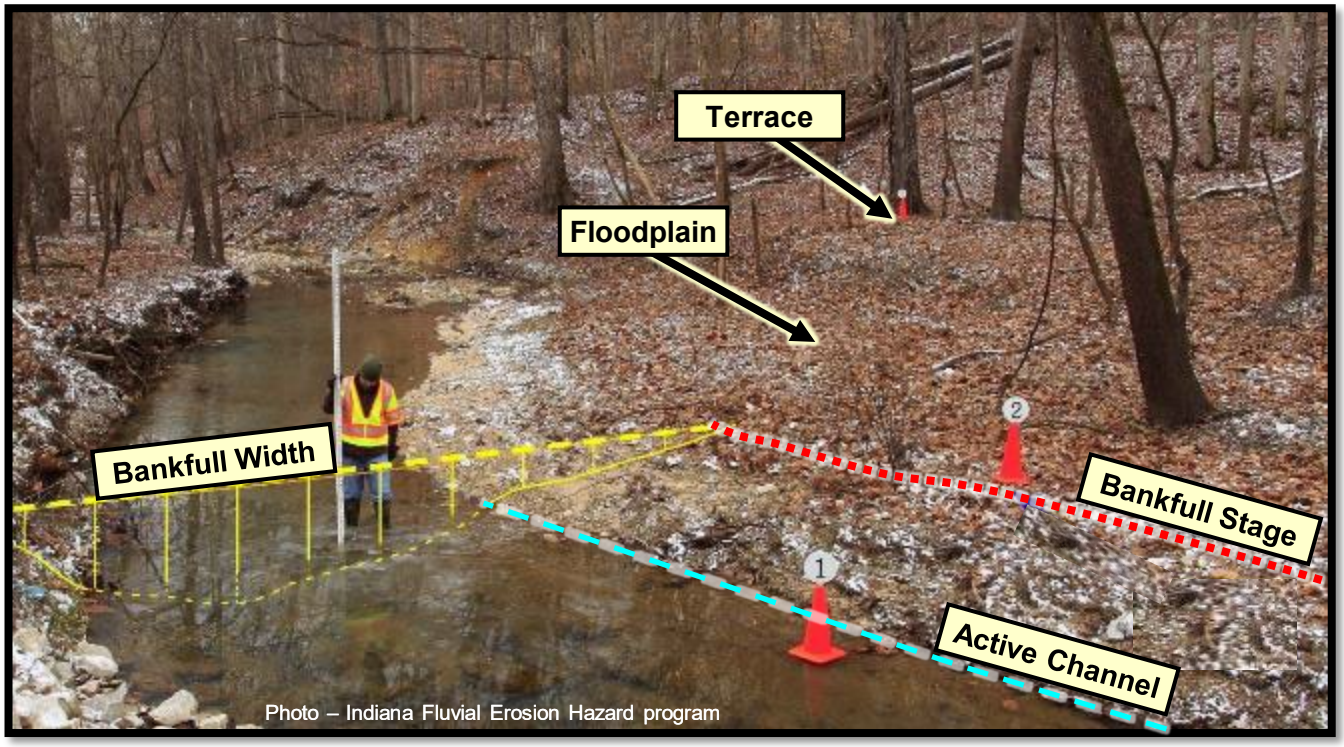
Hard Meander bends: Hard bends make it difficult to find good indicators since the stream is moving laterally.

Additional Bankfull Determination Tips:

- Bankfull flows will be level across the channel, so ensure the tape is level when measuring bankfull widths. If you find strong indicators on one bank, you can stretch your tape level across the stream to get your width.
- When looking for bankfull indicators, think logically about a 1.5-2 year recurrence interval. Does it make sense that the points you are measuring as bankfull will see flow with that frequency?
- When changes in bank slope are a strong field indicators, cross sections collected in the same reach can be used to verify bankfull width by comparing the location of slope changes from the cross section with those in the field.
- On entrenched streams, or streams with historically high sediment impacts (legacy sediments), bankfull elevation is often below the elevation of the "top of stream bank" due to many years of man-made impacts.
- Note that tree roots and other vegetation can exist below the bankfull elevation, especially in dry years.
- Measuring bankfull is often easier during Spring and Fall when vegetation is dormant.
- As long as there are no major tributaries, channel splits, or changes in stream type, you can go as far as needed upstream and downstream of the crossing to find "natural" spots to take bankfull measurements.
- **Be flexible in your measurement locations to find the best representation of the natural channel.**



This photo shows a typical forested stream in the summer. Bankfull width is significantly wider than the stream bed width. Bankfull indicators are obscured by vegetation on the right side of the photo and complicated by roots and vegetation growth on the left side of the photo.

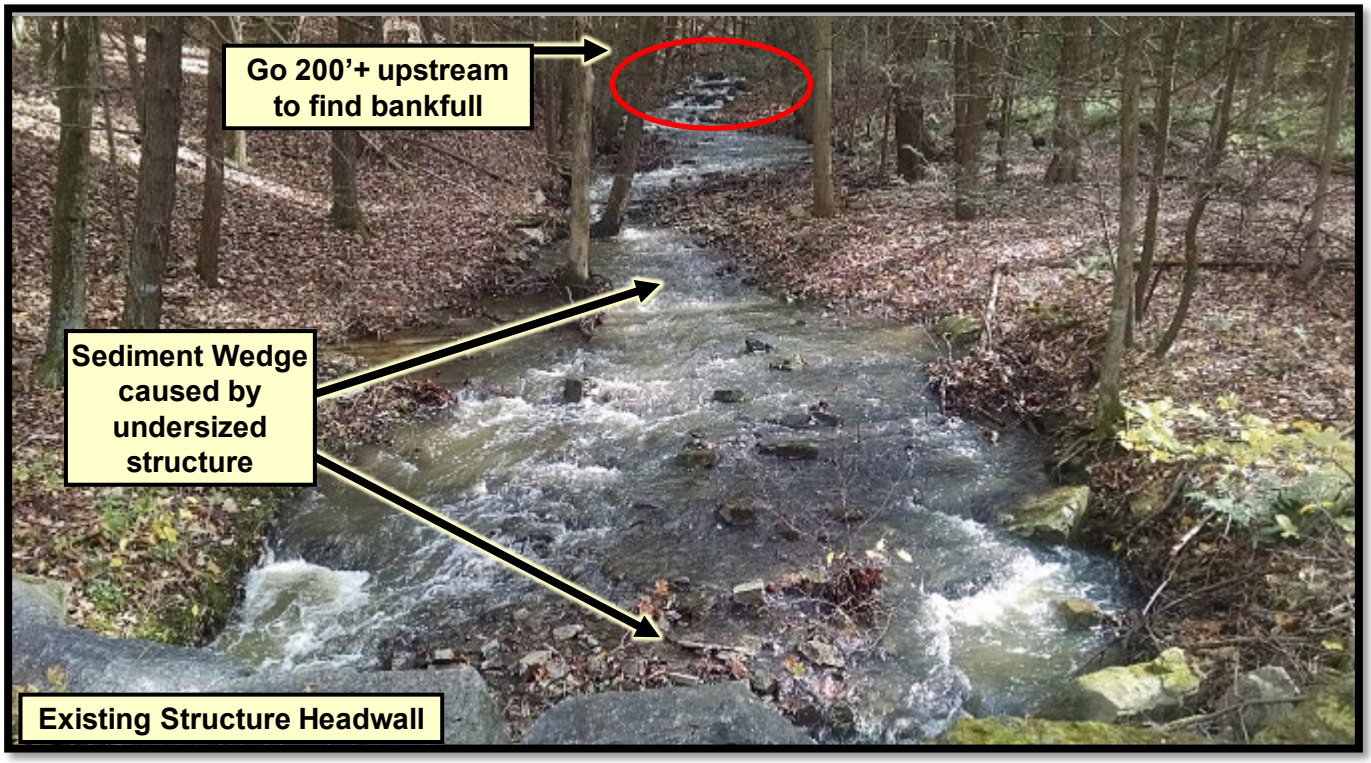


This photo shows a typical forested stream in the winter. Bankfull indicators such as changes in slope, depositional features and changes in particle size are more obvious due to lack of vegetation.

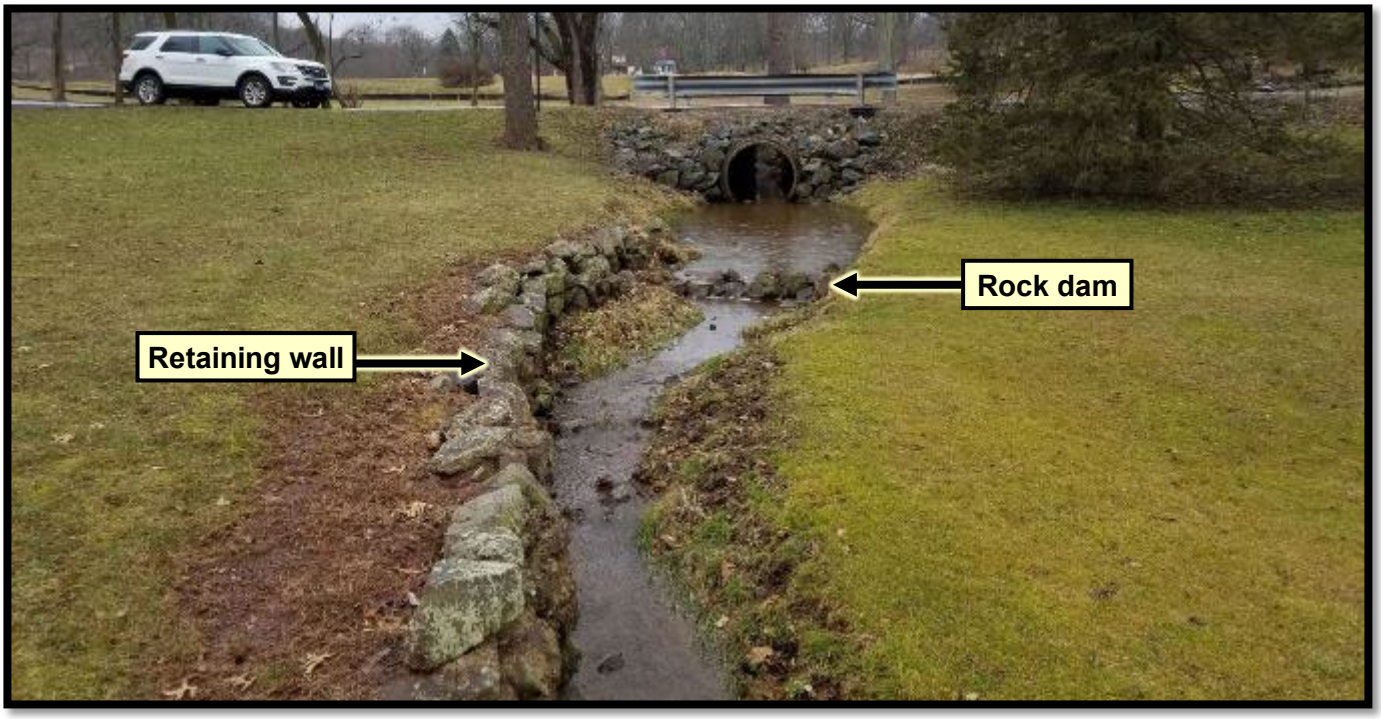
Entrenched channels are often found in agricultural settings and in high gradient channels. When measuring entrenched channels the bankfull width and channel width are often the same.

Additional water sources such as tributaries, springs or tile drains add addition flow and change the bankfull width. If additional water enters above the crossing, then measurements should be taken downstream of the crossing. If additional water enters below the crossing, then measurements should be taken upstream of the crossing. Bankfull measurements of tributaries cannot simply be “added” to get an accurate bankfull with of the combined channel.

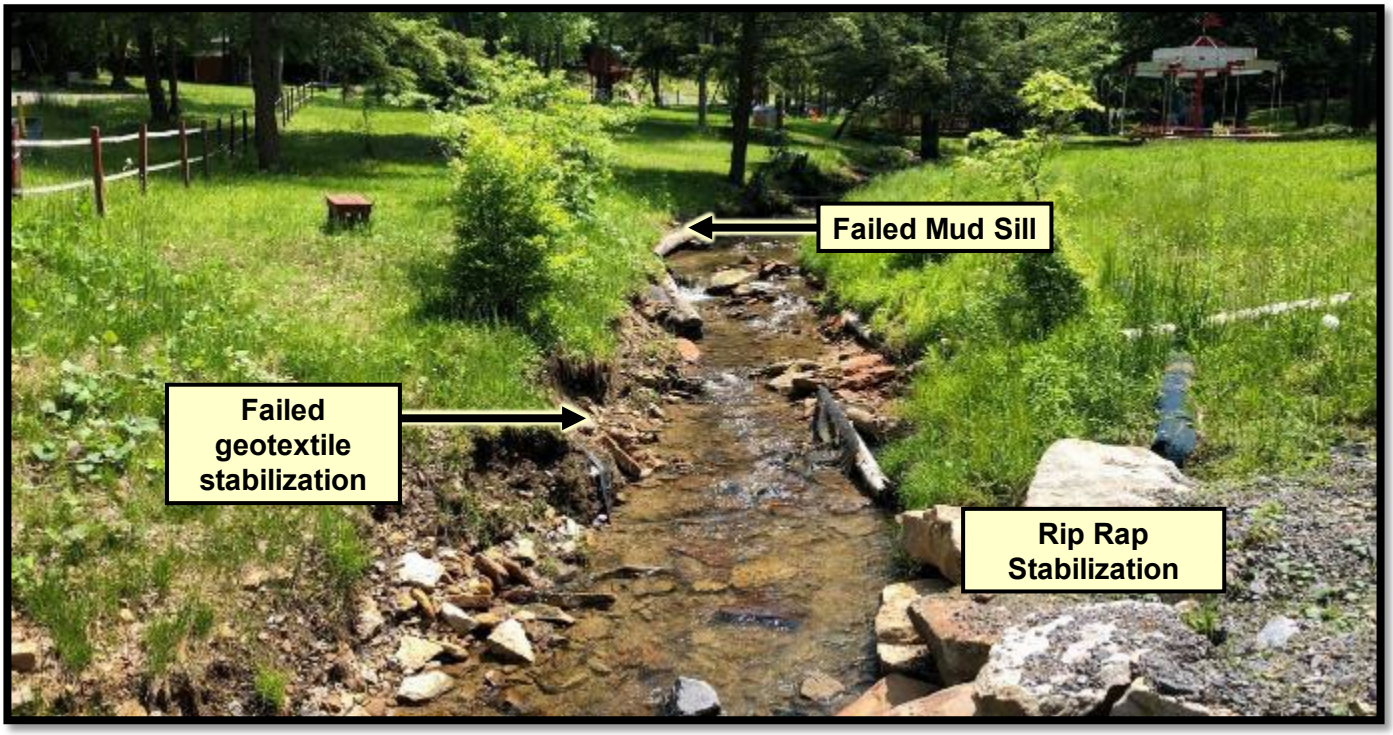
This photo shows a stream section with **locations to avoid when measuring bankfull**. In the foreground the channel is over widened and there is noticeable vegetation in the stream. Upstream there is a log jam and downed trees impacting the stream channel. Remember to be flexible when locating the best representation of the natural channel.



This photo shows a sediment wedge that has formed upstream of an undersized structure causing over widening of the channel. The impacts from the undersized structure extend approximately 150 feet upstream and this section should be to avoid when measuring bankfull. The red oval shows where the natural channel begins.



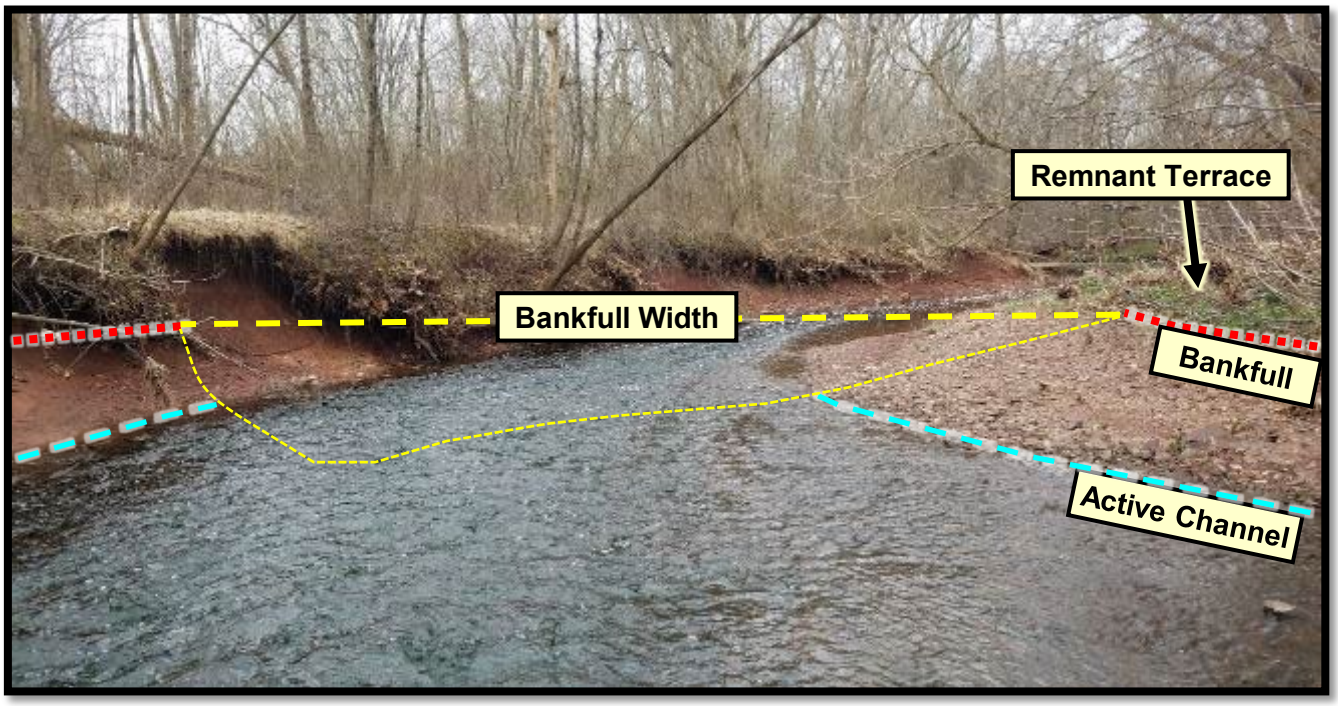
Urban settings pose unique challenges due to human channel modifications. In areas with significant disturbance near the structure it is necessary to start looking for bankfull indicators more than 5 bankfull widths away from the crossing.



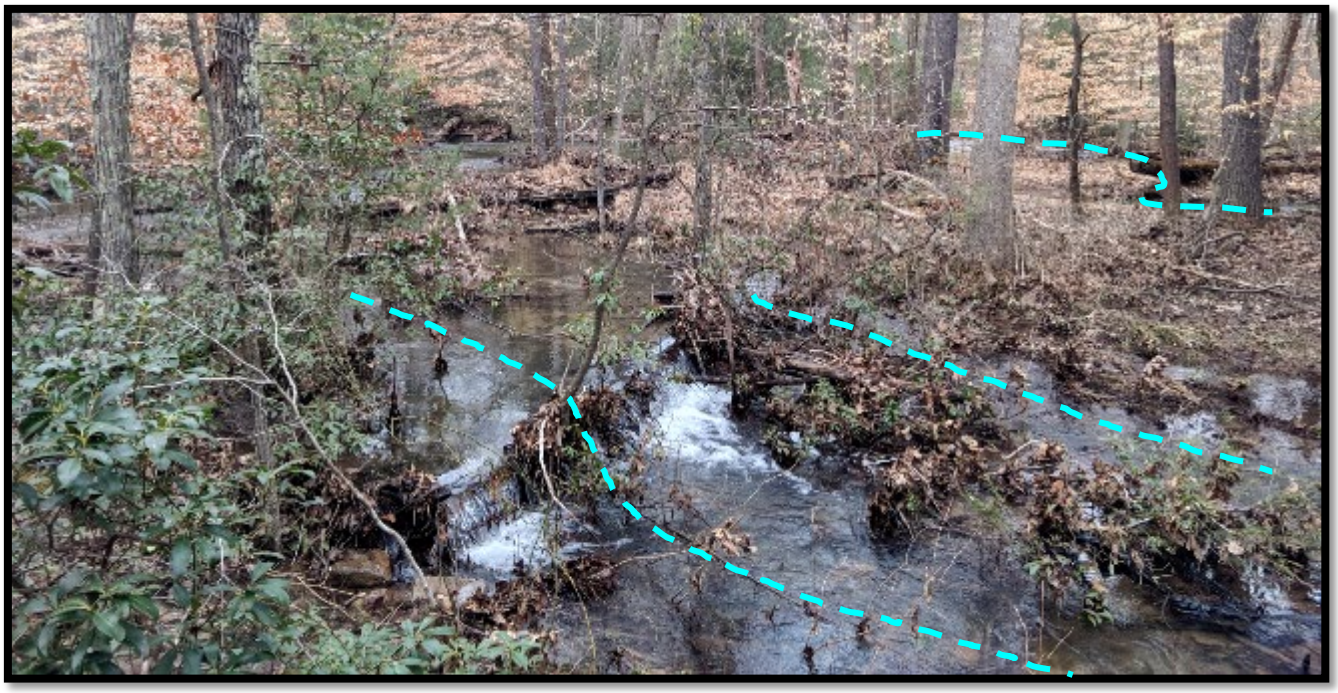
This creek flows through a park and shows impacts from channel modification and failed bank stabilization attempts due to channel downcutting. In areas with significant human caused bank disturbance necessary to start looking for bankfull indicators more than 5 bankfull widths away from the crossing.

In bedrock and boulder channels, bankfull indicators typically include scour lines on the rocks, fine sediment deposition and potentially vegetation changes.

Some settings call for creative bankfull measurement. This small entrenched channel in agricultural field has a bankfull width equal to the stream bed width of just over 1’.



This stream is aggressively adjusting both laterally and vertically. Bankfull elevation is at the top of the gravel point bar shown with the red line on the right, not at the more obvious grade break at the top of the grassy bench where the stream engages its floodplain. This elevation of the grade break is the top of a remnant terrace that is engaged at flows higher than bankfull. This is also a difficult place to measure bankfull due to being on a bend. Avoid measuring bankfull on meander bends like this if possible.



This stream has multiple braids of the main channel and is impacted by significant amounts of large woody debris. Bankfull measurements should be taken not be taken in this section.

Technical Bulletin
Site Assessment - Longitudinal Profile & Cross-Section

PENNSTATE
Center for Dirt and Gravel Road Studies

LONGITUDINAL PROFILE (LONG-PRO) – A survey conducted upstream, downstream, and through an existing structure to determine the stream channel features that are critical to a successful structure replacement. such as: channel and structure slope, grade control types and spacing, scour depth, tie in locations, aggregation wedges, plunge pools, vertical offset of the structure, available cover, and more.

CROSS-SECTION SURVEY - A survey conducted across the channel (perpendicular to the thalweg) to produce a graphical representation of channel dimensions including shape, depth and width.

Other Useful Definitions:

- ✓ **grade control:** instream features such as large rocks, logs, or manmade structures that control channel elevation and slope
- ✓ **grade control spacing:** the average spacing between grade controls in the channel
- ✓ **vertical offset:** vertical difference in existing inlet and outlet streambed elevations
- ✓ **plunge pool:** the large scour hole often caused at the outlet of undersized crossings
- ✓ **sediment wedge:** aggregation of sediment at the inlet of undersize crossings. Often in the form of a gravel bar
- ✓ **thalweg:** the deepest part of the channel cross-section

STREAM CONTINUITY

During high water, natural stream channels move sediment (rock, gravel, sand, etc.), large wood, nutrients and debris downslope through the landscape. Over time, undersized road/stream crossings often disrupt this natural channel movement or continuity by depositing sediment at the inlet, creating a plunge pool at the outlet, and therefore creating a 'vertical offset' between inlet and outlet streambed elevations.

When replacing undersized structures, it is necessary to survey upstream and downstream of the structure itself. Stream characteristics such as slope, grade control size and spacing, channel shape, and bed composition should be consistent through and beyond the project area**. Re-establishing and maintaining channel continuity is essential for the long-term function, durability, aquatic organism passage, and flood resiliency of the new crossing, as well as meeting DEP permit and DGLVR Program requirements.**

LONGITUDINAL PROFILE SURVEY (long-pro)

Developing a longitudinal profile is one of the most important steps to providing the information necessary to implement a successful stream crossing replacement and restore connectivity. The long-pro encompasses an elevation survey upstream, downstream, and through/over the existing structure. It informs a variety of decisions from structure selection to the amount and type of streambed material and grade control needed. It also includes cross-sectional surveys across the channel to identify channel shape and characteristics.

A long-pro is typically done by the Conservation District very early in the project development process, and is required for each site prior to the QAB recommendation for funding. The long-pro survey is intended to provide enough detail on stream slope, grade control, structure cover, and other factors to be able to develop realistic cost estimates for developing a grant application. The project Engineer has discretion to use a survey provided by the conservation district or conduct a new survey for final design and permitting. A Long-pro is required for each site prior to permitting. District technician is required to be on-site while the survey is being performed by the Engineer and/or Surveyor to observe and ensure all required points are obtained. The engineer shall provide the completed survey and stream longitudinal profile to the district technician to assist in determining substrate depths & grade control types and spacing.

PLANNING A LONGITUDIONAL PROFILE SURVEY

Equipment: A simple long-pro can usually be done with a tape (recommended 300'), a laser level, field book, flagging and stakes. These tools will allow you to measure and record distance and elevation values that can later be plotted on a graph to determine stream characteristics. To reduce the number of times the survey

laser must be moved it is recommended to use a laser that can accurately shoot 300' and at least a 20-foot-long survey rod. **Be sure to notify landowners and receive permission before starting the survey.** This is also an opportunity to explain the project to the landowner and gauge their level of support since off right-of-way channel work is required in most stream crossings.

Site Walkthrough: Prior to setting up equipment to perform the survey, begin with a walkthrough of the project site and adjoining stream sections upstream and downstream of the road/stream crossing. During the walkthrough, consider what is the extent of up and downstream channel impacted by the existing crossing structure (aggradation, bed scour, over-widening, bank erosion, etc.)? Larger impacts will likely require surveying a longer reach to determine stable tie in locations. These are the locations where the constructed channel slope through the structure can be reconnected or "tied-in" to the existing channel typically at a stable riffle crest, step, or cascade. Additionally, the following should be taken into consideration during the initial walkthrough and survey setup.

- Optimal setup location for the survey instrument to maximize the line-of-sight to the upstream and downstream limits of survey, as well as to the benchmark. The goal is to not have to move the instrument during the survey greatly reducing the possible introduction of error.
- Extent of survey needed to capture typical channel conditions beyond the areas of impact from the existing crossing (reference reach).

Survey Extent: The extent of the stream segment to be surveyed is best determined based on site-specific conditions observed during the walkthrough (above). At a minimum, the longitudinal profile survey must extend 150' upstream and 150' downstream of the existing crossing. Additional length of survey may be needed to capture potential stable tie-in locations and to include the channel above and below these tie-ins. Begin and end the survey at existing grade control crests (see below). The survey must extend far enough upstream and downstream of the crossing to determine existing channel slopes and elevations in both directions and include data points associated with the existing structure and roadway surface. For additional guidance refer to the *Stream Crossing Replacement Technical Manual*.

Conducting a longitudinal profile survey

In situations where other obstructions or channel splits are nearby, it may not be possible to go 150'. In other cases, it may be necessary to go more than 150' from the crossing, especially in situations with extensive channel impacts due to the structure (large vertical offsets, plunge pools, sediment wedges).

The survey must extend far enough to include a stream segment unimpacted by the existing crossing structure that reflects "typical" channel conditions (reference reach). This reference reach can be used as a basis for design and reconstruction of the stream channel upstream, through, and downstream of the replacement crossing. The reference reach must begin and end at existing grade control features and must, at minimum, include two consecutive sequences of repeating bed features (ex. riffle/pool/riffle/pool/riffle). A longer reference reach including additional bedform sequences is encouraged in order to provide more reliable design criteria. Avoid designating your reference reach in a stream segment that differs greatly from the "typical" conditions. Examples might include areas that are influenced by debris jams, or obvious abnormalities in width, depth, slope, etc.

Remember, the reference reach is intended to reflect "typical" character of the stream channel beyond the influence of the existing road crossing. It is not meant to capture "pristine" conditions. To determine applicability, reference reach slope must be +/- 25% of the proposed continuity slope of the reconstructed streambed, unless otherwise approved by the SCC. If an appropriate reference reach is not located near the crossing, a separate reference reach survey may be conducted further upstream or downstream of the

crossing. To generate data useable for design, the slope, bankfull width and dominant bedform (riffle/pool, step/pool, etc.) of the "off-site" reference reach must be relatively similar to those at the project site.

CONDUCTING A LONGITUDIONAL PROFILE

Setup: Set the laser in a position to see the largest extend of the channel both upstream and downstream. Meandering channels or forested settings may require setting up the laser multiple times and establishing turning points (see below). Be sure the laser is set high enough to be able to take a reading at the top of the planned survey. Establish a minimum of 2 permanent benchmarks such as a nail in a tree, metal stake or other stable structure that will not be disturbed during construction.

Survey Terms:

- **Benchmark (BM)**: A benchmark is anything with a constant elevation that can be used as a reference. Identify two or more locations outside of the anticipated limits of construction disturbance to establish a benchmark. Mark the benchmark location and record a detailed description so that it can be relocated later in the field, potentially by another surveyor.
- **Backsight (BS)**: A rod reading taken on a point of known elevation. It is the first reading taken on a Benchmark to start a survey or the Turning Point if the laser has been moved.
- **Foresight (FS)**: Rod reading taken on any point on which an elevation is to be determined (see "key measuring points" below).
- **Turning Point (TP)**: A point, either temporary or permanent, on which the elevation is determined for use as a pivot between sequential instrument locations. Typically used when needing to move the instrument to complete a survey. The turning point elevation is determined, the instrument is moved, then a backsight is taken from the new location. The difference in the readings will be added/subtracted to all future foresights when plotting to make one continuous graph.

Starting Survey: Begin the survey upstream at a grade control that is well outside the influence of the structure. Start the tape measure at "zero" at this uppermost grade control, and use a survey partner, stake, rock, or tree branch to secure the start of the tape. Consider using a stake or flagging to mark the survey starting point, well out of channel, in case you need to return for additional measurements. Unroll the tape directly down the deepest part of the channel (thalweg) with "zero" being at the upper end. Lay the tape over the roadway and existing structure and continue downstream. If road fill height will greatly impact the measured length, consider placing the tape through the existing structure.

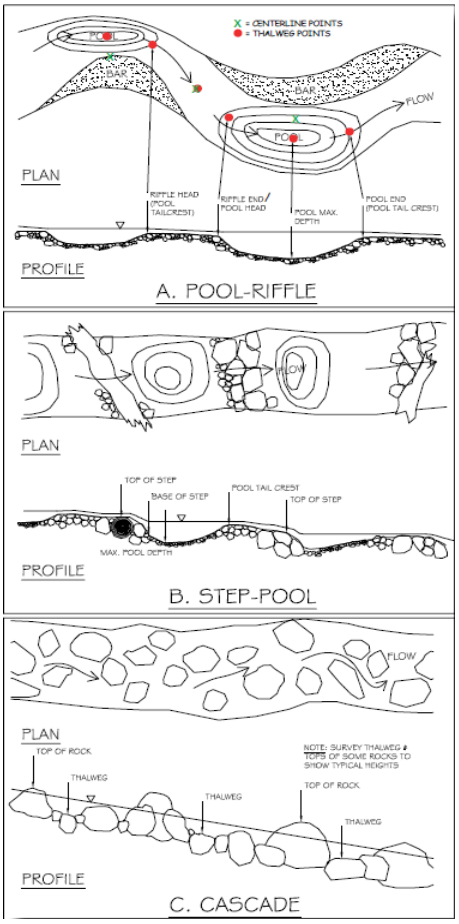
When conducting the longitudinal profile and cross-section assessments, three pieces of information should be recorded for each data point collected. These include:

- **Station:** the distance along the transect being assessed. If a laser level and measuring tape is being used, this would be the tape reading. The assessment typically begins at Station "0" (the start of the tape).
- **Foresight:** if using a laser level, this is the reading taken from the stadia rod. If using more-advanced survey equipment, this might be recorded as an actual elevation. Foresight readings collected in the field can be translated to elevations later, based on the benchmark and laser (height of instrument) elevations.
- **Notes:** a brief description of the feature of interest where the data point is being collected.

Consistency in the way field data is recorded by the conservation district, CDGRS, and the engineer/surveyor can go a long way in streamlining communication and the sharing of information among the project participants. Clarity and consistency of field notes and good organization of Site Assessment data can greatly assist the conservation district in completing the required design plan review in a timely manner. For more information on survey field notes and site assessment data analysis see the *Stream Crossing Replacement Technical Manual.*

Key Measuring Points:

- **Grade controls**: Record a survey data point - station (tape distance) and elevation (rod height) -along the thalweg at each grade control feature in the channel. Rate the grade controls as to their perceived relative stability (low/med/high or poor/moderate/good), based on their expected longevity in relation to other grade control features within the surveyed reach. Some grade controls such as large rocks (particularly with moss growing on them) are very stable, whereas grade controls from downed tree or debris jams may not last as long.
- **Pool bottoms:** Record a survey point at the deepest part of each pool (thalweg).
- **Existing Structure**: Record data points for the existing structure inlet and outlet elevations (top and bottom of structure opening). Collect additional data points for stream bed elevations at the inlet and outlet if different from the structure bottom elevations (if the structure inlet/outlet is perched above the streambed or is buried).
- **Road and Fill**: Stretch the tape over the road (not through the structure). Take several shots over the structure and across the road, including the edges and the centerline. These will help in analyzing the available cover and fill at the site.
- **Other features**: Note and take readings as features such as bedrock, rock clusters, large woody debris, etc.
- **Take readings at any changes in channel slope. The goal is to take a representative survey of the channel both upstream and downstream outside of the structure influence. When unsure, take extra readings.**



Ideal locations to take measurements during long-pro (credit USFS)

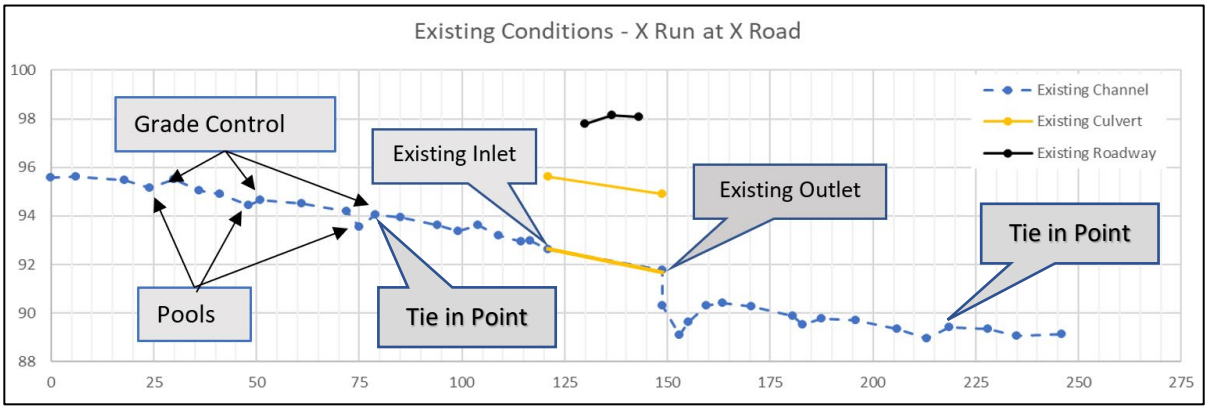
Surveying in difficult conditions: A wide variety of "abnormal" conditions may exist that can complicate the long-pro survey such as:

- **Split channels upstream**: in a case where a feeder stream flows into the channel upstream of the structure, the longitudinal profile should be conducted in the larger main channel. If feeder streams are significant, another "arm" of the long-pro can be shot up that channel for future reference.
- **Braided channels**: Braided channels can present issues in determining where to conduct a longitudinal profile. Long-pros should be conducted in the thalweg or deepest part of the channel, so try to identify the main flow channel in braided systems and conduct the survey there. If unclear, multiple braids can be surveyed.
- **Proximity to stream mouth:** If the stream being surveyed empties into a larger stream below the crossing, conduct the survey into the other channel to a grade control if possible, noting where the streams meet in survey notes.
- **Wetland / beaver issues:** Wetland or beaver influenced channels may make a longitudinal survey difficult or impossible. The survey should extend up and downstream to the greatest extent possible.
- **Manmade obstacles:** Note the location and elevation of any manmade barriers or stream impacts during your survey such as dams, retaining walls, or other culverts on the stream.

LONGITUDIONAL PROFILE SURVEY RESULTS

The long-pro survey will be used to determine a variety of factors that will impact the project moving forward including:

- **Existing grade control spacing**: The distance between existing grade controls should be similar to the planned grade control spacing of the constructed reach.
- **Tie-in Points:** Tie-in points will be determined where stable grade controls exist to tie the "reconstructed channel" through the crossing back into the natural channel and establish continuity.
- **Proposed bed and structure slope:** Once tie-in points are established, the slope of the reconstructed channel through the structure can be calculated. This will impact both structure selection, and streambed depth and composition.
- **Maximum pool and anticipated scour depth**: The maximum pool depth (excluding plunge pool) can be used to establish the anticipated scour depth in order to estimate streambed quantities.
- **Road Cover and height issues**: The survey will identify the amount of cover over the existing structure and can be used to determine the amount of fill available for a new structure based on structure type and size.
- **Structure Selection**: All of these factors above can be used to help with structure selection. Bottomless structures are encouraged for all structures and <u>required</u> for stream channels where the continuity slope of the reconstructed at greater than 4.0% or the bankfull width is over 20', as determined by the longitudinal survey.



Example of a longitudinal survey once plotted out. This survey starts approximately 120' above the existing structure, extends over the road and structure, and extends approximately 100' below the structure.

CROSS-SECTIONAL SURVEYS

When completing a long-pro survey, a minimum of 2 cross-sectional surveys must also be completed. Surveys must be completed at a grade control crest within the reference reach and at the deepest point in the outlet scour pool (if present). If no outlet scour pool exists, this survey should capture the maximum depth of a pool feature from the reference reach. A cross sectional survey is run perpendicular to the long-pro survey and will produce a graphical representation of the channel. These surveys will identify features such as the thalweg (deepest channel point), low flow channel, bankfull elevations, and bank margins. This information will then be used when designing the newly constructed channel through the new stream crossing structure.

<u>Process</u>: Identify a grade control crest and a pool feature adjacent to reliable bankfull indicators, outside of the portion of channel impacted by the crossing structure. Survey a cross-section of the channel and floodplain at these locations by placing a tape perpendicular to the channel thalweg. The tape should pass over the same point along the thalweg where the grade control (top of peak) or pool (max depth) data point would be collected in the longitudinal profile survey. Orient the tape so that the start (station 0') is over the left bank of the stream (facing downstream). Extend the tape far enough to capture a portion of the floodplain beyond the top of bank on both sides of the stream. The tape should be stretched level above the stream channel. At

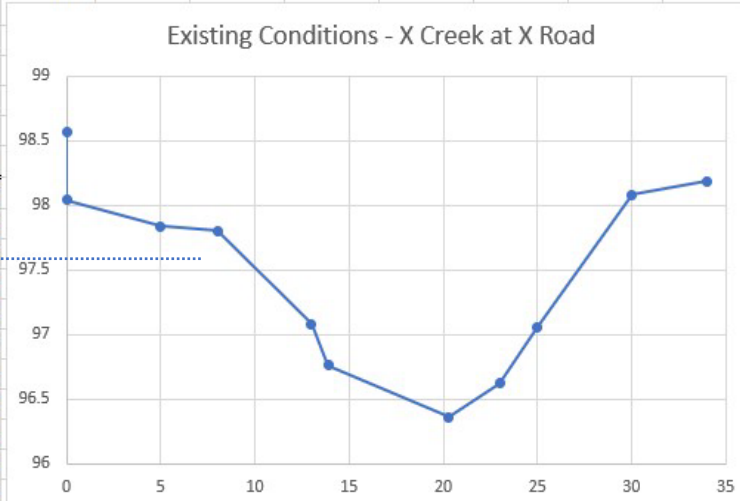
minimum, each surveyed cross section must include data points on both streambanks capturing top-of-bank, bankfull, and right/left edge of water. Instream data points must include a minimum of three streambed points, including the thalweg (low-flow channel).

Optimally, cross-sections can be surveyed at multiple grade control crests and max pool depth locations. As noted above, survey cross sections must be completed at one grade control crest and one max pool depth. Record the location (tape reading) along the longitudinal profile where it intersects with each of the cross-sections.

Existing Conditions - X Creek at X Road

XS #	1
LP STA	46
HI (ft)	103.7

STA	FS	NOTE	ELEV
0	5.13	Top of Left Pin	98.57
0	5.66	Base of Left Pin	98.04
5	5.86	Floodplain	97.84
8	5.9	Bankfull	97.8
13	6.62	Left Edge of Water	97.08
13.9	6.94	Bottom of Left Bank	96.76
20.3	7.34	Thalweg	96.36
23	7.08	Bottom of Right Bank	96.62
25	6.64	Right Edge of Water	97.06
30	5.62	Top of Right Bank	98.08
34	5.51	Floodplain	98.19



An example plot of a surveyed stream channel cross-section. Surveyed sections at the reference reach inform elements of reconstructed reach design such as bankfull (bank margin) height and thalweg depth.

Key measuring points:

- **Floodplain:** Collect one or more data points along the floodplain extending beyond the tops of both banks. These should capture inflection points where noticeable changes in elevation or slope occur.
- **Top of Banks:** Take a reading at the top of both streambanks.
- **Bankfull Elevation:** Take a reading at the bankfull elevation, using the best-available bankfull indicator on the survey transect. Each cross-section surveyed should include at least one bankfull data point. See the Bankfull Width Determination Technical Bulletin for additional information on identifying bankfull elevation**.**
- **Edges of Water:** Take a reading at the water's surface where it meets both streambanks.
- **Bottom of Banks:** Collect a data point along the toe of both banks, where the streambank transitions to the stream bed.
- **Streambed:** Take a reading at three or more locations within the wetted portion of the stream channel. Include a point representing the thalweg, along with two or more additional points. These points should be positioned to best depict the general shape of the streambed.

The surveyed cross section should contain sufficient data points to reflect channel dimensions and shape. Depending on site conditions, additional points may need to be collected. For information on site assessment data analysis for the longitudinal profile survey and the cross-sectional surveys refer to the *Stream Crossing Replacement Technical Manual.*

ADDITIONAL REFERENCES

https://training.fws.gov/courses/csp/csp3200/resources/documents/TeamSurveyPE/LongPro-2019.pdf

https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=46252.wba

https://www.fs.fed.us/rm/pubs_rm/rm_gtr245.pdf

Technical Bulletin
Structure Selection for Stream Crossings

Center for Dirt and Gravel Road Studies

STRUCTURE SELECTION for ROAD STREAM CROSSINGS – Selecting an appropriate structure for crossing replacement will reduce maintenance, improve stream continuity, and increase longevity of the

WHY DOES STRUCTURE SELECTION MATTER?

Every site presents unique challenges and structure selection is a critical component to the success of any stream crossing project. Selecting the proper structure is important in providing continuity of the stream through the road crossing and providing a long-term, low-maintenance solution to the road owner. A properly selected and designed crossing will meet the following objectives:

- ✓ 1.25 bankfull width minimum opening at bankfull elevation
- ✓ Stable grade controls and stream bed in the structure
- ✓ Stream continuity and passage of aquatic organisms
- ✓ Capacity to pass 100-year discharge (Q100) at 80% of the finished opening height

Figures in this document are general guidelines and vary by material and design. Always consult manufacturer for actual specifications.

Bank margins established to create a low-flow channel and protect the structure from scour.

Conducting a longitudinal profile is **essential** to making the best structure selection.

STRUCTURE SELECTION CONSIDERATIONS

Longitudinal Profile: A longitudinal profile conducted upstream and downstream of the structure is a required design practice that helps inform structure selection (See Longitudinal Profile Technical Bulletin). These surveys provide valuable information that can guide structure selection such as: stream slope, scour depth, grade control spacing, vertical offsets of the existing structure, and potential depth or cover issues for the new structure.

Structure Width: Structures must be of adequate width to accommodate the bankfull flow width of the stream at the final bankfull flow elevation with bank margins, account for bank slopes, road approaches and site conditions. Under no circumstances can the structure width be less than 1.25x the bankfull width of the stream at the bankfull elevation. (See Measuring Bankfull Technical Bulletin). For some structures with sloped sides, this means a larger than 1.25x bankful structure must be installed, since establishing streambed in the structure will decrease the effective opening size.

Capacity Requirements: All new structures must be designed to pass the Q100 discharge at a water surface elevation not to exceed 80% of the finished opening height.

Substrate Depths: As defined in the DGLVR Stream Crossing Standard, minimum requirements for establishing streambed through structures with inverts is based on pool depth and stream slope and is typically greater than permit requirements. Bottomless structures are encouraged and **required where the continuity slope of the channel to be reconstructed through the project area will be greater than 4.0% or the bankfull width is over 20'**, as determined by the longitudinal survey. Bank margins must be comprised of rock sized for stability at the Q100.

Depth of Cover: In situations with limited cover over the existing structure, structure choices may be limited. In some cases, additional cover may be used to elevate the road over a larger structure.

Alignment: New structures should be better aligned with the stream channel when possible. This often requires installing a longer structure to account for the skew across the road.

Other factors: Proximity to bedrock, public utilities, expected traffic loading, who is installing the structure,

equipment limitations, bearing capacity of the local soil, private property issues, underground utilities, and other such complications may play a role in determining structure type and installation details.

COMMONLY USED STRUCTURE TYPES

Structures come in a wide variety of materials, widths, heights and strengths to meet a variety of site conditions. Below are some commonly used structures. These are not the only options, contact manufactures for a complete list of options and details.

> **Reminder**: The DGLVR Stream Crossing Standard requires bottomless structures if the reconstructed stream slope through the structure is over 4.0% or the bankfull width is greater than 20'.

Pipe Arch (squash): Pipe arches tend to be the most economical choice for smaller crossings, and most municipalities and contractors are familiar with them. They can be delivered assembled or in sections in a variety of sizes and materials.

Structural Plate Arch Pipe with Invert (Bottom): These structures come in a variety materials, widths and configurations. Placement of streambed material can be difficult, especially in low profile structures, and special attention at bank margins is needed. Structures with sloped sides (pictures right) may need to be oversized (beyond 125%) to achieve a final 125% bankfull channel after establishing the streambed through the pipe.

Bottomless Boxes and Arches: A wide variety of structure materials, shapes, and designs fit this category. Several footer options also exist such as precast, express, or poured onsite. Site characteristics such as soil bearing capacities and the presence of bedrock can affect the cost and footing type required. These are typically easier to achieve and maintain stream continuity than structures with inverts or bottoms.

Concrete Box Culvert: These structures are heavy and expensive, but are commonly used in situations that require traffic support without adding cover over the structure.

Bridge: In larger stream systems, the best choice is often a bridge. It is recommended that a bridge is used when bankfull widths exceed 20 feet or stream slopes exceed 7-8%. Several alternatives exist to standard bridge abutment designs such as spread-footing or Geosynthetic Reinforced Soil abutments.

Round Pipe: Round pipes are not suited for use in stream channels. No round pipes over 36" in diameter are permitted to be used on DGLVR projects.

Other Structure Selection Considerations:

- How long can the road be closed?
- What are traffic loading requirements?
- Will structure have pre-fabricated headwalls & endwalls?
- What is the grade control size and streambed depth required?
- If the structure is bolted together, who will assemble?
- Is a geotech investigation needed to find soil bearing capacity?
- What is the minimum cover depth and will structure fit?

Pipe arch or "squash pipe" (6' wide) (CDGRS)

Arch pipe with invert/bottom (Cambria)

Bottomless arch pipe (York)

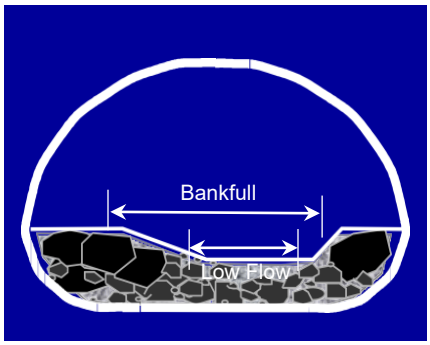
Bottomless concrete box culvert (Cumberland)

Spread footer bridge installation (Indiana)

Often the best place to get answers to questions about required cover, spans, shapes, etc. is to work directly with structure manufactures.

Pipe Arch (squash pipes)

These structures come in a variety of widths and assembly configurations. Placement of streambed material can be difficult, especially in smaller structures, and special attention at bank margins is needed.



Schematic of a pipe arch with low-flow channel

Reminder: The DGLVR Standard:
- Requires bottomless structures if the reconstructed stream slope through the structure is over 4.0% or the bankfull width is greater than 20'.
- Defines required depth of streambed in the structure.

Sizes: Typically available up to ~20' in width. Available in various width to height ratios. The structure may need to be oversized (in excess of 1.25x bankfull) in order to account for the required streambed materials, bank margins, and grade control.

Delivery of a fully assembled 6' w x 4' h x 40' l pipe arch (CDGRS).

Streambed: It can be difficult to place streambed in the structure, especially on smaller diameter and longer structures where getting equipment into the structure is difficult. Washing fine material into the pipe can also be time consuming and difficult.

Other Details:

- Assembly options include delivery in one piece, several pieces, or assembly on site.
- Make considerations for who will be doing assembly. Bolt together structures are very labor intensive.
- With adequate lifting equipment, some structures can be assembled on site then lifted into place (reduces road closures).
- Headwalls and endwalls can be included with the structure, and can either be installed prior to delivery for small structures, or assembled on site.
- Baffles can be installed by some manufacturers to help maintain streambed material in the pipe.
- For larger structures, consider paying for some on-site assistance from the manufacturer, especially if it is being assembled on site or if the municipality or contractor is unfamiliar with the process.
- Due to the large footprint of the structure, a geotechnical investigation is usually not needed.

Installation of a 15' w x 10' h pipe arch that was assembled on site (CDGRS).

Completed 16' w x10' h pipe arch (Crawford).

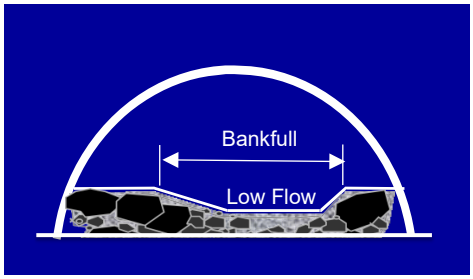
Summary:

- **Pros:** Structures are relatively inexpensive and easy to assemble. Contractors and townships are typically familiar installing these structures. Smaller structures can be delivered in one piece. Less excavation required than some other structures.
- **Cons:** Difficult to get material in smaller diameter or longer structures. Larger structures may not fit sites with low cover height. Limited to stream slopes 4.0% or less.

Structural Plate Arch with Invert (Bottom)

These structures come in a variety of widths and assembly configurations. Placement of streambed material can be difficult, especially in low profile structures, and special attention at bank margins is needed. Limited applicability in streams with steep gradients or large scour depths due to the amount of material required in the structure.

Reminder: The DGLVR Standard:
- Requires bottomless structures if the reconstructed stream slope through the structure is over 4.0% or the bankfull width is greater than 20'.
- Defines required depth of streambed in the structure.



Schematic of an arch pipe with invert with low-flow channel

Sizes: Typically available in widths between 6' and 23' depending on material. Because of tapered sides, it is often necessary to install a strucutre that is larger than 1.25 bankfull at the base. This ensures that after streambed material is placed in the structure, the final opening will still be at least 125% of the bankfull channel width.

Washing fines into the streambed on a 12' w x 4' h pipe arch (Jefferson).

Streambed: It can be difficult to place streambed in the structure, especially on smaller diameter and longer structures where getting equipment into the structure is difficult. Washing fine material into the pipe can also be time consuming and difficult.

Other Details:

- Assembly options include delivery in one piece, several pieces, or assembly on site.
- Make considerations for who will be doing assembly. Bolt together structures are very labor intensive.
- With adequate lifting equipment, some structures can be assembled on site then lifted into place (reduces road closures).
- Headwalls and endwalls can be included with the structure, and can either be installed prior to delivery for small structures, or assembled on site.
- Baffles can be installed by some manufacturers to help maintain streambed material in the pipe.
- For larger structures, consider paying for some on-site assistance from the manufacturer, especially if it is being assembled on site or if the municipality or contractor is unfamiliar with the process.
- Due to the large footprint of the structure, a geotechnical investigation is usually not needed.

19' w x 6' h structure showing low flow channel and bank margins (Northampton)

Assembly in-place of a 12' w x 5' H pipe arch (Elk)

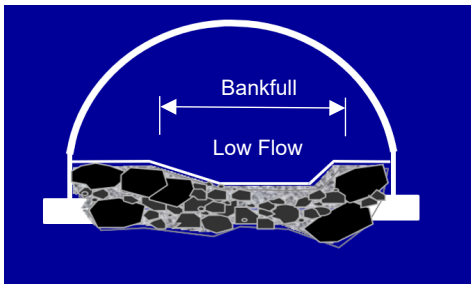
Summary:

- **Pros:** Structures are economical and easy to assemble. Smaller structures can be delivered in one piece or partially assembled. Lower profile (than squash pipe) and can be used in some locations where cover height is a concern.
- **Cons:** Difficult to get material in smaller, longer, and lower-profile structures. Most need to be oversized to accommodate 1.25x bankful channel after installing streambed. Flat plate bottom creates a "slip plane" and makes establishing stable streambed extremely important. Limited to stream slopes 4.0% or less.

Bottomless Boxes and Arches

These structures come in a variety of types such as metal arches or 3-sided concrete boxes and are typically placed on concrete footings that are either precast or cast-in-place. Compared to other structures with inverts, these are typically easier to achieve stream continuity.

Sizes: Typically available in widths from 5' to 35' depending on material type. Available in various aspect ratios and materials, including concrete where cover is an issue. Walls are typically more vertical than pipe arch structures with inverts.



Schematic of an arch pipe with invert with low-flow channel

Streambed: One advantage of bottomless structures is that the streambed that is not impacted by footing installation can be left intact. This typically makes it easier to rebuild the remaining stream channel, construct bank margins, and wash in fines. Grade controls and additional streambed can often be placed inside the structure between the footers before the top is bolted or grouted in place. This can greatly reduce the time needed to reestablish the streambed.


Assembly of a 15' w x 6' h bottomless arch pipe on cast-in-place footings (Juniata).

Footings:

- **Cast-in-place footings:** Forms are framed, and concrete is poured in place. The process will require the road to be closed for a longer period of time for curing.
- **Pre-fabricated footings:** Concrete footing poured in pre-fabricated steel forms that remain in place.
- **Precast footings:** Concrete footings blocks are made off site in sections and fastened together on-site. This method can speed installation and shorten road closure time.
- **Plate Footings:** Plate footings (no concrete) can be used in conditions where soil bearing is >4000 psf and scour is minimal.


Walk-behind equipment being used to place streambed in 12' w x 6.5' h bottomless concrete box (Cumberland).

Other Details:

- Assembly options include delivery in one piece, several pieces, or assembly on site.
- Geotechnical investigation is generally needed to determine the footing depths and bearing capacity in the underlying soil.
- Make considerations for who will be doing assembly. Bolt together structures are very labor intensive.
- Headwalls and endwalls can be included with the structure.
- With no bottom, sometimes the stream can be flumed through work site instead of using a pump-around diversion.
- Consider specifying taller structures or structures with increased vertical wall heights to allow sufficient material to be placed in the structure without compromising 1.25x bankfull width.

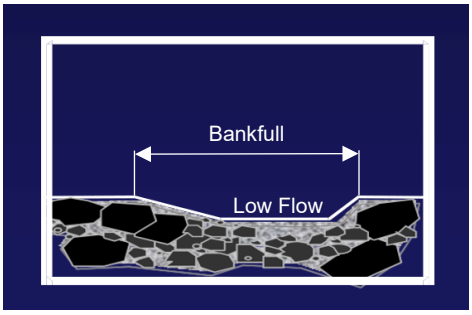

10' w x 4' h bottomless arch pipe (Jefferson).

Summary:

- **Pros:** By leaving the natural streambed intact through the structure and eliminating the potential "slip plane" created by an invert, it is much easier to maintain a natural channel and stream connectivity. Can simplify stream diversion with flume through the worksite.
- **Cons:** Compared to structures with a bottom, these are typically slightly more expensive and take slightly longer to install. Construction requirements can be intimidating to municipal road crews.

Concrete Box Culverts (with inverts)

These structures consist of a simple rectangular box made of concrete. These structures are commonly used in PA, and are sometimes the "default" structure choice of some engineers. These are the most expensive of the "non-bridge" options due to the cost of materials and the need for large equipment or a crane during installation. While they provide good longevity and strength, careful consideration is needed to grade control, substrate, and scour depth.



Schematic of a concrete box culvert.

Reminder: The DGLVR Standard:
- Requires bottomless structures if the reconstructed stream slope through the structure is over 4.0% or the bankfull width is greater than 20'.
- Defines required depth of streambed in the structure.

Assembly of a 16'w x 6' h concrete box culvert (Montgomery)

Sizes: Typically available between 8' and 20'+ in width, and are available in a wide variety configurations including full boxes and a modular systems that are split in half to aid in streambed construction.

Streambed: It can be difficult to place streambed in the structure, especially on smaller and longer structures where getting equipment into the structure is difficult. For larger structures, some material can be put in the structure while assembling the sections. Some smaller structures come with a "lid" that allows the streambed to be placed before closing the box.


Concrete box with stamped concrete headwall (CDGRS).

Other Details:

- Typically delivered in multiple pieces and assembled on site.
- Due to weight, assembly will require large equipment and larger structures may require a crane for assembly.
- Headwalls, endwalls, and wingwalls are options from many manufacturers.
- Baffles can be installed by some manufacturers to help maintain streambed material.
- Due to the large footprint of the structure, a geotechnical investigation is usually not needed.
- Minimal cover is needed over these structures because of their inherent strength. They may be a good option where cover is an issue and raising the road elevation is not an option.

Summary:

- **Pros:** Can be installed quickly and easily (with proper equipment). Can accommodate minimal cover heights. Expensive compared to other non-bridge options. Weight of structure requires large equipment for assembly. Limited to stream slopes 4.0% or less.

Bridges

Typically the best choice for larger stream systems, especially those with a bankfull width over 20'. Bridges are also recommended in streams with very large scour depths and systems with gradients of 7-8% or more. A wide variety of bridge types and options exist to fit a variety of situations.

Traditional 22' precast concrete deck bridge on poured-in-place concrete footings (TU).

Streambed: One significant advantage of bridges is that the streambed between the abutment installations remains intact. It is typically much easier to get the needed equipment and material under a bridge to establish streambed, banks and bank margins compared to other structure options.

Scour: When designed properly, these structures can accommodate streams that are steeper with larger scour depths.

Completed 32' span GRS-IBS bridge (Tioga)

Bridge Types:

- **Traditional:** Vertical abutments typically built near the 1.25x bankfull channel and extend many feet below stream bed scour depth potential. Design may even include driven pilings. Design is effective but additional footer material and time for construction is expensive.
- **GRS:** Geosynthetic Reinforced Soil bridges replace standard concrete abutments with abutments made of layers of compacted fill and geosynthetic fabric. The abutments are faced with stacked concrete blocks. While more labor intensive, GRS bridges can cost less than bridges with traditional concrete abutments. Careful consideration should be given to soil bearing capacity and scour protection.
- **Spread Footer:** Spread footer bridges utilize precast or cast in place concrete footings set back further out of the stream channel. Establishing footings far from the stream means stream disturbance is kept to a minimum and scour is usually not an issue. While these structures require a longer span than typical bridges, they can cost less than bridges with traditional abutments. Careful consideration should be given to soil bearing capacity.

Completed 50' span (~25' channel) spread footer bridge (Indiana).

Inspection Requirements:

- **Spans under 8':** No inspection requirements
- **Spans between 8' and 20':** Some local policies or ordinances require regular structure inspection.
- **Spans over 20':** Federal inspection required every two years at a cost of $2,000-$3,000. Note this applies to all structures over 20' (boxes, arch pipes, etc.), not just bridges.

Summary:

- **Pros:** Spans streambed and banks, and makes it easier to establish streambed and stream continuity through the road. Most AOP friendly design. Come in a wide variety of designs that can be customized for site conditions. Can be designed to accommodate heavy loads and work in almost any conditions.
- **Cons:** Bridges are often more expensive than most other options. Additional design and installation requirements. Potential for future maintenance for bridge owner, and bridges over 20' require federal inspection.

Figures in this document are general guidelines and vary by material and design. Always consult manufacturer for actual specifications.

Summary of Structure Characteristics

Structure Type	Pipe Arch (Squash)	Structural Plate Arch w/Invert	Bottomless Arch/Box	Concrete Box	Bridge	Round Pipe
Sizes	3 – 20’	6 - 23’	5 - 35’	8 - 20’	8’+, recommended if bankful >20’	Not recommended for use in stream channels. Round pipes over 36” not to be used in DGLVR funds. Not recommended for use in stream channels. Round pipes over 36” not to be used in DGLVR funds.
Stream Slopes	**Less than 4.0%** (DGLVR Standard)	**Less than 4.0%** (DGLVR Standard)	Can be designed for most slopes	**Less than 4.0%** (DGLVR Standard)	Can be designed for most slopes	
Cover	Can be difficult due to structure height	Often a better choice than squash pipes where cover is an issue.	Wide variety of cover requirements based on material and design.	Minimal cover required.	NA	
Cost	low	low-med	med	high	med-high	
Establishing Streambed	Difficult in smaller structures	Difficult in smaller structures	Easier, can be done before arch/box is installed	Easier, can be partially done during installation	Easiest, typically spans existing channel	
Stream Substrate Depth	24” min, more depending on scour potential (DGLVR Standard)	24” min, more depending on scour potential (DGLVR Standard)	Footing depth to be determined by Engineer	24” min, more depending on scour potential (DGLVR Standard)	NA - bottomless	
Overall	Economical choice, but typically the most difficult to establish and maintain streambed though the structure.	Good choice in lower gradient and scour channels. Often must be oversized (over 1.25 bankfull) to account for streambed material.	Often best choice for maintaining a natural streambed.	Typically expensive, but quick and require minimal cover. Establishing and keeping streambed can be difficult.	Wide range in cost and types. Best for maintaining streambed as it spans the channel.	

