



A Renovative Hybrid Retaining Wall Design to Reuse an Existing Retaining Wall and Keep a Restaurant Open

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November 2nd, 2023

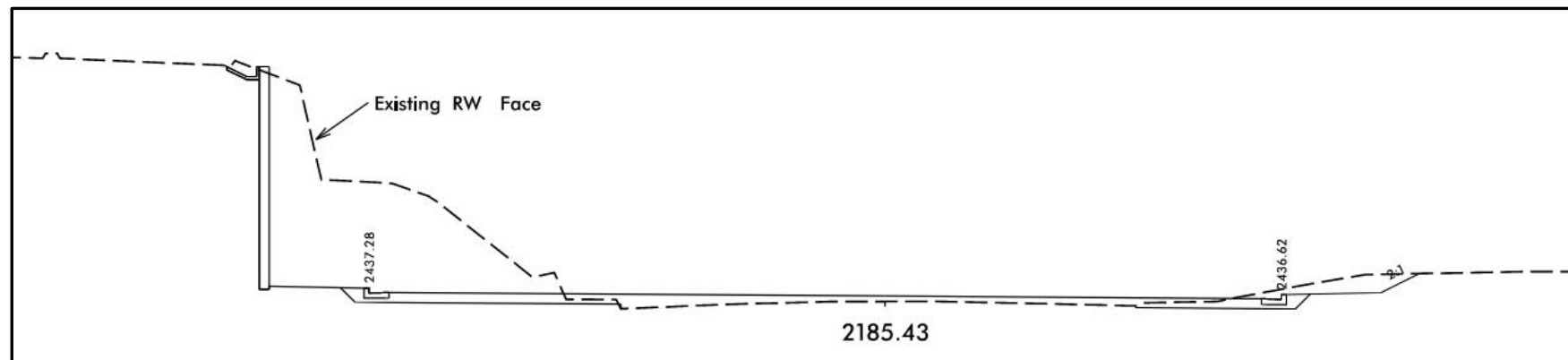
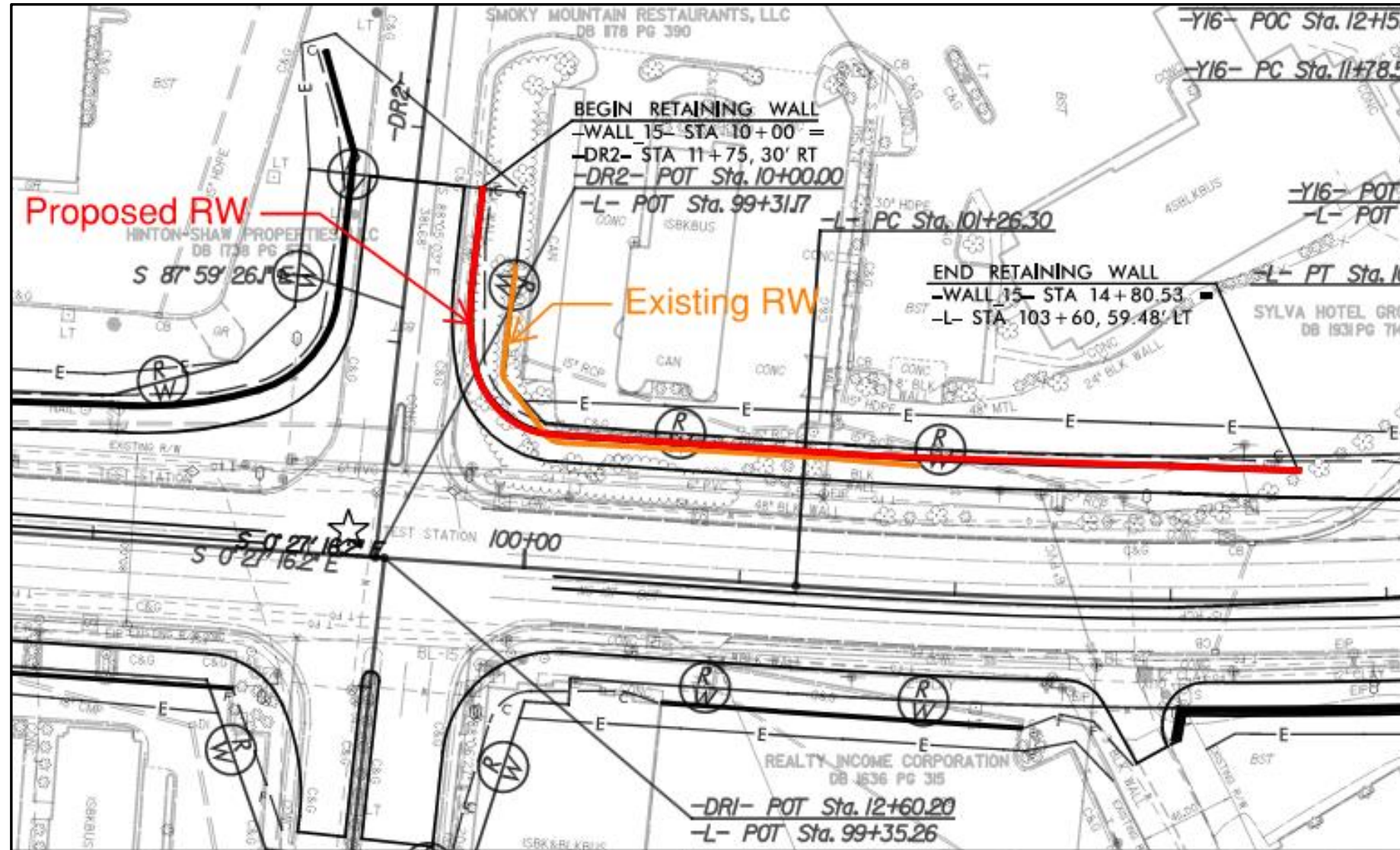
Sonic Plan View



