

USING NATURAL SYSTEMS TO ACCOMPLISH STORMWATER SEPARATION AND WATER QUALITY GOALS

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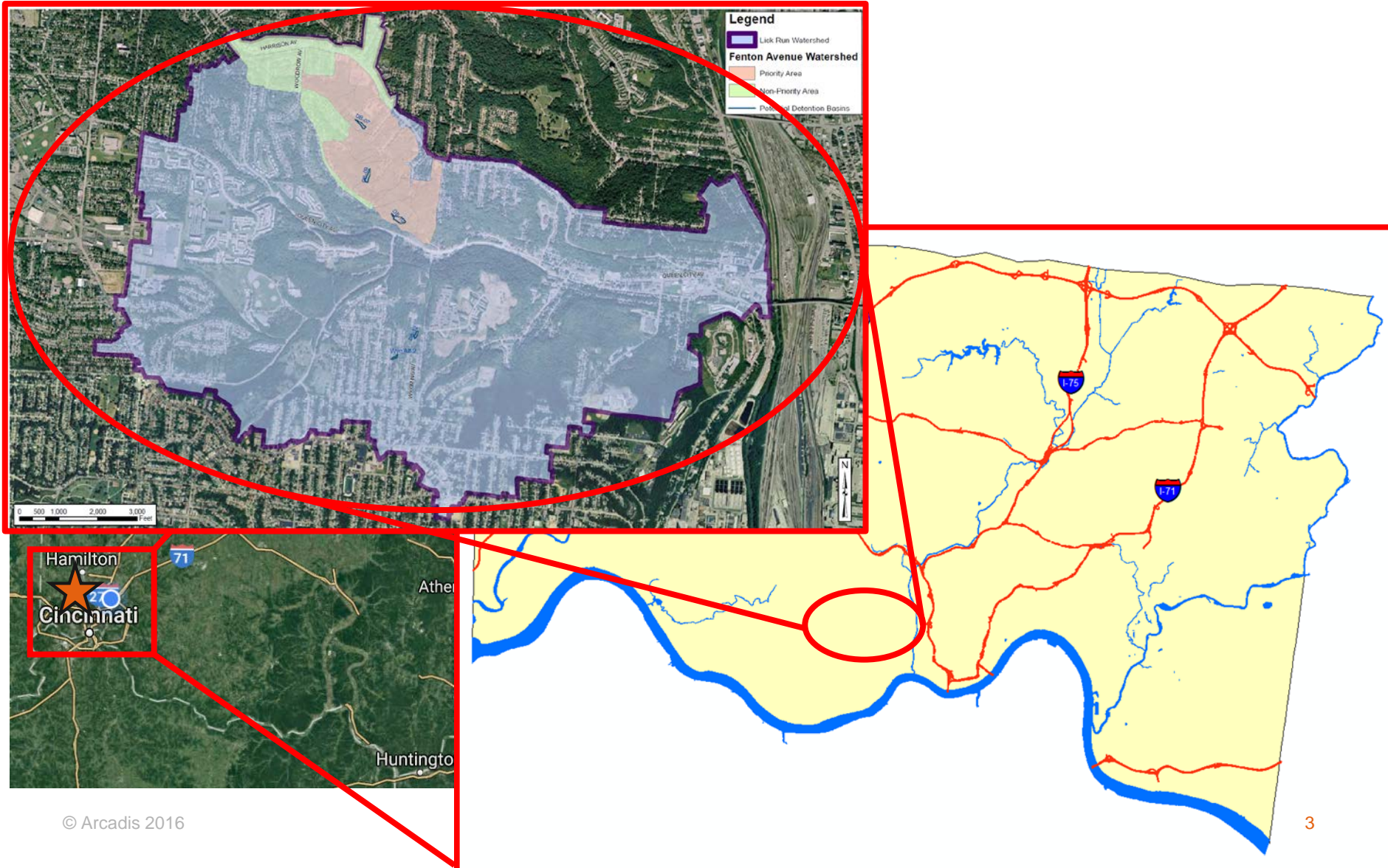
Sue Pressman, PE – Arcadis

Jason Abbott, PE – Arcadis

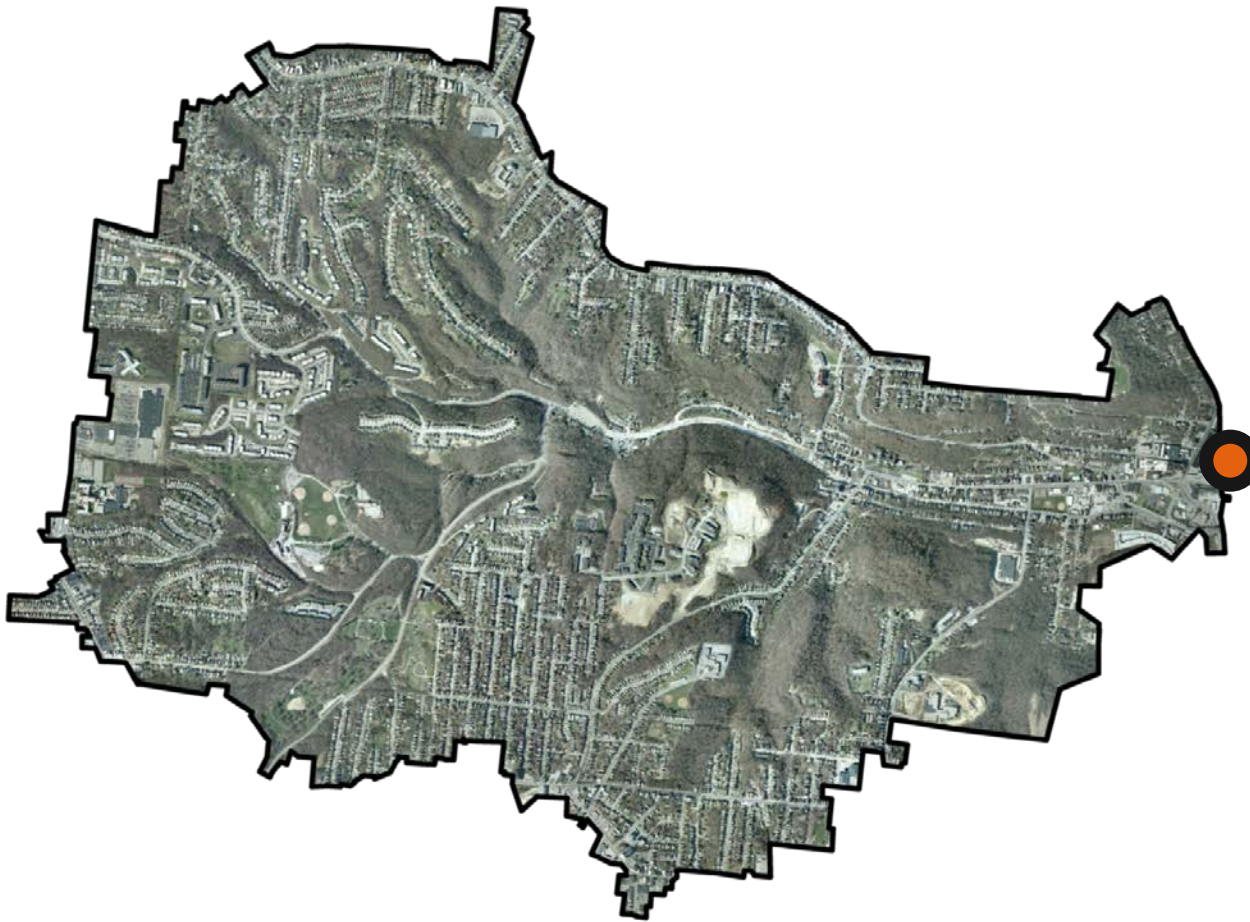
Agenda

1. Background on MSDGC's Lick Run and Queen City & Cora Project
2. Existing Topography, Natural Features Used and Natural Features Designed
3. Flood Plain Enhancements Design
4. Stream Restoration Design
5. Issues with Existing Sewer

