



Otterdale
Road
Drainage
Improvement
Project

ASHE Old Dominion Section Meeting

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OUTLINE

Introductions

Project Overview/Resiliency

Unique Delivery

Challenges & Early Coordination

Modeling Challenges

Project Delivery

CHESTERFIELD COUNTY



Otterdale Branch

Horsepen Creek

Blackman Creek

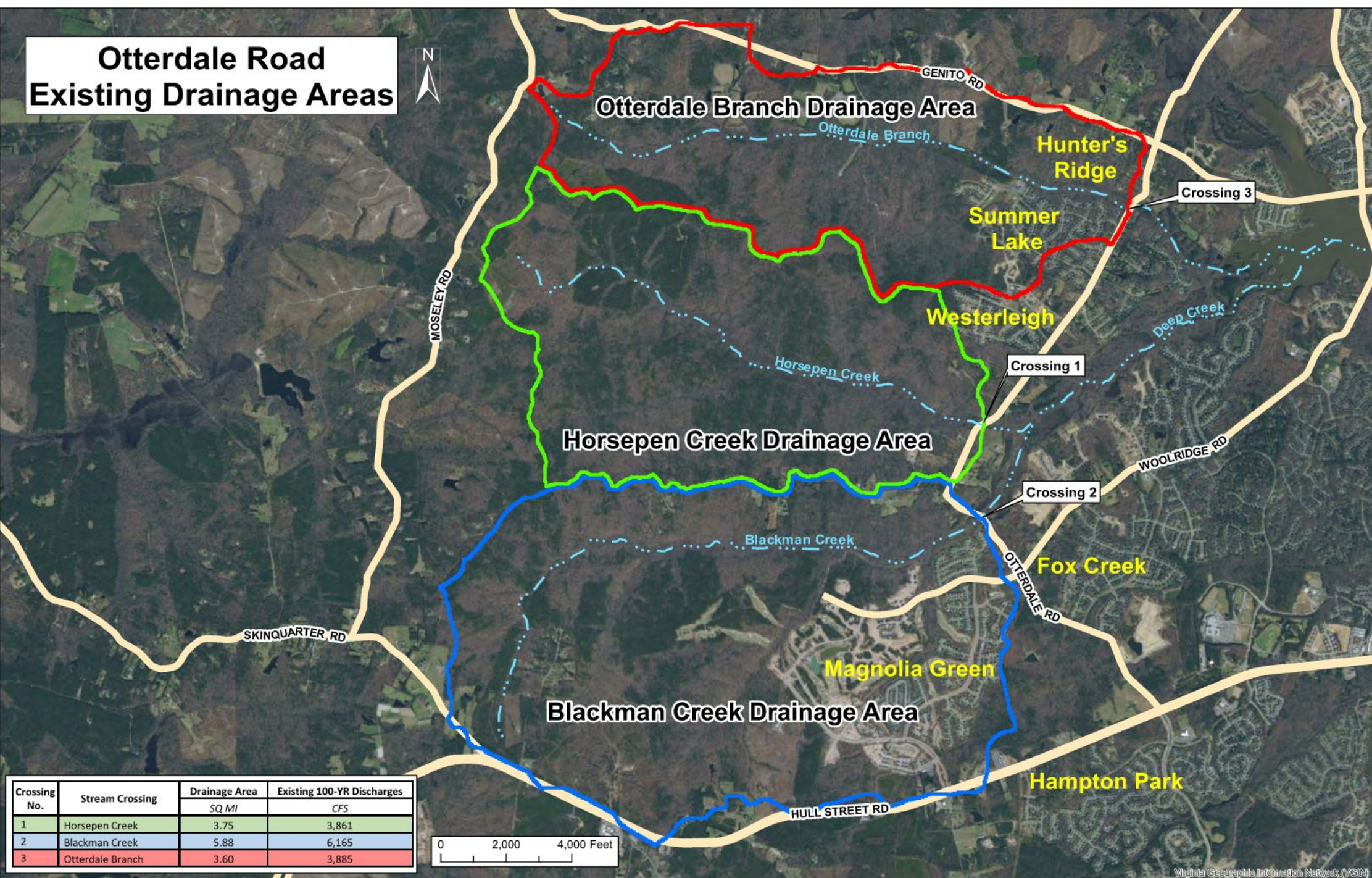
Swift Creek Reservoir

Swift Creek Reservoir

Chesterfield

THE DILEMMA

Otterdale Road Existing Drainage Areas



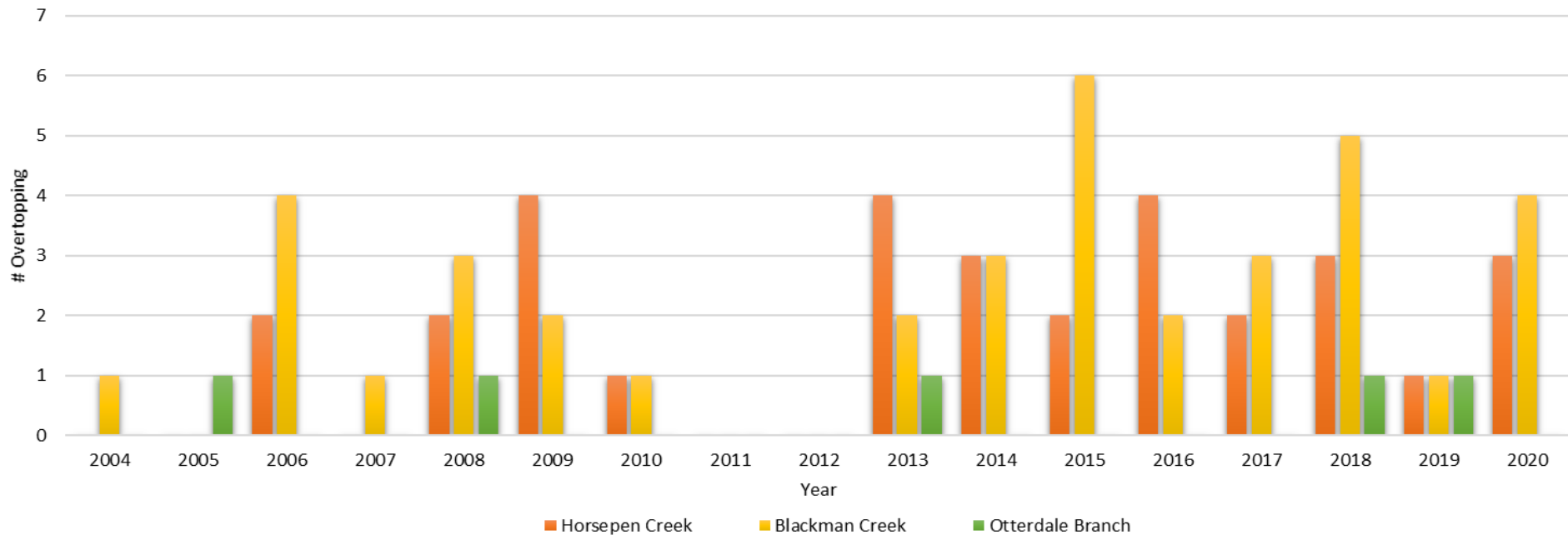
OTTERDALE ROAD FLOODING



In the last 5 years on record:

- Horsepen Creek crossing overtopped 13 times
- Blackman Creek crossing overtopped 15 times
- Otterdale Branch crossing overtopped 2 times

Otterdale Road Flooding History



Horsepen Creek Crossing

- Existing double 3.75 ft X 2.42 ft elliptical pipes
- 35° skewed crossing
- Culverts completely submerged - at least 80% clogged
- Low road, overtopped by 10-year Storm by 1 ft to 1.5 ft
- Recently cleaned out and channel grading performed



Blackman Creek Crossing

- Existing single span prestressed concrete slab bridge
- Pre-existing bridge footings in place—sheet piling
- Significant superelevation—8%
- Low roadway approaches, overtopped by 10-year Storm by over 2 ft



