

INFORMATION HANDOUT

**For Contract No. 09-364504
At Ker, Iny-14,58,395-Various
Identified by
Project ID 0914000051**

MATERIALS INFORMATION

Geotechnical Design Report

MATERIALS INFORMATION

Geotechnical Design Report

*Serious Drought.
Help Save Water!*

Memorandum

To: MR. BRIAN MCELWAIN
PROJECT MANAGER
TRAFFIC DESIGN
DISTRICT 9

Date: March 18, 2015
File: 09-KER-14- PM 11.6
ID: 0914000051
EA: 09-364501
Changeable Message
Sign – SITE 1

Attention: Lianne Talbot

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH (OGDN)

Subject: GEOTECHNICAL DESIGN REPORT (GDR) - CMS MODEL 500 SIGN

INTRODUCTION

This Geotechnical Design Report (GDR) is presented in response to the request dated December 28, 2014 to provide foundation recommendations regarding the installation of a Changeable Message Sign (CMS Model 500). The proposed location of the CMS is on State Route 14, Post Mile R11.6. This proposed sign will provide real-time traffic conditions to motorists ahead of critical decision locations. According to the request, the CMS is to be supported on a CIDH pile per the 2010 Caltrans Standard Plans (S116). Design data for the proposed sign is presented in Table 2 below. The purpose of our investigation is to determine if the soil conditions at the site meet the requirements defined in the standard Plans.

Table 2 - Design Data for Proposed Changeable Message Signs

Post Mile	Direction	Pile Type	Pile Diameter (in)	Pile Length (ft)	Ground Condition
11.6	FNBT	CIDH	60	22.0	Level

FSBT: Facing north bound traffic.

The purpose of this investigation is to determine if the standard plan design at this site is adequate from a geotechnical point of view.

Pertinent Reports and Investigations

The following publications were reviewed to assist in the assessment of site conditions:

- Project Plans and Details, District Design.
- Log-of-Test-Borings, Site 1.
- Google Earth Satellite Maps.
- 2010 Geologic Map of California.
- State Department of Water Resources Water Data Library

SITE GEOLOGY

The CMS site is located in the northwestern corner of the Mojave Desert region adjacent Soledad Mountain. The soils that underlie this region are Pleistocene and Holocene age alluvium, lake, terrace and alluvial fan deposits, the latter two generally dominate along the periphery of the region. The location of the drill site and the type of soils encountered (described below) indicated that the soils are probably a mixture of alluvial flood plain and fan deposits.

The deposits at the site logged in the boring (A-15-001) consisted of poorly graded medium sand with some caliche deposits. Based on the in-situ Standard Penetration test (SPT) results the approximate top 8 ft of soils are classified as dense (avg. N = 39 b/f). From a depth of 8 ft to 18.5 ft the soils are classified as medium dense (avg. N= 28 b/f). Below to the maximum depth explored (35 ft) the soils are classified as dense to very dense (avg. N=64 b/f). Note: Soils classification is based on the Soil and Rock Logging, Classification Manual, 2010 Ed. For details see attached Log of Test Boring.

GROUNDWATER CONDITION

Groundwater was not encountered during drilling. The State Department of Water Resources (DWR) water well data, latest date (2009) show the groundwater at a depth of 190 ft (Water Well 3500025) located approximately 1.8miles NW of the site and at a depth of 89 ft (Water Well 34959) located approximately 2 miles SE of the site. We believe that the depth of groundwater at the site might be somewhere between the two depths given.

SEISMIC CONDITION

Based on seismic evaluation and considering the depth of groundwater and soil conditions the liquefaction potential at the site is impact deemed insignificant.

SOIL CORROSION

The soil corrosion potential at the site is not known. A soil sample was collected at the site for

testing. A corrosion report will be subsequently provided.

FOUNDATION RECOMMENDATIONS

Based on the results of the investigation the soil parameters (soil friction angle and unit weight) exceed the minimum design standards. The proposed 500 CMS Sign may be supported by a CIDH pile foundation as described in the 2010 Standard Plan for a Pile diameter of 5 ft and a length of 22 ft.

CONSTRUCTION CONSIDERATIONS

The boring data and most recent DWR water well information indicates that groundwater should not be encountered during pile construction. However, if a temporal shallow water table should be present at the time of construction, the pile construction shall be by Wet Specification method. Also, temporary casing may be required.

