Technical Memorandum

To: Jeff Lerud, NDOT

Date: February 14, 2020

From: Jack Sjostrom, CA Group

Subject: I-15 from Flamingo to Sahara: Existing Drainage Facilities

Introduction

This Existing Drainage Facilities memo summarizes the existing facilities that may be impacted by the I-15, Flamingo Road and Sahara Avenue Project and will be included as an appendix to the Feasibility Study currently being prepared for the project.

I-15 is a major corridor in southern Nevada connecting California to Arizona. For the past three decades, the Nevada Department of Transportation (NDOT) has been making significant investments on I-15 improvements to keep up with the growth in the Las Vegas area. The segment of I-15 between Flamingo Road and Sahara Avenue is the only remaining piece to be upgraded adjacent to the resort corridor. Other imminent or recently completed projects include: NDOT's I-15 South Corridor Improvement project (Sloan Road to Tropicana Avenue); NDOT's Project Neon (Sahara Avenue to I-15/US95/I-515 Interchange); and the I-15 Tropicana NEPA project (Russell Road to Harmon Avenue) – expected to be completed by 2025.

The existing physical constraints (bridges, right-of-way) on I-15 from Flamingo Road to Sahara Avenue can only accommodate five through lanes in each direction. This configuration causes significant congestion in the current condition, and future traffic demands are expected to break down even further. Consequently, the I-15 from Flamingo Road to Sahara Avenue Feasibility Study was initiated by NDOT to develop and evaluate alternatives primarily focused on improving traffic operations, safety, accommodating future demand on I-15 and adjacent streets, and optimizing the operational efficiency of I-15 and interchanges with Sahara Avenue, Spring Mountain Road and Flamingo Road.

Existing Drainage Facilities

There are several existing drainage facilities in the vicinity of and connected through and across I-15 between Flamingo Road and Sahara Avenue. The major drainage facilities that may be impacted by construction of the proposed improvements are summarized in the following table, "Summary of Drainage Facilities". Information on these facilities was obtained from the following:

- Resort Corridor Access Frontage Road at Flamingo Road (Clark County Contract L-1560)
- Flamingo Road Interchange (NDOT Contract 1998)
- Spring Mountain / I-15 Interchange (NDOT Contract 2438)
- Sahara Avenue / I-15 Interchange (NDOT Contract 2571)
- Spring Mountain / I-15 Interchange (NDOT Contract 2779)
- I-15 Widening – Sahara to Charleston (NDOT Contract 3003)
- I-15 Express Lanes, I-215 to Sahara Avenue, Harmon Channel (NDOT Contract 3355)
- SAM Clark KMZ file provided by NDOT
- Clark County Regional Flood Control District's 2018 Las Vegas Valley Flood Control Master Plan, Update (2018 MPU), Flood Control Facility Maps and Inventory Tables F-29 and F-34 (these maps and inventory tables are attached)
- Google Earth

Summary of Drainage Facilities

#	FACILITY	LOCATION	REFERENCE
1	900’ of 25’W 6’D concrete rectangular channel and Dual 10’X8’X2100’ RCB	West side of I-15, south, through and north of the Sahara Avenue Interchange	Contract 2779 Contract 3003
2	Drop inlets and 10’X4’X300’ RCB	Crossing SB off-ramp at Sahara Avenue	Contract 2571 Contract 3003
3	5800’ of 10’ – 16’ BW riprap lined trapezoidal channel	East side of I-15 from Desert Inn Road to Sahara Avenue	Contract 2438 Contract 2571 Google Earth
4	48”X2200’ RCP, connects to CCRFCD Facility FLWA 0823	East side of I-15, from north of Harmon Avenue to north of the Flamingo Interchange	Contract 2779
5	2: 10’X6’X20’ RCB to 11’X6’X2090’ RCB, connects to CCRFCD Facility FLWA 0823	West side of I-15, south of the Flamingo Interchange to north of the Flamingo Interchange	Contract L-1560
6	CCRFCD Facility FLWA 0823 2: 16’X10’ RCB	Crossing I-15 north of the Flamingo Interchange	2018 MPU F-34
7	30”X950’ RCP 36”X950’ RCP 48”X130’ RCP	Crossing Industrial Road and I-15 south of Twain; east side of I-15 south of Twain Avenue. 48” RCP may connect to #6 on the north side outside of NDOT ROW	Contract 2779
8	7 span bridge 84’W 5.5’D, Structure No. H-804S, H-804N and H-804R also designated as CCRFCD Facility FLWA 0891	Crossing the UPRR north of Flamingo Road	Contract 2779 2018 MPU F-34
9	CCRFCD Facility FLWA 0884 Gabion channel 100’W 3.5’D 3:1 SS	East of UPRR, north of Flamingo Road	2018 MPU F-34
10	CCRFCD Facility FLWA 0874 6:10’X8’ RCB	Crossing Dean Martin Drive and SB off-ramp to Flamingo Road, north of the Flamingo Interchange	2018 MPU F-34
11	650’ of 10’ BW riprap lined trapezoidal channel	West side of I-15, south of Spring Mountain Road Interchange	Contract 2438 Contract 2779
12	Dual 53”X34”X628’ HERCP and 13.5’X28.5’ junction box	West side of I-15, south of Spring Mountain Road Interchange	Contract 2779
13	2: 54”X320’ RCP	Crossing I-15 south of Spring Mountain Road Interchange. Discharges into Primary Detention Area described in #14 below	Contract 2438
14	Primary Detention Area and Secondary Detention Area – connected by 2: 48”X160’ RCPs	Primary Detention Area: East side of I-15, south of Spring Mountain Road Interchange, surrounded by the NB on-ramp to the I-15 Secondary Detention Area: south of Primary Detention Area	Contract 2438 Contract 2779

#	FACILITY	LOCATION	REFERENCE
15	60”X1500’ RCP	West side of I-15 from Spring Mountain Road to Desert Inn Road, discharges into the Rancho Drive Channel	Contract 2779
16	(1)Rancho Drive Channel – 750’ concrete rectangular/trapezoidal, depth varies from 1.7’ to 5’	West side of I-15 from Desert Inn Road to south of Sirius Avenue	Contract 2779
17	4500’ of 10’ BW riprap lined trapezoidal channel	West side of I-15 from Sirius Avenue to Sahara Avenue	Contract 2438
18	2000’ of 30”X19” to 45”X29” HERCP to 36” to 42” RCP	Crossing I-15 north of Spring Mountain Road, then east side of I-15 to north of Desert Inn Road	Contract 2438
19	(1)Proposed CCRFCD Facilities FW15 0301, 0271, 0242 and 0214 consisting of 12’W 4’D 2:1SS concrete channel, and dual 12’X9’ to 12’X10’ RCBs (replaces Rancho Drive Channel to Sahara Avenue)	West side of I-15 from Desert Inn Road to Sahara Avenue	2018 MPU F-29
20	Existing CCRFCD Facilities FW15 0175, 2:10’X8’ RCB	West side of I-15, north of Sahara Avenue	2018 MPU F-29
21	2: 36”X225’ RCP	Crossing I-15, north of Desert Inn Road	SAM Clark KMZ file Contract 2779
22	Concrete valley gutter, 470’	Gore area south of Sahara Avenue Interchange between I-15 NB and NB off-ramp at Sahara Avenue	Contract 3003
23	12’ drop inlet and 14”X23”X74’ HERCP	DI on west side of Dean Martin Drive, south of Harmon Avenue, HERCP discharges into the Harmon Channel	Contract 3355
24	36”X225’ RCP	Culvert crossing I-15 south of Harmon Avenue, discharges into earth-lined channel on east side of I-15	Contract 3355
25	12’X2’ Trench drain and 3: 14”X23”X	Trench drain on west side of Dean Martin Drive, south of Harmon Avenue, HERCP discharges into the Harmon Channel	Contract 3355
26	15’ drop inlet and 4: 14”X23”X80’ HERCP	DI on west side of Dean Martin Drive, north of Harmon Avenue, HERCP discharges into the Harmon Channel	Contract 3355
27	15’ drop inlet and 2: 24”X38” HERCP	DI on west side of Dean Martin Drive, north of Harmon Avenue, HERCP discharges into the Harmon Channel	Contract 3355
28	36”X220’ RCP	Culvert crossing I-15 north of Harmon Avenue, discharges into earth-lined channel on east side of I-15	Contract 2779

#	FACILITY	LOCATION	REFERENCE
29	10’ flat bottom earth channel, 2400’	Earth lined channel on the east side of I-15 between Tropicana Avenue and Flamingo Road	Contract 2779
30	Drop inlet and 24” RCP	DI on east side of Flamingo Road NB off-ramp, south of Flamingo Road	SAM Clark KMZ file
31	Type 2A drop inlet and 24”X43’ RCP	Between I-15 NB and Flamingo Road NB off-ramp, south of Flamingo interchange	Contract 2779
32	Type 2A drop inlet and 24”X160’ RCP	Crossing Flamingo Road SB off-ramp	Contract 1998
33	Embankment protector and 18” to 12” CMP	Crossing EB lanes on Flamingo Road and SB off-ramp	Contract 1998
34	Embankment protector and 18” to 12” CMP	Crossing EB lanes on Flamingo Road	Contract 1998
35	Type 2 drop inlet and 18”X50’ RCP	Crossing Spring Mountain Road exit, north of Flamingo Road	Contract 2779
36	Drop inlets and 18”X125’ RCP	West side of Flamingo Road NB on-ramp, may connect to #4	SAM Clark KMZ file
37	24” RCP	Between Flamingo Road NB on-ramp and Frank Sinatra Drive, north of Flamingo Road	SAM Clark KMZ file
38	Drop inlet, manhole and 18”X110’ RCP	Crossing Spring Mountain Road exit, north of Flamingo Road	Contract 2779
39	Drop inlet, manhole, 18” and 24” CMP	Crossing Spring Mountain Road exit and Frank Sinatra Drive, north of Flamingo Road	Contract 2779
40	Drop inlets, manhole, 24” and 18” RCP	Crossing Spring Mountain Road exit north of Industrial Road	Contract 2779
41	Drop inlets, 8” PVC and 18” RCP	East side of Spring Mountain Road EB exit, discharges into #14	Contract 2779
42	24”X118’ CMP	Crossing Spring Mountain Road NB on-ramp	SAM Clark KMZ file
43	Drop inlet and 53”X34”X150’ HERCP	Crossing Spring Mountain Road SB on-ramp	Contract 2779
44	Drop inlet and 53”X34”X118’ HERCP	Crossing Spring Mountain Road SB on-ramp	Contract 2779
45	Drop inlet and 45”X29”X89’ HERCP	Crossing Spring Mountain Road SB on-ramp	Contract 2779
46	Drop inlet and 24”X65’ CMP	West side of I-15 SB, south of Spring Mountain Road	Contract 2779
47	Drop inlet and 24” RCP	South side of Spring Mountain Road, east of the SB on-ramp	SAM Clark KMZ file
48	Drop inlet and 36”X69’ RCP	Crossing Spring Mountain Road, west of SB on-ramp	Contract 2779

#	FACILITY	LOCATION	REFERENCE
49	Manholes and 48”X220’ RCP with drop inlets and lateral connections	Crossing Spring Mountain Road, west of SB-on-ramp, connects to #15	Contract 2779
50	Drop inlet and 18”X105’ RCP	South side of Spring Mountain Road, east of I-15	Contract 2779
51	Manholes and 36”X310’ RCP	South side of Spring Mountain Road, east of I-15	Contract 2779
52	24”X129’ RCP	Between Spring Mountain Road WB off-ramp and UPRR	Contract 2779
53	42”X152’ RCP	Between Spring Mountain Road WB off-ramp and UPRR	Contract 2779
54	Drop inlet and 18”X248’ RCP	Gore area SW corner of Highland and Western, to gore area between Spring Mountain Road and Spring Mountain Road WB off-ramp	Contract 2779
55	Drop inlet and 30”X19”x360’ HERCP	Gore area between Spring Mountain Road and Spring Mountain Road WB off-ramp to west side of UPRR north of Spring Mountain Road	Contract 2779
56	24”X325’ RCP	East side of NB I-15, north of Spring Mountain Road	SAM Clark KMZ file
57	24”X184’ RCP	West side of SB I-15, north of Spring Mountain Road	Sam Clark KMZ file
58	36” to 24” RCP	Crossing I-15, south of Desert Inn Road	Contract 2779
59	48” RCP	North side of Desert Inn Road, west of I-15	Sam Clark KMZ file Contract 2779
60	Drop inlet and 18”X42’ RCP	Crossing I-15 SB off-ramp to Spring Mountain Road, north of Desert Inn Road	Contract 2779
61	Drop inlets and 18”X540’ RCP	I-15 SB shoulder east side, north of Desert Inn Road	Sam Clark KMZ file
62	36”X270’ RCP	Crossing I-15, north of Sirius Avenue	SAM Clark KMZ file
63	36”X280’ RCP	Crossing I-15, north of Meade Avenue	SAM Clark KMZ file
64	36”X240’ RCP	Crossing I-15, south of Sahara Avenue	SAM Clark KMZ file
65	24”X52’ RCP	East side of I-15, north of Desert Inn Road	SAM Clark KMZ file
66	Drop inlet and 18” RCP	I-15 NB shoulder, north of Desert Inn Road	SAM Clark KMZ file
67	Drop inlets and 18”X250’ RCP	I-15 SB shoulder east side, at Sirius Avenue	SAM Clark KMZ file

#	FACILITY	LOCATION	REFERENCE
68	800’ of trench drain	I-15 SB shoulder east side, north of Sirius Avenue	SAM Clark KMZ file
69	24”X102’ RCP	Crossing I-15 NB, south of Meade Avenue	SAM Clark KMZ file
70	Drop inlets and 18”X220’ RCP	Crossing I-15 NB, north of Meade Avenue	SAM Clark KMZ file
71	3: 4’X4’X65’ RCB	Crossing Rancho Drive, north of Meade Avenue	SAM Clark KMZ file
72	Drop inlet and 18”X150’ RCP	NB I-15 east side, south of Sahara Avenue	Contract 3003
73	Drop inlets and 18”X65’ RCP	West side of NB off-ramp at Sahara Avenue	Contract 3003
74	36” RCP	In Sahara Avenue, east of I-15	Contract 3003
75	Drop inlets and 18”X200’ RCP	North side of Sahara Avenue, east of I-15	Contract 3003
76	3000’ of concrete U-channel	East side of I-15, between Sahara Avenue and Oakey Boulevard	Contract 3003
77	Manholes and 18”X690’ RCP	Industrial Road at Spring Mountain Road then east, connects to #78	Contract 2779
78	Manholes, drop inlets, laterals and 48”X1266’ RCP	Crossing Spring Mountain Road east of Industrial Road, then east	Contract 2779
79	Drop inlet and 42”X120’ RCP	Crossing Sahara Avenue SB off-ramp	Contract 3003
80	Drop inlet and 24”X76’ RCP	Crossing Sahara Avenue SB off-ramp	Contract 2571 Contract 3003
81	Drop inlets, laterals, and 10’X6’X450’ RCB	South side of Sahara Avenue, west of I-15	Contract 3003
82	Drop inlets, 18”X197’ and 24”X130’ RCP	Rancho Drive, south of Sahara Avenue	Sam Clark KMZ file
83	Drop inlet and 18”X63’ RCP	Rancho Drive, south of Sahara Avenue	Sam Clark KMZ file
84	Drop inlet and 18”X50’ RCP	I-15 SB, south of Sahara Avenue	Contract 3003
85	Drop inlet and 18”X16’ RCP	Landscape area, west side of I-15 SB, south of Sahara Avenue	Contract 3003
86	Type 8 drop inlet, manholes and 48”X160’ RCP	South side of Sahara Avenue then east to south in Highland Drive	Contract 3003
87	Drop inlets, 18” and 24” RCP	North side of Sahara Avenue, at Highland Avenue, then crossing Sahara Avenue and continuing south in Highland Drive	Sam Clark KMZ file
88	Existing CCRFCD Facilities FWOK 0000, 10’X8’ RCB	West side of I-15, at Oakey Boulevard	2018 MPU F-29

#	FACILITY	LOCATION	REFERENCE
89	Existing CCRFCD Facilities FWUP 0100, 8'X4' RCB	In Western Avenue crossing Sahara Avenue	2018 MPU F-29
90	24" RCP	Western Avenue at Sahara Avenue	Sam Clark KMZ File
91	Drop inlet and 24"X20' CMP	I-15 NB, north of Desert Inn Road	Sam Clark KMZ File
92	Drop inlet and 24"X20' CMP	I-15 NB, north of Desert Inn Road	Sam Clark KMZ File
93	Drop inlet and 24"X20' CMP	I-15 NB, south of Teddy Drive	Sam Clark KMZ File
94	Drop inlet and 18"X20' RCP	I-15 SB, south of Teddy Drive	Sam Clark KMZ File
95	Drop inlet and 18"X10' RCP	I-15 SB at Kings Way	Contract 3003
96	Drop inlet and 18"X15' RCP	I-15 NB, south of Sahara Avenue	Sam Clark KMZ File
97	Drop inlet and 24"X20' CMP	I-15 NB off-ramp at Sahara Avenue	Sam Clark KMZ File
98	Drop inlet and 18"X6' CMP	I-15 NB off-ramp at Sahara Avenue	Contract 3003
99	Drop inlet and 18"X25' CMP	I-15 NB on-ramp at Sahara Avenue	Contract 3003
100	Drop inlet and 18"X20' CMP	I-15 SB off-ramp to Sahara Avenue	Contract 3003
101	Drop inlet and 18"X40' RCP	I-15 SB off-ramp to Sahara Avenue	Contract 3003
102	Drop inlets and 18"X145' RCP	I-15 SB off-ramp to Sahara Avenue	Contract 3003
103	Drop inlets and 18"X90' RCP	I-15 SB off-ramp to Sahara Avenue	Sam Clark KMZ File
104	Drop inlets and 18"X45' RCP	I-15 SB off-ramp to Sahara Avenue	Sam Clark KMZ File
105	Drop inlet and 18"X25' RCP	I-15 SB, south of Oakey Boulevard	Sam Clark KMZ File
106	Drop inlet and 18"X25' RCP	I-15 SB, south of Oakey Boulevard	Sam Clark KMZ File
107	Drop inlet and 18"X25' RCP	I-15 SB, south of Oakey Boulevard	Sam Clark KMZ File
108	Drop inlet and 18"X25' RCP	I-15 SB, south of Oakey Boulevard	Sam Clark KMZ File

Lengths of facilities are approximate.

(1) 2018 MPU proposes future facility FW15 0301, 12'W 4'D 2:1 SS concrete channel, that appears to replace the Rancho Drive Channel, see CCRFCD Facilities Map F-29, attached.

The project is located on FEMA Flood Insurance Rate Map (FIRM) 32003C2556F, panels 2170 and 2556 of 4090. Exhibits developed from these panels with the project boundary annotated are attached and show the following:

- At the Flamingo Interchange, the center portion of I-15 lies within a Zone A defined by FEMA as a Special Flood Hazard Area (SFHA). SFHA is defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. Zone A is a SFHA for which no base flood elevations have been determined.
- South of the Flamingo Interchange, I-15 lies within a shaded Zone X defined by FEMA as areas of 0.2% annual chance flood; areas of 1% annual change flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- The remainder of the project lies within Zone X, defined by FEMA as areas determined to be outside the 0.2% annual change floodplain.

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BHSA		**BOULDER HIGHWAY SAHARA AVENUE**						
0175	P	14' X 14' RCB	6000	3952	CSA13	SW3	7.93	0.67
0289	P	14' X 12' RCB	2300	3669	CSA11	SW3	7.55	0.87
0331	P	14' X 11' RCB	2000	3346	CSA10-1	SW3	7.15	1.00
CHRA		**WEST CHARLESTON DRAINS - RANCHO**						
0000	E	6' X 5' RCB	310	302	CAL95	SW3	0.62	1.92
0006	E	5' X 5' RCB	420	302	CAL95	SW3	0.62	1.00
0014	E	5' X 4' RCB	600	302	CAL95	SW3	0.62	1.50
FLBN		**FLAMINGO - BOULDER HIGHWAY NORTH**						
0312	P	7' X 4' RCB	2160	621	CCH52	SW3	0.62	4.20
0342	P	7' X 4' RCB	2425	621	CCH52	SW3	0.62	4.20
FLDY		**FLAMINGO WASH - DARBY STORM DRAIN**						
0000	E	84" RCP	100	611	CLF24	FLAM3A	0.76	0.25
0002	E	10' X 3' RCB	50	611	CLF24	FLAM3A	0.76	0.25
0004	E	60" RCP	680	611	CLF24	FLAM3A	0.76	2.80
FLFA		**FLAMINGO - FASHION**						
0000	E	12' X 5' RCB	2050	720	CFW17N	FLAM3A	0.72	0.28
0037	E	8' X 5' RCB	3060	492	FW14	FLAM3A	0.44	0.45
FLLA		**FLAMINGO WASH - LATERAL (FLAMINGO/RAINBOW)**						
0254	E	90" RCP	2730	572	CLF27	FLAM3B	0.51	0.40
0304	P0	MODIFY SPILLWAY, RAISE HEIGHT BY 1' (REPLACES FLLA0305)		1556	CLF25	FLAM3A	1.03	
0305	E	1,556 CFS PMF SPILLWAY (REPLACE W/ FLLA0304)		1556	CLF25	FLAM3A	1.03	
0306	E	30" RCP WITH 18" ORIFICE OUTLET	203	30	DIDB	FLAM3A	1.03	0.43
0308	E	62 AC-FT DESERT INN DETENTION BASIN		813	CLF25	FLAM3A	1.03	
0309	P0	UPGRADE TO 70 AC-FT DESERT INN DETENTION BASIN		813	CLF25	FLAM3A	1.03	
0322	E	81" RCP	1370	245	LF25	FLAM3A	0.27	0.50
0345	E	81" RCP	1340	245	LF25	FLAM3A	0.27	0.50
0369	E	72" RCP	670					0.50
0379	E	66" RCP	1320					0.50
FW15		**FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY**						
0000	E	3: 12' X 10' RCB	2170	3685	CAL93	Boulder4	8.93	0.17
0010	E	3: 12' X 10' RCB	677	3506	CAL96	Boulder4	8.70	0.17
0038	E	3: 12' X 10' RCB	1945	3399	CCCH22	Boulder4	8.52	0.17
0050	E	3: 12' X 10' RCB	870	2613	CCH50	SW4	8.48	0.17
0089	E	2: 18' X 10' RCB	1200	2485	CCWAL2	SW4	8.28	0.20
0100	E	2: 18' X 10' RCB	1510	2324	COK11C	SW3	7.83	0.60
0125	E	2: 10' X 8' RCB	267	1450	DCCSA08	SW3	6.67	0.80
0130	E	20' X 8' RCB	1176	1450	DCCSA08	SW3	6.67	0.57
0150	E	2: 10' X 8' RCB	760	1450	DCCSA08	SW3	6.67	0.80
0175	E	2: 10' X 8' RCB	985	1450	DCCSA08	SW3	6.67	0.75
0214	P	2: 12' X 10' RCB	1610	4269	CED10-C	SW3	6.25	0.73
0242	P	2: 12' X 9' RCB	1500	4130	CCCPS08	SW3	6.03	0.93
0271	P	2: 12' X 10' RCB	1520	3842	CCPS08	SW3	5.49	0.59
0301	P	CONC CHNL 12'W 4'D 2:1 SS	1300	353	CCE3FD-C	SW3	0.42	0.42
FWCH		**WEST CHARLESTON DRAIN**						
0000	E	10' X 7' RCB	1710	1044	CCH22	SW3	1.38	0.74
0020	E	10' X 7' RCB	840	824	CCCH18-C	SW3	1.15	0.40
0036	E	9' X 7' RCB	425	824	CCCH18-C	SW3	1.15	0.40
0044	E	9' X 7' RCB	145	561	CCH18-C	SW3	0.53	0.40
0047	E	7' X 5' RCB	710	561	CCH18-C	SW3	0.53	2.05
0060	E	5' X 4' RCB	400	561	CCH18-C	SW3	0.53	0.40
FWOK		**OAKEY DRAIN**						
0000	E	10' X 8' RCB	1350	960	1COK11C	SW3	1.16	0.62
0020	E	10' X 8' RCB	1025	960	1COK11C	SW3	1.16	0.60
0040	E	8' X 8' RCB	960	749	COK10	SW3	0.85	1.00
0060	E	5' X 5' RCB	970	749	COK10	SW3	0.85	1.50
0076	E	5' X 6' RCB	1175	749	COK10	SW3	0.85	1.04
0100	E	5' X 5' RCB	2020	465	COK09-C	SW3	0.55	2.16
FWPS		**PALMYRA / SIRIUS DRAIN**						
0000	P	12' X 12' RCB	3000	3544	CPS08	SW3	5.07	1.50
0057	P	10' X 10' RCB	5220	2101	CPS06	SW3	2.78	1.28
0157	P	2: 66" RCP	5100	547	CPS03	SW3	0.59	1.15

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FWR2		**FREEWAY CHANNEL - RAILROAD CHANNEL**						
0000	E	5' X 4' RCB	377					1.60
0020	E	EARTH CHNL 10'W 4'D 2:1 SS	650					0.50
FWRR		**FREEWAY CHANNEL BYPASS FACILITY RR BRANCH**						
0000	E	48" RCP	70					1.22
0010	E	CONC CHNL 5'W 5'D 0:1 SS	220					1.22
FWSA		**FREEWAY CHANNEL - SAHARA**						
0000	P	7' X 5' RCB	5700	496	CSA08	SW3	0.42	1.49
FWSH		**SHADOW LANE DRAIN**						
0000	E	3' X 4' RCB	950	247	CH22-C	SW3	0.23	0.20
FWUP		**FREEWAY CHANNEL BYPASS FACILITY**						
0000	E	10' X 9' RCB	350	181	CH50	SW3	0.20	0.37
0010	E	10' X 8' RCB	804	181	CH50	SW3	0.20	0.37
0059	E	10' X 6' RCB	2680	181	CH50	SW3	0.20	0.40
0100	E	8' X 4' RCB	1440	181	CH50	SW3	0.20	0.47
FWVV		**VALLEY VIEW DRAIN**						
0000	P	12' X 11' RCB	1320	1549	CCE3FA	SW3	2.69	0.30
0025	P	10' X 10' RCB	2665	1059	CR4C1	SW3	1.74	0.30
0050	P	8' X 6' RCB	7785	750	DFW05	SW3	1.34	1.50
FWWL		**FREEWAY CHANNEL-WALDMAN AVENUE**						
0000	E	6' X 6' RCB	820	431	CWAL2	SW3	0.45	0.20
LCCH		**LAS VEGAS CREEK CHANNEL**						
0000	E	2: 12' X 7' RCB	730	3212	CAL93C	MEADOWS4	9.90	1.28
0013	E	2: 12' X 6' RCB	2035	3050	CLC20-C	MEADOWS4	9.60	0.82
0051	E	2: 14' X 7' RCB	3113	3050	CLC20-C	MEADOWS4	9.60	0.60
0110	E	TRANSITION STRUCTURE	220	3001	CCLC16-C	MEADOWS4	9.50	
0114	E	2: 14' X 7' RCB	670	2386	CRMEDET	MEADOWS4	8.19	0.80
0127	E	TRANSITION STRUCTURE	110	2386	CRMEDET	MEADOWS4	8.19	
0129	E	2: 14' X 7' RCB	1130	2386	CRMEDET	MEADOWS4	8.19	0.50
0150	E	2: 13' X 7' RCB	200	2386	CRMEDET	MEADOWS4	8.19	0.95
0154	E	TRANSITION STRUCTURE	190	2386	CRMEDET	MEADOWS4	8.19	
0157	E	2: 12' X 6' RCB	1650	1700	CCLC14-C	SW3	2.93	1.06
0230	E	12' X 6' RCB	2140	1450	CLC14-C	SW3	2.53	1.74
0270	E	12' X 6' RCB	1705	814	CCWA02-C	SW3	1.84	0.54
0302	E	8' X 6' RCB	3940	814	CCWA02-C	SW3	1.84	2.49
0377	E	10' X 7' RCB	1226	814	CCWA02-C	SW3	1.84	0.74
0400	E	TRANSITION STRUCTURE	110	458	CWA02-C	SW3	1.47	0.49
0402	E	8' X 6' RCB @ JONES	535	458	CWA02-C	SW3	1.47	0.49
0412	E	60" RCP	1370	458	CWA02-C	SW3	1.47	1.08
0438	E	60" RCP	1090	171	CLC01-C	SW3	1.20	1.60
0458	E	60" RCP	1060	171	CLC01-C	SW3	1.20	1.60
0478	E	60" RCP	1110	171	CLC01-C	SW3	1.20	0.55
0499	E	42" RCP OUTLET	660	87	RAINBWDB	SW3	1.11	1.88
0513	E	102 AC-FT RAINBOW DETENTION BASIN		1027	RAINBWIN	SW3	1.11	
LCDE		**LAS VEGAS CREEK - DECATUR**						
0000	E	6' X 5' RCB	1800	430	LC11-C	SW3	0.38	1.26
0034	E	72" RCP	700	430	LC11-C	SW3	0.38	0.50
LCJO		**LAS VEGAS CREEK - JONES**						
0000	E	6' X 6' RCB	380	381	AL01B-C	SW3	0.37	0.50
0007	E	6' X 5' RCB	675	381	AL01B-C	SW3	0.37	0.62
LCLO		**LAS VEGAS CREEK - LORENZI**						
0000	E	7' X 6' RCB	445	285	DAL00A	SW3	0.41	3.37
0008	E	7' X 6' RCB	2983	285	DAL00A	SW3	0.41	0.40
0054	E	7' X 5' RCB	169	285	DAL00A	SW3	0.41	1.00
LCME		**LAS VEGAS CREEK - MEADOWS**						
0000	E	14' X 8' RCB	895	1484	MEADOWDB	SW3SC	5.67	0.72
0016	E	STILLING BASIN	140	1484	MEADOWDB	SW3SC	5.67	0.21
0017	E	3,300 CFS SPILLWAY (REPLACE W/ LCME0018)		3300	MEADOWDB	SW3SC	5.67	
0018	P	MODIFY SPILLWAY, RAISE HEIGHT BY 1' (REPLACES LCME0017)		3300	MEADOWDB	SW3SC	5.67	
0019	E	1: 11' X 5' RCB AND 1: 11.5' X 5' RCB	110	1484	MEADOWDB	SW3SC	5.67	0.81
0020	E	213 AC-FT MEADOWS DETENTION BASIN		4909	MEADOWIN	SW3SC	7.55	
0021	P	UPGRADE TO 249 AC-FT MEADOWS DETENTION BASIN		4909	MEADOWIN	SW3SC	7.55	

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LCME		**LAS VEGAS CREEK - MEADOWS**						
0026	E	ENERGY DISSIPATOR	110	4909	MEADOWIN	SW3SC	5.67	2.94
0028	E	CONC CHNL 45'W 8.5'D 0:1 SS	922	4909	MEADOWIN	SW3SC	5.67	0.40
0040	E	CONC CHNL 40'W 9.5'D 0:1 SS	525	4819	CAL90-C	SW3SC	5.44	0.40
0070	E	CONC CHNL 18-30'W 7-9.5'D 0:1 SS	255	1956	CAL16	SW3	2.33	2.06
0076	E	FREE SPAN BRIDGE 18'W 8'D @ ALTA	100	1956	CAL16	SW3	2.33	1.89
0077	E	CONC CHNL 18'W 8'D 1:1 SS	618	1956	CAL16	SW3	2.33	1.89
0085	E	10' X 6' RCBC @ VALLEY VIEW	275	1712	1CAL16	SW3	2.09	1.89
LCRA		**LAS VEGAS CREEK - RANCHO**						
0000	E	12' X 8' RCB	380	931	CLC16-C	SW3	1.71	0.60
0004	E	12' X 6' RCB	2367	931	CLC16-C	SW3	1.71	0.77
LVWH		**WASHINGTON AVENUE CHANNEL**						
0447	E	3: 14.33' X 10' RCB	1955	5193	CCAL93	SW5	22.05	0.15
0484	E	CONFLUENCE STRUCTURE	455	5193	CCAL93	SW5	22.05	0.15
MEAL		**MEADOWS ALTA**						
0000	E	CONC CHNL 8'W 11'D 1:1 SS	700	1277	CAL13-3	SW3	1.48	1.58
0012	E	12' X 6' RCBC @ RED SKY	160	1227	CAL10-C	SW3	1.42	3.03
0013	E	CONC CHNL 8'W 11'D 1:1 SS	320	1227	CAL10-C	SW3	1.42	3.03
0015	E	72" RCP	2500	592^	CAL11-C^	SW3	1.38	1.94
0016	P	ADD: 84" RCP	2500	592^	CAL11-C^	SW4	1.38	1.94
0060	E	60" RCP	905	419^	CBR3^	SW3	1.08	1.00
0061	P	ADD: 78" RCP	905	419^	CBR3^	SW3	1.08	1.00
0100	E	72" RCP	1280	837	CBR3	SW3	1.08	1.40
0120	E	60" RCP	3500	385^	CAL05-C^	SW3	1.01	1.00
0121	P	ADD: 78" RCP	3500	385^	CAL05-C^	SW3	1.01	1.00
0130	E	6' X 4' RCB	1150	198	AL04-C	SW3	0.18	0.40
0150	E	60" RCP	285	518	CCUS	SW3	0.74	1.40
0160	E	36" RCP	2600	341	CUS	SW3	0.56	1.25
0209	E	48" RCP	2500	150	DCR2	SW3	0.41	1.70
0256	E	38" X 60" HERCP	81	150	DCR2	SW3	0.41	1.42
0258	E	48" RCP	275	150	DCR2	SW3	0.41	4.31
MECH		**EXTENSION OF MEADOWS / CHARLESTON**						
0108	E	30" RCP	8550	32	OAKEYDB	SW3	1.88	1.43
0310	E	24" RCP	1000	32	OAKEYDB	SW3	1.88	1.43
0323	E	15" RCP OUTLET	200	32	OAKEYDB	SW3	1.88	
0324	E	201 AC-FT OAKEY DETENTION BASIN		1891	OAKEYIN	SW3	1.88	
0334	E	11' X 6' RCB	200	622	C5-OAK-C	SW3	0.56	0.50
0337	E	9' X 6' RCB	520	622	C5-OAK-C	SW3	0.56	0.50
0338	E	10' X 8' RCB	2060	1302	C3A-OAKC	SW3	1.32	1.62
0351	E	90" RCP	1350	622	C5-OAK-C	SW3	0.56	0.50
0378	E	10' X 8' RCB	745	1302	C3A-OAKC	SW3	1.32	2.00
0380	E	66" RCP	385	372	3-HOLM-C	SW3	0.33	2.00
0390	E	83" X 53" RCP	50	372	3-HOLM-C	SW3	0.33	2.00
0410	E	66" RCP	182	372	3-HOLM-C	SW3	0.33	2.00
0420	E	66" RCP	1410	372	3-HOLM-C	SW3	0.33	2.00
MECN		**MEADOWS - CHARLESTON**						
0000	P	9' X 8' RCB	1570	1150	CCH10	SW3	1.00	1.09
0061	P	8' X 7' RCB	3300	1150	CCH10	SW3	1.00	1.82
0123	P	8' X 6' RCB	5200	854	CCH09-C	SW3	0.72	1.64
0223	P	6' X 5' RCB	2700	438	CCH05-C	SW3	0.34	2.04
MEOK		**OAKEY MEADOWS STORMDRAIN**						
0000	E	CONC CHNL 19'W 9.5'D 0:1 SS	112	2871	COK13	SW3SC	2.94	0.55
0002	E	19' X 7' RCB	800	2871	COK13	SW3SC	2.94	0.98
0017	E	19' X 8' RCB	1550	2871	COK13	SW3SC	2.94	0.92
0048	E	18' X 9' RCB	1700	2871	COK13	SW3SC	2.94	0.50
0070	E	7' X 6' RCB	1320	244	CH14B	SW3	0.22	0.44
0079	E	18' X 8' RCB	630	2524	COK12	SW3SC	2.57	0.50
0091	E	18' X 8' RCB	850	2524	COK12	SW3SC	2.57	1.01
0110	E	12' X 8' RCB	2304	1568	CCOK08	SW3SC	1.58	1.04
0150	E	12' X 8' RCB	642	1568	CCOK08	SW3SC	1.58	0.45
0166	E	12' X 9' RCB	1350	1568	COK08	SW3	1.58	0.45
0191	E	12' X 7' RCB	660	995	COK07	SW3	0.93	0.71

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
MEOK		**OAKEY MEADOWS STORMDRAIN**						
0204	E	12' X 6' RCB	655	995	COK07	SW3	0.93	0.71
0217	E	12' X 5' RCB	1276	570	CSA06	SW3	0.52	0.40
MEPA		**MEADOWS PARALLEL**						
0000	E	10' X 6' RCB	1370	276	CCH14A	SW3	0.25	0.50
0022	E	6' X 5' RCB	200	276	CCH14A	SW3	0.25	1.45
0025	E	78" RCP	470	276	CCH14A	SW3	0.25	1.16
PSDE		**PALMYRA / SIRIUS DRAIN - DECATUR LATERAL**						
0000	P	12' X 9' RCB	1330	1127	CED02	SW3	1.21	0.38
0025	P	10' X 8' RCB	1320	652	CED13	SW3	0.65	0.25
WAGC		**WASHINGTON AVENUE CHANNEL - GRAND CENTRAL**						
0014	E	1: 12' X 4' RCB AND 1: 11' X 4' RCB	2440	505	LC21	SW3	0.56	0.20
0060	E	12' X 4' RCB	455	505	LC21	SW3	0.56	0.20

*The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.
**As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.
^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e. HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F-29

LEGEND

ID (Facility Identifier) AABB
Parent Stream Name
Stream Name
Mile 0000
Distance Above Confluence with Parent Stream (Miles)
Miles in Hundredths

ExistingFacility..... E
Proposed or Modified Facility..... P
Contingency Level
Category A..... P
Catgory B..... P0

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe	CIPCP	Reinforced Concrete Arch Culvert	RCAC
Corrugated Metal Arch Pipe Culvert	CMAP	Reinforced Concrete Box	RCB
Corrugated Metal Pipe Culvert	CMPC	Reinforced Concrete Box Culvert	RCBC
High Density Polyethylene	HDPE	Reinforced Concrete Pipe	RCP
Horizontal Elliptical Reinforced Concrete Pipe	HERCP	Reinforced Concrete Pipe Culvert	RCPC
Reinforced Concrete Arch Pipe	RCAP	Storm Sewer Pipe	SSP

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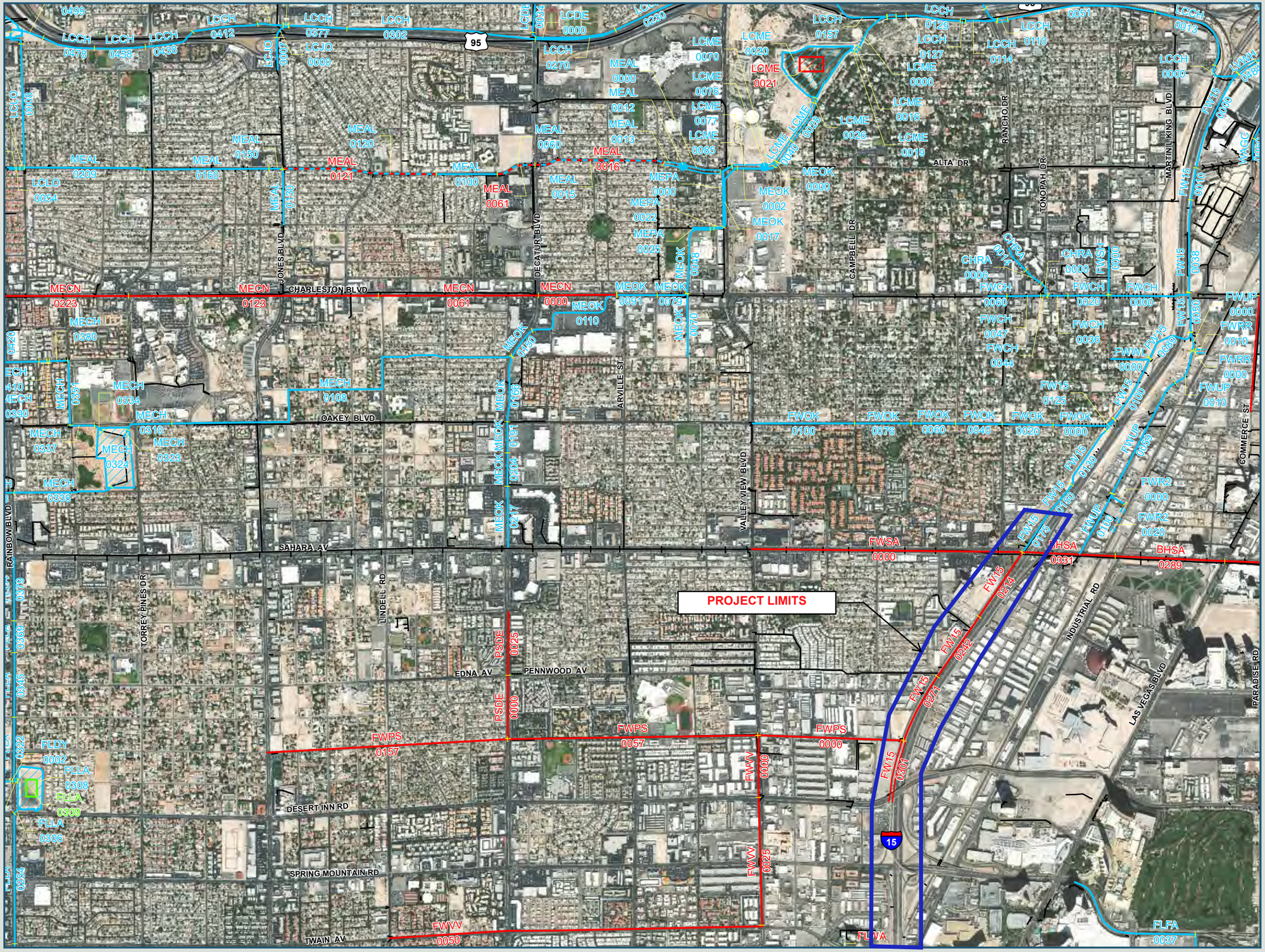


2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-29
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

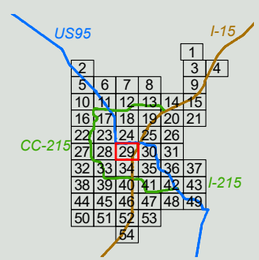
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

N

0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017



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ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FLFA		**FLAMINGO - FASHION**						
0000	E	12' X 5' RCB	2050	720	CFW17N	FLAM3A	0.72	0.28
0037	E	8' X 5' RCB	3060	492	FW14	FLAM3A	0.44	0.45
FLFL		**FLAMINGO WASH - FLAMINGO STORM DRAIN**						
0000	E	54" RCP	1370	650	CFW4	FLAM3A	0.68	1.70
0026	E	57" RCP	1370	650	CFW4	FLAM3A	0.68	1.14
0051	E	51" RCP	1390	369	FW3	FLAM3A	0.37	0.96
0077	E	42" RCP	1160	369	FW3	FLAM3A	0.37	1.68
0101	E	45" RCP	1250					3.54
0123	E	39" RCP	790					0.83
0139	E	33" RCP	430					0.83
0147	E	27" RCP	1260					1.19
FLJO		**FLAMINGO DIVERSION - JONES BRANCH**						
0000	E	12' X 6' RCB	3310	1100	USACE	USACE	1.46	1.00
0076	E	96" RCP	2640	822	CTD9	FLAM3A	0.79	1.00
0126	P	78" RCP	660	338	TD8	FLAM3A	0.29	1.00
FLLA		**FLAMINGO WASH - LATERAL (FLAMINGO/RAINBOW)**						
0000	E	CONC CHNL 20'W 6'D 0:1 SS	2180	1318	CLF32	FLAM3B	2.44	0.75
0041	E	2: 14' X 8' RCB	626	1318	CLF32	FLAM3B	2.44	0.06
0053	E	CONC CHNL 20'W 6'D 0:1 SS	1130	1318	CLF32	FLAM3B	2.44	0.75
0074	E	24' X 10' RCBC @ PRIVATE ST	40	1157	CLF31	FLAM3B	2.21	0.55
0075	E	EARTH CHNL 20'W 6'D 0:1 SS	160	1157	CLF31	FLAM3B	2.21	0.75
0076	E	114" RCP	1490	1157	CLF31	FLAM3B	2.21	0.89
0104	E	114" RCP	5340	916	CLF29	FLAM3B	1.31	0.89
0203	E	96" RCP	1350	773	CLF28	FLAM3B	1.03	0.40
0227	E	93" RCP	1360	773	CLF28	FLAM3B	1.03	0.40
0254	E	90" RCP	2730	572	CLF27	FLAM3B	0.51	0.40
FLRB		**FLAMINGO DIVERSION - RAINBOW BRANCH**						
0000	E	12' X 6' RCB	850	1500	USACE	USACE	1.29	1.00
0050	E	12' X 6' RCB	2590	1261	CTD6	FLAM3A	1.29	0.80
0062	E	12' X 4' RCB	2930	836	CTD5	FLAM3A	0.78	1.18
FLRO		**FLAMINGO WASH - ROCHELLE**						
0000	E	60" CMP	1920	290	FW1	FLAM3A	0.27	1.30
FLTR		**FLAMINGO - TROPICANA DIVERSION CHANNEL**						
0000	E	CONC CHNL 26'W 19.5'D 0:1 SS	1380	3400	USACE	USACE	4.85	0.11
0014	E	26' X 18' RCBC @ DECATUR BLVD	580	3400	USACE	USACE	4.85	0.11
0015	E	CONC CHNL 26'W 18'D 0:1 SS	205	3400	USACE	USACE	4.42	0.11
0020	E	CONC CHNL 13'W 18'D 2:1 SS	610	3400	USACE	USACE	4.42	0.11
0025	E	CONC CHNL 26'W 16.5'D 0:1 SS	500	3400	USACE	USACE	4.42	0.11
0044	E	26' X 16.5' RCBC @ RUSSELL	160	3400	USACE	USACE	4.42	0.11
0046	E	CONC CHNL 13'W 16.5'D 2:1 SS	920	3400	USACE	USACE	4.42	0.11
0065	E	CONC CHNL 19.5'W 18'D 0:1 SS	740	3400	USACE	USACE	4.04	0.11
0076	E	19.5' X 18' RCBC @ LINDELL	120	3300	USACE	USACE	4.04	0.11
0078	E	CONC CHNL 13'W 11.5'D 2:1 SS	2410	3300	USACE	USACE	4.04	1.25
0125	E	19.5' X 16.5' RCBC @ SNAKE	150	3150	USACE	USACE	2.59	1.25
0127	E	CONC CHNL 19.5'W 11.5'D 0:1 SS	2770	3150	USACE	USACE	2.59	1.25
0180	E	19.5 X 15' RCBC @ TORREY PINES DRIVE	120	2850	USACE	USACE	2.59	0.96
0181	E	CONC CHNL 13'W 11.5'D 2:1 SS	2280	2850	USACE	USACE	2.59	0.96
0231	E	19.5' X 8' RCB	325	2850	USACE	USACE	1.29	0.70
0233	E	19.5' X 10' RCB	1575	2850	USACE	USACE	1.29	0.70
FLVV		**FLAMINGO - VALLEY VIEW**						
0000	E	10' X 5' RCB	290	555^	CFW6^	FLAM3A	2.14	0.37
0001	P0	ADD 1: 90" RCP	290	332^	CFW6^	FLAM3A	2.14	0.37
0006	E	54" & 60" RCP	1200	374^	CFW6^	FLAM3A	2.14	0.67
0007	P0	ADD 1: 90" RCP	1200	513^	CFW6^	FLAM3A	2.14	0.67
FLWA		**FLAMINGO WASH**						
0719	E	2: 15' X 10' RCB	1440	3548	CFW17	FLAM3B	5.44	0.53
0748	E	CONC CHNL 30'W 10'D 0:1 SS	1220	2710	CFW17W	FLAM3B	4.50	0.64
0768	E	CONC CHNL 50'W 6'D 4:1 SS	150	2710	CFW17W	FLAM3B	4.50	0.64
0772	E	4: 11' X 7' RCB	90	2710	CFW17W	FLAM3B	4.50	0.50
0773	E	2: 11' X 7' RCB	1530	2710	CFW17W	FLAM3B	4.50	0.91
0798	E	4: 10' X 10' RCB (IMPERIAL PALACE FACILITY)	680	2710	CFW17W	FLAM3B	4.50	0.40

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FLWA		**FLAMINGO WASH**						
0810	E	4: 10' X 10' RCB	640	2710	CFW17W	FLAM3B	4.50	0.38
0820	E	8: 10' X 8' RCB	100	2620	CFW13	FLAM3B	4.33	0.38
0823	E	2: 16' X 10' RCB	2610	2620	CFW13	FLAM3B	4.33	0.83
0874	E	6: 10' X 8' RCB	560	2226	CFW12	FLAM3B	3.81	0.82
0884	E	GABION CHNL 100'W 3.5'D 3:1 SS	320	1821	CFW11	FLAM3B	3.27	0.60
0891	E	7 SPAN BRIDGE 84'W 5.5'D @ UPRR	90	1821	CFW11	FLAM3B	3.27	1.30
0892	E	EARTH CHNL 60'W 10'D 3:1 SS (REPLACE W/ FLWA0893)	110	1821	CFW11	FLAM3B	3.27	0.84
0893	P	GABION CHNL 20'W 8'D 2:1 SS (REPLACES FLWA0892)	110	1821	CFW11	FLAM3B	3.27	0.84
0895	E	EARTH CHNL 60'W 10'D 3:1 SS (REPLACE W/ FLWA0896)	560	1187	CFW11S	FLAM5A	13.70	0.84
0896	P	GABION CHNL 20'W 6'D 3:1 SS (REPLACES FLWA0895)	560	1187	CFW11S	FLAM5A	13.70	0.84
0901	E	4: 12' X 10' RCBC @ FLAMINGO/INDUSTRIAL CONNECTOR	180	1187	CFW11S	FLAM5A	13.70	0.60
0902	E	EARTH/CONC CHNL 30'W 15'D 1:1 SS (REPLACE W/ FLWA0903)	1000	1187	CFW11S	FLAM5A	13.70	0.72
0903	P	CONC CHNL 30'W 4.5'D 1:1 SS (REPLACES FLWA0902)	1000	1187	CFW11S	FLAM5A	13.70	0.72
0923	E	3: 20' X 5' RCAC @ VALLEY	80	1187	CFW11S	FLAM5A	13.70	1.10
0924	E	EARTH CHNL 60'W 14'D 1:1 SS (REPLACE W/ FLWA0925)	1600	1187	CFW11S	FLAM5A	13.70	1.00
0925	P	GABION CHNL 20'W 5.5'D 2:1 SS (REPLACES FLWA0924)	1600	1187	CFW11S	FLAM5A	13.70	1.00
0940	E	EARTH CHNL 60'W 14'D 1:1 SS (REPLACE W/ FLWA0941)	1900	1010	CFW2	FLAM5A	13.10	1.00
0941	P	GABION CHNL 20'W 5'D 2:1 SS (REPLACES FLWA0940)	1900	1010	CFW2	FLAM5A	13.10	1.00
0990	E	7: 12' X 5' RCB	130	926	LWFLDB	FLAM4B	8.87	1.50
0991	E	3: 10' X 8' RCB	1970	926	LWFLDB	FLAM4B	8.87	1.00
1025	E	7: 10' X 5' RCB	90	926	LWFLDB	FLAM4B	8.87	1.10
1026	E	2: 24' X 9' RCAP	450	926	LWFLDB	FLAM4B	8.87	0.43
1033	E	3: 12' X 10' RCAP	680	926	LWFLDB	FLAM4B	8.87	0.43
1039	E	3: 12' X 10' RCBC @ DECATUR	90	926	LWFLDB	FLAM4B	8.87	1.60
1048	E	28,950 CFS PMF SPILLWAY		28950	CLF33	FLAM4B	8.87	
1049	E	2: 72" RCP OUTLET	90	926	LWFLDB	FLAM4B	8.87	
1050	E	222 AC-FT LOWER FLAMINGO DETENTION BASIN		3311	CLF33	FLAM4B	8.87	
1111	E	RIPRAP CHNL 40'W 5'D 2:1 SS	2470	2185	CLF20A	FLAM3B	5.24	1.35
1149	E	CONC CHNL 50'W 8'D 2:1 SS	150	2136	CLF20	FLAM3B	5.06	1.00
1151	E	4: 10' X 8' RCBC @ JONES	100	2136	CLF20	FLAM3B	5.06	1.70
1152	E	EARTH CHNL 50'W 8'D 3:1 SS (REPLACE W/ FLWA1153)	2600	2136	CLF20	FLAM3B	5.06	0.44
1153	P	GABION CHNL 50'W 6'D 2:1 SS (REPLACES FLWA1152)	2600	2136	CLF20	FLAM3B	5.06	0.44
1202	E	4: 10' X 8' RCBC @ TORREY PINES	90	2136	CLF20	FLAM3B	5.06	1.00
1203	E	EARTH/CONC CHNL 40'W 10'D 2:1 SS (REPLACE W/ FLWA1204)	1640	2136	CLF20	FLAM3B	5.06	1.40
1204	P	CONC CHNL 40'W 4.5'D 2:1 SS (REPLACES FLWA1203)	1640	2136	CLF20	FLAM3B	5.06	1.40
1236	E	4 SPAN BRIDGE 80'W 8'D @ TROPICANA	180	1970	CLF19	FLAM3B	4.55	1.20
1237	E	GABION CHNL 40'W 10'D 2:1 SS	1650	1970	CLF19	FLAM3B	4.55	0.91
1266	E	3 SPAN BRIDGE 120'W 15'D 3:1 SS @ RAINBOW	130	1970	CLF19	FLAM3B	4.55	1.20
1267	E	GABION CHNL 40'W 6'D 1:1 SS	3770	1970	CLF19	FLAM3B	4.55	0.90
FWVV		**VALLEY VIEW DRAIN**						
0025	P	10' X 10' RCB	2665	1059	CR4C1	SW3	1.74	0.30
0050	P	8' X 6' RCB	7785	750	DFW05	SW3	1.34	1.50
NBSC		**TROPICANA WASH - NORTH BRANCH SCHIRLLS**						
0000	E	60" RCP	1350	465	TW6	FLAM3A	0.42	0.80
TRBD		**BLUE DIAMOND CHANNEL**						
0000	E	CONC CHNL 10'W 10'D 2:1 SS	1700	4850	USACE	USACE	8.68	0.70
0014	E	23' X 10' RCBC @ DECATUR	130	4850	USACE	USACE	8.68	0.70
0015	E	CONC CHNL 10'W 10'D 2:1 SS	3070	4750	USACE	USACE	8.68	0.90
0075	E	CONC CHNL 19.5'W 12'D 0:1 SS	400	4750	USACE	USACE	8.42	0.48
0083	E	2: 14' X 11' RCBC @ SUNSET	120	4750	USACE	USACE	8.42	0.48
0084	E	CONC CHNL 19.5'W 12'D 0:1 SS	550	4750	USACE	USACE	8.42	0.48
TRMC		**TROPICANA WASH - MCCARRAN AIRPORT**						
0012	E	EARTH CHNL 18'W 5'D 2:1 SS (REPLACE W/ TRMC0013)	950	727	DTRMC	FLAM3A	4.34	0.45
0013	P	CONC CHNL 17'W 6'D 0:1 SS (REPLACES TRMC0012)	2060	727	DTRMC	FLAM3A	4.34	0.65
0030	E	EARTH CHNL 18'W 5'D 2:1 SS (REPLACE W/ TRMC0031)	1490	727	DTRMC	FLAM3A	4.34	0.45
0031	P	TRANSCONC CHNL 54'W 6'D TO 17'W 6'D 0:1 SS (REPL TRMC0030)	400	727	DTRMC	FLAM3A	4.34	0.20
0060	E	5: 10' X 4' RCBC @ TROPICANA AVE	120	2537	CMC11	FLAM3B	3.47	0.70
0062	P0	ADD 1: 10' X 6' RCB	7100	593^	CMC9^	FLAM3B	2.39	0.50
0063	E	2: 8' X 6' RCB	7100	1205^	CMC9^	FLAM3B	2.39	0.50
0195	E	CONC CHNL 12'W 5'D 1.5:1 SS (REPLACE W/ TRMC0196)	1350	1798	CMC9	FLAM3B	2.39	0.60
0196	P0	CONC CHNL 12'W 7'D 1.5:1 SS (REPLACES TRMC0195)	1350	1798	CMC9	FLAM3B	2.39	0.60

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
TRMC		**TROPICANA WASH - MCCARRAN AIRPORT**						
0215	E	SINGLE SPAN BRIDGE 40'W 7'D @ FOUR SEASONS	40	1798	CMC9	FLAM3B	2.39	0.90
0216	E	CONC CHNL 12'W 5'D 1.5:1 SS	930	1798	CMC9	FLAM3B	2.39	1.42
0233	E	2: 8' X 6' RCBC @ DEWEY	40	1705^	CMC9^	FLAM3B	2.39	1.00
0234	P0	ADD 1: 6' X 4' RCBC @ DEWEY	40	93^	CMC9^	FLAM3B	2.39	1.00
0235	E	CONC CHNL 12'W 5'D 1.5:1 SS	1170	1798	CMC9	FLAM3B	2.39	0.80
0263	E	2: 10' X 6' RCB	1500	1532	CMC8	FLAM3B	1.87	1.28
0290	E	RIPRAP CHNL 30'W 2'D 4:1 SS	2440	272	MC8	FLAM3A	0.51	0.79
TRNB		**TROPICANA WASH - NORTH BRANCH**						
0000	E	CONC CHNL 17'W 5'D 0:1 SS	110	835	CTW8W	FLAM3A	1.66	1.19
0015	E	2: 15' X 4' RCBC @ INDUSTRIAL	180	835	CTW8W	FLAM3A	1.66	0.20
0020	E	CONC CHNL 30'W 5'D 0:1 SS	60	835	CTW8W	FLAM3A	1.66	4.22
0030	E	EARTH/CONC CHNL 15'W 8'D 2:1 SS (REPLACE W/ TRNB0031)	1300	835	CTW8W	FLAM3A	1.66	1.10
0031	P	CONC CHNL 12'W 6'D 0:1 SS (REPLACES TRNB0030)	1300	835	CTW8W	FLAM3A	1.66	1.10
0040	E	20' X 4.5' RCAP	1041	835	CTW8W	FLAM3A	1.66	1.00
0060	E	3: 9' X 5' RCB	115	614	TNDB	FLAM3A	1.29	0.59
0062	E	20' X 5.75' RCAP	316	614	TNDB	FLAM3A	1.29	0.77
0067	P	GABION CHNL 10'W 5'D 2:1 SS	1180	614	TNDB	FLAM3A	1.29	1.32
0089	E	10' X 7' RCB	89	614	TNDB	FLAM3A	1.29	0.55
0090	E	104" RCP (HOBAS)	93	614	TNDB	FLAM3A	1.29	0.55
0092	E	10' X 5' RCB OUTLET	389	614	TNDB	FLAM3A	1.29	0.25
0093	E	37,000 CFS PMF SPILLWAY		37000	CTW6	FLAM3A	1.29	
0094	E	64 AC-FT TROPICANA NORTH BRANCH DETENTION BASIN		1147	CTW6	FLAM3A	1.29	
0105	E	2: 14' X 5' RCB	58	1147	CTW6	FLAM3A	1.29	10.50
0106	E	2: 14' X 6' RCBC @ SCHIRLLS	50	745	CTW7	FLAM3A	0.87	1.00
0107	E	CONC CHNL 30'W 5'D 0:1 SS	312	745	CTW7	FLAM3A	0.87	1.18
0113	E	CONC CHNL 26.5'W 7'D 0:1 SS	306	745	CTW7	FLAM3A	0.87	1.18
TRWA		**TROPICANA WASH**						
0092	E	GRASS CHNL 30'W 5'D 4:1 SS	210	1836	CTW9	FLAM3B	1.77	0.90
0096	E	2: 25' X 10' RCAC	30	1836	CTW9	FLAM3B	1.77	0.90
0097	E	GRASS CHNL 30'W 5'D 4:1 SS	300	1836	CTW9	FLAM3B	1.77	0.90
0103	E	3: 16' X 7' RCAP	808	1836	CTW9	FLAM3B	1.77	0.44
0121	E	3: 10' X 6' RCB	1760	1836	CTW9	FLAM3B	1.77	1.27
0150	E	21' X 7' RCB	140	1836	CTW9	FLAM3B	1.77	1.27
0151	E	3: 8' X 7' RCB	70	1836	CTW9	FLAM3B	1.77	1.50
0152	E	2: 12' X 7' RCB	2714	1836	CTW9	FLAM3B	1.77	0.92
0192	E	2: 12' X 8' RCB	381	1836	CTW9	FLAM3B	1.77	1.23
0210	E	4: 10' X 6' RCB	250	1836	CTW9	FLAM3B	1.77	0.50
0218	E	3: 9.5' X 5.5' & 1: 10' X 5.5' RCB	1100	1836	CTW9	FLAM3B	1.77	0.45
0234	E	4: 8' X 7' RCB	1920	1836	CTW9	FLAM3B	1.77	0.86
0278	E	CONC CHNL 17'W 7'D 0:1 SS	310	1222	CTW3	FLAM3B	1.17	1.23
0284	E	19.5' X 7' RCB	1700	1222	CTW3	FLAM3B	1.17	0.79
0310	E	15' X 6.5' RCB	108	937	CTW2	FLAM3B	0.87	1.39
0314	E	15' X 6.5' RCB	3660	937	CTW2	FLAM3B	0.87	1.05
0382	E	10' X 6' RCB	400	557	CTW1	FLAM5A	175.32	1.02
0395	E	10' X 6' RCB	720	557	CTW1	FLAM5A	175.32	1.02
0404	E	10' X 6' RCB	860	557	CTW1	FLAM5A	175.32	0.88
0422	E	10' X 6' RCB	1040	557	CTW1	FLAM5A	175.32	1.13
0433	E	CONC CHNL 10'W 6'D 0:1 SS	280	557	CTW1	FLAM5A	175.32	2.85
0439	E	10' X 7' RCBC @ UPRR	90	496	TRDB	FLAM5A	174.91	0.25
0440	E	CONC CHNL 10'W 6'D 0:1 SS	60	496	TRDB	FLAM5A	174.91	0.25
0441	E	10' X 7' RCB	713	496	TRDB	FLAM5A	174.91	0.26
0452	E	13,000 CFS PMF SPILLWAY		13000	USACE	USACE	13.96	
0453	E	10' X 8.5' RCB OUTLET	200	495	USACE	USACE	174.91	0.26
0454	E	825 AC-FT TROPICANA DETENTION BASIN		6700	USACE	USACE	174.91	
WGTR		**WAGON TRAIL CHANNEL**						
0000	E	GRASS CHNL 20'W 10'D 4:1 SS	2500	1293	CMC7B	FLAM3B	1.36	0.40
0050	E	2: 12' X 5' RCBC @ I-15	446	1293	CMC7B	FLAM3B	1.36	0.80
0058	E	CONC CHNL 9'W 4.25'D 2:1 SS	268	1293	CMC7B	FLAM3B	1.36	6.07
0063	P	CONC CHNL 9'W 5'D 2:1 SS	120	1293	CMC7B	FLAM3B	1.36	6.07
0064	E	3: 96" CMPC	63	1293	CMC7B	FLAM3B	1.36	1.00
0065	E	RIPRAP CHNL 35'W 4'D 2:1 SS	850	1293	CMC7B	FLAM3B	1.36	1.05

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
WGTR		**WAGON TRAIL CHANNEL**						
0080	E	RIPRAP CHNL 20'W 6'D 2:1 SS	350	663	CMC7AS	FLAM3B	0.75	0.36
0088	E	20' X 5' RCAC @ BIRCHER DR	70	663	CMC7AS	FLAM3B	0.75	1.00
0089	E	RIPRAP CHNL 10'W 6.5'D 2:1 SS	470	663	CMC7AS	FLAM3B	0.75	1.00
0097	E	20' X 7' RCAP	30	663	CMC7AS	FLAM3B	0.75	1.00
0098	E	12' X 5' RCAP	869	663	CMC7AS	FLAM3B	0.75	0.50
0111	P	10' X 5' RCB	980	663	CMC7AS	FLAM3B	0.75	1.17
0134	E	11' X 4' RCB	100	459	CMC6B	FLAM3A	1.43	0.72
0136	E	11' X 4' RCB	1057	459	CMC6B	FLAM3A	1.43	0.72

*The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.
**As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.
^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e. HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).
USACE - Refer to "Las Vegas Wash & Tributaries (Tropicana and Flamingo Washes) Hydrologic Basis for Design" prepared by U.S. Army Corps of Engineers, Los Angeles District, June 1993. See Figure W-6 for USACE Boundary.