Lick Run & Queen City and Cora Location



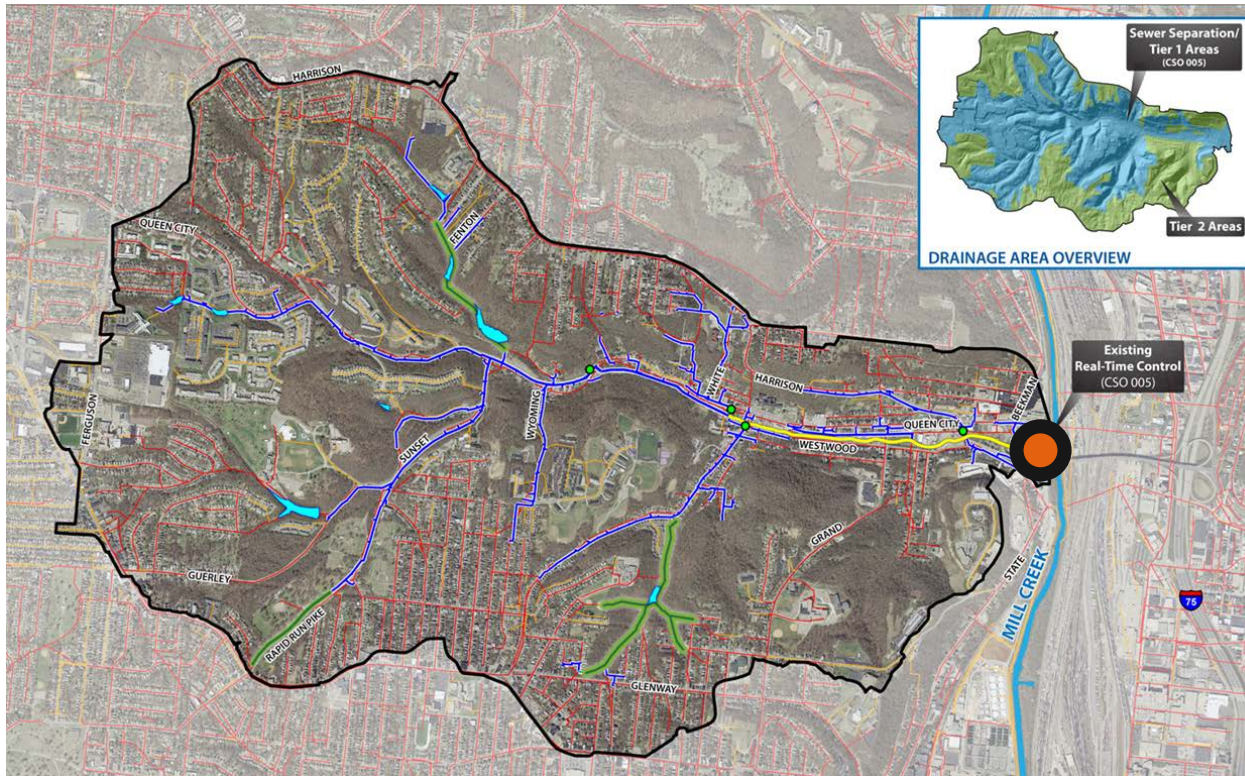
Lick Run Sewershed Background



- 2,900 Acres
- CSO 005
- Average Annual Overflow Volume is ~500 MG*
- One of MSDGC's largest overflow volume

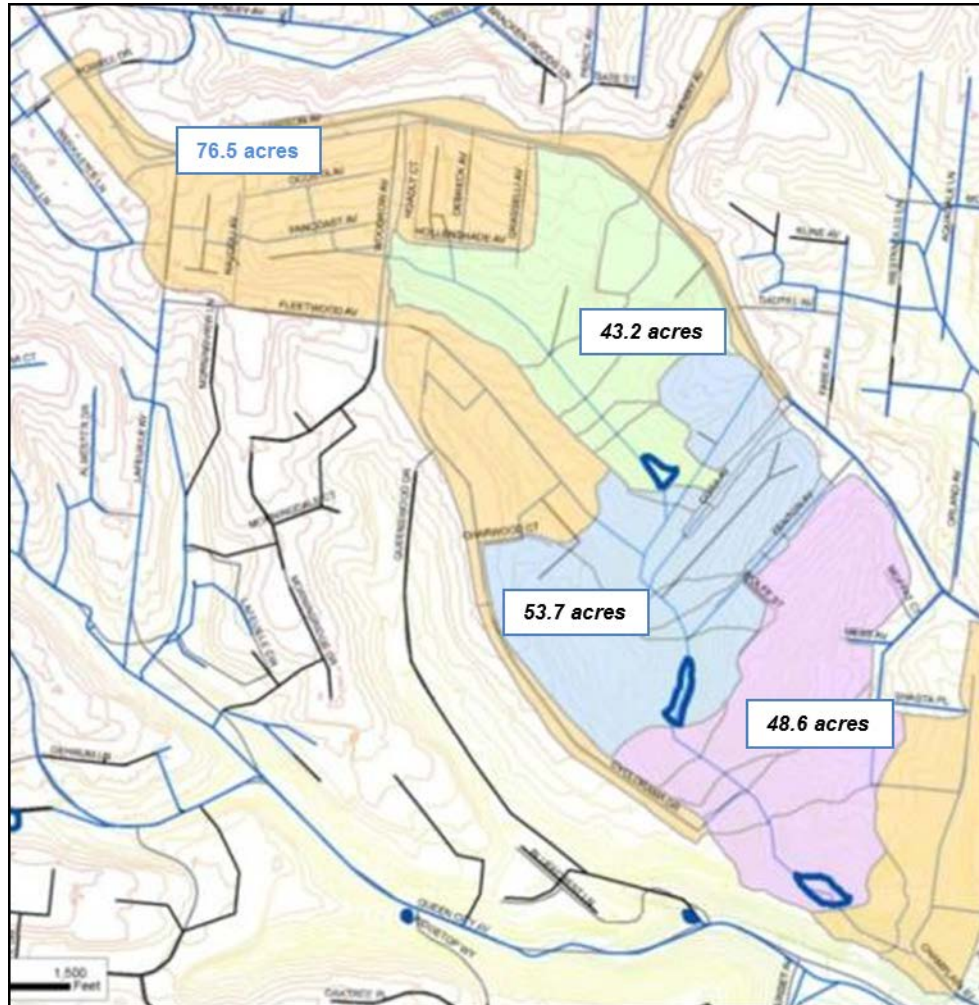
* Per SWMM Version 4.0.14 with RTC

Lick Run Sewershed Background



- Source Control for Reduced CSO Volume
- Strategic Sewer Separation
 - 56% of Lick Run Sewershed
 - ~1,600 acres of 2,900-acre Sewershed
- 12 Individual Projects

