ADMINISTRATIVE REPORT

TO:	PUBLIC WORKS COMMISSION
FROM:	BRAD B. UNDERWOOD, DIRECTOR OF PUBLIC WORKS
PREPARED BY:	PUBLIC WORKS – ENGINEERING
MEETING DATE:	MAY 13, 2015 – Regular Meeting Starts at 7:30 pm
SUBJECT:	CALTRAIN SAN MATEO BRIDGES REPLACEMENT PROJECT - VACATE CITY RIGHT-OF-WAY AND CONVERT RAILROAD AVENUE TO ONE WAY STREET

RECOMMENDATION

That the Public Works Commission provide a recommendation to City Council to vacate a portion of City right-of-way to Peninsula Corridor Joint Powers Board along Railroad Avenue east of the railroad tracks between Monte Diablo Avenue and Cypress Avenue and convert said portion of Railroad Avenue to a one way street.

BACKGROUND

Four rail bridges in the northern part of San Mateo at Tilton Avenue, Monte Diablo Avenue, Santa Inez Avenue, and Poplar Avenue were built in 1903 and have reached the end of their service life. Caltrain's San Mateo Bridges Replacement project includes the replacement of the bridges and associated track work. This project addresses structural deficiencies, reduces seismic vulnerabilities, and upgrades the functionality of the bridges to current standards. The resulting bridges will increase vehicular clearance at these crossings as much as four feet in some sections. The overall project area spans a half-mile along the Caltrain right-of-way from Tilton Avenue to Poplar Avenue, including the rail bridges at Tilton Avenue, Monte Diablo Avenue, Santa Inez Avenue, and Poplar Avenue.

The project has been implemented in two phases. The first phase was comprised of advanced site clearance and tree removal through the project area's corridor by a specialized contractor. This work began in January 2014 and was completed in April 2014.

The second phase of the project is the actual bridge replacement and associated track work, which began in November 2014 and will last approximately two years. The project will require some night and weekend work, and street closures of up to eight weeks in certain locations starting in late 2015. Temporary loss of access to some driveways near the project area will be needed for up to 2 months. The associated track work will raise the track elevations and require retaining walls to be

constructed along the entire length of the project to support the additional ballast for the trackbed to bear the load of the railroad ties and passing trains.

During construction, it was discovered that existing field conditions prevent the construction of one of the retaining walls as designed without compromising the safety of the passing trains, the construction crews, and/or the general public. As part of evaluating design alternatives, Caltrain has approached the City as part of an ongoing coordination effort throughout the project to propose their preferred design alternative.

The preferred design alternative will impact approximately a 20" wide strip of City right-of-way along North Railroad Avenue from Monte Diablo Avenue to Cypress Avenue on the eastern side of the railroad tracks. The current configuration of this North Railroad Avenue segment allows for two way traffic and parallel parking with a varying width of 22'-6" to 24'-6". Modification of the roadway width will result in two possibilities – (1) maintained two-way traffic with loss of parking, or (2) conversion to one-way traffic and allowing parallel parking to remain. The remaining section of Railroad Avenue on the east side of the railroad tracks is South Railroad Avenue between Cypress Avenue and East 4th Avenue, which is a one-way street allowing northbound traffic.

Caltrain staff will attend the Public Works Commission meeting on May 13, 2015 to discuss the existing conflicts encountered, to present their design alternatives and preferred alternative, and to provide a chance for the public and Public Works Commission to review and comment on the alternatives.

Public Works staff recommends maintain parking for the residents while converting the street to a northbound one-way street to be consistent with the other segment of North Railroad Avenue east of the railroad tracks. Staff has notified the City's Police Department and Fire Department; they are supportive of the recommended alternative as well.

NOTICE PROVIDED

For this PWC meeting, Caltrain mailed meeting notices to residents within 1,000 feet who would be most affected by the conversion of the street.

The City sent this Administrative Report to the San Mateo United Homeowners Association.

ATTACHMENTS

Attachment 1 – Caltrain Design Alternatives Analysis

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San Mateo Bridges Replacement Project

Railroad Avenue Retaining Wall

Original Construction / Current Condition

Caltrain main line tracks between Cypress Avenue and Monte Diablo Ave in San Mateo are currently supported on the East Caltrain Right-of-Way line by a three to six foot tall stone retaining wall. The exact construction date of the wall is unknown, but is assumed to have been constructed concurrently with the adjacent steel bridges in 1903.

The wall is comprised of shaped and fit stones dry-stacked without grout, mortar or reinforcement to create positive connection between stones. The stones are cubic in nature ranging from six to 30 inches on a side (please see attached image)

The wall supports the railroad as a gravity retaining wall, utilizing its own mass to retain the soil and train loads above. While empirical evidence proves the wall is suitable to support the applied loads, due to the lack of positive connection in the construction, the structural capacity cannot be calculated, and therefore the wall cannot be modified, retrofitted or enhanced to support additional load.