REGIONAL FLOOD CONTROL DISTRICT

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F-34

LEGEND

ID (Facility Identifier) AABB
Parent Stream Name
Stream Name
Mile 0000
Distance Above Confluence with Parent Stream (Miles)
Miles in Hundredths

ExistingFacility..... E
Proposed or Modified Facility..... P
Contingency Level
Category A..... P
Catgory B..... P0

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe..... CIPCP
Corrugated Metal Arch Pipe Culvert..... CMAP
Corrugated Metal Pipe Culvert..... CMPC
High Density Polyethylene..... HDPE
Horizontal Elliptical Reinforced Concrete Pipe..... HERCP
Reinforced Concrete Arch Pipe..... RCAP
Reinforced Concrete Arch Culvert..... RCAC
Reinforced Concrete Box..... RCB
Reinforced Concrete Box Culvert..... RCBC
Reinforced Concrete Pipe..... RCP
Reinforced Concrete Pipe Culvert..... RCPC
Storm Sewer Pipe..... SSP

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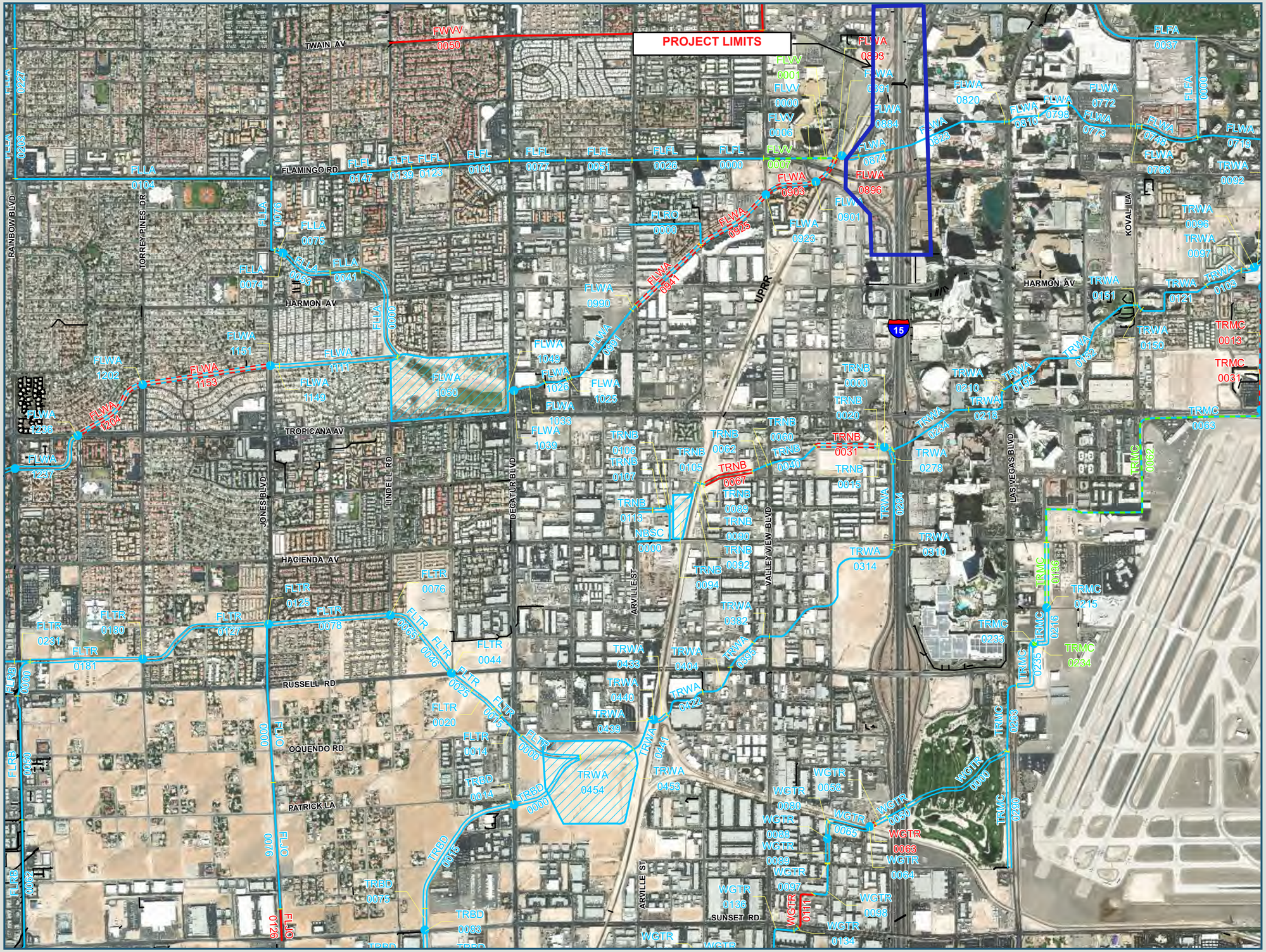


2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-34
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

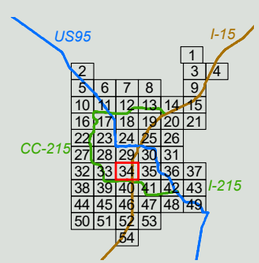
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

N

0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017



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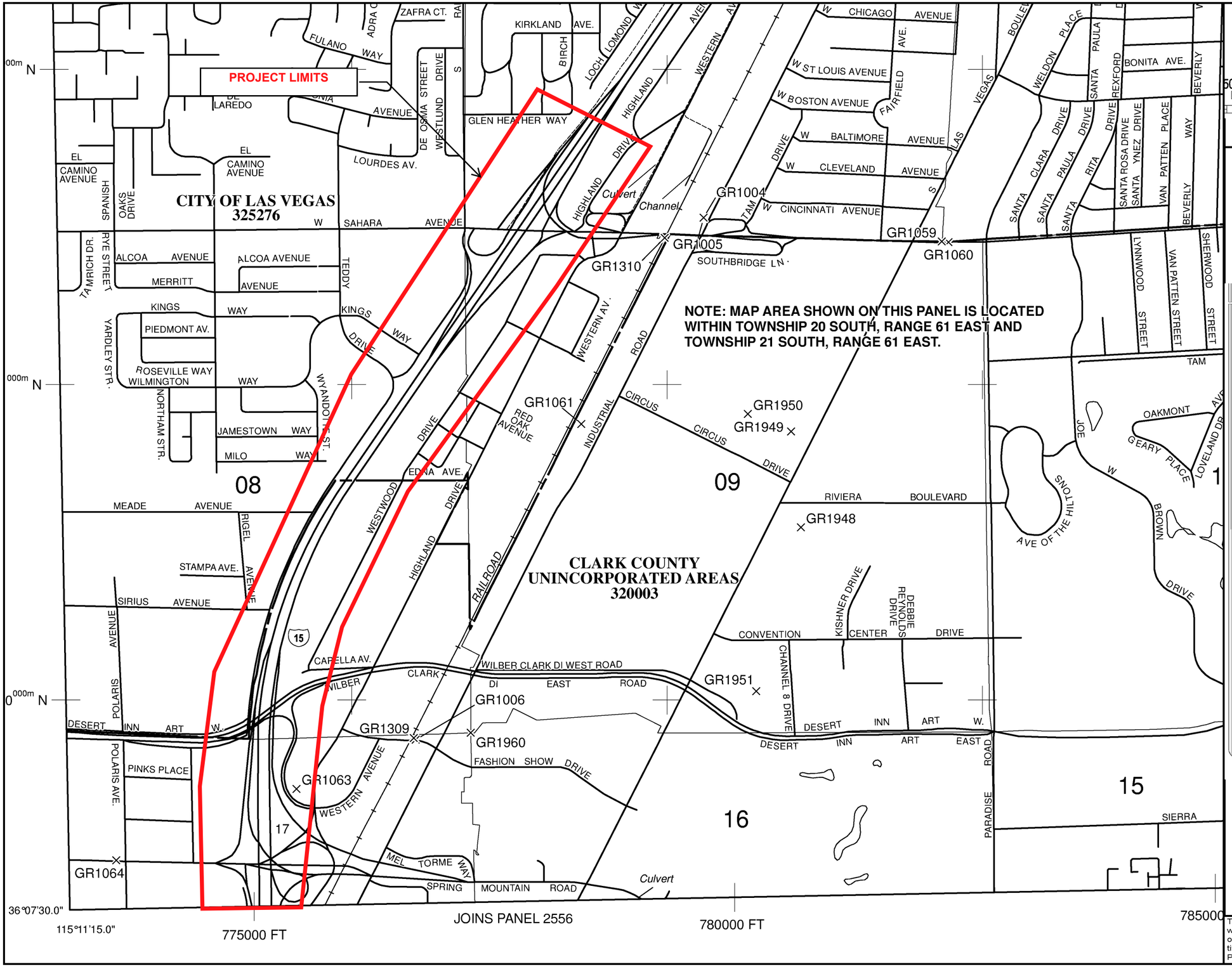


PANEL 2170F

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA

AND INCORPORATED AREAS

PANEL 2170 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2170	F
LAS VEGAS, CITY OF	325276	2170	F
NORTH LAS VEGAS, CITY OF	320007	2170	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2170F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

115°11'15.0"
36°07'30.0"

$^{6}64^{000m}$ E

JOINS PANEL 2170

$^{39}99^{000m}$ N

$^{39}98^{000m}$ N

MAP SCALE 1" = 500'

250 0 500 1000 FEET METE

PROJECT LIMITS

POLARIS AVENUE

SCRIPPS DRIVE W

HIGHLAND DRIVE

CINDER LANE

TWAIN AVENUE

STAN MALLIN DRIVE

SIRENS COVE BOULEVARD

INDUSTRIAL ROAD

JAY SARNO WAY

RAILROAD

GR1067

GR1308

GR1007

GR1069

15

17

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

ZONE A

ZONE A

Culvert

Flamingo Wash

CAESARS PALACE DRIVE

W FLAMINGO ROAD

HOTEL RIO DRIVE

FRANK SINATRA DRIVE

VIA DEL NORD STREET

BELLAGIO

CLARK COU
UNINCORPORATI
320003

PANEL 2556F

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA
AND INCORPORATED AREAS

PANEL 2556 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

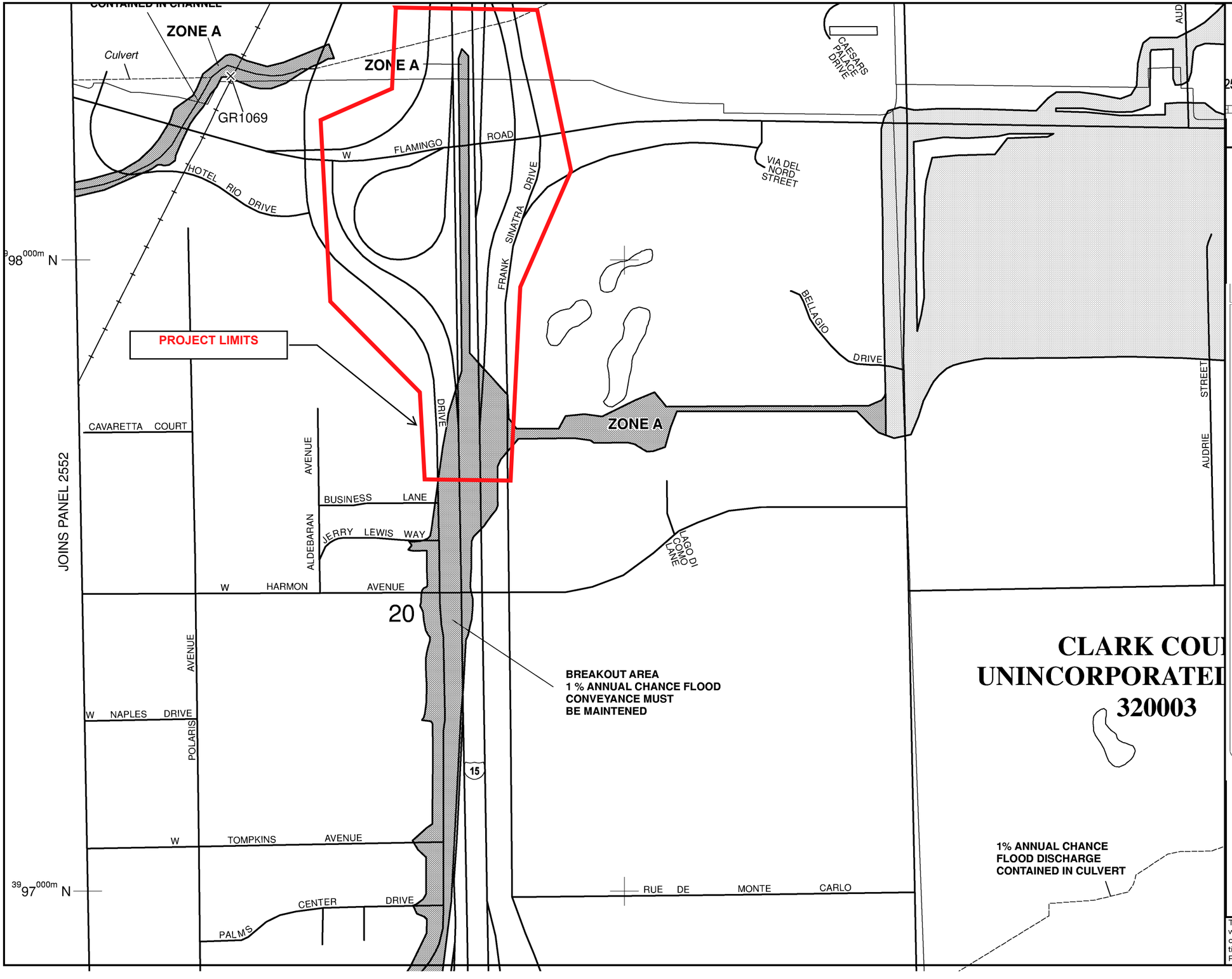
COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2556	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2556F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency



PANEL 2556F

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA

AND INCORPORATED AREAS

PANEL 2556 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2556	F

NATIONAL FLOOD INSURANCE PROGRAM

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MAP NUMBER
32003C2556F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

Culvert

GR1069

ZONE A

ZONE A

HOTEL RIO DRIVE

W FLAMINGO ROAD

FRANK SINATRA DRIVE

CAESARS PALACE DRIVE

VIA DEL NORD STREET

PROJECT LIMITS

16

17

$^{39}98^{000m}$ N

RAILROAD

DEAN MARTIN DR

BELLAGIO DRIVE

CAVARETTA COURT

AVENUE

BUSINESS LN

ALDEBARAN

JERRY LEWIS WAY

W HARMON AVENUE

LAGO DI COMO LANE

BOULEVARD

LAS VEGAS

S

AVENUE

POLARIS

W NAPLES DRIVE

W TOMPKINS AVENUE

$^{39}97^{000m}$ N

PALMS CENTER DRIVE

RUE DE MONTE CARLO

REVISED AREA

W TROPICANA AVE

15

DRIVE

GR1031

SINATRA

GR1030

Tropicana Wash Central Branch

AH

2171

2171

2168

2165

2162

2159

2157

2155

2153

2151

AG

ZONE AE

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT

Wing Wall

FRANK

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT

Footbridge

GR1944

GR1009

GR1010

GR1008

W RENO AVE

W RENO AVENUE

29

DRIVE

MARTIN

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL

DEAN

W ALI BABA LN

LUXOR

ACCESS

ACCESS FRANK SINATRA

$^{39}96^{000m}$ N

POLARIS AVENUE

15

JOINS PANEL 2552

CLARK COUNTY UNINCORPORATED AREAS 320003

20

21

S

LAS VEGAS BOULEVARD

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 21 SOUTH, RANGE 61 EAST.

Legend

- 1% annual chance (100-Year) Floodplain
- 1% annual chance (100-Year) Floodway
- 0.2% annual chance (500-Year) Floodplain

MAP SCALE 1" = 500'

250 0 500 FEET

150 0 150 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2556F

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA

AND INCORPORATED AREAS

PANEL 2556 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2556	F

REVISED TO REFLECT LOMR EFFECTIVE: November 5, 2012

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 32003C2556F

MAP REVISED NOVEMBER 16, 2011

Federal Emergency Management Agency

Technical Memorandum

To: File **Date**: June 2020

From: Roy Davis, CA Group

Subject: I-15 from Flamingo to Sahara: Utility Memorandum

Copies:

1. EXISTING UTILITIES

The existing utility infrastructure in the project area is varied and extensive. The existing utilities are located both above and below ground and include wet utilities, dry utilities, communication utilities, and several types of transmission and distribution facilities. The existing utility group includes but is not limited to various electrical, sanitary sewer, storm drain conveyance, natural gas, and communication facilities that serve residential, commercial, industrial, and various business customers.

1.2 Determination of Existing Utilities

Various sources were used to obtain the existing utility data. The utility companies were contacted, and as-built utility drawings and as-built information was requested from each utility company. If available, the as-built data was reviewed, converted to a common coordinate system and was inserted into the project utility base map. Some utility agencies only provide general exhibits that are not considered as-built drawings but only provide general locations and information regarding the utility. In that case, the information was inserted into the project utility maps and per the utility agency disclaimers, must be field verified.

Requests were submitted to the local government entities in order to obtain existing utility information from constructed roadway, storm drain, flood control, transportation and other pertinent project facilities. This information is generally from previously constructed capital improvement and public works projects. This information was reviewed and inserted into the Project utility base maps. Utility base maps were created for each individual utility in the Project area.

1.3 Utility Matrix

The information obtained, as described above, was used to create a CAD utility base map drawing for the project area. Identification of all existing utilities, utility owners and utility locations were attempted to accurately depict the existing utility infrastructure in the project area. This is an iterative process and as new information is obtained and processed, the *Utility Base Map* is updated. The Utility Matrix is a general overview of the utilities in the project, broken down by smaller areas within the project. The areas of the matrix are listed in a north to south direction.

Table 1: Utility Matrix

Project Area Number	Project Area Description	6" Steel Gas, 4" PE, 6" and smaller gas lines	4"Stell gas in 10" Steel Casing	8" Steel Gas line	16" Steel Gas line	Underground Electrical/Telephone/Communications	Overhead Electrical/Telephone/Communications	24" and smaller water line	30" to 42" water line	60" to 90" water line	21" and smaller sewer	24" to 30" sewer	36" or larger sewer
1	Sahara Avenue	*				*	*				*	*	
2	Rancho and I-15, Sahara to Desert Inn	*	*			*	*	*			*	*	
3	Desert Inn										*	*	
4	I-15 Desert Inn to Spring Mountain										*		
5	Spring Mountain (crossing I-15)	*				*					*	*	*
6	I-15 and Highland, Spring Mountain to Dean Martin	*									*	*	*
7	Dean Martin (crossing I-15)	*		*	*								
8	Frank Sinatra Drive, Dean Martin and I-15, Dean Martin to Flamingo Road	*		*	*	*					*	*	
9	Flamingo Road	*		*	*	*	*				*	*	
10	Dean Martin, Frank Sinatra Drive, Flamingo to Harmon	*		*	*	*					*		

Figure 1 Project Location Map

1.4 Utility Impact Matrix

Table 2: Excel Spreadsheet listing the impacted utilities

UTILITY TABLE – SUMMARY OF EXISTING SW GAS FACILITIES AND IMPACTS												
						Impact						
ID No.	Facility Name and Description	Location	Approximate Begin Station	Approximate End Station	Approximate Length (ft)	Conceptual Alternative 1	Conceptual Alternative 2	Conceptual Alternative 3	Conceptual Alternative 4	Conceptual Alternative 5	Conceptual Alternative 6	
1	FAST Underground	Near Sahara southbound on ramp	728+57	729+88	131.0	X	X	X	X	X	X	
2	CenturyLink underground 2-2" PVC	Near Sahara southbound on ramp	729+90	730+00	10.0	X	X	X	X	X	X	
3	Southwest Gas Underground 4" PE	Along Rancho, near Sahara	713+96	733+77	1,981.0	X	X	X	X	X	X	
4	CLV Sewer	Along Rancho, near Sahara	717+27	733+60	1,633.0	X	X	X	X	X	X	
5	NVE Transmition	Along I-15 northbound between Sahara and Desert Inn	68+17	729+35	66,118.0	X	X	X	X	X	X	
6	FAST Underground	Along I-15 northbound between Sahara and Desert Inn	682+17	729+35	4,718.0	X	X	X	X	X	X	
7	FAST Underground	Along I-15 southboundbetween Sahara and Desert Inn	679+22	729+88	5,066.0	X	X	X	X	X	X	
8	CenturyLink Underground 1-5" PVC	Near Mead/Westwood connector northeast	703+51	704+10	60.0	X	X	X	X	X	X	
9	CenturyLink Underground 1-5" PVC	Near Mead/Westwood connector southeast	695+19	695+52	33.0	X	X	X	X	X	X	* confirm
10	CenturyLink Underground 2-4" PVC	North of Desert Inn crossing I-15	683+77	684+38	62.0	X	X	X	X	X	X	* undergro
11	Southwest Gas Underground 4" STL	North of Desert Inn crossing I-15	683+80	684+38	287.0	X	X	X	X	X	X	* size and
12	NVE Distribution Overhead	North of Desert Inn crossing I-15	683+59	684+11	287.0	X	X	X	X	X	X	
13	CCWRD Underground 18"	North of Desert Inn crossing I-15	683+71	684+22	287.0	X	X	X	X	X	X	
14	Zayo	North of Desert Inn crossing I-15	683+59	684+07	287.0	X	X	X	X	X	X	
15	FAST Underground	Along I-15 southbound near Spring Mountian	664+98	673+52	855.0	X	X	X	X	X	X	
16	FAST Underground	Along I-15 southbound off ramp to Spring Mountian	667+57	673+57	600.0	X	X		X	X	X	
17	FAST Underground	Along I-15 Northbound onramp near Spring Mountian	671+61	673+48	188.0	X	X	X	X	X	X	
18	NVE Transmition	Along I-15 Northbound onramp near Spring Mountian	671+96	674+16	220.0	X	X	X	X	X	X	
19	COX Underground	Along I-15 southbound near Spring Mountian	664+34	664+94	1,196.4	X	X	X	X	X	X	
20	MCI (Team Fishel) Underground 2-2" HDPE	Along I-15 southbound near Spring Mountian	664+27	664+88	638.8	X	X	X	X	X	X	
21	Southwest Gas Underground 4" STL	Crossing I-15 Northbound onramp near Spring Mountian	665+59	665+59	695.6		X	X	X	X	X	
22	FAST Underground	Crossing I-15 Northbound onramp near Spring Mountian	665+11	664+91	214.3		X	X	X	X	X	
23	CCWRD Underground 2-27"	Along Spring Mountian	644+97	664+26	1,930.0		X	X	X	X	X	
24	CenturyLink underground 6-4" PVC	Along Spring Mountian	663+18	663+37	336.0		X	X	X	X	X	
25												
26	NVE Distribution Underground 2-5"C	Along Spring Mountian	661+77	663+25	149.0				X			
27	Zayo	along I-15southbound on ramp at Spring Mountian	660+67	663+55	502.9				X			
28	CenturyLink Underground 4-5" PVC	Crossing Spring Mountian at west roundabout	663+44	667+22	379.0				X			
29	CenturyLink Underground 2-4" PVC	Along Spring Mountian	662+90	663+44	55.0	X	X	X	X	X	X	
30	FAST Underground	Along I-15 southbound on ramp near Spring Mountian	630+48	663+25	3,278.0	X	X	X	X	X	X	
31	NVE Transmition	Along I-15 northbound offramp to Spring Mountian	651+45	654+66	322.0		X	X	X	X	X	
32	Fast Underground	Along I-15 northbound offramp to Spring Mountian	652+64	656+84	421.0		X	X	X	X	X	
33	CenturyLink Underground 2-1" PVC	Along I-15 northbound offramp to Spring Mountian	652+12	659+71	759.0		X		X	X		
34	CenturyLink Underground 2-3" PVC	Near Spring Mountian south braid	659+06	659+33	312.8	X	X	X	X	X	X	
35	CenturyLink Underground 2-3" PVC	Near Spring Mountian south braid	656+69	656+69	60.6	X	X	X	X	X	X	
36	CCWRD Underground 36"	Along S. Highland Dr. near Spring mountian braid	657+19	663+26	607.0	X	X	X	X		X	
37	CenturyLink Underground 2-4" PVC	Along I-15 southbound off ramp to Flamingo	652+46	654+76	230.0	X	X	X	X	X	X	
38	Electric Lightwave undedrground 4" STL	Near Dean Martin Along UPRR	643+23	646+70	348.0	X	X	X	X	X	X	
39	Kinder Morgan underground 14"	Near Dean Martin Along UPRR	642+54	644+62	209.0	X	X	X	X	X	X	
40	Southwest Gas Underground 2" PE	Along I-15 southbound off ramp to Tropicana before Flimingo	629+09	630+81	172.0		X			X		
41	CenturyLink	Along I-15 southbound off ramp to Tropicana before Flimingo	624+52	630+03	552.0	X	X			X	X	
42	NVE Distribution Underground 1-4" C	Along I-15 southbound off ramp to Tropicana before Flimingo	626+06	627+35	129.0		X			X		
43	FAST Underground	Along I-15 southbound between Dean Martin and Flamingo	625+88	630+48	460.0	X	X	X	X	X	X	
44	CCWRD underground 15"	South of Flamingo crossing I-15	616+05	617+89	613.9	X	X	X	X	X	X	
45	Level 3 Overhead	North of Flamingo crossing the I-15	622+92	624+62	579.9	X	X	X	X	X	X	
46	NVE Distribution 4 Overhead	North of Flamingo crossing the I-15	622+63	624+86	579.5	X	X	X	X	X	X	
47	Zayo Overhead	North of Flamingo crossing the I-15	622+91	624+82	579.1	X	X	X	X	X	X	
48	FAST Underground	Along Flamingo	621+33	621+47	783.6					X	X	
49	NVE Transmition	Along I-15 northbound between Harmon and Flamingo	580+65	614+18	3,353.0	X	X	X	X	X	X	
50	FAST Underground	Along I-15 northbound between Harmon and Flamingo	578+36	611+68	3,333.0	X	X	X	X	X	X	
51	FAST Underground	Along I-15 southbound between Harmon and Flamingo	572+34	615+52	4,318.0	X	X	X	X	X	X	
52	NVE Transmition	Crossing I-15 near Flamingo	607+12	607+47	351.1		X	X	X	X	X	
53	Zayo	North of Flamingo crossing the I-15	607+16	611+13	397.0		X	X	X	X	X	
54	Extnet Overhead	Along Dean Martin between Harmon and Flamingo	590+82	598+85	803.0	X	X	X	X	X	X	
55	Extnet Underground	Along Dean Martin between Harmon and Flamingo	598+85	607+51	867	X	X	X	X	X	X	
56	NVE Distribution Underground 2-6" C	Along Dean Martin between Harmon and Flamingo	590+82	607+51	1,669.0	X	X	X	X	X	X	
57	Zayo	Along Dean Martin between Harmon and Flamingo	590+82	607+51	1,669.0	X	X	X	X	X	X	
58	COX Underground	Near Harmon	497+11	599+03	10,192.0	X	X	X	X	X	X	
59	FAST Underground	Along I-15 southbound off ramp to Russell	518+29	526+43	814.0	X	X	X	X	X	X	
60	MCI (Team Fishel) Underground 2-2" HDPE	Crossing I-15 southbound off ramp to Russell	518+45	519+21	116.2	X	X	X	X	X	X	
61	FAST Underground	Along I-15 southbound on ramp from Russell	515+70	518+29	260.0	X	X	X	X	X	X	
62	FAST Underground	Along I-15 northbound on ramp from Russell	519+48	520+48	101.0	X	X	X	X	X	X	

1.5 Utility Descriptions

The areas of the project described in the Utility Matrix were delineated as sub-areas to better facilitate a summary format and a listing of the utilities in each subarea. The sub-areas in the Utility Matrix are described from north to south through the project limits. Alternatives under consideration in this memorandum would have similar impacts to existing utilities. The Utility Impact Matrixes in Table 2 list the impacted utilities associated with each alternative. The following discussion lists the existing utilities regarding their physical location within the project limits.

1.5.1 Area No. 1 Sahara Avenue

In the vicinity of station 737.5, a 6-inch steel gas line runs in the east-west direction in Sahara Avenue. A 4-inch PE gas line connects to the above line in Sahara and runs north-south in Rancho between Sahara and Desert Inn. At approximate station 684, a 4-inch STL line in a 10-inch casing runs east-west and crosses I-15 north of Desert Inn. A 24-inch City of Las Vegas sanitary sewer is located in Sahara Avenue and runs east and west. West of I-15, a Centurylink underground conduit crosses Sahara in a north-south direction.

The major storm drain facilities in this area include CCRFCD facility FWUP 0100, which is an 8'x4' RCB located east of I-15 in Western Avenue and extends across Sahara. Additionally, a 36-inch RCP is located east of I-15 in Sahara Avenue. North of Sahara Avenue and west of I-15 at Oakey Boulevard is CCRFCD Facility FWOK 0000, a 10'x8' RCB. On the west side of I-15 there is a 25'Wx6'D concrete rectangular channel and a dual 10'x8' RCB that extends from the south, across, and north of the Sahara Interchange. There is a 10'x4' RCB that crosses the I-15 southbound off ramp at Sahara. Also, existing CCRFCD facility FW15 0301, a double 10'x8' RCB, is located on the west side of I-15, north of Sahara Avenue. Also located in this section are smaller diameter RCP storm drains, drop inlets and other collection facilities associated with storm runoff collection of the local surface streets and I-15.

1.5.2 Area No. 2 Rancho and I-15, Sahara to Desert Inn

In Rancho, a 4-inch PE gas line branches off the above gas line mentioned above in Area 1 in Sahara, and runs north-south between Sahara and Desert Inn. Near station 684, a 4-inch STL line in a 10-inch casing runs east-west north of Desert Inn. Two, 2-inch conduits cross I-15 at station 735.5 just south of Sahara and join the Centurylink facility above. Also, a 1.5" underground Centurylink conduit exists at the projection of Meade to Westwood, approximate station 732, on the west side of I-15. Two, 4-inch Centurylink conduits are located at station 683.5 running east-west crossing I-15. In Rancho between Sahara and Desert Inn, an 8-inch CLV sanitary sewer is located west of I-15 and runs north-south. At station 684, an 18-inch CCWRD sewer line crosses I-15 north of Desert Inn in an east-west direction. Extenet overhead facilities cross I-15 at station 684 north of Desert Inn. There are underground NVE Transmission facilities located in Rancho between Sahara and Teddy and there are overhead transmission facilities that cross I-15 at station 735.5. Similarly, NVE has underground and overhead distribution facilities that cross I-15 at station 735.5. There is also an existing overhead distribution facility that crosses I-15 at station 684. Zayo has existing overhead facilities that cross I-15 north of Desert Inn at station 684.

The major storm drain facilities in this section of the project include a 10'-16'BW riprap lined channel approximately 5800 feet in length located on the east side of I-15 from Sahara to Desert Inn. The Rancho Drive Channel consists of 750 feet of concrete channel varying from 1.7' to 5' depth and is located on the west side of I-15 between Desert Inn and Sirius. Also located in this area is a 10'BW riprap lined trapezoidal channel approximately 4500 feet in length. There is a 36-inch RCP located in Area 2 from Desert Inn to Sahara on the west side of I-15. There are numerous 36-inch RCP storm drains that cross I-15 north of Sirius, north of Meade, and south of Sahara. Also, there is a 48-inch RCP located on the north side of Desert Inn west of I-15. Additionally, there is a 10'x6' RCB, 450' in length, on the south side of Sahara on the west side of I-15. Also located in this area are numerous smaller diameter storm drains with associated drop inlets and manholes that are part of the overall storm drain system, but are too numerous to mention in this summary.

1.5.3 Area No. 3 Desert Inn

1.5.4 Area No. 4 I-15, Desert Inn to Spring Mountain

Near station 676, six, 4-inch Centurylink conduits cross I-15 south of Desert Inn. At station 677 south of Desert Inn, an 18-inch sanitary sewer crosses I-15. There is an overhead distribution facility south of Desert Inn across I-15 at station 677.The major storm drain facilities in Area 4 include a 60" RCP approximately 1500' in length, located on the west side of I-15 from Spring Mountain to Desert Inn that discharges into the aforementioned Rancho Drive Channel located in Area 2. Also, there are 30"x19"and 45"x29" HERCP's along with 36" and 42" RCP's that cross I-15 north of Spring Mountain to the east side of I-15 and reaches north of Desert Inn. Also located in this area, are numerous smaller diameter storm drains with associated drop inlets and manholes that are part of the storm drain system.

1.5.5 Area No. 5 Spring Mountain Road

Near station 663, a 4-inch STL gas line crosses I-15 in Spring Mountain east to west, jogs north at the east edge of I-15 for approximately 100 feet, then continues in Spring Mountain to the east. At station 664, six 4-inch conduits are located in Spring Mountain and run east-west. Near station 664, a 21-inch and a 27-inch sanitary sewer crosses I-15 in Spring Mountain and runs east-west. At station 665, a Cox underground facility that crosses I-15 is located in Spring Mountain and runs east-west.

1.5.6 Area No. 6 I-15 and Highland, Spring Mountain to Dean Martin

Running north and south there are a 16-inch STL, an 8-inch STL, and a 4-inch PE gas line located in Sammy Davis Jr. between Spring Mountain and Dean Martin. On the east side of Industrial, there is an underground AT&T conduit running north- south. At stations 658 and 659 two pairs of 3-inch Centurylink conduits cross the I-15 south of Spring Mountain. At station 648, two Level 3 facilities located in UPRR right of way north of Dean Martin, cross I-15 running east and west. There are several Cox facilities located in Sammy Davis Jr. between Spring Mountain and where Dean Martin crosses I-15. Kinder Morgan has two pipelines that cross I-15. There is a 14-inch gas pipeline that crosses I-15 on the Dean Martin alignment. Immediately west of the I-15 facility the pipe jogs to the north inside NDOT right of way. When it reaches the UPRR right of way, the pipeline continues to the east. There is also an existing 8-inch Kinder Morgan pipeline that crosses I-15 at station 647.2 within UPRR right of way.

The major storm drain facilities located in this project area include 650 feet of 10'BW riprap lined trapezoidal channel located on the west side of I-15, south of the Spring Mountain Interchange. In this same location on the west side of I-15, there are dual 53"x34" HERCP's, 628' in length and a 13.5'x28.5' junction structure. Crossing I-15, south of the Spring Mountain Interchange, there is a 54" RCP, 320 feet

long that discharges into a Primary Detention Area and a Secondary Detention Area connected by two 48" RCP's. The detention areas are located on the east side of I-15, south of the Spring Mountain Interchange, surrounded by the NB on-ramp to I-15. The Secondary Area is south of the Primary Area. There is a 48" RCP that crosses Spring Mountain west of the SB on-ramp to I-15. There is also a 36" RCP on the south side of Spring Mountain, east of I-15. Additionally, there is a 42" RCP between the Spring Mountain SB off-ramp and the UPRR. There are numerous smaller RCP systems in this project area with associated drop inlets and manholes that are not listed here.

1.5.7 Area No. 7 Dean Martin

At approximate station 642.5, the above referenced 16-inch, 8-inch, and 4-inch gas lines cross I-15 in Dean Martin Dr. Continuing the above AT&T facility, at station 640.5 the AT&T conduit crosses I-15 in Dean Martin. At station 643.5, a Centurylink underground conduit cross I-15 in Dean Martin. At station 642.5, several Cox facilities cross I-15 in Dean Martin east to west.

1.5.8 Area No. 8 Frank Sinatra Drive, Dean Martin and I-15, Dean Martin to Flamingo Road

The above mentioned 16-inch, 8-inch, and 4-inch gas lines continue in Dean Martin on the west side of I-15 in a north-south direction to Flamingo Road. At approximate station 626 a 2-inch PE crosses the SB off ramp north of Flamingo. Between Dean Martin and Flamingo, an underground AT&T facility is located on the east side of Dean Martin. Continuing from the above Centurylink facility in Dean Martin, a Centurylink conduit is located in Dean Martin running north-south, on the west side of I-15. Additionally, a Centurylink facility is located between the west I-15 right of way line and the southbound off ramp between stations 625 and 632. At station 623.5 an overhead Level 3 facility crosses I-15 north of Flamingo Road. A 42-inch sanitary sewer is located in Frank Sinatra on the west side of I-15 between Dean Martin and Flamingo. Cox underground facilities exist in Dean Martin on the west side of I-15 between Dean Martin and Flamingo Road. NVE has underground transmission facilities existing in Frank Sinatra from Dean Martin to the south. Also, there are underground transmission facilities in Dean Martin from the Dean Martin crossing of I-15 to the south, towards Flamingo. At station 640.5, NVE transmission facilities cross I-15 at Dean Martin. Additionally, NVE overhead transmission facilities are found at station 623.5 crossing I-15 north of Flamingo. There are existing NVE distribution facilities in Frank Sinatra Drive from Dean Martin to Flamingo. Also, there is an overhead NVE distribution facility north of Flamingo at station 623.5. Zayo has an existing overhead facility that crosses I-15 north of Flamingo at station 623.5.

The major storm drain facilities in this area of the project include CCRFCD Facility FLWA 0823, a dual 16'x19' RCB that crosses I-15 north of the Flamingo Interchange. North of Flamingo Road crossing UPRR is a 7-span bridge, 84'Wide and 5.5'Deep, designated as Structure H-8045, labeled as CCRFCD Facility FLWA 0891. Also located in this area is CCRFCD Facility FLWA 0884, a 100'W, 3.5'D gabion channel located east of the UPRR and north of Flamingo Road. CCRFCD Facility FLWA 0874, a 10'x8' RCB, crosses Dean Martin and the SB off-ramp to Flamingo Road, north of the Flamingo Interchange. As is true in the other project areas, there are numerous smaller storm drain systems with smaller collection pipes and associated drop inlets and storm drain manholes that are not listed in the Area 8 summary.

1.5.9 Area No. 9 Flamingo Road

An AT&T underground facility running north and south, crosses Flamingo on the Dean Martin alignment. At approximately station 621 the above referenced 16-inch and 8-inch gas lines continue in Dean Martin in a north south direction across Flamingo.

The major storm drain facilities in Area 9 include a 48" RCP, 2200 feet in length, that connects to CCRFCD Facility FLWA 0823 and is located on the east side of I-15 from north of Harmon to north of the Flamingo Interchange. Also, a dual 10'x6' RCB to 11'x6' RCB, 2090 feet in length that connects to Facility FLWA 0823, is located on the west side of I-15 and reaches from south of the Flamingo Interchange to north of the Flamingo Interchange. Like the other project areas, this section of the project has numerous smaller diameter storm drainpipes with associated drop inlets and manhole facilities that are not listed here.

1.5.10 Area No. 10 Dean Martin, Frank Sinatra Drive, Flamingo to Harmon

The above mentioned 16-inch and 8-inch gas lines continue in Dean Martin running north-south in Dean Martin parallel to I-15, south of Flamingo Road. South of Flamingo in Dean Martin, an underground AT&T facility runs north south and is located on the east side of Dean Martin. A 15-inch sewer crosses I-15 at station 616. At station 646.5 north of Flamingo, Electric Lightwave facilities consist of a 4-inch underground conduit that crosses I-15 in the UPRR right of way. Extenet overhead facilities are located between stations 591 and 599, and Extenet underground facilities are located between 599 and 607.5. Zayo has an existing underground facility in the NVE conduit that crosses I-15 at station 607.

The major storm drain facilities in Area 10 include a 12' drop inlet and 14"x23" HERCP that are located on the west side of Dean Martin south of Harmon. The HERCP discharges into the Harmon Channel. There is a 36" RCP culvert that crosses I-15 south of Harmon that also discharges into the Harmon Channel. In addition, there is a 12'x2' trench drain with a 14"x23" HERCP located on the west side of Dean Martin, south of Harmon that also discharges into the Harmon Channel. Additionally, there is a 15' drop inlet with four 14"x23" HERCP and a 15' drop inlet with two 24"x38" HERCP located on the west side of Dean Martin north of Harmon that discharges into the Harmon Channel. There is also a 36" RCP, 220' in length, that crosses I-15 north of Harmon which discharges into the earth lined channel on the east side of I-15. Also, in this area there is a 10' flat bottomed earth channel 2400 feet in length on the east side of I-15 between Tropicana and Flamingo Road. There are several smaller diameter storm drains systems existing in this area that drain the local project area, the local surface streets, and I-15 itself, that were not specifically mentioned in this Area 10 summary.

I-15 Flamingo to Sahara

Bridge Feasibility Study

June 4, 2021

Notice

This document and its contents have been prepared and are intended solely for use in relation to the Structural Feasibility Study for the I-15 Corridor between Flamingo Road and Sahara Avenue.

This document has 119 pages including the cover.

Table 1. Document History

Job Number: 100071386			Unit Number:		
Revision	Purpose Description	Originated	Checked	Reviewed	Date
Rev 0	DRAFT Structural Feasibility Study	LKL	NAB	PFG	10/03/2020
Rev 1	DRAFT Structural Feasibility Study	LKL	NAB	PFG	05/28/2021

Table of Contents

1.0 Introduction

Interstate 15 (I-15) is the primary transportation corridor in southern Nevada connecting to California and Arizona. Over the past three decades, the Nevada Department of Transportation (NDOT) has been making investments in improvements to I-15 to keep up with the growth in the Las Vegas area. The section of I-15 between Flamingo Road and Sahara Avenue is the last section to be upgraded adjacent to the resort corridor (Las Vegas Strip).

This report is intended to document the structural feasibility for the proposed I-15 project corridor from Flamingo Road to Sahara Avenue. The transportation needs for this project are based on 2040 traffic projections as identified by the NDOT Southern Nevada Traffic Study and the Regional Transportation Commission's 2040 TransCAD model. The I-15 from Flamingo to Sahara Feasibility Study (Feasibility Study) was initiated by NDOT to develop and evaluate alternatives primarily focusing on improving I-15 safety and traffic operations, and to identify right-of-way needs to accommodate future traffic demands.

Project Study Area

This Feasibility Study covers an area of approximately 4.5 miles on I-15, as shown in Figure 1. The northern limit is Sahara Avenue (the southern end of NDOT's Project NEON) and the southern limit is I-15/I-215/CC-215 System Interchange.

The project study area includes six interchanges with I-15: Sahara Avenue, Spring Mountain Road, Flamingo Road, Tropicana Avenue, Russell Road, and I-15/I-215/CC-215 System Interchange. Additionally, seven grade separations exist within the corridor; Union Pacific Railroad (UPRR) (under I-15), Dean Martin Drive (under I-15), Twain Avenue (under I-15), Frank Sinatra Drive (along I-15), Harmon Avenue (over I-15), Hacienda Avenue (over I-15), and Sunset Road (over I-15).

Figure 1: Project Limits and Vicinity Map

Project Alternatives

Alternatives were developed to meet the project's purpose and need.

Alternative 1

The lane configuration for both directions on I-15 for Alternative 1 was determined by matching the improvements made as part of Project NEON to the north and the I-15 South Design-Build project to the south. South of Flamingo Road, southbound I-15 would have 1 HOV lane and 4 GP lanes, and 2 HOV lanes and 4 GP lanes north of Flamingo Road. Northbound I-15 would have 1 HOV lane and 4 GP lanes south of Twain Avenue and 2 HOV lanes and 4 GP lanes north of Twain Avenue. This configuration would provide the minimum level of improvement required to match future conditions at the north and south ends of the study area.

Under Alternative 1, the I-15/Flamingo Road interchange would be modified to a typical tight diamond interchange (TDI). The I-15/Spring Mountain interchange would remain in its current configuration, but

reconstruction of the southbound I-15 to eastbound Spring Mountain Road flyover is needed. The flyover would be reconstructed to accommodate additional lanes on I-15.

Alternative 1 also proposes that the southbound Sahara Avenue on-ramp (parallel entrance) would merge onto southbound I-15 just north of Meade Avenue. The following ramps would be braided: southbound Flamingo Road off-ramp with southbound Spring Mountain Road on-ramp, and southbound Tropicana Avenue off-ramp with southbound Flamingo Road on-ramp. An auxiliary lane would be added between the southbound Spring Mountain Road on-ramp and the southbound Tropicana Avenue off-ramp, and between the southbound Flamingo Road on-ramp and the southbound CD road exit. Future single-lane HOV connections in each direction would be accommodated by leaving adequate space in the median of I-15 to Meade Avenue.

Retaining wall locations and heights would be determined during detailed design. In addition to cast-in-place or MSE walls for new or widened bridges, MSE retaining walls are anticipated to accommodate grade differentials where there is insufficient space to allow for sloping embankments.

The proposed and existing bridges that are part of Alternative 1 are shown in Table 1.

Alternative 1 - Bridges

Alternative 1 includes three new bridges, one bridge replacement and seven widenings of existing bridges. There is also one bridge removal needed as part of this alternative. This alternative includes approximately 135,943 square feet of new or widened bridge structure, not including approach slabs. Conceptual Bridge plans for Alternative 1 are provided in Appendix A.

Table 1 - Proposed Bridges – Alternative 1

Carrying and Crossing	Structure Length	Bridge Description	Existing Structure ID	Area of Structure (SQFT)
I-15 SB to EB Spring Mtn. Off-Ramp	699’-0”	Replacement	I-806R	31,455
I-15 NB over Spring Mtn.	226’-0”	Widening	I-806N	3,785
I-15 SB over Spring Mtn.	226’-0”	Widening	I-806S	6,280
I-15 SB to Flamingo Off-Ramp over Spring Mtn. On-Ramp	569’-0”	New Bridge	n/a	22,191
I-15 SB over UPRR	306’-6”	Widening	G-805S	7,110
I-15 SB over Dean Martin Dr.	204’-0”	Widening	H-1901S	3,119
I-15 SB to Flamingo Off-Ramp over UPRR/Industrial/Twain	616’-0”	New Bridge	n/a	24,024
Flamingo over Frank Sinatra	87’-10.5”	Widening	H-2347	2,065
Flamingo over I-15	294’-0”	Widening	I-1745	8,500
Flamingo over Dean Martin Dr.	158’-0”	Widening	H-1744	2,750
Flamingo to I-15 SB On-Ramp	498’-0”	New Bridge	n/a	24,664

Alternative 2

As described for Alternative 1, the lane configuration for both directions on I-15 for Alternative 2 was determined by matching the improvements made as part of Project NEON to the north and the I-15 South Design-Build project to the south. South of Flamingo Road, southbound I-15 would have 1 HOV lane and 4 GP lanes, and 2 HOV lanes and 4 GP lanes north of Flamingo Road. Northbound I-15 would have 1 HOV lane and 4 GP lanes south of Twain Avenue and 2 HOV lanes and 4 GP lanes north of Twain Avenue. This configuration would provide the minimum level of improvement required to match future conditions at the north and south ends of the study area.

Under Alternative 2, the I-15/Flamingo Road interchange would be modified to a typical tight diamond interchange (TDI). The I-15/Spring Mountain interchange would remain in its current configuration, but reconstruction of the southbound I-15 to eastbound Spring Mountain Road flyover is needed. The flyover would be reconstructed to accommodate additional lanes on I-15.

Alternative 2 proposes to add a slip-ramp on the northbound CD road, from eastbound CC-215 to northbound I-15 at Sunset Road. The following ramps would be braided: northbound Russell Road on-ramp (as a full auxiliary lane to Flamingo Road off-ramp) with the northbound CD Road/southbound Tropicana Avenue off-ramp, and northbound Tropicana Avenue on-ramp with the northbound Flamingo Road off-ramp. Auxiliary lanes would be added between the northbound Russell Road on-ramp and the northbound Flamingo Road off-ramp and the northbound Tropicana Avenue on-ramp and the northbound Spring Mountain Road off-ramp. Future single-lane HOV connections in each direction would be accommodated by leaving adequate space in the median of I-15 to Meade Avenue.

Retaining wall locations and heights would be determined during detailed design. In addition to cast-in-place or MSE walls for new or widened bridges, MSE retaining walls are anticipated to accommodate grade differentials where there is insufficient space to allow for sloping embankments.

Alternative 2 includes all the bridge structures in Alternative 1 along with the additional proposed bridges shown in Table 2.

Alternative 2 - Bridges

Alternative 2 includes all the structures in Alternative 1, and in addition, has three new bridges and two bridge replacements. This alternative includes approximately 195,109 square feet of new or widened bridge structure, not including approach slabs. Conceptual Bridge plans for Alternative 2 are provided in Appendix A.

Table 2 - Proposed Bridges – Alternative 2

Carrying and Crossing	Structure Length	Bridge Description	Existing Structure ID	Area of Structure
I-15 NB to Spring Mtn Off-Ramp	505'-6"	New Bridge	n/a	19,802
Harmon over I-15	635'-0"	Replacement	H-2263	67,734
Tropicana to I-15 NB On-Ramp	998'-0"	New Bridge	n/a	44,910
Hacienda over I-15	498'-0"	Replacement	H-2092	39,921
Russell to I-15 NB On-Ramp	485'-0"	New Bridge	n/a	22,742

Alternative 1 Shift and Alternative 2 Shift

Alternative 1 and Alterative 2 under evaluation in the I-15 Flamingo to Sahara Feasibility Study have been reevaluated to incorporate alignment changes that would accommodate the MLK Extension Project as requested by the City of Las Vegas. The modifications to either Alternative 1 or Alternative 2 require shifting I-15 to the east between Flamingo Road and Desert Inn Road. These modifications are identical for both Alternatives 1 and 2.

Major improvements for Alternative 1 Shift and Alternative 2 Shift that would be required to accommodate the MLK Extension Project include:

- Reconstruct the I-15 median between Flamingo Road and Desert Inn Road and reconstruct portions of I-15 to adjust the I-15 cross slope (superelevation) between Flamingo Road and Desert Inn Road.
- Reconstruct the northbound (NB) off-ramp to Spring Mountain Road and reconstruct the NB on-ramp/loop ramp from eastbound (EB) Spring Mountain Road to NB I-15.
- Reconstruct the NB and southbound (SB) I-15 bridge over Twain Avenue.
- Reconstruct the NB and SB I-15 bridges over Spring Mountain Road.
- Demolish the I-15 bridge over Sammy Davis Jr. Drive/Industrial Road and reconstruct I-15 with mechanically stabilized earth (MSE) and retaining walls.

Retaining wall locations and heights would be determined during detailed design. In addition to cast-in-place or MSE walls for new or widened bridges, MSE retaining walls are anticipated to accommodate grade differentials where there is insufficient space to allow for sloping embankments.

There are no new additional right-of-way impacts. The I-15 shift occurs within existing NDOT rights-of-way.

The proposed new and widened bridges of Alternative 1 Shift are shown in Table 3. The proposed new bridges of Alternative 2 Shift are shown in Table 4.

Alternative 1 Shift – Bridges

Alternative 1 Shift includes three new bridges, seven bridge replacements and five widenings. Alternative 1 Shift includes approximately 323,989 square feet of new or widened bridge structure, not including approach slabs. Conceptual Bridge plans for Alternative 1 Shift are provided in Appendix B.

