

I-81/NYS 17 Prospect Mountain Interchange Improvements Project

Broome County, NY



Transportation Research Board ADC40
Transportation-Related Noise & Vibration
2017 Summer Meeting

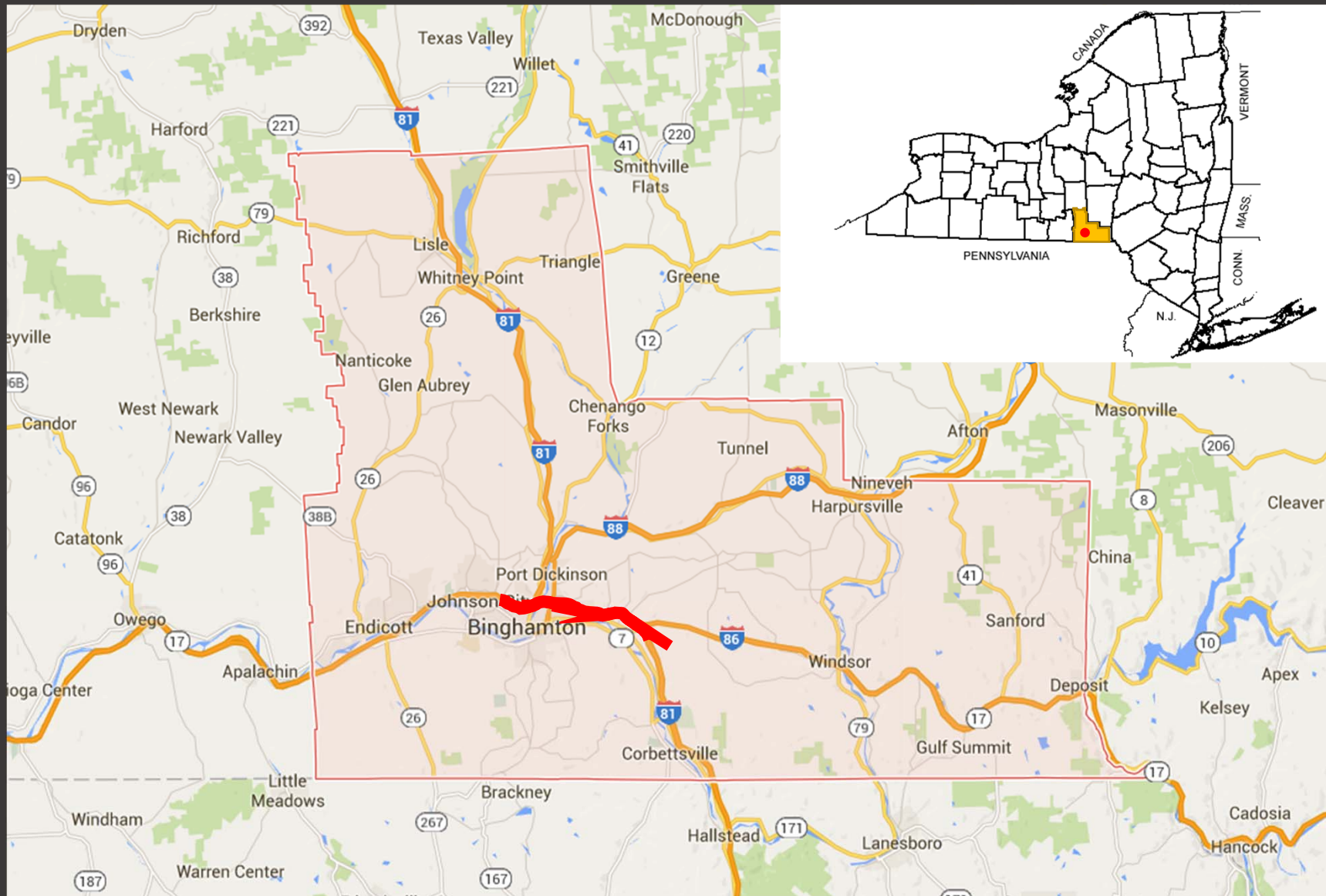
Joe Van Kerkhove, PE
Ken Avery, PE



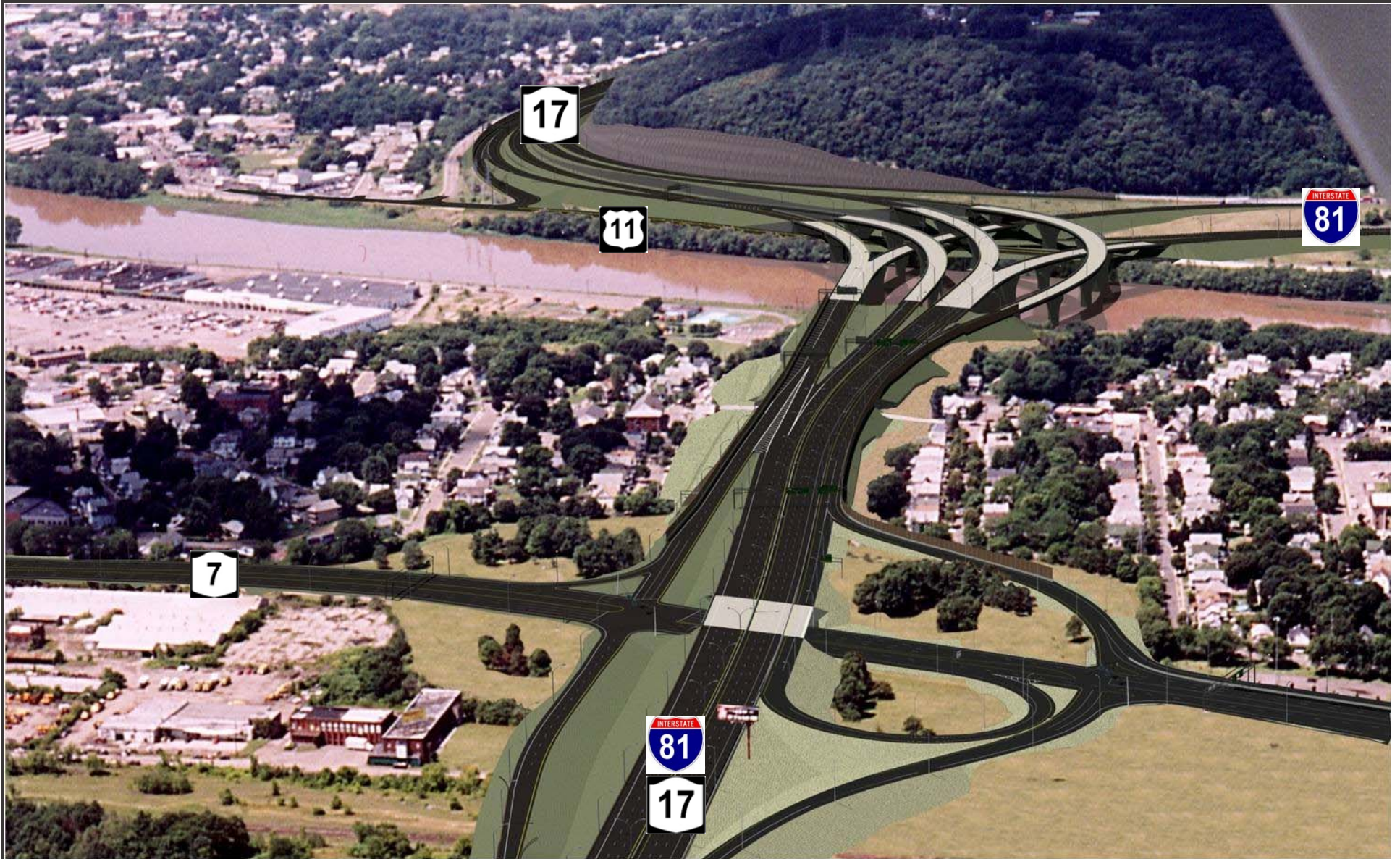
An aerial photograph of a city area, including a river, residential neighborhoods, and commercial buildings. Overlaid on the map is a technical project plan showing proposed roadways, bridges, and green spaces in various colors (green, yellow, orange, grey). Traffic light symbols are placed at several intersections along the proposed routes. The text "Project Background" is centered over the map in a large, white, sans-serif font.

