Memorandum

Flex your power!
Be energy efficient!

To: MR. GARRY TOLEN
DIVISION OF STRUCTURES
OFFICE OF STRUCTURE DESIGN
SECTION 13
STRUCTURE DESIGN WEST

Date: November 18, 2002

File: 04-MRN-101-KP18.7
04-226141
Linden Lane UC
(Widen)
Br. No. 27-0034

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES - MS 5
GEOTECHNICAL DESIGN – WEST, BRANCH F

Subject: Final Foundation Recommendations

This memorandum is in response to your request dated September 20, 2002 regarding final foundation recommendations for the proposed Linden Lane UC. It is proposed to utilize the existing spread footings at both abutments of the existing railroad bridge as indicated on the General Plan dated July 8, 2006 [sic]. The following recommendations are based on the review of the General Plan, the 1984 Log of Test borings, bridge structural records and a site inspection.

GEOLOGY

A foundation investigation was performed for the bridge widening by Caltrans in December 1983. No additional borings or further subsurface investigation is needed at the site.

Based on the Log of Test Borings, the site is underlain by approximately 18 meters of alluvium consisting of stiff to hard silty and sandy clay with scattered gravel throughout. Bedrock was encountered during the 1983 investigation at elevation of +6.0 meters and consists of interbedded sandstone, shale and pebble conglomerate with underlying highly weathered basalt at elevation +1.5 meters.

Groundwater was encountered in December, 1984 at elevations between +16.3 and +18.2 meters. The design groundwater level should be assumed to be at elevation +18.2. Groundwater is not expected to be a factor in the proposed construction as the existing footings will be used for support.

FAULT AND SEISMIC DATA

Preliminary seismic design recommendations dated January 25, 2001, indicate the controlling fault for the site is the Hayward Fault located 12.1 kilometers southeast of the site with a Maximum Credible Earthquake magnitude of 7.5 generating a Peak Bedrock acceleration of 0.4g. Final seismic recommendations should be requested from Mr. Hossain Salimi at 916-227-7147.

SCOUR

No scour potential exists for the proposed structure.

FINAL FOUNDATION RECOMMENDATIONS

The bridge widening may be supported by the existing spread footings which support the abandoned railroad tracks indicated in the General Plan. The allowable bearing capacity (working stress design) is 287 kPa. Ultimate bearing capacity is three times the allowable.

3 TONS/FT²

For any questions regarding the above recommendations, please contact Christopher Koepke at (916) 227-7135.

Prepared by:

CHRISTOPHER KOEPKE
C.E.G. No. 2207
Engineering Geologist
Geotechnical Design – West

Reviewed by:

JOHN K. BOWMAN
C.E.G. 1677
Associate Engineering Geologist
Geotechnical Design - West

cc:
R.E. Pending File
District 4 (2)
TPokrywka – GDW
MMacaranas – GDW
QHuang - GDW

Memorandum

Flex your power!
Be energy efficient!

To: MR. GARRY TOLEN
DIVISION OF STRUCTURES
OFFICE OF STRUCTURE DESIGN
SECTION 13
STRUCTURE DESIGN WEST

Attention: Mr. John Railey

Date: February 20, 2003

File: 04-MRN-101-KP18.7
04-226141
Linden Lane UC
(Widen)
Br. No. 27-0034

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES - MS 5
GEOTECHNICAL DESIGN – WEST, BRANCH F

Subject: Supplementary Final Foundation Recommendations (610 mm CIDH piles)

The following recommendations are in response to your memo dated February 12, 2003 requesting foundation recommendations for additional CIDH piles at both abutment locations required by your design . This is an addendum to our original recommendations dated November 18, 2002. The original design called for using the existing spread footing foundations for support and those recommendations are still valid. The following recommendations are based on the review of schematic drawings provided by your office and the 1984 Log of Test borings.

SUPPLEMENTARY FOUNDATION RECOMMENDATIONS

The proposed widening shall be supported by 450 kN design load, 610 millimeter diameter CIDH piles. The specified tip elevations for the piles are shown in Table 1:

Table 1
Pile Data Table
610mm, 450kN CIDH Piles

Location	Design Loading	Nominal Resistance		Design Pile Tip Elevations (m)	Specified Pile Tip Elevations (m)
		Compression	Tension		
Abut 1	450 kN	900 kN	0	+1.5	+1.5 (1)
Abut 2	450 kN	900 kN	0	+1.5	+1.5 (1)

Notes: 1. Design tip elevation controlled by compression.
2. A minimum penetration of at least 3.0m into bedrock for each pile is required.