Bridge Project Original Design

The San Mateo Bridges Replacement Project will be replacing the four steel structures constructed in 1903 north of the San Mateo Station. In conjunction with replacement, the bridges are being elevated to increase roadway clearance and enhance public safety of roadway vehicles. To enable this increase in clearance, the track profile must be raised through the project limits.

In the area of the stone retaining wall in question, the track profile will raise between 1 foot and 3.5 feet in elevation. To facilitate this raise, retaining walls are being constructed along the Caltrain Right-of-Way lines. In the area of the stone wall the new post-and-pile wall was to be constructed behind the stone wall, between the stone wall and the Caltrain Tracks (please see attached plan sheets for typical section and profile). This section was planned to be constructed by placing a steel H-pile into a drilled hole, and encasing the pile in concrete, the same as the other 3000 feet of wall in the project.

Existing Condition Investigation

- Design investigation prior to contract advertisement
  - pot-holed 3 locations with 4" hand auger to depth below RR Ave pavement
  - no conflicting stones at wall layout line found
  - clay-ey sand with smooth river-rock (up to 3" diameter) found below ballast depth
- Pre-construction investigation by contractor
  - Pot-holed 4 locations with vacuum truck, opening 12" diameter hole
  - Shaped stone at back of wall found at varying distances from face of wall, conflicting with retaining wall piles up to 4"

- Large jagged rip-rap stones (up to 18" in diameter) piles behind fit wall stones
- Rip-rap and conflicting wall stones found to a depth below RR Ave pavement

Explored Construction Methods

1. Baseline proposed method executed at all other wall locations:
   Drill 24" diameter hole using Lo-Drill with Auger bit

Limitations:

- Auger will 'walk-off' large rip-rap.
  - Walking towards wall may de-stabilize retaining wall and cause loss of structural capacity and cause failure into city Right-of Way, while preventing placement of H-pile
  - Walking off any other direction will prevent placement of H-pile or reduce capacity of new retaining wall.
- Auger will not break through Fit Stones.
  - When conflict is encountered bit may damage/de-stabilize stone wall causing loss of structural capacity or failure into city Right-of Way
- Core-through / break-out fit stones
  - may de-stabilize retaining wall and cause loss of structural capacity or cause failure into city Right-of Way

2. Install permanent Steel Casing to depth below stone wall

Limitations:

- Casing cannot be advanced through large rip-rap, nor fit stones. Any attempt to do so would entail measures listed above to drive auger and all associated issues.

3. Demolish stone wall entirely and replace with planned steel post-and pile – weekday work
   - Would require shoring Caltrain Main Line tracks with sheet-piles
   - Vibratory action of sheet pile installation may de-stabilize retaining wall and cause loss of structural capacity
   - Large rip-rap fill may prevent plumb installation of sheet-piles reducing structural capacity of shoring system or de-stabilize stone retaining wall and cause failure into city Right-of-Way

4. Demolish stone wall entirely and replace with planned steel post-and pile – weekend work
   - Execute during six to 8 consecutive 55 hour weekend work windows
   - Demolish stone wall in sections to allow excavation of rip-rap and installation of piles
   - Backfill slope to RR Ave pavement elevation during interim weeks
   - Face of final post and pile wall located on property line.