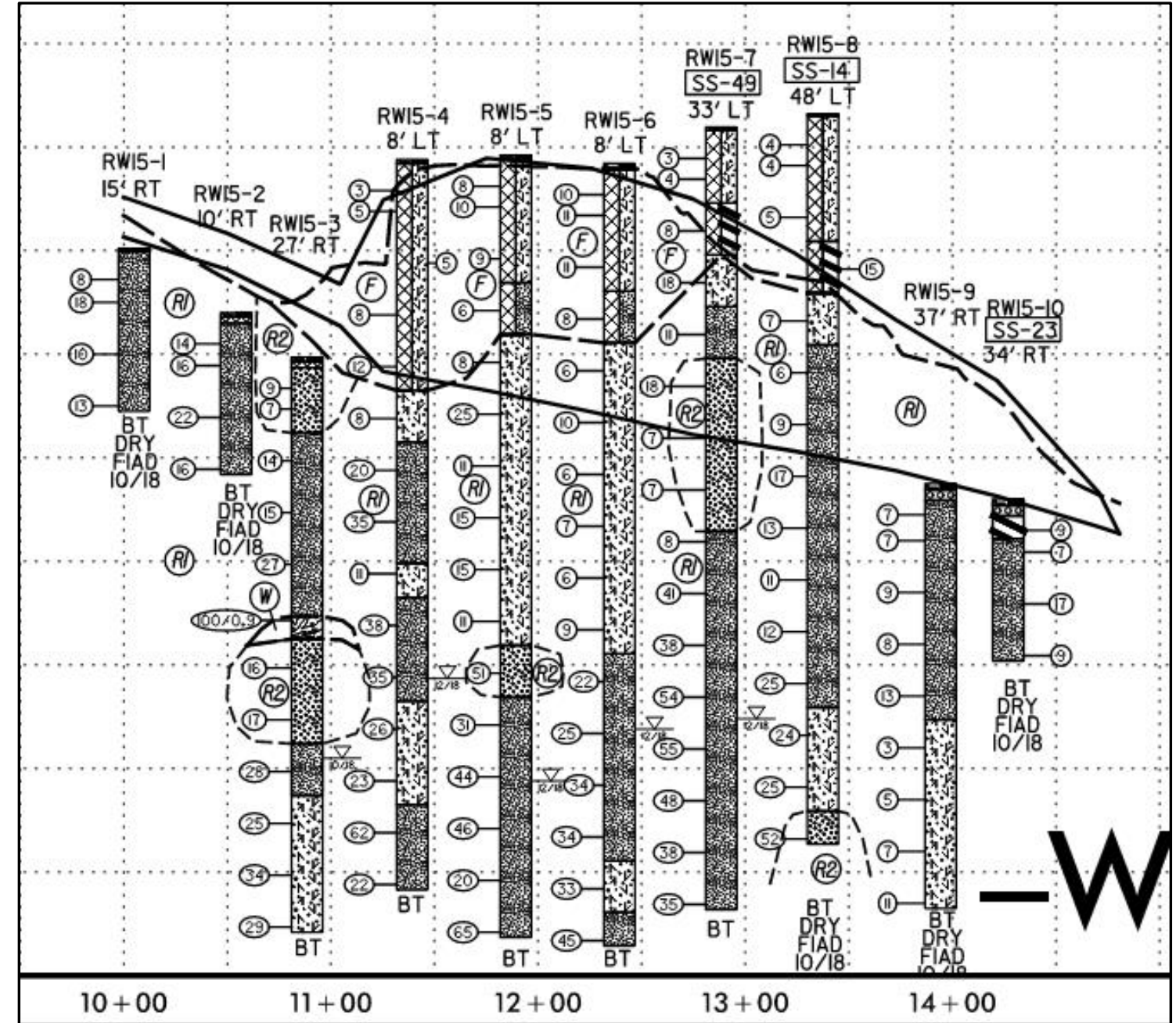
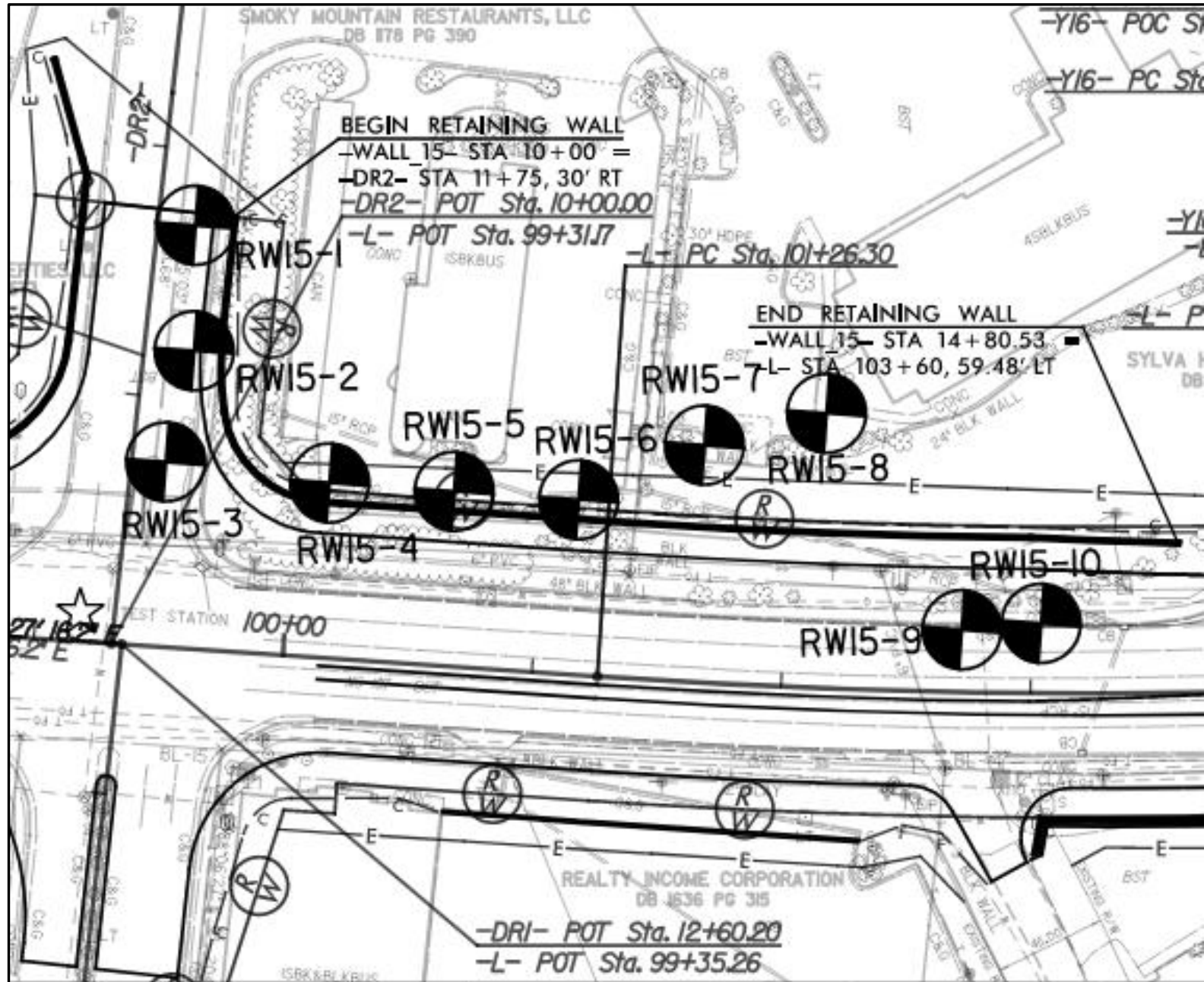
Existing Retaining Wall