Project Background

Project Location



Selected Alternative



Interchange Timeline



1960's
Original
Construction

1999
NYS Rte 17 / I-81
Corridor Noise
Study

2008
Design
Approval

2015
Phase 1
Construction
Completed

2016
Phase 2
Construction
Commences

1995
Interchange
Study

2007
Project
Noise
Study

2013 - 2015
**Phase 2 Design &
Re-Evaluation
Noise Study**

1999 Corridor Noise Study

TRANSPORTATION

PROJECT REPORT

NOISE ABATEMENT NEEDS AND FEASIBILITY STUDY

VOLUME I: NOISE STUDY REPORT

N.Y. ROUTE 17/INTERSTATE ROUTE 81

BROOME COUNTY, NY

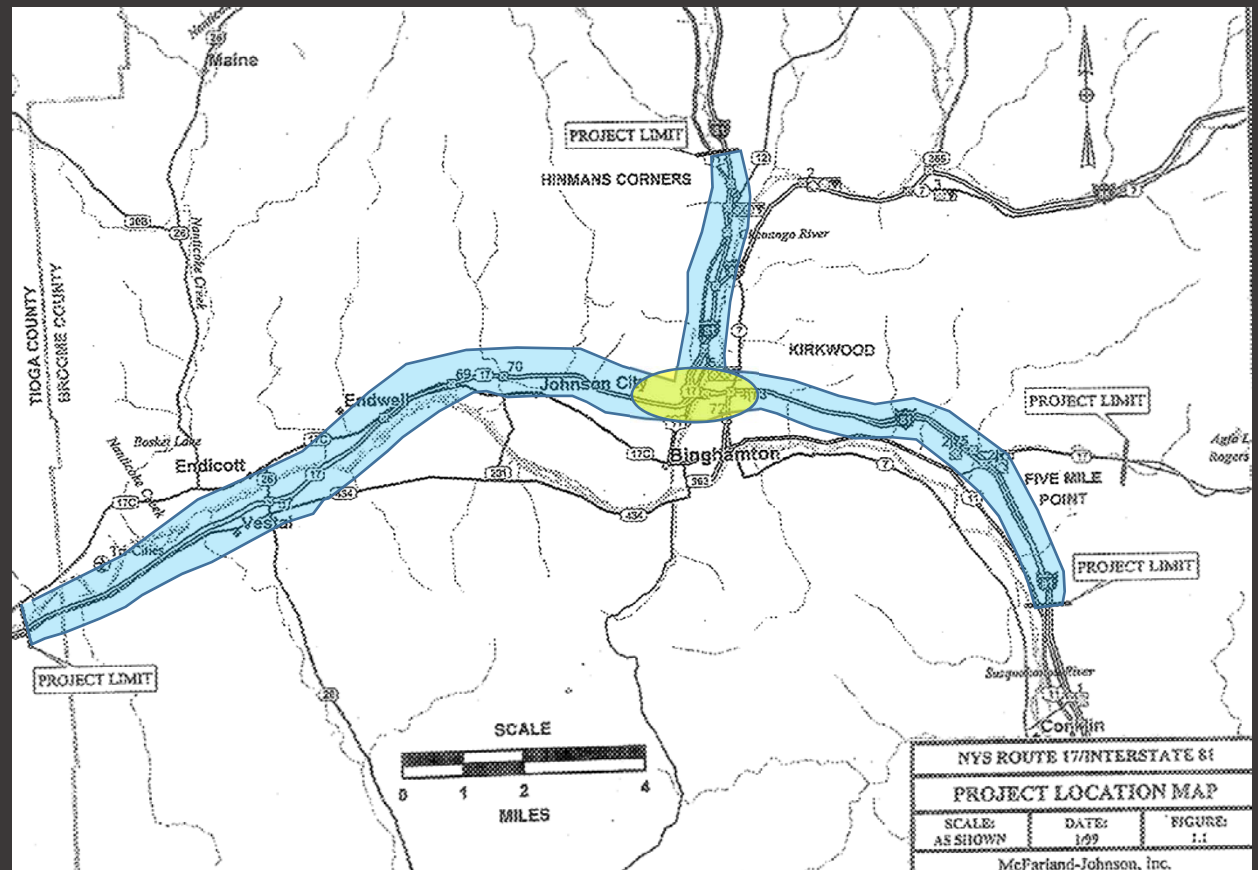
DOO8524, P.I.N. 9066.69.101

May 28, 1999



UNITED STATES
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
JOSEPH H. BOARDMAN, Commissioner



2007 Original Project Noise Study

TRANSPORTATION

NOISE REPORT

NYS ROUTE 17/INTERSTATE 81 INTERCHANGE
SH 63-24, SH 64-1, SH 64-4, SH 64-5, SH 68-8
PIN 9500.61

CITY OF BINGHAMTON
TOWN OF DICKINSON
BROOME COUNTY

Prepared By:
McFarland-Johnson, Inc.
49 Court St., P.O. Box 1980
Binghamton, NY 13902

May 2007

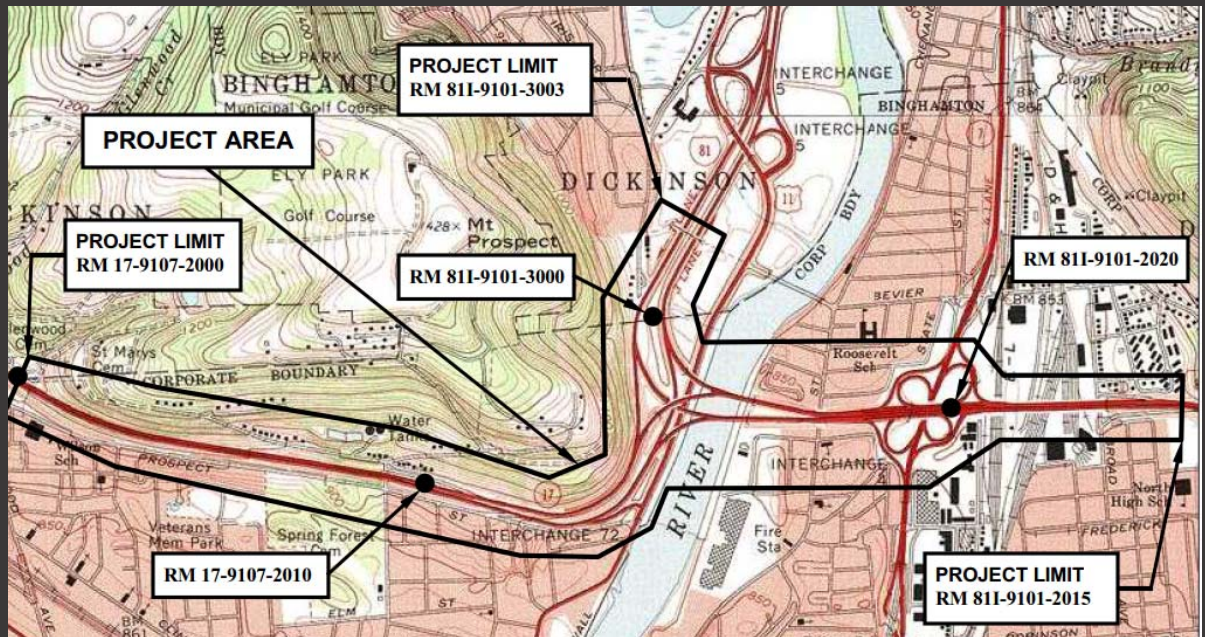


UNITED STATES
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
ASTRID C. GLYNN, Commissioner
ELIOT L. SPITZER, Governor



PROJECT REPORT



2013 – 2014 Additional Noise Analyses


Western Limit Extends to NYS 17 at Airport Road

Eastern Limit Extends to I-81/NYS 17 at I-86

Approx. 7.5 miles



— Original 2007 Noise Study Limits

An aerial photograph of a suburban area with a river on the left, residential streets, and commercial buildings. Overlaid on the map is a technical design for a transportation project, showing a multi-lane road with a central green landscaped area, several roundabouts, and signalized intersections. The design is highlighted in yellow and green against the grey-toned aerial background.

