D & D ENGINEERING, INC.

March 4, 2019

Mr. Steve Duethman
AECOM
2380 McGee Street
Kansas City, MO 64108
816-360-4448 direct
913-221-6173 cell

Re: Bridge Sight Distance

Steve,

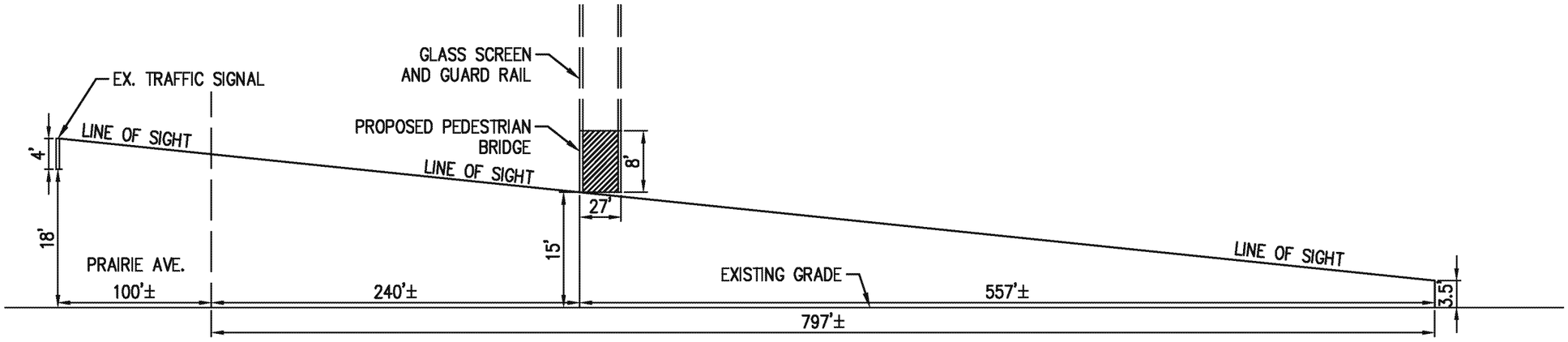
Per your request we studied sight and stopping distance related to two proposed bridges on Prairie Avenue northbound and Century Boulevard westbound.
Our study shows that in both cases our sight distance is significantly longer than the required stopping distance per the stopping sight distance formula and Table 201.1 of the Caltrans Highway Design Manual for a design speed of 50 miles per hour.
The provided sight distance for the Prairie Avenue bridge is 936', and the required stopping distance for this section of Prairie Avenue is 448', based on an uphill slope of 0.5%, a design speed of 50 miles per hour, a friction factor of 0.31 and a 2.5 second reaction time. The Caltrans Highway Design Manual, Table 201.1 requires a minimum of 430'.
The provided sight distance for the Century Boulevard bridge is 797' and the required stopping distance for this section of Century Boulevard is 457', based on a downhill slope of 0.5%, a design speed of 50 miles per hour, a friction factor of 0.31 and a 2.5 second reaction time. The Caltrans Highway Design Manual, Table 201.1 requires a minimum of 430'.
In both cases stopping distance is significantly less than sight distance and if we increase the bridge clearance for any reason from current 15', we would even have longer sight distance.

Sincerely,

D & D Engineering, Inc.

Henrik Nazarian
President

Attachments: Century Westbound Bridge Sight Distance Exhibit, Prairie Northbound Sight Distance Exhibit, Caltrans Highway Design Manual Table 201.1, (2) Street View Images, Traffic Signal Plans