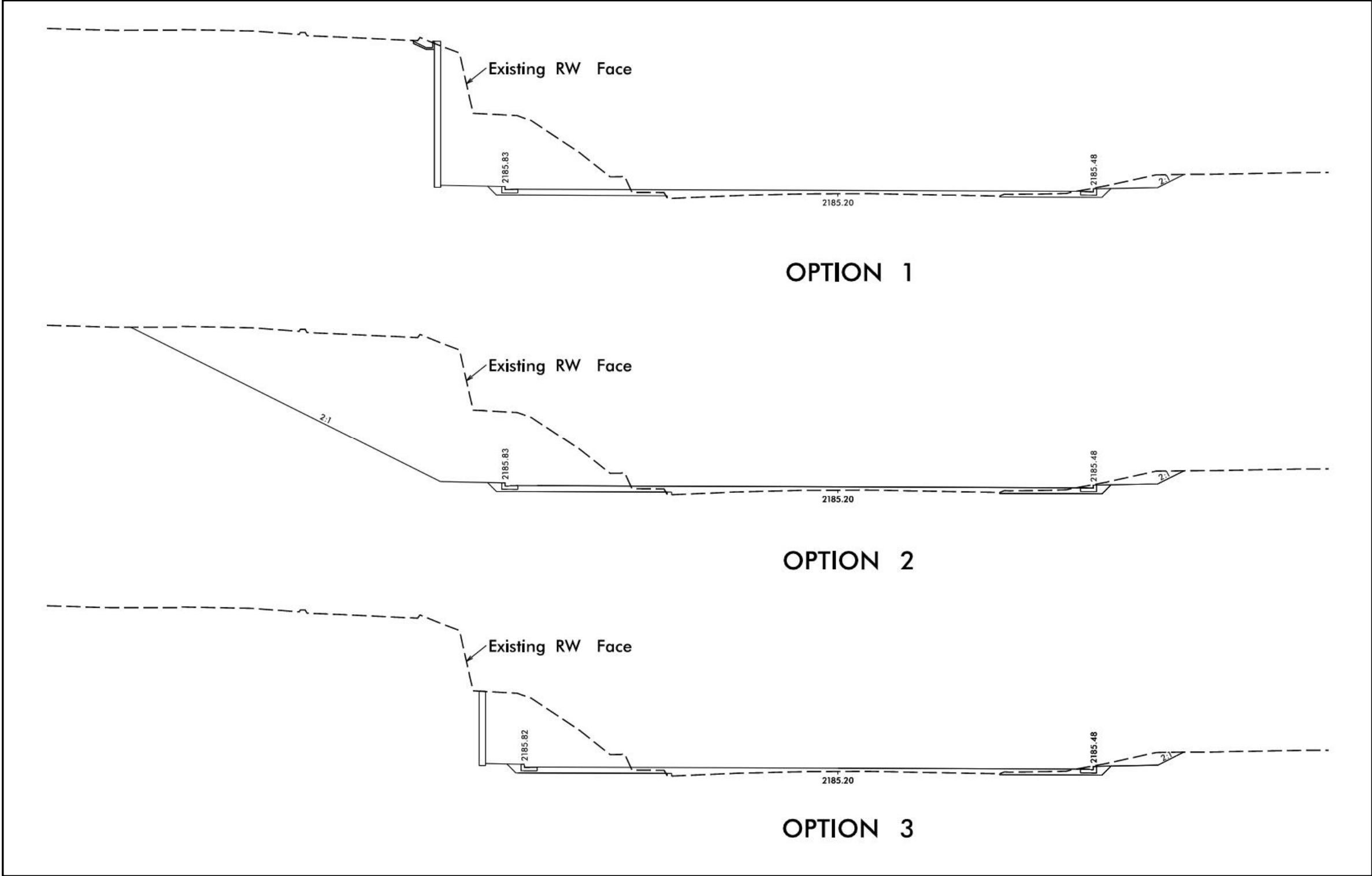
Original Design



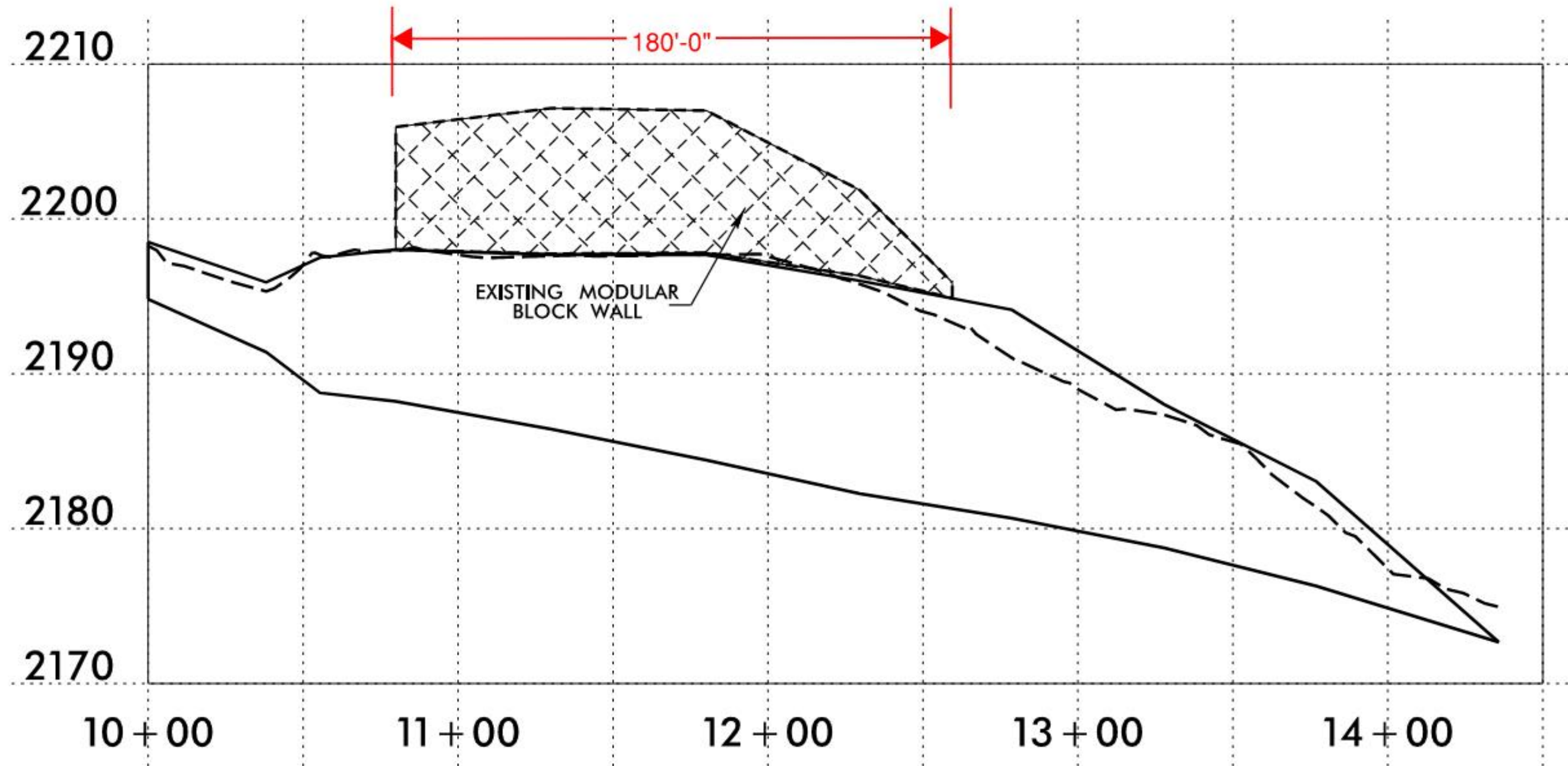
Subsurface Condition