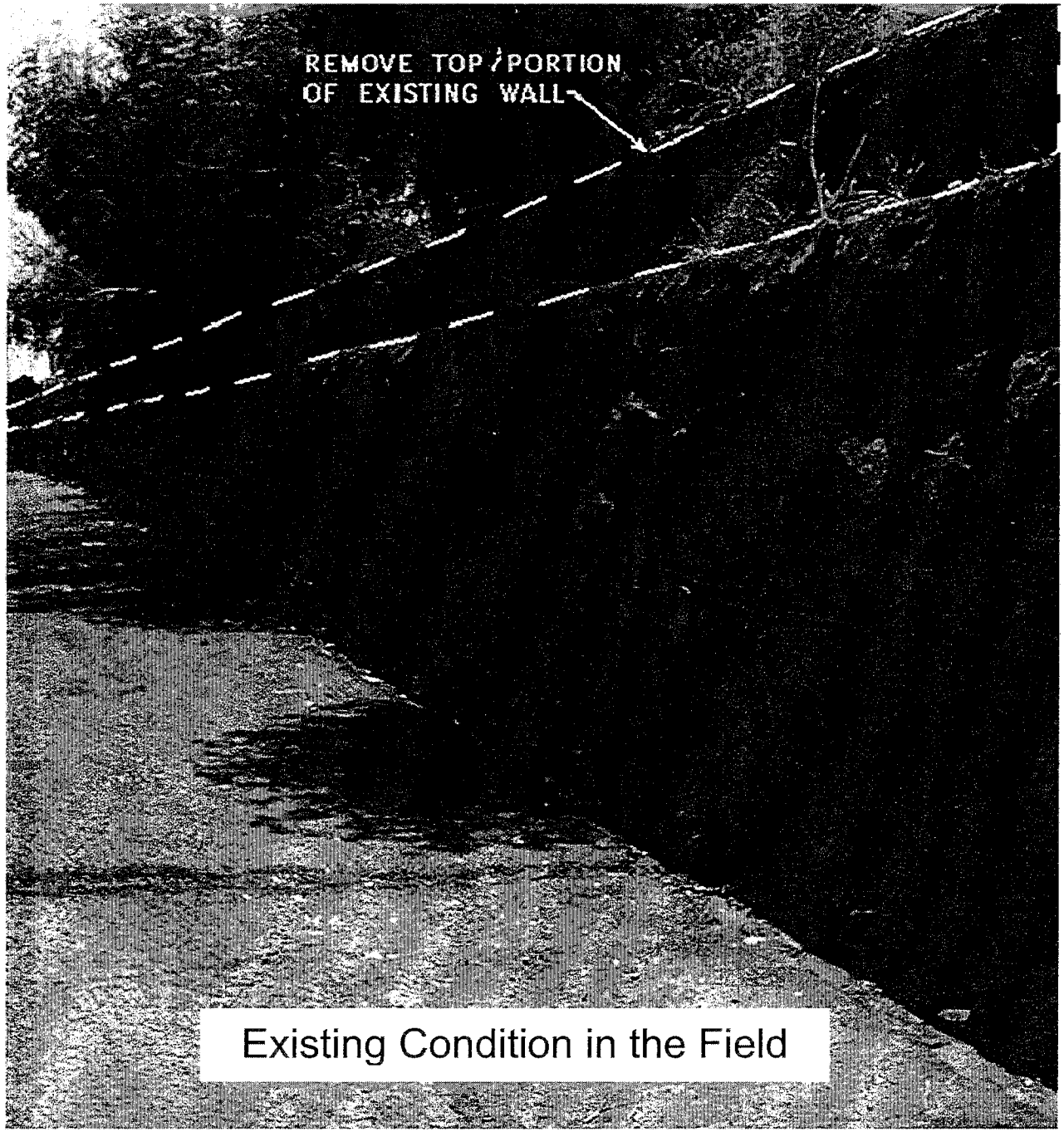
   Limitations:
   - 6-8 consecutive weekends of around the clock work.
   - Adjacent streets impacted or restricted during weekend construction
   - RR Ave closed to all vehicular access during weekend construction
   - RR Ave closed to through access and parking restricted during interim weeks between work windows.

Proposed Construction Method

Due to the challenges and risks listed above in each of the explored construction methods, It is the position of the project team that the safe course of action is to take all measure to not disturb the existing stone wall. While the structural capacity of the existing wall cannot be calculated, it is known to be bale to support the applied loads from the railroad which it has sustained over the last 112 years. It is the concern of the project team that any disruption to the stability of the wall eliminates any certainty that exists in regards to the wall capacity.

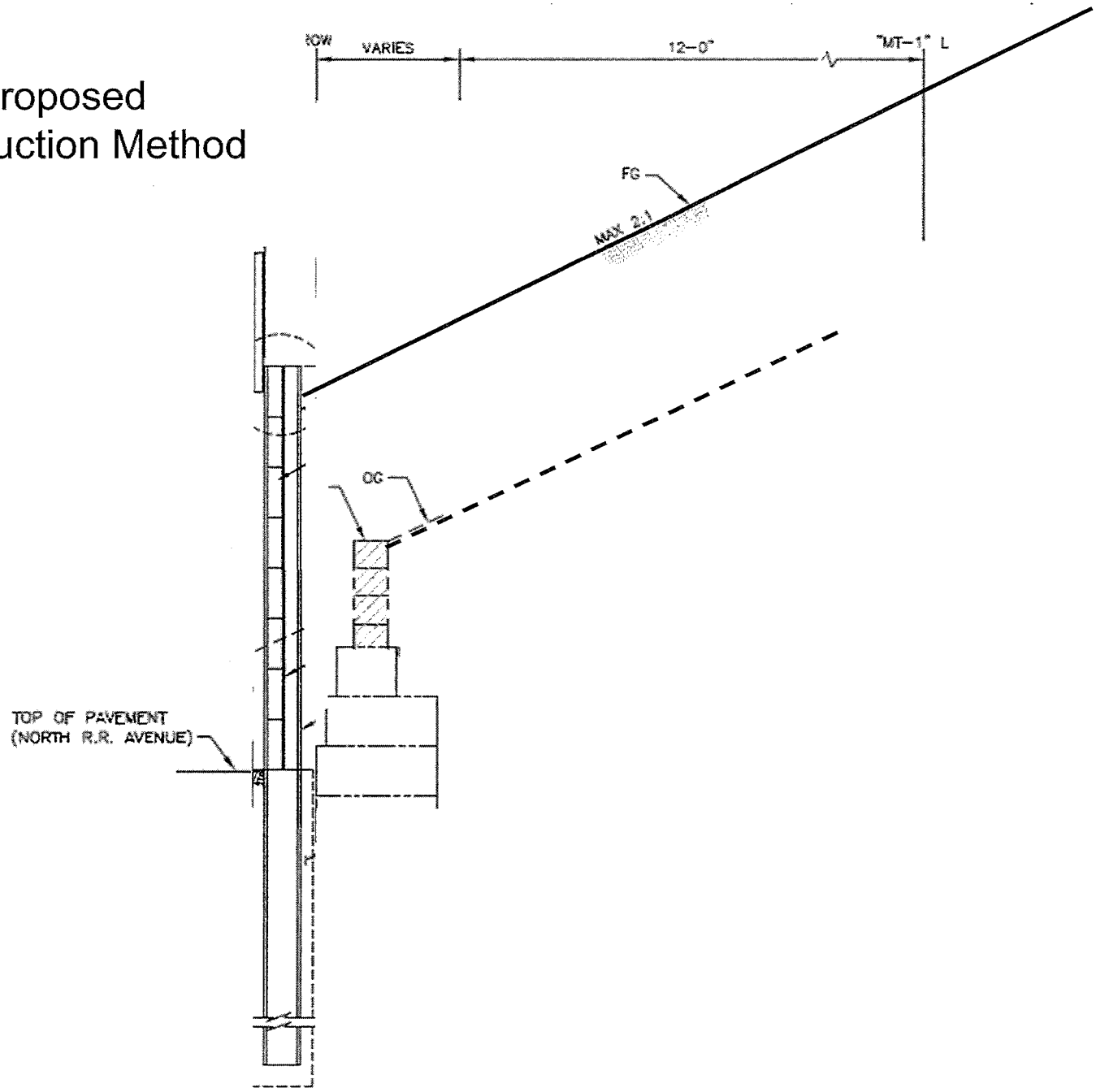
The project team is proposing to construct the planned post and pile wall **in front** (east) of the existing stone wall (please see attached sketch). With this configuration the existing stone wall will not be disturbed during construction, and in the final condition will be encased by structural fill behind the new retaining wall. The stone wall will transition from a structural retaining wall to structural fill material, eliminating any possibility of future failure.