Table 3 - Proposed Bridges – Alternative 1 Shift

Carrying and Crossing	Structure Length	Bridge Description	Existing Structure ID	Area of Structure (SQFT)
I-15 SB to EB Spring Mtn. Off-Ramp	877'-11"	Replacement	I-806R	41,329
I-15 NB over Spring Mtn.	279'-0"	Replacement	I-806N	30,917
I-15 SB over Spring Mtn.	279'-6"	Replacement	I-806S	28,995
I-15 SB to Flamingo Off-Ramp over Spring Mtn. On-Ramp/UPRR	1340'-1"	New Bridge	n/a	55,699
I-15 SB over UPRR	332'-8"	Widening	G-805S	5,979
I-15 NB over UPRR	311'-7"	Widening	G-805N	11,012
I-15 NB Ramp to Spring Mtn. over UPRR/Spring Mtn. to I-15 NB On-Ramp	1734'-6"	Replacement	G-805R	66,717
I-15 SB to Flamingo Off-Ramp over Twain Ave.	141'-10"	New Bridge	n/a	7,374
I-15 SB over Twain Ave.	140'-8"	Replacement	H-804S	16,924
I-15 NB over Twain Ave.	140'-10"	Replacement	H-804N	15,431
I-15 NB Ramp to Spring Mtn. over Twain Ave.	140'-11"	Replacement	H-804R	5,635
Flamingo over Frank Sinatra	87'-10.5"	Widening	H-2347	2,065
Flamingo over I-15	294'-0"	Widening	I-1745	8,500
Flamingo over Dean Martin Dr.	158'-0"	Widening	H-1744	2,750
Flamingo to I-15 SB On-Ramp	498'-0"	New Bridge	n/a	24,664

Alternative 2 Shift - Bridges

Alternative 2 Shift includes all the structures in Alternative 1 Shift, and in addition, has three new bridges and two bridge replacements. This alternative includes approximately 198,090 square feet of new or widened bridge structure, not including approach slabs. Conceptual Bridge Plans for Alternative 2 Shift are provided in Appendix B.

Table 4 - Proposed Bridges – Alternative 2 Shift

Carrying and Crossing	Structure Length	Bridge Description	Existing Structure ID	Area of Structure
I-15 NB to Spring Mtn Off-Ramp	505'-6"	New Bridge	n/a	22,783
Harmon over I-15	635'-0"	Replacement	H-2263	67,734
Tropicana to I-15 NB On-Ramp	998'-0"	New Bridge	n/a	44,910
Hacienda over I-15	498'-0"	Replacement	H-2092	39,921
Russell to I-15 NB On-Ramp	485'-0"	New Bridge	n/a	22,742

Existing Corridor Bridge Inspection Summary

As an additional part of this study, the existing bridges and culverts near the project area were reviewed based on previous inspection reports for structural deficiencies and rehabilitation or replacement needs. The results of this study were discussed and confirmed with NDOT. Only 4 of the 27 structures reviewed had unacceptable sufficiency ratings and require major rehabilitation or replacement, the remaining structures require minor repairs. Documentation of this inspection summary is included in Appendix C.

2.0 Bridge Superstructure Evaluation

Various evaluation factors have been considered and evaluated during the bridge type selection process in accordance with the NDOT Structures Manual, 2008 with Revision 2011-1 and 2014-1, AASHTO LRFD Bridge Design Specifications, 9th Edition, 2020, and AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition, 2011

Structural Requirements

Several considerations were made in selecting the appropriate type of structure. These factors include span length, depth-to-span ratio, seismic characteristics, long-term deflection, torsional resistance, and the ability to adapt to skew and curved alignments. All reinforced concrete beam structure types were eliminated because of their acceptable efficient span length ranges are less than the span lengths of the proposed structures. The proposed span lengths for new structures vary from 90'-11" feet to 284'-0" feet on this project. Span lengths for each structure are shown in Appendix A and Appendix B.

Bridge Design Standard Details

Approach Slabs

Standard approach slabs will be constructed at each end of the bridge. The minimum span length will be kept at 24 feet. NDOT's standard approach slab drawing will be used as the basis in developing the bridge approach slab details.

Concrete Slope Paving

Concrete slope paving will be used on most structures per NDOT standard specifications.

Barrier Rail

A typical 42” barrier rail will be used along both sides of new bridges and along the outside edge of widened structures.

Bridge Lighting

The proposed bridge lighting will be evaluated as part of the final development process.

Bridge Mounted Signs and Signalization

Bridge mounted signs and signalization will be reviewed as part of the final development process.

Costs

Every structure has its reasonable economic limits with a representative control being the span length. For the proposed span lengths on this project, Cast-in-place (CIP) post-tensioning concrete box girders, precast post-tensioned concrete spliced tub girders and steel plate I-girders are the most viable options. CIP concrete box girders may have the lowest material cost compared with the concrete precast and steel plate girders in the same span range. However, CIP concrete bridges require falsework, and there would be added cost in maintaining the existing traffic and meeting the minimum vertical clearances during construction. Furthermore, concrete bridges are heavier and require substantially larger foundations compared to structural steel bridges.

Preliminary detailed cost estimates are developed for each structure. The estimates are for superstructure and material costs only, and do not include inflation. Substructure and foundation costs of the options would be similar but moderately higher for the concrete options due to increase support size for heavier self-weight. Construction costs would vary. Unit square-foot costs were estimated based on cost data from previously constructed similar structures as well as information from steel manufacturers.

Aesthetics

Within the limitations of cost, highway and railroad regulations, constructability and other evaluation factors, the structures with a more pleasant appearance will be selected. CIP concrete box girders are typically considered more pleasing in appearance, but form liners on substructure and color treatments could be used on other options to better compliment adjacent landscape and structures. Final aesthetic guidelines should consider maintaining consistency throughout the corridor and surrounding area. The evaluation will follow the design guidelines in the NDOT Structures Manual.

Geometrics

Geometrics for each structure are shown in Appendix A and Appendix B.

Vertical and Horizontal Clearances

All bridges shall be designed to meet the minimum permanent vertical clearance of 16’-6” over all roadways. The bridges that need to be constructed using falsework shall meet the minimum temporary vertical clearance of 16’-0” for falsework as summarized in the NDOT Structures Manual Figure 11.9-A.

Bridges over the UPRR tracks shall meet the minimum permanent vertical clearance of 23'-4", and the minimum temporary vertical clearance of 21'-6" during construction as required by UPRR.

Horizontal clearances shall be based on design speed and stopping sight distance as set forth by AASHTO. For bridges over UPRR tracks, UPRR prefers all piers and abutments are located outside the Railroad right-of-way limits. If this is not possible, the piers and abutments shall be located more than 25 feet measured perpendicular from centerline of nearest existing or future track. Pier protection will be required if the piers and abutments are located within 25 feet from centerline of nearest existing or future track. The minimum horizontal clearance during construction is 15 feet measured perpendicular from centerline of existing track. All bridges meet the horizontal clearance requirements for roadway and railroad crossings.

A proposed surface and cross slope information was not developed by roadway for this submittal and clearances were not checked at this time.

Constructability

Precast prestressed concrete girders and steel plate girders might be fabricated outside the State of Nevada and transported to the project site, but considerable savings can be achieved in the maintenance of existing traffic during construction and eliminating the need for falsework. The use of the precast prestressed concrete I-girders and steel plate I-girders also shortens the construction time significantly compared to CIP concrete box girders. CIP concrete box girders require falsework resulting in the requirement of minimum temporary vertical clearances during construction, leading to traffic restrictions. The bridges over UPRR tracks need to meet the horizontal clearance requirement during construction, and ensure no interruption to Railroad operations. The UPRR railroad does not permit the use of CIP girders for overhead bridges.

Serviceability and Maintenance

Concrete structures are generally the most cost-effective structure type to maintain, as steel structures require periodic painting for protection against rust and corrosion. Use of weathering steel can reduce the maintenance cost of steel structures.

3.0 Bridge Substructure Evaluation

Geotechnical Requirements

A limited geotechnical assessment was provided by Ninyo & Moore. Based on the review of published geotechnical data, information from previous nearby geotechnical evaluation reports, and Ninyo & Moore's previous professional experience in the project area, Ninyo & Moore provided anticipated subsurface soil conditions, anticipated groundwater conditions, and borings from previous projects. Foundation alternatives were not considered, and recommendations regarding foundation types for the proposed bridge structures were not provided at this time.

Columns

NDOT requires the use of non-flared columns instead of flared octagonal columns. Reinforced concrete

columns have traditionally been constructed with the octagonal shape. However, recently developed landscape aesthetic guidelines indicate a preference for round columns.

Pier Caps

Both drop caps and integral caps will be considered and proposed based on bridge type and required clearance. Straddle caps and cantilevered caps are required at many locations due to the complex braided interchanges. Integral caps are mainly used for cast-in-place concrete bridges. Integral steel caps are non-redundant, expensive and require precise fabrication. Integral concrete caps with steel girders are difficult to construct, usually require temporary falsework and do not allow inspection of the top tension flanges after the bridge goes into service. Therefore, integral caps on steel and precast concrete girder bridges are used only where vertical clearance restrictions exist under the cap.

Abutments

Three basic types will be considered for abutments: integral abutment, semi-integral abutment and seat abutment. Flexible abutments, either integral or semi-integral abutments, are generally preferred for bridges that meet the bridge length, skew and horizontal alignment limits in NDOT's Structures Manual. Seat abutments are used where these conditions and other geometric limitations are not met.

Integral and semi-integral abutments are advantageous because they mobilize earth passive pressure to resist and dampen seismic forces and eliminate damage to abutment backwalls from seismic movements. Additionally, both integral and semi-integral abutments provide the capability to move the expansion joint at the end of the bridge to a point where joint leakage does not promote deterioration of bearings or abutment seats. Semi-integral abutments are the preferred type of abutment when the span length, wingwall length, exposure or superstructure depth requirements for integral abutments cannot be met.

Foundations

Three types of foundations are anticipated for this project; spread footings, driven piles, and drilled shafts. Soil borings have not been performed and foundation recommendations have not been provided at this time, both will be completed prior to final design.

4.0 Bridge Structures – Alternative 1

New Structures

There are three new bridge structures and one bridge replacement as part of Alternative 1. The bridge replacement will require removal of the existing bridge. This bridge will have to be removed and reconstructed in phases to maintain traffic. Phasing will be investigated further for final design.

The proposed superstructure type for all new and replaced structures in Alternative 1 is steel plate I-girders with a composite deck. Steel plate I-girders provide fast on-site construction, no falsework, relatively simple details and formwork, adaptable to the complex geometries proposed in this alternative and low dead weight. The lower superstructure dead load also results smaller footings compared to concrete superstructures. However, steel plate girders have higher construction costs, high

maintenance costs due to periodic painting and require more attention to detailing practices compared to concrete options.

Cast-in-place post-tensioned concrete box girders could potentially be used for the new structures in this alternative as well. CIP concrete box girders typically have lower construction and maintenance costs, and CIP box girders are typically considered more aesthetically pleasing. However, their use of falsework could be problematic and costly as these proposed bridges span over existing highway and ramps.

Precast prestressed concrete girders are not considered because of their span limit.

The total cost for Alternative 1 varies from approximately $24,150,000 to $28,250,000 using the minimum and maximum cost data shown in the following tables that are broken down by each bridge. However, typical market fluctuations and unknown parameters at this preliminary stage could reverse the comparison. Therefore, cost differential is likely not to be the controlling factor. Market conditions in this economy can change quickly due to regional, national, and international events, including increased demand. The unit costs for the steel and concrete options could vary substantially before construction, particularly when accounting for inflation and other cost variables.

Widenings

There are seven widened structures included in Alternative 1.

All widened structures are proposed to be widened in-kind, widening in kind will provide aesthetic continuity while also minimizing potential clearance issues and potentially allowing for similar foundations.

I-15 SB to EB Spring Mtn. Rd Off-Ramp

This proposed flyover bridge replaces the existing I-15 Southbound to Eastbound Spring Mountain Rd. flyover off-ramp. The proposed bridge is 699’-0” in length with 3-spans and is 45’-0” in width. Five steel plate I-girders are anticipated. One of the piers will be cantilevered given the limited placement options between existing northbound and southbound I-15 bridges over Spring Mountain with the proposed alignment. The bridge requires replacement due to the new proposed ramp alignment and existing pier conflicts with both proposed alternatives.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB to EB Spring Mtn. Rd Off-Ramp	Composite Steel I-Girders	31,455	$215	$6,762,825
	CIP Post-Tensioned Box Girder		$175	$5,504,625

I-15 NB over Spring Mtn. Rd

This proposed structure widens existing Bridge I-806N which carries northbound I-15 over Spring Mountain Rd. The length of widened structure is 226’-0” and the width varies from approximately 14’-1`” to 9’-2”.

The existing structure is precast concrete box girder, maintaining existing foundation locations and widening in-kind is preferred. One precast tub girder will be required.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB Over Spring Mtn. Rd I-806N	Precast Box Girder	3,785	$150	$567,750

I-15 SB over Spring Mtn. Rd

This proposed structure widens existing Bridge I-806S which carries southbound I-15 over Spring Mountain Rd. The length of widened structure is 226'-0" and the width varies from approximately 24'-10" to 23'-10".

Similar to northbound, the existing structure is a precast concrete box girder, maintaining existing foundation locations and widening in-kind is preferred. Three precast tub girders will be required.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB Over Spring Mtn. Rd I-806S	Precast Box Girder	6,280	$150	$942,000

I-15 SB to Flamingo Off-Ramp Over Spring Mtn. On-Ramp

This proposed new bridge provides an off-ramp to Flamingo Rd from southbound I-15. This structure is 569'-0" in length with 4-spans and is 39'-0" in width. Four steel plate I-girders are anticipated. One of the piers will be a straddle in order to create a reasonable span arrangement over the braided interchange. Using an integral cap at this location would be ideal to increase clearance. This bridge creates a proposed braid with the Spring Mountain Rd. on-ramp to southbound I-15.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB to Flamingo Off-Ramp	Composite Steel I-Girders	22,191	$215	$4,771,065
	CIP Post-Tensioned Box Girder		$175	$3,883,425

I-15 SB over UPRR

This proposed structure widens existing Bridge G-805S which carries southbound I-15 over UPRR. The length of widened structure is 306'-6" and the width varies from approximately 22'-10" to 14'-11".

The existing structure steel plate I-girders, maintaining existing foundation locations and widening in-kind is preferred. Four steel plate I-girders are proposed to meet NDOT's closure pour requirements. Pier protection, and fencing will also be placed per the UPRR guidelines.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB Over UPRR	Composite Steel I-Girders	7,110	$220	$1,564,200

I-15 SB over Dean Martin Dr.

This proposed structure widens existing Bridge G-805S which carries southbound I-15 over Dean Martin Dr. The length of widened structure is 204'-0" and the width is approximately 12'-0".

The existing structure is a cast-in-place post-tensioned concrete box girder, maintaining existing foundation locations and widening in-kind is preferred. An addition of a single cell cast-in-place box girder is proposed.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB Over Dean Martin Dr.	CIP Post-Tensioned Box Girder	3,119	$175	$545,825

I-15 SB to Flamingo Rd. Off-Ramp over UPRR/Dean Martin Dr./Twain

This proposed new bridge provides an off-ramp to Flamingo Rd from southbound I-15. This structure is 616'-0" in length with 6-spans and is 39'-0" in width. Four steel plate I-girders are anticipated. The span arrangement and foundation location is laid out to align with the existing parallel I-15 southbound bridges.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB to Flamingo Off-Ramp	Composite Steel I-Girders	24,024	$215	$5,165,160
	CIP Post-Tensioned Box Girder		$175	$4,204,200

Flamingo Rd. Over Frank Sinatra Dr.

This proposed structure widens existing Bridge H-2347 which carries Flamingo Rd. over Frank Sinatra Dr. The length of widened structure is 87'-11" and the width is 19'-6".

While as-builts for this bridge were not provided at the time of the report, the bridge is presumed to be comprised of precast deck slab girders, maintaining existing foundation locations and widening in kind is proposed.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Flamingo Rd Over Frank Sinatra Dr	Precast Deck Slab	2,065	$150	$309,750

Flamingo Rd. Over I-15

This proposed structure widens existing Bridge I-1745 which carries Flamingo Rd. over I-15. The length of widened structure is 294'-0" and the width is 26'-3".

The bridge is a composite steel plate I-girder bridge, maintaining existing foundation locations and widening in kind is proposed.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Flamingo Rd Over I-15	Composite Steel I-Girders	8,500	$215	$1,827,500

Flamingo Rd. Over Dean Martin Dr.

This proposed structure widens existing Bridge H-1744 which carries Flamingo Rd. over Dean Martin Dr. The length of widened structure is 158'-0" and the width is 14'-0".

The bridge is a cast-in-place post-tensioned box girder, maintaining existing foundation locations and widening in kind is proposed.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Flamingo Rd Over Dean Martin Dr.	Post Tensioned Box Girder	2,750	$175	$522,500

Flamingo Rd to I-15 SB On-Ramp

This proposed new bridge provides an on-ramp from Flamingo Rd to I-15 SB. This structure is 498'-0" in length with 3-spans and varies from 43'-11" to 51'-0" in width. Five steel plate I-girders are anticipated. One of the piers will be a straddle in order to create a reasonable span arrangement over the braided interchange. Using an integral cap at this location would be ideal to increase clearance. This bridge creates a proposed braid with the southbound Tropicana Ave off-ramp.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Flamingo Rd. to I-15 SB On-Ramp	Composite Steel I-Girders	24,664	$215	$5,302,760
	CIP Post-Tensioned Box Girder		$175	$4,316,200

5.0 Bridge Structures – Alternative 2

New Structures

There are three new bridge structures and two bridge replacements as part of Alternative 2. Both bridge replacements will require removal of the existing bridges. Bridges will have to be removed and reconstructed in phases to maintain traffic. Phasing will be investigated further for final design.

The proposed superstructure type for all new and replaced structures in Alternative 2 is steel plate I-girders. Steel plate I-girders provide fast on-site construction, no falsework, relatively simple details and formwork, adaptable to the complex geometries proposed in this alternative and low dead weight. The lower superstructure dead load also results smaller footings compared to concrete superstructures. However, steel plate girders have higher construction costs, high maintenance due to periodic painting costs and requires more attention to detailing practices compared to concrete options.

Cast-in-place post-tensioned concrete box girders could potentially be used for the new structures in this alternative as well. CIP concrete box girders typically have lower construction and maintenance costs, and CIP box girders are typically considered more aesthetically pleasing. However, their use of falsework could be problematic due to this bridge spanning over the existing on-ramp.

Precast prestressed concrete girders are not considered because of their span limit.

The total cost for Alternative 2 varies from approximately $34,150,000 to $41,950,000 using the minimum and maximum cost data shown in the following tables that are broken down by each bridge. However, typical market fluctuations and unknown parameters at this preliminary stage could reverse the comparison. Therefore, cost differential is likely not to be the controlling factor. Market conditions in this economy can change quickly due to regional, national, and international events, including increased demand. The unit costs for the steel and concrete options could vary substantially before construction, particularly when accounting for inflation and other cost variables.

Widenings

There are no widened structures in Alternative 2.

I-15 NB to Spring Mtn. Rd Off-Ramp

This proposed new bridge provides an off-ramp from I-15 NB to Spring Mountain Rd. This structure is 505’-6” in length with 4-spans and is 39’-0” in width. Four steel plate I-girders are anticipated. This proposed bridge creates a braid over the Flamingo Rd to I-15 NB on-ramp.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB to Spring Mtn. Rd Off-Ramp	Composite Steel I-Girders	19,802	$215	$4,257,430
	CIP Post-Tensioned Box Girder		$175	$3,465,350

Harmon Over I-15

This proposed bridge replaces the existing Harmon Ave crossing over I-15. This bridge is 635'-0" in length with 5-spans and varies in width from 127'-6" to 85'-6". The bridge requires replacement due to an existing pier line located in the proposed roadway alignment of Alternative 2.

The existing bridge was constructed in 2002 and is comprised of 8 steel plate girders at 11'-0" spacing. Two spans of the bridge were widened by an additional 4 girder lines in 2007 as part of an improvement project initiated by neighboring casinos. A similar girder layout would be used on the proposed structure with differing plate sizes and thicknesses to account for the revised span arrangement.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Harmon Over I-15	Composite Steel I-Girders	67,734	$215	$14,562,810
	CIP Post-Tensioned Box Girder		$175	$11,853,450

Tropicana Ave to I-15 NB On-Ramp

This proposed new bridge provides an on-ramp from Tropicana Ave to I-15 NB. This structure is 998'-0" in length with 6-spans and varies from 51'-0" to 39'-0" in width. Five steel plate I-girders are anticipated. This proposed bridge creates a braid over the I-15 NB to Flamingo Rd. off-ramp.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Tropicana Ave to I-15 NB On-Ramp	Composite Steel I-Girders	44,910	$215	$9,655,650
	CIP Post-Tensioned Box Girder		$175	$7,859,250

Hacienda Over I-15

This proposed bridge replaces the existing Hacienda Ave crossing over I-15. This bridge is 498'-0" in length with 4-spans and is 80'-0" in width. The bridge requires replacement due to an existing pier line located in the proposed roadway alignment of Alternative 2.

The existing bridge is comprised of 8 steel plate girders at 10'-3" spacing. A similar girder layout would be used on the proposed structure with differing plate sizes and thicknesses to account for the revised span arrangement.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Hacienda Over I-15	Composite Steel I-Girders	39,921	$215	$8,583,015
	CIP Post-Tensioned Box Girder		$175	$6,986,175

Russell Rd. to I-15 NB On-Ramp

This proposed new bridge provides an on-ramp from Russell Rd. to I-15 NB. This structure is 485'-0" in length with 3-spans and varies from 51'-0" to 36'-8" in width. Five steel plate I-girders are anticipated. One of the piers will be a straddle in order to create a reasonable span arrangement over the braided interchange. Using an integral cap at this location would be ideal to increase clearance. This proposed bridge creates a braid over the northbound CD/I-15 NB to Tropicana Ave. off-ramp.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Russell Rd to I-15 NB On-Ramp	Composite Steel I-Girders	22,742	$215	$4,889,530
	CIP Post-Tensioned Box Girder		$175	$3,979,850

6.0 Bridge Structures – Alternative 1 Shift

New Structures

There are three new bridge structures and seven bridge replacements as part of Alternative 1 Shift. All seven of the bridge replacements will require removal of the existing bridges. Bridges will have to be removed and reconstructed in phases to maintain traffic. Phasing will be investigated further for final design.

Additionally, the removal of the southbound I-15 bridge over Dean Martin Drive will be required. Under Alternative 1 Shift, Dean Martin Drive under I-15 will no longer be in use and this existing bridge conflicts with the new proposed bridge over Twain Ave. As such, it is proposed that at a minimum, the southbound I-15 over Dean Martin Drive be removed, but preferably all three bridges over Dean Martin Drive are removed and the area underneath the existing bridges be filled and walled-in with MSE walls for structural integrity.

The proposed superstructure type for all new and replaced structures in Alternative 1 Shift is steel plate I-girders with a composite deck. Steel plate I-girders provide fast on-site construction, no falsework, relatively simple details and formwork, adaptable to the complex geometries proposed in this alternative and low dead weight. The lower superstructure dead load also results smaller footings compared to concrete superstructures. However, steel plate girders have higher construction costs, high maintenance costs due to periodic painting and require more attention to detailing practices compared to concrete options.

Cast-in-place post-tensioned concrete box girders are potential options for the new structures in this alternative as well. CIP concrete box girders typically have lower construction and maintenance costs, and CIP box girders are typically considered more aesthetically pleasing. However, their use of falsework could be problematic and costly, as these bridges span over the existing highway and ramps.

Precast prestressed concrete girders are offered as a third option for some of the bridges. However, further investigation would be required to determine if the girder pick weight, given the proposed spans, would exceed the limitations of available equipment.

The total cost for Alternative 1 Shift varies from approximately $55,450,000 to $69,950,000 using the minimum and maximum cost data shown in the following tables that are broken down by each bridge. However, typical market fluctuations and unknown parameters at this preliminary stage could reverse the comparison. Therefore, cost differential is likely not to be the controlling factor. Market conditions in this economy can change quickly due to regional, national, and international events, including increased demand. The unit costs for the steel and concrete options could vary substantially before construction, particularly when accounting for inflation and other cost variables.

Widenings

There are five widened structures included in Alternative 1 Shift.

All widened structures are proposed to be widened in-kind, widening in kind will provide aesthetic continuity while also minimizing potential clearance issues and potentially allowing for similar foundations.

I-15 SB to EB Spring Mtn. Rd Off-Ramp

This proposed flyover bridge replaces the existing I-15 Southbound to Eastbound Spring Mountain Rd. flyover off-ramp. The bridge requires replacement due to the new proposed ramp alignment and existing pier conflicts with the proposed I-15 roadway alternative. The proposed bridge is 877’-11” in length with 4-spans and is 47’-0” in width. Five steel plate I-girders are anticipated. Pier placement is very limited given the proposed ramp alignment and the proposed median width and location of I-15 northbound and southbound lanes, as well as Spring Mountain eastbound and westbound lanes.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB to EB Spring Mtn. Rd Off-Ramp	Composite Steel I-Girders	41,329	$215	$8,885,819
	CIP Post-Tensioned Box Girder		$175	$7,232,643

I-15 NB over Spring Mtn. Rd

This proposed structure replaces the existing Bridge I-806N which carries northbound I-15 over Spring Mountain Rd. The new structure will allow for a widened Spring Mountain roadway beneath. The proposed length of the new structure is 279’-0 and the width varies from approximately 110’-0`” to 113’-0”. To maintain required clearance, the profile for I-15 will need to be raised.

The existing structure is precast concrete box girder. With a composite steel I-girder superstructure, twelve girders are anticipated. A CIP post-tensioned box girder or precast tub girders are also suitable options at this location.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB Over Spring Mtn. Rd I-806N	Composite Steel I-Girders	30,917	$215	$6,647,070
	CIP Post-Tensioned Box Girder		$175	$5,410,406
	Precast Box Girder		$150	$4,637,491

I-15 SB over Spring Mtn. Rd

This proposed structure replaces the existing Bridge I-806S which carries southbound I-15 over Spring Mountain Rd. The new structure will allow for a widened Spring Mountain roadway beneath. The proposed length of the new structure is 279'-6" and the width varies from approximately 99'-0`" to 108'-0".

The existing structure is precast concrete box girder. With a composite steel I-girder superstructure, eleven girders are anticipated. A CIP post-tensioned box girder or precast tub girders are also suitable options at this location.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB Over Spring Mtn. Rd I-806S	Composite Steel I-Girders	28,995	$215	$6,233,852
	CIP Post-Tensioned Box Girder		$175	$5,074,066
	Precast Box Girder		$150	$4,349,199

I-15 SB to Flamingo Off-Ramp over Spring Mtn. On-Ramp/UPRR

This proposed new bridge provides an off-ramp to Flamingo Rd from southbound I-15 and creates a braided interchange with the Spring Mtn. on-ramp to southbound I-15, as well as providing a crossing over the UPRR. This structure is approximately 1340'-1" in length with 10 spans and varies in width from 39'-0" to 51'-0". Four steel plate I-girders are anticipated. One of the piers will be a straddle in order to create a reasonable span arrangement over the braided interchange. Using an integral cap at this location would be ideal to increase clearance.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB to Flamingo Off-Ramp	Composite Steel I-Girders	55,699	$215	$11,975,252
	CIP Post-Tensioned Box Girder		$175	$9,747,298

I-15 SB over UPRR

This proposed structure widens existing Bridge G-805S which carries southbound I-15 over UPRR. The length of widened structure is approximately 332'-8" measured along the proposed alignment with three spans and a width varies of 25'-6".

The existing structure steel plate I-girders, maintaining existing foundation locations and widening in-kind is preferred. Four steel plate I-girders are proposed to meet NDOT's closure pour requirements, which involves providing 3-feet minimum. Pier protection, and fencing will also be placed per the UPRR guidelines.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB Over UPRR	Composite Steel I-Girders	5,979	$220	$1,315,292

I-15 NB over UPRR

This proposed structure widens existing Bridge G-805N which carries northbound I-15 over UPRR. The length of widened structure is approximately 311'-7" measured along the edge of the existing bridge deck with three spans and the width varies from approximately 32'-10" to 38'-0".

The existing structure steel plate I-girders, maintaining existing foundation locations and widening in-kind is preferred. Five steel plate I-girders are proposed to meet NDOT's closure pour requirements, which involves providing 3-feet minimum. Pier protection, and fencing will also be placed per the UPRR guidelines.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB Over UPRR	Composite Steel I-Girders	11,012	$220	$2,422,663

I-15 NB Ramp to Spring Mtn. over UPRR/Spring Mtn. to I-15 NB On-Ramp

Due to the shift in the I-15 alignment to accommodate the MLK Extension Project, the existing northbound I-15 ramp to Spring Mtn. that crosses over both the UPRR as well as the Spring Mtn. on-ramp to northbound I-15 has to be removed. With this shift and required removal, a new ramp must be replaced approximately 30-feet to the east of the existing structure.

This proposed structure is approximately 1734'-6" in length with 14 spans and the width varies from approximately 28'-0" to 83'-0" at multiple gore locations.

The existing structure is a cast-in-place post-tensioned concrete box girder. With a composite steel I-girder superstructure, the number of girders will vary depending on width of bridge and flare of each unit and span. A CIP post-tensioned box girder would also be suitable at this location. Pier protection, and fencing will also be placed per the UPRR guidelines.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB Ramp to Spring Mtn.	Composite Steel I-Girders	66,717	$215	$14,344,133
	CIP Post-Tensioned Box Girder		$175	$11,675,457

I-15 SB to Flamingo Rd. Off-Ramp over Twain Ave.

This proposed new bridge continues the off-ramp to Flamingo Rd from southbound I-15. This structure is 141'-10" in length with a single span and is 51'-0" in width. Four steel plate I-girders are anticipated.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB Ramp to Flamingo Over Twain Ave.	Composite Steel I-Girders	7,374	$215	$1,585,346
	CIP Post-Tensioned Box Girder		$175	$1,290,398
	Precast Box Girder		$150	$1,106,055

I-15 SB over Twain Ave.

This proposed new bridge carries southbound I-15 over Twain Ave. This structure is 140'-8" in length with a single span and varies in width from approximately 122'-0" to 117'-0". Thirteen steel plate I-girders are anticipated. As currently proposed, this bridge layout conflicts with the existing I-15 bridge over Dean Martin Drive. The existing bridge would need to be removed to allow for construction of this new bridge.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 SB Over Twain Ave.	Composite Steel I-Girders	16,939	$215	$3,641,909
	CIP Post-Tensioned Box Girder		$175	$2,964,345
	Precast Box Girder		$150	$2,540,867

I-15 NB over Twain Ave.

This proposed new bridge carries northbound I-15 over Twain Ave. This structure is 140'-10" in length with a single span and a width of approximately 108'-9". Twelve steel plate I-girders are anticipated. While this bridge does not conflict with the existing northbound I-15 bridge over Dean Martin Drive, the removal of this existing bridge is still recommended for constructability and stabilization.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB Over Twain Ave.	Composite Steel I-Girders	15,402	$215	$3,311,470
	CIP Post-Tensioned Box Girder		$175	$2,695,382
	Precast Box Girder		$150	$2,310,328

I-15 NB Ramp to Spring Mtn. over Twain Ave.

This proposed new bridge continues the off-ramp to Flamingo Rd from southbound I-15. This structure is 140'-11" in length with a single span and a width of approximately 41'-0". Five steel plate I-girders are anticipated. While this bridge does not conflict with the existing northbound I-15 ramp bridge over Dean Martin Drive, the removal of this existing bridge is still recommended for constructability and stabilization.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB Ramp to Spring Mtn. Over Twain Ave.	Composite Steel I-Girders	5,838	$215	$1,255,241
	CIP Post-Tensioned Box Girder		$175	$1,021,708
	Precast Box Girder		$150	$875,750

Flamingo Rd. Over Frank Sinatra Dr.

This structure does not vary under Alternative 1 Shift, see Section 4.0 Bridge Structures – Alternative 1 for more details.

Flamingo Rd. Over I-15

This structure does not vary under Alternative 1 Shift, see Section 4.0 Bridge Structures – Alternative 1 for more details.

Flamingo Rd. Over Dean Martin Dr.

This structure does not vary under Alternative 1 Shift, see Section 4.0 Bridge Structures – Alternative 1 for more details.

Flamingo Rd to I-15 SB On-Ramp

This structure does not vary under Alternative 1 Shift, see Section 4.0 Bridge Structures – Alternative 1 for more details.

7.0 Bridge Structures – Alternative 2 Shift

New Structures

There are three new bridge structures and two bridge replacements as part of Alternative 2 Shift. Both bridge replacements will require removal of the existing bridges. Bridges will have to be removed and reconstructed in phases to maintain traffic. Phasing will be investigated further for final design.

The proposed superstructure type for all new structures in Alternative 2 Shift is steel plate I-girders. Steel plate I-girders provide fast on-site construction, no falsework, relatively simple details and formwork, adaptable to the complex geometries proposed in this alternative and low dead weight. The lower superstructure dead load also results smaller footings compared to concrete superstructures.

However, steel plate girders have higher construction costs, high maintenance due to periodic painting costs and requires more attention to detailing practices compared to concrete options.

Cast-in-place post-tensioned concrete box girders could potentially be used for the new structures in this alternative as well. CIP concrete box girders typically have lower construction and maintenance costs, and CIP box girders are typically considered more aesthetically pleasing. However, their use of falsework could be problematic due to this bridge spanning over the existing on-ramp.

Precast prestressed concrete girders are not considered because of their span limit.

The total cost for Alternative 2 Shift varies from approximately $34,700,000 to $42,600,000 using the minimum and maximum cost data shown in the following tables that are broken down by each bridge. However, typical market fluctuations and unknown parameters at this preliminary stage could reverse the comparison. Therefore, cost differential is likely not to be the controlling factor. Market conditions in this economy can change quickly due to regional, national, and international events, including increased demand. The unit costs for the steel and concrete options could vary substantially before construction, particularly when accounting for inflation and other cost variables.

Widenings

There are no widened structures in Alternative 2 Shift.

I-15 NB to Spring Mtn. Rd Off-Ramp

This proposed new bridge provides an off-ramp from I-15 NB to Spring Mountain Rd. This structure is 505’-6” in length with 4-spans and is 41’-0” in width. This proposed bridge is 2’-0” wider than in Alternative 2, otherwise the bridge layout for Alternative 2 Shift is identical. Four steel plate I-girders are anticipated. This proposed bridge creates a braid over the Flamingo Rd to I-15 NB on-ramp.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
I-15 NB to Spring Mtn. Rd Off-Ramp	Composite Steel I-Girders	22,783	$215	$4,898,400
	CIP Post-Tensioned Box Girder		$175	$3,987,100

Harmon Over I-15

This proposed bridge replaces the existing Harmon Ave crossing over I-15. This bridge is 635’-0” in length with 5-spans and varies in width from 127’-6” to 85’-6”. The bridge requires replacement due to an existing pier line located in the proposed roadway alignment of Alternative 2 Shift. One pier requires a 1’-0” relocation relative to Alternative 2, otherwise the bridge layout for Alternative 2 Shift is identical.

The existing bridge was constructed in 2002 and is comprised of 8 steel plate girders at 11’-0” spacing. Two spans of the bridge were widened by an additional 4 girder lines in 2007 as part of an improvement

project initiated by neighboring casinos. A similar girder layout would be used on the proposed structure with differing plate sizes and thicknesses to account for the revised span arrangement.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Harmon Over I-15	Composite Steel I-Girders	67,734	$215	$14,562,810
	CIP Post-Tensioned Box Girder		$175	$11,853,450

Tropicana Ave to I-15 NB On-Ramp

This proposed new bridge provides an on-ramp from Tropicana Ave to I-15 NB. This structure is 998'-0" in length with 6-spans and varies from 51'-0" to 39'-0" in width. One column of a straddle bent required a slight relocation relative to Alternative 2, otherwise the bridge layout for Alternative 2 Shift is identical. Five steel plate I-girders are anticipated. This proposed bridge creates a braid over the I-15 NB to Flamingo Rd. off-ramp.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Tropicana Ave to I-15 NB On-Ramp	Composite Steel I-Girders	44,910	$215	$9,655,650
	CIP Post-Tensioned Box Girder		$175	$7,859,250

Hacienda Over I-15

This proposed bridge replaces the existing Hacienda Ave crossing over I-15. This bridge is 498'-0" in length with 4-spans and is 80'-0" in width. The bridge requires replacement due to an existing pier line located in the proposed roadway alignment of Alternative 2 Shift. One pier requires a 12'-0" relocation relative to Alternative 2, otherwise the bridge layout for Alternative 2 Shift is identical.

The existing bridge is comprised of 8 steel plate girders at 10'-3" spacing. A similar girder layout would be used on the proposed structure with differing plate sizes and thicknesses to account for the revised span arrangement.

Bridge Name	Superstructure Type	Plan Area (SF)	Cost ($/SF)	Estimated Cost
Hacienda Over I-15	Composite Steel I-Girders	39,921	$215	$8,583,015
	CIP Post-Tensioned Box Girder		$175	$6,986,175

Russell Rd. to I-15 NB On-Ramp

This structure does not vary under Alternative 2 Shift, see Section 5.0 Bridge Structures – Alternative 2 for more details.

8.0 Existing Bridge - Inspection Review

As an additional component of this feasibility level analysis, the condition of existing bridges and culverts within the project corridor were studied. The as-builts and inspection reports were reviewed, and an initial assessment was provided for NDOT. Atkins collaborated with NDOT to finalize the repair recommendations, these are provided in Appendix C.

Appendix A: Conceptual Bridge Plans – Alternative 1 and Alternative 2

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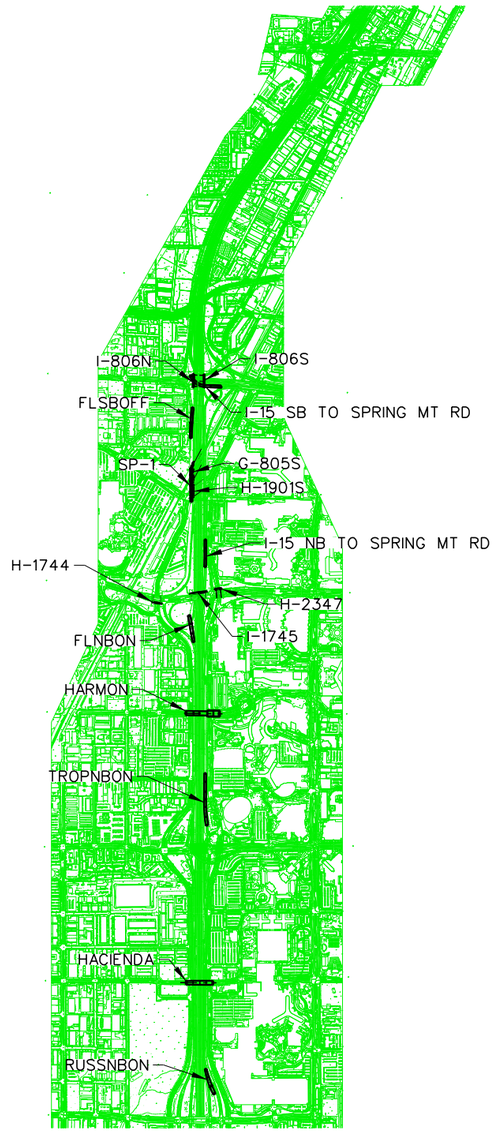
NEVADA	SPI-015-1(75)	CLARK	1

PRELIMINARY

SUBJECT TO REVISION

$$$$date$$$



KEY PLAN

BRIDGE DRAWING INDEX

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

BRIDGE TITLE SHEET

ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

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NEVADA	SPI-015-1(75)	CLARK	2

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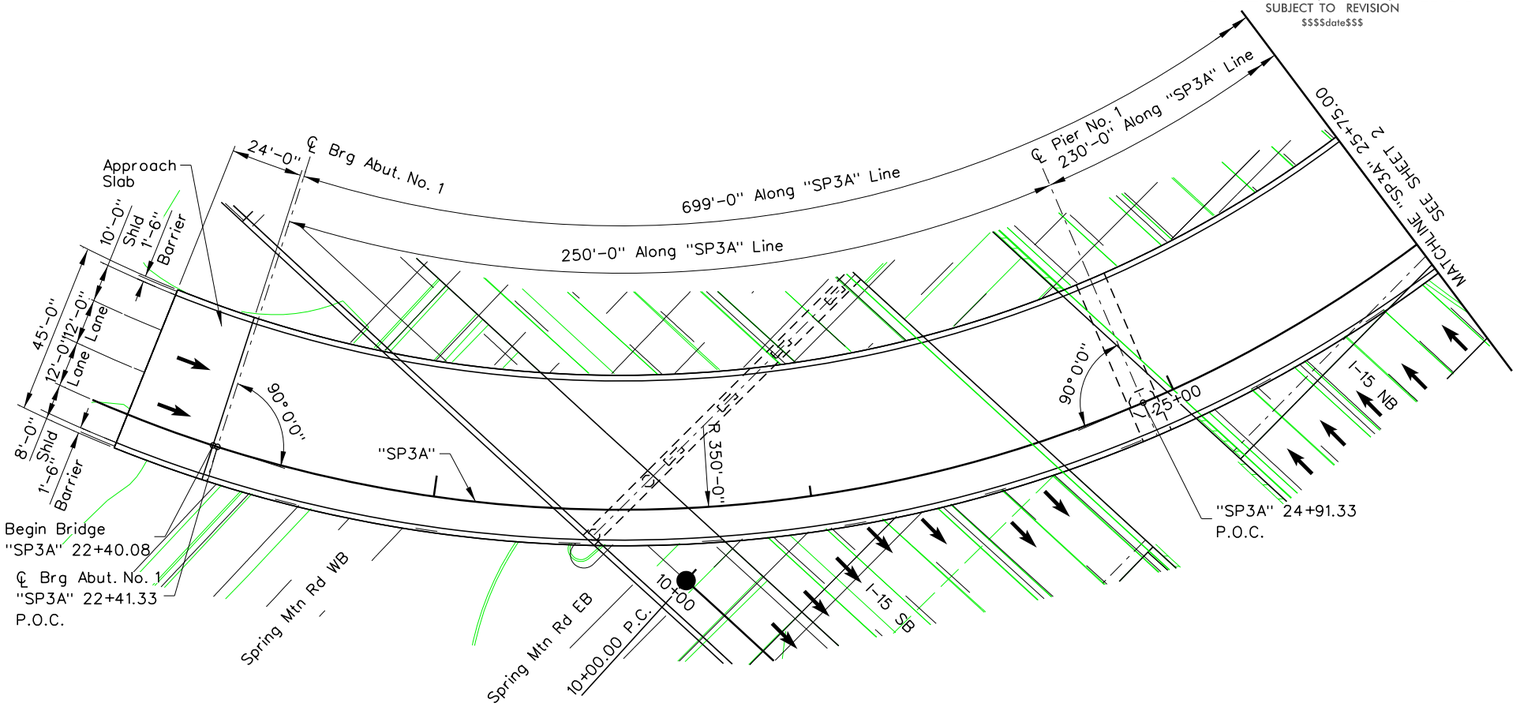

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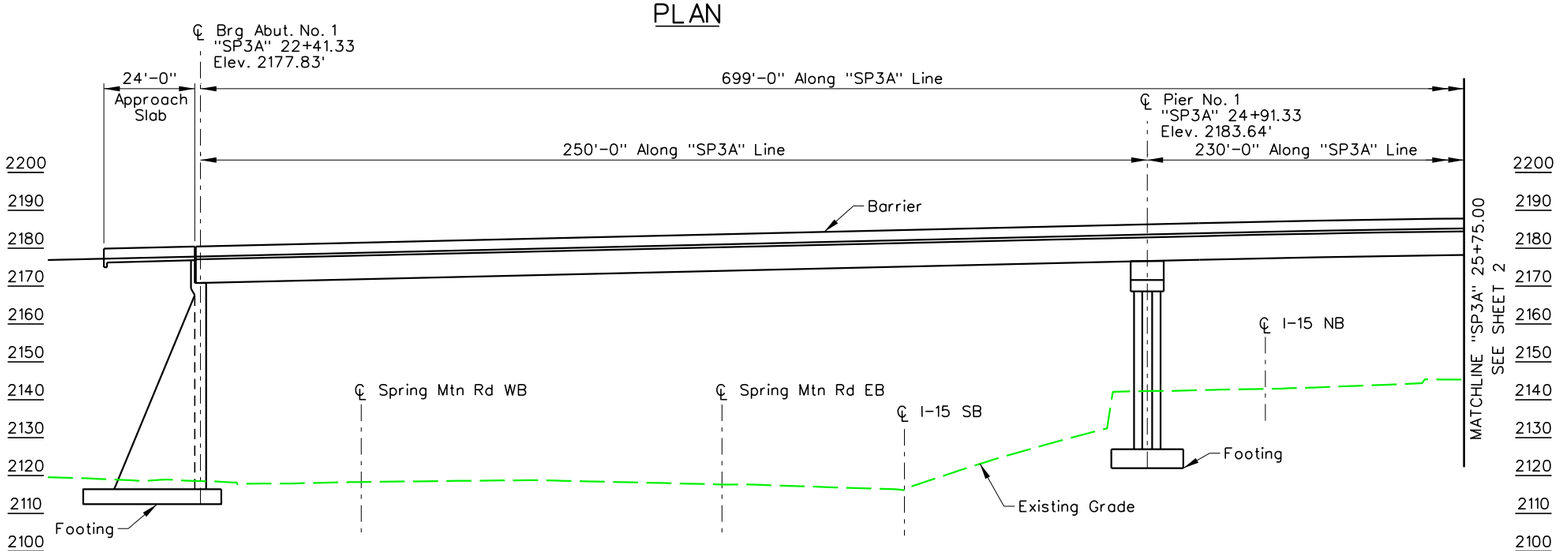

ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB TO SPRING MTN RD OFF-RAMP
(SHEET 1 OF 2)
ALTERNATIVE 1 & 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SP1-015-1(175)	CLARK	3

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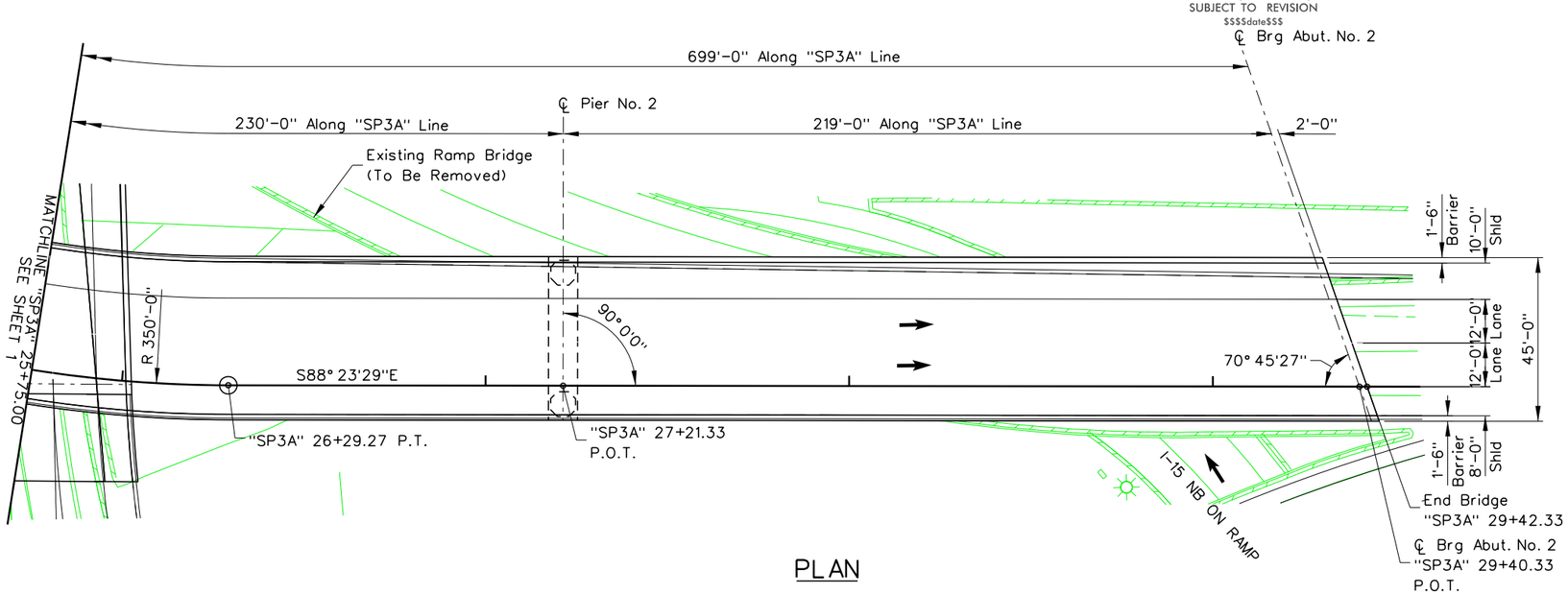

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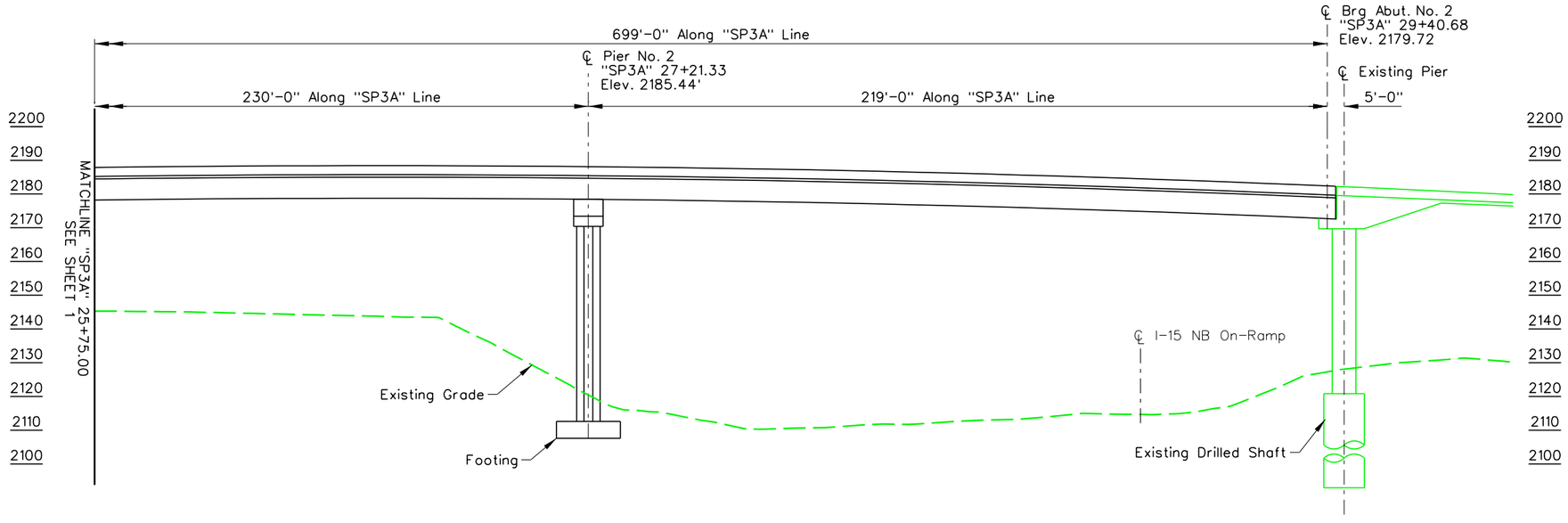

ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB TO SPRING MTN RD OFF-RAMP
SHEET 2 OF 2
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
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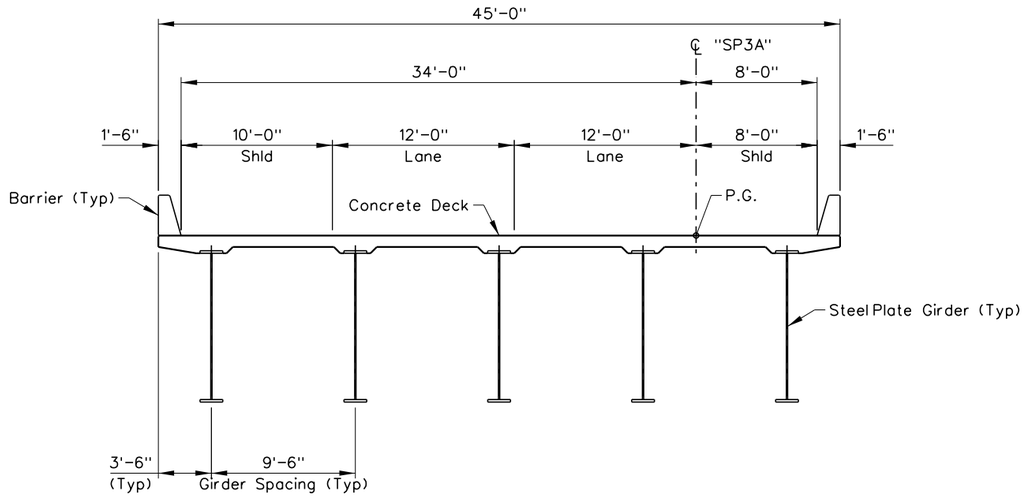


TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB TO SPRING MTN RD OFF-RAMP
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

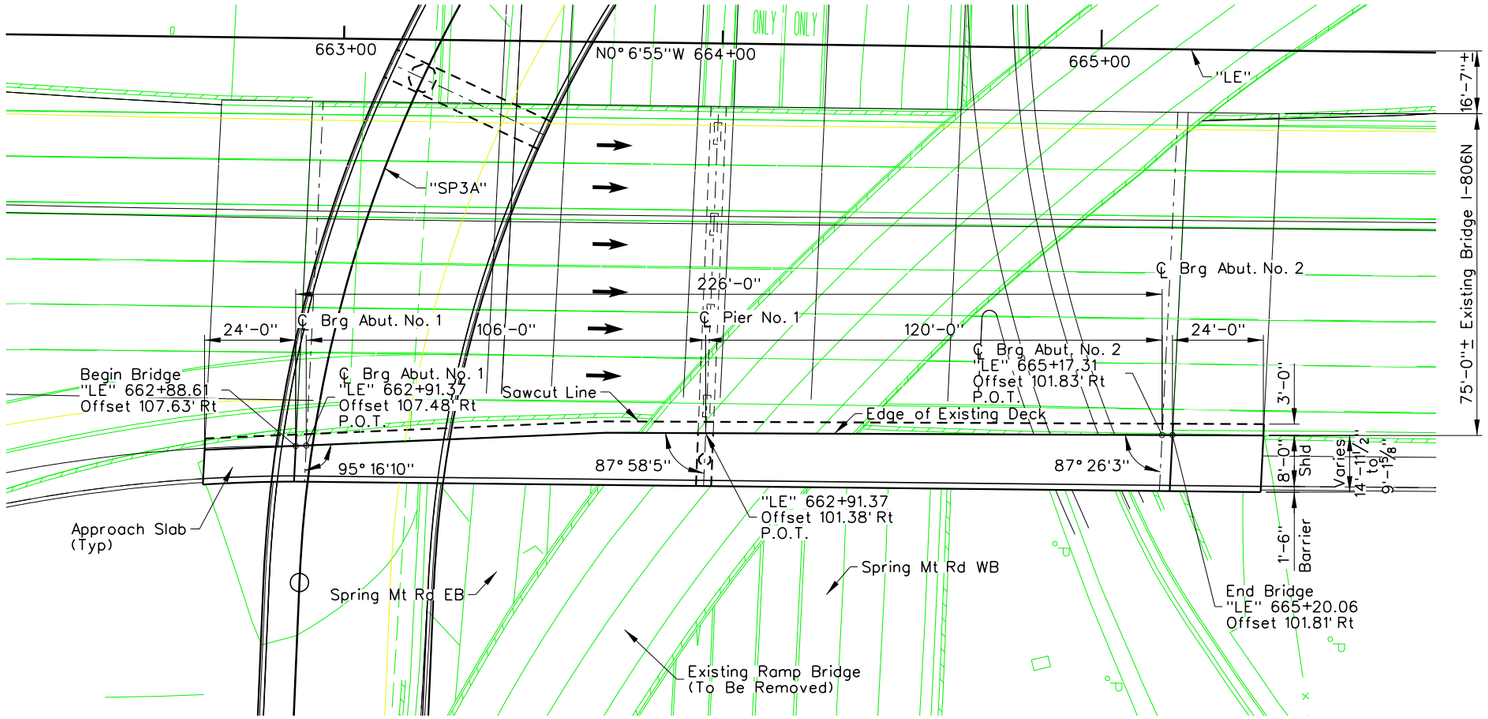
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	5

PRELIMINARY

SUBJECT TO REVISION

$$$$date$$$

T21S R61E



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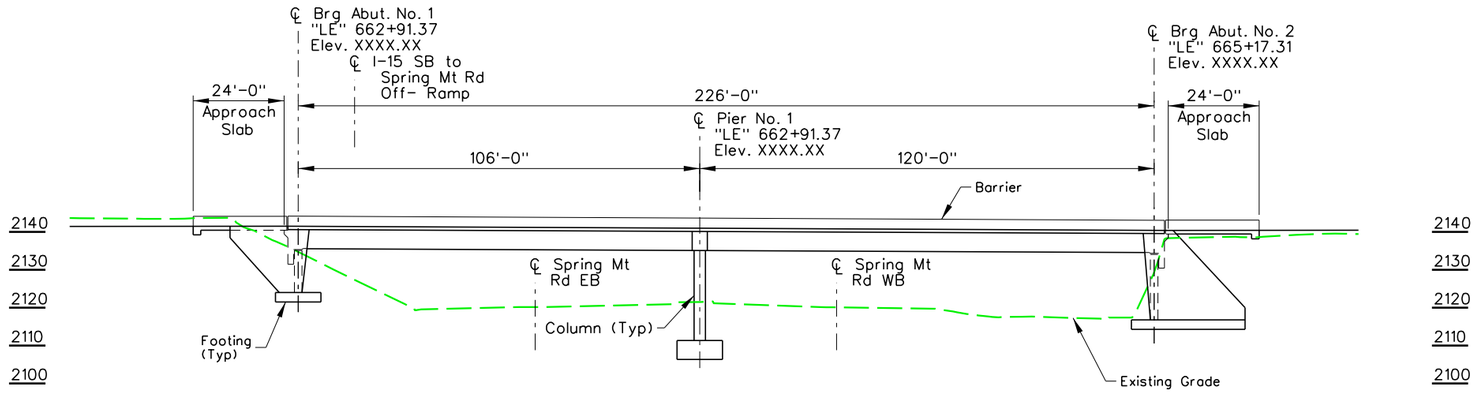