Temporary casing may be needed due to dry sandy soils at the site. Touching the walls of the shaft during placement of the steel reinforcement should be avoided to not exacerbate soil unraveling.

If you have any questions regarding this report please contact William Bertucci (916) 203-7992 or John Huang (916) 227-1037.

Report by:



WILLIAM BERTUCCI
Associate Engineering Geologist
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services



JOHN HUANG
Senior Materials and Research Engineer
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

Attachment: Log of Test Boring (A-15-001)

cc: District Project Manager – Brian McElwain
Project Coordination Engineer – Andrew Tan
District Environmental Planning – Angie Calloway
District Materials Engineer – Doug Lambert
District Transportation Engineer -Mitchell Ngo
GS Corporate



LOGGED BY Ed Kretschmer	BEGIN DATE 3-4-15	COMPLETION DATE 3-4-15	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 2181788.4 ft / 6514065.1 ft WGS84	HOLE ID A-15-001
DRILLING CONTRACTOR Caltrans			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 2644.0 ft NGVD29
DRILLING METHOD Hollow-Stem Auger			DRILL RIG Acker AD2	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT			SPT HAMMER TYPE 700398 140# Safety	HAMMER EFFICIENCY, ERI 1.18%
BOREHOLE BACKFILL AND COMPLETION Cement Grout 3/04/2015			GROUNDWATER READINGS None Encountered	AFTER DRILLING (DATE)
				TOTAL DEPTH OF BORING 35.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
2639.00	5		Poorly graded SAND (SP); dense; reddish brown; dry; medium SAND; nonplastic fines; stratified; moderate cementation; with Caliche.	X	1	14 20 19	39	100							
2634.00	10			X	2	12 16 16	32	67							
2629.00	15		Medium dense; less caliche.	X	3	5 11 13	24	100							
2624.00	20		Very dense; brown; with Caliche.	X	4	21 40 49	89	100							
2619.00	25			X	5	19 35 30	65	44							
2614.00	30		Dense; fine SAND.	X	6	13 19 17	36	83							
2609.00	35		Very dense.	X	7	30 31 34	65	100							
			Bottom of borehole at 35.0 ft bgs												
			This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												

BR - STANDARD KERN-INFO.GPJ CALTRANS LIBRARY (FEB 2013).GLB 3/18/15



Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE BORING RECORD				HOLE ID A-15-001	
DIST 09	COUNTY KER	ROUTE 14 pm	POSTMILE 11.6	PROJECT ID 0914000051	
PROJECT OR BRIDGE NAME Kern-Inyo CMS EA 09-364501					
BRIDGE NUMBER		PREPARED BY ELK		DATE	SHEET 1 of 1

*Serious Drought.
Help Save Water!*

Memorandum

To: MR. BRIAN MCELWAIN
PROJECT MANAGER
TRAFFIC DESIGN
DISTRICT 9

Date: March 18, 2015
File: 09-KER-58- PM 107
ID: 0914000051
EA: 09-364501
Changeable Message
Sign – SITE 2

Attention: Lianne Talbot

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH (OGDN)

Subject: GEOTECHNICAL DESIGN REPORT (GDR) - CMS MODEL 500 SIGN

INTRODUCTION

This Geotechnical Design Report (GDR) is presented in response to the request dated December 28, 2014 to provide foundation recommendations regarding the installation of a Changeable Message Sign (CMS Model 500). The proposed location of the CMS is on State Route 58, Post Mile R107. This proposed sign will provide real-time traffic conditions to motorists ahead of critical decision locations. According to the request, the CMS is to be supported on a CIDH pile per the 2010 Caltrans Standard Plans (S116). Design data for the proposed sign is presented in Table 2 below. The purpose of our investigation is to determine if the soil conditions at the site meet the requirements defined in the standard Plans.

Table 2 - Design Data for Proposed Changeable Message Signs

Post Mile	Direction	Pile Type	Pile Diameter (in)	Pile Length (ft)	Ground Condition
107	FEBT	CIDH	60	22.0	Level

FSBT: Facing east bound traffic

Pertinent Reports and Investigations

The following publications were reviewed to assist in the assessment of site conditions:

- Project Plans and Details, District Design.
- Log-of-Test-Borings, Site 2.
- Google Earth Satellite Maps.
- 2010 Geologic Map of California.
- State Department of Water Resources Water Data Library.