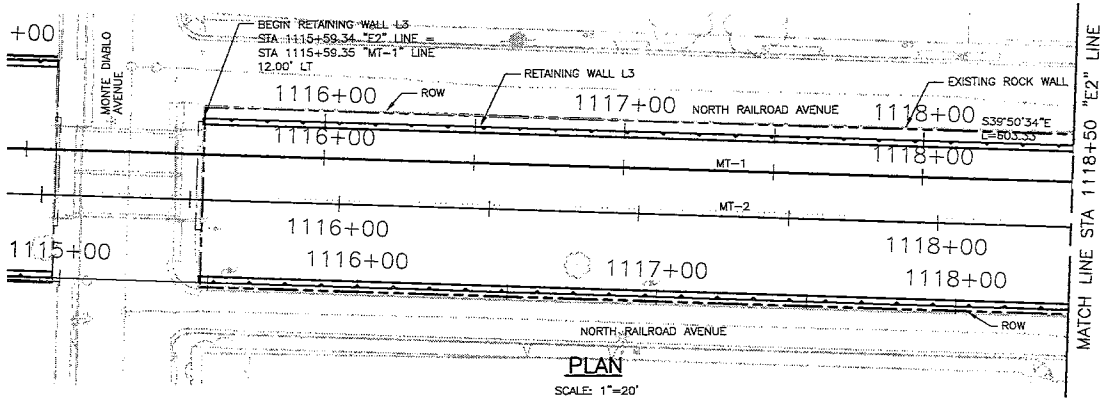
This proposal would involve constructing the retaining wall in the existing roadway of Railroad Avenue and require an encroachment of approximately 20" into the city Right-of-Way. Field investigation by project staff shows the width of Railroad Avenue between Cypress and Monte Diablo Aves to vary between 22'-6" and 24'-6" and is currently a two-way road with parking along one side.