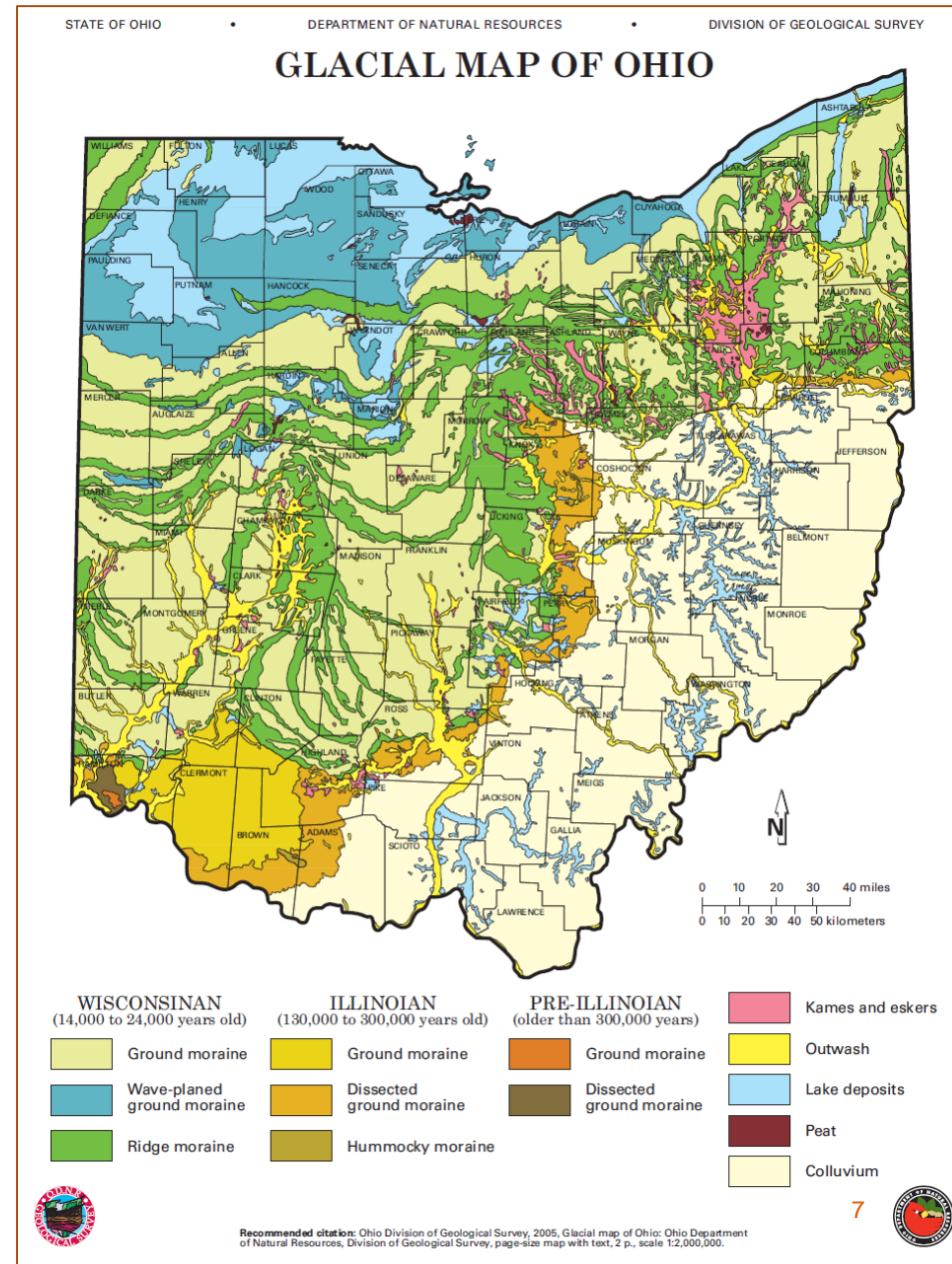
Queen City and Cora Project Background



- Strategic Separation of Undeveloped Areas
 - 145 of 240 acres
- Topographic Relief of 240 feet over a span of 4,700 feet (5% slope)
- Existing 60-inch to 42-inch Combined Sewer

Local Geology

- Topography Formed by Glacial Moraines & Outwash
- Cincinnati is Well Suited for Stormwater Storage in Undeveloped Ravines
- Must Evaluate for Hill Side Stability



General Search For Suitable Topography

Large Detention Opportunities



Small Detention Opportunities

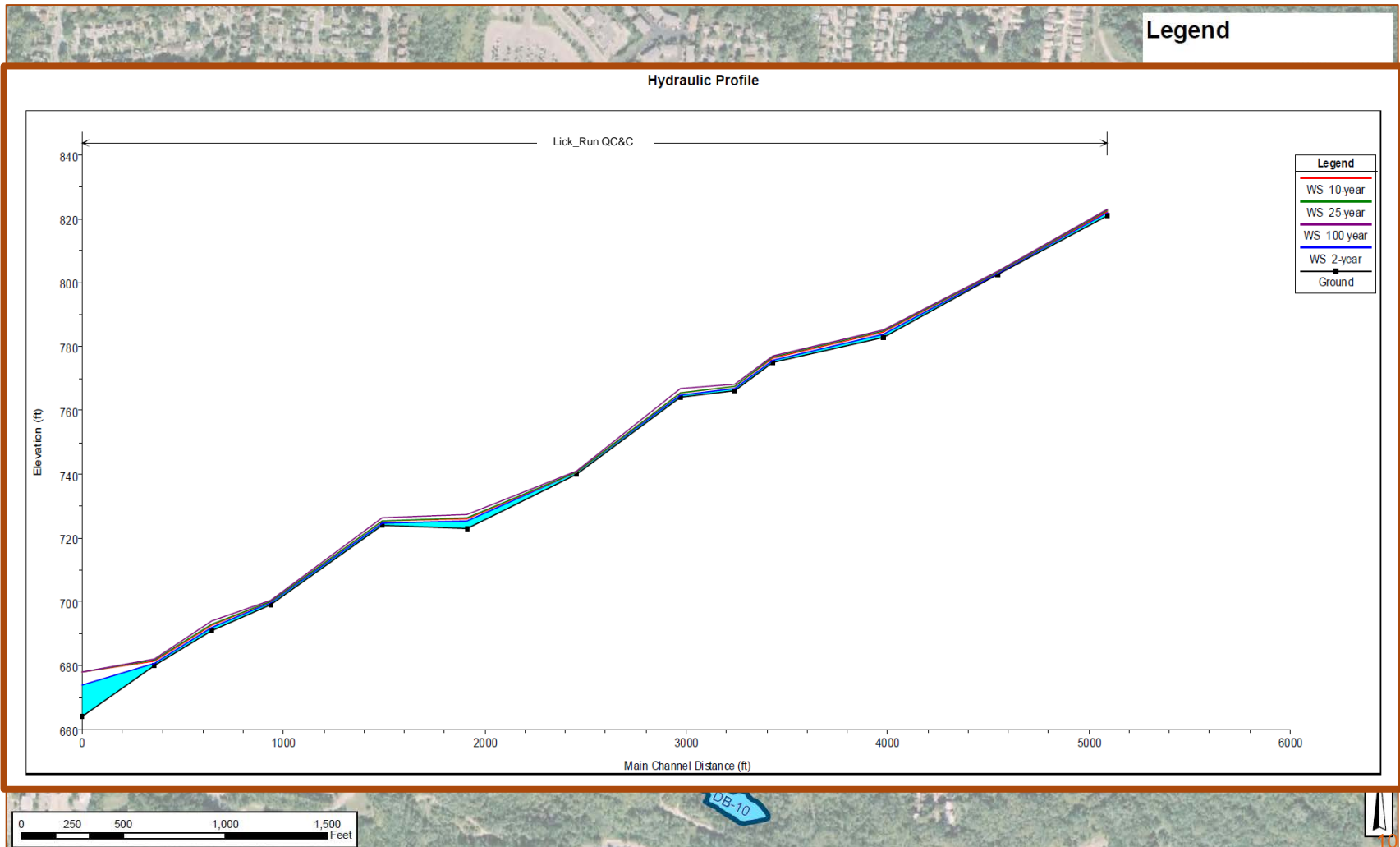


- Potential to Directly Capture/Separate Stormwater Runoff
 - Storage Basins
- Evaluate Tree Removal
- Evaluate ODNR Dam Classifications
 - Exempt Dams (less than 6 feet in height)
- Evaluate USACE NWP requirements