SITE GEOLOGY

The CMS site is located in the northwestern edge of the Mojave Desert region at the north end of the Horned Toad Hills and the Tehachapi mountain range located to the northwest of the site. The soils that underlie this region are Pleistocene and Holocene age flood plain alluvium, lake, terrace and alluvial fan deposits, the latter two generally dominate along the periphery of the region. The location of the drill site and the type of soils encountered (described below) indicated that the soils are probably a mixture of alluvial flood plain and fan deposits.

The deposits at the site logged in the boring (A-15-002) consisted of poorly graded sand with gravel to the maximum depth explored 40 ft (maximum depth explored). Based on the in-situ Standard Penetration test (SPT) the soils are classified as predominately dense to very dense ($30 \text{ b/f} \leq N < 50 \text{ b/f}$ and $50 \text{ b/f} \leq N$ respectively). The exceptions occurred at 8.5 ft and 28.5 ft where the soils are medium dense ($10 \text{ b/f} \leq N < 30 \text{ b/f}$). Soils classification is based on the Soil and Rock Logging, Classification Manual, 2010 Edition. For details see attached Log of Test Boring.

GROUNDWATER CONDITION

Groundwater was not encountered during drilling. The State Department of Water Resources (DWR) water well data, latest date (1982) show the groundwater at a depth of 484 ft (Water Well 350719) located approximately 4 miles SW of the site. Although this well is not close to the site, it is located similarly near the Horned Toad Hills. We believe therefore that the well groundwater conditions might be representative of what would be expected at the site.

SEISMIC CONDITION

Based on seismic evaluation and considering the depth of groundwater and soil conditions the liquefaction potential at the site is impact deemed insignificant.

SOIL CORROSION

The soil corrosion potential at the site is not known. A soil sample will be collected at the site for testing. A corrosion report will be subsequently provided.

FOUNDATION RECOMMENDATIONS

Based on the results of the investigation the soil parameters (soil friction angle and unit weight) exceed the minimum design standards. The proposed 500 CMS Sign may be supported by a CIDH pile foundation as described in the 2010 Standard Plan for a Pile diameter of 5 ft and a length of 22 ft.

CONSTRUCTION CONSIDERATIONS

The boring data and most recent DWR water well information indicates that groundwater should not be encountered during pile construction. However, if a temporal shallow water table should be present at the time of construction, the pile construction shall be by Wet Specification method. Also, temporary casing may be required.

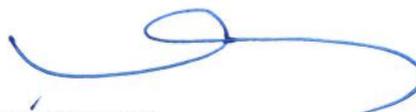
Temporary casing may be needed due to dry sandy soils at the site. Touching the walls of the shaft during placement of the steel reinforcement should be avoided to not exacerbate soil unraveling.

If you have any questions regarding this report please contact William Bertucci (916) 203-7992 or John Huang (916) 227-1037.

Report by:

 for Bertucci

WILLIAM BERTUCCI
Associate Engineering Geologist
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services



JOHN HUANG
Senior Materials and Research Engineer
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

Attachment: Log of Test Boring (A-15-002)

cc: District Project Manager – Brian McElwain
Project Coordination Engineer – Andrew Tan
District Environmental Planning – Angie Calloway
District Materials Engineer – Doug Lambert
District Transportation Engineer -Mitchell Ngo
GS Corporate



LOGGED BY Ed Kretschmer	BEGIN DATE 3-10-15	COMPLETION DATE 3-10-15	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 2229101.0 ft / 6498233.7 ft WGS84	HOLE ID A-15-002
DRILLING CONTRACTOR Caltrans			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION 3398.0 ft NGVD29
DRILLING METHOD Hollow-Stem Auger			DRILL RIG Acker AD2	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT			SPT HAMMER TYPE 700398 140# Safety	HAMMER EFFICIENCY, ERI 1.18%
BOREHOLE BACKFILL AND COMPLETION Cement Grout 3/10/2015			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS None Encountered	TOTAL DEPTH OF BORING 40.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		Fill.												
3393.00	5		Poorly graded SAND with GRAVEL (SP); very dense; light brown; dry; few fine, subrounded, elongated GRAVEL; nonplastic fines.	X	1	50	22								
3388.00	10		Medium dense.	X	2	7 10 7	17	17							
3383.00	15		Dense.	X	3	12 15 12	27	50							
3378.00	20		Minor carbonates in gravel.	X	4	14 21 21	42	72							
3373.00	25			X	5	30 28 25	53	89							
3368.00	30		Medium dense.	X	6	5 9 8	17	89							
3363.00	35		Dense.	X	7	13 19 17	36	100							