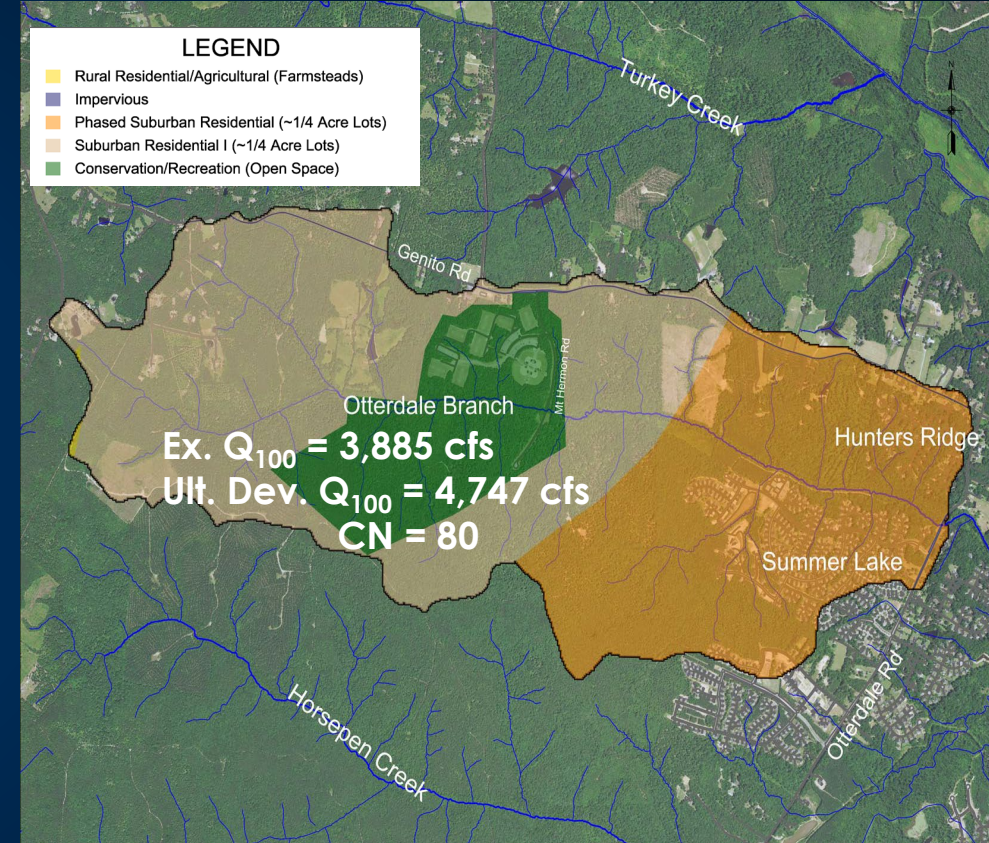
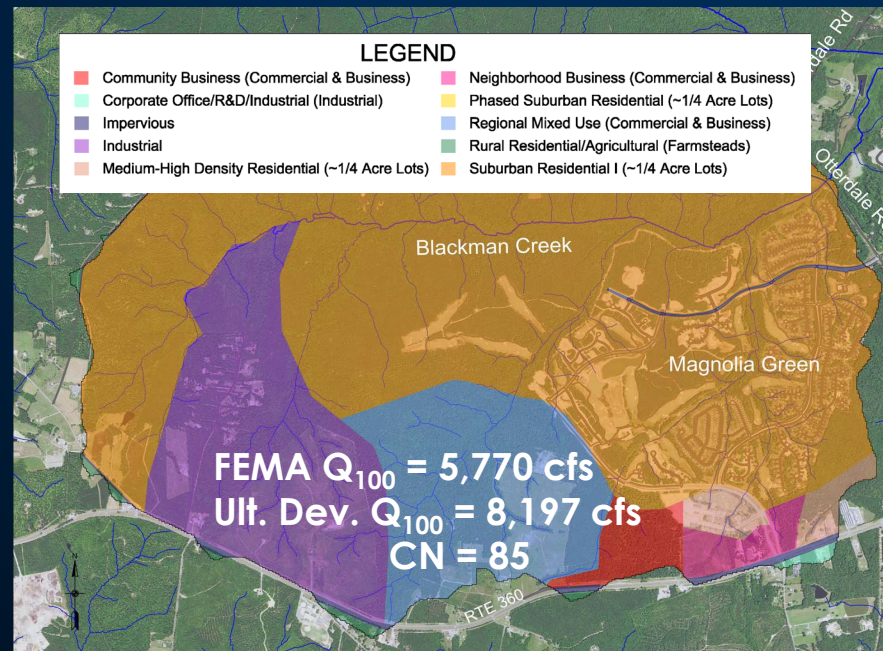
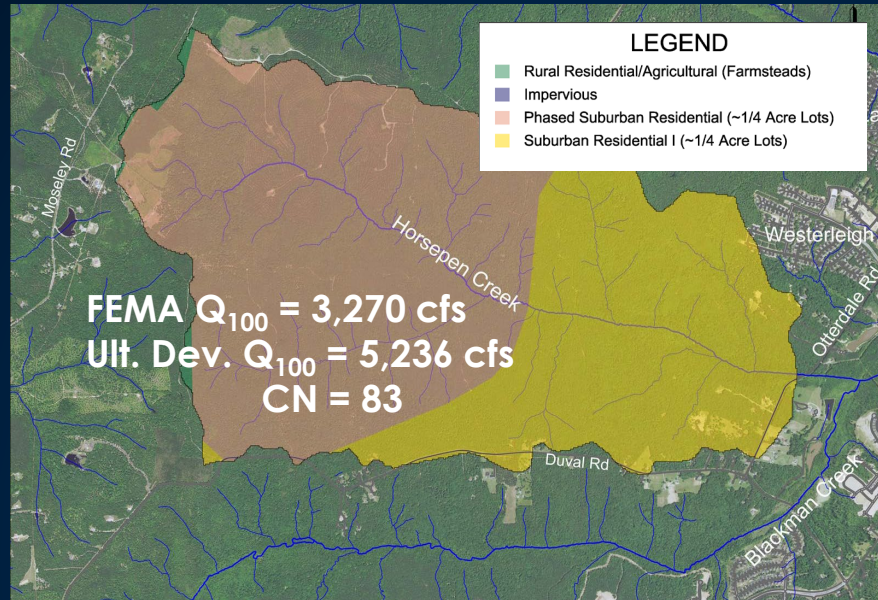
Otterdale Branch Crossing

- Existing double 7 ft X 6 ft concrete box culvert
- 68° skewed crossing
- Culverts completely submerged—at least 80% clogged
- Low road, overtopped by 10-year Storm by 1.7 ft



Flood Resiliency

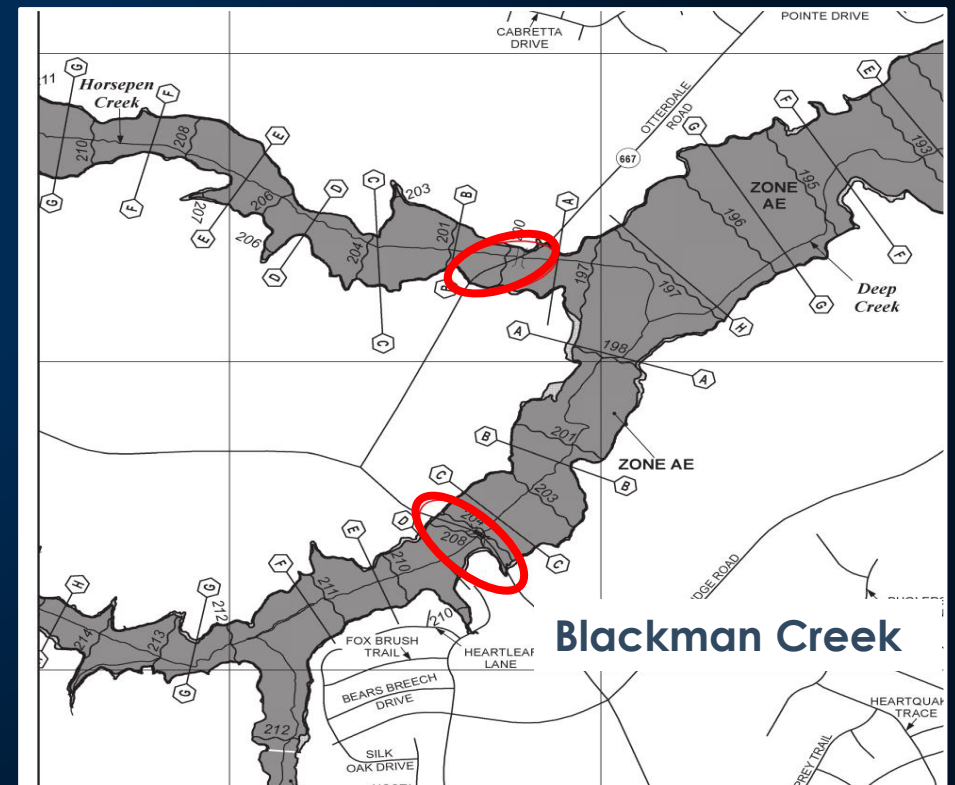
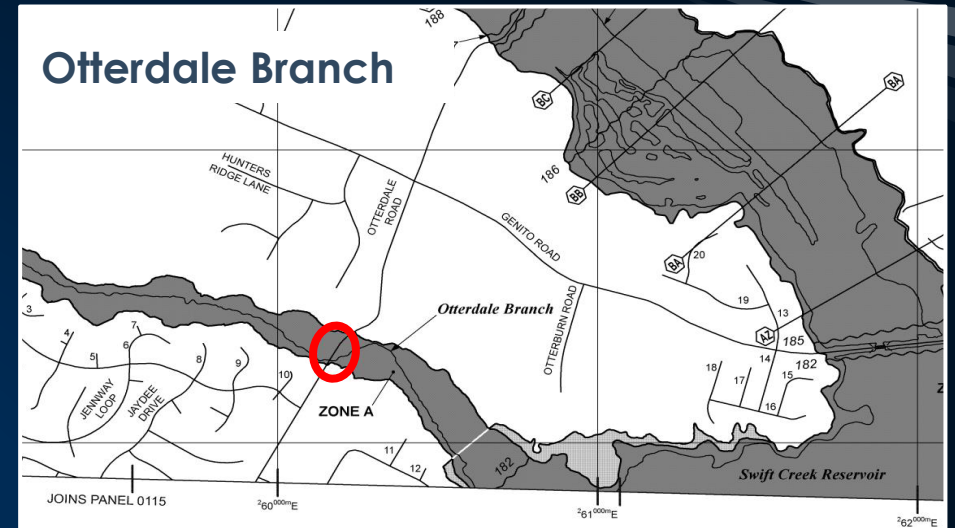
- Emergency Situation —Conservative approach addressing future flooding
- Bridge design checked for ultimate development of watershed per County Plan— Ultimate Solution
- Floodplain impacts evaluated with FEMA/existing hydrology
- Reduced freeboard requirements



	CN by Soil Type:		
	B	C	D
Impervious	98	98	98
Residential, 1/4 Acre	75	83	87
Commercial	92	94	95
Industrial	88	91	93
Farmsteads	82	86	--

FEMA Flood Zones

- Horsepen Creek and Blackman Creek FEMA Flood Zone AE, Otterdale Branch Zone A
- Early coordination with Chesterfield Floodplain Manager - consensus on CLOMR requirements
- Iterative road profile design/modeling
- Bridge span opening and stream grading
- Achieved No Rise on Blackman Creek and Otterdale Branch
- Site conditions at Horsepen Creek—CLOMR Required



Unique Delivery

- Emergency type project with DB approach to expedite delivery of this project - used DB procurement
- Project Bundle: Horsepen Creek 100% design, innovation on Blackman Creek and Otterdale Branch
- JMT acquired all Environmental permits
- Utility Relocation coordinated upfront by JMT
- County acquired R/W
- Horsepen Creek different
 - Approved CLOMR required prior to construction
 - Full SWM Design
 - Construction NTP