ELEVATION

Notes:

1. Elevations and dimensions are taken along edge of existing deck.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 NB OVER SPRING MTN RD
BRIDGE I-806N WIDENING
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

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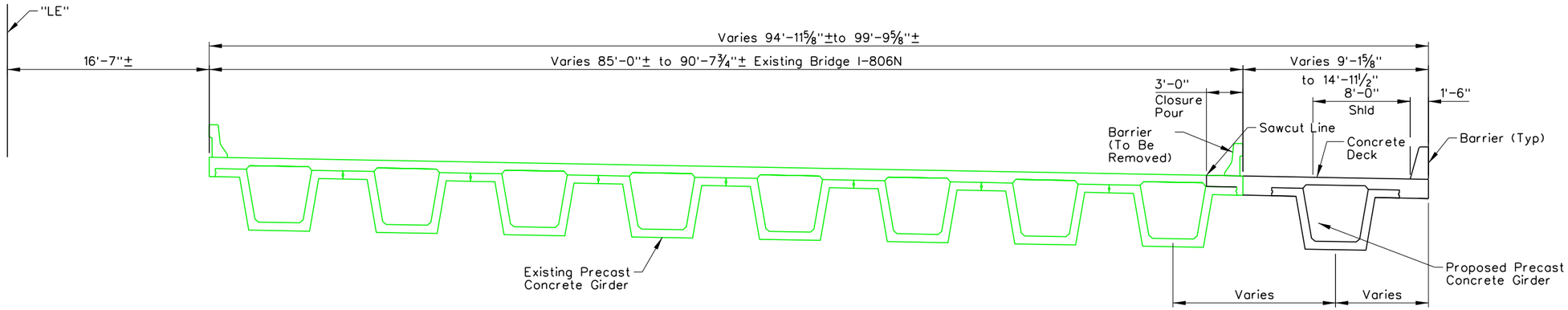
NEVADA	SPI-015-1(75)	CLARK	6



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 NB OVER SPRING MTN RD
BRIDGE I-806 N WIDENING
ALTERNATIVE 1 & 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
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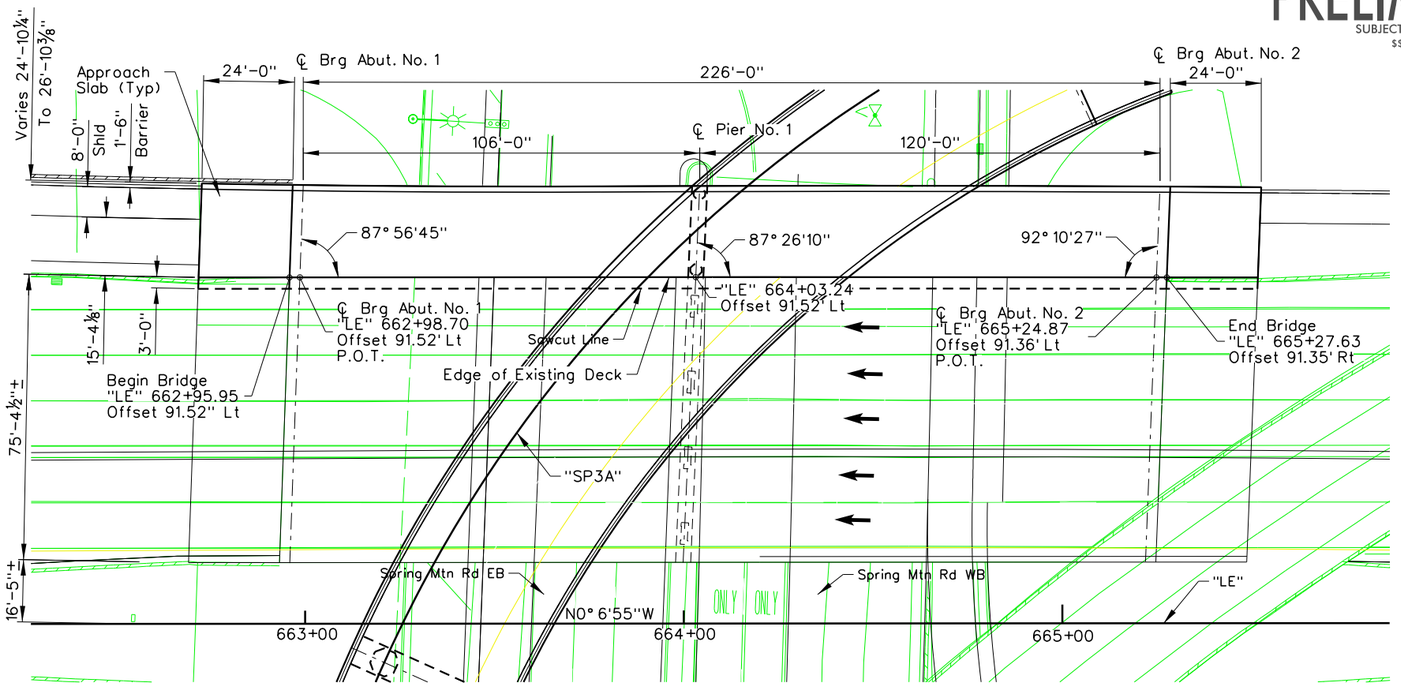

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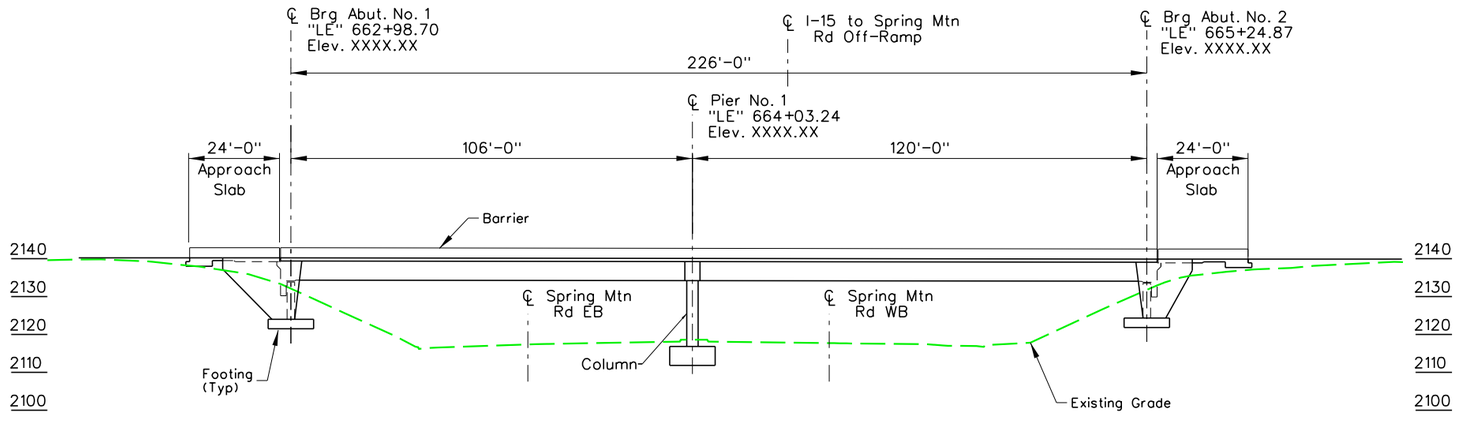


ELEVATION

Notes:

1. Elevations and dimensions are taken along existing edge of deck.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

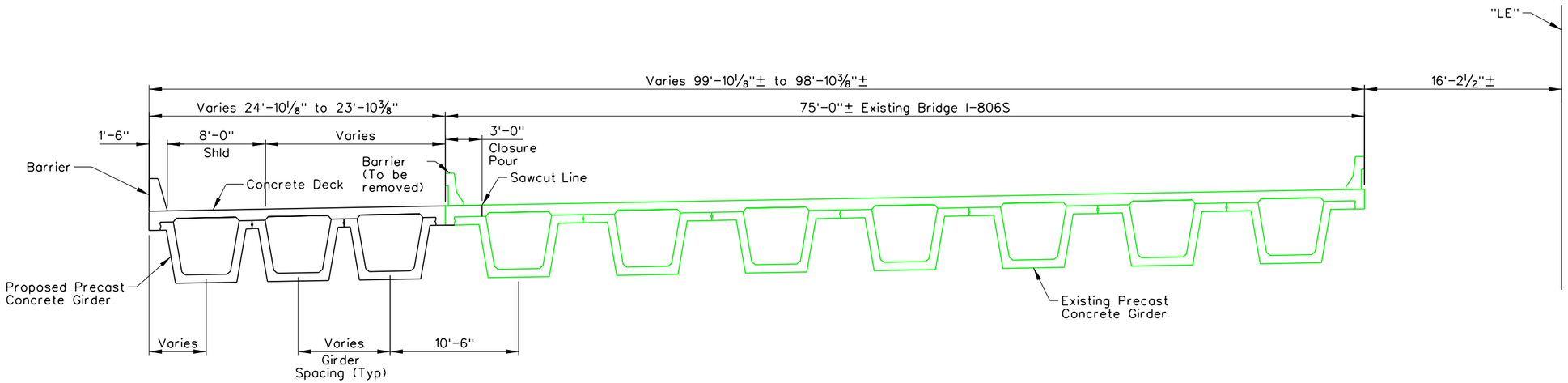
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB OVER SPRING MTN RD
BRIDGE I-806S WIDENING
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	8



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB OVER SPRING MOUNTAIN RD
BRIDGE I-806S WIDENING
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	9

PRELIMINARY

SUBJECT TO REVISION

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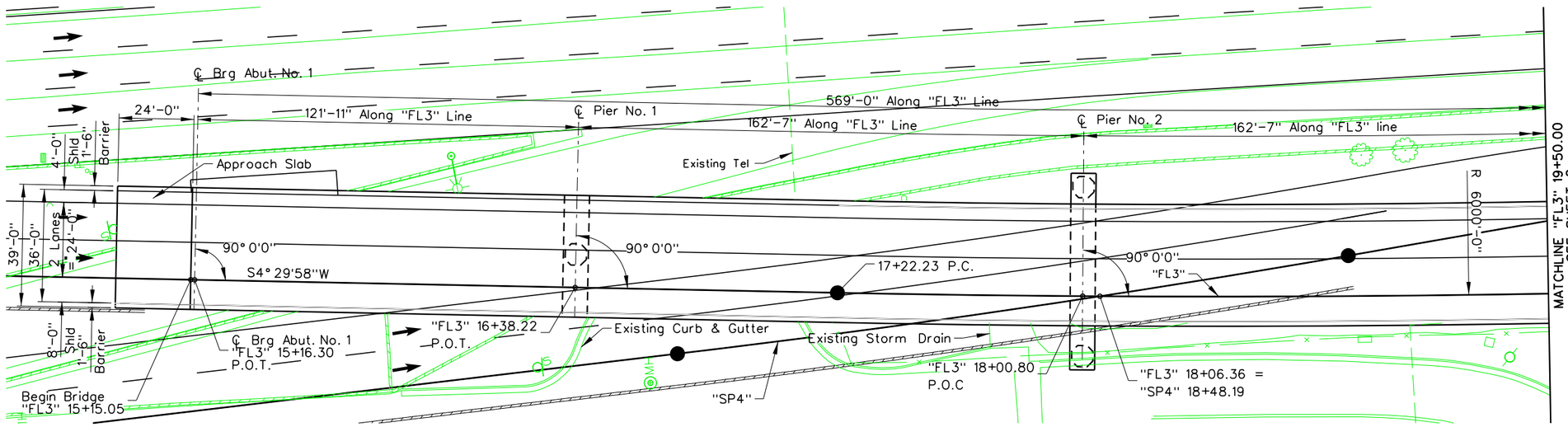

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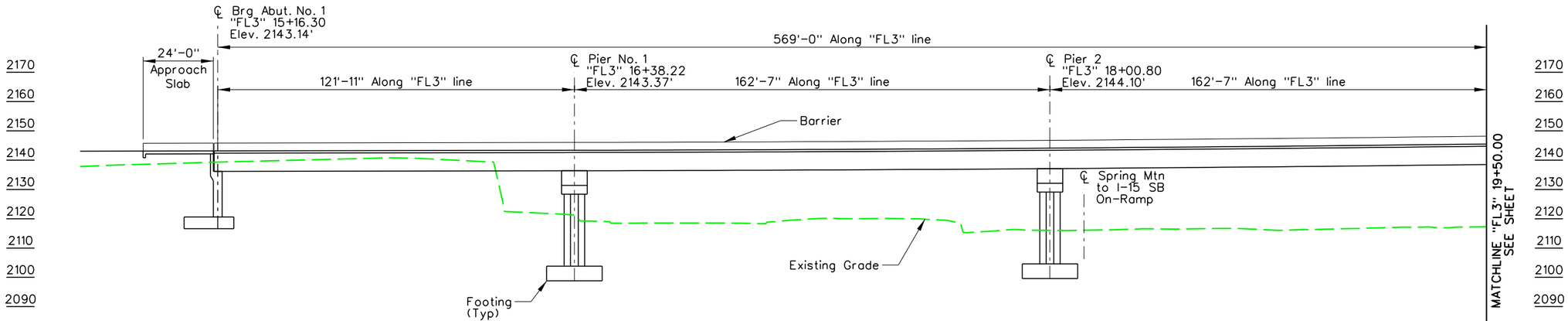


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

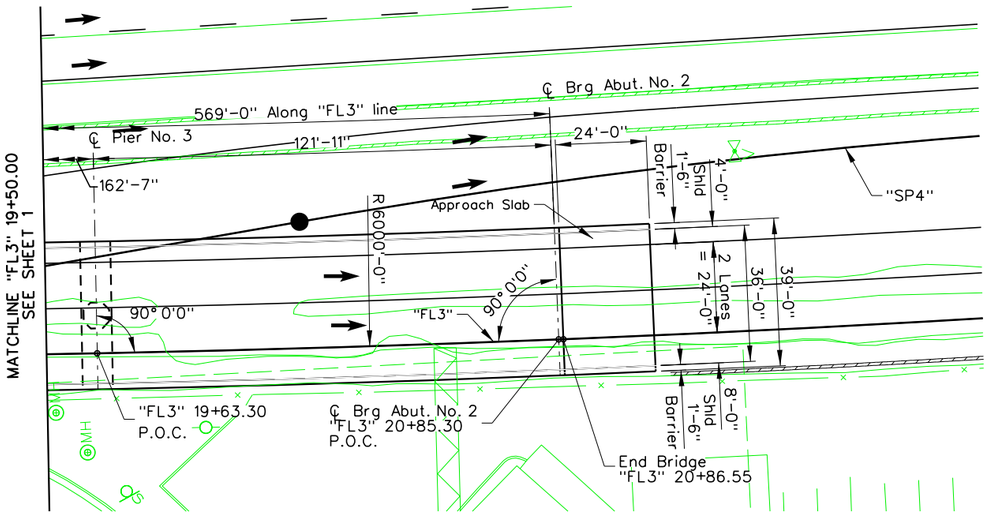
I-15 SB TO FLAMINGO RD
OFF-RAMP SHEET 1 OF 2
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	10

T21S R61E



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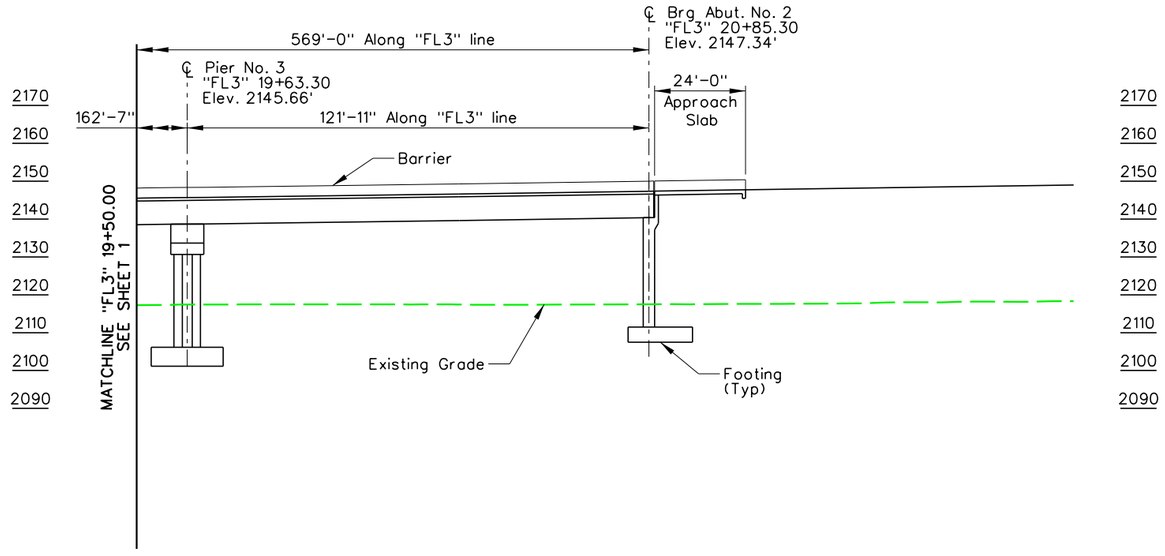


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

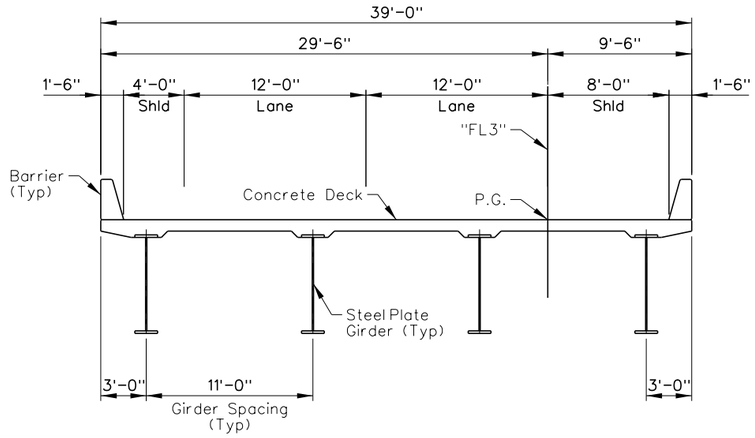
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB TO FLAMINGO RD
OFF-RAMP SHEET 2 OF 2
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	11



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

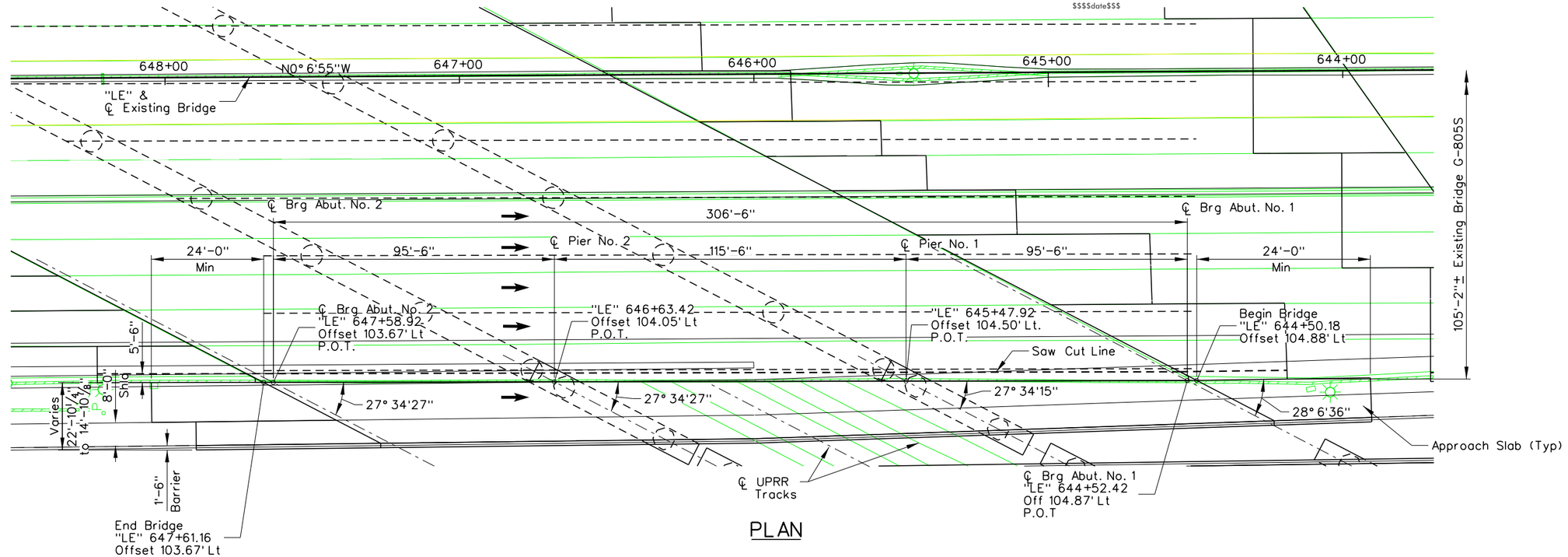
I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

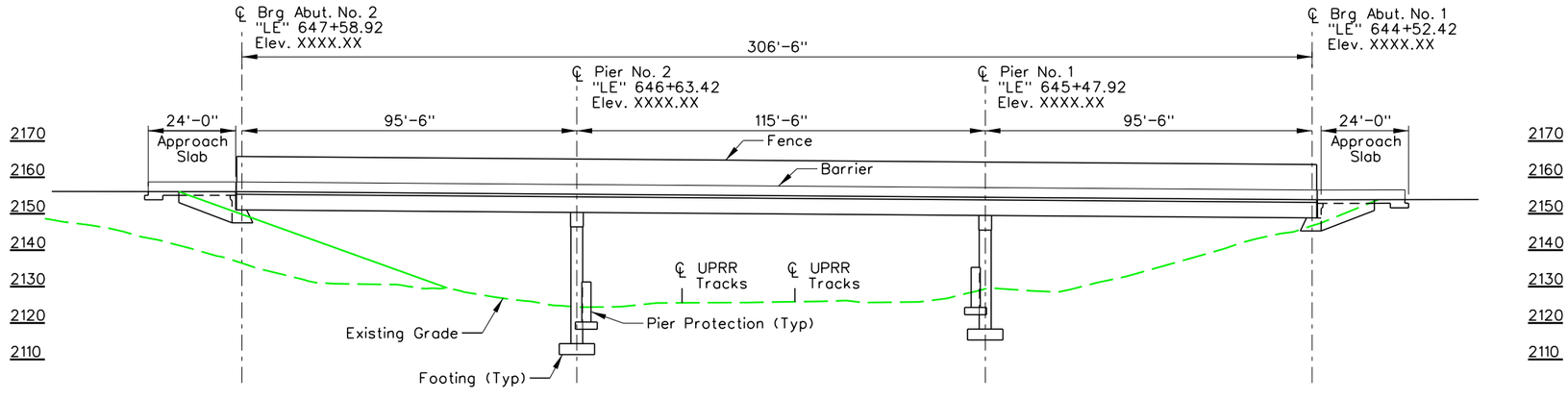
I-15 SB TO FLAMINGO RD
OFF-RAMP
ALTERNATIVE 1 & 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	12

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$



PLAN



ELEVATION

Notes:

1. Elevations and dimensions are taken along edge of existing deck.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

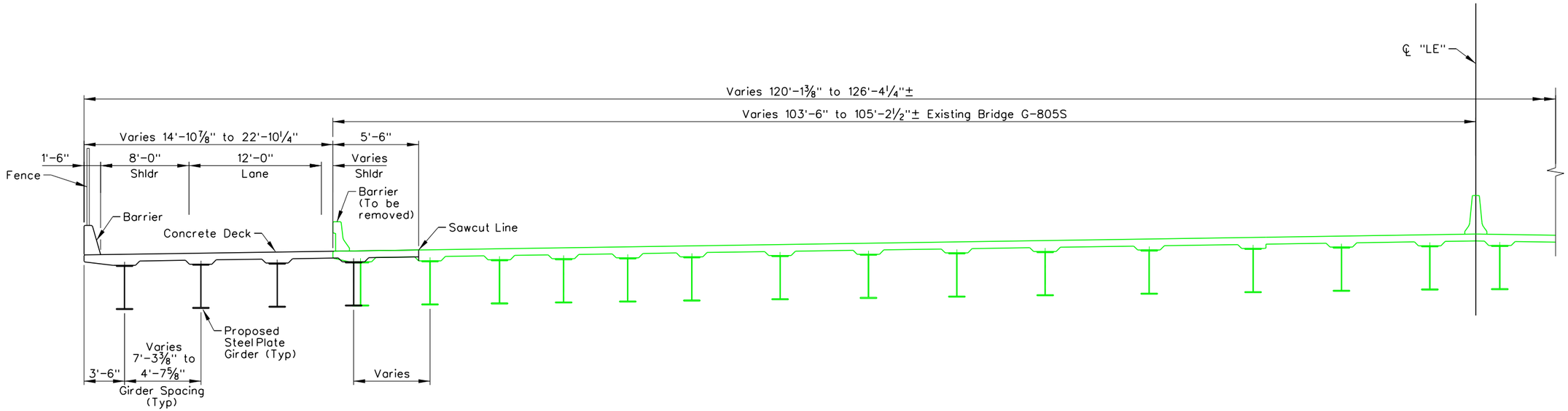
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB OVER UPRR
BRIDGE G-805S WIDENING
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	13



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

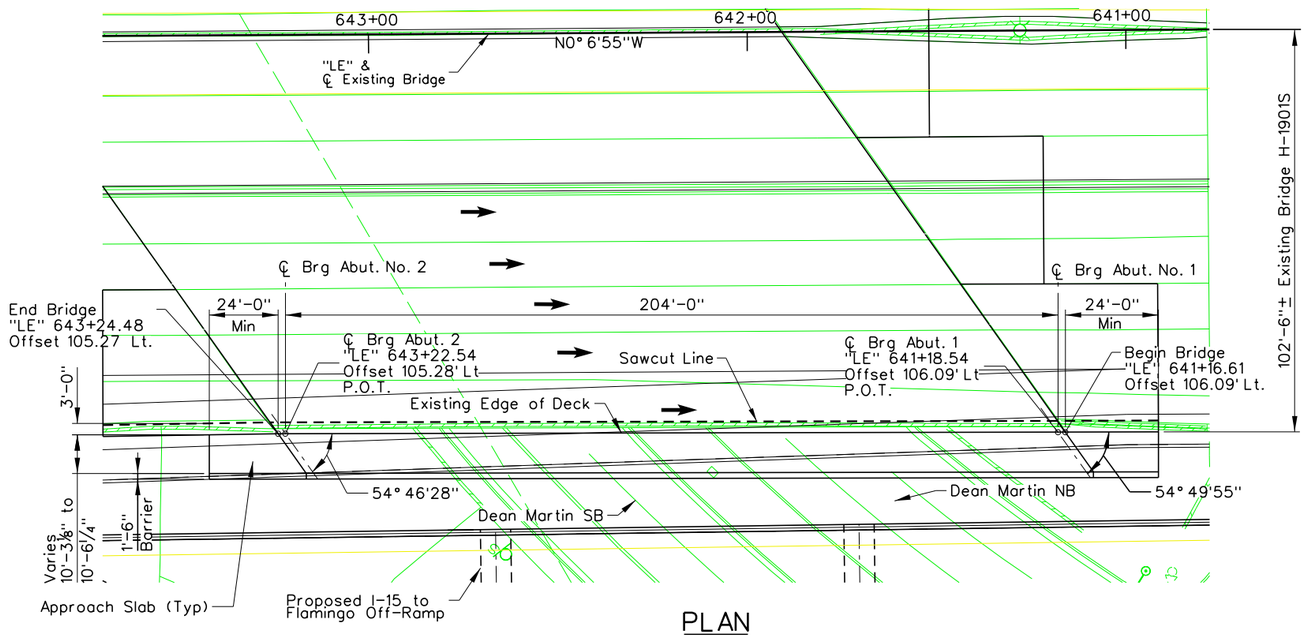
TYPICAL SECTION

I-15 SB OVER UPRR
BRIDGE G-805S WIDENING
ALTERNATIVE 1 & 2

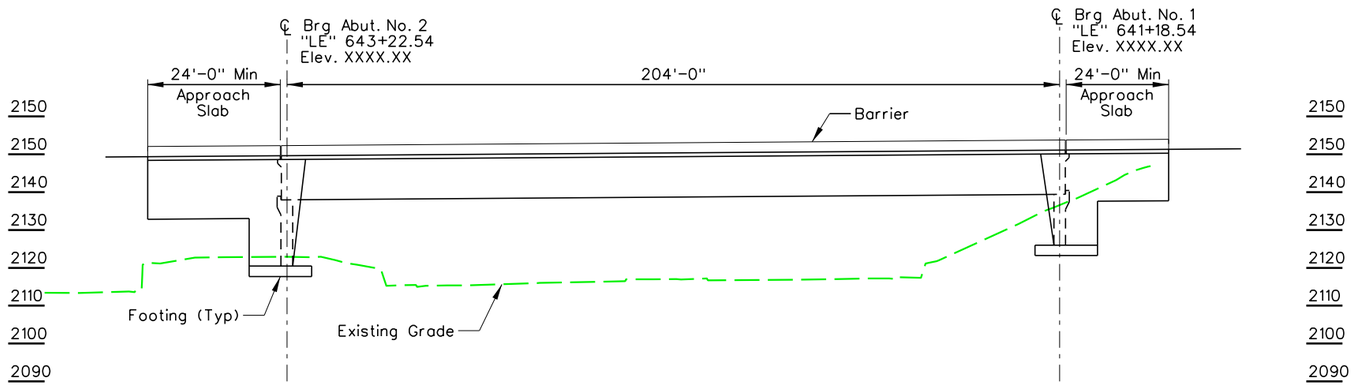
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	14

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



PLAN



ELEVATION

NOTES:

1. Elevations and dimensions are taken along edge of existing deck.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

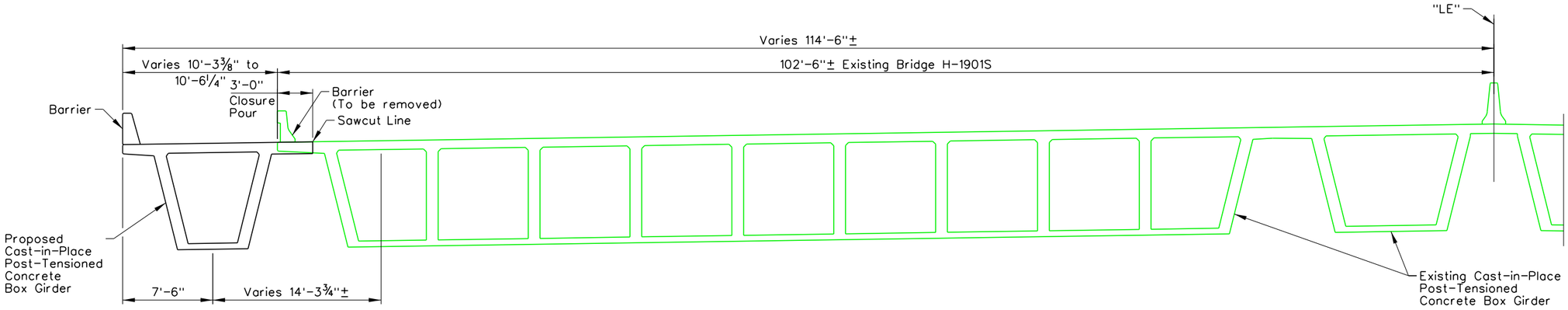
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB OVER DEAN MARTIN DR
BRIDGE H-1901S WIDENING
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	15



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB OVER DEAN MARTIN DR
BRIDGE H-1901S WIDENING
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

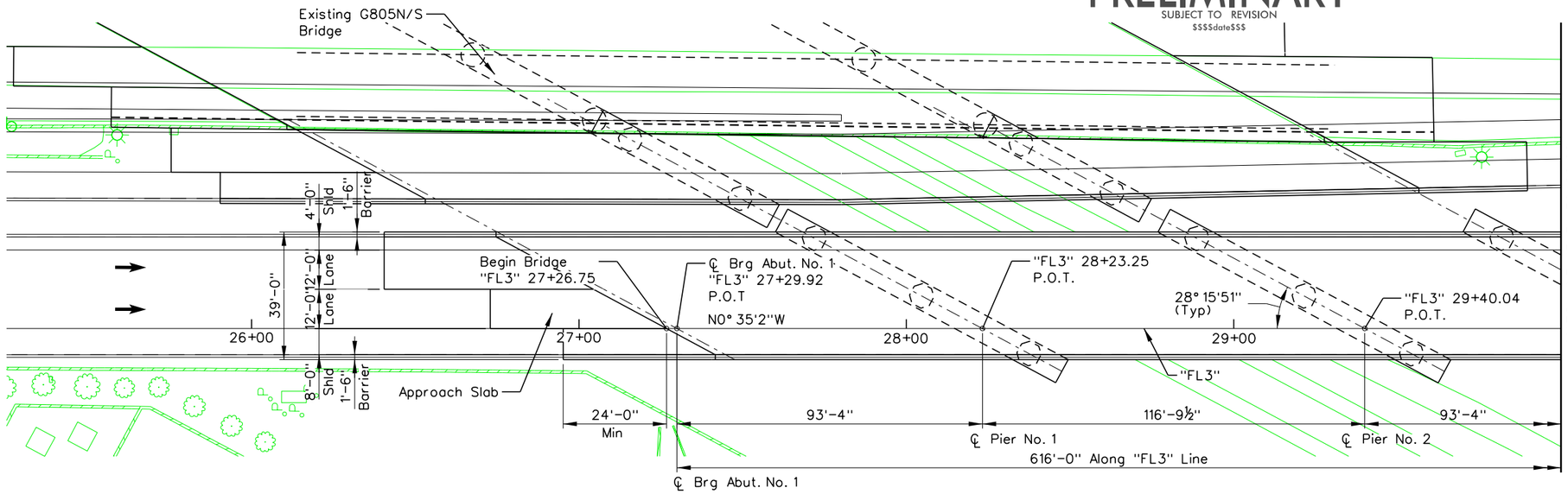
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	16

PRELIMINARY

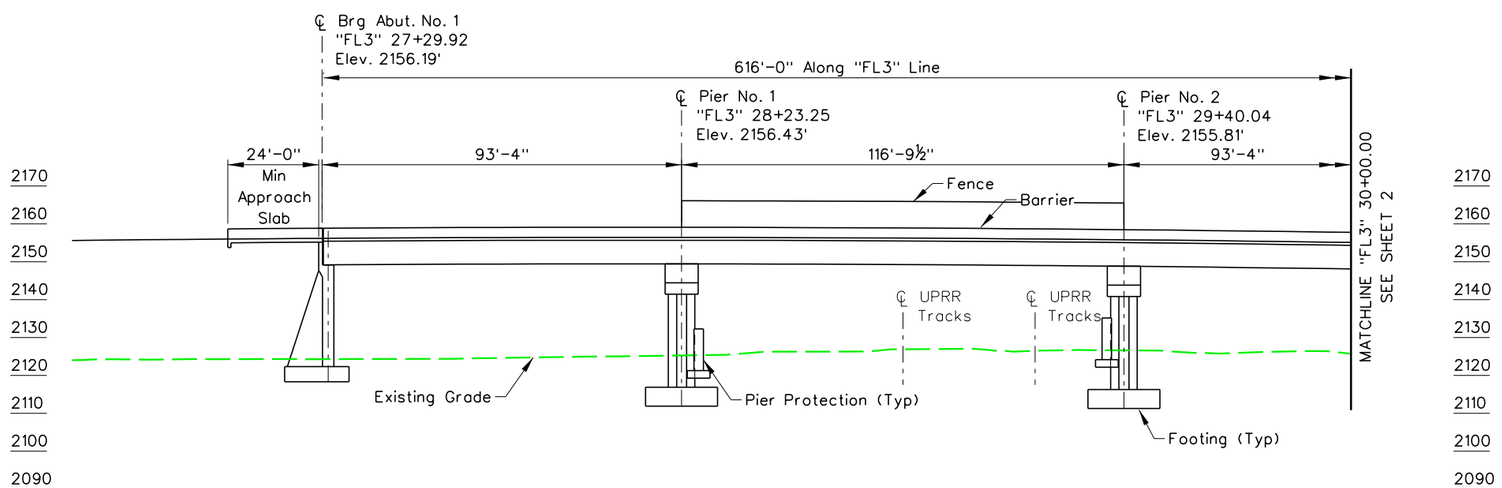
SUBJECT TO REVISION

$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

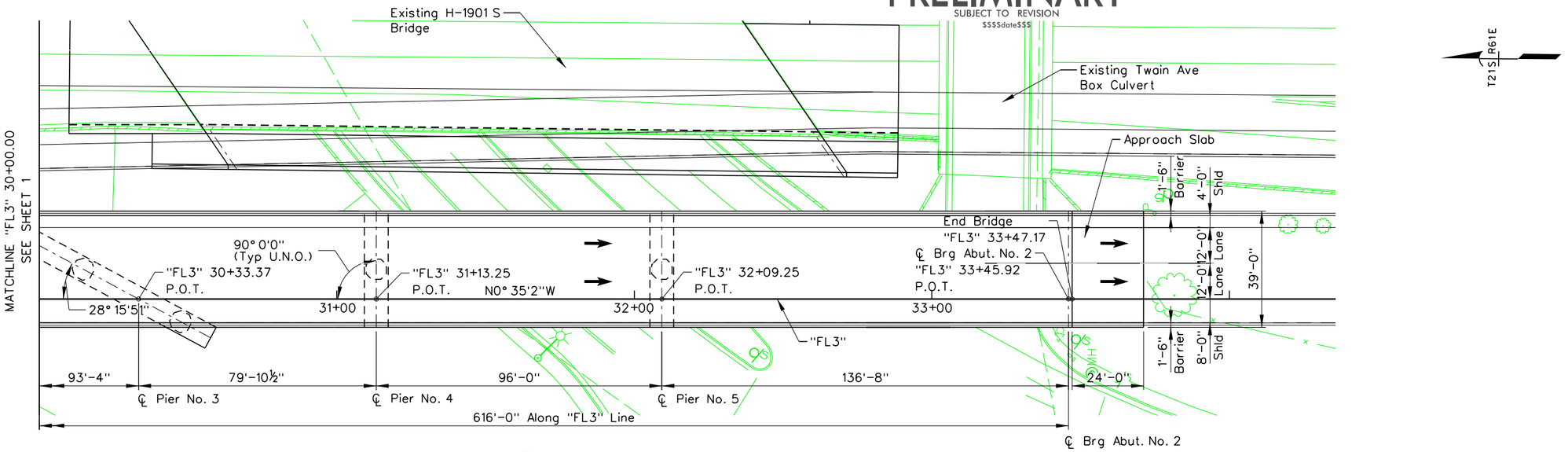
PLAN AND ELEVATION

I-15 SB TO FLAMINGO OVER UPRR/INDUSTRIAL SHEET 1 OF 2 ALTERNATIVE 1 & 2

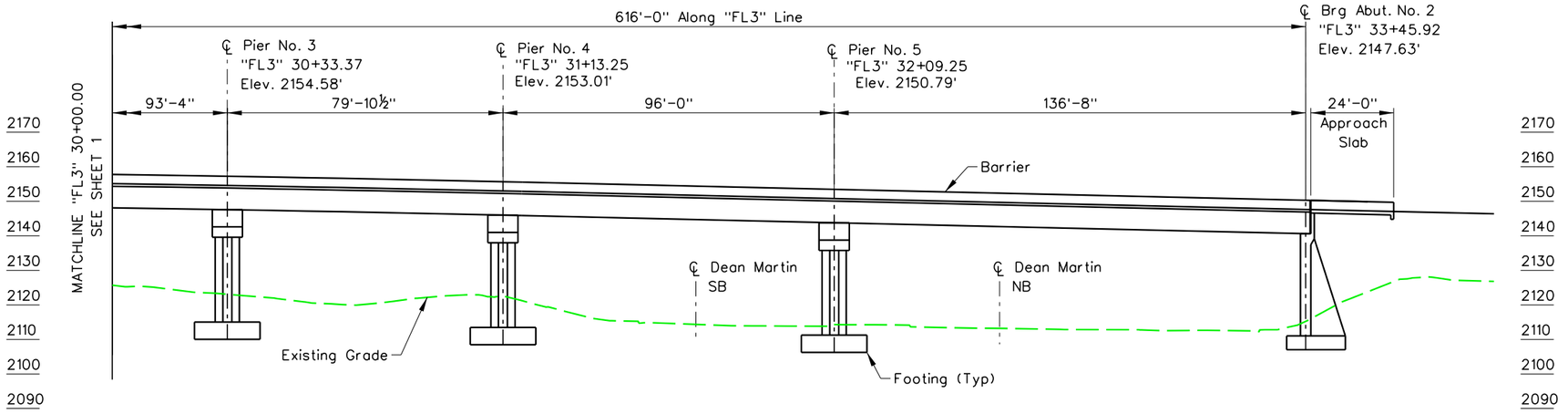
$$$$scale$$$ PLOT SCALE $$$$username$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	17

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

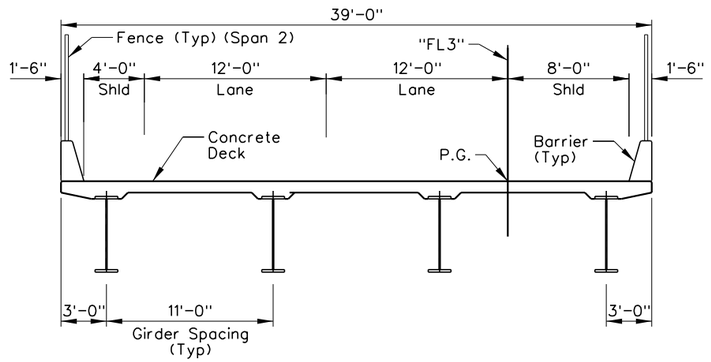
PLAN AND ELEVATION

I-15 SB TO FLAMINGO OVER UPRR/INDUSTRIAL SHEET 2 OF 2
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	18



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

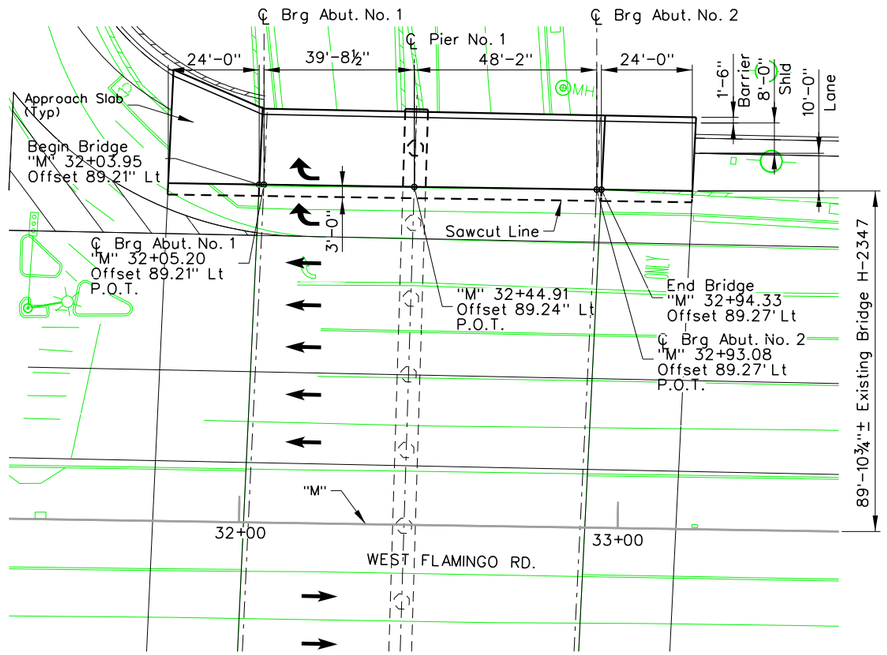
I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

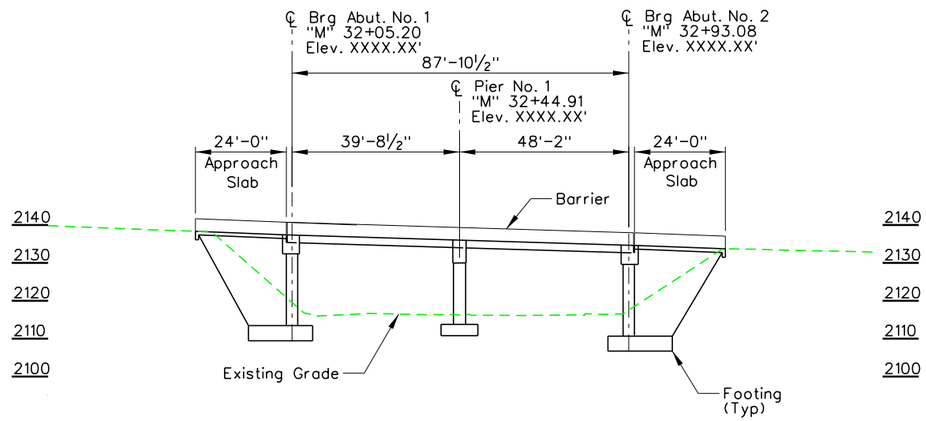
I-15 SB TO FLAMINGO OVER UPRR/INDUSTRIAL
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(175)	CLARK	19



PLAN



ELEVATION

Notes:

1. Elevations and dimensions are taken along edge of existing deck.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

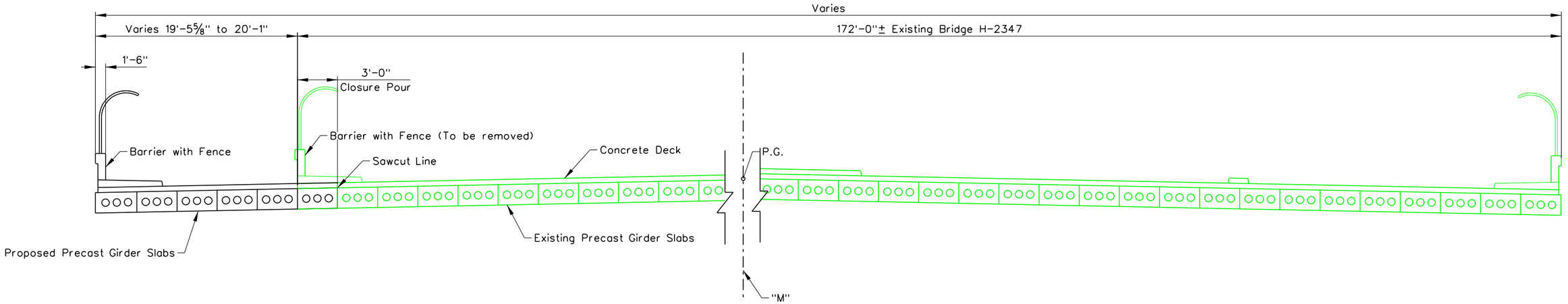
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

FLAMINGO ROAD OVER FRANK SINATRA DR
BRIDGE H-2347 WIDENING
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	20



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

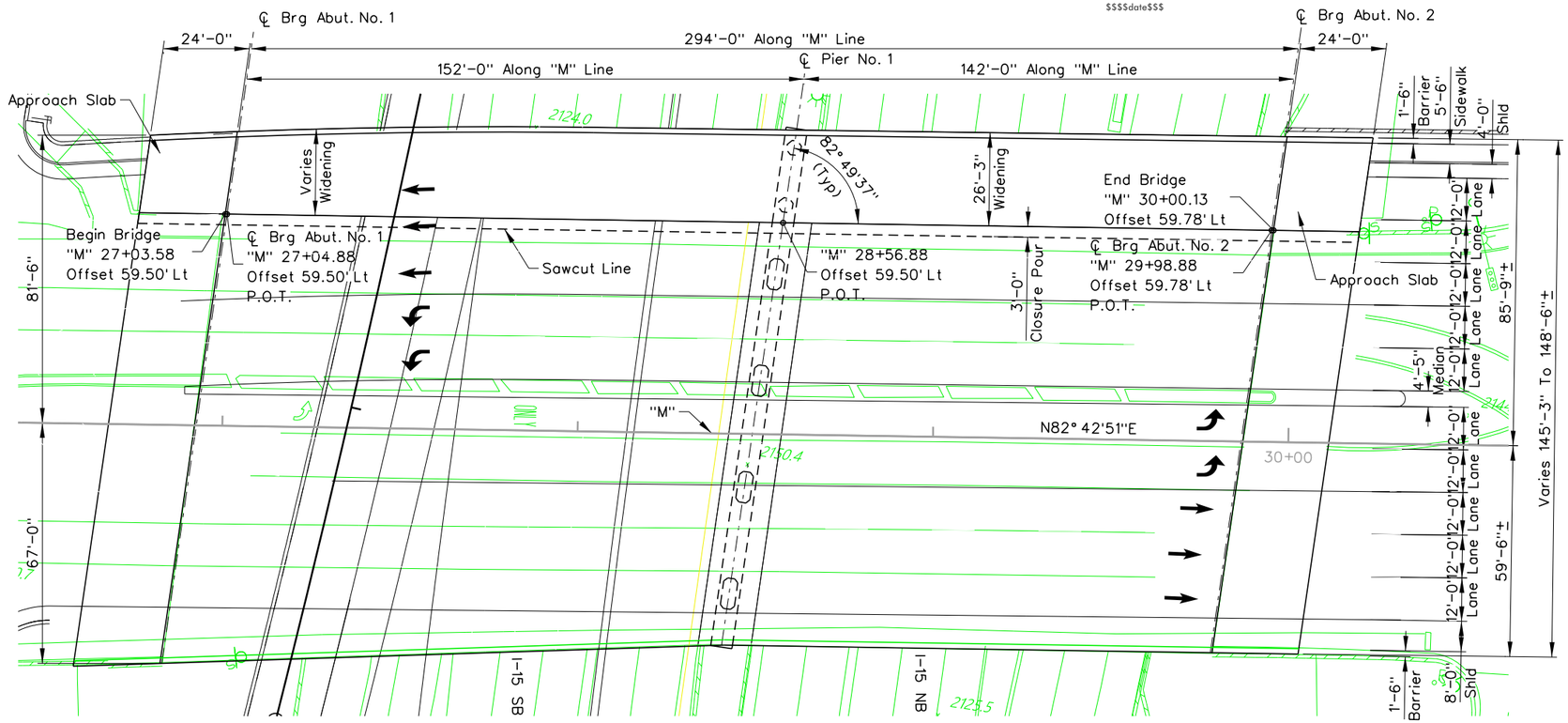
FLAMINGO RD OVER FRANK SINATRA DR
BRIDGE H- 2347 WIDENING
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

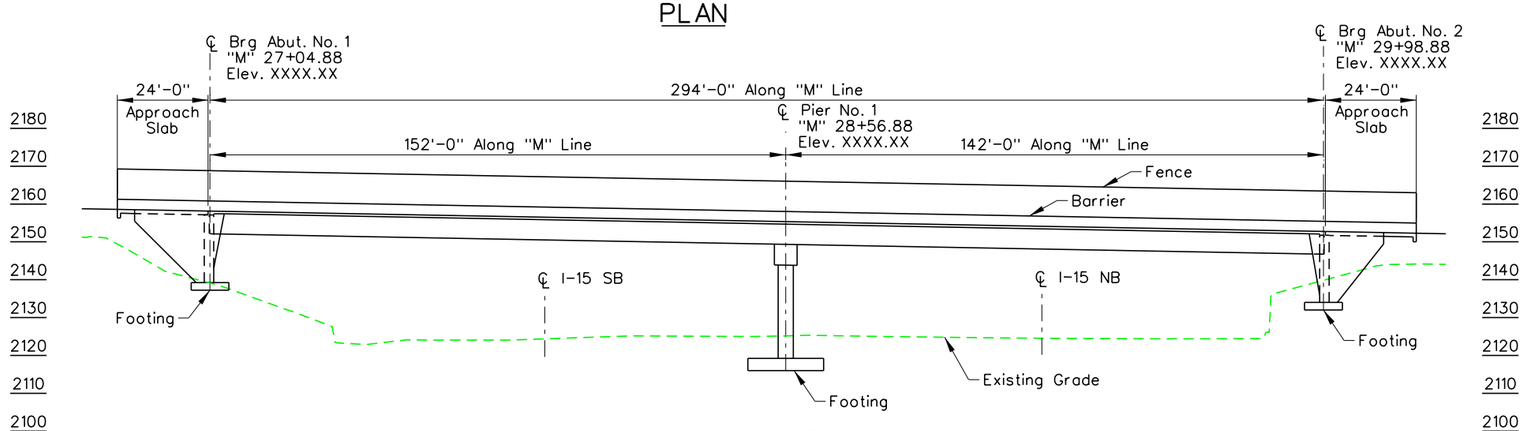
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(175)	CLARK	21

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

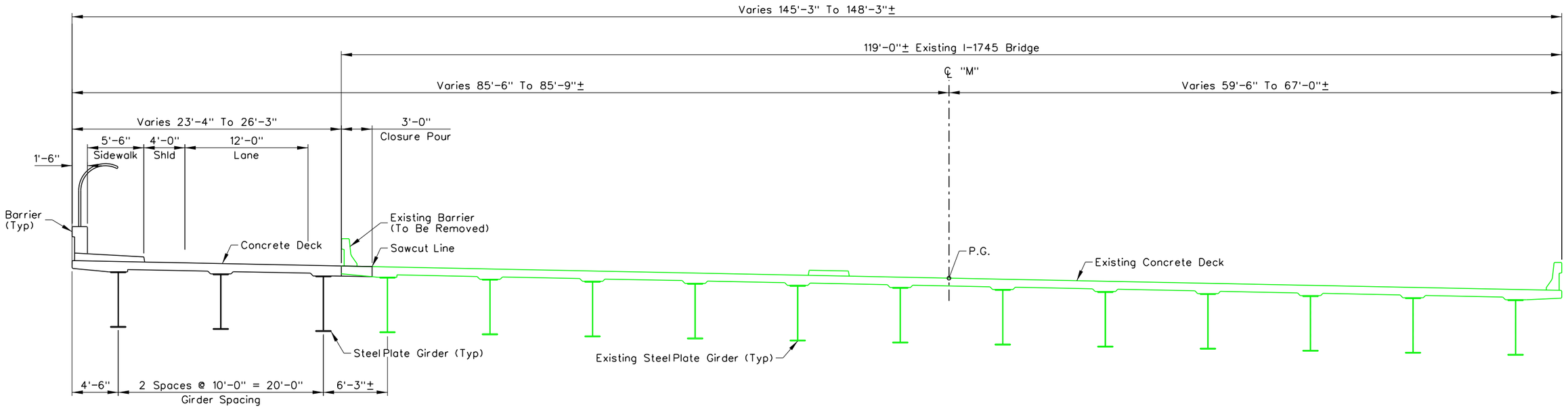
PLAN AND ELEVATION

FLAMINGO RD OVER I-15
BRIDGE I-1745 WIDENING
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(175)	CLARK	22



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

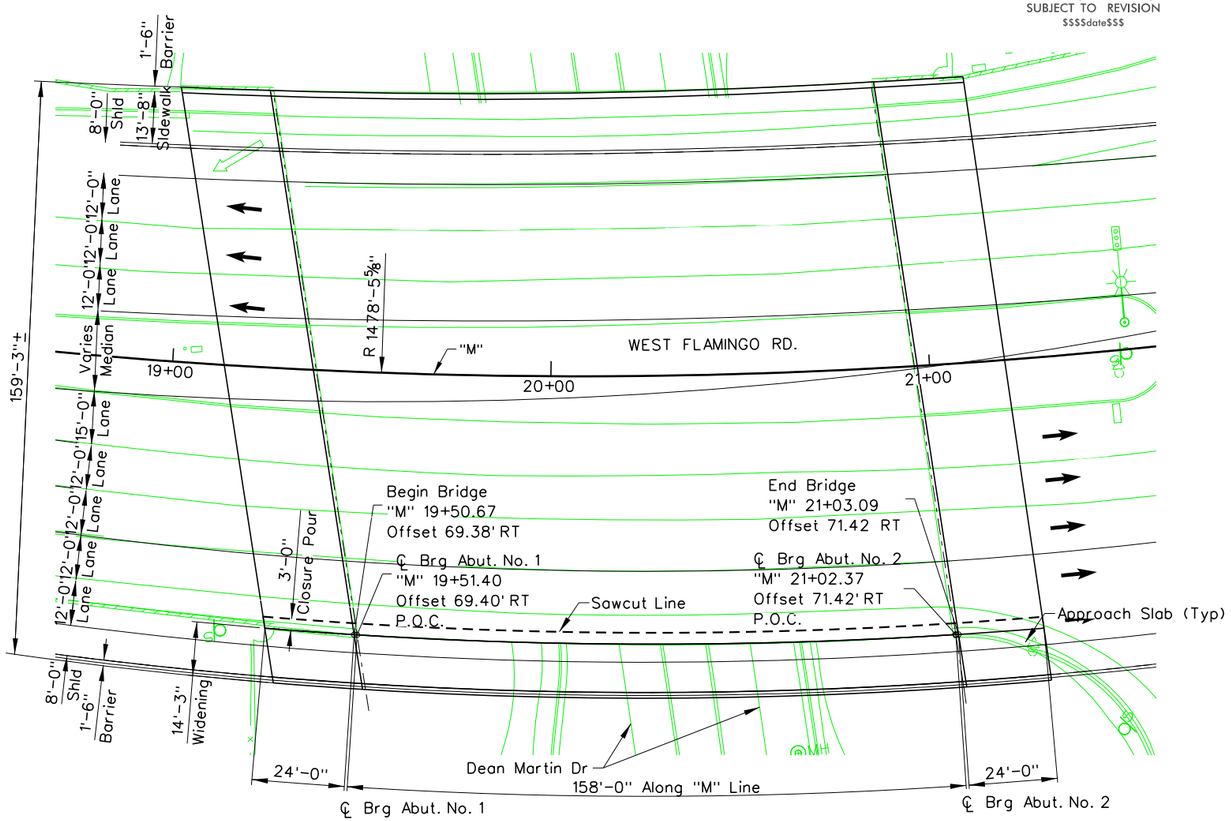
TYPICAL SECTION

FLAMINGO ROAD OVER I-15
BRIDGE I-1745 WIDENING
ALTERNATIVE 1 & 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	23

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



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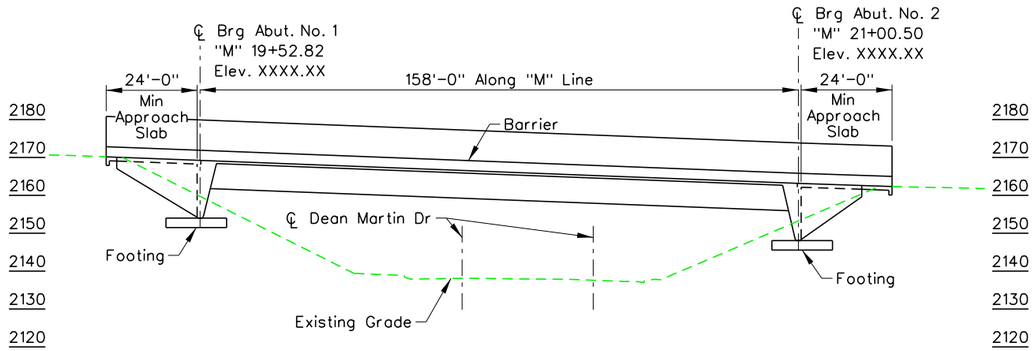