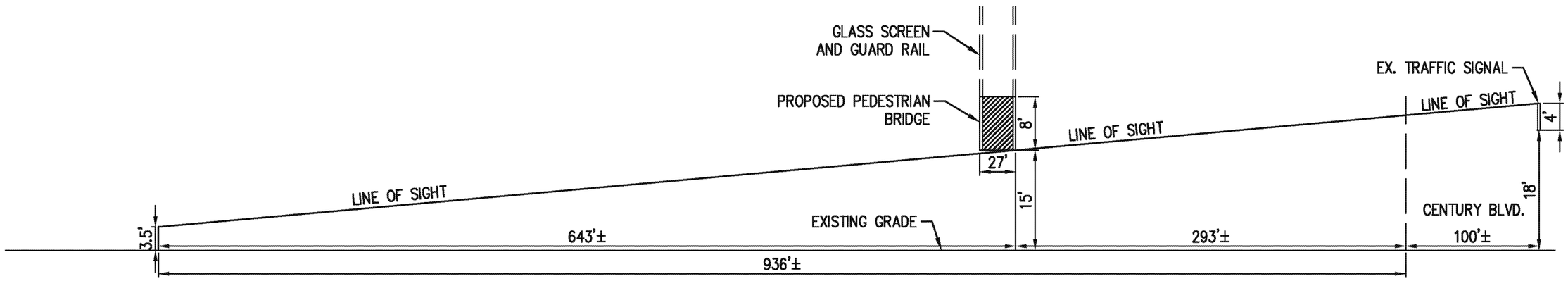
CENTURY BOULEVARD

D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-351-6800

CENTURY WESTBOUND BRIDGE
SIGHT DISTANCE EXHIBIT

SCALE: N.T.S.
DATE: 02/27/2019
SHT NO.: 01 OF 01

Drawing Name: M:\17001\Eng\17001\Exhibits\12_Sight Distance Exhibit (Pedestrian Bridge)_02-27-19\Sight Distance Exhibit - Century.dwg
Last Opened: Feb 27, 2019 - 5:03pm by: Lester Rodriguez



PRAIRIE AVENUE

D & D ENGINEERING, INC.
8901 S. LA CIENEGA BLVD, SUITE 106
INGLEWOOD, CA 90301
Phone: 424-351-6800

PRAIRIE NORTHBOUND BRIDGE
SIGHT DISTANCE EXHIBIT

SCALE: N.T.S.
DATE: 02/27/2019
SHT NO.: 01 OF 01

Drawing Name: M:\17001\Eng\17001\Exhibits\12_Sight Distance Exhibit (Pedestrian Bridge)_02-27-19\Sight Distance Exhibit - Prairie.dwg
Last Opened: Feb 27, 2019 - 5:02pm by: Lester Rodriguez

CHAPTER 200
GEOMETRIC DESIGN AND STRUCTURE STANDARDS

Topic 201 - Sight Distance

Index 201.1 - General

Sight distance is the continuous length of highway ahead, visible to the highway user. Four types of sight distance are considered herein: passing, stopping, decision, and corner. Passing sight distance is used where use of an opposing lane can provide passing opportunities (see Index 201.2). Stopping sight distance is the minimum sight distance for a given design speed to be provided on multilane highways and on 2-lane roads when passing sight distance is not economically obtainable. Stopping sight distance also is to be provided for all users, including motorists and bicyclists, at all elements of interchanges and intersections at grade, including private road connections (see Topic 504, Index 405.1, & Figure 405.7). Decision sight distance is used at major decision points (see Indexes 201.7 and 504.2). Corner sight distance is used at intersections (see Index 405.1, Figure 405.7, and Figure 504.3I).

Table 201.1 shows the minimum standards for stopping sight distance related to design speed for motorists. Stopping sight distances given in the table are suitable for Class II and Class III bikeways. The stopping sight distances are also applicable to roundabout design on the approach roadway, within the circulatory roadway, and on the exits prior to the pedestrian crossings. Also shown in Table 201.1 are the values for use in providing passing sight distance.

See Chapter 1000 for Class I bikeway sight distance guidance.

Chapter 3 of "A Policy on Geometric Design of Highways and Streets," AASHTO, contains a thorough discussion of the derivation of stopping sight distance.

201.2 Passing Sight Distance

Passing sight distance is the minimum sight distance required for the driver of one vehicle to pass another vehicle safely and comfortably. Passing must be accomplished assuming an oncoming vehicle comes into view and maintains the design speed, without reduction, after the overtaking maneuver is started.

