FOR CONTRACT NO.: 03-0F2204

# INFORMATION HANDOUT

## MATERIALS INFORMATION

### FOUNDATION REPORT FOR SLY PARK ROAD UC (REPLACE)

### AERIALLY DEPOSITED LEAD, TRAFFIC STRIPE PAINT, AND NATURALLY OCCURRING ASBESTOS SITE INVESTIGATION REPORT

**ROUTE: 03-ED-50-R30.7/R31.7**

**State of California** **Business, Transportation and Housing Agency**

# M e m o r a n d u m

***Flex your power!***
***Be energy efficient!***

**To:** MR. JOE DOWNING
Chief
Office of Bridge Design-North
Division of Engineering Services
Design Branch 3

**Date:** January 22, 2013

**File**: 03-ED-50- PM 31.3
Sly Park Road UC (Replace)
Br. No. 25-0150
(Replaces Br. No. 25-0042)
03-0F2200
(Proj. #0300000072)

Attention: Mr. Pyo Hong

**From:** **DEPARTMENT OF TRANSPORTATION**
**DIVISION OF ENGINEERING SERVICES**
**Geotechnical Services – MS 5**
**Office of Geotechnical Design – North**

**Subject:** Foundation Report for Sly Park Road UC (Replace)

## Introduction

Per your request the Office of Geotechnical Design-North (OGD-N), Branch A has prepared the Foundation and Seismic Recommendations Report for the proposed replacement of the Sly Park Road Undercrossing (Br. No. 25-0150) located on Route 50 at PM 31.3, in El Dorado County, California.

Our Office has evaluated the site conditions and geology based on a review of the existing As-Built Plans, Bridge Inspection Reports and available geologic literature and mapping. The following recommendations are based on a field study completed in October and December 2012 along with a review of the available General Plan, Foundation Plan, existing As-Built borings and records, Bridge Inspection Reports and available geologic literature and mapping.

Elevations used in this report are based on the on the NGVD 29 vertical datum.

The following Department of Transportation, Caltrans records and resources were used during preparation of the Foundation Report:

- General Plan for the Sly Park Road Undercrossing (Replace) (Br. No. 25-0150) dated August 10, 2012.
- Foundation Plan for the Sly Park Road Undercrossing (Br. No. 25-0150) dated November 9, 2012.

- As-Built General Plan for the Sly Park Road Undercrossing (Br. No. 25-0042) approved December 20, 1962.
- As-Built Foundation Plan for the Sly Park Undercrossing (Br. No. 25-0042) approved December 20, 1962.
- As-Built Abutment Details for the Sly Park Road Undercrossing (Br. No. 25-0042) approved December 20, 1962.
- As-Built Bent Details for the Sly Park Road Undercrossing (Br. No. 25-0042) approved December 20, 1962.
- As-Built Standard Details No. 1 for the Sly Park Road Undercrossing (Br. No. 25-0042) approved December 20, 1962.
- As-Built Log of Test Borings for the Sly Park Road Undercrossing (Br. No. 25-0042) approved December 20, 1962.
- Bridge Inspection Report for the Sly Park Road Undercrossing (Br. No. 25-0042) dated October 18, 2010.
- Foundation Report for Sly Park Road UC (Br. No. 25-0042), undated (circa 1963).

**Project Description**

The existing bridge was built in 1964. The structure was built as a three span reinforced concrete (RC) continuous girder with RC 5-column bents and RC open end diaphragm abutments. All existing supports are founded on 10BP-42 steel "H" piles.

The Sly Park Road UC structure has been identified by the Structure Replacement and Improvement Needs (STRAIN) report program as needing replacement. According to the Project Summary Report dated September 2009, the structure is in poor condition with ongoing historic problems of high chloride content and subsequent weak deck.

Elevations used in this report are based on NGVD 29 vertical datum and horizontal coordinates are based on the NAD 83 horizontal datum, unless otherwise noted.

**Field Investigation and Testing**

The Office of Geotechnical Design-North conducted a subsurface investigation in October and December 2012 for the proposed replacement of the Sly Park Road Undercrossing (Br. No. 25-0150).