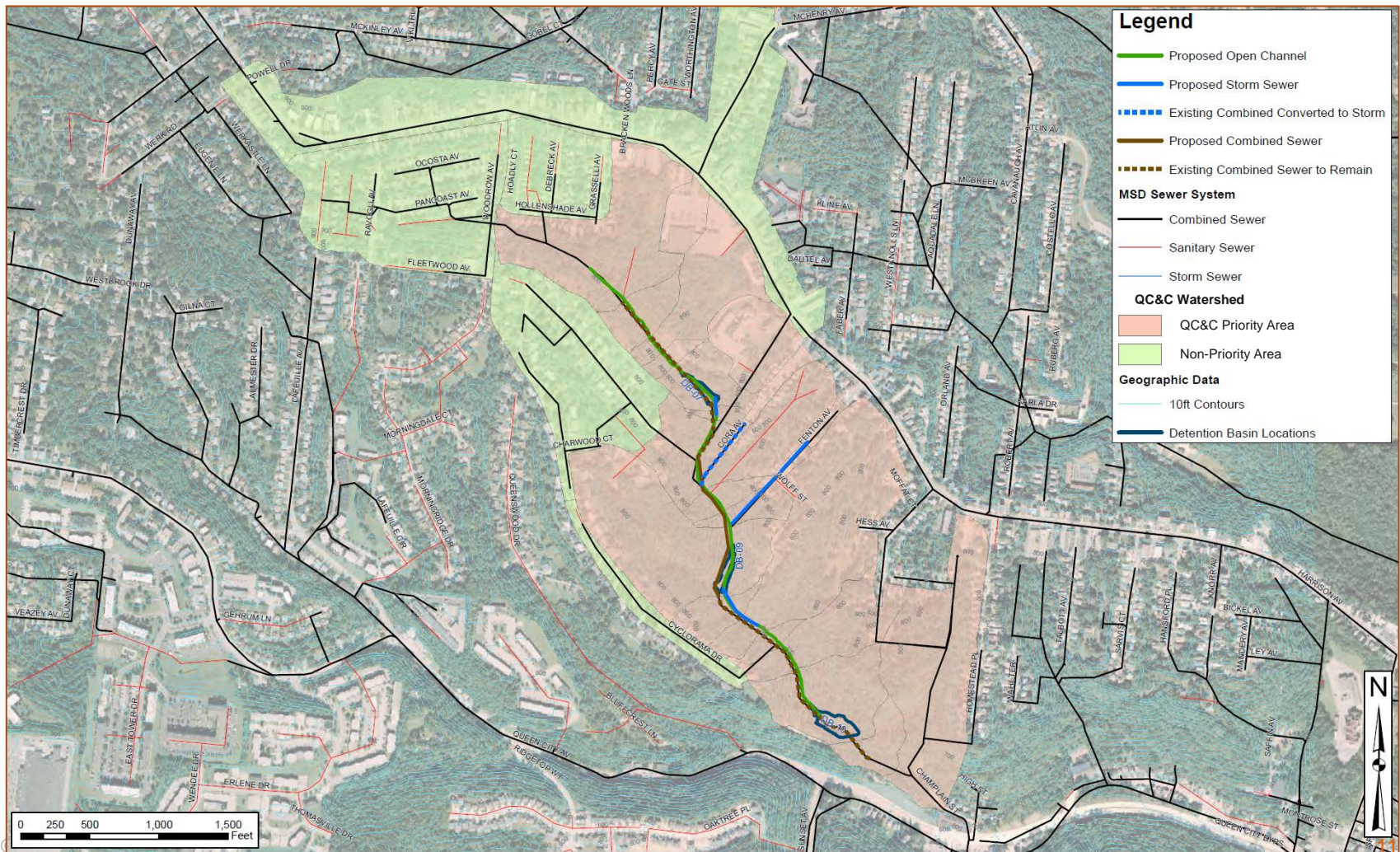
Dam Classifications & Exemptions

- Dam Classification is defined in Ohio Administrative Code, Section 1501: 21-13-01
- Dams Which are Exempt From the ODNR jurisdiction are defined in ORC Section 1521.062
- A Dam is exempt from the state's authority if:
 - It is 6 feet or less in height regardless of total storage
 - Less than 10 feet in height with not more than 50 acre-feet of storage
 - Not more than 15 acre-feet of total storage regardless of height

Queen City and Cora Storage & Topography



Queen City and Cora Storage & Topography



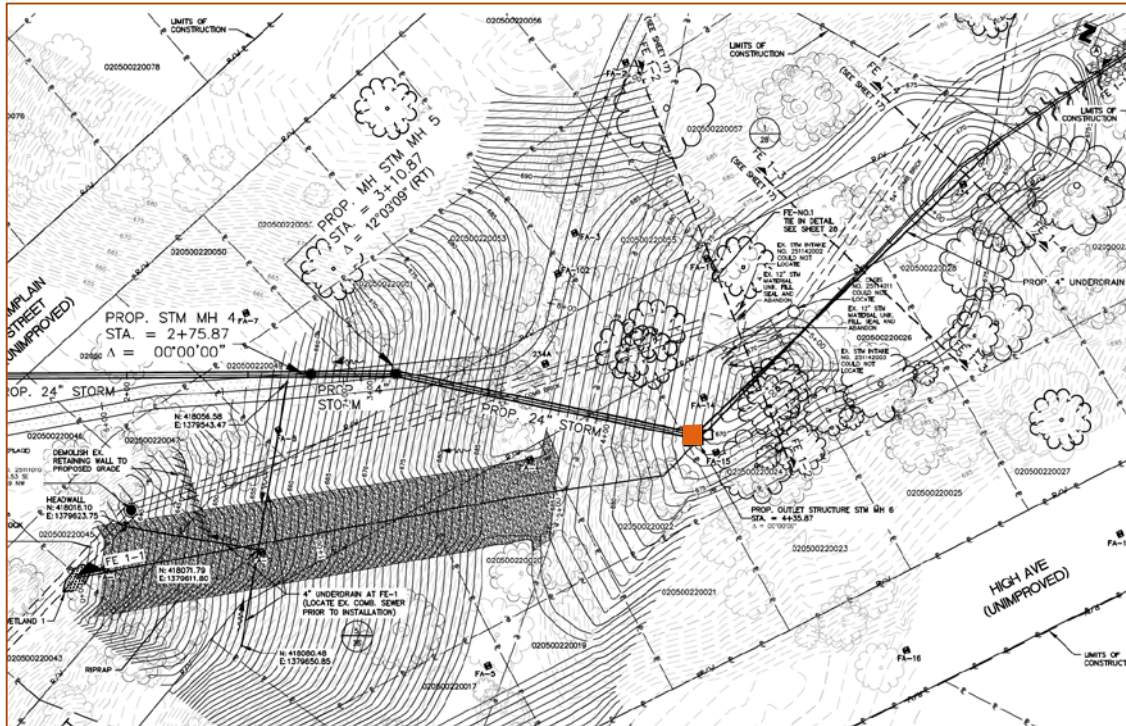
Floodplain Enhancements (Wet bottom detention basins)

- Utilized for Water Quality & Stormwater Retention
- Designed to use Existing Topography and be Exempt from Ohio Administrative Code for Dam Permitting
- Orifice & Weir Outlet Structures
 - Discharge less than $\frac{1}{2}$ of Extended Detention Volume (75% of Water Quality Volume) in 8 hours
 - Drain Entire Basin to Permanent Pool Volume in More than 24 hours (Permanent Pool 6" to 18" deep)
- Able to be Drained Completely Through Underdrain in Case of Nuisance Vectors
- Emergency Spillways