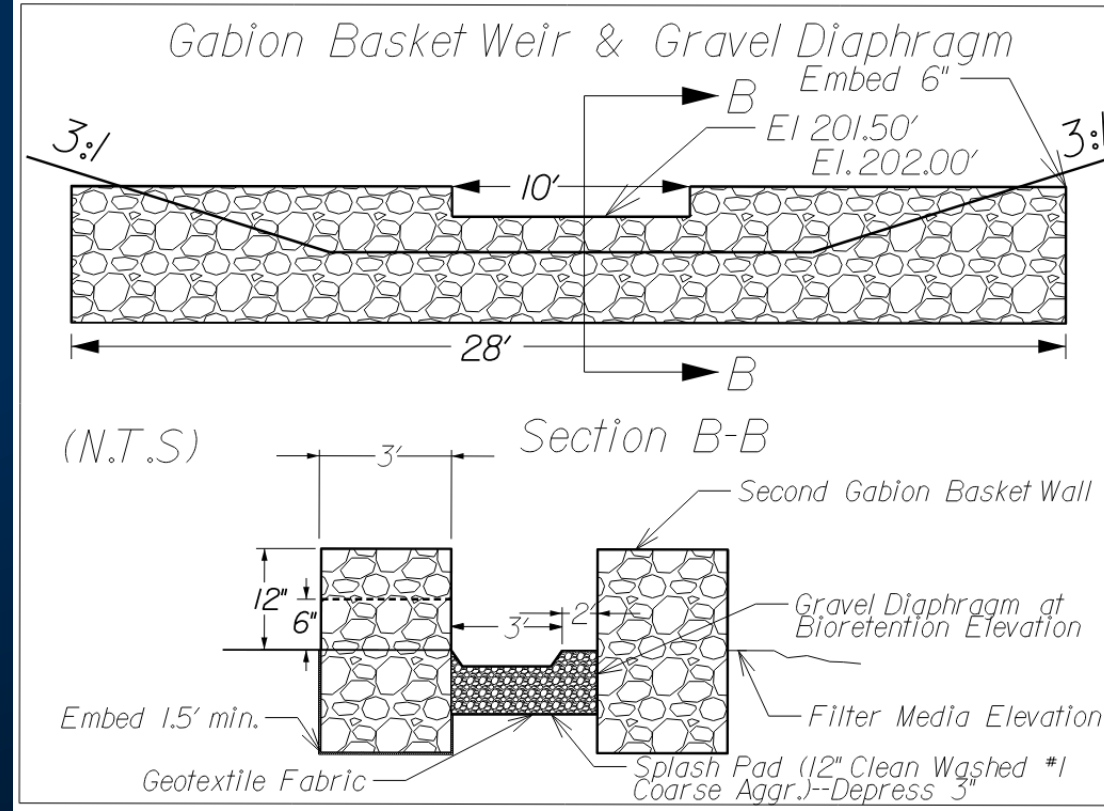
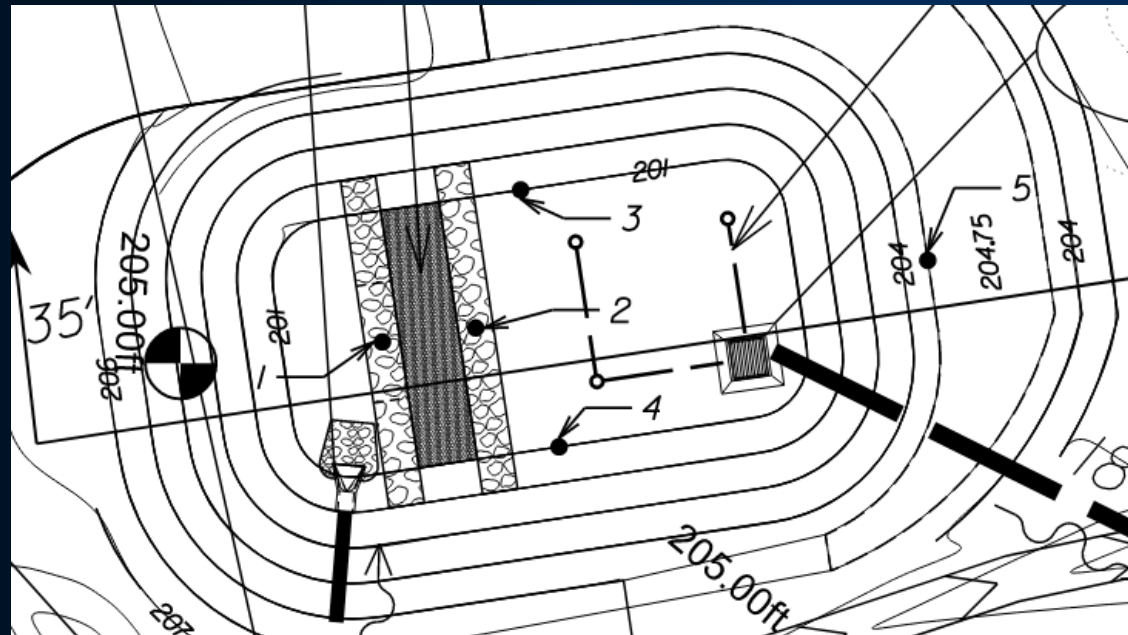
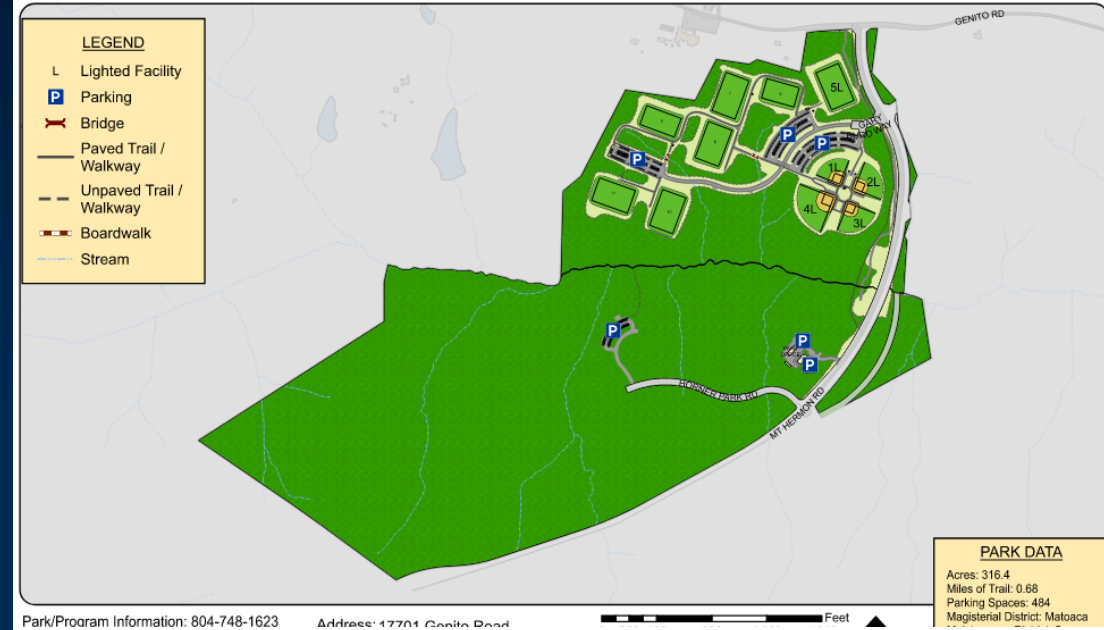
Site Challenges & Early Coordination

- COVID Challenge—Public Involvement & Project Delivery
- Beaver remnants
- Cultural Resources—Archaeological Survey Findings
- Soils & Watershed
- Connections & Teamwork Early On—County Staff, FEMA, and private citizens
- Unofficial reviews of approach



Stormwater Management Requirements

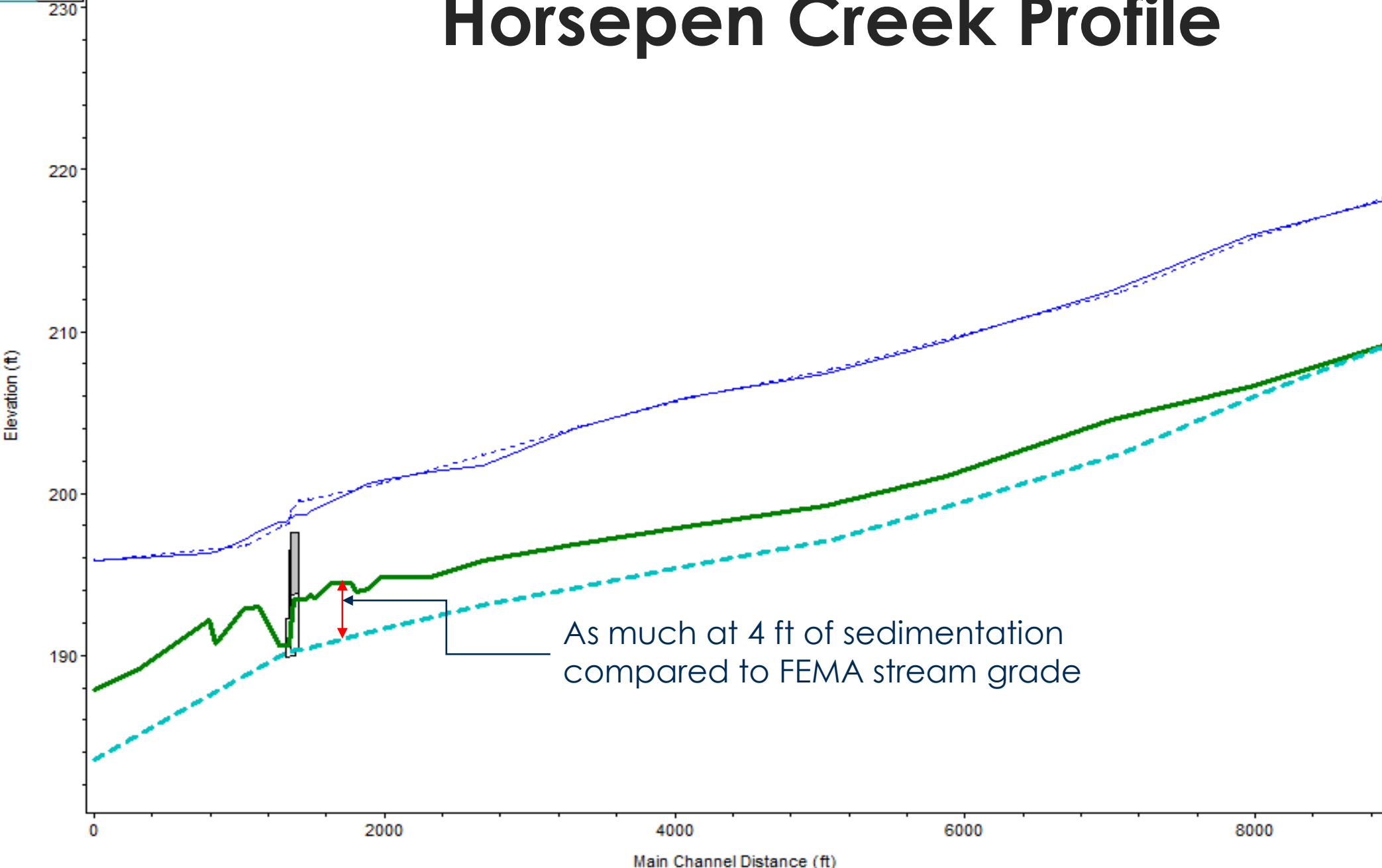
- Swift Creek Reservoir—No Nutrient Credit Purchase
- High Groundwater
- Floodplains, wetland, and RPA's
- Offsite Treatment Options
- Innovative Pre-Treatment Approach for Bioretention