Existing Condition in the Field

Proposed Construction Method





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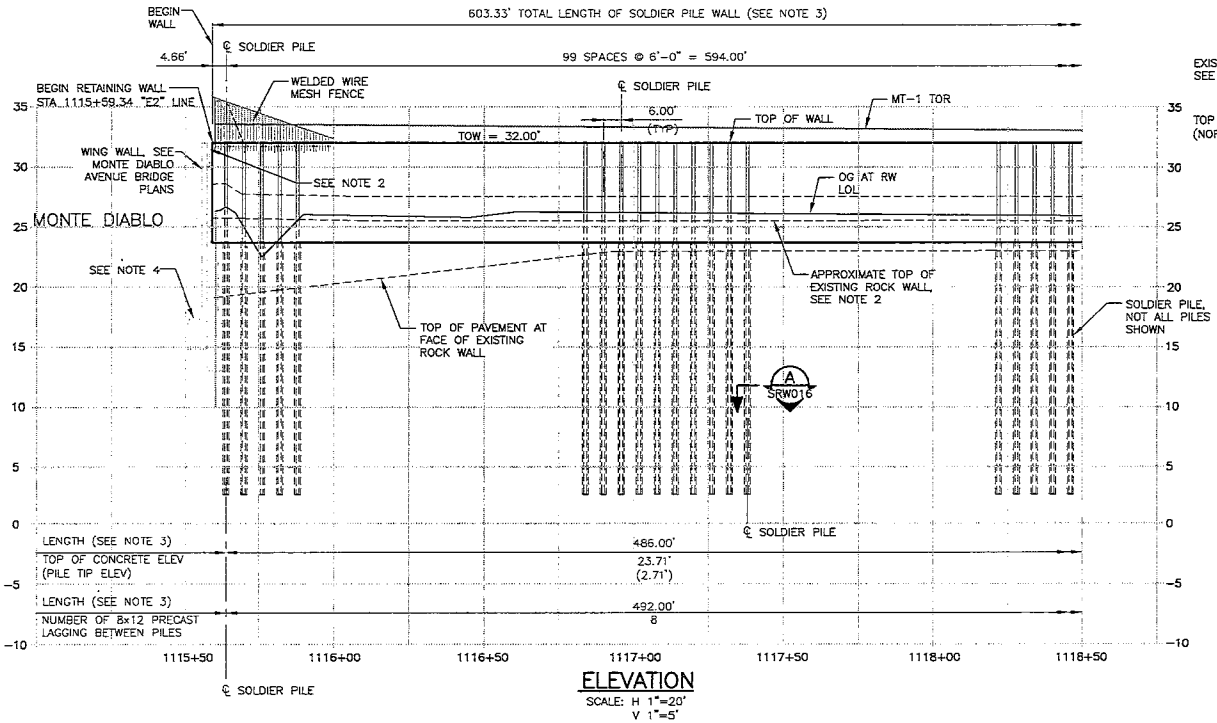

ELEVATION

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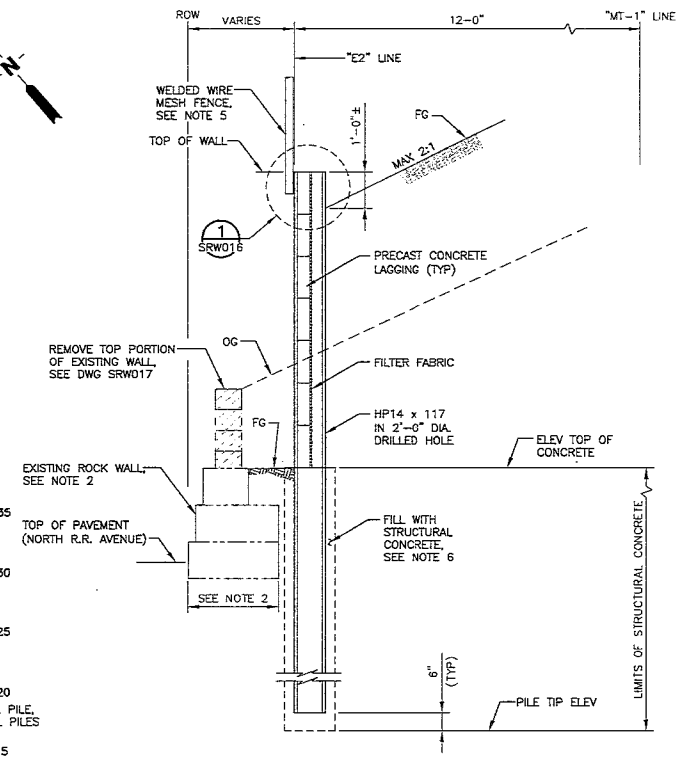

SOLDIER PILE WALL TYPICAL SECTION

NO SCALE

ABBREVIATIONS:

OG = ORIGINAL GROUND

LEGEND

LIMITS OF REMOVAL

EXISTING STRUCTURE

NOTES:

1. VERIFY ALL CONTROLLING FIELD CONDITIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.
2. EXISTING ROCK WALL SHOWN FOR ILLUSTRATION PURPOSES ONLY. AS-BUILT PLANS ARE NOT AVAILABLE. VERIFY ACTUAL WALL DETAILS AND DIMENSIONS.
3. LENGTH MEASURED ALONG "E2" LINE.
4. THE EXISTING WING WALL LOCATION AND SHAPE ARE ESTIMATED. SEE NOTE 1.
5. FOR DETAILS, SEE DRAWING SRW017.
6. COMPRESSIVE STRENGTH SHALL NOT BE LESS THAN 5000 PSI AT 28 DAYS.