(continued)



Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE
BORING RECORD

DIST. 09	COUNTY KER	ROUTE 58 pm	POSTMILE 107.0
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HOLE ID
A-15-002

PROJECT ID
0914000051

PROJECT OR BRIDGE NAME
Kern-Inyo CMS EA 09-364501

BRIDGE NUMBER	PREPARED BY ELK
---------------	---------------------------

DATE

SHEET
1 of 2

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
			(continued).												
3358.00	40		Very dense.	X	8	23 27 30	57	100							
			Bottom of borehole at 40.0 ft bgs												
3353.00	45		<p>This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.</p>												
3348.00	50														
3343.00	55														
3338.00	60														
3333.00	65														
3328.00	70														
3323.00	75														
3318.00	80														



Department of Transportation
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

REPORT TITLE BORING RECORD				HOLE ID A-15-002	
DIST. 09	COUNTY KER	ROUTE 58 pm	POSTMILE 107.0	PROJECT ID 0914000051	
PROJECT OR BRIDGE NAME Kern-Inyo CMS EA 09-364501					
BRIDGE NUMBER		PREPARED BY ELK		DATE	SHEET 2 of 2

*Serious Drought.
Help Save Water!*

Memorandum

To: MR. BRIAN MCELWAIN
PROJECT MANAGER
TRAFFIC DESIGN
DISTRICT 9

Date: March 18, 2015
File: 09-KER-395- PM 31.6
ID: 0914000051
EA: 09-364501
Changeable Message
Sign - SITE 3

Attention: Lianne Talbot

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH (OGDN)

Subject: GEOTECHNICAL DESIGN REPORT (GDR) - CMS MODEL 500 SIGN

INTRODUCTION

This Geotechnical Design Report (GDR) is presented in response to the request dated December 28, 2014 to provide foundation recommendations regarding the installation of a Changeable Message Sign (CMS Model 500). The proposed location of the CMS is on State Route 395, Post Mile R31.6. This proposed sign will provide real-time traffic conditions to motorists ahead of critical decision locations. According to the request, the CMS is to be supported on a CIDH pile per the 2010 Caltrans Standard Plans (S116). Design data for the proposed sign is presented in Table 2 below. The purpose of our investigation is to determine if the soil conditions at the site meet the requirements defined in the standard Plans.

Table 2 - Design Data for Proposed Changeable Message Signs

Post Mile	Direction	Pile Type	Pile Diameter (in)	Pile Length (ft)	Ground Condition
31.6	FSBT	CIDH	60	22.0	Level

FSBT: Facing south bound traffic.

Pertinent Reports and Investigations

The following publications were reviewed to assist in the assessment of site conditions:

- Project Plans and Details, District Design.
- Log of Test Borings Site 3.
- Google Earth Satellite Maps.
- 2010 Geologic Map of California.
- State Department of Water Resources Water Data Library.

SITE GEOLOGY

The CMS site is located in the north central edge of the Mojave Desert region in Indian Wells Valley. The soils that underlie this region are Pleistocene and Holocene age flood plain alluvium, lake, terrace and coalescing alluvial fan deposits, the latter two generally dominate along the periphery of the region. The location of the drill site and the type of soils encountered (described below) indicated that the soils are probably a mixture of alluvial flood plain and fan deposits.

The deposits at the site logged in the boring (A-15-003) consisted of predominately dense poorly graded coarse sand to a depth of approximately 33.5 ft. From 33.5 to 38.ft dense poorly graded sand with silt and gravel was encountered. Below to the maximum depth explored (45 ft) dense poorly graded sand was encountered. Note: Soils classification is based on the Soil and Rock Logging, Classification Manual, 2010 Ed. For details see attached Log of Test Borings.

GROUNDWATER CONDITION

Groundwater was not encountered during drilling. The State Department of Water Resources (DWR) water well data (3-Well cluster), showed the groundwater at an average depth of 362 ft (Water Well 357181, measurements in 2013-14). The well cluster is located approximately 1635 ft south of the site. We believe that the water well data is most likely representative of deep groundwater conditions at the site.