HorsepenCr Main

Horsepen Creek Profile

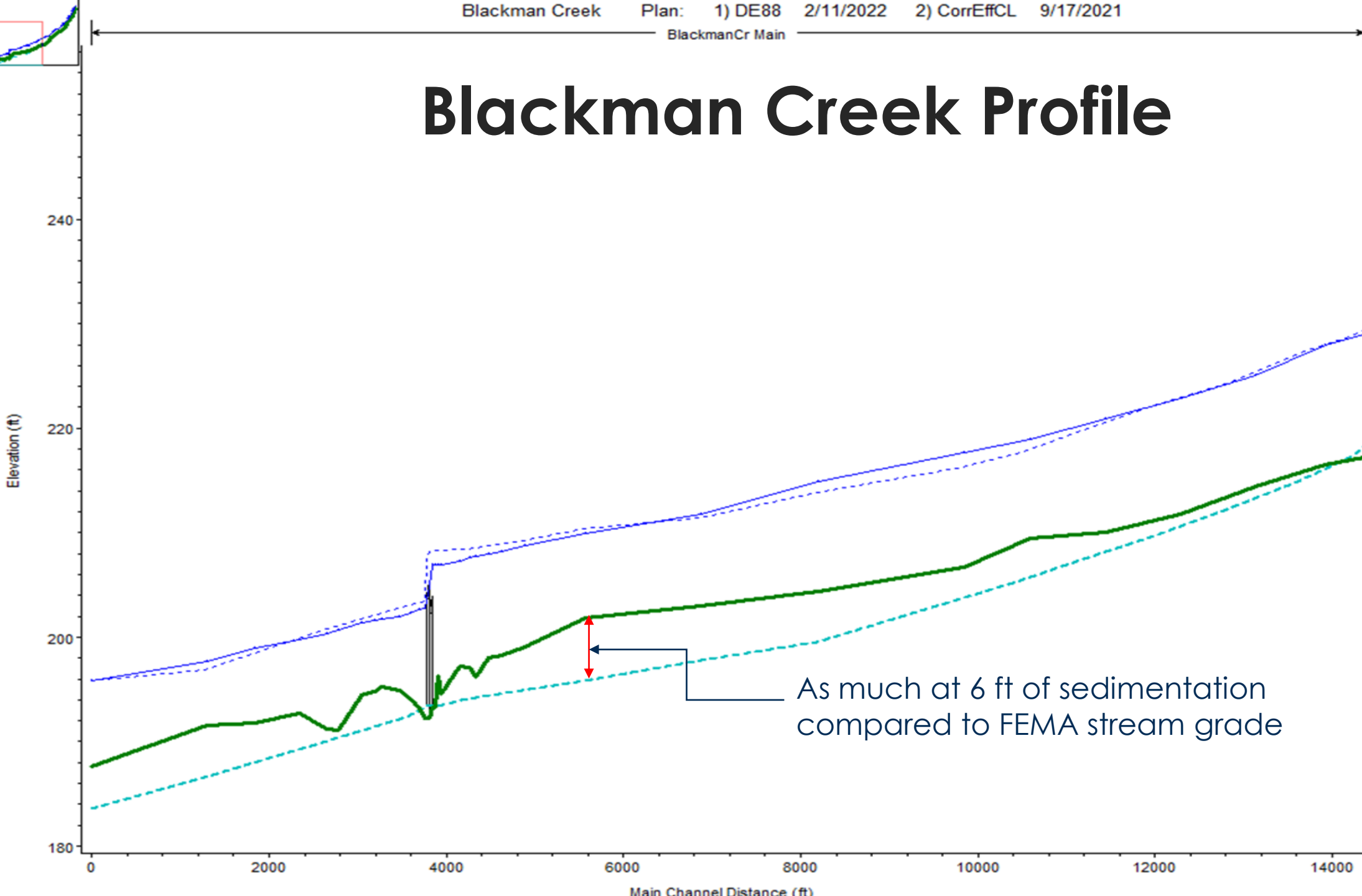
Legend	
	WS 100-YR - Survey
	WS 100-YR - FEMA
	Survey Ground
	FEMA Ground



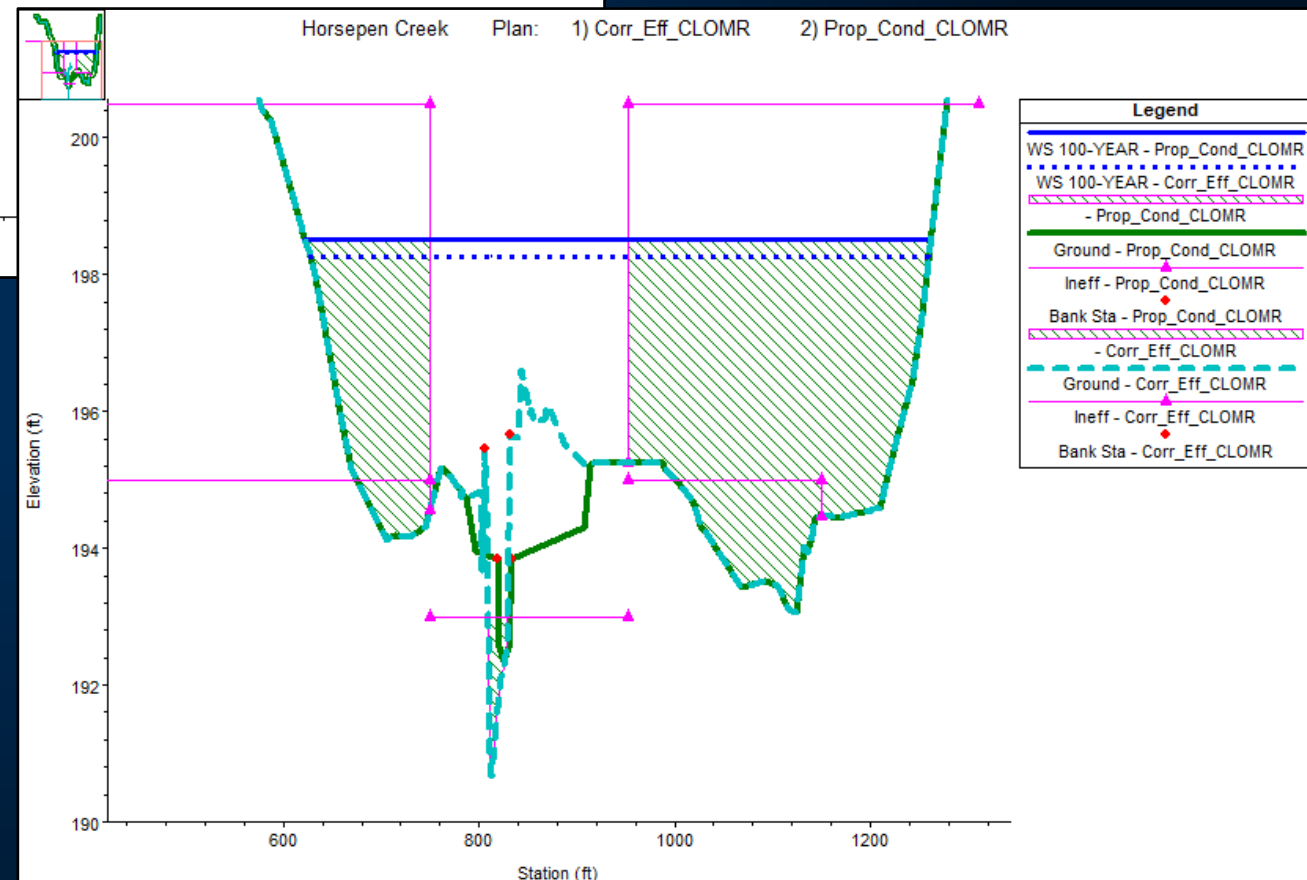
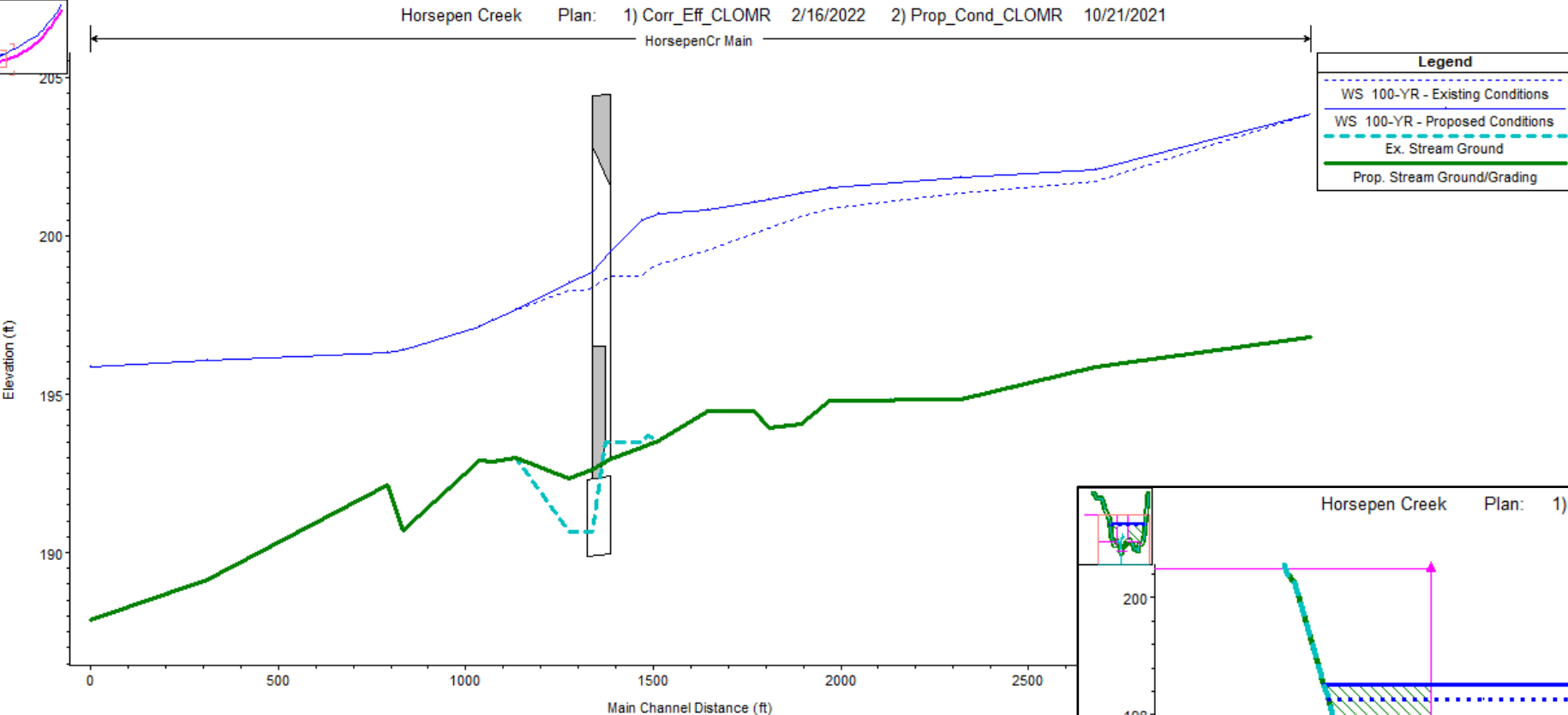
As much at 4 ft of sedimentation compared to FEMA stream grade