20' 0 20' 40'
GRAPHIC SCALE

REV	DATE	BY	SUB	APP	DESCRIPTION
0	082114				CONFORMED

DESIGNED B. CONSOLACION
DRAWN P. AROONLAP
CHECKED V. LOPEZ
IN CHARGE A. SEYEDMADANI
DATE 082114

RECORD PROFESSIONAL ENGINEER — Benjamin L. Consolacion, No. C 058434, Exp. 12/31/15, CIVIL, STATE OF CALIFORNIA

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Caltrain
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DEPUTY DIRECTOR	S. CHAO
PROJECT MANAGEMENT	P. KITTO
STRUCTURES	C. CHEN
TRACK/CIVIL	B. SUSANTO

PENINSULA CORRIDOR JOINT POWERS BOARD

SAN MATEO BRIDGES REPLACEMENT PROJECT
RETAINING WALL NO. L3

SHEET 1 OF 2

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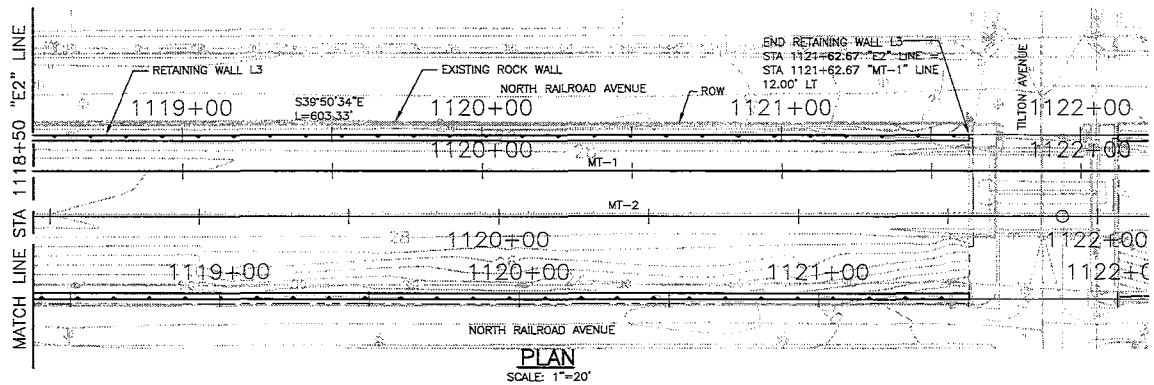

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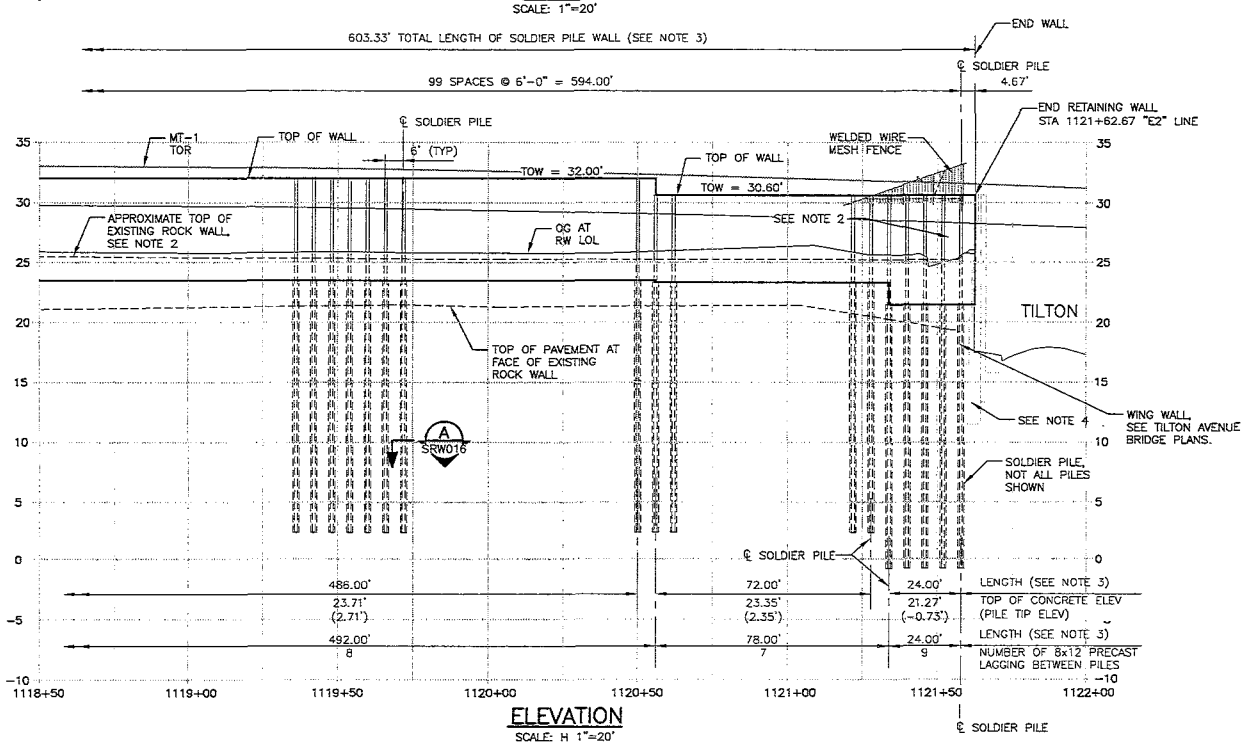