Table 201.1
Sight Distance Standards

Design Speed[1] (mph)	Stopping[2] (ft)	Passing (ft)
10	50	---
15	100	---
20	125	800
25	150	950
30	200	1,100
35	250	1,300
40	300	1,500
45	360	1,650
50	430	1,800
55	500	1,950
60	580	2,100
65	660	2,300
70	750	2,500
75	840	2,600
80	930	2,700

(1) See Topic 101 for selection of design speed.
(2) For sustained downgrades, refer to underlined standard in Index 201.3

The sight distance available for passing at any place is the longest distance at which a driver whose eyes are 3 ½ feet above the pavement surface can see the top of an object 4 ¼ feet high on the road. See Table 201.1 for the calculated values that are associated with various design speeds.

In general, 2-lane highways should be designed to provide for passing where possible, especially those routes with high volumes of trucks or recreational vehicles. Passing should be done on tangent horizontal alignments with constant grades or a slight sag vertical curve. Not only are drivers reluctant to pass on a long crest vertical curve, but it is impracticable to design crest vertical curves to provide for passing sight distance because of high cost where crest cuts are involved. Passing sight


18'
RIGHT LANE
MUST
TURN RIGHT
Google

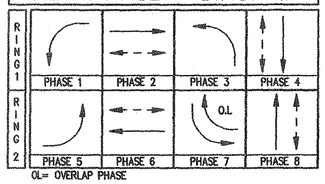
18'

CONDUCTOR SCHEDULE

AWG SIZE OR CABLE TYPE	POLE & PHASES	CONDUIT LOCATION 1	2	3	4	5	6	7	8	9	10	11
12 CABLE	① #1,#6,#6P / #4PPB							1/1			1/1	1/1
	② #3,#4P / #6PPB										1/1	1/1
	③ #3,#6,#8P / #6PPB									1/1	1/1	1/1
11–#14 1–#12	④ #5,#6,#7,#6P /#6PPB								1/1 (N)	1/1	1/1	1/1
	⑤ #5,#2,#2XP / #8PPB	1/1	1/1	1/1	1/1		1/1	1/1			1/1	1/1
	⑥ #7,#8P / #2PPB		1/1	1/1	1/1		1/1	1/1			1/1	1/1
	⑦ #7,#4,#4P			1/-	1/-		1/-	1/-			1/-	1/-
	⑧ #2PPB				-/1		-/1	-/1			-/1	-/1
(3–#14,PPB)	⑨ #4PPB						-/1	-/1			-/1	-/1
3 CABLE	⑩ #1,#2P					1/-	1/-	1/-			1/-	1/-
	TOTALS 12 CONDUCTOR / 3 CONDUCTOR	1/1	2/2	3/2	3/3	1/-	4/4	5/5	1/1 (N)	2/2	8/8	8/8
#10	LUMINAIRES	2	2	2	2	2	2	2	(N)	2	2	–
#6	SIGNAL SERVICE	–	–	–	–	–	–	–	–	–	–	2
VIDEO DETECTION CABLE		1	1	2	2	–	2	3	–	1	4	4
6 PR #19 INTERCONNECT		–	–	–	–	–	–	1	1	1	–	–
CONDUIT SIZE		2" *	2" *	2" *	2" *	2" *	2" *	2" *	3" (N)	2" *	2–3" *	2–3" *