The publishers of this publication gratefully acknowledge the financial support of the PA State Conservation Commission. For additional information or assistance, contact: Center for Dirt & Gravel Roads Studies, Penn State University, 215 Transportation Research Building, University Park, PA 16802 (Toll-Free Phone: 1-866-668-6683, Fax: 814-863-6787, Email: dirtandgravel@psu.edu). Additional copies available on our website at: https://www.dirtandgravel.psu.edu.

Pennsylvania SCC State Conservation Commission
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Technical Bulletin

Grade Control

Center for Dirt and Gravel Road Studies

GRADE CONTROL – Grade controls are natural or manmade structures that controls channel elevation and channel slope such as logs, riffles or rock cascades. Grade controls can be used to stabilize the material in the structure, prevent head cutting, create habitat and maintain the slope and continuity of the channel. Field data collected during the longitudinal stream profile survey and additional stream stability analysis is used to inform the size, spacing, and type of grade control to be used during stream bed reconstruction.

WHY GRADE CONTROL IS IMPORTANT

Grade controls are instream structures that control channel elevation and channel slope. Typically, these structures are made of large rock or logs and simulate naturally occurring grade controls. It is important to simulate these natural grade controls through the entire reconstructed stream reach to:

- Minimize channel adjustments such as head cutting
- Maintain channel slope, elevation, and stability
- Increase flood resiliency of the crossing
- Maintain stream continuity and aquatic organism passage (AOP)
- Provide continuity of slope and reconnect the stream channel

WHEN TO USE GRADE CONTROL

Grade controls are required to be used in and around the replacement structure to stabilize the stream material and maintain channel slope and bed elevation. Additionally, stable grade controls are required to “tie-in” the reconstructed reach to the adjoining natural channel segments. Grade control structures can also be used to:

- Prevent upstream head cutting
- Provide instream aquatic habitat
- Define channel cross section and low-flow channel
- Prevent streambank erosion

TYPES OF GRADE CONTROLS

Channel slope dictates the natural bedform and type of grade controls in a stream channel. As channel slope increases (steeper channel) stream energy is dissipated through vertical drops, and the grade controls are more frequent and robust. The longitudinal profile survey completed in the reference reach of the channel will help determine the best type of grade control and spacing for your project. Grade controls structures typically used in stream crossing projects include:

- **Cross vanes (rock or log):** Are structures that extend completely across the channel and tie into the stream banks. They are used for grade control, centering flows in the thalweg and can also be used to create pool habitat if desired.
- **Constructed riffles:** Are used to set stream grade and upstream pool depth, and to stabilize the streambed through a riffle feature. These consist of a constructed riffle crest and series of ribs or sills spanning the channel width.
- **Rock clusters and cascades:** These structures are typically used in high gradient streams to set the stream channel grade and dissipate stream energy.
- **Buried rib:** These structures are typically buried at or below the stream bed and used to prevent headcutting and streambed material loss if the reconstructed channel adjusts beyond what is anticipated.
- **J-hook:** These structures extend partially into the stream channel and are used to help center the flows, provide control grade and move energy away from the bank.

Figure 1: From left to right, log cross vane with throat log, rock clusters and cascade, and constructed riffle.

For channel modifications such as grade controls outside of the 50' upstream and downstream GP-7/11 permit construction boundary additional permitting may be needed. For grade control construction that does not involve substantial channel fill or excavation (beyond that incidental to installation of grade controls), consider the use of an additional GP-1 to authorize placement of these features. For more information on types of grade controls and their uses see the PA Fish and Boat Commission document "Habitat Improvement for Trout Streams" https://www.fishandboat.com/Resource/Documents/habitat_improve_trout.pdf

DESIGN OF GRADE CONTROLS

Stable grade control features need to be appropriately sized and spaced for the prevailing stream size and slope, which is determined from the longitudinal profile survey of a reference reach (See Site Assessment Technical Bulletin and Stream Crossing Replacement Technical Manual). They must be designed and constructed to be stable at the 100-year discharge (Q100) to ensure long-term immobility and should be keyed into adjacent streambanks/bank margins. Stable grade controls are essential to minimizing scour potential, both within the replacement structure and through the adjoining project reach. Sufficient burial depth and/or placement of footer rocks must be considered to prevent the likelihood of undermining and failure. Failure of one or more grade control features through the reconstructed reach or spacing grade controls too far apart can trigger vertical adjustment of the adjoining streambed, particularly upstream (i.e., headcutting). This can create vertical obstructions to AOP at the upstream limit of the headcut and effects water quality by contributing large amounts of sediment which otherwise would not have been introduced into the system. For more information on design see the *Stream Crossing Replacement Technical Manual*.

Determine the following stream design criteria from the 'reference reach' portion of the longitudinal profile survey:

- Minimum, maximum, and typical (average) spacing of grade control features
- Typical longitudinal length of grade control features (riffle length, for example)
- Type of grade control
- Maximum and typical pool depths
- Stream slope and channel profile

The project designer or engineer must specify a channel profile and continuity slope with grade control spacing through the reconstructed reach that mimics that of the reference reach to the greatest extent possible. Specify the installation of grade control features similar in type, length, and spacing through the full length of the reconstructed reach. Typical spacing from the reference reach may need to be adjusted slightly to fit the length of the reconstructed reach. Avoid using grade control types that may induce excessive bed scour (namely drop structures) inside the structure, since this can increase risk of substrate loss through the crossing.

To meet the DGLVR Stream Crossing Design & Installation Standard (DGLVR Stream Crossing Standard), any constructed grade controls and key pieces of the substrate, including constructed bank margins within the structure, shall be designed to be stable at the Q100 discharge. In design, the engineer must use an appropriate method for calculating a stable rock size for construction of grade control features, bank margins and key pieces through the reconstructed reach, including within the replacement structure. Construction details for grade control sizing are required as part of the DGLVR Stream Crossing Standard. Stable rock size must be specified as a "minimum diameter" (such as "24-inches") instead of a gradation class (such as "R-6", for example). Additionally, quarried aggregate used for grade control must meet aggregate testing requirements outlined in the DGLVR Stream Crossing Standard.

CONSTRUCTION DESIGN DRAWINGS

The DGLVR Stream Crossing Standard requires construction plans to include *"(VI. B.7.) Locations and construction details, including rock sizing, in-stream structures, grade controls, and/or bank stabilization structures (if applicable)".* Grade control elements should be depicted in the Construction Drawings as follows:

- Detail drawings showing plan-, section- and profile views (where applicable) for all grade controls and instream structures. Notations must clearly indicate material type, size, installation slopes and overall structure length.
- Site Plan and profile drawings including locations and elevations of grade control features (at crest, thalweg, and bankfull) through the reconstructed reach. Notations must indicate whether grade control features at the "tie-in" points will be maintained (as existing) or will be constructed.

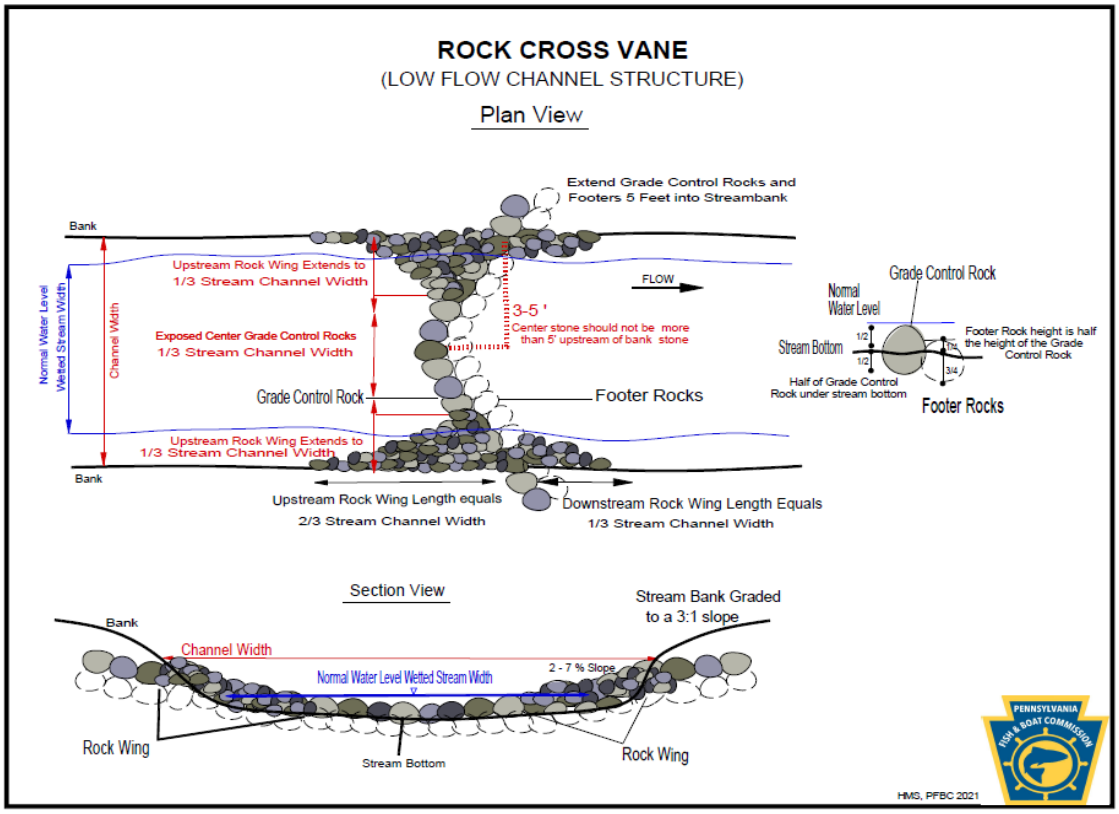

Figure 2. Example rock cross vane plan and section views standard drawing. PA Fish and Boat Commission, 2021. https://www.fishandboat.com/Resource/Documents/habitat_improve_trout.pdf

HOW TO PLACE GRADE CONTROLS

Planning is an important part of a successful grade control installation. Some questions to consider if grade control is needed within the structure are:

- Is the structure tall enough to use standard or specialized equipment to place? (Photo 1)
- Is it possible to place the grade control material while assembling the pipe? (Photo 2)

If structure height is limiting, consider renting a walk-behind skid steer. In smaller pipes, the only option may be hand placement of the larger grade control material and washing of fines between the grade controls.

Photo 1: Placing grade control material in a 15'w x 10'h pipe arch (squash pipe).

Photo 2: Placing large material during pipe assembly.

Photo 3: Grade control placed inside of a 15' wide arch pipe before placing final streambed.

Placement of Grade Controls

Consider the optimal method for placing both grade control rocks and substrate (streambed) material inside the structure. If a machine or some other mechanical method can be used to move and place material, it may be best to build the streambed and grade controls simultaneously from structure inlet to outlet. In this case, streambed material is placed until each grade control location is reached and then the grade control is installed. If material cannot be placed mechanically, consider placing grade control and key pieces within the structure first along with any larger substrate material needed to prevent scour. Whenever possible, grade control and key pieces used should be placed into a bed of smaller aggregate and not directly on the invert of the structure (Photo 3). Additionally, when placing material use caution not to damage the structure bottom with machine tracks or buckets. Inside the structure, grade controls should extend all the way to the edges of the structure and tie in with the bank margins. Outside of the structure, grade controls should be keyed into the banks for stability at high flows.

Except for the j-hook, the structures described in this document should span the entire bankfull width channel. The constructed grade control should mimic the channel cross sectional shape from the reference reach as best as possible (figure 2). This should include a low flow channel with a bottom elevation that matches the stream bed elevation from the construction plans.

After placement of the grade controls, the designed smaller substrate matrix should be placed in lifts to bring the streambed up to the designed elevation and slope. In most stream settings the streambed material will consist of a well-graded aggregate of very fine, fine and coarse bed material that provides for both sediment transport and bed resiliency. For more information on design and placement of streambed materials refer to the Streambed Restoration Technical Bulletin and *Stream Crossing Replacement Technical Manual*.

Aspects of construction to be inspected by the engineer must include the installation of grade control structures and bank margins. This inspection must confirm and document that grade control features and bank margins are constructed of the stable minimum rock size, and that thalweg elevations, locations, slopes and lengths specified in the Construction Documents and Detail Drawings are met.

Technical Bulletin

Streambed Restoration

Center for Dirt and Gravel Road Studies

RESTORING NATURAL STREAMBED MATERIAL – Restoring the natural streambed material through a stream crossing replacement is a critical component of a successful project. Natural streambed material is the substrate that makes up the stream channel bottom. Field observations, longitudinal stream profile survey, grade control features and shear stress calculations within the identified survey reach can all be used to inform decision making on depth and sizing of material.

WHY STREAMBED MATERIAL IS IMPORTANT

It is important to simulate the natural streambed through the reconstructed crossing to:

- Control permeability to prevent the streamflow from going sub-surface
- Provide continuity of slope and reconnect the stream channel
- Provide grade control
- Create varied velocities across the cross-section of the stream
- Dissipate energy and prevent excessive scour and material loss in the structure.
- Increase the lifespan of the structure

Maintaining streambed material in the structure is the only way to accomplish full Aquatic Organism Passage (AOP).

Figure 1: Streambed material is made up of surface and subsurface layers. The surface layer is typically coarser than the subsurface layer because of the scour of fines between the larger particles. The subsurface layer is finer than the surface layer because fines are present in the voids between the larger particles.

LOW FLOW CHANNEL AND BANK MARGINS

When reconstructing the streambed through the replacement structure, it is critical to build a low flow channel, bankfull channel, and bank margins (Figure 2). The cross section of the reconnected channel shall be designed to replicate the channel cross section shape that was collected during the site assessment (See Site Assessment Bulletin and Stream Crossing Replacement Technical Manual). A low flow and bankfull channel plus bank margins:

- reconnect the constructed channel to the existing channel
- allow for natural sediment movement
- ensures that AOP is possible through a range of flows and velocities

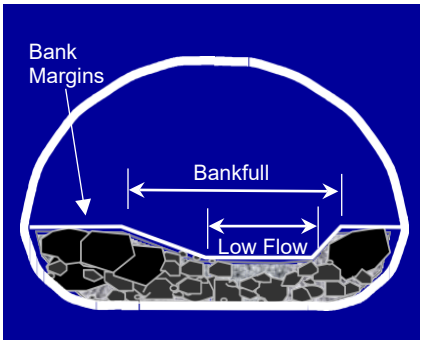

Figure 2. Schematic of a pipe arch with low-flow channel, bankfull channel and bank margins.

It is easier to establish bank margins and low flow channels in structures that are larger than bankfull. If a low flow channel and bank margins are not established, it will increase the chance of sediment deposition within the structure due to a wide flat channel (Figure 3). If the channel inside the structure is wider than the natural streambed, then the stream will lose velocity inside the structure and its ability to transport the sediment through the crossing will decrease. The resulting sediment deposition can force water to the sides and increase velocities at the edge of the structure. The increased velocities encourage scouring in the structure, can jeopardize footers, and ultimately impact structural integrity.

Figure 3: The photo on the left shows a properly constructed streambed with a low flow and bankfull channel, along with bank margins. The photo on the right shows a structure did not have a properly constructed channel and the resulting sediment deposition at the inlet forcing the flow to the side of the structure.

DESIGN AND CONTRACT CONSIDERATIONS FOR STREAMBED MATERIAL

- The DGLVR Stream Crossing Design & Installation Standard requires construction plans to include *"(VI. B.8.) Depth, gradation, and composition of material for streambed restoration".* Elements that must be depicted in the Construction Drawings include the streambed material thickness, and inlet and outlet bed elevations. The material gradation and composition must be noted, and if the native material onsite will be reused or if material will need to be imported. Drawings must include gradation, composition, and construction details for the low-flow channel, bankfull channel and the bank margins.

- Minimum stream substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footers) is to be based on the maximum pool depth in the reference reach with a minimum safety factor multiplier as listed in Table 1. Alternatively, minimum bury depth can be determined using industry accepted scour analysis and modeling tools for stream system analysis and/or bridges (storm sewer models are not acceptable for stream crossing scour analysis)

- The minimum substrate depth required shall be 24-inches or depth determined with scour analysis models or using the Anticipated Scour Depth, whichever is greater.

Table 1: Pool Depth Safety Factor Multiplier to establish Anticipated Scour Depth

Stream Slope	Pool Depth Multiplier
0% - 2.0%	1.5
2.1% - 4.0%	2.0
> 4.0%	2.5

- Structures installed on stream slopes >4.0% must be bottomless. The 2.5 safety factor multiplier is to establish the recommended minimum bottom of footing buried depth. Final footing buried depth is to be determined by the Engineer in project design.

- The cross-sectional survey shall inform dimensions of features such as the low-flow channel, bankfull width, and bank margins to be used when reconstructing the channel through and around the new structure.

- The size of bed material and key grade control pieces will inform how wide bank margins need to be. At a minimum, the new structure must be 125% of bankfull width of the stream at the bankfull elevation. This allows space for proper construction of the low-flow channel, bankfull channel and bank margins within it. (See Structure Selection Technical Bulletin and Stream Crossing Replacement Manual)

- To meet DGLVR Policy and Stream Crossing Design & Installation Standard, grade controls and key pieces, including bank margins within the structure, shall be designed to be stable at the 100-year discharge (Q100). In design, the planner or engineer must use a suitable method for calculating a stable rock size to specify for construction of grade control features through the reconstructed reach, including within the replacement structure.

- Apart from sand- and silt-bed streams, natural streambeds typically consist of a well-graded substrate with a wide range of particle sizes. Among other functions, coarser (larger) particles provide roughness, and grade control, while finer particles contribute to compaction of the bed. This mix of particle sizes should replicate the natural stream bed and is critical to managing flood velocities and creating aquatic organism habitat. When specifying a bed material gradation, consider a mix that provides this natural range of small and larger particles to best mimic natural channel performance. For additional streambed material design guidance see the *Stream Crossing Replacement Technical Manual.*

- During development of a grant application careful consideration should be given to additional labor requirements and specialized equipment needs to place material within the proposed structure, such as mini excavators or walk behind skid steers (Photos 1 and 2). If needed, a budget line item in the grant application should be provided to address these specialized equipment needs.

- It is also important to consider the extent of stream channel modifications or reconstruction required up and down gradient of the proposed replacement structure to reconnect the stream channel. This is determined by looking at a longitudinal profile to tie the proposed project into existing or constructed grade control features and ensure proper stream slope through the structure. If this work is performed outside of the stream crossing permit boundary, off right-of-way permission must be obtained from the landowner in accordance with SCC policy, and additional permitting may be required.

- During the planning and design phase, identify the potential methods for placement and compaction of streambed material including the appropriate water source for washing fines into the structure (See “Placement and Washing of Fine Material” below). Account for this construction activity in the grant application budget, Erosion and Sediment Control Plan (including a plan for stream diversion during construction and washing) and all subsequent plans and bidding documents.

- Once contracted, details pertaining to the grade control sizing, streambed mix design, and suggested methods of construction should be incorporated within the permit application and construction drawings. This information also needs to be detailed in the bid or contract documents as well.

- When installing structure without inverts (bottomless structures), it is critical to only disturb the part of the stream channel that is necessary to set and properly backfill the footers. The considerations described above, including minimum substrate depth, and the material placement process described below are applicable to structures with or without inverts.

STREAMBED MATERIAL AND PLACEMENT

Planning is an important part of a successful streambed restoration. Some questions to consider are:

- Is the structure tall enough to use standard or specialized equipment to place stream bed material? (Photos 1, 2)
- Is it possible to place material while assembling the pipe? (Photo 3)

If structure height is limiting, consider renting a walk-behind skid steer. In smaller pipes, the only option may be hand placement of the larger material and washing of fines.

Specification of a stable substrate matrix through the reconstructed reach should consider the natural tendency of streams to mobilize and transport bedload as well as the need to maintain material in the structure over the long-term. Streambed reconstruction should include a mobile component as well as a larger component more capable of withstanding the anticipated range of flows over the lifespan of the new crossing. Fine materials (such as native streambed material excavated from the project site) can be added to provide compaction of void spaces in the larger rock and supplement the mobile surface layer of the finished streambed. Robust key pieces and/or grade controls sized for Q100 establish and maintain the finished streambed elevation, slope, and spacing of bed features through the reconstructed stream reach. The designer must develop a specified substrate mix that adequately reflects these components. In most stream settings, a well-graded aggregate of very fine, fine and coarse bed material provides for both sediment transport and bed resiliency. These are augmented with placement of larger key pieces and grade controls at locations informed by the longitudinal profile. Refer to the *Stream Crossing Replacement Technical Manual* for recommended methods for streambed substrate design.

Photo 1: Placing larger material in a 15'w x 10'h pipe arch (squash pipe).


Photo 2: Placing fine material in a 8'w x 6'h bottomless arch with a walk behind skid steer.

<u>Placement of Grade Control and Key Pieces:</u>

Often, the first step is placement of the large rock used as grade control and key pieces within the structure that will be stable at Q100 (Figure 4). In some cases, it may be best to build the streambed and grade controls simultaneously from structure inlet to outlet. In this case, streambed material and key pieces are placed until each grade control location is reached and then the grade control is installed (Figure 5). All large material should be placed on a small amount of finer stream bed material to prevent damage to the structure invert during placement. Typically, the key pieces and grade control material should be larger than any visible native material to ensure stability under sheer stresses found at the maximum hydraulic capacity of the structure (Photo 4). (See Grade Control Technical Bulletin)


Photo 3: Placing fine material inside a bottomless concrete culvert with walk behind skid steer.


Photo 4: Large material placed in a 12'w x 6'h arch pipe before placing streambed.

<u>Placement of Bed Material:</u>

Streambed reconstruction should include a mobile component as well as a larger substrate that is stable at higher flows but not expected to be stable at Q100. In most stream settings, this is a well-graded mixture of very fine, fine and coarse bed material that provides sediment transport and bed resiliency. Although substrate mix design will be site specific a three-part mix can be used as a framework suitable substrate for the reconstructed reach. An example would be a mix of R4 rock, 2A or 2RC stone with fines and native material if deemed acceptable by the onsite construction supervisor or engineer. Refer to the *Stream Crossing Replacement Technical Manual* for recommended methods for streambed substrate design. This aggregate should be mixed, in equal parts, from stockpiles prior to being placed in the culvert or stream channel (Photo 5). In areas that require significant depth of fill, such as the outlet scour pool or streams with large scour potential, place the streambed material in lifts of approximately one foot. After placement, thoroughly compact mechanically and hydraulically in place

before starting the next lift (Photo 4). Mechanical compaction can be achieved with equipment such as a jumping jack tamper, vibratory plate compactor or even the weight of machinery used to place the material such as a walk behind skid steer. If the structure is too small for machinery the fine material should still be hydraulically washed between lifts.

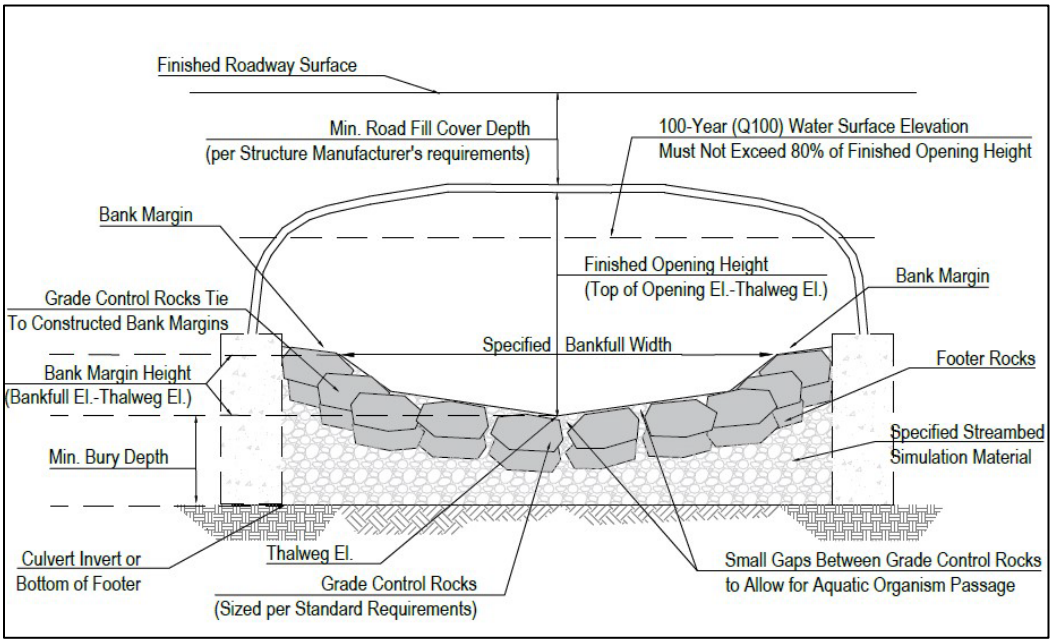

Figure 4. A typical cross section **at a grade control** showing channel shape through a culvert. The bottom line represents invert or recommended top of footing depth. The dashed line shows the water surface elevation of the 100-year discharge.

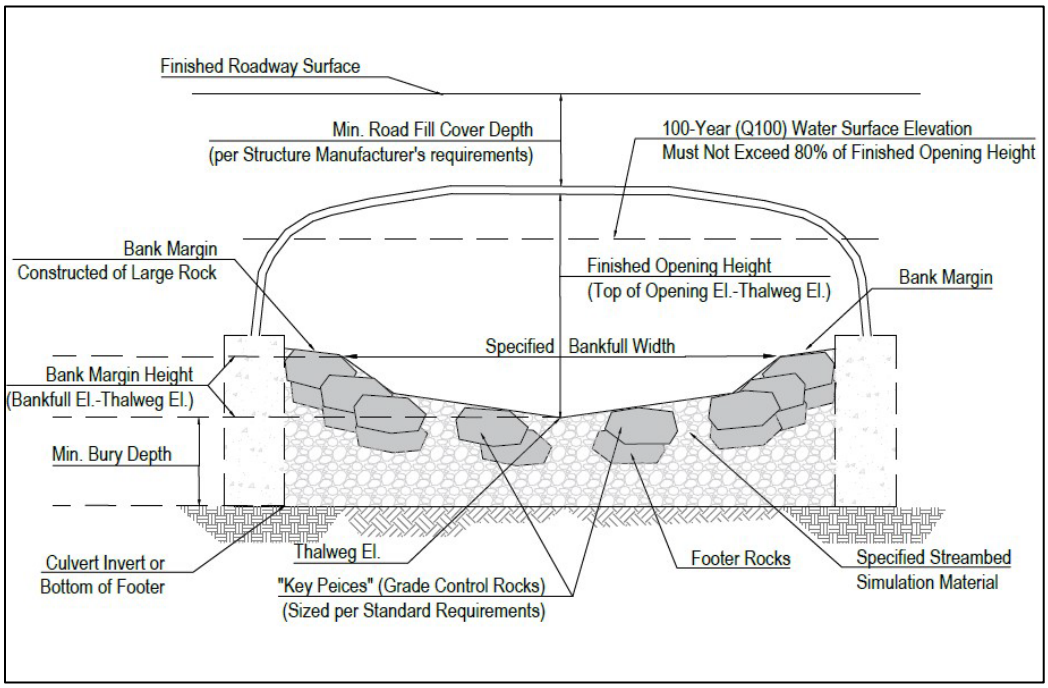

Figure 5: A typical cross section **between grade controls** showing channel shape through a culvert. The bottom line represents invert or recommended top of footing depth. The dashed line shows the water surface elevation of the 100-year discharge.

Placement and Washing of Fine Material:

Washing the fines is a critical part of rebuilding the streambed properly during a culvert replacement. Fine material such as native stream bed material or similar quarried material with adequate fines (ex. 2RC) is placed on top of the larger material and compacted mechanically or hydraulically as described above to force fine sediments into the voids between larger particles. If not done properly, water will go subsurface and you will lose the ability to successfully reconnect aquatic organism passage. It is also important to consider and specify Erosion and Sedimentation requirements for washing materials in the plans.

Photo 5: Mixing native material and larger foundational stone prior to placement.

If significant depth of fill is required, place the large material and fines in lifts of approximately one foot and compact as described previously. If machinery cannot be used, it is typically easier to wash material in from the inlet of the structure (Figure 4). On longer crossings it might be necessary to wash from both the inlet and outlet. To begin washing, have the excavator place a bucket or two of fines at the inlet/outlet and wash the material into the structure until the fines are gone. Place a couple more buckets of material at the inlet/outlet and repeat as many times as needed. The best way to determine if the fines have filled the void spaces is when the water stays on top of the newly constructed stream bed and does not go subsurface.

The amount of water needed to properly wash the fines will vary from site to site. There are several variables that dictate the amount of water needed: size of stream crossing (length & width), composition of fines, quantities (tons/yards) of fines, and the number of lifts needed. During the planning phase it is critical determine if an adequate water supply and pump capacity exists onsite, or if you will need a local water truck or fire company to supply the water. A tanker truck of 1,500 gallons or more from the local fire department is a great way to wash fines (Figure 4). If using the local fire company, plan accordingly as they may not be able to provide a water truck during normal business hours if they are a volunteer service and they may be called away from the job site for emergency calls. Typically, a 3-inch pump with a fire nozzle or straight stream nozzle work well in most applications. If the stream is large enough to supply the water, a 6-inch pump is preferred because of the large volume of water they can provide. However, a 6-inch pump line can be extremely difficult to handle. There is a delicate balance between having enough pressure and volume of water. When in doubt go with the pump that moves the greatest volume of water.

Figure 4: The photo on the left shows washing of fine material into a 6'w x 4'h pipe arch (squash pipe) using a fire truck. The photo on the right shows the washing process between tanker loads and view of a baffle grade control.

The publishers of this publication gratefully acknowledge the financial support of the PA State Conservation Commission. For additional information or assistance, contact: Center for Dirt & Gravel Roads Studies, Penn State University, 215 Transportation Research Building, University Park, PA 16802 (Toll-Free Phone: 1-866-668-6683, Fax: 814-863-6787, Email: dirtandgravel@psu.edu). Additional copies available on our website at: https://www.dirtandgravel.psu.edu.

Pennsylvania SCC State Conservation Commission
PennState Center for Dirt and Gravel Road Studies

April 27, 2022

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Pennsylvania Association of Conservation Districts
5925 Stevenson Ave, Suite A
Harrisburg, PA 17112

RE: Stream Crossing Replacement Policy, Standard, and Technical Manual Comments

Dear Brenda,

Thank you for submitting comments on the proposed updates to the Dirt, Gravel, and Low-Volume Road Program (DGLVR Program or Program) Stream Crossing Structural Replacement Policy (policy), Stream Crossing Design & Installation Standard (standard), and Stream Crossing Replacement Technical Manual (technical manual). This comment response has been prepared jointly by the State Conservation Commission (Commission or SCC) and the Penn State University Center for Dirt and Gravel Road Studies (Center or CDGRS). **Please note that when "Commission" or "SCC" is used in this document, it is referring to the thoughts and responses of SCC staff, not members of the Commission itself**.

We understand that the Pennsylvania Association of Conservation Districts (PACD) shared combined comments from 18 county conservation districts. Please also note that the Center received comments directly from 20 conservation districts, including 13 of the same districts that submitted comments to PACD plus 7 additional districts. Commission and Center staff contacted counties that we received responses from to directly discuss their comments in person and will provide a separate response document to these individual comments. We understand that some counties that submitted comments to PACD wished to remain anonymous and we will address the concerns in your letter with the understanding that all conservation districts will be able to view this response.

We would like to provide one point of clarification up front. You indicated that you wanted to provide a compilation of comments on the dirt and gravel/low volume roads ***stream bank*** program standard, policy, and technical manual. The proposed policy, standard, and technical manual apply to ***stream crossing replacement projects*** only. Bank stabilization, slide repair, and other Environmentally Sensitive Road Maintenance (ESM) practices could be applied to stream banks, but they are not a part of the proposed new policy, standard, or technical manual.

To keep responses in order and ensure everything is addressed, PACD's letter has been broken into 21 individual comments by topic and are addressed with individual responses below.

PACD Comment 1: *The program overall is working, and we would request that the SCC not approve any additional policies that compromise the success of the program. Most districts believe the SCC should not adopt this proposed stream crossing policy, standard, and manual as it contradicts the originally intended purpose of the program.*

SCC/CDGRS Response 1: We would agree that the program overall is working well. The SCC visits each county once every three years to perform Quality Assurance/Quality Control (QAQC) visits. The overwhelming majority of the counties meet or exceed expectations for fiscal accountability, program administration, and project implementation. It is very rare for a QAQC report to show that

a county does not meet the expectations of the Program. Since 2015, 147 QAQC reviews out of 153 were rated as meeting, exceeding expectations, or exceptional overall. Over the past several years, the QAQCs, along with technical assistance and help requests, have shown that the main area of the Program where improvements can be made is in regard to stream crossing replacements. In 2021, 20 of the 22 QAQC reports completed included recommendations to improve future stream crossing replacements. The intent of the proposed stream crossing changes is to address shortcomings identified in stream crossing replacement projects, while not changing the "success of the Program" in addressing road drainage, base, and surface issues.

The statement that "most districts believe…contradicts the originally intended purpose of the program" is not accurate. We received comments from 22 Conservation Districts, and only three of them expressed concern about a conflict with the Program's purpose, with three more concerned about the loss of local control. There are districts that are opposed to these changes, but there are also districts supportive of them, but most districts fall somewhere in the middle with concerns about particular topics. In addition, 41 districts did not feel the need to comment. See our response to PACD Comment 3 for additional explanation about how stream crossing replacements fit into the DGLVR Program's purpose. We received over 450 individual comments and some very good suggestions. We took these comments back to the DGLVR Policy and Planning Workgroup, which includes representatives from over a dozen conservation districts, to discuss potential revisions, and several changes were made based on district comments.

PACD Comment 2: *The significant concern is that continued and frequent additions to the Policy Manual is making it more cumbersome and difficult for districts to administer. Section 9106 of the PA Motor Vehicle Code (DGLVR provisions) indicates the program should be administered with the "adoption of procedures that assure a minimal amount of procedural paperwork". The current proposal does not comply with the section referenced above. The current DGLVR policy manual (July 2020) is 130 pages in length. The proposed stream crossing information is well over 100 pages, thus nearly doubling the amount of procedural program requirements districts must navigate.*

SCC/CDGRS Response 2: The DGLVR Program has a goal of reviewing and updating guidance documents at least once every two years, and the current Administrative Manual (Admin Manual) is dated July of 2020. This is consistent with other SCC programs. Staff does monitor the Admin Manual frequently to make sure all policies are current and up to date. Changes to the Admin Manual are done in consultation with the DGLVR Policy and Planning Workgroup and with a comment period for all conservation districts to provide input. Any time changes are approved by the Commission, training is provided in the form of webinars and in person/hybrid administrative training. SCC staff feels that this approach is preferable to manuals that are left to become outdated with less frequent updates.

In Section 9106 of PA Motor Vehicle Code, the line "adoption of procedures that assure a minimal amount of procedural paperwork" that is referenced in your comment is contained in 9106(F)(3), which details duties of the Quality Assurance Board at the county level intended to guide local road-owning applicants. We agree that the process should be kept as simple as possible for the grant recipients. Section 9106 (D) pertains to the State Conservation Commission's administration of the Program, specifically, that the "SCC shall adopt performance standards". The SCC has adopted standards for Driving Surface Aggregate, for full-depth reclamation, and now proposes the Stream Crossing Design & Installation Standard. This is all consistent with the SCC duties outlined in 9106 (D).

The statement about "nearly doubling the amount of procedural program requirements districts must navigate" is inaccurate. The proposed policy changes will increase section 7.1 of the Administrative Manual from three pages to six pages, and the new standard is eight pages in length. Please note that any required DGLVR Program changes are contained within these 14 pages. The

Stream Crossing Replacement Technical Manual (technical manual) is a separate document. The technical manual does not include any additional policy or standard requirements, but only serves as a reference providing guidance for meeting the DGLVR Program requirements listed in the policy and standard documents. Please let us know if you have found "requirements" in the manual that do not exist in the standard or policy so we can make corrections. This manual was developed in response to the districts' request for more guidance for stream crossing projects. It follows along the lines of other DGLVR guidance and reference material that currently exists such as the Driving Surface Aggregate Handbook, Product Approval Instructions, and numerous technical bulletins and other resources.

PACD Comment 3: *Simply put, many districts believe the proposed policy manual changes signify a diversion from the foundation of the program, where funding was being provided to get good projects on the ground that benefit both the environment and local roads at a relatively low effort and minimal red tape, which make this program so appealing to municipalities. Districts do not want the new policy to turn the program into a bridging program that is focusing on the stream repair rather than putting the townships first and helping them maintain their roads for an overall pollution reduction. Rather than re-inventing the policy, districts recommend the Center look at editing the current application process.*

SCC/CDGRS Response 3: One of the main goals of the DGLVR Program is to reduce sedimentation in streams from roads (9106(A)). This is accomplished by providing education and funding to public road owners. Stabilizing road erosion costs more in up-front construction costs but reduces long term road maintenance costs and environmental costs of sediment pollution from roads. This is true of all ESM practices, including stream crossing replacements that achieve stream continuity. The comment is correct that the DGLVR Program focuses on making the Program accessible to road owners through simple and minimal paperwork when possible. To date, the vast majority of completed stream crossing replacement projects do much to benefit local roads but fall short of meeting the Program's environmental goals.

The comment also correctly identifies that stream crossing replacements are very different from "traditional" DGLVR Projects, which typically include improved road drainage, road base corrections, and resurfacing. These practices correct erosion issues through building better roads. However, stream crossing replacements are inherently more complex because they involve stream reconstruction in addition to road construction. For a stream crossing replacement to achieve the long-term reduction in maintenance and erosion that the DGLVR Program aims for, the stream channel that was destabilized and eroding due to the undersized structure must be stabilized. Simply replacing the undersized structure with a larger one within the footprint of the roadway does not undo the on-going erosion potential of the adjacent stream course created by the undersized crossing. The comment implies an increase in "red tape". Stream crossing projects, by their nature, will come with more "red tape" than most other projects will encounter because of the in-stream work. Permitting, usually a Chapter 105 GP-7 or GP-11, requires that an engineer is involved in the design and permitting of the structure. These projects can also require wetland delineation, PNDI searches, and possibly historical searches.

The proposed documents are intended to provide needed guidance to districts, engineers, and applicants to outline Program expectations and effectively implement successful projects. **While any district who feels they can adequately manage stream crossing projects is welcome to do so, no district is required to fund stream crossing replacements. This is a decision that can be made at the local level.** If project size, complexity, engineering, and "red tape" are a concern, districts and grant applicants can choose to focus on environmentally sensitive maintenance practices that require minimal or no engineering or permitting. These may include road fill, French mattresses, sub surface drainage, driving surface aggregate, cross pipes, broad based dips, and

more. Projects such as these often proceed more quickly from an application to a contract to a finished project. These practices are all still available and we encourage all districts to use these practices where applicable. Stream crossing structural replacements, like all ESM practices eligible for DGLVR funding, are expected to follow the DGLVR Program policy and standards that are current at the time the contract is signed.

PACD Comment 4: *Districts and municipalities have continued to improve their installation of stream crossings, in-part due to the education and training provided by PSU and SCC. Prior to 2014 there were nearly no program requirements regarding stream crossings. The November 2014 policy manual was the first significant introduction of requirements. Since that time districts have become more knowledgeable and improved the development and implementation of these crossings.*

SCC/CDGRS Response 4: Prior to 2014, the SCC portion of the DGLVR Program received $4 million annually. Under this limited funding, the average CD allocation was $65,000 and many districts received the minimum allocation of $20,000. The number of stream crossing replacements completed prior to 2015 was minimal as a function of limited funding. Since the Program funding increase in 2014 and the corresponding increased interest in funding stream crossing replacements, everyone, including SCC and CDGRS staff, has learned a great deal about the process. We agree that conservation districts have become more knowledgeable about the process and should be commended for their efforts. The proposed updates and documents attempt to fill a gap in policy and guidance that has been identified in recent years and to further support conservation districts' continued growth in the implementation of these crossings. Refer to SCC/CDGRS Response 1 for additional explanation about the gap in DGLVR policy and guidance for stream crossing replacements.

PACD Comment 5: *If this new policy is adopted, the momentum gained over the past seven years is likely to cease. A manual that far exceeds any other resource agencies and is not practical to implement. The proposed changes will greatly reduce the number of stream crossings the program installs and leave the district technical assistance out of the equation as municipalities install their own crossings (their own way). The fear is that the requirements in the proposed manual will deter municipalities from participating in DGLVR projects at all, or at the very least that they will not design or implement any streambank crossings because of the complexity and cost of the project. The beauty of this program has been its common-sense, cost-effective approach, which will be lost if the manual is implemented.*

SCC/CDGRS Response 5: As detailed in SCC/CDGRS Response 3, stream crossings are inherently more complex than other environmentally sensitive maintenance practices utilized in DGLVR projects. While typical DGLVR stream crossing replacements in recent years improve road infrastructure and increase flood resiliency, it has become clear that they do not achieve the long-term stream continuity and stability needed to achieve the DGLVR Program's environmental goals (see SCC/CDGRS Responses 1 and 3). When the Program funds "traditional projects" such as fill, DSA, cross pipes, etc., the projects can be easily fixed or adjusted if issues were to occur. For example: if DSA ruts, it can be regraded; if ditches erode, additional cross pipes can be added. In contrast, in addition to being more expensive, many of the stream crossing structures being installed by the Program are designed with intended lifespans of 50-75 years or more. We have seen many structures with bottoms or inverts that are quickly exposed during the first high flow, leading to a significantly reduced lifespan for the structure since the bottom will be damaged by sediment and debris during every subsequent high flow event. Additionally, in many of these situations where material is not retained within the structure, upstream headcut advancement can actually worsen erosion of the streambed and banks for hundreds of feet upstream of the replaced crossing.

The assumption that these changes may initially deter some municipalities from applying for DGLVR funds for stream crossing replacements may be correct. However, the goal of these changes is to increase the number of projects the Program funds that meet Program expectations for erosion

and sedimentation reduction, connectivity, capacity, and longevity. While this may lead to an overall reduction in the amount of stream crossing replacements completed, it is more important for DGLVR funding to install quality projects that meet Program goals than to install a greater number of projects that do not meet Program goals. Most conservation districts are currently only funding one or two replacements annually. Since this represents a small fraction of stream crossings that are replaced annually with other funds, DGLVR projects should serve as model projects for improving stream crossing replacements. While DGLVR-funded stream crossings replacements may slow down in response to the updates, these documents are meant to carry forward the momentum of building better roads and cleaner streams by correcting issues identified in DGLVR stream crossing replacements. Also, as outlined in SCC/DGLVR Response 3, districts may choose not to fund stream crossings or to limit the number of stream crossing projects funded in favor of "traditional" drainage projects.

PACD Comment 6: *With every rendition of a new policy manual, districts continue to lose control. The proposed stream crossing standard, policy, and manual continue with that theme. Historically, the program worked because of its simplicity. Districts worked in conjunction with PSU. PSU provided technical direction for districts who were in need of their expertise. For the most part, SCC's role with the program remained an administrative as needed basis. The SCC ensured policy was being followed through routine QAQCs. It seems that simplicity is lost with this stream proposal. PSU is not mentioned at all in the standard and policy. They no longer are able to assist districts with common sense Best Management Practices regarding streams. Instead, the SCC has taken the role of administration and technical assistance. The proposed policy states "Conservation Districts are required to notify the SCC of proposed stream crossing replacements as soon as practical….". For 66 Districts to work with 83,000 miles of streams throughout the Commonwealth, districts find it impractical to have to funnel nearly every decision related to stream crossings through two SCC staff members. This again contradicts the DGLVR law that "enables local officials to establish fiscal and environmental controls."*

SCC/CDGRS Response 6: As detailed in SCC/CDGRS Response 3, stream crossings are inherently more complex than historical DGLVR projects and it remains a local decision for conservation districts to choose whether to fund stream crossing projects. The proposed changes do not impact "standard" Program projects involving road drainage, base, and surface improvements, and these practices are still encouraged.

The assumption that "[the Center is] no longer able to assist districts with common sense Best Management Practices regarding streams" is inaccurate. The SCC provides funding for the Center for Dirt and Gravel Road Studies to provide education, outreach, and technical assistance for all DGLVR participants and projects, including stream crossings. The Stream Crossing Structural Replacements policy is a small part of the Program's Administrative Manual. The Admin Manual also details the Center's structure, role, and availability for technical assistance. In reviewing ~450 comments from 22 districts, there were no comments asking for the Center to be named in the standard or policy. In fact, eight districts expressed comments about needing additional Center time and assistance moving forward. The standard and technical manual were reviewed and commented on by the DGLVR Policy and Planning Workgroup, which includes Center staff, and was written in large part by Center staff. The SCC also continues to provide funding for Trout Unlimited (TU) employees to provide additional technical assistance to DGLVR stream crossing replacement projects.

The requirement for districts is to notify the SCC in advance of contracting for stream crossing replacements, is not new. It was enacted with the last round of policy revisions in July of 2020. The notification does not require the districts to "funnel nearly every decision related to stream crossings through two SCC staff members". The requirement, now and proposed, is for notification, not approval. The notification allows the SCC, Center, and TU staff to make technical assistance available as needed in a timely fashion. SCC, Center, and TU staff will periodically review the stream crossing notifications as a team. Districts have an opportunity to request technical assistance as they complete the notifications. As the team reviews the notifications, much

discussion centers on how to best provide coordinated assistance to assure projects can be completed successfully.

PACD Comment 7: *Clearly the implementation of this proposed standard, policy, and manual will require significant education/training on every level. If the SCC adopts this policy, the districts would like training and funding to cover costs that are directly related to the education/training required within the proposed stream documents. In addition, education/training costs should also be permitted throughout the project's duration, not just prior to contracting to promote consistency across the state. The manual requires the districts to educate/train through the stream crossing installation process and the disricts should be reimbursed.*

SCC/CDGRS Response 7: We agree that a significant education and training effort will be required to implement these changes. Planning is underway to implement the initial round of these training in 2022. The Center is working closely with the SCC and has begun discussion with a subcommittee of the DGLVR "Education and Outreach" advisory workgroup on training details. Initial plans are for a multi-day training involving both remote class sessions and in-person field work on a regional basis. Please note that in the draft policy (section 7.1.2.5), there is a proposed training requirement for district staff. We agree that districts should be reimbursed for expenses related to education and training. The Program provides funding for staff in several ways:

- A district may use up to 10% of their annual allocation for administrative expenses. As outlined in 3.4.2 of the Administrative Manual: "The primary purpose of administrative funds is to assure adequate funding for technical staff who work on the Program."
- A district may use up to 10% of their allocation for education expenses. In 3.4.3, the Administrative Manual states: "The primary purpose of education funds is to allow the district to attend trainings and events for their own education, and to provide training and events for potential program participants."

Over the past 5 years, districts have been using approximately 7.5% of their allocation for administrative expenses and 3.2% of their allocation for education expenses. With a limit of 10% for both of these categories, many districts can increase staff time spent on their DGLVR Program with the funding already available to them. DGLVR Program policy, current or proposed, does not limit the use of education funding "prior to contracting".

PACD Comment 8: *Districts believe that the stream crossing documents be a guidance, not policy. Over the next two (minimum) construction seasons, districts request that the SCC and PSU implement this proposed manual to create some example sites. Once this guidance manual is implemented, many of the questions can be answered, and then at that time the manual will be better aligned to become policy.*

SCC/CDGRS Response 8: We understand the hesitancy of some districts given the significant changes being proposed. Note, though, that with ~100 stream crossing projects funded annually over the last few years, we have a large amount of example sites, both good and bad, that we have learned from. The lessons learned from those sites have driven many of the proposed changes. If the process is to be "slowed down" or phased in, the SCC may have to consider some other mechanism to reduce the number of stream crossings replaced during that period that do not meet Program goals. Continuing to allow stream crossing replacements that do not achieve Program goals for the next two or more years is not a viable option. See our response to PACD Comments 1 and 3 for additional information about stream crossings that meet DGLVR Program goals.

Some conservation districts across the state may be considered "early adopters" of the proposed requirements and guidance. They have already adopted these principles and can show how these projects have been done with great success. A recorded webinar from 2/11/2021 is available on the Center's website that outlines the issue with many projects completed over the last several years (https://www.dirtandgravel.psu.edu/education-and-training/webinars/past-webinars).

The SCC and Center would be willing to take PACD staff in the field to tour and discuss successful projects and areas for improvement.

PACD Comment 9: *Engineering costs are a universal concern among conservation districts with the implementation of the proposal manual. Districts believe the limit should be increased to 15%. Additionally, bidding for engineering is unrealistic in rural areas, as there are limited engineering options. Even at 15%, that will not even come close to the costs of engineering with all of the additional requirements. Some of the requirements make sense, but project costs will increase dramatically with the increased engineer responsibilities. Looking at the fund spending timeframe, the permit timeframe, and time bidding the project itself, bidding engineering also is another time constraining burden on a construction timeline.*

SCC/CDGRS Response 9: The proposed changes include more engineering involvement, which we know is a concern for some districts. Under the current policy, engineers are generally involved in the design for the purpose of obtaining a Chapter 105 general permit. After permitting, the design engineer is rarely on-site for oversight, certifications, or inspections. It is often left to the conservation district and grant recipient to conduct the final project inspection. This current procedure could potentially leave the districts open to liability due to the lack of involvement from the engineer.

The proposed new standard requires the design engineer certify that the project was inspected at critical stages, and that the finished project was installed to the engineer's design. It is beneficial to public safety and reduces conservation district liability to have an engineer certify that their design was installed correctly. **Conservation districts are concerned about liability, and this added requirement for engineering involvement is a big step to help reduce that issue.**

No standard currently exists for engineers to follow when designing DGLVR Projects. This often leads to inadequate project designs, permitting issues, and requiring project re-designs or change orders during construction. Establishing a Program standard for stream crossing replacements will ensure that designers have a common baseline of requirements for designing DGLVR projects. Having an established standard and requiring additional engineer involvement should help reduce costly change orders and overruns. In other areas of the country where similar requirements have been implemented, they have seen an initial significant increase in engineering costs, followed by a gradual reduction in costs after two years attributed to "engineering firms becoming more familiar with how to handle these projects" (Mass., 2015.)

We understand districts are concerned about increased engineering costs and request additional funding be made available for engineers. We agree that this is a legitimate concern, and we have revisited the proposed policy to increase engineering allowances. The idea of requiring engineering quotes was a way to provide additional funding for engineers while at the same time providing a method of cost containment. Many grant recipients use the Program's example Request for Proposals to request bids for engineering for a DGLVR stream crossing replacement. In an example of the varying prices of engineering, in one case quotes were submitted by three engineering firms at $19,000, $39,000, and $56,000 for the same project. This clearly demonstrates the benefit of taking quotes from multiple engineering firms. **Based on comments received, requiring bidding for engineering is clearly not a popular idea among conservation districts. SCC and Center staff worked with advisory workgroups to develop an alternative plan that encourages but does not require bidding.**

Reference:

(Mass., 2015) Massachusetts Department of Fish and Game Division of Ecological Restoration. 2015. Community Benefits of Stream Barrier Removal Projects in Massachusetts: Costs and Benefits at Six Site. Prepared by Industrial Economics, Incorporated.

PACD Comment 10: *Districts would benefit from engineering assistance to implement the program and have been asking for engineering assistance for some time. The proposed stream crossing manual has many requirements related to engineering that reach beyond most district's capabilities. Districts request assistance with engineering. The Center should either provide*

engineering assistance or provide funding to PACD to enhance and expand their current engineering assistance program. Another option is to allow districts to be reimbursed for engineering services or engineering staff costs associated with proposed project costs. Utilizing an engineer from the Center or TAG, you could eliminate the need for 3 engineering estimates, which seems to be excessive given that many municipalities have an engineer on retainer.

SCC/CDGRS Response 10: The Commission will identify and evaluate various options to provide additional engineering assistance. Engineering services are typically not required before a project is contracted. If engineering services are required prior to contracting, some districts have used DGLVR Administrative funds to retain the services of an engineer or have requested that the applicant pay for these engineering services as in-kind. As detailed in SCC/CDGRS Response 9, the SCC has reconsidered the proposed engineering cost allowance and bidding requirements. It should be noted that the municipal engineer "on retainer" may or may not be the best choice for project design. Engineers have different specialties, and the civil engineer often employed by municipalities typically have limited direct experience with stream systems.

PACD Comment 11: *With the proposed changes, the program application process will be more cumbersome as a longitudinal profile will have to be done and then the plan would have to be specific so that an accurate estimate can be prepared. Districts are unclear on how this will all happen before the QAB ranks and then approves an application when no funding is available through the program for engineering prior to a contract. The municipality will have a large amount of engineering time involved even before the application is ranked. The proposal will allow engineers to use the conservation district longitudinal profile but if they do not it will be up to the engineering firm to do their own survey. The district will need to observe/assist with the engineer's longitudinal profile which will be redundant work if a longitudinal profile is already done.*

SCC/CDGRS Response 11: It is clear from the comments we received that there is a large degree of concern and confusion about the role of the longitudinal profile (long-pro) conducted during initial site assessment and the engineering survey. The longitudinal profile that the districts perform takes place before a contract is signed as part of the site assessment. The purpose of the site assessment is to provide better estimates for the grant application and cost estimation on items such as the structure size, structure type, amount of streambed needed, amount of grade control needed, and length of stream segment to be reconstructed. Without this information, applicants and districts are guessing at overall project costs when generating contracts and frequently underestimate costs. In looking at recent data from the DGLVR GIS used for reporting, it is evident that stream crossing replacement projects are twice as likely to require contract amendments due to increased cost compared to regular projects.

The long-pro provides the minimum site measurements required to generate an accurate grant application. This is similar to a district measuring the width, depth, and length of a proposed DSA or fill job to properly estimate quantities for the grant application. A preliminary long-pro is essential to taking measurements for a stream crossing replacement cost estimate.

The initial long-pro is not difficult or time consuming once basic survey skills and stream morphology are learned. Many DGLVR technicians already know how to complete longitudinal profiles and do so independently or with assistance from Center, SCC, or TU staff. Commission and Center staff regularly assist district staff with longitudinal profile surveys. Staff recently helped a conservation district conduct three separate long-pro surveys in a county. They started the long-pro at the first site around 9:00 AM and they completed the last site around 1:30 PM. At the end of the day, the technician understood how to do longitudinal profiles and was confident they could complete them independently. An engineer, and hence the need for a municipality to pay an engineer before there is a contract, should not be necessary for this preliminary site assessment. These skills will be key elements included in the pending Stream Crossing Replacement Certification Training being offered to districts.

Design Survey: The preliminary measurements taken in the initial site assessment, including a long-pro, described above are different than an engineer's design survey, which will be used in the creation of the formal project plans. The design engineer will frequently send out a survey crew to complete the design survey for a stream crossing. While these crews are often experts in "how to survey", they are often accustomed to surveying for parking lots, developments, stormwater systems, etc. The surveyors are rarely experts in stream morphology and function, and therefore do not understand the purpose of a long-pro or what specific shots are needed. This is why district involvement is critical to ensuring the surveyor does a complete long-pro survey. Without this interaction, additional costs may be incurred since many surveys would not be sufficient and would have to be redone.

PACD Comment 12: *As mentioned earlier, the new manual will significantly increase the project costs, meaning there will be less projects developed and built, thus reducing overall environmental benefits. For instance, is the increase in 125% bank full width structures provide the best bang for the buck? There needs to be some cost/benefit analysis by CDGRS to make sure the desired benefits of these policy changes are substantiated by the increase in costs.*

SCC/CDGRS Response 12: As described in our responses to PACD Comments 5 and 8, stream crossings that achieve stream continuity best meet the DGLVR Program goal of reducing long-term costs of erosion, sedimentation, and maintenance. Establishing stream continuity means that a section of stream disconnected and destabilized by an undersized road-stream crossing structure is restored to a stable condition that flows continuously from the upstream channel, through the road, to the downstream channel. Correcting accelerated road and steam erosion is an environmental benefit that also reduces the need for constant maintenance such as removing debris and sediment aggradation from stream crossing inlets, stabilizing eroding banks, and repairing road and structure wash outs.

Undersized stream crossing structures are much more likely to fail than structures greater than bankfull width that accommodate continuous stream channels (USFS, 2008). The benefits of greater than bankfull width structures were clearly seen throughout New England following Tropical Storm Irene in 2011 when "damage was largely avoided at two road–stream crossings where stream simulation design was implemented and extensive at multiple road–stream crossings constructed using traditional undersized hydraulic designs." (Gillespie et al., 2014). It is very expensive when a stream crossing structure fails, both environmentally and economically. A failed stream crossing structure inputs a huge sediment load into the stream, can accelerate stream bed and bank erosion, causes a road closure that interrupts business, can damage adjacent and downstream properties, and can create public safety hazards.

Cost-benefit analyses from multiple states and the US Forest Service show that modest increases in the initial investment of road-stream crossing structures designed to achieve stream continuity yield substantial economic and societal benefits in the long term (Levine, 2013). These benefits include cost reductions associated with increased flood resiliency and fewer catastrophic failures, reduced annual maintenance costs to the road owner, reduced erosion and sedimentation, and improved habitat conditions and stream health. Because of this, many US states and organizations, including most New England states, have been incorporating stream continuity into stream crossing guidance and standards in the previous decades. The table below details requirements by entities in other states related to two major requirements for stream crossing replacement: minimum structure size and minimum embedment (depth of material in structure).

Additionally, the cost of labor and materials have increased over the past several years. Supply chain issues and high inflation rates in and of themselves will likely lead to increased costs. The costs we believe the comment is concerned with are more associated with the increased cost of implementing the new standard. That would be the difference between the cost of doing a project of marginal environmental benefit vs the cost of doing a project that not only provides a safe and efficient structure, but also reconnects the stream upstream, through, and downstream of the new structure. The Commission can accept the fact that projects designed to showcase ESM practices generally have a higher initial cost, but lower long-term maintenance costs.

State	Type	Entity	Year	Min Structure Width	Min Embedment (material in structure)
PA	Guidance	PA DCNR	2022	1.25 Bankfull Channel Width	20%
PA	Regulation	PA DEP	2013	x	6" or 1' depending on permit
CT	Guidance	CT DEP	2008	1.2x Bankfull	1', or 20% if over 10'
MA	Regulation	Riverways Prog.	2012	1.2x Bankfull, + dry passage	2', or 25% for round pipes
ME	Regulation	ME DEP	2008	25-year flow	
ME	Guidance	USFWS	2017	1.2x Bankfull	2' or 20% (salmon areas only)
NH	Regulation	NH DES	2009	1.2x Bankfull +2' (bridge over 16')	1' – 2', 25% for round pipes
NY	Guidance	NY DEC	?	1.25x Streambed Width	20%
VT	Guidance	VT FWD	2007	Bankfull + size of bank rocks	
GA	Guidance	GA DNR	2012	Average channel width	20%
NC	Standard	NC DOT	2003	x	1', or 20% if under 4'
SD	Guidance	SD DOT	2011	1.2 Bankfull	1'
CA	Regulation	CA F&G	2007	1.5x Active Channel Width	20%
OR	Standard	OR DOT	2014	1.25 Ordinary High Water Width	20%
WA	Regulation	?	?	1.2x Bankfull +2'	20%
AZ	Guidelines	AZ F&G	?	Span floodplain with dry passage	17% (1/6 structure height)
RI	Guidance	RI DOT	2019	1.2x Bankfull	2' or 20%
FHWA	Guidelines	US FHWA	2010	X	Structure dependent (2', 20%, 30%)

Minimum structure size and minimum embedment (depth of material in structure) from various entities in other regions of the United States.

References:

- *Table: Data Summarized from USFWS: Information compiled by the U.S. Fish and Wildlife Service, Chesapeake Bay Field Office (Leah Franzluebbers) and the Maryland Fish and Wildlife Conservation Office (Julie Devers) in March of 2019, updated in September of 2020.*
- Gillespie, N., A. Unthank, L. Campbell, R. Gubernick, D. Cenderelli, M. Weinhold, P. Anderson, D. McKinley, S. Roy, B. Austin, S. Wells, J. Rowan, C. Orvis, R. Kirn, M. Hudy, A. Bowden, J. Levine, A. Singler, and E. Fretz. 2014. *Flood Effects on Road-Stream Crossing Infrastructure: Economic and Ecological Benefits of Stream Simulation Designs*. Fisheries Vol 39(2): 63-76.
- Levine, J. 2013. *An Economic Analysis of Improved Road-Stream Crossings*. The Nature Conservancy, Adirondack Chapter, Keene Valley, NY.
- USFS, U.S. Forest Service Stream Simulation Working Group. Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road–Stream Crossings. Publication 0877-1801. San Dimas Technology and Development Center, U.S. Department of Agriculture, Forest Service. 2008.

PACD Comment 13: *Additionally, conservation district costs and staff time will escalate. In many cases, the district's dirt and gravel road specialist has other job description duties and could not handle the additional workload the new manual will require. The increase in the time to do the program when doing longitudinal profiles, reviewing multiple documents, attending meetings, needing to be on site regularly will most likely cause districts to go over the hours that can be paid through the program. The reality is that districts may decide not to do stream crossing replacements, resulting in more time and funding for smaller projects.*

SCC/CDGRS Response 13: Conservation districts are already tasked with overseeing projects funded with DGLVR grants. These requirements are spelled out in (9106 (F)(8)) of law, and in Article1(1.4) of the 5-year agreement. DGLVR Project oversight involves continuous communication with project participants and involvement in projects from start to finish, often achieved through site assessment, meetings, reviewing project documents for consistency with DGLVR requirements, site inspections, and other communication means. These items are key to implementing any successful DGLVR project, not just stream crossing replacements.