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SHEET 2 OF 2

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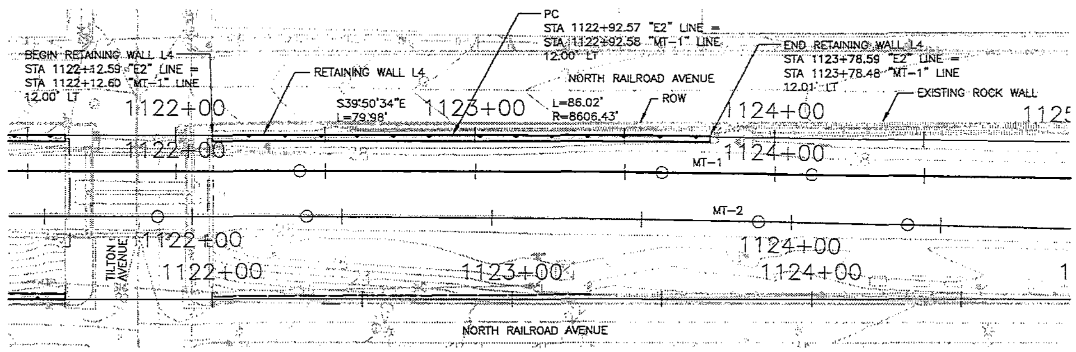

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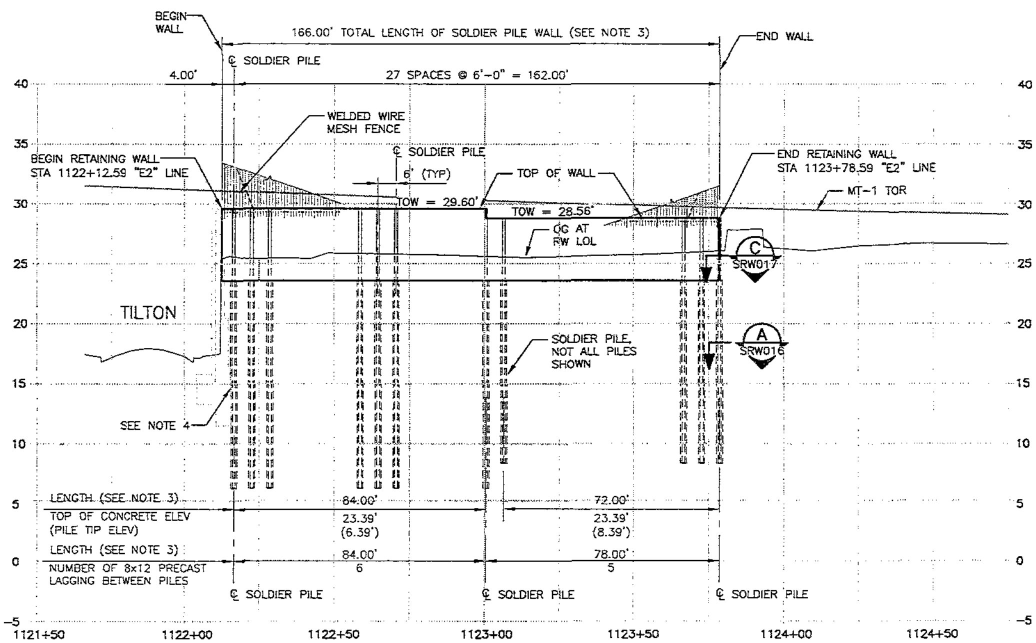

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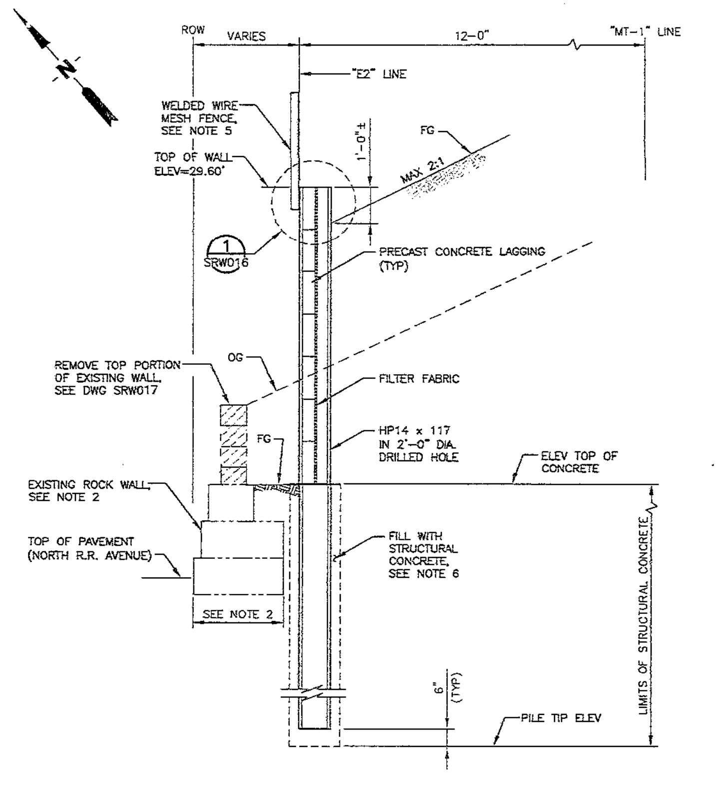