SEISMIC CONDITION

Based on seismic evaluation and considering the depth of groundwater and soil conditions the liquefaction potential at the site is impact deemed insignificant.

SOIL CORROSION

The soil corrosion potential at the site is not known. A soil sample will be collected at the site for testing. A corrosion report will be subsequently provided.

FOUNDATION RECOMMENDATIONS

Based on the results of the investigation the soil parameters (soil friction angle and unit weight)

MR. Brian McElwain
Site 3

March 18, 2015
CMS Installation
EA: 09-364501
ID: 0914000051

Page 3

exceed the minimum design standards. The proposed 500 CMS Sign may be supported by a CIDH pile foundation as described in the 2010 Standard Plan for a Pile diameter of 5 ft and a length of 22 ft.

CONSTRUCTION CONSIDERATIONS

The boring data and most recent DWR water well information indicates that groundwater should not be encountered during pile construction. However, if a temporal shallow water table should be present at the time of construction, the pile construction shall be by Wet Specification method. Also, temporary casing maybe required.

Temporary casing may be needed due to dry sandy soils at the site. Touching the walls of the shaft during placement of the steel reinforcement should be avoided to not exacerbate soil unraveling.

If you have any questions regarding this report please contact William Bertucci (916) 203-7992 or John Huang (916) 227-1037.

Report by:



WILLIAM BERTUCCI
Associate Engineering Geologist
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Geotechnical Services
Division of Engineering Services



JOHN HUANG
Senior Materials and Research Engineer
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

Attachment: Log of Test Boring (A-15-003)

cc: District Project Manager – Brian McElwain
Project Coordination Engineer – Andrew Tan
District Environmental Planning – Angie Calloway
District Materials Engineer – Doug Lambert
District Transportation Engineer -Mitchell Ngo
GS Corporate



LOGGED BY Ed Kretschmer	BEGIN DATE 3-10-15	COMPLETION DATE 3-10-15	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 2449353.3 ft / 6600591.5 ft WGS84	HOLE ID A-15-003
DRILLING CONTRACTOR Caltrans	BOREHOLE LOCATION (Offset, Station, Line)			SURFACE ELEVATION 2517.0 ft NGVD29
DRILLING METHOD Hollow-Stem Auger	DRILL RIG Acker AD2			BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT	SPT HAMMER TYPE 700398 140# Safety			HAMMER EFFICIENCY, ERI 1.18%
BOREHOLE BACKFILL AND COMPLETION Cement Grout 3/10/2015	GROUNDWATER READINGS	DURING DRILLING None Encountered	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING 45.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
2512.00	5		Poorly graded SAND (SP); medium dense; pale brown; dry; coarse SAND ; nonplastic fines.	X	1	5 7 12	19	100							
2507.00	10		Dense.	X	2	9 16 20	36	100							
2502.00	15		Medium dense.	X	3	9 12 12	24	100							
2497.00	20		Dense.	X	4	10 17 18	35	100							
2492.00	25			X	5	12 16 17	33	100							
2487.00	30			X	6	16 21 21	42	100							
2482.00	35		Poorly graded SAND with SILT and GRAVEL (SP-SM); dense; brown; trace fine, rounded GRAVEL.	X	7	15 17 20	37	100							
2477.00	40		Poorly graded SAND (SP); no gravel.	X	8	13 18 20	38	83							

(continued)



Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE BORING RECORD				HOLE ID A-15-003
DIST. 09	COUNTY KER	ROUTE 395 pm	POSTMILE 31.6	PROJECT ID 0914000051
PROJECT OR BRIDGE NAME Kern-Inyo CMS EA 09-364501				
BRIDGE NUMBER	PREPARED BY ELK	DATE	SHEET 1 of 2	

3 BR - STANDARD KERN-INOY GPJ CALTRANS LIBRARY (FEB 2013) GLB 3/18/15

5 BR - STANDARD KERN-INYO GPJ CALTRANS LIBRARY (FEB 2013) GUB 3/18/15

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
			(continued).												
2472.00	45		Bottom of borehole at 45.0 ft bgs	X	9	16 17 21	38	100							
2467.00	50		<p>This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.</p>												
2462.00	55														
2457.00	60														
2452.00	65														
2447.00	70														
2442.00	75														
2437.00	80														
2432.00	85														
2427.00	90														



