Appendix I:
Non-standard Features

Note: This list excludes the segments where we have DARs at Lusk on I-805, and at Voigt on I-5. All interchanges which belong to city of Encinitas will be assumed that the designs would stay the same as current designs.

Preferred Alternative

8+4 with Buffer (Preferred Alternative) Non-standard Features/Design Exceptions			
LOCATIONS	**STATION**	**DESCRIPTION**	**HDM INDEX**
Genesee_NB -G1M	491_497	Non-standard Decision Sight Distance, Non-standard lengths 3 vertical curves	
Genesee_NB -R1B	493	Non-standard Decision Sight Distance	
Genesee_NB- R1B	494_499	Non-standard curve lengths (3 vertical curves) , Non-standard Sopping sight distance, Design Speed, Decision Sight Distance	
Genesee_SB_ G4B	492_498	Non-standard Decision Sight Distance (2 vertical curves)	
Genesee_SB_ R2M	495_500	Non-standard Decision Sight Distance	
Entire of the project		Multiple cross slopes for the mainlanes due to hydroplaning problems.	301.2
Entire of the project		Pavement structural	612.2
From Sorrento Valley to Del Mar Heights		Non-standard lane widths and shoulder widths(both sides- due to sign structures, ROW avoid impacts).	301.1, 302.1
From Sorrento Valley to Del Mar Heights		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Genesee	518-520	Non-standard outer separation	310.2
Genesee	518-520	Non-standard stopping sight distance, median width, superelevation	201.3, 305.1, 504.3(4)
Genesee	518-520	Non-standard horizontal clearance to fixed object	309.1
5/805 Merge		Non-standard lane drop (too short 2/3 WV)	504.4
5/805 Merge		Non-standard decision sight distance (110mph)	201.7
Carmel Valley SB on-ramp		Non-standard superelevation for the curve on the gore section. (does not match bridge)	504.3(4)
Carmel Valley SB on-ramp		Non-standard design speed after the gore	504.2
Carmel Valley SB on-ramp		Non-standard design for CHP enforcement path	
Carmel Mountain/56		Non-standard interchange spacing	501.3
Del Mar Heights	549-576	Non-standard lane widths and shoulder widths(both sides).	301.1, 302.1
Del Mar Heights	549-576	Non-standard horizontal clearance to fixed object	309.1
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard taper to make lane drop (20:1 < 30:1)	504.3
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard design speed after the gore (25 design < 50 MPH)	504.2
Via De La Valle		Non-standard lane and shoulder width on SB direction.	301.1, 302.1
Via De La Valle R4 (EB to SB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3
Via De La Valle R5 (WB to SB on-ramp)		Non-standard design speed after the gore	504.2
Lomas Santa Fe	602-621	Need to check for stopping sight distance and vertical curve length.	
Lomas Santa Fe	602-621	Minimum distance (curb return to curb return) between ramp intersections and local road intersections (less than 125m or 165 m) (Lomas Santa Fe NB off-ramp and driveway access to Ross shopping center; Lomas Santa Fe NB on-ramp and Santa Helena; Lomas Santa Fe SB off-ramp Solana Hill Dr.; Lomas Santa Fe SB on-ramp and Solana Hill Dr.)	504.3
Lomas Santa Fe	602-621	Median planting to plant oleanders back in median along horizontal curve between Lomas Santa Fe and Manchester Ave.	902.1
Lomas Santa Fe	602-621	Non-standard interchange spacing between Lomas Santa Fe Dr. and Manchester Ave. 1.4km	501.3
Lomas Santa Fe Ramps	602-621	Check stopping sight distance and vertical curve length, shoulder width, and horizontal clearance	201.3, 204.4, 302.1, 309.1
Lomas Santa Fe Ramps	602-621	Non-standard shoulder width at spot locations of the modified Lomas Santa Fe NB and SB off-ramps	302.1
Lomas Santa Fe Local Street	602-621	Minimum distance (curb return to curb return) between ramp intersections and local road intersections (less than 125m or 165 m) (Lomas Santa Fe NB off-ramp and driveway access to Ross shopping center; Lomas Santa Fe NB on-ramp and Santa Helena; Lomas Santa Fe SB off-ramp Solana Hill Dr.; Lomas Santa Fe SB on-ramp and Solana Hill Dr.)	504.3
Lomas Santa Fe Local Street	602-621	Median planting to plant oleanders back in median along horizontal curve between Lomas Santa Fe and Manchester Ave.	902.1
Lomas Santa Fe Local Street	602-621	Non-standard interchange spacing between Lomas Santa Fe Dr. and Manchester Ave. 1.4km	501.3

8+4 with Buffer (Preferred Alternative)
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Manchester Ave.	621-640	Shoulder width, horizontal clearance	302.1, 309.1
Manchester Ave.	621-640	Need to check for stopping sight distance and minimum distance (curb return to curb return) between ramp intersections and local road interactions (89m between the SB off-ramp/Manchester Ave. intersection and Ocean Cove Dr./Manchester Ave. intersection; 30m between the NB on-ramp/Manchester Ave intersection and the proposed Manchester Ave/access road to DAR park-and-ride facility intersection).	201.3, 504.3
Manchester Ave.	621-640	Median planting to plant oleanders back in median along horizontal curve between Lomas Santa Fe and Manchester Ave.	902.1
Manchester Ave.	621-640	Non-standard interchange spacing between Lomas Santa Fe Dr. and Manchester Ave. 1.4km	501.3
Manchester Ave. Ramps	621-640	Need to check vertical curve length, stopping sight distance, shoulder width, and horizontal clearance.	204.4, 201.3, 302.1, 309.1
Birmingham Dr.	640-657	Shoulder width, horizontal clearance, interchange spacing between Birmingham Dr. and Santa Fe Dr.	302.1, 309.1, 501.3
Birmingham Dr.	640-657	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Birmingham Dr. Ramps	640-657	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Birmingham Dr. Ramps	640-657	Distance between ramp intersections and local road intersections (Birmingham Dr. NB on-ramp and Villa Cardiff Dr; Birmingham Dr. SB off-ramp and MacKinnon Ave; Birmingham Dr. SB on-ramp and MacKinnon Ave.)	504.3
MacKinnon Ave.	654-656	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Santa Fe Dr	654-656	Shoulder width, horizontal clearance, interchange spacing between Birmingham Dr. and Santa Fe Dr.; between Santa Fe Dr. and Encinitas Blvd.	302.1, 309.1, 501.3
Santa Fe Dr	654-656	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Santa Fe Dr	654-656	Distance between ramp intersections and local road intersections less than 125m or 165 m (Santa Fe Dr. NB on-ramp and Regal Rd.; Santa Fe Dr. DB off-ramp and driveway access to Scripps Memorial Hospital; Santa Fe Dr. SB on-ramp and driveway access to Vons shopping center)	504.3
Santa Fe Dr Ramps	654-656	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Santa Fe Dr Ramps	654-656	Distance between ramp intersections and local road intersections less than 125m or 165 m (Santa Fe Dr. NB on-ramp and Regal Rd.; Santa Fe Dr. DB off-ramp and driveway access to Scripps Memorial Hospital; Santa Fe Dr. SB on-ramp and driveway access to Vons shopping center)	504.3
Requeza St.	671-673	Need check for stopping sight distance and vertical curve length	201.3, 204.4
Encinitas Blvd.	670-687	Shoulder width, horizontal clearance, interchange spacing between Santa Fe Dr. and Encinitas Blvd.	302.1, 309.1, 501.3
Encinitas Blvd.	670-687	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Encinitas Blvd.	670-687	Distance between ramp intersection and local road intersection (less than 125m or 165m) (Encinitas blvd. NB on-ramp and Saxony Rd.; Encinitas Blvd NB off-ramp and Calle Magdalena; Encinitas Blvd. SB off-ramp and driveway to Petco Shopping Center; Encinitas Blvd. SB on-ramp and drive access to Radisson Inn Hotel)	504.3
Encinitas Blvd. Ramps	670-687	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Encinitas Blvd. Ramps	670-687	Distance between ramp intersection and local road intersection (less than 125m or 165m) (Encinitas blvd. NB on-ramp and Saxony Rd.; Encinitas Blvd NB off-ramp and Calle Magdalena; Encinitas Blvd. SB off-ramp and driveway to Petco Shopping Center; Encinitas Blvd. SB on-ramp and drive access to Radisson Inn Hotel)	504.3
Leucadia Blvd.	687-708	Shoulder width, horizontal clearance	302.1, 309.1
Leucadia Blvd.	687-708	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Leucadia Blvd.	687-708	Distance between ramp intersections and local road intersection (less than 125m or 165m) (Leucadia Blvd NB off-ramp and Clark Ave; Leucadia Blvd. NB on-ramp and Urania Ave; Leucadia Blvd. SB off-ramp and Orpheus Ave; Leucadia Blvd. SB on-ramp and Orpheus Ave.	504.3
Leucadia Blvd. Ramps	687-708	Shoulder width, horizontal clearance	302.1, 309.1
Leucadia Blvd. Ramps	687-708	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Leucadia Blvd. Ramps	687-708	Distance between ramp intersections and local road intersection (less than 125m or 165m) (Leucadia Blvd NB off-ramp and Clark Ave; Leucadia Blvd. NB on-ramp and Urania Ave; Leucadia Blvd. SB off-ramp and Orpheus Ave; Leucadia Blvd. SB on-ramp and Orpheus Ave.	504.3
Leucadia Blvd. Local Streets	687-708	Distance between ramp intersections and local road intersection (less than 125m or 165m) (Leucadia Blvd NB off-ramp and Clark Ave; Leucadia Blvd. NB on-ramp and Urania Ave; Leucadia Blvd. SB off-ramp and Orpheus Ave; Leucadia Blvd. SB on-ramp and Orpheus Ave.	504.3
La Costa Ave	708-731	Shoulder width, horizontal clearance	302.1, 309.1

8+4 with Buffer (Preferred Alternative)
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
La Costa Ave	708-731	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
La Costa Ave Ramps	708-731	Shoulder width.	302.1
La Costa Ave Ramps	708-731	Need to check vertical curve length and stopping sight distance.	204.4, 201.3
La Costa Ave Ramps	708-731	Distance between ramp intersection and local road intersection (less than 125m or 165m) (La Costa Ave NB off-ramp and Piraeus St.; La Costa Ave. NB on-ramp and driveway access to Park and Ride facility)	504.3
La Costa Ave Local Streets	708-731	Distance between ramp intersection and local road intersection (less than 125m or 165m) (La Costa Ave NB off-ramp and Piraeus St.; La Costa Ave. NB on-ramp and driveway access to Park and Ride facility)	504.3
La Costa Ave Local Streets	708-731	Distance between ramp intersections (La Costa Ave. NB off-ramp and SB on-ramp; La Costa Ave. NB on-ramp and SB off-ramp)	504.3
Chinquapin Ave	798-809	NB inside three general-purpose lanes 3.3m following the NB off ramp and through Tamarack Ave. OC	301.1
Chinquapin Ave.	798-809	NB HOV shoulder lane 2.4m	302.1
Chinquapin Ave.	798-809	Interchange spacing between Tamarack Ave and Carlsbad Village Dr. 1.35km	501.3
Carlsbad Village Dr.	811-820	NB inside three general-purpose lanes 3.3m. NB outside shoulder width before the NB off-ramp 1.2m.	301.1, 302.1
Carlsbad Village Dr.	811-820	Interchange spacing between Tamarack Ave and Carlsbad Village Dr. 1.35km	501.3
Carlsbad Village Dr.	811-820	Interchange spacing between Carlsbad Village Dr. and Las Flores Dr. (0.911km)	501.3
SR-78	830-835	Interchange spacing between Las Flores Drive and SR-78 0.85Km	501.3
SR-78 Ramps	830-835	Distance between successive exits NB to WB and NB to EB 200m	504.3
SR-78 R1 (WB to NB on-ramp)		Non-standard design speed on the curve due to ROW impact.	504.2
SR-78 R2 (NB to WB off-ramp)		Non-standard geometric curve for the loop ramp(35 m)	
SR-78 R2 (NB to WB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
SR-78 R3 (NB to EB off-ramp)		Non-standard connector configuration in the east side due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard connector configuration due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard design speed after the gore	504.2
SR-78 R4 (SB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
SR-78 R5 (SB off-ramp)		Non-standard design speed after the gore	504.2
Cassidy St.	835-841	Non-standard lane width, shoulder width, horizontal clearance, median width to keep Soto St. in place.	301.1, 302.1, 309.1, 305.1
Cassidy St.	835-841	Vertical curve length	204.4
Cassidy St.	835-841	Interchange spacing between SR-78 and Cassidy St.; between Cassidy St. and California St.	501.3
Cassidy Ramps	835-841	Check for stopping and decision sight distance standards.	201.3, 201.7
Cassidy Ramps	835-841	Check for vertical curve length	204.4
Cassidy R2 (SB on-ramp)		Non-standard ramp configuration due to weaving length problem	
Cassidy R2 (SB on-ramp)		Non-standard design speed after the gore	504.2
SD NB Sta 840+00 to 843+00		Non-standard lane widths (3 - 3.3 m) & shoulders (1.2 m) due to ROW impact	301.1, 302.1
California St.	841-848	Shoulder width, horizontal clearance (as Soto St. shift to the east providing more room for freeway widening)	302.1, 309.1
California St.	841-848	Median width, vertical curve length, (between Cassidy St. and California St.)	305.1, 204.4
California St.	841-848	Interchange spacing (between California and Cassidy St. and between California St. and Oceanside Blvd.)	501.3
California St.	841-848	Contrast surface treatment	704.1
California St. Ramps	841-848	Check stopping sight distance and vertical curve length	201.3, 204.4
California NB on-ramp		Non-standard design speed before the gore	504.2
Loma Alta Creek Bridge	849-850	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd.	848-859	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd. Ramps	848-859	Lane drop taper (at modified Oceanside Blvd. SB onramp)	504.3
Oceanside Blvd. Ramps	848-859	Shoulder widths	302.1
Oceanside Blvd. Ramps	848-859	Check vertical curve length, stopping sight distance and horizontal clearance	204.4, 201.3, 309.1
Oceanside R2 (NB off-ramp)		Non-standard geometric curve for the loop ramp (37 m < 40 m)	
Oceanside R2 (NB off-ramp)		Non-standard design speed after the gore	504.2
Oceanside R3 (SB on-ramp)		Non-standard superelevation	504.3(4)

8+4 with Buffer (Preferred Alternative)
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Oceanside R3 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Oceanside R3 (SB on-ramp)		Non-standard design speed after the gore	504.2
Oceanside DAR		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Brooks St.	859-861	Shoulder width, horizontal clearance, vertical curve length (check if any), and median width	302.1, 309.1, 204.4, 305.1
Mission Avenue	861-872	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Mission Avenue	861-872	Median width, interchange spacing between I-5/Mission Ave. and I-5/SR-76 Interchanges	305.1, 501.3
Mission R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Mission R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R2 (NB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Mission R4 (SB off-ramp)		Non-standard design speed after the gore	504.2
Neptune Way/Eight St. Overcrossing	874-875	Non-standard horizontal clearance	201.3
SR-76 R1 (NB on-ramp)		Non-standard taper to make lane drop	504.3
SR-76 R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
SR-76 R2 (NB off-ramp)		Non-standard superelevation	504.3(4)
SR-76 R2 (NB off-ramp)		Non-standard design speed curves.	504.2
SD SB Sta 874+00 to 878+00		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Harbor R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Harbor R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
Distance between Harbor R3 and R2		Non-standard distance between two off-ramps.	501.3
Harbor R3 (NB to EB off-ramp)		Non-standard lane drop taper	504.3
Harbor R3 (NB to EB off-ramp)		Non-standard superelevation	504.3(4)
Harbor R3 (NB to EB off-ramp)		Non-standard deceleration lane	403.5
Harbor R4 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Entire of the project		Non-standard shoulders in various locations where traffic sign posts will be installed.	302.1

Other Build Alternatives

10+4 with Barrier
Non-standard Features/Design Exceptions

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Genesee_NB -G1M	491_497	Non-standard Decision Sight Distance, non-standard lengths 3 vertical curves	
Genesee_NB -R1B	493	Non-standard Decision Sight Distance	
Genesee_NB- R1B	494_499	Non-standard curve lengths (3 vertical curves) , non-standard Sopping sight distance, Design Speed, Decision Sight Distance	
Genesee_SB_ G4B	492_498	Non-standard Decision Sight Distance (2 vertical curves)	
Genesee_SB_ R2M	495_500	Non-standard Decision Sight Distance	
Entire of the project		Multiple cross slopes for the mainlanes due to hydroplaning problems.	
Entire of the project		Pavement structural	
From Sorrento Valley to Del Mar Heights		Non-standard lane widths and shoulder widths(both sides- due to sign structures, ROW avoid impacts).	
From Sorrento Valley to Del Mar Heights		Non-standard cross slope in mainlanes because of keeping existing pavement	
Genesee	518-520	Non-standard outer separation	
Genesee	518-520	Non-standard stopping sight distance, median width, superelevation	
Genesee	518-520	Non-standard horizontal clearance to fixed object	

10+4 with Barrier
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
5/805 Merge		Non-standard lane drop (too short 2/3 WV)	
5/805 Merge		Non-standard decision sight distance (110mph)	
Carmel Valley SB on-ramp		Non-standard superelevation for the curve on the gore section. (does not match bridge)	
Carmel Valley SB on-ramp		Non-standard design speed after the gore	
Carmel Valley SB on-ramp		Non-standard design for CHP enforcement path	
Carmel Mountain/56		Non-standard interchange spacing	
Del Mar Heights	549-576	Non-standard lane widths and shoulder widths(both sides).	
Del Mar Heights	549-576	Non-standard horizontal clearance to fixed object	
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard taper to make lane drop (20:1 < 30:1)	
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard design speed after the gore (25 design < 50 MPH)	
Via De La Valle		Non-standard lane and shoulder width on SB direction.	
Via De La Valle R4 (EB to SB on-ramp)		Non-standard superelevation to match city street @ its termini	
Via De La Valle R5 (WB to SB on-ramp)		Non-standard design speed after the gore	
Manchester Ave.	621-640	Shoulder width, horizontal clearance, median width.	302.1, 309.1, 305.1
Manchester Ave.	621-640	Need to check for stopping sight distance and minimum distance (curb return to curb return) between ramp intersections and local road intersections (89m between the SB off-ramp/Manchester Ave intersection and Ocean Cove Dr./Manchester Ave. intersection; 30m between the NB on-ramp/Manchester Ave. intersection and the proposed Manchester Av./access road to DAR park-and-ride facility intersection).	201.3, 504.3
Manchester Ave.	621-640	Median planting to plant oleanders back in median along horizontal curve between Lomas Santa Fe and Manchester Ave.	902.1
Manchester Ave.	621-640	Non-standard interchange spacing between Lomas Santa Fe Dr. and Manchester Ave. 1.4km	501.3
Manchester Ave. Ramps	621-640	Need to check vertical curve length, stopping sight distance, shoulder width, and horizontal clearance	204.4, 201.3, 302.1, 309.1
Birmingham Dr.	640-657	Shoulder width, horizontal clearance, interchange spacing between Birmingham Dr. and Santa Fe Dr.	302.1, 309.1, 501.3
Birmingham Dr. Ramps	640-657	Need to check vertical curve length, stopping sight, and sight distance	204.4, 201.3
Santa Fe Dr.	657-670	Shoulder width, horizontal clearance	302.1, 309.1
Santa Fe Dr.	657-670	Interchange spacing between Birmingham Dr. and Santa Fe Dr.; between Santa Fe Dr. and Encinitas Blvd.	501.3
Santa Fe Dr.	657-670	Check for stopping sight distance and vertical curve length	201.3, 204.4
Santa Fe Dr. Ramps	657-670	Need to check vertical curve length and stopping sight distance	204.4, 201.3
Santa Fe Dr. Ramps	657-670	Probably distance between ramp intersections and local road intersections (Regal Road and Santa Fe Dr. NB on-ramp)	501.3
Requeza St.	671-673	Shoulder width (NB and SB HOV inside shoulder widths 1.5m)	302.1
Requeza St.	671-673	Horizontal clearance (NB and SB HOV inside shoulder adjacent to concrete barriers 1.5m)	309.1
Requeza St.	671-673	Check for stopping sight distance and vertical curve length	201.3, 204.4
Encinitas Blvd.	670-687	Shoulder width, horizontal clearance, interchange spacing between Santa Fe Dr. and Encinitas Blvd.	302.1, 309.1, 501.3
Encinitas Blvd.	670-687	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Encinitas Blvd.	670-687	Interchange distance between ramp intersections and local road intersections (Encinitas Blvd. NB on-ramp and Saxony Rd. Encinitas Blvd NB off-ramp and Calle Magdalena, Encinitas Blvd. SB off-ramp and driveway access to Petco shopping center, Encinitas Blvd SB on-ramp and driveway assess to Radisson Inn hotel)	504.3
Encinitas Blvd. Ramps	670-687	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Encinitas Blvd. Ramps	670-687	Interchange distance between ramp intersections and local road intersections (Encinitas Blvd. NB on-ramp and Saxony Rd. Encinitas Blvd NB off-ramp and Calle Magdalena, Encinitas Blvd. SB off-ramp and driveway access to Petco shopping center, Encinitas Blvd SB on-ramp and driveway assess to Radisson Inn hotel)	504.3
Leucadia Blvd.	687-708	Shoulder width, horizontal clearance	302.1, 309.1
Leucadia Blvd.	687-708	Check for stopping sight distance and vertical curve length	201.3, 204.4
Leucadia Blvd.	687-708	Probably distance between ramp intersections and local road intersections (Leucadia Blvd NB off-ramp and Clark Avenue; Leucadia NB on-ramp and Urania Ave; Leucadia Blvd SB off-ramp and Orpheus Ave; Leucadia Blvd SB on-ramp and Orpheus Ave.	504.3
Leucadia Blvd. Ramps	687-708	Shoulder width, horizontal clearance	302.1, 309.1
Leucadia Blvd. Ramps	687-708	Check for stopping sight distance and vertical curve length	201.3, 204.4

10+4 with Barrier
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Leucadia Blvd. Ramps	687-708	Probably distance between ramp intersections and local road intersections (Leucadia Blvd NB off-ramp and Clark Avenue; Leucadia NB on-ramp and Urania Ave; Leucadia Blvd SB off-ramp and Orpheus Ave; Leucadia Blvd SB on-ramp and Orpheus Ave.	504.3
La Costa Ave.	708-731	Shoulder width, horizontal clearance	302.1, 309.1
La Costa Ave.	708-731	Check for stopping sight distance and vertical curve length	201.3, 204.4
La Costa Ave.	708-731	Check distance between ramp intersections and local road intersections (La Costa Ave NB off-ramp and Piraeus St.; La Costa Ave. NB on-ramp and driveway access to Park and Ride facility)	504.3
La Costa Ave. Ramps	708-731	Shoulder width	302.1
La Costa Ave. Ramps	708-731	Check vertical curve length and stopping sight distance	204.4, 201.3
La Costa Ave. Ramps	708-731	Check distance between ramp intersections and local road intersections (La Costa Ave NB off-ramp and Piraeus St.; La Costa Ave. NB on-ramp and driveway access to Park and Ride facility)	504.3
Cannon Rd.	775-798	Median width (< 6.6m)	305.1
Chinquapin Ave.	798-809	NB inside three general-purpose lanes 3.3m following the NB off ramp and through Tamarack Ave. OC	301.1
Chinquapin Ave.	798-809	NB HOV shoulder lane 2.4m	302.1
Chinquapin Ave.	798-809	Interchange spacing between Tamarack Ave and Carlsbad Village Dr. 1.35km	501.3
Chestnut Ave.	809-811	NB outside shoulder width 1.2m, NB HOV shoulder lane 2.4m	302.1, 302.1
Carlsbad Village Dr.	811-820	Interchange spacing between Tamarack Ave and Carlsbad Village Dr. 1.35km	501.3
Carlsbad Village Dr.	811-820	Interchange spacing between Carlsbad Village Dr. and Las Flores Dr. 0.911km	501.3
Las Flores Dr. Ramps	820-829	NB on-ramp grade 8.1% descending	504.2
Las Flores Dr. Ramps	820-829	SB off-ramp grade 8.6% ascending	504.2
I-5/SR-78 interchange	830-835	Interchange spacing between Las Flores Dr. and SR-78 Interchange 0.85km	504.3
I-5/SR-78 interchange	830-835	Distance between successive exits NB to WB and NB to EB 200m	504.3
Lomas Santa Fe	602-621	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Lomas Santa Fe	602-621	Minimum distance (curb return to curb return) between ramp intersections and local road intersections (less than 125m or 165 m) (Lomas Santa Fe NB off-ramp and driveway access to Ross shopping center; Lomas Santa Fe NB on-ramp and Santa Helena; Lomas Santa Fe SB off-ramp Solana Hill Dr.; Lomas Santa Fe SB on-ramp and Solana Hill Dr.)	504.3
Lomas Santa Fe	602-621	Median planting to plant oleanders back in median along horizontal curve between Lomas Santa Fe and Manchester Ave.	902.1
Lomas Santa Fe	602-621	Non-standard interchange spacing between Lomas Santa Fe Dr. and Manchester Ave. 1.4km	
SR-78	830-835	Interchange spacing between Las Flores Drive and SR-78 0.85Km	501.3
SR-78 Ramps	830-835	Distance between successive exits NB to WB and NB to EB 200m	504.3
SR-78 R1 (WB to NB on-ramp)		Non-standard design speed on the curve due to ROW impact.	504.2
SR-78 R2 (NB to WB off-ramp)		Non-standard geometric curve for the loop ramp(35 m)	
SR-78 R2 (NB to WB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
SR-78 R3 (NB to EB off-ramp)		Non-standard connector configuration in the east side due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard connector configuration due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard design speed after the gore	504.2
SR-78 R4 (SB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
SR-78 R5 (SB off-ramp)		Non-standard design speed after the gore	504.2
Cassidy St.	835-841	Non-standard lane width, shoulder width, horizontal clearance, median width to keep Soto St. in place.	301.1, 302.1, 309.1, 305.1
Cassidy St.	835-841	Vertical curve length	204.4
Cassidy St.	835-841	Interchange spacing between SR-78 and Cassidy St.; between Cassidy St. and California St.	501.3
Cassidy Ramps	835-841	Check for stopping and decision sight distance standards.	201.3, 201.7
Cassidy Ramps	835-841	Check for vertical curve length	204.4
Cassidy R2 (SB on-ramp)		Non-standard ramp configuration due to weaving length problem	
Cassidy R2 (SB on-ramp)		Non-standard design speed after the gore	504.2
SD NB Sta 840+00 to 843+00		Non-standard lane widths (3 - 3.3 m) & shoulders (1.2 m) due to ROW impact	301.1, 302.1
California St.	841-848	Shoulder width, horizontal clearance (as Soto St. shift to the east providing more room for freeway widening)	302.1, 309.1