Design Alternatives



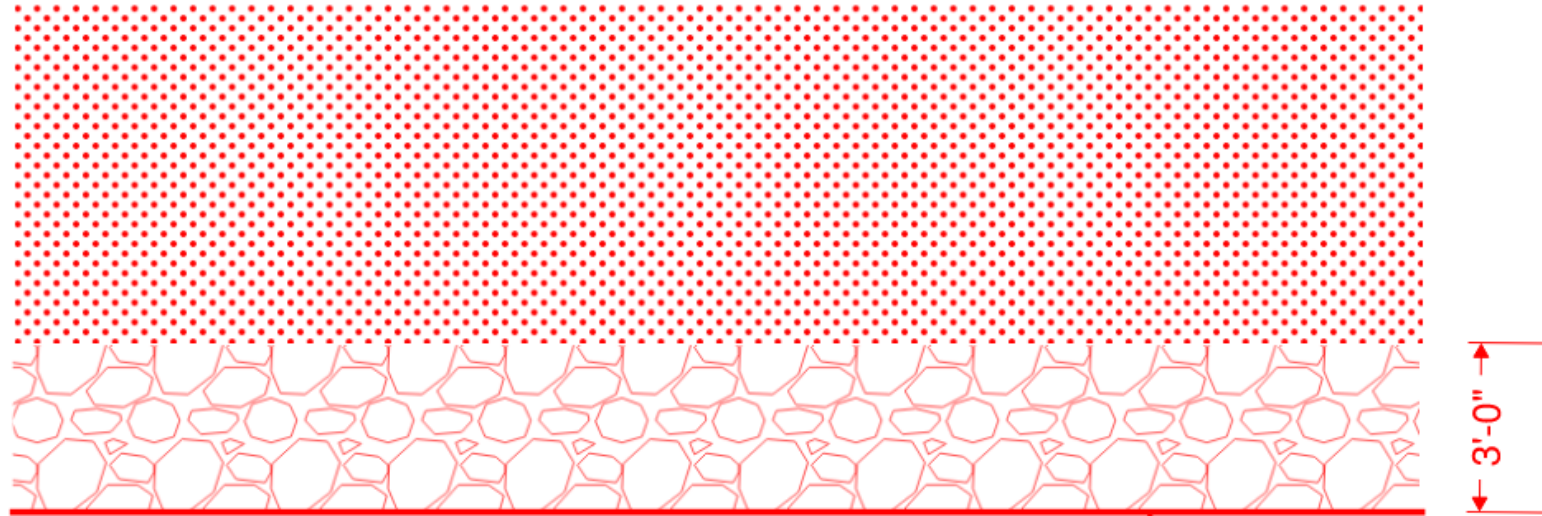
Option 3 with Existing Retaining Wall Underpinning