Blackman Creek Profile

Legend	
WS 100-YEAR - FEMA	
WS 100-YEAR - Survey	
FEMA Ground	
Survey Ground	



As much as 6 ft of sedimentation compared to FEMA stream grade



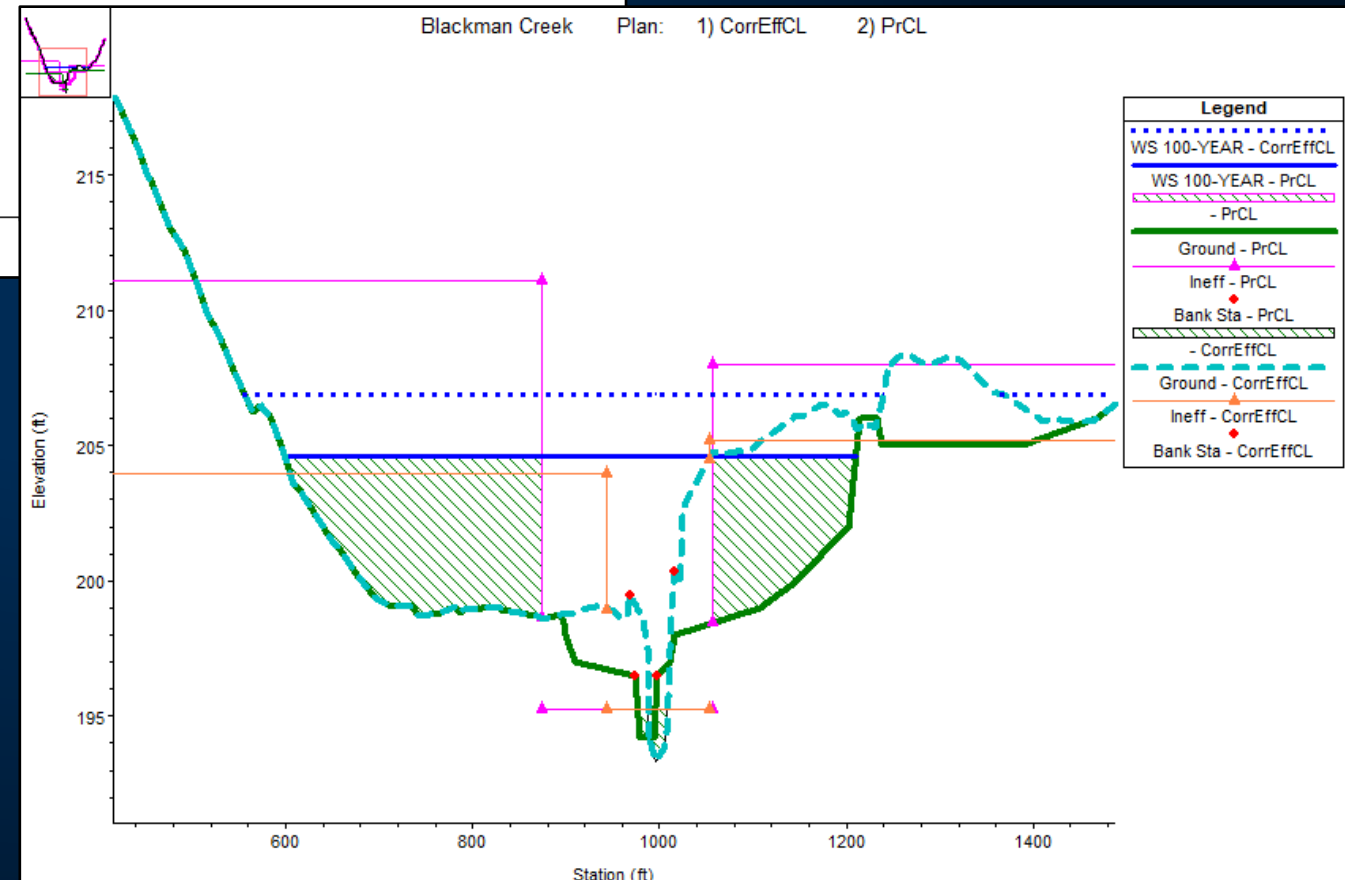
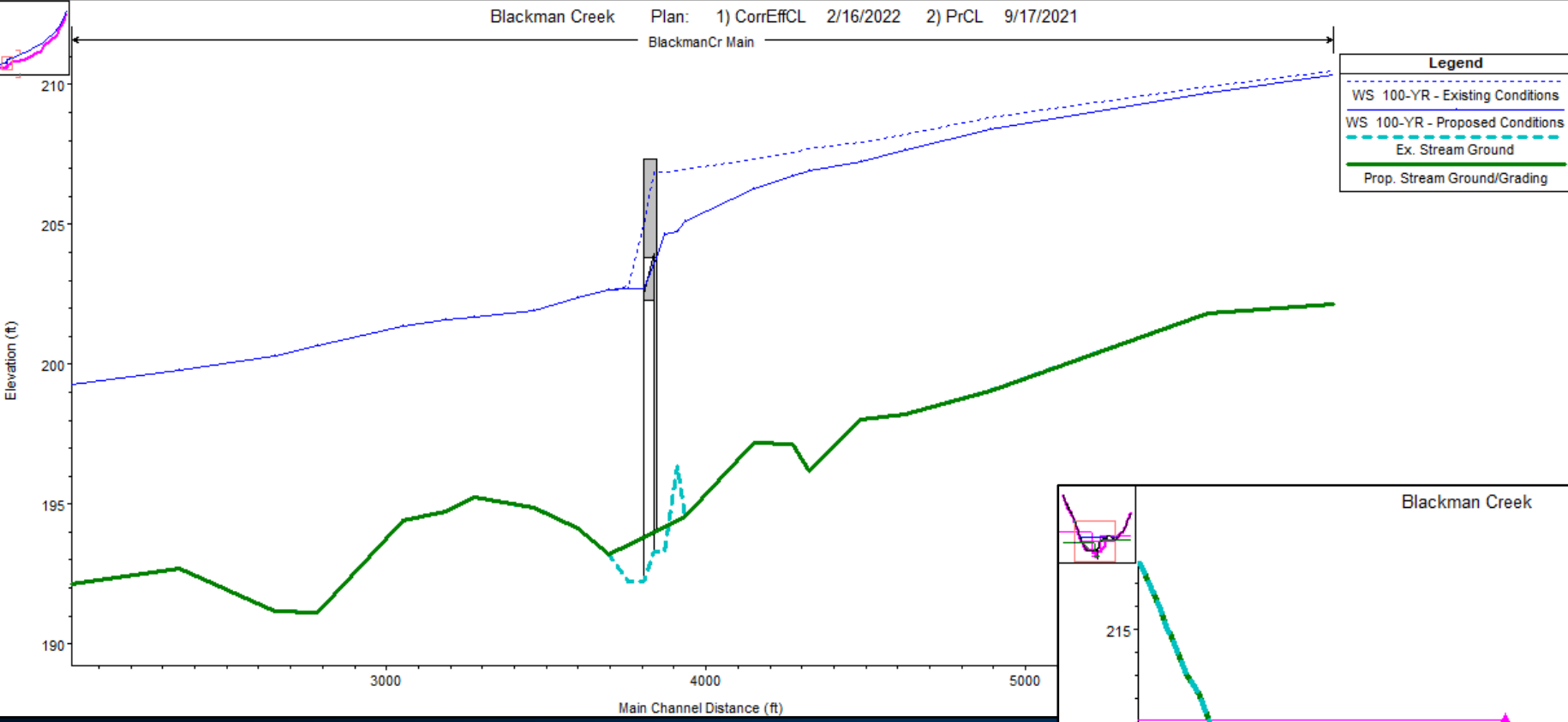
Horsepen Creek