Phase 2 Design **BERGMANN ASSOCIATES**

Phase 2 – Noise Analysis & Design

- **NYSDOT added adjacent Noise study areas from the 1999 Corridor Study – Bergmann scoped to complete noise analyses of these areas**
- **Bergmann also scoped with Final design of 6,500 ft of Noise Barriers that were already recommended for construction in the 2007 Noise Study**
- **As a result of Bergmann 2013 Noise Analyses, additional noise barriers are recommended for construction**
- **NYSDOT DETERMINES THAT ADDITIONAL NOISE REVIEW MUST FALL UNDER A RE-EVALUATION PROCESS**

WEST AREA

Re-Evaluation (((NOISE)))

Legend

- Proposed Noise Barrier
- Photo Simulation Location
- Benefited Residences



Phase 2: I-81 / NY17 Interchange Reconstruct
PIN 9500.80

Noise Wall Location - West

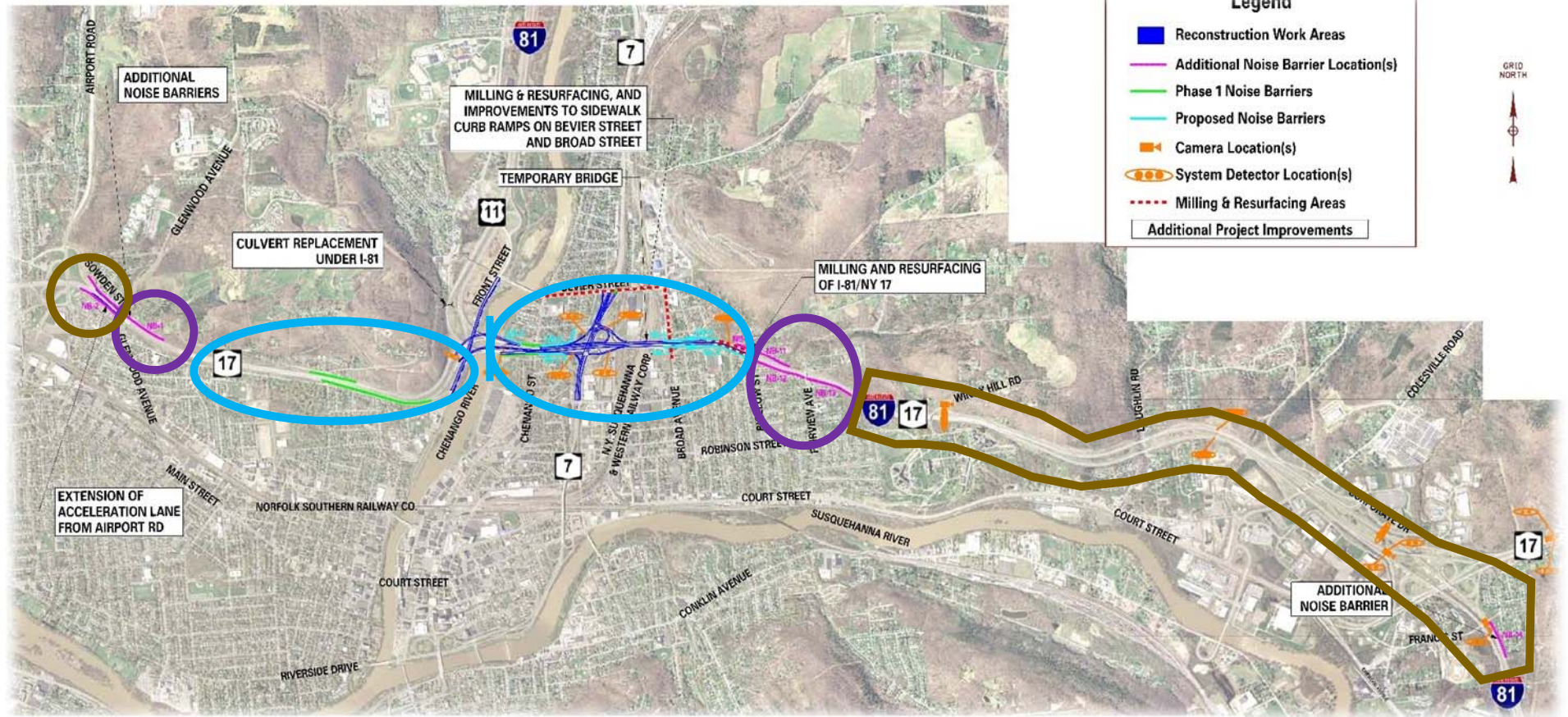
SHEET NO. 1 OF 1	SCALE N.T.S.	DATE November 20
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Phase 2 Project Elements (Re-Evaluation Items)

NEPA Re-Evaluation
Statement!

- A. Non-Standard Highway Features
- B. Milling and Resurfacing Roadways
- C. Modifications / Reconstruction of Highway X-Culvert
- D. Additional Drainage Inlets
- E. Extension of Acceleration Lane
- F. Addition of Temporary Bridge
- G. Addition of Concrete Median
- H. Extension of Eastern & Western Limits for the
Purpose of Noise Analyses to coincide with
limits of Enhanced ITS work**

Phase 2 Further Extends Noise Project Area Limits



Phase 2 Project Elements (NYSDOT Noise Policy)

- 2007 Study was performed using Previous Policy
- Updated NYSDOT Policy in 2011 was in place during 2013 & 2014 Studies
- Major Change in Policy was the reasonableness Cost Index for abatement measures
- Previous Policy – A maximum \$50,000 wall cost per benefitted receptor applied
- Current Policy – A maximum of 2000 sq-ft of wall per benefited receptor applies
- Decision made to use Previous Policy since noise barriers were found feasible & reasonable to build in the original study area of the Project

Phase 2 Project Elements (Additional Noise Analysis Locations)

- **NYSDOT requested that Bergmann perform additional noise measurements and analyze locations not included in the studies - Residential property owners claimed that they were not considered in any of the Project Noise Studies**
- **Seemed to be problematic at first because the noise studies had already identified impacts and recommended noise barriers for construction**
- **Fortunately, we able to resolve these issues**

Phase 2 Project Elements (Additional Noise Analysis Locations)