As detailed in SCC/CDGRS Response 3, we recognize that stream crossing replacement projects are inherently more complex and time consuming than standard drainage projects. If a district feels they do not have the capacity to properly implement DGLVR Projects or otherwise administer their local DGLVR Program, they are encouraged to reach out to the SCC to discuss ways to improve their local DGLVR Program. This is also a topic discussed at every QAQC – districts receive individualized recommendations to improve their local programs, including ways to utilize DGLVR funding to support staffing and outreach efforts. Over the past 5 years, districts have been using approximately 7.5% of their allocation for administrative expenses and 3.2% of their allocation

for education expenses. With a limit of 10% for both of these categories, many districts can increase staff time spent on their DGLVR Program with the funding already available to them.

The current lack of time invested by some districts is a factor in some of the issues we are currently seeing with stream crossing projects. We understand that conservation districts receiving smaller DGLVR allocations may struggle to fund and oversee any large DGLVR Project, including stream crossing replacements. If a conservation district cannot devote the time or commit to training staff on how to properly implement a stream crossing, we agree it would be better for that district to focus on the types of projects they have capacity to properly oversee. Conservation districts can decide locally what projects they are able to implement, which could include the decision to not fund stream crossing replacements.

PACD Comment 14: *The proposed manual will require conservation district staff to participate in additional meetings such as a pre-application meeting, a pre-design meeting, a bid site showing and a pre-construction meeting, adding time and cost to the district. The proposed manual also requires district staff to review documents and provide written confirmation to the grant recipients or engineer that those plans and specifications comply with DGLVR policy and stream bank standards. CD staff will be required to:*

- *Attend survey meetings conducted by municipalities and engineers;*
- *Complete "project lifecycle checklists";*
- *Conduct surveys for each stream;*
- *Provide direction to engineers;*
- *Conduct longitudinal surveys.*

The concern is that these tasks require more district staff time and resources.

SCC/CDGRS Response 14: Attendance at those meetings is important to ensuring all parties are on the same page at each critical stage of the project. Many districts already participate in these meetings for all of their projects. Regarding additional staff time, refer to SCC/CDGRS Response 13. Conservation districts are currently tasked with providing project oversight on all funded projects, not just stream crossing replacements. Districts that successfully implement the DGLVR Program are already involved in all of the bullet points listed in comment 14. Please note that districts are not required to be in charge of the bid site showing. The only requirement is for districts to attend, if one is held.

PACD Comment 15: *The DGLVR program was founded on the idea of environmentally friendly maintenance for road repair on a local level. Is all of this just a part of a case study entitled "Improving Road Stream Crossings for Storm Resiliency and Aquatic Organism Passage: Pennsylvania Case Study:" https://trid.trb.org/view/1690452. Instead, shouldn't the Center be looking for the simplest practices with the most impactful results for PA? The Center's goal should be simple practices with positive environmental impacts in the most cost-efficient manner and common sense.*

SCC/CDGRS Response 15: Since the beginning, the DGLVR Program has focused on implementing the best long-term solutions to both environmental and road issues. Sometimes this means spending more money up front to do what is better in the long term. A good example of this is road fill. Rather than implement conventional practices, such as armoring ditches, that may be cheaper initially, the Program has stressed the use of road fill to permanently correct drainage issues. Initially, this was not an easy sell to applicants or conservation districts. Today, however, it is a core ESM practice, and over the last three years (2019-21) the Program has used more than 1.3 million tons of road fill to elevate entrenched roadways. Another example is the use of Driving Surface Aggregate instead of the conventional practices of surfacing roads with a shallow coating of PennDOT 2A or 2RC that will only last a year or two.

The same focus on long-term improvements described above applies to stream crossings as well. Continuing to install sub-standard crossings where continuity is not achieved and where pipe

bottoms are exposed to constant abrasion, significantly reducing their lifespan, is NOT the idea the Program was founded on.

The case study referenced in the comment was a simple presentation given to about 40 people at an annual conference of the Transportation Research Board (TRB) in Washington, D.C. It was meant, as the name implies, to showcase the Program's efforts in PA in order for entities in other states to learn from what is working and what is not. The Center has been involved with the Transportation Research Board since 2003, and many useful partnerships and projects have come from their involvement, including the ESM field guide developed with the US Forest Service. Participation in the TRB has also allowed us to take advantage of lessons learned in other states and bring those experiences back to PA.

The Center and Program are in fact looking for the "most impactful results for PA". Pennsylvania as a whole is significantly behind many other states and entities in design standards for connectivity for road-stream crossings. The US Forest Service has been promoting the design of stream crossings for continuity instead of hydraulic design for several decades. Many other states have been following suit in recent years as they recognize the long-term benefits of this approach. The table provided in SCC/CDGRS Response 12 summarizes some of these requirements in other areas of the country.

PACD Comment 16: *Perhaps the Center should follow DCNR's lead with simple, common-sense practices for stream crossings. http://elibrary.dcnr.pa.gov/PDFProvider.ashx?action=PDFStream&docID=1742800&chksum=&revision=0&docName=sf-Culvert+BMPs&nativeExt=pdf&PromptToSave=False&Size=120190&ViewerMode=2&overlay=0*
The Center should also consider working with the PA Aquatic Connectivity Team? https://www.coldwaterconference.org/uploads/5/0/9/0/50909909/lorson_aop_in_pa.pdf

SCC/CDGRS Response 16: The DCNR guidelines referenced are a step in the right direction. It outlines many good ideas but stops short of providing guidance on "how" to accomplish the things that it outlines. The Program's proposed updates essentially build off of and expand on many of the concepts in these guidelines. The SCC and CDGRS are also part of another workgroup of state agencies working on aquatic organism passage projects that DCNR is an active participant in. After speaking with the developer of the document provided in the comment, it should be noted that the DCNR guidance document provided is several years old. The updated document expands on the existing guidance including the recommendation of a 125% bankfull structure similar to DGLVR proposed changes. In addition, DCNR has reviewed the DGLVR standard and technical manual and are planning to utilize them as guidance for their projects. DCNR has expressed support for these proposed changes, stating: "*DCNR also supports the combined efforts of the State Conservation Commission and Center for Dirt and Gravel Road Studies in regard to the development of the technical guidance documents for stream crossings."* The SCC & Center have been an active part of the PA Aquatic Connectivity Team since 2018. We have presented to the team several times in the past and presented the new standard and technical manual to them at their March 2022 meeting. Organizing members of the PA Aquatic Connectivity Team from the PA Fish and Boat Commission have also attended several of the DGLVR advisory workgroup meetings to review the proposed policy, standard, and manual last fall, and have helped shape these documents.

PACD Comment 17: *The SCC should consider increasing the administration cost percentage to 15% or 20%. The increased time needed for additional paperwork reviews, engineering reviews, long pro surveys, etc., will create a major funding shortfall to smaller funded district staff, and budgeting time with staff funding limitations could be an issue, both now and in the future. Large projects take at times more funding for a district than it receives already, and adding to the list of staff requirements further limits staff ability to be effective. Staff cannot work on DGLVR projects when they are out of funds, and payroll is being partially covered by another project or program.*

SCC/CDGRS Response 17: Section (9106.F.5.v) of the PA motor vehicle code states "Administrative costs, limited to actual documented costs and restricted to a maximum of 10%". Therefore, the SCC cannot increase the administration cost percentage above 10%. Over the past 5 years, districts have been using approximately 7.5% of their allocation for administrative expenses and 3.2% of their allocation for education expenses. With a limit of 10% for both of these categories, many districts can increase staff time spent on their DGLVR Program with the funding already available to them. The SCC is available to assist districts with budgeting their time accordingly to ensure adequate staff time is available to implement a stream crossing properly. See our response to PACD Comment 13 for additional discussion of DGLVR administration and education costs.

PACD Comment 18: *Districts agree with the 1,25 X bankful width for structures, for proper AOP but strongly disagree with the "all or nothing" approach of "off right of way" work for stream continuity, etc. It would be counterproductive to not install a good project if an adjoining landowner does not agree to sign the form and allow the work. Also, some sites in forested areas would take major work to even gain access, depending on what would be needed. A project that is a major improvement over what was there previously is better than walking away from a project due to an uncooperative landowner. Also – off ROW work costs would be a financial burden on smaller funded districts, potentially taking funds away from other projects that could be completed or make a project too costly to complete.*

SCC/CDGRS Response 18: It is encouraging to hear that the SCC, Center, PACD, and conservation districts agree that structures need to be properly sized for larger than the bankfull channel. However, the size of the structure is only one important component to achieving continuity of a stream through a road crossing. Undersized structures that have been in place for many years (the kind of sites the Program is focusing on), have often created channel impacts upstream and downstream from the crossing itself. These impacts are typically in the form of deposition upstream, a vertical offset at the crossing, and excessive erosion and lowering of the channel below the crossing. Simply installing a wider structure typically does not address the legacy impacts of the previous undersized structure to the stream channel. These impacts typically carry a high potential for continued erosion and sedimentation within the stream corridor upstream and downstream of the crossing. Restoration and stabilization work beyond the immediate footprint of the roadway and right-of-way (ROW) is almost always needed in order to address these legacy stream channel impacts. In fact, with a typical ROW width of 33 feet in PA, many of the new structures themselves extend outside these limits, not even including any channel work. The requirement for off-ROW permission for these projects is no different than it has been for all projects since the Program began.

The Statement "A project that is a major improvement over what was there previously is better than walking away from a project due to an uncooperative landowner" misses the Program's goal of achieving stream continuity and long-term sediment reduction. Even with standard drainage projects, there are cases where the Program has had to walk away from funding a project because of the lack of landowner cooperation and inability to implement an effective project. The more impacted the stream is by the undersized crossing, the less likely that a "major improvement" can be made without landowner permission. This is why the statement "Contact the SCC in questionable circumstances where a lack of landowner permission may hinder successful project" is included in section 3.4.3 of the proposed technical manual.

Off-ROW work is usually needed to implement a successful stream crossing project. It is up to individual districts to evaluate the extent and cost of such work, and the project overall, to make funding determinations based on their local conditions such as allocation and backlog of applications. As noted in SCC/CDGRS Response 5, it is more important for DGLVR funding to install

quality projects that meet Program goals than to install a greater number of projects that do not meet Program goals.

PACD Comment 19: *The Center or SCC should consider adding staff to complete longpro surveys and use district staff for assistance. Surveys are subjective and could lead to issues if SCC or Center staff do not agree with a district's survey/evaluation after the project is completed.*

SCC/CDGRS Response 19: It is not realistic to expect Center, SCC, TU or other entities to be able to effectively oversee the current number of stream crossings being funded (in addition to long-pros on sites that do not get funded). Funneling this service to a central entity would also add large scheduling backlogs and further erode the "local control" of the DGLVR Program. As detailed in SCC/CDGRS Response 11, the Center and SCC currently, and will continue to, provide technical assistance and training opportunities to conservation district staff on longitudinal profiles. Trout Unlimited is also available for technical assistance on longitudinal profiles.

PACD Comment 6 expressed concerns about the loss of local control and the perceived need to "to funnel nearly every decision related to stream crossings through two SCC staff members". A requirement to "funnel" all of the long-pros through limited staff in Harrisburg or elsewhere would create a significant bottleneck in the planning process. As detailed in SCC/CDGRS Response 11, the process of providing a preliminary long-pro is not as time intensive or complex as some districts perceive. Conservation districts have requested additional information and guidance for conducting longitudinal profiles, and the proposed policy updates, standard, and technical manual provide this. The updated DGLVR stream crossing training currently under development will include significant training on longitudinal profiles to clearly communicate expectations and teach the necessary skills. Conservation districts with concerns about conducting longitudinal profiles are encouraged to request assistance from the Center and SCC and to attend future trainings on the topic.

The comment mentions concern about various interpretations of stream surveys, specifically regarding the Center or SCC staff potentially "not agree[ing] with a district's survey/evaluation after the project is completed." We acknowledge that streams are dynamic systems and that individual measurements are expected to vary. However, if measurements are taken using consistent methods and with an understanding of stream morphology, the variations should be minimal and consistent trends are reliably measurable. Stream measurements such as the average bankfull width, channel slope, and spacing of grade control features are replicable if done correctly.

DGLVR project reviews, such as during QAQCs, include evaluating whether site assessments and project designs follow best practices and accurately represent the site. If it is evident that errors were made during site measurement, the SCC and Center are dedicated to providing recommendations, education, and assistance to help conservation district staff prevent such issues from recurring. Typically, further consequences or correctional actions are only considered if a conservation district disregards required actions to meet DGLVR Program policy.

PACD Comment 20: *Districts support the provision allowing for an exemption request. This will be a big impact in counties where there have been a number of stormwater drainage ways that end up counting as "streams" under the current definition.*

SCC/CDGRS Response 20: As in comment 18, it is good to see that the SCC, Center, PACD, and conservation districts have areas where we all agree. We appreciate the support for the proposed exemption process. We received numerous specific suggestions regarding the exemptions that have been discussed with DGLVR advisory workgroups and incorporated in the updated proposed documents.

PACD Comment 21:

There are several reviews of documents such as bid documents, construction plans/details that may put the CDs in a place where liability could be an issue. It needs to be very clear that districts are not liable or have legal issues as a result of the proposed manual inspection requirements including inspections.

SCC/CDGRS Response 21: The SCC and Center agree that it is important to clarify conservation districts' role in these reviews to reduce unintended liability. The policy and draft review letters state that: *"The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that these submitted documents comply with DGLVR policy and Stream Crossing Standard before they are submitted (or resubmitted) for permit review. The purpose of this review is to verify consistency with DGLVR policies and Stream Crossing Standard, not to review engineering calculations or permit completeness." (7.1.2.6 of policy)*

Similar wording is provided for the bid review process. If you have specific suggestions for wording changes to make this clearer, we welcome any suggestions. The SCC will conduct a legal review of these documents once the draft is final.

As detailed in our response to PACD Comment 13, inspections to ensure projects meet DGLVR policy have been a part of the district responsibilities dating back to the beginning of the Program and is a part of the enabling legislation, 5-Year Agreement, Statement of Policy, and the Administrative Manual. The proposed standard will provide for more complete projects that are designed and certified by a licensed professional engineer. Having the engineer on site during installation of critical phases and certifying proper installation will help assure quality projects while reducing liability concerns. Many of the proposed requirements in policy and the use of the standard are actually intended to reduce or limit the potential liability on a conservation district by giving the design engineer standards and requirements that do not currently exist.

Summary

The SCC and Center greatly appreciate the time invested by all parties in reviewing these documents and providing these comments. It clearly shows how invested everyone is in the continued success of the Dirt, Gravel, and Low-Volume Road Program. Every comment has been read and led to continued discussions both internally and with DGLVR advisory workgroups.

The SCC and Center staff have also received comments from several external entities that are generally in support of these changes, and the impacts they could potentially have to other entities across the commonwealth:

- ***PA Department of Conservation and Natural Resources (DCNR) feedback on DGLVR documents (2/21/22):*** *"DCNR also supports the combined efforts of the State Conservation Commission and Center for Dirt and Gravel Road Studies in regard to the development of the technical guidance documents for stream crossings….While the SCC/DGR guidance documents include much more technical based guidance, both of our agencies are aiming to achieve the same goals for aquatic organism passage."*
- ***PA Department of Environmental Protection (DEP) feedback on DGLVR documents (2/17/22):*** *"Overall, the proposed changes are positive and in keeping with resource protections and generally consistent with DEP's regulations under Chapter 105. The proposed stream crossing replacement changes are positive both for stewardship of funds and the environment because it promotes and funds projects which are resilient to flood damage by being designed to withstand higher intensity storm events, thereby decreasing maintenance and replacement costs and promoting aquatic connectivity and reduced erosion… The implementation of these policies and guides places the DGLVR program as a leader in promoting stream continuity design within Pennsylvania."*
- ***PA Fish and Boat Commission (PFBC) feedback on DGLVR documents (2/1/22):*** *"The PFBC certainly appreciates the hard work that went into developing the new policy, standard and technical manual. We are*

optimistic that this effort will result in improved stream continuity at road stream crossings and hope that the practices outlined in the technical manual can be a model for non DGLVR projects state wide."

- ***US Forest Service (USFS) feedback on DGLVR documents (1/19/22):*** *"Your group did a really nice job of pulling all these pieces together to guide what happens within your sphere of influence. Well done."*

The proposed DGLVR Stream Crossing policy, standard, and technical manual, even after additional discussion and editing, will not be perfect. They will continue to evolve over time as gaps and potential improvements are identified. It is inherently more difficult to "fix" a stream than to "fix" a road. We acknowledge that the proposed changes are a large step to take, but we feel they are a significant step in the right direction. Pennsylvania has over 15,000 road/stream crossings on public unpaved roads, and over 87,000 road/stream crossings on paved public roads ("blueline" crossings only; many additional smaller crossings exist). The Program's $28 million annual allocation falls well short of the ability to replace even a small fraction of these crossings. Since its inception, the Program has focused its relatively small allocation to specific projects and practices that create long term environmental and road improvements, both through on-the-ground projects and through education of the road-owning community as a whole. It is more important to fund quality projects that meet Program goals than to install a greater number of projects that do not meet Program goals. Most conservation districts are currently only funding one or two replacements annually. Since this represents a small fraction of stream crossings that are replaced annually with other funds, DGLVR projects should serve as model projects for improving stream crossing replacements. The Program goals remain unchanged: reducing environmental impacts, particularly sediment pollution, caused by unpaved and low volume paved roads. The Program replaces undersized stream crossings because they impact the stream, not just the roadway, and cause erosion and sedimentation in the stream channel. The Program should ensure the most effective practices are used when replacing these structures to provide long term stability to both the road and the stream.

Thank You,

Roy Richardson
Program Coordinator
DGLVR Program
State Conservation Commission
PA Dept of Agriculture

Steven Bloser
Director
Center for Dirt and Gravel Road Studies
Penn State University

Comment Responses: DGLVR Stream Crossing Policy, Standard, and Technical Manual

The Dirt, Gravel, and Low-Volume Road Program (DGLVR Program or Program) has proposed updates to the Program's Stream Crossing Structural Replacement Policy (Policy), as well as a new Stream Crossing Design & Installation Standard (Standard) and a Stream Crossing Replacement Technical Manual (Technical Manual). Approximately 450 comments were received by the Center for Dirt and Gravel Road Studies (Center or CDGRS) and State Conservation Commission (Commission or SCC).

Commission and Center staff would like to thank all the conservation districts and cooperating agencies that took the time to read through these documents and provide comments. Staff has contacted all the districts and cooperating agencies that submitted comments directly to us and have reviewed their comments in person with all that wished to do so. The SCC and Center have also meet with the DGLVR Policy and Planning Advisory Workgroup (advisory workgroup) to discuss the comments and proposed responses. As a result of the comments, changes were made to the proposed Policy, Standard, and Technical Manual. **Comment responses are a collaboration of Center and SCC staff.** The updated proposed Policy, Standard, and Manual are available on the Center's Website at: (https://www.dirtandgravel.psu.edu/general-resources/stream-crossings/dglvr-stream-crossing-document-review-website). While some parts of the proposed documents have not been updated, this does not mean comments were ignored. All comments were reviewed and considered. Pennsylvania is a diverse state, and one policy will not fit every local condition perfectly. The SCC and Center strive to provide policy and guidance that will best suit most cases, including built-in flexibility such as exemptions from the Stream Crossing Standard for certain projects and the continued ability of county DGLVR Programs to focus on local priorities.

The Commission and Center are dedicated to making the DGLVR Program the best that it can be, which includes continuous support of conservation districts. New training on DGLVR Stream Crossings will be available to conservation districts starting in 2022, individual technical assistance continues to be available, and we encourage open communication between conservation districts, the SCC, and the Center. We deeply appreciate the hard work districts put into administering the DGLVR Program locally and identifying areas for Program improvement.

Part of continuing to improve the DGLVR Program includes ensuring Program goals are met. Since the beginning, the DGLVR Program has focused on implementing the best long-term solutions to both environmental and road issues. Sometimes this means spending more money up front to do what is better in the long term. A good example of this is road fill. Rather than implement conventional practices, such as armoring ditches, that may be cheaper initially, the Program has stressed the use of road fill to permanently correct drainage issues. Initially, this was not an easy sell to applicants or conservation districts. Today, however, it is a core ESM practice, and over the last three years (2019-21) the Program has used more than 1.3 million tons of road fill to elevate entrenched roadways. Another example is the use of Driving Surface Aggregate (DSA) instead of the conventional practices of surfacing roads with a shallow coating of PennDOT 2A or 2RC that will only last a year or two.

The SCC acknowledges that the proposed changes are a large step to take, but we feel they are a significant step in the right direction. Pennsylvania has over 15,000 road/stream crossings on public unpaved roads, and over 87,000 road/stream crossings on paved public roads ("blueline" crossings only; many additional smaller crossings exist). The Program's $28 million annual allocation falls well short of the ability to replace even a small fraction of these crossings. **Since its inception, the Program has focused its relatively small allocation to specific projects and practices that create long term environmental and road improvements, both through on-the-ground projects and through education of the road-owning community. It is more important to fund quality projects that meet Program goals than to install a greater number of projects that do not meet Program goals.** Most conservation districts are currently only funding one or two replacements annually. Since this represents a small fraction of stream crossings that are replaced annually with other funds, DGLVR projects should serve as model projects for improving stream crossing replacements. The Program goals remain unchanged: reducing environmental impacts, particularly sediment pollution, caused by unpaved and low volume paved roads. The Program replaces undersized stream crossings because they impact the stream, not just the roadway, and cause erosion and sedimentation in the stream channel. The Program should ensure the most effective practices are used when replacing these structures to provide long term stability to both the road and the stream.

Program or General Comments:----------

1) Overall changes may lead to a combination of: 1) conservation districts not funding stream crossings, 2) applicants not applying for stream crossings, 3) applicants installing undersized structures themselves instead. (10 counties, 2 engineers)

- This comment voices similar concerns that have been voiced about all Environmentally Sensitive road Maintenance (ESM) practices. One of the main goals of the DGLVR Program is to reduce sedimentation in streams from roads (9106(A)). Stabilizing road erosion costs more in up-front construction costs but reduces long term road maintenance costs and environmental costs of sediment pollution from roads. This is true of all ESM practices, including stream crossing replacements that achieve stream continuity. While it is true that some potential DGLVR grant applicants may not understand the benefits of ESM practices, that does not mean that the DGLVR Program should compromise on its goals. Instead, the DGLVR Program provides education and funding to make ESM practices more accessible to road owners.
- If DGLVR funds are spent on a stream crossing replacement, the project needs to achieve the goals of reduced long-term maintenance needs and sedimentation in streams. To date, the majority of completed stream crossing replacement projects do much to benefit local roads but fall short of meeting the Program's environmental goals. The DGLVR Program has learned a lot in recent years about how to install stream crossing projects that better meet Program goals and needs to provide updated guidance and policy accordingly. The proposed documents are intended to provide the needed guidance to districts, engineers, and applicants to outline program expectations and effectively implement successful projects.
- We recognize that stream crossing replacement projects are inherently more complex and time consuming than standard drainage projects. The current lack of time invested by some districts is a factor in the issues we are currently seeing with stream crossing projects. We understand that conservation districts receiving smaller DGLVR allocations may struggle to fund and oversee any large DGLVR Project, including stream crossing replacements. If a district feels they do not have the capacity to properly implement DGLVR Projects or otherwise administer their local DGLVR Program, they are encouraged to reach out to the SCC to discuss ways to improve their local DGLVR Program. **While any district who feels they can adequately manage stream crossing projects is welcome to do so, no district is required to fund stream crossing replacements. This is a decision that can be made at the local level.**

2) Implementation is too rushed. Slow down, start with training, do demo projects, then eventually implement policy (6 counties)

- We understand the hesitancy of some districts given the significant changes being proposed. Note, though, that with ~100 stream crossing projects funded annually over the last few years, we have a large amount of example sites, both good and bad, that we have learned from. The lessons learned from those sites have driven many of the proposed changes. If the process is to be "slowed down" or phased in, the SCC may have to consider some other mechanism to reduce the number of stream crossings replaced during that period that do not meet Program goals. Continuing to allow stream crossing replacements that do not achieve Program goals for the next two or more years is not a viable option. If implemented, conservation districts may choose to "pause" the funding of stream crossing replacements at the local level until they are comfortable implementing them.
- Some conservation districts across the state may be considered "early adopters" of this new policy. They have adopted these principles and have shown how these projects have been done with great success.

3) This policy and standard reduce the "local control" that has always been part of the Program. (3 counties)

- Local control is one of the "components" of the DGLVR Program, implementing sound environmental improvements is one of the "Purposes" of the Program. The Program has always operated under "local control" but with statewide "guiderails". It is a legal obligation of the SCC to establish these statewide "guiderails" for the Program.

- Stream crossing replacements are inherently more complex because they involve stream reconstruction in addition to road construction. Over the past several years, the QAQCs, along with technical assistance and help requests, have shown that the main area of the Program where improvements can be made is regarding stream crossing replacements. In 2021, 20 of the 22 QAQC reports completed included recommendations to improve future stream crossing replacements. The DGLVR Program has learned a lot in recent years about how to install stream crossing projects that better meet Program goals and needs to provide updated guidance and policy accordingly. The intent of these changes is to address shortcomings identified in stream crossing replacement projects and provide the needed guidance to districts. The Program still maintains the principles of local control of conservation districts and Quality Assurance Boards (QABs), including establishing local policies within the state-wide requirements and choosing local priorities for funding.

4) These changes could lengthen project timelines, and make it difficult for conservation districts to meet 2-year spending requirements. (4 counties)

- It is true that stream crossing replacements can take longer to implement than drainage, base, and surfacing projects due to the complexity of the projects and need for engineering and permitting. Other projects that may take longer to implement include bank/slide stabilization, full depth reclamation, projects requiring engineering and/or permits, and projects utilizing outside grant funding. If a conservation district funds many complex/time-consuming projects in a short time frame, it may be difficult for them to meet their 2-year spending requirements. Conservation districts are always encouraged to consider project implementation timelines when allocating funds to ensure that spending requirements can be met. The SCC and Center are available to assist conservation districts with meeting their spending requirements.
- If project size, complexity, engineering, and "red tape" are a concern, districts and grant applicants can choose to focus on environmentally sensitive maintenance practices that require minimal or no engineering or permitting. These include road fill, french mattresses, sub surface drainage, driving surface aggregate, cross pipes, broad based dips, and more. Projects such as these often proceed more quickly from an application to a contract to a finished project, which is what the townships and districts used to focus on. These practices are all still available and we encourage all districts to use these practices where applicable.

5) Concerns that the proposed policy does not align with the Program's history of a streamlined process with simple applications, hand drawn sketches, and minimal requirements. (3 counties)

- Stream crossing replacements are very different from "traditional" DGLVR Projects, which include improved road drainage, road base corrections, and resurfacing. These practices correct erosion issues through building better roads. However, stream crossing replacements are inherently more complex because they involve stream reconstruction in addition to road construction. For a stream crossing replacement to achieve the long-term reduction in maintenance and erosion that the DGLVR Program aims for, the stream channel that was destabilized and eroding due to the undersized structure must be stabilized. Simply replacing the undersized structure with a larger one within the footprint of the roadway does not undo the on-going erosion potential of the adjacent stream course created by the undersized crossing. Stream crossing projects, by their nature, will come with more requirements than most other projects will encounter because of the in-stream work. Permitting, usually a Chapter 105 GP-7 or GP-11, requires that an engineer is involved in the design and permitting of the structure. These projects can also require wetland delineation, PNDI searches, and possibly historical searches.
- As stated in previous responses: If a district feels they do not have the capacity to properly implement certain DGLVR Projects, they are encouraged to reach out to the SCC to discuss ways to improve their local DGLVR Program. Also, while any district who feels they can adequately manage stream crossing projects is welcome to do so, no district is required to fund stream crossing replacements. This is a decision that can be made at the local level. If project size, complexity, engineering, and "red tape" are a concern, districts and grant applicants can choose to focus on environmentally sensitive maintenance practices that require minimal or no engineering or permitting.

6) The Program is focusing on or promoting stream crossings at the expense of drainage projects. (2 counties)

- This is incorrect. Since the funding increase in 2014, the drive to fund stream crossing replacements has come largely from grant applicants and conservation districts. In fact, the purpose of some of the initial policies was to limit funding to where environmental improvements could be made without becoming simply a "bridge replacement program". The increased emphasis on stream crossing policy and education from the Center and SCC in recent years is due to several factors:
    - The continued demand in funding for this type of project. In some counties, applications for stream crossing replacements outnumber drainage applications on a regular basis.
    - Over the past several years, the QAQCs, along with technical assistance and help requests, have shown that the main area of the Program where improvements can be made is regarding stream crossing replacements. If DSA was the most common project shortcoming seen in the field, then DSA would be the focus of additional policy or education to make improvements.
    - There is currently a lack of material for conservation districts, applicants, and engineers to follow that outlines the Program goals when it comes to stream crossing replacements.
- The Center and SCC are reacting to an identified Programmatic need by trying to provide the added documentation, guidance, and training needed. As stated in previous responses: If a district feels they do not have the capacity to properly implement certain DGLVR Projects, they are encouraged to reach out to the SCC to discuss ways to improve their local DGLVR Program. Also, while any district who feels they can adequately manage stream crossing projects is welcome to do so, no district is required to fund stream crossing replacements. This is a decision that can be made at the local level. If project size, complexity, engineering, and "red tape" are a concern, districts and grant applicants can choose to focus on environmentally sensitive maintenance practices that require minimal or no engineering or permitting.

7) The Program is setting its goals too high; conservation districts should be able to fund "improvement to marginal levels" with Program funds. (4 counties)

- Since the beginning, the DGLVR Program has focused on implementing the best long-term solutions to both environmental and road issues. Sometimes this means spending more money up front to do what is better in the long term.
- The same focus on long-term improvements described above applies to stream crossings as well. Continuing to install sub-standard crossings where continuity is not achieved and where pipe bottoms are exposed to constant abrasion, significantly reducing their lifespan, is NOT the idea the Program was founded on.
- We acknowledge that the proposed changes are a large step to take, but we feel they are a significant step in the right direction. Pennsylvania has over 15,000 road/stream crossings on public unpaved roads, and over 87,000 road/stream crossings on paved public roads ("blueline" crossings only; many additional smaller crossings exist). The Program's $28 million annual allocation falls well short of the ability to replace even a small fraction of these crossings. **Since its inception, the Program has focused its relatively small allocation to specific projects and practices that create long term environmental and road improvements, both through on-the-ground projects and through education of the road-owning community. It is more important to fund quality projects that meet Program goals than to install a greater number of projects that do not meet Program goals.** Most conservation districts are currently only funding one or two replacements annually. Since this represents a small fraction of stream crossings that are replaced annually with other funds, DGLVR projects should serve as model projects for improving stream crossing replacements. The Program goals remain unchanged: reducing environmental impacts, particularly sediment pollution, caused by unpaved and low volume paved roads. The Program replaces undersized stream crossings because they impact the stream, not just the roadway, and cause erosion and sedimentation in the stream channel. The Program should ensure the most effective practices are used when replacing these structures to provide long term stability to both the road and the stream.

SCC Standard Exemptions: *(7.1.3 of Policy)*----------

8) Issues with determination of "bed and bank" or ability to get permission to go 500' upstream to determine bed and banks. (4 counties)

- We recognize this may require interaction with multiple landowners. One option is to request the potential applicant contact the landowners upstream and downstream of the existing structure prior to entering the property for this initial assessment, including the bankfull determination and potential longitudinal profile. The "500' bed and banks" is only one option for an automatic exemption to the DGLVR Stream Crossing Standard, and many of these small channels will likely be under 20 acres as well. Watershed areas can be measured remotely in the GIS system, especially with the help of the "Topographic Wetness Index" (see 12/17/20 webinar for details on TWI https://www.dirtandgravel.psu.edu/education-and-training/webinars/past-webinars) The Program's stream crossing training will include guidance on the exemptions to the DGLVR Stream Crossing Standard.

9) Reword or remove the "no habitat value" example in "SCC exemptions". (3 counties, 1 agency, 1 organization)

- We agree that the "no habitat value" example is unclear. The SCC Exemption to the DGLVR Stream Crossing Standard has been reworded to be more generic to where SCC exemptions may apply.

10) Why do crossings that qualify for an exemption from the standard still need to be 125% bankfull? (2 counties)

- Pipes in small "exemptible" crossings are often still undersized despite potentially not having aquatic organisms. Sizing the new structure to 125% bankfull will provide a higher capacity for water and debris and mean less long-term maintenance and erosion issues if installed properly. Other requirements are outlined in the exemption details to ensure channel stability such as grade controls.

Engineering----------

11) Requirements will drive up engineering cost, especially inspections and certification (7 counties, 1 organization, 1 engineer)

- The proposed changes include more engineering involvement, which we know is a concern of districts. Under the current policy, engineers are generally involved in the design for obtaining a Chapter 105 general permit. After permitting, the design engineer is rarely on-site for oversight, certifications, or inspections. It is often left to the conservation district and grant recipient to conduct the final project inspection. This current procedure could potentially leave the districts open to liability due to the lack of involvement from the engineer.
- The proposed new standard requires the design engineer to certify that the project was inspected at critical stages and that the finished project was installed to the engineer's design. It is beneficial to public safety and reduces conservation district liability to have an engineer certify that their design was installed correctly. **Conservation districts are concerned about liability, and this added required engineer involvement is a big step to help reduce that issue.**
- No standard currently exists for engineers to follow when designing DGLVR Stream Crossing Projects. This uncertainty often leads to inadequate project designs, permitting issues, and requiring project re-designs or change orders during construction. Establishing a Program standard for stream crossing replacements will ensure that designers have a common baseline of requirements for designing DGLVR projects. Having an established standard and requiring additional engineer involvement should help reduce costly change orders and overruns. In other areas of the country where similar requirements have been implemented, they have seen an initial significant increase in engineering costs, followed by a gradual reduction in costs

after two years attributed to "engineering firms becoming more familiar with how to handle these projects *(Massachusetts, 2015)*

12) Increase the currently proposed engineering limit (10%, 15% with bidding) further, and do not require receiving bids for engineering. (11 counties, 1 organization,1 engineer)

- We understand districts are concerned about increased engineering costs and requests additional funding be made available for engineers. We agree that this is a legitimate concern, and we have revisited the proposed policy to increase engineering allowances without bidding. The idea of requiring engineering quotes was a way to provide additional funding for engineers while at the same time providing a method of cost containment. Many conservation districts use the Program's example Request for Proposal (RFP) to take bids for a stream crossing. In an example of the varying prices of engineering, in one case quotes were submitted by three engineering firms at $19,000, $39,000, and $56,000 for the same project. This clearly demonstrates the benefit of taking quotes from multiple engineering firms. **Based on comments received, requiring bidding is clearly not a popular idea among conservation districts, and SCC staff has developed a different way to provide additional engineering assistance and still achieve some sort of cost containment as follows:**
    - For all DGLVR projects, engineering costs will be limited to 20% of the DGLVR contract amount, not to exceed $25,000.00.
    - Competitive bidding for engineering is strongly recommended.
    - The Request for Proposal (RFP) will still be encouraged but not required for use by conservation districts and grant recipients.

13) A training is needed specific to engineers, possibly required or incentivized. (8 counties)

- We agree that training for engineers and consultants designing DGLVR stream crossing replacements would be beneficial. The focus so far has been on developing training for conservation districts. Then, engineering training can be built off of the conservation district training. One reason that required training or certification for engineers is not being proposed at this time is because having a small number of trained/certified engineers who are eligible to work on DGLVR Projects would increase costs and decrease availability of engineering services for these projects. The Program will continue to discuss the length, format, and the ability to require or incentivize such training for engineers, without severely limiting the pool of available engineers.

14) The DGLVR Program needs to find a way to pay engineers for design work before a contract is signed. (7 counties)

- Engineering services are typically not required before a DGLVR contract between a conservation district and grant applicant is signed. Increased guidance and training will be provided to conservation districts on conducting site assessments and using them to inform grant application preparation. If engineering services are required prior to contracting, some districts have used administrative money to retain the services of an engineer or have requested that the applicant pay for these engineering services as in-kind. It should be noted that the municipal engineer "on retainer" may or may not be the best choice for project design. Engineers have different specialties, and the civil engineer often employed by municipalities typically have limited direct experience with stream systems.

Conservation District: Training----------

15) Need more details on stream crossing training (6 counties)

- Planning has begun to implement the initial round of these trainings in 2022. The Center is working closely with the SCC and has begun discussion with a subcommittee of the "Education and Outreach" advisory

workgroup on training details. Initial plans are for a multi-day training involving both remote class sessions and in-person field work on a regional basis. Additional details will be available on the Center's website when they are available.

16) The level of training is very significant. (4 counties)

- We agree. Current planning for conservation districts is for approximately 4 full days of training: two full-day in person, and four half-day remote. This is a tentative plan and will continue to evolve.

17) What if the conservation district staff who is stream crossing certified leaves the district? (2 counties)

- The proposed policy states that district staff must attend Stream Crossing Replacement Certification Training and receive a certificate of completion before the Quality Assurance Board (QAB) can recommend or the conservation district Board can approve a contract for a project involving a stream crossing replacement (effective 7/1/23). Should that employee leave, any approved contracts do not need to be withdrawn. Existing contracts may continue to be carried out and the district should seek assistance from the SCC and Center. Before another new stream crossing contract is signed, a conservation district staff member must attend the stream crossing training as soon as possible to become certified. Conservation districts should also consider having multiple staff attend the Stream Crossing Replacement Certification Training. Where appropriate, districts are encouraged to share staff resources with other counties.

Conservation District: Capacity----------

18) Conservation districts do not have enough time, or funding to pay for needed time, to administer these complex stream crossing projects. (7 counties, 1 engineer)

- We recognize that stream crossing replacement projects are inherently more complex and time consuming than standard drainage projects. These projects focus on constructing a stable stream channel through the road, which requires additional technical knowledge and thorough communication with all project participants. The proposed conservation district requirements for stream crossing projects reflect how important it is for conservation districts to communicate Program expectations and ensure they are being followed for these projects.
- Many of these requirements are already recommended for all DGLVR Projects as conservation districts are already tasked with overseeing projects funded with DGLVR grants. These requirements are spelled out in (9106 (F)(8) of the law, and in Article1(1.4) of the 5-year agreement. DGLVR Project oversight involves continuous communication with project participants and involvement in projects from start to finish, often achieved through site assessment, meetings, reviewing project documents for consistency with DGLVR requirements, site inspections, and other communication means. These items are key to implementing any successful project, not just stream crossing replacements. However, these tasks are especially important for stream crossing projects because they are inherently more complex projects.
- Therefore the policy proposes more detailed requirements about conservation district oversight and involvement in DGLVR stream crossing projects. The current lack of time invested by some districts is a factor in the issues we are currently seeing with stream crossing projects.
- Over the past 5 years, districts have been using approximately 7.5% of their allocation for administrative expenses and 3.2% of their allocation for education expenses. With a limit of 10% for both of these categories, many districts can increase staff time spent on their DGLVR Program with the funding already available to them. At the same time, we understand that some conservation districts without a full time DGLVR technician have limited staff time available to spend more time on DGLVR Projects without hiring additional staff. Where appropriate, districts are encouraged to share staff resources with other counties.
- We understand that conservation districts receiving smaller DGLVR allocations may struggle to fund and oversee any large DGLVR Project, including stream crossing replacements. If a district feels they do not have the capacity to properly implement certain DGLVR Projects or otherwise administer their local DGLVR Program, they are encouraged to reach out to the SCC to discuss ways to improve their local DGLVR

Program. This is also a topic discussed at every QAQC – districts receive individualized recommendations to improve their local programs, including ways to utilize DGLVR funding to support staffing and outreach efforts. If a conservation district cannot devote the time or commit to training staff on how to properly implement a stream crossing, we agree it would be better for that district to focus on the types of projects they have capacity to properly oversee. Conservation districts can decide locally what projects they are able to implement, which could include the decision to not fund stream crossing replacements.

19) Recommend an engineer at the State (CDGRS/SCC/Other) level to design projects. (2 counties)

- The Commission will identify and evaluate various options to provide additional engineering assistance.

20) More design and implementation assistance will be needed. Does CDGRS/SCC/TU have the capacity to provide necessary assistance? (5 counties)

- The CDGRS/SCC/TU believe they have the capacity needed but will monitor the situation. Several conservation districts have indicated they plan to reduce the number or even "pause" stream crossing replacement projects during the initial implementation of the proposed new policy and standard. This will likely lead to an overall reduction in the number of stream crossing projects funded. We also realize that the time invested on each project may increase initially until CDs become familiar with the new procedure. It is unclear what the total impact of doing less projects but spending more time on the ones that are funded, will have on the demand for technical assistance. The stream crossing notifications help anticipate workload and direct assistance as needed.

Conservation District: Required Site Meetings----------

21) The CD should not be required to be at the bid site showing. (3 counties)

- Attendance at bid site showings and other meetings is important to ensuring all parties are on the same page at each critical stage of the project. Many districts already participate in these meetings for all of their projects. Conservation districts are currently tasked with providing project oversight on all funded projects, not just stream crossing replacements. Districts that successfully implement the DGLVR Program are already involved in these meetings. Please note that districts are not required to oversee the bid site showing. The only requirement is for districts to attend, if one is held.

22) Site showings and pre-construction meetings should require engineer attendance (2 counties)

- This section was not meant to require attendance by any particular party, merely to describe each meeting and identify the parties likely to attend. We have reworded to clarify, indicating entities that are "typically in attendance". While requiring engineers at a pre-construction meeting is not a statewide policy, districts can require this at the local level.

Conservation District: Review of Permit and Bid Documents----------

23) Conservation districts should not have to review bid documents or permit applications. Concerns about conservation districts not having enough knowledge, and about liability. (7 counties)

- Conservation districts are responsible for making sure DGLVR-funded projects meet DGLVR requirements, including policy and standards. The conservation district review of bid documents and permit applications are to check that the documents meet DGLVR requirements. This review is not for conservation districts to check compliance with any other requirements, including municipal codes. As stated in 7.1.2.6 of the draft policy: "*The purpose of this review is to verify consistency with DGLVR policies and Stream Crossing Standard, not to review engineering calculations, permit completeness, or bidding requirements.*"
- The Stream Crossing Technical Manual includes optional checklists that conservation districts can use when reviewing documents for consistency with DGLVR policy and standards. Additional training on document

reviews will also be provided to conservation districts. The Center and SCC are also available for assistance on individual projects if needed.

24) Conservation districts need significant training and resources if they are to be required to review bid packages. (6 counties)

- We agree. SCC and CDGRS staff are currently developing a training module that includes training on document reviews. Assistance will also be available on individual projects if issues arise.

Conservation District: Site Inspections----------

25) Conservation districts should not be expected to inspect any concrete during construction. (5 counties)

- Conservation districts are not expected to perform complicated concrete testing such as slump, air entrainment, taking test cylinders, etc. However, all districts that contract stream crossing replacement projects will be expected to develop the basic inspection skills needed to manage a project. Construction inspection will be a component of the Stream Crossing Replacement Certification Training. The training will cover basic concrete inspection topics in the hope that Districts will notify the appropriate entity (engineer, contractor, grant applicant) if something does not appear to be constructed properly. The language pertaining to concrete inspections has been clarified.

26) Conservation districts should not check elevations during construction. (4 counties)

- Conservation districts should have the basic skills and equipment needed to perform basic construction checks, including elevations. Conservation districts may also ask the contractor to check elevations in front of them and compare to the plan drawings details. Construction inspection and survey skills will be a component of the Stream Crossing Replacement Certification Training. This applies to all DGLVR projects, not just stream crossing replacement projects.

Longitudinal Profile (Long-Pro) and Design Survey----------

27) Significant misunderstanding as to the initial pre-contract longitudinal profile, versus the engineering design survey, and how they relate. (General misunderstanding in comments)

- The longitudinal profile that the districts perform takes place before a contract is signed as part of the site assessment. The purpose of the site assessment is to provide better estimates for the grant application and cost estimation on items such as the structure size, structure type, amount of streambed needed, amount of grade control needed, and length of stream segment to be reconstructed. Without this information, applicants and districts are guessing at overall project costs when generating contracts and frequently underestimate costs. In looking at recent GIS data, it is evident that stream crossing replacement projects are twice as likely to require contract amendments due to increased cost compared to regular projects.
- The long-pro provides the minimum site measurements required to generate an accurate grant application. This is similar to a district measuring the width, depth, and length of a proposed DSA or fill job to properly estimate quantities for the grant application. A preliminary long-pro is another way of taking measurements for a cost estimate.
- The initial long pro is not difficult or time consuming once basic survey skills and stream morphology are learned. Many DGLVR technicians already know how to complete longitudinal profiles and do so independently or with assistance from Center, SCC, or TU staff. Commission and Center staff regularly assist district staff with longitudinal profiles. Staff recently helped a conservation district conduct three separate long-pros in a county. They started the long-pro at the first site around 9:00 AM and they completed the last site around 1:30 PM. At the end of the day, the technician understood how to do longitudinal profiles and was confident they could complete them independently. An engineer, and hence the need for a municipality to pay an engineer before there is a contract, should not be necessary for this preliminary site

assessment. These skills will be key elements included in the pending Stream Crossing Replacement Certification Training being offered to districts.

- Design Survey: The preliminary measurements taken in the initial site assessment, including a long-pro, described above are different than an engineer's design survey, which will be used in the creation of the formal project design. The design engineer will frequently send out a survey crew to complete the design survey for a stream crossing. While these crews are often experts in "how to survey", they are often accustomed to surveying for parking lots, developments, stormwater systems, etc. The surveyors are rarely experts in stream morphology and function, and therefore do not understand the purpose of a long-pro or what specific shots are needed. Therefore, district involvement is critical to ensuring the surveyor does a complete long-pro survey. Without this interaction, additional costs may be incurred since many surveys would not be sufficient and would have to be redone.
- Additional responses pertaining to longitudinal profiles are located below in the technical comments section.

28) Can the conservation district have someone else (CDGRS/TU/Engineer) conduct the long-pro? (3 counties)

- While it is not realistic to expect Center, SCC, TU or other entities to be able to effectively conduct long-pros on all potential projects, those entities are available to help train and assist conservation districts with long-pros. The pre-application long pro should be a relatively simple and quick process. Districts may enlist outside entities (engineers, etc.) to conduct long-pros, but reimbursements for these pre-contract services would have to come out of conservation district administrative funding or from the grant applicant.

29) Concerns about needing landowner permission to conduct the a long-pro. (2 counties)

- District staff should always seek permission when working on private property. If permission cannot be obtained to conduct a site assessment, it is unlikely that permission could be obtained to complete project work. If permission to work off-ROW cannot be obtained, the project cannot be completed.

30) Conservation district staff should not be required to be on-site for the Engineering Site Survey, many citing liability concerns with "overseeing" engineers. (10 counties, 1 agency)

- Conservation districts are not expected to "oversee" the entire design survey conducted by the engineer, only the aspects related to the longitudinal profile. The preliminary measurements taken in the conservation district's pre-contract site assessment are different than an engineer's design survey, which will be used in the creation of the formal project plans. The design engineer will frequently send out a survey crew to complete the design survey for a stream crossing. While these crews are often experts in "how to survey", they are often accustomed to surveying for parking lots, developments, stormwater systems, etc. The surveyors are rarely experts in stream morphology and function, and therefore do not understand the purpose of a long-pro or what specific shots are needed. Therefore district involvement is critical to ensuring the surveyor does a complete long-pro survey. Without this interaction, additional costs may be incurred since many surveys would not be sufficient and would have to be redone.

Structure Size/Type:----------

31) Requirement for structures to span a minimum of 125% bankfull width is excessive. (3 districts, 3 engineers)

- The requirement to install a structure that is a minimum of 125% bankfull width is to ensure adequate width inside the structure to build a stable stream channel, including bank margins, to ensure stream continuity. Stream crossings that achieve stream continuity best meet the DGLVR Program goal of reducing long-term costs of erosion, sedimentation, and ongoing maintenance. Establishing stream continuity means that a section of stream disconnected and destabilized by an undersized road-stream crossing structure is restored to a stable condition that flows continuously from the upstream channel, through the road, to the downstream channel. Correcting accelerated road and steam erosion is an environmental benefit that also

reduces the need for constant maintenance such as removing debris and sediment aggradation from stream crossing inlets, stabilizing eroding banks, and repairing road and structure wash outs.

- Undersized stream crossing structures are much more likely to fail than structures greater than bankfull width that accommodate continuous stream channels (USFS 2008). The benefits of greater than bankfull width structures were clearly seen in New England following Tropical Storm Irene in 2011 when, "damage was largely avoided at two road–stream crossings where stream simulation design was implemented and extensive at multiple road–stream crossings constructed using traditional undersized hydraulic designs." (Gillespie et al., 2014). It is very expensive when a stream crossing structure fails, both environmentally and economically. A failed stream crossing structure inputs a huge sediment load into the stream, can accelerate stream bed and bank erosion, causes a road closure that interrupts business, can damage adjacent and downstream properties, and can create public safety hazards.
- Cost-benefit analyses from multiple states and the U.S. Forest Service show that modest increases in the initial investment of road-stream crossing structures designed to achieve stream continuity yield substantial economic and societal benefits in the long term (Levine, 2013). These benefits include cost reductions associated with increased flood resiliency and fewer catastrophic failures, reduced annual maintenance costs to the road owner, reduced erosion and sedimentation, and improved habitat conditions and stream health. Because of this, many US states and organizations, including most New England states, have been incorporating stream continuity into stream crossing guidance and standards in the previous decades (see table below).

State	Type	Entity	Year	Min Structure Width	Min Embedment (material in structure)
PA	Guidance	PA DCNR	2022	1.25 Bankfull Channel Width	20%
PA	Regulation	PA DEP	2013	x	6" or 1' depending on permit
CT	Guidance	CT DEP	2008	1.2x Bankfull	1', or 20% if over 10'
MA	Regulation	Riverways Prog.	2012	1.2x Bankfull, + dry passage	2', or 25% for round pipes
ME	Regulation	ME DEP	2008	25-year flow	
ME	Guidance	USFWS	2017	1.2x Bankfull	2' or 20% (salmon areas only)
NH	Regulation	NH DES	2009	1.2x Bankfull +2' (bridge over 16')	1' – 2', 25% for round pipes
NY	Guidance	NY DEC	?	1.25x Streambed Width	20%
VT	Guidance	VT FWD	2007	Bankfull + size of bank rocks	
GA	Guidance	GA DNR	2012	Average channel width	20%
NC	Standard	NC DOT	2003	x	1', or 20% if under 4'
SD	Guidance	SD DOT	2011	1.2 Bankfull	1'
CA	Regulation	CA F&G	2007	1.5x Active Channel Width	20%
OR	Standard	OR DOT	2014	1.25 Ordinary High Water Width	20%
WA	Regulation	?	?	1.2x Bankfull +2'	20%
AZ	Guidelines	AZ F&G	?	Span floodplain with dry passage	17% (1/6 structure height)
RI	Guidance	RI DOT	2019	1.2x Bankfull	2' or 20%
FHWA	Guidelines	US FHWA	2010	X	Structure dependent (2', 20%, 30%)

Minimum structure size and minimum embedment (depth of material in structure) from various entities in other regions of the United States. *Information compiled by the U.S. Fish and Wildlife Service, Chesapeake Bay Field Office (Leah Franzluebbers) and the Maryland Fish and Wildlife Conservation Office (Julie Devers) in March of 2019, updated in September of 2020.*

32) Concerns about requirements that structures be sized to accommodate the 25-year storm at 80% rule, especially related to road elevation (2 counties, 2 engineers)

- This requirement was originally intended, in part, to reduce or eliminate the use of low-profile structures. These low-profile structures (a 12' wide by 3' tall arch pipe for example), even if installed at 125% bankfull, are prone to washing out because the limited rise of the structure prevents adequate streambed construction without excessively reducing the flow capacity. In other words, there is not enough room for both streambed and water in these shallow structures.
- We have had several conversations with USFS and others and are re-evaluating the details of this requirement to increase the flooding capacity and channel stability.

- Based on these comments, it was determined that the program would be best served by requiring structures pass the 100-year storm @ 80% of the opening from the streambed to the top of the structure. For additional details, see the response to this topic in the "technical comments" section of this document.

33) Increasing structure size will mean more structures (anything over 16' bankfull) to fall under PennDOT bridge inspection requirements. (2 counties)

- Bridge inspection for structures over 20' are a requirement of PennDOT and federal regulations. They are not established by the DGLVR program. Districts may establish local policies to not fund structures that will require annual bridge inspections.

34) Requiring bottomless over 4% is too restrictive. Changes will require higher cost bottomless structures on small channels (2-5' bankfull) above 4%. (2 counties, 1 engineer)

- While installing bottomless structures on streams with a slope of 4% or greater and a small bankfull width may increase structure costs, there are also benefits to this method. It is very difficult to build a stream bed correctly and make it stay in a small stream crossing structure with a bottom. This is especially true considering that larger rocks are needed to stabilize steeper stream channels. Requiring bottomless structures for channels 4% or steeper, even small channels, is intended to improve the constructability and long-term success of the crossings.
- The SCC, Center, and Policy and Planning Workgroup discussed the cutoff slope for bottomless structures at length and decided that 4% would best suit most project sites. We acknowledge that Pennsylvania includes diverse landscapes and one policy will not fit every potential project site perfectly. Any sites with extenuating circumstances may qualify for an exemption from following the standard (and therefore the bottomless requirement), either automatic for smaller structures, or SCC approved for slightly larger structures.

Working off the Right-of-way:----------

35) What if landowner approval cannot be obtained to go far enough upstream or down to install a project that meets the standard? (3 counties, 1 engineer)

- Off-ROW work is usually needed to implement a successful stream crossing project. It is up to individual districts to evaluate the extent and cost of such work, and the project overall, to make funding determinations based on their local conditions such as allocation and backlog of applications. It is more important for DGLVR funding to install quality projects that meet Program goals than to install a greater number of projects that do not meet Program goals.
- Even with standard drainage projects, there are cases where the Program has had to walk away from funding a project because of the lack of landowner cooperation and inability to implement an effective project. The more impacted the stream is by the undersized crossing, the less likely that a "major improvement" can be made without landowner permission. Therefore, the statement "Contact the SCC in questionable circumstances where a lack of landowner permission may hinder successful project" is included in section 3.4.3 of the proposed technical manual.
- The size of the structure is only one important component to achieving continuity of a stream through a road crossing. Undersized structures that have been in place for many years (the kind of sites the Program is focusing on), have often created channel impacts upstream and downstream from the crossing itself. These impacts are typically in the form of deposition upstream, a vertical offset at the crossing, and excessive erosion and lowering of the channel below the crossing. Simply installing a wider structure does not address the legacy impacts of the previous undersized structure to the stream channel. These impacts carry a high potential for continued erosion and sedimentation within the stream corridor upstream and downstream of the crossing. Restoration and stabilization work beyond the immediate footprint of the roadway and right-of-way (ROW) are almost always needed to address these legacy stream channel

impacts. In fact, with a typical ROW width of 33 feet in PA, many of the new structures themselves extend outside these limits, not even including any channel work. The requirement for off-ROW permission for these projects is no different than it has been for all projects since the Program began. Off-ROW work is usually needed to implement a successful stream crossing project. If off-ROW work is necessary to the successful completion of a project, but permission cannot be obtained, the project cannot be funded.

Overall Project Cost Increases:----------

36) Overall changes may require engineers on small stream crossing replacements that otherwise would not utilize an engineer because the crossing qualifies for a Chapter 105 permit waiver. (2 counties, 1 engineer)

- That would be unusual, but possible. All projects done to the proposed new standard will need engineer design and certification even if a permit requirement is waived. Note that many of these smaller structures may also qualify for an exemption from following the standard, either automatic for smaller structures, or SCC approved for slightly larger structures. Also, a project that receives a program waiver does not need to follow the DGLVR Program standard, but it may still need an engineered design to meet permit requirements.

37) The Statewide DGLVR Program needs a funding increase to address proper stream crossing installations. (3 counties)

- The SCC, Center, and others will continue to look for future opportunities to expand DGLVR funding. In the meantime, a district that does not have adequate funding for stream crossing projects may still install other Environmentally Sensitive Maintenance practices.

Technical Comments: ----------

The summary of technical comments below are the result of multiple reviews and discussions with individuals and agencies including the US Forest Service, PA DEP, PA Fish and Boat, and several engineering firms.

38) Comments from Districts noted concerns with required new structure span (width), rise (height) and storm design conveyance, but other agencies recommended larger structures.

- The purpose of these proposed requirements is to allow for additional opening space (20% of Finished Opening Height) for better conveyance of wood, sediment and debris during flooding, and to discourage the use of low profile (wide but low height) structures, as they have proven to be problematic in establishing and maintaining streambed. Adequate structure height is necessary to: improve constructability; establish proper rock sizing in bank margins and grade control; create a stable streambed; extend structure longevity; and provide greater flood resiliency.
- The SCC and Center have discussed several considerations internally and with technical commenters. These discussions with agencies such as US Forest Service suggest using the 100-year instead of 25-year discharge and a minimum of 1.5x bankfull for structure width.
- Based on discussions with the advisory workgroup and technical reviewers, the Center and SCC propose the following:
    - New stream crossing structures shall be designed to pass, at a minimum, the 100-year, 24-hour discharge at a water surface elevation not to exceed 80% the height of the finished opening area (height from streambed thalweg (lowest point) to either the top of the culvert opening or to the lowest point on bridge beams).
    - The DGLVR Standard includes multiple requirements for structure sizing, including bankfull width channel, bank margins, and 100-year storm outlined above. Once these are met, the width of the structure must be at least 1.25x bankfull.

39) Site Assessment (longitudinal profile and cross sections) concerns noted a need for more clarity and establishing length of the longitudinal profile and location of cross sections.

- In response to the comments regarding the longitudinal profile, the standard has been amended to provide more clarity for the longitudinal profile and cross sections. It also has been amended to specify reference reach criteria. The technical manual has been updated to include more detail on proper longitudinal profiles and cross sections. This will be a major topic discussed in detail during the required stream crossing training.

40) Comments suggest side slope requirements are more stringent than PennDOT:

- The Center and SCC discussed cut/fill slope requirements with technical staff and determined these are necessary for proper stream crossing slope stabilizations.
- The Standard and Policy documents have been updated to specify requirement that headwall and endwall must be included with all stream crossing replacement projects (culverts).

41) Material Testing requirements restrict the use of native material found on-site:

- After discussions with the advisory workgroup, the standard has been updated to note that only quarried aggregate used for grade control, bank margins, and bank protection must meet Program specifications. Native stone found onsite does not need to be tested.

42) Pool Scour and Minimum Invert Bury Depth Concerns

- Pool Depth Multipliers are intended to anticipate "elevated risk" for scour at a given project site and account for max pool scour that occurs during a flood. These are based on site specific factors that contribute to elevated risk of scour. Multipliers are intended to be conservative and to account for max pool scour during flood and streambed material that is often undersized.
- The bury depth of structure invert or bottom of footing has been clarified to note it is measured from the thalweg at a grade control, not at the pool elevation. It has also been updated so that the minimum bury depth is 24 inches (increased from 18 inches) or the depth determined with scour analysis models or the Anticipated Scour Depth, whichever is greater.

43) Comments noted concern with lack of specified substrate (streambed) material mix design.

- The SCC and Center worked with technical commenters and the advisory workgroup to discuss options in detail about expanding the specification to include more streambed design detail. After discussions, it was decided to expand the guidance provided in the technical manual related to streambed design, but not to create additional requirements in the standard.

References:

- Gillespie, N., A. Unthank, L. Campbell, R. Gubernick, D. Cenderelli, M. Weinhold, P. Anderson, D. McKinley, S. Roy, B. Austin, S. Wells, J. Rowan, C. Orvis, R. Kirn, M. Hudy, A. Bowden, J. Levine, A. Singler, and E. Fretz. 2014. *Flood Effects on Road-Stream Crossing Infrastructure: Economic and Ecological Benefits of Stream Simulation Designs*. Fisheries Vol 39(2): 63-76.
- Levine, J. 2013. *An Economic Analysis of Improved Road-Stream Crossings*. The Nature Conservancy, Adirondack Chapter, Keene Valley, NY.
- Massachusetts Department of Fish and Game Division of Ecological Restoration. 2015. Community Benefits of Stream Barrier Removal Projects in Massachusetts: Costs and Benefits at Six Site. Prepared by Industrial Economics, Incorporated.
- *Table: Minimum structure size and minimum embedment (depth of material in structure) from various entities in other regions of the United States*. Data Summarized from USFWS. Information compiled by the U.S. Fish and Wildlife Service, Chesapeake Bay Field Office (Leah Franzluebbers) and the Maryland Fish and Wildlife Conservation Office (Julie Devers) in March of 2019, updated in September of 2020.

- USFS, U.S. Forest Service Stream Simulation Working Group. Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road–Stream Crossings. Publication 0877-1801. San Dimas Technology and Development Center, U.S. Department of Agriculture, Forest Service. 2008.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

Agenda Item: 6. E

Date: **April 27, 2022**

To: **State Conservation Commission**

From: **Roy Richardson, Dirt and Gravel Roads Program Coordinator**

Through: **Karl G. Brown, Executive Secretary**

RE: **Dirt, Gravel, and Low Volume Roads Program (DGLVR) – Proposed changes to the Administrative Manual**

Background - The State Conservation Commission (Commission) last approved updates to the DGLVR Administrative Manual (manual) in May 2020. Proposed changes to the stream crossing policy have been discussed in prior agenda items. In addition, staff recommends several other changes and clarifications to the manual.

