

Dirt Gravel and Low
Volume Road Program

WEBINAR

1/9/25, 9am

Project Spotlight: First Stream Crossings to DGLVR Standard



Photos: Cumberland CD

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CDGRS

Shaun McAdams

spm140@psu.edu

Eric Chase

ehc111@psu.edu



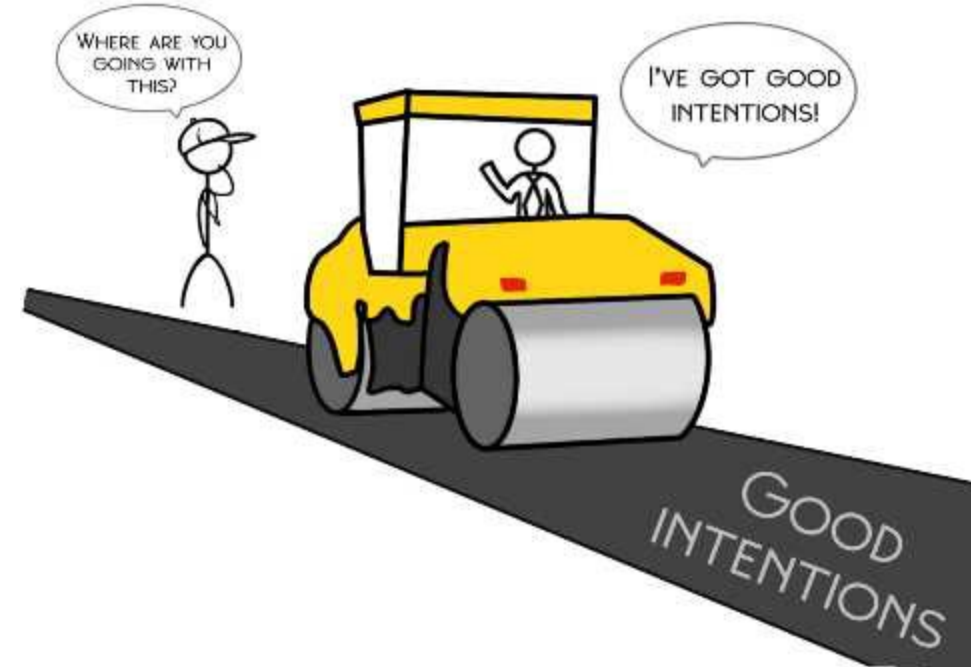


Stream Crossing Projects

- **Background**
- Assessment, Planning, and Design
- Installation and Post-Construction (short-term)



- Previous Goals and Guidance
 - Bankfull width replacement structures
 - Aquatic organism passage
 - Structure alignment
 - Consideration for floodplain connectivity



Background (A Need for Improvement)



- BETTER GUIDANCE TO MEET ORIGINAL GOALS

- STREAM CONTINUITY & STABILITY*

- 125% bankfull width structure (minimum)
 - Slope Continuity (reference reach and limits of reconstruction)
 - Water surface elevation not to exceed 80% of opening height at Q100
 - Channel stability (dimensions, bury depth, streambed material, sizing of bank margins and grade controls)
 - >4% slopes require bottomless structures

The DGLVR Stream Crossing Standard



- A guide and requirements for ensuring stream continuity and long-term success
 - Preliminary assessment requirements
 - Required meetings
 - Design requirements
 - Required design & bid package review
 - Required construction oversight
 - Critical stages of construction



Stream Crossing Projects

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Site Assessment (Survey)



Longitudinal Profile

Cross Sections



Pebble Count

Initial Recommendations



Recommended Proposed Conditions (Bottomless Structure) - Cherry Run at Gardnerhill Road



3.6% channel slope
(bottomless recommended)

Informs:

- Channel restoration for continuity
- Structure type & estimated dimensions
- Roadway adjustment?

Recommended Proposed Conditions - UNT Pohopoco Creek at Whitey B Drive



5.4% channel slope
(bottomless required)

Initial Recommendations



3/1/24, 12:46 PM

Geomorphic Assessments



LARSON TRANSPORTATION INSTITUTE **Geomorphic Assessments**

PA-ELK [Logout](#)

Cherry Run @ Gardner Hill Road (id: 58)

Pebble Count Data

Table 1. PSD Input

	Size (mm)	No. of Particles	% by Count	Sand
Sand	d < 2	9	9.0%	
VF Gravel	2 <= d < 2.8	1	2.0%	
	2.8 <= d < 4	1		
Fine Gravel	4 <= d < 5.7	5	7.0%	
	5.7 <= d < 8	5		
Medium Gravel	8 <= d < 11.3	2	10.0%	
	11.3 <= d < 16	3		
Coarse Gravel	16 <= d < 22.6	8	13.0%	
	22.6 <= d < 32	5		
VC Gravel	32 <= d < 45.2	6	14.0%	
	45.2 <= d < 64	8		
Sm. Cobble	64 <= d < 90.5	12	25.0%	
	90.5 <= d < 128	13		
Lg. Cobble	128 <= d < 181	10	11.0%	
	181 <= d < 256	1		