10+4 with Barrier
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
California St.	841-848	Median width, vertical curve length, (between Cassidy St. and California St.)	305.1, 204.4
California St.	841-848	Interchange spacing (between California and Cassidy St. and between California St. and Oceanside Blvd.)	501.3
California St.	841-848	Contrast surface treatment	704.1
California St. Ramps	841-848	Check stopping sight distance and vertical curve length	201.3, 204.4
California NB on-ramp		Non-standard design speed before the gore	504.2
Loma Alta Creek Bridge	849-850	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd.	848-859	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd. Ramps	848-859	Lane drop taper (at modified Oceanside Blvd. SB onramp)	504.3
Oceanside Blvd. Ramps	848-859	Shoulder widths	302.1
Oceanside Blvd. Ramps	848-859	Check vertical curve length, stopping sight distance and horizontal clearance	204.4, 201.3, 309.1
Oceanside R2 (NB off-ramp)		Non-standard geometric curve for the loop ramp (37 m < 40 m)	
Oceanside R2 (NB off-ramp)		Non-standard design speed after the gore	504.2
Oceanside R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Oceanside R3 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Oceanside R3 (SB on-ramp)		Non-standard design speed after the gore	504.2
Oceanside DAR		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Brooks St.	859-861	Shoulder width, horizontal clearance, vertical curve length (check if any), and median width	302.1, 309.1, 204.4, 305.1
Mission Avenue	861-872	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Mission Avenue	861-872	Median width, interchange spacing between I-5/Mission Ave. and I-5/SR-76 Interchanges	305.1, 501.3
Mission R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Mission R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R2 (NB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Mission R4 (SB off-ramp)		Non-standard design speed after the gore	504.2
Neptune Way/Eight St. Overcrossing	874-875	Non-standard horizontal clearance	201.3
SR-76 R1 (NB on-ramp)		Non-standard taper to make lane drop	504.3
SR-76 R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
SR-76 R2 (NB off-ramp)		Non-standard superelevation	504.3(4)
SR-76 R2 (NB off-ramp)		Non-standard design speed curves.	504.2
SD SB Sta 874+00 to 878+00		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Harbor R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Harbor R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
Distance between Harbor R3 and R2		Non-standard distance between two off-ramps.	501.3
Harbor R3 (NB to EB off-ramp)		Non-standard lane drop taper	504.3
Harbor R3 (NB to EB off-ramp)		Non-standard superelevation	504.3(4)
Harbor R3 (NB to EB off-ramp)		Non-standard deceleration lane	403.5
Harbor R4 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Entire of the project		Non-standard shoulders in various locations where traffic sign posts will be installed.	302.1

10+4 with Buffer
Non-standard Features/Design Exceptions

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Genesee_NB -G1M	491_497	Non-standard Decision Sight Distance, Non-standard lengths 3 vertical curves	
Genesee_NB -R1B	493	Non-standard Decision Sight Distance	
Genesee_NB- R1B	494_499	Non-standard curve lengths (3 vertical curves) , Non-standard Sopping sight distance, Design Speed, Decision Sight Distance	
Genesee_SB_ G4B	492_498	Non-standard Decision Sight Distance (2 vertical curves)	
Genesee_SB_ R2M	495_500	Non-standard Decision Sight Distance	
Entire of the project		Multiple cross slopes for the mainlanes due to hydroplaning problems.	301.2
Entire of the project		Pavement structural	612.2
From Sorrento Valley to Del Mar Heights		Non-standard lane widths and shoulder widths(both sides- due to sign structures, ROW avoid impacts).	301.1, 302.1
From Sorrento Valley to Del Mar Heights		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Genesee	518-520	Non-standard outer separation	310.2
Genesee	518-520	Non-standard stopping sight distance, median width, superelevation	201.3, 305.1, 504.3(4)
Genesee	518-520	Non-standard horizontal clearance to fixed object	309.1
5/805 Merge		Non-standard lane drop (too short 2/3 WV)	504.4
5/805 Merge		Non-standard decision sight distance (110mph)	201.7
Carmel Valley SB on-ramp		Non-standard superelevation for the curve on the gore section. (does not match bridge)	504.3(4)
LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Carmel Valley SB on-ramp		Non-standard design speed after the gore	504.2
Carmel Valley SB on-ramp		Non-standard design for CHP enforcement path	
Carmel Mountain/56		Non-standard interchange spacing	501.3
Del Mar Heights	549-576	Non-standard lane widths and shoulder widths(both sides).	301.1, 302.1
Del Mar Heights	549-576	Non-standard horizontal clearance to fixed object	309.1
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard taper to make lane drop (20:1 < 30:1)	504.3
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard design speed after the gore (25 design < 50 MPH)	504.2
Via De La Valle		Non-standard lane and shoulder width on SB direction.	301.1, 302.1
Via De La Valle R4 (EB to SB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3
Via De La Valle R5 (WB to SB on-ramp)		Non-standard design speed after the gore	504.2
Lomas Santa Fe	602-607+50	Non-standard horizontal clearance to fixed objects	309.1
Lomas Santa Fe	602-621	Check for stopping sight distance	201.3
Lomas Santa Fe	602-621	Check for vertical curve length	204.4
Lomas Santa Fe	602-621	Minimum distance between ramp intersection and local road intersections	501.3
Lomas Santa Fe	602-621	Median planting to plant oleanders back to in median along horizontal curve between Lomas Santa Fe and Manchester Avenue	902.1
Lomas Santa Fe	602-621	Non-standard interchange spacing between Lomas Santa Fe and Manchester Avenue	501.3
Lomas Santa Fe Ramps	602-621	Check vertical curve length, stopping sight distance, shoulder width and horizontal clearance	204.4, 201.3, 302.1, 309.1
Lomas Santa Fe Local Street	602-621	Minimum distance between ramp intersections and local road intersections	501.3
Lomas Santa Fe R2 (EB to NB on-ramp)		Non-standard design speed after the gore	504.2
Manchester DAR		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Manchester R1 (NB on-ramp)		Non-standard superelevation for the curve at the gore (controlled by bridge)	504.3(4)
Manchester R3 (SB on-ramp)		Non-standard geometric curve for the loop ramp(35 m)	
Manchester R3 (SB on-ramp)		Non-standard taper to make lane drop	206.3
View Point SB on-ramp		Non-standard geometric design for ramp alignment	
View Point SB on-ramp		Non-standard weaving length bet the on-ramp and Manchester off-ramp	504.7
Birmingham R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3
Requeza St. Overcrossing	671-673	Shoulder width, horizontal clearance	302.1, 309.1
Requeza St. Overcrossing	671-673	Check for stopping sight distance and vertical curve length	201.3, 204.4
Encinitas R1 (NB on-ramp)		Non-standard design speed before the gore vertical curve length	504.2, 204.4
Leucadia R1 (NB on-ramp)		Non-standard design for CHP enforcement path (No CHP road)	

10+4 with Buffer
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Leucadia R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Leucadia R1 (NB on-ramp)		Non-standard design speed after the gore	504.2
La Costa R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Poinsettia R1 (NB on-ramp)		4:1 slope	304.1
Poinsettia R3 (SB on-ramp)		4:1 slope	304.1
Poinsettia R4 (SB off-ramp)		4:1 slope	304.1
Palomar Airport Rd.	758-775	NB HOV shoulder width 2.4m	302.1
Palomar Airport Rd. Ramps	758-775	NB and SB HOV shoulder width 2.4m	302.1
Paloma R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Paloma R4 (WB to SB on-ramp)		Non-standard geometric curve for the ramp(1400 m instead of 1000 m)	
Paloma R4 (WB to SB on-ramp)		Non-standard taper to make lane drop	504.3
Paloma R4 (WB to SB on-ramp)		Non-standard superelevation for the curve at the gore	504.3(4)
SD SB Sta 769+60 to 779+80		Non-standard lane widths (2 - 3.3 m) & inside shoulder(2.4 m) due to ROW impact	301.1, 302.1
Canon Rd.		Non-standard inside shoulder (south of Canon)	302.1
Canon Rd. Ramps and DAR	775-796	Super DAR ramp < 12%	302.1
Cannon R3 (SB on-ramp)		No CHP enforcement path due to ROW impacts	
Cannon DAR		Non-standard cross slope in mainlanes because of keeping existing pavement (<1.5%)	301.2
SD NB Sta 802+20 to 823+20		Non-standard lane widths (3 - 3.3 m) & inside shoulder(2.4 m) due to ROW impact	301.1, 302.1
Chinquapin Avenue and Tamarack Avenue	798-809	NB inside general-purpose lanes 3.3m following the NB off ramp and through Tamarack Ave. OC	301.1
Chinquapin Avenue and Tamarack Avenue	798-809	NB HOV shoulder lane 2.4m	302.1
Chinquapin Avenue and Tamarack Avenue	798-809	Interchange spacing between Tamarack Ave. and Carlsbad Village Dr.	501.3
Agua Hedionda	792-798	Non-standard slope 2:1	304.1
Tamarack R1 (NB on-ramp)		Non-standard vertical clearance, stopping sight distance	309.2, 201.3
Tamarack R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
Tamarack R1 (NB on-ramp)		Non-standard horizontal clearance to fixed object	309.1(2)
Chestnut Avenue	809-811	NB outside shoulder width 1.2, NB HOV shoulder lane 2.4m	302.1, 302.1
Carlsbad Village Dr.	809-811	NB inside general-purpose lanes 3.3m	301.1
Carlsbad Village Dr.	809-811	NB outside shoulder width 1.2 before NB off ramp	302.1
Carlsbad Village Dr.	809-811	Interchange spacing between Tamarack Ave. and Carlsbad Village Dr. 1.35Km	501.3
Carlsbad Village Dr.	809-811	Interchange spacing between Carlsbad Village Dr. and Las Flores Dr. 0.911Km	501.3
Carlsbad Village R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
Carlsbad Village R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Carlsbad Village R3 (SB on-ramp)		Non-standard horizontal clearance to ROW	309.1
Carlsbad Village R3 (SB on-ramp)		Non-standard design speed after the gore	504.2
Las Flores Dr.	820-829	NB inside three general-purpose lanes 3.3m between NB off ramp and Las Flores OC	301.1
Las Flores Dr.	820-829	NB HOV shoulder lane 2.4m.	302.1
Las Flores Dr.	820-829	SB outside shoulder width after the SB onramp 2.4m	302.1
Las Flores R1 (NB on-ramp)		Non-standard ramp configuration due to weaving length problem	
Las Flores R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
Las Flores R2 (NB off-ramp)		Non-standard lateral clearance to wall	309.4
Las Flores R3 (SB on-ramp)		Non-standard design speed after the gore (< 75MPH)	504.2
Las Flores R3 (SB on-ramp)		Non-standard ramp configuration due to ROW impact.	
Las Flores R4 (SB off-ramp)		Non-standard design speed after the gore	504.2
SR-78	830-835	Interchange spacing between Las Flores Drive and SR-78 0.85Km	501.3
SR-78 Ramps	830-835	Distance between successive exits NB to WB and NB to EB 200m	504.3
SR-78 R1 (WB to NB on-ramp)		Non-standard design speed on the curve due to ROW impact.	504.2

10+4 with Buffer
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
SR-78 R2 (NB to WB off-ramp)		Non-standard geometric curve for the loop ramp(35 m)	
SR-78 R2 (NB to WB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
SR-78 R3 (NB to EB off-ramp)		Non-standard connector configuration in the east side due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard connector configuration due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard design speed after the gore	504.2
SR-78 R4 (SB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
SR-78 R5 (SB off-ramp)		Non-standard design speed after the gore	504.2
Cassidy St.	835-841	Non-standard lane width, shoulder width, horizontal clearance, median width to keep Soto St. in place.	301.1, 302.1, 309.1, 305.1
Cassidy St.	835-841	Vertical curve length	204.4
Cassidy St.	835-841	Interchange spacing between SR-78 and Cassidy St.; between Cassidy St. and California St.	501.3
Cassidy Ramps	835-841	Check for stopping and decision sight distance standards.	201.3, 201.7
Cassidy Ramps	835-841	Check for vertical curve length	204.4
Cassidy R2 (SB on-ramp)		Non-standard ramp configuration due to weaving length problem	
Cassidy R2 (SB on-ramp)		Non-standard design speed after the gore	504.2
SD NB Sta 840+00 to 843+00		Non-standard lane widths (3 - 3.3 m) & shoulders (1.2 m) due to ROW impact	301.1, 302.1
California St.	841-848	Shoulder width, horizontal clearance (as Soto St. shift to the east providing more room for freeway widening)	302.1, 309.1
California St.	841-848	Median width, vertical curve length, (between Cassidy St. and California St.)	305.1, 204.4
California St.	841-848	Interchange spacing (between California and Cassidy St. and between California St. and Oceanside Blvd.)	501.3
California St.	841-848	Contrast surface treatment	704.1
California St. Ramps	841-848	Check stopping sight distance and vertical curve length	201.3, 204.4
California NB on-ramp		Non-standard design speed before the gore	504.2
Loma Alta Creek Bridge	849-850	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd.	848-859	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd. Ramps	848-859	Lane drop taper (at modified Oceanside Blvd. SB onramp)	504.3
Oceanside Blvd. Ramps	848-859	Shoulder widths	302.1
Oceanside Blvd. Ramps	848-859	Check vertical curve length, stopping sight distance and horizontal clearance	204.4, 201.3, 309.1
Oceanside R2 (NB off-ramp)		Non-standard geometric curve for the loop ramp(37 m < 40 m)	
Oceanside R2 (NB off-ramp)		Non-standard design speed after the gore	504.2
Oceanside R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Oceanside R3 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Oceanside R3 (SB on-ramp)		Non-standard design speed after the gore	504.2
Oceanside DAR		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Brooks St.	859-861	Shoulder width, horizontal clearance, vertical curve length (check if any), and median width	302.1, 309.1, 204.4, 305.1
Mission Avenue	861-872	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Mission Avenue	861-872	Median width, interchange spacing between I-5/Mission Ave. and I-5/SR-76 Interchanges	305.1, 501.3
Mission R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Mission R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R2 (NB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Mission R4 (SB off-ramp)		Non-standard design speed after the gore	504.2
Neptune Way/Eight St. Overcrossing	874-875	Non-standard horizontal clearance	201.3
SR-76 R1 (NB on-ramp)		Non-standard taper to make lane drop	504.3
SR-76 R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
SR-76 R2 (NB off-ramp)		Non-standard superelevation	504.3(4)
SR-76 R2 (NB off-ramp)		Non-standard design speed curves.	504.2
SD SB Sta 874+00 to 878+00		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2

10+4 with Buffer
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Harbor R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Harbor R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
Distance between Harbor R3 and R2		Non-standard distance between two off-ramps.	501.3
Harbor R3 (NB to EB off-ramp)		Non-standard lane drop taper	504.3
Harbor R3 (NB to EB off-ramp)		Non-standard superelevation	504.3(4)
Harbor R3 (NB to EB off-ramp)		Non-standard deceleration lane	403.5
Harbor R4 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Entire of the project		Non-standard shoulders in various locations where traffic sign posts will be installed.	302.1

8+4 with Barrier
Non-standard Features/Design Exceptions

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Genesee_NB -G1M	491_497	Non-standard Decision Sight Distance, Non-standard lengths 3 vertical curves	
Genesee_NB -R1B	493	Non-standard Decision Sight Distance	
Genesee_NB- R1B	494_499	Non-standard curve lengths (3 vertical curves) , Non-standard Sopping sight distance, Design Speed, Decision Sight Distance	
Genesee_SB_ G4B	492_498	Non-standard Decision Sight Distance (2 vertical curves)	
Genesee_SB_ R2M	495_500	Non-standard Decision Sight Distance	
Entire of the project		Multiple cross slopes for the mainlanes due to hydroplaning problems.	301.2
Entire of the project		Pavement structural	612.2
From Sorrento Valley to Del Mar Heights		Non-standard lane widths and shoulder widths(both sides- due to sign structures, ROW avoid impacts).	301.1, 302.1
From Sorrento Valley to Del Mar Heights		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Genesee	518-520	Non-standard outer separation	310.2
Genesee	518-520	Non-standard stopping sight distance, median width, superelevation	201.3, 305.1, 504.3(4)
Genesee	518-520	Non-standard horizontal clearance to fixed object	309.1
5/805 Merge		Non-standard lane drop (too short 2/3 WV)	504.4
5/805 Merge		Non-standard decision sight distance (110mph)	201.7
Carmel Valley SB on-ramp		Non-standard superelevation for the curve on the gore section. (does not match bridge)	504.3(4)
Carmel Valley SB on-ramp		Non-standard design speed after the gore	504.2
Carmel Valley SB on-ramp		Non-standard design for CHP enforcement path	
Carmel Mountain/56		Non-standard interchange spacing	501.3
Del Mar Heights	549-576	Non-standard lane widths and shoulder widths(both sides).	301.1, 302.1
Del Mar Heights	549-576	Non-standard horizontal clearance to fixed object	309.1
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard taper to make lane drop (20:1 < 30:1)	504.3
Del Mar Heights R4 (WB to SB on-ramp)		Non-standard design speed after the gore (25 design < 50 MPH)	504.2
Via De La Valle		Non-standard lane and shoulder width on SB direction.	301.1, 302.1
Via De La Valle R4 (EB to SB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3
Via De La Valle R5 (WB to SB on-ramp)		Non-standard design speed after the gore	504.2
Lomas Santa Fe	602-621	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Lomas Santa Fe	602-621	Minimum distance (curb return to curb return) between ramp intersections and local road intersections (less than 125m or 165 m) (Lomas Santa Fe NB off-ramp and driveway access to Ross shopping center; Lomas Santa Fe NB on-ramp and Santa Helena; Lomas Santa Fe SB off-ramp Solana Hill Dr.; Lomas Santa Fe SB on-ramp and Solana Hill Dr.)	504.3
Lomas Santa Fe	602-621	Median planting to plant oleanders back in median along horizontal curve between Lomas Santa Fe and Manchester Ave.	902.1
Lomas Santa Fe	602-621	Non-standard interchange spacing between Lomas Santa Fe Dr. and Manchester Ave. 1.4km	501.3

8+4 with Barrier
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Lomas Santa Fe Ramps	602-621	Check stopping sight distance and vertical curve length, shoulder width, and horizontal clearance	201.3, 204.4, 302.1, 309.1
Lomas Santa Fe Ramps	602-621	Non-standard shoulder width at spot locations of the modified Lomas Santa Fe NB and SB off-ramps	302.1
Lomas Santa Fe Local Street	602-621	Minimum distance (curb return to curb return) between ramp intersections and local road intersections (less than 125m or 165 m) (Lomas Santa Fe NB off-ramp and driveway access to Ross shopping center; Lomas Santa Fe NB on-ramp and Santa Helena; Lomas Santa Fe SB off-ramp Solana Hill Dr.; Lomas Santa Fe SB on-ramp and Solana Hill Dr.)	504.3
Lomas Santa Fe Local Street	602-621	Median planting to plant oleanders back in median along horizontal curve between Lomas Santa Fe and Manchester Ave.	902.1
Lomas Santa Fe Local Street	602-621	Non-standard interchange spacing between Lomas Santa Fe Dr. and Manchester Ave. 1.4km	501.3
Manchester Ave.	621-640	Shoulder width, horizontal clearance	302.1, 309.1
Manchester Ave.	621-640	Need to check for stopping sight distance and minimum distance (curb return to curb return) between ramp intersections and local road interactions (89m between the SB off-ramp/Manchester Ave. intersection and Ocean Cove Dr./Manchester Ave. intersection; 30m between the NB on-ramp/Manchester Ave intersection and the proposed Manchester Ave/access road to DAR park-and-ride facility intersection).	201.3, 504.3
Manchester Ave. Ramps	621-640	Need to check vertical curve length, stopping sight distance, shoulder width, and horizontal clearance.	204.4, 201.3, 302.1, 309.1
Birmingham Dr.	640-657	Shoulder width, horizontal clearance, interchange spacing between Birmingham Dr. and Santa Fe Dr.	302.1, 309.1, 501.3
Birmingham Dr.	640-657	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Birmingham Dr. Ramps	640-657	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
MacKinnon Ave.	654-656	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Santa Fe Dr	654-656	Shoulder width, horizontal clearance, interchange spacing between Birmingham Dr. and Santa Fe Dr.; between Santa Fe Dr. and Encinitas Blvd.	302.1, 309.1, 501.3
Santa Fe Dr	654-656	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Santa Fe Dr Ramps	654-656	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Santa Fe Dr Ramps	654-656	Distance between ramp intersections and local road intersections less than 125m or 165 m (Santa Fe Dr. NB on-ramp and Regal Rd.; Santa Fe Dr. DB off-ramp and driveway access to Scripps Memorial Hospital; Santa Fe Dr. SB on-ramp and driveway access to Vons shopping center)	504.3
Requeza St.	671-673	Shoulder width (NB and SB HOV inside shoulder widths = 1.5 m), horizontal clearance (NB and SB HOV inside shoulder adjacent to concrete barriers = 1.5m)	302.1, 309.1
Requeza St.	671-673	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Encinitas Blvd.	670-687	Shoulder width, horizontal clearance, interchange spacing between Santa Fe Dr. and Encinitas Blvd.	302.1, 309.1, 501.3
Encinitas Blvd.	670-687	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Encinitas Blvd.	670-687	Distance between ramp intersection and local road intersection (less than 125m or 165m) (Encinitas blvd. NB on-ramp and Saxony Rd.; Encinitas Blvd NB off-ramp and Calle Magdalena; Encinitas Blvd. SB off-ramp and driveway to Petco Shopping Center; Encinitas Blvd. SB on-ramp and drive access to Radisson Inn Hotel)	504.3
Encinitas Blvd. Ramps	670-687	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
Encinitas Blvd. Ramps	670-687	Distance between ramp intersection and local road intersection (less than 125m or 165m) (Encinitas blvd. NB on-ramp and Saxony Rd.; Encinitas Blvd NB off-ramp and Calle Magdalena; Encinitas Blvd. SB off-ramp and driveway to Petco Shopping Center; Encinitas Blvd. SB on-ramp and drive access to Radisson Inn Hotel)	504.3
Leucadia Blvd.	687-708	Shoulder width, horizontal clearance	302.1, 309.1
Leucadia Blvd.	687-708	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Leucadia Blvd. Ramps	687-708	Shoulder width, horizontal clearance	302.1, 309.1
Leucadia Blvd. Ramps	687-708	Need to check for stopping sight distance and vertical curve length.	201.3, 204.4
Leucadia Blvd. Ramps	687-708	Distance between ramp intersections and local road intersection (less than 125m or 165m) (Leucadia Blvd NB off-ramp and Clark Ave; Leucadia Blvd. NB on-ramp and Urania Ave; Leucadia Blvd. SB off-ramp and Orpheus Ave; Leucadia Blvd. SB on-ramp and Orpheus Ave.	504.3
La Costa Ave	708-731	Shoulder width, horizontal clearance	302.1, 309.1
La Costa Ave	708-731	Need to check for stopping sight distance and vertical curve length	201.3, 204.4
La Costa Ave Ramps	708-731	Shoulder width.	302.1
La Costa Ave Ramps	708-731	Need to check vertical curve length and stopping sight distance.	204.4, 201.3

8+4 with Barrier
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
La Costa Ave Ramps	708-731	Distance between ramp intersection and local road intersection (less than 125m or 165m) (La Costa Ave NB off-ramp and Piraeus St.; La Costa Ave. NB on-ramp and driveway access to Park and Ride facility)	504.3
Palomar Airport Rd.	758-775	NB HOV shoulder width 2.4m	302.1
Canon Rd. Ramps and DAR	775-796	SB off ramp outside shoulder with 1.2m	302.1
Chinquapin Ave	798-809	NB inside three general-purpose lanes 3.3m following the NB off ramp and through Tamarack Ave. OC	301.1
Chinquapin Ave.	798-809	NB HOV shoulder lane 2.4m	302.1
Chinquapin Ave.	798-809	Interchange spacing between Tamarack Ave and Carlsbad Village Dr. 1.35km	501.3
Chestnut Ave.	809-811	NB outside shoulder width 1.2m, NB HOV shoulder lane 2.4m	302.1, 302.1
Carlsbad Village Dr.	811-820	NB inside three general-purpose lanes 3.3m. NB outside shoulder width before the NB off-ramp 1.2m.	301.1, 302.1
Carlsbad Village Dr.	811-820	Interchange spacing between Tamarack Ave and Carlsbad Village Dr. 1.35km	501.3
Carlsbad Village Dr.	811-820	Interchange spacing between Carlsbad Village Dr. and Las Flores Dr. (0.911km)	501.3
Las Flores Dr.	821-829	NB inside three general-purpose lanes 3.3m between NB off ramp and Las Flores OC	301.1
Las Flores Dr.	821-829	NB HOV shoulder lane 2.4m.	302.1
Las Flores Dr.	821-829	SB outside shoulder width after the SB onramp 2.4m	302.1
Las Flores Dr. Ramps	820-829	NB on-ramp grade 8.1% descending	504.2
Las Flores Dr. Ramps	820-829	SB off-ramp grade 8.6% ascending	504.2
I-5/SR-78 Interchange	830-835	Interchange spacing between Las Flores Dr. and SR-78 interchange 0.85km	501.3
I-5/SR-78 interchange	830-835	Distance between successive exits NB to WB and NB to EB 200m	504.3
SR-78	830-835	Interchange spacing between Las Flores Drive and SR-78 0.85Km	501.3
SR-78 Ramps	830-835	Distance between successive exits NB to WB and NB to EB 200m	504.3
SR-78 R1 (WB to NB on-ramp)		Non-standard design speed on the curve due to ROW impact.	504.2
SR-78 R2 (NB to WB off-ramp)		Non-standard geometric curve for the loop ramp(35 m)	
SR-78 R2 (NB to WB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
SR-78 R3 (NB to EB off-ramp)		Non-standard connector configuration in the east side due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard connector configuration due to weaving length problem.	
SR-78 R4 (SB on-ramp)		Non-standard design speed after the gore	504.2
SR-78 R4 (SB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
SR-78 R5 (SB off-ramp)		Non-standard design speed after the gore	504.2
Cassidy St.	835-841	Non-standard lane width, shoulder width, horizontal clearance, median width to keep Soto St. in place.	301.1, 302.1, 309.1, 305.1
Cassidy St.	835-841	Vertical curve length	204.4
Cassidy St.	835-841	Interchange spacing between SR-78 and Cassidy St.; between Cassidy St. and California St.	501.3
Cassidy Ramps	835-841	Check for stopping and decision sight distance standards.	201.3, 201.7
Cassidy Ramps	835-841	Check for vertical curve length	204.4
Cassidy R2 (SB on-ramp)		Non-standard ramp configuration due to weaving length problem	
Cassidy R2 (SB on-ramp)		Non-standard design speed after the gore	504.2
SD NB Sta 840+00 to 843+00		Non-standard lane widths (3 - 3.3 m) & shoulders (1.2 m) due to ROW impact	301.1, 302.1
California St.	841-848	Shoulder width, horizontal clearance (as Soto St. shift to the east providing more room for freeway widening)	302.1, 309.1
California St.	841-848	Median width, vertical curve length, (between Cassidy St. and California St.)	305.1, 204.4
California St.	841-848	Interchange spacing (between California and Cassidy St. and between California St. and Oceanside Blvd.)	501.3
California St.	841-848	Contrast surface treatment	704.1
California St. Ramps	841-848	Check stopping sight distance and vertical curve length	201.3, 204.4
California NB on-ramp		Non-standard design speed before the gore	504.2
Loma Alta Creek Bridge	849-850	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd.	848-859	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Oceanside Blvd. Ramps	848-859	Lane drop taper (at modified Oceanside Blvd. SB onramp)	504.3
Oceanside Blvd. Ramps	848-859	Shoulder widths	302.1

8+4 with Barrier
Non-standard Features/Design Exceptions (cont.)