Proposed changes – Commission and Center have developed these recommended changes and have reviewed them with the Policy and Planning workgroup. In addition, the proposed changes have been reviewed by PDA legal staff. The document provided here is in "track changes" format to assist in highlighting changes from the 2020 manual. Many of the changes were minor clarification or corrections. The more significant changes are as follows:

- 3.3.4 – Clarification on how expenses are tracked in the GIS
- 3.4.2 – Clarification on Cost Allocation Methodology
- 3.4.2 – Clarification on eligible administrative expenses
- 3.4.3 – Clarification on eligible education expenses
- 3.5.3 – Increased threshold for amendments from 20% to 40% of original contract amount
- 3.7.4 – Clarification on when headwalls and end walls must be used
- 3.7.4 – Clarification on when FEMA rates must be used for rented equipment
- 3.7.4 – Increased maximum allowed for engineering costs from 10% to 20% of contract amount with a $25,000 cap
- 3.7.4 – Reinforced the importance of obtaining permission to work off ROW
- 3.8.5 – Reinforced that no preparation or design costs are eligible for reimbursement until a contract is signed

- 3.9 – require conservation districts to fill out contracts, contract amendments, and completion reports in the DGLVR GIS
- 4.3.1 – Clarification of Sunshine Act requirements for QAB site visits
- 7.1.0 – Stream crossing policy changes already discussed in prior agenda items
- 7.2.1 – Driving surface aggregate changes already discussed in a prior agenda item
- 7.2.3 – Fill exemption for DSA: changed from requiring a minimum of 12 inches of road fill including the thickness of the driving surface to a minimum of 12 inches not including the driving surface
- 7.4.2.1 – Clarified that the use of petroleum solvent based "cutback asphalts" such as MC-30 and MC-70 are not allowed for use in the Program
- Appendices Deleted: Contract, contract amendment, and completion report are proposed to be removed as appendices since they are now generated by the GIS
- Appendices added or updated:
    - Appendix E – New appendix to show examples of cost allocation methods
    - Appendix F – The DSA Standard and Specification with the proposed new changes
    - Appendix G – The proposed new Stream Crossing Replacement Standard
    - Appendix H – Stream Crossing Replacement evaluation
    - Appendix I – Exemptions from Stream Crossing Standard

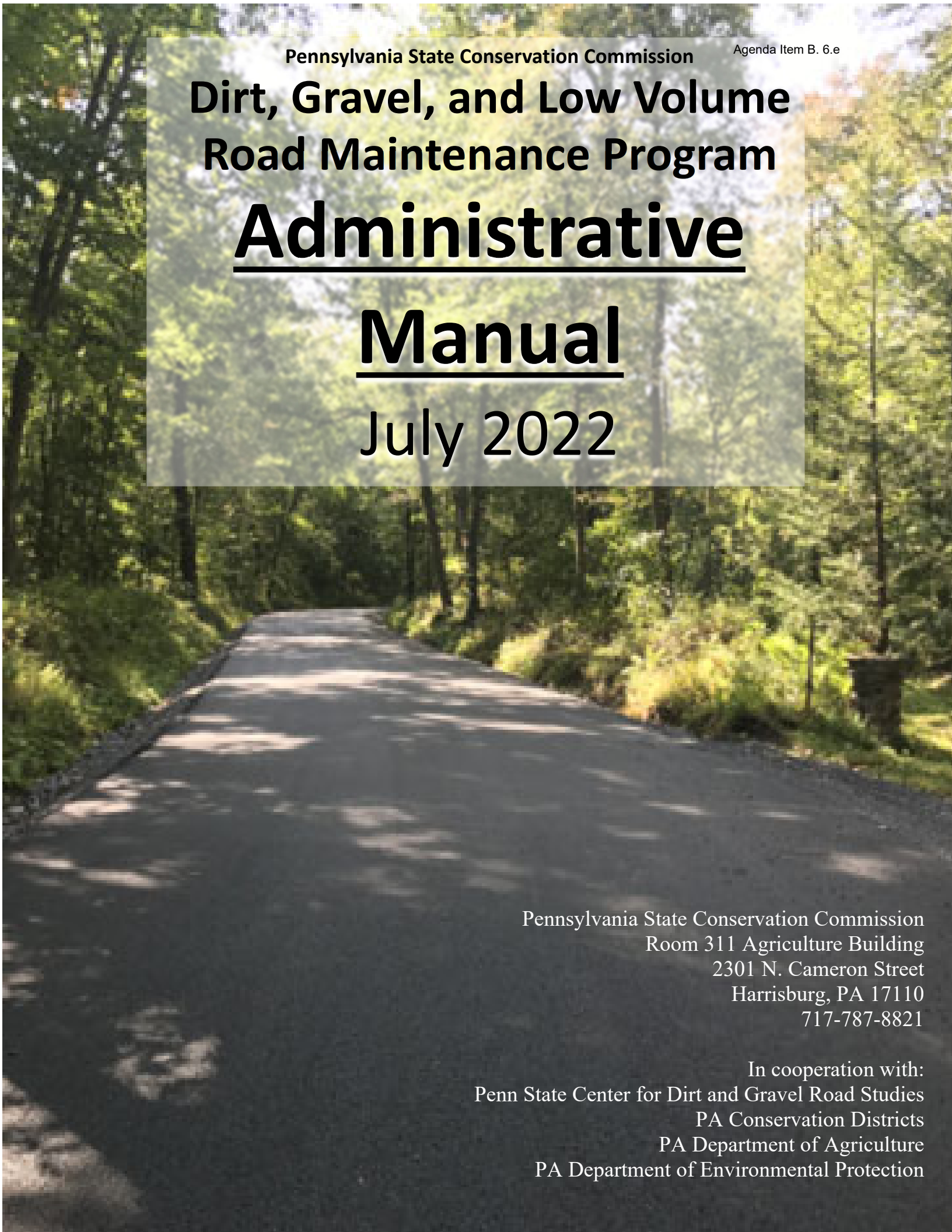
Staff recommends these changes to the DGLVR Administrative Manual for approval.

Pennsylvania State Conservation Commission

Dirt, Gravel, and Low Volume Road Maintenance Program

Administrative Manual

July 2022



Pennsylvania State Conservation Commission
Room 311 Agriculture Building
2301 N. Cameron Street
Harrisburg, PA 17110
717-787-8821

In cooperation with:
Penn State Center for Dirt and Gravel Road Studies
PA Conservation Districts
PA Department of Agriculture
PA Department of Environmental Protection

Pennsylvania Dirt, Gravel, and Low-Volume Road Maintenance Program

Before picture of cover photo project. 800 feet of underdrain and a 500 foot French Mattress served to dry out this saturated roadbed. Paving was done in-kind.

Photo Credits:
Cumberland County Conservation District

Administrative Manual

July 0122, 20220

Questions or Comments:

State Conservation Commission
Program Coordinator
2301 North Cameron Street,
Harrisburg, PA, 17110
717-787-2103

Table of Contents is auto updating, but updating with track changes makes a mess. The TOC will be updated after changes are accepted

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ADDITIONAL REFERENCES

This Administrative Manual is intended to help Conservation Districts administer the Dirt, Gravel, and Low-Volume Road Program in their county. In addition to this Manual, several other more technical resources are available through the Center's website at www.dirtandgravelroads.org

DSA Handbook: Comprehensive Guide to Driving Surface Aggregate, the only approved surface aggregate for use on Dirt and Gravel Road Projects

Stream Crossing Technical Manual: Comprehensive Guide for the planning, design, and installation of stream crossing structural replacements.

Product and Process Approval Guide: The Program uses an approval process for products such as dust suppressants and soil stabilizers before they can be paid for with Program funds. Both the product approval instructions and list of approved products are available on the Center's website

Environmentally Sensitive Maintenance References:

- Technical Bulletins: A collection of technical documentation for many of the ESM practices used by the Program is available on the Center's website.
- ESM Field Guide: "Glove-box guide" developed in association with the US Forest Service based largely on Program ESM Practices.
- ESM training book: The training book given out at the ESM training.

Chapter 1

Introduction

NOTE THAT FORMATTING AND MARGINS ARE MESSED UP DUE TO TRACK CHANGES. THIS WILL BE FIXED AFTER CHANGES ARE ACCEPTED

1. INTRODUCTION

This manual is intended to outline policy and provide guidance to participants of the Dirt, Gravel, and Low-Volume Road Maintenance Program (Program). The primary audience of this manual is county conservation district (district) personnel who work with the administration of the Dirt, Gravel, and Low-Volume Road Maintenance Program. This includes not only district managers and staff but Quality Assurance Board (QAB) members and district directors as well. Grant applicants may find sections of the manual, Chapter 5 in particular, useful when developing projects and preparing grant applications.

It is the intent and purpose of this Program:

(1) to fund safe, efficient and environmentally sound maintenance of sections of dirt and gravel roads which have been identified as sources of dust and sediment pollution.

(3) to fund safe, efficient and environmentally sound maintenance of sections of low-volume roads that are sealed or paved with an average daily traffic count of 500 vehicles or less.

-9106 (A) (1),(3)

1.1 Program Purpose

The purpose of the Program is to create a better public road system with a reduced environmental impact. The Program focuses on "Environmentally Sensitive Road Maintenance Practices" that reduce the impact of road runoff and sediment to local streams, while reducing long term road maintenance costs.

1.2 Program Structure

Statewide funding and guidance comes from the State Conservation Commission (Commission). Local districts, and their associated Quality Assurance Boards, develop local policies and award grants to public road-owning entities. Public entities such as townships and boroughs apply to the districts for funding and complete the project work.

1.2.1 State Conservation Commission

The Commission, a departmental administrative commission under the concurrent authority of the PA Department of Environmental Protection (DEP) and the PA Department of Agriculture (PDA), administers the Dirt, Gravel, and Low-Volume Road Program. The Commission determines statewide Program policies, allocates funds to districts, and implements a quality assurance / quality control effort. The role of the Commission is detailed in Chapter 2 of this manual.

1.2.2 Conservation Districts and Quality Assurance Boards (QABs)

Conservation districts administer and implement the Program at the county level. Districts accept applications for funding from potential applicants, and award grants to local road owning entities. District staff is responsible for working with grant applicants to develop projects, project oversight, financial tracking and reporting, and general administration of the Program at the county level. District staff should work closely with the QAB described below. The role of districts is detailed in Chapter 3 of this manual.

Each district is required to form a Quality Assurance Board (QAB) made up of four members including district staff, PA Fish and Boat Commission, and Natural Resource Conservation Service. The QAB acts in an advisory capacity to the district board. The QAB, working closely with district staff, is responsible for recommending local Program policies, developing application ranking criteria, and recommending projects for funding. All policies and funding recommendations by the QAB must be adopted by the district board. The role of the QAB is detailed in Chapter 4 of this manual.

1.2.3 Grant Applicants

Any state or local public entity that owns and maintains public roads is eligible to apply for Program funding. The majority of applicants are townships, but other entities such as boroughs, cities, counties, PA Game Commission, PennDOT, PA Fish and Boat Commission, and others are eligible to apply. Applicants are encouraged to work closely with districts, starting with a pre application meeting. Successful applicants will enter into contracts with county districts to complete project work. Applicants can complete project work themselves, or by hiring contractors. The role of grant applicants is detailed in Chapter 5 of this manual.

1.2.4 Penn State Center for Dirt and Gravel Road Studies (Center)

The Center was formally created in 2001 to address the education, training, and technical assistance needs of the Dirt, and Gravel Road Maintenance Program. The duties of the Center include: development and delivery of a two-day training course for Program eligibility, holding annual maintenance workshops, providing technical and administrative assistance to Program stakeholders, approval of new products, maintenance of GIS project tracking system, development of technical reference material, and supplying general support to the Commission and districts. The role of the Center is detailed in Chapter 6 of this manual.

1.3 Program History

1.3.1 Unpaved Roads and Sediment

Sediment is the largest pollutant by volume to the waters of the commonwealth. Pennsylvania's 20,000 miles of publicly owned unpaved roads are a prime example of non-point source pollution. Unpaved roads not only generate sediment, but also act as collectors for runoff and sediment from adjacent land uses. Traditional practice in road maintenance has been to convey water along roads and deposit it into streams by the quickest means possible. This practice results in increased flood flows in streams and transports sediment and a host of other pollutant into local waterways.

1.3.2 Unpaved Road Inventory

The Pennsylvania Chapter of Trout Unlimited (TU) first brought the problem of unpaved road runoff into the spotlight in 1991. TU sportsmen in Centre and Potter County State Forests were the

driving force behind the developing grassroots effort to reduce sediment pollution from dirt and gravel roads.

A Task Force on Dirt and Gravel Roads was created in 1993 to investigate, research and document the significance of sediment and dust, as well as other forms of water pollution resulting from dirt and gravel road maintenance practices. This private-public partnership enlisted members representing nonprofit organizations, businesses and local, state, and federal government agencies.

In the summers of 1996-1998, volunteers from TU went out at their own expense and drove thousands of miles of roads in an effort to identify pollution sites on Pennsylvania's dirt and gravel roads. TU inventory volunteers recorded locations where roads were adversely impacting a stream, concentrating on Pennsylvania's High Quality and Exceptional Value watersheds. The efforts put forth by the volunteers resulted in the identification and assessment of over 900 sites in protected watersheds statewide. These sites became the basis for creating the Dirt and Gravel Road Maintenance Program.

1.3.3 Section 9106 of the PA Vehicle Code

The Task Force achieved its goal in 1997 when a law (Section 9106 of the PA Vehicle Code) was enacted establishing the Pennsylvania Dirt and Gravel Road Maintenance Program. The law provided a non-lapsing annual allocation of $5Million, with $4Million going to the State Conservation Commission and $1M going to the Department of Conservation and Natural Resources. The Program follows a few key concepts including: local control over projects and decision making; education and training to local stakeholders; simplified grant applications; and implementing long-term road and environmental improvements

1.3.4 Program Timeline

1998: First funding available. Projects begin on 900 pollution sites, or worksites, identified in protected watersheds statewide.

2000: Conservation districts complete assessment of all watersheds, identifying over 12,000 pollution sites statewide.

2001: Center for Dirt and Gravel Road Studies formally created at Penn State University to handle the training, outreach, and technical assistance aspects of the Program.

2003: Conservation districts complete the 1,000th funded worksite through the Program.

2008: A second statewide assessment of unpaved roads in all watersheds increases the inventory to over 16,500 pollution sites statewide.

2009: Conservation districts complete the 2,000th funded worksite through the Program.

2013: Act 89 of 2013 is enacted, effectively increasing the funding for the Program from $5Million to $35Million annually in 2014-15. The Act dedicates $28Million of this to the Commission, and also mandates that $8M of that money be used for the maintenance of low-volume paved roads with less than 500 vehicles per day.

2015: The Program completes its first 74 paved LVR contracts with new funding, Dirt and Gravel completed contracts hit the 3,000 mark

2018: The first 5-year contract under increased funding is completed, with over 4,300 Dirt and Gravel and 500 LVR contracts completed since the Program began.

2021: The Program completed its 6,000th project

2022: Spending by conservation districts ~~will pass~~passed a quarter of a billion dollars (includes project spending on completed and active contracts, administrative, and education spending)

1.3.5 Low-Volume Roads

Act 89 of 2013 specifies that "A minimum of $8,000,000 of the total appropriated annually shall be for maintenance and improvement of (paved) low-volume roads." The act further defined low-

volume roads as "sealed or paved with an average daily traffic count of 500 vehicles or less." The low-volume road portion of the Program focuses on the same environmental improvements as the Dirt and Gravel Road portion, not just paving and re-paving roads. For more information on the low-volume road specific issues, see Section 7.4.

1.4 Environmentally Sensitive Maintenance Overview

1.4.1 Worksites

> ***Worksite**: A worksite is an identified portion of road that impacts water quality. The Program uses worksites to focus funding to improve water quality.*

A worksite is an identified portion of a road that impacts water quality. The Program has both paved Low-Volume Road (LVR) worksites and Dirt and Gravel (D&G) worksites. A worksite has an identified beginning and end that demarks the limits of the section of road impacting the stream and other water bodies. The Program uses worksites to ensure project funding is focused only on those sections of road that impact water quality. The areas outside of worksites may be in need of repair or be generating sediment, but do not have a direct connection to a stream or water body (typically on higher ground away from water).

Districts have identified over 17,000 D&G worksites statewide on unpaved roads. The majority of these D&G worksites were identified in statewide "assessments" completed in 2000 and 2008. These assessments also evaluated each worksite according to the "pollution potential" on the site and provided it with a score. Districts may use this assessment score in their application rankings. Worksites have also been added over time as needed. Districts may add worksites to their inventory at any time. Worksites range in size from a single stream crossing to over a mile in length. The average D&G worksite size funded in the first 17 years of the Program is 0.45 miles in length.

There is no established database of potential LVR worksites. LVR worksites should be identified by applicants and confirmed by the districts using similar principles as the D&G worksites (identifying limits of water quality impact).

1.4.2 Environmentally Sensitive Maintenance (ESM)

> ***ESM**: **Environmentally Sensitive Maintenance** promotes permanent road improvements that reduce concentrated drainage, prevent erosion, and reduce long-term road maintenance costs.*

Because this is an "administrative" manual, only a brief overview of ESM practices is given here. For complete information and documentation of ESM practices, attend the Program's ESM training or see the technical documentation on the Program's website at www.dirtandgravelroads.org.

ESM is a term used to describe a suite of principles and practices that are designed to create a more environmentally and financially sustainable public road system. They are long term practices designed to reduce erosion and maintenance within the road area.

Long-term environmental benefits are achieved by attempting to "restore natural drainage" to a state similar to how it was before the road existed. In contrast to traditional "stormwater systems" that are designed to collect and convey large volumes of runoff, ESM practices focus on diffusing flow at the source, encouraging infiltration and reducing concentrated flow volumes. Environmental benefits of this approach to waterways include reduced sediment and other pollutant delivery, and reduced flood flows by "disconnecting" the road drainage system.

Long-term financial benefits are achieved because the same forces of erosion that cause environmental damage translate into increased maintenance costs as well. Every time a road, ditch, or bank washes out, it requires a large time and money investment by the local road owning entity. Some ESM practices may have higher than average up-front costs, but they save money over their lifetime by reducing future maintenance needs and costs.

1.4.2.1 ESM Principles

- Avoid concentrating drainage where possible
- Minimize Flow Volumes
- Reduce effects of concentrated drainage
- Reduce surface erosion
- Reduce cost and frequency of road maintenance

1.4.2.2 Example ESM Practices

The following is a **very brief** summary of some of the Program's most common ESM practices taught in the two-day ESM training course:

- **Road/Stream Interactions:** ESM practices for stream crossings focus on reducing the sediment delivery to the stream, stream stability issues, and the stream crossing itself. Practices such as highwater bypasses, French mattresses, proper stream crossing sizing, better bridge and pipe design, and in-stream flow control structures can be effectively used to stabilize the road/stream interface.
- **Road Surface:** ESM practices for the road surface include drainage control and improved aggregate. Drainage control starts with proper crown and cross-slope, but also includes practices such as grade breaks, berm removal, and broad-based dips. Improved surface aggregate focuses on the Program's Driving Surface Aggregate and includes maintenance concerns such as grading and pothole repair.
- **Road Base:** Practices that improve the base of a road include mechanical base improvements, underdrains, French mattresses, and in some cases full-depth reclamation.
- **Vegetation management practices:** Practices that manage vegetation in a sustainable manner will reduce erosion from the road area and save on future maintenance costs associated with tree trimming and cleanup. Practices include selective thinning, proper pruning, seeding and mulching, and managing vegetation for long term stability.
- **Road Bank management practices:** Practices that stabilize the upslope or downslope road bank include slope reinforcement, filling the road profile, naturalizing bank shape, and natural or mechanical slope reinforcement.
- **Road Ditch and Outlet Stabilization:** ESM practices for ditches include anything that reduces the flow in the ditch. The simplest of these practices is to provide more drainage outlets in the form of new turnouts and crosspipes. Selecting locations to outlet water and choosing the proper outlet stabilization methods is also important. Other practices such as berm removal and filling the road profile attempt to eliminate ditches completely and promote sheet flow. Practices to reduce the effect of subsurface flow such as underdrains are also important.
- **Off right-of way practices:** Practices that start outside the road area in an effort to reduce the amount of water coming to the public road. Interceptor swales and bank benches reduce the amount of overland flow coming to the road. Driveways and access lanes are often large contributors of water to the public road and can be addressed by re-profiling or with surface control features such as grade breaks, water bars, or conveyor belt diverters.

- **Paved Low-Volume Road Specific Practices:** Low-volume roads may require an added set of ESM practices, especially those located in urban areas where traditional drainage dispersal and infiltration practices may not be practical. LVR-specific practices will evolve over time, but should focus on making improvements to both the environment and the road.

Chapter 2

State Conservation Commission Role

2. STATE CONSERVATION COMMISSION ROLE

2.1 Commission Structure

The Pennsylvania State Conservation Commission (Commission) is a 14-member commission that has a primary mission to ensure the wise use of Pennsylvania's natural resources and to protect and restore the natural environment through the conservation of its soil, water, and related resources. The Commission provides support and oversight to the state's 66 conservation districts for the implementation of conservation programs in an efficient and responsible manner.

The Commission administers several state conservation programs including the Dirt, Gravel, and Low-Volume Road Maintenance Program, the Nutrient Management and Odor Management Program, Resource Enhancement and Protection (REAP Tax Credit) Program, Conservation Excellence Grant (CEG), Agri-Link, and the Leadership Development Program. Staff also provides oversight and professional certification for nutrient management specialists, odor management specialists and manure hauler and brokers.

The Commission is a departmental administrative commission under the concurrent authority of the PA Department of Environmental Protection (DEP) and the PA Department of Agriculture (PDA). The Commission is administratively housed with PDA. The Commission accomplishes its mission by working cooperatively with local, state and federal government agencies, numerous industry and professional associations and nonprofit organizations.

2.2 Program Administration

The Commission approves all policies affecting the districts regarding the Dirt, Gravel, and Low-Volume Road Maintenance Program. The state-level staff consists of a program coordinator and support staff that provides oversight to the program.

2.2.1 Program Coordinator

The Commission, through the program coordinator, is responsible for the administration of the program. Districts and Center staff are encouraged to contact the program coordinator for answers to administrative questions on topics such as: program policy interpretation; funding advances; replenishment requests; questions on state policies; questions on two year spending requirements; questions about setting local policies; administrative issues regarding local projects; ombudsman issues – conflict resolution; and other general administrative issues.

2.2.2 Coordination with Other Agencies

The Commission works closely with local districts to implement the Program through a five-year agreement. The Commission allocates funds to the districts, answers administrative and policy questions, and acts as an ombudsman to resolve any disputes that arise. The Commission will periodically visit each district to perform a quality assurance/quality control (QAQC) evaluation to assure that the Program is administered properly in each individual county.

In addition to QAQC evaluations, the Commission requires an annual audit of all district funds including Dirt, Gravel, and Low-Volume Road Maintenance Program Funds. The Commission may require other reporting to assure that the Program is properly administered.

The Commission also works closely with the Center for Dirt and Gravel Road Studies (Center) through a multi–year agreement, primarily for education, outreach, and technical assistance to Program participants. The Center's role is detailed in Chapter 6 of this manual.

The Commission works with the Department of Environmental Protection (DEP), mainly through DEP's conservation district field representatives (field reps). Field reps attend district board meetings and answer programmatic questions on a local level. Field reps also assist with programmatic

activities such as the Annual Workshops. The Commission, DEP, Districts, and the Center work together on other programmatic issues such as permitting, erosion and sediment controls, etc.

The Commission also partners with other state and local agencies and organizations such as: PA Fish and Boat Commission; Department of Conservation and Natural Resources (DCNR), Natural Resource Conservation Service (NRCS), PA Game Commission; PA State Association of Township Supervisors (PSATS), PA State Association of Boroughs (PSAB), PA Department of Transportation (PennDOT), Trout Unlimited, and others.

2.2.3 Apportionment of Funds to Conservation Districts

2.2.3.1 Agreements with Conservation Districts

Funding is apportioned by the Commission to conservation districts through a five-Year contract that allows the funding transfer without initiating annual contracts or contract amendments. For more information on this arrangement, please contact the DGLVR Program Coordinator at the PA State Conservation Commission.

2.2.3.2 Dirt and Gravel Allocations

Dirt and Gravel road funding is allocated based on a formula developed by staff with input from advisory work groups and approved by the Commission. The formula considers miles of dirt and gravel roads, length of identified pollution sites (worksites), local cost of limestone, and the miles of dirt and gravel roads in HQ/EV watersheds. The Commission approves district allocations for dirt and gravel roads maintenance annually. A copy of the formula and an explanation of how the formula works can be found at www.dirtandgravelroads.org. The Commission publishes the allocation of funds to the individual counties in the Pennsylvania Bulletin.

2.2.3.3 Low-Volume Road Allocations

Like the Dirt and Gravel Road allocations, Low-volume Road allocations are allocated based on a formula developed by staff with input from advisory workgroups and approved by the Commission. The formula currently considers the actual miles of low-volume state roads, the potential miles of low-volume local roads, the distance of roads to a stream, and whether a road is located in an urban or rural environment. The Commission approves district allocations for low-volume roads maintenance annually. A copy of the LVR formula and an explanation of how the formula works can be found at www.dirtandgravelroads.org. The Commission publishes the allocation of funds to the individual counties in the Pennsylvania Bulletin.

2.2.3.4 Apportionment Process to Conservation Districts

The Commission advances 50 percent of a district's allocation as advanced working capital. Districts have two years from State budget approval to spend funds (details in 3.3.4). Details on the apportionment of funds from the Commission to districts are detailed at www.dirtandgravelroads.org.

2.3 Quality Assurance / Quality Control

2.3.1 QAQC Structure

~~The Commission will periodically review districts' Dirt, Gravel, and Low-Volume Road Maintenance Program to ensure that they are in compliance with the enabling legislation, regulations and policies. The purpose of the evaluation is to assess the district's administration, functionality, and project work within the Dirt, Gravel, and Low-Volume Road Maintenance Program. The Commission will select districts for QAQC visits and notify them accordingly.~~

~~The visit typically consists of two or three days at the district office reviewing program administration and visiting field sites. The QAQC team may vary in member composition depending on the district being evaluated. The team is typically composed of personnel from the Commission, the Center for Dirt and Gravel Roads Studies and DEP.~~

~~DEP field representatives have an important role in the QAQC visits and the subsequent follow-up that may be required. The field representatives will be involved in administrative review prior to the QAQC visit. Field representatives also play an important role after the QAQC visit by sharing successful strategies with other districts and insuring any recommendations for improvement are implemented by the district.~~

~~The evaluations are conducted based on three components of the Program: Program Administration, Program Functionality and Project(s). The outcome of the QAQC process will be written description commendations, recommendations, and if needed, required actions.~~ The Commission will periodically review districts' Dirt, Gravel, and Low-Volume Road Maintenance Program to ensure that they are in compliance with the enabling legislation, regulations and policies. The purpose of the evaluation is to assess the district's finances, administration/functionality, and project work within the Dirt, Gravel, and Low-Volume Road Maintenance Program. The Commission will select districts for QAQC visits and notify them accordingly. The visit typically consists of one or two days at the conservation district to review program administration and visit field sites. The QAQC team may vary in member composition depending on the district being evaluated. The team is typically composed of personnel from the Commission, the Center for Dirt and Gravel Roads Studies and DEP. DEP field representatives may assist the district in preparing for the QAQC visit, if the district would like. Field representatives also may also share successful strategies with other districts and help with recommendations for improvement. The evaluations are conducted based on three components of the Program: Financial Review, Administration/Functionality, and Project(s). The outcome of the QAQC process will be written a written report detailing commendations, recommendations, and if needed, required actions.

2.3.2 QAQC Visit

~~As part of the QAQC visit, the team will interview the district manager, the QAB members, and any district staff that is involved in fieldwork or administration of the Program. Members of the team may also conduct interviews with selected grant recipients in the county under QAQC review. Program finances will also be reviewed as part of the QAQC process. A minimum of three completed sites will be visited by the QAQC team as part of the formal assessment. After the conclusion of the interviews and site visits, the assessment team will prepare a preliminary report that will describe the results of the team's visit. The team will discuss the preliminary report with the district manager and any district staff or board members, or QAB members who may wish to be present. This can be completed in person or via conference call, depending on the District's preference.~~ Prior to the QAQC visit, the SCC will send out a pre-visit letter detailing the overall QAQC process as well as any pre-visit information the district is required to submit. As part of the QAQC visit, the team may interview the district manager, the QAB members, financial staff, and any district staff that is involved in running the Program. The SCC also asks the district to invite their district board to participate in the QAQC visit and interviews. Members of the team may also conduct interviews with grant recipients in the county under QAQC review. Program finances will also be reviewed as part of the QAQC process. Holding interviews prior to the in person visit often allows for more time reviewing projects in the field. The QAQC team will discuss interview times when preparing for the visit. The QAQC

team will visit as many field sites as practical during the in person visit. The QAQC team will work with the district to determine a final list of projects to review. After the conclusion of the interviews and site visits, the QAQC team will prepare a preliminary report that will describe the results of the team's visit. The team will discuss the preliminary report with the district manager and any district staff, board members, and/or QAB members who may wish to be present. This can be completed in person or via conference call, depending on the district's preference.

2.3.3 QAQC Follow-up

The district will have two weeks to submit written comments on the preliminary report to SCC Staff. ~~the Program Coordinator. The Dirt, Gravel, and Low-Volume Road Maintenance Program Coordinator will have two weeks from the closure of the comment period to~~ SCC Staff will collate and consider comments from those interviewed and prepare and distribute the final QAQC report to the district.

The final report of the evaluation may include a written list of recommendations or requirements that need improvement. In order for a district to remain compliant with Program guidelines and to remain eligible for future allocations, ~~written recommendations and requirements~~required actions, if any, must be addressed to the satisfaction of the Commission in a timely fashion.

Either the Commission or a district may request a re-evaluation of a District's Dirt, Gravel, and Low-Volume Road Maintenance Program. ~~after a minimum of six months have passed from the previous evaluation.~~ Commission staff will communicate with ~~–~~ districts regarding any required actions needed as a result of a QAQC visit to ensure they are implemented.

Chapter 3

Conservation District Role

3. CONSERVATION DISTRICTS ROLE

3.1 District Structure

In 1945, Pennsylvania General Assembly recognized the need to support grassroots conservation efforts. As a result, the Conservation District Law was passed, and districts were created. Today there is a district established in every Pennsylvania County except Philadelphia.

Conservation districts implement a variety of programs, and provide assistance for a range of issues unique to their county, such as: Dirt, Gravel, and Low-Volume Roads Program; Abandoned Mines; Agricultural Land Preservation; Chesapeake Bay Program; Environmental Education; Erosion & Sedimentation Pollution Control; Floodplain Management; Forest Management; Nutrient Management Program; Storm Water Management; Waterway Protection; West Nile Virus Surveillance Program; Wildlife Management; and more.

Each district is led by a board of directors made up of local people from all walks of life. These volunteers study county natural resource issues and make decisions which enhance and protect the local community.

3.2 Overview

Section 9106 of the PA Motor Vehicle Code created a dedicated, non-lapsing fund to provide money and training to local communities for local road maintenance. Annually, $28 million is distributed by the Commission to districts in Pennsylvania through a five-year agreement.

The districts are the entities that administer the Dirt, Gravel, and Low-Volume Road Maintenance Program. Each county utilizes a Quality Assurance Board (QAB) that advises the District on local program policies and recommends projects for funding. The role of the QAB is detailed in Chapter 4 of this manual.

District staff plays a very important role in the administration of the Program by performing a wide variety of tasks including education and outreach, project evaluation, technical assistance, project oversight, accounting, and auditing.

3.3 Receiving Funds from Commission

3.3.1 Five-year Agreement

Funding is apportioned by the Commission to districts through a five-year agreement that allows the funding transfer without initiating annual contracts or contract amendments. ~~Districts may take advantage of electronic transfer of funds from the Commission~~. The PA Treasury is requiring all vendors, including conservation districts, to receive funds via direct deposit. Districts may find it easier to keep "Dirt and Gravel" and "Low-Volume Road" funds in separate accounts. However, it is not required to have a separate account for dirt, gravel, and low-volume road funds, as long as they can provide for separate accounting of the funds.

3.3.2 Advance Working Capital

Districts will receive 50 percent of their annual allocation as advanced working capital. The Commission may withhold advance payments at their discretion. Advanced working capital is typically distributed to districts in October for each fiscal year. No district action is required to receive advanced working capital other than to have an active five-year agreement with the Commission and to be in compliance with the Commission spending requirements outlined below.

When the working capital advance is disbursed to the district, it will be accompanied by a detailed statement approved and signed by the Commission showing the total amount advanced, the maximum amount that may be used for administration, the maximum amount that may be used for education, the minimum amount that must be used for projects, in addition to identifying the amount available for replenishment in that year's allocation. This form must be retained in the district's files for audit and QAQC purposes. The Commission may require periodic reporting of funds remaining in district accounts.

3.3.3 Replenishment of Working Capital

As districts spend advanced working capital on administration, education, and project work, they are eligible to receive a replenishment of funds from the remaining 50 percent of their allocation remaining in Harrisburg. Only funds that have been spent by the district or advanced to grant recipients, not simply committed to a contract, are claimed as replenishments. Replenishment of advanced working capital is done through the Program's DGLVR Mapper during quarterly reports detailed in Section 3.10 and 3.11. Actual expenditures are reported each quarter, and replenishments will be automatically generated. Two separate replenishments are generated each quarter, one for Dirt and Gravel, and one for Low Volume, until the district's funds remaining in Harrisburg have all been disbursed.

3.3.4 Spending Requirements

Districts are required to spend their entire allocation ~~(projects, administration, and education)~~ within two years of state budget approval in order to be eligible for future allocations. If a district does not spend sufficient funding, the funds will revert back to the control of the Commission. The Commission may also determine that the district is ineligible for future allocations, or reduced future allocations. When that occurs, that district's future allocation(s) may be distributed to other districts using existing allocation formulas. Districts that miss one or more year's allocation will be eligible for future allocations once again after the two-year spending requirement is met. The Commission may, at its discretion, extend the two-year spending requirement if circumstances warrant.

Dirt and Gravel Road allocation spending must be tracked separately from Low-Volume Road allocation spending. Ineligibility for Dirt and Gravel Road allocations does not necessitate ineligibility for Low-Volume Road allocation, or vice-versa.

Administrative and education/training expenses must be utilized in the fiscal year they are allotted. DGLVR funds cannot be used for administrative or education/training expenses after the end of the allotted fiscal year without written permission from the State Conservation Commission. At the end of the first fiscal year, all remaining DGR and LVR funds from the allocation must be spent on projects as outlined in Section 3.4.4 and 3.7.

Each conservation district's spending requirements are tracked in the GIS (see sections 3.9-3.11). The funds available to be spent on administrative and education/training costs are tracked in the "Claimable Admin/Edu" tool within the quarterly report tool.

The 2-year spending requirement is tracked in the Annual Summary Report tool in the GIS. DGR and LVR spending requirements are tracked separately. The total spent is calculated as the sum total of what has been spent on projects under contract, completed projects, administration, and education since the beginning of the Program. The spending requirement is the amount the conservation district must spend to receive the next year's allocation. The spending requirement is equal to the sum total of all allocations the district has received except for the last 2 complete allocation cycles. The difference is calculated by subtracting the total spent from the spending requirement and must be zero or greater for the district to receive the next year's allocation. In order to be eligible for an allocation, a Conservation District can have no more than two years of allocation unspent.

3.3.5 Program Reduction or Termination

The Dirt, Gravel, and Low Volume Road Program is a voluntary program for districts. Districts may choose to receive a reduced allocation, or temporarily suspend their entire allocation for various reasons. Districts may also choose to withdraw from the Program (either ~~D&G~~DGR, LVR, or both) and return funding to the Commission. Districts who elect one of these options may return to full Program participation in future years with Commission approval. To discuss any of the options mentioned above, contact the program coordinator at the Commission.

Pursuant to the five-year agreement between the Commission and districts, when the Commission determines that the terms and conditions of the agreement are not materially being met, the Commission may, after 30 day written notice, suspend the District's authority to proceed with work under this agreement. The suspension will remain in effect until corrective action has been taken to the satisfaction of the Commission, or until the agreement is terminated and all unspent funds are returned to the Commission. The Commission may also require the return of funds, or reduce future allocations, if funds have been spent outside of Commission policy.

3.4 Accounting of Funds at District

3.4.1 Separate Accounting

While it is not required to have separate accounts for Program funds, separate accounting is required for administrative, education, project work, and interest for both the Dirt and Gravel and Low-Volume Road allocations.

Districts must place all funds received from the Commission in an interest-bearing Federal Deposit Insurance Corporation or equivalent insured account. Districts must work with their banking institutions to assure that account balances in excess of $250,000 are also insured or otherwise collateralized. The Commission may approve other lending, borrowing and savings institutions for districts to utilize for the Dirt, ~~and~~ Gravel, and Low-Volume Road Maintenance Program funds on a case-by-case basis. District records relating to the Dirt, Gravel, and Low-Volume Road Maintenance Program projects must be kept for a minimum of seven years from the date of final payment on a project. Administrative and education expense records must be kept for a minimum of seven years from the end of the fiscal year in which the expenses were utilized. Records of interest earned must be kept for a minimum of seven years from the end of the fiscal year in which the interest was earned. The PA state fiscal year runs from July 1st through June 30th.

Dirt and Gravel Roads funds, which include funds for projects, education, and administration, are to be used solely for Dirt and Gravel Road Program expenses, and these funds must be accounted for separate from the Low-Volume Roads funds.

Low-Volume Roads funds, which include funds for projects, education, and administration, are to be used solely for Low-Volume Road Program expenses, and these funds must be accounted for separate from the Dirt and Gravel Road funds.

3.4.2 Eligible Expenses

3.4.2.1 Cost allocation Method for Shared Expenses

Some conservation district expenses, such as vehicles, rent, and office expenses, are shared between the DGLVR Program and other programs or funding sources. A portion of shared expenses may be eligible DGLVR administrative and/or education expenses, as detailed below:

- The percent of shared expenses that are eligible DGR expenses are equal to the percent of staff time spent on DGR activities. The percent of staff time spent on DGR activities must be calculated compared to the total staff time spent on all programs/activities sharing the expense.
- The percent of shared expenses that are eligible LVR expenses are equal to the percent of staff time spent on LVR activities. The percent of staff time spent on LVR activities must be calculated compared to the total staff time spent on all programs/activities sharing the expense.
- Salaries and associated benefits can only be paid for with DGLVR funds for time spent working directly on the DGLVR Program. Tracking can be done on an hourly basis, a percent effort basis, or some other method that allocates salary in accordance with time spent on the DGLVR Program.
    - Salary and benefits for time spent on DGR activities are to be paid for with DGR funds. Salary and benefits for time spent on LVR activities are to be paid for with LVR funds. If a conservation district chooses to divide salaries on a percent basis, then the percent of a staff member's salaries and benefits paid for with DGR funds must be proportionate to the amount of time that staff member spends on DGR activities out of the staff member's total hours in a given time period. The percent of a staff member's salaries and benefits paid for with LVR funds must be proportionate to the amount of time that staff member spends on LVR activities out of the staff member's total hours in a given time period.
    - The conservation district must keep and be able to provide documentation to the SCC of time spent on DGR and LVR activities as part of the administration and education funding record-keeping.

Examples of cost allocation methods that meet the policy outlined above are available in Appendix I. These are not the only acceptable cost allocation methods. For assistance in developing a cost allocation method, contact the SCC.

3.4.2 3.4.2.2 Administrative Funds

A district may use up to 10 percent of their total allocation for administering the Dirt, Gravel, and Low-Volume Road Maintenance Program. Administrative funds must be tracked separately for the Dirt and Gravel~~,~~ Road allocation and Low-Volume Road allocation~~s~~. The primary purpose of administrative funds is to assure adequate funding for technical staff who work on the Program. Administrative funds can also be used to cover regular expenses occurred in administering the Program such as travel costs, equipment, and supplies. Administrative funds must be spent on eligible expenses as they are incurred~~;~~, funds cannot be transferred in advance to a separate account. Administrative expenses must be incurred within the allotted fiscal year. The "banking" of administrative funds for multiple years is only allowed with written permission from the Commission. Administrative expenses are outlined in the Commission Statement of Policy Section 11 (Appendix B). The district is responsible for keeping accurate and detailed records of what was paid for with administrative funds for a minimum of seven years from the end of the fiscal year in which the expenses were incurred. This documentation must be available to the SCC upon request. The district

is responsible , and for properly reporting these expenditures in the GIS Program as described in section 3.9. A district is not required to spend any or all of their 10 percent allocation limit on administration. Funds not spent on administration each fiscal year must be spent on projects. Administrative expense records must be kept for a minimum of seven years from the end of the fiscal year in which the expenses were incurred

Guidelines for Administrative Expenditures

For questions about eligible DGLVR Administrative Expenditures, please contact the Commission.

- **Salary** is an eligible administrative expense.
  - This includes technical staff, support staff, and management salaries related to administering the Program. Example administration activities include:
    - site inspections, meetings, completing paperwork, communications, etc. related to DGLVR Projects.
    - QAB meetings and Conservation District Board of Director meetings
    - Reviewing DGLVR applications
  - Benefits associated with those salaries are also an eligible expense.
  - Salaries can only be claimed for time spent working directly on the DGLVR Program. Tracking can be done on an hourly basis, a percent effort basis, or some other method that allocates salary in accordance with time spent on the Program. See Section 3.4.2.1 above for more information about using DGLVR Administrative funds to pay part of a staff member's salary and benefits. Conservation districts must be able to document that staff time claimed as administrative time is spent on eligible administrative activities. This should be a time sheet and/or report that includes details of the activity, including the date, activity description, staff member(s), amount of time, road name, road owner, and how the activity qualifies as a DLGVR educational activity, or some other method that documents that administrative time is spent on eligible administrative activities.
- **Travel** is an eligible administrative expense
  - Includes all expenses directly related to Program administration such as: travel to field sites, meetings, and trainings, vehicle costs, per-diems, parking, etc.
- **Office expenses** are eligible administrative expenses
  - Includes all expenses directly related to Program administration such as: computers, printers, communication services, expendable office supplies, etc.
- **Field equipment** is an eligible administrative expense
  - Funds can be used to purchase equipment for CD use such as: levels, tapes, survey equipment, safety equipment, etc.
  - Funds can be used to purchase equipment for loan/rent to applicants such as: traffic counters, grader blades, leaf blowers, etc.
  - Funds can NOT be used to purchase equipment for townships or other applicants, including cost-sharing on equipment.
- **Demonstration projects** can be funded by the Conservation District with either administrative or education funds. Refer to section 3.4.6 of his administrative manual for details.
- **Miscellaneous**
  - Other potential administrative expenses include but are not limited to:
    - Aggregate testing
    - Consultant services
    - Overhead costs such as insurance, utilities, rent, etc.

- **Questions:** Please contact the State Conservation Commission with questions about eligible administrative expenses.

- **Allocation Method:** A portion of administrative costs that are shared between programs, such as vehicles, rent, or office expenses, are eligible DGLVR administrative expenses as determined by a cost allocation method. See section 3.4.2.1 for details on acceptable cost allocation methods and how to determine what portion of shared expenses are eligible DGLVR expenses. ~~For shared district expenses such as vehicles, rent, or office expenses, the district must establish and follow a credible allocation method to equitably distribute expenses among multiple programs. Once established, this allocation method should be used for all district Programs and must be available to the Commission upon request.~~
- ~~**Example 1:** If a district has 10 Full-Time Equivalent (FTE) staff, and 1.5 of those FTE staff are funded by the DGLVR Program, then 15% of general overhead expenses (utilities, rent, and other shared expenses) can be charged to the Program.~~
- ~~**Example 2:** If a district has a vehicle that is shared equally by 4 programs, vehicle expenses could be divided equally among the 4 Programs.~~
- ~~**Example 3:** If a district has a vehicle that is shared unequally by several programs, vehicle expenses or charges must be based on actual usage for each Program.~~

3.4.3 3.4.2.3 Education Funds

A district may use up to 10 percent of their total allocation for education expenses in the Dirt, Gravel, and Low-Volume Road Maintenance Program. Education funds must be tracked separately for the Dirt and Gravel Road allocation and Low-Volume Road allocation. The primary purpose of education funds is to allow the district to attend trainings and events for their own education, and to provide training and events for potential program participants. Education funds must be spent as expenses are incurred~~.~~; funds cannot be transferred in advance to a separate account. Education expenses must be incurred within the allotted fiscal year. The "banking" of education funds for multiple years is only allowed with written permission from the State Conservation Commission. Education expenses are outlined in the Commission Statement of Policy, Section 11. Eligible Expenses (Appendix B). The district is responsible for keeping accurate and detailed records of what was paid for with education funds for a minimum of seven years from the end of the fiscal year in which the expenses were incurred. This documentation must be available to the SCC upon request. The district is responsible for properly reporting these expenditures in the GIS Program as described in section 3.9.~~, and for properly reporting these expenditures in the GIS Program.~~ A district is not required to spend any or all of their 10 percent allocation limit on education. Funds not spent on education each fiscal year must be spent on projects.

Some districts may choose to use drones to take project pictures, video, and create educational materials. Note that districts using drones for any program are subject to the SCC's "Conservation District Drone Utilization Policy".

Guidelines for Education Expenditures

For questions about eligible DGLVR Education Expenditures, please contact the Commission.

- **Salary** is an eligible education expense.
  - This includes technical staff, support staff, and management salaries related to ~~(attending or hosting): trainings, conferences, field days, and workshops technical assistance, or other outreach activities~~ DGLVR educational activities.
    - DGLVR educational activities include:
      - attending or hosting trainings, conferences, field days, workshops, technical assistance, or other outreach activities.

- Teaching individuals or small groups about the DGLVR Program in regard to potential DGLVR Project sites without a current contract for DGLVR funds. This includes working with potential grant applicants to develop an application for DGLVR funds, such as pre-application meetings.

▪ DGLVR educations activities do NOT include:

- Administering DGLVR Projects with a current DGLVR Contract
- Administering the DGLVR Program, including QAB meetings, Conservation District Board of Director meetings, and reviewing DGLVR applications

  - Benefits associated with those salaries are also an eligible expense.
  - Salaries can only be claimed for time spent working directly on educational efforts for the DGLVR Program. Tracking can be done on an hourly basis, a percent effort basis, or some other method that allocates salary in accordance with time spent on the Program. See Section 3.4.2.1 above for more information about using DGLVR funds to pay part of a staff member's salary and benefits. Conservation districts must be able to document that staff time claimed as educational time is spent on eligible educational activities. This should be a time sheet and/or report that includes details of the activity, including the date, activity description, staff member(s), amount of time, road name, road owner, and how the activity qualifies as a DLGVR educational activity, or some other method that documents that educational time is spent on eligible educational activities.

- **Travel** is an eligible education expense
  - Includes all expenses directly related to education activities for the Program such as: travel to training and workshops, and travel to set up trainings, workshops, and demonstrations for local stakeholders.
- **Field equipment** for applicant use is an eligible education expense
  - Funds can be used to purchase equipment for loan/rent to applicants such as: traffic counters, grader blades, leaf blowers, etc.
  - Funds can NOT be used to purchase equipment for townships or other applicants, including cost-sharing.
  - Funds can NOT be used to purchase field equipment for CD use.
- **Training costs** are an eligible education expense
  - Direct costs of providing training or education could include: facility rental, food, educational materials, providing transportation, etc.
- **Promotional materials** are an eligible education expense
  - Promotional materials may include advertisements, reports, websites, project signage, and promotional items.
  - Spending on promotional items (pens, hats, door prizes, etc.) is limited to $1,000 annually unless otherwise approved by the Commission.
- **Participation incentives** are eligible education expenses
  - Participation incentives could include paying travel expenses related to education activities for potential applicants or QAB members
- **Demonstration projects** can be funded by the Conservation District with either administrative or education funds. Refer to section 3.4.6 of his administrative manual for details.
- **Allocation Method:** A portion of administrative costs that are shared between programs, such as vehicles, rent, or office expenses, are eligible DGLVR administrative expenses as

determined by a cost allocation method. See section 3.4.2 for details on acceptable cost allocation methods and how to determine what portion of shared expenses are eligible DGLVR expenses. ~~For shared district education expenses such as audio/visual equipment or educational displays, the district must establish and follow a credible allocation method to equitably distribute expenses among multiple programs. Once established, this allocation method should be used for all district Programs and must be available to the Commission upon request.~~

3.4.4 Project Funds

A minimum of 80 percent of a district's allocation must be dedicated for project work for both Dirt and Gravel and Low-Volume Roads. Project funds must be tracked separately for the Dirt and Gravel and Low-Volume Road allocations. Project funds must be spent within two years of State budget approval. The details of project funding, including eligible projects and expenses, are detailed in Section 3.7.

3.4.5 Interest Funds

All interest accrued from Program funds (administrative, education, and projects) must be used only for project work. Interest accrued from low-volume roads funds must go to low-volume road projects and interest accrued from dirt and gravel funds must go to dirt and gravel projects. Interest must be reported in the DGLVR Mapper during each quarterly report. Records of interest earned must be kept for a minimum of seven years from the end of the fiscal year in which the interest was earned and must be available to the SCC upon request.

3.4.6 Demonstration Projects

Only administration and education funds can be used to fund "Demonstration Projects" that do not follow the typical application submittal and ranking process.

A typical Program project is one that is submitted by an applicant, reviewed and ranked by a Quality Assurance Board (QAB), and approved for funding by the district board. Typical projects can be used for educational purposes. Education events on typical projects usually entail inviting other potential applicants out to the site for an educational session before, during, or after project implementation. They are especially effective to highlight practices that are new to a particular county or region. These "typical projects" are funded with project funds, while education/administrative funds can be used to cover the costs of the training or educational event.

A "demonstration project" is a project that is funded by the districts that does not follow the lifecycle of the "typical project" above. Demonstration projects can be implemented by the district to showcase a particular practice or project without the typical application submittal and ranking process. Certain conditions must be met before a demonstration project can be funded without the typical application submittal and ranking process:

- Only education or administrative funds can be used.
- Must follow existing Program policies: be on an eligible public road; focus on environmental improvements; meet LVR traffic counts; etc.
- Must have QAB and district board approval.
- Must have a contract, MOU, or other agreement with the road-owning entity.

Demonstration projects are not intended to be used to circumvent training requirements or typical project agreements with eligible applicants. If project funds are to be used, the project becomes a "typical project" and must go through the standard application submittal and ranking process. When a district funds a demonstration project, the district can either contract with the road-owning entity, or purchase material and contract directly with the contractors performing the work. If the district enters into a contract with the road owning entity to complete a demonstration project, standard Program contracts and procedures apply. The district must assure that all permits are obtained prior to construction, and must comply with all federal, state, and local requirements including prevailing wage. A district may fund a demonstration project by paying for materials and subcontractors directly. A separate agreement must be made with the road-owning entity that identifies the following:

- The size and scope of the project (including location map, a project sketch, and an itemized cost estimate).
- The district's responsibilities for the project
- The road owning entity's responsibilities for the project.
- The responsible entity for any future maintenance that may be required.

These additional requirements are needed since a standard Program contract between the district and the applicant may not be used.

3.5 Dispersing Funds to Grant Recipients

It is acceptable to advance some funds at the beginning of the project, pay for portions of the project as work is completed after bills and receipts are submitted, or wait until the project is entirely completed to pay the entire amount at one time. Districts should develop their own individual policies regarding payment to project grantees (Statement of Policy section 14.c(1)). A written schedule of payments in conformance with local policies and the Commission Statement of Policy must be included in the contract (Appendix C).

3.5.1 Advancing Funds to Grant Recipients

Up to 50 percent of the contract amount may be advanced to grant recipients once a contract is signed. More restrictive policies can be set by the local QAB.

In addition to advancing up to 50 percent of funds in advance of project work, it is also acceptable to provide additional funding (up to 70 percent of the project funds) after the project is underway. Subsequent payments are only to be made on a cash expended basis.

3.5.2 Remainder of Funding to Grant Recipients

In accordance with the Commission Statement of Policy (section 14.c(3)), the district shall withhold payment of at least 30 percent of the approved project expenses (contract amount plus any amendments) until the satisfactory completion of the project. Final payment for the project expenses shall be made only after a final on-site inspection by the district determines that the work was performed consistent with the project application and the work plan, and to the satisfaction of the district.

3.5.3 Contract Amendments

In some cases, the grant recipient may request additional time or addition funding above the contracted amount to complete a project. The approval of additional time or funding to a contract is at the discretion of the district board, based either on a ~~case by case~~case-by-case basis or by county policy. Districts may develop their own policies for handling cost overruns and time extensions,

provided they are consistent with Commission policy. It is the discretion of the conservation district board how to handle ~~if~~ amendments to existing contracts. Options include but are not limited to: requiring district board approval; requiring QAB and district board approval; empowering CD staff to approve amendments, etc. There is no additional funding from the Commission to pay for cost overruns.

For cost overruns totaling 40 ~~20~~ percent or less of the initial contract amount, ~~a~~ the ~~contract~~ Contract ~~amendment~~ Amendment must be completed and signed by both entities (available at www.dirtandgravelroads.org). Multiple amendments may be granted, provided the total of all amendments is not more than ~~20~~ 40 percent of the initial contract amount. ~~Amendments must be approved by the district board according to policies they establish. For cost overruns totaling more than 20 percent of the initial contract amount, a second separate contract must be made for the additional funds.~~ For contract amendments over 40 percent of the initial contract amount, written approval is required from the State Conservation Commission. For extensions of the completion date of the project, the same "Amendment form" described above can be used. Keep in mind that ~~if a contract is between $20,800 and $25,000 (approaching the prevailing wage threshold),~~ an amendment may increase the total value of the project so that prevailing wage would apply to contractor costs. More on prevailing wage in section 3.7.4.4

3.6 District Educational Opportunities

There are many opportunities for education and training for districts in various aspects of Program administration and project implementation outlined below. Also outlined below are ideas for districts to implement education and outreach efforts to municipalities and other entities within their county.

3.6.1 Education and Training FOR Districts

3.6.1.1 Environmentally Sensitive Maintenance (ESM) Training

The ESM training is a two-day course that covers the road maintenance practices employed by the Program. ESM training is made available to all district board members, QAB members, and district staff. It is highly recommended that all persons representing the district who have a significant role in the Program attend an ESM training.

ESM training is **mandatory** for at least one district representative on the QAB, and for the district staff person(s) most involved with the Program. ESM training must be taken once every five years to maintain certification. For more information on the ESM principles covered in the training, see Section 1.4.

3.6.1.2 Stream Crossing Replacement Training

This multi-day training covers the details of completing a stream crossing replacement through the DGLVR Program. It includes both remote and in-person sessions, and includes topics ranging from conducting a longitudinal profile, reviewing project plans, construction oversight, and final inspection.

Effective July 1, 2023, at least one conservation district staff member must have completed the DGLVR Program's "Stream Crossing Replacement Certification Training" and received a certificate of completion before the QAB can recommend or the conservation district can approve a contract for a project involving a stream crossing. A Stream Crossing Replacement Re-Certification Training must be taken once every three years to maintain staff certification. This training requirement does

not apply to crossings that qualify for an automatic exemption from the DGLVR Stream Crossing Standard (see section 7.1.3.1).

~~3.6.1.2~~3.6.1.3 Annual Maintenance Workshop

ESM training provides training on the fundamentals of environmentally sensitive road maintenance. The annual workshops give the opportunity for more in depth training on a wide variety of subjects such as diagnostics, stream crossings, low-volume roads, demonstration projects. The workshop is held at a different location in Pennsylvania each year. Many workshop sessions include bus trips to actual project locations. Individuals that have a current ESM training certification may attend an annual workshop once every five years in lieu of re-taking ESM training. Individuals whose five-year ESM certification has expired may not use the workshop as recertification, but must re-attend an ESM training.

~~3.6.1.3~~3.6.1.4 Administrative Training

Administrative training is available for district staff, QAB members, and others. This training will cover the administrative policies and guidance provided in this manual. Administrative training is required for staff person(s) most directly responsible for administering the Program. Identified district personnel responsible for administering the Program must attend the administrative training at least once every three years.

~~3.6.1.4~~3.6.1.5 Quality Assurance/Quality Control (QAQC)

QAQC visits are described in Section 2.3. The focus of the QAQC visits is to ensure Program policies and standards are being met, and to provide an education and training opportunity to district personnel.

~~3.6.1.5~~3.6.1.6 Technical Assistance Visits

Technical assistance visits are conducted primarily by Center staff, but Commission staff may attend as well. Technical assistance visits are usually initiated by district staff to request help with a difficult worksite. Technical assistance visits provide excellent training opportunities not only for district staff, but for municipalities as well.

3.6.1.6 Remote Learning Center

The Center has established a "Remote Learning Center" on its website at: https://www.dirtandgravel.psu.edu/education-and-training/remote-learning-center. The Remote Learning Center contains a wide variety of recorded webinars and remote trainings that are available free of charge to anyone. The website contains not only recording of trainings, but also the PowerPoint files that were used for each training. Conservation Districts may find the PowerPoint slides useful in their own educational efforts within their county.

~~3.6.1.6~~3.6.1.7 Other Trainings

Other optional trainings and educational events intended for conservation district staff administering the DGLVR Program. They include but are not limited to:

- Boot Camps: 3-day field focused trainings with active field sites
- ~~Stream Crossing Trainings: trainings of various lengths focusing on determining bankfull, choosing structures, establishing grade control, and other factors for more successful stream crossings~~

- Webinars: Short topic-specific presentations with question and answer typically held in the winter and early spring. Recordings and presentations form past webinars are available online and make a good starting point for new district staff.
- New-hire trainings: Two or three-day sessions focused on new hires at Conservation Districts
- ~~CD Sharing Sessions: Regional meetings where Conservation Districts gather to review and discuss completed and upcoming projects.~~
- Assessment Trainings: One-day sessions intended to show Conservation Districts how to conduct assessments on unpaved roads to identify and assess pollution prevention sites.

For a complete list and schedule of trainings, visit the "education training" section at www.dirtandgravelroads.org

3.6.2 Education and Training BY Conservation Districts

Education and outreach to municipalities, other potential grant applicants, and other local entities is required of each district. Below are some ideas for districts to improve the local education and outreach effort. Please contact the Center if you have questions or would like assistance setting up any of the potential outreach activities below.

3.6.2.1 Participate in Existing Outreach Events

Many counties have local or regional events that provide the opportunity to reach many potential grant applicants and other public entities. Consider becoming a member of local and/or statewide municipal associations, such as a local Council of Governments or PA State Association of Township Supervisors, to participate and promote the DGLVR Program through their events and media. Providing outreach and education at these events, such as developing a traveling display, can be an excellent use of educational funds. Some potential opportunities for such outreach include:

- **Municipal Conventions:** The Center and Commission participates in Township and Borough annual conventions each year. Many counties host their own municipal conventions every year that provide an excellent opportunity to meet with or even present to a large number of local government entities.
- **Contractor Workshops:** Many regions around the state hold "contract workshops" or other such educational days. These events are typically one-day "mini-conferences" relating to a variety of programs. They can provide a great opportunity to interact with municipalities as well as some of the sub-contractors they frequently use.
- **Elected Official Breakfasts:** Many counties have various events for their elected officials. Municipalities are often invited to these brief sessions that highlight some local projects going on in the county, and can provide an excellent showcase for completed DGLVR projects.
- **Municipal Visits:** Consider visiting municipalities during slower times of the year to discuss the program, potential projects, and to establish a better working relationship with them.

3.6.2.2 Host outreach events

In addition to participating in some of the existing events described above, many districts host their own events for education and outreach. Consider involving other entities in the presentation of these events such as product suppliers, contractors, equipment companies, and the townships involved in the projects.

- **DGLVR Demonstration Days:** "Demo Day" is a term used to describe half-day educational sessions held on a project site, typically aimed at municipalities. It is recommended that demo days be kept to a maximum of 2-3 hours and include breakfast or snacks to encourage attendance. Demo days typically include some type of presentation or talk at a certain time

(either in the field, or indoor with a presentation), followed by a walk-through of the field site being used for the demo. Attendee can then stay as long as they like to ask questions and interact with the district. Active project sites, especially when new or innovative practices are being implemented, often make the best demo days. Another option is to hold dual "before and after" demo days, where the first day is spent going over the plan before the project begins, followed a month or so later by a day spent walking through the completed site.

- **Program Update Sessions:** Districts are encouraged to host presentation and discussion sessions to provide Program updates for municipalities and other applicants. These sessions can focus on policy updates, or simply showcase completed projects from the previous year. Update sessions can be general, or focused on a particular subject, such as "Administering the DGLVR Program for municipal secretaries". They can also be combined with other programs run by the District.
- **Project Tours:** Many districts hold annual project tours where attendees board a bus and visit a wide variety on field sites. These tours can be customized for a range of audiences, and can be DGLVR focused, or include projects from other district programs as well.
- **Pre-Application Site Visits:** Pre-application site walk-through is highly recommended and provide an excellent opportunity for one-on-one education and outreach with the applicant.

3.6.3 Program and Project Promotion

Districts are encouraged to use their education funds to promote the Program and completed projects however they can within their county. Some ideas for such promotion include:

- **Press Releases:** After a particularly successful project, consider drafting a brief press release and making it available to local media outlets. Often such simple efforts can be picked up by a variety of media outlets and provide an effective and nearly free source of promotion.
- **Newsletters:** Many districts have monthly newsletters where they include short write-ups of successfully DGLVR projects. A few larger districts even have "DGLVR only" newsletters they periodically send out to their municipalities.
- **Project Signage:** A simple but underutilized form of project promotion is to place signs on completed projects such as "Road improvements sponsored by…..", or "Another successful project from……". Signs do not have to be permanent. Many sign shops can produce simple signs on corrugated plastic that are relatively inexpensive and will last 1-3 years. Check with the municipality to make sure signs are in compliance with any sign ordinances.