Additional Site #1



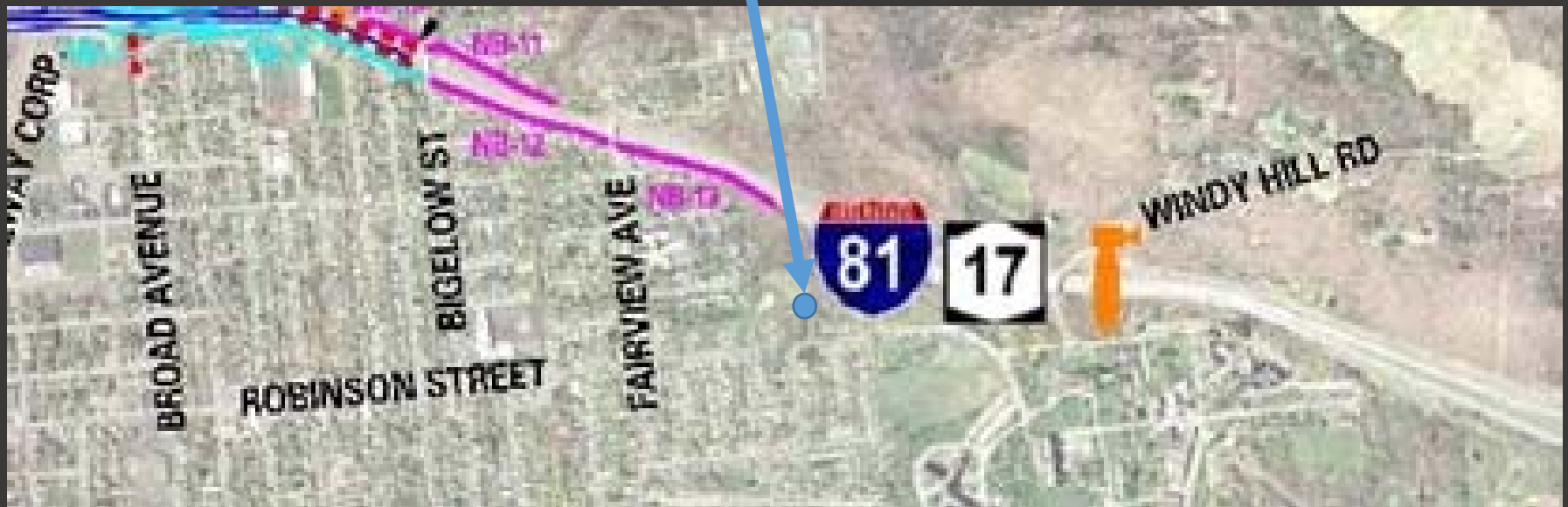
Residential Property fell inside a “gap” in the defined noise study area from the original 2007 study, and the study area scoped by NYSDOT for the 2013 study; and was then overlooked when defining study areas in 2014

Phase 2 Project Elements (Additional Noise Analysis – Site #1)

- **Measurements were taken, and analysis was performed using the TNM model already created for the 2013 Study.**
- **NO Traffic Noise Impacts identified at this residential property**
- **An updated barrier analysis was performed by extending the adjacent recommended wall (NB-1)**
- **Wall height in excess of 30 feet was required to achieve a 5 dBA reduction at the property**
- **Additional wall area would make it fail reasonableness criteria – NB-1 remained as identified in 2013 Study**

Phase 2 Project Elements (Additional Noise Analysis Locations)

Additional Site #2



Residential Property was not within any of the noise study areas from the 1999 study, and during the re-evaluation review this neighborhood was left out of the noise study due to its distance from the highway.

Phase 2 Project Elements

(Additional Noise Analysis – Site #2)

- **Measurements were taken, and analysis was performed using the TNM model already created for the 2013 Study.**
- **NO Traffic Noise Impacts identified at this residential property**
- **An updated barrier analysis was performed by extending the adjacent recommended wall (NB-13)**
- **Distance between highway and nearest property is (~400 ft), and it was not possible to achieve a 5 dBA reduction at the property**
- **NB-13 remained as identified in 2013 Study**

A photograph of a large bridge under construction over a river. The bridge has multiple concrete piers and a curved approach. A yellow crane is visible on a barge in the water. The background shows a forested hillside. The text "Phase 1 Construction Photos" is overlaid in white.

Phase 1 Construction Photos

Phase 1 Construction



A photograph of a construction site for noise barriers. In the foreground, there is a long, low concrete wall with a corrugated metal panel. Behind it, a higher concrete wall is under construction, featuring several vertical concrete pillars and horizontal concrete beams. Two workers in high-visibility vests are visible near the base of the upper wall. In the background, a large metal lattice tower structure is visible against a hazy sky. The entire image has a semi-transparent grey overlay.

Phase 2 Noise Barriers

Phase 2 Noise Barriers

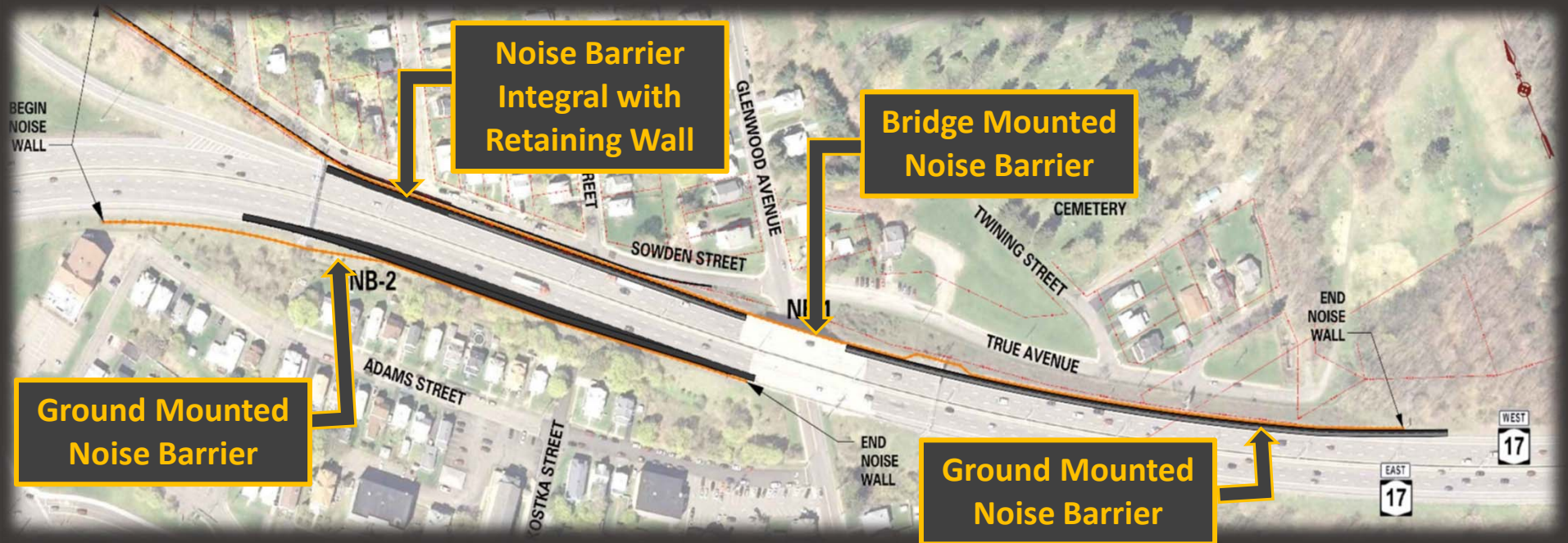
Match Phase 1 Noise Barriers



Most Noise Barriers being Constructed are standard ground-mounted but several other foundation types / mounting systems were used

Western Limit Noise Barriers

West of Phase 1



North Side (NB-1): 775 m (+/-)

South Side (NB-2): 375 m (+/-)

Sub-Total (This Graphic): 1,150 m (+/-)