Table 2. Results

% Finer	DI	Dia (mm)	Dia (ft)	Dia (in)	Size
98%	D ₉₈	480.4	1.58	18.9	R-5
95%	D ₉₅	286.75	0.94	11.3	R-4
90%	D ₉₀	184.5	0.61	7.3	R-3
84%	D ₈₄	135.8	0.45	5.3	R-3
50%	D ₅₀	55	0.18	2.2	2"-
35%	D ₃₅	22	0.07	0.9	2"-
30%	D ₃₀	20	0.07	0.8	2"-
16%	D ₁₆	5.84	0.02	0.2	2"-
10%	D ₁₀	2.9	0.01	0.1	2"-
5%	D ₅	0.5	0.00	0.0	2"-

Informs:

- Streambed gradation for channel restoration

A Quick Word on Design...



Good stream crossing design doesn't just happen!

- *This is a new (and much different) approach than engineers and townships are used to...*
- *Its not enough to hand the Program Standard to an engineer and leave it alone...*
- ***BE PROACTIVE AND ENGAGED THROUGH THE DESIGN PROCESS!***
 - *Check in often with engineer and the grant recipient*
 - *Set up regular update meetings*
 - *Reach out to the Center for help anytime you think you might need it*

Project Design (Plan Review)



Design Package Review Checklist for Stream Crossings

Applicant: F&Twp Road Name: Gardner Hill Rd LAT/LONG: _____
 Reviewer: SPM Date: 03/26/2024
 DGR LVR

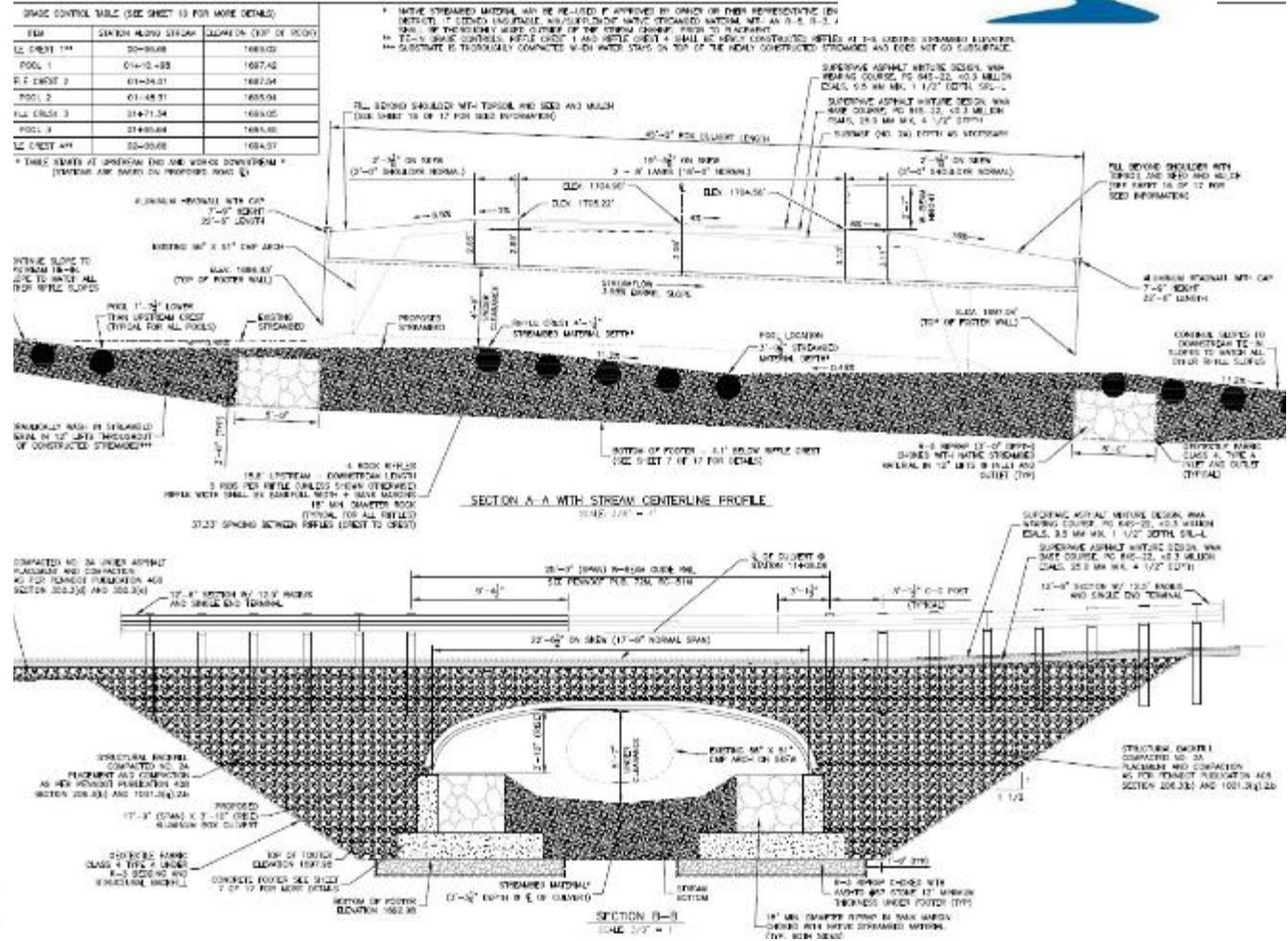
The DGLVR Program requires that all plans and specifications be submitted to the conservation district for review prior to permit submittal. The conservation district review is to confirm that DGLVR Policy and Stream Crossing Standard are met. The conservation district may ask for assistance in reviewing 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.B.:

1. 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). CP 10/17, RD 9/17 + 8/17
 - 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. 10/17
 - Plan view should clearly show the existing structure, structure alignment, dimensions, road approaches, cross section locations and any wetlands. MISSING
 - Section drawings should show the existing structure dimensions, elevation, and depth of road cover. MISSING
 - Drawings include existing roadway elevation, and elevation and location of benchmarks. 4/17, 3/17
2. Geographic Location and bankfull width of stream.
 - The plan view drawings note and depict the bankfull width of the stream, bankfull elevation(s) and location of all cross-sectional measurements. OK, 3/17 + 11/17
3. 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. 3/17, 4/17, 5/17
 - Alignment of replacement structure is shown on the plan view. 3/17



Stream Crossing Projects



- Background
- Assessment, Planning, and Design
- **Installation and Post-Construction (short-term)**

Whitey B Road

View of inlet, facing
downstream



Whitey B Road



View of existing channel,
facing upstream

Whitey B Road

View of existing outlet,
facing upstream



Whitey B Road

View of existing channel,
facing downstream



Whitey B Road

May 13, 2024 at 7:57:17 AM

Setting Contech Express Footer frames



Whitey B Road

Installing upstream grade control riffles



Whitey B Road

Installing bank margins and
grade control riffles between
footer frames



Whitey B Road

May 16, 2024 at 12:57:02 PM

Checking finished thalweg /
grade control elevations



Whitey B Road

May 16, 2024 at 3:24:59 PM

Hydraulic compaction of
specified streambed materials
(*“washing in the fines”*)