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

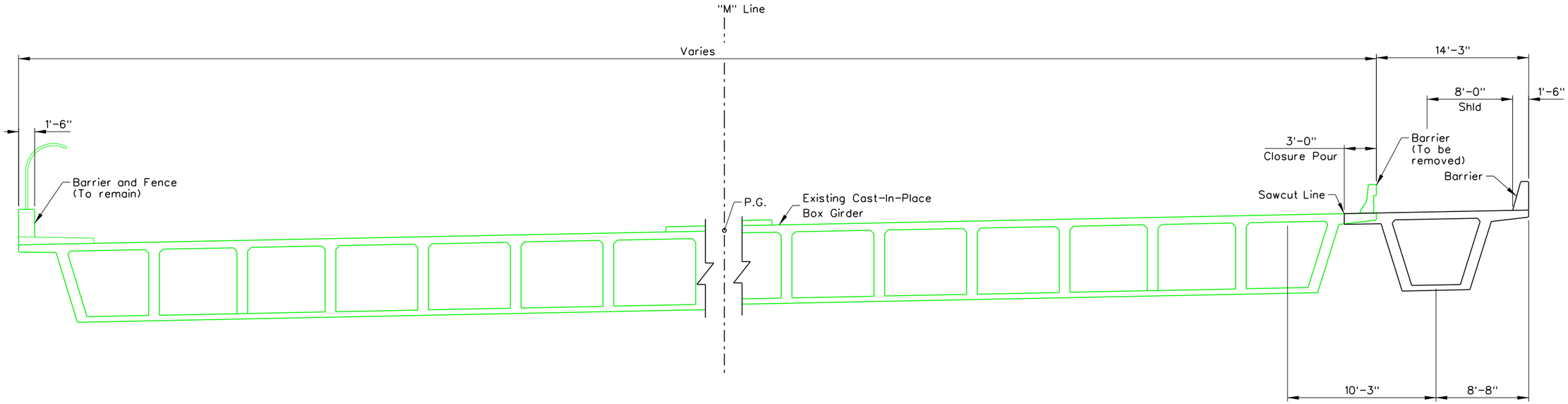
PLAN AND ELEVATION

FLAMINGO ROAD OVER DEAN MARTIN DR
BRIDGE H-1744 WIDENING
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	24



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

FLAMINGO ROAD OVER DEAN MARTIN DR
BRIDGE H-1744 WIDENING
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

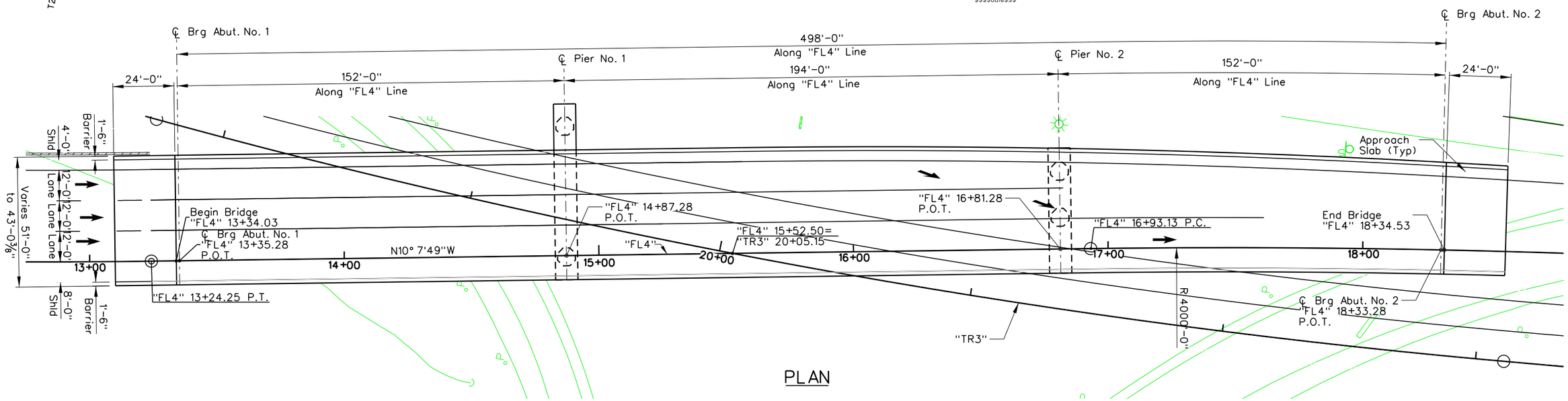
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(175)	CLARK	25

PRELIMINARY

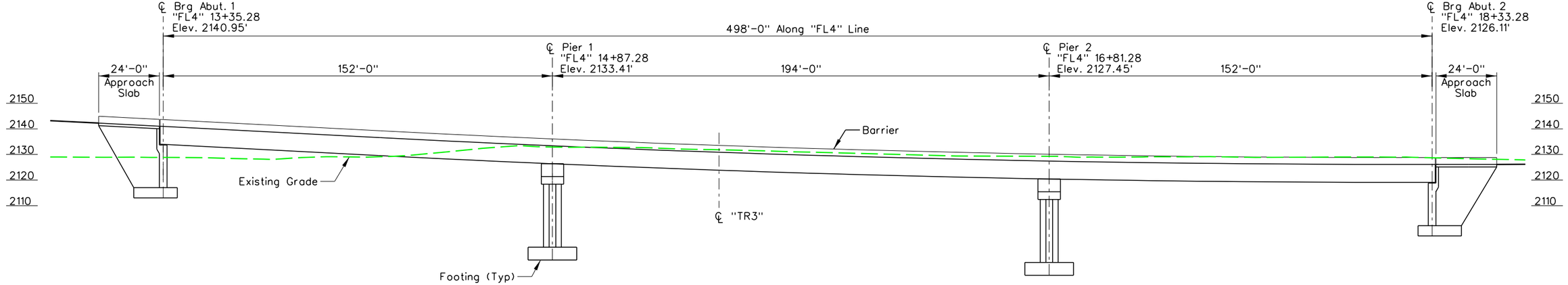
SUBJECT TO REVISION

$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

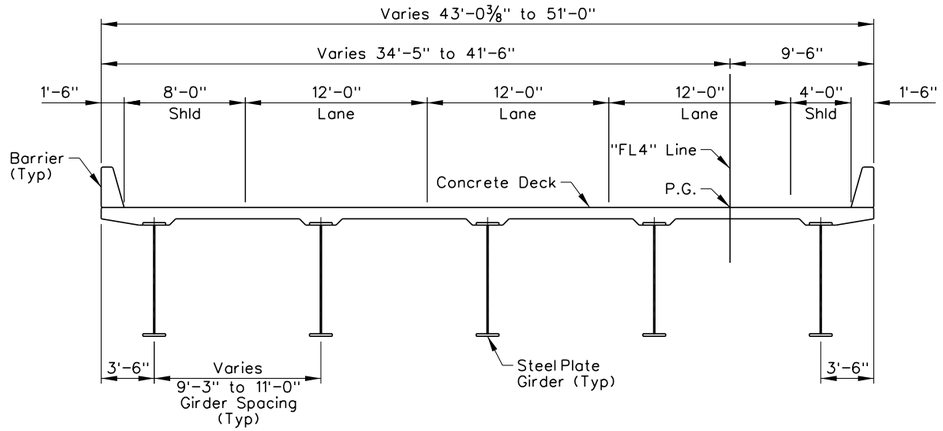
PLAN AND ELEVATION

FLAMINGO RD TO I-15 SB ON-RAMP
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(175)	CLARK	26



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

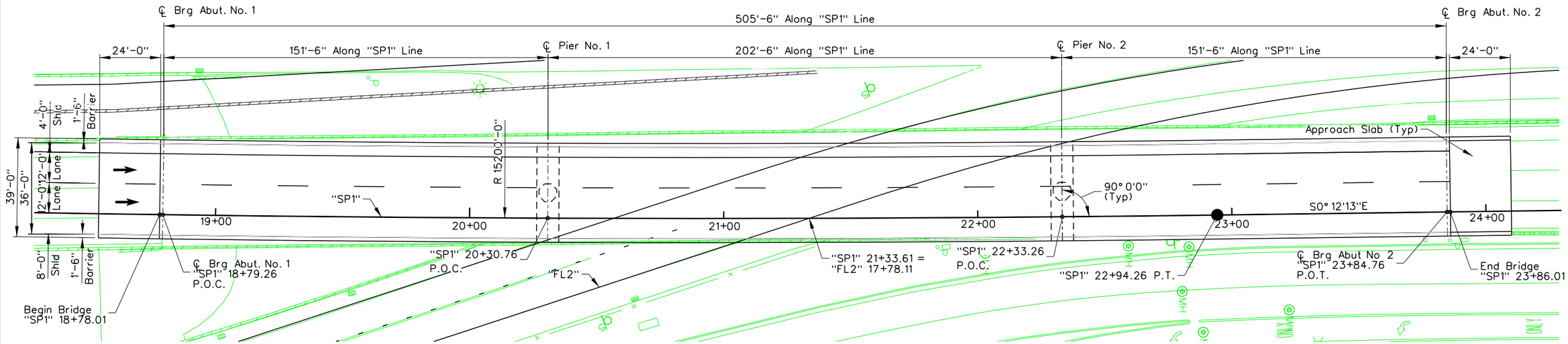
FLAMINGO ROAD TO I-15 SB ON-RAMP
ALTERNATIVE 1 & 2

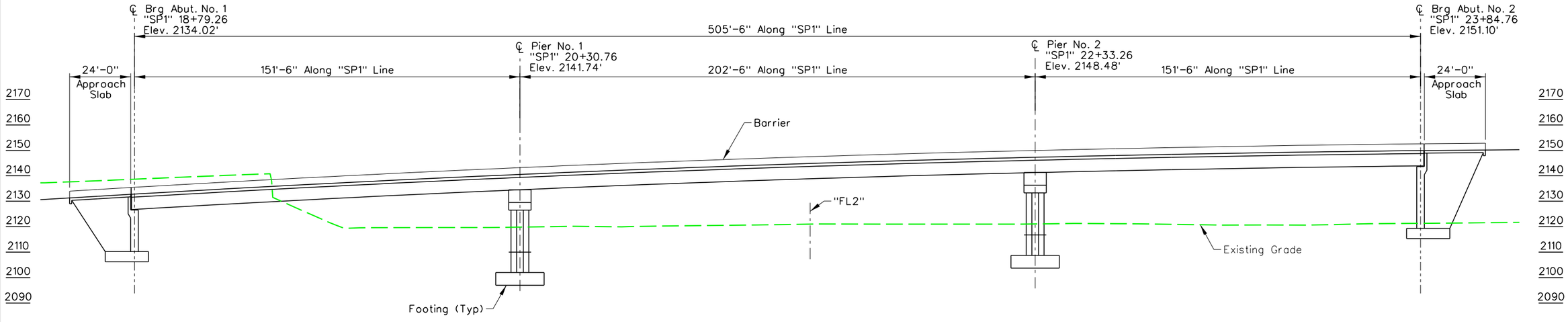
$$$$dgnspec$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	27

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E





STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

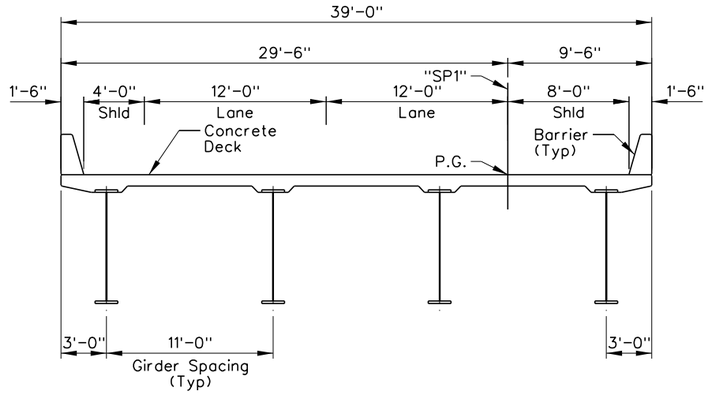
PLAN AND ELEVATION

I-15 NB TO SPRING MTN RD
OFF-RAMP
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	28



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

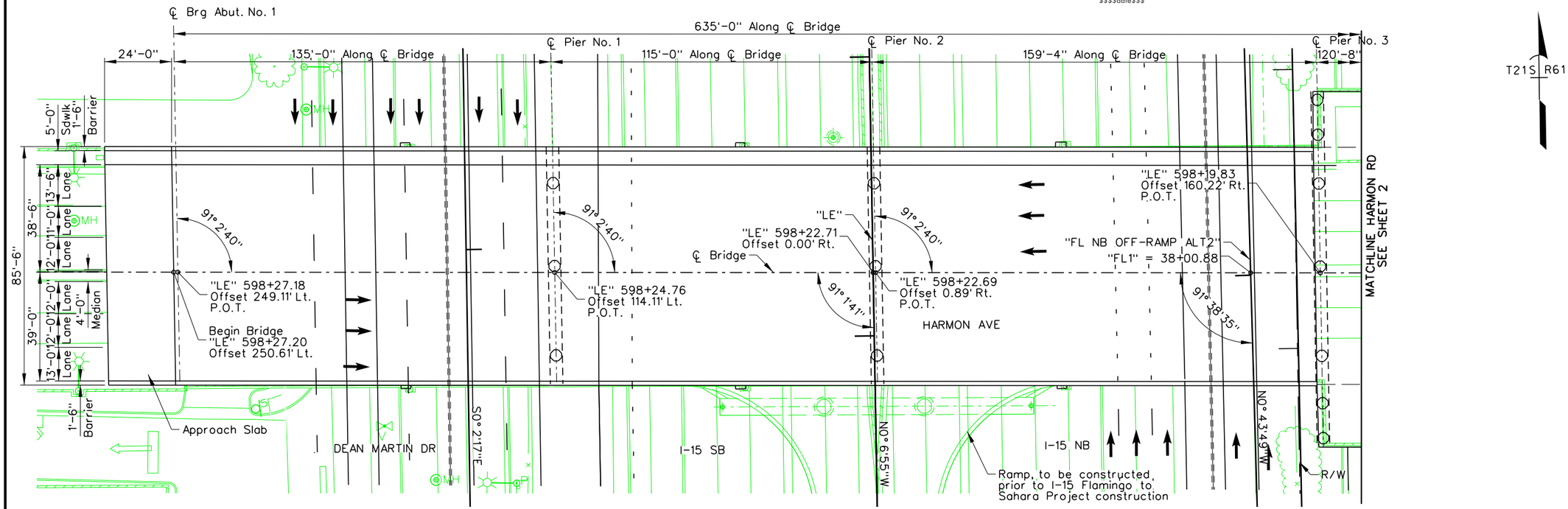
I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

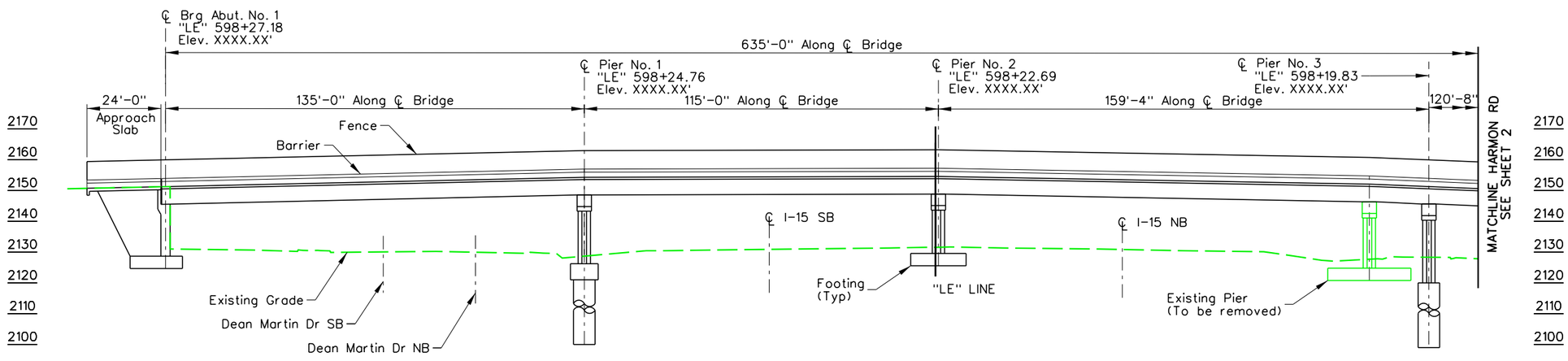
I-15 NB TO SPRING MTN RD
OFF-RAMP
ALTERNATIVE 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	29

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

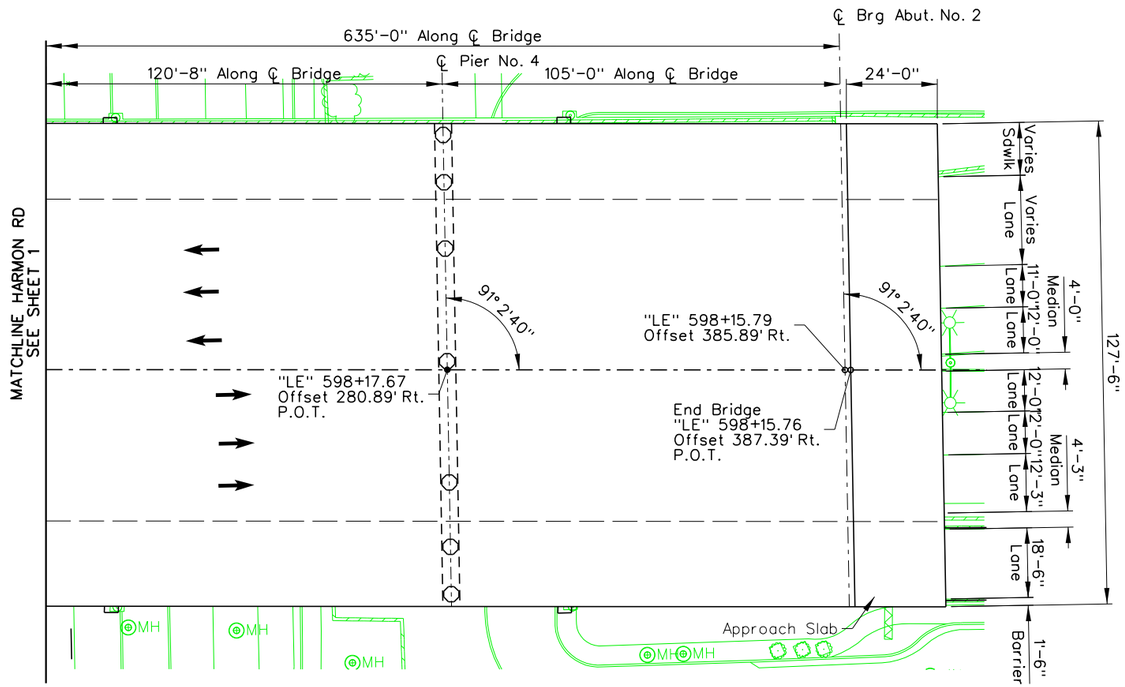
PLAN AND ELEVATION

HARMON AVE OVER I-15
SHEET 1 OF 2
ALTERNATIVE 2

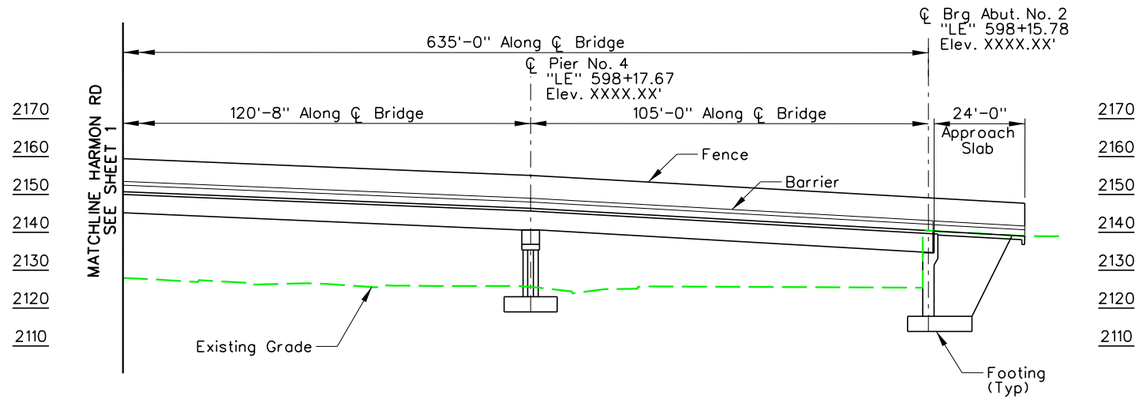
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	30

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

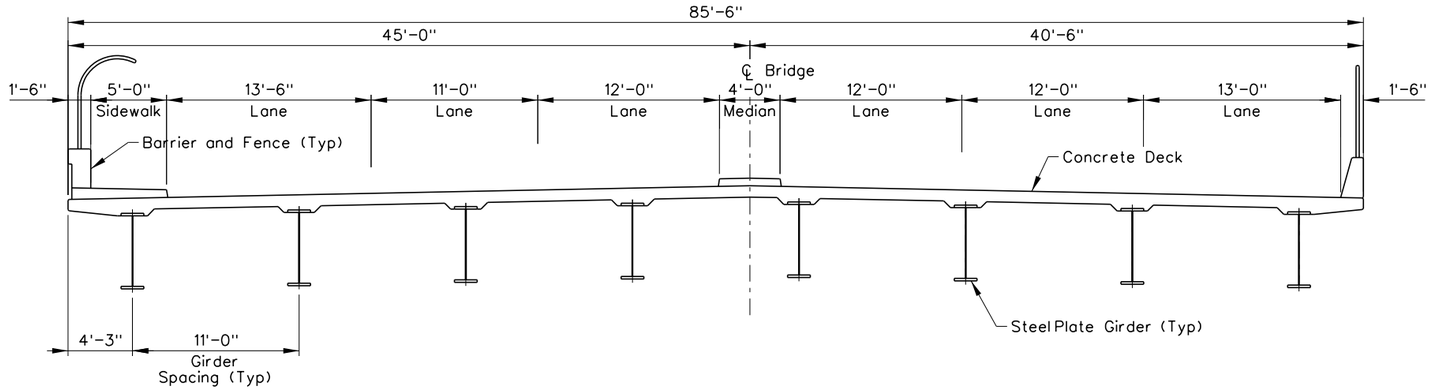
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

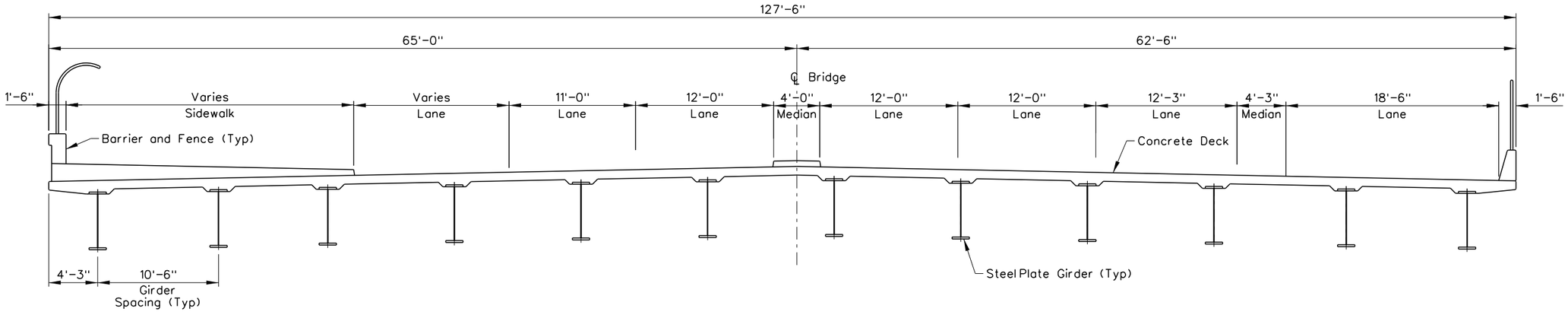
HARMON AVE OVER I-15
SHEET 2 OF 2
ALTERNATIVE 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	31

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$



TYPICAL SECTION
Spans 1 – 4



TYPICAL SECTION
Spans 5 & 6

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

HARMON AVE OVER I-15

ALTERNATIVE 2

$$$$dgnspec$$$

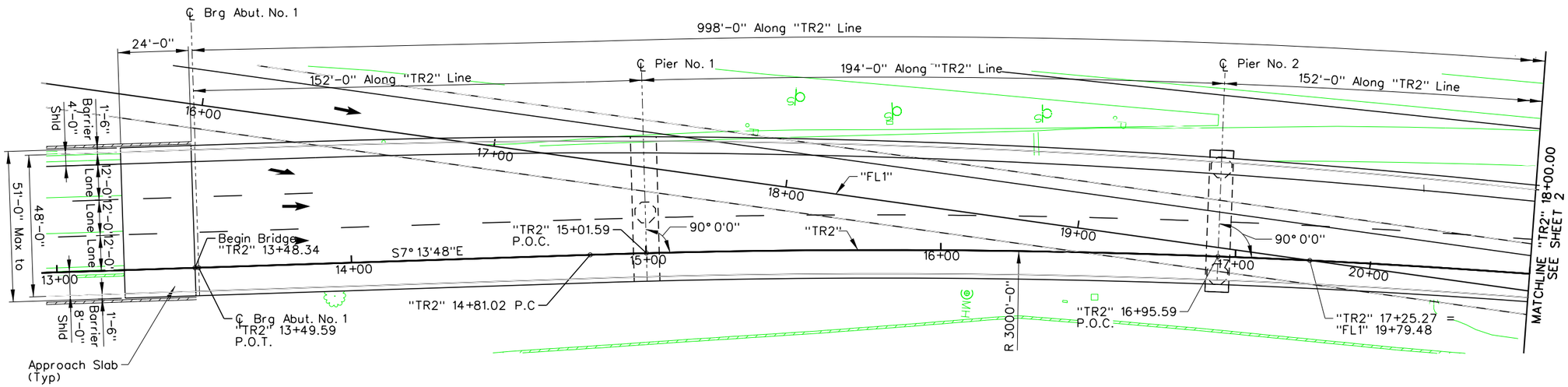
PRELIMINARY

SUBJECT TO REVISION

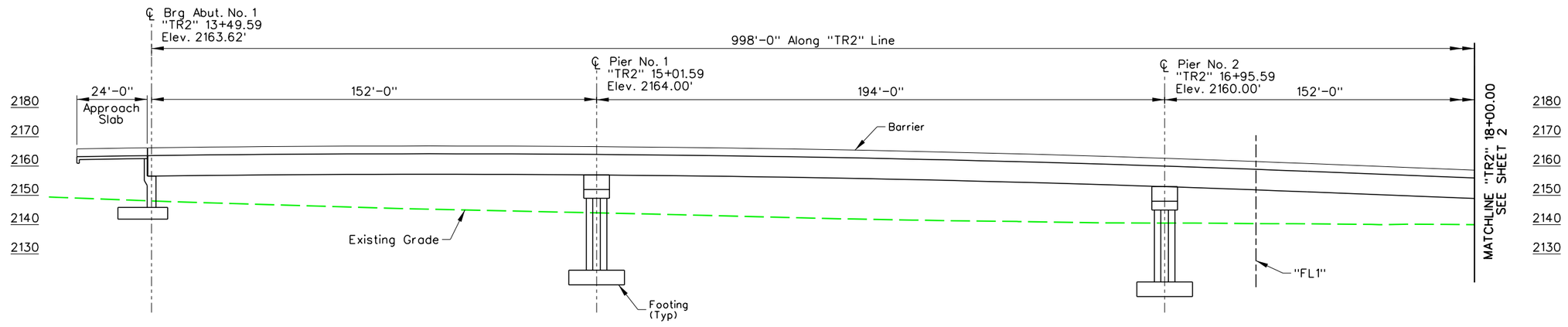
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	32

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

TROPICANA AVE TO I-15 NB ON-RAMP
SHEET 1 OF 2
ALTERNATIVE 2

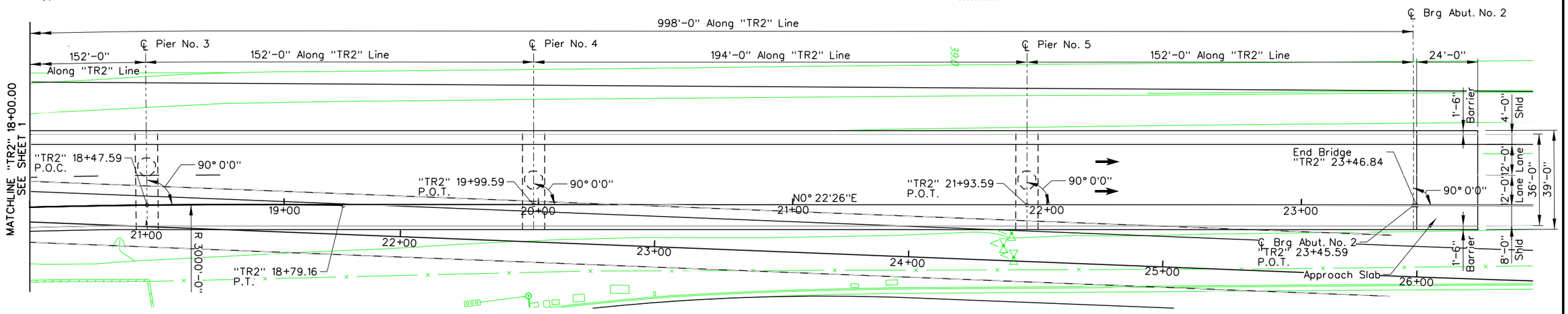
$$$$scale$$$ PLOT SCALE $$$$username$$$

$$$$dgnspec$$$

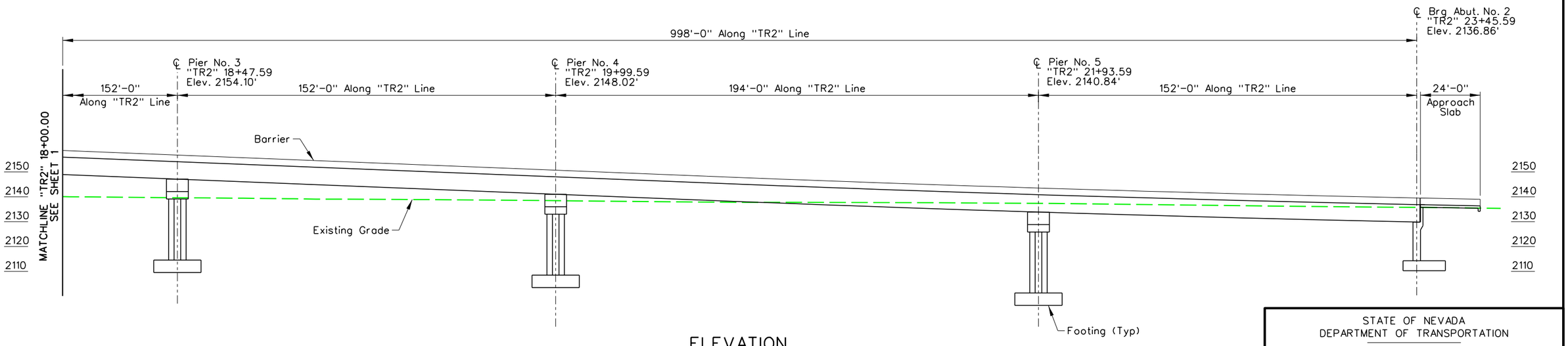
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	33

T21S R61E

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

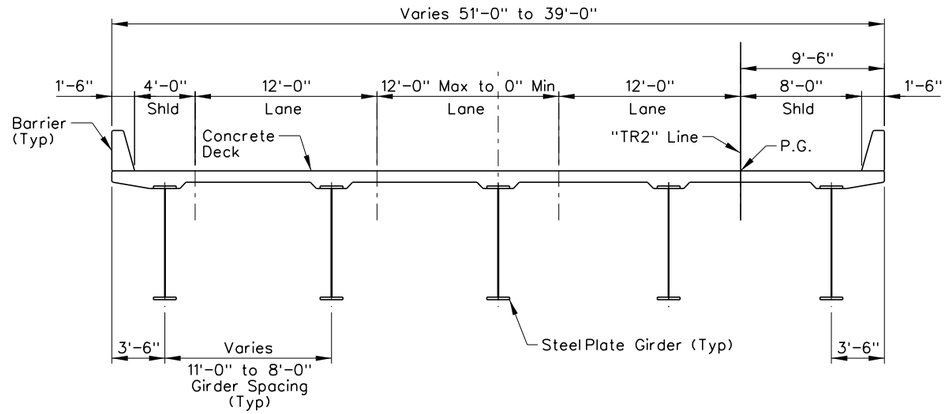
PLAN AND ELEVATION

TROPICANA AVE TO I-15 NB ON-RAMP
SHEET 2 OF 2
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	34



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

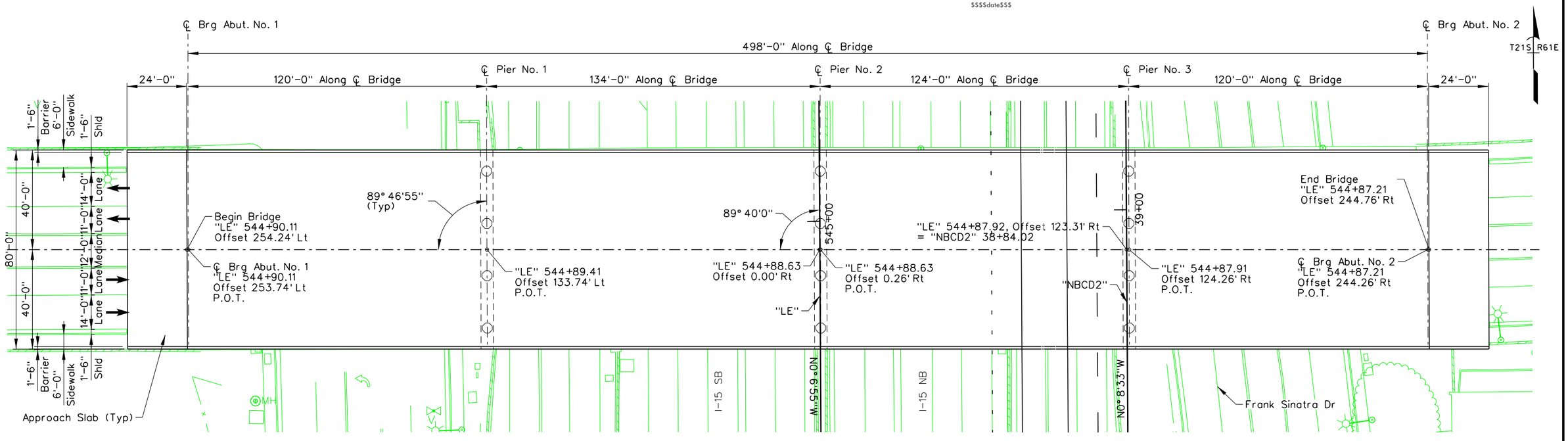
TYPICAL SECTION

TROPICANA AVE TO I-15 NB ON-RMP
ALTERNATIVE 2

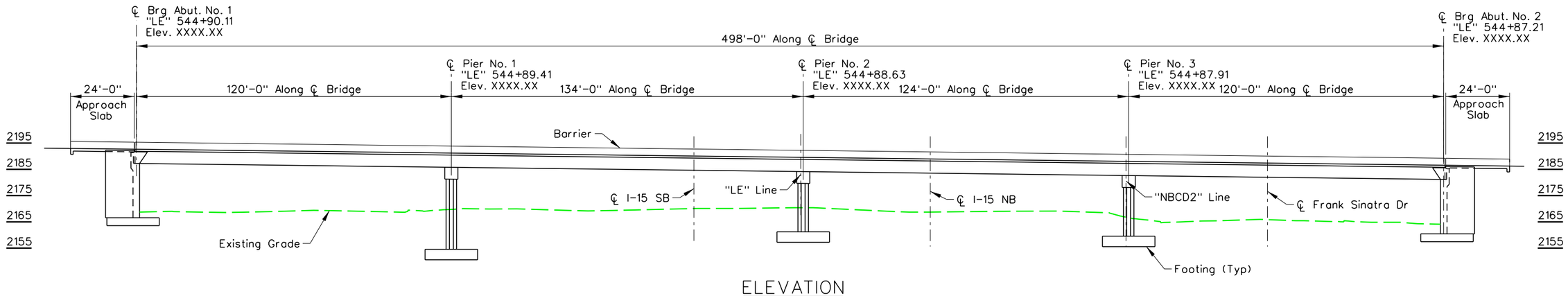
$$$$dgnspec$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	35

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

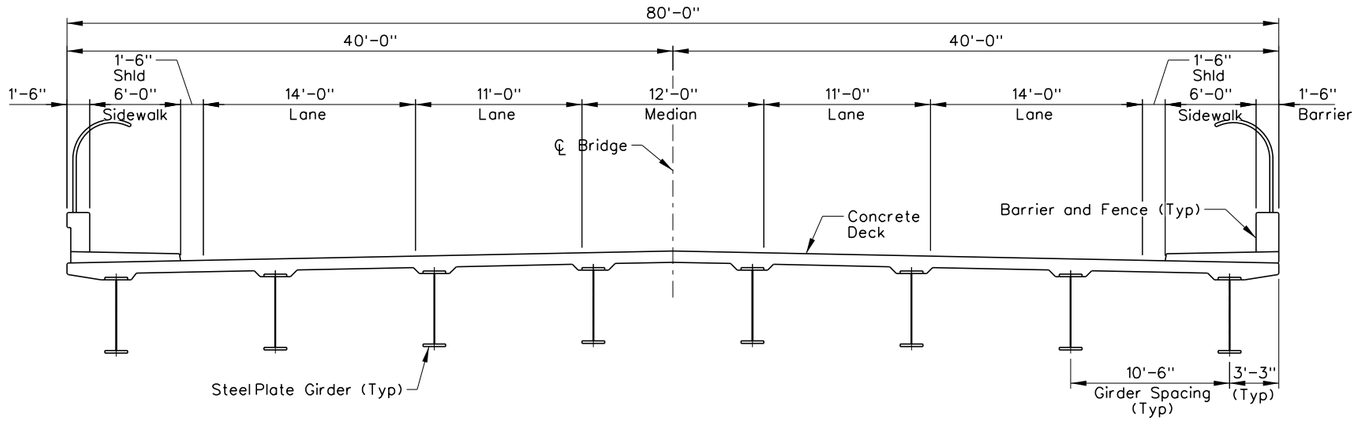
PLAN AND ELEVATION

HACIENDA OVER I-15
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	36



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

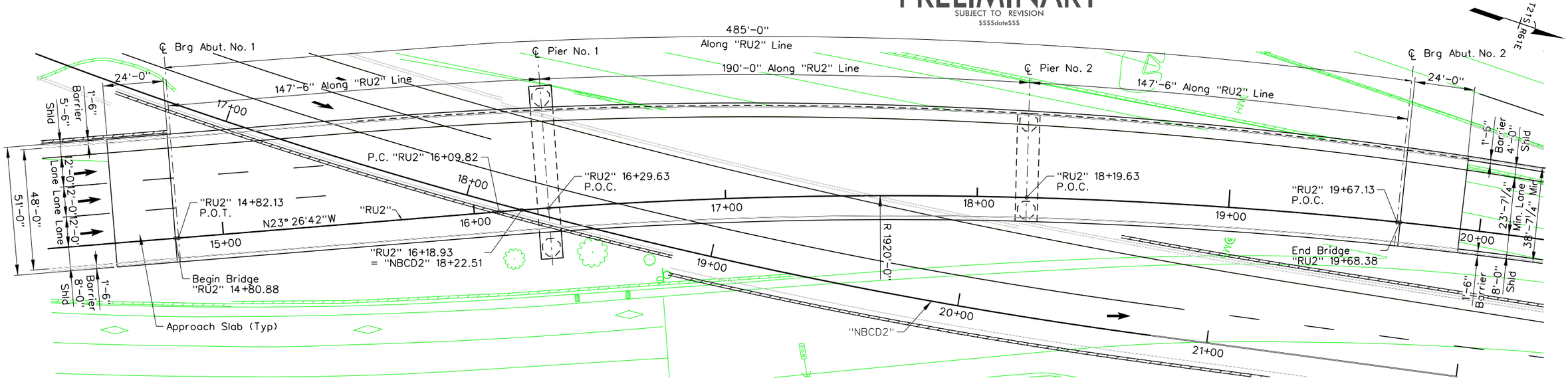
HACIENDA OVER I-15

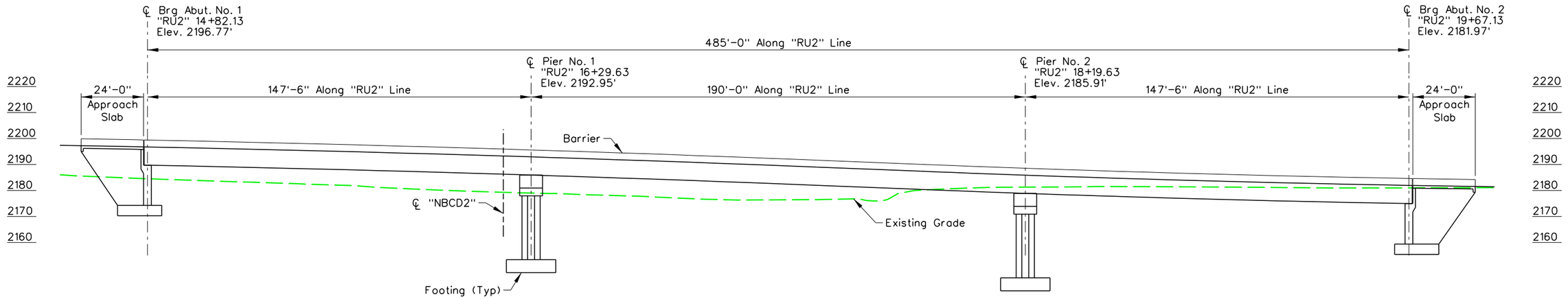
ALTERNATIVE 2

$$$$dgnspec$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	37

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$





STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

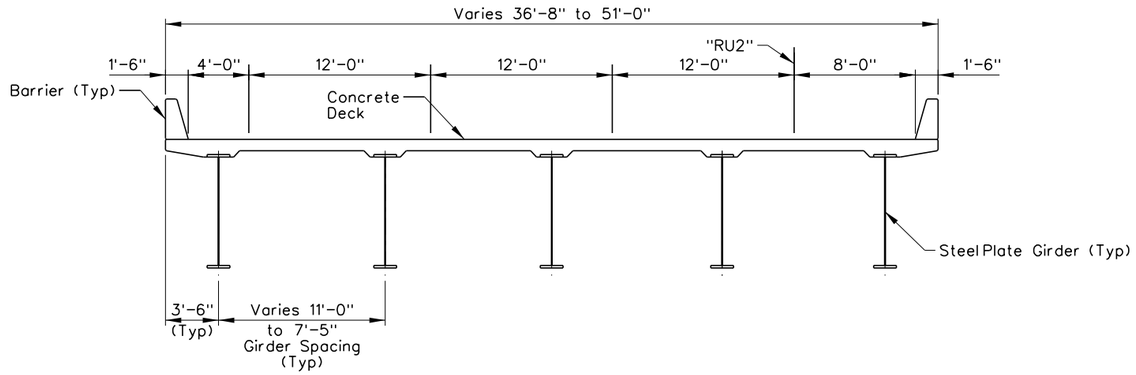
PLAN AND ELEVATION

RUSSELL RD TO I-15 NB ON-RAMP
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	38



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

RUSSEL RD TO I-15 NB ON RAMP

ALTERNATIVE 2

Appendix B: Conceptual Bridge Plans – Alternative 1 Shift and Alternative 2 Shift

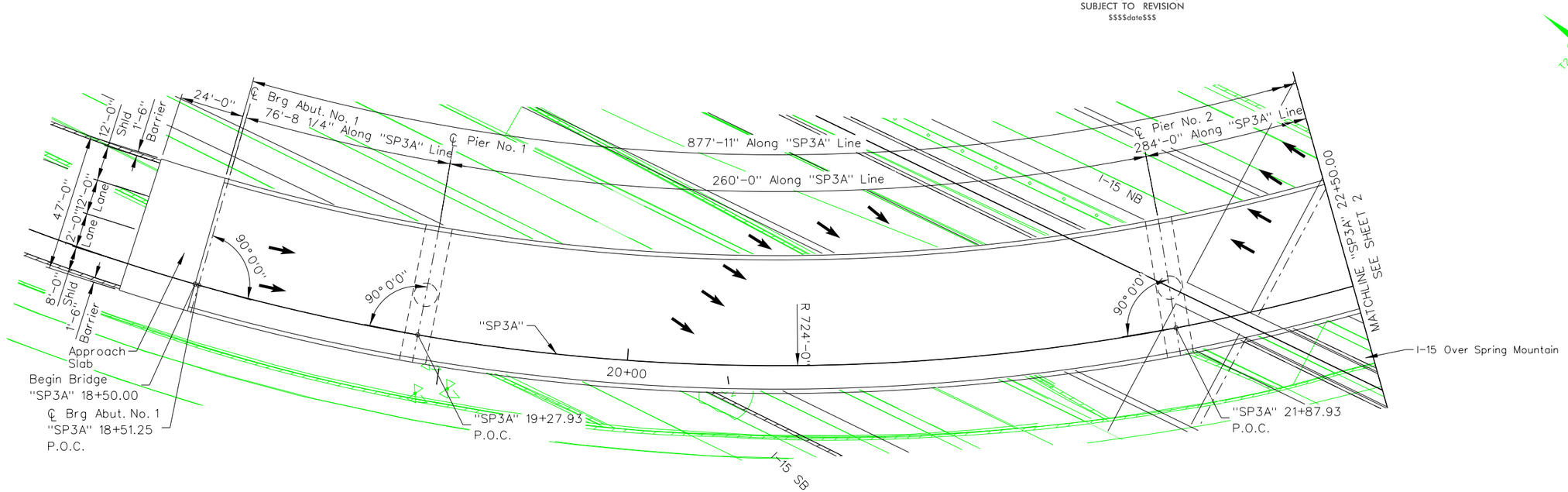
$$$$dgnspec$$$

PRELIMINARY

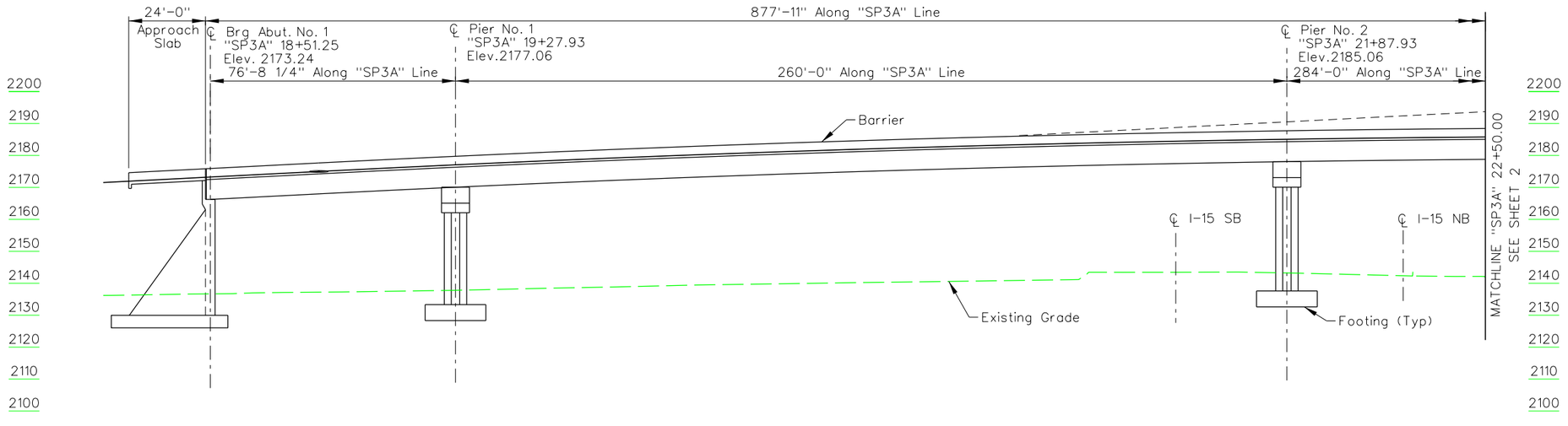
SUBJECT TO REVISION

$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	1



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

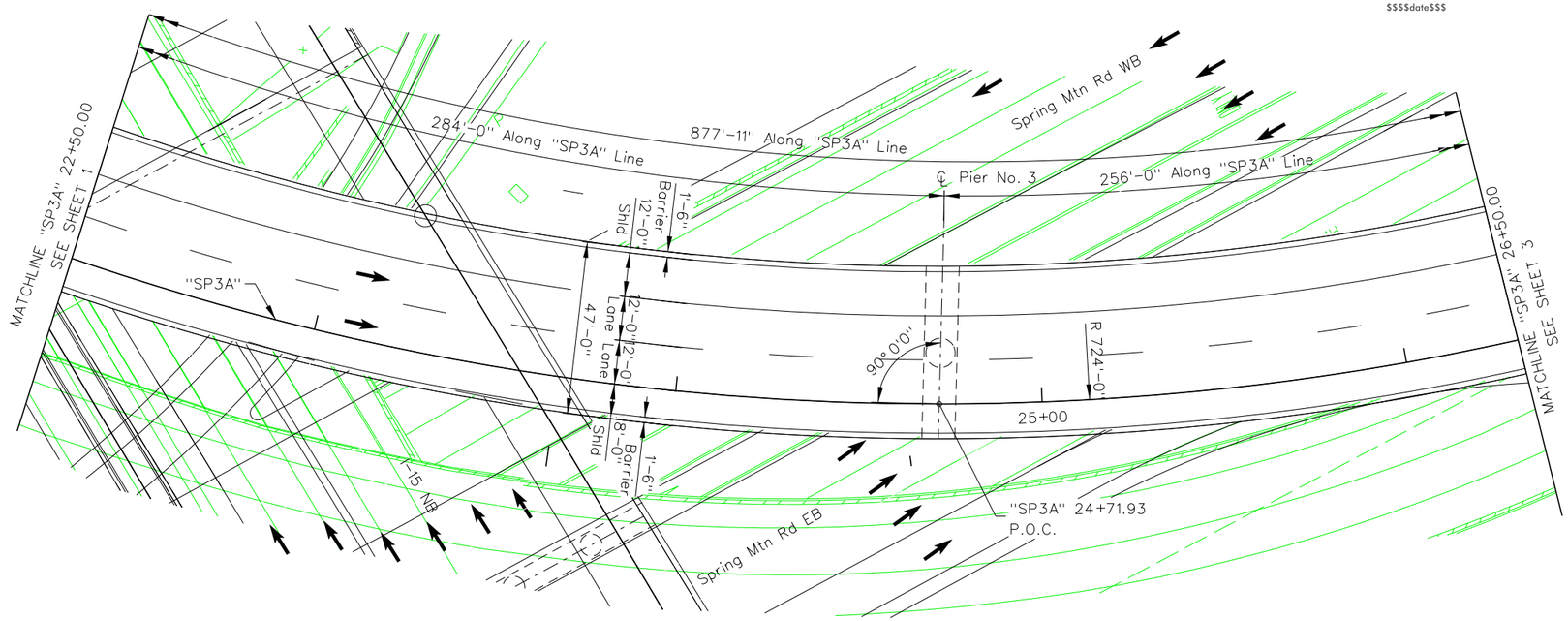
I-15 SB TO SPRING MTN RD OFF-RAMP
(SHEET 1 OF 3)
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

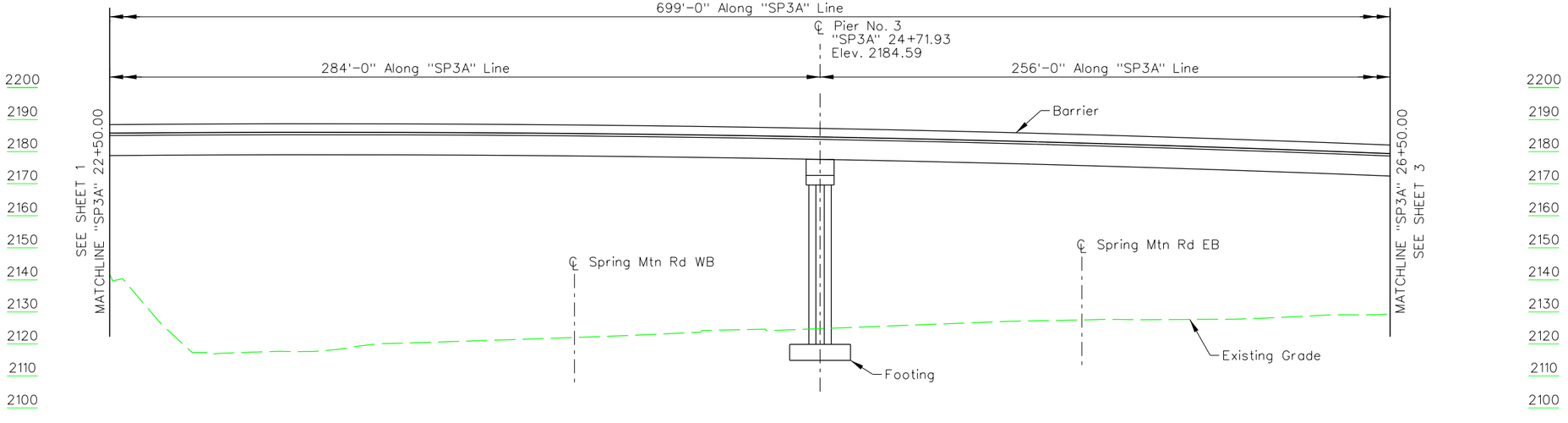
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

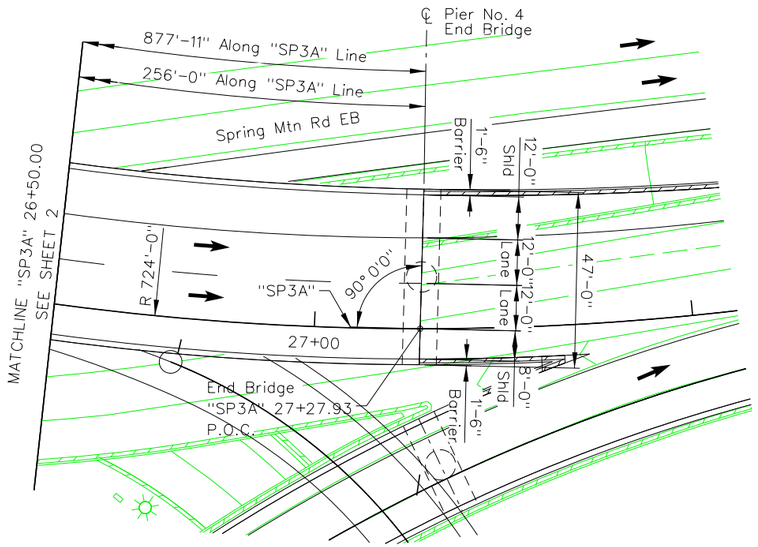
I-15 SB TO SPRING MTN RD OFF-RAMP
(SHEET 2 OF 3)
ALTERNATIVE 1 & 2

PRELIMINARY

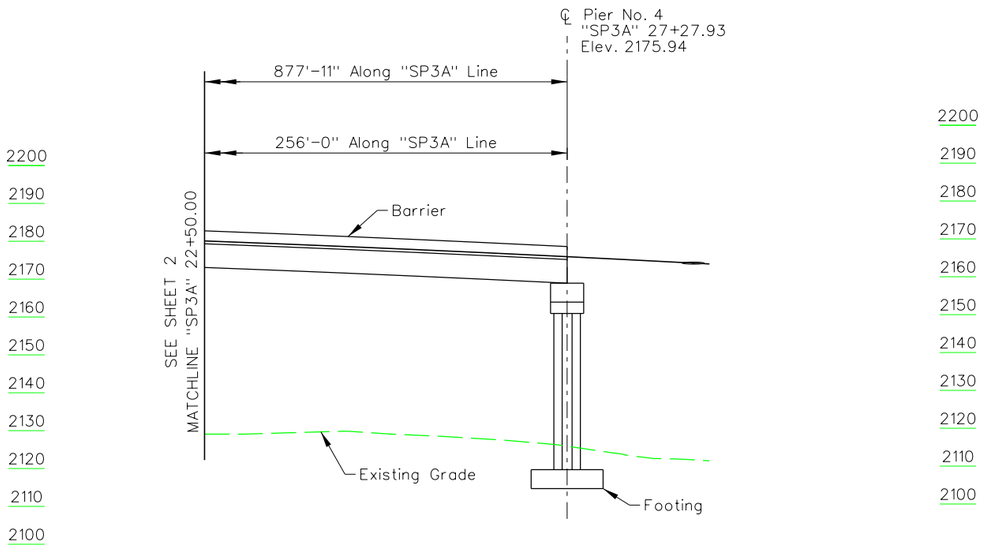
SUBJECT TO REVISION

$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	3



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

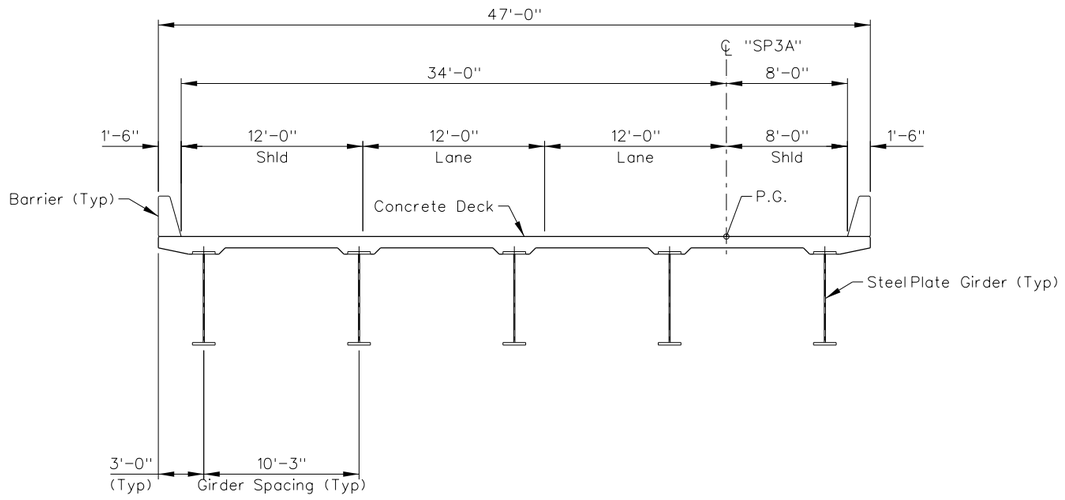
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB TO SPRING MTN RD OFF-RAMP
(SHEET 3 OF 3)
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	4