Soldier Pile Wall

Sowden Street

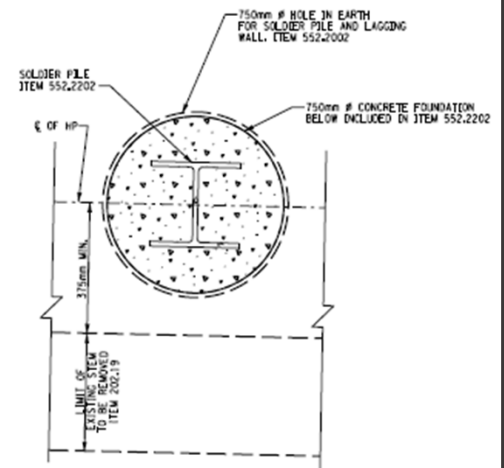
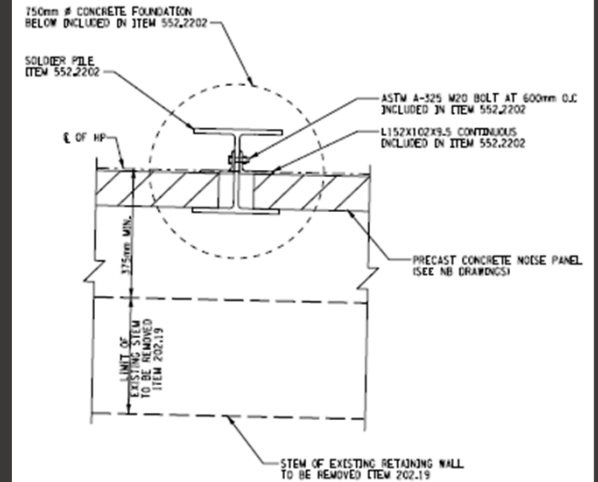
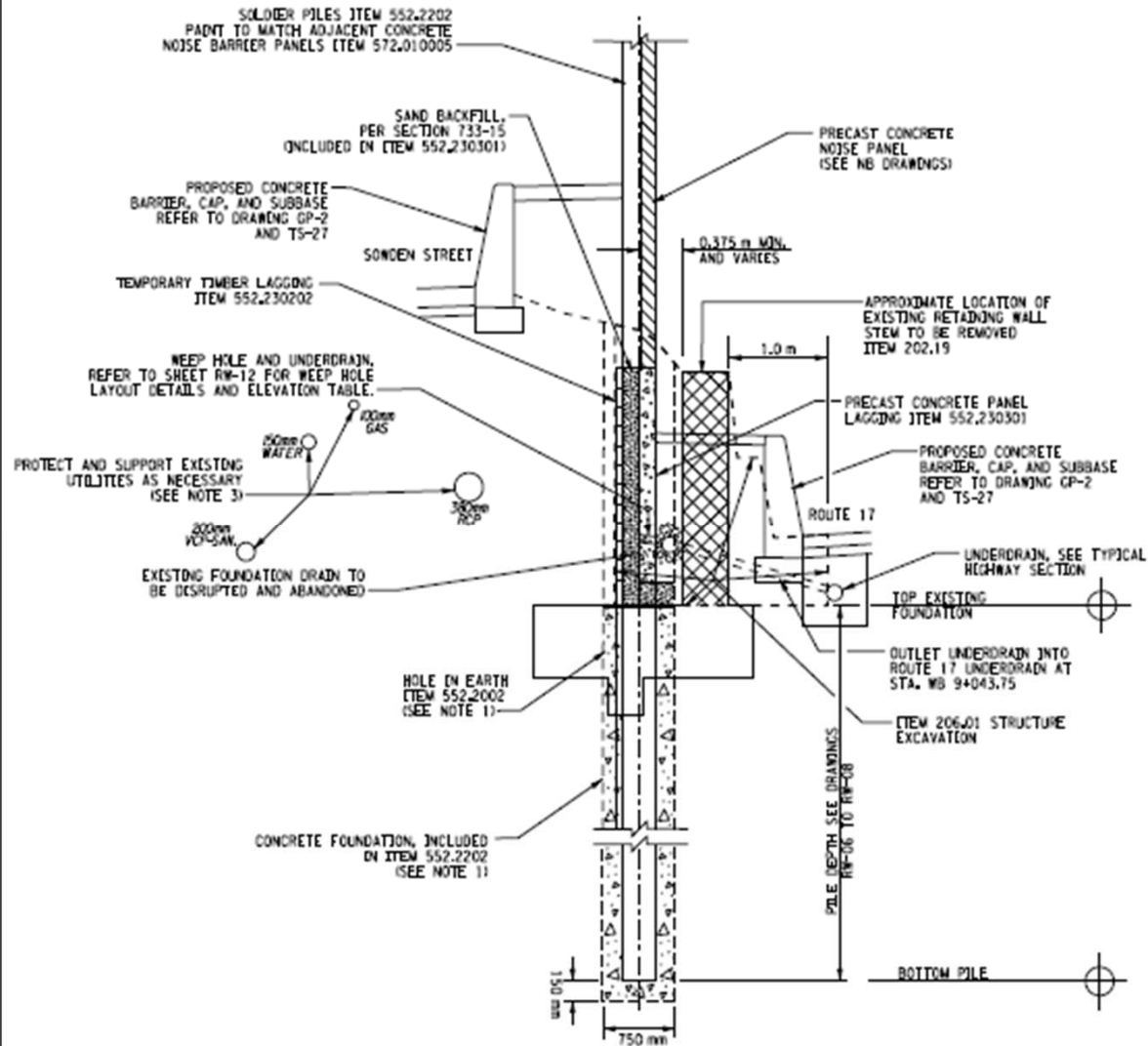