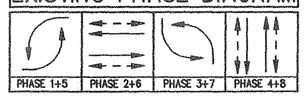
* ALL CONDUCTORS AND CABLES ARE EXISTING UNLESS NOTED OTHERWISE
(N) = NEW

NEW PHASE DIAGRAM



OL= OVERLAP PHASE

EXISTING PHASE DIAGRAM



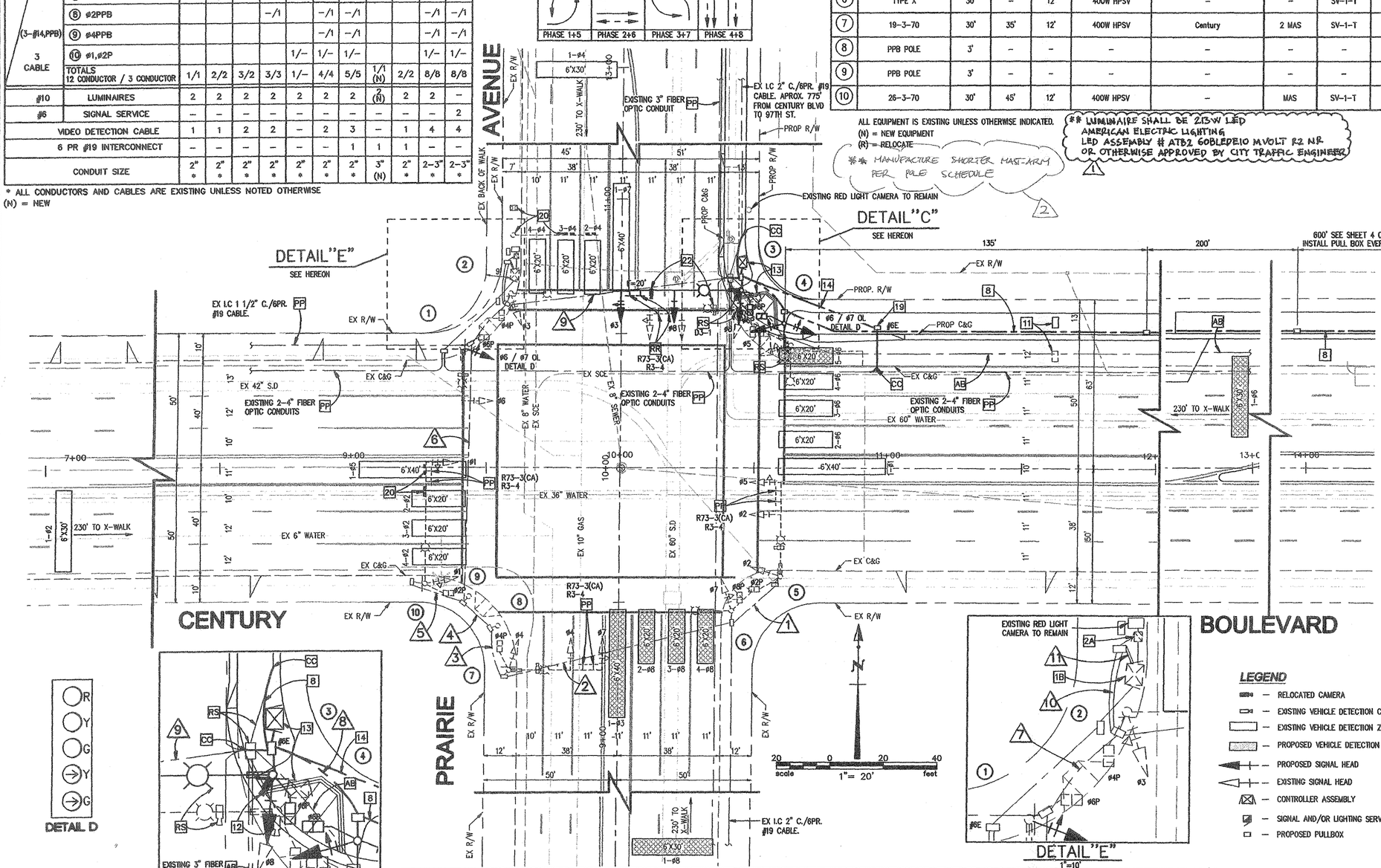
POLE SCHEDULE

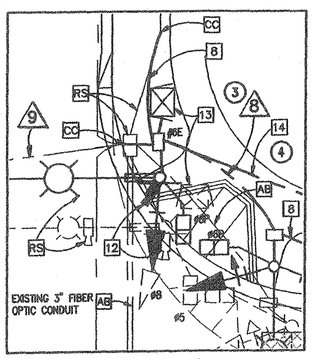
No.	STANDARD Type	Height	Sig. M.a.	Lum. M.a.	LUMINAIRE	S.N.S. LEGEND I.S.N.S.	SIGNAL MOUNTING VEHICLE M.A.	VEHICLE POLE	PED	PED PUSH BTN (SEE DETAIL "B") QUAD.	PHASE	ARROW	POLE LOCATION (SEE DETAIL "A") A	B	REMARKS
1	TYPE III	30'	20'	12'	400W HPSV	Prairie	MAS	SV-1-T(N)	SP-1-T	3	ø4	←	EXISTING		RS SV-1-T INSTALL DETAIL "D" SV-1-T
2	TYPE X	30'	–	12'	400W HPSV	–	–	SV-1-T	SP-1-T	5	ø6	→	EXISTING		–
3	~~26-3-100(N)~~ 26A-5-100(N)	30'	~~35'~~ 45'	15'(N)	~~400W HPSV(N)~~ #1 400W HPSV(N)	Century(R)	2 MAS	SV-1-T(R)	SP-1-T(R)	5	ø6	←	14'	3'	RS EXISTING POLE, REMOVE FOUNDATION COMPLETE RR PPB, SP-1-T , SV-1-T AND 2 MAS
4	TYPE 26(N)	30'	–	15'(N)	~~400W HPSV(N)~~ #1 400W HPSV(N)	–	–	SV-2-T(R)	SP-1-T(R)	7	ø8	→	7'	3'	RS EXISTING POLE, REMOVE FOUNDATION COMPLETE RR PPB, SP-1-T AND SV-1-T
5	19-3-70	30'	35'	12'	400W HPSV	Prairie	2 MAS	SV-1-T	SP-1-T	7	ø8	←	EXISTING		–
6	TYPE X	30'	–	12'	400W HPSV	–	–	SV-1-T	SP-1-T	1	ø2	→	EXISTING		–