Special Considerations

Groundwater will be encountered during, and will be a factor in the construction of CIDH piles.

During foundation construction, pile excavations should be observed by an Engineering Geologist to verify the geotechnical conditions encountered and that adequate bedrock penetration is attained.

For any questions regarding the above recommendations, please contact Christopher Koepke at (916) 227-7135.

REGISTERED GEOLOGIST
CHRISTOPHER W. KOEPKE
No. 2207
CERTIFIED ENGINEERING GEOLOGIST
Exp. 10-04
STATE OF CALIFORNIA

CWK
For JB

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TPokrywka – GDW
MMacaranas – GDW
QHuang - GDW

State of California Business, Transportation and Housing Agency

Memorandum

Flex your power!
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To: MR. GARRY TOLEN
DIVISION OF STRUCTURES
OFFICE OF STRUCTURE DESIGN
SECTION 13
STRUCTURE DESIGN WEST

Date: February 28, 2003

File: 04-MRN-101-KP17.6
04-226141
Linden Lane UP
(New)
Br. No. 27C-0158

From: CHRISTOPHER KOEPKE CWK
Engineering Geologist
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Supplementary Foundation Recommendations

The following recommendations are in response to your February 27, 2003 request for specified tip elevations for CIDH piles at the abutment wall locations as an alternative to the HP 250X85 steel H-piles recommended in the final foundation recommendations memo dated November 18, 2002.

SUPPLEMENTARY FOUNDATION RECOMMENDATIONS

The proposed new structure may be supported by 625 kN design load, 610 millimeter diameter CIDH piles. The specified tip elevations for the piles are shown in Table 1:

Table 1
Pile Data Table
610mm, 625kN CIDH Piles

Location	Design Loading	Nominal Resistance		Design Pile Tip Elevations (m)	Specified Pile Tip Elevations (m)
		Compression	Tension		
Abutment Wall #1	625 kN	1250 kN	0	+1.5	+1.5 (1)
Abutment Wall #2	625 kN	1250 kN	0	+1.5	+1.5 (1)

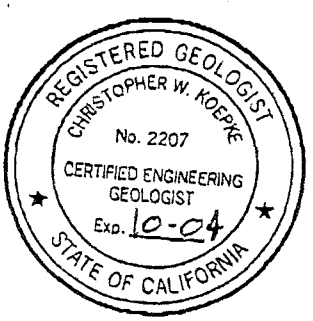
Notes: 1. Design tip elevation controlled by compression.
2. A minimum penetration of at least 3.0m into bedrock for each pile is required.

Special Considerations

Groundwater will be encountered during, and will be a factor in the construction of CIDH piles.

During foundation construction, pile excavations should be observed by an Engineering Geologist to verify the geotechnical conditions encountered and that adequate bedrock penetration is attained.

For any questions regarding the above recommendations, please contact Christopher Koepke at (916) 227-7135.



cc: TPokrywka, R.E. Pending File, QHuang

CKoepke

Memorandum

Flex your power!
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To: MR. GARRY TOLEN
DIVISION OF STRUCTURES
OFFICE OF STRUCTURE DESIGN
SECTION 13
STRUCTURE DESIGN WEST

Date: November 18, 2002

File: 04-MRN-101-KP19.6
04-226141
Lincoln Avenue UC
(Widen)
Br. No. 27-0030

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES - MS 5
GEOTECHNICAL DESIGN – WEST, BRANCH F

Subject: Final Foundation Recommendations

This memorandum is in response to your request dated September 20, 2002 regarding final foundation recommendations for the proposed Lincoln Avenue UC. It is proposed to widen the existing bridge on the left side by 3.7 meters as indicated on the General Plan dated September 17, 2002. These recommendations are based on the review of the General Plan, the 1965 Log of Test borings and a site inspection.

GEOLOGY

A foundation investigation was performed for the existing bridge by Caltrans in December, 1965. No additional borings or further subsurface investigation is required.

Based on the Log of Test Borings, the site is underlain by alluvium consisting of stiff clay 4.6 meters thick overlain by a 1.5 meter thick layer of gravelly clay fill material. Bedrock encountered during the 1965 investigation at elevation +37.7 meters consists of interbedded sandstone and shale.

Groundwater was encountered during the December, 1965 investigation at elevation +37 meters. The design groundwater level should be assumed to be at this elevation.

FAULT AND SEISMIC DATA

Preliminary seismic design recommendations dated January 23, 2001, indicate the controlling fault for the site is the Hayward Fault located 12.2 kilometers southeast of the site with a Maximum Credible Earthquake magnitude of 7.5 generating a Peak Bedrock acceleration of 0.4g. Final seismic recommendations should be requested from Mr. Hossain Salimi at 916-227-7147.