**Narrow
Bifurcated
Median!**

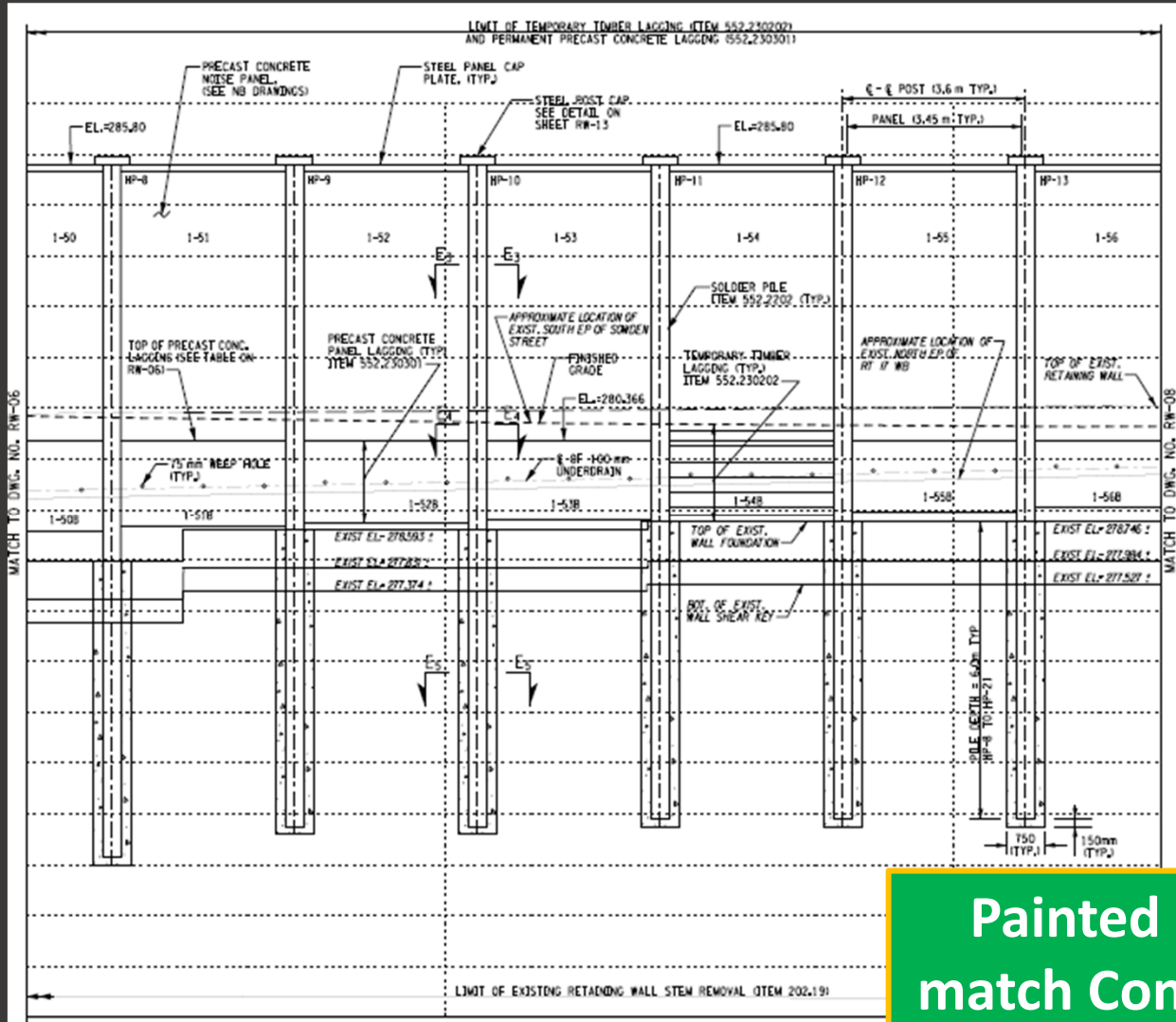


Soldier Pile Wall

Sowden Street



Sowden Street

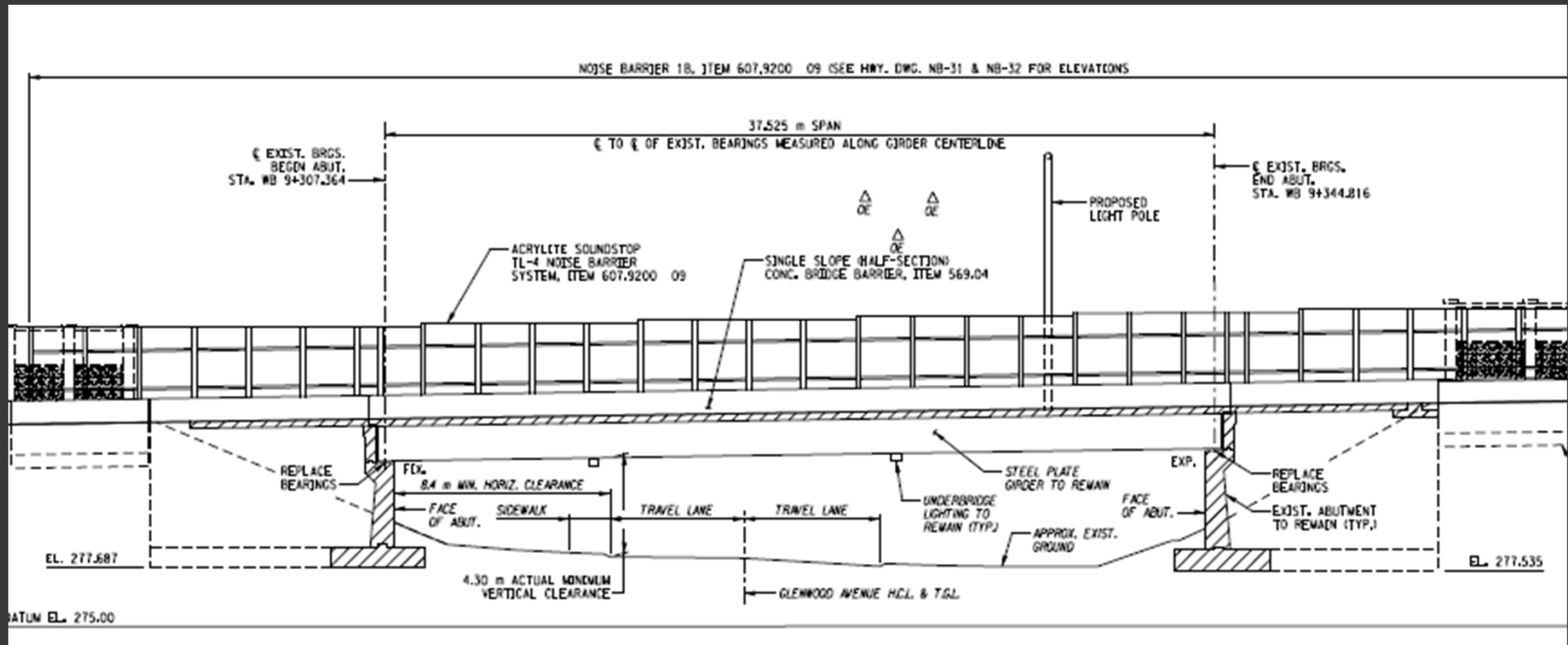


Painted H-Piles to match Concrete Noise Barrier Posts!