7	19-3-70	30'	35'	12'	400W HPSV	Century	2 MAS	SV-1-T	SP-1-T	–	–	–	EXISTING		–
8	PPB POLE	3'	–	–	–	–	–	–	–	1	ø2	←	EXISTING		–
9	PPB POLE	3'	–	–	–	–	–	–	–	3	ø4	→	EXISTING		–
10	26-3-70	30'	45'	12'	400W HPSV	–	MAS	SV-1-T	SP-1-T	–	–	–	EXISTING		–

ALL EQUIPMENT IS EXISTING UNLESS OTHERWISE INDICATED.
(N) = NEW EQUIPMENT
(R) = RELOCATE

** MANUFACTURE SHORTER MAST-ARM PER POLE SCHEDULE

*# LUMINAIRE SHALL BE 213-W LED AMERICAN ELECTRIC LIGHTING LED ASSEMBLY # ATB2 60BLED8IO MVOLT R2 N.R. OR OTHERWISE APPROVED BY CITY TRAFFIC ENGINEER

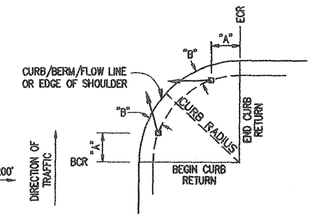




DETAIL "C"
1"=10'

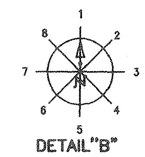
DETAIL D

DETAIL "E"
1"=10'



DETAIL "A"

* TYPICAL SIGNAL STANDARD PLACEMENT UNLESS DIMENSIONED ON PLANS.
* FOR "A" AND "B" DIMENSIONS, SEE POLE SCHEDULE OR AS DIRECTED BY THE ENGINEER.



DETAIL "B"
PUSH BUTTON LOCATION
N.T.S.

CONSTRUCTION NOTES

1B EXISTING TYPE 170E CONTROLLER ASSEMBLY AND 332 CABINET, TO REMAIN. FURNISH AND INSTALL ADDITIONAL DETECTOR SENSOR UNITS AND ALL NECESSARY APPURTENANCES TO PROVIDE THE INTENDED OPERATION. UPGRADE DETECTION CARDS TO ITERIS VANTAGE EDGE 2.

2A EXISTING SERVICE ENCLOSURE TO REMAIN.