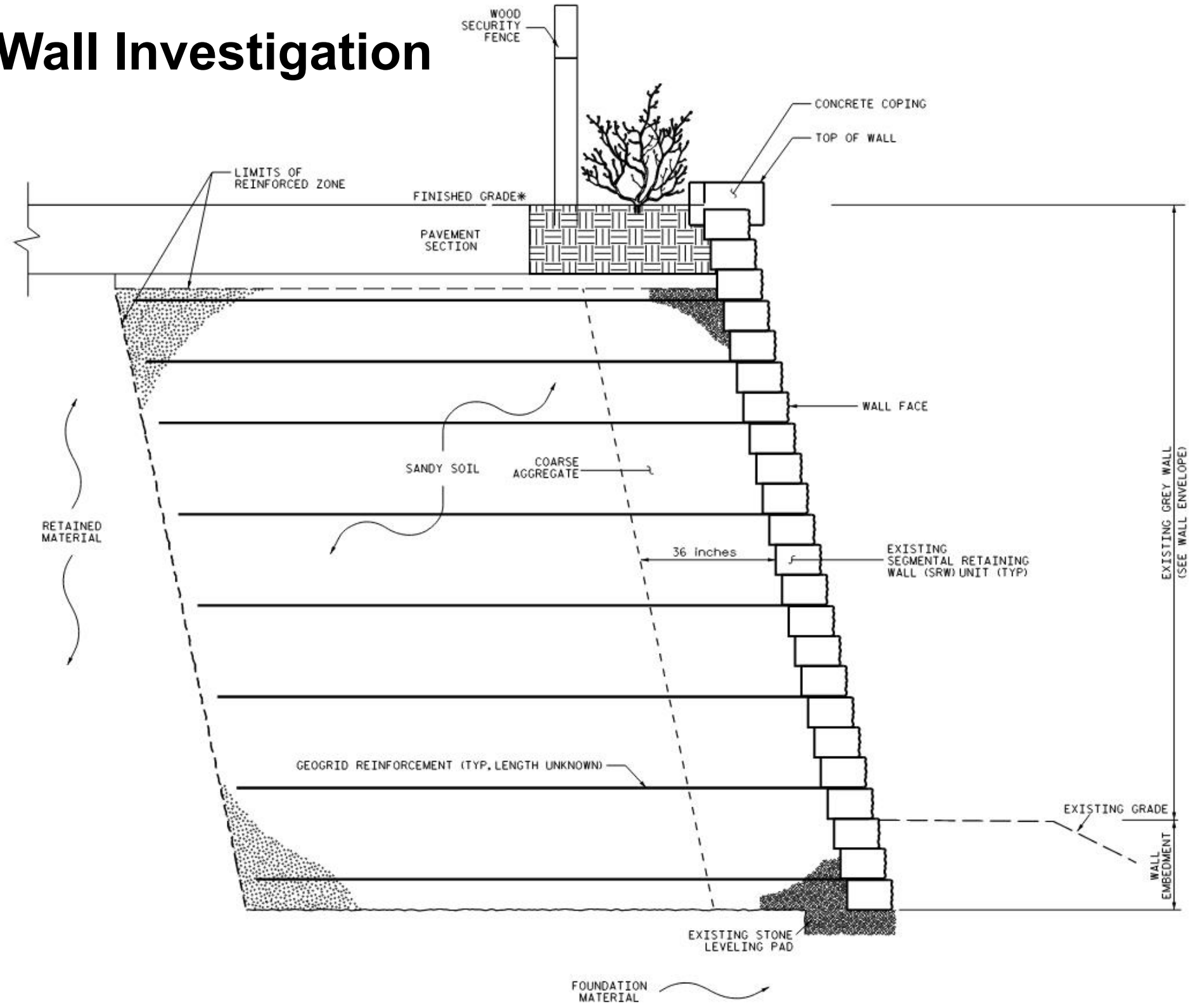
Existing Retaining Wall Investigation



Existing Retaining Wall Investigation

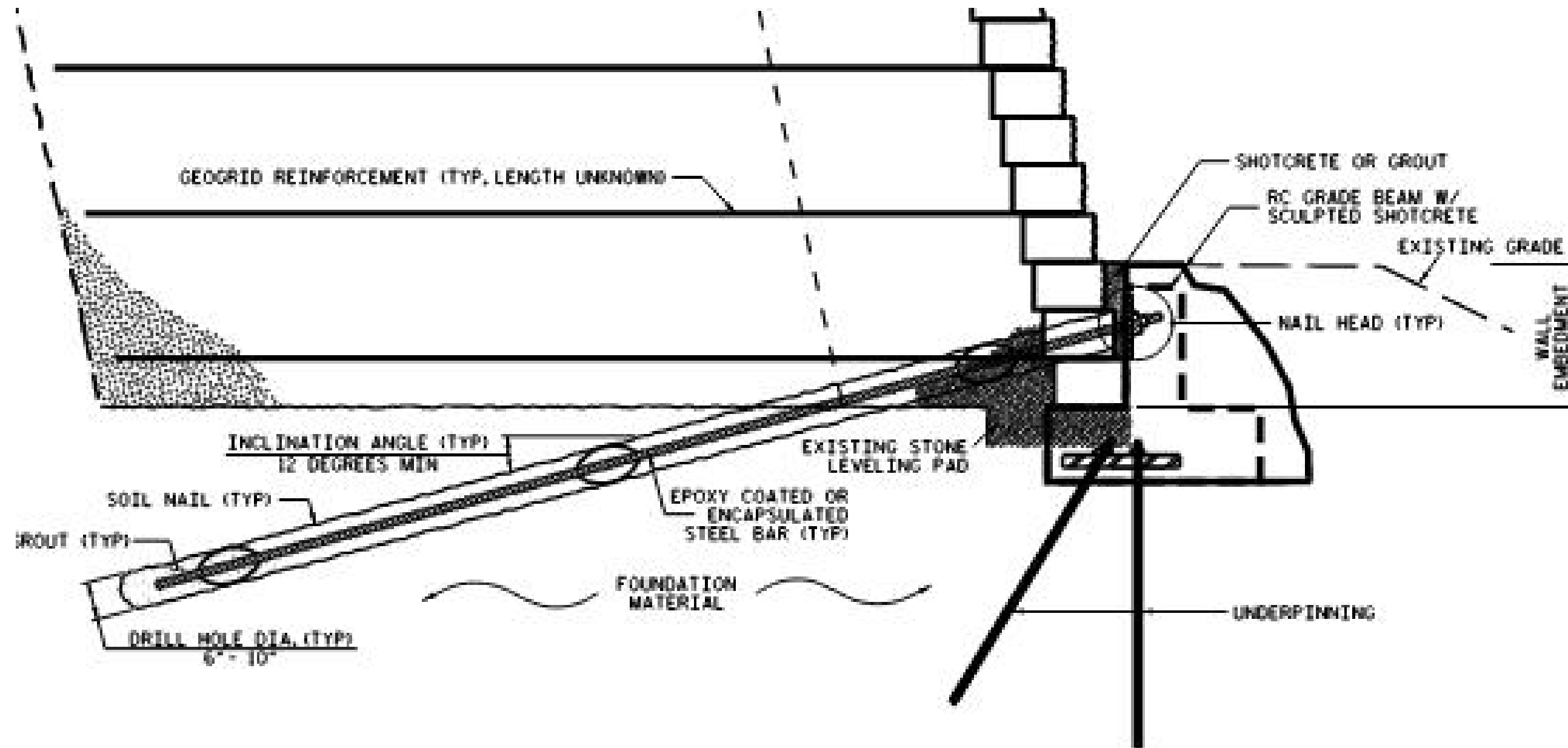