LOCATIONS	STATION	DESCRIPTION	HDM INDEX
Oceanside Blvd. Ramps	848-859	Check vertical curve length, stopping sight distance and horizontal clearance	204.4, 201.3, 309.1
Oceanside R2 (NB off-ramp)		Non-standard geometric curve for the loop ramp(37 m < 40 m)	
Oceanside R2 (NB off-ramp)		Non-standard design speed after the gore	504.2
Oceanside R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Oceanside R3 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Oceanside R3 (SB on-ramp)		Non-standard design speed after the gore	504.2
Oceanside DAR		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Brooks St.	859-861	Shoulder width, horizontal clearance, vertical curve length (check if any), and median width	302.1, 309.1, 204.4, 305.1
Mission Avenue	861-872	Shoulder width, horizontal clearance, vertical curve length (check if any)	302.1, 309.1, 204.4
Mission Avenue	861-872	Median width, interchange spacing between I-5/Mission Ave. and I-5/SR-76 Interchanges	305.1, 501.3
Mission R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Mission R1 (NB on-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R2 (NB off-ramp)		Non-standard superelevation to match city street @ its termini	504.3(4)
Mission R3 (SB on-ramp)		Non-standard superelevation	504.3(4)
Mission R4 (SB off-ramp)		Non-standard design speed after the gore	504.2
Neptune Way/Eight St. Overcrossing	874-875	Non-standard horizontal clearance	201.3
SR-76 R1 (NB on-ramp)		Non-standard taper to make lane drop	504.3
SR-76 R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
SR-76 R2 (NB off-ramp)		Non-standard superelevation	504.3(4)
SR-76 R2 (NB off-ramp)		Non-standard design speed curves.	504.2
SD SB Sta 874+00 to 878+00		Non-standard cross slope in mainlanes because of keeping existing pavement	301.2
Harbor R1 (NB on-ramp)		Non-standard superelevation for the curve on the gore section.	504.3(4)
Harbor R1 (NB on-ramp)		Non-standard design speed before the gore	504.2
Distance between Harbor R3 and R2		Non-standard distance between two off-ramps.	501.3
Harbor R3 (NB to EB off-ramp)		Non-standard lane drop taper	504.3
Harbor R3 (NB to EB off-ramp)		Non-standard superelevation	504.3(4)
Harbor R3 (NB to EB off-ramp)		Non-standard deceleration lane	403.5
Harbor R4 (SB on-ramp)		Non-standard taper to make lane drop	504.3
Entire of the project		Non-standard shoulders in various locations where traffic sign posts will be installed.	302.1

The following tables for the Preferred Alternative (refined 8+4 with buffer) are provided for the reviewer's information and ease of review. The tables summarize the Mandatory and Advisory Design Exceptions for the 8+4 with Buffer Alternative. They are included consistent with NEPA guidance, which encourages efficiency in the environmental review process by allowing lead agencies to decide whether to develop the preferred alternative to a higher level of design detail (23 USC 139 [f][4][D]) than other alternatives, thereby facilitating the development of specific design or mitigation measures.

Mandatory

Horizontal Stopping Sight Distance (Index 201.1)						
Location and Obstruction	**Begin Non-Standard Horizontal SSD (Station)**	**End Non-Standard Horizontal SSD (Station)**	**Standard Design Speed**	**Provided Design Speed**	**Standard SSD**	**Provided SSD**
	English (Metric)		**ft**	**mph**	**ft**	**ft**
Between Genesee Ave. and I-5/805 Merge (Median Barrier for SB Traffic)	1608+05.58 "SD-5" (490+13.64)	1617+53.52 "SD-5" (493+02.47)	75	68	840	717
I-5/805 Merge (Outside Barrier for SB Traffic)	1638+49.19 "SDL" (499+41.23)	1643+60.70 "SDL" (500+97.14)	75	55	840	507
I-5/805 Merge (Outside Barrier for SB Traffic)	1639+00.70 "SDH" (499+56.93)	1660+87.77 "SDH" (506+23.55)	75	63	840	633
I-5/805 Merge (Inside Barrier for NB Traffic)	1640+33.56 "SDR" (499+97.43)	1646+45.78 "SDR" (501+84.03)	75	62	840	613
Between I-5/805 Merge and Carmel Mountain Rd. (Median Barrier for NB Traffic)	1689+45.60 "SD-5" (514+94.72)	1701+54.93 "SD-5" (518+63.22)	75	62	840	622
Between I-5/805 Merge and Carmel Mountain Rd. (Outside Barrier at Existing Light Pedestal for SB Mainline Traffic)	1691+25.48 "SB" (538+35)	1696+64.70 "SB" (539+99)	75	57	840	543
Between I-5/805 Merge and Carmel Mountain Rd. (Median Barrier for SB Traffic)	1708+04.71 "SD-5" (520+61.28)	1737+82.22 "SD-5" (529+68.82)	75	62	840	617
Ramps						
Just South of Carmel Mountain Rd. (Outside Barrier for NB Mainline Traffic)	1711+87.20 "NB" (544+64)	1718+37.04 "NB" (546+62)	75	64	840	654
Just North of Carmel Mountain Rd. (Outside Barrier for NB Mainline Traffic)	1715+01.58 "NB" (545+59)	1722+65.56 "NB" (547+92)	75	71	840	768
I-5/SR 56 Junction (Median Barrier for SB Traffic)	1762+07.29 "SD-5" (537+07.98)	1772+43.75 "SD-5" (540+23.90)	75	66	840	669

Horizontal Stopping Sight Distance (Index 201.1) (Continued)						
Location and Obstruction	Begin Non-Standard Horizontal SSD (Station)	End Non-Standard Horizontal SSD (Station)	Standard Design Speed	Provided Design Speed	Standard SSD	Provided SSD
	English (Metric)		ft	mph	ft	ft
Between Via De La Valle and Lomas Santa Fe Dr. (Median Barrier for SB Traffic)	1959+20.55 "SD-5" (597+16.58)	1966+44.77 "SD-5" (599+37.33)	75	68	840	727
Between Lomas Santa Fe Dr. and Manchester Ave. (Median Barrier for NB Traffic)	2027+59.45 "SD-5" (618+01.20)	2046+23.02 "SD-5" (623+69.10)	75	62	840	622
Between Manchester Ave. and Birmingham Dr. (Median Barrier for SB Mainline Traffic)	2103+82.90 "SD-5" (641+24.71)	2111+37.59 "SD-5" (643+54.74)	75	70	840	759
Between Manchester Ave. and Birmingham Dr. (Median Barrier for NB Traffic)	2122+41.14 "SD-5" (646+91.23)	2136+30.82 "SD-5" (651+14.67)	75	68	840	718
Between Santa Fe Dr. and Requeza St. (Median Barrier for SB Traffic)	2193+91.78 "SD-5" (668+70.75)	2204+59.91 "SD-5" (671+96.18)	75	68	840	718
Just South of La Costa Ave. (Median Barrier for NB Traffic)	2352+13.94 "SD-5" (716+93.35)	2362+26.05 "SD-5" (720+01.70)	75	68	840	718
Between Cannon Rd. and Chinquapin Ave. (Median Barrier for SB Traffic)	2592+93.25 "SD-5" (790+32.58)	2600+04.71 "SD-5" (792+49.44)	75	63	840	625
Between Cannon Rd. and Chinquapin Ave. (Median Barrier for NB Traffic)	2610+24.00 "SD-5" (795+60.12)	2618+33.83 "SD-5" (798+06.95)	75	55	840	509
Just South of Mission Ave. (Median Barrier for NB traffic)	2825+77.30 "SD-5" (861+29.73)	2843+03.40 "SD-5" (866+55.68)	75	63	840	622
Just South of Neptune Way to North of I-5/SR 76 Junction (Median Barrier for SB Traffic)	2866+59.29 "SD-5" (873+73.75)	2883+92.35 "SD-5" (879+01.99)	75	63	840	624
Genesee Ave NB On-Ramp (Inside Barrier)	1628+16.03 "G1M" (496+26.33)	1631+95.45 "G1M" (497+41.97)	50	46	430	380
Via De La Valle NB Off-Ramp (Outside Barrier)	1935+54.6 "VV3M" (589+95.44)	1938+92.58 "VV3M" (590+98.46)	46	43	375	332
Via De La Valle SB On-Ramp (Outside Barrier)	1942+08.37 "VV4M" (591+94.71)	1944+39.68 "VV4M" (592+65.21)	38	32	276	223

Horizontal Stopping Sight Distance (Index 201.1) (Continued)						
Location and Obstruction	**Begin Non-Standard Horizontal SSD (Station)**	**End Non-Standard Horizontal SSD (Station)**	**Standard Design Speed**	**Provided Design Speed**	**Standard SSD**	**Provided SSD**
	English (Metric)		**ft**	**mph**	**ft**	**ft**
Lomas Santa Fe NB On-Ramp (Outside Barrier)	2007+53.59 "LSF-1M" (611+89.69)	2011+16.68 "LSF-1M" (613+00.36)	50	45	430	358
Manchester Ave SB Off-Ramp (Soundwall S633)	2071+59.79 "M-4M" (631+42.3)	2075+36.86 "M-4M" (632+57.23)	46	46	377	373
Manchester Ave NB On-Ramp (Outside Barrier)	2071+27.29 "M-1M" (631+32.4)	2073+85.38 "M-1M" (632+11.06)	45	36	366	255
Manchester Ave NB On-Ramp (Inside Barrier-worst case)	2066+11.59 "M-1M" (629+75.21)	2067+47.64 "M-1M" (630+16.68)	33	22	227	134
Birmingham Dr NB On-Ramp (OutsideBarrier)	2133+84.07 "BD-1M" (650+39.46)	2135+40.34 "BD-1M" (650+87.1)	25	24	150	145
Poinsettia Ln SB On-Ramp (Outside Barrier)	2428+50.2 "PL-3M" (740+20.74)	2432+64.31 "PL-3M" (741+46.96)	50	48	427	406
Palomar Airport Rd SB Off-Ramp (Outside Rertaining Wall)	2521+46.62 "PA-5M" (768+54.29)	2525+69.89 "PA-5M" (769+83.3)	50	49	426	419
Cassidy St SB On-Ramp (Outside Retaining Wall)	2745+27.81 "CS1" (836+76.08)	2747+50.4 "CS1" (837+43.92)	50	32	430	218
Cassidy St SB Off-Ramp (Outside Barrier)	2749+73.71 "CS2" (838+11.99)	2751+59.61 "CS2" (838+68.65)	42	28	322	182
Oceanside Blvd NB On-Ramp (Outside Retaining Wall)	2800+24.95 "OB1M" (853+51.6)	2803+70.28 "OB1M" (854+56.86)	50	43	430	335
Mission Ave NB On-Ramp (Inside Barrier)	2840+02.91 "MSA-1M" (865+64.09)	2841+10.91 "MSA-1M" (865+97.01)	37	18	274	112
Mission Ave NB On-Ramp (Outside Retaining Wall)	2842+39.83 "MSA-1M" (866+36.3)	2844+89.76 "MSA-1M" (867+12.48)	50	33	430	228

Horizontal Stopping Sight Distance (Index 201.1) (Continued)

Location and Obstruction	Begin Non-Standard Horizontal SSD (Station)	End Non-Standard Horizontal SSD (Station)	Standard Design Speed	Provided Design Speed	Standard SSD	Provided SSD
	English (Metric)		ft	mph	ft	ft
Mission Ave SB Off-Ramp (Outside Retaining Wall)	2845+95.31 "MSA-4M" (867+44.65)	2849+42.66 "MSA-4M" (868+50.52)	46	43	374	337
SR-76 SB On-Ramp (Outside Barrierl)	2867+75.3 "SR76-3" (874+09.11)	2871+56.78 "SR76-3" (875+25.39)	50	46	430	372
Harbor Dr NB Off-Ramp (Outside Retaining Wall)	2899+52.58 "HD3M" (883+77.55)	2903+29.23 "HD3M" (884+92.35)	50	46	430	369

Lane Widths (Index 301.1)

Location	Begin Station	End Station	Standard Lane Width	Provided Lane Width
	English (Metric)	English (Metric)	ft	ft
I-5/805 Merge North to Del Mar Heights Rd.	1663+00 "SDL" (506+88)	1839+40 "SD-5" (560+65)	12	11*
I-5/805 Merge North to Carmel Valley Rd.	1680+36 "SD-5" (512+17)	1775+80 "SD-5" (541+26)	12	11*
Between Cassidy and California	2746+75 "SD-5" (837+21)	2773+75 "SD-5" (845+44)	12	11*

*Outermost through lane = 12'

Cross Slope - Widening (Index 301.3)

Location	Begin Station	End Station	Standard Cross Slope	Existing Cross Slope	Widening: Provided Cross Slope
	English (Metric)	English (Metric)	%	%	%
Entire Project (I-5 Widening)	1525+60 "SD-5" (465+00)	2945+53 "SD-5" (897+80)	1.50% to Match Exist	1.50%	3.00%

Shoulder Width (Index 302.1)						
(HOV and Inside Mainline, 10 ft Standard Width						
Location	**Shoulder type***	**Begin Station**	**End Station**	**Length**	**Standard Shoulder Width**	**Provided Width**
		English (Metric)	English (Metric)	ft	ft	ft
La Jolla Village Dr to Voigt DAR	SB HOV Left Shoulder	1532+58 "SD-5" (467+13)	1543+15 "SD-5" (470+35)	1057	10	10 to 0
La Jolla Village Dr to Voigt DAR	NB HOV Left Shoulder	1541+51 "SD-5" (469+85)	1545+50 "SD-5" (471+07)	399	10	10 to 6.74
Between Genesee Ave and Roselle St	NB HOV Left Shoulder	1600+00 "SD-5" (487+68)	1608+56 SD-5" (490+29)	856	10	5.6 to 10
Between Genesee Ave and Roselle St	SB HOV Left Shoulder	1602+60 "SD-5" (488+47)	1609+20 "SD-5" (490+49)	670	10	5 to 10
Outside Shoulders, 10 ft Standard Width						
I-5/805 Merge	SB HOV Left Shoulder	1631+71 "SDH" (497+35)	1645+94 "SDH" (501+68)	1422	10	5 to 10
I-5/805	SB HOV Left Shoulder	1543+13 "A" (470+35)	1670+56 "SD-5" (509+19)	1216	10	2 (@ column) to 10
I-5/805	NB HOV Left Shoulder	1545+00 "A" (470+92)	1670+70 "SD-5" (509+23)	1037	10	4 to 10
Carmel Mountain Road to Carmel Valley Rd.	SB HOV Left Shoulder	1701+27 "SD-5" (518+55)	1839+40 "SD-5" (560+65)	13813	10	1 (@ column) to 10
Carmel Mountain Road to Carmel Valley Rd.	NB HOV Left Shoulder	1709+82 "SD-5" (521+15)	1775+80 "SD-5" (541+26)	6598	10	2 (@ column) to 10
Between Manchester and Lomas Santa Fe	SB HOV Left Shoulder	2038+62 "SD-5" (621+37)	2048+70 "SD-5" (624+44)	1008	10	4.2 to 10
Between Manchester and Lomas Santa Fe	NB HOV Left Shoulder	2049+24 "SD-5" (624+61)	2055+50 "SD-5" (626+52)	626	10	4 to 10
Between Birmingham and Manchester	SB HOV Left Shoulder	2092+03 "SD-5" (637+65)	2101+43 "SD-5" (640+52)	940	10	4 to 10
Between Birmingham and Manchester	NB HOV Left Shoulder	2101+47 "SD-5" (640+53)	2103+59 "SD-5" (641+17)	212	10	9 to 10
Between Cassidy and California	NB HOV Left Shoulder	2746+75 "SD-5" (837+21)	2773+75 "SD-5" (845+44)	2700	10	4 to 10
North of Harbor Drive to End of Project	NB HOV Left Shoulder	2935+00 "SD-5" (894+59)	2945+05 "SD-5" (897+65)	1005	10	7.8 to 10
Due to sign and light structures, 10 ft Standard Width						
I-5/805 Merge	SB Right Shoulder	1636+80 "SDL" (498+90)	1649+60 "SDL" (503+80)	1266	10	4 to 10
Between Carmel Mountain Rd. and I-5/SR 56	SB Right Shoulder	1740+76 "WS" (530+58)	1745+75 "WS" (532+10)	499	10	10 to 8.5
Carmel Valley Rd/ SR-56	SB Right Shoulder	1763+62 "SD-5" (537+55)	1768+00 "SD-5" (538+89)	438	10	1 (@ column) to 10
Carmel Valley Rd/ SR-56	NB Right Shoulder	1764+50 "SD-5" (537+82)	1767+00 "SD-5" (538+58)	250	10	5.5 (@ column) to 10

Shoulder Width (Index 302.1)						
HOV and Inside Mainline, 10 ft Standard Width						
Location	**Shoulder type***	**Begin Station**	**End Station**	**Length**	**Standard Shoulder Width**	**Provided Width**
		English (Metric)	English (Metric)	ft	ft	ft
Between Via de la Valle and Lomas Santa Fe	NB Right Shoulder	1980+82 "SD-5" (603+75)	1987+78 "SD-5" (605+88)	696	10	3 (@ Conc Barrier) to 10
Between Cassidy and California	NB Right Shoulder	2746+75 "SD-5" (837+21)	2773+75 "SD-5" (845+44)	2700	10	4 (@ Ret Wall) to 10
Mission Ave	SB Right Shoulder	2837+08 "SD-5" (864+74)	2838+12 "SD-5" (865+06)	104	10	8 to 10
Ramps						
Leucadia Blvd. NB On-Ramp	Outside Shoulder Adjacent to Retaining Wall in Cut	2291+62 "LB-1M" (698+48)	2292+98 "LB-1M" (698+90)	130	10	8
Tamarack Ave. NB On-Ramp	Outside Shoulder Adjacent to Retaining Wall in Cut	2640+69 "TM-1M" (804+88)	2643+99 "SD-5" (805+89)	329	10	8
Converging-56 WB & I-5 SB Connector	Inside Shoulder of I-5 SB Bypass	1749+32 "WS" (533+19)	1760+38 "WS" (536+56)	1113	5	3.96 to 4.92
Converging-56 WB & I-5 SB Connector	Outside Shoulder of I-5 SB On-Ramp	1749+32 "WS" (533+19)	1760+38 "WS" (536+56)	1113	10	2.96 to 10
Due to sign and light structures, 10 ft Standard Width						
I-5/805 Merge	NB Mainline Right Shoulder	1669+66.30 "NB" (531+77)	1669+99.09 "NB" (531+87)	32.79	10	10 to 9.4
I-5/805 Merge	NB Mainline Right Shoulder	1672+89.09 "NB" (532+75.38)	1673+28 "NB" (532+87.24)	38.91	10	10 to 9.12
Between I-5/805 Merge and Carmel Mountain Rd.	SB Mainline Right Shoulder	1688+32.80 "SB" (537+45.82)	1706+64.73 "SB" (543+04.30)	1831.93	10	10 to 7.63
Between I-5/805 Merge and Carmel Mountain Rd.	NB Mainline Right Shoulder	1689+25.68 "NB" (537+74.21)	1689+72.77 "NB" (537+88.57)	47.09	10	10 to 9.07
Between I-5/805 Merge and Carmel Mountain Rd.	NB Mainline Right Shoulder	1692+48.08 "NB" (538+72.48)	1693+07.55 "NB" (538+90.61)	59.47	10	10 to 8.83
Between I-5/805 Merge and Carmel Mountain Rd.	NB Mainline Right Shoulder	1695+83.96 "NB" (539+74.86)	1696+27.63 "NB" (539+88.18)	43.67	10	10 to 9.11
Between I-5/805 Merge and Carmel Mountain Rd.	NB Mainline Right Shoulder	1699+15.44 "NB" (540+75.92)	1702+72.22 "NB" (541+84.70)	356.78	10	10 to 8.94
South of Carmel Mountain Rd.	NB HOV Left Shoulder	1703+20.04 "SD-5" (519+13.55)	1703+25.09 "SD-5" (519+15.09)	5.05	10	10 to 9.97
Between Carmel Mountain Rd. and I-5/SR 56 Junction	SB Mainline Right Shoulder	1713+54.99 "SB" (545+14.69)	1738+31.86 "WS" (529+84.06)	2476.87	10	10 to 7.68

*Shoulder Type is based on directional of travel

Minimum Horizontal Clearances						
To Fixed Objects- (Index 309.1(3)a and b)						
Location	**Object Type**	**Direction**	**Begin Station**	**End Station**	**Standard Horizontal Clearance**	**Provided Horizontal Clearance (Provided Shoulder Width*)**
			English (Metric)	**English (Metric)**	**ft**	**ft**
La Jolla Village Dr to Voigt DAR	Existing and Proposed Inside Barrier	SB	1532+58 "SD-5" (467+13.03)	1543+15.30 "SD-5" (470+35.29)	10	10 to 0
La Jolla Village Dr to Voigt DAR	Existing Inside Barrier	NB	1541+51.30 "SD-5" (469+85.32)	1545+49.50 "SD-5" (471+06.70)	10	10 to 6.74
Between Genesee Ave. and Roselle Street	Inside Barrier	NB	1600+00 "SD-5" (487+68)	1608+56 "SD-5" (490+29)	10	10 to 5.6
Between Genesee Ave. and I-5/805 Merge	Inside Barrier	SB	1602+59.87 "SD-5" (488+47.21)	1609+20.29 "SD-5" (490+48.50)	10	10 to 5
I-5/805 Merge	Inside Barrier	SB	1631+70.65 "SDH" (497+34.51)	1645+94.49 "SDH" (501+68.19)	10	10 to 5
I-5/805 Merge	Outside Barrier	SB	1636+79.90 "SDL" (498+89.73)	1649+59.85 "SDL" (503+79.88)	10	4 to 10
I-805 Merge	Existing and Proposed Inside Barrier and Existing Overhead Sign Pedestals	SB	1543+13 "A" (470+35)	1670+55.89 "SD-5" (509+18.64)	10	2 to 10
I-805 Merge	Existing Inside Barrier and Existing Overhead Sign Pedestal	NB	1545+00 "A" (470+92)	1670+69.51 "SD-5" (509+22.79)	10	4 to 10
I-5/805 Merge	Existing Outside Barrier Light Pedestal	NB Mainline	1669+66.30 "NB" (531+77)	1669+99.09 "NB" (531+87)	10	10 to 9.4
I-5/805 Merge	Existing Outside Barrier Light Pedestal	NB Mainline	1672+89.09 "NB" (532+75.38)	1673+28 "NB" (532+87.24)	10	10 to 9.12
Between I-5/805 Merge and Carmel Mountain Rd.	Existing Outside Barrier and Light and Overhead Sign Pedestals	SB Mainline	1688+32.80 "SB" (537+45.82)	1706+64.73 "SB" (543+04.30)	10	10 to 7.63
Between I-5/805 Merge and Carmel Mountain Rd.	Existing Outside Barrier Light Pedestal	NB Mainline	1689+25.68 "NB" (537+74.21)	1689+72.77 "NB" (537+88.57)	10	10 to 9.07
Between I-5/805 Merge and Carmel Mountain Rd.	Existing Outside Barrier Light Pedestal	NB Mainline	1692+48.08 "NB" (538+72.48)	1693+07.55 "NB" (538+90.61)	10	10 to 8.83
Between I-5/805 Merge and Carmel Mountain Rd.	Existing Outside Barrier Light Pedestal	NB Mainline	1695+83.96 "NB" (539+74.86)	1696+27.63 "NB" (539+88.18)	10	10 to 9.11
Between I-5/805 Merge and Carmel Mountain Rd.	Existing Outside Barrier at Light and Overhead Sign Pedestals	NB Mainline	1699+15.44 "NB" (540+75.92)	1702+72.22 "NB" (541+84.70)	10	10 to 8.94
South of Carmel Mountain Rd. to North of Del Mar Heights Rd.	Inside Barrier	SB	1701+26.81 "SD-5" (518+54.65)	1839+40.03 "SD-5" (560+64.92)	10	10 to 1

Minimum Horizontal Clearances (Continued)						
To Fixed Objects- (Index 309.1(3)a and b)						
Location	**Object Type**	**Direction**	**Begin Station**	**End Station**	**Standard Horizontal Clearance**	**Provided Horizontal Clearance (Provided Shoulder Width*)**
			English (Metric)	**English (Metric)**	**ft**	**ft**
To Fixed Objects- (Index 309.1(3)a and b)						
South of Carmel Mountain Rd.	Existing Inside Barrier at Overhead Sign Pedestal	NB	1703+20.04 "SD-5" (519+13.55)	1703+25.09 "SD-5" (519+15.09)	10	10 to 9.97
Just South of Carmel Mountain Rd. to North of I-5/SR 56 Junction	Inside Barrier	NB	1709+81.47 "SD-5" (521+15.15)	1775+80.00 "SD-5" (51+26.38)	10	10 to 2
Between Carmel Mountain Rd. and I-5/SR 56 Junction	Existing Outside Barrier and Overhead Sign Pedestal	SB Mainline	1713+54.99 "SB" (545+14.69)	1738+31.86 "WS" (529+84.06)	10	10 to 7.68
Between Carmel Mountain Rd. and I-5/SR 56 Junction	Existing Outside Barrier	SB Mainline	1740+76.03 "WS" (530+58.48)	1745+74.54 "WS" (532+10.43)	10	10 to 8.5
I-5/SR 56 Junction	Outside Barrier	SB	1763+61.97 "SD-5" (537+55.13)	1767+99.93 "SD-5" (538+88.62)	10	1 to 10
I-5/SR 56 Junction	Outside Barrier	NB	1764+87.43 "SD-5" (537+93.37)	1766+84.63 "SD-5" (538+53.48)	10	9.69 to 5.5
Between Via de la Valle and Lomas Santa Fe Dr.	Outside Barrier	NB	1981+59.98 "SD-5" (603+99.16)	1987+00 "SD-5" (605+63.76)	10	10 to 3 (7.5 to 3)
Between Lomas Santa Fe Dr. and Manchester Ave.	Inside Barrier	SB	2038+62.04 "SD-5" (621+37.15)	2048+70.60 "SD-5" (624+44.56)	10	10 to 4.2
Between Lomas Santa Fe Dr. and Manchester Ave.	Inside Barrier	NB	2049+23.71 "SD-5" (624+60.75)	2055+49.87 "SD-5" (626+51.60)	10	10 to 4
Between Manchester Ave. and Birmingham Dr.	Inside Barrier	SB	2092+03.42 "SD-5" (637+65.20)	2101+43.53 "SD-5" (640+51.75)	10	10 to 4
Between Manchester Ave. and Birmingham Dr.	Inside Barrier	NB	2101+47.16 "SD-5" (640+52.85)	2103+59.21 "SD-5" (641+17.49)	10	10 to 8.96
South of Cassidy St. to North of California St.	Inside Barrier	NB	2746+74.94 "SD-5" (837+21.09)	2773+75 "SD-5" (845+44.07)	10	10 to 4
Between Cassidy St. and California St.	Outside MBGR, Retaining Wall and Barrier	NB	2755+24.89 "SD-5" (839+79.99)	2765+45.52 "SD-5" (842+91.07)	10	4.12 to 10 (3.94 to 9.02)
Just South of Mission Avenue	Outside Barrier	SB	2837+07.68 "SD-5" (864+74.10)	2838+11.94 "SD-5" (865+05.88)	10	8 to 10
Ramps						
La Jolla Village Dr NB Loop On-Ramp	Outside Retaining Wall in Cut	NB	1533+05 "LD2M" (467+27)	1534+88 "LD2M" (467+83)	10	9 to 10 (8)
Del Mar Hts NB On-Ramp	Outside Retaining Wall in Cut	NB	1839+72 "DEL-1M" (560+75)	1841+21 "DEL-1M" (561+20)	10	8.8 to 10 (4)

Minimum Horizontal Clearances (Continued)

To Fixed Objects- (Index 309.1(3)a and b)