SCOUR

No scour potential exists for the proposed structure.

FINAL FOUNDATION RECOMMENDATIONS

The proposed widening may be supported by 610 millimeter diameter CIDH piles at the abutments. Table 1 shows the estimated design tip elevations for CIDH piles.

Table 1

PILE DATA TABLE					
Location	Pile Type	Design Loading (kN)	Nominal Resistance (kN)		Design Tip Elevation (m)
			Compression	Tension	
Abut. #1	610mm Ø CIDH	670	1340	-	+36.7(1)
Abut. #4	610mm Ø CIDH	670	1340	-	+36.7(1)

Notes:
(1) Design tip elevations based on compressional demand.

Bents #2 and #3 may be supported on spread footings. The allowable bearing capacity (working stress design) is 288 kPa. Ultimate bearing capacity is three times the allowable. Bottom of footings are to be at elevation +43.3 and footing widths are to match existing.

SPECIAL CONSIDERATIONS

CIDH piles must be drilled at least 1.0 meter into shale/sandstone bedrock.

Groundwater may be encountered near the pile tip.

Spread footings must have embedments of at least 1.0 meter.

Construction records indicate hard drilling may be expected in bedrock.

For any questions regarding the above recommendations, please contact Christopher Koepke at (916) 227-7135.

Prepared by:

Chris Koepke

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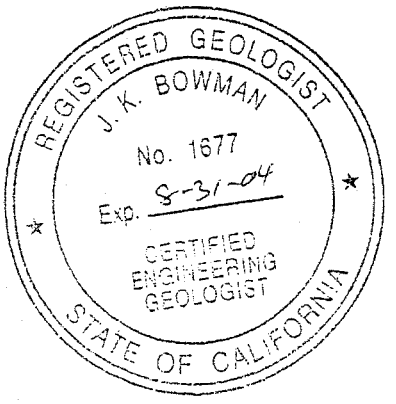
Engineering Geologist
Geotechnical Design – West

Reviewed by:

JOHN K. BOWMAN
C.E.G. 1677
Associate Engineering Geologist
Geotechnical Design - West

cc:
R.E. Pending File
District 4 (2)
TPokrywka – GDW
MMacaranas – GDW
QHuang - GDW



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: 10/6/03

Linden Lane UP
Structure Name

04 - Mrn - 101 - 17.6
District County Route km Pos:

District Project Development
District Project Engineer

04-226141 27C-0158
E.A. Number Structure Number

Foundation Report By: C. Koepke Dated: 11/18/02; 2/28/03

Reviewed By: J. Bailey (SD) R. Price (GS)

General Plan Dated: 10/1/03 Foundation Plan Dated: 9/24/03

☒ 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 Bridge Design Branch No.

Geotechnical Services

Rev. 06/02

DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

To: tructure Design
Design
R.E. Pending File
3. Specifications & Estimates
4. File

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

Date: 10/6/03

Linden LN UC
Structure Name

04 - Mrn - 101 - 18.7
District County Route km Post

District Project Development
District Project Engineer

04-226101 27-0034L
E.A. Number Structure Number

Foundation Report By: C. Koepke Dated: 11/18/02 ; 2/20/03

Reviewed By: J. Railey (SD) R. Price (GS)

General Plan Dated: 9/25/03 Foundation Plan Dated: 9/25/03

☒ 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 Bridge Design Branch No.

Geotechnical Services

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DIVISION OF ENGINEERING SERVICES
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4. File

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

Date: 10/6/03

Lincoln Ave. UC
Structure Name

04 - Mrn - 101 - 19.6
District County Route km Post

District Project Development
District Project Engineer

04-226141 27-0030
E.A. Number Structure Number

Foundation Report By: C Koepke Dated: 11/18/03

Reviewed By: N Tachta (SD) R. Price (GS)

General Plan Dated: 9/24/03 Foundation Plan Dated: 1/31/03

☒ No changes. ☐ The following changes are necessary.

FOUNDATION CHECKLIST

- ✓ Pile Types and Design Loads
- ✓ Pile Lengths
- ✓ Predrilling
- ✓ Pile Load Test
- ✓ Sucstitution of H Piles For Concrete Piles ☐ Yes ☑ No
- ✓ Footing Elevations, Design Loads, and Locations
- ✓ Seismic Data
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Nasser Tachta
Structure Design Bridge Design Branch No.

Geotechnical Services

Rev. 06/02