Existing Retaining Wall Investigation

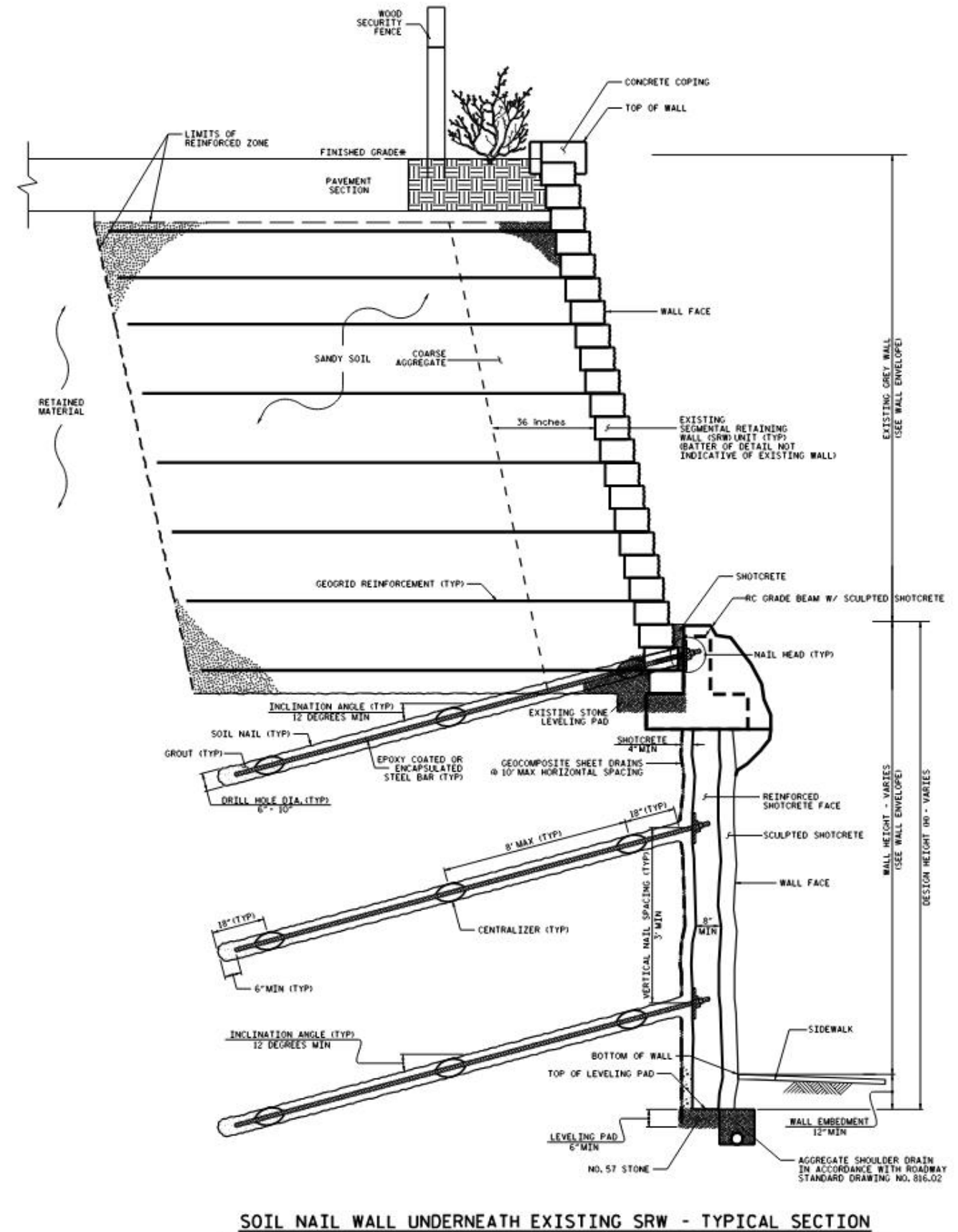
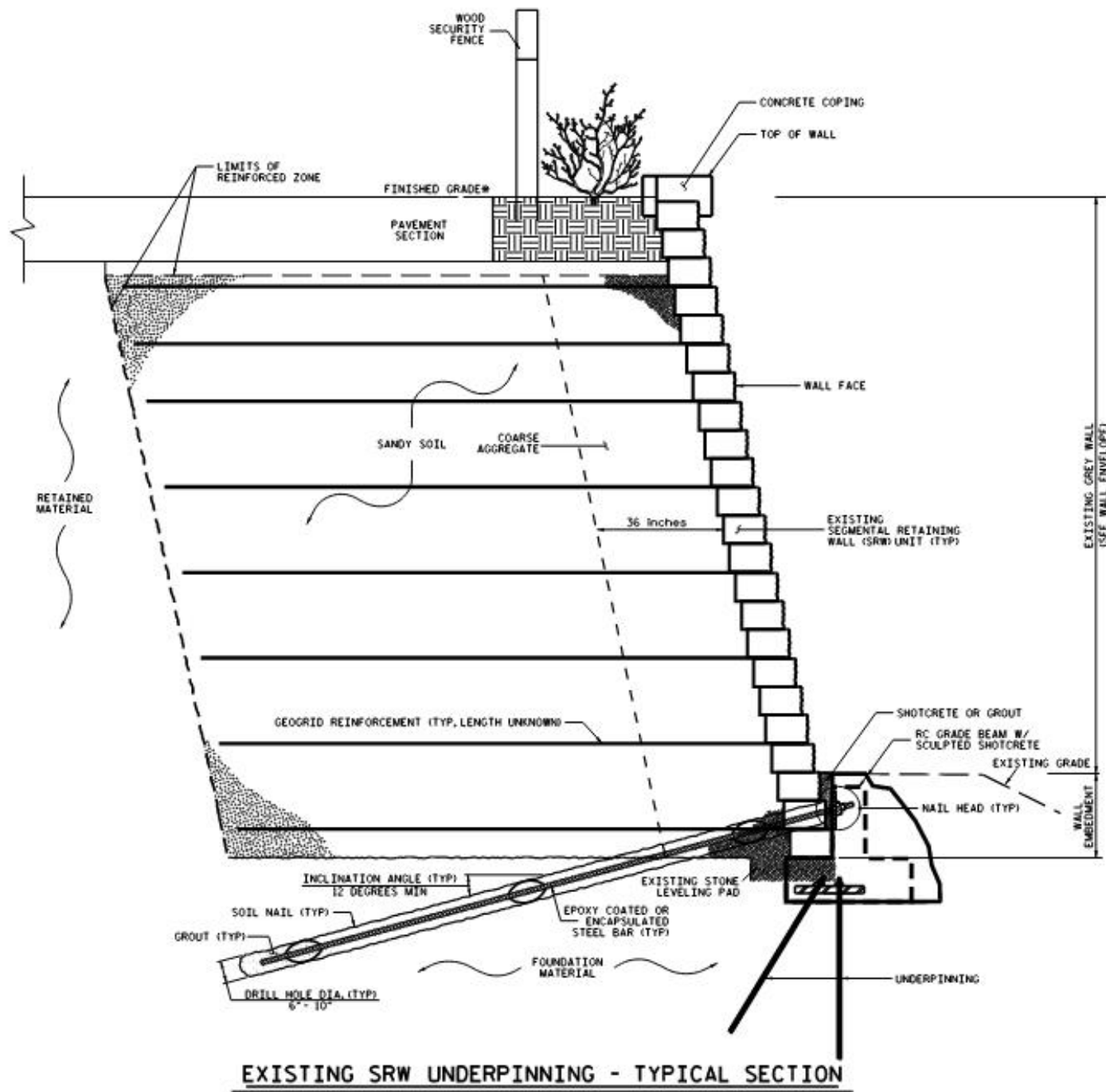