The 2012 subsurface investigation for the Sly Park Road Undercrossing consisted of eight hand driven (wacker) borings (HD-12-001 thru HD-12-008) and seven cone penetration test borings (CPT-001 thru CPT-007). The maximum depth reached by the 2012 subsurface investigation for the Sly Park Road Undercrossing was approximately 49 feet. Sampling was achieved in the wacker borings by utilizing a one-inch sampler. A summary of the borings drilled during the subsurface investigation is included below in Table 1.

**Table 1. The 2012 Subsurface Exploration Summary**

| Structure | Boring No. | Completion Date | Drilling Method | Approximate Ground Surface Elevation(1) (ft.) | Boring Depth (ft.) |
|---|---|---|---|---|---|
| Sly Park Road UC | HD-12-001 | 10/22/12 | Hand Driven (wacker) | 3955.5 | 11.4 |
| Sly Park Road UC | HD-12-002 | 10/23/12 | Hand Driven (wacker) | 3958 | 17.7 |
| Sly Park Road UC | HD-12-003 | 10/23/12 | Hand Driven (wacker) | 3958 | 11.1 |
| Sly Park Road UC | HD-12-004 | 10/24/12 | Hand Driven (wacker) | 3955 | 6.9 |
| Sly Park Road UC | HD-12-005 | 10/24/12 | Hand Driven (wacker) | 3968.5 | 23.5 |
| Sly Park Road UC | HD-12-006 | 10/25/12 | Hand Driven (wacker) | 3969 | 20 |
| Sly Park Road UC | HD-12-007 | 10/31/12 | Hand Driven (wacker) | 3957 | 15.1 |
| Sly Park Road UC | HD-12-008 | 10/31/12 | Hand Driven (wacker) | 3956 | 14.2 |
| Sly Park Road UC | CPT-12-001 | 12/10/12 | Cone Penetrometer | 3974.5 | 41.7 |
| Sly Park Road UC | CPT-12-002 | 12/10/12 | Cone Penetrometer | 3979 | 37.1 |
| Sly Park Road UC | CPT-12-003 | 12/10/12 | Cone Penetrometer | 3979 | 38.2 |
| Sly Park Road UC | CPT-12-004 | 12/10/12 | Cone Penetrometer | 3978 | 26.1 |
| Sly Park Road UC | CPT-12-005 | 12/10/12 | Cone Penetrometer | 3978 | 46.6 |
| Sly Park Road UC | CPT-12-006 | 12/10/12 | Cone Penetrometer | 3974 | 49.3 |
| Sly Park Road UC | CPT-12-007 | 12/10/12 | Cone Penetrometer | 3974 | 32.3 |

1. Elevation based on NGVD 29 vertical datum.

## Summary of Site Geology and Subsurface Conditions

Regional Setting and Area Geology

The project site is located within the Sierra Nevada geomorphic province. Based on the California Geological Survey (CGS) Open-File Report 2003-03, compiled by Lawrence L. Busch, the site is underlain by the Tertiary Mehrten formation which is described as stream channel, alluvial and mudflow deposits derived mainly from andesitic volcanic rocks.

According to the "Caltrans District 3, Areas Likely to Contain Naturally Occurring Asbestos" map, the project site is not identified to be located in an area likely to be containing naturally occurring asbestos.

Subsurface Conditions

The soil encountered during the 2012 subsurface investigation for the Sly Park Road UC (Replace) generally consists of both granular and cohesive soil. The granular soil consists of loose and medium dense sandy silt and clayey sand. The cohesive soil consists of soft, stiff, very stiff and hard lean clay, lean clay with sand and sandy lean clay.

The As-Built LOTB sheet for Sly Park Road UC (Br. No. 25-0042), in addition to the 2012 subsurface investigation, was reviewed and considered during the preparation of the Foundation Report. According to As-Built LOTB sheet for Sly Park Road UC (25-0042) approved December 20, 1962, materials underlying the site "consist of 3 to 4 feet of soft residual sandy clay overlying 10 to 20 feet of deeply weathered volcanic ejecti in an ash matrix (agglomerate). Below the agglomerate is moderately weathered and fractured andesite which is "highly competent." A more detailed presentation of the subsurface conditions is presented on the As-Built Log of Test Borings date approved December 20, 1962.