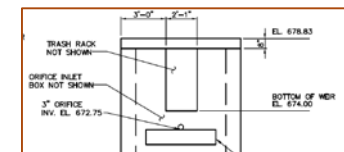
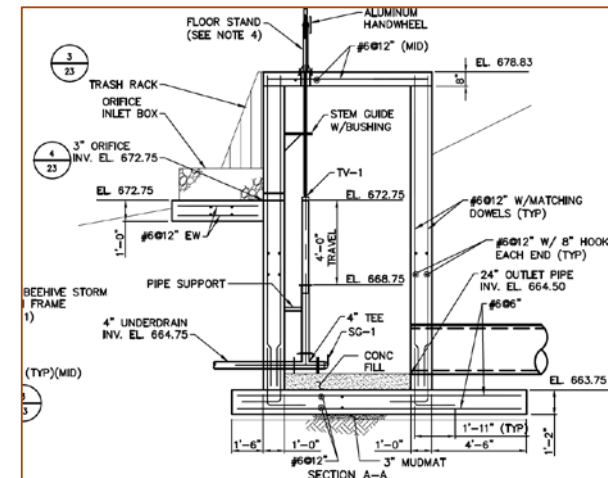
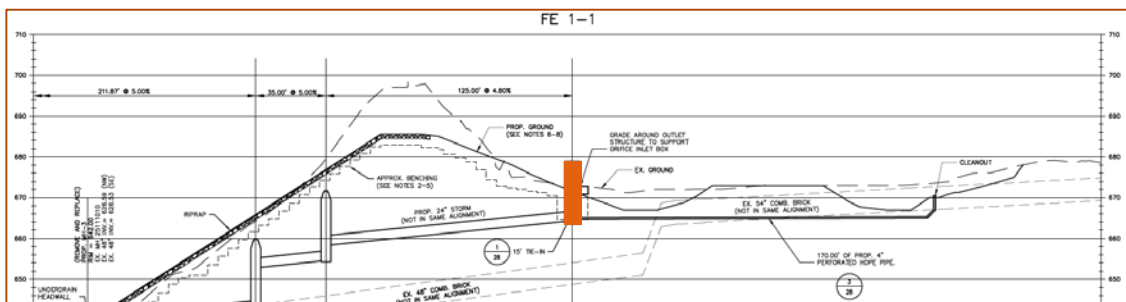
Floodplain Enhancement No. 1



Floodplain Enhancement No. 1



- Forebay
- Micropool
 - Permanent Pool
- Outlet Structure (Orifice & Weir)
 - Convey 100-year storm

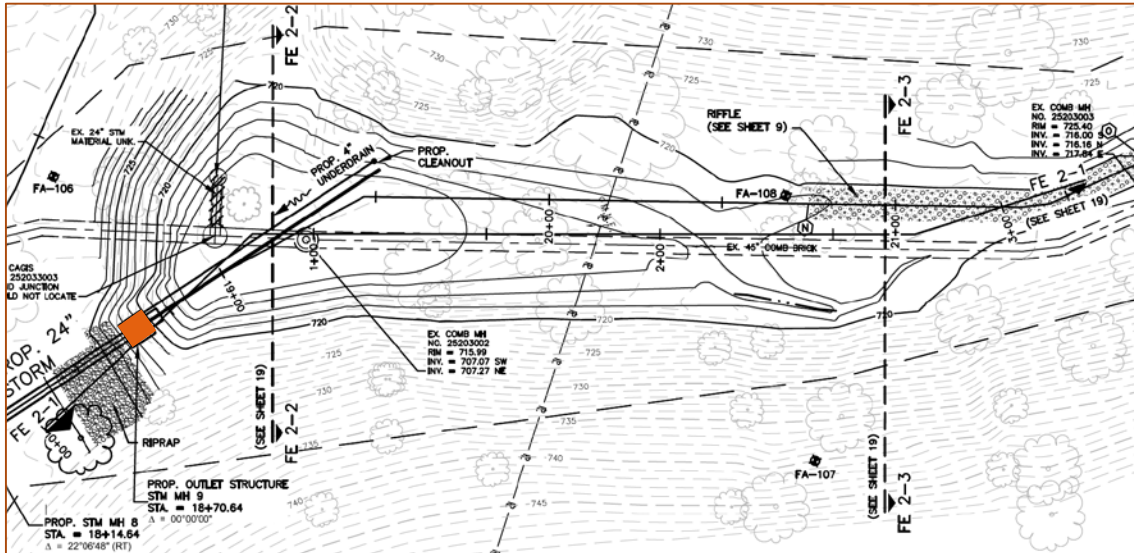




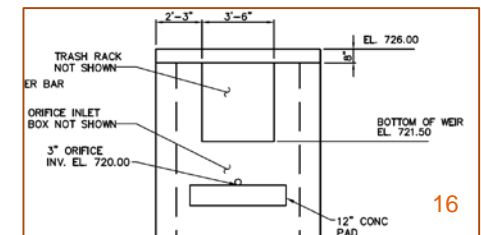
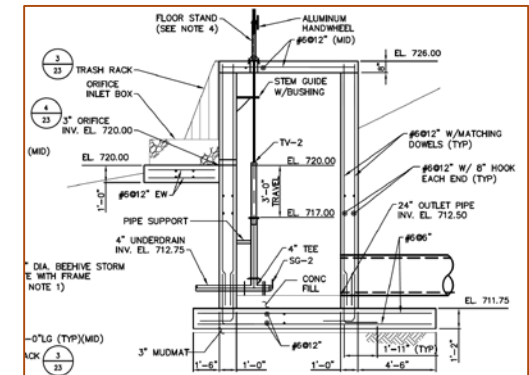
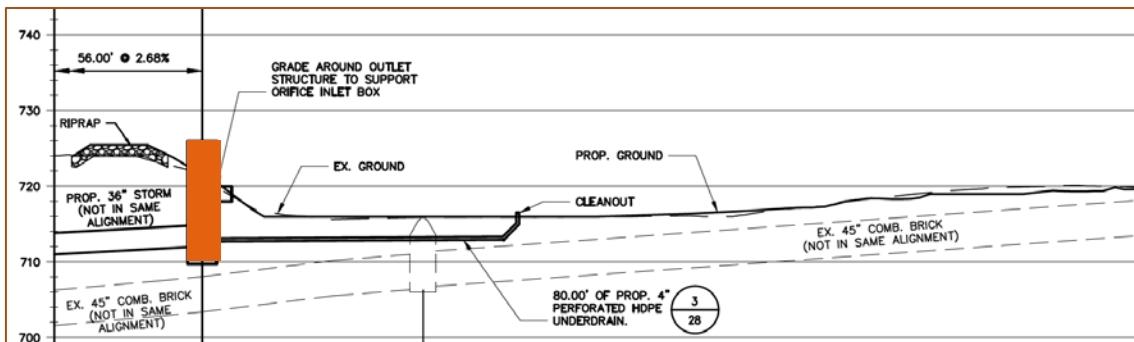
Floodplain Enhancement No. 2



Floodplain Enhancement No. 2



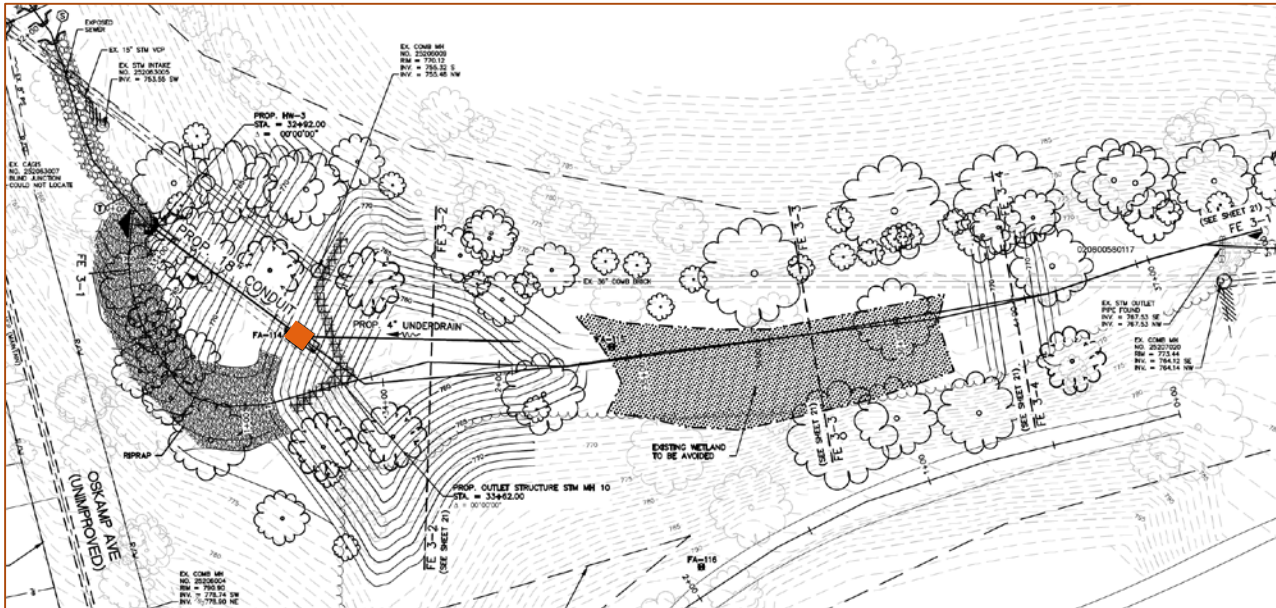
- Micropool
 - Permanent Pool
- Outlet Structure (Orifice & Weir)
 - Convey 25-year storm