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB TO SPRING MTN RD OFF-RAMP
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

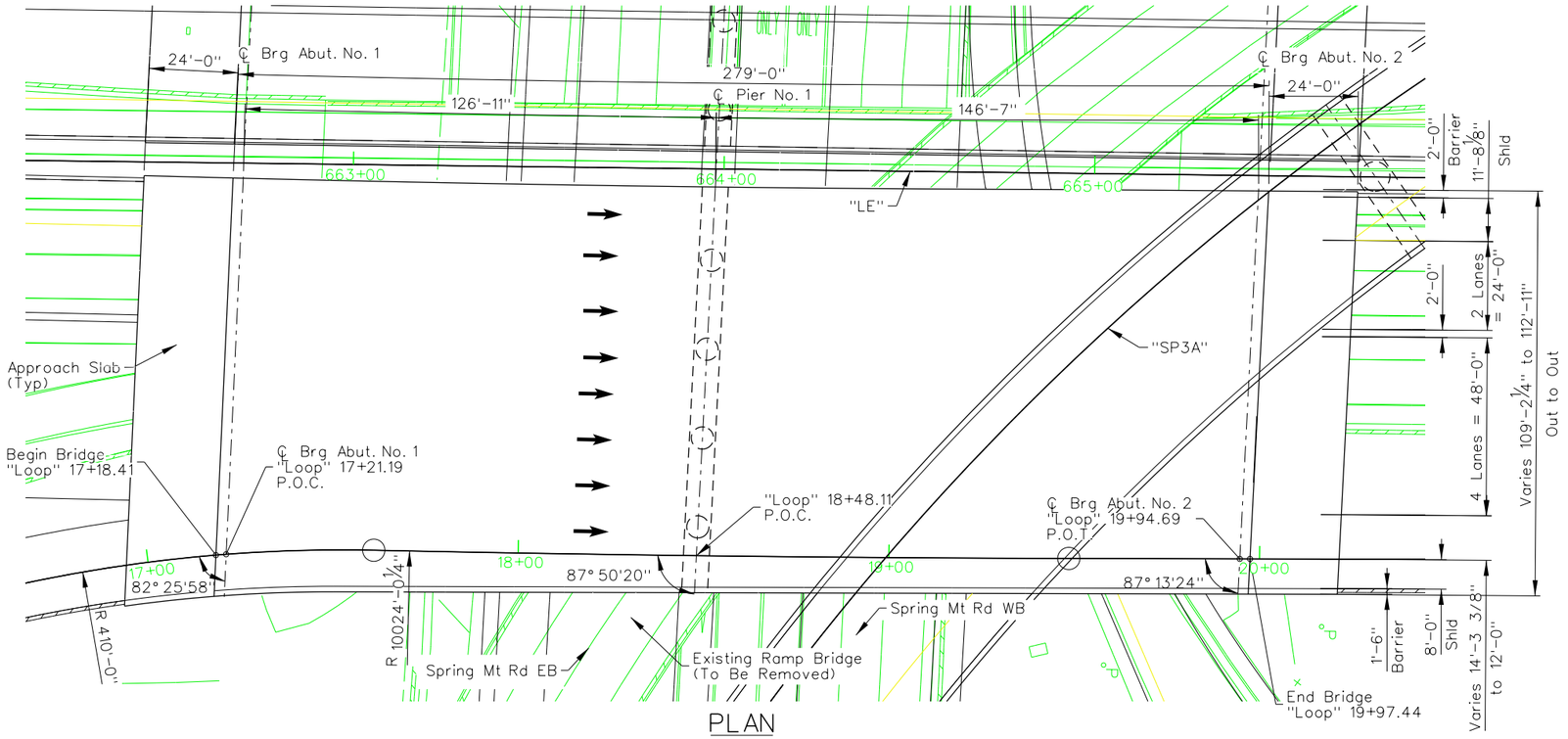
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	5

PRELIMINARY

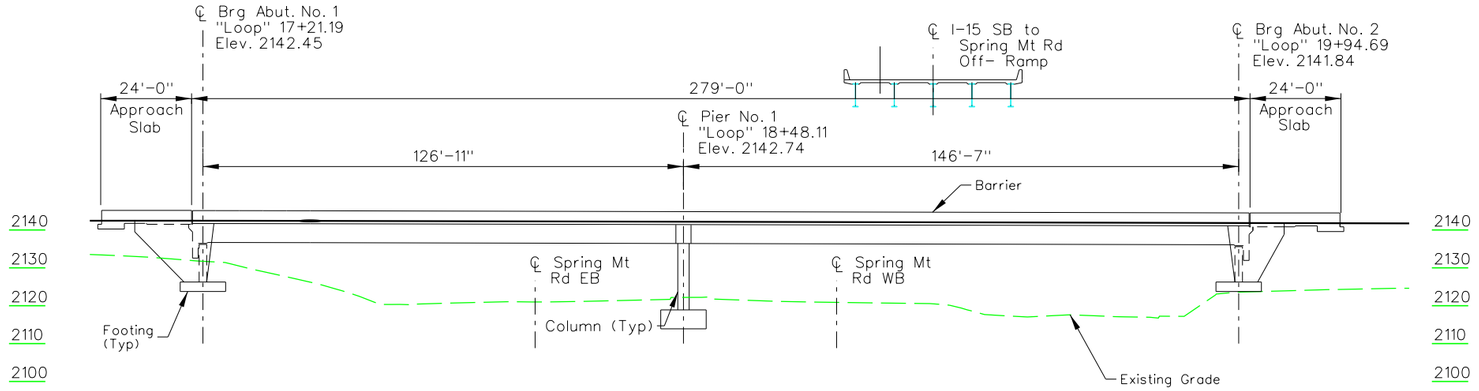
SUBJECT TO REVISION

$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

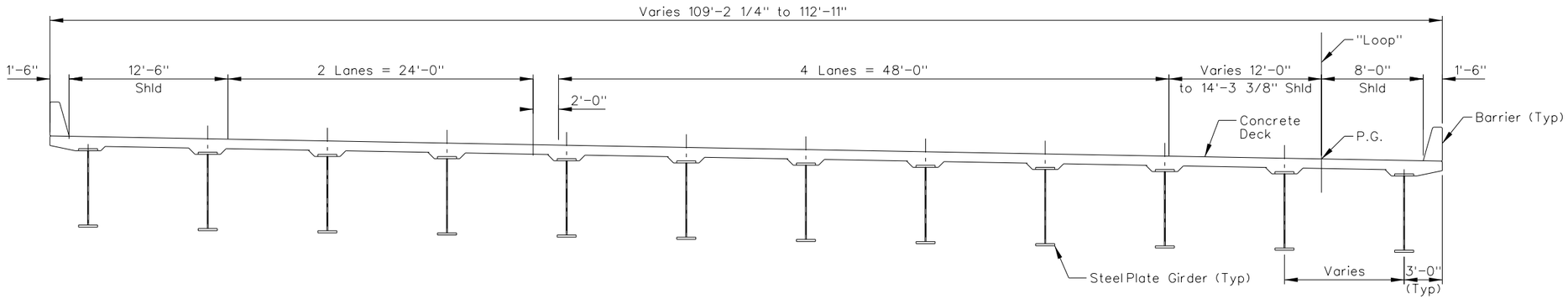
I-15 NB OVER SPRING MTN RD

ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	6



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 NB OVER SPRING MTN RD
BRIDGE I-806 N
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

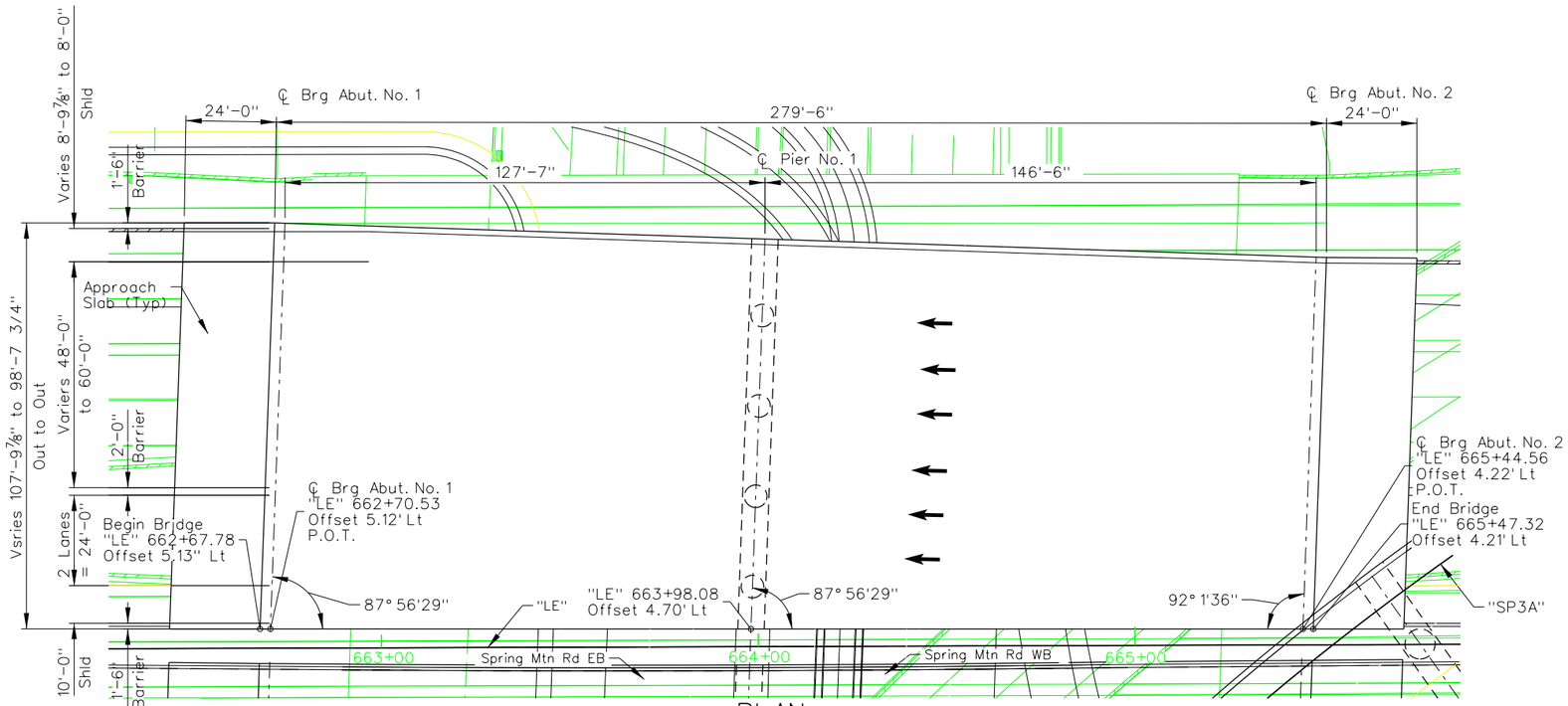
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	7

PRELIMINARY

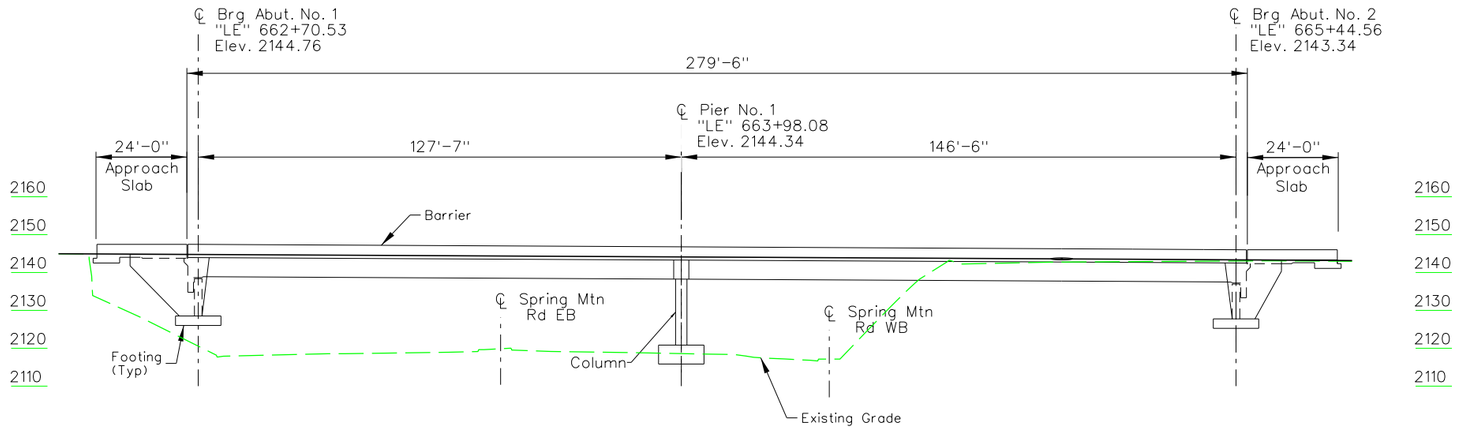
SUBJECT TO REVISION

$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

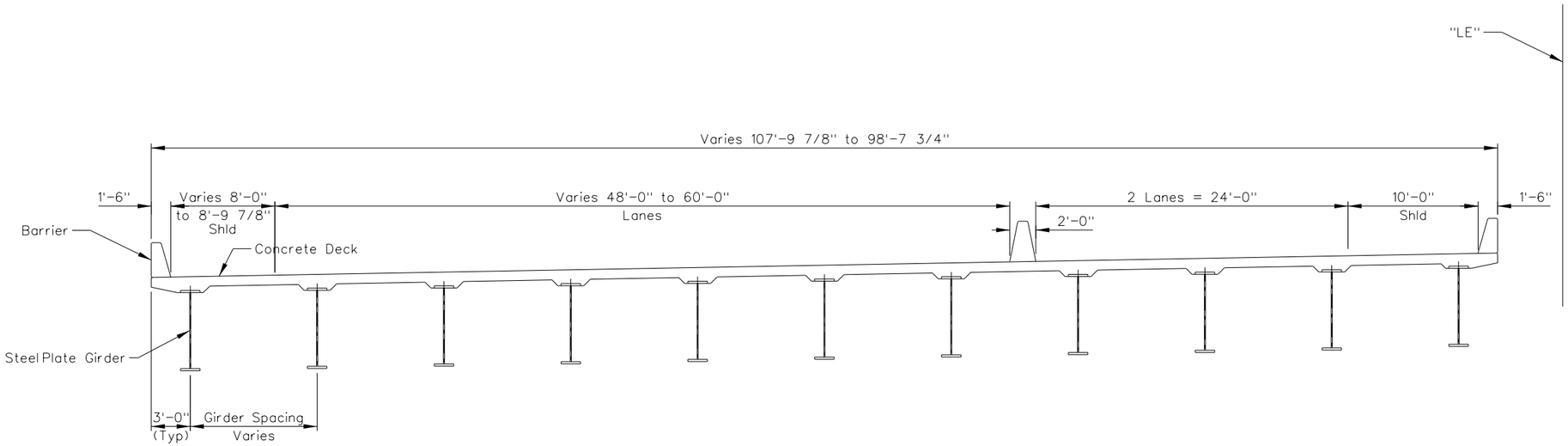
I-15 SB OVER SPRING MTN RD

ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	8



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB OVER SPRING MOUNTAIN RD
BRIDGE I-806S
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

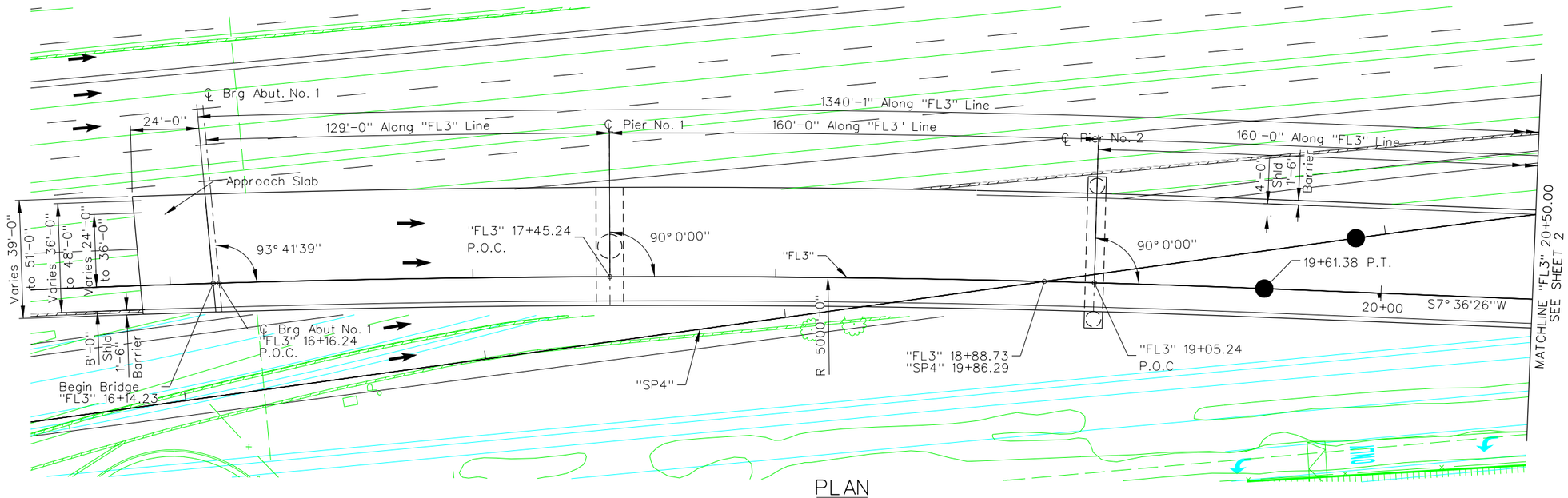
PRELIMINARY

SUBJECT TO REVISION

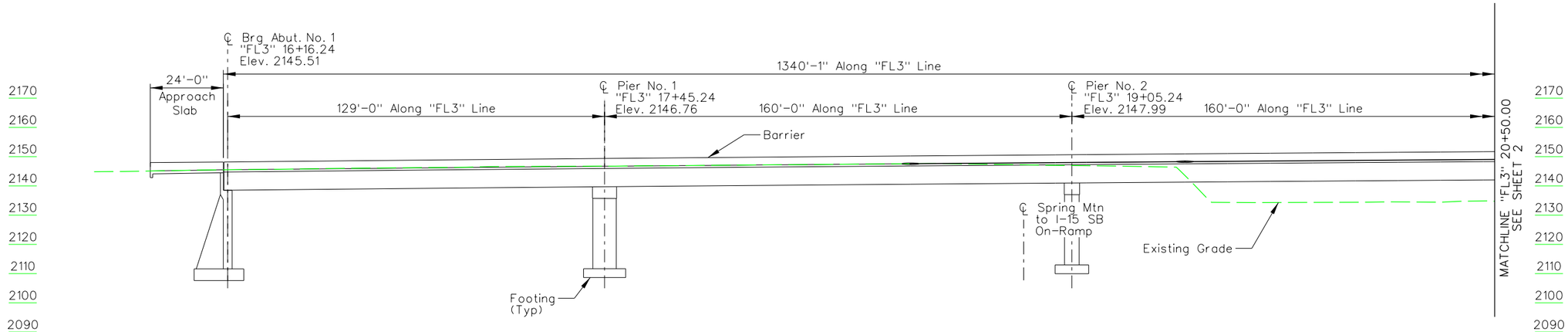
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	9

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB TO FLAMINGO RD
OFF-RAMP SHEET 1 OF 3
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

$$$$dgnspec$$$

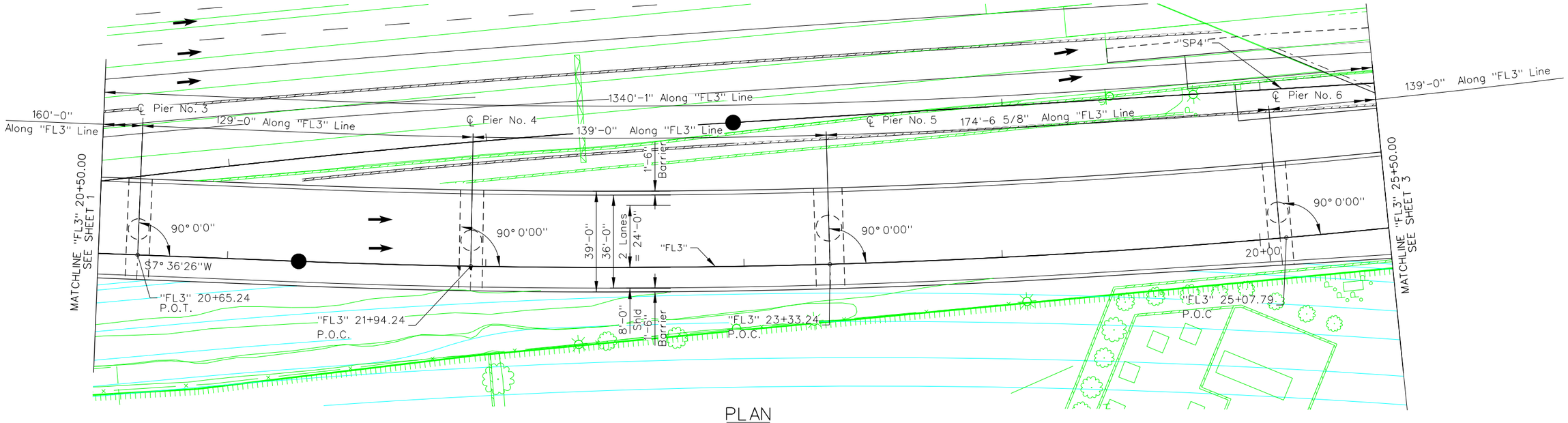
PRELIMINARY

SUBJECT TO REVISION

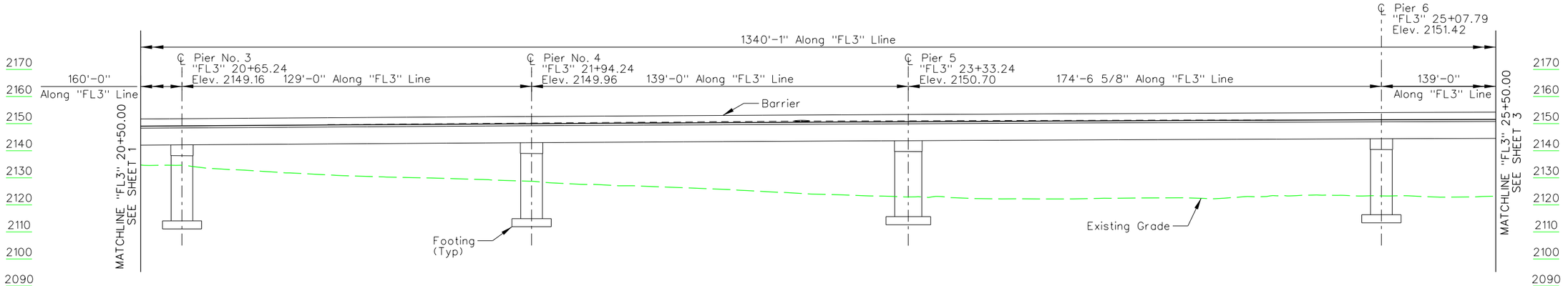
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	10

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB TO FLAMINGO RD
OFF-RAMP SHEET 2 OF 3
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

$$$$dgnspec$$$

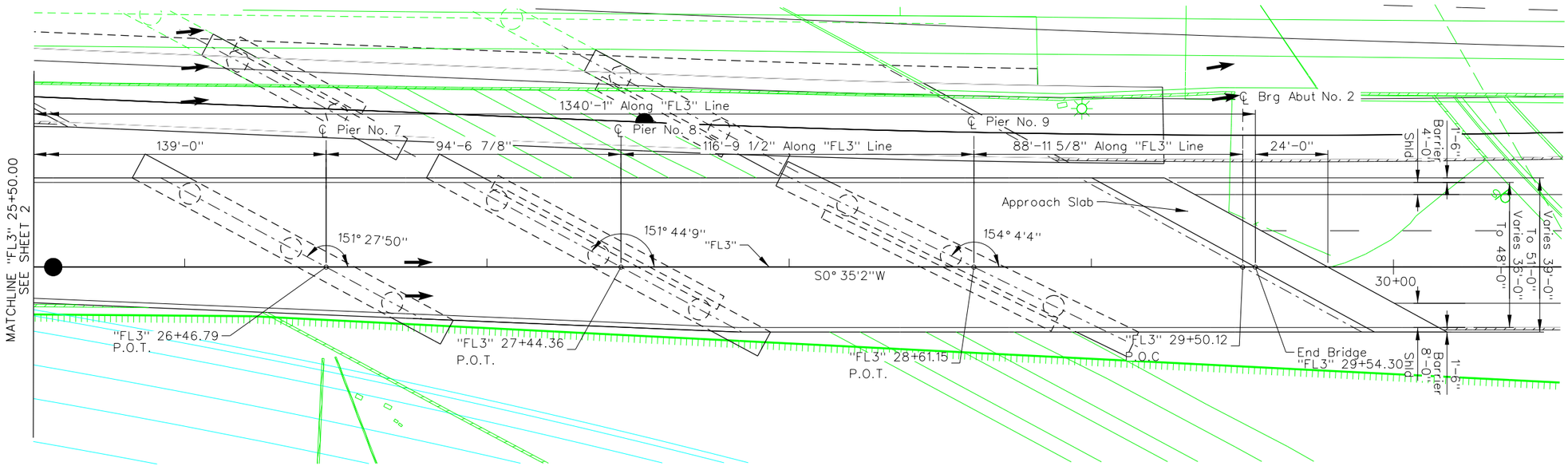
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)		11

PRELIMINARY

SUBJECT TO REVISION

$$$$date$$$

T21S R61E



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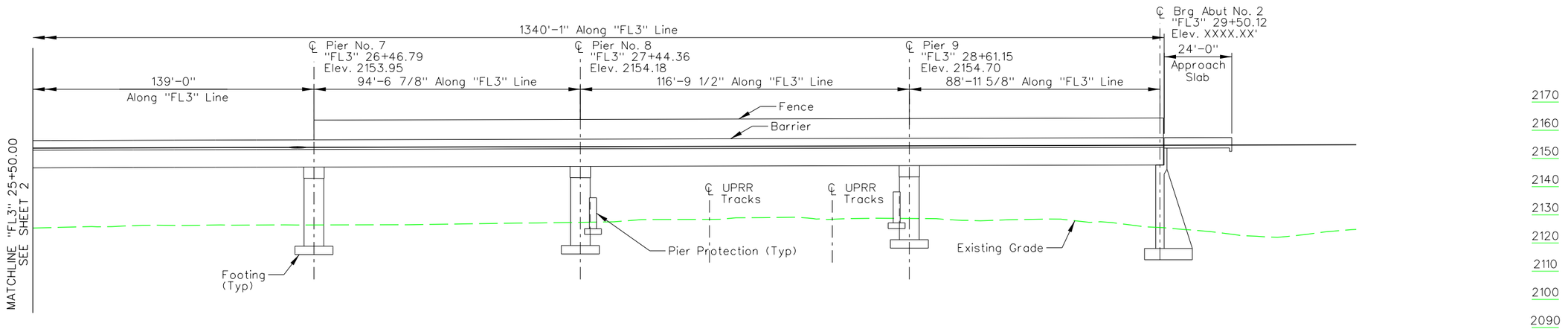


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

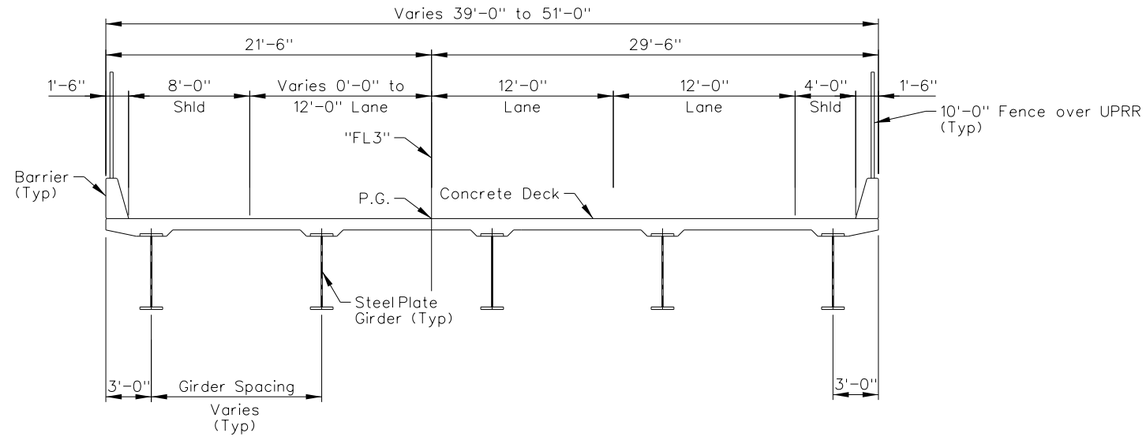
PLAN AND ELEVATION

I-15 SB TO FLAMINGO RD
OFF-RAMP SHEET 3 OF 3
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	12



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB TO FLAMINGO RD
OFF-RAMP
ALTERNATIVE 1 & 2

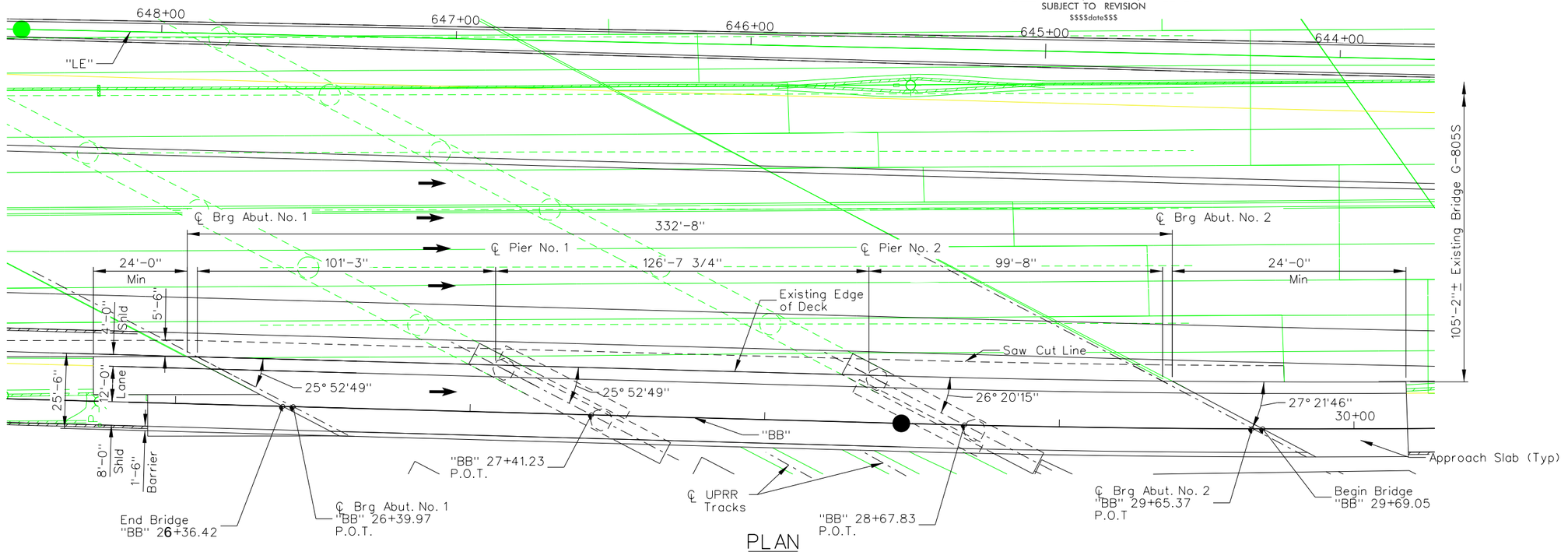
$$$$dgnspec$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	13

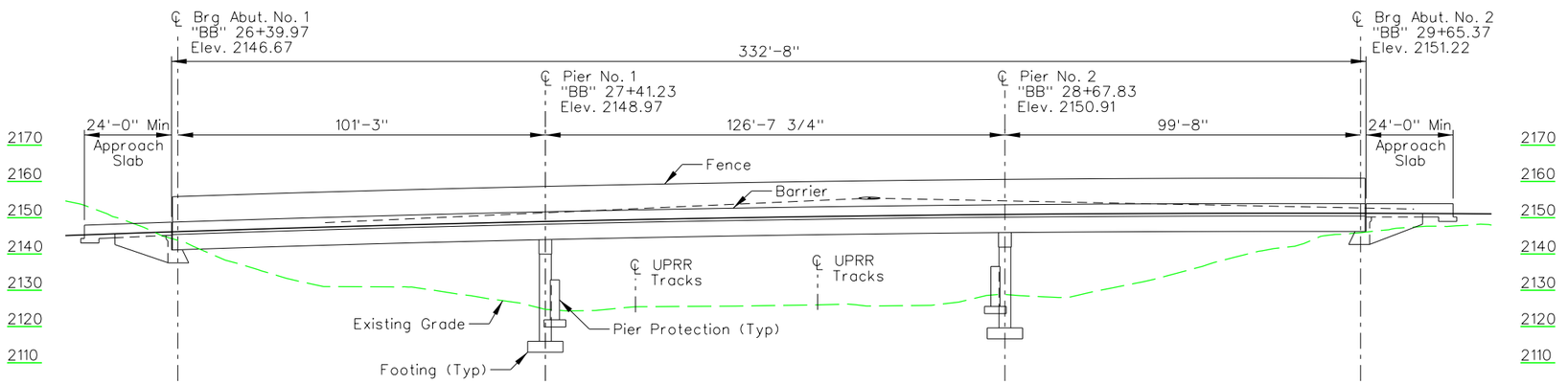
PRELIMINARY

SUBJECT TO REVISION

$$$$date$$$



PLAN



ELEVATION

Notes:

1. Elevations and dimensions are taken along edge of existing deck.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

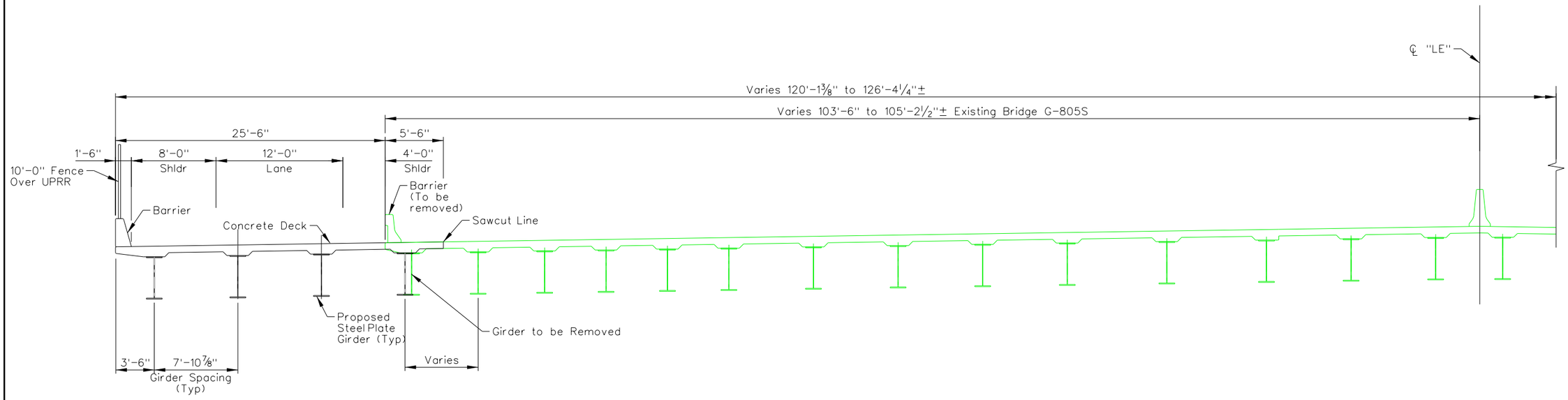
PLAN AND ELEVATION

I-15 SB OVER UPRR
BRIDGE G-805S WIDENING
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	14



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB OVER UPRR
BRIDGE G-805S WIDENING
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

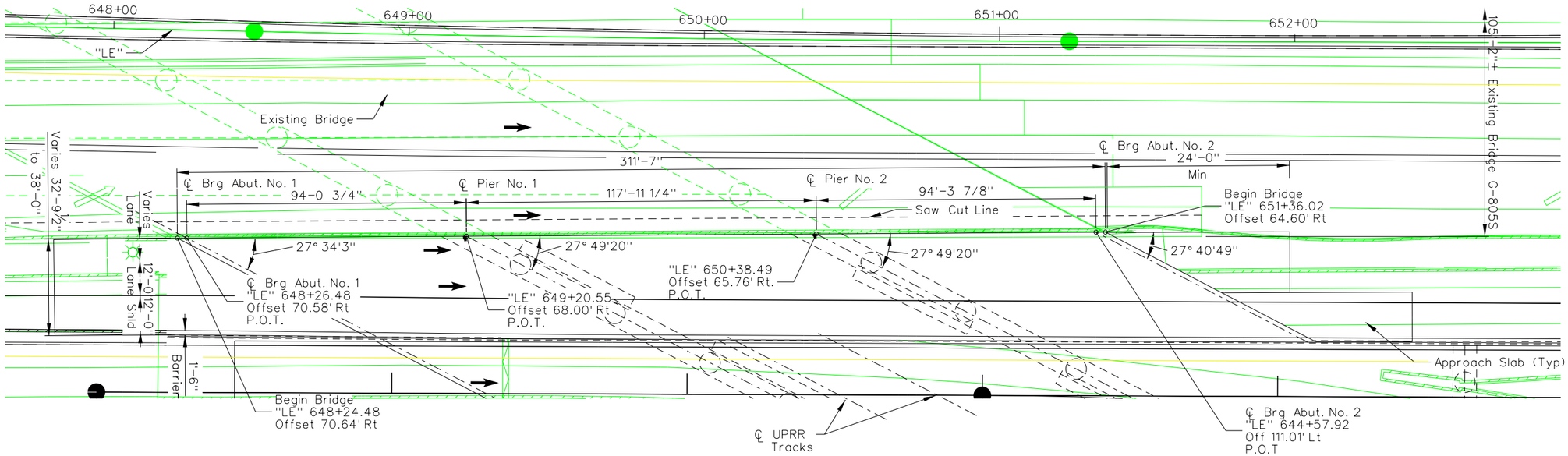
PRELIMINARY

SUBJECT TO REVISION

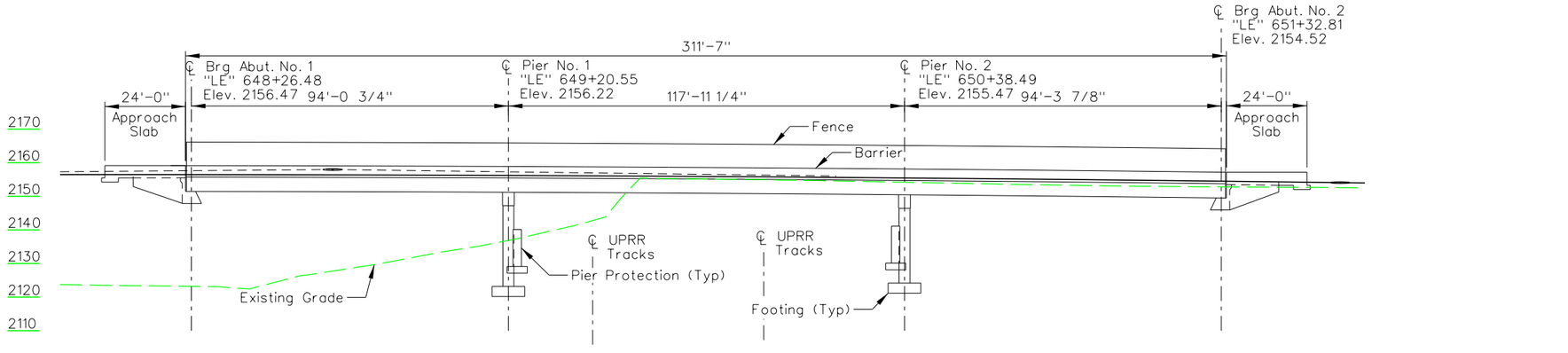
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	15

T21S R61E



PLAN



ELEVATION

Notes:

1. Elevations and dimensions are taken along edge of existing deck.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

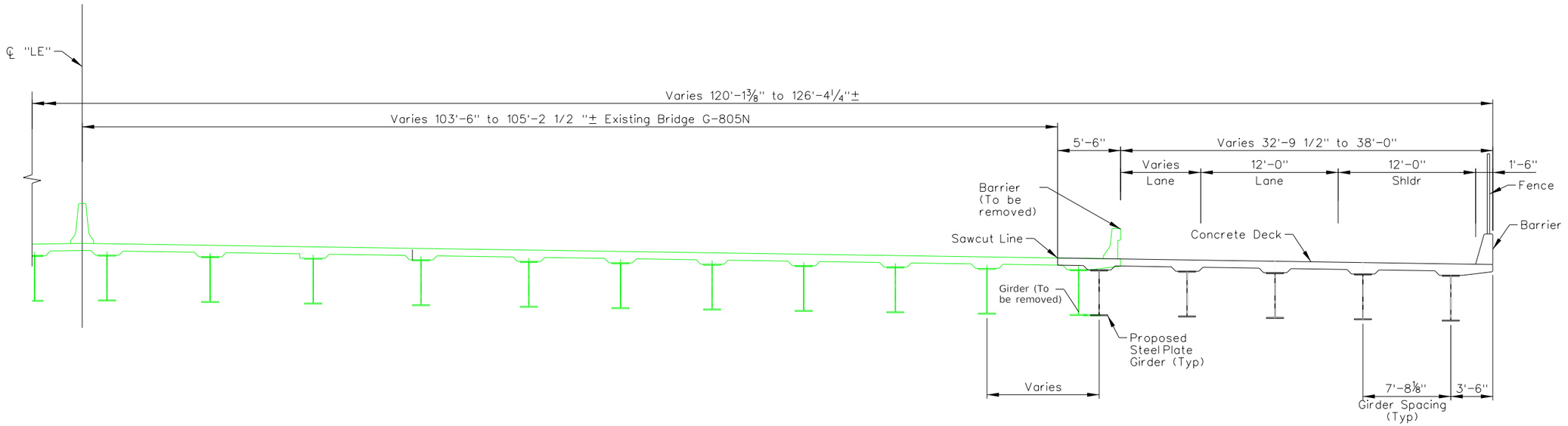
PLAN AND ELEVATION

I-15 NB OVER UPRR
BRIDGE G-805N WIDENING
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	16



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 NB OVER UPRR
BRIDGE G-805N WIDENING
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

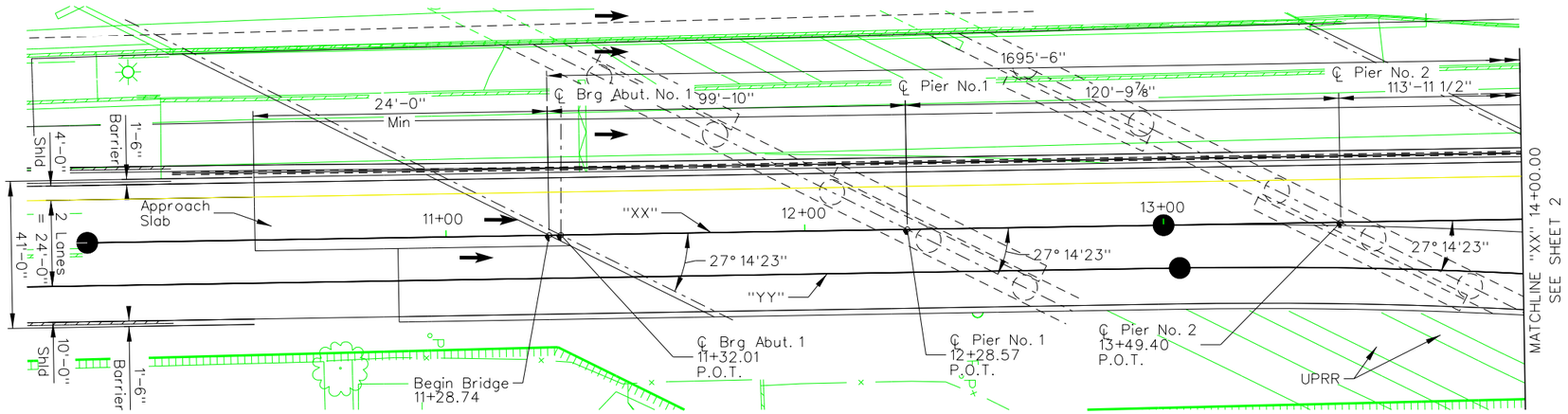
PRELIMINARY

SUBJECT TO REVISION

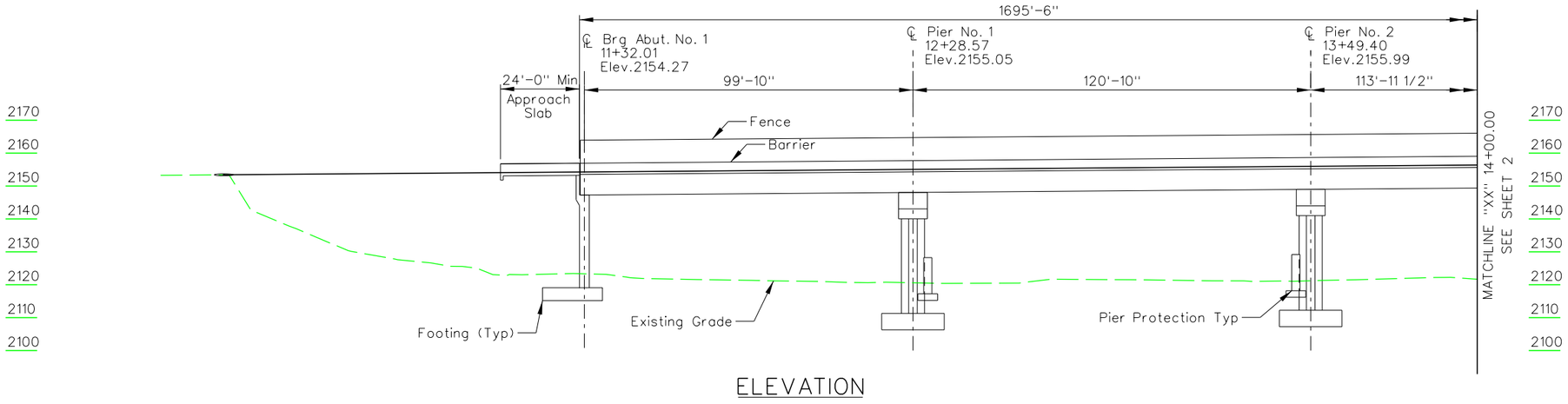
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	17

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

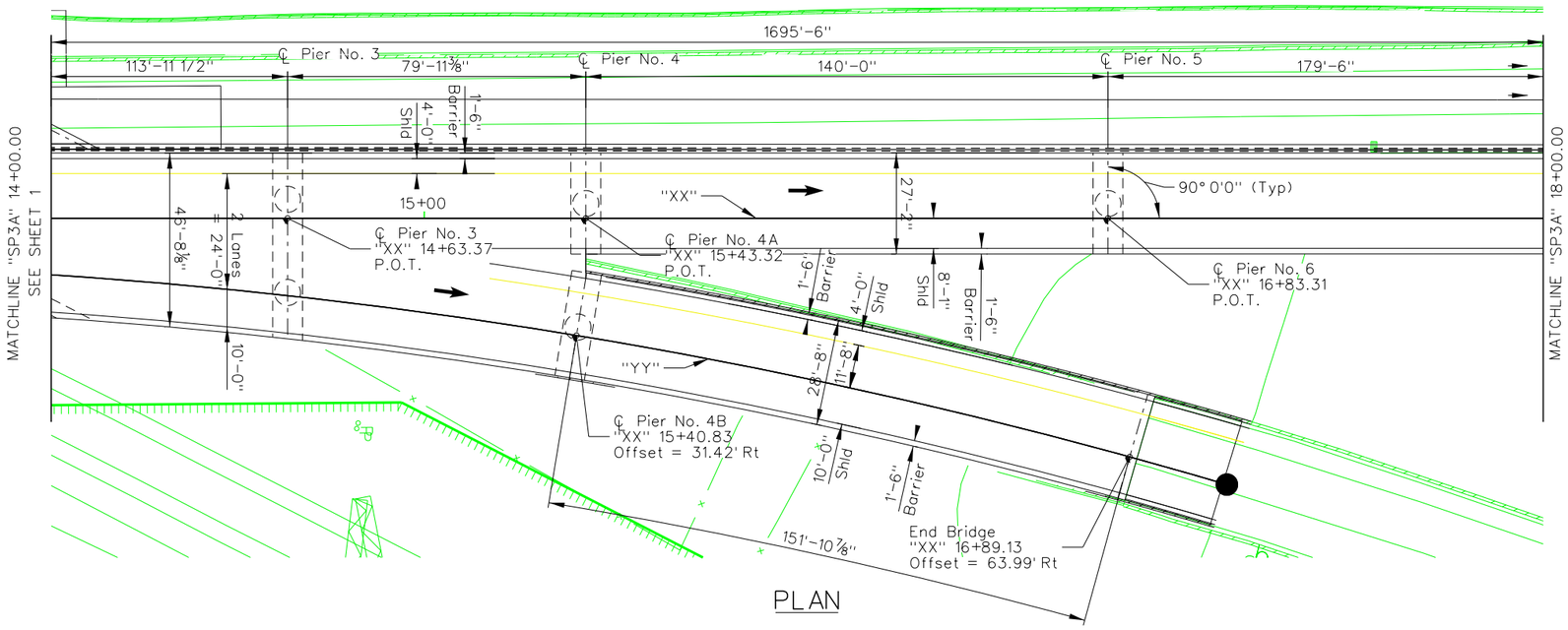
SPRING MNT NB OFF RAMP OVER
UPRR SHEET (1 OF 5)
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

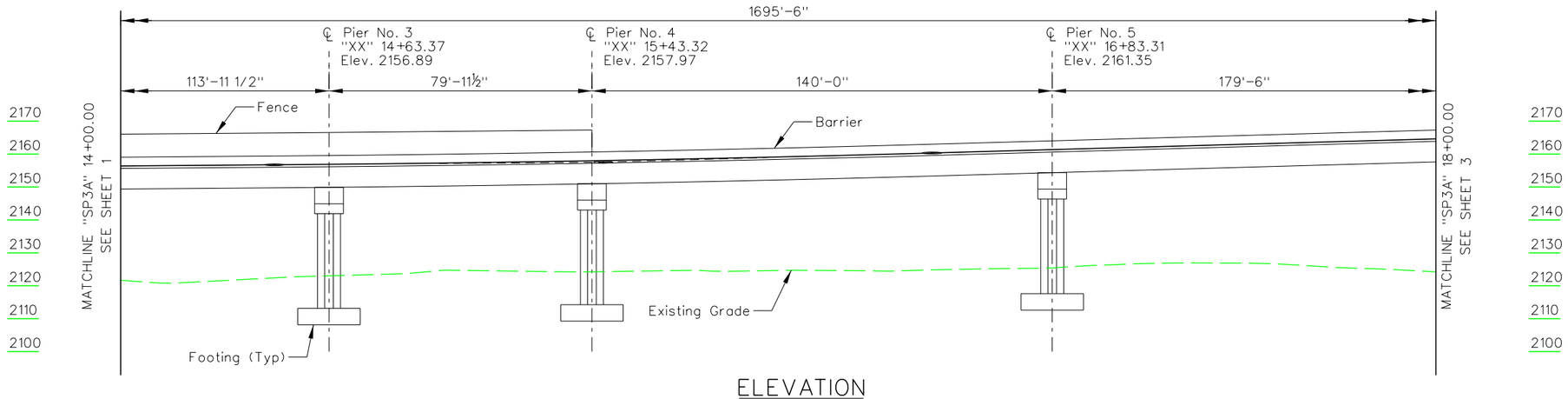
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	18

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

SPRING MNT NB OFF RAMP OVER
UPRR SHEET (2 OF 5)
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

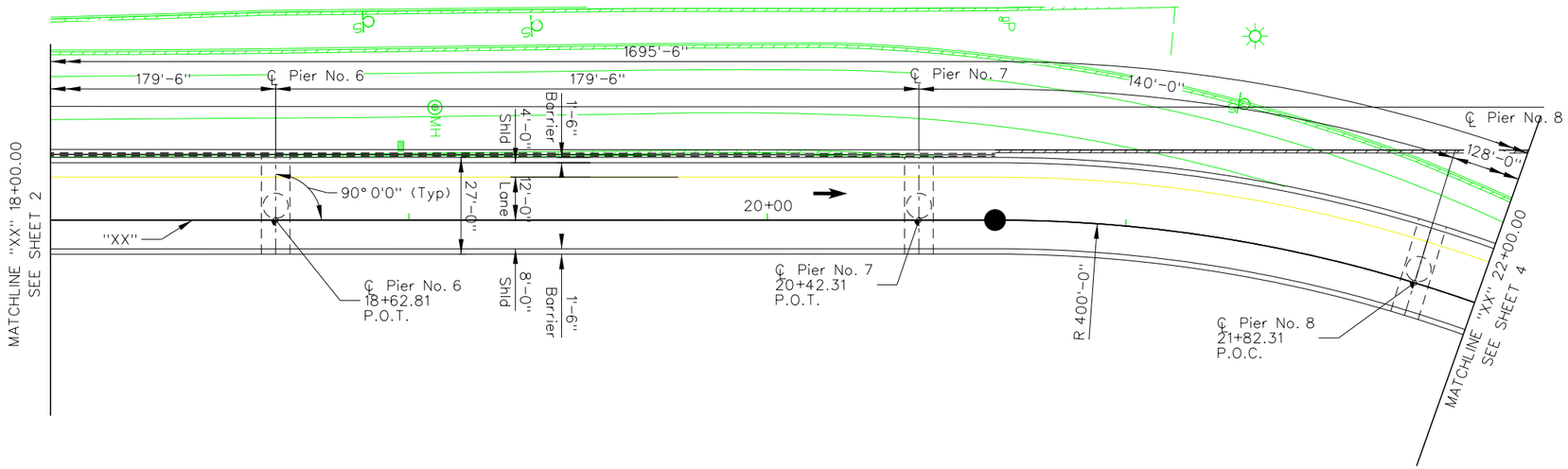
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	19