3.7 Program Eligibility

3.7.1 Eligible Applicants

Public entities that own public roads in Pennsylvania that are open to public vehicle travel are eligible to apply to districts for Program funding. Municipalities and other eligible and ineligible entities are described below.

The person in charge of work plan development and project implementation from the entity that has applied for funds from the Program must have attended environmentally sensitive maintenance (ESM) training within the past five (5) calendar years to become "ESM Certified" to apply for funding.

In determining applicant eligibility, it is important to focus on the entity that owns the road itself, not necessarily the land the road traverses. Often one entity owns the road through the property of another entity, for example a township-owned road through state forest land. The entity that owns the road corridor is the entity that is eligible to apply for funding.

The "ESM certified" person for the applicant must be an employee or elected official of the entity. The ESM certified individual must be the person in charge of work plan development and project implementation for the applying entity. Attendance by individuals not directly involved with the project design and implementation (interns, secretaries, etc.) do not qualify an applicant to be eligible for funding. Engineers on retainer or others who serve multiple municipalities are welcome to attend the ESM training, but their attendance does not count as ESM Certification for the municipalities they represent. Alternatively, if an engineer is on the payroll at a particular eligible entity, it would count as ESM certification for that municipality. Empowering and educating local municipalities is one of the primary benefits of the Program. In the case of other entities, the person who has direct oversight responsibilities for the project must be the one to attend the ESM training. Individuals that have a current ESM training certification may attend an annual maintenance workshop once every five years in lieu of re-taking ESM training. Individuals whose five-year ESM certification has expired may not use the annual maintenance workshop as recertification, but must re-attend an ESM training.

3.7.1.1 Municipalities

Eligible municipalities in Pennsylvania include 1,500+ townships, 900+ boroughs, and 50+ cities. Districts should become acquainted with the various municipal officials and employees in their counties. Boroughs and cities will likely play a larger role in the low-volume road portion of the Program.

To date, townships are the most frequent Program applicant, accounting for over 90 percent of the projects completed statewide. Township size, composition, and structure vary widely across the state. The two township positions most likely to be involved in Program projects are the "Supervisor" and the "Roadmaster". Supervisors are elected officials who handle a great variety of tasks for a township. Roadmasters can be elected supervisors or hired employees, and are the person(s) in charge of road maintenance for the township. Depending on size, population, and funding, a township may have multiple roadmasters and supervisors, or may have one person serving in both capacities. Pennsylvania's 1,500+ townships are governed by the Township Code. A complete copy of the 2nd Class Township Code may be found at: https://www.legis.state.pa.us/WU01/LI/LI/US/HTM/1933/0/0069..HTM.

Boroughs are small to large towns that have incorporated boundaries. Borough involvement in the Program has been limited in the past since they own fewer unpaved roads than townships, but their involvement has increased with the addition of paved low-volume roads to the Program in 2014. Boroughs, like townships, vary widely in their size and structure. Borough staff under the Borough Code requires a borough secretary and allows for a borough manager including engineers as well. It is not mandated, but it is not unusual for there to be a public works department to provide road maintenance services. Pennsylvania's 900+ boroughs are governed by the Borough Code. A complete copy of the Borough Code may be found at:
https://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&ttl=08

Cities, like boroughs, will likely play a larger role in the low-volume road portion of the Program. Their size and structure vary considerably across the state.

3.7.1.2 Other Potential Applicants

Other local, county, or state public entities that own and maintain public roads that are open to public vehicle travel are eligible to apply to the district for project funding. The most common of these entities are listed below, although the list is not all-inclusive:

PA Department of Transportation (PennDOT): PennDOT owns ~500 miles of unpaved roads and thousands of miles of paved low-volume roads. PennDOT projects are typically designed at the

regional level by regional engineers. Project oversight, however, is typically done at the county level by county maintenance managers. Both the project designer and the person in charge of project oversight must be ESM certified. Signatory authority for applications resides in the PennDOT District Offices.

PA Game Commission (PGC): The PGC owns approximately 1,000 miles of public use roads and 400+ miles of seasonal roads Statewide. The regional land manager will identify the personnel to attend ESM training in order for the PGC to be eligible to receive funds. Signatory authority for applications resides in the PGC Regional or Central offices.

PA Fish and Boat Commission (PFBC): PFBC ownership of roads is minor except for access roads and boat launch ramps. Boat launch ramps that are open to public use are eligible for funding. The PFBC personnel responsible for the project area must attend ESM training. Signatory authority for projects resides in the PAFBC Regional or Central offices.

County and other Government Entities: In many cases other local government agencies such as parks departments or municipal authorities own land and roads that are open to public travel. As long as the roads meet the requirements for worksite eligibility and the person in charge of maintaining those roads has ESM certification, they are eligible for funding. **Department of Conservation and Natural Resources (DCNR):** DCNR (through State Parks and the Bureau of Forestry) administers more than 3,000 miles of dirt, gravel, and paved low-volume roads. DCNR directly receives $7,000,000 per year under the Program, separate from the Commission allocation. DCNR officials are also required to be ESM certified in order to participate in the Program. The DCNR portion of the Program is administered separately from the Commission portion.

3.7.1.3 Determining Road Ownership

For Program eligibility, the entity that owns the road "right of way" is the determining factor, not who owns the land adjacent to the road. For example, a township may own a road that is surrounded by state or national forest on both sides.

Contracts and payments can only be made with the entity that owns the road. In some cases, the ownership of a road may be in question or unknown. Some considerations in determining road ownership of "orphaned" roads:

- If a municipality receives "Liquid Fuels" funding for the road, then it is eligible.
- Most public roads will have courthouse records of ownership.
- It is the responsibility of the potential applicant to prove road ownership to the satisfaction of the district.
- County solicitors may be able to help with road ownership determinations.

3.7.1.4 Ineligible Entities

Federal Government: The Federal Government owns and maintains roads in various capacities from national parks and monuments, U.S. Army Corps of Engineers lands, and the Allegheny National Forest. The Commonwealth of Pennsylvania cannot pay or provide funding to maintain roads owned by the federal government.

Private Road Owners (individuals and entities): Privately owned roads, even those open to public use, are not eligible to apply for funds. This applies to roads owned by private individuals, but also includes roads owned by associations, private conservancies, non-profit companies, and other non-public entities.

3.7.2 Eligible Roads

> ***"Eligible Sites"***
> - *Stream Impact*
> - *Publicly owned*
> - *Open to public travel*
> - *ESM certified*
> - *<500ADT (if paved)*

Only public roads owned by one of the eligible applicants described above may be considered for funding. A road must also be open to public motor vehicle travel for a minimum of two consecutive weeks annually in order to be eligible for funding. Using separate allocations, it is the intent of the Program to use Dirt and Gravel funds on dirt and gravel roads, and Low-Volume funds on low-volume roads, as defined below. The source of project funding (D&G vs LVR) is determined based on the existing surface of the road. The only exception is that either funding source may be used for projects that involve the transition of a road from paved to unpaved.

3.7.2.1 Dirt and Gravel Roads

The "Dirt and Gravel" portion of the Program is designed to fund work on public roads with unbound road surfaces. These are surfaces of natural material or crushed aggregate that have not been incorporated into a bound layer using asphalt, oil, or other such binder. As a general rule, "unpaved" roads are roads that are graded and rolled as part of routine maintenance.

3.7.2.2 Paved Low-Volume Roads

The "Paved Low-Volume Road" portion of the Program is designed to fund work on public roads where the surface has been bound with asphalt, oil, or other such binder. "Tar and Chip", or "chip-sealed" roads are considered paved and fall under the Low-Volume Roads portion of the Program for funding. Only paved roads with 500 vehicles per day or less are eligible for Low-Volume Road funding. See Section 7.5 for traffic count guidance.

3.7.2.3 Surface Conversions

While eligible entities may choose to seal or pave a DGR project on their own at some future point in time, no Program funds should be utilized for the specific purpose of converting unpaved roads to paved or "tar and chip". If a grant recipient plans to convert a gravel road to pavement in the future, a Dirt and Gravel project can still be completed to implement drainage and base improvements, but Program funds shall not include pavement preparation. Paving or "tar and chip" application to an unpaved road is not an eligible expense in either part of the Program (D&G or LVR), unless otherwise approved by the Commission.

The Program recognizes the value of converting a poorly constructed or poorly maintained low-volume road into a high quality dirt and gravel road through full depth reclamation or other similar processes. Districts may utilize either low-volume or dirt and gravel program component funds for these purposes.

3.7.3 Eligible Projects

Both low-volume and dirt and gravel projects must focus on both environmental and road improvements. Projects should focus on worksites (identified pollution sites) and Environmentally Sensitive Maintenance (ESM) practices to reduce pollution while providing a more stable road. Only projects that provide some form of environmental benefit, typically by reducing sediment and concentrated drainage to waterways, should be considered for funding. Worksites and ESM practices are described in detail in Section 1.4. The focus of the DGLVR Program is on long-term environmental and road improvements. The Program does not fund "routine maintenance" that is part of the regular duties of the road owner such as simply grading roads, crack-sealing asphalt, or bridge repair.

3.7.4 Eligible Project Expenses

There are no special Program-specific purchasing procedures for paying for material, equipment, or labor costs for Program projects. Municipalities should use their municipal code as guidance. Other grant recipients should follow normal purchasing procedures and normal contract procedures using advertising and bidding as warranted. Those expenditures must be tracked following normal bookkeeping and audit procedures, and records must be retained for a minimum of seven years from project completion. Applicants may apply for the full costs of all materials, equipment, and labor required for implementation of the project (there is no statewide in-kind requirement). It is up to individual districts to determine which project costs will be reimbursed by Program grant funds.

3.7.4.1 Materials

Typical material expenses on a project that can be reimbursed with Program funds include but are not limited to items such as pipe, stone, fill, fabric, aggregate, etc. Products with the potential ability to leach off the road (such as dust suppressants or road stabilizers) must meet Commission requirements for non-pollution. The Center maintains a list of approved products that are eligible for use on Program projects. For more information on approved products see Section 6.2.12. Inlets and outlets of all cross pipes must have erosion protection, such as headwalls, endwalls, drop inlet boxes, and/or rip rap. All stream crossing structures must have a headwall and endwall.

3.7.4.2 Equipment

Program projects are often completed with applicant-owned equipment. Reimbursement of applicant-owned equipment costs is an eligible expense under the Program. Applicant-owned equipment can be reimbursed up to accepted Federal Emergency Management Agency (FEMA) rates. FEMA rates should also be used to calculate in-kind contributions on applicant-owned equipment. FEMA rates do not include operator costs. FEMA equipment rate website: http://www.fema.gov/schedule-equipment-rates Contact Commission or Center staff for questions about equipment without listed FEMA rates. Where FEMA rates do not accurately reflect local equipment costs, applicants may request approval to use other rates, if written documentation can be provided.

Some Program projects may require equipment that the applicant does not own. It is an eligible expense for an applicant to rent or lease equipment necessary to complete a project with Program funds. Equipment rented or leased with Program funds can only be used on the project for which it was rented.

DGLVR funds, including project, administrative, or education, cannot be used to purchase, cost share, or maintain equipment for an applicant. It is acceptable for a district to purchase equipment for loan/rent to applicants. A district may purchase such equipment with administrative and educational funding as outlined in Section 3.4.2.

3.7.4.3 Labor

Program projects are often completed using applicant labor and equipment operators. Reimbursement of applicant labor and equipment operators is an eligible expense under the Program. Labor rates may include benefits. Because DGLVR grant recipients are always public entities, prevailing wage is not required to be paid for labor provided by the grant recipient.

3.7.4.4 Contractor Costs

Projects may be completed entirely or partially by contractors hired by the grant recipients. Grant recipients should follow their standard procedures regarding project bidding and working with sub-

contractors. Districts must make payments directly to the grant recipient, not to the grant recipient's contractors.

Projects funded by Program funds that are bid out to contractors, including owner-operators and/or sole proprietors, in which the estimated cost of the total project, exceeds prevailing wage limits (currently $25,000) are subject to provisions of Pennsylvania's Prevailing Wage Act (1961, August 15, P. L. 987, No. 442), 43 P. S. Section 165-1 et seq.

3.7.4.5 Prevailing Wage Documentation

Conservation Districts need to notify grant recipients of prevailing wage requirements and to verify the requirements of prevailing wage were followed by the grant recipient prior to final payment.

Where prevailing wage applies, it is the responsibility of the grant recipient to register the project with the PA Department of Labor and Industry, and include prevailing wage notification in any proposal to solicit bids for the contract. Prevailing wage scale can be obtained from the Prevailing Wage Division of the Pennsylvania Department of Labor and Industry. Contact your county solicitor or the Pennsylvania Department of Labor and Industry for additional guidance and questions. A "Frequently Asked Questions" document concerning prevailing wage can be found on the Center's website at www.dirtandgravelroads.org Additional information available from the PA Department of Labor and Industry at http://www.dli.pa.gov/Individuals/Labor-Management-Relations/llc/prevailing-wage/Pages/default.aspx.

It is the responsibility of the grant recipient to assure prevailing wage has been paid and to obtain copies of certified payrolls from any contractors where prevailing wage applies. Conservation Districts need to notify grant recipients of prevailing wage requirements and to verify the requirements of prevailing wage were followed by the grant recipient prior to final payment.

A prevailing wage "Notification letter"", attachment F to the DGLVR Contract, must be completed and kept in the project file. This letter ensures that applicants have verified that they are aware of prevailing wage requirements.

If federal funds are involved in a project, federal prevailing wage requirements (Davis Bacon Act) often supersedes PA prevailing wage. Davis Bacon requirements are acceptable to the DGLVR program in this case, and Certified Payroll forms accepted by the US Department of Labor must be completed and kept in the project file.

For projects where prevailing wage is required, a Weekly Payroll form and notarized "Certified Statement of Compliance", attachment G to the DGLVR contract, must be completed and kept in the project file. This form is completed by each contractor and ensures they have met the requirement of the prevailing wage act.

3.7.4.6 In-Kind Contributions

In-kind contributions refer to costs incurred by the grant recipients for a project that are not reimbursed as part of the grant. In-kind or matching contributions from grant recipients are not required statewide. Districts, however, may establish matching requirements or give additional consideration to projects with in-kind funding.

While matching contributions are not required, the Program does track in-kind contributions from grant recipients as part of project reporting. In general, in-kind is limited to un-reimbursed materials, equipment, and labor from the grant recipients that is part of the Program project. Only costs that are directly part of a Program project, and that meet all current Program policies for eligible expenses, shall be considered as in-kind. Some examples of ineligible expenses that will not be considered as

in-kind contributions include, but are not limited to: Stream crossing replacements that do not meet Program policy; Surface aggregates that do not meet the Program's DSA policy; Full Depth Reclamation projects that do not meet the Program's policy."

3.7.4.7 Consultants, Engineering, and Permitting Costs

Some Program projects will require permits and/or engineering or consultant work to design and complete. Program funds can be used to cover engineering, permitting, or similar consultant costs, but such costs are limited to a maximum of ~~10~~ 20 percent of the total contract amount between the district and the grant recipient, with a maximum of $25,000 total for engineering, permitting, or similar consultant costs. Note this limit is defined as up to ~~10~~ 20 percent of the contract amount (Program contracted funds), not ~~10~~ 20 percent of the total project value (which could include in-kind or other funds). For example, a $30,000 contract on a project totaling $50,000 is limited to ~~10~~ 20 percent of the contract, or ~~$3,000~~$6,000, for engineering and permitting. Another example, a $140,000 contract, 20 percent of the contract would be $28,000, but the program will only fund up to the maximum of $25,000. Preparation or design costs such as engineering or surveying that are incurred before the contract is signed are not eligible for grant reimbursement but can be counted as in-kind.

3.7.4.8 Working off the Right-of-way

Public roads have a right-of-way that extends out from the centerline of the road. The size of the right-of-way varies based on road owner and road classification.

Often significant drainage and sediment that negatively affects the public road comes from outside of the right-of-way. Sources include, but are not limited to, farm fields, access lanes, and driveways. Working outside the road right-of-way is an allowable Program expense, but only when the off right-of-way impact is having a direct negative effect on a public road AND addressing the off right-of-way impact is directly necessary to the successful completion of the project on the public road. Off right-of-way work can be completed either upslope or downslope from the road, but must be limited in scope to cost-effective practices that directly reduce road impacts.

Before working outside the right-of-way, the grant recipient must obtain written permission from the landowner. Landowner permission should be sought as early as possible in the funding process, ideally before contracting, to ensure the project can be implemented as planned. A sample landowner agreement is provided at www.dirtandgravelroads.org. Districts and grant recipients can use their own landowner agreements as long as they are in a form and manner similar to the sample provided. Districts must keep a copy of the signed landowner consent form with the project file for any work performed off the right of way.

In certain situations, off-right-of-way work requires the prior written approval from the State Conservation Commission. Where off right of way work is more than 35 percent of the total project costs (including Program funds and in-kind contributions), or where work extends more than 500 feet off of the right-of-way districts must first obtain written approval from the Commission before a contract can be signed. The district must keep a copy of the written Commission approval for off right-of-way work with the project file.

Funds can be spent on activities outside the right-of-way only when:

- It is part of a larger project on a public road.
- The issue on the public road cannot be effectively resolved within the right-of-way with traditional ESM practices.

- The district determines it is directly necessary as part of the successful completion of the project on the public road.
- It is limited in scope to cost-effective ESM practices that directly reduce impacts to the public road.
- It is limited in size to only address the area necessary to reduce impacts to the public road.
- Prior written approval of the Commission is obtained, if required (see above).
- The grant recipient has obtained written permission from the landowner.

If project work is confined to the road right-of way, landowner permission is recommended when downslope property will be impacted by road practices. This is particularly true where new drainage outlets from pipes, turnouts, etc. may impact the downslope landowner.

In some cases, landowner permission may be instrumental to implementing a successful DGLVR project (additional culvert outlets for example). In some cases, a viable alternative may exist to implement a successful plan without landowner permission, but in other cases sufficient water quality improvements cannot be made due to landowner constraints. In such cases, DGLVR funding may be better spent on a different project location. Contact the SCC in questionable circumstances where a lack of landowner permission may hinder successful project implementation.

3.7.4.9 Combined Funds

Program funds may be combined with other funds to pay for a road maintenance project. If Program funds are combined with other funding sources, detailed accounting of which funds were spent on which portions of the project must be maintained. The other funding sources may be used as matching funds for Program projects, provided the Program funds are used on identified pollution worksites. Projects funded with combined funding sources must still adhere to the Program's non-pollution standards and ESM practices. Should other funding sources have requirements in conflict with the Program's non-pollution standards, funds cannot be combined. It may be possible to complete a project in stages where the Program funds are used on a phase of a project (i.e.- drainage and base improvements) and another funding source is used on a different phase (i.e.- improving the road surface).

3.8 Administering Projects

3.8.1 Notification to Applicants

The district is responsible for informing all potential applicants of funding availability, application deadlines, and other information necessary to Program participation. District staff should work with the Quality Assurance Board (QAB) in development of strategies for insuring equal access and notification to potential Program applicants. More details are available in the QAB Section 4.4.1.1

Conservation Districts are strongly encouraged to meet with potential applicants on site to discuss the potential project before an application is submitted for funding.

3.8.2 Pre-Application Site Visit

Districts are strongly encouraged to meet with potential applicants on site to discuss the potential project before an application is submitted for funding. Note that a pre-application meeting is required for stream crossing replacements (see chapter 7.1 for details). The purpose of a pre-application meeting is to work jointly with the applicant to ensure that the plan they submit is in the best interest of both entities. Some applicants, especially those new to the Program, may focus on road

improvement concerns over environmental concerns. The pre-application meeting allows districts to provide input on the potential project at an early stage before the applicant has invested a large amount of time and resources in developing a plan. Program Quality Assurance / Quality Control visits have repeatedly shown that districts that conduct pre-application site visits have a better relationship with their municipalities and end up putting better projects on the ground.

This visit also allows an early discussion of potential topics relating to permitting, funding availability, and other issues that could affect the scope or design of the project. Potential landowner issues, discussed in Section 3.7.4.7, should be a part of the initial site visit. Often the type of practices used on a road will depend a great deal on the cooperation of local landowners, especially where off right-of-way work or additional drainage outlets are required for successful project completion. District may develop local polices requiring pre-application meetings.

3.8.3 Pre-Design Site Visit

Many Program projects, such as most stream crossing replacements, will require a design and/or seal from an engineer. If the services of an engineer are required, it is strongly suggested that the d~~D~~istrict holds a pre-design meeting on site with the applicant and their engineer either before or after an application is submitted. Note that a pre-design meeting is required for stream crossing replacements (see chapter 7.1 for details). This meeting ensures that the engineer designs a project or structure that best meets the needs of the county, applicant, and program. Districts may develop local polices requiring pre-application or pre-design meetings. Costs incurred before a contract is signed are not eligible for reimbursement under the grant.

3.8.4 Receiving Grant Applications

3.8.4.1 Application process

All applications for Program funding must be received on the "Dirt, Gravel, and Low-Volume Road Maintenance Program Grant Application" one-page form that has been approved by the Commission. The form must be signed by the applicant. The form, and instructions for completing the form, can be found in Appendix C.

District staff should review applications for administrative completeness and to ensure they comply with established Program policies and guidance. A project sketch, location map, and itemized costs are a required part of the grant application. District staff is encouraged to work with applicants to revise the scope of their applications that do not meet Program standards. Districts may make minor changes to the application and have the applicant show concurrence by initialing and dating the change. In cases where significant changes are needed to the application work plan, the district should work with the township to create a new application that represents an acceptable project. Examples of "significant changes" may include: changes in project scope, recommended design changes, considerations for engineering and permitting costs, resizing of stream crossing structures, etc. The district may, at their discretion, refuse to accept incomplete applications or applications that do not properly address environmental issues.

Applications that district staff deem complete and potentially acceptable to the Program should be forwarded to the local Quality Assurance Board (QAB) for review and prioritization. The QAB will review and prioritize applications based on established written criteria and make funding recommendations to the conservation district board. Details of the QAB review process can be found in Section 4.3. The QAB operates in an advisory capacity only. All applications for funding must be acted on by the district board at a sunshined meeting. All applicants should be notified in writing of the funding decisions of the district board.

3.8.4.2 Unfunded Applications

Districts may develop their own county policies on the retention of unfunded applications. Applications may be retained for consideration in the next grant round, or the district may request the re-submittal of applications for each grant round. If unfunded grant applications are retained, the district should check with the applicant before the next grant cycle to ensure the scope or costs of the application have not changed.

3.8.4.3 Grant Funding Cycles

Districts may have an open application period, or they may establish application deadlines. Many districts have established application deadlines in order to encourage timely submittal by applicants. Some districts have also moved to a fall submission deadline, giving them all winter to revise applications, rank projects, obtain permits, meet with sub-contractors, and perform other logistics so that the project can begin the following spring. All eligible applicants should be informed of any application deadlines in accordance with the notification requirements outlined in Section 3.8.1.

3.8.5 Contracting

When an application has been accepted and approved by a district board, the district will enter into a contract agreement with the successful applicant. The contract, when signed by both parties, is a legally binding document between the applicant and the district that describes in detail the responsibilities of both parties. No funding transfers can take place with grant applicants, and no project work can begin, without a signed contract. Preparation or design costs such as engineering or surveying that are incurred before the contract is signed are not eligible for grant reimbursement but can be counted as in-kind. The contract states the terms and conditions for the project.

Districts may add additional provisions to their contract, as long as they do not negate or conflict with the standard contract provisions or any Program policies. Districts must receive written clearance from their solicitor stating that the proposed provisions are compliant with this section prior to adding additional provisions, and provide written notification to the Commission.

All contracts must be made using the "Dirt, Gravel, and Low-Volume Road Maintenance Program Contract Agreement" form that has been approved by the Commission. Contracts must be generated using the GIS at https://www.dirtandgravel.psu.edu/general-resources/cdgrs-mapper-geographic-information-system-gis. Districts may add provisions to the standard contract agreement described above. If a contract cannot be completed in a reasonable timeframe, the district should consider closing out or canceling the contract. Districts who maintain open contracts for multiple years may see reduced allocations in future years at the discretion of the Commission. The contract and attachments can be found in Appendix C.

3.8.5.1 Contract Attachments

When a contract is signed, the attachments listed on the contract and described below become a legally binding part of that contract. The contract and project-specific attachments must be retained with project files. The contract and attachments can be found in Appendix C of this manual. The attachments to each Dirt, Gravel, and Low-Volume Road Maintenance Program Contract include:

- **Grant Application and Workplan:** (attachment A to contract) The approved grant application submitted by the applicant, including cost estimate breakdowns. The grant application must include a workplan, which consists of a hand-drawn or digitally produced sketch of the proposed project. A workplan is a plan view of the road with all planned features such as pipes, aggregate, underdrain, surface features, etc. Applicants may use the space provided on the back of the grant application for the work plan. The grant application must also include a map that identifies where the project is located. When the scope of

project work is changed, it is recommended to document this on an updated grant application that is signed or initialed by the conservation district and grant recipient. At a minimum, districts must keep records of changes such as in a project narrative, via letters, in a saved or printed email, or other documented communication.

- **General Contract Provisions:** (attachment B to contract) Standard contracting provisions required on all Program contracts.
- **Statement of Policy:** (attachment C to contract) incorporated into Contract by reference only and included in Appendix B of this manual.
- **QAB/District Standards and policies:** (attachment D to contract) Any policies adopted by district board. Note that these policies are county-specific.
- **Schedule of Payments:** (attachment E to contract) One page form that outlines how funding will be distributed by the district to the grant recipient
- **Prevailing Wage Notification Letter:** (attachment F to contract) Letter signed by grant recipient indicating they are aware of prevailing wage requirements.
- **Prevailing Wage Certified Statement of Compliance:** (Attachment G to contract) Two-page form from PA Department of Labor and Industry completed by contractors to verify prevailing wage was paid.

3.8.6 Pre-~~Project~~ Construction Logistics

3.8.6.1 Permits, PA One-Call

It is the responsibility of the grant recipient to ensure that all necessary permits are obtained and any other pre-project requirements such as PA One-Call are met. For more details on permits and other requirements, refer to Chapter 8.

3.8.6.2 Pre-~~Project~~ Construction Meeting

The district should meet with the successful grant recipients, preferably on site, prior to the start of any project work. Note that a pre-construction meeting is required for stream crossing replacements (see chapter 7.1 for details). If the grant recipient is utilizing a subcontractor, the subcontractor should be involved in the pre-project meeting. During the meeting, each contract item or element of the approved plan should be discussed to avoid any misunderstanding about how the plan is to be implemented and how payment will be made to the grant recipient. In cases where Driving Surface Aggregate (DSA) is involved, the pre-construction meeting should be held as far in advance as possible, prior to the start of the project, to allow for DSA sampling. Other more complex project elements such as stream crossing replacements, may require additional lead time as well.

3.8.6.3 Notification of Project Work

Grant recipients MUST notify the district before beginning work on a project. The amount of notice needed must be spelled out in the contract with the district. This will allow the district to meet in person with the grant recipient and any contractors or sub-contractors who will be implementing the plan to determine the phase and sequence of the project and discuss other project elements. The district must also be notified before beginning a new phase of the project (for example, drainage work is completed and aggregate placement will begin). The district may withhold payments and/or request reimbursement of advanced funds and cancelation of the contract if a grant recipient fails to comply with notification requirements.

3.8.7 Project Oversight

When it comes to project oversight, remember, "You get what you inspect, not what you expect."

It is the responsibility of the district to ensure that the work being performed on the project is in accordance with the contract and attachments as well as Program policy and standards. The level of direct district oversight will depend on a variety of factors including complexity of the project, past history, and knowledge of grant recipient. District personnel should visit the project regularly during its implementation to determine whether or not the plan is being followed or if changes need to be made. District oversight is critical at the beginning of a project, and anytime that a new phase or element of a project begins. Expensive or complex items, such as Driving Surface Aggregate (DSA) placement or stream crossing replacement, will require more extensive district oversight. Districts can request assistance from Commission or Center staff on project oversight and implementation. Program Quality Assurance / Quality control county visits have repeatedly shown that district who spend more time on-site during project implementation end up with more successful projects.

3.8.8 Contract Amendments

~~In some cases, unforeseen circumstances arise that may require changes to the scope of a project. Changes that affect the requested funds (up to 20 percent) or completion timeframe of the contracted project can be made at the discretion of the district. The contract amendment process is outlined in Section 3.5.3 and the contract amendment form can be found at www.dirtandgravelroads.org. Keep in mind that if a contract is between $20,800 and $25,000 (barely under the prevailing wage threshold), an amendment may increase the total value of the project so that prevailing wage would apply to contractor costs. More on prevailing wage in section 3.7.4.4~~ Contract amendment up to 40 percent of the initial contract amount are allowed at the discretion of the conservation district, and larger amendments requires SCC approval. See section 3.5.3 for details on contract amendments.

3.8.9 Project Completion

In order for final payment to be made to a grant recipient, the following are required: a final on-site inspection, a project completion report, and receipts for all grant expenses. Other documentation may also be required such as DSA certifications, Off ROW consent, or Prevailing Wage documentation. An optional "Hard File Checklist" that outlines documentation required and recommended to be kept in project hard files is available at: https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/blank-forms

3.8.9.1 Final Inspection

Upon project completion, a final inspection must be scheduled on-site involving the district and the grant recipient. Final inspections should be scheduled immediately after work is complete, so any remediation can be done while equipment is still on site if needed. Other entities such as the QAB and sub-contractors to the grant recipient should be encouraged to participate. The purpose of the final inspection is to:

- Verify the project is completed in accordance with Program standards and to the satisfaction of the district.
- Verify that all work elements classified as "in-kind services" are also completed in accordance with Program standards and to the satisfaction of the district.
- Verify that work elements proposed in the work plan have been properly installed.
- Allow the district to summarize the project work elements and costs on the project

completion report.

- Document any changes made from the grant application that have not already been documented.

3.8.9.2 Project Remediation (if necessary)

During the final inspection, the district may find elements of the project that were not installed, or were not installed to Program or district standards. If so, remediation work may be required of the grant recipient before the project can be considered "complete". The district should verify any remediation work meets Program standards before making final payment.

3.8.9.3 Project Completion Report

A project completion report is required to formally report the status of projects as complete and close contracts. This report summarizes the costs and project work done on the site and includes a section for additional notes, where changes to the original project scope can be listed. The completion report must be signed by both the district and the grant recipient. The completion report and instructions can be found in Appendix G.

3.8.9.4 Receipts for Grant Expenses

Receipts are required for all eligible expenses, including materials, equipment, labor, and engineering, covered by the DGLVR contract before final payments can be made. Receipts, or copies of these receipts, should be retained with project files. Receipts are encouraged, but not required for grant recipient in-kind expenses.

3.8.10 Project File Retention

All records relating to the Program must be kept for a minimum of seven years from the date of final payment on a project. ~~A "project file checklist" that outlines required and recommended documents is provided on the Center's website.~~ An optional "Hard File Checklist" that outlines documentation required and recommended to be kept in project hard files is available at: https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/blank-forms

3.9 GIS reporting System

The Program uses a customized online Geographic Information System (GIS) called "DGLVR Mapper" to track potential and completed project location, work done, and expenditures. A GIS is a system of maps and databases where data may be sorted, selected and displayed in a spatial format. The DGLVR Mapper GIS software is designed to facilitate the entry of project and financial data by districts. The GIS software is used to identify sites, assess sites, add or delete sites to the existing database and track project information from application submittal to completion and beyond. Districts keep track of all potential and completed worksites in the DGLVR Mapper GIS software. A public version of the DGLVR Mapper is also available that allows the public to view basic project data for the entire state.

Access to the DGLVR Mapper GIS system is through a secure login on the Center's website www.dirtandgravelroads.org. This login system will allow users in each district to access the GIS software for their county. In order to obtain a user ~~id~~ID and password to login, ~~you~~ district staff must attend a ~~one-day~~ GIS training. ~~These trainings, held by the Center, are held 2-3 times a year based on demand. Please contact the Center if you are interested in attending a training. Center staff can~~

~~also conduct one-on-one training sessions if needed.~~Please contact the Center to schedule GIS trainings for new staff and as needed.

Districts are encouraged to keep up with GIS data entry for funded projects ~~contracted and completed projects~~ on a real-time basis. At a minimum, districts must enter information on funded projects ~~contracted and completed projects~~ and program expenditures into the GIS system on a quarterly basis. ~~–~~All c~~C~~ontracts, amendments (if applicable), and completion reports must be generated using the GIS. All funded projects are required to be filled out in the GIS as much as possible. This includes the assessment (if applicable), ~~The contract section in the GIS includes~~ the grant application, contract, amendments (if applicable), payment(s), ~~and~~ completion report, photos (if applicable), and any additional supporting files. Districts are required to update the GIS database for the Quarterly and Annual Reports (as described below), and immediately before Quality Assurance / Quality Control visits. The Commission may withhold funds to counties that do not keep GIS data current.

In addition to the district login described above, the GIS system also has a "public viewer" option. The public viewer allows anyone to access a statewide project map with access to limited project information without logging in.

For more information on the GIS system, or to login, go to https://www.dirtandgravel.psu.edu/general-resources/cdgrs-mapper-geographic-information-system-gis

3.10 Quarterly Reports

Districts are required to submit quarterly reports to the Commission using the DGLVR Mapper. Reports are due 15 days after each quarter ends, beginning April 15 for the January to March quarter. All administrative, education, and project expenses must be reported in the quarter in which they are paid out of the Program account. Districts must keep documentation ~~for~~ of all Program expenses and income according to section 3.4. Financial staff involved in the DGLVR Program must complete a quarterly report GIS training to gain access to the quarterly report system.

In order to submit quarterly reports, the following must be completed:

- All income (advances, replenishments, interest) and expenses (project, administrative, and educational) ~~expenditures~~ for the quarter must be entered into the GIS system.
- Local and GIS account balances must match before the quarterly report is submitted each quarter.
- Information on ~~contracted~~ funded projects is also required, including checking that all currently open contracts are in good standing and are not expired. The GIS includes a contract verifier tool that can be used during this process.
- Complete the summary of Program activities from district staff for the quarter.
- The Conservation District Manager, or ~~their~~ its approved designee, is required to submit the report.

~~For more information on the quarterly reporting process or available training, visit: https://www.dirtandgravel.psu.edu/general-resources/cdgrs-mapper-geographic-information-system-gis.~~

3.11 Annual Summary Reports

> *The State Conservation Commission shall annually assess the program and annually report to the Transportation Committee of the Senate and the Transportation Committee of the House of Representatives on its acceptance and effectiveness.*
>
> *-§ 9106, (D), (3)*

Districts are required to submit a report annually to the Commission on all project work and spending activity. The information on the annual summary report is used by the Commission to report to the Transportation Committees in the Pennsylvania House and Senate annually.

Since quarterly reporting is required for all Program expenditures, submitting the annual report is nearly automatic. Once the quarterly report due January 15th has been submitted and accepted, the Annual Report can be submitted in the DGLVR Mapper system. Completing t~~T~~he Annual Summary Report includes ensuring all quarterly reports are submitted and accepted, entering average limestone DSA cost, and managing project errors. The average cost of **limestone** aggregate (DSA) delivered (not placed) is a small factor in District Allocations (in accordance with section 9106, the law that created the Dirt and Gravel Road Program). ~~For more information on the reporting process, visit https://www.dirtandgravel.psu.edu/general-resources/cdgrs-mapper-geographic-information-system-gis.~~

Chapter 4

Quality Assurance Board Role

4. QUALITY ASSURANCE BOARD (QAB) ROLE

The Program is designed around the concept of "local control". Consistent with this philosophy, the Commission establishes statewide requirements and guidelines, but allows individual districts to establish local policies and procedures to customize the Program for the needs within their county. Each district is required to establish a four-member Quality Assurance Board (QAB) that becomes the primary "steering committee" that makes recommendations to the district board on local policies and project funding.

The QAB's purpose is to assist the district with the establishment of local controls and program requirements including but not limited to fiscal, environmental, written priorities, training incentives and site inspection. **The QAB serves in an advisory capacity only to the conservation district board.** The QAB makes recommendations to the board but the authority for project approval and spending is with the district directors. Only the district board may approve spending of Program Funds.

Within the conservation district a Quality Assurance Board shall be impaneled to establish and administer the grant program. The four-member Quality Assurance Board is to be comprised of a nonvoting chairman appointed by the conservation district directors and one local representative appointed by each of the following entities:

(1) The Federal Natural Resource Conservation Service
(2) The Pennsylvania Fish and Boat Commission
(3) The county conservation district

If circumstances require, the chairman may vote to decide a tie vote.

-§ 9106, (E)

4.1 QAB Composition

A four member QAB is required by law for each district administering the Program. The QAB must consist of the four members described above in 9106 (E), or their designee. The chairman of the QAB may not participate in a vote, other than to decide a tie vote. No one other than the four QAB members may vote. To broaden citizen involvement, the QAB may enlist any individual or organization to be advisors (non-voting) to the four-member QAB.

The district should select the district's voting and non-voting members for the QAB, verify their willingness to serve and ascertain that no conflict of interest exists by adopting and enforcing a conflict of interest policy statement.

The district should contact the PA Fish and Boat Commission (PFBC) and the Natural Resource Conservation Service (NRCS) to identify the proper representatives from each agency for the QAB. Individuals possessing an awareness of local environmental issues, familiarity with project administration, road maintenance, or natural habitats could be valuable QAB members. If any appointee cannot meaningfully participate, or chooses not to participate, a suitable replacement should be found.

The PFBC or NRCS may appoint a person who is not necessarily a PFBC or NRCS employee to the QAB to serve as that agency's representative. Local conservation agencies such as Trout Unlimited or conservancies may be a potential source of QAB volunteers should PFBC or NRCS wish to appoint a designee. The appointment must be agreed upon by both the district and the agency. PFBC, NRCS, or the district can also designate alternates to their spot on the QAB who can attend and vote if the primary member cannot attend. Such designations must be in writing from each

agency with respect to their spot on the QAB. A sample QAB designee letter can be found at www.dirtandgravelroads.org. This letter is a sample only. It can be modified as needed.

The individual members of the QAB are expected to become familiar with the Program and they are encouraged to attend the Environmentally Sensitive Maintenance (ESM) training. At least one of the two district members of the QAB must attend ESM training every five years. There is no requirement for the QAB members representing the PFBC and the NRCS to attend training, but it is strongly encouraged.

4.2 QAB Meetings

4.2.1 Scheduling QAB Meetings

QAB meetings may be held on a regular schedule, or on an as-needed basis. All QAB meetings are subject to the public notification requirements outlined below. The most common action items that occur at QAB meetings are:

- Visit to potential application sites
- Review and/or ranking of grant application(s)
- Recommendations of project for funding to district board
- Review of completed projects
- Recommendation of local policies to district board

4.2.2 Public Meeting Notifications

QAB meetings must be scheduled and are subject to the requirements of Pennsylvania's Sunshine law.

PA Sunshine law requires that notice of regularly scheduled QAB meetings must be given once a year by advertising in a newspaper of general circulation at least three days prior to the first meeting of the year. The notice must give the place, date, and time of the first meeting and a schedule of the QAB's remaining regular meetings. Notice of the QAB meeting also must be prominently posted at the principal office of the agency or at the public building where the meeting is to be held.

If QAB meetings are not held on a regular schedule, procedures in the Sunshine law for "special meetings" should be followed. For rescheduled or special meetings, notice of the meeting must be published in a newspaper of general circulation at least 24 hours in advance of the meeting. The notice must give the place, date, and time of the meeting. QAB meetings may be held using a conference call. These meetings must still be sunshined and the public must be able to participate. The public should be invited to come to the district office to participate in the call and have the committee members call in to participate. Details on the PA Sunshine Act can be found at: http://webpages.charter.net/gdsbmmllp/sunshine.htm

> *"The Pennsylvania Sunshine Act requires all public agencies to take all official actions and conduct all deliberations leading up to official actions at public meetings. The Act covers all such actions by municipal governing bodies, committees of these governing bodies and municipal boards and commissions."*
>
> *-Open Meetings, the Sunshine Act*

4.2.3 QAB Meeting Procedures

The QAB must establish rules of order and procedures to govern their meetings. **There must be a quorum (the Chairman plus at least two of the three voting QAB members), to vote on any recommendations to the district board.** The QAB chairman may only vote to decide a tie. Meeting

minutes must be kept and made available to the district board and general public. QAB meetings may be held via conference call as long as they meet the public notice requirements described above.

4.3 QAB Role in Projects

While much of the administrative and project oversight work is the responsibility of the district staff, QAB members are encouraged to be active participants in the Program to the greatest extent possible. An active QAB is typically the first sign of a successful Program in a county.

4.3.1 Project Ranking

Some of the major functions of the QAB are to determine project eligibility, rank projects for funding, and make funding recommendations to the district board. Each county should have a written local ranking sheet for projects, as described in Section 4.4.1.3.

QAB members are encouraged to visit application sites before regular QAB meetings in order to be able to better discuss the projects and applications. Many counties will have QAB site tours to look at application sites together. This has the advantage of allowing discussion between the QAB members and district staff. Some counties will provide QAB members with a list of applications, and QAB members will perform site visits on their own prior to QAB meetings. In some counties, the district staff will visit potential application sites, and take pictures to present to the QAB at their regular meeting. While not as effective as visiting the potential projects, the presentation approach is still more beneficial than simply looking at a list of applications on paper.

Field visits by the QAB are not subject to Sunshine Act requirements as long as no deliberations of QAB business occurs and no official actions or recommendations are made during the visit. ~~Remember in scheduling QAB meetings, both official and unofficial, that "all deliberations leading up to official actions" are subject to the public notification requirements of the Sunshine law described above.~~

4.3.2 Project Funding Recommendation

The QAB makes recommendations to the district board based on established district ranking criteria and Program policies. QAB funding recommendations must be made at a public meeting subject to PA's Sunshine law described above. District staff should then take QAB recommendations to the district board for approval at a regular meeting. Once the district board acts to approve an application for funding, district staff can pursue any final measures necessary to secure a contract with the grant recipient.

4.3.3 Project Implementation and Completion

Once the district board acts on the QAB's recommendation and enters into a contract with a grant recipient, district staff will be responsible for the general administration, oversight, and inspection of the project. Future decisions on funded projects can be made between the district staff and district board with minimal QAB involvement. For example, the district board may approve a contract amendment to a project without QAB involvement. QAB members are encouraged to stay involved with the project through site visits, but no further QAB action is required. Many districts also hold "completed site tours" with their QAB that allows them to visit and discuss completed projects.

4.4 QAB Role in Policy

In addition to project funding recommendations, the development of local policies is the second major function of the QAB. As with funding recommendations, any QAB policy recommendations must be approved by the district board. Some of the policies described below are "required" by either

the Commission Statement of Policy (Section 8. QAB Responsibilities) or the law that created the Program. The "optional" polices below are given only as examples of other policies that have been adopted by QABs around the state. QABs may create policies that are equally or more restrictive than statewide policies. For example, requiring all DSA to be paver placed (Statewide policy requires paver placement over 500 tons). ~~since statewide policy is that new stream crossing structures must be at least 100 percent of bank full width; local policies could alter this to be at least 120 percent.~~ Local policies can also impose additional requirements. For example, a policy requiring pre-application site visits, which are highly recommended but not required statewide, could be adopted by the local QAB.

In order to assist districts and QABs in developing policies, a collection of policies from each county is available on the Center's website at http://www.dirtandgravel.psu.edu/pa-program-resources/conservation-districts.

4.4.1 Required Policies

4.4.1.1 Equal Access

The Commission Statement of Policy (Section 7.f) requires districts to develop a "fair and open selection process" pertaining to notifying potential applicants and accepting potential applications. All potential applicants must receive equal notification on topics such as: funding availability, application deadlines, availability of district-owned equipment (such as grader blades or traffic counters), training, etc. See Section 3.7.1 for a listing and description of eligible applicants.

4.4.1.2 Conflict of Interest

The Commission Statement of Policy (Section 8.d(3)) requires districts to develop "rules of conduct, including "…to avoid conflicts of interest by members of the QAB". These include provisions for QAB, conservation district staff, and district board members to abstain from voting on the recommendations of policies or projects where they have a vested interest.

4.4.1.3 Project Ranking

The Commission Statement of Policy (Section 8.b(3)) requires districts to develop "written criteria to specify priorities" when it comes to ranking projects for funding. This is typically in the form of a grant application ranking sheet developed by the QAB and approved by the district board. These evaluation sheets rank applications using a numerical score and provide a basis for comparing numerous applications before making funding recommendations. A sample grant application ranking sheet is available at www.dirtandgravelroads.org.

4.4.1.4 Incentive for Training

The Commission Statement of Policy (Section 8.b(5)) requires districts to develop "incentives for training road managers and equipment operators". Commission policy is that the person in charge of project implementation for the applicant must be ESM certified, but districts may institute additional training incentives.

Some examples of additional training incentives include: reimbursing applicants travel expenses for attending ESM training or annual workshops; hosting ESM trainings in their county to reduce travel time and expenses for potential applicants; and encouraging district staff to put on other workshops, field days, tours, etc.

The cost of implementing the incentives may be paid for with either education or administrative funds. The district may establish a written policy to specify what incentives may be used.

4.4.1.5 Non-pollution Standards

The Commission Statement of Policy (Section 8.b(6)) requires districts to develop "standards that prohibit use of materials or practices which are environmentally harmful". The district must adopt the Commission's non-pollution standards or a more stringent policy.

4.4.2 Optional Local Policies and Procedures

QABs may recommend, and district board may adopt, a range of local policies that govern how the Program is administered within the county. Any local policies must be equally or more stringent than any statewide Program policies, and must ensure equal access to all potential Program participants. Please contact Commission staff if you have questions on a particular policy. A few examples of the potentially limitless array of local policies include:

- Establishing deadlines for grant application submittal.
- ~~Establishing a maximum grant cap.~~
- Only advancing X percent (must be ≤50 percent) of funds, or none at all, to grant recipients before work begins.
- Limiting the amount or percentage of project funding that can be used of Driving Surface Aggregate or asphalt paving.
- Establishing a policy that grant recipients must maintain previous projects to be eligible for future funding.
- Requiring a certain percentage in-kind match.

Chapter 5

Applicant Role

5. APPLICANT ROLE

This section of the manual is intended to serve as a primer for potential applicants. While this section should serve as a guide for potential applicants, communication with the local district is vital to becoming a successful applicant.

5.1 Before Applying for Funds

5.1.1 Local Procedures and Policies

There are currently 6~~5~~6 counties participating in the Program. As much as is practical, control of the Program is driven down to individual County Conservation Districts (Districts). Each district is governed by a district board~~,~~ and is advised by a local Quality Assurance Board (QAB) that develops county specific policies and procedures. These local policies can address many county specific issues such as the following:

- Application periods
- Training requirements and training incentives
- Types of projects accepted
- Maximum amount of funds allocated to a specific project
- Maximum number of applications accepted from an applicant
- Ranking criteria
- Maintenance requirements

It is imperative that any potential applicant contact their local district early in the process. This initial contact should occur well in advance of submitting an application.

5.1.2 Eligibility

Potential applicants must meet certain eligibility requirements as follows:

- The person in charge of work plan development and project implementation for the applying entity must have attended environmentally sensitive maintenance (ESM) training within the past five calendar years to become "ESM Certified". Individuals not directly involved with the project design and implementation (interns, secretaries, etc.) do not qualify an applicant to be eligible for funding. Engineers on retainer or others who serve multiple municipalities are welcome to attend the ESM training, but their attendance does not count as "ESM Certification" for the municipalities they represent.
- The road must be publicly owned, not simply open to the public. For Program eligibility, the entity that owns the road "right of way" is the determining factor, not who owns the land adjacent to the road. For example, a township may own a road that is surrounded by state or national forest on both sides. Contracts and payments can only be made with the entity that owns the road. In some cases, the ownership of a road may be in question or unknown. Some considerations in determining road ownership of "orphaned" roads:
  - If a municipality receives "Liquid Fuels" funding for the road, then it is eligible.

Typical project timeline:

1. *Identify potential project.*
2. *Site visit with District.*
3. *Submit application to District.*
4. *If funded, enter into contract.*
5. *Acquire any necessary permits and permission.*
6. *Perform, or have contractor perform work.*
7. *Final site inspection with District.*

  - Most public roads will have courthouse records of ownership.
  - It is the responsibility of the potential applicant to prove road ownership to the satisfaction of the district.
  - Local solicitors may be able to help with road ownership determinations.
- In addition to being publicly owned, the road must be open to public vehicle travel a minimum of two consecutive weeks out of the year.
- The project in the application must adequately address any environmental concern.

Refer to Section 3.7.2 of this manual for more detailed information on eligible projects.

5.1.3 Pre-application Site Visit

A pre-application site visit with the district is strongly encouraged, and in some counties is required. Note that a pre-application meeting is required for stream crossing replacements (see chapter 7.1 for details). Districts are encouraged to rank projects higher if a pre-application site visit has occurred. The purpose of the visit is to provide a potential applicant the opportunity to discuss the size and scope of a potential project with the district. District input at this time can save time, and it can avoid the frustration of taking time to prepare an application only to find out the project may be considered ineligible or low priority. District staff may provide input during the visit that could make the application more likely to be approved. Districts may also be knowledgeable on other aspects of the project, such as permit requirements, one call notifications, erosion and sedimentation control planning, etc. Potential landowner issues, discussed in Section 3.7.4.7, should be a part of the initial site visit.

5.1.4 Combined Funds

Program funds may be combined with other funds to pay for a road ~~maintenance~~ improvement project. If Program funds are combined with other funding sources, detailed accounting of which funds were spent on which portions of the project must be maintained. The other funding sources may be used as matching funds for Program projects, provided the Program funds are used on identified pollution worksites. Projects funded with combined funding sources must still adhere to the Program's non-pollution standards and Environmentally Sensitive Maintenance Practices. Should other funding sources have requirements in conflict with the Program's non-pollution standards, funds cannot be combined. It may be possible to complete a project in stages where the Program funds one phase of a project (i.e. drainage and base improvements) and another funding source funds a different phase (i.e. improving the road surface).

5.2 Applying for Funds

Districts develop their own procedures for accepting applications. Some districts may establish application deadlines while others may continually accept applications. The following are general Program requirements, but districts may add additional requirements:

- One grant application should be received for each project site. Multiple project sites will require multiple applications. Districts may suggest funding larger projects in multiple phases using a single or multiple contracts. The grant application is provided in Appendix C.
- Applicants shall submit applications to the district who will forward it to the local Quality Assurance Board (QAB) for review and prioritization.
- The QAB will review the applications and make funding recommendations to the district board.
- The district board will act on the QAB recommendations and award funding based upon

previously defined local priorities and available funding.

- The district shall keep a copy of the completed application, project sketch, and location map on file.
- Applicants should keep a copy of the completed application on file.

Projects funded by Dirt, Gravel, and Low-Volume Road funds that are bid out to contractors in which the estimated cost of the total project (materials, equipment and labor), exceeds prevailing wage limits (currently $25,000) are subject to provisions of Pennsylvania's Prevailing Wage Act (1961, August 15, P. L. 987, No. 442), 43 P. S. Section 165-1 et seq. Where prevailing wage applies, it is the responsibility of the grant recipient to register the project with the PA Department of Labor and Industry~~,~~ and include prevailing wage notification in any proposal to solicit bids for the contract. Prevailing wage scale can be obtained from the Prevailing Wage Division of the Pennsylvania Department of Labor and Industry. Note that owner-operators / sole-proprietors are not exempt from prevailing wage requirements. Contact your county solicitor or the Pennsylvania Department of Labor and Industry for additional guidance and questions. A "Frequently Asked Questions" document concerning prevailing wage can be found on the Center's website at www.dirtandgravelroads.org Additional information available from the PA Department of Labor and Industry at http://www.dli.pa.gov/Individuals/Labor-Management-Relations/llc/prevailing-wage/Pages/default.aspx. ~~If federal funds are also involved in a project, federal prevailing wage requirements (Davis Bacon Act) supersedes PA prevailing wage. Davis Bacon requirements are acceptable to the DGLVR program in this case.~~

If federal funds are involved in a project, federal prevailing wage requirements (Davis Bacon Act) often supersedes PA prevailing wage. Davis Bacon requirements are acceptable to the DGLVR program in this case, and Certified Payroll forms accepted by the US Department of Labor must be completed and kept in the project file.

A prevailing wage "Notification letter"~~"~~, attachment F to the DGLVR Contract, must be completed and returned to the Conservation District.

For projects where prevailing wage is required, a Weekly Payroll form and notarized "Certified Statement of Compliance", attachment G to the DGLVR contract, must be completed before final payment can be made.

Districts may make minor changes to the application and have the applicant show concurrence by initialing and dating the correction. Unfunded grant applications may be retained for future grant rounds~~,~~ or may need to be resubmitted. Check with your district for their policies and procedures regarding unfunded grant applications.

5.3 Pre-contract Documentation

It is not necessary for an applicant to have all required permits, traffic counts, and other requirements in hand prior to submitting an application, but many of these requirements must be met before funding is advanced to the grant recipient or before project work can begin. While districts may develop more stringent requirements, the following is a list of general pre-contract requirements:

- PA One Call must be notified at various stages of the project, including the design phase and also prior to construction. One Call assigns a serial number to each call they receive. These serial numbers must be recorded and kept in the project file.
- Many projects will require some type of environmental permit. Applicants are encouraged to work with the district to determine what environmental permits, if any, may be required. Any required permits must be obtained by the grant recipient before work can begin on the portion of the project related to the permit. See Chapter 8 for more permit guidance.

- Some projects may require an Erosion and Sediment Control (E&S) plan. Your district can help you to determine if an E&S plan is necessary. A sample E&S plan is available on the Center's website.
- Low-volume road projects require that a traffic count be conducted. This traffic count must show that the worksite has a traffic count of 500 vehicles a day or less, and the count must be provided to the district for review prior to entering into a contract. See Section 7.5 for traffic count guidance.

5.4 Entering Into a Contract

Before project work can start, the district must enter into a contract with the successful applicant. The contract will specify the location, a description of the work to be performed, and the time frame within which the work will be performed. Documents such as the grant application, project sketch, location map, and project estimates become attachments to the contract. The contract will also specify the amount of funding available for the project upon completion, as well as any provisions for advance payments, payments during construction, and provisions for final payment after the work has been completed. The contract must be signed by the district chairman (or appointed designee) and a person authorized to sign for the successful applicant.

5.5 Project Work

5.5.1 Notification of Project Work

Grant recipients MUST notify the district before beginning work on a project. The amount of notice needed must be spelled out in the contract with the district. This will allow the district to meet in person with the grant recipient and any contractors or sub-contractors who will be implementing the plan to determine the phase and sequence of the project and discuss other project elements. The district must also be notified before beginning a new phase of the project (for example, drainage work is completed and aggregate placement will begin). The district may withhold payments and/or request reimbursement of advanced funds and cancelation of the contract if a grant recipient fails to comply with notification requirements.

5.5.2 Performing Project Work

Grant recipients should follow their standard operating procedures when performing project work such as: bidding procedures for contractors and materials, standard safety requirements, traffic control, road closure, etc. Municipalities should use their municipal codes and other appropriate standards as guidance. Other grant recipients should follow normal purchasing procedures and normal contract procedures using advertising and bidding as warranted. Project expenditures should be tracked following normal bookkeeping and audit procedures~~,~~ and retained for seven years from project completion. Copies of all receipts for project expenditures to be reimbursed by grant funds must be submitted to the district.

Work must be performed in accordance with the accepted application and work plan unless both parties agree to project changes in writing. The grant recipient is responsible for oversight of any contractors or subcontractors working on the project. Work must be performed within the contracted scope, budget, and timeframe.

If an increase in costs or extension of time is required, the district must be contacted as soon as possible. At the district's discretion based on existing policies and funding availability, contracts may be amended for cost overruns up to ~~20~~ 40 percent of the original contract amount, or to extend the timeframe for completion. ~~When cost over-runs exceed 20 percent of the original contracted~~

~~amount, an additional or new contract will be required.~~ Cost overruns over 40% of the initial contract amount require SCC approval. Keep in mind that if a contract is ~~between $20,800 and $25,000 (~~barely under the prevailing wage threshold for contracted work~~),~~ an amendment may increase the total value of the project so that prevailing wage would apply to contractor costs. More on prevailing wage in section 3.7.4.4

5.5.3 Project Completion and Reporting

When a project is completed, the district and the grant recipient will meet on site to perform a final inspection. ~~–~~This is documented on a project completion report. The purpose of the final inspection is to assure that all contracted items have been satisfactorily completed. Grant recipients are encouraged to schedule a final inspection immediately after work is complete, so any remediation can be done while equipment is still on site if needed. Upon completion, the grant recipient may submit detailed financial records documenting project costs.~~–~~ The district will then issue a final payment. ~~-~~The project completion report and instructions can be found in Appendix G. Note that other documentation may also be required to be submitted to the conservation district before final payment is made. Such documentation may include, but is not limited to, DSA certifications, Off ROW consent, or Prevailing Wage documentation. A "Hard File Checklist" that outlines documentation that conservation districts must have on file and may request from grant recipients is available at: https://www.dirtandgravel.psu.edu/pa-program-resources/program-specific-resources/blank-forms

5.5.4 Future Maintenance

There are no statewide requirements for maintenance after projects have been completed. Local Districts, however, may set policy on maintenance requirements for completed projects in their county. Maintenance of past projects may be considerations in a district's application ranking criteria.

Chapter 6

Center for Dirt and Gravel Road Studies

6. CENTER FOR DIRT AND GRAVEL ROAD STUDIES

6.1 Center Structure

The Center is an independently funded non-profit entity at Penn State University. The Commission contracts with the Center to provide education, outreach, and technical assistance to entities involved with the Program. The services provided by the Center are outlined in the next section. In addition to supporting the Commission part of the Program, the Center also contracts with various other entities such as the PA Department of Conservation and Natural Resources and the PA Game Commission to provide similar training and research services.

6.2 Center Services

6.2.1 Education and Training

The primary education tool of the Program is the two-day ESM course developed, maintained, and presented by the Center. The Center also hosts an annual maintenance workshop for Program participants that include multiple classroom sessions and field demonstration projects. The Center is also involved in various other trainings and educational efforts such as district administrative training, GIS trainings, and topic-specific trainings and webinars. Details of these educational services can be found in Section 3.6.

6.2.2 Outreach

The Center performs various activities in an effort to promote the Program and environmentally sensitive road maintenance principles. Such activities include participating in various professional meetings and trade shows, representing Program interests on various nationwide panels and committees, and creating and distributing promotional materials for the Program.

6.2.3 Project Technical Assistance

Center staff is available to help district staff with project planning, design, implementation and inspection. This technical assistance can be in the form of phone, e-mail, or site visits. The Center typically provides on-site assistance with projects that involve new District staff, new or innovative techniques, or especially complicated projects. Some typical services performed on technical assistance on-site visits include: on-site training of new district staff, project evaluation and planning, grant application review, interactions with applicants; conflict resolution, project stationing and site-plan development, driving surface aggregate preparation and placement assistance, project implementation and oversight assistance, and review of completed projects. It is important to note that the focus of providing this technical assistance is to build capacity at the district. Center staff will work through the district for all interactions with Program applicants.

6.2.4 Program Technical Assistance

In addition to project-related technical assistance, the Center is also available to discuss any Program-related questions or issues the district and applicants may have on a wide variety of topics. This technical assistance can be done via phone, e-mail, or even by in-office visits when large issues or new district staff is involved. If a policy interpretation or administrative assistance is needed, the Center will forward questions and concerns to staff at the Commission.

6.2.5 Written and Digital Reference Material

The Center creates and distributes a wide variety of reference material that is available both in print and online including:

- ESM training guidebook.
- Technical Bulletins on specific ESM practices.
- Write-ups about innovative projects.
- Quarterly newsletters containing Program updates.
- Annual summary reports for the Program.
- Cooperation with Commission on Program policy and guidance documents.

6.2.6 Website

The Center maintains a comprehensive website including reference material for the Program as well as other Center activities. The website can be found at www.dirtandgravelroads.org.

6.2.7 GIS and Reporting

The Program uses a customized GIS system, detailed in Section 3.10, to track the locations, deliverables, and expenditures for all road project work. The Center is responsible for the development, maintenance, and training of this GIS system; as well as the collection of the quarterly and annual summary report from districts. The Center also works with the Commission to develop reports to provide to the state legislature and others based on county data.

6.2.8 Workgroups

The Center, in conjunction with the Commission, maintains several advisory workgroups to the Program. District staff makes up the majority of the workgroups. The workgroups act in an advisory capacity only, making recommendations to the Commission for approval. There are four active workgroups that meet on an as-needed basis. The education and outreach workgroup deals with the ESM Course content and format, the annual maintenance workshop planning, and various other outreach and education efforts such as GIS trainings, roundtables, and more. The policy and planning workgroup deals with allocation and policy recommendations to the Commission. The low-volume road workgroup was created in 2014 specifically to handle issues related to the new low-volume road program. The product and process workgroup deals with technical issues such as Driving Surface Aggregate and approving products for use with Program funds.

6.2.9 DSA Clearinghouse

The Center maintains a “DSA Clearinghouse” that is designed to facilitate DSA purchasing and placements around the state by creating a central point of contact and information for aggregate suppliers and districts. This “DSA Clearinghouse” is described in Section 7.2.

6.2.10 Research

The Center performs a limited amount of research on practices and policies that directly affect the Program. Research topics vary widely from road sediment quantification, to cost-benefit analyses, to development of new and innovative practices.

6.2.11 QAQC

While the Quality Assurance/Quality Control process, described in Section 2.3, is led by Commission staff, the Center still plays a significant role in the process. The Center has worked with the Commission to develop the QAQC process. Center staff is part of the QAQC visit team and typically assume a role related to the evaluation of completed project sites.