Location	Object Type	Direction	Begin Station English (Metric)	End Station English (Metric)	Standard Horizontal Clearance ft	Provided Horizontal Clearance (Provided Shoulder Width*) ft
Santa Fe Drive NB Off-Ramp	Sound Wall	NB	2163+00 "SD-5" 659+40)	2173+00 "SD-5" (662+40)	10	8.8-10 (8)
Encinitas Blvd SB On-Ramp	Outside Retaining Wall in Cut	SB	2221+91 "ENB-3M" (677+24)	2222+07 "ENB-3M" (677+29)	10	8 to 10 (8)
Leucadia Blvd SB On-Ramp	Outside Retaining Wall in Cut	SB	2278+86 "LB3M" (694+60)	2280+87 "LB3M" (695+21)	10	9 to 10 (8)
Leucadia Blvd NB On-Ramp	Outside Retaining Wall in Cut	NB	2291+80 "LB1M" (698+54)	2292+97 "LB1M" (698+90)	10	9 to 10 (8 to 9.32)
Palomar Airport Rd NB On-Ramp	Outside Retaining Wall in Cut	NB	2521+63 "PA-1M" (768+59)	2522+28 "PA-1M" (768+79)	10	8.8 to 10 (8)
Tamarack Ave NB On-Ramp	Outside Retaining Wall in Cut	NB	2640+69 "TM-1M" (804+88)	2643+99 "SD-5" (805+89)	10	8.3 to 10 (8)
Las Flores SB On-Ramp	Outside Retaining Wall in Cut	SB	2698+95 "LF-3M" (822+64)	2700+34 "LF-3M" (823+06)	10	9.to 10 (8)
Cassidy St SB Off -Ramp	Soundwall	SB	2750+63 "CS2" (838+39)	2757+55 "SD-5" (840+50)	10	9.5 (8)

Index 309.1(3)(a) - Minimum Horizontal Clearance to all objects (barriers, MBGR, crash cushions, bridge rails, etc) shall be 10' Left and Right Shoulder Width
Index 309.1(3)(b) - Minimum Horizontal Clearance to Walls (Retaining Walls in Cut, Abutments, noise barriers) shall be 10'
***Shoulder width only noted if different than Provided Horizontal Clearance**

Interchange Spacing (Index 501.3)

Southern Interchange	Northern Interchange	Standard Spacing 5,280 ft or 10,560 ft	Existing Spacing ft	Provided Spacing ft
I-5/La Jolla Village Dr	Voigt DAR	5,280	N/A	3,544
Voigt DAR	I-5/Genesee Ave	5,280	N/A	1,975
I-5/Genesee Ave	I-5/Roselle St	5,280	5,308	5,259
I-5/Roselle St	I-5/I-805	10,560	2,363	2,436
I-5/I-805	I-5/Carmel Mtn Rd	10,560	3,450	3,103
I-5/Carmel Mtn Rd	I-5/SR-56	10,560	5,767	5,767
I-5/SR-56	I-5/Del Mar Heights Rd	10,560	6,433	6,433
I-5/Birmingham Dr	I-5/Santa Fe Dr	5,280	4,125	4,123
I-5/Santa Fe Dr	I-5/Encinitas Blvd	5,280	4,807	4,807

Interchange Spacing (Index 501.3) (Continued)				
Southern Interchange	**Northern Interchange**	**Standard Spacing**	**Existing Spacing**	**Provided Spacing**
		5,280 ft or 10,560 ft	ft	ft
I-5/Palomar Airport Rd	I-5/Cannon Rd	5,280	5,062	5,062
I-5/Tamarack Ave	I-5/Carlsbad Village Dr	5,280	4,431	4,431
I-5/Carlsbad Village Dr	I-5/Las Flores Dr	5,280	2,990	2,990
I-5/Las Flores Dr	I-5/SR-78	10,560	2,731	2,731
I-5/SR-78	I-5/Cassidy St	10,560	1,400	1,400
I-5/Cassidy St	I-5/California St	5,280	2,012	2,012
I-5/California St	I-5/Oceanside Blvd	5,280	2,512	2,512
I-5/Oceanside Blvd	I-5/Mission Ave	5,280	4,679	4,679
I-5/Mission Ave	I-5/SR-76	5,280	3,818	3,818
I-5/SR-76	I-5/Harbor Dr	5,280	2,453	2,453

Isolated Off-Ramps and Partial Interchanges (Index 502.2)				
Location	**Existing Interchange Configuration**	**Proposed Interchange Configuration**	**On-Ramp(s) required for full interchange?**	**Off-Ramp(s) required for full interchange?**
I-5/Roselle Street	Partial Interchange	Same as Existing	NB I-5 On-Ramp	SB I-5 Off-Ramp
I-5/SR-56	Partial Interchange	Same as Existing	WB SR-56 to NB I-5 Connector	SB I-5 to EB SR-56 Connector
I-5/SR-78	Partial Interchange	Removing EB to NB connector	EB SR-78 to NB I-5 Connector	N/A
I-5/Cassidy Street	Partial Interchange	Same as Existing	NB I-5 On-Ramp	NB I-5 Off-Ramp
I-5/California Street	Isolated On-Ramp	Same as Existing	SB I-5 On-Ramp	NB and SB I-5 Off-Ramp

Access Control (Index 504.8)

Location	Access Rights Opposite of Ramp Terminal?
Roselle St SB On-Ramp	NO
Roselle St NB Off-Ramp	NO
Lomas Santa Fe NB Off-Ramp	NO
Santa Fe Dr NB Off-Ramp	NO
Leucadia Blvd NB Off-Ramp	NO
Las Flores SB Off-Ramp	NO
Vista Way (SR-78) SB On and Off-Ramps	NO
California St NB On-Ramp	NO
Oceanside Blvd SB On and Off-Ramp	NO
Oceanside Blvd NB On and Off-Ramp	NO
Mission Ave SB Off-Ramp	NO
SR-76 NB On and Off-Ramps	NO
Harbor Dr SB On and Off-Ramps	NO
Harbor Dr NB On and Off-Ramps	NO

Access Control (Index 504.8)

Location	Access Control Extend 50' Beyond?	Proposed Distance
		ft
Birmingham Dr NB Off-Ramp	NO	10' to Dwy
Tamarack Ave NB On-Ramp	NO	39' to Pio Pico Dr.
Tamarack Ave NB Off-Ramp	NO	22' to Dwy
Tamarack Ave SB On-Ramp	NO	8' to Dwy
Tamarack Ave SB Off-Ramp	NO	70' to Dwy
Carlsbad Village Dr NB On-Ramp	NO	140' to Pio Pico Dr.
Carlsbad Village Dr NB Off-Ramp	NO	45' to Dwy
Carlsbad Village Dr SB On-Ramp	NO	0' to Dwy
Carlsbad Village Dr SB Off-Ramp	NO	37' to Dwy
Las Flores NB On-Ramp	NO	12' to Dwy
Las Flores NB Off-Ramp	NO	45' to Dwy
Las Flores SB On-Ramp	NO	10' to Tuttle St
Las Flores SB Off-Ramp	NO	39' to Dwy
Vista Way (SR-78) SB On-Ramp	NO	8' to Dwy
California St NB On-Ramp	NO	0' to Dwy
Oceanside Blvd NB On-Ramp	NO	285' to Dwy
Oceanside Blvd SB Off-Ramp	NO	50' to Dwy
Mission Ave NB On-Ramp	NO	24' to Dwy
Mission Ave SB Off-Ramp	NO	392' to Dwy
Harbor Dr SB Off-Ramp	NO	144' to Dwy

Route Continuity (Index 502.3)

Location	Existing Route Continuity	Provided Route Continuity
I-5 and I-805	NO: through traffic on right	NO: through traffic on right

Minimum Weaving Length (Index 504.7)					
Southern Interchange	**Northern Interchange**	**Direction**	**Standard Weaving Length**	**Existing Weaving Length**	**Provided Weaving Length**
		NB/SB	**2,000 ft or 5,000 ft**	**ft**	**ft**
I-5/805	I-5/Carmel Mountain Rd.	NB	5,000	4,390	4,343
I-5/805	I-5/Carmel Mountain Rd.	SB	5,000	1,770	1,660
I-5/Carmel Mountain Rd.	I-5/SR-56	NB	5,000	2,910	3,300
I-5/Carmel Mountain Rd.	I-5/SR-56	SB	5,000	2,630	1,850
I-5/Manchester Ave.	Vista Point	SB	2,000	922	1,108
I-5/Birmingham Dr	I-5/Santa Fe Dr	NB	2,000	2,100	1,900
I-5/Birmingham Dr	I-5/Santa Fe Dr	SB	2,000	2,010	1,600
I-5/Carlsbad Village Dr	I-5/Las Flores Dr	NB	2,000	970	1,165
I-5/Carlsbad Village Dr	I-5/Las Flores Dr	SB	2,000	830	1,255
I-5/Las Flores Dr	I-5/SR-78	NB	5,000	950	840
I-5/Las Flores Dr	I-5/SR-78	SB	5,000	690	885
I-5/SR-78	I-5/Cassidy St	SB	5,000	1,270	1,050
I-5/California St	I-5/Oceanside Blvd	NB	2,000	1,510	1,136
I-5/Mission Ave	I-5/SR-76	NB	2,000	1,465	1,468
I-5/Mission Ave	I-5/SR-76	SB	2,000	1,075	1,218
I-5/SR-76	I-5/Harbor Drive	NB	2,000	1,240	1,540
I-5/SR-76	I-5/Harbor Drive	SB	2,000	1,470	1,322

Horizontal Clearance to Noise Barrier (Index 1102.2)				
Minimum Standard Clearance, 10 feet				
Noise Barrier ID Number and Location	**Begin Station**	**End Station**	**Provided Lateral Clearance**	**Placed on Safety Shape Barrier?**
	English (Metric)	**English (Metric)**	**ft**	**YES/NO**
S811 - SB, south of Carlsbad Village Drive near Oak Ave	2671+60 "SD-5" (814+30)	2672+50 "SD-5" (814+57)	8.8	YES, on retaining wall with barrier
S827 - SB, north of Las Flores Drive	2709+38 "SD-5" (825+82)	2709+56 "SD-5" (825+87)	4.3	YES
S841 - SB, north of Cassidy Street	2751+00 "SD-5" (838+50)	2756+00 "SD-5" (840+02)	9.3	YES, on retaining wall with barrier
S868 - NB, north of Mission Ave	2846+00 "SD-5" (867+46)	2848+26 "SD-5" (868+15)	8.8	YES, on retaining wall with

				barrier

Superelevation (Index 202.2)						
Location	**Direction**	**Begin Station**	**Radius (Direction)***	**Standard Rate**	**Rate on Proposed Widening (Max)**	**Comfortable Speed**
	NB/SB	**English (Metric)**	**ft**	**ft/ft**	**ft/ft**	**in mph per HDM (fig. 202.2)**
I-5 Northbound Mainline at Voigt DAR						
Between La Jolla Village Drive and Voigt Drive	NB	1555+50.30 "SD-5" (474+11.72)	10,004 (Left)	0.02	0.0302 (Adverse)	80
Between La Jolla Village Drive and Voigt Drive	NB	1563+94.40 "SD-5" (476+69)	10,004 (Left)	0.02	0.03 (Adverse)	80
Between Voigt Drive and Genesee Avenue	NB	1568+50.80 "SD-5" (478+08.13)	10,004 (Left)	0.02	0.0307 (Adverse)	80
Genesee Ave.	NB	1583+50.30 "SD-5" (482+65.18)	10,004 (Left)	0.02	0.0303 (Adverse)	80
I-5 Southbound Mainline at Voigt DAR						
Between La Jolla Village Drive and Voigt Drive	SB	1555+43 "SD-5" (474+09.51)	10,003.3 (Right)	0.02	0.0302 (Adverse)	80
Between La Jolla Village Drive and Voigt Drive	SB	1567+23.90 "SD-5" (477+69.45)	10,004 (Right)	0.02	0.03 (Adverse)	80
Between Voigt Drive and Genesee Avenue	SB	1572+14.80 "SD-5" (479+19.08)	10,004 (Right)	0.02	0.0313 (Adverse)	80
Genesee Ave.	SB	1586+10.30 "SD-5" (483+44.42)	10,000 (Right)	0.02	0.0303 (Adverse)	80
I-5 Northbound Mainline at Manchester DAR						
On San Elijo Bridge	NB	2066+17.69 "SD-5" (629+77.07)	10,000 (Left)	0.02	0.03 (Adverse)	80
Between Manchester Avenue and Birmingham Drive	NB	2084+50 "SD-5" (635+35.56)	10,000 (Left)	0.02	0.03 (Adverse)	80
I-5 Southbound Mainline at Manchester DAR						
On San Elijo Bridge	SB	2066+68.44 "SD-5" (629+92.54)	10,000 (Right)	0.02	0.03 (Adverse)	80

Distance Between Ramp Intersections and Local Road Intersections (Index 504.3 (j) (3))				
Location	Ramp	Crossroad Intersection	Standard Distance	Provided Distance
	NB/SB		ft	ft
Voigt Drive	SB DAR on-ramp	Gilman Drive	400	149
Carmel Valley Road	NB on-ramp	Old El Camino Real	400	207
Carmel Valley Road	SB on-ramp	Sorrento Valley Road	400	271
Lomas Santa Fe Drive	NB on-ramp	Santa Helena	400	72
Lomas Santa Fe Drive	SB off-ramp	Solana Hills Drive	400	289
Manchester Avenue	SB off-ramp	Ocean Cove Drive	400	246
Birmingham Drive	SB on-ramp	Carol View Drive	400	210
Santa Fe Drive	NB on-ramp	Regal Road	400	33
Encinitas Boulevard	NB on-ramp	Saxony Road	400	157
Leucadia Boulevard	NB on-ramp	Piraeus Street	400	8
Leucadia Boulevard	SB off-ramp	Orpheus Avenue	400	109
La Costa Avenue	NB off-ramp	Piraeus Street	400	253
Poinsettia Lane	NB off-ramp	Lowder Lane	400	325
Palomar Airport Road	NB off-ramp	Paseo del Norte	400	367
Palomar Airport Road	SB off-ramp	Avenida Encinas	400	187
Cannon Road	NB off-ramp	Paseo del Norte	400	384
Cannon Road	SB off-ramp	Avenida Encinas	400	147
Tamarack Avenue	NB on-ramp	Pio Pico Drive	400	39
Tamarack Avenue	SB on-ramp	Jefferson Street	400	220
Carlsbad Village Drive	NB on-ramp	Pio Pico Drive	400	140
Las Flores Drive	NB off-ramp	Pio Pico Drive	400	213
Las Flores Drive	SB on-ramp	Tuttle Street	400	0
Cassidy Street	SB on/off ramps	Stewart Street	400	340
California Street	NB on-ramp	Bellaire Street	400	136
Oceanside Boulevard	SB off-ramp	Vine Street	400	276
Harbor Drive	SB on-ramp	Carmelo Drive	400	154

Standards for Curvature - Minimum Radius (Index 203.2)					
Location	**Begin Horizontal Curve (Station)**	**Design Speed (mph)**	**Standard Radius**	**Provided Radius**	**Provided Design Speed**
			ft	**ft**	
Between I-5/805 Merge and Carmel Mountain Road	1692+33.15 "SB" (538+67.88)	75	3000	2500	72
Between Cannon Road and Chinquapin Avenue	2592+93.26 "SD-5" (790+32.74)	75	3000	2000	69
Between Cannon Road and Chinquapin Avenue	2610+24.01 "SD-5" (795+60.27)	75	3000	2000	69
North of Harbor Drive	2916+25.59 "SD-5" (888+87.66)	75	3000	2500	72
			Ramps		
La Jolla Village Dr. NB On-Ramp	1534+26 "LD1M" (467+64)	44	661	260	28
La Jolla Village Dr. SB Off-Ramp	1533+03 "LD6M" (467+27)	32	338	221	25
Carmel Valley Rd. NB Off-Ramp	1763+91 "CV-2M" (537+64)	48	778	650	43
Del Mar Heights Rd. SB Loop On-Ramp	1835+17 "DEL-4M" (559+36)	50	850	174	23
Via De La Valle NB Loop On-Ramp	1939+42 "VV-2M" (591+14)	50	850	142	21
Via De La Valle SB Loop On-Ramp	1950+07 "VV-5M" (594+38)	50	850	137	20
Lomas Santa Fe Dr. NB Loop On-Ramp	1999+82 "LSF-2M" (609+55)	50	850	130	20
Lomas Santa Fe Dr. SB Loop On-Ramp	2008+68 "LSF-5M" (612+25)	36	460	65	16
Manchester Ave. NB On-Ramp	2066+16 "M-1M" (629+77)	36	450	215	25
Manchester Ave. NB On-Ramp	2071+22 "M-1M" (631+31)	43	639	300	30
Manchester Ave. NB Loop Off-Ramp	2069+14 "M-2M" (630+67)	41	589	190	24
Manchester Ave. SB Loop On-Ramp	2069+96 "M-3M" (630+92)	40	559	130	20
Manchester Ave. SB Off-Ramp	2071+87 "M-4M" (631+51)	45	705	500	38
Vista Point SB Loop On-Ramp	2094+22 "VP2" (638+32)	33	368	91	18
Vista Point SB Loop On-Ramp	2092+71 "VP2" (637+86)	50	850	53	15
Birmingham Dr. NB On-Ramp	2135+56 "BD-1M" (650+92)	30	305	150	21
Palomar Airport Rd. SB Loop On-Ramp	2518+63 "PA-4M" (767+68)	50	850	131	20
SR-78 SB On-Ramp	2726+10 "SR78-4" (830+92)	50	850	246	27
SR-78 SB On-Ramp	2730+08 "SR78-4" (832+13)	39	528	160	22
SR-78 SB Loop Off-Ramp	2725+72 "SR78-5" (830+80)	45	700	140	21
SR-78 NB Loop Off-Ramp	2736+26 "SR78-2" (834+01)	39	513	118	19
Cassidy St. SB On-Ramp	2745+00 "CS1" (836+68)	50	850	263	28
Cassidy St. SB On-Ramp	2748+66 "CS1" (837+79)	31	338	250	27
Oceanside Blvd. NB On-Ramp	2795+90 "OB-1M" (852+19)	36	443	256	27

Standards for Curvature - Minimum Radius (Index 203.2) (Continued)					
Location	**Begin Horizontal Curve (Station)**	**Design Speed**	**Standard Radius**	**Provided Radius**	**Provided Design Speed**
		mph	**ft**	**ft**	
Oceanside Blvd. NB On-Ramp	2799+70 "OB-1M" (853+35)	50	850	492	38
Oceanside Blvd. NB Loop Off-Ramp	2795+15 "OB-2M" (851+96)	38	508	146	21
Oceanside Blvd. SB Loop On-Ramp	2797+13 "OB-3M" (852+57)	41	661	136	20
Mission Ave. NB On-Ramp	2838+78 "MSA-1M" (865+26)	36	445	149	21
Mission Ave. NB On-Ramp	2842+44 "MSA-1M" (866+38)	50	850	328	31
Mission Ave. NB Loop Off-Ramp	2841+53 "MSA-2M" (866+10)	34	408	140	21
Mission Ave. SB Loop On-Ramp	2843+80 "MSA-3M" (866+79)	50	378	131	20
SR-76 NB Loop On-Ramp	2871+31 "SR76-1" (875+18)	50	850	182	23
SR-76 NB Off-Ramp ("SR76-2")	2878+44 "SR76-2" (877+35)	50	850	600	42
SR-76 NB Off-Ramp ("SR76-2A")	2876+73 "SR76-2A" (876+83)	31	348	230	26
SR-76 SB Loop Off-Ramp	2866+78 "SR76-4" (873+79)	50	850	180	23
Harbor Dr. NB On-Ramp	2909+84 "HD1M" (886+92)	50	850	184	23
Harbor Dr. SB Loop On-Ramp	2904+81 "HD4M" (885+39)	46	699	177	23
Harbor Dr. NB Off-Ramp	2908+44 "HD2M" (886+49)	39	533	223	25

Minimum Deceleration Length						
Index 504.2 (Figure 504.2B)						
Interchange	**Direction**	**Ramp**	**Station English (Metric)**	**Proposed Radius**	**Standard DL**	**Proposed DL**
Lomas Santa Fe Dr.	NB	Off-Ramp	1996+20 "LSF-3M" (608+44)	980'	420'	240'
Cassidy St.	SB	Off-Ramp	2751+59 "CS2" (838+68)	295'	570'	494'

Minimum Separation					
Index 1003.1(6)					
Location	Direction	Begin Station	End Station	Standard Separation	Proposed Separation
		English (Metric)	English (Metric)	ft	ft
San Dieguito River to Via de la Valle SB On-Ramp	SB	1927+65 "SD-5" (587+55)	1935+46 "SD-5" (589+93)	15	13.5
Between La Costa Ave and Batiquitos Lagoon	SB	2371+29 "LCA-4M" (722+77)	2374+24 "SD-5" (723+67)	15	13.4

Advisory

Side Slopes 4:1 or Flatter (Index 304.1)				
Location	Direction	Begin Station	End Station	Proposed Side Slope
	NB/SB?	English (Metric)	English (Metric)	
Mainline				
Sorrento Valley Rd.	NB	1647+64 "SDH" (502+20)	1650+92 "SDH" (503+20)	2:1
Sorrento Valley Rd.	SB	1648+29 "SDH" (502+40)	1650+26 "SDH" (503+00)	2:1
Carmel Valley Rd.	NB	1765+09 "SD-5" (538+00)	1767+06 "SD-5" (538+60)	3:1
Carmel Valley Rd.	NB	1768+04 "SD-5" (538+90)	1769+03 "SD-5" (539+20)	2:1
Del Mar Heights to Via de le Valle	NB	1870+08 "SD-5" (570+00)	1944+00 "SD-5" (592+53)	2:1
Del Mar Heights to Via de le Valle	SB	1873+03 "SD-5" (570+90)	1945+50 "SD-5" (592+99)	2:1
Via de la Valle	NB	1937+66 "SD-5" (590+60)	1942+42 "SD-5" (592+05)	2:1
Via de la Valle	SB	1941+27 "SD-5" (591+70)	1946+03 "SD-5" (593+15)	2:1
Via de la Valle	NB	1947+51 "SD-5" (593+60)	1953+41 "SD-5" (595+40)	2:1
Manchester Ave./San Elijo Lagoon	NB	2045+28 "SD-5" (623+40)	2063+65 "SD-5" (629+00)	2:1
Manchester Ave./San Elijo Lagoon	SB	2045+28 "SD-5" (623+40)	2063+65 "SD-5" (629+00)	2:1
North of Manchester Ave.	NB	2111+65 "SD-5" (643+63)	2116+14 "SD-5" (645+00)	2:1
Santa Fe Dr.	SB	2155+51 "SD-5" (657+00)	2170+00 "SD-5" (661+42)	2:1
Santa Fe Dr.	NB	2171+92 "SD-5" (662+00)	2174+21 "SD-5" (662+70)	2:1
Santa Fe Dr.	NB	2175+20 "SD-5" (663+00)	2186+35 "SD-5" (666+40)	2:1
Santa Fe Dr. to Encinitas	SB	2175+20 "SD-5" (663+00)	2209+00 "SD-5" (673+30)	2:1
North of Santa Fe Dr.	NB	2189+63 "SD-5" (667+40)	2191+60 "SD-5" (668+00)	2:1
North of Santa Fe Dr.	NB	2198+82 "SD-5" (670+20)	2204+72 "SD-5" (672+00)	2:1
Encinitas Blvd.	NB	2224+41 "SD-5" (678+00)	2228+67 "SD-5" (679+30)	2:1
North of Encinitas Blvd.	NB	2248+69 "SD-5" (685+40)	2250+66 "SD-5" (686+00)	2:1

Side Slopes 4:1 or Flatter (Index 304.1) (Continued)				
Location	**Direction**	**Begin Station**	**End Station**	**Proposed Side Slope**
	NB/SB?	English (Metric)	English (Metric)	
Between Encinitas & Leucadia	SB	2249+00 "SD-5" (685+49)	2260+43 "SD-5" (688+98)	2:1
Leucadia Blvd.	SB	2264+44 "SD-5" (690+20)	2270+34 "SD-5" (692+00)	2:1
South of Leucadia Blvd.	NB	2267+06 "SD-5" (691+00)	2270+01 "SD-5" (691+90)	2:1
Leucadia Blvd.	SB	2292+65 "SD-5" (698+80)	2307+55 "SD-5" (703+34)	2:1
Leucadia to La Costa Blvd.	SB	2310+14 "SD-5" (704+13)	2353+00 "SD-5" (717+20)	2:1
La Costa Ave to Batiquitos Lagoon	SB	2363+55 "SD-5" (720+41)	2383+00 "SD-5" (726+34)	2:1
North of Batiquitos Lagoon	SB	2386+00 "SD-5" (727+25)	2395+00 "SD-5" (730+00)	2:1
La Costa Ave to Batiquitos Lagoon	NB	2365+49 "SD-5" (721+00)	2397+64 "SD-5" (730+80)	2:1
South of Poinsettia Ln	SB	2419+72 "SD-5" (737+53)	2420+60 "SD-5" (737+80)	2:1
South of Palomar Airport Rd.	NB	2489+50 "SD-5" (758+80)	2493+11 "SD-5" (759+90)	2:1
Cannon Rd.	SB	2558+40 "SD-5" (779+80)	2568+90 "SD-5" (783+00)	2:1
Agua Hedionda Lagoon	NB	2599+15 "SD-5" (792+22)	2615+09 "SD-5" (797+08)	2:1
Agua Hedionda Lagoon	SB	2600+72 "SD-5" (792+70)	2612+20 "SD-5" (796+20)	2:1
Carlsbad Village Drive	NB	2672+24 "SD-5" (814+50)	2681+76 "SD-5" (817+40)	2:1
Carlsbad Village Drive	SB	2673+23 "SD-5" (814+80)	2681+76 "SD-5" (817+40)	2:1
Jefferson to SR-78	NB	2717+52 "SD-5" (828+30)	2732+65 "SD-5" (832+91)	2:1
Jefferson to SR-78	SB	2718+50 "SD-5" (828+60)	2730+25 "SD-5" (832+18)	2:1
Loma Alta Creek to Oceanside Blvd.	SB	2787+40 "SD-5" (849+60)	2791+99 "SD-5" (851+00)	2:1
North of Oceanside Blvd.	SB	2806+43 "SD-5" (855+40)	2809+55 "SD-5" (856+35)	2:1
North of Mission Ave.	NB	2849+74 "SD-5" (868+60)	2858+92 "SD-5" (871+40)	2:1
Ramps				
Carmel Valley Rd. NB On-Ramp	NB	1771+80 "CV1M" (540+04)	1779+00 "CV1M" (542+24)	2:1
Del Mar Heights NB Off-Ramp	NB	1825+83 "DEL-2M" (556+51)	1832+70 "DEL-2M" (558+61)	2:1
Manchester Ave SB Loop On-Ramp	SB	2070+00 "M-3M" (630+94)	2071+58 "M-3M" (631+42)	2:1
Birmingham Dr. NB Off-Ramp	NB	2128+00 "BD-2M" (648+61)	2130+60 "BD-2M" (649+41)	2:1
Santa Fe Dr. NB Off-Ramp	NB	2166+66 "SF-2M" (660+40)	2169+94 "SF-2M" (661+40)	2:1
Encinitas Blvd. NB Off-Ramp	NB	2215+26 "ENB-2M" (675+21)	2220+42 "ENB-2M" (676+78)	2:1
Encinitas Blvd. SB Off-Ramp	SB	2233+20 "ENB-4M" (680+68)	2236+40 "ENB-4M" (681+65)	2:1
La Costa NB Off- Ramp	NB	2350+39 "LCA-2M" (716+40)	2356+95 "LCA-2M" (718+40)	2:1
La Costa NB On-Ramp	NB	2359+10 "LCA-1M" (719+05)	2362+20 "LCA-1M" (720+00)	2:1
La Costa SB Off-Ramp	SB	2359+57 "LCA-4M" (719+20)	2362+86 "LCA-4M" (720+20)	2:1
Palomar Airport Rd. SB Off-Ramp	SB	2517+27 "PA-5M" (767+26)	2519+93 "PA-5M" (768+07)	2:1
Cannon Rd. NB Off-Ramp	NB	2554+46 "CAN-2M" (778+60)	2559+05 "CAN-2M" (780+00)	2:1
Cannon Rd. SB Off-Ramp	SB	2571+89 "CAN-4M" (783+91)	2575+45 "CAN-4M" (785+00)	2:1
Carlsbad Village Dr. NB On-Ramp	NB	2681+97 "CVD-1M" (817+46)	2683+08 "CVD-1M" (817+80)	2:1
Mission Ave. NB On-Ramp	NB	2837+92 "MSA-1M" (865+00)	2841+95 "MSA-1M" (866+23)	2:1
SR-76 NB Loop On-Ramp	NB	2876+75 "SR76-1" (876+83)	2879+00 "SR76-1" (877+52)	3:1
SR-76 NB Loop On-Ramp	NB	2880+62 "SR76-1" (878+01)	2885+15 "SD-5" (879+39)	2:1