Department of Transportation
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

REPORT TITLE BORING RECORD				HOLE ID A-15-003	
DIST. 09	COUNTY KER	ROUTE 395 pm	POSTMILE 31.6	PROJECT ID 0914000051	
PROJECT OR BRIDGE NAME Kern-Inyo CMS EA 09-364501					
BRIDGE NUMBER		PREPARED BY ELK		DATE	SHEET 2 of 2

*Serious Drought.
Help Save Water!*

Memorandum

To: MR. BRIAN MCELWAIN
PROJECT MANAGER
TRAFFIC DESIGN
DISTRICT 9

Date: March 18, 2015
File: 09-KER-395- PM 58.38
ID: 0914000051
EA: 09-364501
Changeable Message
Sign - SITE 4

Attention: Lianne Talbot

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH (OGDN)

Subject: GEOTECHNICAL DESIGN REPORT (GDR) - CMS MODEL 500 SIGN

INTRODUCTION

This Geotechnical Design Report (GDR) is presented in response to the request dated December 28, 2014 to provide foundation recommendations regarding the installation of a Changeable Message Sign (CMS Model 500). The proposed location of the CMS is on State Route 395, Post Mile R58.38 just north of the Lone Pine town center. This proposed sign will provide real-time traffic conditions to motorists ahead of critical decision locations. According to the request, the CMS is to be supported on a CIDH pile per the 2010 Caltrans Standard Plans (S116). Design data for the proposed sign is presented in Table 2 below. The purpose of our investigation is to determine if the soil conditions at the site meet the requirements defined in the standard Plans.

Table 2 - Design Data for Proposed Changeable Message Signs

Post Mile	Direction	Pile Type	Pile Diameter (in)	Pile Length (ft)	Ground Condition
58.38	FSBT	CIDH	60	22.0	Level

FSBT: Facing south bound traffic.

Pertinent Reports and Investigations

The following publications were reviewed to assist in the assessment of site conditions:

- Project Plans and Details, District Design.
- Log-of-Test-Boring, Site 4.
- Google Earth Satellite Maps.
- 2010 Geologic Map of California.
- State Department of Water Resources Water Data Library.

SITE GEOLOGY

The CMS site is located in the relative narrow Owens Valley. The soils that underlie this valley are Pleistocene and Holocene age alluvium, lake, and coalescing alluvial fan deposits, the latter two generally dominate along the periphery of the valley.

The deposits at the site logged in the boring (A-15-001) consisted of poorly graded sand with gravel, poorly graded sand and poorly graded sand with silt and gravel. Based on the in-situ Standard Penetration test (SPT) the soils within the upper 8.5 ft of are classified as loose ($N_{60}' = 11$ b/f). Below to the maximum depth explored (51 ft) the soils are predominately very dense (avg. $N_{60}' = 55$ b/f). Note: Soils classification is based on the Soil and Rock Logging, Classification Manual, 2010 Ed.

GROUNDWATER CONDITION

Groundwater was encountered at a depth of 29 ft during drilling. The State Department of Water Resources (DWR) water well data, showed the groundwater at a depth of 18.5 ft (Water Well 366045, measurement in January 2015). The well is located approximately 1.3 miles SE of the site. A historical record from this well (1970-2015) shows a fairly stable shallow groundwater table. The groundwater table average depth over the 34 year period was about 15 ft with a plus and minus range of about 6 ft. A few scattered higher and lower numbers were not counted. It is reasonable to assume that the relatively deep groundwater depth recorded in the boring might reflect the effect of the drought the region has experienced over the last four years.

SEISMIC CONDITION

Based on seismic evaluation and considering the depth of groundwater and soil conditions the liquefaction potential at the site is impact deemed insignificant.

SOIL CORROSION

The soil corrosion potential at the site is not known. A soil sample will be collected at the site for testing. A corrosion report will be subsequently provided.

FOUNDATION RECOMMENDATIONS

Based on the results of the investigation the soil parameters (soil friction angle and unit weight) exceed the minimum design standards. The proposed 500 CMS Sign may be supported by a CIDH pile foundation as described in the 2010 Standard Plan for a Pile diameter of 5 ft and a length of 22 ft.