6.2.12 Product and Process Approvals

All products and materials purchased with Program funds must adhere to the Program's non pollution standards. The product and process workgroup develops product testing protocols. These protocols are then reviewed by the Commission. When a product is submitted for approval, the workgroup reviews the product according to Commission approved protocols. A list of approved products is maintained on the Center's website at www.dirtandgravelroads.org

Chapter 7

Additional Program Policies

7. ADDITIONAL PROGRAM POLICIES

The purpose of this chapter is to address more complex Program policies that are not necessarily applicable to every project. This chapter contains policies and guidance on:

- 7.1: Stream Crossing Replacement
- 7.2: Driving Surface Aggregate
- 7.3: Full Depth Reclamation
- 7.4: Low-Volume Road Specific Guidance
- 7.5: Low-Volume Road Traffic Counts

Section 7.1 related to stream crossings was completely rewritten, beyond the ability to "track changes". The existing policy has been replaced with the proposed new policy below.

Existing 7.1:

~~7.1 Stream Crossing Structural Replacement (Bankfull) Policy~~

~~This section applies to stream crossing replacements (not road drainage "crosspipes") on both Low-Volume funds and Dirt and Gravel roads.~~

~~7.1.1 Background~~

~~The goal of this policy is to limit the replacement of stream crossing structures to those which are negatively impacting streams. The best quantification of stream impact is the size of the existing structure related to the bankfull width of the channel. A channel's bankfull width is the width of flow at a "dominate channel forming flow stage" where sediment and bed material is moved most effectively through the stream system. Although it varies, bankfull is typically associated with a flow level between one and two year recurrence. Stream crossing structures that are significantly less than the channel's bankfull width are typically associated with many problems including gravel deposition above the road and excessive stream scour and erosion below the road. The policy below limits paying for structural replacement on pipes over 4' in diameter to only those locations where the existing structure is less than 75 percent of the bankfull channel width. These structures are most likely to be causing negative stream impacts, and are most likely to be sources of perpetual maintenance and road impacts to local municipalities (gravel bar removal, erosion, etc.). In addition, any new structures must have a width at least equal to the channel's bankfull width. Bankfull structures have been shown to be both cost effective over their lifetime and provide significant aquatic benefits. In addition, installing bankfull structures helps reduce annual maintenance costs, and can prevent road damage and road closures due to flooding.~~

~~7.1.2 Replacement of Road/stream Crossing Structures~~

~~The purpose of this policy is to determine eligibility for stream crossing structural replacement with Program funds. Environmentally Sensitive Maintenance practices applied to the surrounding stream crossing structure area (road, stream banks, ditches, headwalls, wingwalls, high water bypass etc.) are still eligible Program expenses around all stream crossings regardless of bankfull measurements. Within the limits described below, the final decision on funding structure~~

replacement, along with the type of structure used (pipe, box, etc.), is at the discretion of local QABs. Individual QABs can enact stricter polices within their counties, for example requiring structures to be 50 percent bankfull instead of 75 percent to be eligible for replacement, or requiring new structures to be 1.2 times bankfull width. These qualifications for replacement with Program funds do not exempt projects from any permitting or engineering requirements. Engineers should be made aware of this policy early in the planning process, as stream crossing designed solely based on hydraulic capacity are typically smaller than a bankfull structure. Districts should hold an on-site pre-design meeting with the applicant and their engineer prior to the structure design process and application development. Districts may develop local polices requiring pre-application or pre-design meetings.

Bankfull structures will not only accommodate the hydraulic capacity of the stream, but will allow for better stream function through the road in regards to bedload movement, sediment and debris transport, and aquatic organism passage. Stream crossing replacements can be funded as standalone projects, or as part of a larger Program project. The Program's "Stream Crossing Evaluation Form", along with guidelines on bankfull determination, can be found in Appendix E.

Stream Crossing Replacement Policy:

EXISTING stream crossing structures with an opening equal to or less than 13 square feet *(equivalent to a 48" diameter round pipe):*

- **Are eligible to be replaced with Program funds.**
- **The NEW REPLACEMENT structure must** *(all four)***:**
  1. Have a structure width at least equal to bankfull width (100 percent ratio).
  2. Be properly aligned with the channel when possible.
  3. Consider additional floodplain connectivity when possible.
  4. Be designed and constructed to accommodate the passage of aquatic organisms through the structure.

EXISTING stream crossing structures with an opening of more than 13 square feet *(equivalent to a 48" diameter round pipe)***:**

- **In order to be eligible for replacement, EXISTING structures must** *(all three)***:**
  1. Have a structure to bankfull width ratio of 75 percent or less.
  2. Show signs of streambank erosion.
  3. Show signs of streambed erosion/aggradation.
- **The NEW REPLACEMENT structure must** *(all four)***:**
  1. Have a structure width at least equal to bankfull width (100 percent ratio).
  2. Be properly aligned with the channel when possible.
  3. Consider additional floodplain connectivity when possible.
  4. Be designed and constructed to accommodate the passage of aquatic organisms through the structure.

Round pipes over 36" in diameter are not permitted for use in DGLVR funded stream crossings. Oval or squash pipes are acceptable. This applies only to stream crossing replacements. Round crosspipes are standard and acceptable for road drainage.

Existing structures that do not meet the above criteria are not eligible for replacement (materials, equipment, or labor) with Program funds. This policy applies to replacement of structures and does not prohibit work adjacent to the structure.

Considerations for multiple pipes

~~Stream crossings consisting of multiple "side-by-side" pipes are associated with a wide variety of problems including clogging and channel stability issues. Installation of multiple pipe structures is NOT permitted with Program funds (high-water or overflow pipes are permitted, but do not count towards bankfull capacity). In addition, existing stream crossings consisting of multiple pipes are eligible for replacement regardless of their relationship to the bankfull measurement, as long as they are replaced with a single opening structure of at least bankfull width. This policy applies to multiple pipes only, not multi-cell bridges.~~

~~Policy Application to Small Streams~~

~~For Program purposes, the stream crossing policy applies to situations where streams, including intermittent channels, with identified bed and banks are flowing into the road or the uphill ditch. Contact the State Conservation Commission in questionable circumstances. In order for policy exceptions on "questionable stream" channels, Districts must obtain written approval from the Commission prior to contracting the project.~~

~~Routine Maintenance~~

~~The Program has never paid for "routine or regular maintenance" such as simply grading roads. Similarly, regular maintenance of stream crossing structures is not eligible for funding. This includes work items such as culvert lining, extending undersized stream crossings, bridge deck repair, etc. that provide minimal environmental improvements.~~

~~Stream Crossing Replacement Notification~~

~~Conservation Districts are required to notify the SCC of proposed stream crossing replacements as soon as practical before a contract is signed. An online notification system is available by logging in to the Centers website (same log-in as accessing the GIS system) at www.dirtandgravelroads.org~~

Proposed new 7.1

7.1 Stream Crossing Structural Replacements

This section applies to stream crossing replacements (not road drainage "cross pipes") funded by the Dirt, Gravel, and Low-Volume Road (DGLVR) Program on both Low-Volume and Dirt and Gravel roads. Refer to Chapter 1 of the DGLVR Stream Crossing Replacement Technical Manual for additional discussion of the background, purpose, and intended benefits of the policies detailed here.

7.1.1 Background

Replacement Structures: One of the DGLVR Program's major goals of stream crossing replacements is to ensure that structures that are funded by the DGLVR Program are designed and implemented properly to achieve stream continuity through the roadway. Stream continuity refers to the connectivity and continuation of typical streambed features (profile, slope, width, composition, grade controls, pools) along its length upstream, downstream, and through a road crossing structure. DGLVR projects often reconnect segments of stream that have been disconnected and vertically offset by an undersized road crossing. New structures funded by the DGLVR Program must be wide enough to allow for construction of a functional stream channel through the crossing. This includes bank margins, low flow channel, grade controls, and other stream features. Construction of a bankfull-width stream channel through wider-than-bankfull-width structures will not only accommodate the hydraulic capacity of the stream but will also allow

for better stream function through the road regarding flood resiliency, sediment and debris transport, and aquatic organism passage.

Existing Structure Eligibility for Replacement: Another major goal of the DGLVR stream crossing replacements is to limit paying for replacement of stream crossing structures to locations which are negatively impacting streams and the aquatic environment. The best overall approximation of environmental impact from a crossing is the width of the existing structure opening related to the bankfull width of the channel. A channel's bankfull width is the width of flow at a "dominate channel forming flow stage" where sediment and bed material is moved most effectively through the stream system, typically associated with a one-to-two-year recurrence interval for Pennsylvania. Stream crossing structures that are significantly less than the channel's bankfull width are typically associated with many problems, including gravel deposition upstream of the road, excessive stream scour and erosion downstream of the road, flooding, and washouts. DGLVR site eligibility policy (detailed in section 7.1.2.2) limits paying for structural replacement on existing pipes over 4' in diameter to only those locations where the existing structure is less than 75 percent of the bankfull channel width. These structures are most likely to be causing negative stream impacts and are most likely to be sources of perpetual maintenance and road impacts to road owners (gravel bar removal, erosion, etc.).

7.1.2 DGLVR Stream Crossing Replacement Policy

This section details the DGLVR Stream Crossing replacement policy for eligibility, new structures, and details additional responsibilities of the conservation district.

7.1.2.1 Policy for Structure Installation

All stream crossing replacements funded in whole or in part with DGLVR funds, or listed as in-kind on a DGLVR Project, must follow the DGLVR Stream Crossing Design & Installation Standard, unless an "Exemption from DGLVR Stream Crossing Standard" (see section 7.1.3) is applicable. The Standard and its attachments are available online at https://www.dirtandgravel.psu.edu/ For projects receiving an Exemption from DGLVR Stream Crossing Standard, other site-specific requirements apply (see section 7.1.3).

7.1.2.2 Policy for Stream Crossing Eligibility for Replacement

Eligibility criteria for replacing stream crossings, in whole or in part, with DGLVR funds:

- **Small Pipes:** Existing stream crossing structures with an opening width less than or equal to 48" are automatically eligible for replacement regardless of their relationship to the bankfull channel width, as long as they are replaced according to DGLVR Policy.
- **Multiple Pipes:** Existing stream crossings consisting of multiple (side-by-side) pipes are automatically eligible for replacement regardless of their relationship to the bankfull channel width, as long as they are replaced according to DGLVR Policy. This automatic eligibility applies to multiple pipes only, not multi-cell or multi-opening bridges.
- **All Other Structures:** For existing single-opening structures with an opening width over 48", only structures with a "structure opening width to bankfull channel width" ratio of 75% or less are eligible for replacement with DGLVR Program funds.
- **SCC Notification**: Conservation districts are required to notify the State Conservation Commission (SCC) of proposed stream crossing replacements as soon as practical before a contract is signed. An online notification system is available by

logging in to the Center for Dirt and Gravel Road Studies' website (same log-in as accessing the GIS system) at www.dirtandgravelroads.org.

Note: When measuring the width of an existing structure, measure the most limiting width (for example: the narrowest pipe in a series of "necked-down" pipes, or the narrowest point perpendicular to the flow between abutments of a skewed bridge).

7.1.2.3 Where the DGLVR Stream Crossing Policy Applies

All stream crossing replacements funded in whole or in part with DGLVR funds, or listed as in-kind on a DGLVR Project, must follow the DGLVR Stream Crossing Design & Installation Standard, unless an "Exemption from DGLVR Stream Crossing Standard" (see section 7.1.3) is applicable. The Standard and its attachments are available online at https://www.dirtandgravel.psu.edu/. For projects receiving an Exemption from DGLVR Stream Crossing Standard, other site-specific requirements apply (see section 7.1.3).

For DGLVR Program purposes, the stream crossing policy outlined here applies to situations where streams, including intermittent channels, with identified bed and banks are flowing into the road or the uphill ditch. See section 7.1.3 for more information on Automatic and SCC-requested exemptions from the DGLVR Stream Crossing Standard. Contact the State Conservation Commission in questionable circumstances.

Routine maintenance of stream crossing structures is not eligible for DGLVR funding. This applies both to stream crossing structures that are ineligible to be replaced with DGLVR funds or are eligible for replacement with DGLVR funds but are not being replaced. For these structures, no work may be performed directly on the stream crossing structure or its components unless the structure is replaced according to DGLVR Program Policy. "Work" includes, but is not limited to, culvert lining, extending undersized stream crossings, bridge deck repairs, and adding or replacing headwalls and endwalls to an existing stream crossing structure. The policies and qualifications for replacement with DGLVR Program funds outlined here and in the DGLVR Stream Crossing Design & Installation Standard **do not exempt projects from any permitting or engineering requirements**.

7.1.2.4 Policy Limiting Engineering and Consulting Costs

As outlined in section 3.7.4.7, Program funds can be used to cover engineering, permitting, or similar consultant costs, but such costs are limited to a combined maximum of 20 percent of the total contract amount between the district and the grant recipient, not to exceed $25,000. A Request for Proposal (RFP) is available on the Center for Dirt and Gravel Road Studies' website. This document is highly recommended for use in hiring an engineer/consultant for stream crossing projects.

7.1.2.5 Conservation District Education Requirements

Education Requirements for ~~CD~~Conservation Districts: Effective July 1, 2023, at least one conservation district staff member must have completed the DGLVR Program's "Stream Crossing Replacement Certification Training" and received a certificate of completion before the QAB can recommend or the conservation district Board can approve a contract for a project involving a stream crossing replacement. A Stream Crossing Replacement Re-Certification Training must be taken once every three years to maintain staff certification. This training requirement does not apply to crossings that qualify for an automatic exemption from the DGLVR Stream Crossing Standard (see section 7.1.3.1).

7.1.2.6 Conservation District Requirements

- **Conservation Districts are required to hold meetings including:**
  - **Pre-application:** Meeting, typically held with grant applicant before application submittal.
  - **Pre-design:** If an engineer is required by permitting or DGLVR standard, then a pre-design meeting must be held. On-site meeting, typically held with grant applicant and project engineer, occurs after the grant applicant signs a contract with the conservation district for DGLVR funding and hires an engineer, and before design and permitting.
  - **Pre-construction:** On-site meeting, typically held with grant recipient,
  - project engineer, and sub-contractor (if applicable), prior to starting construction.

- **Conservation Districts are required to attend a bid site showing (if held):** On-site meeting, typically held with grant recipient, project engineer, and potential bidders/contractors, for structure installation before bids are due. These meetings are highly recommended but at the discretion of the grant recipient.

- A "Stream Crossing Evaluation Form" (Attachment E) must be completed by the conservation district and kept in the project file for all stream crossing replacements, even those with an exemption from the DGLVR Stream Crossing Standard. This form requires measurement of the bankfull channel and existing structure to determine DGLVR Program eligibility.

- Stream crossing replacements nearly always extend outside the road right-of-way. Applicants are strongly encouraged to get verbal permission from landowners for off right-of-way work before contracting. Before working outside the right-of-way, the grant recipient must obtain written permission from the landowner. Landowner permission should be sought as early as possible in the funding process, ideally before contracting, to ensure the project can be implemented as planned. A sample landowner agreement is provided at www.dirtandgravelroads.org. Districts and grant recipients can use their own landowner agreements as long as they are in a form and manner similar to the sample provided. Districts must keep a copy of the signed landowner consent form with the project file for any work performed off the right of way. If landowner permission is required to achieve stream continuity and meet DGLVR Stream Crossing Standard, but cannot be obtained, the project cannot be completed. Contact the SCC in questionable circumstances. This off-ROW policy is detailed in section 3.7.4.8 of the DGLVR Administrative Manual.

- A site assessment must be completed for each stream crossing prior to the QAB recommending the project for funding. This site assessment must be completed by the conservation district or their designee and must be used to support development of cost estimates and the grant application. A site assessment includes obtaining a longitudinal profile and a minimum of two cross-sections of the existing stream channel. The longitudinal profile and cross sections can be used by the conservation district to review future surveys and project plans to ensure they meet DGLVR Program policies and Stream Crossing Standard. The longitudinal profile and cross sections must be completed in accordance with section IV. K of the DGLVR Stream Crossing Replacement Standard. Additional details for completing longitudinal profiles and cross sections are available in X.X of the technical manual and in the attached technical bulletin. If, later in the design process, the design engineer completes their own site assessment to support their project design, the conservation district staff is required to be on-site while the site

assessment is being performed by the engineer and/or surveyor. The conservation district's role during the engineer's site assessment is to observe and assist with the longitudinal profile and cross sections and ensure all important data points are obtained. The site assessment requirement does not apply to sites that are eligible for an automatic Exemption from DGLVR Stream Crossing Standard but does apply to sites that may later receive an Exemption from DGLVR Stream Crossing Standard through the SCC (see 7.1.3.1).

- If a project is required to be designed by an engineer, the grant recipient or engineer must provide all permit applications, Ssite aAssessment, design plans and specifications, (per DGLVR stream crossing replacement standard), to the conservation district. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that these submitted documents comply with DGLVR policy and Stream Crossing Standard before they are submitted (or resubmitted) for permit review. The purpose of this review is to verify consistency with DGLVR policies and Stream Crossing Standard, not to review engineering calculations or permit completeness. "Consistency" and "deficiency" form letters for conservation district use can be found on the Center's website.

- If a project is required to be bid out for construction, the grant recipient or engineer must provide all draft bid packages to the conservation district. The conservation district must review the draft documents and provide written confirmation to the grant recipient or engineer that those draft bid documents comply with DGLVR policy and Stream Crossing Standard before they are provided to potential bidders. This purpose of this review is to verify consistency with DGLVR policies and Stream Crossing Standard, not to review engineering calculations or bidding requirements. It is up to the grant recipient to comply with applicable bidding requirements. "Consistency" and "deficiency" form letters for conservation district use can be found on the Center's website.

- Conservation districts must be on-site regularly during construction to ensure DGLVR Program policies and the Stream Crossing Standard are being met. At minimum, the conservation district must be onsite during the installation of "Critical Stages of Construction" as defined in the DGLVR Stream Crossing Standard.

- In situations where no current stream crossing exists and a new crossing is to be installed, DGLVR Program policy must still be followed. The conservation district must contact the SCC for eligibility guidance. This requirement does not apply to sites that receive an exemption from the DGLVR Stream Crossing Standard (see 7.1.3.1).

- Conservation districts must complete the "Project Lifecycle Checklist" during the planning and implementation of stream crossing replacements, and the form must be kept in the project file. This requirement does not apply to sites that receive an exemption from the DGLVR Stream Crossing Standard (see 7.1.3.1).

7.1.3 Exemptions from DGLVR Stream Crossing Standard: Site-specific Exemptions to Following the Standard

The State Conservation Commission (SCC) recognizes that it is not always practical, cost effective, or biologically beneficial to complete a comprehensive stream continuity project in certain

situations. Stream crossing replacements vary drastically around the state, and this section on exemptions from DGLVR Stream Crossing Standard is designed to provide maximum leeway for the conservation district and SCC to adapt to unique situations. The exemptions from DGLVR Stream Crossing Standard discussed in this section only exempt projects from DGLVR requirements, and do not exempt projects from any applicable permit requirements from DEP or other entities.

7.1.3.1 Automatic Exemptions from DGLVR Stream Crossing Standard

The following existing conditions may be, at the discretion of the conservation district, considered "Exempt from DGLVR Stream Crossing Standard" without SCC approval for channels with a bankfull width of 4' or less and:

- The defined bed and bank coming to the road does not extend more than 500' upslope of the road ditch, or,
- The drainage area of the bed and bank coming to the road is 20 acres or less

Complete the "Automatic Exemption from the DGLVR Stream Crossing Standard" form (attachment J) and keep it in the project file. Automatic exemptions still need to be reported in the SCC notification system.

7.1.3.2 SCC Approval for Exemptions from DGLVR Stream Crossing Standard

Occasionally, circumstances may exist where a conservation district would like to request an exemption from the DGLVR Stream Crossing Standard from the SCC on a larger stream that does not qualify for an automatic exemption as outlined in 7.1.3.1. These situations must be handled individually, and a signed "SCC Exemption from the DGLVR Stream Crossing Standard" form must be obtained from the SCC and kept in the project file. Examples of some conditions where an exemption from the DGLVR Stream Crossing Standard may be requested:

- Small channels that fall outside the automatic exemptions above
- Crossings with extensive outlet drops that would make establishing connectivity impossible or prohibitively expensive for the amount of habitat improvement it would provide.
- Other stream crossings with special circumstances.

A signed "SCC Approval for Exemption from the DGLVR Stream Crossing Standard Request" form (attachment K) must be kept in the project file.

7.1.3.3 Details for Exemptions from DGLVR Stream Crossing Standard

What is waived with an Exemption from DGLVR Stream Crossing Standard (either automatic or SCC):

- The need to follow the DGLVR Stream Crossing Design and Installation Standard,
- The need to achieve stream continuity as it relates to slope, streambed material depth, and establishing grade control within the structure, and
- The need to establish a low-flow channel and bank margins through the structure.

Requirements for projects covered by an Exemption from DGLVR Stream Crossing Standard (either automatic or SCC).

If continuity cannot be achieved, the following steps must be taken to ensure stream crossings that receive an exemption from the DGLVR Stream Crossing Standard will still result in a stable crossing that will not lead to accelerated erosion or other issues.

- Any requirements from local, state and federal laws and all applicable permits are **not** waived as part of this exemption and must be followed.
- New structures must still be a single span at a minimum of 1.25 times or 125% of the bankfull channel width unless otherwise approved by the SCC.
- Ensure the stability of the channel upstream and downstream. Grade controls must be shown on plan drawings if drawings are required.
  - Upstream: Grade control(s) are required immediately (between one and two bankfull widths) upstream of the inlet of the new structure to prevent headcutting (headward erosion lowering channel elevation that moves upstream over time). These grade controls are typically installed at the existing streambed elevation. If a larger structure is installed in a channel with road height limitations, installing a larger structure below the existing streambed elevation without grade control(s) will likely cause a headcut.
  - Downstream: Outlet stabilization is required in the form of grade controls, bank armoring, and/or filling in scour holes. Any grade controls are typically installed at the existing streambed elevation. Pipes may need to be extended further off the road, and the erosion potential caused by any elevation drops must be considered.
- New structures must be properly aligned with the channel, unless not feasible due to permitting restrictions or other constructability restraints.
- Consider floodplain connectivity when necessary (e.g., high water by-pass, overflow pipes, etc.).
- If permits and engineered plans are required, conservation districts are required to review all plans and specifications to ensure the project complies with DGLVR policy and requirements before they are submitted for permit review.
- Divert surface runoff and road drainage away from the stream and structure in a manner that prevents erosion and prevents discharges to the stream.
- For projects receiving an exemption from the DGLVR Stream Crossing Standard, other site-specific requirements may apply. If applicable, these will be identified by the SCC on a project-specific basis.

7.2 Driving Surface Aggregate (DSA)

This section applies **primarily to Dirt and Gravel funds**, but DSA may have limited use under Low-Volume funds, such as the conversion of a paved road back to gravel. All DSA must meet the SCC's DSA Standard and Specification (Appendix X). Technical details for DSA including placement and purchasing specifications are not included in this administrative manual. See the Center's Aggregate Handbook for technical documentation.

For D&G projects, surface aggregate is not a required part of a project. However, if surface aggregate is purchased with Program funds, Driving Surface Aggregate (DSA) must be used.

7.2.1 DSA Overview

DSA is a crushed stone mixture developed by the Center in 2001 to be used as a wearing course for unpaved roads. DSA is designed to achieve maximum density compared to other aggregates in

order to resist erosion and support traffic. DSA has a few key differences compared to traditional aggregates such as PennDOT 2A or 2RC:

- Well graded to include a range of rock sizes from 1.5" to "stone dust".
- 10-15 percent of the material is composed of "rock fines" that bind the material together (up to 17% fines if Plasticity Index is less than 2).
- Placement by motor paver is highly encouraged, and required for placements over ~~1,000~~ 500 tons.
- Several other requirements including a maximum plasticity limit, a pH range, a minimum hardness specification, and optimum moisture requirements.

~~Driving surface aggregate meeting the Commission's specification is the only approved road surface material that may be purchased (for D&G projects) with Program funds. The only exception to this is on road fill projects. Projects that involve an average thickness of one foot or more (including surface) of road fill material may utilize an alternative aggregate to cap the newly added road base.~~.

7.2.2 Use of DSA

The Program goal is to improve water quality. DSA is designed to resist erosion and stand up to the forces of traffic. DSA has been proven to reduce sediment loads compared to traditional aggregates by as much as 90 percent, and reduce dust by as much as 75 percent. Since DSA was designed to resist erosion, it was originally intended to be placed on sections of road adjacent to streams where draining road runoff to the waterway is unavoidable. Over the years, DSA has evolved into a "standard practice" on projects in many districts, and is being overused. DSA is NOT a required component of every Program project. The extent to which DSA is used on projects is at the discretion of individual Districts and QABs. When DSA is used as part of a project, it should be the very last phase of the project. DSA alone does not constitute a comprehensive Program project. All possible base and drainage improvements (new pipes, underdrain, road fill, French mattresses, etc.) must be completed first to reduce environmental impacts of the road and extend the longevity of the DSA. Avoid placing DSA on entrenched roads, or on roads where surface drainage issues are not resolved.

7.2.3 Exception to using DSA on Fill Projects

Driving surface aggregate meeting the Commission's Standard and Specification is the only approved road surface material that may be purchased (for DGR projects) with Program funds. The only exception to this is on road fill projects. Road fill projects are defined as projects which install an average compacted thickness of 12-inches or more of fill material, not including the driving surface, to allow for proper drainage and/or strengthen the existing road base. Road fill projects must be capped with DSA or an alternative aggregate at a minimum depth of 6-inches. Shale or bank-run gravel may not be used as the final driving surface. This exception is not meant to replace DSA with fill.

7.2.4 DSA Certification

DSA must be placed in accordance with the DSA specification and certification found in the DSA Handbook at www.dirtandgravelroads.org. A DSA certification is required for every project where DSA is used. The DSA certification does not apply to an entire quarry. The DSA certification applies only to a particular source or pile of DSA that is being purchased. Additional certifications are

required if the quarry changes the DSA production process (for example switching to a different seam of stone). The DSA certification must be obtained by the grant recipient before aggregate is placed, and must be kept with project files.

7.2.5 DSA Quality Control

DSA must be sampled and tested by an independent lab before it is delivered to a project site. Sampling can be done by district representatives following the guidelines in the Aggregate handbook. **DSA sampling, testing, and approval is "pile-specific", not "quarry-specific".** Testing must be done on the aggregate pile that is directly supplying the job. The costs of testing can be incorporated into project costs, or paid out of a district's admin/education funds. Sampling can also be done by the Center's "DSA Clearinghouse".

The Center will act as a "DSA Clearinghouse" for DSA projects. The purpose of this DSA Clearinghouse is to ensure quality DSA purchase and placements for districts statewide by:

- Visiting and talking with quarries to ensure they understand the DSA requirements.
- Collecting samples and performing testing to ensure DSA meets all material requirements before delivery and placement.
- Keeping records of aggregate testing to avoid duplicating efforts.
- Establishing a central point of contact for quarries on DSA issues.
- Assistance with contractor coordination.
- On-site assistance during DSA placement.

If districts plan to use the DSA Clearinghouse, it is recommended that they contact the Center when a potential DSA supplier is chosen, at least 30 days before placement. Notification can be made utilizing the DSA Purchase Notification Form, provided in the Aggregate Handbook, or on the Center's website. **If districts choose to sample their own DSA, they should share testing results with the Center** in order to provide a more comprehensive statewide database and avoid duplicate testing.

7.3 Full-Depth Reclamation (FDR)

7.3.1 Program Eligibility:

FDR is an eligible expense in the Program, at the discretion of individual districts, for use on paved Low-Volume Road (LVR) projects. FDR is not an eligible expense on unpaved roads. FDR shall not be funded on paved LVR roads with DGLVR Program funds unless all applicable drainage improvements and Environmentally Sensitive Maintenance practices have been employed, as road owners are hesitant to install drainage practices at a later point when it would disturb the new road base. Shallow surface grinds for the purpose of road resurfacing are not considered FDR projects. FDR is a major rehabilitation technique in which the full depth (minimum 6") of the surface and predetermined portion of the underlying base is uniformly pulverized and blended to provide a stronger, homogeneous road base.

7.3.2 Alternatives to FDR

FDR is an expensive process that may not be necessary everywhere it is proposed. When considering funding FDR projects, consider alternative base improvement techniques such as:

- **Imported fill:** Importing fill to raise the elevation of a road can be less expensive than FDR in some cases. Entrenched roads in particular will benefit from road fill to eliminate drainage issues while providing a sound road base.

- **French Mattress:** In some cases, road base instabilities are a direct result of spring and seeps coming up near or under the road. French mattresses provide excellent road base while insuring that wet areas around and under the road will not affect the road above.
- **Geo-synthetics:** The use of geo-synthetics such as geogrid can increase the structural strength and stability of the road base. Geogrid is an excellent solution to fix base problems and is cost effective on small projects.

7.3.3 Program FDR Requirements:

If a district chooses to fund an FDR project, the following requirements apply:

- The Center must be made aware of the proposed FDR project before a contract is signed. A site visit from Commission or Center staff may be requested.
- FDR must follow specifications in PennDOT Publication 447 (Approved Products for Lower Volume Local Roads)
- The mix design for FDR projects must be determined by an independent third-party.
- FDR is a base stabilization technique and does not provide a final running surface. Consideration for asphalt, "tar and chip", or some other final running surface must be part of the planning for FDR projects.
- Any additives or binding agents used in chemical stabilization must be on the Program's "Approved Products" list, detailed on the Center's website.

7.4 Low-Volume Road Specific Guidance

This section applies **only to Low-Volume funds**, not Dirt and Gravel funds. The previous guidance and policy in this manual also applies to LVR projects and funds. For the purposes of the LVR Program, a "paved" road is defined to include any road surfaced with asphalt, "tar and chip", "chip seal", bitumen, concrete, or other asphalt-like coating.

7.4.1 LVR Guiding Principals

7.4.1.1 Project Focus

The focus of road projects in the LVR portion of the Program should be on similar ESM principles that have been used in the Program since its inception. Projects in the LVR Program must contain benefits to both the road systems (improved drainage, reduced surface, ditch and bank erosion, smoother surface, more durable surface, reduced maintenance costs, etc.) and the environmental systems (water quality, stream quality, reduced storm water flows, improved air quality, increased infiltration). The balance between road improvements and environment benefits should be considered in the local QAB/district project ranking criteria and funding decisions.

7.4.1.2 Long Term Benefits

Similar to Dirt and Gravel Projects, the focus of LVR projects should be on long-term road and environmental improvement projects.

- Routine maintenance of LVR or storm water systems such as cleaning inlets, street sweeping, crack sealing, etc. is not eligible for funding under this Program.
- Program funds should not be used to pay for deferred or neglected maintenance on drainage/storm water systems without road improvements.
- Program funds should not be used to fund any LVR issues that do not provide a long term benefit to the road and to the environment.

7.4.1.3 Mistakes/design Errors

Program funds should not be used to correct recent mistakes and or design errors on LVRs that are the responsibility of the original project engineer or construction firm. If recent (within its reasonable design lifespan)– LVR construction projects contain design or construction flaws, correction of these problems should be the duty of the project's engineer or contractor of record, and LVR funds should not be allocated for these purposes.

7.4.1.4 Project Eligibility

In order to be eligible for LVR funding, a road must have an existing paved (including chip sealed) surface, and it must have a verified average daily traffic count of less than 500 vehicles per day (according to Commission guidance). For more information on traffic count guidance, see Section 7.5.

All projects must apply ESM principles and practices to address an environmental concern directly related to the road, make improvements to the road system, or to meet all other Program requirements (ie. permits or approvals). The project eligibility requirements in section 3.7 of this manual apply to Low-Volume Roads.

7.4.2 LVR Project Guidelines

7.4.2.1 Paying for Asphalt or Other Surfacing

Resurfacing paved roads (sealing or paving) is not a primary focus of the LVR Program component. Resurfacing costs can be considered by a district as a component part of a larger ESM project. It is at the discretion of individual districts and QABs whether resurfacing costs (sealing or paving) will be funded through the Program, either on individual projects or as countywide policy. Before funding any resurfacing work on projects, the following ESM principles must be addressed:

- Drainage issues
- Base instability issues
- Other necessary and appropriate issues such as bank stability, road entrenchment, vegetation, etc.

  The use of petroleum solvent based "cutback asphalts" such as MC-30 and MC-70 are NOT allowed for use in the Program.

7.4.2.2 Surfacing Unpaved Roads

It is not the intent of the Program to encourage the sealing or paving of existing dirt or gravel roads and converting them to sealed or paved low-volume roads. While eligible entities may choose to seal or pave a DGR project on their own at some future point in time, no Program funds should be utilized for the specific purpose of converting unpaved roads to paved or "tar and chip", unless otherwise approved by the Commission.

7.4.2.3 Reclaiming Paved or Sealed Roads to Gravel

The Program recognizes the value of converting a poorly constructed or poorly maintained paved low-volume road into a high-quality gravel road through full depth reclamation or other similar processes. Districts may utilize either dirt and gravel, or low-volume road program component funds for these purposes.

7.4.3 LVRs in Urban Areas

Many ESM principles and practices in use by the Program can be readily adapted to paved LVRs in a rural environments. LVR funding, however, is not limited to rural roads or rural environments. LVR projects in urban areas will require a new set of best management practices (BMPs) that will take some time to develop and disseminate through the Program. The level of focus in rural and urban environments will be at the discretion of districts and QABs.

~~In order to increase the knowledge base of potential urban LVR BMPS, district should contact the Center when planning to fund an urban LVR project that is outside of "traditional ESM practices". This will give the Center opportunity to provide input to these urban projects prior to QAB approval, and will help the Center to increase the knowledge base of urban BMPs for statewide education purposes.~~

The LVR portion of the Program is not JUST a storm water program. Projects, especially in urban areas, need to strike a balance between environmental improvements and road improvements. It will be up to districts and QABs to determine the proper balance for projects in their counties.

7.4.4 Safety Considerations

The Commission recognizes the fact that many LVR component projects will have higher levels of daily traffic and higher levels of posted speed than projects on unpaved roads. Grant recipients are required to follow the same safety protocols as with all other road work (flaggers, signs, etc). The funding of any traffic control and safety components of a Program project is at the discretion of the district.

7.5 Traffic Counts for Low-Volume Roads

Before a contract can be signed for a low-volume road project, the applicant is responsible for validating that the road has 500 vehicles per day or less consistent with Commission and any local QAB policy. The Program's "Traffic Count Validation form and Instructions" can be found in Appendix F.

- Applicant is responsible for providing traffic counts before a contract can be signed.
- A traffic count is not required in order to submit an application, unless required by local QAB policy.
- The district is responsible for verifying that a count exists, and that the count meets the criteria established in state and local policy.
- Traffic counts are considered valid for a period of five years, provided there are no new significant changes in traffic flow volumes or patterns.
- Documentation of traffic counts using a signed "Traffic Count Validation Form" must be retained with project files according to the Commission's record retention policy. Districts may opt to include the completed traffic count validation form as an attachment to the project contract.
- Districts may, at their discretion, use administrative and education funding to facilitate or support traffic counts for applicants. Districts should ensure that all potential applicants have equal access to any traffic count facilitation measures they may employ.
- Traffic counts only apply to a segment of road between intersections, not to an entire length of road. Application sites that include intersections may require multiple counts.
- Traffic counts should be done on the proposed project location, or on a road that ensures that traffic on the project location can be determined.

7.5.1 OPTION A: Validate with Existing Traffic Count Data or Extrapolation

7.5.1.1 Use of Existing Data

Existing traffic counts can be used to verify road eligibility for LVR funding. Existing data must have been collected within the previous five years and conform to the Program's Level 2 count protocol at a minimum. "Estimated" traffic counts that exist for many municipal roads cannot be used.

7.5.1.2 Extrapolation of Existing Data

It is permissible to use existing data for roads with 500 vehicles per day or less to logically extrapolate to subsidiary roads. (For example, a spur road between two state roads where both state roads have less than 500 vehicles per day must also have less than 500.) This extrapolation of data can be used to verify that a road has 500 vehicles per day or less without performing a count. This extrapolation of traffic counts must prove the ADT on the road is 500 or less to be eligible for LVR funding. Potential sources of existing traffic count data include:

- State Roads: http://www.penndot.gov/ProjectAndPrograms/Planning/Maps/Pages/Traffic-Volume.aspx
- Local Roads: PennDOT regional offices or County Planning Commissions.

7.5.2 OPTION B: Validate with Level 1 Count: 2 Hour Count

An applicant may do a Level 1 count to determine the traffic count on a potential project site. This involves counting traffic for a two hour period, either by hand tally, video recording, or an automated traffic counter. A Level 1 count of 500 vehicles per day or less will qualify the road for LVR funding. A Level 1 count must meet the following criteria:

- It must be conducted between March 1 and the week before Thanksgiving.
- It cannot be conducted on a holiday, or the day before or after a holiday.
- It must be conducted on a Tuesday, Wednesday, or Thursday
- It must be conducted for a minimum of two consecutive hours between 3:00 pm and 6:00 pm.
- Only the number of vehicle passes is counted, regardless of direction of travel or type of vehicle.
- The traffic count for the time period will be adjusted to a 24 hour period by simply multiplying the 2 hour count volume times twelve (12)
- Applicants may skip the Level 1 count and go straight to a Level 2 count if desired
- Only licensed motor vehicles should be counted.

If a Level 1 count produces a count of 500 vehicles per day or less, the project on the road is considered eligible without a Level 2 count. If a Level 1 count produces a count of more than 500 vehicles per day, it does not disqualify the road, but necessitates a Level 2 count because of its increased accuracy. The purpose of a Level 1 count is to provide a reasonably accurate traffic count with minimal time investment.

7.5.2.1 Level 1 Count Examples

Example 1: A traffic count for two consecutive hours between 4:00 pm and 6:00 pm produces a count of 25 vehicles. 24hours (per day) / 2hours (per study) = 12

12 x 25 =300 average daily count.

This worksite would be eligible (no Level 2 count needed).

Example 2: A traffic count for two consecutive hours between 3:30 pm and 5:30 pm produces a count of 53 vehicles. 24hours (per day) / 2hours (per study) = 12

12 x 53 = 636 average daily count.

This does not disqualify the road. It simply means that a more accurate Level 2 count is required if the applicant wants to continue to pursue Program funding.

7.5.3 OPTION C: Validate with Level 2 Count: 24 hour Automated Count

A Level 2 count involves the placement of an automated traffic counter on the road for a minimum period of 24 hours. Note that these are the minimum criteria for a count. More comprehensive or longer counts can be substituted as long as they meet the minimum requirements below for a "Level 2 count". A Level 2 count of 500 vehicles per day or less will qualify the road for LVR funding. Level 2 counts supersede Level 1 counts if there is a discrepancy. A level 2 count must meet the following criteria:

- It must be conducted between March 1 and the week before Thanksgiving.
- It cannot be conducted on a holiday, or the day before or after a holiday.
- It must be conducted between 12 AM Tuesday and 12 AM Friday.
- It must be conducted for a minimum of 24 consecutive hours.
- Only the number of vehicle passes is counted, regardless of direction of travel or type of vehicle.

If a Level 2 count produces a count of 500 vehicles per day or less, the project on the road is considered eligible. If a Level 2 count produces a count of more than 500 vehicles per day, a project on that road is not eligible for LVR funding. 24 hour counts do not have be broken up by hour or any smaller time unit.

The criteria described in the Level 2 count represent a "minimum acceptable criteria". Counties may use or adopt more stringent traffic count requirements as long as it meets or exceeds the requirements here. (A more stringent requirement is a count that provides more statistically accurate data. For example: requiring Level 2 counts for all roads, requiring 48 hour counts, or requiring hourly totals on counts to provide information to PennDOT.)

7.5.4 Seasonal Activities and Special Circumstances

A traffic count survey cannot be conducted in a timeframe or manner that intentionally causes artificially low average daily traffic counts on a particular road segment. This includes conducting a traffic count during summer recess for a school access road, or conducting a traffic count when access to a road segment is temporarily or partially restricted or reduced (i.e. detoured, weight, or size restricted, etc.) or conducting a traffic count in any other timeframe or manner that intentionally causes low average daily traffic counts.

Chapter 8

Permits and Other Requirements

8. PERMITS AND OTHER REQUIREMENTS

Program projects must comply with all federal state and local permit requirements. The Program has no specialized permits and projects are not exempt from any permit requirements. For specific questions regarding permitting, contact your local DEP regional staff or district.

> Any required project permits must be obtained by the grant recipient before work can begin on the portion of the project related to the permit.

Permits are not required in order for an application to be submitted to the district. Any required permits must be obtained by the grant recipient before work can begin on the portion of the project related to the permit. The grant recipient is responsible for obtaining all necessary permits. The district is responsible for verifying all necessary permits have been obtained and retaining documentation with project files. Permit costs, and any engineering required cost for permits, is an allowable project expense at the discretion of the district as long as such costs are less than 20~~10~~ percent of the total contract. The list below represents the most common permits required in road maintenance work, but is not all-inclusive.

8.1.1 National Pollutant Discharge Elimination System (NPDES)

The National Pollutant Discharge Elimination System (NPDES) is a program established under the Federal Clean Water Act (CWA) to control discharges from point sources. The program was originally established to focus on discharges from pipes but since 1990 has included requirements for storm water runoff. The specific statute is found in Section 402 of the CWA.

If a project is going outside the cross-section of the road and more than 1 acre of construction occurs, an NPDES permit is required.

Contact the local district for more information.

8.1.2 State Permits

A wide variety of permits may be required from multiple state agencies for various aspects of the Program. District staff are knowledgeable about which permits are necessary and are willing to help project grant recipients obtain those permits.

8.1.2.1 Erosion and Sediment Control - 25 Pa Code Chapter 102.

An Erosion and Sediment Control plan (E&S plan) is a document that outlines erosion control measures to be employed during project implementation. An E&S plan is required for projects where more than 5,000 square feet of earth is disturbed, or in all cases in special protection watersheds.

An E&S control permit is required if a project will disturb more than 25 acres (inside and outside the road footprint combined).

For more details on Erosion and Sediment control, see: the Erosion and Sediment Pollution Control Manual (DEP Document 363-2134-008).

8.1.2.2 Water Obstruction and Encroachments- 25 Pa Code Chapter 105

Chapter 105 deals with watercourses and wetlands. A watercourse is a channel for the conveyance of surface water with a defined bed and banks.

Chapter 105 permits are waived for water obstructions (culverts, fills, etc.) if the drainage area to watercourse is less than 100 acres. However, the U.S. Army Corps of Engineers may be required to review and approve the project.

8.1.2.3 General Permits

8.1.2.3.1 GP-7

General Permit-7 may be used for culverts and bridge replacement if the drainage area is less than 1 sq. mi.

For bridges and culverts that were constructed prior to 1979 and have a drainage area of less than 5 sq. mi the permit requirements are waived, as the bridge exists. If work has to be done to the structure a waiver of permit can be obtained from the regional DEP office.

All other projects will require a submittal of a joint permit to the regional DEP office. Township officials are encouraged to work with district staff so that all regulatory requirements are met.

8.1.2.3.2 General Permit 11

A (GP-11) is issued by the DEP and is for maintenance, testing, repair or replacement of water obstructions and encroachments. The GP-11 is not a replacement for an emergency permit and should be used for culverts bridges and other water obstructions but not dams. The grant recipient should contact the regional DEP office for the latest information and instructions. Other restrictions including Bog Turtles and PNDI may have to be considered.

8.1.2.4 Pennsylvania Natural Diversity Inventory (PNDI)

The Pennsylvania Natural Diversity Inventory (PNDI) identifies and describes the Commonwealth's rarest and most significant ecological resources. Data is collected and maintained using the format of the Nature Conservancy's Natural Heritage Program (NHP). The NHP is an international network for biological information. PNDI is Pennsylvania's NHP and the consistency of data and record keeping provides an opportunity to assess the status of an organism or ecosystem over a broad geographic area. The PNDI's geographic areas are not constrained by political boundaries or subdivisions. PNDI represents the most comprehensive and consistent baseline information available to analyze cause and effect for this indicator.

For more information on PNDI, go to: the Department of Conservation and Natural Resources at http://www.naturalheritage.state.pa.us/

8.1.3 Pennsylvania One Call System, Inc.

The One Call System is a single nonprofit communication clearinghouse established within the Commonwealth to provide a single toll free telephone number for contractors or designers or any other person planning to perform excavation work. The One Call System notifies the facility owner of the contractors' intent to perform excavation. After PA One Call is made, utility companies will visit the project site to mark any underground utilities such as power or gas lines to prevent damage. PA One Call will provide serial numbers to callers as proof they have met the requirement of the law. Districts should remind grant recipients, engineers, and contractors involved with Program projects of their notification requirements under the PA One Call law. PA One Call serial numbers must be retained with project files. For more information, see: http://www.pa1call.org PA One Call: Call Before You Dig! 800-242-1776.

8.1.4 Local Ordinances

Counties and local municipalities are responsible for most planning and zoning ordinances. Municipal roadmasters should be aware of any ordinances or local limiting factors that may inhibit

Program projects. The municipality should ensure that any projects are not in conflict with local ordinances.

Appendices

PROPOSED NEW APPENDICEES

APPENDIX A.	DIRT GRAVEL, AND LOW-VOLUME ROAD PROGRAM LAW 9106
APPENDIX B.	COMMISSION STATEMENT OF POLICY
~~APPENDIX C.~~	~~CONTRACT AND ATTACHMENTS~~ not needed, since GIS now generates
APPENDIX C.	BLANK GRANT APPLICATION was part of contract attachments, no changes
~~APPENDIX D.~~	~~CONTRACT AMENDMENT~~ not needed, since GIS now generates
APPENDIX D.	TRAFFIC COUNTY VALIDATION AND INSTRUCTIONS
~~APPENDIX E.~~	~~PROJECT COMPLETION REPORT~~ not needed, since GIS now generates
APPENDIX E.	COST ALLOCATION METHOD EXAMPLES
APPENDIX F.	DSA STANDARD AND SPECIFICATION
APPENDIX G.	STREAM CROSSING REPLACEMENT STANDARD
APPENDIX H.	STREAM CROSSING REPLACEMENT EVALUATION
APPENDIX I.	EXEMPTIONS FROM STREAM CROSSING STANDARD
APPENDIX J.	DEFINITIONS AND ACRONYMS

Appendix A. Dirt Gravel, And Low-Volume Road Program Law 9106

Section 9106 of PA motor vehicle code that establishes the Dirt, Gravel, and Low-Volume Road Program. Originally passed in 1997 and amended by PA act 89 of 2013.

THIS APPENDIX IS UNCHAGNED

Original bill from 1997. Underlined sections added in 2013 as part of Act 89

§ 9106. Dirt~~,~~ gravel and low volume road maintenance.

(A)**statement of purpose**. It is the intent and purpose of this section:
(1) to fund safe, efficient and environmentally sound maintenance of sections of dirt and gravel roads which have been identified as sources of dust and sediment pollution.
(2) to establish a dedicated and earmarked funding mechanism that provides streamlined appropriation to the county level and enables local officials to establish fiscal and environmental controls.
(3) to fund safe, efficient and environmentally sound maintenance of sections of low volume roads that are sealed or paved with an average daily traffic count of 500 vehicles or less.

(B)**general rule**.--Of the funds available under section 9502(a)(1) (relating to imposition of tax), $7,000,000 shall be annually distributed to the department of conservation and natural resources for the maintenance and mitigation of dust and sediment pollution from parks and forestry roads. Funds in the amount of $28,000,000 shall be appropriated annually to the state conservation commission and administered in a non-lapsing, nontransferable account restricted to maintenance and improvement of dirt~~,~~ gravel and low volume state and municipal roads. The state conservation commission shall apportion the funds based on written criteria it develops to establish priorities based on preventing dust and sediment pollution. In the first fiscal year, top priority shall be given to specific trouble spot locations already mapped by the task force on dirt and gravel roads and available from the department. A minimum of $8,000,000 of the total appropriated annually shall be for maintenance and improvement of low volume roads." *(NOTE: remainder of § 9106 remains unchanged)*

(C)Apportionment Criteria. The apportionment criteria shall:
(1) Be based on verified need to correct pollution problems related to the road.
(2) Consider the total miles of dirt and gravel roads maintained by local municipalities or state agencies that are open to the public during any period of the year.
(3) Consider total miles of dirt and gravel roads within watersheds protected as of November 1996 as exceptional value or high quality waters of this Commonwealth.
(4) Consider allowances for the local cost of limestone aggregate.
(5) Consider the commitments of grant applicants to comply with the non-pollution requirements established.

(D) State Conservation Commission. The State Conservation Commission shall:
(1) Adopt performance standards
(2) Provide for a system of audit.
(3) Annually assess the program and annually report to the Transportation Committee of the Senate and the Transportation Committee of the House of Representatives on its acceptance and effectiveness. The State Conservation Commission shall be entitled to withhold and expend the costs of the audit and report preparation up to the maximum limit of 2% of the funds administered.

Original bill from 1997. Underlined sections added in 2013 as part of Act 89

(E) Quality Assurance Boards.

Apportioned funds are to be dispersed to the county conservation districts which apply for then and are to be used by State agencies and local municipalities that maintain roads within the county and fulfill certain requirements specified under subsection (g). Within the conservation district a Quality Assurance Board shall be impaneled to establish and administer the grant program. The four member Quality Assurance Board is to be comprised of a nonvoting chairman appointed by the conservation district directors and one local representative appointed by each of the following entities:

(1) The Federal Natural Resource Conservation Service

(2) The Pennsylvania Fish and Boat Commission

(3) The county conservation district

If circumstances require, the chairman may vote to decide a tie vote.

(F) Administration. The Quality Assurance Board's administration of funding shall include:

(1) Adoption of written criteria to assure equal access for all eligible applicants within specified funding categories.

(2) Provision of documentation that application has been made for all required permits.

(3) Adoption of procedures that assure a minimal amount of procedural paperwork.

(4) Adoption of written criteria to specify priorities:

(5) Adoption of funding categories to provide separate budgeting for:

(i) Department of Conservation and Natural Resources, Bureau of Forestry roads.

(ii) Municipal government roads.

(iii) Road demonstration projects.

(iv) Training grants restricted to 15% of funding.

(v) Administrative costs, limited to actual documented costs and restricted to a maximum of 10%.

(6) Adoption of incentives for training road managers and equipment operators.

(7) Adoption of standards that prohibit use of materials or practices which are environmentally harmful.

(8) Adoption of site inspection requirements to verify completion of work.

(G) Grant Application. Each grant application shall:

(1) Be specific to one work site or one type of work except that all State Forest roads within one county and within one Forest District may be authorized on a single grant.

(2) Expedite the approval process by allowing the Quality Assurance Board to insert additional requirements that complete and qualify the grant for approval and which when accepted by the applicant become a binding obligation on the applicant.

(3) Require minimal handwritten information such as location, problem being solved, basis of cost estimate, project work schedule, basis of successful completion, and type and amount of pollution reduced. The grant application shall not exceed one page with reference to published standards being acceptable.

Appendix B. Commission Statement of Policy

Statement of Policy for Dirt, Gravel, and Low-Volume Road maintenance Program. This document also becomes "Attachment C" (by reference) to the contract between the Conservation District and the Grant recipient.

THIS APPENDIX IS UNCHAGNED

DIRT, GRAVEL, AND LOW VOLUME ROAD MAINTENANCE PROGRAM - STATEMENT OF POLICY

Approved as final by action of the State Conservation Commission on January 17, 2018.

Section 1. Purpose. It is the intention of the Commission to provide local governments and other eligible entities with funds to:

(a) Fund safe, efficient and environmentally sound maintenance of sections of dirt and gravel roads which have been identified as sources of dust and sediment pollution.

(b) Establish a dedicated and earmarked funding mechanism that provides streamlined apportionment to the county level and enables local officials to establish fiscal and environmental controls.

(c) Fund safe, efficient and environmentally sound maintenance of sections of low volume roads that are sealed or paved and have an average daily traffic count of 500 vehicles or less. Provide training to road crews on techniques of dirt, gravel, and low volume road maintenance which minimize negative environmental impact.

(d) Conduct demonstrations of new and innovative techniques of dirt, gravel, and low volume road maintenance to assist in training of road crews and educate the public on this matter.

Section 2. Definitions. The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise:

Act - The act of November 25, 2013, P. L. 974, No.89 (75 Pa.C.S. § 9106).

Advisory Workgroup - Advisory workgroups established by the Commission to assist and advise the Commission on the implementation and administration of the program.

Center - Center for Dirt and Gravel Road Studies at Penn State University

Commission - The State Conservation Commission created by the Conservation District Law (Act of May 15, 1945, P.L. 547, No. 217, as amended July 7, 2006 (P.L. 1059, No. 110) and subsequently amended July 9, 2008 (P.L. 986, No. 75) (3 P.S. §849 et seq.)).

Cooperating organization - An organization approved by the Commission to assist in implementing the act.

District - A conservation district as defined in the Conservation District Law.

Exceptional value - A stream or watershed which is designated as an exceptional value water under Chapter 93 (relating to water quality standards).

High quality - A stream or watershed which is designated as a high-quality water under 25 Pa. Code Chapter 93 (relating to water quality standards).

Low volume road - A road that is sealed or paved and has an average daily traffic count of 500 vehicles or less

Performance standards - The administrative policies or technical requirements, or both, adopted by the Commission for the implementation of the Program, including standards that prohibit the use of materials or practices which are environmentally harmful.

Program - The Dirt, Gravel, and Low Volume Road Maintenance Program.

Project area - A designated area where critical sediment or dust, or both, pollution problems have been identified.

Project participant - A municipality or State agency eligible to participate in a Program project under the act.

QAB - Quality Assurance Board-The administrative board impaneled by a district to administer the Program locally, under 75 Pa.C.S. § 9106(e).

Section 3. Cooperation.

(a) The Commission will encourage cooperation between Commonwealth and Federal agencies, the Center for Dirt and Gravel Road Studies and other organizations which have either direct or indirect involvement in the program to achieve the objectives to reduce pollution originating from dirt, gravel, and low volume roads.

(b) Agencies other than conservation districts will be encouraged to work closely with the appropriate conservation districts to promote local awareness of the projects and to effectuate the purposes of the Program.

Section 4. Apportionment Criteria.

(a) The Commission will apportion the amount of funds for each participating district under the program, based on the act and the criteria in subsection (c).

(b) The Commission may reallocate funds if an agreement cannot be fulfilled by the district, local government, contractor, and agency or cooperating organization.

(c) Apportionment criteria shall be based on the verified need to correct pollution problems related to the road and shall include consideration of the following:

(1) The total number of miles of dirt and gravel roads maintained by local municipalities or State agencies that are open to the public during any period of the year.

(2) The total miles of dirt and gravel roads within watersheds protected as of November 1996 as exceptional value or high quality waters of this Commonwealth.

(3) Allowances for the local costs of limestone aggregate.

(4) The commitments of grant applicants to comply with the nonpollution requirements established.

(5) Other factors determined by the Commission to be appropriate.

(d) The Commission may allocate funds for training or road demonstration project, or both, to an aggregated budget managed by the Commission and may establish spending limits, consistent with the act, which includes the portion of the aggregated funds administered by the Commission.

Section 5. Payments by the Commission to Districts.

(a) State funds apportioned to districts under this Program will be utilized solely for implementing a county level Program.

(b) The Commission will provide apportioned funds to a participating district through an agreement between the Commission and each participating district.

(c) The Commission may withhold funds until the Commission has received any overdue Program reports and audit statements as required by the Commission.

(d) For purposes of disbursing funds to participating conservation districts, the Commission may process an advanced working capital payment as follows:

(1) Upon the full execution of the grant agreement, the Commission may process up to 50% of the approved grant amount. Subsequent payments to the districts will be made on an "actual cash expended" basis to replenish the working capital advance.

(2) Advance payments by a conservation district to an eligible project participant under a project agreement shall be considered "actual cash expended" when the advance is paid by the conservation district.

(3) The district shall request the payments to replenish working capital to the Commission in a format and time frame as prescribed by the Commission. The Commission may set a minimum payment level or time frequency, or both, for each request for payment.

Section 6. Advisory Workgroups. Advisory workgroups shall advise the Commission on the following:

(a) Allocation of funds from the State level to conservation districts.

(b) Development of Program and administrative procedures for QABs.

(c) Review of administrative and technical guidance for the Program.

(d) Other matters relating to the administration of the Program.

Section 7. District Responsibilities.

(a) A district participating in the Program shall enter into an agreement with the Commission establishing the duties and responsibilities of each entity.

(b) The district shall receive and manage funds for the Program that have been apportioned by the Commission to the district.

(c) The district is responsible for all aspects of the management and administration of the Program within that county.

(d) A participating district shall conduct its Program consistent with the act, this subchapter and all other policies and regulations established by the Commission.

(e) The district shall appoint and impanel a four-member QAB to administer the Grant Program within the county, under the supervision and direction of the district board of directors. The QAB is to be comprised of a non-voting chairperson appointed by the district and one local representative appointed by each of the following entities:

(1) The Federal Natural Resource Conservation Service.

(2) The Fish and Boat Commission.

(3) The district.

(f) The district shall develop a fair and open project selection process, consistent with Commission policy, that provides general program information to all eligible project participants and includes sign-up periods necessary to receive requests for road maintenance and repair work

from eligible project participants. Special efforts will be made to enlist the cooperation of project participants with identified critical erosion or dust problems.

(g) Work completion by project participants will be subject to approval by the district under the performance standards adopted by the QAB.

(h) The district shall conduct an annual audit of Program expenditures in accordance with guidance provided by the Commission.

(i) The district shall submit the results of its annual audit to the Commission in a manner and time frame established by the Commission. The Commission reserves the right to audit all Program-related accounts and records to determine if funds were expended in accordance with Commission policies and the act.

(j) The district shall report Program accomplishments to the Commission on prescribed forms at times as specified by the Commission.

(k) The district shall maintain a separate accounting of funds received under the Program. The district shall maintain an itemized accounting of administrative costs claimed. Districts shall deposit funds in a Federally insured interest bearing account. Interest earnings from the account shall be applied only to the Program. The percent of apportioned funds utilized by the district for administration or training grants may not exceed those limits established by the Commission or the act, or both.

(l) Records shall be retained by districts for 3 years after completion of the work.

(m) The Commission reserves the right to examine all records and files maintained by the district related to the administration of the district's Program.

Section 8. QAB Responsibilities.

(a) The QAB impaneled by a district shall establish and administer the Program for the district under the direction of the board of directors of the district and consistent with the policies adopted by the Commission.

(b) The QAB shall consider and adopt the following:

(1) Written criteria to assure equal access for all eligible applicants within each funding category.

(2) Procedures that assure a minimum amount of procedural paperwork.

(3) Written criteria to specify priorities.

(4) Funding categories to provide separate budgeting for road maintenance projects, road demonstration projects, training grants and administrative costs:

(A) QAB training grants may not exceed limits established by the Commission.

(B) Administrative costs may not exceed 10%.

(5) Incentives for training road managers and equipment operators.

(6) Standards that prohibit use of materials or practices which are environmentally harmful.

(7) Site inspection requirements to verify completion of work.

(c) The QAB shall review applications and recommend project participants to be funded through the Program.

(d) The QAB shall consider and adopt procedures for the conduct of business by the Board, including the following:

(1) Meeting schedules and procedures for public notice of meetings.

(2) Recordkeeping and provisions to make minutes and records available to the public.

(3) Rules of conduct, including rules necessary to avoid conflicts of interest by members of the QAB.

Section 9. Application by Project Participants.

(a) Applications will be on a form approved by the Commission. Applications should be submitted to the local conservation district at the times designated by the local district. Handwritten applications will be acceptable.

(b) An application shall be specific to one work location and shall include the following:

(1) A short description of the problem being solved.

(2) The basis of the cost estimate.

(3) The proposed project work schedule.

(4) The basis for successful completion.

(5) The type of pollution to be reduced.

(6) Other items specified by the Commission.

(c) The QAB may expedite the approval process by inserting additional requirements which become binding when accepted by the applicant.

Section 10. Agreements.

(a) An agreement is required between a district and project participants.

(b) The form of agreements between the district and project participants shall be approved by the Commission.

(c) Each agreement shall provide that the parties agree to comply with the conditions in this subchapter, the general contract conditions adopted by the Commission and the performance criteria adopted by the QAB of the district.

(d) The term of the agreement shall be sufficient to cover the duration of work implemented under the agreement.

Section 11. Eligible Expenses.

(a) Eligible expenses include all Program and project costs associated with the administration and implementation of the Program, and the design, review, approval, implementation and maintenance of any project approved and funded by the Program. Eligible costs payable to project participants for Program projects and eligible costs payable to conservation districts for the overall administration and implementation of the Program will be determined by the Commission.

(b) Eligible expenses for project participants include the materials, services and labor required to design and implement a project, including, but not limited to, construction and maintenance supplies and materials, equipment rental and transportation charges, demurrage, reimbursement for use of participant owned equipment, salaries and benefits, automotive and hauling travel including room and board expenses, contracted specialized services, miscellaneous expenses, certain engineering and technical fees as determined by the Commission and other expenses necessary for the satisfactory completion of a project as determined by the Commission.

(c) Eligible expenses for participating conservation districts shall include eligible costs defined in subsections (a) and (b) for project participants, plus materials, services, labor, insurance/liability coverage and all other expenses necessary for the overall administration and implementation of the Program, the development and delivery of training/education programs, demonstration projects, resource assessment, site inspections and other expenses determined by the Commission to be necessary to administer and implement the Program.

Section 12. Project Participant Responsibilities.

(a) Project participants shall conduct the dirt, gravel, and low volume road maintenance project in accordance with the project agreement with the district, the work plan for the project, the standards established by the QAB for the district, and the policies adopted by the Commission.

(b) Project participants may not use materials or practices that are environmentally harmful.

(c) Project participants shall apply for necessary local, State and Federal permits required for the project and provide the district with suitable documentation of permit issuance and requirements.

(d) Project participants shall report Program accomplishments to the district in a manner prescribed in the agreement.

(e) Claims for payment shall be submitted to the district in accordance with the schedule contained in the agreement. The claims shall be itemized and show that the utilization of funds are in accordance with the budget outlined in the agreement. The claims shall also include receipts, weigh slips or other appropriate supporting information, as determined by the Commission, to document actual expenditures by the project participant.