Side Slopes 4:1 or Flatter (Index 304.1) (Continued)				
Location	**Direction**	**Begin Station**	**End Station**	**Proposed Side Slope**
	NB/SB?	English (Metric)	English (Metric)	
Harbor Dr. NB Off-Ramp	NB	2904+87 "HD2M" (885+40)	2905+50 "HD2M" (885+60)	2:1
Harbor Dr. SB Off-Ramp	SB	2905+52 "HD5M" (885+60)	2908+13 "HD5M" (886+40)	2:1

18 ft Minimum Catch Distance (Index 304.1)				
Location	**Direction**	**Begin Station**	**End Station**	**Proposed Catch Distance**
	NB/SB?	English (Metric)	English (Metric)	ft
Mainline				
North of Del Mar Heights	NB	1869+29 "SD-5" (569+76)	1871+09 "SD-5" (570+31)	Var 8 to 18
Lomas Santa Fe SB On-Ramp	SB	1995+73 "SD-5" (608+30)	1999+97 "SD-5" (609+59)	Var 6.6 to 13
South of Santa Fe Dr.	SB	2151+94 "SD-5" (655+91)	2156+23 "SD-5" (657+22)	Var 3 to 18
North of Santa Fe Dr.	SB	2197+60 "SD-5" (669+83)	2201+29 "SD-5" (670+95)	Var 8 to 18
North of Encinitas Blvd.	NB	2250+65 "SD-5" (686+00)	2251+63 "SD-5" (686+30)	Var 7 to 18
North of Encinitas Blvd.	SB	2258+04 "SD-5" (688+25)	2259+84 "SD-5" (688+80)	Var 13.8 to 14.3
North of Encinitas Blvd.	SB	2269+84 "SD-5" (691+85)	2276+35 "SD-5" (693+83)	Var 10.5 to 18
North of Leucadia Blvd.	SB	2292+60 "SD-5" (698+78)	2307+19 "SD-5" (703+23)	Var 10.6 to 18
North of Leucadia Blvd.	SB	2310+79 "SD-5" (704+33)	2315+83 "SD-5" (705+86)	Var 13.7 to 18
La Costa Ave	NB	2361+25 "SD-5" (719+71)	2367+49 "SD-5" (721+61)	Var 15.1 to 18
Poinsettia Lane	SB	2424+45 "SD-5" (738+97)	2428+59 "SD-5" (740+23)	Var 11 to18
North of Poinsettia Lane	SB	2445+53 "SD-5" (745+40)	2454+29 "SD-5" (748+07)	Var 5.5 to 16.5
North of Poinsettia Lane	NB	2449+76 "SD-5" (746+69)	2470+89 "SD-5" (753+13)	Var 8.8 to 18
North of Poinsettia Lane	SB	2485+26 "SD-5" (757+51)	2487+89 "SD-5" (758+31)	Var 8.6 to 18
South of Palomar Airport Rd	NB	2493+33 "SD-5" (759+97)	2494+43 "SD-5" (760+30)	Var 16.7 to 18
South of Palomar Airport Rd	SB	2498+78 "SD-5" (761+63)	2499+96 "SD-5" (761+99)	Var 7 to 18
North of Palomar Airport Rd	SB	2546+12 "SD-5" (776+06)	2554+35 "SD-5" (778+57)	Var 1 to 6
North of Cannon Rd	SB	2579+49 "SD-5" (786+23)	2580+72 "SD-5" (786+60)	Var 16 to 18
North of Cannon Rd	SB	2592+95 "SD-5" (790+33)	2593+64 "SD-5" (790+54)	Var 16 to 18
North of Tamarack Rd	SB	2633+70 "SD-5" (802+75)	2644+45 "SD-5" (806+03)	Var 14.7 to 18
Carlsbad Village Dr.	SB	2683+50 "SD-5" (817+93)	2687+02 "SD-5" (819+00)	Var 7.7 to 17
North of Harbor Drive	NB	2943+09 "SD-5" (897+05)	2943+95 "SD-5" (897+32)	Var 5.4 to 18
Ramps				
Carmel Valley Rd. SB On-ramp	SB	1761+40 "CV3M" (536+87)	1763+92 "CV3M" (537+64)	Var 8.5 to 18
Birmingham NB On-ramp	NB	2142+40 "BD-1M" (653+00)	2143+73 "BD-1M" (653+41)	Var 9.3 to 18
Santa Fe Dr NB Off-ramp	NB	2168+92 "SF-2M" (661+09)	2172+28 "SF-2M" (662+11)	Var 3.2 to 18
Leucadia Blvd. SB On-ramp	SB	2283+07 "LB-3M" (695+88)	2284+22 "LB-3M" (696+23)	Var 7.3 to 13

18 ft Minimum Catch Distance (Index 304.1) (Continued)				
Location	**Direction**	**Begin Station**	**End Station**	**Proposed Catch Distance**
	NB/SB?	English (Metric)	English (Metric)	ft
La Costa Ave NB Off-ramp	NB	2346+93 "LCA-2M" (715+34)	2348+27 "LCA-2M" (715+75)	Var 6.6 to 9.5
Palomar Airport Road SB Off-ramp	SB	2517+27 "PA-5M" (767+26)	2522+27 "PA-5M" (768+79)	Var 4.3 to 12.6
Tamarack Ave. NB Off-ramp	NB	2631+78 "TM-2M" (802+17)	2632+75 "TM-2M" (802+46)	Var 9.2 to 13.3
Carlsbad Village Dr. SB Off-ramp	SB	2678+83 "CVD-4M" (816+51)	2681+43 "CVD-4M" (817+30)	Var 5.1 to 18
Cassidy St. SB On-ramp	SB	2747+09 "CS1" (837+31)	2749+30 "CS1" (837+99)	Var 13.1 to 16.6
Mission Ave. NB On-ramp	NB	2837+82 "MSA-1M" (864+97)	2843+09 "MSA-1M" (866+57)	Var 11.8 to 16.5
Mission Ave. SB Off-ramp	SB	2848+50 "MSA-4M" (868+22)	2850+54 "MSA-4M" (868+84)	Var 5.5 to 10.5
SR-76 SB On-ramp	SB	2870+39 "SR76-3" (874+89)	2876+00 "SR76-3" (876+60)	Var 1.1 to 15.4
Harbor Drive SB On-ramp	SB	2899+60 "HD4M" (883+80)	2902+10 "HD4M" (884+56)	Var 6.1 to 7.6

Median Width (Index 305.1)				
Location	**Begin Station**	**End Station**	**Standard Median Width**	**Proposed Median Width**
	English (Metric)	English (Metric)	ft	ft
South of Voigt DAR	1531+25 "SD-5" (466+73)	1553+91 "SD-5" (473+63)	36	22 to 36
North of Genesee Ave	1590+03 "SD-5" (484+64)	1601+30 "SD-5" (488+08)	36	22 to 30.67
North of Genesee Ave	1607+63 "SD-5" (490+00)	1627+96 "SD-5" (496+20)	36	22 to 25.72
South of Carmel Mountain Rd.	1627+96 "SD-5" (496+20)	1701+27 "SD-5" (518+55)	36	22
Del Mar Heights	1833+95 "SD-5" (558+99)	2056+33 "SD-5" (626+77)	36	22 to 36
South of Manchester DAR	2063+16 "SD-5" (628+85)	2064+92 "SD-5" (629+39)	36	22 to 36
North of Manchester DAR	2086+67 "SD-5" (636+02)	2089+05 "SD-5" (636+74)	36	22 to 36
North of Manchester DAR	2094+89 "SD-5" (638+52)	2104+13 "SD-5" (641+34)	36	27.5 to 36
North of Manchester to Batiquitos	2109+59 "SD-5" (643+00)	2379+91 "SD-5" (725+40)	36	32 to 36
Batiquitos Lagoon to Cannon Rd.	2389+35 "SD-5" (728+27)	2556+36 "SD-5" (779+18)	36	32 to 36
Cannon Rd.	2556+36 "SD-5" (779+18)	2585+95 "SD-5" (788+20)	36	31.5 (9.6m) to 35.4 (10.8m)
North of Cannon Rd. to Harbor Dr.	2610+97 "SD-5" (795+82)	2909+52 "SD-5" (886+82)	36	22.77 (6.94m) to 35.4 (10.8m)

Compound Curves (Index 203.5)				
Location	**Begin Station**	**Radius 1**	**Radius 2**	**Smaller Radius at least 2/3 the Larger Radius?**
	English (Metric)	ft	ft	
Manchester Ave. NB On-Ramp	2071+21 "M-1M" (631+30)	300	850	No
Vista Point SB On-Ramp	2092+71 "VP1" (637+86)	91	53	No
SR-78 SB On Ramp	2730+08 "SR78-4" (832+13)	440	160	No
SR-78 SB Loop Off-Ramp	2727+93 "SR78-5" (831+47)	140	430	No
Harbor Dr. SB Loop On-Ramp	2904+81 "HD4M" (885+39)	476	177	No

Outer Separation (Index 310.2)						
Location	**Adjacent Local Road**	**Direction**	**Begin Station**	**End Station**	**Standard Separation**	**Proposed Separation**
		NB/SB?	English (Metric)	English (Metric)	ft	ft
Mainline						
South of Voigt Dr.	Gilman Dr.	SB	1564+25 "SD-5" (476+78)	1564+80 "SD-5" (476+95)	26	24.9
South of Lomas Santa Fe	Ida Ave	SB	1985+65 "SD-5" (605+23)	1987+36 "SD-5" (605+75)	26	24.5
North of Birmingham Dr.	Villa Cardiff	NB	2137+54 "SD-5" (651+52)	2140+06 "SD-5" (652+29)	26	15.1
South of Requeza St.	Devonshire Rd.	SB	2202+02 "SD-5" (671+18)	2203+28 "SD-5" (671+56)	26	19.56
North of Palomar Airport Rd.	Avenida Encinas	SB	2542+07 "SD-5" (774+82)	2545+78 "SD-5" (775+95)	26	23.6
Tamarack Ave to Carlsbad Village Dr.	Pio Pico Dr.	NB	2636+20 "SD-5" (803+51)	2673+40 "SD-5" (814+85)	26	10.2
Carlsbad Village Dr. to Las Flores Dr.	Pio Pico Dr.	NB	2683+55 "SD-5" (817+95)	2696+08 "SD-5" (821+77)	26	15.9
South of Cassidy St.	Soto Rd.	NB	2741+80 "SD-5" (835+70)	2744+98 "SD-5" (836+67)	26	12
Cassidy to California	Soto Rd.	NB	2756+22 "SD-5" (840+10)	2765+53 "SD-5" (842+93)	26	6
South of Mission Ave.	Garfield St.	SB	2826+59 "SD-5" (861+54)	2828+16 "SD-5" (862+02)	26	13
South of Harbor Drive	North Coast Highway	SB	2884+60 "SD-5" (879+23)	2892+47 "SD-5" (881+62)	26	12.3
Ramps						
Carmel Valley Rd. SB On-ramp	Sorrento Valley Rd.	SB	1757+87 "CV3M" (535+80)	1760+81 "CV3M" (536+69)	26	18
Santa Fe Dr. NB On-ramp	Regal Rd.	NB	2178+56 "SF-1M" (664+03)	2180+03 "SF-1M" (664+47)	26	7.8
Leucadia Blvd. NB On-ramp	Piraeus St.	NB	2289+97 "LB-1M" (697+98)	2295+01 "LB-1M" (699+52)	26	9.8
La Costa Ave. NB Off-ramp	Piraeus St.	NB	2347+28 "LCA-2M" (715+45)	2350+36 "LCA-2M" (716+39)	26	15
Carlsbad Village Dr. SB On-ramp	Pine Ave.	SB	2667+01 "CVD-3M" (812+90)	2667+34 "CVD-3M" (813+01)	26	20.2
Carlsbad Village Dr. SB On-ramp	Oak Ave.	SB	2671+86 "CVD-3M" (814+38)	2672+34 "CVD-3M" (814+53)	26	12.1
Las Flores Dr. SB On-ramp	Buena Vista Way	SB	2699+73 "LF-3M" (822+89)	2700+37 "LF-3M" (823+07)	26	17.1
Las Flores Dr. SB On-ramp	Tuttle St.	SB	2704+76 "LF-3M" (824+41)	2706+08 "LF-3M" (824+81)	26	16.1
Cassidy St. SB Off-ramp	Griffin Rd.	SB	2755+81 "CS2" (839+97)	2756+03 "CS2" (840+04)	26	23.8
Mission Ave. NB On-ramp	Santa Barbara St.	NB	2837+67 "MSA-1M" (864+92)	2839+09 "MSA-1M" (865+35)	26	21.3
Mission Ave. NB On-ramp	Buena St.	NB	2843+69 "MSA-1M" (866+76)	2843+88 "MSA-1M" (866+81)	26	24.8

Outer Separation (Index 310.2) (Continued)						
Location	Adjacent Local Road	Direction	Begin Station	End Station	Standard Separation	Proposed Separation
		NB/SB?	English (Metric)	English (Metric)	ft	ft
SR-76 SB On-ramp	N. Horne St.	SB	2864+15 "SR76-3" (872+99)	2864+91 "SR76-3" (873+22)	26	14.8
Harbor Dr. NB Off-ramp	Harbor Dr. right turn bypass	NB	2904+38 "HD3M" (885+26)	2906+99 "HD3M" (886+05)	26	12.5

Angle of Intersection (Index 403.3)			
Location	Station	Standard Angle	Proposed Angle
	English (Metric)	Degrees	Degrees
Voigt DAR	1569+20 "SD-5" (478+29)	90 to 75	57.80
Carmel Valley Rd. NB Off-ramp	1770+67 "CVD-2M" (539+70)	90 to 75	61.51
Lomas Santa Fe NB ramps	2005+61 "SD-5" (611+31)	90 to 75	53.99
Lomas Santa Fe SB ramps	2005+61 "SD-5" (611+31)	90 to 75	57.75
Santa Fe Dr. NB On-Ramp	2174+58 "SF-1M" (662+81)	90 to 75	60.69
Leucadia Blvd. SB On-ramp	2286+64 "LB-3M" (696+98)	90 to 75	70.44
Carlsbad Village Dr. NB Off-ramp	2677+71 "CVD-2M" (816+17)	90 to 75	72.00
Las Flores Dr. NB On-ramp	2705+62 "LF-1M" (824+67)	90 to 75	46.97
Las Flores Dr. SB On-ramp	2708+47 "LF-3M" (825+54)	90 to 75	42.03

Distance Between Successive Exits (Index 504.3)			
First Exit	Second Exit	Required Distance Between Successive Exits	Provided Distance Between Successive Exits
		1,000 ft	ft
Carmel Valley Rd. SB off-ramp	SB I-5/SR-56 Connector	1000	690
NB I-5 to EB SR-78 Connector	NB I-5 to WB SR-78 Loop Ramp	1000	786
SB I-5 to WB SR-76 Connector	SB I-5 to EB SR-76 Loop Ramp	1000	745
NB I-5 to EB Harbor Dr.	NB I-5 to WB Harbor Dr.	1000	622

2 Lane Exit Auxiliary Lane (Index 504.3 (6))					
Location	**Begin Station**	**2 Lane Exit?**	**Auxiliary Lane Provided?**	**Required Length of Auxiliary Lane**	**Provided Length of Auxiliary Lane**
	English (Metric)	**YES/NO**	**YES/NO**	**ft**	**ft**
Mission Ave. SB Off-Ramp	2853+67 "MSA-4M" (869+80)	YES	YES	1300	780
Harbor Dr. NB Off-Ramp	2883+85 "SD-5" (879+00)	YES	YES	1300	1240

Planting on Freeway Medians (Index 902.1)			
Location	**Begin Station**	**End Station**	**Median Planting?**
	English (Metric)	**English (Metric)**	**YES**
Del Mar Heights Rd to Manchester Ave	1841+00 "SD-5" (561+14)	2046+70 "SD-5" (623+84)	YES
Manchester Ave to Agua Hedionda Lagoon	2087+00 "SD-5" (636+10)	2600+40 "SD-5" (792+60)	YES
Agua Hedionda Lagoon to Neptune Ave	2609+60 "SD-5" (795+40)	2866+80 "SD-5" (873+80)	YES

Freeway Entrances and Exits (Index 504.2, Figures 504.2A-B, 504.3L, 504.4)					
Location	**Ramp Type**	**Begin Station**	**Non-Standard Feature**	**Standard**	**Proposed**
		English (Metric)		**ft**	**ft**
SB I-5 at 805 Merge	Diverging Branch Connection Case 3	1547+74 "SD-5" (471+75)	Auxiliary Lanes	2,500	835
SB I-5 at 805 Merge	Diverging Branch Connection Case 3	1671+41 "SD-5" (509+45)	Auxiliary Lanes	1,500	948
Lomas Santa Fe Dr. SB Loop On-Ramp	One Lane	2004+61 "LSF-5M" (611+00)	3000' Radius Curve	167.11' Length	150.7' Length
SR-78 SB On-Ramp	Two Lane	2726+10 "SR78-4" (830+92)	3000' Radius Curve	3000' Radius	246' Radius
NB I-5 to EB SR-78	Diverging Branch Connection Case 2	2722+50 "SD-5" 829+80	Auxiliary Lanes	4250' Total	1545'
Cassidy St. SB On-Ramp	One Lane	2742+61 "CS1" (835+95)	Tangent	300' Length	238' Length
Cassidy St. SB On-Ramp	One Lane	2745+00 "CS1" (836+68)	3000' Radius Curve	3000' Radius	262' Radius
NB I-5 to EB SR-76	Diverging Branch Connection Case 1	2863+00 "SD-5" 872+60	Auxiliary Lanes	2500	1168
Harbor Dr. NB On-Ramp	One Lane	2912+58 "HD1M" (888+69)	3000' Radius Curve	3000' Radius	Tangent

Mainline Lane Reduction at Interchanges (Index 504.6)					
Location	Direction	Begin Station	End Station	Number of Mainline Lanes approaching Interchange	Number of Mainline Lanes through Interchange
	NB/SB	English (Metric)	English (Metric)	#	#
La Jolla Village Drive	SB	1535+14 "SD-5" (467+91)	1545+96 "SD-5" (471+21)	5	4

Distance Between Ramp Intersections and Local Road Intersections (Index 504.3 (j) (3))				
Location	Direction	Crossroad Intersection	Standard Distance	Provided Distance
	NB/SB		ft	ft
Del Mar Heights Road	SB	Portofino Drive	500	410
Via de la Valle	SB	Jimmy Durante Blvd	500	446
Poinsettia Lane	SB	Avenida Encinas	500	404
Carlsbad Village Drive	SB	Hope Avenue	500	417
SR-78	SB	Stewart Street	500	472
SR-76	SB	North Coast Highway	500	466

Lane Reductions (Index 206.3)							
Location	Ramp	Begin Station	Reduction Width	Design Speed	Standard Lane Reduction Length (WV)	Proposed Lane Reduction Length	Proposed Ratio
		English (Metric)	ft	mph	ft	ft	
Vista Point	SB On-Ramp	2090+91 "VP2" (637+31)	6	50	300	179	30:1
SR-78	SB Loop Off-Ramp	2724+44 "SR78-5" (830+41)	6.6	50	330	118	18:1
Mission Ave.	NB On-Ramp	2841+09 "MSA-1M" (865+96)	4.27	50	213	135	32:1
Mission Ave.	SB Loop On-Ramp	2841+77 "MSA-3M" (866+17)	6.56	50	328	203	31:1
SR-76	SB Loop Off-Ramp	2866+78 "SR76-4" (873+79)	4.27	50	213	130	31:1

Ramp Lane Drop Location (Index 504.3)						
Location	**Ramp**	**Begin Station**	**Dropped Lane Width**	**Proposed Lane Drop Taper Length**	**Proposed Ratio**	**Taper Length beyond 6' Point**
		English (Metric)	**ft**	**ft**		**ft**
Lomas Santa Fe Dr.	NB Loop On-Ramp	2002+41 "LSF-2M" (610+34)	18	540	30:1	300
Lomas Santa Fe Dr.	SB Loop On-Ramp	2001+61 "LSF-5M" (610+09)	12	360	30:1	300
Mission Ave.	NB On-Ramp	2843+95 "MSA-1M" (868+84)	12	355	30:1	328
SR-76	SB On-Ramp	2862+86 "SR76-3" (872+60)	12	397	34:1	328

Metered Multilane Ramp Lane Drop Taper (Index 504.3 2b)						
Location	**Ramp**	**Begin Station**	**Minimum Standard Lane Drop Taper**	**Dropped Lane Width**	**Proposed Lane Drop Taper Length**	**Proposed Ratio**
		English (Metric)		ft	ft	
Palomar Airport Rd.	SB Loop On-Ramp	2516+00 "PA-4M" (766+88)	30:1	24.0	360	15:1

Free Right-Turns at Ramp Terminals (Index 504.3)		
Location	**Ramp**	**Approximate Station**
		English (Metric)
La Jolla Villlage Drive	NB on-ramp	1531+47 "LD1M" (466+79)
Palomar Airport Rd.	SB on-ramp	2517+00 "PA-3M" (767+18)
SR-78	NB off-ramp	2741+20 "SR78-2" (835+52)
Cassidy St.	SB on-ramp	2749+50 "CS1" (838+05)
Cassidy St.	SB off ramp	2746+82 "CS2" (837+23)

Single Lane Ramp-Lane Drop (Index 504.3 (5))						
Location	**Ramp**	**Begin Station**	**Lane Width Being Dropped**	**Standard Lane Drop Length (WV) (V=50 mph)**	**Proposed Length of Lane Drop**	**Lane Drop Ratio Provided**
		English (Metric)	ft	ft	ft	
Del Mar Heights Rd.	SB Loop On-Ramp	1830+50 "DEL-4M" (557+94)	28.0	1400	777	28:1
Poinsettia Ln.	NB On-Ramp	2443+40 "PL-1M" (744+75)	12.0	600	240	20:1
Palomar Airport Rd.	SB Loop On-Ramp	2513+00 "PA-4M" (765+96)	30.2	1510	687	23:1
Mission Ave.	SB Loop On-Ramp	2829+92 "MSA-3M" (862+56)	23.6	1180	659	28:1
SR-76	NB Loop On-Ramp	2876+68 "SR76-1" (876+81)	27.9	1395	718	26:1

Branch Connection Auxiliary Lane (Index 504.4 (6))				
Location	**Branch Type**	**Begin Station**	**Required Length of Auxiliary Lane**	**Provided Length of Auxiliary Lane**
		English (Metric)	ft	ft
NB I-5 to EB SR-76	Diverging Branch Connection Case 1	2863+00 "SD-5" 872+60	1300	780

Appendix J:
Potential Utility Relocations

LIST OF UTILITIES FOR I-5 NORTH COAST CORRIDOR PROJECT

Route: 11-SD-5
PM: 34.1/54.6
Description: I-5 North Coast Corridor

Project Engineer: Jorge Perez Valdes
Service Engineer: Simon Tse
R/W Utility Coordinator: Gwen Denny

Date: 03/03/13

EA 11-235800

I.D.	OWNER	FACILITY	LOCATION (I-5 Alignment, Metric)	Potential Utility Conflict
3.5-1*	SDG&E	69KV Electric	Genesee Avenue (West of NB off-ramp)	For all build alternatives, the existing temporary over-head transmission line would be housed within the new bridge for Genesee, and both the poles (west side and east side) would be eliminated. No environmental impacts are anticipated.
1	City of San Diego	24" SCRWP water main	Transversely crossing @ Sta.562+10-add	Cut side slopes and install a 7 m crib wall on the SB side and a 4 m crib wall on the NB side-add
2	City of San Diego	Water Main Valve	Transversely crossing @ Sta.562+10	Cut side slopes and install a 7 m crib wall on the SB side and a 4 m crib wall on the NB side
3	SBC	U/G Tel Fiber Optic	Parallel to R/W @ Sta 568+70 to 572+80	Inside New R/W. Cut NB side slope
4	SBC	U/G Tel Fiber Optic	Parallel to R/W @ Sta 568+70 & 572+80	Inside New R/W. Cut NB side slope
5	SBC	U/G Tel Fiber Optic	Parallel to R/W @ Sta 582+70 to 590+80	Inside New R/W. Cut NB side slope
6	SBC	U/G Tel Fiber Optic	Parallel to R/W @ Sta 582+70 & 590+80	Inside New R/W. Cut NB side slope
7	City of San Diego	8" VCP sewer main	Transversely crossing @ Sta.604+00	Cut side slopes and installing a 4.3 m retaining wall on the SB side and 6 m crib wall on the NB side
8	City of San Diego	14" ductile iron water main	Transversely crossing @ Sta.603+82	Cut side slopes and installing a 4.3 m retaining wall on the SB side and 6 m crib wall on the NB side
9	City of San Diego	12" ACP	Transversely crossing @ Sta.618+40	Cut side slopes and install retaining walls
10	City of San Diego	6" DIP Water main	Transversely crossing @ Sta.632+05	Cut NB side slope.
11	City of Encinitas	6" VCP	Transversely crossing @ Sta.650+70	Cut NB side slope and construct ramp on the SB side.

* This utility was identified within this *EIR/EIS* in *Table 3.5.1, Utilities Over 50 kV*.

12	City of San Diego	8" VCP sewer main	Transversely crossing @ Sta.648+45	Fill NB side slope and install 5.5 m crib wall and construct a 4.3 m retaining wall on the SB side.
13	City of San Diego	10" P sewer main	Transversely crossing @ Sta.658+70	Cut NB side slope and install retaining wall.
14	City of Encinitas	12" CP water main	Transversely crossing @ Sta.671+60	Cut SB side slope and construct a 7.0 m retaining wall. Fill NB side slope.
15	City of San Diego	6" STL water main	Transversely crossing @ Sta.681+64	Cut NB side slope and construct 4.0 m crib wall. Fill SB side slope
16	City of San Diego	8" VCP sewer main	Transversely crossing @ Sta.688+42	Fill SB side slope. Cut NB side slope and construct 5.5 m retaining wall.
17	SBC	U/G telephone line	Transversely crossing @ Sta.688+66	Fill SB side slope. Cut NB side slope and construct 5.5 m retaining wall.
18	City of San Diego	12" ACP water main	Transversely crossing @ Sta.688+70	Fill SB side slope. Cut NB side slope and construct 5.5 m retaining wall.
19	City of San Diego	15" VCP sewer main	Transversely crossing @ Sta.716+04	Inside and outside lane widening and construct ramp on the SB side.
20	City of San Diego	30" RCP sewer main	Transversely crossing @ Sta.759+80	Inside and outside lane widening and construct retaining wall on the SB side.
21	SDG&E	3" gas main	Transversely crossing @ Sta.772+40	Inside and outside lane widening
22	SDG&E	4" gas main	Transversely crossing @ Sta.800+10	Cut NB side slope and construct crib wall on the SB side.
23	City of San Diego	12" STL water main	Transversely crossing @ Sta.800+05	Cut NB side slope and construct crib wall on the SB side.
24	SDG&E	3" gas main	Transversely crossing @ Sta.806+00	Cut NB side slope construct a 4.3 m retaining wall.
25	City of San Diego	8" VCP sewer main	Transversely crossing @ Sta.805+92	Cut NB side slope construct a 4.3 m retaining wall.
26	City of San Diego	6" ACP water main	Transversely crossing @ Sta.807+75	Cut NB side slope construct a 4.3 m retaining wall and construct retaining wall on the SB side.
27	City of San Diego	6" ACP water main	Transversely crossing @ Sta.805+86	Cut NB side slope construct a 4.3 m retaining wall.
28	SDG&E	4" gas main	Transversely crossing @ Sta.813+10	Cut NB side slope construct a 4.3 m retaining wall side and construct retaining wall on the SB side.
29	City of San Diego	8" VCP sewer main	Transversely crossing @ Sta.813+05	Cut NB side slope construct a 4.3 m retaining wall side and construct retaining wall on the SB side.