## Groundwater

No groundwater was encountered in the borings performed during the March 1960 field investigation. No groundwater was encountered above elevation 3940 feet (NGVD 29) in the hand driven (wacker) borings during the recent 2012 field investigation. No groundwater measurements were taken in the cone penetration test (CPT) borings. Groundwater surface elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at time of construction.

## Corrosion Evaluation

Composite soil samples were collected from Borings HD-12-002 and HD-12-005 for the Sly Park Road UC (Replace) drilled during the 2012 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite sample for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil or water samples collected at the site: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not used to define a site as being corrosive. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite samples were considered to be corrosive at this site. Refer to Table 2 for specific test results.

**Table 2. Corrosion Test Summary of the Composite Sample for Sly Park Road UC (Replace) (Br. No. 25-0150)**

| SIC Corrosion Number | Nearby Support Location | Boring Number | Sample Depth (ft) | pH | Minimum Resistivity (Ohm-Cm) | Chloride Content (PPM) | Sulfate Content (PPM) |
|---|---|---|---|---|---|---|---|
| C837034 | Abut 1 | HD-12-002 | 3-4 | 5.36 | 551 | 1194 | 0 |
| C837033 | Abut 2 | HD-12-005 | 1-2 | 5.38 | 129 | 5342 | 0 |

## Scour

There is no scour potential at the site, since the bridge does not span any water channel.

## Seismic Recommendations

Based on the Caltrans ARS Online Tool (Version 2.0.5), the nearest active fault for the site is the West Tahoe (Fault ID No. 77) with Mmax of 7.0. The fault is located southwest of the bridge site and the rupture distance to the fault plane is estimated to be 29 miles.

Based on the on the As-Built Log of Test Borings dated March 1962 and the recent field investigation, a $V_{S30}$ (the weighted average shear wave velocity for the top 100 feet of foundation materials) of 1080 feet per second is considered to be applicable to the foundation materials.

Based on the "Methodology for Developing Design Response Spectrum for Use in Seismic Design Recommendations, November 2012," the design ground motion is the highest spectral acceleration as obtained by any or a combination of the following three methods for the Sly Park Road Undercrossing:

1) Statewide minimum deterministic spectrum requirements with MMax of 6.5, vertical strike-slip event with a rupture distance of 7.5 miles.
2) The nearest active fault as shown on the ARS Online Tool (Version 2.0.4).
3) The USGS 5% Probability of Exceedance in 50 years (975 year return period).

Based on the $V_{S30}$, the preliminary Acceleration Response Spectrum (ARS) is determined by methods 1 and 3 as stated above. The peak ground acceleration is estimated to be 0.23g as shown on the ARS curve.

The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting towards or passing directly through the project site.

The potential for soil liquefaction based on the foundation materials is considered to be insignificant.

**As-Built Foundation Data**

As-Built General Plan and Foundation Plan sheets for the Sly Park Road Undercrossing (Br. No. 25-0042) approved December 20, 1962 along with the undated Foundation Report for Sly Park Road UC (circa 1963) indicate that the bridge foundations consist of driven steel 10BP42 "H" piles at all support locations. The design load of piling for this structure is shown as 45 tons on the Standard Details No. 1 sheet approved December 20, 1962. A summary of the existing foundation data is presented below in Table 3.

**Table 3**
**As-Built Pile Data for the Sly Park Road Undercrossing (Br. No. 25-0042)**

| Support Location | Pile Type [1,3] | Design Load (Tons) | Bottom of Footing Elevation [1] (ft) | Average Pile Tip Elevation [2] (ft) |
|---|---|---|---|---|
| Abutment 1 | 10BP-42 Steel Piles | 45 | 3965 | 3928.3 |
| Bent 2 Lt. | 10BP-42 Steel Piles | 45 | 3951 | 3926.6 |
| Bent 2 Lt. C | 10BP-42 Steel Piles | 45 | 3950 | 3923.7 |
| Bent 2 C | 10BP-42 Steel Piles | 45 | 3949 | 3926.9 |
| Bent 2 Rt. C | 10BP-42 Steel Piles | 45 | 3948 | 3928.6 |
| Bent 2 Rt. | 10BP-42 Steel Piles | 45 | 3948 | 3929.9 |
| Bent 3 Lt. | 10BP-42 Steel Piles | 45 | 3950 | 3927.8 |
| Bent 3 Lt. C | 10BP-42 Steel Piles | 45 | 3949 | 3930.8 |
| Bent 3 C | 10BP-42 Steel Piles | 45 | 3949 | 3930.6 |
| Bent 3 Rt. C | 10BP-42 Steel Piles | 45 | 3948 | 3930.9 |
| Bent 3 Rt. | 10BP-42 Steel Piles | 45 | 3947 | 3935.0 |
| Abutment 4 | 10BP-42 Steel Piles | 45 | 3969 to 3966 (varies left to right) | 3931.9 |