(f) The district and the Commission reserve the right to audit project related accounts and records to determine if funds were expended in conformance with the agreement.

(g) A project participant shall maintain a separate accounting of the funds received under the Program.

(h) Records shall be retained for 3 years following the last payment for the project.

(i) Upon the request of the district or the Commission, or both, project participants shall provide access to all records, files and documents related to Program projects.

Section 13. Performance Standards.

(a) The Commission will establish, as it deems appropriate, performance standards for the implementation of the Program. These standards may include specific administrative policies or technical requirements, or both, adopted by the Commission for the implementation and administration of the Program, including standards which prohibit the use of materials or practices which are environmentally harmful.

(b) Standards which prohibit the use of materials or practices which are environmentally harmful shall include the following minimum requirements:

(1) The commercial products used by project participants within a project area shall be used or installed, or both, according to manufacturer's recommendations and label requirements.

(2) Materials toxic to aquatic life, as defined by The Clean Streams Law (35 P. S. §§ 691.1--691.1001), may not be used where surface runoff may enter surface or ground waters.

(3) Compliance with applicable Federal, State and local laws, regulations and permit requirements.

Section 14. Payment of Eligible Expenses to Project Participants.

(a) Payments made by a district pursuant to a project agreement shall be solely for eligible expenses.

(b) Claims for payment shall be submitted by a project participant to the district in accordance with the schedule and terms contained in the approved project agreement. The claims shall be itemized and show that the utilization of funds are in accordance with the project cost summary contained in the approved project application and work plan. Claims may include receipts, weigh slips, equipment use time sheets, employee time sheets or other appropriate supporting information to document actual expenditures by the project participants.

(c) For the purpose of dispersing funds to a project participant under a project agreement, the district may process an advanced working capital payment as follows:

(1) Upon the full execution of the project agreement, the district may process an advanced payment to a project participant of up to 50% of the approved project expenses.

(2) Subsequent payments to the project participant will be made on an actual cash expended basis.

(3) In all cases, the district shall withhold payment of at least 30% of the approved project expenses until the satisfactory completion of the project. Final payment for the project expenses shall be made only after a final inspection by the district determines that the work was performed consistent with the project application and the work plan, and to the satisfaction of the district.

Appendix C. Blank Grant Application

This grant application is used by local road owning entities to apply to conservation districts for funding. It includes a required site sketch / workplan, and optional cost summary sheets. The final approved grant application becomes an attachment to the contract between the conservation district and the grant recipient. The contract and all-standard attachments are automatically generated by conservation districts in the DGLVR GIS system.

THIS APPENDIX WAS PART OF THE CONTRACT IN PREVIOUS MANUAL APPENDIX. THE APPLICATION ITSELF IS UNCHANGED.

Attachment A
To Contract

SECTION 9106 OF THE PENNSYLVANIA VEHICLE CODE

DIRT, GRAVEL AND LOW VOLUME ROAD MAINTENANCE GRANT APPLICATION

Project Location: County _____ Project Location: Municipality _____

ESM Certified Person _____ Position _____ Certification Date _____

Official Name of Applying Agency _____

Mailing Address _____

Contact Person _____ Phone _____ Fax _____ E-Mail _____

District Use Only

Application Type: ☐ DGR ☐ LVR

Work Site ID: _____

Date Received: _____

Road Name / ID Number _____ Affected Stream or Tributary _____

Proposed Project Start Date _____ Proposed Project Completion Date _____

Existing Road Surface Type: ☐ Unpaved ☐ Paved

Is project considered an emergency? ☐ Yes ☐ No

1.The applicant is required to identify and obtain all necessary permits before starting the project.

2. Identify the proposed work elements: ☐ Ditches Improved ☐ Ditch Outlets Added ☐ Off Right-of-Way Improvements
☐ Road Banks Improved ☐ Road Base Improved ☐ Road Surface Stabilized
☐ Stream Crossings Improved ☐ Storm Water Improvements ☐ Vegetative Management ☐ Other _____

3. The applicant is required to obtain the DSA Specification and Certification form prior to DSA placement.

4. Complete Attachment B "Project Work Plan" including a sketch of proposed project. Attach a locational map with the project highlighted.

5. Project cost estimate: (summarize costs here and attach detailed documentation if needed)

Grant Requested Funds			In-Kind Contributions		
Materials	Equipment	Labor	Materials	Equipment	Labor
See Attachment A1			See Attachment A2		

Grant Requested……. $_____

In-Kind Contributions….. $_____

Total Project Value…….. $_____

Applicant Signature _____ Date _____

Attachment B
To Contract

SECTION 9106 OF THE PENNSYLVANIA VEHICLE CODE

DIRT, GRAVEL AND LOW VOLUME ROAD MAINTENANCE PROJECT WORK PLAN

Applicant	Road Name / ID Numb	Date

Instructions:

- Draw a sketch of the proposed project that includes:
  - All Proposed Work (i.e., Cross Pipes, Stream Crossings, Other ESM Practices)
  - Project Road Length in Feet or Miles
  - Nearest Intersection and/or Reference Landmarks
  - Known Utilities
  - North Arrow
- Attach a copy of a locational map with the project highlighted
- Attach additional project details as necessary

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Dial 8-1-1 or 1-800-242-1776 not less than 3 business days nor more than 10 business days prior to the start of excavation.

Project Length = _____ feet / miles (circle one)

North Arrow

Attachment A1
to Contract
(optional)

SECTION 9106 OF THE PENNSYLVANIA VEHICLE CODE

DIRT, GRAVEL AND LOW VOLUME ROAD MAINTENANCE
DETAILED ESTIMATED PROJECT EXPENDITURES
GRANT REQUESTED FUNDS

Use best estimates and complete as much info as possible.

Materials			
Type	Unit Cost	Qty	Cost $
Total Materials $			

Equipment			
Type	Hours	FEMA* Rate/Hr	Cost $
Total Equipment $			

Labor			
Type	Rate/Hr	Hours	Cost $
Total Labor $			

* FEMA rates are only applicable where municipality-owned equipment is used otherwise use contracted rates.

*Prevailing wage may apply to projects over $25,000 when a contractor is involved.

Total Grant Requested: $_____ (materials + equipment + labor)

Applicant	County	Road Name / ID Number	Date

Attachment A1
to Contract
(optional)

SECTION 9106 OF THE PENNSYLVANIA VEHICLE CODE

DIRT, GRAVEL AND LOW VOLUME ROAD MAINTENANCE
DETAILED ESTIMATED PROJECT EXPENDITURES
IN-KIND FUNDS

Use best estimates and complete as much info as possible.

Materials			
Type	Unit Cost	Qty	Cost $
Total Materials $			

Equipment			
Type	Hours	FEMA* Rate/Hr	Cost $
Total Equipment $			

Labor			
Type	Rate/Hr	Hours	Cost $
Total Labor $			

* FEMA rates are only applicable where municipality-owned equipment is used otherwise use contracted rates.

*Prevailing wage may apply to projects over $25,000 when a contractor is involved.

Total In-Kind Contributions: $_____ (materials + equipment + labor)

Applicant _____ County _____ Road Name / ID Number _____ Date _____

SECTION 9106 OF THE PENNSYLVANIA VEHICLE CODE

DIRT, GRAVEL AND LOW VOLUME ROAD MAINTENANCE
Grant Application/Project Work Plan Instructions

The following instructions pertain to the Dirt, Gravel and Low Volume Maintenance Program **Grant Application** and **Project Work Plan** forms. These instructions are to act as a guide only. Note that all fields are required unless indicated otherwise.

It is strongly recommended grant applicant and Conservation District representatives hold an on-site meeting to discuss a potential project plan before an application is submitted.

Grant Application Instructions

"District Use Only":

- Applicant DOES NOT fill out any of the information within this box.

General Information:

- **County** – The County the road project in question is within.
- **Municipality** – The Municipality (township, borough, or city) the road project in question is within.
- **ESM Certified Person** – List the person who will oversee the project who is currently ESM certified.
- **Position** – The current position of the ESM Certified Person.
- **Certification Date** – The date the ESM Certified Person completed their ESM training. Applicant may need to contact their Conservation District if the date is unknown. The person responsible for project design and oversight for applying entity must be ESM certified within last 5 years to be eligible for funding.
- **Official Name of Applying Agency** – The name of the agency who is applying for Dirt, Gravel and Low Volume Maintenance funding.
- **Mailing Address** – The mailing address of the applying agency. Include street address, state, and zip code.
- **Contact Person** – The official contact person of the applying agency.
- **Phone** – The phone number of the official contact person or the applying agency.
- **Fax** – The fax number of the official contact person or the applying agency. *Optional*
- **E-Mail** – The e-mail address of the official contact person or the applying agency. *Optional*

Affected Road Information:

- **Road Name / ID Number** – The name and identification number of the road in question. List both if available.
- **Affected Stream or Tributary** – The name of the stream or tributary that the road project in question is currently affecting. If project affects a small unnamed tributary (UNT), list the first named stream downstream of the tributary, such as “UNT to Trout Run”..
- **Proposed Project Start Date** – The proposed date that applicant expects the project to begin.
- **Proposed Project Completion Date** – The proposed date that applicant expects the project to be finished.
- **Existing Road Surface Type** – Check the appropriate CURRENT surface type of the road project in question. “tar & chip” or “chip sealed” roads are considered paved.
- **Is project considered an emergency** – Check if the project would be considered an emergency. For example, a road that is washed out and is unpassable due to a storm would be considered an emergency.

Additional Questions, Proposed Work Elements, and Cost Estimates:

1) **Applicant is required to identify and obtain all necessary permits before starting the project:**
   - By signing the application, the applicant acknowledges they understand that they will be required to identify and obtain all required permits before starting the project. Applicant is not required to identify and obtain these permits prior to submitting the grant application.
2) **Identify the proposed work elements:** Check all that apply
   - **Ditches Improved** – Stabilizing ditches through elimination, vegetation, armoring, flow reduction, etc.
   - **Ditch Outlets Added** – Addition of drainage outlets such as pipes, turnouts, etc.
   - **Off Right-of-Way Improvements** – Improvements to access roads, lanes, etc. that affect the public roadway.
   - **Road Banks Improved** – Stabilizing of banks through reprofiling, armoring, vegetation, etc.

- **Road Base Improved** – Improvements to road base through material addition, milling, geo-synthetics, etc.
- **Road Surface Stabilized** – Improvements to the road surface through new material, stabilizers, etc.
- **Stream Crossings Improved** – Replacement or stabilization of road/stream crossings.
- **Storm Water Improvements** – Improvements to or disconnection of traditional storm water collection systems.
- **Vegetative Management** – Vegetation work such as tree thinning, selective thinning, seeding, etc.
- **Other** – List any other proposed work elements not covered by the above choices.

3) **Applicant is required to obtain the DSA Specification and Certification form Prior to DSA placement.**
   - Applies to any projects using Driving Surface Aggregate (DSA).
   - By signing the application, applicant acknowledges that they understand that they will be required to obtain the Specification and Certification from the aggregate supplier prior to aggregate placement.

4) **Complete Attachment B by drawing a sketch of the proposed project. Attach a copy of a locational map with the project highlighted:**
   - This project sketch is part of the Project Work Plan that is addressed at the end of the Grant Application help.

5) **Project cost estimate:**
   - **Applicant must provide estimates for both grant requested funds and in-kind services.**
     - **"Grant Requested Funds":** summarizes the project costs that the applicant is requesting from the Program through the Conservation District.
     - **"In-Kind Contributions":** summarizes the costs incurred by the applicant in project implementation where no reimbursement will be requested or made through the Program.
   - **Cost estimates** - Cost estimates for simple projects may fit in the space provided on the Grant Application. Many projects, however, may require a separate worksheet. The optional "Detailed Estimated Project Expenditures" and "Detailed Estimated In-Kind Contributions" worksheets (Attachments A1 and A2) can be used to summarize cost details.
   - **Grant Requested** – The project costs that the applicant is requesting from the Program through the Conservation District.
   - **In-Kind Contributions** – The costs that will be borne by the applicant where no reimbursement will be requested or made through the Program.
   - **Total Project Value** – Grant Requested + In-Kind Contributions. This is the total estimated cost of the project.

Finalizing the Application:
- **Applicant Signature** – The signature of the applicant.
- **Date** – The date the Grant Application was completed.

Project Work Plan Instructions

General Information:
- **Applicant** – The entity applying for the grant.
- **Road Name / ID Number** – The name and identification number of the road in question. List both if available.
- **Date** – The date the project work plan was completed.
- **North Arrow** – Draw a locational north arrow that identifies where north is as related to the sketch.
- **Project Length** – Enter the length of the proposed work area (not necessarily entire road length). Then circle the appropriate unit of "feet" or "miles". If the total proposed work length is less than 1 mile, then it is recommended to enter the work length in feet.

Attach a copy of a locational map with the project highlighted:
- Highlight or circle the project location on a map such as township map, topographic map, photocopied atlas map, GIS map, PennDOT map, etc. Do not include any project work items on the location map (they go on the workplan). The purpose of this map is to allow the project site to be easily found.

DETAILED ESTIMATED PROJECT EXPENDITURES WORKSHEETS
INSTRUCTIONS

OPTIONAL - (attachments A1 and A2) - OPTIONAL

Included with the Grant Application packet are two additional project expenditure worksheets. These two worksheets, Grant Requested Funds and In-Kind Contributions, are referred to in the Grant Application as Attachment A1 and Attachment A2, respectively. These are not required but are recommended if the applicant needs more space than what is provided in the Grant Application. Since they are nearly identical, general help is provided below.

- **Grant Requested Funds/In-Kind Contributions Worksheets:**
- **Materials** – List the type, unit cost, quantity, and total cost for each proposed material.
- **Equipment** – List the type, hours, FEMA Rate/Hour if applicable, and cost for each piece of equipment proposed. Note that FEMA rates are only applicable where township-owned equipment if used otherwise applicant should use contracted rates.
- **Labor** – List the rate, hours, and cost per type of laborer.
- **Total** – The total cost of materials, equipment, and labor.
- **Applicant** – The Grant Application applicant.
- **County** – The County the road project in question is within.
- **Municipality** – The Municipality (township, borough, or city) the road project in question is within.
- **Road Name / ID Number** – The name and identification number of the road in question. List both if available.
- **Date** – The date the project expenditures form was completed.

Appendix D. Traffic Count Validation and Instructions

Form for recording traffic counts to ensure that paved low-volume roads have traffic counts of ≤500 vehicles per day in order to be eligible for funding. Applies to paved Low Volume Roads only, Dirt and Gravel Roads do not require traffic counts.

THIS APPENDIX IS UNCHAGNED

Dirt, Gravel, and Low Volume Road Maintenance Program (DGLVRP)
Traffic Count Validation Form

TRAFFIC COUNT LOCATION

Road Name and #:_____ Road Owner:_____

County: _____ Township: _____

GPS Location (if available):_____W, _____N

If GPS location not available, describe count location here: _____

_____

(for example: Traffic count on Smith road, ½ mile north of intersection with SR180, Maple road.)

Traffic Counts can be validated by use of existing data, a level 1 two-hour count, or a level 2 twenty-four-hour counts. Select the method used below and complete that section of the form.

Select method used

☐ **Existing Data or Extrapolation:** For existing traffic data, or extrapolation of existing data, describe the data used and extrapolation method on the back of this page. If necessary, attach a description of the data and extrapolation methodology, source and date of traffic counts used, and maps.

☐ **LEVEL 1 TRAFFIC COUNT DETAILS** (2 hour count)

Count Performed From __/__/____, _____ to _____
Date *Time* *Time*

Describe Count Method: (hand/camera/counter/etc.)_____

Count Performed by: _____ of _____
(name) (organization)

Total Count = _____ vehicles x 12 = _____ ADT

☐ **LEVEL 2 TRAFFIC COUNT DETAILS** (24 hour (minimum) automatic count)

Count Length: **24hr** 48hr 72 hour other: _____

Count Performed From __/__/____, _____ to __/__/____, _____
Date *Time* *Date* *Time*

Counter Used: air tube other:_____ Counter Make/Model:_____

Count Performed by: _____ of _____
(name) (organization)

Total Count = _____ 24 hour count = _____ ADT

Applicant Validation: I hereby swear that this count is accurate as reported here and done in accordance with State Conservation Commission specifications.

_____,_____ _____, _____
print name *position* *signature* *date*

Conservation District Validation: The traffic count data supplied by the applicant is acceptable to the Conservation District in accordance with SCC and county policy.

_____,_____ _____, _____
print name *position* *signature* *date*

This form verifies eligibility of a sealed road for LVR funding as having a traffic count of 500 vehicles per day or less. It must be signed and retained in the project files.

Details for use of existing data or extrapolation from existing data:

Existing Data must have been collected within the previous 5 years and conform to the Program's Level 2 count protocol at a minimum. "Estimated" traffic counts that exist for many municipal roads cannot be used.

It is possible to use existing data for roads with 500 vehicles per day or less to extrapolate logically to subsidiary roads. For example, a spur road between two State Roads where both state roads have less than 500 vehicles per day must also have less than 500. This extrapolation of data can be used to verify that a road has 500 vehicles per day or less without performing a count. This extrapolation of traffic counts must prove the ADT on the road is 500 or less to the satisfaction of the Conservation District.

Describe existing data used and extrapolation methodology below. Attach additional material and maps if needed.

_____

_____

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Dirt, Gravel, and Low Volume Road Maintenance Program (DGLVRP)

Traffic Count Instructions for Applicants

10/20/14

This document is intended to provide instructions to applicants for performing traffic counts. For details of the Program's Traffic Count Policy, see the Program's administrative manual chapter 7.4.

Traffic Count Location – This section is to enter basic information about the location of the traffic count such as the name and location of the road, county and township, and the name of the road owning entity. GIS coordinates are helpful to locate the project on a map, but if this is not known, please describe the location so that it can be easily found (i.e. Intersection of Elk Lane and Beaver Creek Road).

Choose one of the 3 methods below to determining traffic count:

- Existing Data or Extrapolation - Indicate whether this traffic count is taken from existing data, or extrapolated from existing data. See Chapter 7.4 of the administrative manual for more details on data extrapolation. Page two of the form can be used to describe the methodology used to extrapolate from existing traffic data.

- Level 1 Traffic count details – Record the date and time the count was performed, describe what method was used to take the count (i.e. camcorder). Indicate the name of the person taking the count, and who they work for. For a 2 hour count, multiply the number of cars counted by 12 to determine the average daily traffic (ADT).

- Level2 traffic count details – Record the length of the count, the dates and times of the count, and the type of counter used, including the make and model of the counter. Indicate the name of the person taking the count, and who they work for. Record the total count, then adjust to a 24 hour count if needed (i.e. 800 cars counted in 48 hours = 400 ADT).

Applicant Validation – Applicant must print and sign and date the validation form. Indicate the position held by the person signing the validation.

Conservation District Validation - Conservation District must print and sign and date the validation form. Indicate the position held by the person signing the validation.

Appendix E. Cost Allocation Method Examples

Cost allocations methods must be used by conservation districts to determine administrative and education spending, especially as related to shared expenses within the district. More information in section 3.4.2.1 of this manual.

THIS APPENDIX IS NEW

Cost Allocation Method Examples 3/2022

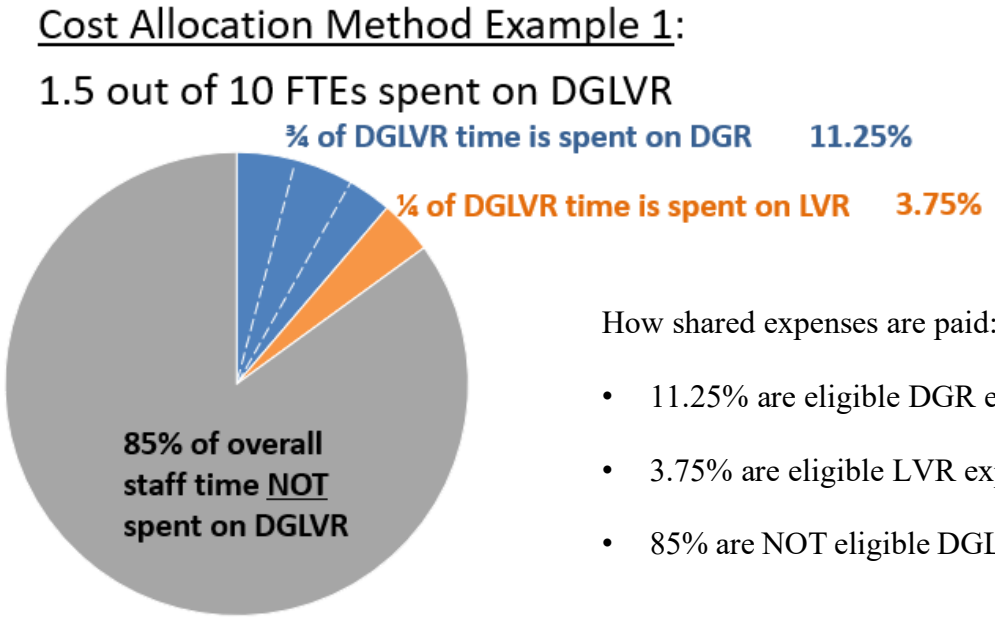
PA County Conservation District use of Dirt, Gravel, and Low-Volume Road Funding

Example 1: Full-Time Equivalents (FTE)

- A full-time equivalent (FTE) is a unit of measurement that represents the amount of time worked by one full time employee.
- If a district has 10 FTE staff, and 1.5 of those FTE staff are funded by the DGLVR Program, then 15% of general overhead expenses (utilities, rent, and other shared expenses) are eligible DGLVR administrative expenses.
- DGR and LVR funds must be tracked separately (section 3.4.1), so this 15% is subdivided into DGR and LVR categories. Out of all DGLVR staff time (1.5 FTEs), 75% is DGR and 25% is LVR. This means that:
  - 11.25% of the shared expenses are an eligible DGR expense because 75% of 15% is 11.25%
  - 3.75% of the shared expenses are an eligible LVR expense because 25% of 15% is 3.75%

Example 1: 1.5 FTEs out of 10 FTEs are spent on DGLVR Activities. 75% of the 1.5 FTEs is spent on DGR activities, and 25% is spent on LVR activities.

Two ways to calculate percentages: 15% ÷ 4 = 3.75%	Example Expense: $1,000.00
¾ of DGLVR time is DGR 3.75% x 3 = 11.25% is DGR	$1,000 x 11.25% = **$112.50 is an eligible DGR expense**
¼ of DGLVR time is LVR 3.75% x 1 = 3.75% is LVR	$1,000 x 3.75% = **$37.50 is an eligible LVR expense**
OR	$1,000 – $112.50 – $37.50 = **$850 is not an eligible DGR or LVR expense**
75% of 15% = 0.75 x 0.15 = 0.1125	
25% of 15% = 0.25 x 0.15 = 0.0375	



How shared expenses are paid:

- 11.25% are eligible DGR expenses
- 3.75% are eligible LVR expenses
- 85% are NOT eligible DGLVR expenses

Cost Allocation Method Examples 3/2022

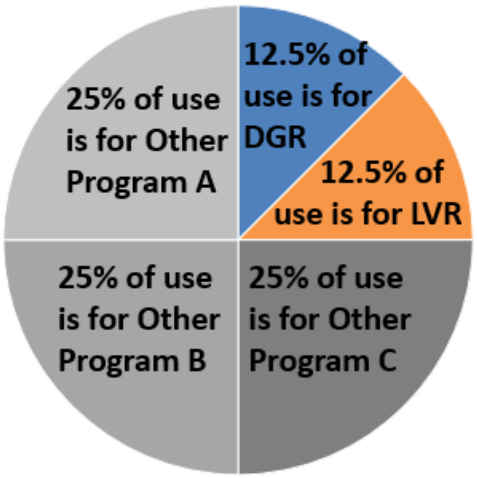
PA County Conservation District use of Dirt, Gravel, and Low-Volume Road Funding

Example 2: If a district has a vehicle that is shared equally by 4 programs, vehicle expenses could be divided equally among the 4 Programs. DGLVR is one of the 4 programs, and the vehicle is used for equal amounts on DGR and LVR activities. 1/8 or 12.5% of the vehicle expenses are eligible DGR expenses, and 1/8 or 12.5% of the vehicle expenses are eligible LVR expenses. *Note: In this scenario, vehicle logs would document the equal usage of the vehicle for different programs, and the logs must be retained and provided upon request per section 3.4.1.*

Example 2:	
100% / 8 = 12.5%	Example Expense: $1,000.00
1/8 (12.5%) of vehicle use is DGR	$1,000 x 12.5% = **$125.00 is an eligible DGR expense**
1/8 (12.5%) of vehicle use is LVR	$1,000 x 12.5% = **$125.00 is an eligible LVR expense**
	$1,000 – $125 – $125 = **$750 is not an eligible DGR or LVR expense**

Cost Allocation Method Example 2:

Vehicle shared equally by 4 Programs



How shared expenses are paid:

- 12.5% of each expense is an eligible DGR expense
- 12.5% of each expense is an eligible DGR expense
- 75% of each expense is NOT an eligible DGR expense

Cost Allocation Method Examples 3/2022

PA County Conservation District use of Dirt, Gravel, and Low-Volume Road Funding

Example 3: If a district has a vehicle that is shared unequally by several programs, vehicle expenses or charges must be based on actual usage for each Program.

Example 3:

Vehicle is used for 500 miles in a quarter. 52 of those miles were for DGR activities, and 110 were for LVR activities.

Eligible DGR mileage expense = 52 x $0.58 (or other acceptable mileage rate) = $30.16
Eligible LVR mileage expense = 110 x $0.58 (or other acceptable mileage rate) = $63.80

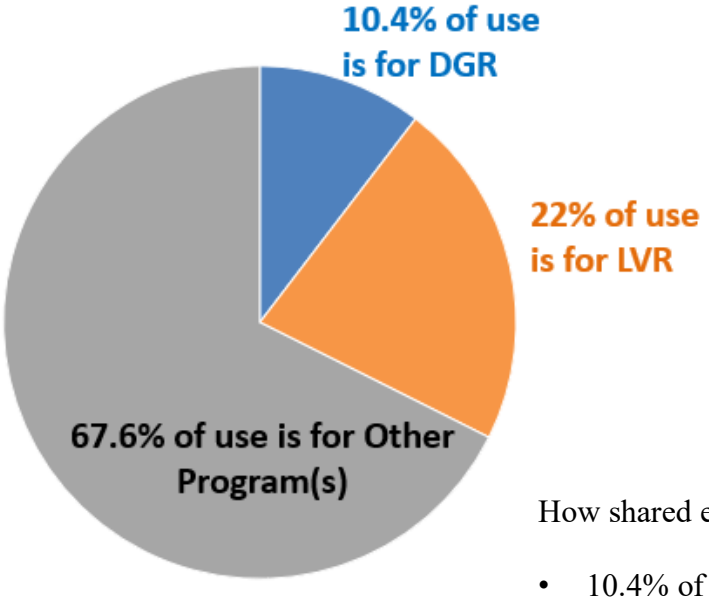
How much of a $50 oil change is eligible for reimbursement with DGR and LVR funds?

DGR: $\frac{52}{500} = 0.104$ $50 x 0.104 = $5.20 of the oil change is an eligible DGR expense

LVR: $\frac{110}{500} = 0.22$ $50 x 0.22 = $11.00 of the oil change is an eligible LVR expense

Cost Allocation Method Example 3:

Vehicle shared unequally by multiple programs



How shared expenses are paid:

- 10.4% of each expense is an eligible DGR expense
- 22% of each expense is an eligible LVR expense
- 67.6% of each expense NOT an eligible DGLVR expense

Appendix F. DSA Standard and Specification

Driving Surface Aggregate standard and specification for use with DGLVR funded aggregate placements. See section 7.2 of this manual for additional information.

THIS APPENDIX IS NEW: In the past, this was approved separately by the SCC. We chose to include it here since the stream crossing standard will be included. There were minor changes to the DSA standard and specification, and a track changes version is included here.

SCC approved 7/22/2020

PA State Conservation Commission
Driving Surface Aggregate Standard and Specification

I. **Definition -** This document is for the purchase and placement of Driving Surface Aggregate (DSA) for the Pennsylvania State Conservation Commission's Dirt, Gravel, and Low-Volume Road Maintenance Program (DGLVRMP). DSA is an aggregate mixture of crushed stone designed specifically as a surface-wearing course for unpaved roads. DSA provides a durable road surface with longer maintenance cycles than conventional road surface aggregates.

II. **Use -** For the purposes of funding under the DGLVRMP, DSA must be used in areas where it will have an environmental benefit (reduced erosion, reduced runoff). DSA shall only be placed after drainage and subgrade issues have been addressed by utilizing practices that promote Environmentally Sensitive Maintenance. DSA was originally designed to reduce erosion and runoff on road segments close to streams where drainage improvements were limited. Surface aggregate is not required on every project.

III. **Material -** DSA to be used on DGLVRMP projects shall be tested prior to delivery by an independent lab that has no affiliation with the source quarry. Samples tested using DGLVR funds must be performed by a lab that is certified by AASHTO, USACE, or PennDOT. Samples shall be obtained by Conservation District (CD) staff, Center for Dirt and Gravel Road Studies (CDGRS) staff, or otherwise approved by the SCC. Material must meet the following requirements:

Gradation: The required sieve sizes and allowed ranges, determined by weight, for DSA components are shown in Table 1. Submit actual sieve passing values to one decimal. Values will not be rounded to whole numbers.

Sieve Size	Percent Passing
1.5"	100
0.75"	65 – 97
#4	30 – 65
#16	15 – 30
#200*	10 – 15

*If the Plasticity Index for the material is 2 or below, then the #200 sieve is permitted to be 10-17% passing.

Table 1 – DSA Gradations

A. **Abrasion Resistance**: The loss of mass (LA Abrasion) shall be less than ~~40%~~ 45%**.** Determine the resistance to abrasion using the Los Angeles Abrasion test, ASTM C131.

B. **pH**: Aggregate shall be in the range of pH 6 to pH 12.45 as measured by ASTM D4972.

C. **Moisture**: Upon delivery to the site, material shall be well mixed and placed at optimum moisture content or up to 2% below that value as determined for that particular source. The optimum percentage moisture is to be determined using Proctor Test ASTM D698, Procedure C, Standard. Aggregate provider is encouraged to perform moisture testing prior to loading material for delivery.

D. **Plasticity**: Material shall not exceed a Plasticity Index (PI) of 4. The laboratory test required for these results is ASTM D4318 – Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. If Plasticity Index for material is 2 or below, the #200 sieve is permitted to be 10-17% passing.

E. **Soundness**: Determine the percentage of mass (weight) loss of each fraction of the coarse aggregate after five cycles of immersion and drying using a sodium sulfate solution according to PTM No. 510. The maximum weighted percent loss allowed is 20%.

F. **Aggregate**: All DSA shall be derived from natural rock formations that meet program specification for abrasion resistance, pH and freedom from contaminants.

G. **Fines**: If fines need to be added to the aggregate to meet DSA gradation requirements, the added material passing the #200 sieve must be derived from rock material that conforms to program specifications. No mineral clay or silt soil may be added. The amount of particles passing the #200 sieve shall be determined using the washing procedures specified in PTM No. 100.

H. **Mixing**: DSA shall be properly mixed and at the proper moisture content before it is loaded onto the transport vehicles.

IV. Delivery and Placement

A. **Preparation of Subgrade**: Unsatisfactory drainage and subgrade conditions shall be corrected prior to placement by scarifying, reshaping, and re-compacting, or by replacing or importing subgrade/sub-base. The subgrade/subbase shall be crowned or side-sloped to ½ to ¾ inch per foot (4%-6% slope). Beginning and ending of DSA placements shall include a paving notch across the width of the subgrade. The paving notch shall have a minimum depth equal to the compacted DSA placement, and a sufficient length to facilitate transition into existing road surface, or a minimum of 4’ in length.

B. **Transport**: Tarps shall be used to cover 100% of the load’s exposed surface from the time of loading until immediately before placement.

C. **Certification**: A properly executed SCC DSA Certification Form shall be provided at the time of initial delivery and subsequent certification forms shall be provided if quarry conditions change. This Certification Form is to apply to the specific stockpile of DSA material being delivered from the source. The form certifies that the DSA material meets all of the specifications and requirements.

D. **Placement**: The use of a motorized paver is highly recommended for all DSA placements. For projects and/or contracts including over ~~1,000~~ 500 tons of DSA, a motorized paver is required. Paver must be in good working order and be of sufficient horsepower to be capable of pushing loaded trucks uphill while placing material in a full width pass at the required minimum depth stipulated in the contract. If the total tonnage is less than 500 tons the DSA must be paver placed or placed by tailgating and groomed with a road grader equipped with a carbide tipped grader blade. A track mounted paver is preferred. DSA shall be placed in a single pass across the width of the road. The crown or cross slope must range from ½ to ¾ inch per foot (4-6%). Material shall be placed in a single 6-8 inch loose lift or layer. This lift is to be compacted with a vibratory roller as specified in Section V - Compaction. If freezing temperatures or

precipitation are forecast that may cause the material to freeze, or prevent the material from drying out, placement shall be postponed at the discretion of the road owner, Conservation District, or aggregate supplier. DSA shall not be placed before April 1st or after September 30th unless otherwise approved by the SCC.

V. Compaction

A. **Vibratory Roller:** After placement, the material shall be compacted using a minimum ten-ton vibratory roller. DSA shall be compacted to a minimum of 95% of the dry-mass (dry-weight) density according to ASTM D698, Procedure C, Standard as determined by pre-sampling (refer to Materials, Section III.D). The road owner, or its designated representative, reserves the right to determine the in-place moisture and density according to ASTM D6938.

VI. Maintenance - Properly placed and compacted DSA provides a durable road surface with longer maintenance cycles than traditional aggregates, but it is not maintenance free. Refer to the Center for Dirt and Gravel Roads "Driving Surface Aggregate Handbook" for additional guidance on DSA maintenance.

VII. References:

A. State Conservation Commission Driving Surface Aggregate Certification Form. http://www.dirtandgravel.psu.edu/sites/default/files/General%20Resources/DSA/SCC_DSA_Spec_2014.pdf
B. Penn State Center for Dirt and Gravel Road Studies "Driving Surface Aggregate Handbook" http://www.dirtandgravel.psu.edu/general-resources/driving-surface-aggregate-dsa
C. ASTM C131 [AASHTO T96] - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine. http://www.astm.org/Standards/C131
D. ASTM D4972 - Standard Test Method for pH of Soils. http://www.astm.org/Standards/D4972
E. ASTM D698, Procedure C, Standard [AASHTO T99] – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3). http://www.astm.org/Standards/D698
F. ASTM D4318 [AASHTO T89/90] – Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. http://www.astm.org/Standards/D4318
G. Pennsylvania Test Method No. 100. - Method of Test for amount of material finer than 75 µm (no. 200) sieve in aggregate. http://www.dot.state.pa.us/public/pdf/BOCM_MTD_LAB/PUBLICATIONS/PUB_19/PTM-100.pdf
H. Pennsylvania Test Method No. 510 – Method of Test for soundness of aggregate by use of sodium sulfate. http://www.dot.state.pa.us/public/pdf/BOCM_MTD_LAB/PUBLICATIONS/PUB_19/PTM-510.pdf
I. ASTM D6938 [AASHTO T310] – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth). http://www.astm.org/Standards/D6938

Appendix G. Stream Crossing Replacement Standard

Standard required to be used on all DGLVR stream crossing replacements, unless an "exemption to the standard" applies. See section 7.1 of this manual for additional information.
THIS APPENDIX IS NEW

DRAFT 4/13/2022. This has not been approved by the SCC.

PA STATE CONSERVATION COMMISSION
DIRT, GRAVEL AND LOW VOLUME ROAD PROGRAM

STREAM CROSSING DESIGN & INSTALLATION STANDARD

I. DEFINITIONS

Aggradation: Deposition of sediment and corresponding increase in streambed elevation, often due to inability of the stream to adequately convey its sediment load during flood.

Anticipated Scour Depth: Depth of expected scour used to determine structure bury depth based on observed maximum reference reach pool depth and a factor of safety.

Aquatic Organism Passage: Unimpeded movement of aquatic organisms through the road/stream crossing.

Bankfull Elevation: In non-confined channels, the elevation point at which the stream typically accesses the floodplain. Channel dimensions at the bankfull elevation convey the channel-forming or dominant discharge.

Bankfull Width: A site-specific, field-derived measurement of channel width at the bankfull elevation.

Bank Margins: Large rock placed along the outside edges of the reconstructed bankfull channel within the stream crossing structure. Placement of the bank margins define bankfull channel width and bank margin (bankfull) elevation / height through the structure.

Bedform: Typical sequence of streambed features through the project reference reach (riffles/pools, step/pool, etc.).

Channel Continuity: Relative consistency and connectivity of a stream channel upstream, through, and downstream of a road/stream crossing, in regard to physical characteristics of the channel such as slope, planform, dimensions, profile, and bedforms.

Continuity Slope: Slope of the reconstructed section of streambed necessary to re-establish a relatively-continuous slope, profile and bedforms (channel continuity) along the entire length of stream extending upstream, through, and downstream of the new crossing.

Crossing: Refers to the location of a road/stream crossing structure.

Cross-Section Survey: A survey conducted across the channel (perpendicular to the thalweg) to produce a graphical representation of channel dimensions including shape, depth and width.

Degradation: Accelerated erosion and transport of sediment from the streambed and banks, and corresponding lowering of the streambed elevation. Often associated with increased scour potential due to channel constriction or abrupt increase in channel slope.

Finished Opening Area: The unobstructed area within the structure after accommodating for stream bed material, low flow channel, and bank margins.

Finished Opening Height: Vertical distance measured from the thalweg elevation at the crest of a constructed grade control feature inside the replacement structure, upward to the top of the culvert opening or bottom of bridge beam.

Flood Resiliency: Reducing the risk of flood damages to people and infrastructure by planning and implementing measures that improve floodwater conveyance and provide for long-term stability of a self-maintaining stream corridor.

Grade Control: Natural or manmade structures that control channel elevation, dictate channel slope and maintain bedforms. Common types include riffles, cascades, steps, rock clusters and large wood features.

Intermittent Watercourse: A stream or waterway with surface flow during various times of the year when groundwater inputs are sufficient to provide streamflow. At other times of the year, when there is insufficient groundwater input, the stream channel may be dry.

Invert: Interior bottom elevation of stream crossing structure.

Key Pieces: Largest rocks in the reconstructed streambed substrate. Often these can be clustered to provide areas of minor, frequent grade control along the length of the channel bed in-between more robust constructed grade control features.

Longitudinal Profile Survey: Survey of the stream channel, typically measured from upstream to downstream along the channel thalweg, to capture prominent features such as channel elevations, depths, and slopes at bedform features such as riffles, pools, runs, glides, and step/pools.

Low Flow Channel: Portion of the channel commonly wetted during stream base flow.

Outlet Scour Pool: An overly-widened and deepened pool bedform feature often (but not always) located immediately downstream of an undersized crossing.

Perennial Watercourse: A stream or waterway with surface flow throughout the entire calendar year.

Q100: The 100-year recurrence interval of stream flow. In any given year, there is a 1% probability that a flow of that magnitude or greater would occur.

Reconstructed Reach: Section of stream to be constructed upstream, through, and downstream of the new structure to re-establish channel continuity between the tie-in points.

Reference Reach: Section of stream channel that best reflects the “typical” natural, minimally-impacted physical characteristics (profile, dimension, planform and dominant bedform) of the channel. For stream crossing projects, the reference reach is located beyond the extent channel impacts associated with the existing structure. Site Assessment (survey) of the reference reach is used as a blueprint for design of the reconstructed reach.

Site Assessment: Survey of longitudinal profile and cross-sections through, and adjoining to, the project site used to inform project design.

Structure: A road/stream crossing structure, such as a culvert or bridge, constructed across a stream to provide controlled access for vehicles.

Substrate: Mixture of rock that composes the streambed.

Thalweg: The line of lowest elevation along the flowpath of a stream channel. Dimensionally, this is reflected as the lowest point of elevation in the channel cross-section.

Tie-in Points: Locations of existing- or constructed grade control features where the upstream- and downstream limits of the reconstructed reach transition to the existing stream channel. Tie-in points define the limits of the reconstructed reach necessary to achieve channel continuity upstream, through, and downstream of the crossing**.**

II. PURPOSE

This standard is applied for the purposes of:

A. Providing greater flood resiliency at road stream crossings and reducing maintenance of undersized crossings.
B. Improving water quality by reducing sediment and erosion occurring at the road and stream interface.
C. Reducing streambed and streambank degradation.
D. Constructing & maintaining stream channel continuity through the road profile.
E. Accommodating aquatic organism passage upstream, downstream, and through the road crossing.
F. Repairing and stabilizing stream channels damaged by undersized stream crossings.

III. CONDITIONS WHERE PRACTICE APPLIES

This practice applies to stream crossing structure replacements and installations on state or local publicly owned roads where:

A. DGLVR funding is used, in whole or in part, to fund a stream crossing replacement.

B. An intermittent or perennial watercourse exists.

C. A defined bed and bank convey water to a roadway.

IV. GENERAL CRITERIA APPLICABLE TO ALL STREAM CROSSING INSTALLATIONS

A. Refer to the Dirt, Gravel, and Low-Volume Roads (DGLVR) Program "Stream Crossing Replacement Technical Manual" for additional design and construction guidance and details regarding implementation of the standards and requirements listed below.

B. All stream crossing projects shall be authorized in accordance with local, state and federal laws. All applicable permits must be obtained prior to construction.

C. All stream crossing structures shall be comprised of one single-opening structure installed at each crossing. Projects shall not utilize multi-opening structures or the placement of multiple single-opening structures at any one crossing location. Additional floodplain conveyance structures may be installed a minimum of one bankfull-width distance outside of the bankfull channel.

D. New stream crossing structures shall be designed to pass, at a minimum, the 100-year discharge (Q100) at a water surface elevation not to exceed 80% of the finished opening height.

A Hydrologic and Hydraulic (H&H) Study is required that includes:

1. finished thalweg elevations, and
2. clearly labeled discharge values and water surface elevations at the proposed crossing inlet for Q2, Q10, Q25, Q50, and Q100.

E. Grade controls, bank margins and key pieces shall, at a minimum, be designed to be stable at Q100.

F. Structures must be of adequate width to accommodate the bankfull width of the stream at the final bankfull elevation with stable bank margins. Once these design criteria are met, the structure width shall not be less than 1.25x the bankfull width of the stream at the bankfull elevation.

G. In project design and construction, bankfull channel dimensions must be based upon project site-specific field measurements. Channel dimensions derived from other methods, such as modeling of estimated bankfull discharge, shall not be utilized.

H. New structures must be properly aligned with the channel, unless not feasible due to permitting restrictions or other constructability restraints. See Attachment A and the SCC GP-11 Permit Memo (Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification of permitting, including minor channel realignments that might be authorized with a GP-11 for stream crossings designed to this Standard.

I. Consider floodplain connectivity when necessary (e.g., high water by-pass, overflow pipes, etc.). Floodplain- or overflow pipes must be placed a minimum of one bankfull-width distance outside of the bankfull channel.

J. Structures must be designed and constructed to accommodate the passage of aquatic organisms through the structure.

K. Round pipes over 36" in diameter may not be utilized for stream crossings.

L. Low flow channels with well-defined bank margins must be built through the structure.

M. Site Assessment:

1. A longitudinal profile survey is required for each site prior to project design and/or permitting. The surveyed stream segments must extend far enough to capture existing channel slopes upstream and downstream of the crossing and must include an appropriate reference reach to support project design. To determine applicability, reference reach slope must be +/- 25% of the proposed continuity slope of the reconstructed streambed, unless otherwise approved by the SCC. If an appropriate reference reach is not located near the crossing, a separate survey may be conducted on an appropriate reference reach further upstream or downstream of the crossing. The reference reach must begin and end at existing grade control features and must, at minimum, include two consecutive sequences of repeating bed features (ex. riffle/pool/riffle/pool/riffle). A longer reference reach including additional bedform sequences is encouraged in order to provide more reliable design criteria.
    i. The longitudinal profile survey must extend both upstream and downstream of the crossing and include data points associated with the existing structure and roadway surface.
    ii. Sufficient number and locations of data points must be collected to determine the stream channel features that are critical to a successful structure replacement. These include:
        1. channel and structure slope
        2. grade control types, lengths, and spacing,
        3. pool scour depth,
        4. potential tie-in points,
        5. aggradation wedges,
        6. plunge pools,
        7. vertical offset of the streambed adjacent to the structure,
        8. available roadway cover.
    iii. The longitudinal profile survey must extend a minimum of 150' upstream and 150' downstream of the existing crossing. Additional length of survey may be necessary to capture a suitable reference reach to support project design. Actual length of the longitudinal profile survey is dependent upon the site conditions, availability of a suitable reference reach, channel size and distance necessary to accurately capture existing channel slopes both upstream and downstream of the crossing. The longitudinal profile survey must extend from an existing grade control upstream of the crossing feature to an existing grade control feature downstream of the crossing.
2. Cross-section surveys are required at a minimum of two locations. At minimum, surveys must be completed at a grade control crest within the reference reach and at the deepest point in the outlet scour pool (if present). If no outlet scour pool exists, this survey should capture the maximum depth of a pool feature from the reference reach. At minimum, each surveyed cross section must include data points on both streambanks capturing top-of-bank, bankfull, and right/left edge of water. Instream data points must include a minimum of three streambed points, including the thalweg (low-flow channel).
3. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on Site Assessment requirements.

N. The engineer is responsible for the Site Assessment data they use. If conservation districts provide Site Assessment data, the engineer has discretion to use the provided data or conduct their own surveys. If a Site Assessment is completed by the design engineer to support their project design, the conservation district technician is required to be on-site while the surveys are being performed by the engineer and/or surveyor. The engineer shall provide the completed survey and Site Assessment data to the conservation district technician. The Site Assessment data provided to the conservation district shall include stationing, elevations, and notations of key stream features as outlined in (M.) above.

O. The Site Assessment data (from longitudinal profile and cross section surveys) described above shall be used to inform project design considerations, including the following:

1. Minimum stream substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) is to be based on the maximum pool depth in the reference reach with a minimum safety factor multiplier as listed in Table 1. Alternatively, minimum bury depth can be determined using industry accepted scour analysis and modeling tools for stream system analysis and/or bridges (storm sewer models are not acceptable for stream crossing scour analysis).

Table 1: Pool Depth Safety Factor Multiplier to establish Anticipated Scour Depth

Continuity Slope	Pool Depth Multiplier
0% - 2.0%	1.5
2.1% - 4.0%	2.0
> 4.0%*	2.5

* Structures installed on reconstructed reach stream slopes >4.0% must be bottomless. The 2.5 safety factor multiplier is to establish the recommended minimum bottom of footing buried depth. The final footing buried depth is to be determined by the Engineer in project design.

2. Minimum substrate depth (measured below the low flow channel at a grade control crest, to the structure invert or bottom of the footings) shall be 24-inches, or the depth determined with scour analysis models or the Anticipated Scour Depth, whichever is greater.
3. The design shall identify stable tie-in points at grade control features (either existing or to be constructed). The distance between the upstream- and downstream tie-in points must extend far enough in both directions to restore channel continuity upstream, through, and downstream of the structure.
4. In-stream channel grade control(s) are required for re-constructing the stream channel and/or stabilizing the stream bed and channel through the reconstructed stream reach. Types of grade control features utilized must be the same type as those within the appropriate reference reach. Design of grade control feature length and spacing shall be based upon the Site Assessment data.
5. Design of the cross-sectional shape of the reconstructed reach must be based on Site Assessment data.

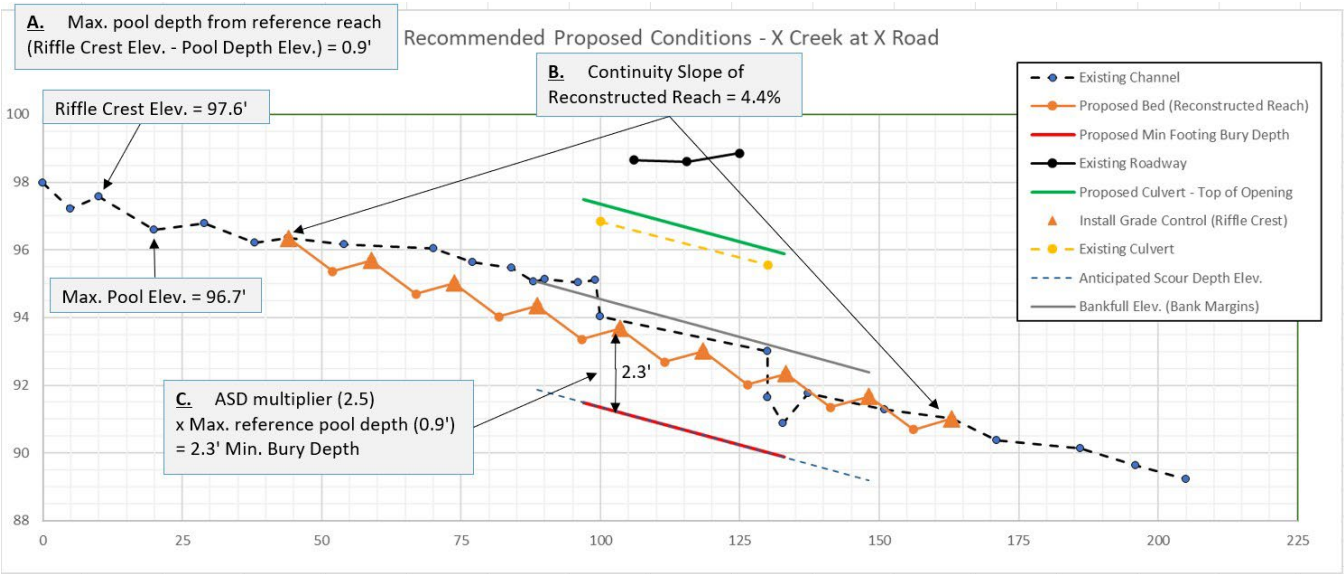


Figure 1. Determining Minimum Bury Depth through the Anticipated Scour Depth / Pool Depth Multiplier Method. **A.** Maximum reference reach pool depth is defined as the greatest vertical difference between each pool bottom elevation and the elevation of the corresponding grade control crest immediately upstream (in this example, 0.9'). **B.** The slope of the stream segment to be reconstructed in order to reestablish channel continuity upstream, through, and downstream of the replacement crossing ("continuity slope") determines the multiplier value to be applied. In this example, a continuity slope of 4.4% corresponds to a pool depth multiplier value of 2.5 (see Table 1, above). **C.** Minimum bury depth is the product of the maximum reference pool depth x pool depth multiplier. In this example, 0.9' x 2.5 = 2.3' minimum bury depth. The minimum bury depth defines the minimum depth to which the bottom of footings (or structure invert) must be installed. This depth is measured downward from the thalweg elevation at the crest of a constructed grade control feature within the replacement structure.

P. Stream crossing projects will likely require work outside of the right-of-way to re-construct the stream channel, install grade controls, and/or allow for construction access to the stream and structure. Before working outside the right-of-way, the grant recipient must obtain written permission from the landowner(s). In instances when written off right-of-way permission cannot be obtained to do work necessary to achieve channel continuity, the project cannot be completed with DGLVR funds.

Q. The grant recipient or engineer must provide all plans and specifications to the conservation district. The conservation district must review the documents and provide written confirmation to the grant recipient or engineer that those plans and specifications comply with DGLVR policy and the Stream Crossing Standard before they are submitted (or resubmitted) for permit review.

R. Side Slopes: Make all finished cut and fill road slopes stable for the materials involved. Make the side slopes in soil materials no steeper than 2 horizontal to 1 vertical (2:1) in cut slopes or 3 horizontal to 1 vertical (3:1) for fill slopes. Make rock cuts or fills no steeper than 2 horizontal to 1 vertical (2:1).

S. All stream crossing replacement structures must include a headwall and endwall.

T. Quarried aggregate rip-rap for use as grade control, bank margins, or bank stabilization: Use only rock that is sound, durable, and able to withstand exposure to air, water, and freezing and thawing. Aggregate must be obtained from a Pennsylvania Department of Transportation approved source, or must be tested and meet the following criteria:

1. Abrasion Resistance: The loss of mass (LA Abrasion) shall be less than 45%: Determine the resistance to abrasion using the Los Angeles Abrasion test, ASTM C131.
2. Soundness: Determine the percentage of mass (weight) loss of each fraction of the coarse aggregate after five cycles of immersion and drying using a sodium sulfate solution according to PTM No. 510. The maximum weighted percent loss allowed is 20%.

U. Vegetation: Revegetate and permanently stabilize all disturbed areas as soon as practical after construction activities are complete. Revegetation and site stabilization shall comply with the PA Chapter 102 Erosion Control requirements (See the PA Erosion and Sediment Pollution Control Program Manual for additional guidance).

V. Road Approaches to Stream Crossings: Ensure that the roadway approaches are stable and road drainage systems have been addressed and are adequate to divert road drainage (e.g., ditches, turnouts, etc.) away from the stream and structure in a manner that prevents erosion.

W. Project work cannot start until all Federal, State, and Local permits are obtained, if needed. In particular, any required DEP 102/105 permits must be obtained before construction may begin. See the SCC GP-11 Permit Memo Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification.

V. STRUCTURE SELECTION

A. Bottomless structures shall be used for all structure replacements where the continuity slope of the channel to be reconstructed through the project area will be greater than 4.0% or the bankfull width is over 20', as determined by the longitudinal survey.

B. Structures with inverts / bottoms may be used for structure replacements where the continuity slope of the channel to be reconstructed will be 4.0% or less (as determined by the longitudinal survey) or on sites over 4.0% where it is determined by a geotechnical investigation report that soil bearing pressure cannot support structure abutments or footings.

VI. CONSTRUCTION PLANS AND SPECIFICATIONS

A. The grant recipient must provide all permit applications, Site Assessment data, design plans and specifications (per DGLVR stream crossing replacement standard) to the conservation district for review. The conservation district must review the documents and provide written confirmation to the grant recipient that these submitted documents comply with DGLVR policy and the Stream Crossing Standard before they are submitted (or resubmitted) for permit review.

B. Construction plans and specifications shall be designed and prepared in accordance with this Stream Crossing Standard. Construction plans and specifications shall be prepared for all stream crossing projects, regardless of who the contractor or installer may be (applies to projects installed by the grant recipient, such as a municipality). Clearly describe the requirements for applying the practice to achieve its intended purpose in the plan and specifications. At a minimum, the plan and specifications must include the following:

1. Existing conditions of the project site, including but not limited to the full longitudinal profile survey and cross sections of the stream, existing stream crossing, stream crossing and channel slope, road approaches, and delineated wetlands (if applicable).
2. Geographic location and bankfull width of stream.
3. Proposed stream crossing structure width, length, and height with profile and typical cross sections.
4. Elevations and locations of abutments, footings, wingwalls and other associated appurtenances.
5. Details for stream bed re-construction (e.g., channel width, proposed channel alignment, channel side slopes, stream bed slope and location of tie-in points). See Attachment A and the SCC GP-11 Permit Memo (Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification of permitting, including minor channel realignments that might be authorized with a GP-11 for stream crossings designed to this Standard.
6. Location and details for low flow channel width, depth, and material size and types.

7. Locations and construction details, including rock sizing, in-stream structures, grade controls, and/or bank stabilization structures (if applicable).
8. Depth, gradation, and composition of material for streambed restoration. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on determining substrate gradation and composition.
9. Specification for compaction of placed streambed material.
10. Details for scour hole restoration and reestablishing channel cross section.
11. Structure manufacturer's details, specifications, and installation instructions.
12. Thickness, compressive strength, reinforcement, testing, and other special requirements for concrete according to the manufacturer specifications, if applicable.
13. Load limits for bridges and/or culverts including signage and guide rail per state or local codes.
14. Location of all utilities and notification requirements (PA One Call).
15. Location and elevation of survey benchmarks.
16. Method of surface water diversion and dewatering during construction.
17. Erosion and Sedimentation Control Plan, if applicable.
18. Vegetative requirements that include seed and plant materials to be used, establishment rates, and season of planting.
19. Cross section view of the proposed structure that clearly notes proposed streambed thalweg elevation (at the crest of a constructed grade control feature), Q100 water surface elevation, and top of structure opening elevation.
20. Additional site-specific requirements.

VII. CONSTRUCTION

A. The grant recipient or engineer must provide all draft bid packages (if applicable) to the conservation district. The conservation district must review the draft bid documents and provide written confirmation to the grant recipient or engineer that those draft bid documents comply with DGLVR policy and Stream Crossing Standard before they are provided to potential bidders. All bid documents and practices must conform with municipal codes and other standard procurement requirements of the grant recipient.

B. Final construction documents shall include, at a minimum, the following items:
   1. Bidding Documents (if applicable).
   2. Construction Plan.
   3. Erosion and Sedimentation Control Plan.
   4. Construction Specifications.

C. At a minimum, two benchmarks must be set by the engineer or surveyor in an area outside of the zone of construction and disturbance.

D. Critical Stages of Construction to be inspected by the Engineer (and/or Engineer's designee) at the time of installation is required. Critical Stages include, but are not limited to, the following:
   1. Installation of structure subgrade and bedding materials and establishing inverts/elevations.
   2. Installation of footings, abutments and structure appurtenances.
   3. Installation of grade control features, bank margins, and streambed substrate.
   4. Installation or placement of stream crossing structure.
   5. Compaction and backfill of stream crossing structure.

E. Conservation districts must be on-site regularly during construction to ensure that DGLVR Program Policy and Stream Crossing Standard are being met. Conservation Districts must be onsite during installation of the Critical Stages of Construction defined in VII. D, above.

F. Certification and Documentation of Critical Stages of Construction: The Engineer shall provide the project owner a signed and sealed certification form (Attachment B) indicating that the critical stages of construction outlined in Section VII.D were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard. The engineer must also provide the project owner with red-lined construction documents that indicate any changes in the as-built conditions of the project compared to the design plans.

References:

1. Dirt, Gravel, and Low Volume Road Maintenance Program Administrative Manual. May 2022.
2. Dirt, Gravel, and Low Volume Road Stream Crossing Technical Manual. May 2022.
3. U.S.D.A. Forest Service Stream Simulation Manual: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings. May 2008.
4. Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual. Technical Guidance Number 363-2134-008. March 2012.

Attachments:

Attachment A: Chapter 105 General Permit Types Most Applicable to Stream Crossing Replacements

Attachment B: Inspection and Documentation of Critical Stages of Construction Certification Form

Attachment C: Typical Detail Drawings

Attachment A:

Chapter 105 Permits that are Most Applicable to Stream Crossing Replacements

Attachment A:

Chapter 105 Permits that are Most Applicable to Stream Crossing Replacements

- GP-1 Fish Habitat Enhancement Structures, 3150-PM-BWEW0501
- GP-3 Bank Rehabilitation, Bank Protection, and Gravel Bar Removal, 3150-PM-BWEW0503
- GP-7 Minor Road Crossings, 3150-PM-BWEW0507
- GP-11 Maintenance, Testing, Repair, Rehabilitation or Replacement of Water Obstructions and Encroachments, 3150-PM-BWEW0511

Additional information on PA Chapter 105 permitting can be found at
https://www.dep.pa.gov/Business/Water/Waterways/Pages/ePermitting.aspx

See the SCC GP-11 Permit Memo (Appendix F of the DGLVR Stream Crossing Replacement Technical Manual) for additional clarification on potential stream realignments and increasing road elevations.

Consult with DEP as needed on permitting questions, as well as with other entities involved in any required Federal, State, or Local permits that may be needed.