CONSTRUCTION CONSIDERATIONS

The boring data and most recent DWR water well information indicates that groundwater should not be encountered during pile construction. However, if a temporal shallow water table should be present at the time of construction, the pile construction shall be by Wet Specification method. Also, temporary casing may be required.

Temporary casing may be needed due to dry sandy soils at the site. Touching the walls of the shaft during placement of the steel reinforcement should be avoided to not exacerbate soil unraveling.

If you have any questions regarding this report please contact William Bertucci (916) 203-7992 or John Huang (916) 227-1037.

Report by:

 for Bertucci

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Associate Engineering Geologist
Office of Geotechnical Design – North
Geotechnical Services
Division of Engineering Services



JOHN HUANG
Senior Materials and Research Engineer
Office of Geotechnical Design – North
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Division of Engineering Services

Attachment: Log of Test Boring A-15-004)

cc: District Project Manager – Brian McElwain
Project Coordination Engineer – Andrew Tan
District Environmental Planning – Angie Calloway
District Materials Engineer – Doug Lambert
District Transportation Engineer -Mitchell Ngo
GS Corporate



LOGGED BY Ed Kretschmer	BEGIN DATE 3-11-15	COMPLETION DATE 3-11-15	BOREHOLE LOCATION (Lat/Long or North/East and Datum) 2016023.2 ft / 6836582.9 ft WGS84		HOLE ID A-15-004
DRILLING CONTRACTOR Caltrans			BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION 3719.0 ft NGVD29
DRILLING METHOD Hollow-Stem Auger			DRILL RIG Acker AD2		BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) SPT			SPT HAMMER TYPE 700398 140# Safety		HAMMER EFFICIENCY, ERI 1.18%
BOREHOLE BACKFILL AND COMPLETION Cement Grout 3/11/2015			GROUNDWATER READINGS	DURING DRILLING 29.0 ft	AFTER DRILLING (DATE) 29.0 ft on
					TOTAL DEPTH OF BORING 51.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
3714.00	5		Poorly graded SAND with GRAVEL (SP); medium dense; brown; dry, medium SAND ; nonplastic fines.	X	1	4 4 5	9	83							
3709.00	10		Dense. Light brown.	X	2	10 12 15	27	100							
3704.00	15		Poorly graded SAND (SP).	X	3	13 21 22	43	83							
3699.00	20		Moist.	X	4	13 15 17	32	100							
3694.00	25		Poorly graded SAND with GRAVEL (SP); coarse SAND.	X	5	24 23 25	48	78							
3689.00	30		Very dense, wet; Refusal at 50 blows / ft. Tube filled due to slough. therefore N value questionable.	X	6	51		33							
3684.00	35			X	7	33 34 29	63	100							
3679.00	40		Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; few fines ; 1.25-2.25.	X	8	25 33 37	70	100							

(continued)



Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE BORING RECORD				HOLE ID A-15-004	
DIST. 09	COUNTY INY	ROUTE 395 pm	POSTMILE 58.38	PROJECT ID 0914000051	
PROJECT OR BRIDGE NAME Kern-Inyo CMS EA 09-364501					
BRIDGE NUMBER		PREPARED BY ELK		DATE	SHEET 1 of 2

5 BR - STANDARD KERN-INYO.GPJ CALTRANS L BRARY (FEB 2013).CLB 3/18/15

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
3674.00	45		(continued). Poorly graded SAND with GRAVEL (SP); dense.	X	9	7 15 30	45	100							
3669.00	50		Poorly graded SAND (SP); very dense; Refusal; >4.5.	X	10	41 51		67							
			Bottom of borehole at 51.0 ft bgs												
3664.00	55		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
3659.00	60														
3654.00	65														
3649.00	70														
3644.00	75														
3639.00	80														
3634.00	85														
3629.00	90														

5 BR - STANDARD KERN-INYO.GPJ CALTRANS LIBRARY (FEB 2013).GLB 3/18/15



Department of Transportation
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

REPORT TITLE
BORING RECORD

DIST. 09	COUNTY INY	ROUTE 395 pm	POSTMILE 58.38
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HOLE ID
A-15-004

PROJECT ID
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PROJECT OR BRIDGE NAME
 Kern-Inyo CMS EA 09-364501

BRIDGE NUMBER	PREPARED BY ELK
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DATE

SHEET
 2 of 2