Whitey B Road

May 17, 2024 at 10:29:52 AM

View of completed stream channel and culvert “shell” installed

Whitey B Road

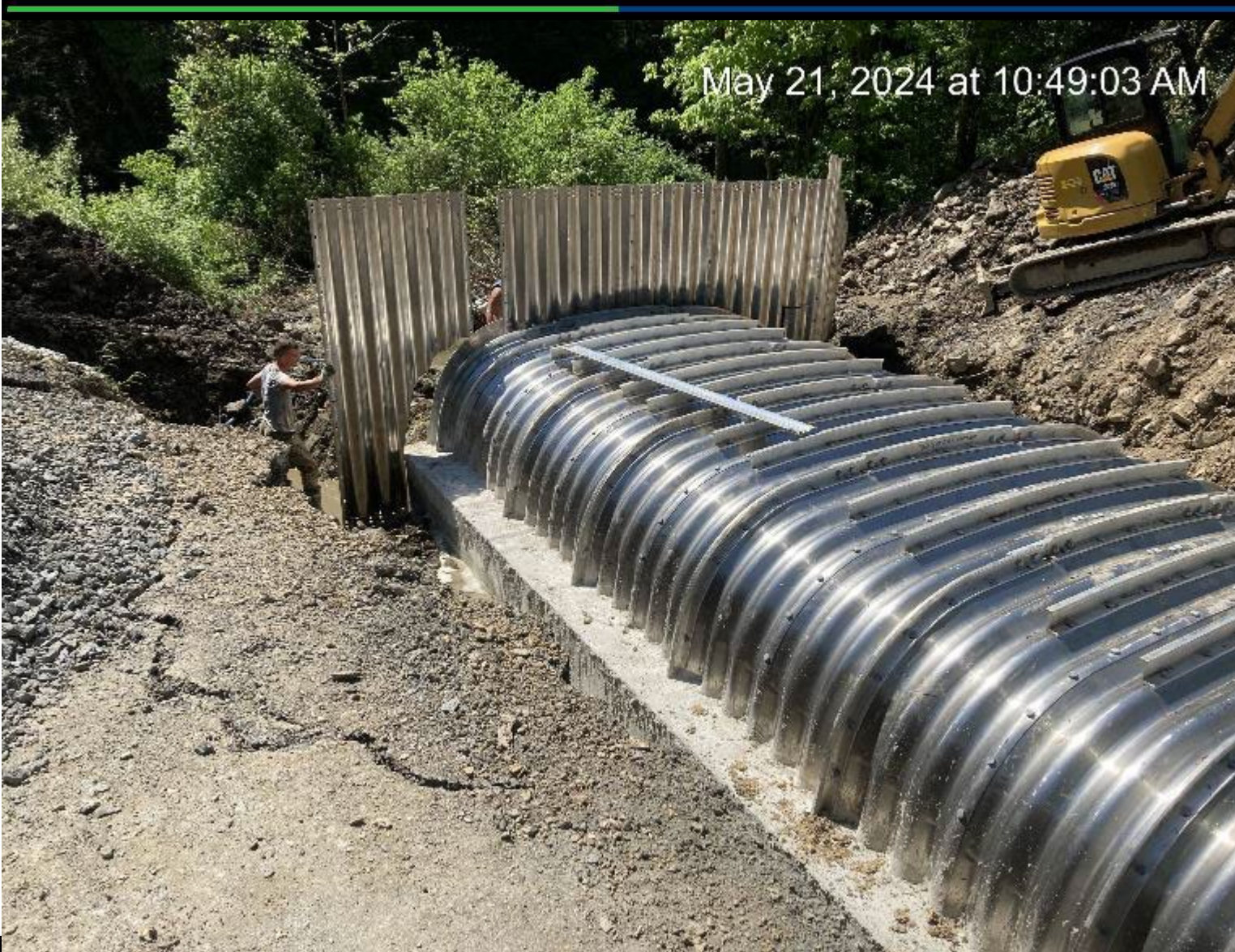


Aluminum culvert is secured to the footer within the poured concrete

Whitey B Road

May 21, 2024 at 10:49:03 AM

Headwall installation



Whitey B Road

May 21, 2024 at 10:48:01 AM

Upstream wingwalls after installation



Whitey B Road

May 22, 2024 at 9:57:59 AM

Backfill and compaction around
structure
(alternating lifts ~18" deep)



Whitey B Road

May 22, 2024 at 9:56:06 AM

Each lift is compacted before the next is placed



Whitey B Road

May 24, 2024 at 10:45:14 AM



Completed project – view facing upstream from centerline of roadway

Whitey B Road



Completed project – view of inlet facing downstream

Whitey B Road

May 28, 2024 at 11:41:37 AM

Completed project – view of
channel upstream of inlet

Whitey B Road

May 28, 2024 at 11:40:33 AM

Completed project – view of channel facing upstream through culvert

Polly Pine – Standard Design



July 3rd 2024 – Polly Pine Road facing upstream, double pipes in ~15' bankfull

Polly Pine



Polly Pine (Union Cty) - 22'
wide concrete box - ~15'
bankfull – Designed under
standard

Polly Pine



July 18, 2024 – Building streambed ~2.5' deep



July 18, 2024 – Building
constructed riffle



July 23, 2024 – Completed structure and stream bed restoration looking downstream.

Polly Pine



July 23, 2024 – Completed
looking upstream.

Hurricane Debby ~8 inches



Polly Pine



Hurricane Debby ~8 inches

Polly Pine



Hurricane Debby ~8 inches

Polly Pine



August 13th 2024 – Post
Debby looking
downstream.

Polly Pine



August 13th 2024 – Post
Debby looking upstream.

Gardner Hill



View of existing culvert,
facing upstream

Gardner Hill

First footer poured; stem
wall rebar visible



Gardner Hill

Second footer and first
Stem wall poured



Gardner Hill

Streambed reconstruction
and grade control
installation



Gardner Hill

Streambed reconstruction
and hydraulic compaction
“washing”



Gardner Hill

Installation of aluminum culvert “shell” over footers and constructed stream channel



Gardner Hill



Structure installed on footers and starting backfilling and poured headwalls

Gardner Hill

Installing upstream grade controls after bypass removal



Gardner Hill



Completed structure,
looking downstream
toward inlet

Questions ?



DGLVR Stream Crossings (Standard)

Eric Chase, Center for Dirt and
Gravel Road Studies

Shaun McAdams, Center for Dirt
and Gravel Road Studies