8 INSTALL I.C. 2" CONDUIT & P.R. #19 INTERCONNECT.

11 RELOCATE EXISTING LIGHTED MONUMENT SIGN. CONDUITS SIZE AND LOCATION, PULLBOXES LOCATION, SERIES CIRCUITS, WIRING DIAGRAMS AND SERVICE LOCATION PER SEPARATE PLAN BY OTHERS.

12 RELOCATE EXISTING CCTV CAMERA.

13 RELOCATE EXISTING 334 ITS CCTV CONTROLLER CABINET.

14 FURNISH AND INSTALL 3" PVC CONDUIT, 48-STRANDED SINGLE MODE FIBER OPTIC CABLE, AND ONE (1) #10 GREEN STRANDED.

19 INSTALL 6E F.O PULLBOX. INSTALL 2-4" CONDUITS BY CONNECTING IN TO EXISTING 2-4" F.O CONDUITS. PULL NEW 2-48 SMFO CABLE TO THE NEXT INTERSECTION. PER DETAILS ON SHEET 10.

20 REMOVE EXISTING ILLUMINATION DIRECTIONAL SIGNS AND FOUNDATION COMPLETE.

22 RELOCATE VIDEO DETECTION UNIT TO MAST ARM WITH EXTENSION BAR "UGLY STICK", PER SPECIFICATIONS.

AB ABANDON CONDUIT, REMOVE CONDUCTORS.

CB INSTALL CONDUIT IN EX PULL BOX

CC CONNECT NEW AND EXISTING CONDUIT

RR REMOVE AND REUSE

RS REMOVE AND SALVAGE EQUIPMENT

PP PROTECT IN PLACE

BC INSTALL PULL BOX IN EXISTING CONDUIT RUN.

SC SPLICE NEW TO EXISTING CONDUIT.

LEGEND

- RELOCATED CAMERA
- EXISTING VEHICLE DETECTION CAMERA
- EXISTING VEHICLE DETECTION ZONE
- PROPOSED VEHICLE DETECTION ZONE
- PROPOSED SIGNAL HEAD
- EXISTING SIGNAL HEAD
- CONTROLLER ASSEMBLY
- SIGNAL AND/OR LIGHTING SERVICE
- PROPOSED PULLBOX

DIGALERT
DIAL TOLL FREE 811
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

OWNER / DEVELOPER:
HOLLYWOOD PARK LAND CO., LLC
100 WILSHIRE BLVD, SUITE 940
SANTA MONICA, CA 90401
TEL: (310) 382-9000
FAX: (310) 382-9097

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture
25152 SPRINGFIELD COURT, SUITE 350 • SANTA CLARITA, CA 91355 • 661-284-7400
PREPARED UNDER THE SUPERVISION OF:
HENRIK NAZARIAN, P.E. R.C.E. 59589 1/31/12 DATE

REGISTERED PROFESSIONAL ENGINEER HENRIK NAZARIAN No. 59589 Exp. 12/31/13 CIVIL STATE OF CALIFORNIA

NO.	DATE	REVISION DESCRIPTION
1	2/18/12	REVISED LUMINAIRE TYPE HN
2	7/17/14	UPDATED SIGNAL POLE & MOUNTING TYPES AS SHOWN

APPROVED BY: PUBLIC WORKS 1-31-12 DATE
SUBMITTED BY: DATE
CHECKED BY: CHAD SWEET, SENIOR TRANSPORTATION ENG. 1/31/12 DATE

CITY OF INGLEWOOD, CALIFORNIA
PUBLIC WORKS DEPARTMENT

PLANS FOR THE MODIFICATION OF
TRAFFIC SIGNALS W/ SAFETY LIGHTING
AT THE INTERSECTION OF
CENTURY BLVD. and PRAIRIE AVE.

PERMIT NUMBER:	PLAN SCALE:	SHEET NO.	PLAN NUMBER:
TS-0000	1" = 20'	5 OF 10	TR-3903

Drawing Name: L:\07119\Eng\07119-2000\Final Plots\OFF-SITE\Traffic Signal\05_070119-2000t1.dwg
Last Opened: Jan. 30, 2012 - 1:07pm by: DJuarez