Attachment B:

Inspection and Documentation of Critical Stages of Construction Certification Form

Attachment B:

DGLVR Stream Crossing Replacement

Inspection and Documentation of Critical Stages of Construction Certification Form

Project Title: _____

Road Name: _____

Municipality, County: _____

Professional Engineer Certification

I hereby certify that the Critical Stages of Construction were inspected and installed in accordance with the Construction Documents and DGLVR Stream Crossing Standard:

_____, _____
Signature of Professional Engineer *Date*

Professional Engineer Seal

Notes:_____

_____

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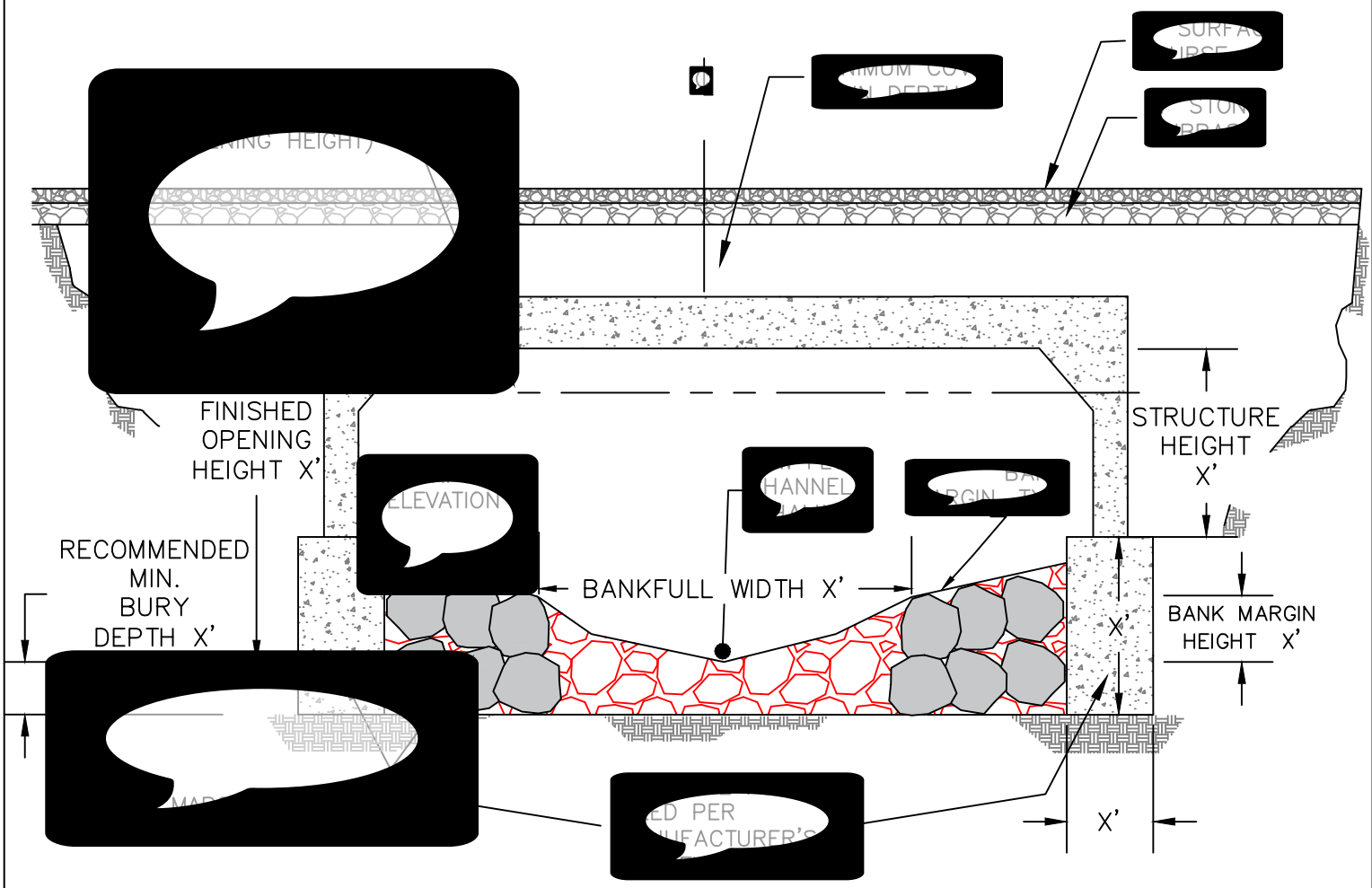
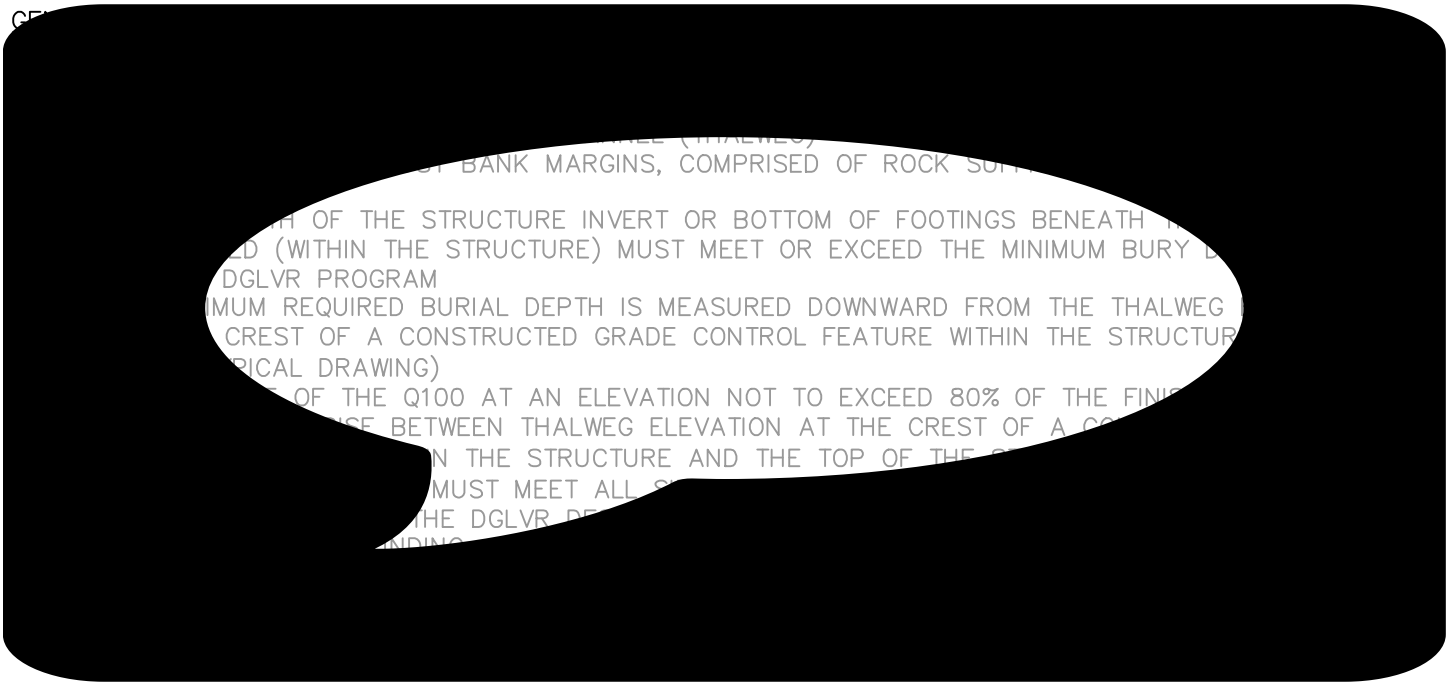
Attachment C:

Typical Detail Drawings





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Center for Dirt and Gravel Road Studies

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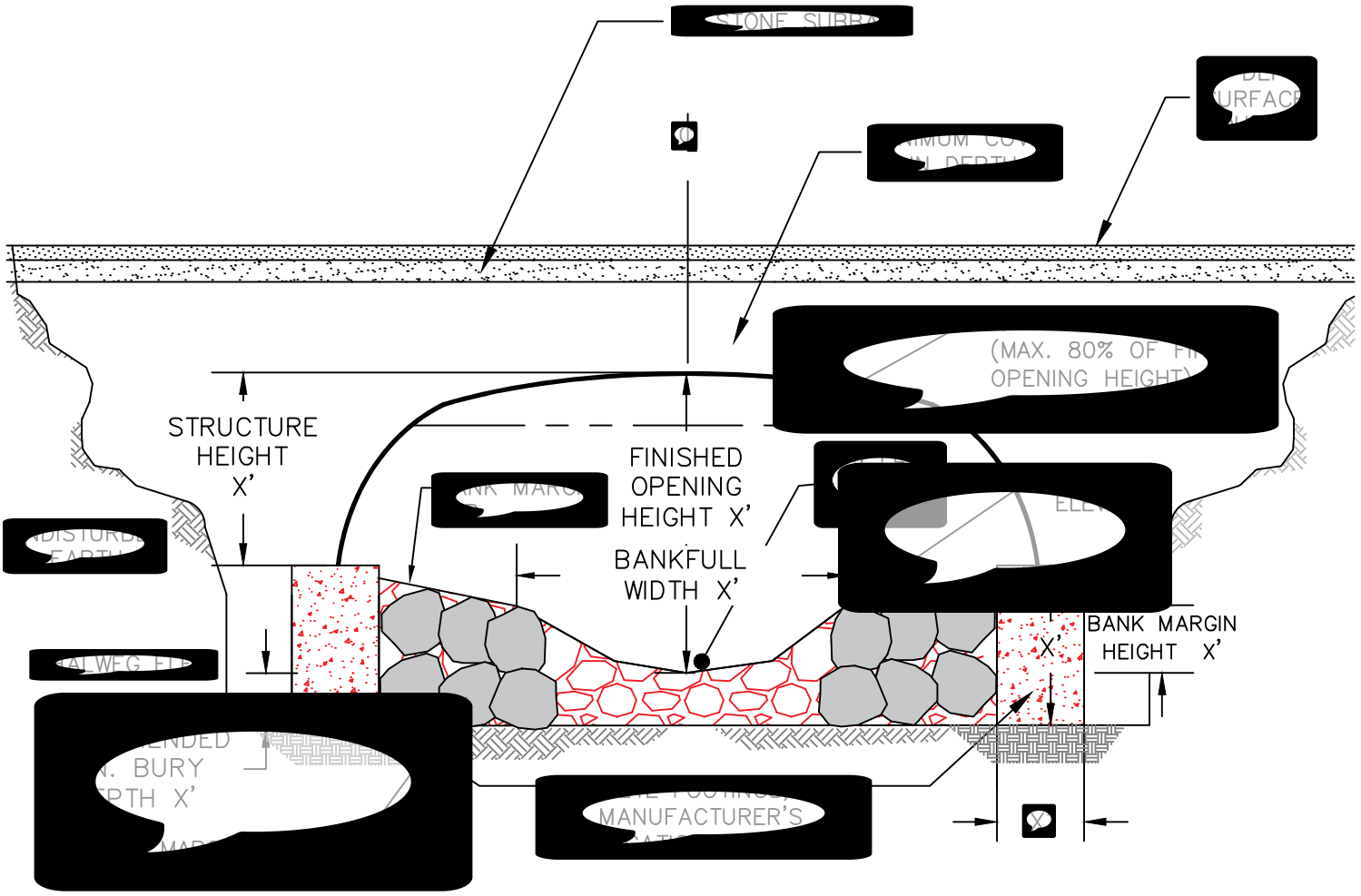

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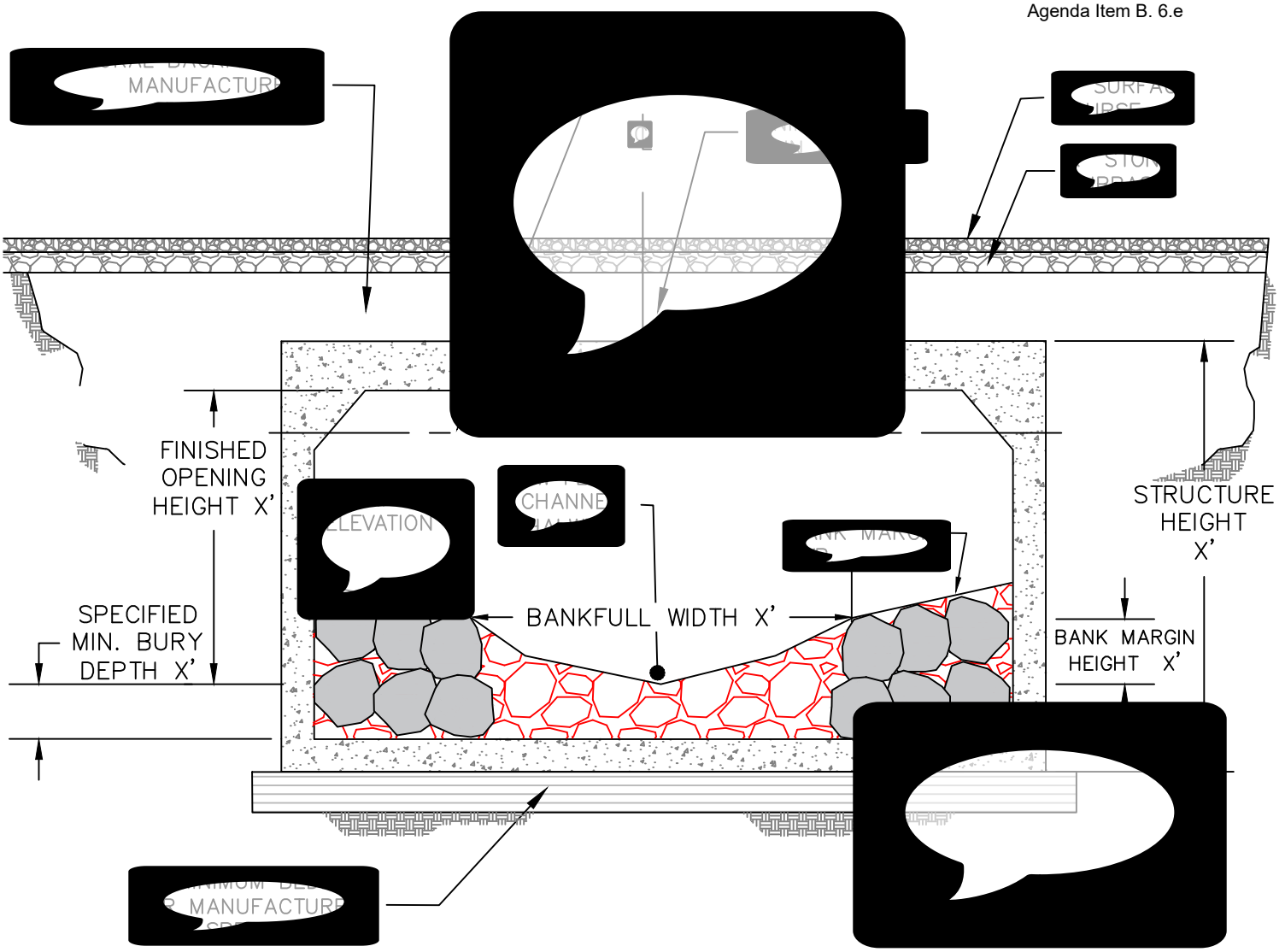

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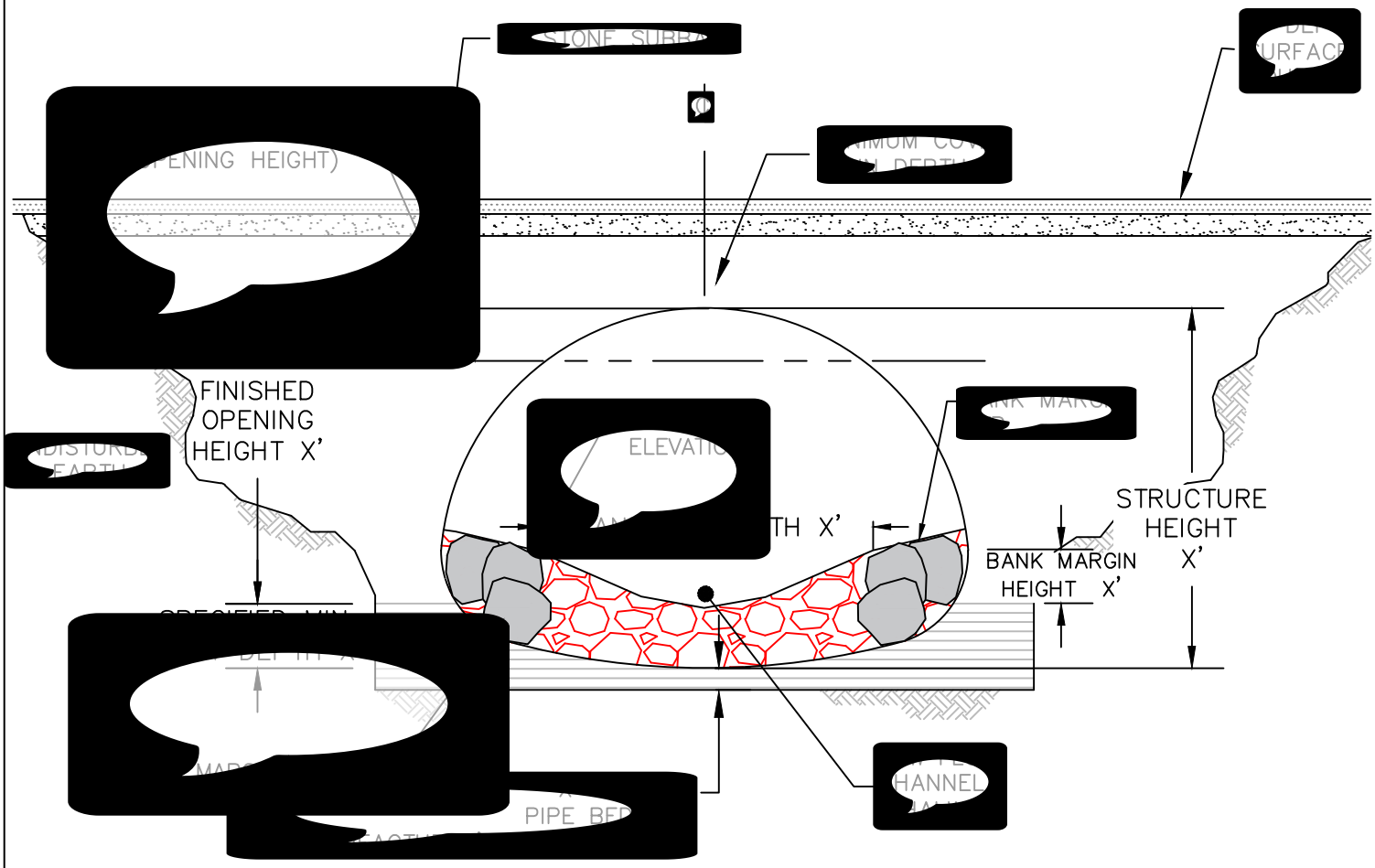

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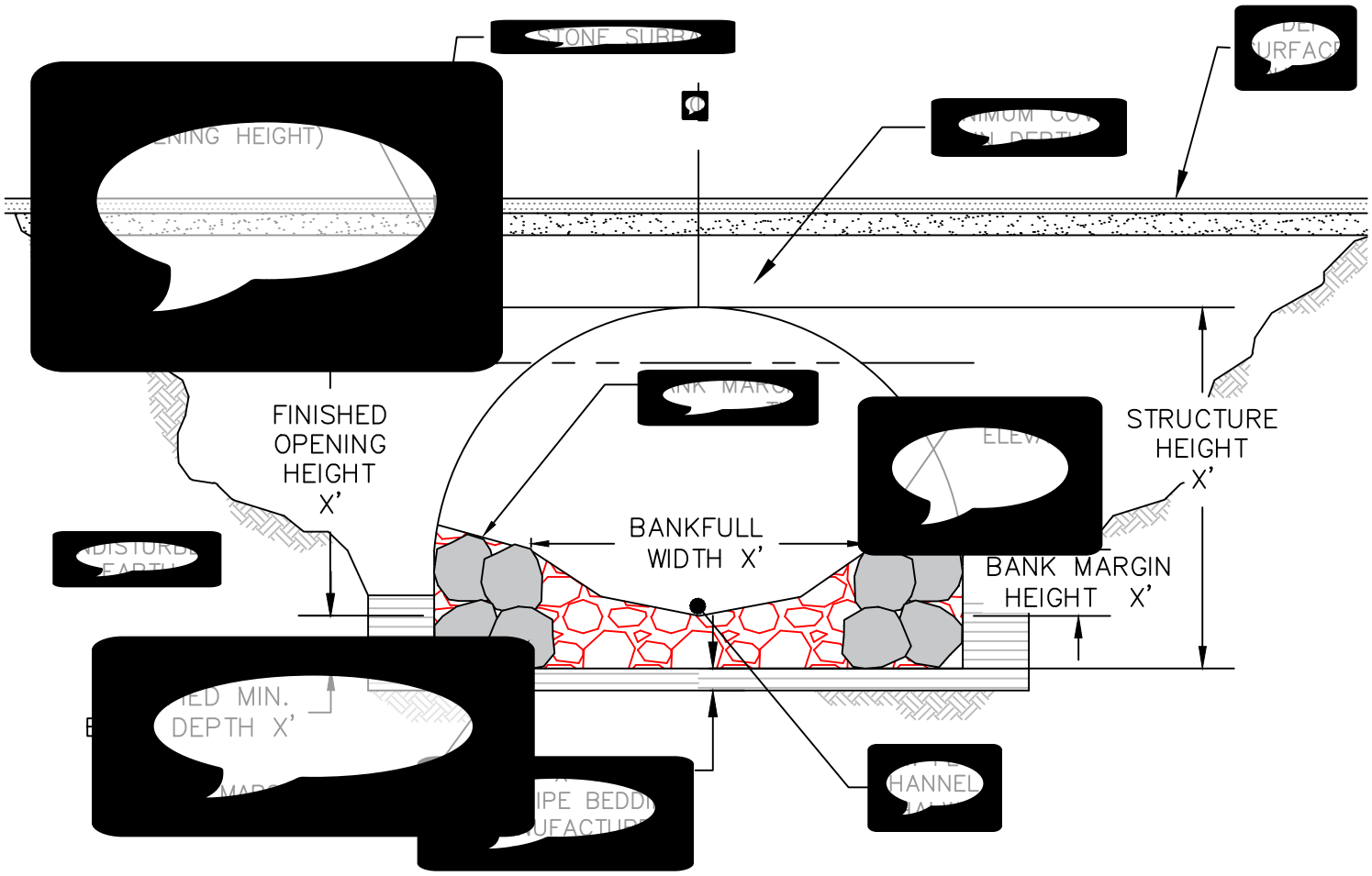

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Center for Dirt and Gravel Road Studies

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Appendix H. Stream Crossing Replacement Evaluation

Form used to determine eligibility of stream crossing site for funding, including instructions on bankfull measurements. Form must be kept in project file for all funded stream crossing replacements. See section 7.1 of this manual for additional information.
THIS APPENDIX IS NEW

PA Dirt Gravel and Low Volume Road Program—Stream Crossing Eligibility Determination 12/10/2021

Reviewer Information:

Date: _____

Reviewer(s): _____

_____

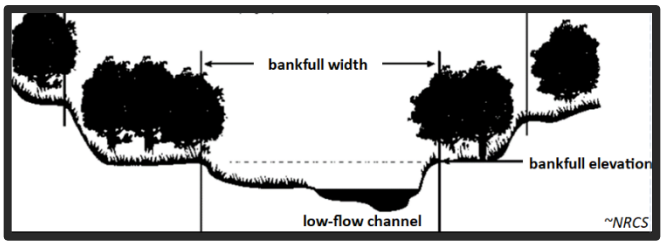
Existing Structure (circle):

round oval arch Other (Draw)

box bridge multiple

Site Information:

County		Township	
Road Owning Entity			
Structure Owning Entity			
Road Name			
Stream Name			
Latitude	N	Longitude	W
Site Notes			



Measuring Bankfull Channel Width: Since stream conditions vary, these guidelines are flexible, and the goal is to determine bankfull width of an unaltered "reference reach" of the stream.

Where to take Measurements: Look upstream if possible, trying to find an undisturbed stretch of stream free from influences that may impact cross section (such as debris jams, floodplain obstructions, bedrock outcrops, etc.). Look downstream for measurements if prevented from going upstream. In order to get out of the "area of influence" from the structure, roughly estimate the bankfull channel width, then go at least 5 times that distance away from the structure before considering taking bankfull measurements. Additional bankfull widths should be measured so that three to five (more preferred) measurements are collected. Subsequent bankfull width measurement should be collected at least 1/2 bankfull width away from the first measurement. Avoid taking bankfull measurements at unique, unnatural, or temporary features such as log or debris jams, manmade obstructions, bedrock outcrops, hard meander bends, and braided channels. Bankfull measurements can be taken further from the structure if needed if there are no major splits in the channel. **Be flexible** when taking choosing where to take measurement in order to capture the most representative reaches for the stream.

Taking Bankfull Measurements: When taking a bankfull measurement, locate bankfull indicators (such as changes in bank slope, depositional features, vegetation changes, and scour features) and stretch a tape across the channel to determine the bankfull width at that elevation. Look for bankfull indicators that line up on both sides of the channel as the bankfull elevation should be level across the channel. Remember that bankfull flows typically occur every 1-2 years, so don't mistake higher benches far outside the channel for bankfull. Additional bankfull determination guidance is available Chapter xx of the Stream Crossing Technical Manual.

Bankfull Measurements Taken *3 minimum, more is better*			
1	ft	**6**	ft
2	ft	**7**	ft
3	ft	**8**	ft
4	ft	**9**	ft
5	ft	**10**	ft

A) Average Bankfull Channel Width= _____(ft)
average of measurements taken to left

B) Existing Opening Width= _____(ft)
Measure the most limiting width. For example: the narrowest pipe in a series of "necked-down" pipes, or the narrowest point between abutments of a skewed bridge perpendicular to the flow).

C) Opening to Bankfull Width Ratio= _____%
"B" divided by "A"

Structure Eligibility

Is the opening width of the existing structure 48" or less, or does the structure consist of multiple pipes? YES NO

For structures with a single opening over 48", is the opening to bankfull width ratio ("C" above) 75% or less? YES NO

If the answer to either question above is "YES" the structure is eligible for replacement with DGLVR funds. In all cases, new structures follow the DGLVR replacement Standard unless it qualifies for a policy exemption. Keep a copy of this form in project files.

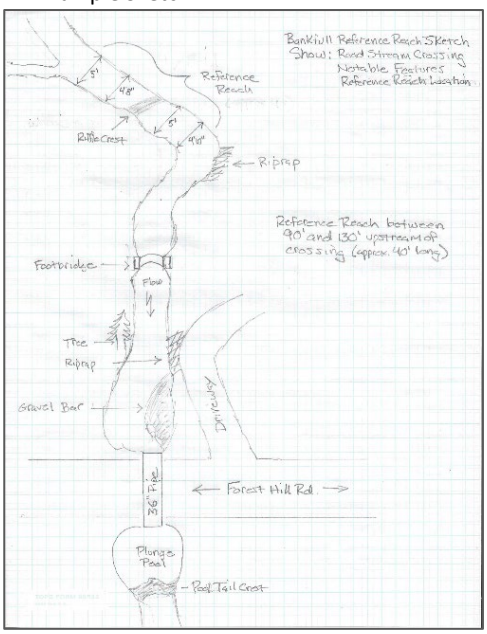
Additional Notes: _____

_____

_____

Optional: provide an aerial sketch of the existing conditions and the locations where bankfull measurements were taken.

Example Sketch:



Appendix I. Exemptions from Stream Crossing Standard

In certain circumstances, stream crossing replacements may be exempt from following the stream crossing standard. The exemption process and site requirements when an exemption is received are detailed in section 7.1.3 of this manual.

Automatic Exemptions: Completed by CD for very small channels. No SCC approval needed. Form must be kept in project file.

SCC Granted Exemption: Exemption for larger channels provided by the State Conservation Commission. Form must be kept in project file.

THIS APPENDIX IS NEW

PA Dirt Gravel and Low Volume Road Program

Automatic Exemptions from DGLVR Stream Crossing Standard Justification Form 03/2022

Purpose: This form is to be used by a Conservation District to identify and record a stream crossing as meeting SCC criteria for an automatic exemption from using the PA State Conservation Commission Dirt, Gravel and Low Volume Road Program Stream Crossing Design & Installation Standard.

Reviewer Information:

Date: _____

Reviewer(s):_____

_____

_____

_____

Site Information:

County		Township	
Road Owning Entity			
Structure Owning Entity			
Road Name			
Stream Name			
Latitude	N	Longitude	W
Site Notes			
Drainage Area	ac		

Excerpt from "Automatic Exemptions": for full current policy see admin manual chapter 7.1.3.1

The following existing conditions can be, at the discretion of the Conservation District, considered "DGLVR Standard Exempt" without SCC approval for channels with a bankfull width of 4' or less and:

- The defined bed and bank coming to the road does not extend more than 500' upslope of the road ditch, or,
- The drainage area of the bed and bank coming to the road is 20 acres or less

Standard Exemption Justification:

☐ **Bankfull width of the channel coming to the road: _____feet, and**

☐ **The bankfull width is 4' or less and the channel does not extend more than 500' upslope of the road ditch, or**

Length the "bed and banks" channel extends upstream from the road: _____feet

☐ **The bankfull width is 4' or less and the drainage area of the bed and bank coming to the road is 20 acres or less**

Drainage area to road crossing: _____acres – include a map showing drainage area

Method used to determine drainage area: _____

Crossings meeting the above criteria can, at the discretion of the Conservation District, be considered automatically exempt from using the PA State Conservation Commission DGLVR Program Stream Crossing Design & Installation Standard. **However, sites qualifying for an automatic exemption must still follow the requirements in section 7.1.3.3 of the DGLVR Stream Crossing Policy in the Administrative Manual.**

Additional Notes: _____

_____

_____

Keep a copy of this form, and the bankfull determination form in project files.

_____
Signature

_____
Print Name

PA Dirt Gravel and Low Volume Road Program

SCC Approval for Exemptions from DGLVR Stream Crossing Standard Request Form 03/2022

Purpose: This form is to be used by a Conservation District when requesting an SCC exemption from using the PA State Conservation Commission Dirt, Gravel and Low Volume Road Program Stream Crossing Design & Installation Standard. This is for sites that do not qualify for an "automatic exemption" as outlined in section 7.1.3.2 of the Stream Crossing Manual.

Reviewer Information:

Date: _____

Reviewer(s):_____

_____

_____

_____

Site Information:

County		Township	
Road Owning Entity			
Structure Owning Entity			
Road Name			
Stream Name			
Latitude	N	Longitude	W
Site Notes			
Drainage Area	ac		

Reason for exemption request:

_____

_____

_____

_____

Project Status: ☐ Pre-application/planning ☐ Application submitted ☐ Under Contract

Drainage Area: _____ acres **Bankfull Channel Width:** _____feet

Please Also Provide:

- ☐ Location map
- ☐ Photographs (minimum one of existing inlet and outlet)
- ☐ Stream Crossing Evaluation Form (Bankfull measurement form)

A longitudinal profile survey may be required.

SCC USE ONLY

☐ **Not Approved** (must follow DGLVR Standard) Date received: _____

☐ **Conditionally Approved.** See Reverse for Details

☐ **Approved.** This crossing does not need to follow the DGLVR standard. However, sites receiving a SCC exemption must still follow the requirements in section 7.1.3.3 of the DGLVR Stream Crossing Policy in the Administrative Manual.

_____

DGLVR Program Coordinator (Date)

Keep a copy of this form, and the bankfull determination form in project files.

SCC Approval for Exemptions from DGLVR Stream Crossing Standard Request Form

Conditional Approval Details:

The SCC has granted approval for this site to not follow the DGLVR stream crossing replacement standard as long as the following conditions are met:

Appendix J. Definitions and Acronyms

Commonly used definitions and acronyms used in this manual.

THIS APPENDIX IS HAS BEEN UPDATED. Track changes version provided

PA Dirt, Gravel, and Low Volume Road maintenance Program 3/2022

Definitions and Acronyms

Act - The Act of April 17, 1997 (P.L. 6, No. 3) amending the Vehicle Code by adding the Dirt and Gravel Road Maintenance Program at 75 P.S. §9106.

Administrative Funds (at the district) – up to 10% of a district's allocation that can be used to administer the Program at the county level.

Advance Working Capital – the portion of a conservation district's allocation that is received up-front from the Commission.

Allocations – Funding distributed from the Commission to conservation district for both Dirt and Gravel, and Low Volume Roads.

Allocation Method - For shared district expenses such as vehicles, rent, or office expenses, the district must establish and follow a credible allocation method to equitably distribute expenses among multiple programs.

Assessment - The process of evaluating a road to determine which sections are having negative environmental impacts.

Average Daily Traffic Count- A traffic count that meets the standards described in section 7.3.6 of this manual.

Bankfull – The stream channel width at the dominant channel forming flow, typically with a recurrence interval between 1 and 2 years.

Center for Dirt and Gravel Road Studies – Non-profit entity at Penn State that provides education, outreach, and technical assistance to entities involved in the Program.

Certification – Relating to Driving Surface Aggregate: A notarized form provided by the quarry detailing specifications of the DSA material being provided.

Cooperating Organization - An organization approved by the Commission to assist in implementing the Act.

Davis Bacon Act - Federal version oft the PA Prevailing Wage Act. Where Federal prevailing wages are required, Pennsylvania prevailing wages do not have to be used. 43 P.S. § 165-15.

Demonstration Project – A "Demonstration Project" is a project that is funded by the Conservation Districts that does not follow the lifecycle of the "typical project" above. Demonstration Projects can be implemented by the Conservation District to showcase a particular practice or project without the typical application submittal and ranking process using the district's educational or administrative funds.

Dirt and Gravel Road – A public road with an unbound surface layer.

District - A conservation district as defined in the Act of December 19, 1984 (P.L.

1125, No. 221, §2) known as the Conservation District Law, 3 P.S. §849-864.

Driving Surface Aggregate (DSA) – A specification of crushed aggregate that is designed to achieve maximum density and resist erosion. DSA is the only approved surface aggregate for unpaved roads in the Program. Refer to the State Conservation Commission DSA Standard and

Specification for more details.

Education Funds (at the district) – up to 10% of a district's allocation that can be used to for educational efforts at the county level.

Environmentally Sensitive Maintenance (ESM) - a term used to describe a suite of principles and practices that are designed to create a more environmentally and financially sustainable public road system. They are long term practices designed to reduce erosion and maintenance within the road area.

Environmentally Sensitive Maintenance Training (ESM training) – 2-day training course that potential grant applicants must attend in order to be eligible for to apply to their district for funding.

Exceptional Value - A stream or watershed which is designated as an exceptional value water pursuant to 25 *Pa. Code* Chapter 93.

Geographic Information System (GIS) – A systems of interconnected digital maps and databases use to store large amounts of spatial data.

Grant Applicant / Recipient – A public road-owning entity such as a municipality or state agency who is eligible to apply to the district for Program funding.

High Quality - A stream or watershed which is designated as a high quality water pursuant to 25 *Pa. Code* Chapter 93.

In-kind - Materials or services contributed to a project by the grant recipient.

Low Volume Road - For the purposes of the low volume road, a low volume road is a paved or sealed road with an average daily traffic count of 500 vehicles or less.

Paved or Sealed Road - For the purposes of the low volume road program, a "paved" road is defined to include any road surfaced with asphalt, "tar and chip", "chip seal", bitumen, concrete, or other asphalt-like coating.

Performance Standards – Administrative policies and/or technical requirements adopted by the Commission for the implementation of the Dirt, Gravel, and Low Volume Road Maintenance Program, including standards that prohibit the use of materials or practices which are environmentally harmful.

Prevailing Wage – Pa legislation that requires the "prevailing wage" rate to be paid to contracted labor for construction projects with an estimated cost of $25,000.00 or more when public funds are involved. Refer to Prevailing Wage & the Dirt, Gravel, and Low-Volume Road Program Frequently Asked Questions for Municipalities updated 3/2021

Project Area – see *also "worksite"*, A worksite that has been designated for funding through the Program.

Project Completion Report – A two page form signed by the district and grant recipient that summarizes the funding and work for a particular project.

Project Participant - A municipality or state agency eligible to participate in a Dirt, and Low Volume Road Maintenance project under the Act.

Quality Assurance Board (QAB) - The 4-member administrative board impaneled by each district to administer the Dirt, Gravel, and Low Volume Road Maintenance Program locally, pursuant to 75 P.S. §9106(e).

Quality Assurance / Quality Control (QAQC) – A visit and review of an individual districts program administration and implementation by Program and Center staff.

Replenishment – Process for districts to claim remaining funding from the Commission after expenditure of advance working capital.

Right-of-way – A publicly owned corridor surrounding the road, in many cases extending 33' form the centerline of the roadway.

State Conservation Commission (Commission) – Administrative home of the Program at the PA Department of Agriculture in Harrisburg.

Sunshine – Public meeting notification requirements that apply to QAB and Conservation District meetings.

Worksite – A section of road that have been identified to be a source of sediment or other pollution to a waterway.

Acronyms

ADT	Average Daily Traffic Count
ASR	Annual Summary Report
BMP	Best Management Practice
CD	Conservation District
CDGRS	Penn State Center for Dirt and Gravel Road Studies
COE	Corps of Engineers
DCNR	Department of Conservation and Natural Resources
DEP	Department of Environmental Protection
DGR	Dirt and or Gravel Road (unbound surface)
DGLVRP	Dirt, Gravel, and Low Volume Roads Program
DSA	Driving Surface Aggregate
DRBC	Delaware River Basin Commission
E&S Plan	Erosion and Sedimentation Pollution Control Plan
EPA	Environmental Protection Agency
EV/HQ	Exceptional Value/High Quality (stream designations)
ESM	Environmentally Sensitive Maintenance
FEMA	Federal Emergency Management Agency
G2	Growing Greener Program
GIS	Geographic Information System

GP	General Permit
GRS-IBS	Geos-synthetically Reinforced Soil – Integrated Bridge system
LVR	Low Volume Road (Under 500 Cars ADT)
MOU	Memorandum of Understanding
MS4	Municipal Storm Sewer System Separate from a Sanitary System
NACD	National Association of Conservation Districts
NICET	National Institute for Certification in Engineering Technologies
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service (USDA)
PACD	PA Association of Conservation Districts
PDA	PA Department of Agriculture
PEC	PA Environmental Council
PEMA	PA Emergency Management Agency
PFA	PA Forestry Association
PFBC	PA Fish and Boat Commission
PGC	Pennsylvania Game Commission
PNDI	Pennsylvania Natural Diversity Inventory
PSATS	PA State Association of Township Supervisors
QAB	Quality Assurance Board (Dirt, Gravel, and Low Volume Roads Program)
QAQC	Quality Assurance / Quality Control Visit
RCSOB	Rachel Carson State Office Building
ROW	Right-of-Way
SCC	State Conservation Commission
SOP	Standard Operating Procedure
SRBC	Susquehanna River Basin Commission
TMDL	Total Maximum Daily Load (Watershed Conservation 303d)
TU	Trout Unlimited
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

USGS United States Geological Survey

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 27, 2022

TO: State Conservation Commission Members

FROM: Frank X. Schneider, Director
Nutrient and Odor Management Programs

THROUGH: Karl G. Brown
Executive Secretary

RE: Nutrient and Odor Management Programs Report

The Nutrient and Odor Management Program Staff of the State Conservation Commission offer the following report of measurable results for the time-period of March / April 2022.

For the months of March and April 2022, staff and delegated conservation districts have:

1. Odor Management Plans:
    a. 7 OMPs in the review process
    b. 12 OMPs Approved
    c. 0 OMP approvals Rescinded

2. Reviewed and approved 44 Nutrient Management (NM) Plans in the 1st quarter of 2022.
    a. Those approved NM plans covered 6,023 acres
    b. Those approved NM plans included 13,744 Animal Equivalent Units (AEUs), generating 131,949 tons of manure.

3. Managing thirteen (13) ACTIVE enforcement or compliance actions, currently in various stages of the compliance or enforcement process. Monitoring an additional seven (7) other cases of enforcement / compliance / interest.

4. Continue to daily answer questions for NMP and OMP writers, NMP reviewers, delegated Conservation Districts, and others.

5. Assisted DEP with various functions and as workgroup members in Federal and State settings for the Chesapeake Bay Program.

6. Continue to preliminary review of the regulations for:
    a. Act 38
    b. Act 49
    c. NM Certification
    d. OM Certification

7. Workgroup of agencies and CDs to develop the Required Output Measures (ROMs) and a workload analysis for the next 5-year NM/MM delegation agreement and make adjustments as needed. These materials are planned to be presented at the May SCC meeting.

8. Received comments on the proposed delegated amounts for the next 5-year NM/MM delegation agreement. These materials are planned to be presented at the May SCC meeting.

9. Worked with DEP to transfer the next NM/MM delegation agreement to the E-Grants submission process.

10. Work with PDA is disseminating information on Highly Pathogenic Avian Influenza and bio-security to CDs and the private/public sector.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: March 14, 2022

TO: State Conservation Commission Members

FROM: Amy Zerbe, Nutrient Management Program Regional Coordinator
State Conservation Commission

THROUGH: Karl G. Brown
Executive Secretary

RE: Nutrient Management Plan Update Report: Dallas Equine Center, LLC – Pinewood Acres – Lauren Swicklik – Luzerne County

I have completed my review of the Dallas Equine Center, LLC – Pinewood Acres – Lauren Swicklik Nutrient Management Plan (NMP) Plan Update which was submitted by Josh Keister on March 8, 2022. This update is for the NMP that includes crop years 2021 through 2023.

The original NMP for Dallas Equine Center, LLC – Pinewood Acres – Lauren Swicklik, an existing equine operation located in Luzerne County, was approved on January 21, 2020. The operation is home to 12 light riding horses, 2 heavy riding horses, and 3 ponies. This operation has 3.7 acres suitable for manure application. This operation, having an animal density of 4.92 AEUs/acre is defined as a Concentrated Animal Operation (CAO) under the PA Nutrient Management Act. The operation is not considered a Concentrated Animal Feeding Operation (CAFO) by the Department of Environmental Protection (DEP).

This NMP update is categorized as a Simple Update. After my review, I deemed the update to be technically complete and have notified the plan writer and operator that the update has been accepted.

No Commission action is required for NMP updates.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 25, 2022

TO: State Conservation Commission Members

FROM: Brady Seeley, Conservation Program Specialist
Nutrient and Odor Management Programs

THROUGH: Karl G. Brown
Executive Secretary

RE: Nutrient Management Plan Update Report: Pine Hurst Acres, LP – Northumberland County

I have completed my review of the Pine Hurst Acres, LP Nutrient Management Plan (NMP) Update which was submitted by Dean R. Patches on April, 19 2022. This update is for the NMP that includes crop years 2021 through 2023.

The original NMP for Pine Hurst Acres, LP, an existing swine and beef operation located in Northumberland County, was approved on July 22, 2020. The operation is home to 4,400 finishing swine and 14 finishing beef. This operation has 2,244.61 acres suitable for manure application. This operation, having an animal density of 0.32 AEUs/acre is defined as a Volunteer Animal Operation (VAO) under the PA Nutrient Management Act. The operation is considered a Concentrated Animal Feeding Operation (CAFO) by the Department of Environmental Protection (DEP).

This NMP update is categorized as a Simple Update. After my review, I deemed the update to be technically complete and have notified the plan writer and operator that the update has been accepted.

No Commission action is required for NMP updates.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 27, 2022

TO: Members
State Conservation Commission

FROM: Karl J. Dymond
State Conservation Commission

SUBJECT: May 2022 Status Report on Facility Odor Management Plan Reviews

Detailed Report of Recent Odor Management Plan Actions

In accordance with Commission policy, attached is the Odor Management Plans (OMPs) actions report for your review. No formal action is needed on this report unless the Commission would choose to revise any of the plan actions shown on this list at this time. This recent plan actions report details the OMPs that have been acted on by the Commission and the Commission's Executive Secretary since the last program status report provided to the Commission at the March 2022 Commission meeting.

Program Statistics

Below are the overall program statistics relating to the Commission's Odor Management Program, representing the activities of the program from its inception in March of 2009, to April 26, 2022.

The table below summarizes approved plans grouped by the Nutrient Management Program Coordinator areas.

	Central	NE/NC	SE/SC	West	Totals
2009	7	6	28	1	42
2010	5	7	25	2	39
2011	10	12	15	2	39
2012	9	17	16	2	44
2013	10	11	38	3	62
2014	13	16	44	2	75
2015	15	15	61	2	93
2016	19	16	59	5	99
2017	25	24	44	3	96
2018	14	13	40	1	68
2019	12	11	14		37
2020	9	11	41	1	62
2021	15	15	30	1	61
2022	7	3	10		20
Total	170	177	465	25	
Grand Total					837

As of April 26, 2022, there are eight hundred and thirty-seven **approved** plans and/or amendments, nine plans have been **denied**, thirteen plans/ amendments have been **withdrawn** without action taken, ninty-two plans/ amendments were **rescinded,** and seven plans/ amendments are going through the **plan review process**.

OMP Actions Status Report

Action	OMP Name	County	Municipality	Species	AEUs	OSI Score	Status	Amended
2/24/2022	Fisher, Donald L – Home Farm	Perry	Greenwood Twp	Broilers	257.40	23.9	Approved	A
3/7/2022	Dickinson, Robbie & Danyell	Fulton	Taylor Twp	Swine	693.59	41.7	Approved	A
3/14/2022	Hillandale-Gettysburg, LP – Site 1	Adams	Tyrone Twp	Layers	0.00	40.5	Approved	
3/16/2022	Martin, Daniel Z – Farm 2	Lancaster	Elizabeth Twp	Turkey	109.72	75.2	Approved	
4/7/2022	Buckwalter Farms, LLC	Lancaster	E Donegal Twp	Swine	369.80	35.1	Approved	
4/7/2022	Crouse Legacy Acres, LLC	Berks	Tulpehocken Twp	Layers	154.00	27	Approved	A
4/7/2022	Petre, Daniel L – Diehl Farm	York	Shrewsbury Twp	Layers	375.08	21.8	Approved	
4/12/2022	Lapp, Emanuel	Northumberland	Lower Mahanoy Twp	Cattle	7.00	23.2	Approved	
4/12/2022	Parsons, Todd	Huntingdon	Tell Twp	Turkey	0.00	40.2	Approved	
4/18/2022	Carsonville Farms, LP	Dauphin	Wayne Twp	Pullets	68.77	37.3	Approved	
4/26/2022	Peifer, Chad A – Poultry Farm	Lancaster	Colerain Twp	Duck	84.92	36.9	Approved	
4/26/2022	Perry Hills Poultry, LLC – Pullet Farm	Perry	Juniata Twp	Layers	42.60	27.0	Approved	

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 14, 2022

TO: Members
State Conservation Commission

FROM: Brady Seeley
Conservation Program Specialist

Frank X. Schneider, Director
Nutrient and Odor Management Programs

THROUGH: Karl G. Brown
Executive Secretary

SUBJECT: 2022 Odor Management Plan Self Certification

The State Conservation Commission approved the use of an Odor Management Self Certification process on November 12, 2014.

On January 18, 2022, SCC staff mailed Odor Management Self Certification letters and forms to the following:

66 – No Odor Best Management Practice (BMP) plans
466 – Level 1 Odor BMP plans that require only the BMP Attestment Statement.

Those that received self-certification letters were given 6 weeks to return the forms.

As of this memo, the SCC has received the following self-certifications:

57 – No Odor BMP plans, an 86% return rate.
386 – Level 1 Odor BMP plans (Commitment Statement), an 83% return rate.

Between the two categories of self-certification sent, the following was reported:

368– No significant changes
3 – Significant changes already made
11 – Expect to make significant changes
4 – Under construction or other
3 – Plans Rescinded

SCC staff is in the process of contacting those that made significant changes, expect to make significant changes and others, to develop plans of action to bring those operations back into compliance.

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: February 25, 2022

TO: State Conservation Commission

FROM: Joel Semke, Program Administrator

THRU: Johan E. Berger, Program Manager
Financial, Certification and Conservation District Programs

SUBJ: 2021/2022 Program Accomplishments
Resource Protection and Enhancement Program (REAP)

REAP Program Summary

The REAP program allows farmers, businesses, and landowners to earn state tax credits in exchange for the implementation of conservation Best Management Practices (BMPs) on Pennsylvania farms. REAP is a "first-come, first-served" program – no rankings. The program is administered by the State Conservation Commission and the tax credits are awarded by the Pennsylvania Department of Revenue. Eligible applicants receive between 50% and 75% of project costs in the form of State tax credits for up to $250,000 per agricultural operation in any consecutive 7-year period.

Additional provisions grant the Commission the ability to 1) reserve and target up to $3.0 million of the total annual allocation for best management practices for nutrient and sediment reduction within the Chesapeake Bay watershed and, 2) the option to implement a 90% REAP tax credit option for certain high-priority BMPs within watersheds covered by an approved TMDL. Those practices include: riparian forest buffers; livestock exclusion from streams and supporting practices; stream crossings; cover crops; soil health BMPs; and other BMPs determined appropriate by the SCC.

Program Accomplishments

The FY2021 REAP application period opened August 2, 2021. The annual tax credit allocation for FY2021 is $13 million.

Below is a summary of the FY2020 and FY2021 rounds of REAP applications, credits awarded to date, and a summary of REAP credits awarded for specific BMPs of interest. The FY2021 round of REAP began with approximately $3 million already allocated to approved 'roll-over' FY2020 applications.

(1.) Applications Received

Applications		Total Cost	Other Public Funds	REAP Requests	Credits Granted
FY2020	381	$36.5 million	$4.0 million	$14.9 million	$11.9 million
FY 2021*	347	$33.2 million	$4.2 million	$14.0 million	$6.9 million

*information for FY 2021 is current to April 24, 2022. Approximately 150 applications will be rolled into the FY2022-23 program year. Estimated tax credit eligibility of roll-over application ~ $3.0 – 4.0 million.

(2.) Summary of selected BMPs approved for REAP tax credits - FY 2020 & FY 2021

	FY2020	FY2021
REAP Request (project types)		
Proposed Projects	$3.5 million	$6.8 million
Completed Projects	$11.4 million	$7.2 million
No-Till Equipment, Manure Injectors, Rollers	$8.2 million	$8.6 million
Structural BMPs	$7.1 million	$4.1 million
Plans (Ag E&S, Soil Health, Manure & Nut. Mgt.)	$103,000	$100,000
Cover Crops	$913,000	$970,000
Precision Ag Equipment	$534,000	$235,000
Sponsored Applications	44	54

(3.) Summary of Program Activities - January 01, 2022 – April 25,2022

The following is a summary of program activities accomplished in calendar year **2022**. Please note that actions (i.e. credits issued) may have been taken on projects or activities approved in prior fiscal years (i.e. FY2019 and FY2020).

a. Tax Credits issued to applicants for completed, eligible projects $821,000

b. Number of BMPs completed associated with issued tax credits 40 projects

c Number of tax credit 'sales' completed 14 sale *transactions*

d. Total tax credits processed through 'sales $748,000

e. Number of site inspections conducted on completed projects 3

f. Educational and promotional activities included speaking events and various visits to conservation districts and NRCS offices across Pennsylvania. 2

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

April 30, 2022

To: Members

State Conservation Commission

From: Johan E. Berger, Director
Financial Assistance, Policy, Certification & Conservation District Programs

RE: Conservation Excellence Grant Program

The Conservation Excellence Grant Program (CEG Program), created under the 2019 PA Farm Bill, has been active since July 2020 beginning with the distribution of $2.5 million in funding to the Lancaster and York county conservation districts. Both Lancaster and York counties are identified as Tier1 counties by DEP in Pennsylvania's Chesapeake Bay Phase 3 Watershed Implementation Plan (ChesBay Phase III WIP)and thus were priority counties for implementation of the CEG Program. Subsequently, with funding allocations to the Commission in FY2020 and FY2021, five Tier 2 counties, Bedford, Centre, Cumberland, Franklin, and Lebanon counties have been integrated into the CEG Program.

- Total funding allocated to the seven county conservation districts as of January 1, 2022, is $8.808 million. These allocations includes $6.5 million in state funding and $2.308 million from a DEP sub-grant as part of DEP's *Chesapeake Bay Implementation Grant Program* for expansion of the CEG Program in Tier 2 counties identified in the ChesBay Phase III WIP.
- Public-Private Partnership – Lancaster Farmland Trust (LFT) has been engaged in a $1.154 million grant agreement since January 1, 2021, for a project to develop a public-private partnership model that will utilize CEG' s financial bundling (grants, tax credits and loans) for the implementation of best management practices mimicking the CEG Program in Salisbury Township, Lancaster county. LFT is currently working with 4 project sites to complete design or construction activities of BMPs. LFT anticipates expanding its funding support to four more project sites with match from the National Fish and Wildlife Foundation before completion of the grant agreement.
- CEG Program activities - Table 1- Application and Project data – Conservation Excellence Grant Program illustrates the status of project applications received by participating districts and the status of grants/projects. Over $7.339 million in program funds have been committed to grant projects by conservation districts and over $1.508 million in payments to farmers for BMP implementation have been completed.

Table 1 – Application and Project data – Conservation Excellence Grant Program (as of April 27,2022)

*Information not available at the time of the report.

County	Applications Received	Applications Approved	Grant award totals	Project Descriptions	Number of Completed Projects	Completed Project descriptions	Grant funds Disbursed to applicants
Bedford	9	5	$998,927	Waste Storage Facility, HUAP, Fencing, Trails & Walkways	1	Waste Storage Facility & Grassed Waterway	$112,182
Centre	5	5	$847,200	Level-lip spreader, HUAP; manure storages systems; livestock grazing systems	2	Level-lip spreader, HUAP	$230,000
Cumberland	9	9	$1,054,400	HUAP, Manure transfer system; streambank fencing with components.	1	HUAP & Waste Storage	$72,000
Franklin	33	19	$1,341,785	Barnyard Runoff; Manure Storage; Roofed Heavy Use Area Protection (HUAP) and Manure Stacking areas; Stream Crossing	13	Waste Storage Facility, Diversion, Grass Filter Area	$499,914
Lancaster	35	31	$1,677,974	Grassed Waterways & Diversions; Roofed Manure Stacking areas & HUAP	4	Grassed Waterway; Roofed HUAP; Waste Storage	$531,700
Lebanon	5	5	$1,227,022	HUA Protection, Waste Storage Facilities	*	*	0
York	23	17	$192,069	Grassed Waterway ; Cover Crop Planting(395+ac.)	14	Cover Crops, Diversion	$63,150
TOTAL	119	**91**	**$7,339,377**				**$1,508,946**

COMMONWEALTH OF PENNSYLVANIA
STATE CONSERVATION COMMISSION

DATE: April 30, 2022

TO: State Conservation Commission

FROM: Johan E. Berger, Program Manager
Financial, Certification and Conservation District Programs

SUBJ: 2022 Program Accomplishments: Nutrient and Odor Management Specialist; Commercial Manure Hauler & Broker Certification programs

Certification Program Summary

State Conservation Commission staff facilitate training and certification programs for persons interested in 'commercial' or 'public' certification to develop or review nutrient management or odor management plans under the Act 38 *Nutrient Management* and *Facility Odor Management* programs. Training is also facilitated for commercial manure haulers and brokers seeking certification under the Act 49 *Commercial Manure Hauler and Broker Certification* program.

Program Accomplishments (January 1, 2022 to April 30, 2022)

1. Nutrient Management Specialist Certification training - The Spring 2022 training cycle began in March 2022 with 20-25 individuals participating in the necessary certification coursework to achieve provisional certification in commercial and public certification categories. Each cycle includes twelve (12) days of training in eight (8) courses. Twenty-four (24) individuals completed this training in 2021.
2. Commercial Manure Hauler and Broker certification training – Program staff conducted an 'in-person' certification training in January and March 2022 while following PA Department of Health and federal CDC COVID-19 guidance for group gatherings. Each cycle contains two (2) days of coursework . Twenty (20) commercial manure haulers and five (5) brokers completed their required coursework and certification requirements. Thirty-one (31) individuals completed this training in 2021.
3. Program staff performed five (5) 'in-house' reviews of nutrient management plan reviews for certification requirements. *Note: This is an internal review conducted on NMPs under review by public review specialists seeking final certification.* Thirty (30) reviews were completed in 2021.
4. Program staff issued the following licenses to individuals (to-date), in 2022, who successfully completed 'final' certification requirements and/or continuing education requirements for license renewals:
   a. *Nutrient Management and Odor Management Specialists 20*
   b. *Nutrient Management Specialist (Provisional license) ..... Pending training*

c. *Commercial Manure Haulers and Brokers:* *120*

Total *140*

5. Total licenses monitored and maintained by Commission staff on behalf of PDA:
   a. *Nutrient Management Specialists* *265*
   b. *Commercial Manure Haulers and Brokers* *660*
   c. *Odor Management Specialists* *37*

   Total *962*
6. Approved credits for eligible continuing education programs scheduled and conducted up to December 31, 2021:

   a. Nutrient Management & Odor Management Specialist certification ..... 37 events

   b. Commercial Manure Hauler and Broker certification: ..... 20 events

   Total 67

PENNSYLVANIA AGRICULTURAL OMBUDSMAN PROGRAM

BUILDING BRIDGES

Farmers*Municipalities*Citizens
Conservation Districts*Agribusiness

To: Members — April 30, 2022
State Conservation Commission
From: Beth Futrick
Agriculture/Public Liaison
Through: Karl G. Brown, Executive Secretary
State Conservation Commission
Re: Ombudsman Program Update – Southern Alleghenies Region

Activities: February-April

Administering NFWF Grant

- Organized 2 farmer workshops
  - Lycoming County – Manure Management and Fly IPM. This event was cancelled because of restriction due to Avian Influenza threats. As part of the cancelation notice, I wrote an article about manure management and fly IPM practices that was published in the Der Ober Tal Brief.
  - Blair County and region-wide – Soil Health Hub development in partnership with PA Soil Health Coalition. This workshop was cancelled due to low registration. We had contacted and organized producers in the Huntingdon, Bedford, and Blair County area to be part of a farmer-panel. We met to discuss how to re-group and re-organized soil health outreach with the goal of a regional soil health hub. New on-farm meetings are being developed and the farmer-panelist agreed to become farmer-mentors as part of a new soil health hub. One of the goals is to assist regional CDs with meeting their CAP goals to increase cover crop acres.
- Assisted with a municipal workshop for Blair.
- Presentation prepared for the PACD-NFWF workshop
- Assisting with Keystone Development Center USDA grant to conduct a Regional Food Hub feasibility study for the Southern Alleghenies region. -Assist with organizing farmer-focus group meetings. -Assist with organizing end-user focus group meetings

Conflict Issues/Municipal Assistance

--Due to high amounts of poultry litter being imported for fertilizer, I submitted another article this spring about fly control and proper handling of imported manure.
-- Blair County- Logan Twp - assisted with urban ag ordinance
-- Cambria County - assisted with farmer market development
--Huntingdon County - assisting a "local food" restaurant with finding appropriate grants and other funding sources to support sourcing locally grown products for their menu.
-- Cambria County – assisted with defining Right to Farm Law and ACRE for the CD and a municipality
-- Bedford County – met with a concerned neighbor to a potential hog operation. I reviewed manure, nutrient, and odor management with the gentleman and followed-up with a phone call to Bedford CD

Meetings/Trainings/Events

Meeting with Shelly Dehoff to review the PA Ag. Ombudsman website
Meeting with Secretary Redding
PA Agroforestry committee meeting.
Blair County - Penn State Extension Committee meeting
4- Site Showings for streambank restoration (NFWF Grant)
Speaking engagement - Snyder County Farmers Meeting
Southern Alleghenies Conservancy and RCD meetings
Keystone Development Center– Regional Farmers Meeting
Meeting with farmer-mentors and PA Soil Health Coalition to plan for a new cover crop workshop and the development of a new Soil Health Hub

Reports & Grant Applications

PACD mini-grant mid-term report - this funding supports the Blair and Lycoming Farmer Workshops.
BCCD Board Report

Blair County Conservation District
1407 Blair Street, Hollidaysburg, PA 16648
Phone: 814-696-0877x113 Fax: 814-696-9981mail: bfutrick@blairconservationdistric.orgWeb-site: www.paagombudsman.com

Funded through the Blair County Conservation District and the PA Department of Agriculture

PENNSYLVANIA AGRICULTURAL OMBUDSMAN PROGRAM

BUILDING BRIDGES

Farmers * Municipalities * Citizens
Conservation Districts * Agribusiness

To: Members
State Conservation Commission

May 10, 2022

From: Shelly Dehoff
Agriculture/Public Liaison

Through: Karl G. Brown, Executive Secretary
State Conservation Commission

Re: Agricultural Ombudsman Program Update

Activities: Since mid-March 2022, I have taken part or assisted in a number of events, including the following:

- Coordinating manure injection educational and promotion effort for farmers in Lancaster County, and handling incentive program applications and invoice payment processing; program interest expanding greatly
  - Providing explanation of manure injection incentive program to people outside of Lancaster Co as other funding sources are becoming available for manure injection
  - Cooperating with Sustainable Chesapeake for additional grant that will enhance the ability to incentivize manure injection to more farmers
  - Submitted grant application for Year 3 out of 3, from the Campbell Foundation
- Events as South Central Task Force Agriculture Subcommittee Planning Specialist:
  - Hosted/facilitated April Subcommittee meeting
  - Attended regional Homeland Security Conf and hosted 2 break out sessions on AgroTerrorism by the FBI, and about foreign food, plant and pest prevention at ports of Philadelphia by Customs and Border Patrol; including a beagle.
  - Due to HPAI outbreak, monitoring things daily, listening to regular update meetings/calls and fielding phone calls and emails from colleagues as well as the public about specific or general concerns and requests
  - Hosted Stop the Bleed training for Lancaster CD and NRCS staff
- Participated and recorded minutes for March and April Lancaster Co. Agriculture Council meetings
- Coordinated Conservation Foundation of Lanc Co meetings and an Exec Comm meeting; gave presentation on OMB program
- Placed order for 135 more biosecurity signs, requested by 9 difference Cons Districts, designed for a non-ag audience who may not understand the importance of respecting biosecurity on farms, and how their actions may impact local farms
- Working on updating Ombudsman website
- Participated in career panel via Zoom at request of Selinsgrove FFA advisor for students
- Attended seminar on high tunnels and stormwater at Center for Water Quality Excellence.
- Presented at multiple regional municipal outreach meetings with LCCD staff; re: OMB program
- Listened to NMA regional round table
- Attended Mental Health in Ag seminar sponsored by CDE, taught by PSU Extension
- Reviewed LCCD Scholarship applications, helped decide which candidates to interview, and then interviewed them
- Helped with LCCD tree sale packaging and distribution
- Helped with LCCD Sr Hi Envirothon

Local Government Interaction: I have been asked to provide educational input regarding agriculture:

Chester Co—ongoing participation in Mushroom Farmers of PA, and Phorid Fly Action Group virtual meetings
Regional—regional municipal organization asked for input about Ag zoning requirements; been ongoing discussion off and on for years; they are working on model ordinance
Bucks Co—farmer denied new well to be drilled for specialty crop

Moderation or Liaison Activities: I have been asked to provide moderation or liaison assistance with a particular situation:

Northampton Co- farmer/municipality issue regarding flooding concerns and debris blockages in right of way
Berks Co—neighboring farmer to farmer/biosecurity/trespassing animals concerns continues to be an issue
Lancaster Co—Worked with Senator's office to help with stormwater complaint

1383 Arcadia Road Room 200 Lancaster, PA 17601 *Phone*: 717-880-0848 *Fax*: 717-299-9459
Email: shellydehoff@lancasterconservation.org *Website*: www.agombudsman.com
Funded through the Lancaster Co. Conservation District and the PA Department of Agriculture

Research and Education Activities:

Lancaster Co—multiple requests about poison hemlock, what to do, where to report it; researched PDA authority and how to report it; left people know

Lancaster Co—received request about mediation from non-ag person, helped her despite not being ag related, to give her some options for possible help

Fly Complaint Response Coordination: I have taken complaints or am coordinating fly-related issues in:

Schuylkill Co—new complaint

Lancaster Co—repeat of complaint from last year

Lancaster Co—questions about flies spreading HPAI

York Co—new complaint