EXISTING SRW - TYPICAL SECTION

Existing Retaining Wall Underpinning



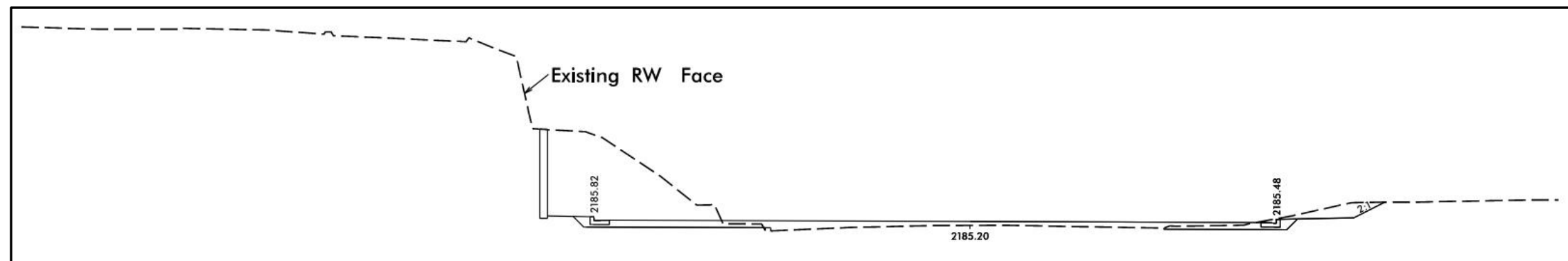
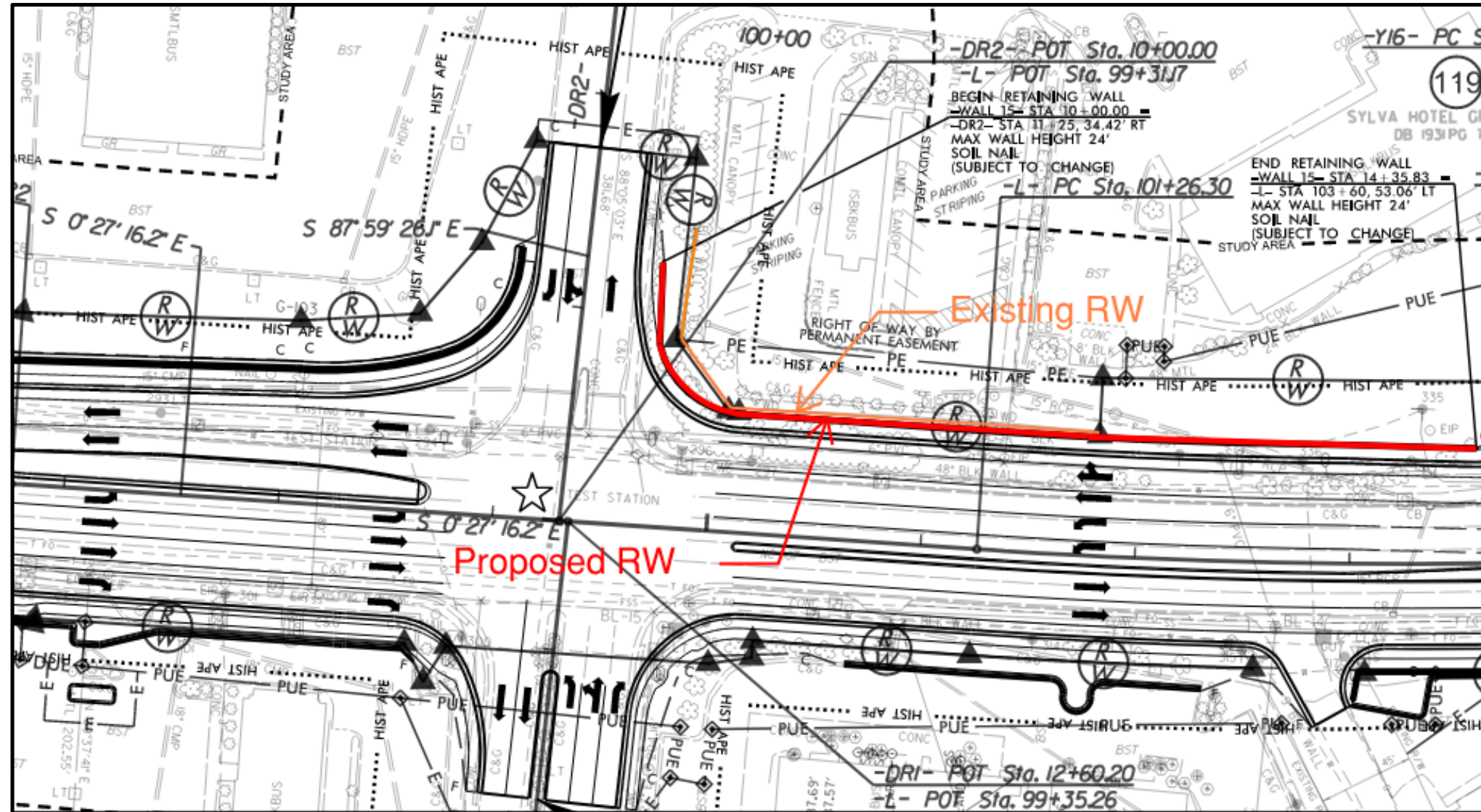
Existing Retaining Wall Underpinning