*Notes:*

1. *Bottom of footing elevations and pile types were obtained from the Foundation Plan for Sly Park Road Undercrossing approved December 20, 1962.*
2. *The average pile tip elevations were determined from the Quantity Calculations sheets dated August 21, 1963 for the Sly Park Road Undercrossing.*

## Foundation Recommendations

The following recommendations are for the proposed Sly Park Road UC (Replace) (Br. No. 25-0150), as indicated on the General Plan dated August 10, 2012. At Abutments 1 and 2 support locations, steel "H" piles are recommended for support.

Refer to Table 4 for the Foundation Design Recommendations and Table 5 for the Pile Data Table.

## Table 4. Foundation Design Recommendations for Sly Park Road UC (Replace) (Br. No. 25-0150)

| Foundation Design Recommendations | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Support Location | Pile Type | Cut-off Elevation (ft) | LRFD Service-I Limit State Load (kips) per Support | | LRFD Service-I Limit State Total Load (kips) per Pile (Compression) | Nominal Resistance (kips) | Design Tip Elevations (ft) | Specified Tip Elevation (ft) | Nominal Driving Resistance Required (kips) |
| | | | Total | Permanent | | | | | |
| Abut. 1 Left | HP 14X117 | 3949.5 | 4800 | 4150 | 200 | 400 | 3919 (a) | 3919 | 400 |
| Abut. 1 Right | HP 14X117 | 3947.5 | | | 200 | 400 | 3924 (a) | 3924 | 400 |
| Abut. 2 Left | HP 14X117 | 3948.5 | 4800 | 4150 | 200 | 400 | 3922 (a) | 3922 | 400 |
| Abut. 2 Right | HP 14X117 | 3946.5 | | | 200 | 400 | 3922 (a) | 3922 | 400 |

*Notes:*

*1) Design tip elevations are controlled by: (a) Compression.*

## Table 5. Pile Data Table for Sly Park Road UC (Replace) (Br. No. 25-0150)

| Pile Data Table | | | | | | |
|---|---|---|---|---|---|---|
| Location | Pile Type | Nominal Resistance (kips) | | Design Tip Elevation (ft) | Specified Tip Elevation (ft) | Nominal Driving Resistance (kips) |
| | | Compression | Tension | | | |
| Abut. 1 Left | HP 14X117 | 400 | 0 | 3919 (a) | 3919 | 400 |
| Abut. 1 Right | HP 14X117 | 400 | 0 | 3924 (a) | 3924 | 400 |
| Abut. 2 Left | HP 14X117 | 400 | 0 | 3922 (a) | 3922 | 400 |
| Abut. 2 Right | HP 14X117 | 400 | 0 | 3922 (a) | 3922 | 400 |

*Notes:*

1) *Design tip elevations are controlled by: (a) Compression.*

## Abutments 1 and 2 Right and Left Side Retaining Walls

New Standard Plan Type 1 retaining walls on spread footings will be built at the Abutments 1 and 2 right and left side to accommodate the new bridge. The Standard Plan Type 1 retaining wall foundations should be designed in accordance to Caltrans Standard Plans (2010) as shown on Revised Standard Plan RSP B3-1A sheet for Loading Case 1.

The Abutments 1 and 2 right and left side retaining wall footings may be supported on spread footings founded on newly-placed structure backfill. For adequate support of the proposed retaining walls, it is recommended that the upper 2 feet of native materials be removed and replaced with structure backfill compacted to 95% relative compaction. The limits of 95% relative compaction of structure backfill are to conform to the limits specified for relative compaction of embankments under retaining wall footings without piles, as defined in section 19-5.03B of the Standard Specifications.