NY 17 WB Over Glenwood Ave

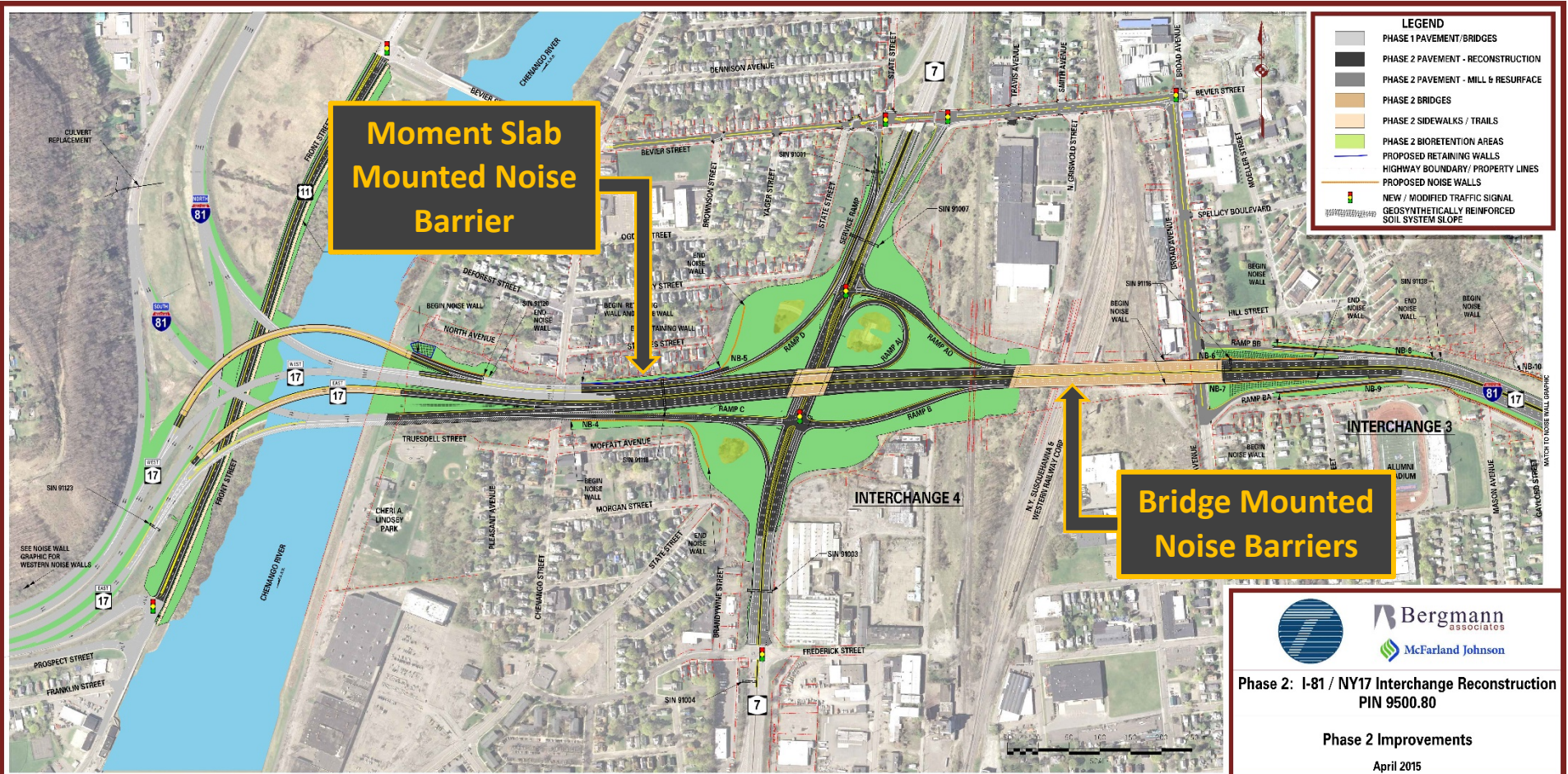


NY 17 WB Over Glenwood Ave



Phase 2 Noise Barriers

Interchange 3 and 4



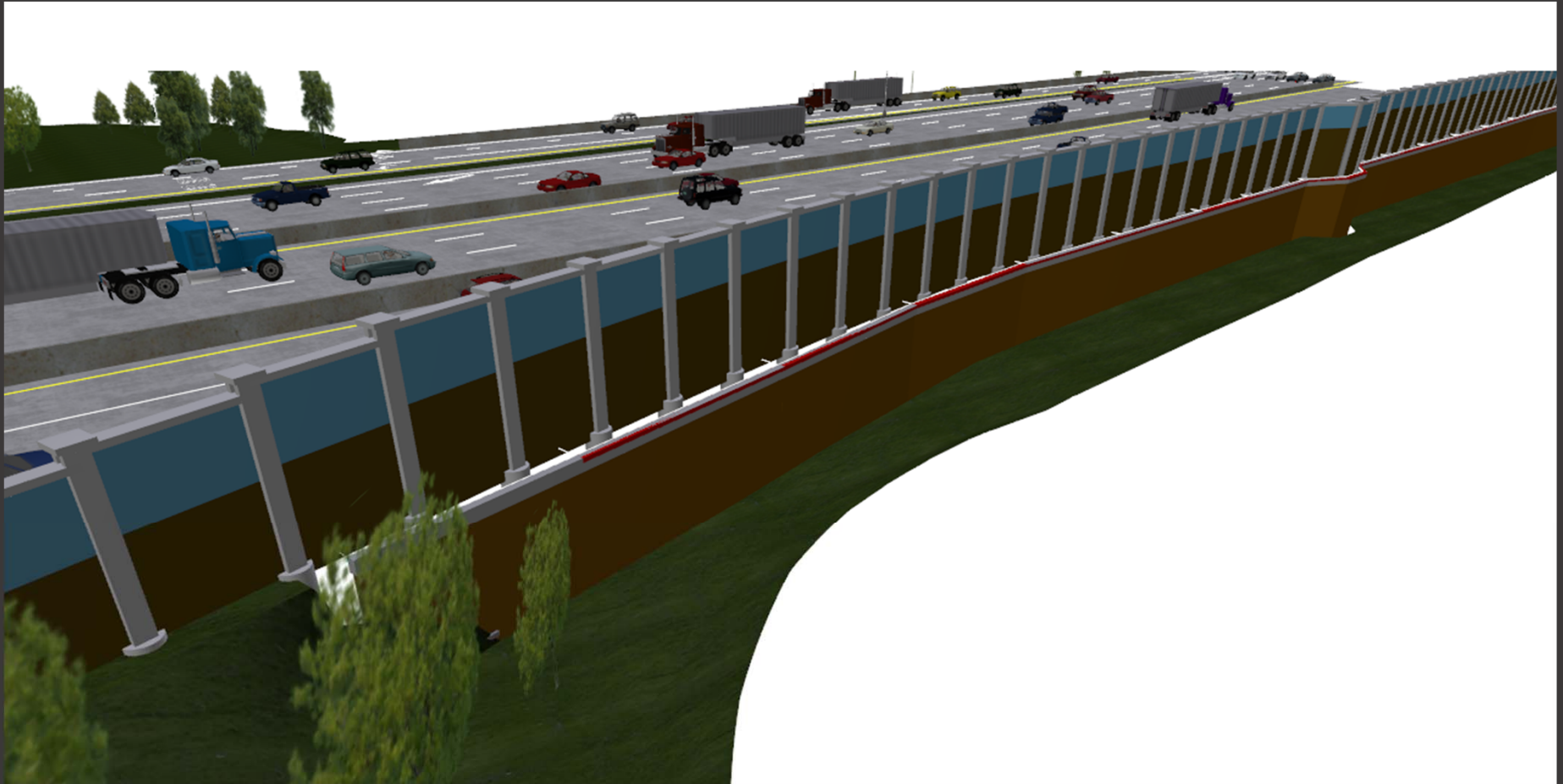
North side (NB-3, 5, 6 & 8): 125 m, 340 m, 240 m & 250 m (+/-)

South side (NB-4, 7, & 9): 270 m, 245 m and 530 m (+/-)

Sub-Total (This Graphic): 2,000 meters (+/-)

Fill-Type Retaining Wall

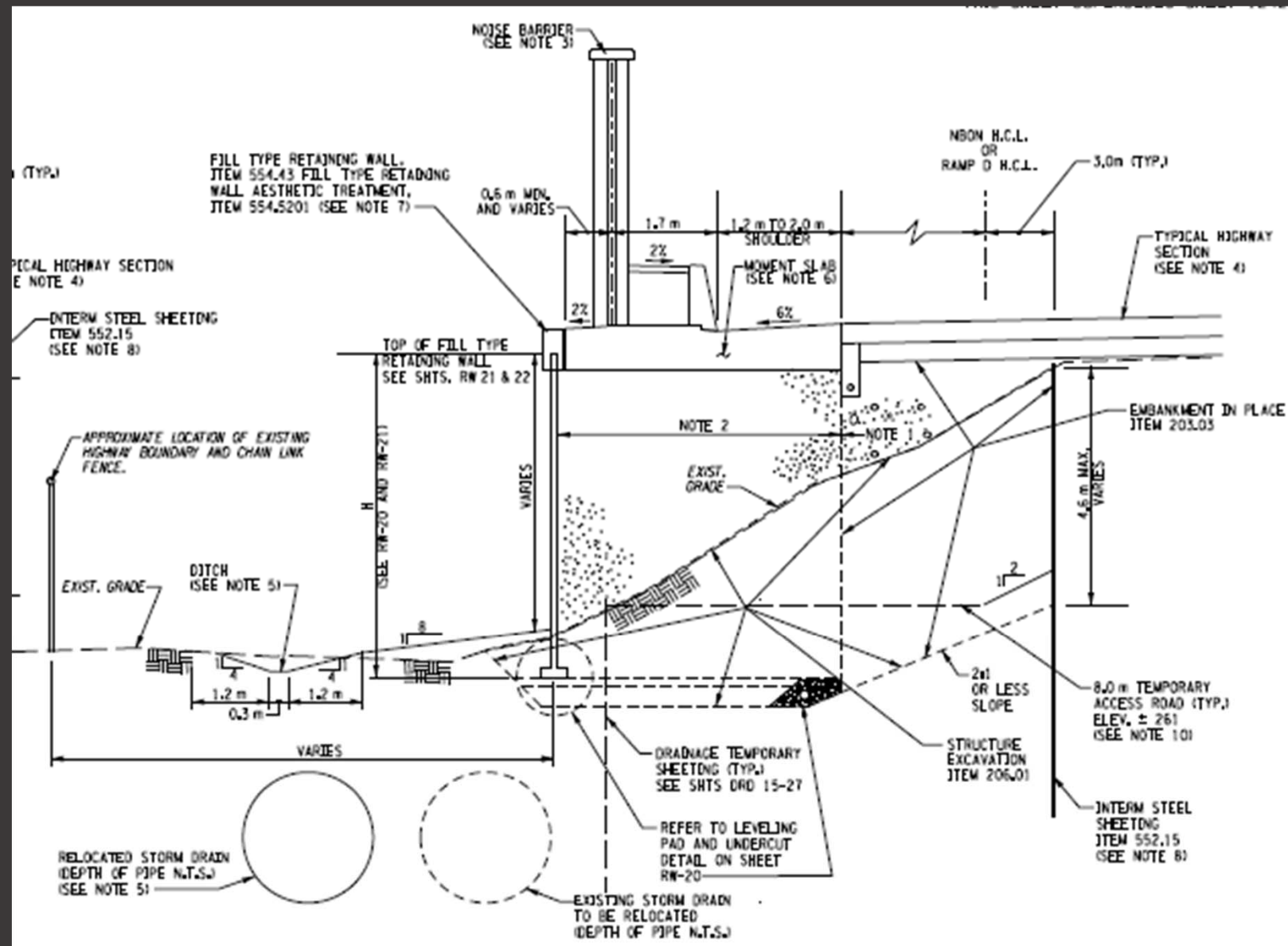
NBON



Noise Barrier mounted on Moment Slabs on top of Retaining Wall

Fill-Type Retaining Wall

NBON



Noise Barrier (Transparent-Bridge Mount)