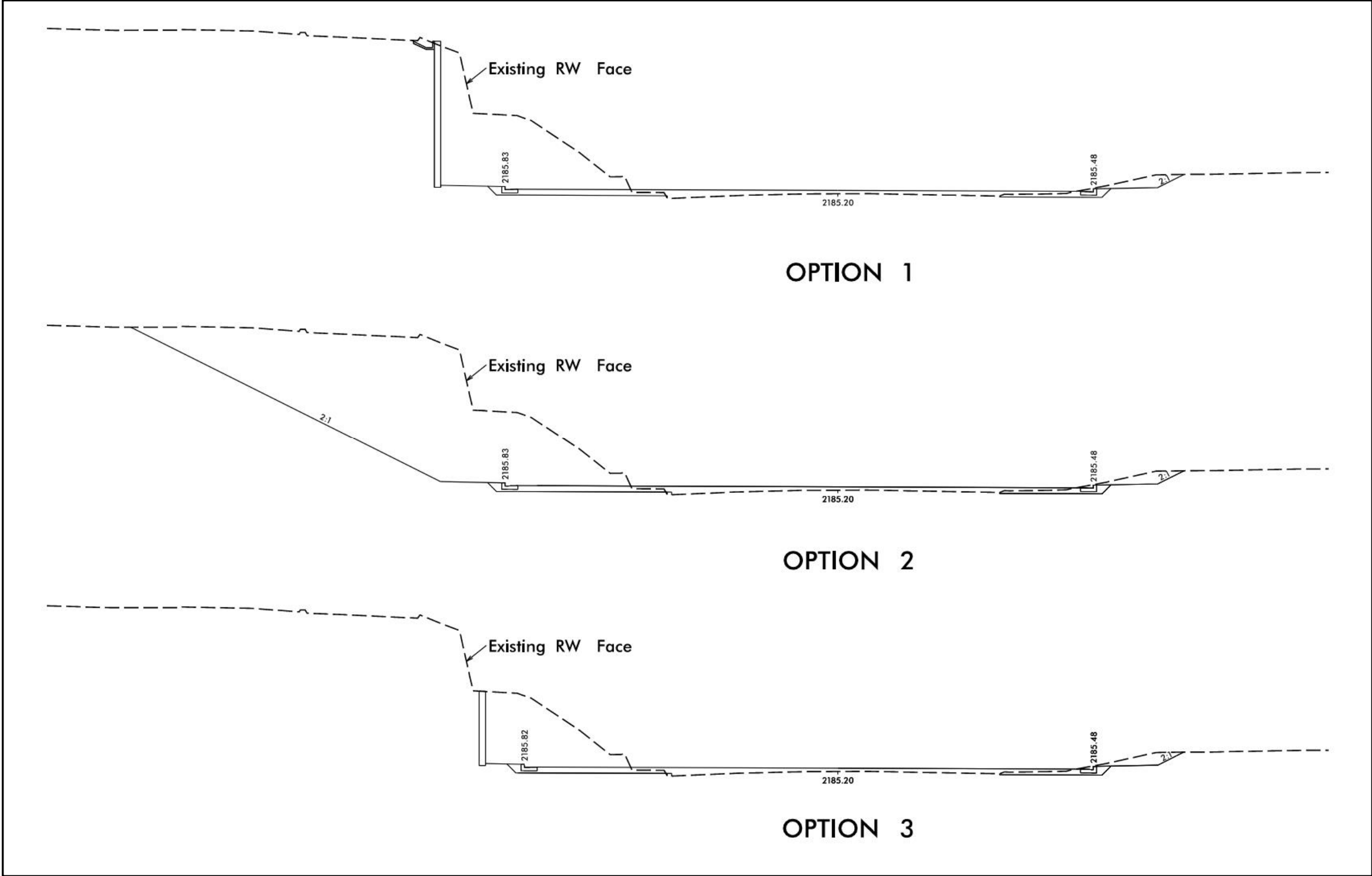
Underpinning Method for Existing 180 ft Modular Block Wall

- Grade Beam Underpinning
 - Assume 3 ft x 1 ft Base, 2 ft x 1 ft Stem, 34 CY of RC
- Mini Piled Underpinning
 - Assume 6 ft spacing, 20- 30 ft long piles, 30 Mini Piles
- Cost Estimate for 180 ft Underpinning
 - RC: \$700/CY, \$24k
 - Helical Pier (Screw Pile): \$3000/EA, \$90k
 - Micropiles: \$8000/EA, \$240k
 - Say \$150k to \$300k

Proposed Design



Cost Comparison



Cost Comparison

Design	SN		ROW	Underpinning	Cut Slope	Total Cost
	Area (sf)	Cost				
Option 1	6,720	\$907,200	\$2,000,000	-	-	\$2,907,200
Option 2	3,410	\$460,350	\$2,000,000	-	\$54,360	\$2,514,710
Option 3	4,210	\$568,350	-	\$300,000	-	\$868,350

Special Provisions

- Design the underpinning and protection system based on the dead loads, construction vehicles, sequence of construction, and other construction loads that are anticipated on proposed.
- Confirm the design meets current AASHTO, FHWA, and NCDOT Standards and Provisions.
- The underpinning system drawings shall include design dimensions, limits of work, elevations, material, member sizes, construction sequence, specific installation procedures, and testing requirements.
- Ensure that no component of the underpinning system conflicts with other construction related to the project.

Special Provisions

- Ensure all components of the underpinning system stay within the legal right-of-way unless an easement is obtained by the Contractor.
- Satisfactory completion of the work and acceptable performance of the underpinning system shall be determined by comparing pre-construction and post-construction LiDAR scans of the existing wall face and property above.
- The post-construction scan shall be performed no sooner than 90 days and up to 1 year following completion of the underpinning system and associated soil nail wall.
- In no instance shall the change in the pre-construction and post-construction location of any individual point exceed 2" total and the differential movement between points shall not exceed more than 0.5" in 30 feet.

QUESTIONS?