All proposed retaining wall spread footings, which will be constructed on the embankment slope, are to be positioned such that they have a minimum horizontal footing embedment of 4 feet, measured from the top of footing to the face of the finished slope.

## Construction Considerations

1. At the Engineer's option, any driven steel "H" piles which refuse within 10 feet of specified tip elevation at Abutments 1 and 2 may be considered adequate and the excess pile length cut-off. Refusal for this project shall be defined as two times the required pile acceptance criteria. Refer to the Caltrans Standard Specifications 49-2.01A(4)(b) (2010) for information concerning the pile acceptance criteria.
2. For adequate support of the proposed Abutments 1 and 2 right and left side retaining wall footings, the upper 2 feet of native materials are to be removed and replaced with structure backfill compacted to 95% relative compaction. The limits of 95% relative compaction of structure backfill are to conform to the limits specified for relative compaction of embankments under retaining wall footings without piles, as defined in section 19-5.03B of the Standard Specifications.
3. At Abutments 1 and 2 left and right side retaining walls, concrete for the proposed retaining wall support footings shall be placed neat against undisturbed structure backfill on the bottom of the footing excavation. Should the bottom of the footing excavation be disturbed, then the disturbed soils shall be recompacted to 95% relative compaction prior to placement of concrete for the structure support footings.

**Project Information**

"Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is information originating from Geotechnical Services.

*Data and information attached with the project plans are:*

A. Log of Test Borings (Sly Park Road UC (Replace), Br. No. 25-0150).

*Data and information included in the Information Handout provided to the bidders and contractors are:*

A. Foundation Report for Sly Park Road UC (Replace) (Br. No. 25-0150) dated January 22, 2013.

The recommendations contained in this report are based on specific project information regarding design loads, foundation dimensions and structure locations provided by the OBDN, Branch 3. If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Tim Alderman at (916) 227-1035 or Reid Buell at (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

Report by:

Supervised by:

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Office of Geotechnical Design-North

Attachments: ARS Curve

cc: OGDN File
GS File Room
John Holder – District 3 Project Manager
Ofelia Alcantara – Structure OE
Structure Construction R.E. Pending File – RE_Pending_File @dot.ca.gov

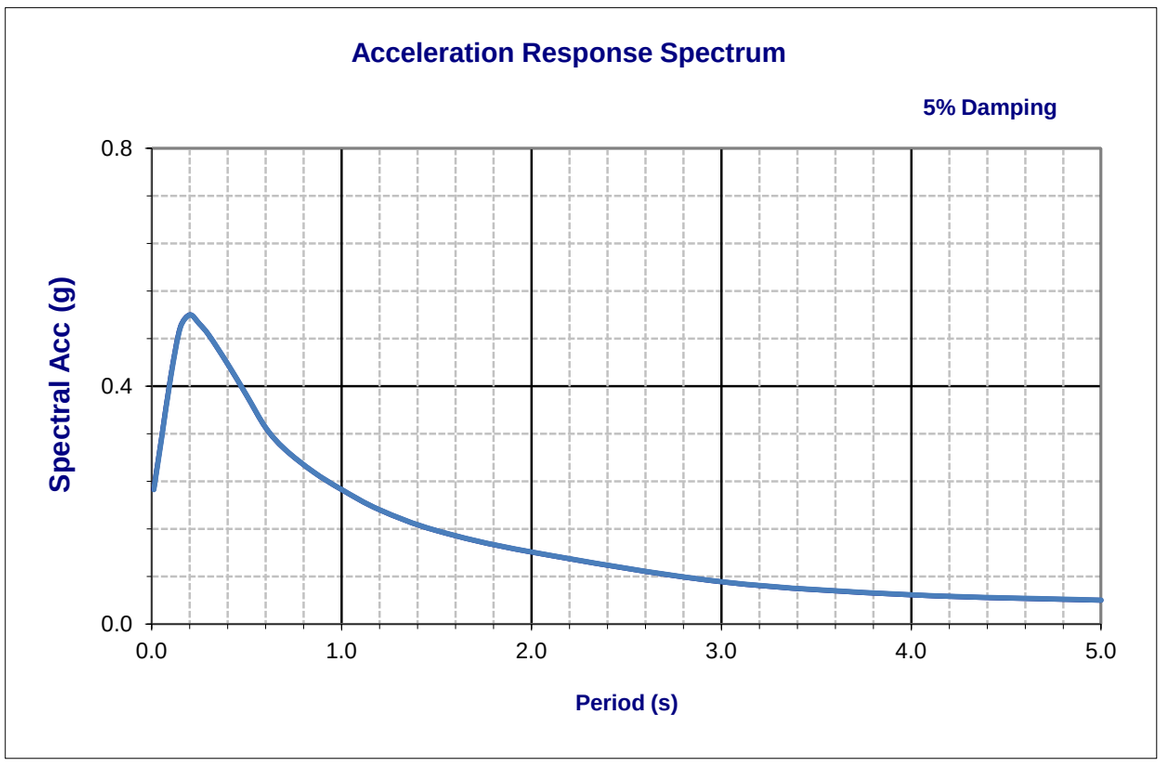
# Sly Park Road UC (Replace)