PRELIMINARY

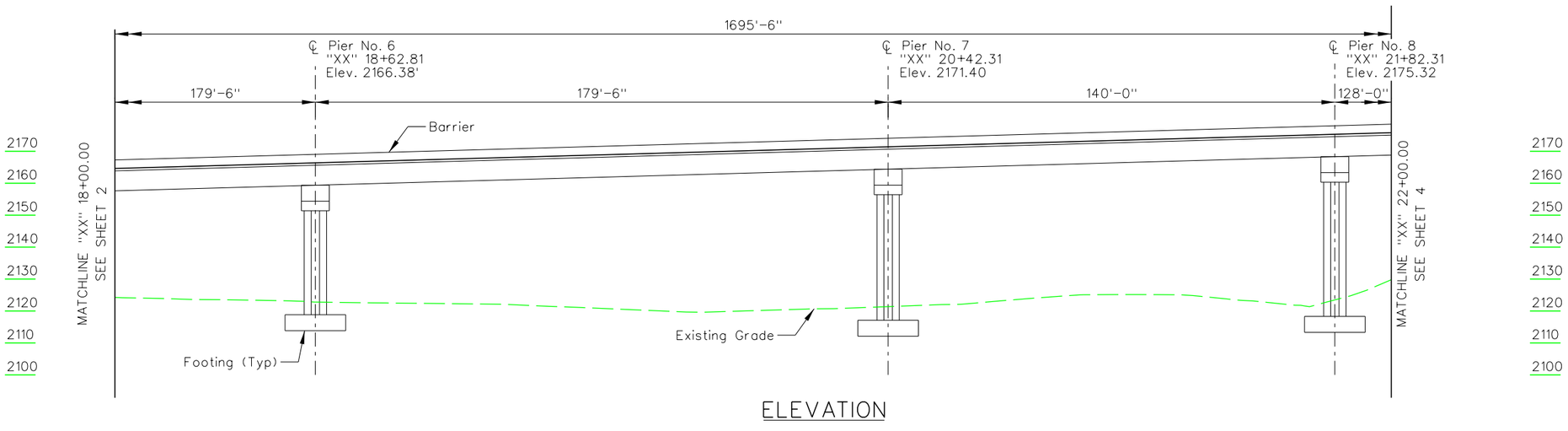
SUBJECT TO REVISION

$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

SPRING MNT NB OFF RAMP OVER UPRR SHEET (3 OF 5)
ALTERNATIVE 1 & 2

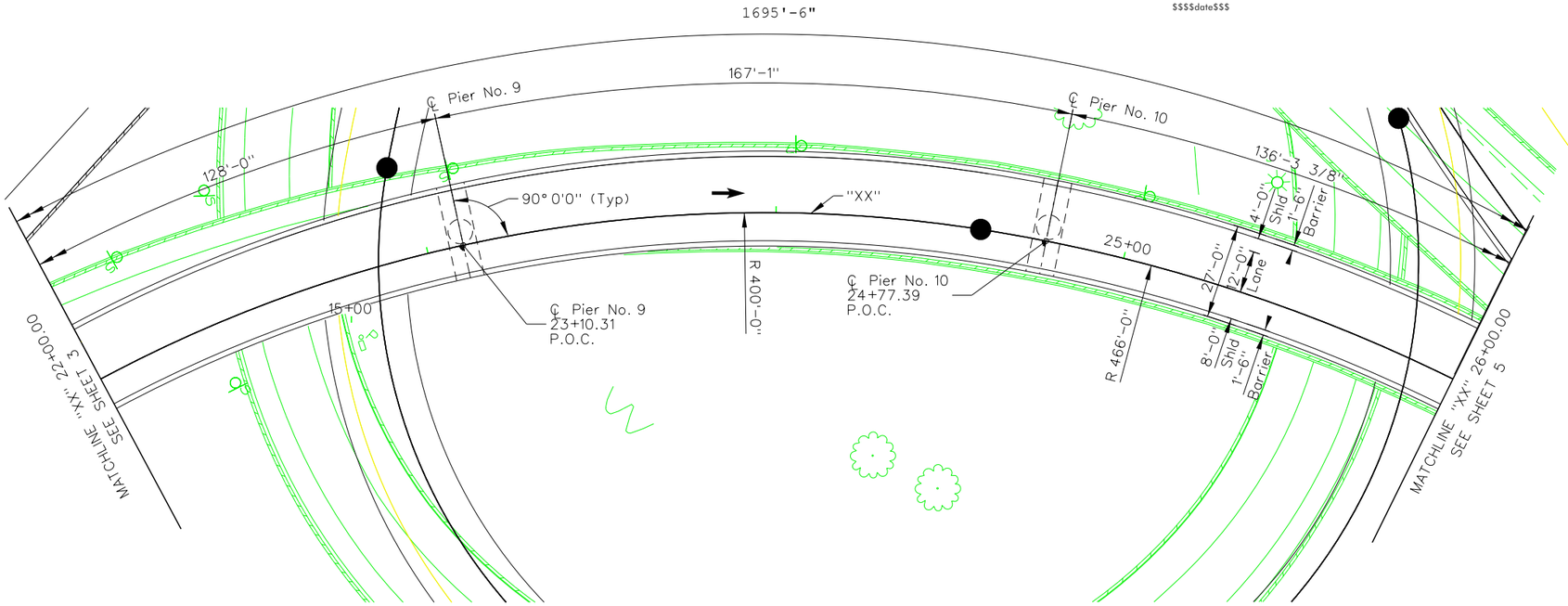
$$$$scale$$$ PLOT SCALE $$$$username$$$

$$$$dgnspec$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	20

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



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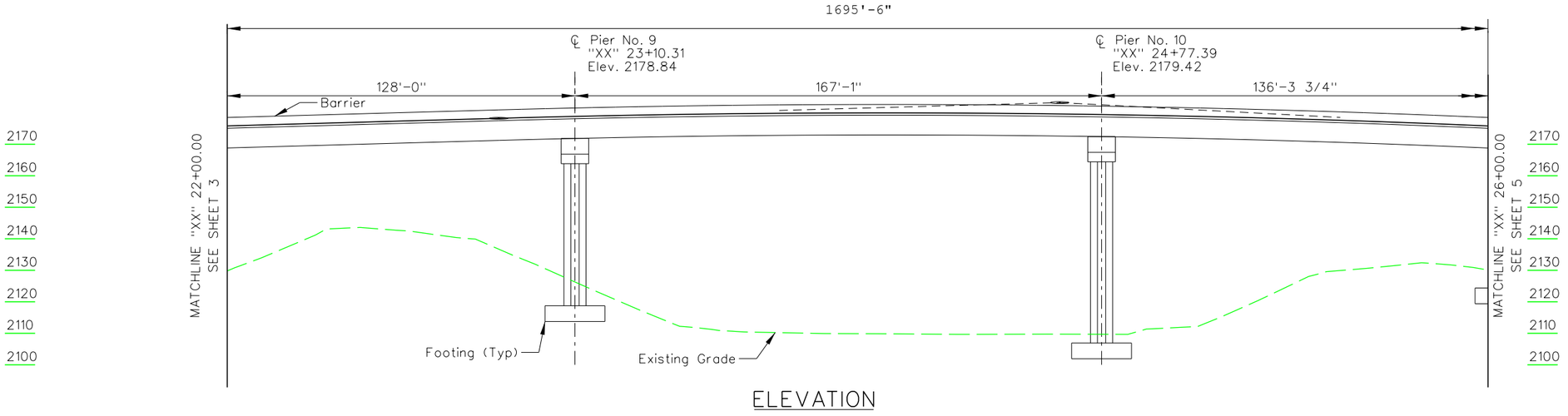


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

SPRING MNT NB OFF RAMP OVER
UPRR SHEET (4 OF 5)
ALTERNATIVE 1 & 2

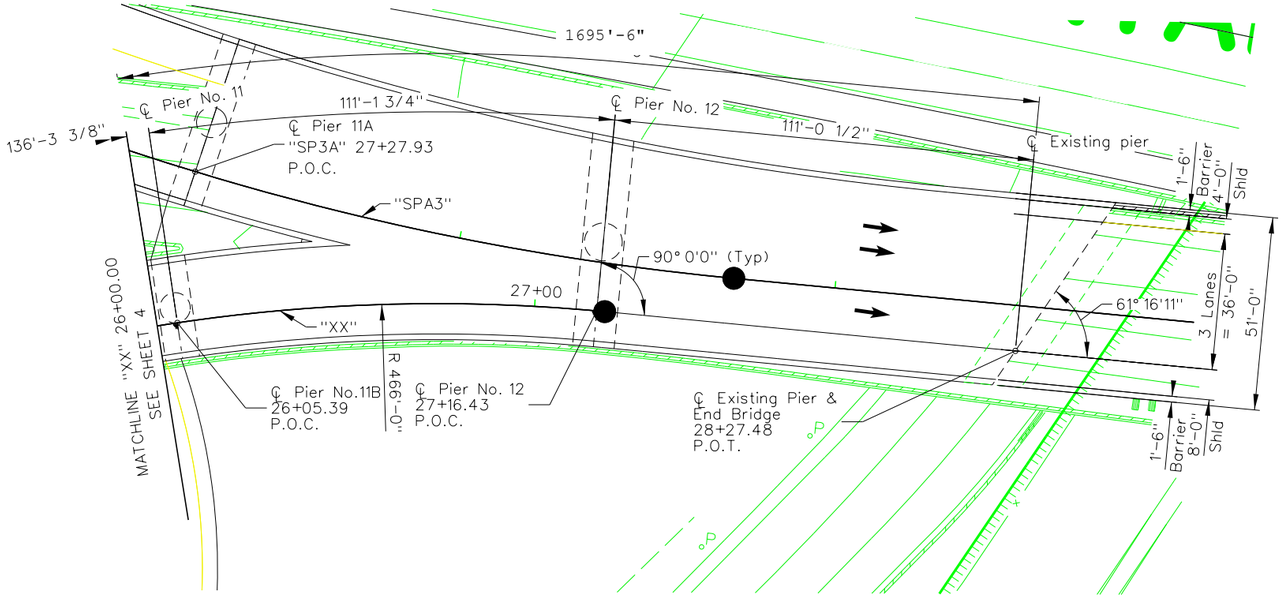
$$$$scale$$$ PLOT SCALE $$$$username$$$

$$$$dgnspec$$$

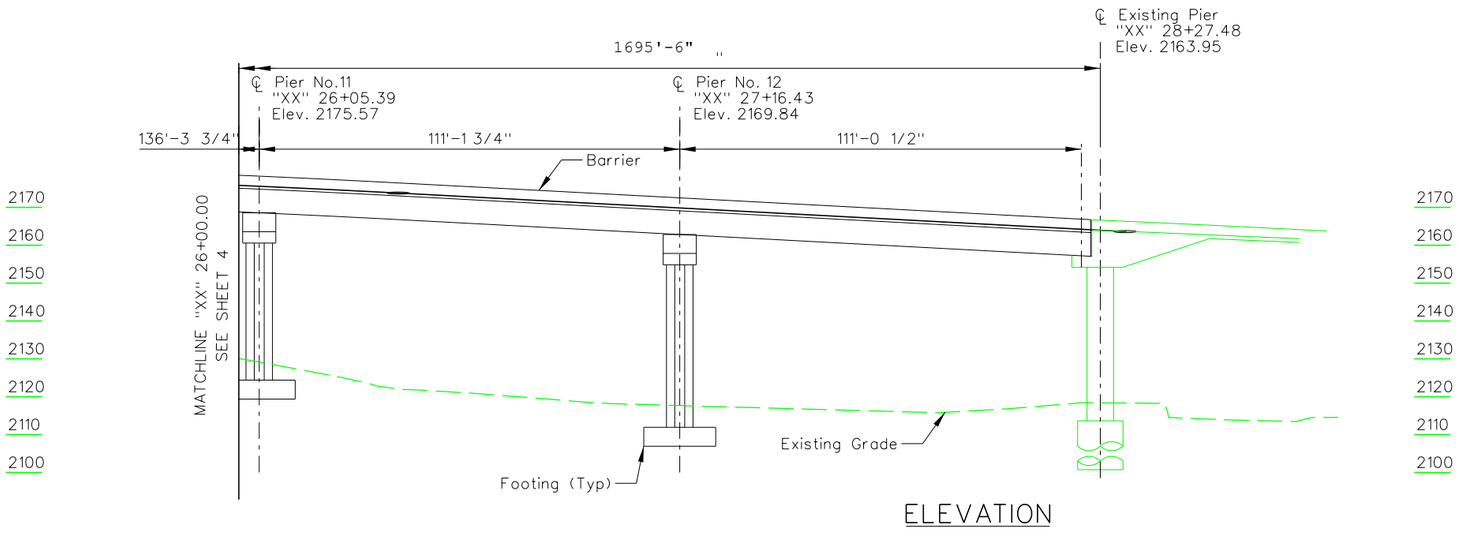
PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	21

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

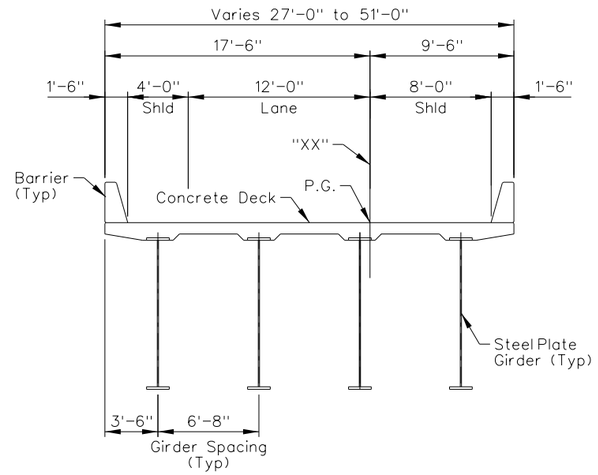
PLAN AND ELEVATION

SPRING MNT NB OFF RAMP OVER
UPRR SHEET (5 OF 5)
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	22



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

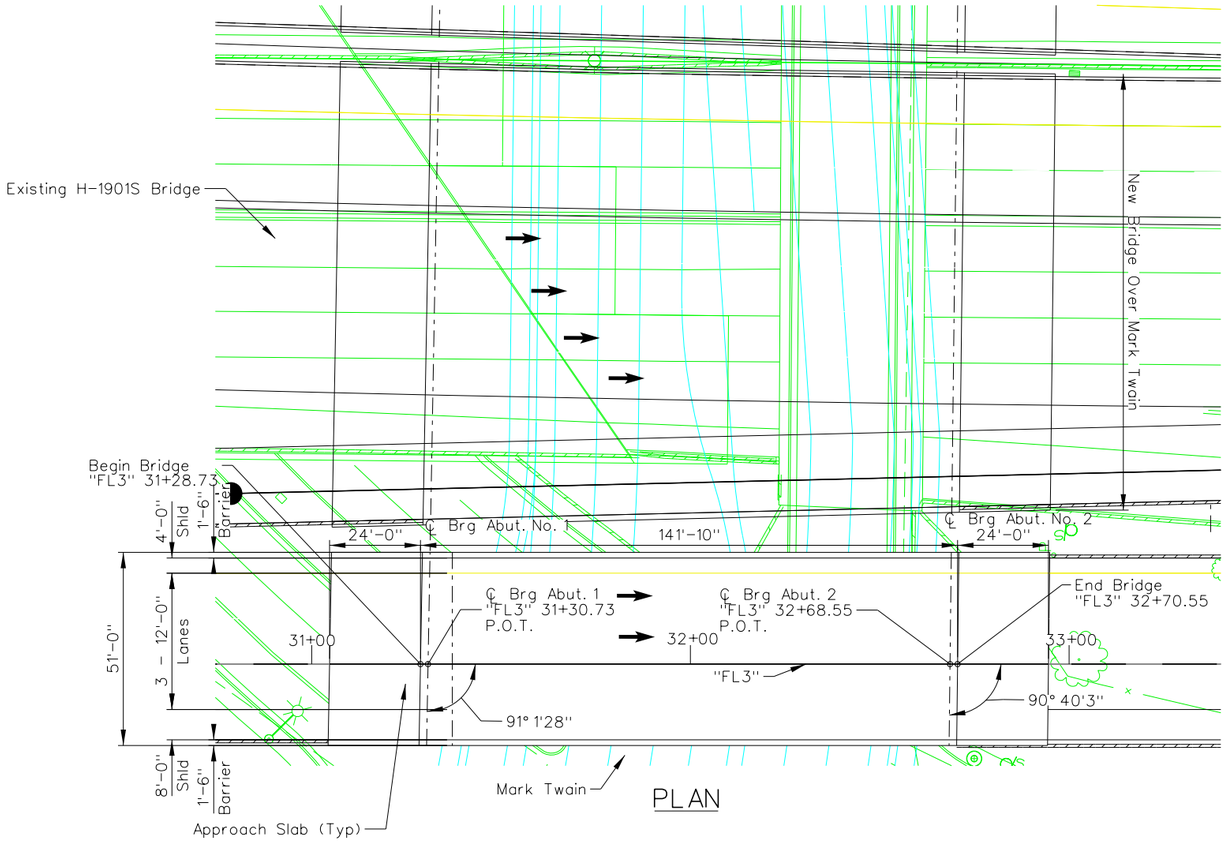
TYPICAL SECTION

SPRING MTN NB OFF RAMP OVER UPRR
ALTERNATIVE 1 & 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	23

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



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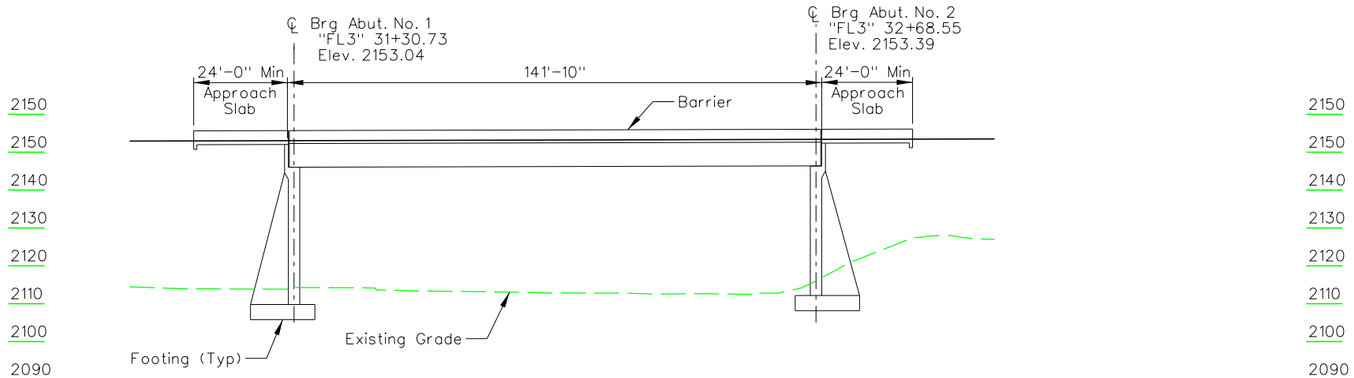


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

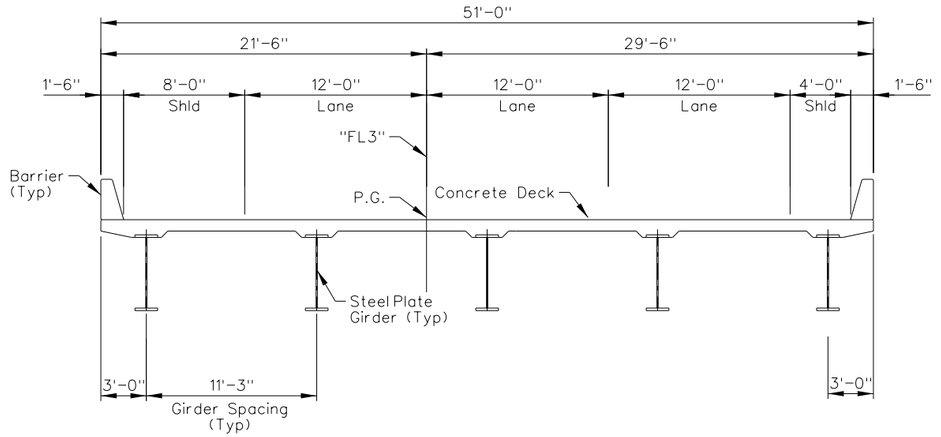
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

I-15 SB RAMP FLAMINGO
OVER MARK TWAIN
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	24



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

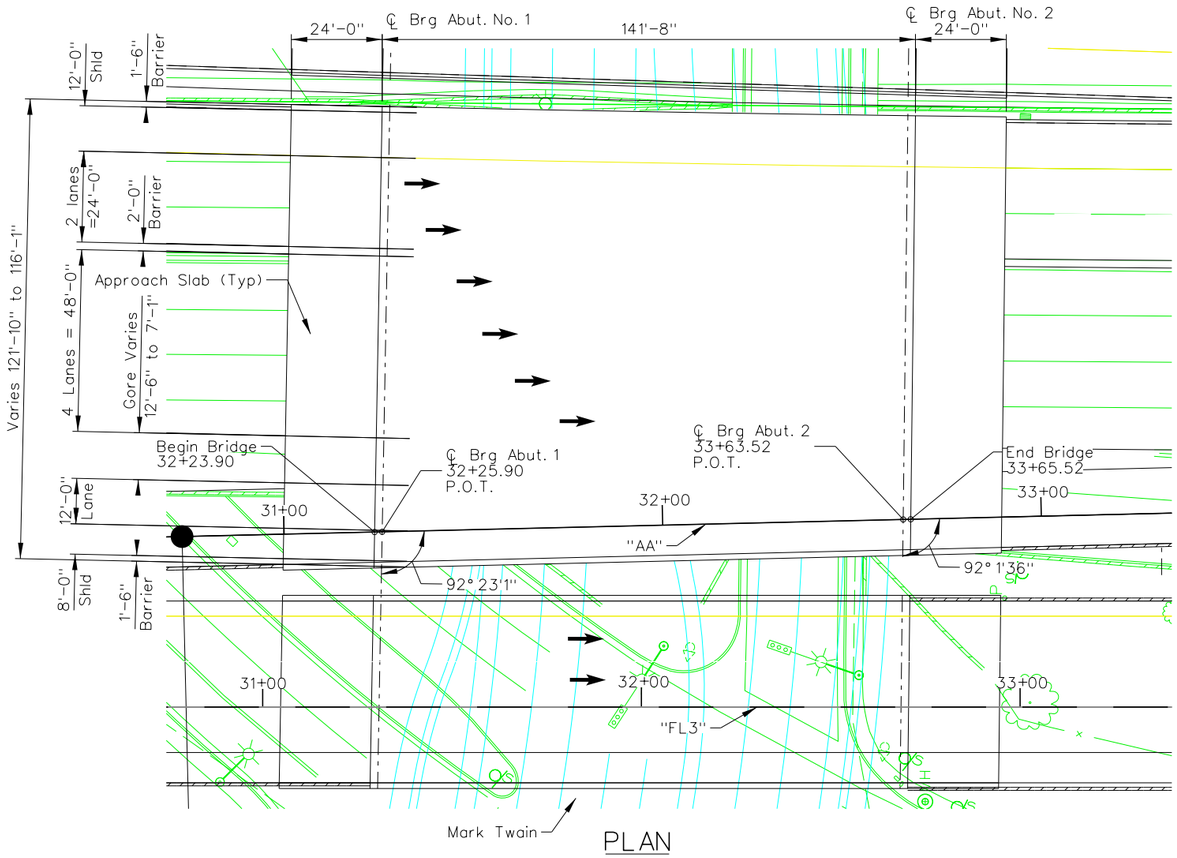
TYPICAL SECTION

I-15 SB TO FLAMINGO RD
OFF-RAMP OVER MARK TWAIN
ALTERNATIVE 1 & 2

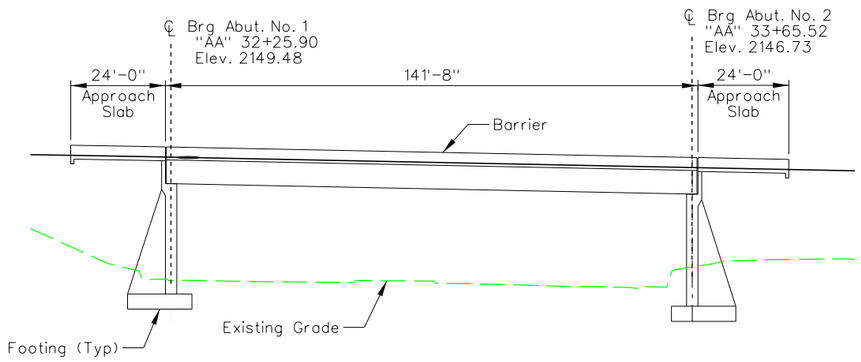
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	25

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

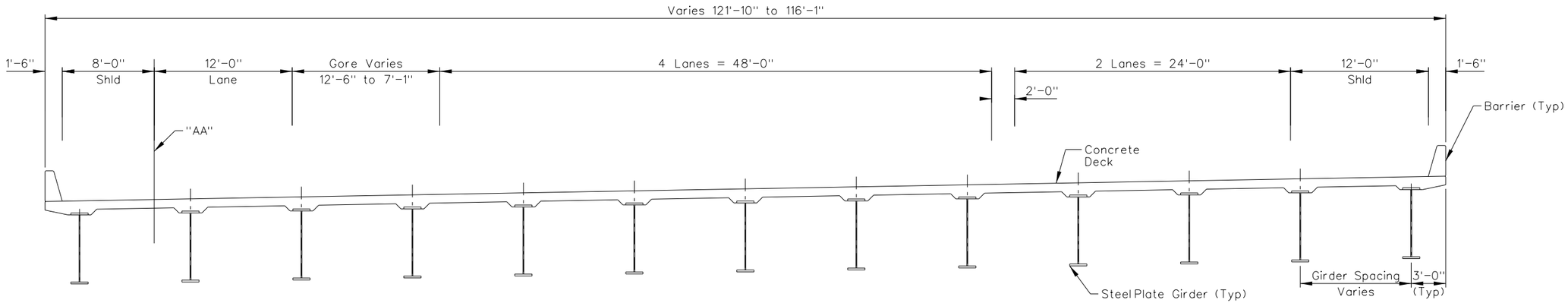
PLAN AND ELEVATION

I-15 SB OVER MARK TWAIN

ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	26



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 SB OVER MARK TWAIN

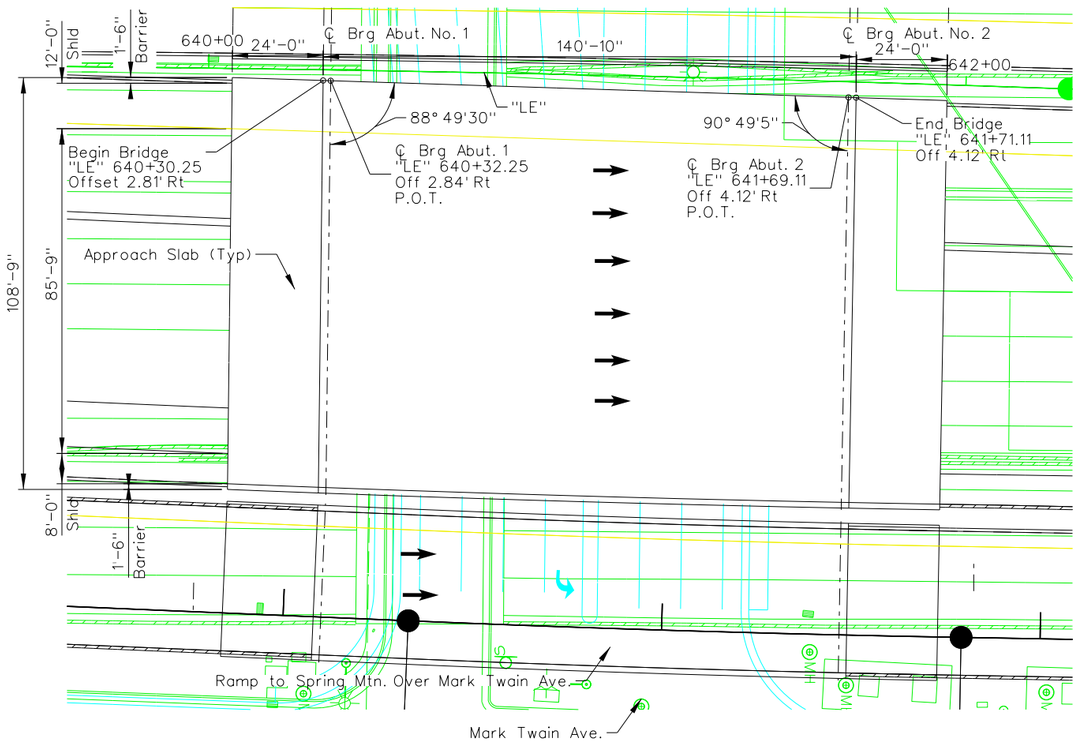
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	27

T21S R61E



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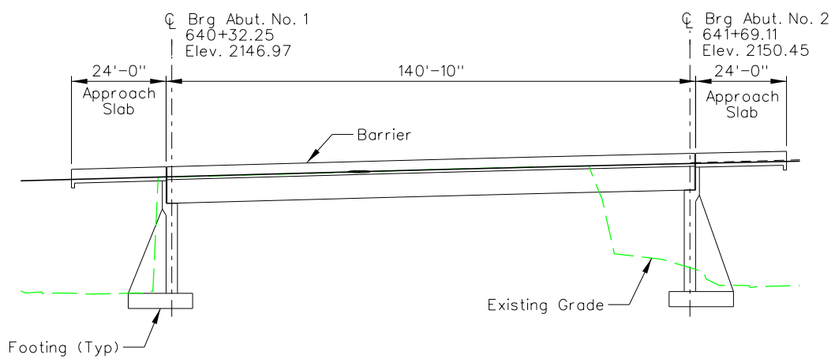


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

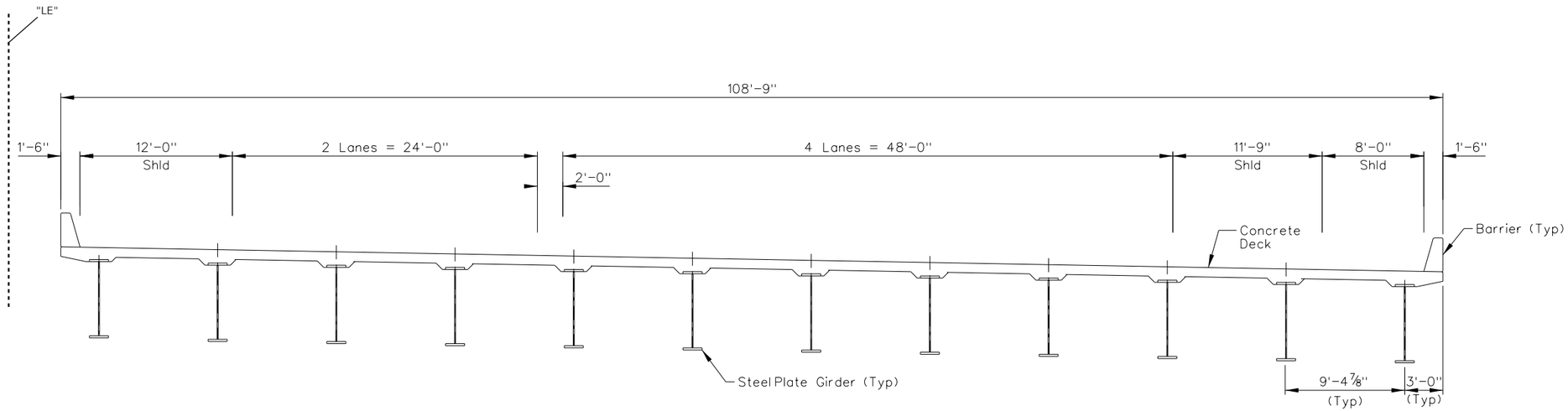
PLAN AND ELEVATION

I-15 NB OVER MARK TWAIN
NEW BRIDGE
ALTERNATIVE 1 & 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	28



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

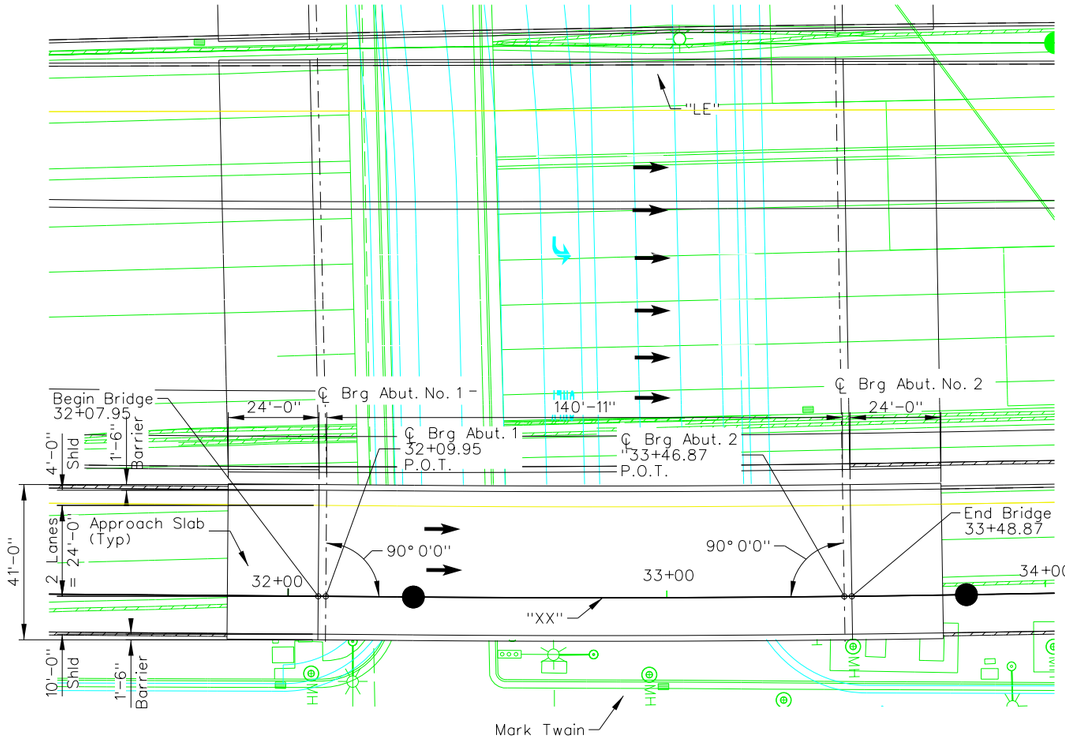
TYPICAL SECTION

I-15 NB OVER SPRING MTN RD
BRIDGE I-15 OVER MSRK TWAIN
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	29

T21S R61E



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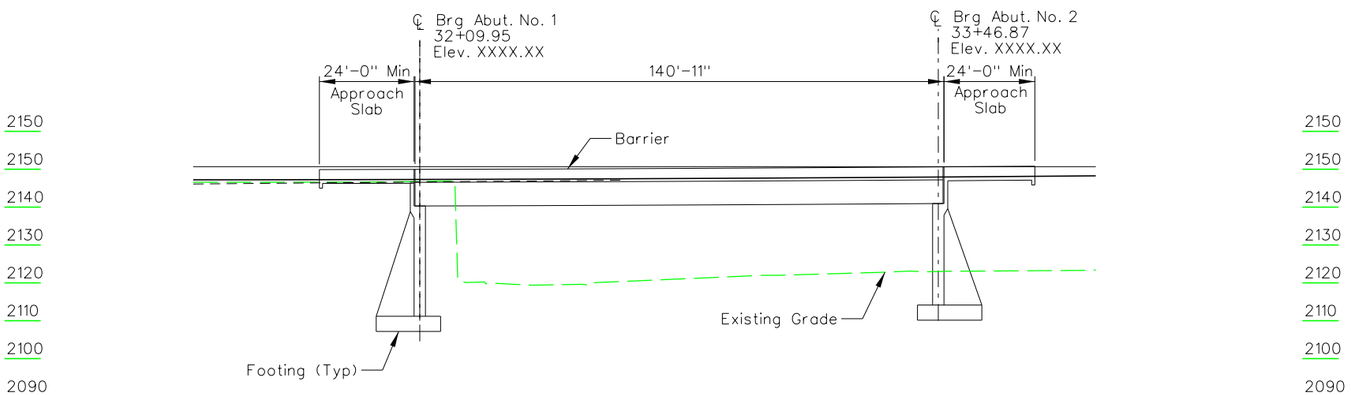


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

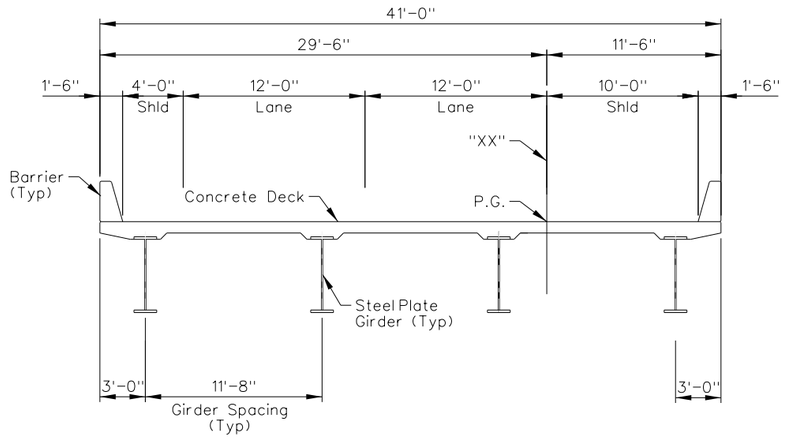
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

SPRING MNT NB OFF RAMP OVER
MARK TWAIN
ALTERNATIVE 1 & 2

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	30



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

SPRING MTN NB OFF RAMP OVER
MARK TWAIN
ALTERNATIVE 1 & 2

$$$$dgnspec$$$

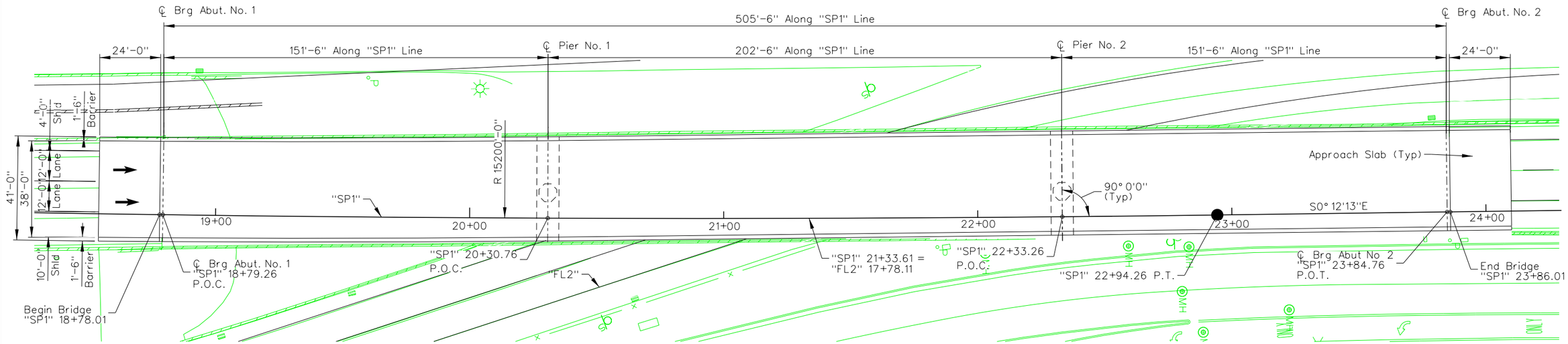
PRELIMINARY

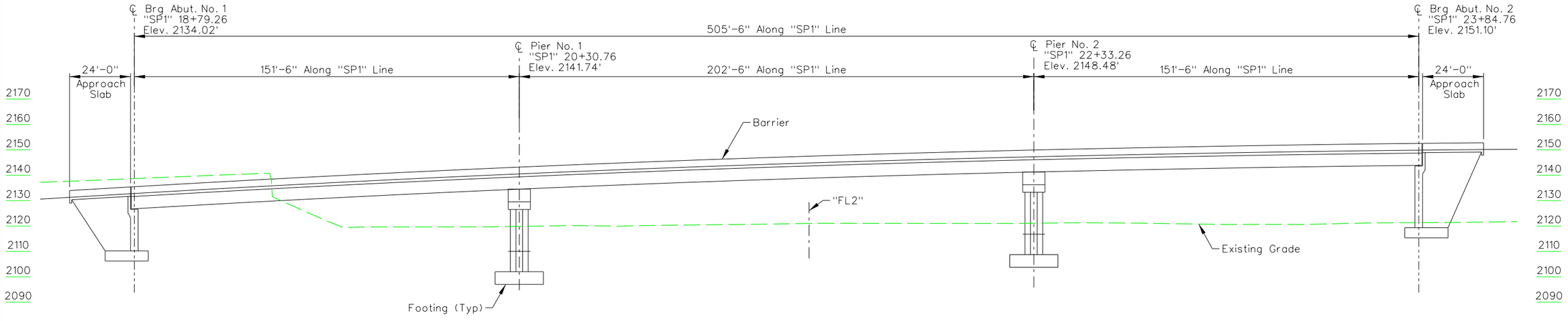
SUBJECT TO REVISION

$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	

T21S R61E





STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

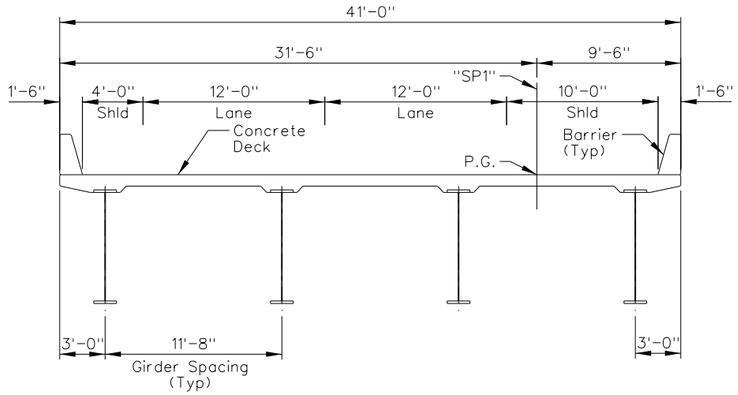
PLAN AND ELEVATION

I-15 NB TO SPRING MTN RD
OFF-RAMP
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

I-15 NB TO SPRING MTN RD
OFF-RAMP
ALTERNATIVE 2

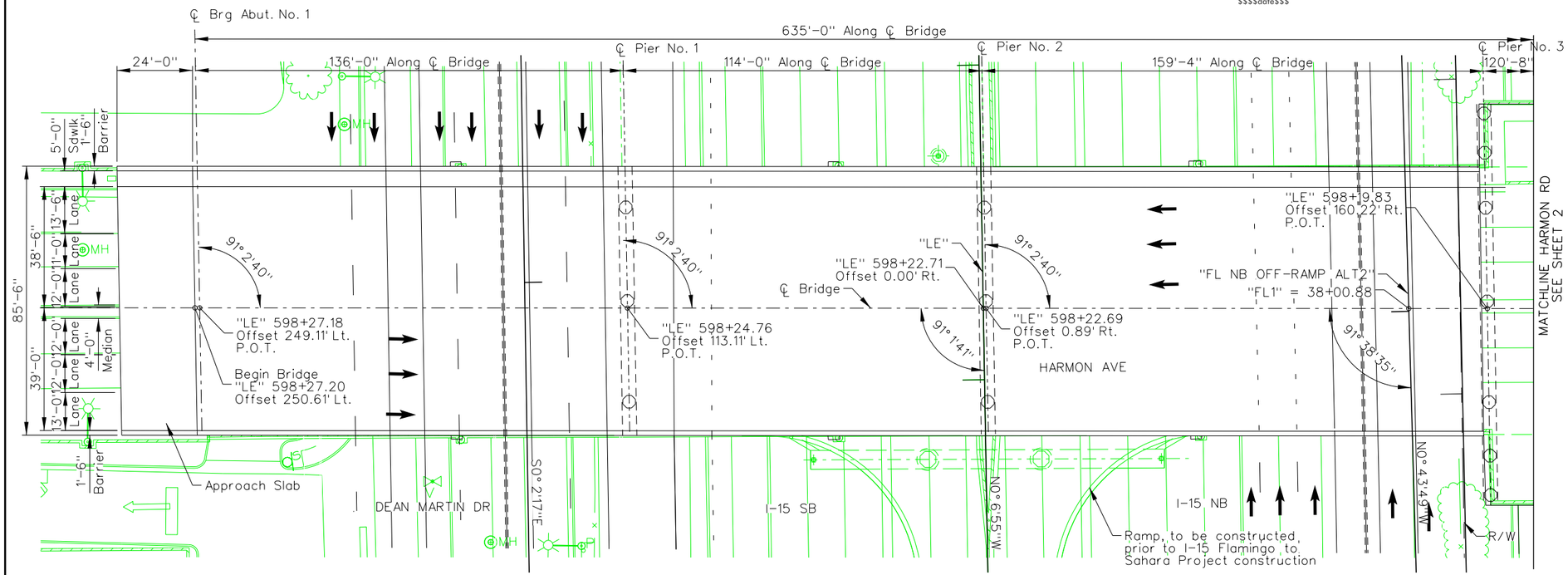
$$$$dgnspec$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	

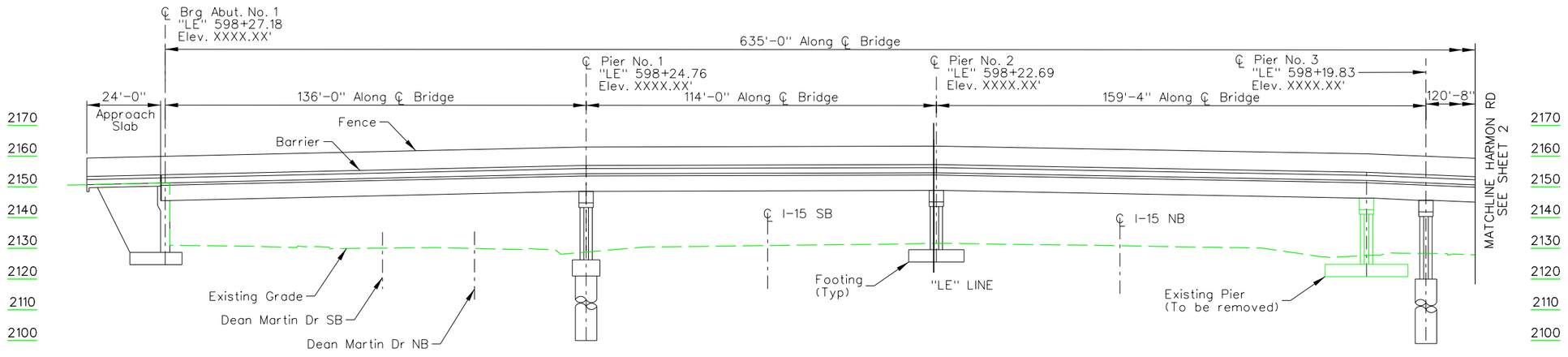
PRELIMINARY

SUBJECT TO REVISION

$$$$date$$$



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

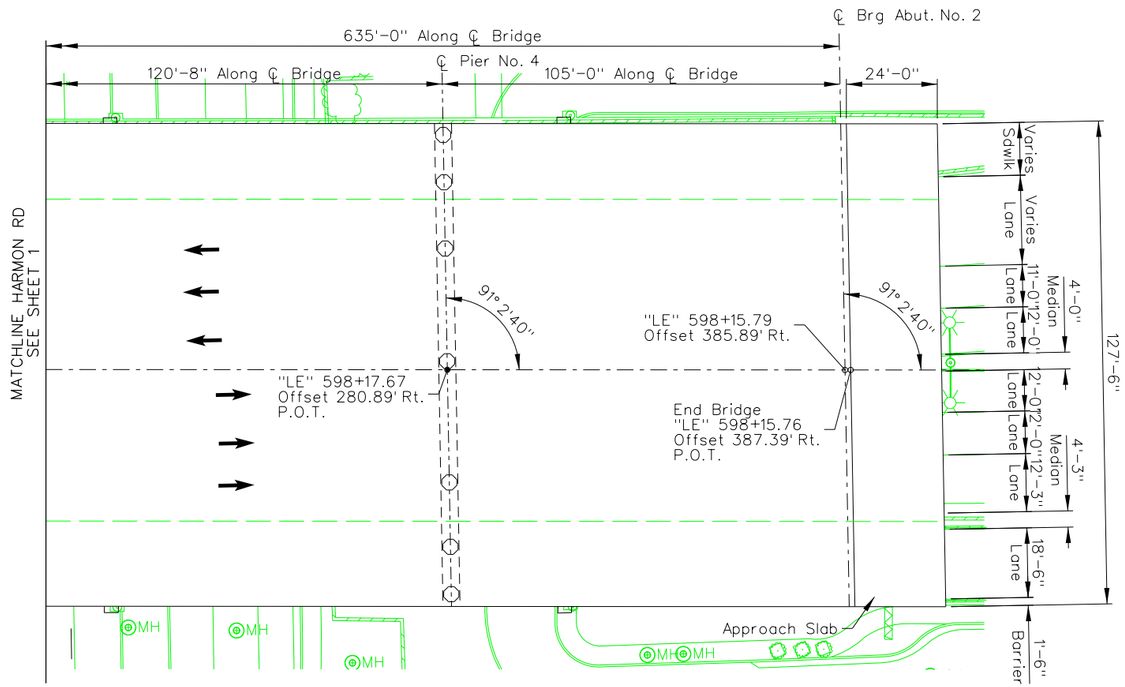
HARMON AVE OVER I-15
SHEET 1 OF 2
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

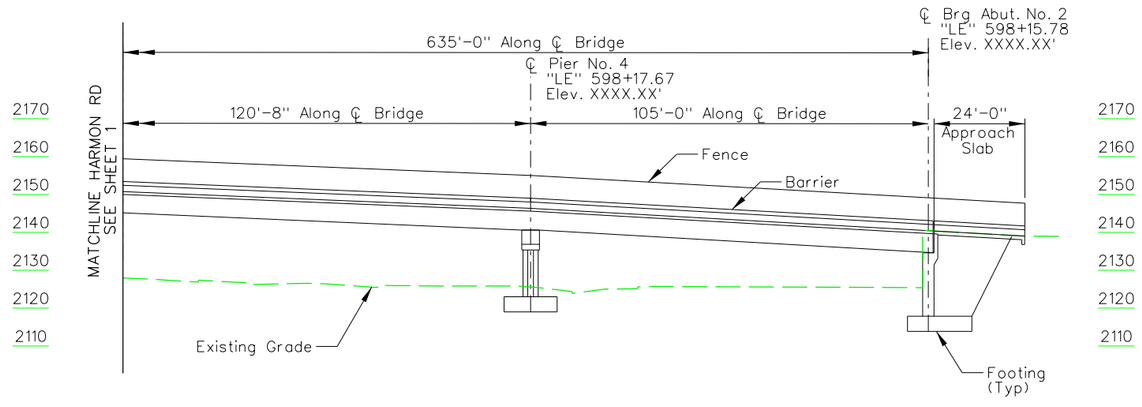
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

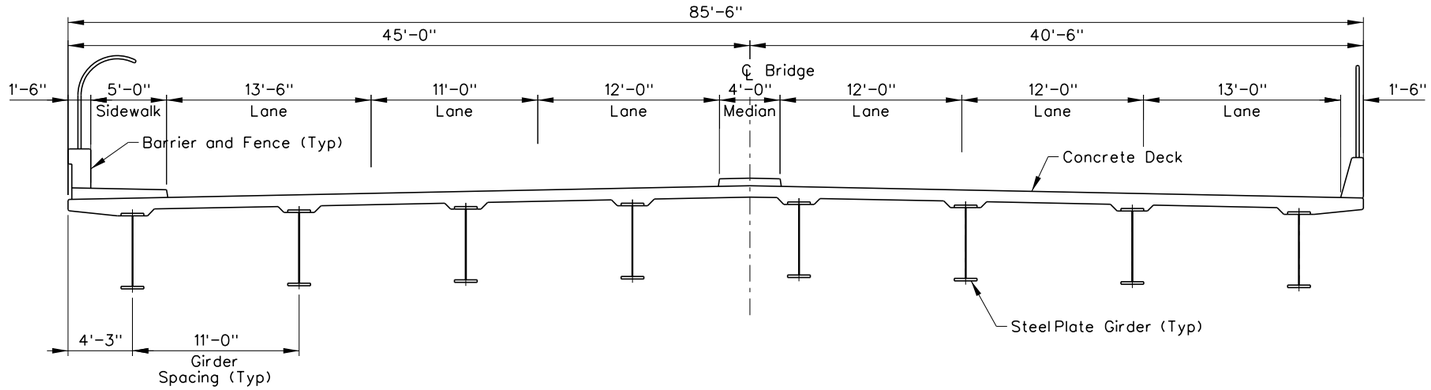
I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

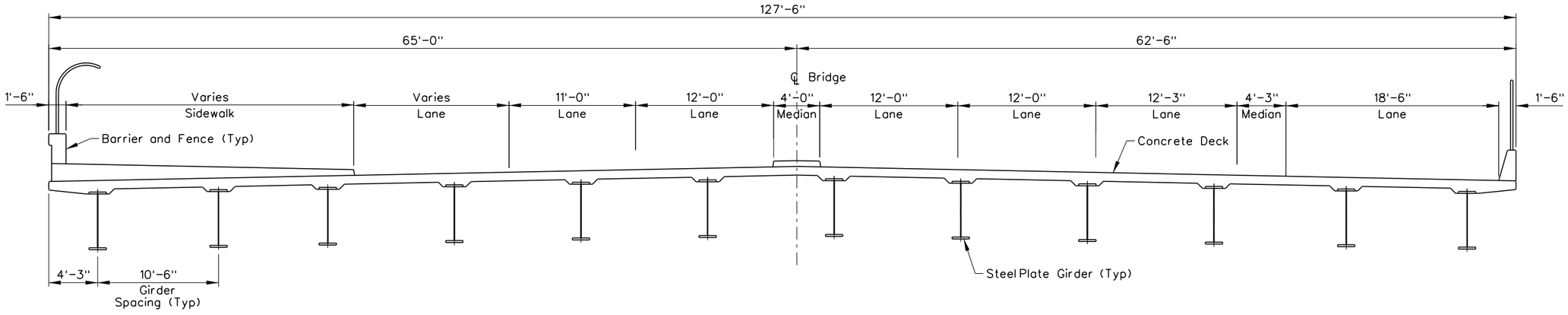
HARMON AVE OVER I-15
SHEET 2 OF 2
ALTERNATIVE 2

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$



TYPICAL SECTION
Spans 1 – 4



TYPICAL SECTION
Spans 5 & 6

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

HARMON AVE OVER I-15

ALTERNATIVE 2

$$$$dgnspec$$$

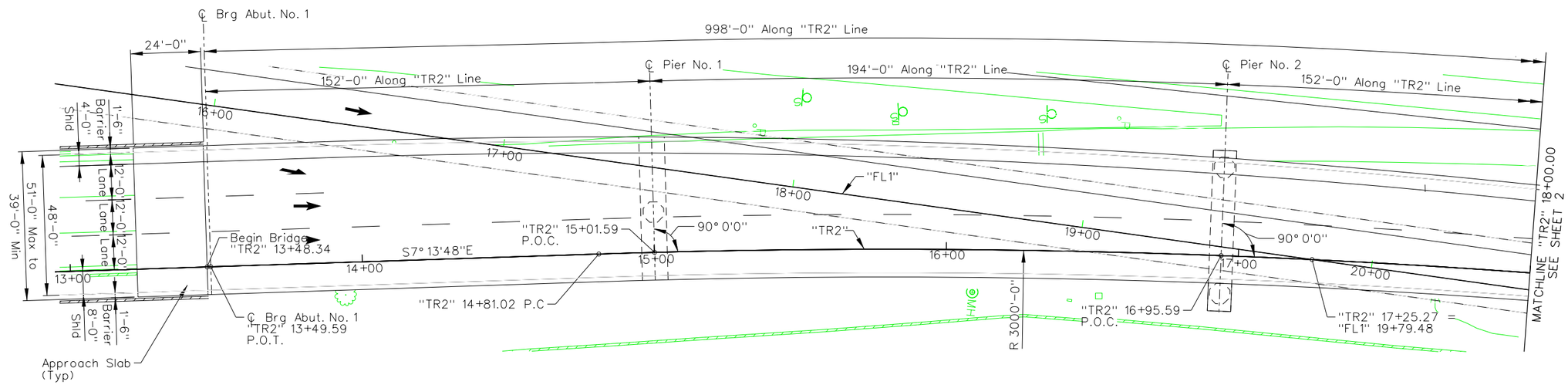
PRELIMINARY

SUBJECT TO REVISION

$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	

T21S R61E



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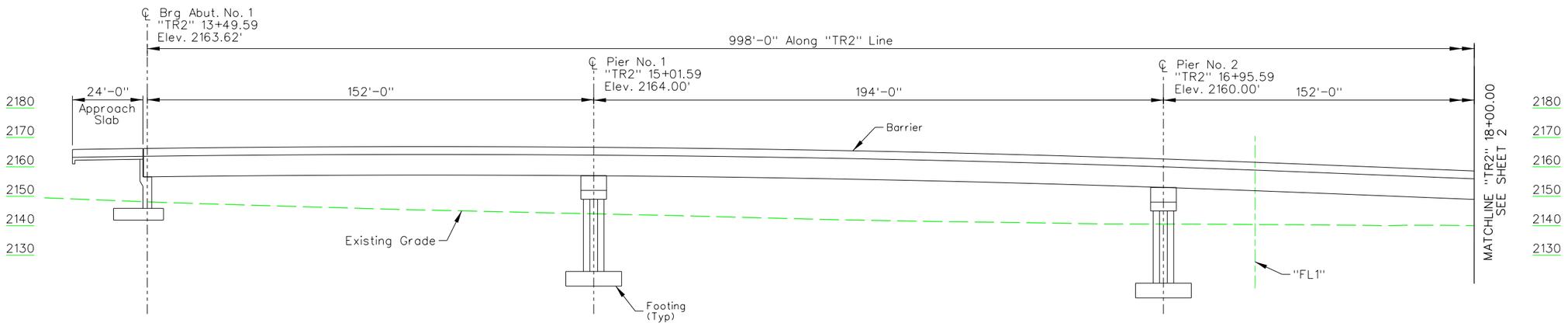


ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

PLAN AND ELEVATION

TROPICANA AVE TO I-15 NB ON-RAMP
SHEET 1 OF 2
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

$$$$dgnspec$$$

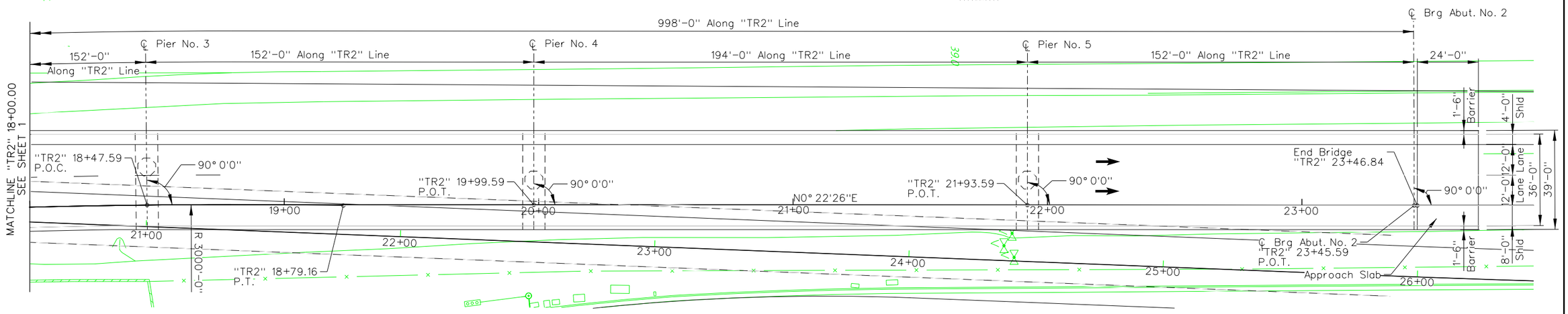
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	