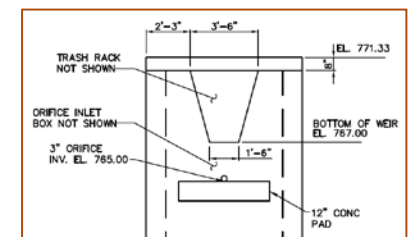
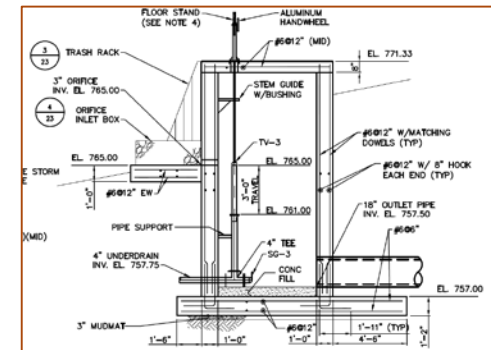
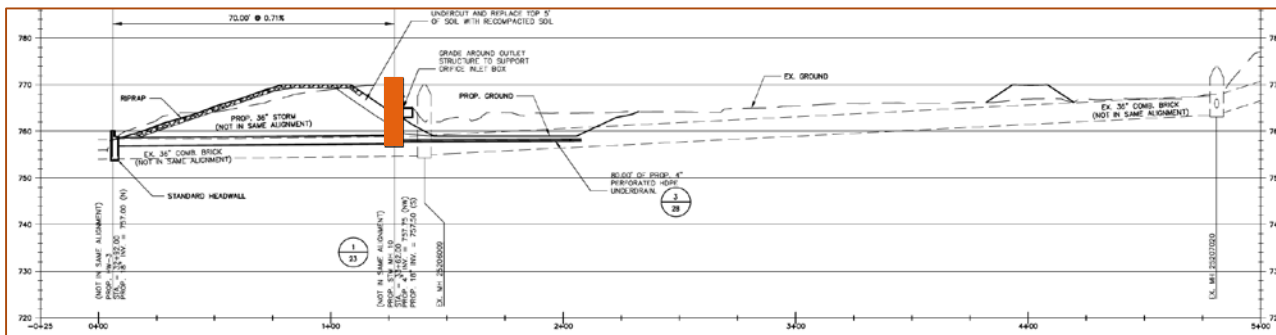
Floodplain Enhancement No. 3



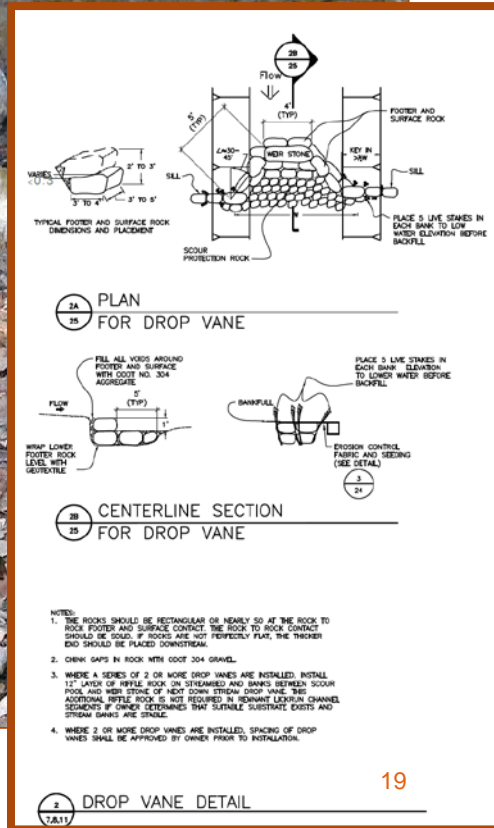
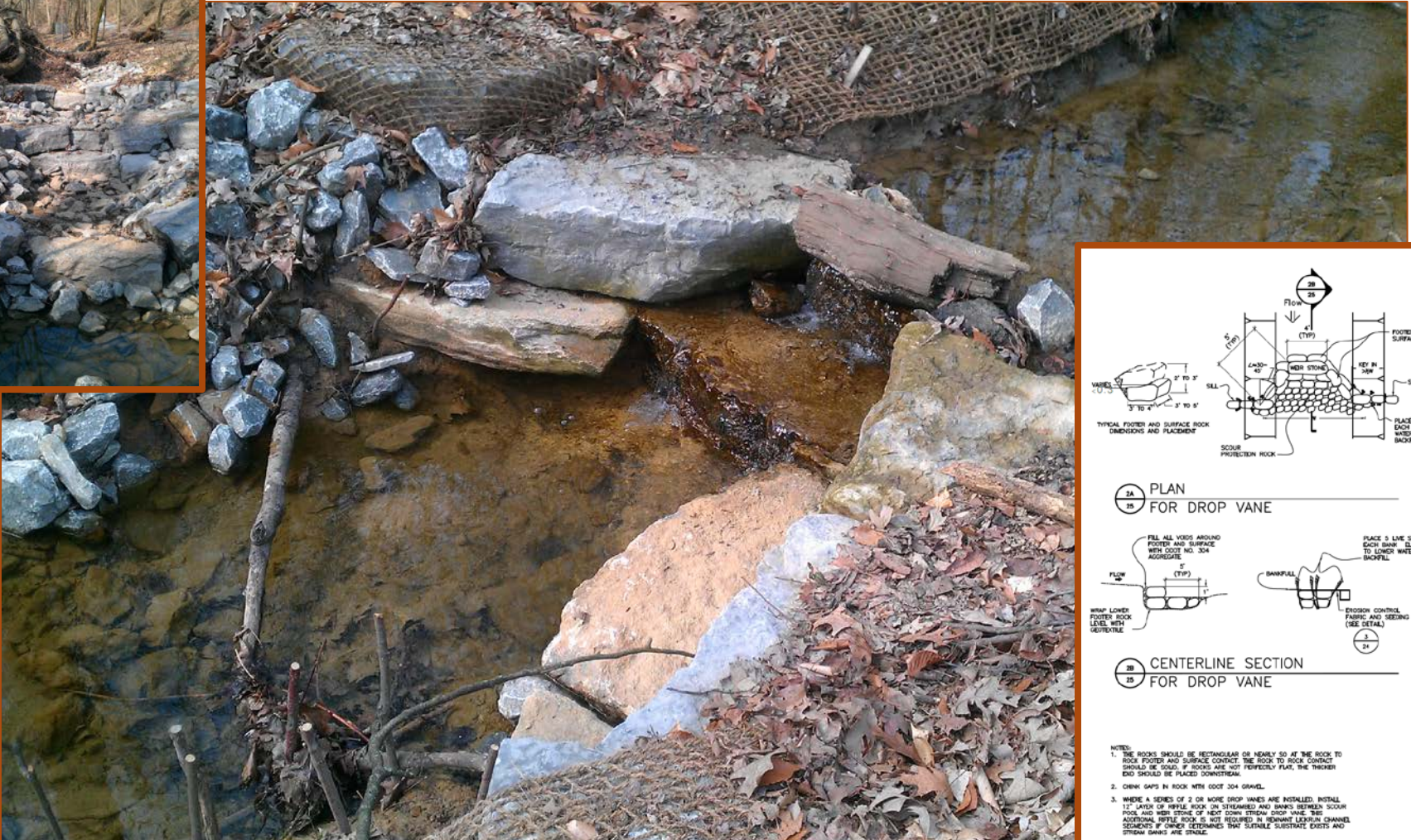
Floodplain Enhancement No. 3