30	City of San Diego	8" ACP water main	Transversely crossing @ Sta.814+55	Cut NB side slope construct a 4.3 m retaining wall and construct retaining wall on the SB side.
31	City of San Diego	12" ACP water main	Transversely crossing @ Sta.813+00	Cut NB side slope construct a 4.3 m retaining wall and construct retaining wall on the SB side.
32	SDG&E	8" gas main	Transversely crossing @ Sta.835+70	Cut NB side slope
33	City of San Diego	10" VCP sewer main	Transversely crossing @ Sta.835+75	Cut NB side slope
34	City of San Diego	10" VCP sewer main	Transversely crossing @ Sta.842+02	Cut NB side slope and construct 4.0 m retaining wall
35	SBC	U/G Telephone line	Transversely crossing @ Sta.841+95	Cut NB side slope and construct 4.0 m retaining wall
36	City of San Diego	8" ACP water main	Transversely crossing @ Sta.835+85	Cut NB side slope
37	City of San Diego	12" ACP water main	Transversely crossing @ Sta.843+70	Cut SB side slope and construct 4.0 m retaining wall
38	City of San Diego	8" VCP sewer main	Transversely crossing @ Sta.861+30	Widen inside and outside lane and construct 1.0 m retaining wall
39	City of San Diego	12" ACP sewer main	Transversely crossing @ Sta.867+75	Cut NB & SB side slopes and construct 3.0 m retaining wall and 4.6 m crib wall
40	SDG&E	2" gas main	Transversely crossing @ Sta.874+55	Widen outside lane and construct SB 4.0 m retaining wall
41	City of San Diego	8" VCP sewer main	Transversely crossing @ Sta.874+35	Widen outside lane and construct SB 4.0 m retaining wall
42	City of San Diego	8" ACP water main	Transversely crossing @ Sta.874+20	Widen outside lane and construct SB 4.0 m retaining wall
43	SDG&E	6" gas main	Transversely crossing @ Sta.882+95	Widen inside and outside lane
44	City of San Diego	6" VCP sewer main	Transversely crossing @ Sta.881+50	Widen outside lane and construct NB 4.0 m retaining wall
45	City of San Diego	12" ACP water main	Transversely crossing @ Sta.881+45	Widen outside lane and construct NB 4.0 m retaining wall
46	SBC	U/G telephone line	Longitudinal to San Dieguito River Br.	San Dieguito River Bridge
47	SBC	U/G telephone line	Longitudinal to San Dieguito River Br.	San Dieguito River Bridge - Widen North & South Bound

48	City of San Diego	12" VCP sewer main	Longitudinal to Via De La Valle	Via De La Valle Bridge - Widen North & South Bound
49	Daniels Cablevision	U/G Cable Line	Longitudinal to Via De La Valle	Via De La Valle Bridge - Widen North & South Bound
50	Santa Fe Irrigation District	21" SCRW water main	Longitudinal to Via De La Valle	Via De La Valle Bridge - Widen North & South Bound
51	SBC	U/G telephone line	Longitudinal to Via De La Valle	Via De La Valle Bridge - Widen North & South Bound
3.5-2[†*]	SDG&E	69KV Electric	Between NB off-ramp & HOV/Managed Lanes	For all build alternatives, the transmission pole may be protected in place or be relocated 65.6 ft to the east. No environmental impacts are anticipated.
3.5-3[*]	SDG&E	69KV Electric	Between Via De La Valle & Lomas Santa Fe Drive	For 10+4 Barrier only, the transmission pole would move to east on the south-west corner of the intersecting streets. No environmental impacts are anticipated.
52	City of Solana Beach	8" VCP sewer main	Longitudinal to Lomas Santa Fe Dr.	Lomas Santa Fe Bridge
53	Daniels Cablevision	U/G Cable Line	Longitudinal to Lomas Santa Fe Dr.	Lomas Santa Fe Bridge - Widen North & South Bound
54	Santa Fe Irrigation District	16" SCRW water main	Longitudinal to Lomas Santa Fe Dr.	Lomas Santa Fe Bridge - Widen North & South Bound
55	Santa Fe Irrigation District	21" SCRW water main	Longitudinal to Lomas Santa Fe Dr.	Lomas Santa Fe Bridge
56	SBC	U/G telephone line	Longitudinal to Lomas Santa Fe Dr.	Lomas Santa Fe Bridge
57	City of Encinitas Water District	8" VCP sewer main	Longitudinal to Manchester Avenue.	Manchester Avenue Bridge - Widen North & South Bound
58	City of Encinitas Water District	14" DIP sewer main	Longitudinal to Manchester Avenue.	Manchester Avenue Bridge - Widen North & South Bound
59	City of Escondido Municipal water District	36" DIP sewer main	Longitudinal to Manchester Avenue.	Manchester Avenue Bridge - Widen North & South Bound
60	Daniels Cablevision	U/G Cable Line	Longitudinal to Manchester Avenue.	Manchester Avenue Bridge - Widen North & South Bound

[*] This utility was identified within this *EIR/EIS* in *Table 3.5.1, Utilities Over 50 kV*.

61	SBC	U/G telephone line	Longitudinal to Manchester Avenue.	Manchester Avenue Bridge - Widen North & South Bound
62	SDG&E	U/G electric line	Longitudinal to Manchester Avenue.	Manchester Avenue Bridge - Widen North & South Bound
63	SDG&E	4" gas main	Longitudinal to Birmingham Drive.	Birmingham Drive Bridge -Remove
3.5-4[‡*]	SDG&E	69KV Electric	Between Manchester & Birmingham Avenues	The transmission pole is within all build alternatives to be protected in place and is not impacted.
3.5-5[*]	SDG&E	69KV Electric	Between Manchester & Birmingham Avenues	The transmission pole is within all build alternatives to be protected in place and is not impacted.
3.5-6[*]	SDG&E	69KV Electric	Between Manchester & Birmingham Avenues	The transmission pole is within the 10+4 Barrier/Buffer and 8+4 Barrier project areas to be protected in place and is not impacted.
3.5-7[*]	SDG&E	69KV Electric	South of Birmingham Avenues	The transmission pole is within the 10+4 Barrier/Buffer and 8+4 Barrier project areas to be protected in place and is not impacted.
64	SBC	U/G telephone line	Longitudinal to Mackinnon Ave.	MacKinnon Avenue Bridge -Remove
65	Cardiff Encinitas Sanitation District	8" VCP sewer main	Longitudinal to Santa Fe Dr.	Santa Fe Drive Bridge Widen North & South Bound and Median
66	City of Encinitas Water District	12" PVC reclaim water main	Longitudinal to Santa Fe Dr.	Santa Fe Drive Bridge Widen North & South Bound and Median
67	City of Encinitas Water District	12" PVC reclaim water main	Longitudinal to Santa Fe Dr.	Santa Fe Drive Bridge Widen North & South Bound and Median
68	SBC	U/G telephone line	Longitudinal to Santa Fe Dr.	Santa Fe Drive Bridge
69	SDG&E	4" gas main	Longitudinal to Santa Fe Dr.	Santa Fe Drive Bridge Widen North & South Bound and Median
70	SDG&E	U/G electric line	Longitudinal to Santa Fe Dr.	Santa Fe Drive Bridge Widen North & South Bound and Median
71	Cardiff Encinitas Sanitation District	8" VCP sewer main	Longitudinal to Encinitas Blvd.	Encinitas Boulevard Bridge Widen North & South Bound and Median

[* ‡] This utility was identified within this *EIR/EIS* in *Table 3.5.1, Utilities Over 50 kV*.

72	SBC	U/G telephone line	Longitudinal to Encinitas Blvd.	Encinitas Boulevard Bridge Widen North & South Bound and Median
73	SDG&E	10" gas main	Longitudinal to Encinitas Blvd.	Encinitas Boulevard Bridge
74	Daniels Cablevision	U/G Cable Line	Longitudinal to Leucadia Blvd.	Leucadia Boulevard Bridge -Remove
75	SBC	U/G telephone line	Longitudinal to Leucadia Blvd.	Leucadia Boulevard Bridge -Remove
76	SDG&E	4" gas main	Longitudinal to Leucadia Blvd.	Leucadia Boulevard Bridge -Remove
77	Leucadia Waste-Water District	12" ACP sewer main	Longitudinal to La Costa Ave.	La Costa Avenue Bridge -Remove
78	Leucadia Waste-Water District	12" DIP sewer main	Longitudinal to La Costa Ave.	La Costa Avenue Bridge -Remove
79	San Dieguito Water District	6" ACP water main	Longitudinal to La Costa Ave.	La Costa Avenue Bridge -Remove
80	San Dieguito Water District	6" STL Reclaimed water main	Longitudinal to La Costa Ave.	La Costa Avenue Bridge -Remove
81	SDG&E	4" gas main	Longitudinal to La Costa Ave.	La Costa Avenue Bridge -Remove
82	SDG&E	U/G electric line	Longitudinal to La Costa Ave.	La Costa Avenue Bridge -Remove
83	Carlsbad MWD	2-14" STL Reclaimed water main	Longitudinal to Poinsettia Ln.	Poinsettia Lane Bridge -Remove
84	Carlsbad MWD	12" STL water main	Longitudinal to Poinsettia Ln.	Poinsettia Lane Bridge -Remove
85	SBC	U/G telephone line	Longitudinal to Poinsettia Ln.	Poinsettia Lane Bridge -Remove
86	SBC	U/G telephone line	Longitudinal to Poinsettia Ln.	Poinsettia Lane Bridge -Remove
87	SDG&E	4" gas main	Longitudinal to Poinsettia Ln.	Poinsettia Lane Bridge -Remove
88	SDG&E	U/G electric line	Longitudinal to Poinsettia Ln.	Poinsettia Lane Bridge -Remove

89	Carlsbad MWD	8" STL Reclaimed water main	Longitudinal to Palomar Airport Rd.	Palomar Airport Road. Bridge - Remove
90	Carlsbad MWD	10" STL water main	Longitudinal to Palomar Airport Rd.	Palomar Airport Road. Bridge-Remove
91	SBC	U/G telephone line	Longitudinal to Palomar Airport Rd.	Palomar Airport Rd. Bridge -Remove
92	SBC	U/G telephone line	Longitudinal to Palomar Airport Rd.	Palomar Airport Road. Bridge - Remove
93	SDG&E	3" gas main	Longitudinal to Palomar Airport Rd.	Palomar Airport Road. Bridge - Remove
94	Carlsbad MWD	10" VCP sewer main	Longitudinal to Cannon Rd.	Cannon Road. Bridge - Widen North & South Bound
95	Carlsbad MWD	12" ACP water main	Longitudinal to Cannon Rd.	Cannon Road. Bridge - Widen North & South Bound
96	SBC	U/G telephone line	Longitudinal to Cannon Rd.	Cannon Road. Bridge - Widen North & South Bound
97	SDG&E	20" gas main	Longitudinal to Cannon Rd.	Cannon Road. Bridge - Widen North & South Bound
98	SDG&E	3" gas main	Longitudinal to Cannon Rd.	Cannon Road. Bridge - Widen North & South Bound
99	SDG&E	U/G electric line	Longitudinal to Cannon Rd.	Cannon Road. Bridge - Widen North & South Bound
3.5-8[§*]	SDG&E	230KV & 230KV Electric	North of Cannon Road	For all build alternatives, the project currently proposes to avoid four high-voltage transmission towers. For all build alternatives, should transmission towers relocation become necessary, all the four structures on west side would be relocated 65.6 ft to the west within the existing unpaved lot. No environmental impacts are anticipated.
3.5-9[*]	SDG&E	230KV & 138KV Electric	North of Cannon Road	For all build alternatives, the project currently proposes to avoid four high-voltage transmission towers. For all build alternatives, should transmission towers relocation become necessary, all the four structures on west side would be relocated 65.6 ft to the west within the existing unpaved lot. No environmental impacts are anticipated.

[*] This utility was identified within this *EIR/EIS* in *Table 3.5.1, Utilities Over 50 kV*.

3.5-10***	SDG&E	138KV & 138 KV Electric	North of Cannon Road	For all build alternatives, the project currently proposes to avoid four high-voltage transmission towers. For all build alternatives, should transmission towers relocation become necessary, all the four structures on west side would be relocated 65.6 ft to the west within the existing unpaved lot. No environmental impacts are anticipated.
3.5-11*	SDG&E	138KV & 138 KV Electric	North of Cannon Road	For all build alternatives, the project currently proposes to avoid four high-voltage transmission towers. For all build alternatives, should transmission towers relocation become necessary, all the four structures on west side would be relocated 65.6 ft to the west within the existing unpaved lot. No environmental impacts are anticipated.
3.5-12*	SDG&E	69KV Electric	South of SR 76	For all build alternatives, the pole would be relocated 65.6 ft to the west. No environmental impact is anticipated.
100	Carlsbad MWD	10" STL water main	Longitudinal to Tamarack Ave.	Tamarack Avenue Bridge -Remove
101	Carlsbad MWD	12" STL water main	Longitudinal to Chinquapin Ave.	Chinquapin Avenue Bridge -Remove
102	SDG&E	3" gas main	Longitudinal to Chinquapin Ave.	Chinquapin Avenue Bridge -Remove
103	Carlsbad MWD	8" VCP sewer main	Longitudinal to Chestnut Ave.	Chestnut Avenue Bridge - Remove
104	SBC	U/G telephone line	Longitudinal to Chestnut Ave.	Chestnut Avenue Bridge - Remove
105	Carlsbad MWD	8" ACP water main	Longitudinal to Carlsbad Village Drive.	Carlsbad Village Drive Bridge - Remove
106	Carlsbad MWD	8" VCP sewer main	Longitudinal to Carlsbad Village Drive.	Carlsbad Village Drive Bridge - Remove
107	Carlsbad MWD	15" ACP water main	Longitudinal to Las Flores Drive.	Las Flores Drive Bridge
108	Carlsbad MWD	6" VCP sewer main	Longitudinal to Jefferson Street	Jefferson Street Bridge - Remove
109	City of Oceanside	10" Brine Line	Longitudinal to Oceanside Boulevard	Oceanside Boulevard Bridge - Widen North & South Bound
110	City of Oceanside	14" ACP water main	Longitudinal to Oceanside Boulevard	Oceanside Boulevard Bridge - Widen North & South Bound

* This utility was identified within this *EIR/EIS* in *Table 3.5.1, Utilities Over 50 kV*.

111	City of Oceanside	18" ACP sewer main	Longitudinal to Oceanside Boulevard	Oceanside Boulevard Bridge - Widen North & South Bound
112	City of Oceanside	24" CIP force main	Longitudinal to Oceanside Boulevard	Oceanside Boulevard Bridge - Widen North & South Bound
113	SBC	U/G telephone line	Longitudinal to Oceanside Boulevard	Oceanside Boulevard Bridge - Widen North & South Bound
114	SDG&E	4" gas main	Longitudinal to Oceanside Boulevard	Oceanside Boulevard Bridge - Widen North & South Bound
115	SDG&E	U/G electric line	Longitudinal to Oceanside Boulevard	Oceanside Boulevard Bridge - Widen North & South Bound
116	City of Oceanside	8" VCP sewer main	Longitudinal to Brook Street	Brook Street Bridge -Remove
117	SDG&E	6" gas main	Longitudinal to Brook Street	Brook Street Bridge -Remove
118	City of Oceanside	12" CIP water main	Longitudinal to Mission Avenue	Mission Avenue Bridge -Remove
119	Daniels Cablevision	U/G Cable Line	Longitudinal to Mission Avenue	Mission Avenue Bridge
120	SBC	U/G telephone line	Longitudinal to Bush Street	Bush Street Bridge
121	SDG&E	U/G electric line	Longitudinal to Mission Avenue	Mission Avenue Bridge -Remove
122	SDG&E	U/G electric line	Longitudinal to Bush Street	Bush Street Bridge -Remove

Appendix K:
Reference Graphics from the Draft EIR/EIS and Supplemental Draft EIR/EIS

REFERENCE GRAPHICS

This appendix contains Draft EIR/EIS and Supplemental EIR/EIS reference graphics that are not included in the Final EIR/EIS, and are provided for the convenience of the reader. Updated 10+4 Buffer alternative graphics, including deletion of the Cannon and Oceanside Direct Access Ramps, can be compared with the current 8+4 Buffer alternative (Preferred Alternative) graphics provided in this Final EIR/EIS, Please note that following public circulation of the Draft EIR/EIS in 2010, phasing graphics (Figures 2-2.14a through 2-2.14ao of the Draft EIR/EIS) also were updated with editorial and design changes. In addition, the Mancheser DAR simulation from Draft EIR/EIS Section 3.7 is provided below for comparison with the current design depicted in Final EIR/EIS Figure 3-7.50. From the Supplemental Draft EIR/EIS Figures Appendix B-1 through B-3 showing preliminary detail for community enhancement park and ride facilities.