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SAN MATEO BRIDGES REPLACEMENT PROJECT
RETAINING WALL NO. L4

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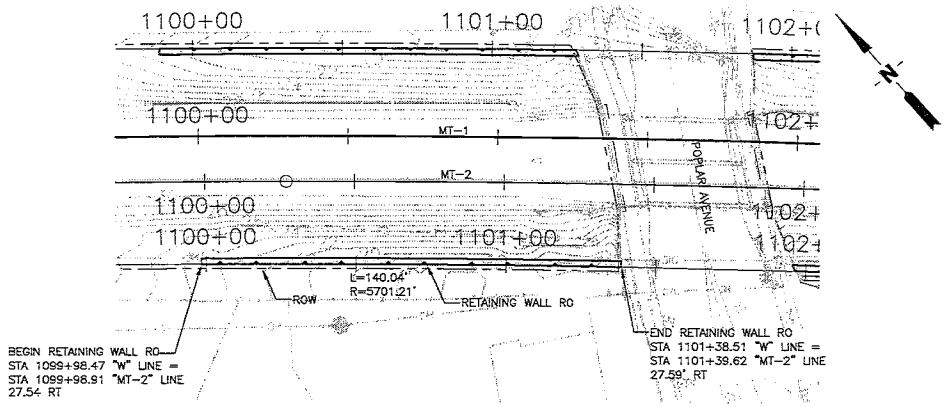

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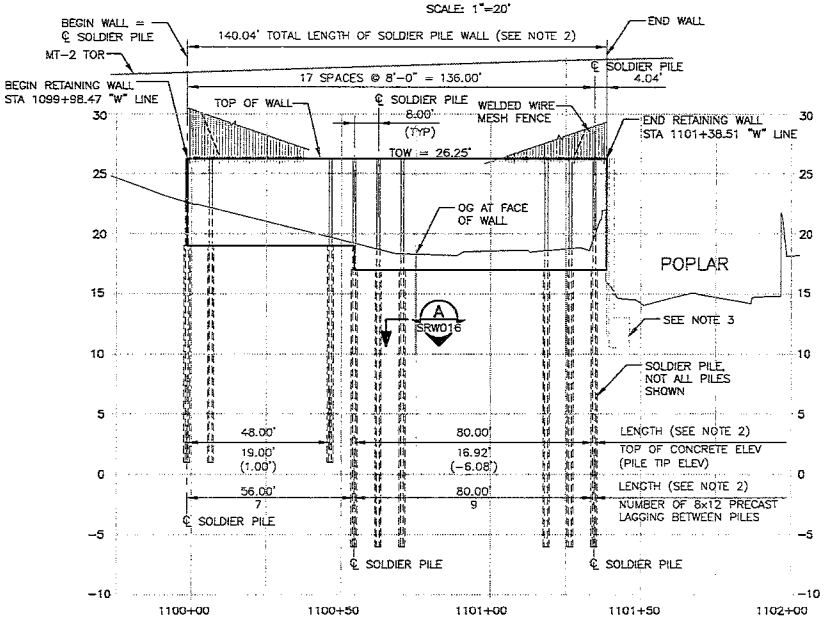

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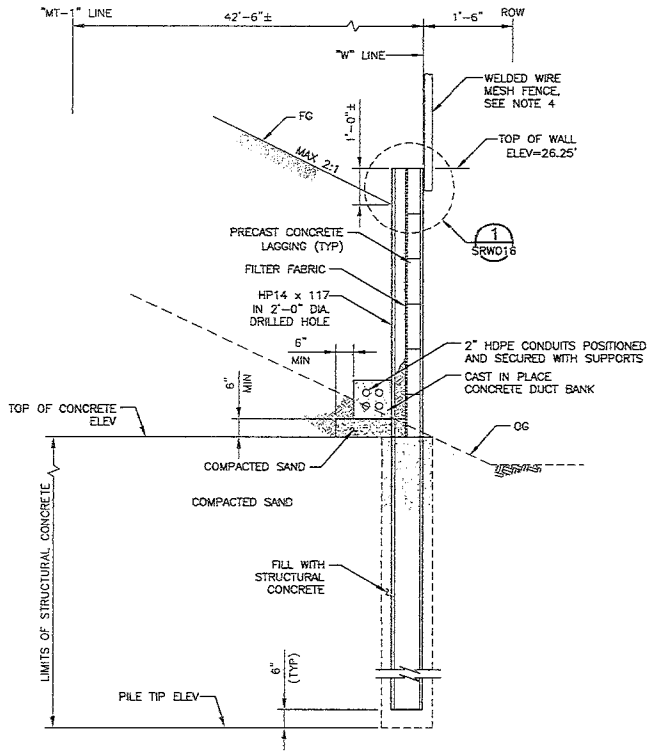

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