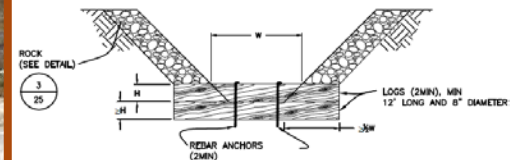
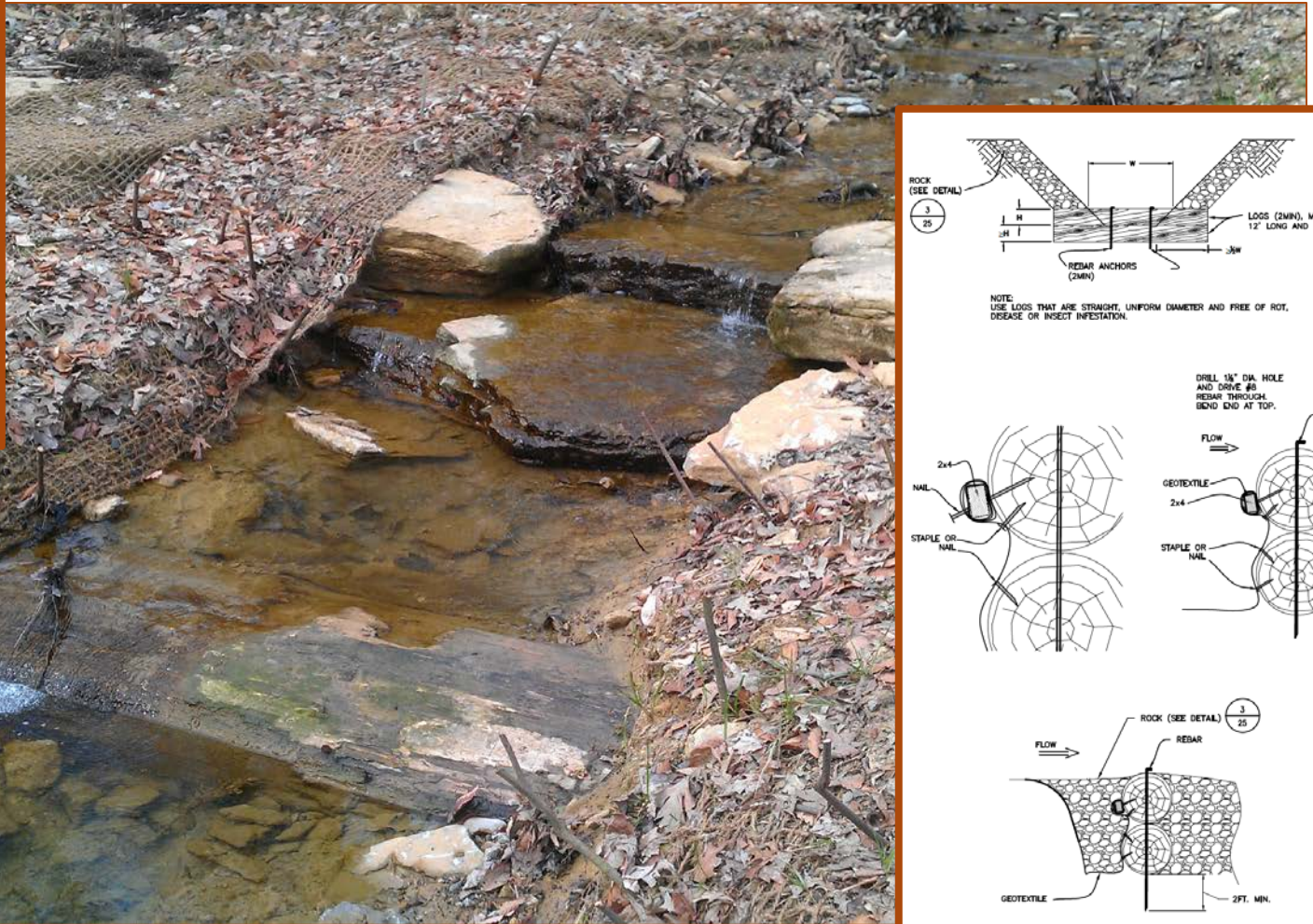
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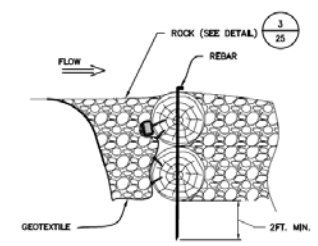
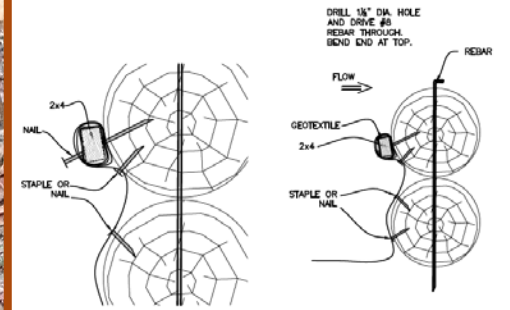
Drop Vane