ACRYLITE® Soundstop

TL4 System



Meets NCHRP 350, Test Level 4 crash test and 2012 AASHTO LRFD

Eastern Limit Noise Barriers

East of Interchange 3 and Bigelow Street



North Side (NB-11 & 14): 305 m & 320 m (+/-)

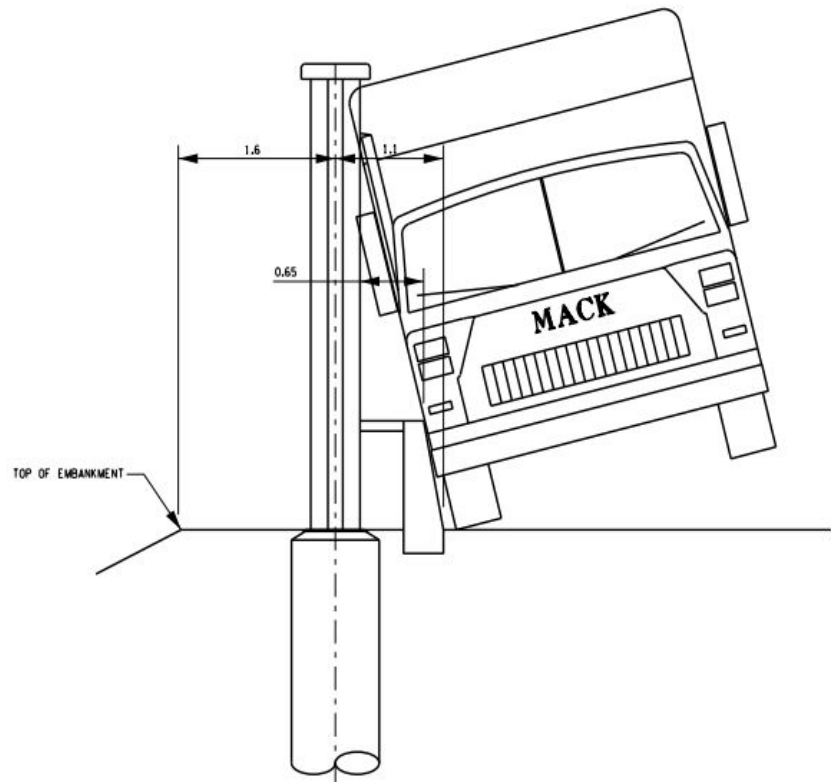
South Side (NB-12 & 13): 405 m & 370 m (+/-)

Sub-Total (This Graphic): 1,400 meters (+/-)

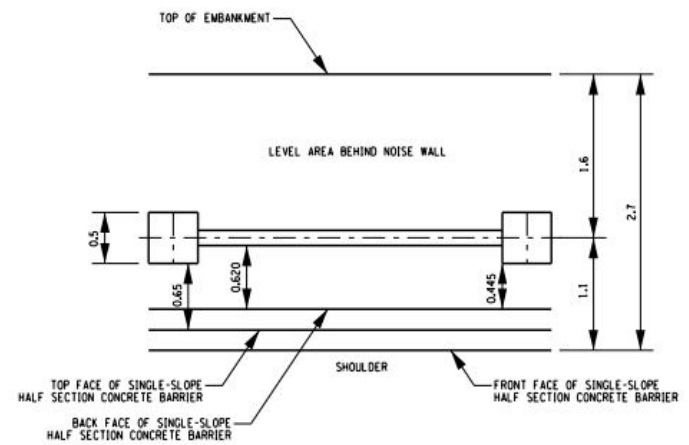
Phase 2 Total: 4,550 m (+/-) Approx. 3 miles

Noise Barrier (Ground Mount)

Phase 1 Design



ELEVATION VIEW

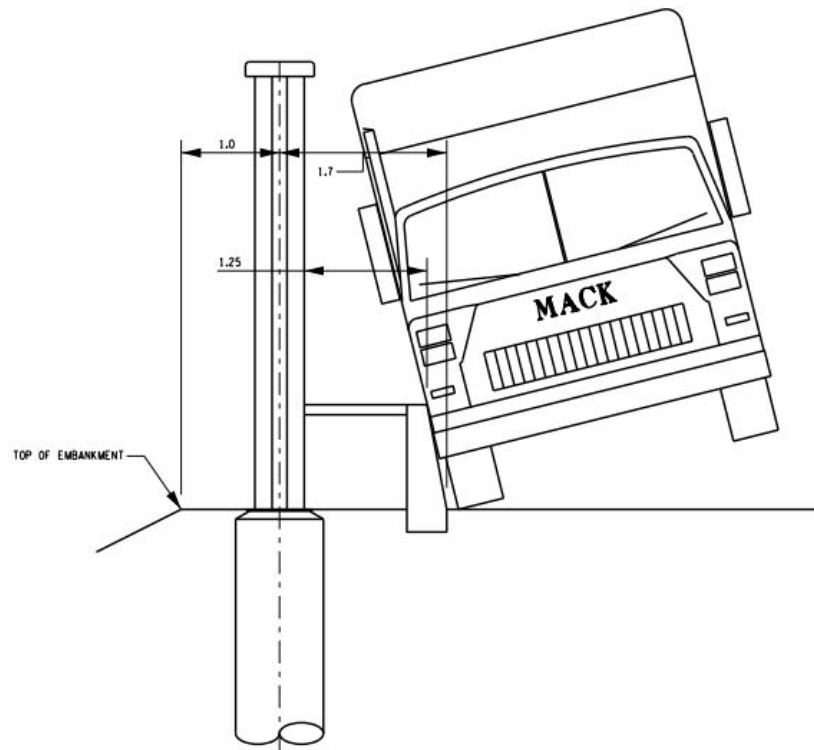


PLAN VIEW

PHASE 1 DESIGN

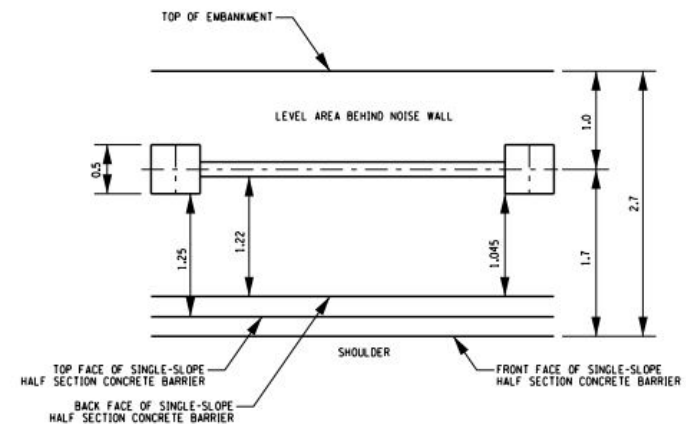
Noise Barrier (Ground Mount)

Phase 2 Design



ELEVATION VIEW

CURRENT DESIGN
(MEETS 2012 LRFD)



PLAN VIEW

- 2012 LRFD – Noise Barriers must resist vehicular collision forces unless it has been crash-tested or meets setback requirements.
- Requirements adopted by NYSDOT in April 2014

Phase 2 Cost

Total Project BID = \$150 Million

Noise Barrier Items BID = \$15 Million

Noise Barriers 10% of Overall Project

TNM Training Comes to Life



An aerial photograph of a suburban area with a proposed road interchange. The interchange is highlighted with yellow and green overlays, showing multiple lanes and ramps. A river or lake is visible on the left side of the image. The word "Questions?" is overlaid in large white text in the center of the image.

Questions?