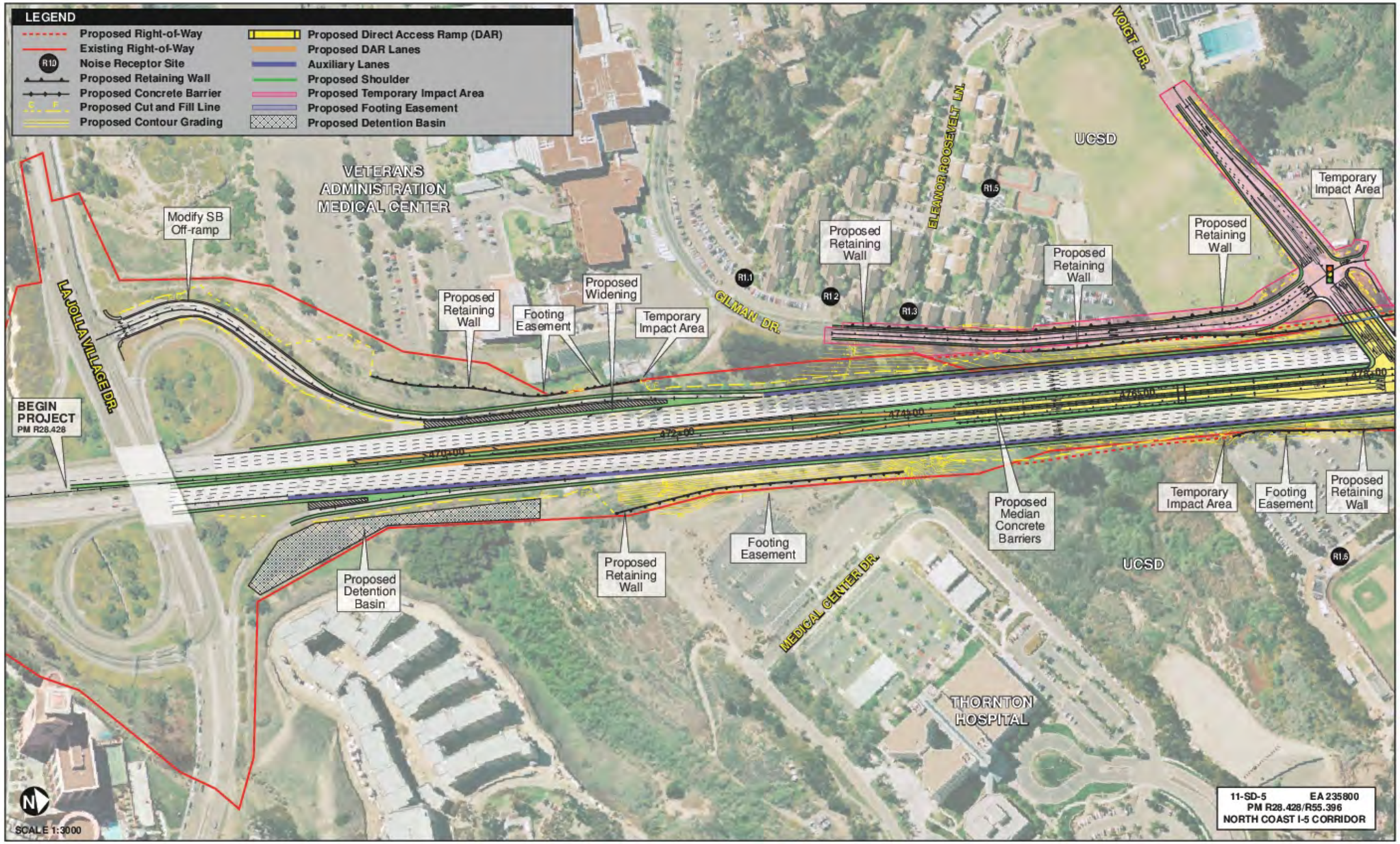


Figure 2-2.14a Project Features Map: 10+4 Buffer Alternative

Figure K-1, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

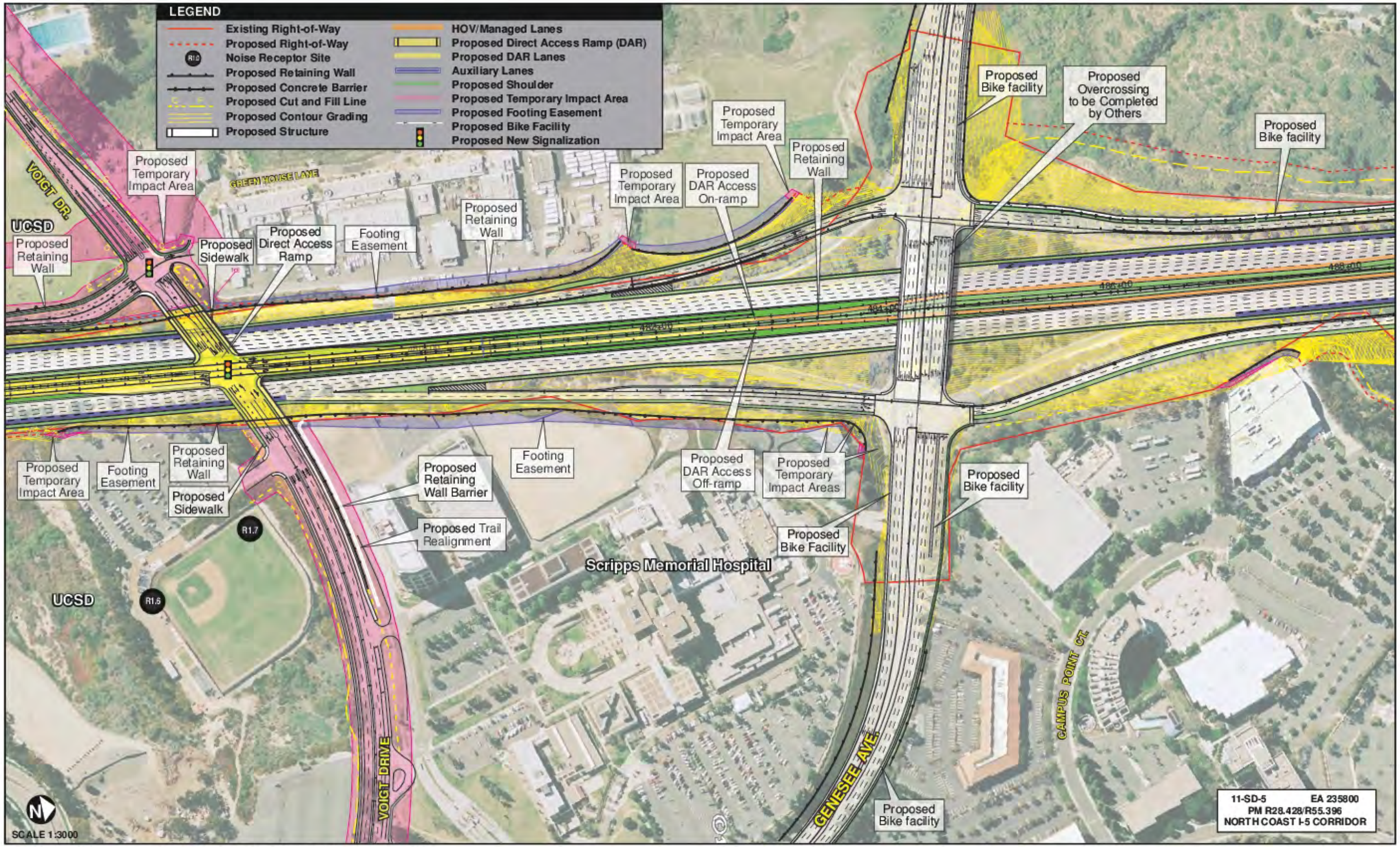


Figure 2-2.14b Project Features Map: 10+4 Buffer Alternative

Figure K-2, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

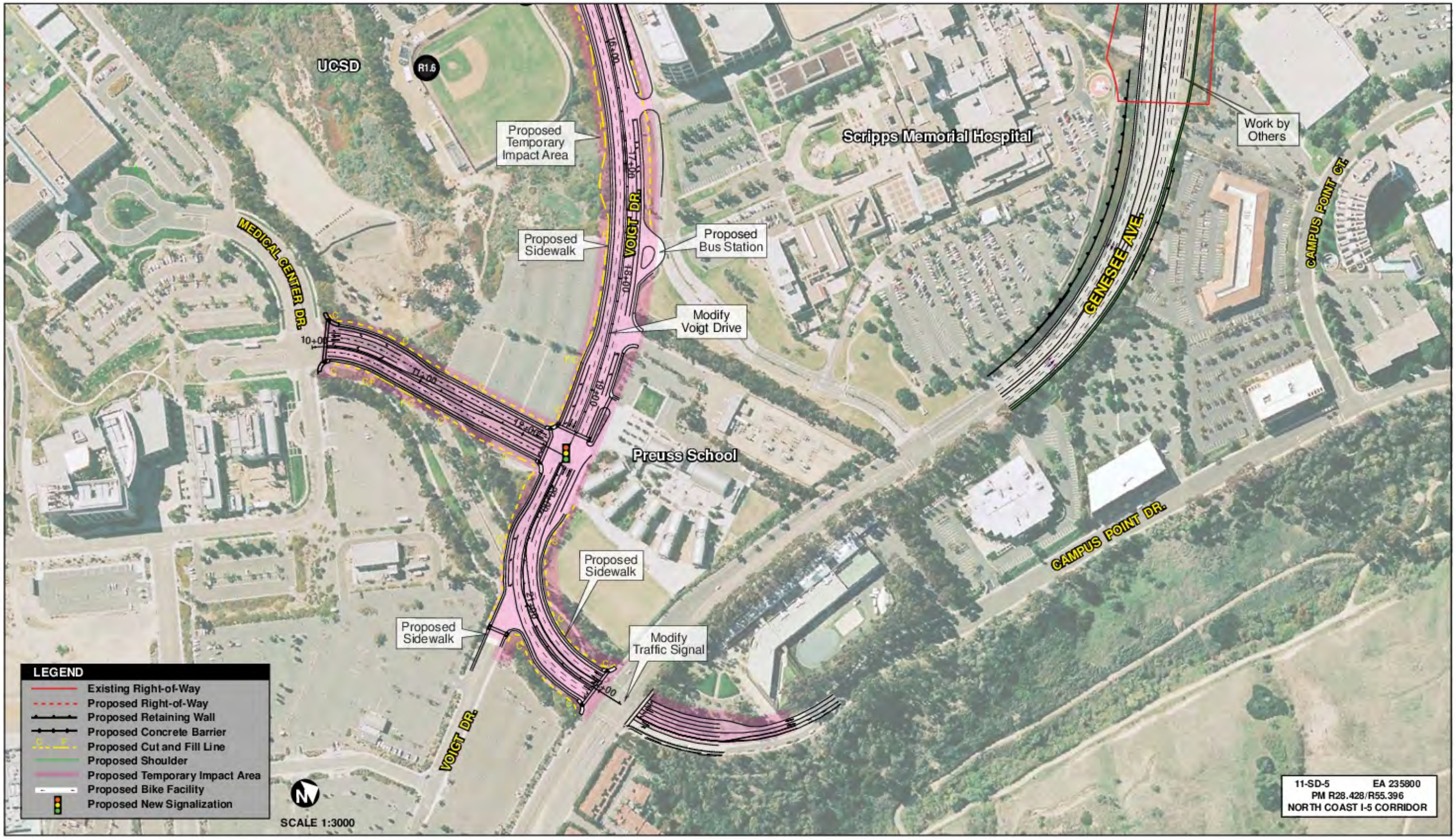


Figure 2-2.14c Project Features Map: 10+4 Buffer Alternative

Figure K-3, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

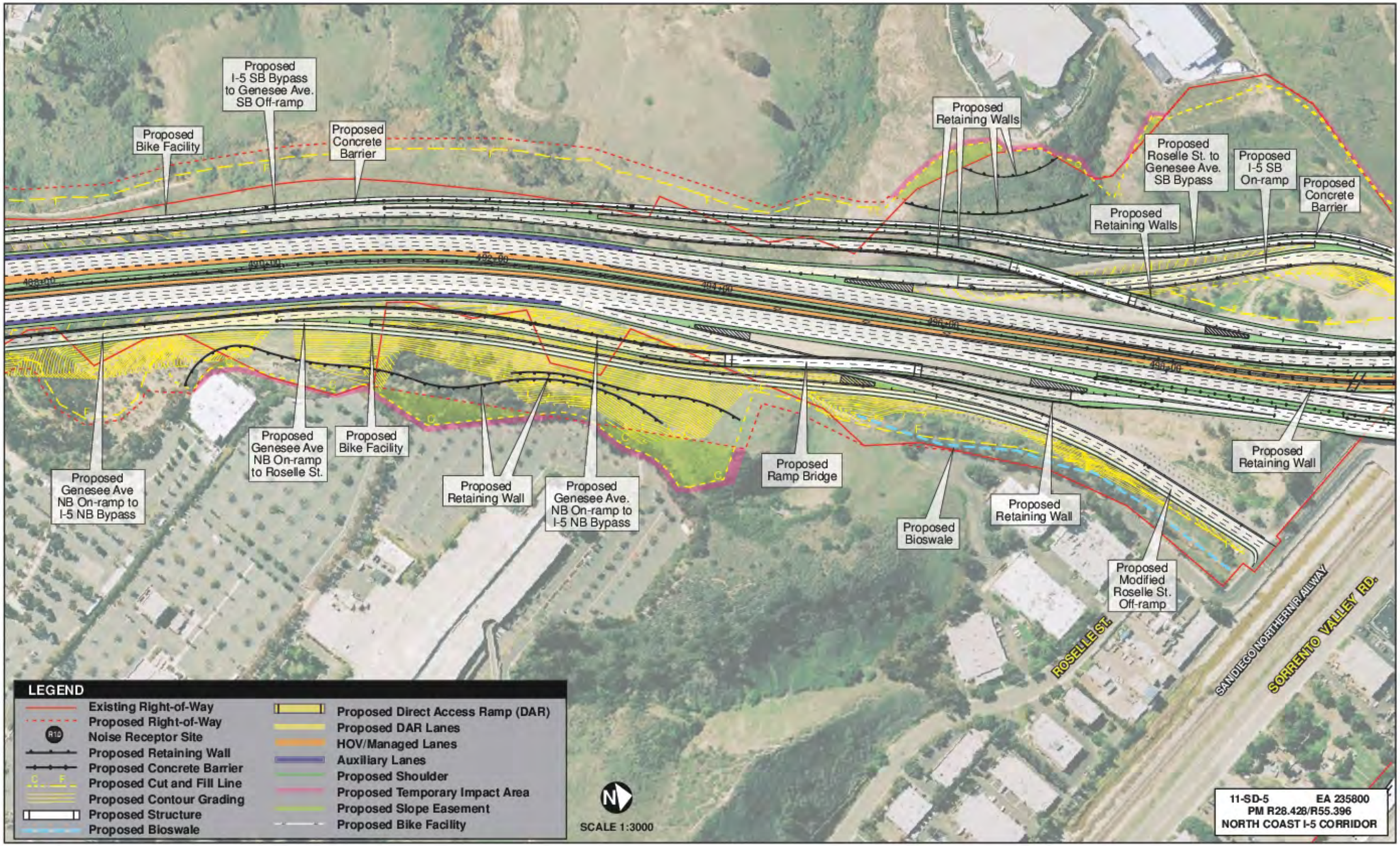


Figure 2-2.14d Project Features Map: 10+4 Buffer Alternative

Figure K-4, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

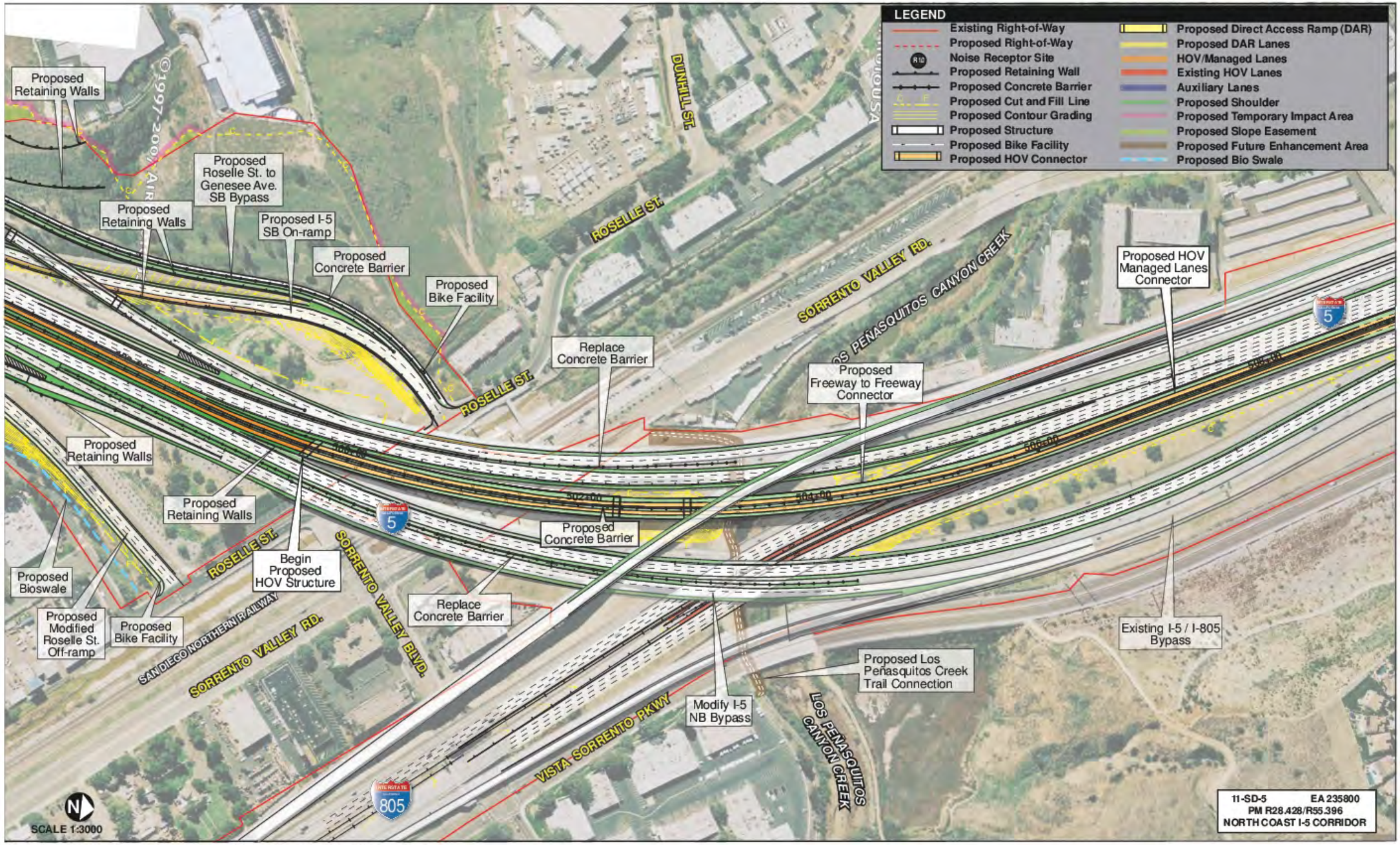


Figure 2-2.14e Project Features Map: 10+4 Buffer Alternative

Figure K-5, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

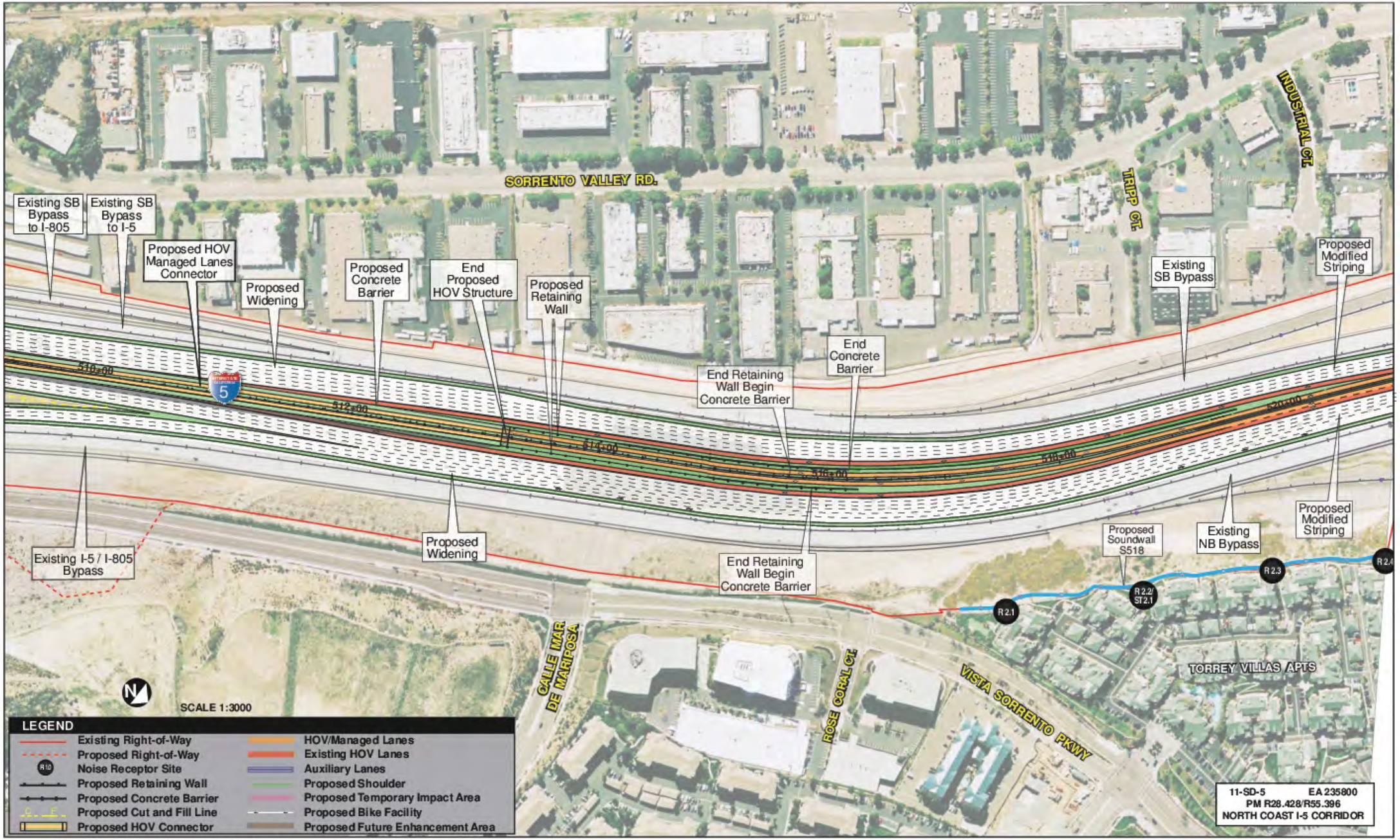


Figure 2-2.14f - Project Features Map - 10+4 Buffer Alternative

Figure K-6, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

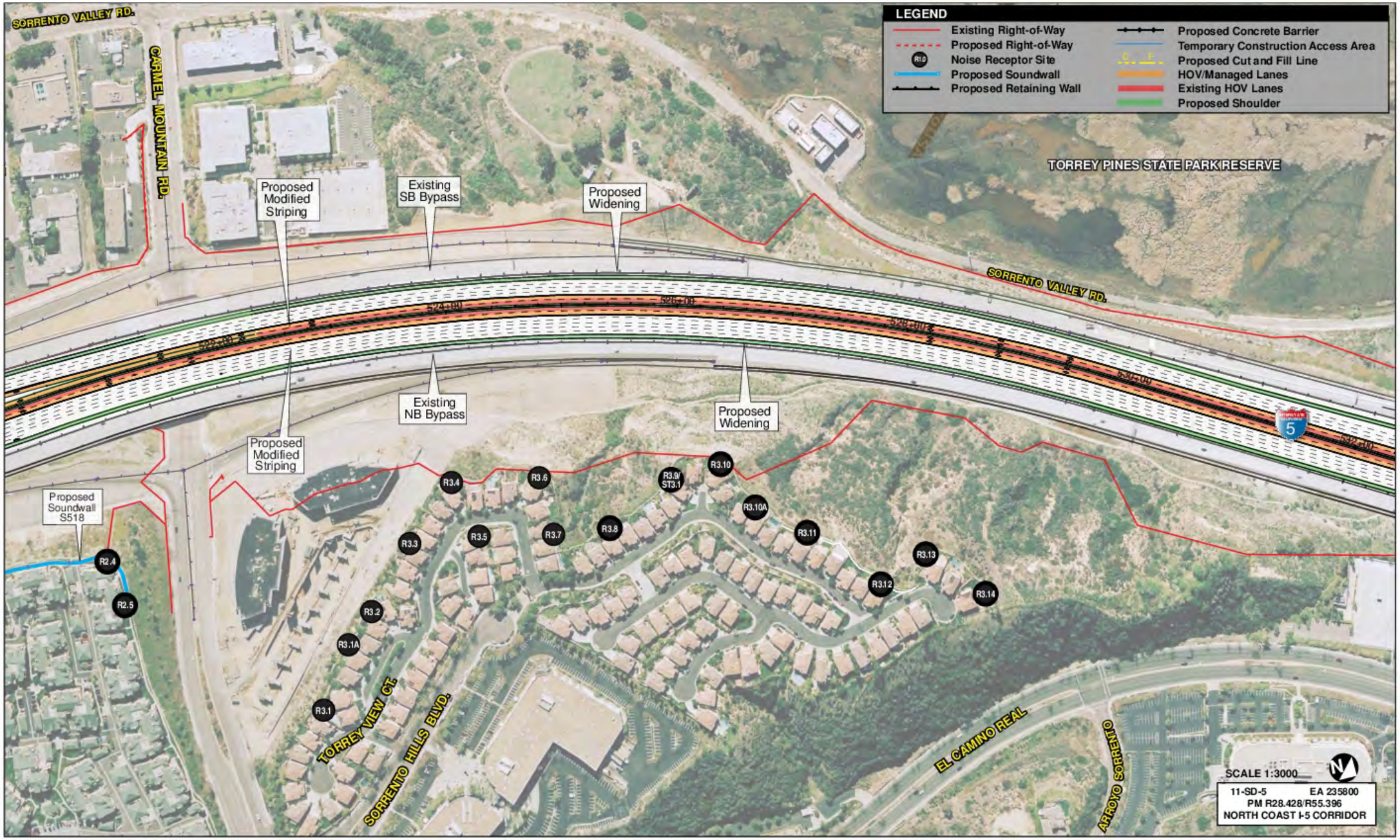


Figure 2-2.14g Project Features Map: 10+4 Buffer Alternative

Figure 2-2.14h Project Features Map: 10+4 Buffer Alternative

Figure K-8, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

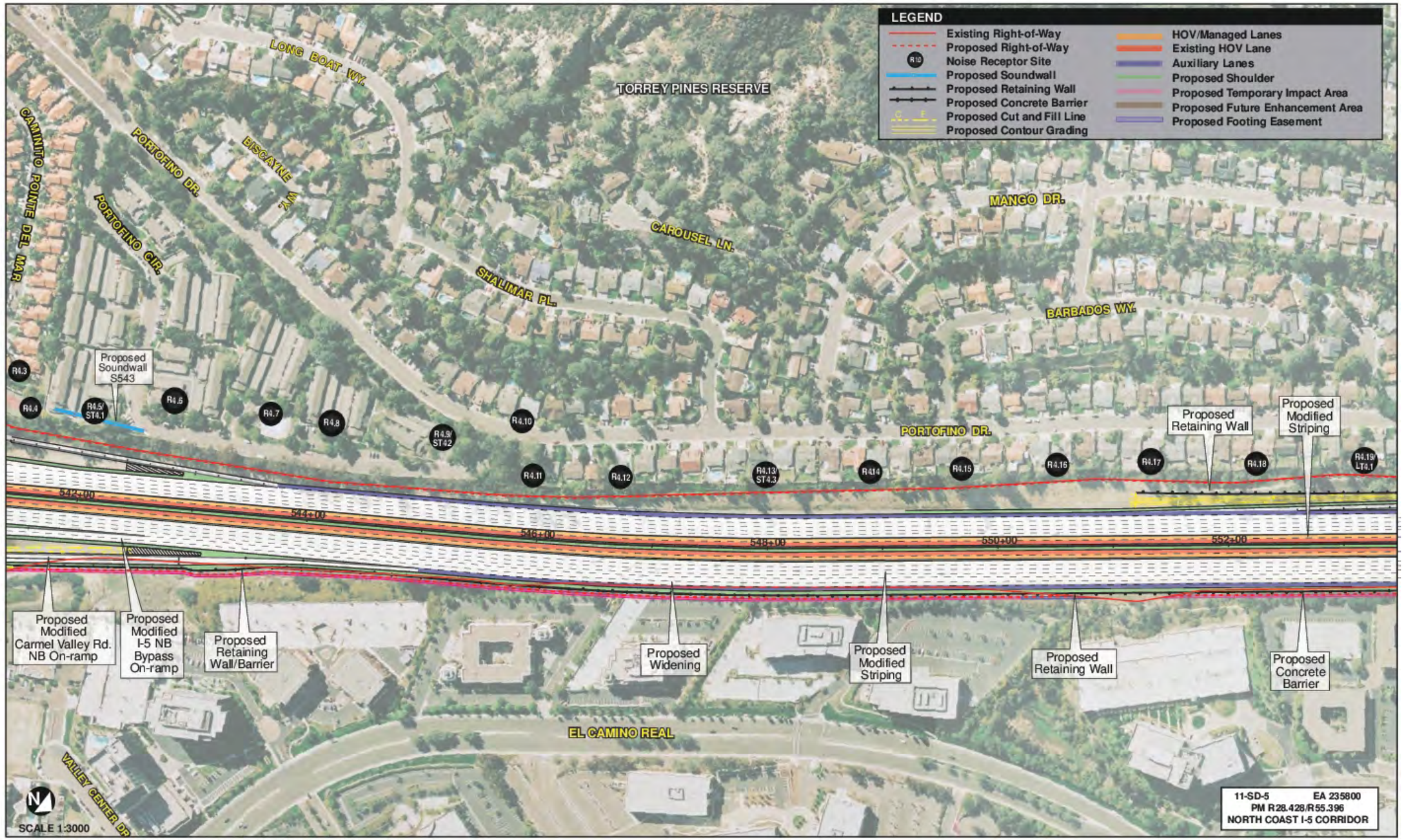


Figure 2-2.14i Project Features Map: 10+4 Buffer Alternative