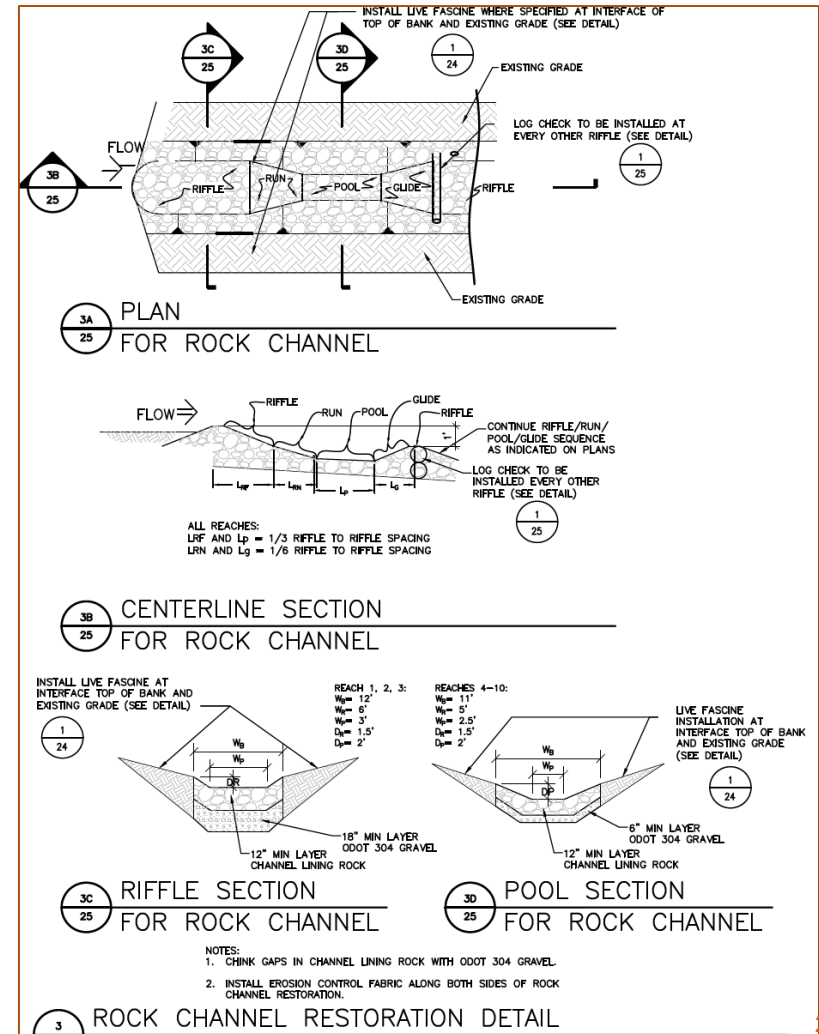
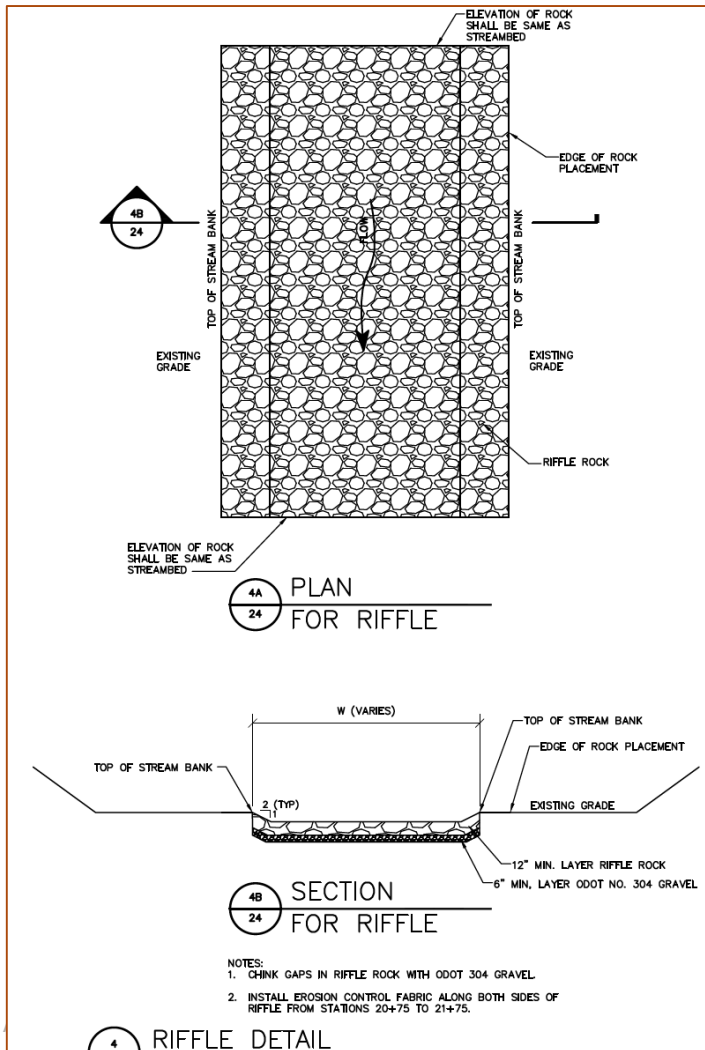
Log Check



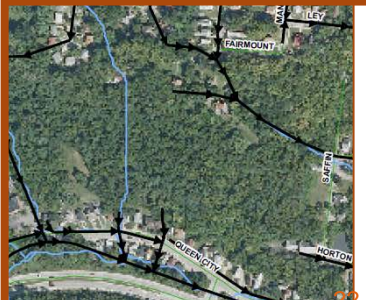
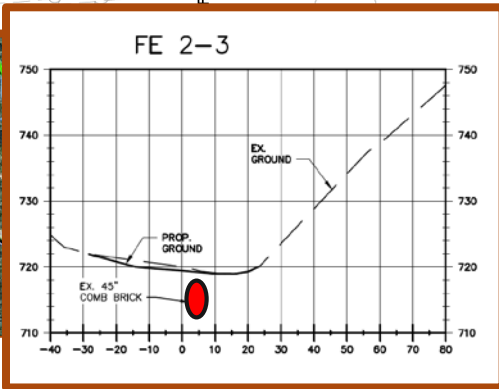
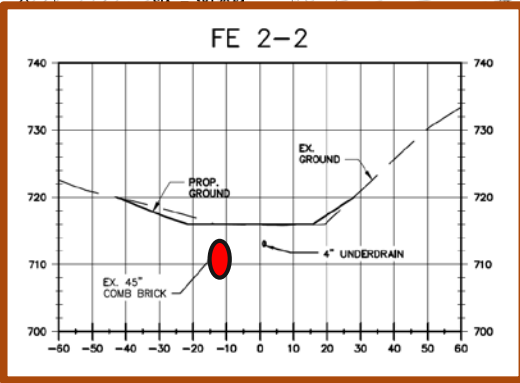
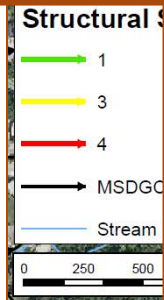
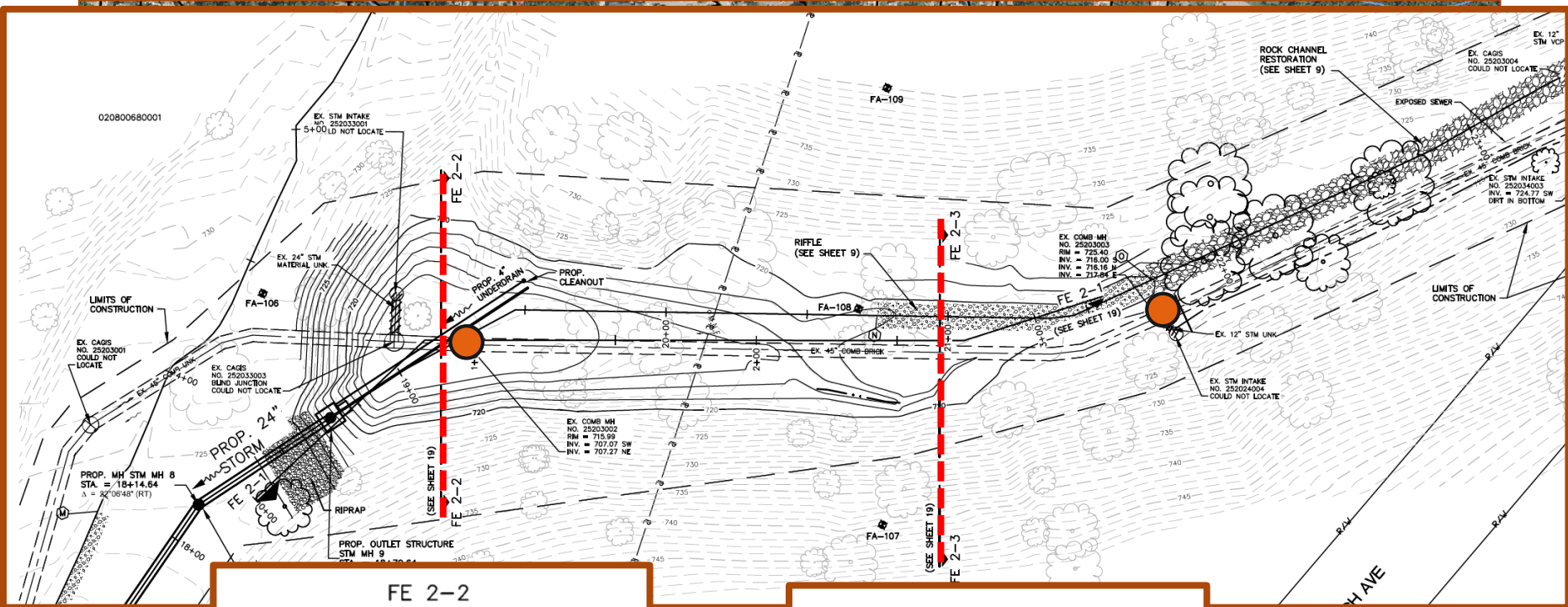
NOTE:
USE LOGS THAT ARE STRAIGHT, UNIFORM DIAMETER AND FREE OF ROT,
DISEASE OR INSECT INFESTATION.



Riffles & Rock Channel Restoration



Lining of Existing Sewer & Manholes



Questions

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