Out of Scope Stream Grading/ Stream Assessment

0.5% Proposed Stream Grade

Modeling Driving Force

Permanent Ineffective Flow Areas

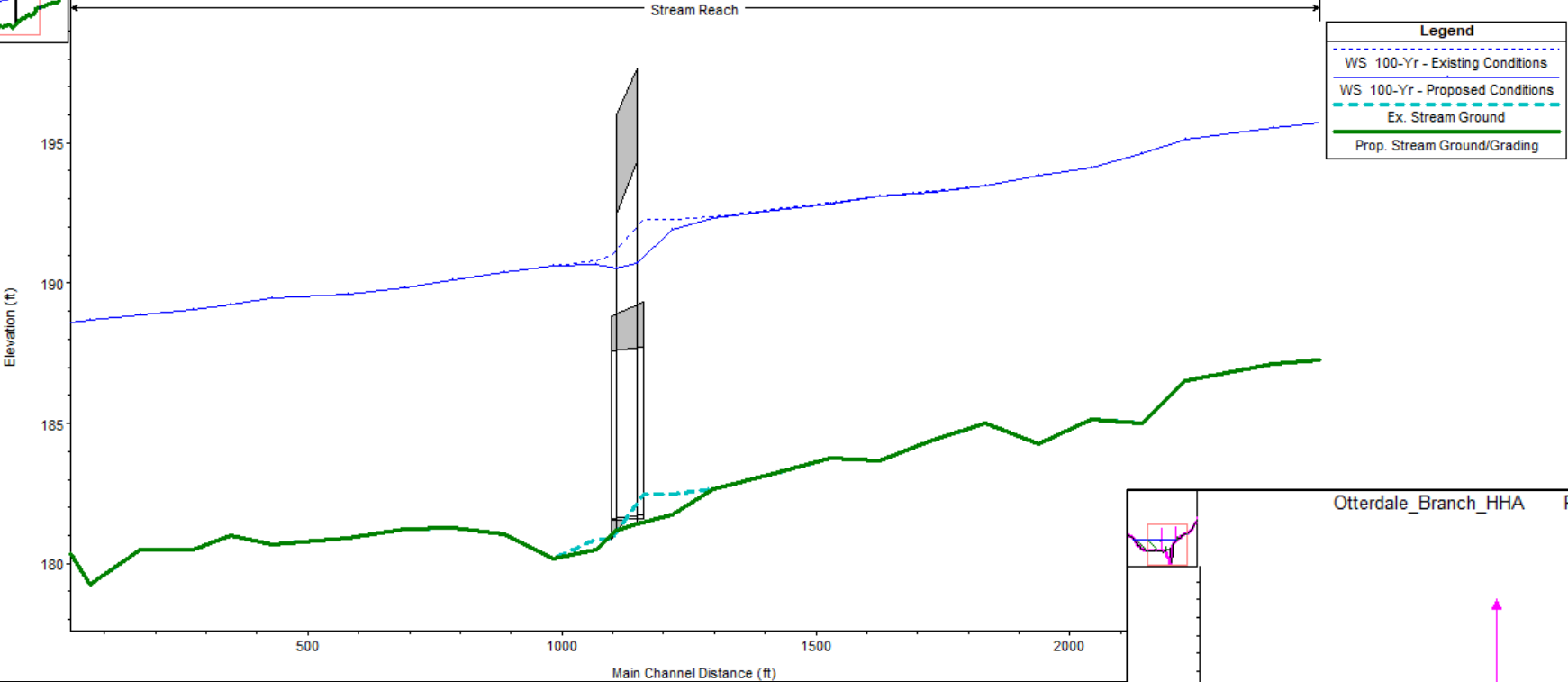


Blackman Creek

Stream grading

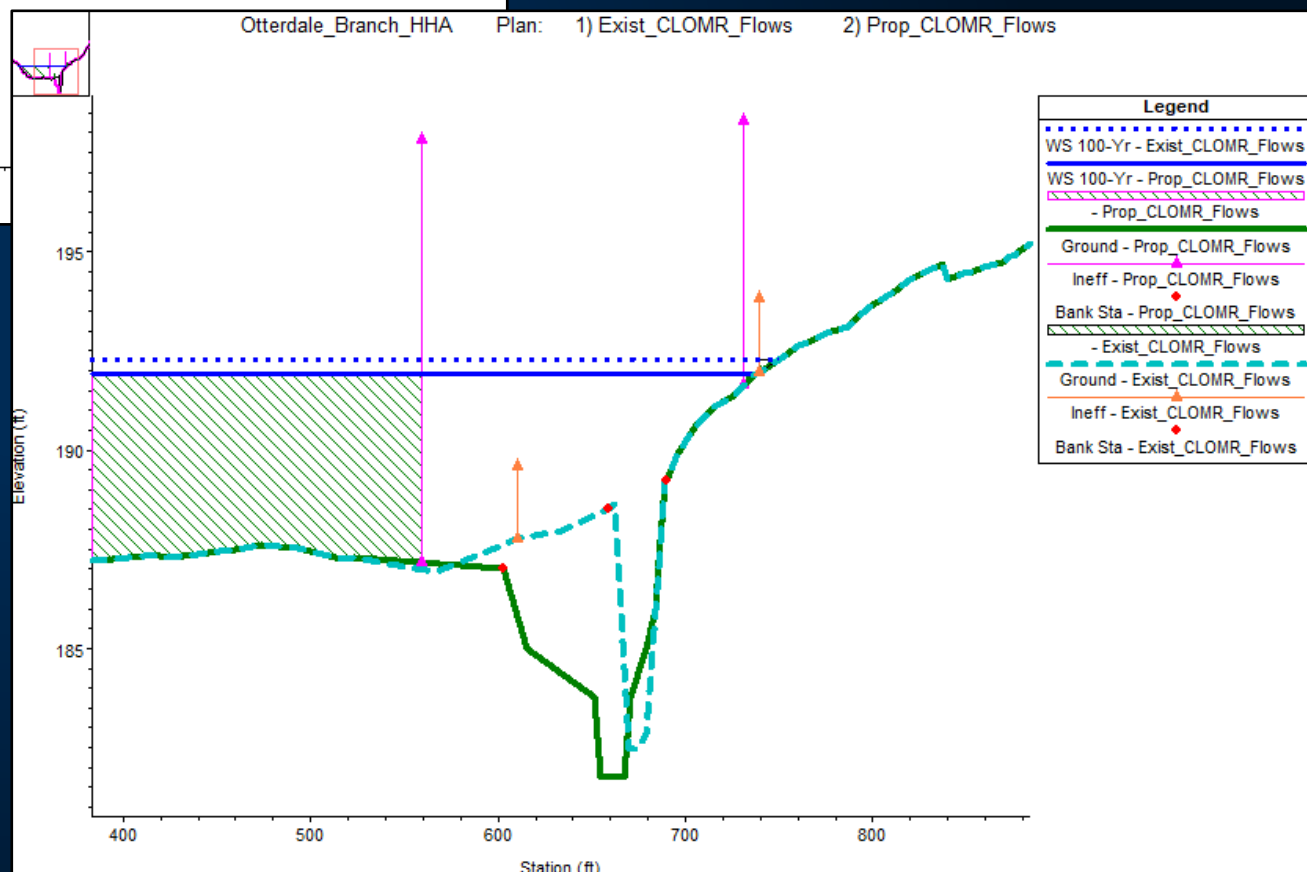