**Bridge No.** 25-0150
**EFIS** 0300000072

**Latitude** 38.7614
**Longitude** -120.5757

Control **Envelope**

| Period (s) | Sa(g) |
|---|---|
| 0.010 | 0.226 |
| 0.050 | 0.310 |
| 0.100 | 0.417 |
| 0.150 | 0.499 |
| 0.200 | 0.520 |
| 0.250 | 0.505 |
| 0.300 | 0.486 |
| 0.400 | 0.437 |
| 0.500 | 0.384 |
| 0.600 | 0.330 |
| 0.700 | 0.294 |
| 0.850 | 0.256 |
| 1.000 | 0.226 |
| 1.200 | 0.192 |
| 1.500 | 0.157 |
| 2.000 | 0.121 |
| 3.000 | 0.071 |
| 4.000 | 0.049 |
| 5.000 | 0.040 |
| | |




## Deterministic Procedure Data

| | | |
|---|---|---|
| **Fault** | West Tahoe | |
| **Fault ID** | 77 | |
| **Style** | N | |
| **Mmax** | 7 | |
| **Dip** | 50 | deg |
| **$Z_{TOR}$** | 0 | km |

| | | |
|---|---|---|
| **$R_{rup}$** | 46.8 | km |
| **$R_{jb}$** | 46.8 | km |
| **$R_x$** | 46.8 | km |
| **$V_{S30}$** | 330 | m/s |
| **$Z_{1.0}$** | N/A | m |
| **$Z_{2.5}$** | N/A | km |

## Notes

Please note the Design ARS curve is an envelope of minimum and probabilitic spectrum.

**Final**

**Design Response Spectrum**

# FOUNDATION REVIEW

DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

To: Structure Design
1. Design
2. R.E. Pending File
3. Specifications & Estimates
4. File

Geotechnical Services
1. GD - North ; South ; West
2. GS File Room

Date: 4/17/13

Sly Park Rd. UC
Structure Name

03 - ED - 050 - R31.3
District County Route km Post: m.

03000072

District Project Development
District Project Engineer

03-0F2201 25-0150
E.A. Number Structure Number

Foundation Report By: T. Alderman Dated: 1/11/13

Reviewed By: P. Hong (SD) R. Price (GS)

General Plan Dated: 3/22/13 Foundation Plan Dated: 4/16/13

☒ No changes. ☐ The following changes are necessary.

## FOUNDATION CHECKLIST

Pile Types and Design Loads
- Pile Lengths
- Predrilling
- Pile Load Test
- Substitution of H Piles For Concrete Piles ☐ Yes ☐ No

- Footing Elevations, Design Loads, and Locations
- Seismic Data
- Location of Adjacent Structures and Utilities
- Stability of Cuts or Fills
- Fill Time Delay

Effect of Fills on Abutments and Bents
- Fill Surcharge
- Approach Paving Slabs
- Scour
- Ground Water
- Tremie Seals/Type D Excavation

Structure Design Branch 5
Bridge Design Branch No.

Geotechnical Services

Rev. 06/02