PRELIMINARY

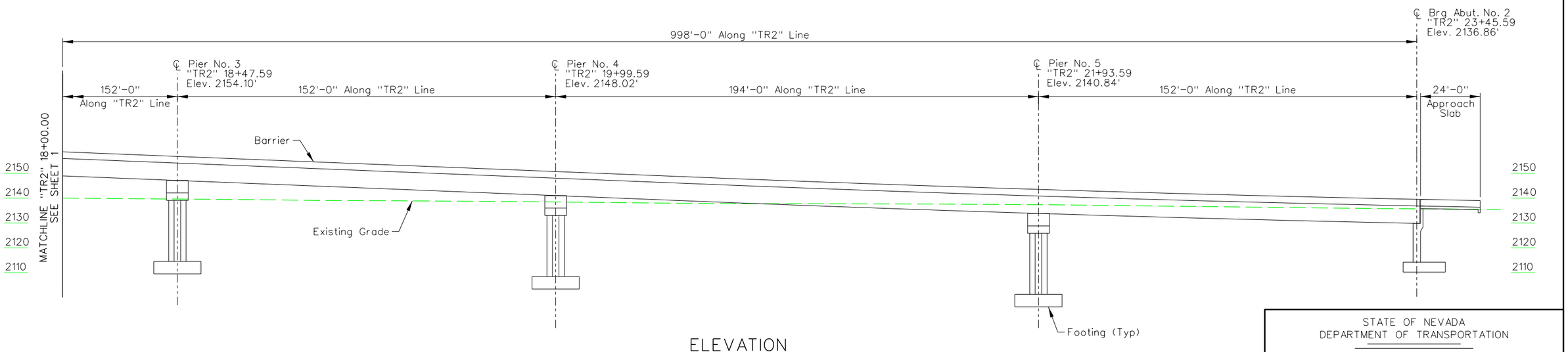
SUBJECT TO REVISION

$$$$date$$$

T21S R61E



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

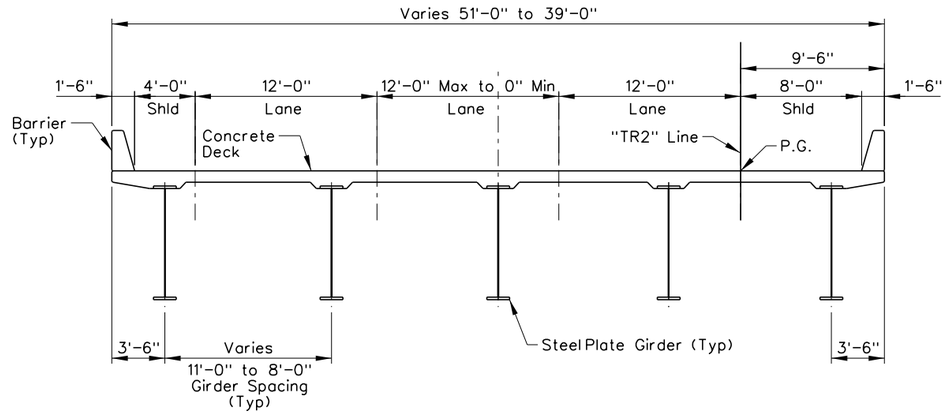
PLAN AND ELEVATION

TROPICANA AVE TO I-15 NB ON-RAMP
SHEET 2 OF 2
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

TROPICANA AVE TO I-15 NB ON-RMP
ALTERNATIVE 2

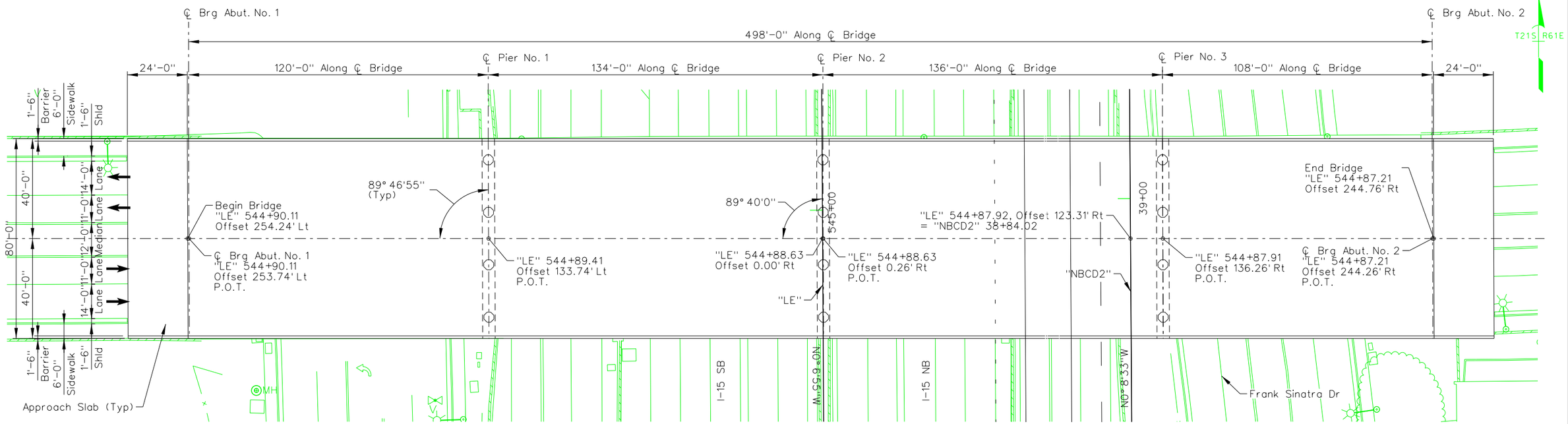
$$$$dgnspec$$$

PRELIMINARY

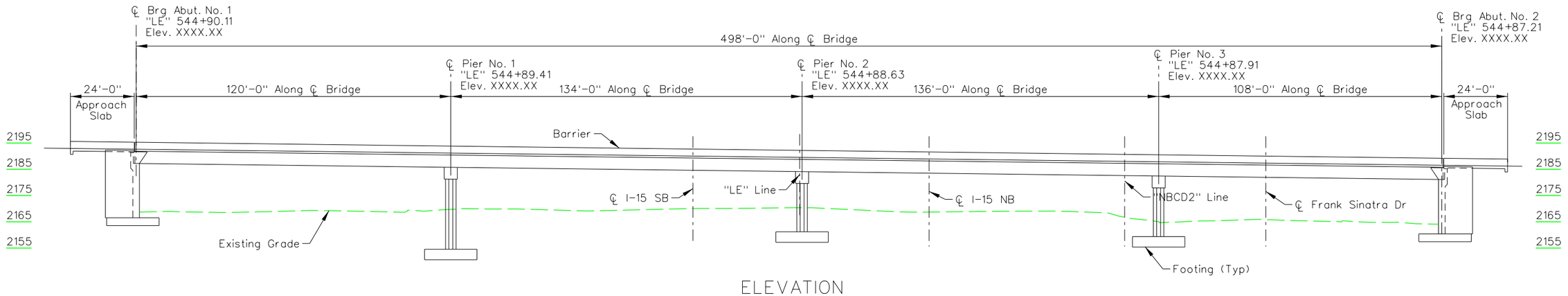
SUBJECT TO REVISION

$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	



PLAN



ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

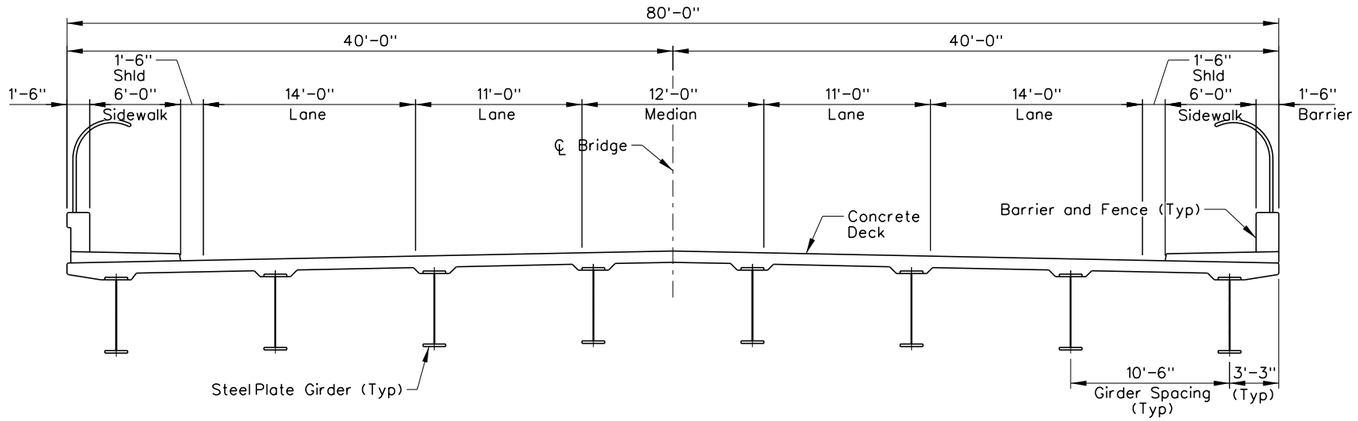
PLAN AND ELEVATION

HACIENDA OVER I-15
ALTERNATIVE 2

$$$$scale$$$ PLOT SCALE $$$$username$$$

PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	SPI-015-1(75)	CLARK	



TYPICAL SECTION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

I-15 FLAMINGO TO SAHARA

TYPICAL SECTION

HACIENDA OVER I-15

ALTERNATIVE 2

Appendix C: Existing Bridge Inspection Summary

I-15 Flamingo to Sahara Feasibility Study

Reference Data : Bridge Inspection Reports

						27/106				75A	76	94	crticality = major crticality = now		58	59	60	62	67	70
Bridge Number and Name	**No fix**	**Minor Fix**	**Major Rehab or Replace**	**Deficiencies**	**Structure Type**	**Length**	**Year Built /(Reconst.)**	**Sufficiency Rating**	**FO**	**SD**	**Type of work**	**Lenght of Stru Impr**	**Bridge Impr Cost ('000)**	**Maintenance Inspection Work Items**	**Work Items costs per Report**		**Deck condition**	**Super. Condition**	**Sub. condition**	**Culvert**	**Struc Eval**	**Posting**
B 795 I 15 OVER TROPICANA WASH			X	deterioration of structural elements 1. Typical cracking with rust staining and delamination at construction joints 2.Typical corroded rebar in divider walls due to lack of cover	Reinforced concrete culvert	40.0 ft	1964 / 2011	**70**	**N**	**N**	_	0 ft	$0	Perform action within next 2 yrs. Seal Crack in Asphalt Wearing Surface Repair Spalled Concrete in Culvert Wall/Slab	$2,600		N	N	N	6 Deterioration or initial disintegration	6 Equal to present minimum criteria	5 Equal to or above legal load
B1793 SR 592 FLAMINGO Over TROPICANA WASH			X	Bridge railing and approach guard rail does not meet acceptable standards deterioration of structural elements 1. Transverse crack with efflorescence and rust staining in Barrel 3 ceiling 2.Corroded rebar in north face of Divider Wall 1	Reinforced concrete culvert	37.4 ft	1986 / (0000)	**79.3**	**N**	**N**	31 Replace.	64.9	$477	Perform action within next 2 yrs. Remove Debris/Trash from Culvert Perform action when time and money permit Repair Spalled Concrete in Culvert Wall/Slab Replace/Install/Tighten Bridge Railing Nuts Replace/Install Guardrail Apply Protective Coating to Culvert	$5,101	plus some items with unit costs	N	N	N	6 Deterioration or initial disintegration	6 Equal to present minimum criteria	5 Equal to or above legal load
G 805N I 15 Over UPRR	X			deterioration of structural elements 1. Concrete Abutment 2 - Near Girder 3 - Diagonal Cracking 2.Concrete Abutment 2 - Bay 5 - Spall with Exposed and Corroded Rebar Steel Pile - Abutment 1 - Bay 10 - Measurable Section Loss	cont steel I-grider with CIP deck	320.9 ft	1964 / (0000)	**82**	**N**	**N**	35 Rehab	320.86	$50	Perform action withn 1 yr: Repair/Replace Relief Joint Header Perform action within next 2 yrs. Apply Protective Coating to exposed pile Seal Deck/Slab Cracks Repair Undermined portion of Abutment Wingwall or Pier Clean Expansion Joints Perform action when time and money permit Repair Spalled Concrete at Abutment Repair/Fill Approach Embankment Erosion Repaint/Refinish Concrete Bridge Railing Replace/Tighten Anchor Bolt Nuts in Bearing Assemblies Repaint Portion of Steel Superstructure Substructure Graffiti Eradication Seal Cracks in Abutment (Pressure Inject Epoxy)	$100 K	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	6 Satisfactory minor deterioration	N	6 Equal to present minimum criteria	5 Equal to or above legal load

Bridge Number and Name	No fix	Minor Fix	Major Rehab or Replace	Deficiencies	Structure Type	Length	Year Built /(Reconst.)	Sufficiency Rating	FO	SD	Type of work	Lenght of Stru Impr	Bridge Impr Cost ('000)	Maintenance Inspection Work Items	Work Items costs per Report		Deck condition	Super. Condition	Sub. condition	Culvert	Struc Eval	Posting
G 805R I 15 RAMP TO SPR.M Over UPRR/RAMP SP.M TO I 15		X			Prestressed Concrete Closed Web/Box Girder	1576.1 ft	1999 / (0000)	**94.6**	**N**	**N**	_	0	$0	<u>Perform action within 1 yr:</u> Clean Deck Drains <u>Perform action within next 2 yrs.</u> Repair/Replace Relief Joint Header Material Clean Expansion Joints Repair/Maintain Utility/Utility Supports Repair/Maintain Bridge-mounted Sign/Sign Structure Seal Cracks in Concrete Superstructure (Pressure Inject Epoxy)- *hinges* Remove and Replace Pavement Relief Joint (Preformed Joint Filler) <u>Perform action when time and money permit</u> Seal Cracks in Concrete Bridge Railing (Pressure Inject Epoxy) Seal Deck/Slab Cracks (Pourable Sealant) Repaint/Refinish Concrete Bridge Railing <u>Monitor</u> Monitor cracks in hinges for widening	$81,591	plus some items with unit costs	6 Satisfactory minor deterioration	6 Satisfactory minor deterioration	7 Good minor problems	N	6 Equal to present minimum criteria	5 Equal to or above legal load
G 805S I 15 Over UPRR		X		deterioration of structural elements 1. Concrete Abutment 1 - Bay 1 - Spall	cont steel I-grider with CIP deck	320.9 ft	1964 / (0000)	**94.6**	**N**	**N**	31 Replace.	351.7	$1,485	<u>Perform action within next 2 yrs</u> Repair Deck/SlabSpalling/Delamination (Partial Depth) Remove and Replace Pavement Relief Joint (Preformed Joint Filler) Seal Deck/Slab Cracks (Pourable Sealant) Clean Expansion Joints <u>Perform action when time and money permit</u> Seal Cracks in Abutment (Pressure Inject Epoxy) Repair Spalled Concrete at Pier Repair/Maintain Utility/Utility Supports Repair/Fill Approach Embankment Erosion Replace/Install Chain Link Fence/Railing Substructure Graffiti Eradication Repair Spalled Concrete at Abutment Repaint Portion of Steel Superstructure Repaint Portion of Steel Superstructure Replace/Tighten Anchor Bolt Nuts in Bearing Assemblies Clean Debris from Abutment/Pier Seat	$200 K	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	6 Satisfactory minor deterioration	N	6 Equal to present minimum criteria	5 Equal to or above legal load

Bridge Number and Name	No fix	Minor Fix	Major Rehab or Replace	Deficiencies	Structure Type	Length	Year Built /(Reconst.)	Sufficiency Rating	FO	SD	Type of work	Lenght of Stru Impr	Bridge Impr Cost ('000)	Maintenance Inspection Work Items	Work Items costs per Report		Deck condition	Super. Condition	Sub. condition	Culvert	Struc Eval	Posting
G1064 SR 589/SAHARA AV Over UPRR,WESTERN, INDUSTRIAL			X	typical active leaking at pier caps deck rehabilitation deterioration of structural elements 1. Spall with un-corroded/painted rebar in the north deck fascia at Abutment 1 2. Spall with painted/un-corroded rebar in the Bay 6 deck soffit near Abutment 1 3.Typical spall with corroded prestressing strand ends at the closure pour in the girder ends 4. Fire damage at Column 7, Pier 7	PC/PS I-girder	904.8 ft	1966/0000	73.2	N	N	31 Replace.	812.65	$6,155	Perform action within 1 yr: Remove and Replace Pavement Relief Joint (Preformed Joint Filler) Remove and Replace Expansion Joint (Strip Seal) Repair Deck/Slab Spalling/Delamination (Partial Depth) Repair/Fill Approach Embankment Erosion Repair Spalls in Concrete Superstructure Repair/MaintainUtility/Utility Supports Perform action within next 2 yrs. Repair/MaintainUtility/Utility Supports Replace/Install Chain Link Fence/Railing Seal Crack in Asphalt Wearing Surface Seal Crack in Approach Slab (Pourable Sealant) Repair Deck/Slab Soffit Spalling/Delamination Tighten/Provide Guardrail to Bridge rail Connection Bolts Seal Deck/Slab Cracks (Pourable Sealant) Clean Debris from Abutment/Pier Seat Repair Spalled Concrete at Pier Perform action when time and money permit Patch Spalls in Concrete Bridge Railing Seal Cracks in Abutment (Pressure Inject Epoxy) Repaint/RefinishConcrete Bridge Railing Apply Protective Coating to Abutment/Wingwall Seal Cracks in Pier (Pressure Inject Epoxy) Seal Cracks in Concrete Slope Paving (Pressure Inject	$425,150	plus some items with unit costs	5 Fair (minor section loss)	5 Fair (minor section loss)	7 Good minor problems	N	5 somewhat better than minimum adequacy	5 Equal to or above legal load LR<1 for P9 (0.8) to P13 (0.77) truck
G1743 SR 592 FLAMINGO Over UPRR AND FLAMINGO WASH	X			1. Crack in the weld at the top of the flange/vertical stiffener juncture in Diaphragm 4, Bay 9, Girder 10, Span2 2. Fire damage and failed coating on the Girder 8, north face at Abutment2 3.Bent cross bracing at Abutment 2, Bay 8	Steel Girder Bridge	381.9 ft	1985/(0000)	89	N	N	_	0	$0	Perform action within 1 yr: Fatigue Crack Arrest -Drill Crack Tips in Steel Members Remove and Replace Expansion Joint (Compression Seal) Replace/Install Chain Link Fence/Railing Clean Debris from Abutment/Pier Seat Perform action within next 2 yrs. Patch Spalls in Concrete Bridge Railing Repaint Portion of Steel Superstructure Repair/Maintain Utility/Utility Supports Backfill Undermining/Erosion Replace/Tighten Anchor Bolt Nuts in Bearing Assemblies Eradicate Graffiti onSuperstructure Members Substructure Graffiti Eradication Apply Protective Coating to Substructure Replace/Tighten Bolts in Steel Connections Seal Deck/Slab Cracks (Pourable Sealant) Repaint/Refinish Concrete Bridge Railing Seal Cracks in Concrete Slope Paving (Pressure Inject Epoxy) Remove and Replace Concrete Sidewalk Perform action when time and money permit Backfill Undermining/Erosion Replace/Tighten Anchor Bolt Nuts in Bearing Assemblies Eradicate Graffiti on Superstructure Members Substructure Graffiti Eradication Apply Protective Coating to Substructure Replace/Tighten Bolts in Steel Connections Seal Deck/Slab Cracks (Pourable Sealant) Repaint/Refinish Concrete Bridge Railing	$172,069	plus some items with unit costs	6 Satisfactory minor deterioration	6 Satisfactory minor deterioration	7 Good minor problems	N	6 Equal to present minimum criteria	5 Equal to or above legal load LR<1 for P13 (0.92) truck
H 804N I 15N Over TWAIN AVE	X			geometric deficiencies Deck Geometry : Basically intolerable requiring high priority of replacement	R/C Frame (except frame culverts)	38.4 ft	1964/(1998)	66	Y	N	_	0	$0	Perform action within next 2 yrs. Seal Deck/Slab Cracks (Pourable Sealant) Pavement Relief Joint (Preformed Joint Filler	$38,571		6 Satisfactory minor deterioration	6 Satisfactory minor deterioration	7 Good minor problems	N	6 Equal to present minimum criteria	5 Equal to or above legal load

Bridge Number and Name	No fix	Minor Fix	Major Rehab or Replace	Deficiencies	Structure Type	Length	Year Built /(Reconst.)	Sufficiency Rating	FO	SD	Type of work	Lenght of Stru Impr	Bridge Impr Cost ('000)	Maintenance Inspection Work Items	Work Items costs per Report		Deck condition	Super. Condition	Sub. condition	Culvert	Struc Eval	Posting
H 804R I 15 RAMP TO SP. M Over TWAIN AVE		X		deterioration of structural elements 1. Open/incipient spall in the northeast wingwall	R/C Frame (except frame culverts)	33.8 ft	1999/(0000)	**94.8**	**N**	**N**	_	0	$0	Perform action within next 2 yrs. Repair Deck/SlabSpalling/Delamination (Partial Depth) Repair Spalled Concrete at Wingwall Clean Expansion Joints Seal Deck/Slab Cracks (Pourable Sealant) Repair/Replace Relief Joint Header Material Perform action when time and money permit Repair/MaintainUtility/Utility Supports	$4,701		6 Satisfactory minor deterioration	6 Satisfactory minor deterioration	8 Very Good no problems noted	N	6 Equal to present minimum criteria	5 Equal to or above legal load
H 804S I 15S Over TWAIN AVE			X	deterioration of structural elements 1. Spall with exposed rebar in the south abutment backwall	R/C Frame (except frame culverts)	38.4 ft	1964/(1998)	**89.3**	**N**	**N**	_	0	$0	Perform action within next 2 yrs. Repair Asphalt Wearing Surface Remove and Replace Pavement Relief Joint (Preformed Joint Filler) Seal Deck/Slab Cracks (Pourable Sealant) Perform action when time and money permit Repair Spalled Concrete at Abutment Patch Spalls in Concrete Bridge Railing Apply Protective Coating to Abutment/Wingwall Repaint/Refinish Concrete Bridge Railing	$150 K		6 Satisfactory minor deterioration	6 Satisfactory minor deterioration	7 Good minor problems	N	6 Equal to present minimum criteria	5 Equal to or above legal load
H1744 SR592 FLAMINGO RD Over INDUSTRIAL RD		X			post-tensioned concrete box girder	162.1 ft	1985/(0000)	**85.7**	**N**	**N**	_	0	$0	Perform action within next 2 yrs. Repair Asphalt Wearing Surface Seal Deck/Slab Cracks (Pourable Sealant) Repair Deck/SlabSpalling/Delamination (Partial Depth) Perform action when time and money permit Repaint/Refinish Concrete Bridge Railing Seal Cracks in Concrete Slope Paving (Pressure Inject Epoxy) Repair/Replace Metal Bridge Railing Repair/Maintain Utility/Utility Supports Install Object Marker Remove and Replace Concrete Sidewalk	$64,150	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
H1901N I 15N Over INDUSTRIAL RD		X		deterioration of structural elements 1. Spall in Abutment 2 under Bearing7	CIP post-tensioned concrete box girder	208.0 ft	1993/(0000)	**86.1**	**N**	**N**	_	0	$0	Perform action within next 2 yrs. Remove and Replace Pavement Relief Joint (Preformed Joint Filler) Clean Expansion Joints Perform action when time and money permit Repair Spalled Concrete at Abutment Seal Deck/Slab Cracks (Pourable Sealant) Repaint/Refinish Concrete Bridge Railing Patch Spalls in Concrete Approach Railing	$77,229		7 Good minor problems	8 Very Good no problems noted	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
H1901R RMP 15N TO SPR MTN Over INDUSTRIAL RD		X		deterioration of structural elements Diagonal crack at the east corner of Abutment 2	CIP post-tensioned concrete box girder	204.1 ft	1999/(0000)	**95.6**	**N**	**N**	_	0	$0	Perform action within next 2 yrs. Clean Expansion Joints Repair/Replace ReliefJoint Header Material Perform action when time and money permit Repair Spalled Concrete at Abutment Patch Spalls in Concrete Bridge Railing Seal Deck/Slab Cracks (Pourable Sealant)	$12,517		7 Good minor problems	8 Very Good no problems noted	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load

Bridge Number and Name	No fix	Minor Fix	Major Rehab or Replace	Deficiencies	Structure Type	Length	Year Built /(Reconst.)	Sufficiency Rating	FO	SD	Type of work	Lenght of Stru Impr	Bridge Impr Cost ('000)	Maintenance Inspection Work Items	Work Items costs per Report	Deck condition	Super. Condition	Sub. condition	Culvert	Struc Eval	Posting
H1901S I 15S Over INDUSTRIAL RD		X		deterioration of structural elements Spall in the end block of Girder 1 at Abutment 2	CIP post-tensioned concrete box girder	208.0 ft	1993/(0000)	**88.2**	**N**	**N**	31 Replace.	242	$1,604	<u>Perform action within next 2 yrs.</u> Clean Expansion Joints Repair/MaintainUtility/Utility Supports Repair/Replace Relief Joint Header Material <u>Perform action when time and money permit</u> Repair Spalls in Concrete Superstructure Seal Deck/Slab Cracks (Pourable Sealant)	$26,754	7 Good minor problems	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
H2011 DESERT INN RD Over I 15		X		leakage through joints and cracks Prestressed Concrete Box Girder - Span 1 - Efflorescence at Patches changes in geometry Prestressed Concrete Box Girder - 6 inch Offset of Girder Diaphragm at Northeast Corner deterioration of structural elements 1.Reinforced Concrete Abutment - Incipient Spalling and Associated Cracking at North End of Abutment 2 2.Reinforced Concrete Abutment - Northeast Corner - Deterioration at Top 3.Reinforced Concrete Abutment - Spall at Shear Key 1 at Abutment 2	CIP post-tensioned concrete box girder	470.1 ft	1995/(0000)	**95.2**	**N**	**N**	_	0	$0	<u>Perform action within next 2 yrs.</u> Clean Expansion Joints Repair/MaintainUtility/Utility Supports Seal Deck/Slab Cracks (Pourable Sealant) Seal Cracks in Concrete Approach Railing (Pressure Inject Epoxy) <u>Perform action when time and money permit</u> Repaint/Refinish Concrete Bridge Railing Repair Deck/SlabSpalling/Delamination (Partial Depth)	$49,460 plus some items with unit costs	6 Satisfactory minor deterioration	6 Satisfactory minor deterioration	6 Satisfactory minor deterioration	N	6 Equal to present minimum criteria	5 Equal to or above legal load LR<1 for P9 (0.8) to P13 (0.63) truck
H2015 I 15 RAMP TO SP. M Over RAMP FLAMINGO TO I 15		X			CIP post-tensioned concrete box girder		1999/(xxxx)	Structure Inventory &appraisal Report is missing LR<1 for P11(0.96) to P13 (0.85) truck						<u>Perform action within next 2 yrs.</u> Clean Expansion Joints <u>Perform action when time and money permit</u> Seal Cracks in Concrete Slope Paving (Pressure Inject Epoxy)	$1,600						
H2263 HARMON AV Over I-15, INDUSTRIAL, FSD		X		deterioration of structural elements 1. Spall in the deck overhang at the northwest 2.Spall in the north Abutment 1 cheek wall leakage through joints and cracks Typical leakage staining on abutments due to failed strip seal glands changes in geometry Tilted keeper plate due to sole plate condition at Bearing 2, Abutment 1	Steel Girder Bridge	636.8 ft	2003/(0000)	**98.5**	**N**	**N**	_	0	$0	<u>Perform action withn 1 yr:</u> Repair/Maintain Utility/Utility Supports Remove and Replace Strip Seal Gland <u>Perform action within next 2 yrs.</u> Repair Spalled Curb Replace/Install Chain Link Fence/Railing Seal Deck/Slab Cracks (Pourable Sealant) <u>Perform action when time and money permit</u> Repair Spalled Concrete at Pier Patch Spalls in Concrete Approach Railing Repaint Metal Bridge Railing Seal Deck/Slab Cracks (Pressure Inject Epoxy) Repaint/Refinish Concrete Bridge Railing Repair Deck/Slab Soffit Spalling/Delamination Repair Spalled Concrete at Abutment Clean Debris from Abutment/Pier Seat	$139,515	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load LR<1 for P9 (0.76) to P13 (0.66) truck

Bridge Number and Name	No fix	Minor Fix	Major Rehab or Replace	Deficiencies	Structure Type	Length	Year Built /(Reconst.)	Sufficiency Rating	FO	SD	Type of work	Lenght of Stru Impr	Bridge Impr Cost ('000)	Maintenance Inspection Work Items	Work Items costs per Report		Deck condition	Super. Condition	Sub. condition	Culvert	Struc Eval	Posting
H3056 SA3 RAMP Over OAKEY BLVD		X		deterioration of structural elements 1. Spall Abutment 2	PS concrete girder with composite deck		2017/(XXXX)	Structure Inventory &appraisal Report is missing						<u>Perform action within 1 yr:</u> Place Polymer Concrete Overlay <u>Perform action when time and money permit</u> Repair Spalled Concrete at Abutment Clean Expansion Joints	$334	plus some items with unit costs						
H3217N I-15N Over OAKEY BLVD		X		changes in geometry Crooked Diaphragms	PS concrete girder with composite deck	233.2 ft	2018/(0000)	**89.3**	**N**	**N**	_	0	$0	<u>Perform action within 1 yr:</u> Place/Replace Multi-Layer Polymer Concrete Overlay Seal Deck/Slab Cracks (Pressure Inject Epoxy) <u>Perform action when time and money permit</u> Clean Expansion Joints	$262,935	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
H3217S I 15 Over OAKEY BLVD		X		Spall on Girder 9	PS concrete girder with composite deck	221.0 ft	2018/(0000)	**89.3**	**N**	**N**	_	0	$0	<u>Perform action within 1 yr:</u> Place Polymer Concrete Overlay <u>Perform action within next 2 yrs.</u> Seal Cracks in Abutment (Pressure Inject Epoxy Repair Spalls in Concrete Superstructure		items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	8 Equal to present desirable criteria	5 Equal to or above legal load
I 806N I 15N Over SR591 SPRING MTN RD		X			CIP post-tensioned concrete box	231.0 ft	1994/(0000)	**85.7**	**N**	**N**	31 Replace.	264	$1,714	<u>Perform action within next 2 yrs.</u> Seal Deck/Slab Cracks (Pourable Sealant) Clean Expansion Joints Repair/Replace Relief Joint Header Material Repair/Maintain Utility/Utility Supports <u>Perform action when time and money permit</u> Seal Cracks in Concrete Slope Paving (Pressure Inject Epoxy) Repair/Fill Approach Embankment Erosion Patch Spalls in Concrete Bridge Railing	$49,770	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
I 806R RMP 15S-E SPR MTN Over I 15, SPR MTN RD, RMP		X		Prestressed Concrete Box Girder - Northeast Corner - Spall	cont. composite steel plate Girder	1530.2 ft	1999/(0000)	**97.2**	**N**	**N**	_	0	$0	<u>Perform action within 1 yr:</u> Clean Expansion Joints Remove and Replace Strip Seal Gland Clean Debris from Abutment/Pier Seat <u>Perform action within next 2 yrs.</u> Repair/Replace Expansion Joint Header Clean Deck Drains Seal Deck/Slab Cracks (Pourable Sealant) <u>Perform action when time and money permit</u> Seal Cracks in Concrete Superstructure (Pressure Inject Epoxy) Replace Elastomeric Bearing Pads Other Substructure Rehabilitation/Strengthening Remove and Replace Pavement Relief Joint (Preformed Joint Filler) Spot Clean and Paint Steel Beams/Bearing Assemblies Eradicate Graffiti on Superstructure Members Replace/Tighten Anchor Bolt Nuts in Bearing Assemblies	$117,825	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load

Bridge Number and Name	No fix	Minor Fix	Major Rehab or Replace	Deficiencies	Structure Type	Length	Year Built /(Reconst.)	Sufficiency Rating	FO	SD	Type of work	Lenght of Stru Impr	Bridge Impr Cost ('000)	Maintenance Inspection Work Items	Work Items costs per Report		Deck condition	Super. Condition	Sub. condition	Culvert	Struc Eval	Posting
I 806S I 15S Over SR591 SPRING MTN RD		X		Stalactite formation in weep holes of Girder 7 geometric deficiencies Underclearence: Intolerable	CIP post-tensioned concrete box	232.0 ft	1994/(0000)	**86.1**	Y	**N**	31 Replace.	265.75	$1,727	<u>Perform action withn 1 yr:</u> Clean Expansion Joints <u>Perform action within next 2 yrs.</u> Remove and Replace Pavement Relief Joint (Preformed Joint Filler) Repair/Maintain Bridge-mounted Sign/Sign Structure <u>Perform action when time and money permit</u> Seal Cracks in Concrete Slope Paving (Pressure Inject Epoxy) Patch Spalls in Concrete Bridge Railing Seal Deck/Slab Cracks (Pourable Sealant) Investigate infiltration of Girder 6 and Girder 7 in Span 1 as evidenced by weep hole leakage. Repair Spalled Concrete Slope Paving Repair/MaintainUtility/Utility Supports	$11,723	plus some items with unit costs	7 Good minor problems	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
I 837 I 15 Over SR589 SAHARA AV		X		deterioration of structural elements deck cracking appears to be reflective of the top mat of rebar and may indicate corrosion and/or lack of adequate cover.	cont. rolled steel	287.4 ft	2001/(0000)	**84.6**	**N**	**N**	_	0	$0	<u>Perform action withn 1 yr:</u> Clean Expansion Joints <u>Perform action within next 2 yrs.</u> Repair/Replace Relief Joint Header Material Remove and Replace Expansion Joint (Compression Seal) Repair/Maintain Utility/Utility Supports Repair Spalled Concrete Slope Paving Clean Debris from Abutment/Pier Seat Patch Spalls in Concrete Bridge Railing Place/Replace Multi-Layer Polymer Concrete Overlay (Install multilayer polymer concrete overlay or equivalent to prolong service life of the deck.) <u>Perform action when time and money permit</u> Repair Spalled Concrete at Wingwall Replace/Tighten Anchor Bolt Nuts in Bearing Assemblies	$600 K	plus some items with unit costs	5 Fair (minor section loss)	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
I 837R I 15 Over I 15 & SAHARA		X			cont. composite steel plate Girder	1611.9 ft	1995/(0000)	**94.4**	**N**	**N**	31 Replace.	1611	$4,351	<u>Perform action withn 1 yr:</u> Replace/Tighten Bolts in Steel Connections Clean Deck Drains <u>Perform action within next 2 yrs.</u> Repair Deck/Slab Soffit Spalling/Delamination Clean Expansion Joints Spot Clean and Paint Steel Beams/Bearing Assemblies Clean Debris from Abutment/Pier Seat <u>Perform action when time and money permit</u> Repair/Replace Relief Joint Header Material Repaint/Refinish Concrete Bridge Railing	$129,166	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load LR<1 for P13 (0.66) truck

Bridge Number and Name	No fix	Minor Fix	Major Rehab or Replace	Deficiencies	Structure Type	Length	Year Built /(Reconst.)	Sufficiency Rating	FO	SD	Type of work	Lenght of Stru Impr	Bridge Impr Cost ('000)	Maintenance Inspection Work Items	Work Items costs per Report		Deck condition	Super. Condition	Sub. condition	Culvert	Struc Eval	Posting
I1745 SR592 FLAMINGO RD Over I 15		X		Impact damage to Girder 11 and 12 in Span 2	steel I Girder	296.9 ft	1985/(0000)	**86.8**	**N**	**N**	_	0	$0	<u>Perform action within 1 yr:</u> Repair/Maintain Utility/Utility Supports Remove and Replace Expansion Joint (Compression Seal) <u>Perform action within next 2 yrs.</u> Seal Crack in Asphalt Wearing Surface Repair/Fill Approach Embankment Erosion Clean Debris from Abutment/Pier Seat Remove and Replace Concrete Curb Seal Deck/Slab Cracks (Pourable Sealant) <u>Perform action when time and money permit</u> Replace/Install Approach Chain Link Fence/Railing Seal Cracks in Concrete Slope Paving (Pressure Inject Epoxy) Heat Straighten Steel Members	$500 K	plus some items with unit costs	6 Satisfactory minor deterioration	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load
I2482 RMP 15S TO E SAHAR Over SR589 SAHARA AV		X		Impact damage with failed coating on Girder 1, Span 2 Spall in the northeast corner of Abutment 2 backwall	Cont. steel Bridge	276.6 ft	2001/(0000)	**94.1**	**N**	**N**	_	0	$0	<u>Perform action within 1 yr:</u> Clean Expansion Joints <u>Perform action within next 2 yrs.</u> Spot Clean and Paint Steel Beams/Bearing Assemblies Clean Debris from Abutment/Pier Seat Seal Crack in Asphalt Wearing Surface <u>Perform action when time and money permit</u> Repaint/Refinish Concrete Bridge Railing Repair Spalled Concrete at Abutment Seal Cracks in Concrete Slope Paving (Pressure Inject Epoxy)	$22,186	plus some items with unit costs	7 Good minor problems	7 Good minor problems	7 Good minor problems	N	7 Better than present minimum criteria	5 Equal to or above legal load

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MEMORANDUM

June 3, 2021

To: Garakhalli Mohan, Sr Engineer IV

From: Jeffrey Hanna, SR/WA

Subject: Revised Right-of-Way Cost Estimate for Alternatives 1 & 2
I-15 Flamingo to Sahara Feasibility Study

The following is a revised Right-of-Way (R/W) Impact Analysis and Cost Estimate for the I-15 Flamingo to Sahara feasibility study, specifically related to Alternatives 1 and 2. This revision provides for the addition of one parcel, which will potentially be impacted under Alternative 2 and the conversion of a previously non-digital billboard, to digital. The remaining parcels identified in this report were provided by the design team and do identify what are believed to be impacted, based on preliminary information.

For the R/W analysis, we relied upon information provided by the design team, along with aerial mapping available from several sources on the internet. For the Cost Estimate, we relied upon the Marshall Valuation handbook (for improvement costs), along with sales and listings of comparable real property. The intent of this report is to provide a vehicle that allows for project planning, risk assessment and identification of potential costs associated with the acquisition of additional R/W. Please note, the R/W cost estimate is not an appraisal, nor should it be used for any other purpose than purely budgeting for the various alternatives being considered.

IMPACT ANALYSIS

There are several properties which offer increased risk to the project schedule and budget for the alternatives being proposed. The biggest risks involve impacts to structures, either totally, or partially, within the proposed acquisition areas. Our estimate process did not include access to the properties, including building structures. In addition,when a billboard is impacted,we always look for ways to relocate the structures and business, if at all possible. It is our understating that, while the City of Las Vegas ordinances allow for relocation of billboards impacted by public projects, Clark County has a moratorium on billboards. For this analysis, we assumed that any billboard impacted within unincorporated Clark County could not be relocated; therefore,these signs represent a significant impact to the project from a R/W perspective.

The following properties may present a significant risk to the project:

APN 162-08-802-002/STEWART, JEFFREY & FAMILY TR:This proposed partial acquisition will impact a small concrete block building and cause removal of a non-digital double sided billboard

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sign. It was estimated that the concrete block building would be a purchased in total. The billboard is located within unincorporated Clark County. Accordingly, it will most likely not be relocatable.

APN 162-08-802-001 / NSA PROPERTY HOLDINGS LLC: This proposed partial acquisition impacts a significant portion of a 2-story self-storage building. For this estimate we assumed a total loss of the remaining portion of the building and relocation of all the personal property items for an estimated 140 mini-storage units. While the acquisition will most likely require a total acquisition of one building, the remainder property is still functional as a self-storage business.

APN 162-08-703-011 / CROMER GEORGE A FAMILY TRUST: This proposed partial acquisition will impact 3 consecutive parcels owned by the same Trust. A double-sided digital billboard, concrete block building and a notable amount of personal property items will be impacted. The billboard is located within unincorporated Clark County and most likely will not be relocatable. It was estimated that the concrete block building would be purchased in total, any personal property items stored in the building and all items situated in the acquisition area will need to be relocated.

APN 162-08-703-006 / TUFFLI COMPANY INC: This proposed partial acquisition will also impact a double-sided digital billboard. This billboard is also located within unincorporated Clark County and most likely will not be relocatable.

APN 162-08-703-003 / JPCRE INVESTMENTS LLC: This proposed partial acquisition hits a relatively small corner of a new, very good quality, concrete block, meat cold storage building. This building has 27 foot-high ceilings. The risks involved are high and include the practicality of new load-bearing wall replacement and the uncertainty of what is located within the portion of the building that must be removed. Other problems are that the bulk of the off-street parking is being eliminated and access to the rear and north face of the building is being impaired. We want to ensure this business can remain in place and fully functional in the after condition.

APN 162-08-703-001/REM INVESTMENTS LLC:This proposed partial acquisition was assumed to be a total acquisition due to the impacts to the4875 Sq. Ft. metal building,whichwill totally damage the remainder of thestructure. In addition,the acquisition will impact a double-sideddigitalbillboard.We assumed a total acquisition for the building and relocation costs for any personal property needing to be relocated.The billboard is located within unincorporated Clark County and most likely will not berelocatable.

APN162-08-613-003/ HIGHLAND INDUSTRIAL PARKLLC:The proposed partial acquisition will impact a non-digital double-sided billboard. This property is located within the City of Las Vegas, which permits the relocation of billboards that are impacted by publicprojects. Although the City may permit the relocation of the billboard, it appears that it may be physically impossible due to the limited space between the proposed right-of-way and the existing buildings on the remainder.A considerable amount of off-street parking may be eliminated as well.

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COST ESTIMATE

Estimated R/W cost information, relative to the two alternatives currently under consideration, is provided below:

Alternative 1 "Shift":
- Estimated R/W Costs: $37,260,000 (rounded)
- Estimated Impact to Privately Owned Property: 157,194sf
- Estimated Impact to Existing Public R/W: 110,556sf

Alternative 2 "Shift":
- Estimated R/W Costs: $45,310,000 (rounded)
- Estimated Impact to Privately Owned Property: 191,133sf
- Estimated Impact to Existing Public R/W: 95,680sf

The attached spreadsheets provide a breakdown of estimated costs for each parcel that is potentially being impacted. Please keep in mind that as more information becomes available over time, design changes will occur. As a result, the impact to private property can and will also change. It will be necessary to amend these R/W Cost Estimates in the future to reflect the changes and improvements to project designs, along with any changes that individual property owners may make to their property.

Upon review of the attached, please keep in mind that an estimated contingency of 15% was applied to both R/W cost estimates to account for condemnation activities and other costs that are impossible to estimate at this stage of the process. As previously noted, our cost estimate is not an appraisal and its intended use is for budgeting purposes only.

R/W COST ESTIMATE WORKSHEET

Atkins, Member of the SNC Lavalin Group | **PROJECT: 1-15** | **EA** | **COUNTY**

ALTERNATIVE # 1

Date: June 2, 2021

OWNER	APN	Land Use Code	Total Property Area	Area Type	R/W Area	Estimated Land Cost	Sq Ft Value	Improvement Value	Damages	Billboard*	Escrow / Title Costs	Appraisal / Review Costs	Relcoation Cost	# RAP Displacees	Costs per Parcel	Excess Area
Spilsbury J&M Invest	162-08-802-003	50.21	1.70	AC	486	$ 19,500	$ 40	$ 6,700	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 36,700	-
Stewart J & J Family Tr	162-08-802-002	50.24	0.88	AC	1,171	$ 46,900	$ 40	$ 24,400	$ 20,000	$ 1,950,000	$ 1,500	$ 20,000	$ 70,000	-	$ 2,132,800	-
NSA Property Holdings	162-08-802-001	51.25	2.16	AC	5,413	$ 216,500	$ 40	$ 151,300	$ 577,500	$ -	$ 1,500	$ 15,000	$ 965,000	-	$ 1,926,800	-
Blackacre Properties	162-08-703-012	50.24	1.59	AC	5,965	$ 238,600	$ 40	$ 17,000	$ -	$ -	$ 1,500	$ 15,000	$ -	-	$ 272,100	-
Cromer George Family Tr	162-08-703-011	40.37	1.67	AC	8,163	$ 326,500	$ 40	$ 16,400	$ -	$ 5,000,000	$ 1,500	$ 15,000	$ 275,000	-	$ 5,634,400	-
Cromer George Family Tr	162-08-703-010	50.21	0.56	AC	2,999	$ 120,000	$ 40	$ 66,000	$ -	$ -	$ 1,500	$ 2,500	$ -	-	$ 190,000	-
Cromer George Family Tr	162-08-703-009	58.73	1.28	AC	7,446	$ 297,900	$ 40	$ 14,900	$ -	$ -	$ 1,500	$ 2,500	$ -	-	$ 316,800	-
JPCRE Investments	162-08-703-008	40.37	1.00	AC	5,936	$ 237,500	$ 40	$ 1,000	$ -	$ -	$ 1,500	$ 9,000	$ 25,000	-	$ 274,000	-
Tuffli Co	162-08-703-007	40.37	0.60	AC	3,840	$ 153,600	$ 40	$ -	$ -	$ -	$ 1,500	$ 2,500	$ 250,000	-	$ 407,600	-
Tuffli Co	162-08-703-006	40.37	0.53	AC	3,600	$ 144,000	$ 40	$ -	$ -	$ 5,000,000	$ 1,500	$ 15,000	$ 50,000	-	$ 5,210,500	-
Tuffli Co	162-08-703-005	15	0.52	AC	3,402	$ 136,100	$ 40	$ -	$ -	$ -	$ 1,500	$ 2,500	$ -	-	$ 140,100	-
Needax LLC	162-08-703-004	50.24	1.47	AC	7,686	$ 307,500	$ 40	$ 65,400	$ -	$ -	$ 1,500	$ 9,000	$ 20,000	-	$ 403,400	-
JPCRE Investments	162-08-703-003	40.36	1.03	AC	6,226	$ 249,100	$ 40	$ 166,400	$ 256,500	$ -	$ 1,500	$ 20,000	$ 50,000	-	$ 743,500	-
Gunter Family Tr	162-08-703-002	40.37	0.76	AC	4,722	$ 188,900	$ 40	$ 21,400	$ -	$ -	$ 1,500	$ 9,000	$ 15,000	-	$ 235,800	-
REM Investments LLC.	162-08-703-001	40.37	0.72	AC	5,374	$ 215,000	$ 40	$ 138,300	$ 132,400	$ 5,000,000	$ 1,500	$ 15,000	$ 300,000	-	$ 5,802,200	-
Highland Industrial Park	162-08-613-007	50.24	0.60	AC	8,828	$ 353,100	$ 40	$ 115,700	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 665,000	-
Highland Industrial Park	162-08-613-006	50.24	1.25	AC	9,409	$ 376,400	$ 40	$ 139,000	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 711,600	-
Highland Industrial Park	162-08-613-005	50.24	1.23	AC	8,819	$ 352,800	$ 40	$ 136,900	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 685,900	-
Highland Industrial Park	162-08-613-004	50.24	1.23	AC	8,578	$ 343,100	$ 40	$ 114,800	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 654,100	-
Highland Industrial Park	162-08-613-003	50.24	1.23	AC	8,711	$ 348,500	$ 40	$ 72,900	$ -	$ 1,700,000	$ 1,500	$ 15,000	$ 185,700	-	$ 2,323,600	-
Highland Industrial Park	162-08-613-002	50.24	1.23	AC	8,895	$ 355,800	$ 40	$ 137,200	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 689,200	-
Highland Industrial Park	162-08-613-001	50.24	1.38	AC	8,828	$ 353,100	$ 40	$ 137,200	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 686,500	-
CY&R Heritage Inn Palmdale	162-20-214-003	50.24	10.14	AC	4,758	$ 333,100	$ 70	$ 28,300	$ 5,000	$ -	$ 1,500	$ 9,000	$ -	-	$ 376,900	-
Tharaldson Ethanolk Plant	162-20-214-004	50.21	2.31	AC	3,898	$ 272,900	$ 70	$ 21,500	$ -	$ -	$ 1,500	$ 9,000	$ 20,000	-	$ 325,000	-
Camco Inc	162-20-210-006	50.21	0.49	AC	3,045	$ 213,200	$ 70	$ 17,500	$ 2,000	$ -	$ 1,500	$ 9,000	$ -	-	$ 243,200	-
J 3 Harmon	162-20-210-015	15	0.17	AC	287	$ 20,100	$ 70	$ 900	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 31,500	-
Hom Line	162-20-213-000	Condo	3+/-	AC	3,215	$ 321,500	$ 100	$ 2,300	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 334,300	-
Greenberg Lawrence & Beth	162-20-311-322	Condo	3.71	AC	4,834	$ 483,400	$ 100	$ 65,400	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 559,300	-
ARH LLC	162-20-312-000	Condo	4.03	AC	2,390	$ 239,000	$ 100	$ 36,900	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 286,400	-
Heritage Inn Las Vegas	162-20-302-024	43.32	2.93	AC	270	$ 27,000	$ 100	$ 1,900	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 39,400	-
Clark County Public ROW	-	-	-	-	110,556	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	-	-
		Land Use Code	Total Property Area	Area Type	R/W Area	Estimated Land Cost	Sq Ft Value	Improvement Value	Damages	Billboard*	Escrow / Title Costs	Appraisal / Review Costs	Relcoation Cost	# RAP Displacees	Total Costs per Parcel	
		-	-	AC	267,750	$ 7,290,600		$ 1,717,600	$ 993,400	$ 18,650,000	$ 45,000	$ 302,000	$ 3,339,900	-	$32,338,600	
TOTAL Cost															$32,400,000	(rounded)
15% **CONTINGENCY** Cost															$4,860,000	
Total **ESTIMATED** R/W Costs															**$37,260,000**	

R/W COST ESTIMATE WORKSHEET

Atkins, Member of the SNC Lavalin Group | **PROJECT: 1-15** | **EA** | **COUNTY**

ALTERNATIVE # 2

Date: June 2, 2021

OWNER	APN	Land Use Code	Total Property Area	Area Type	R/W Area	Estimated Land Cost	Sq Ft Value	Improvement Value	Damages	Billboard*	Escrow / Title Costs	Appraisal / Review Costs	Relcoation Cost	# RAP Displacees	Costs per Parcel	Excess Area
Nevada Power	162-20-801-015	72.63	0.37	AC	275	$ 27,500	$ 100		$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 38,000	-
Aria Resort & Casino	162-20-711-008	42.31	61.43	AC	22,954	$ 4,590,800	$ 200	$ 156,100	$ -	$ -	$ 1,500	$ 15,000	$ -	-	$ 4,763,400	-
Bcore Paradise	162-20-510-002	42.31	74.17	AC	10,395	$ 2,079,000	$ 200	$ 70,700	$ -	$ -	$ 1,500	$ 15,000	$ -	-	$ 2,166,200	-
Spilsbury J&M Invest	162-08-802-003	50.21	1.70	AC	486	$ 19,500	$ 40	$ 6,700	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 36,700	-
Stewart J & J Family Tr	162-08-802-002	50.24	0.88	AC	1,171	$ 46,900	$ 40	$ 24,400	$ 20,000	$ 1,950,000	$ 1,500	$ 20,000	$ 70,000	-	$ 2,132,800	-
NSA Property Holdings	162-08-802-001	51.25	2.16	AC	5,413	$ 216,500	$ 40	$ 151,300	$ 577,500	$ -	$ 1,500	$ 15,000	$ 965,000	-	$ 1,926,800	-
Blackacre Properties	162-08-703-012	50.24	1.59	AC	5,965	$ 238,600	$ 40	$ 17,000	$ -	$ -	$ 1,500	$ 15,000	$ -	-	$ 272,100	-
Cromer George Family Tr	162-08-703-011	40.37	1.67	AC	8,163	$ 326,500	$ 40	$ 16,400	$ -	$ 5,000,000	$ 1,500	$ 15,000	$ 275,000	-	$ 5,634,400	-
Cromer George Family Tr	162-08-703-010	50.21	0.56	AC	2,999	$ 120,000	$ 40	$ 66,000	$ -	$ -	$ 1,500	$ 2,500	$ -	-	$ 190,000	-
Cromer George Family Tr	162-08-703-009	58.73	1.28	AC	7,446	$ 297,900	$ 40	$ 14,900	$ -	$ -	$ 1,500	$ 2,500	$ -	-	$ 316,800	-
JPCRE Investments	162-08-703-008	40.37	1.00	AC	5,936	$ 237,500	$ 40	$ 1,000	$ -	$ -	$ 1,500	$ 9,000	$ 25,000	-	$ 274,000	-
Tuffli Co	162-08-703-007	40.37	0.60	AC	3,840	$ 153,600	$ 40		$ -	$ -	$ 1,500	$ 2,500	$ 250,000	-	$ 407,600	-
Tuffli Co	162-08-703-006	40.37	0.53	AC	3,600	$ 144,000	$ 40		$ -	$ 5,000,000	$ 1,500	$ 15,000	$ 50,000	-	$ 5,210,500	-
Tuffli Co	162-08-703-005	15	0.52	AC	3,402	$ 136,100	$ 40		$ -	$ -	$ 1,500	$ 2,500	$ -	-	$ 140,100	-
Needax LLC	162-08-703-004	50.24	1.47	AC	7,686	$ 307,500	$ 40	$ 65,400	$ -	$ -	$ 1,500	$ 9,000	$ 20,000	-	$ 403,400	-
JPCRE Investments	162-08-703-003	40.36	1.03	AC	6,226	$ 249,100	$ 40	$ 166,400	$ 256,500	$ -	$ 1,500	$ 20,000	$ 50,000	-	$ 743,500	-
Gunter Family Tr	162-08-703-002	40.37	0.76	AC	4,722	$ 188,900	$ 40	$ 21,400	$ -	$ -	$ 1,500	$ 9,000	$ 15,000	-	$ 235,800	-
REM Investments LLC	162-08-703-001	40.37	0.72	AC	5,374	$ 215,000	$ 40	$ 138,300	$ 132,400	$ 5,000,000	$ 1,500	$ 15,000	$ 300,000	-	$ 5,802,200	-
Highland Industrial Park	162-08-613-007	50.24	0.60	AC	8,828	$ 353,100	$ 40	$ 115,700	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 665,000	-
Highland Industrial Park	162-08-613-006	50.24	1.25	AC	9,409	$ 376,400	$ 40	$ 139,000	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 711,600	-
Highland Industrial Park	162-08-613-005	50.24	1.23	AC	8,819	$ 352,800	$ 40	$ 136,900	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 685,900	-
Highland Industrial Park	162-08-613-004	50.24	1.23	AC	8,578	$ 343,100	$ 40	$ 114,800	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 654,100	-
Highland Industrial Park	162-08-613-003	50.24	1.23	AC	8,711	$ 348,500	$ 40	$ 72,900	$ -	$ 1,700,000	$ 1,500	$ 15,000	$ 185,700	-	$ 2,323,600	-
Highland Industrial Park	162-08-613-002	50.24	1.23	AC	8,895	$ 355,800	$ 40	$ 137,200	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 689,200	-
Highland Industrial Park	162-08-613-001	50.24	1.38	AC	8,828	$ 353,100	$ 40	$ 137,200	$ -	$ -	$ 1,500	$ 9,000	$ 185,700	-	$ 686,500	-
CY&R Heritage Inn Palmdale	162-20-214-003	50.24	10.14	AC	4,758	$ 333,100	$ 70	$ 28,300	$ 5,000	$ -	$ 1,500	$ 9,000	$ -	-	$ 376,900	-
Tharaldson Ethanolk Plant	162-20-214-004	50.21	2.31	AC	3,898	$ 272,900	$ 70	$ 21,500	$ -	$ -	$ 1,500	$ 9,000	$ 20,000	-	$ 325,000	-
Camco Inc	162-20-210-006	50.21	0.49	AC	3,045	$ 213,200	$ 70	$ 17,500	$ 2,000	$ -	$ 1,500	$ 9,000	$ -	-	$ 243,200	-
J 3 Harmon	162-20-210-015	15	0.17	AC	287	$ 20,100	$ 70	$ 900	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 31,500	-
Hom Line	162-20-213-000	Condo	3+/-	AC	3,215	$ 321,500	$ 100	$ 2,300	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 334,300	-
Greenberg Lawrence & Beth	162-20-311-322	Condo	3.71	AC	4,834	$ 483,400	$ 100	$ 65,400	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 559,300	-
ARH LLC	162-20-312-000	Condo	4.03	AC	2,390	$ 239,000	$ 100	$ 36,900	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 286,400	-
Heritage Inn Las Vegas	162-20-302-024	43.32	2.93	AC	270	$ 27,000	$ 100	$ 1,900	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 39,400	-
Mirage Resorts Inc.	162-20-801-013	42.31	1.44	AC	315	$ 31,500	$ 100	$ -	$ -	$ -	$ 1,500	$ 9,000	$ -	-	$ 42,000	-
Clark County Public ROW	-	-	-	-	95,680	$ -	$ -	$ -	$ -	$ -					$	

		Land Use Code	Total Property Area	Area Type	R/W Area	Estimated Land Cost	Sq Ft Value	Improvement Value	Damages	Billboard*	Escrow / Title Costs	Appraisal / Review Costs	Relcoation Cost	# RAP Displacees	Costs per Parcel	
		-	-	AC	286,813	$ 14,018,740		$ 1,944,400	$ 993,400	$ 18,650,000	$ 51,000	$ 350,000	$ 3,339,900	0	$39,348,200	
TOTAL Cost															$39,400,000	(rounded)
15% **CONTINGENCY** Cost															$ 5,910,000	
Total **ESTIMATED** R/W Costs															**$45,310,000**	(rounded)