Scour Countermeasure Outside of Channel

Avoiding wetlands

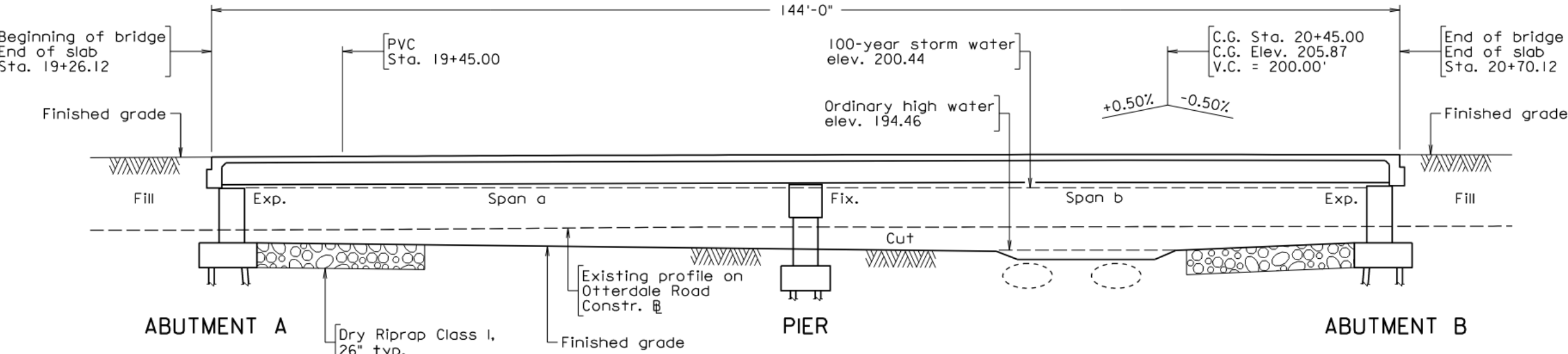
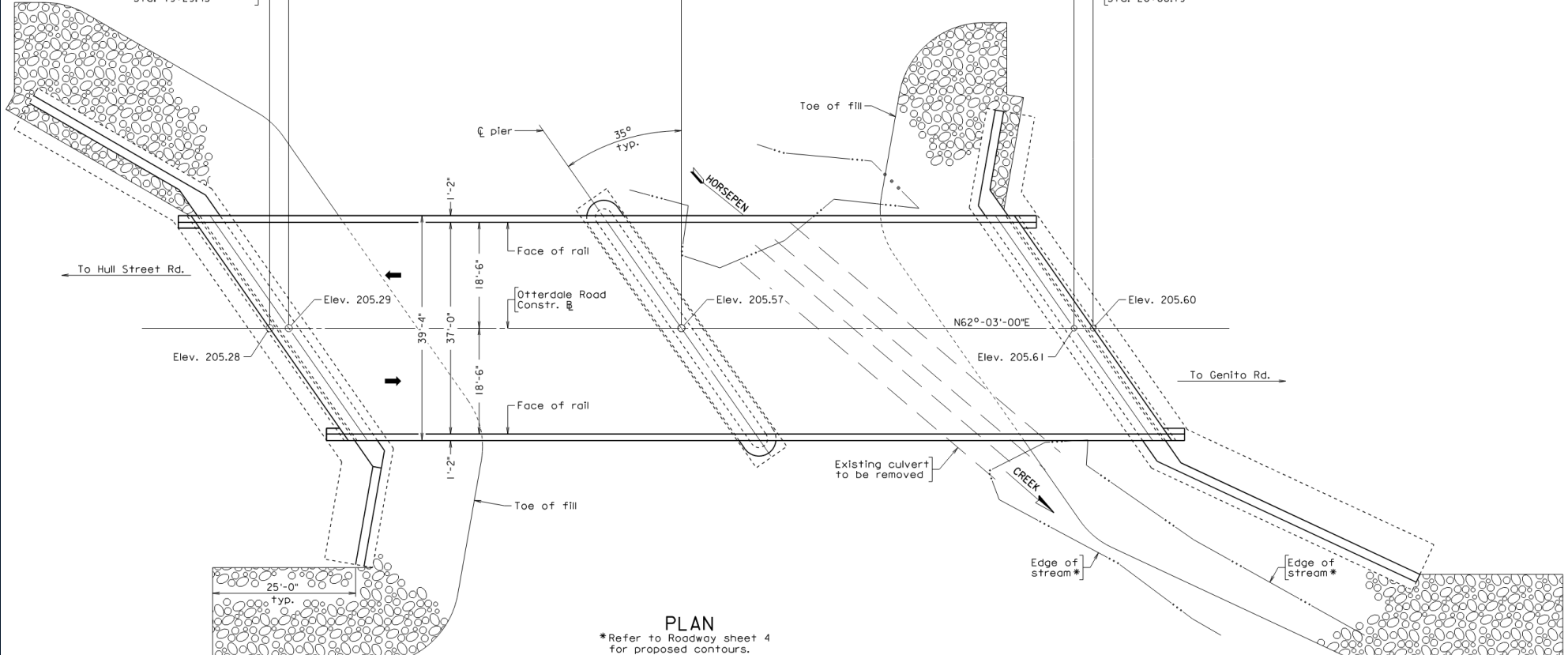


Otterdale Branch

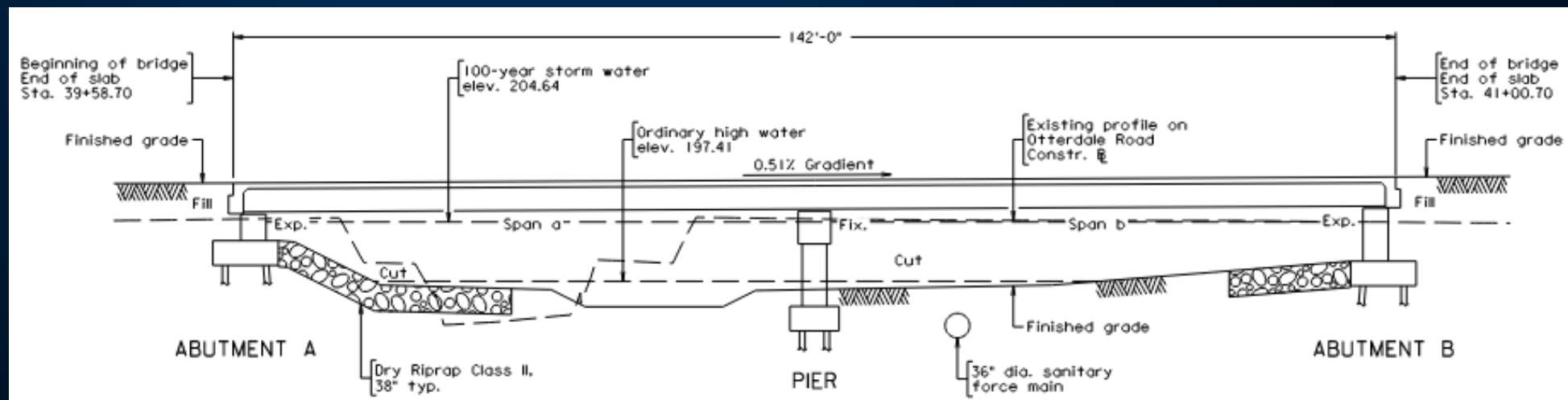
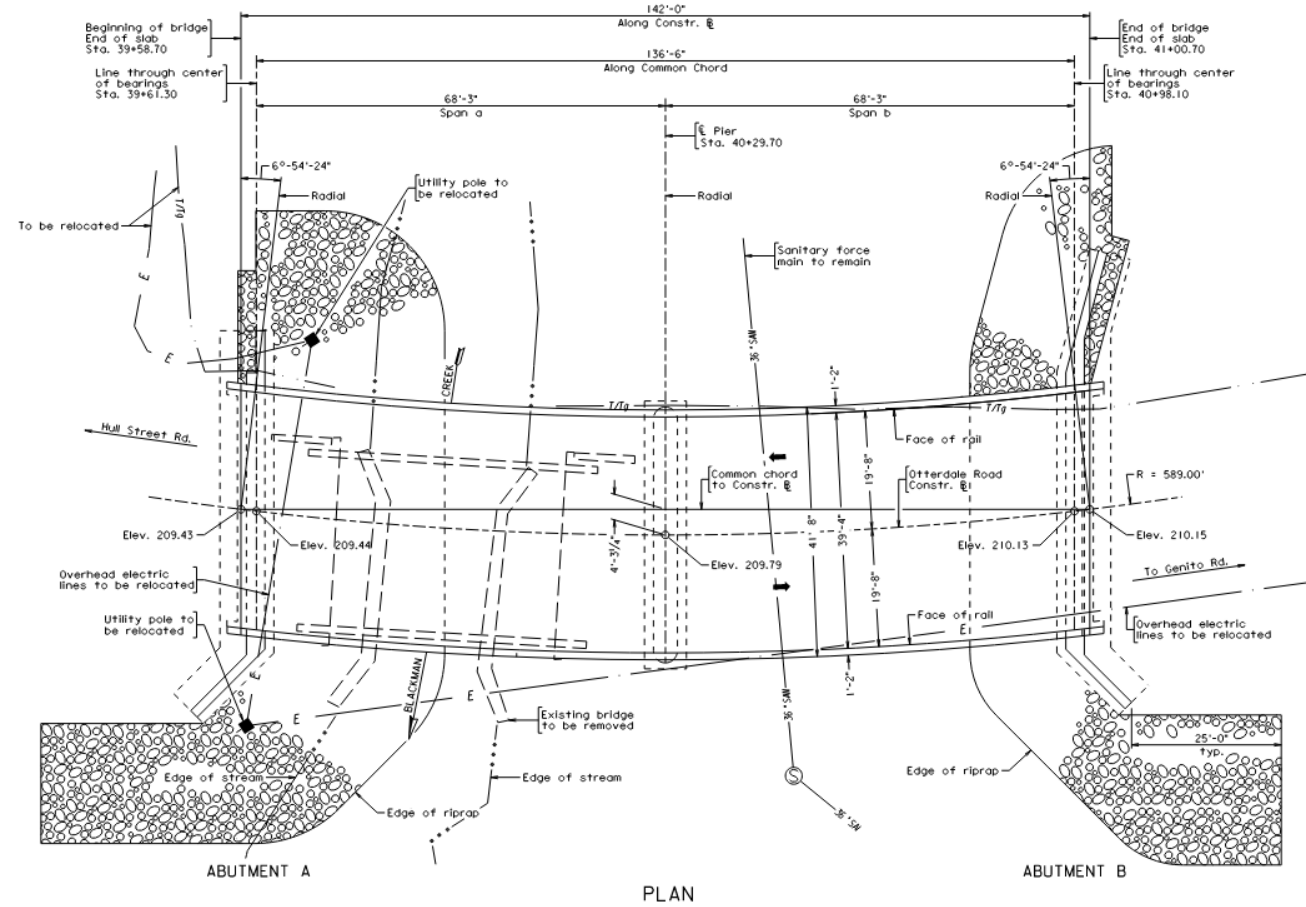
Proposed Single Span Bridge



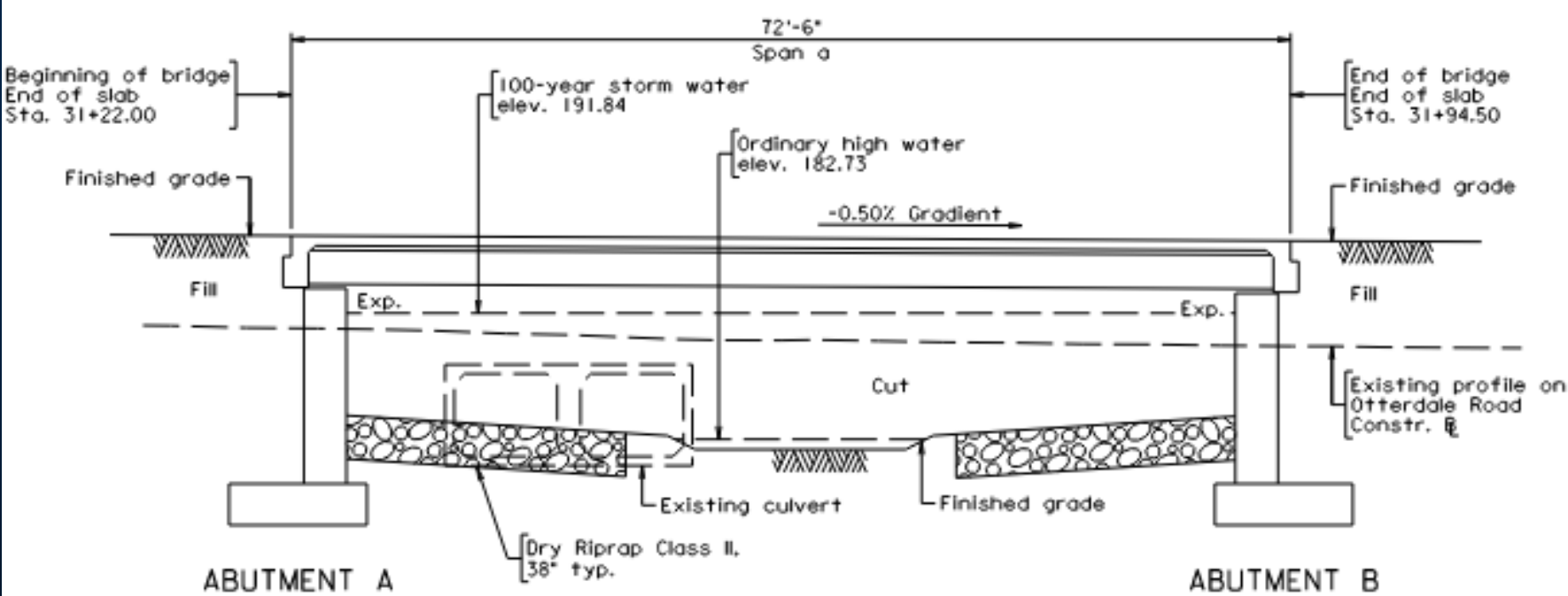
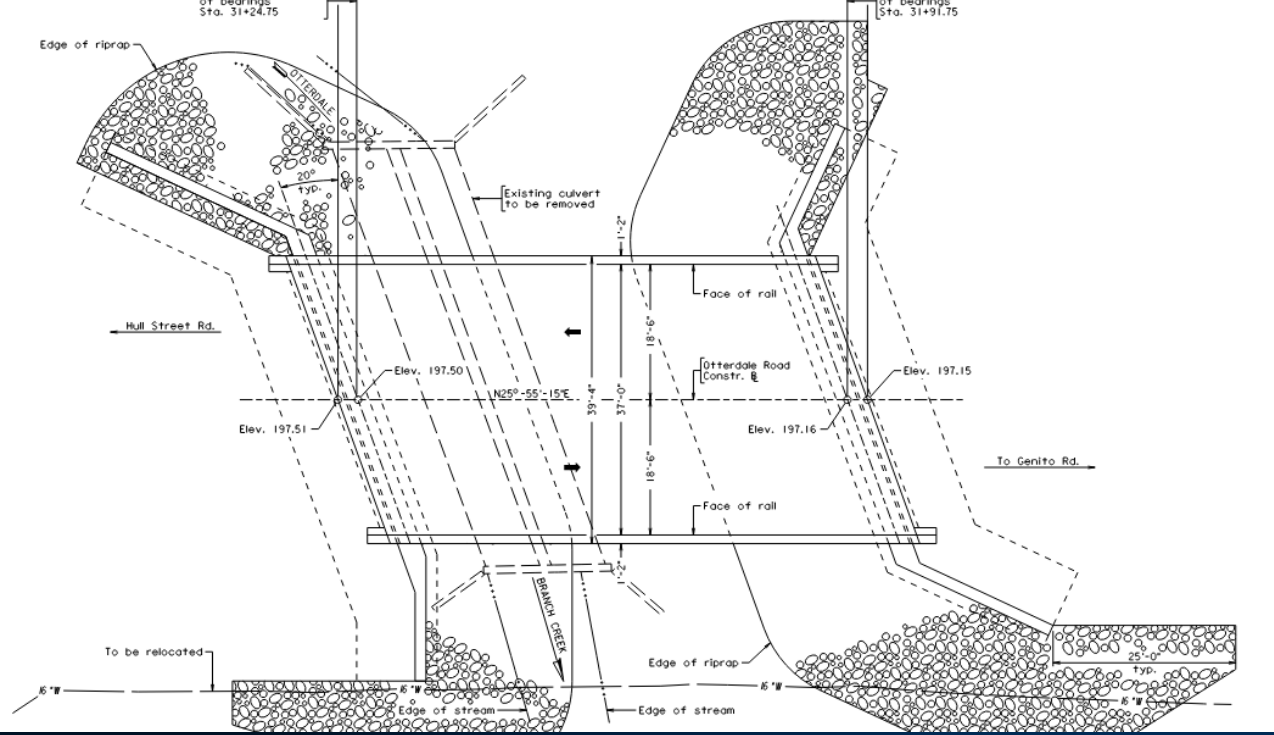
Horsepen Creek Bridge



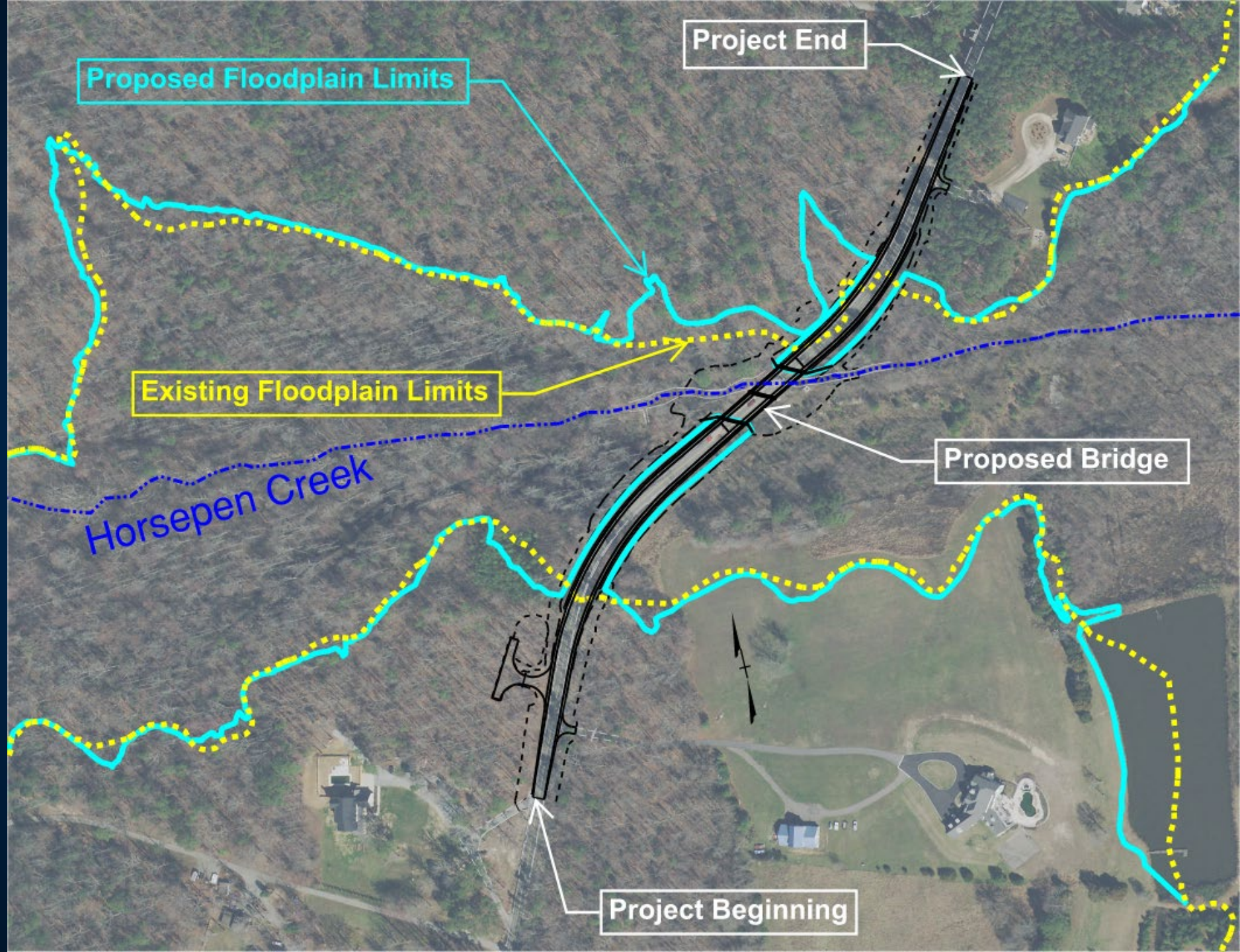
Blackman Creek Bridge



Otterdale Branch Bridge



Horsepen Creek Floodplain



Project Delivery

- Request for CLOMR submitted May 3, 2021
- Over the shoulder review/collaboration/ relationships
- CLOMR Issued on December 15, 2021—7.5 months!
- Commitment to deliver
- Delivered as promised
- Awarded January 26, 2022
- Construction Underway



@OtterdaleRoad

www.OtterdaleRoadDrainageImprovements.com

Questions?