Figure K-9, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

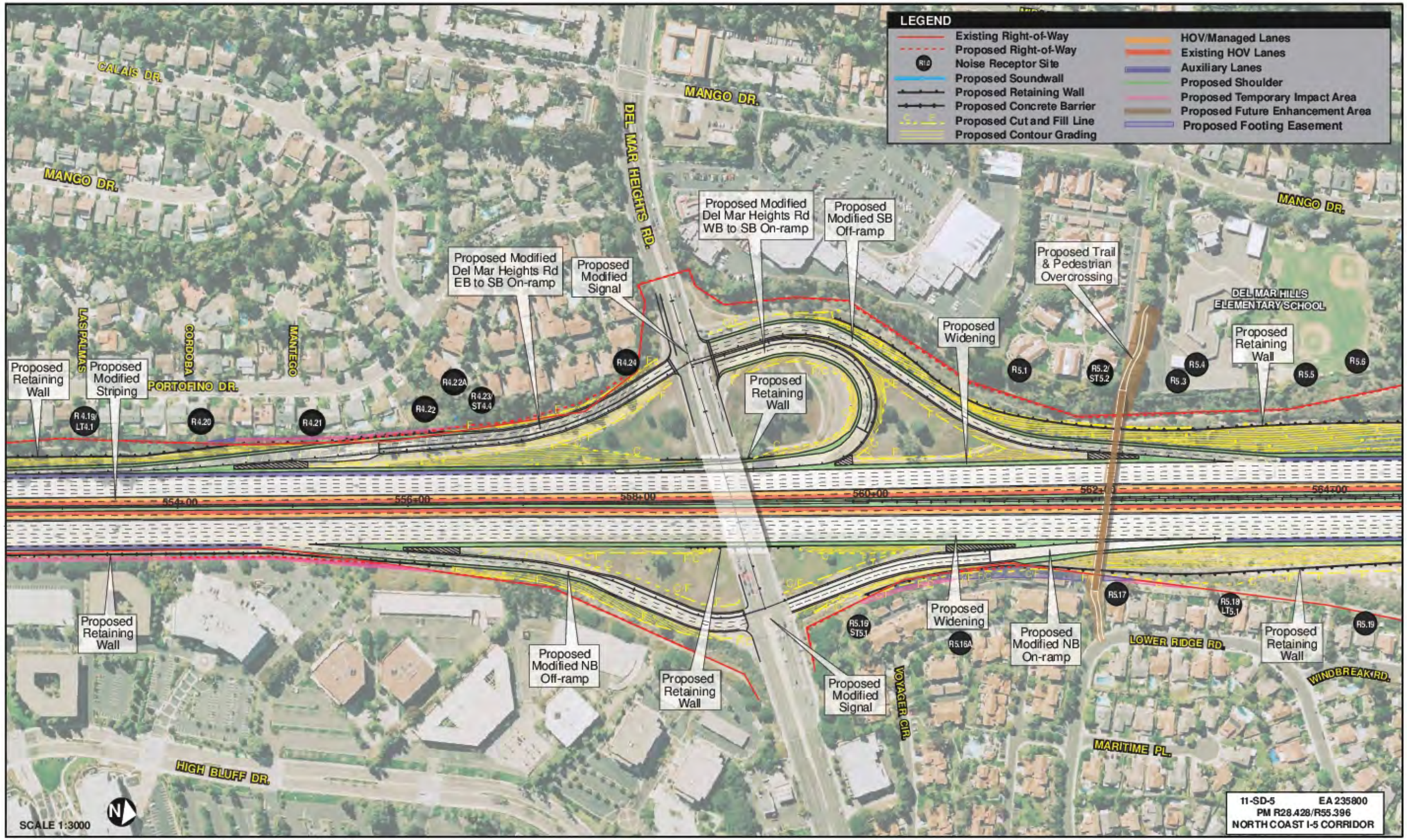


Figure 2-2.14j Project Features Map: 10+4 Buffer Alternative

Figure K-10, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

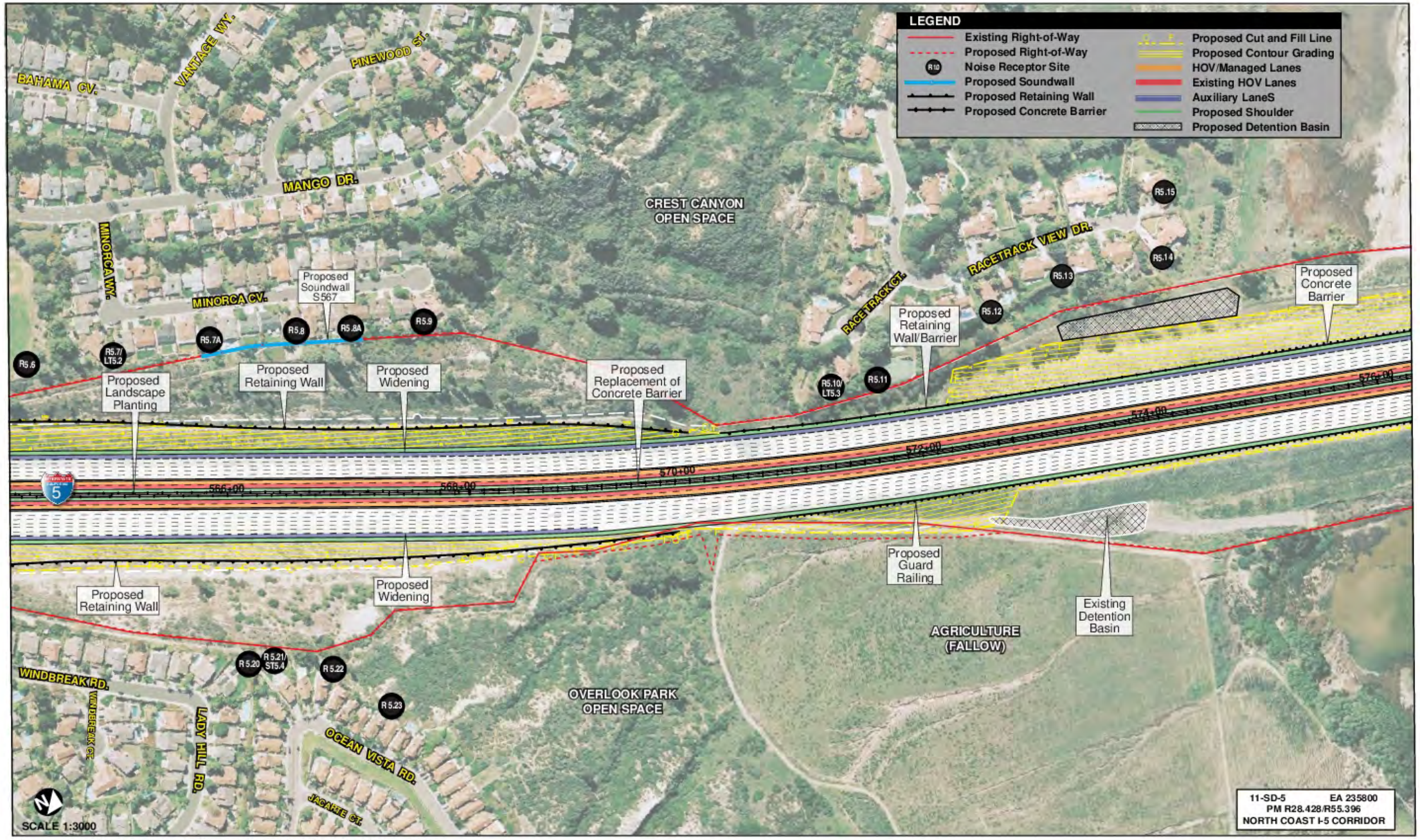


Figure 2-2.14k Project Features Map: 10+4 Buffer Alternative

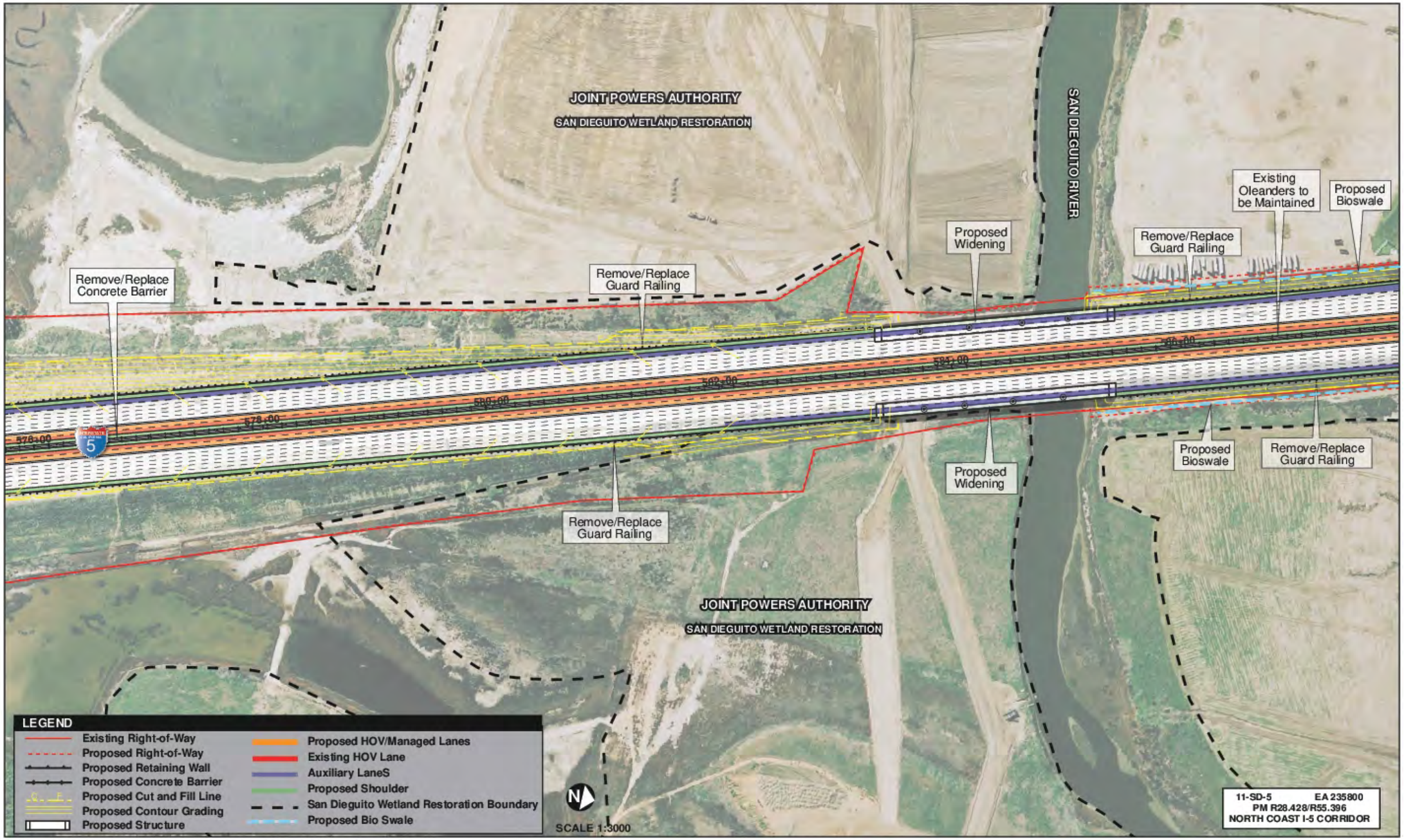


Figure 2-2.14l Project Features Map: 10+4 Buffer Alternative

Figure K-12, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

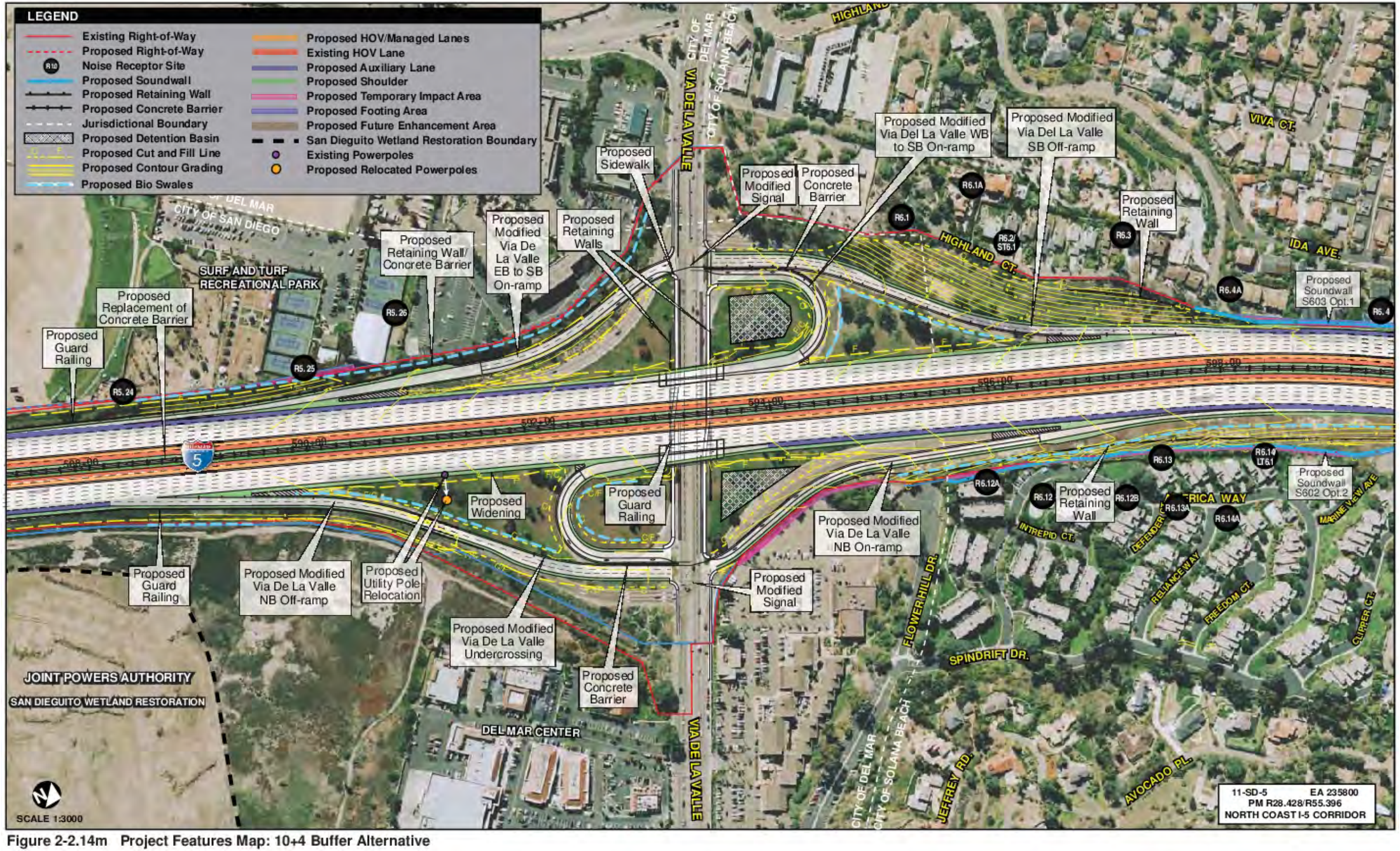


Figure 2-2.14m Project Features Map: 10+4 Buffer Alternative

Figure K-13, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

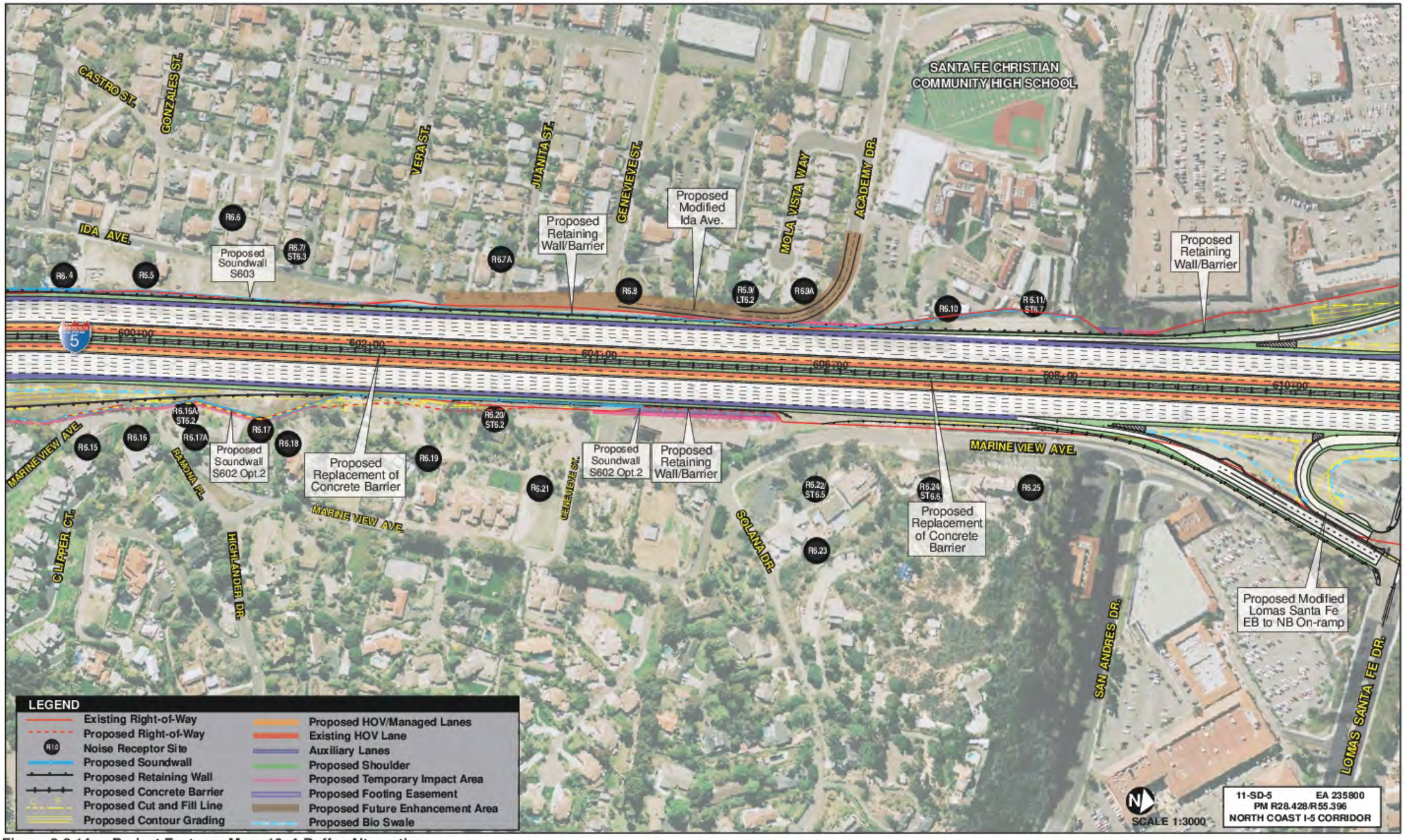


Figure 2-2.14n Project Features Map: 10+4 Buffer Alternative

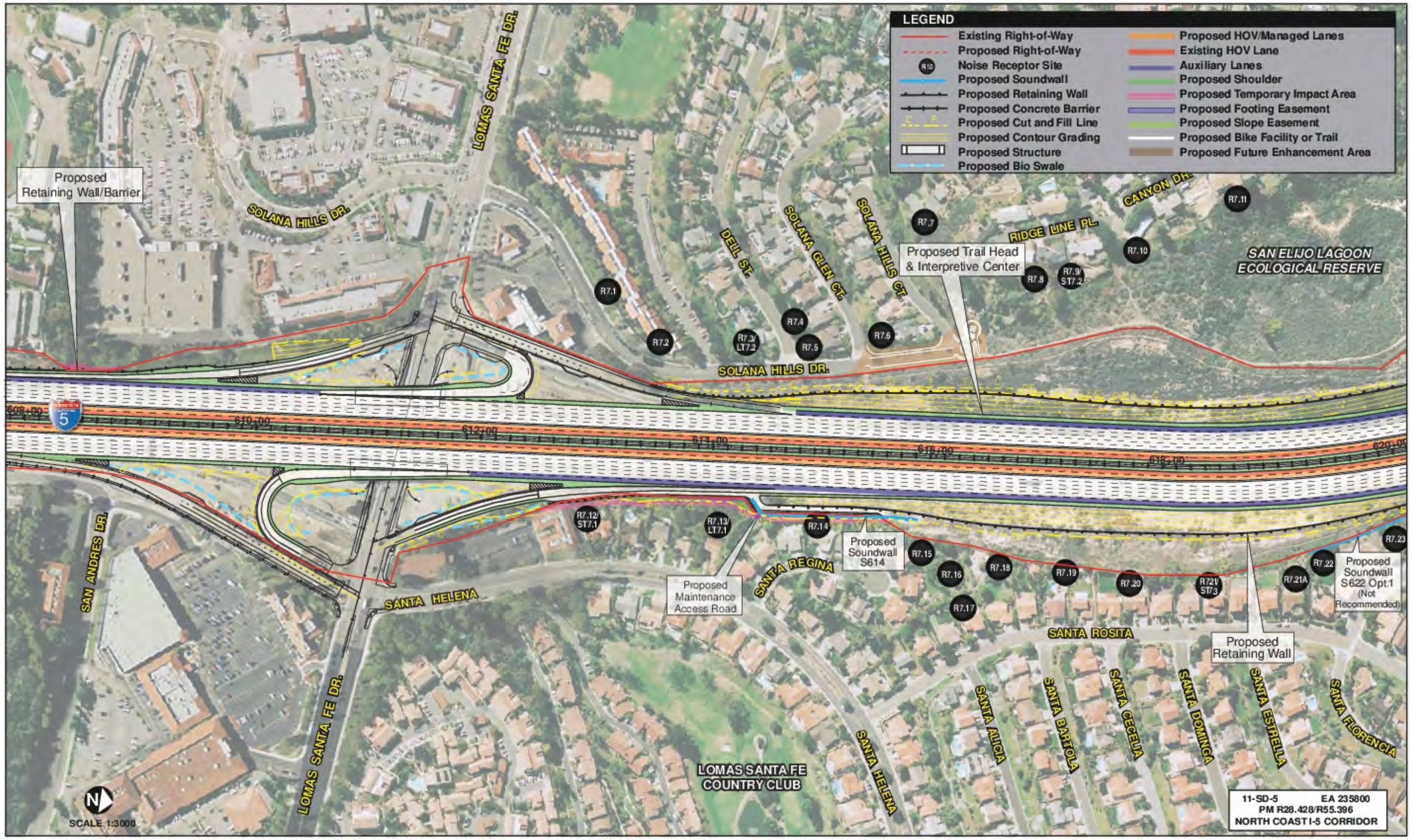


Figure 2-2.14o Project Features Map: 10+4 Buffer Alternative

Figure K-15, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

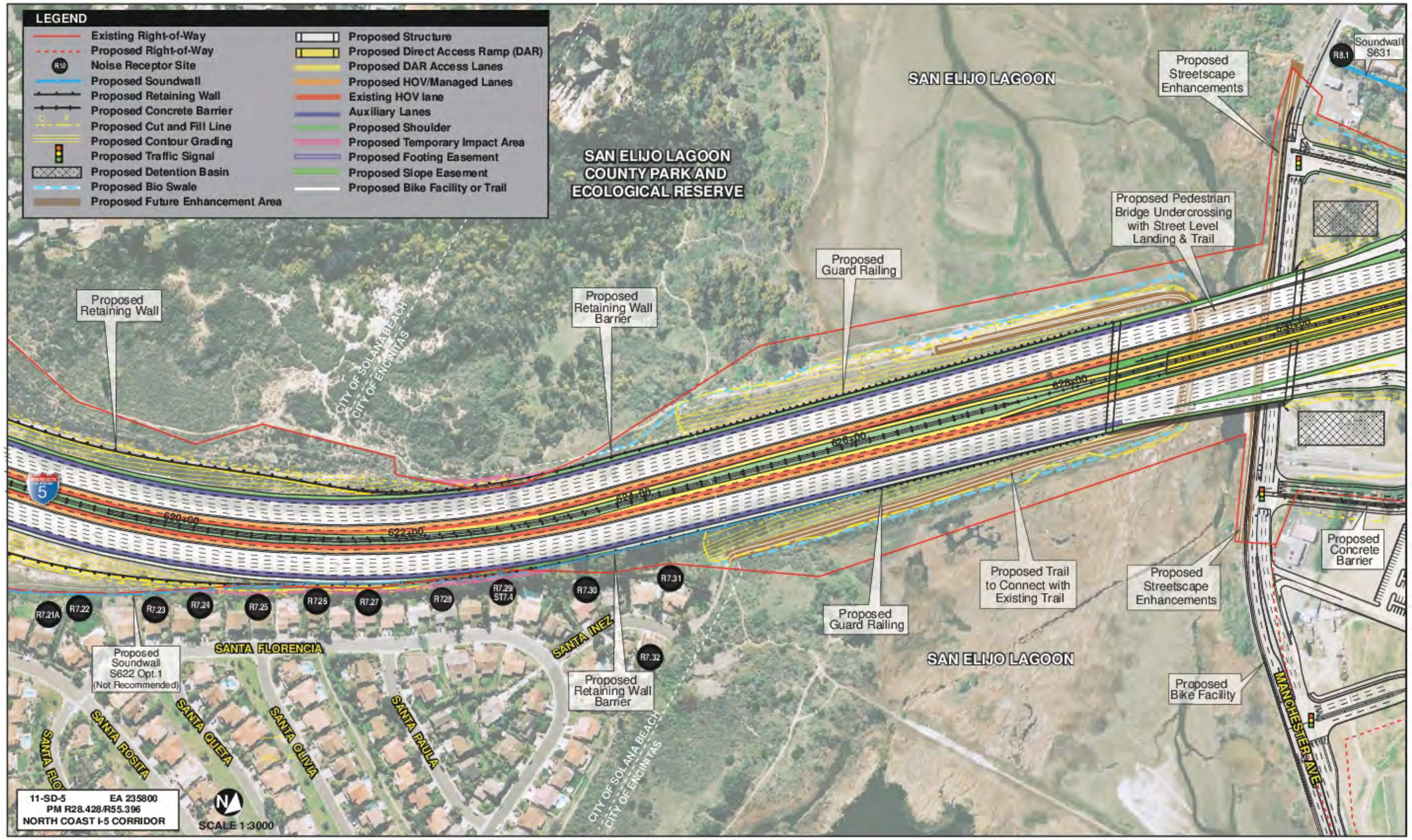


Figure 2-2.14p Project Features Map: 10+4 Buffer Alternative

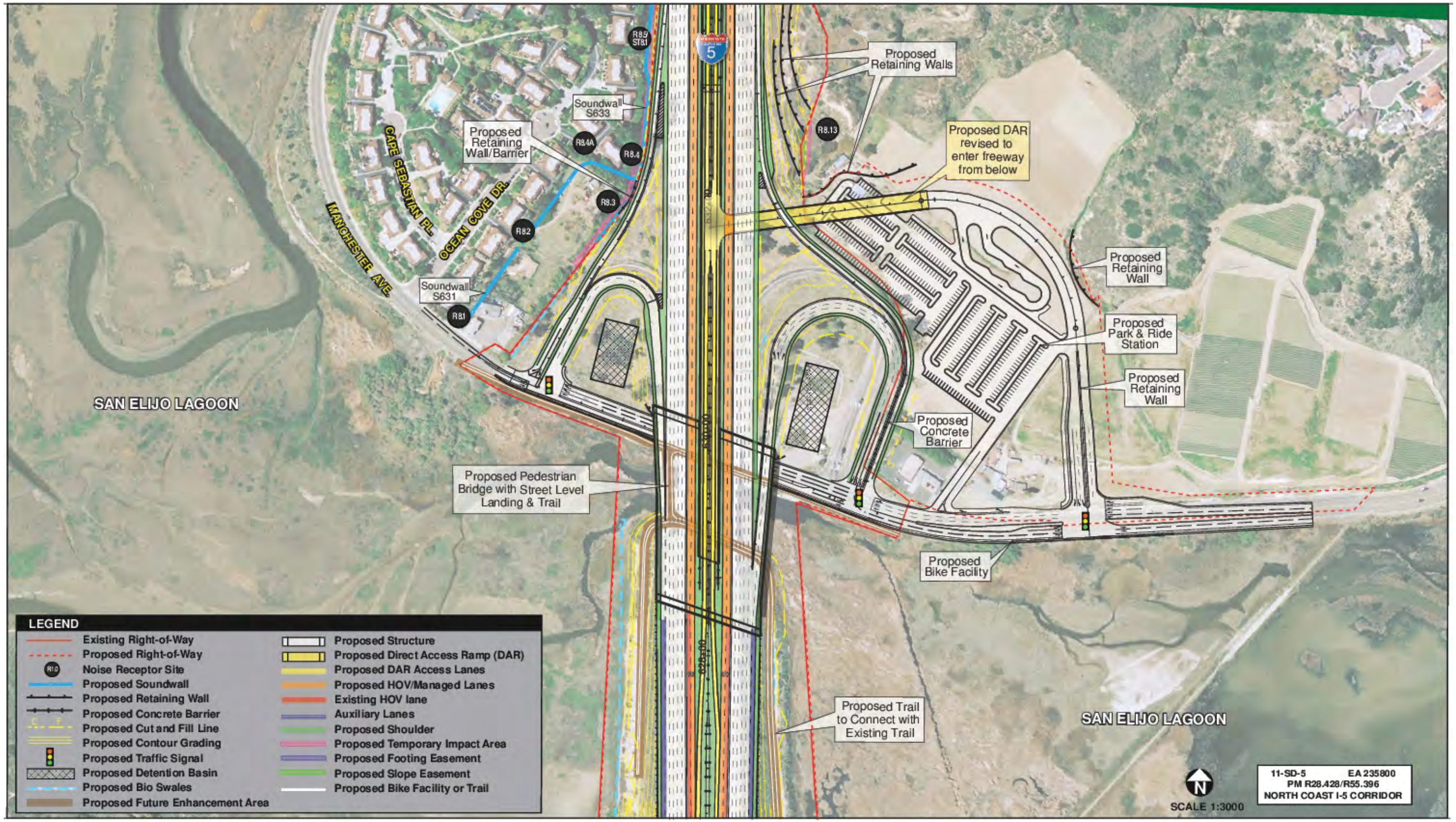


Figure 2-2.14q Project Features Map: 10+4 Buffer Alternative

Figure K-17, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

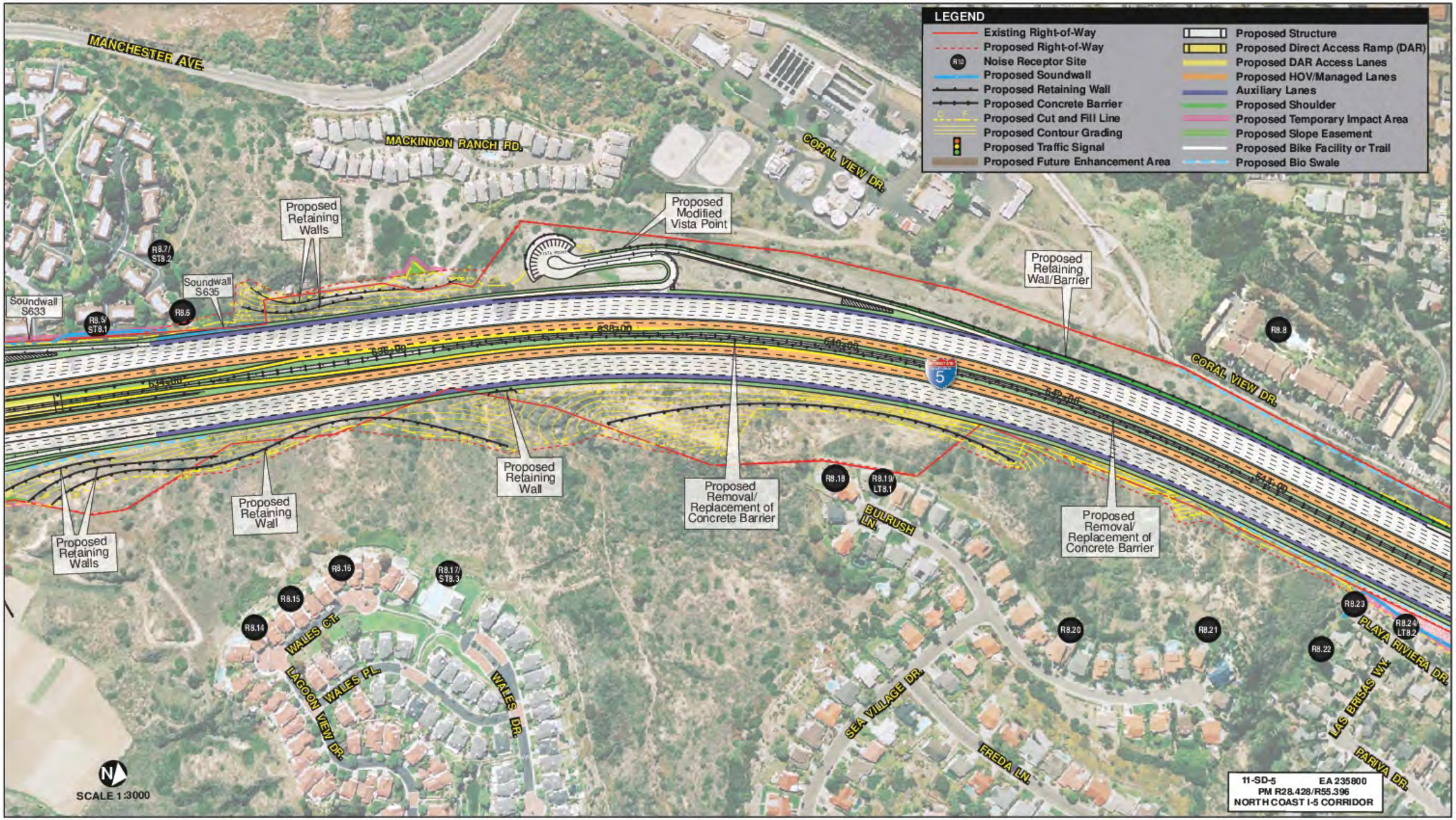


Figure 2-2.14r Project Features Map: 10+4 Buffer Alternative

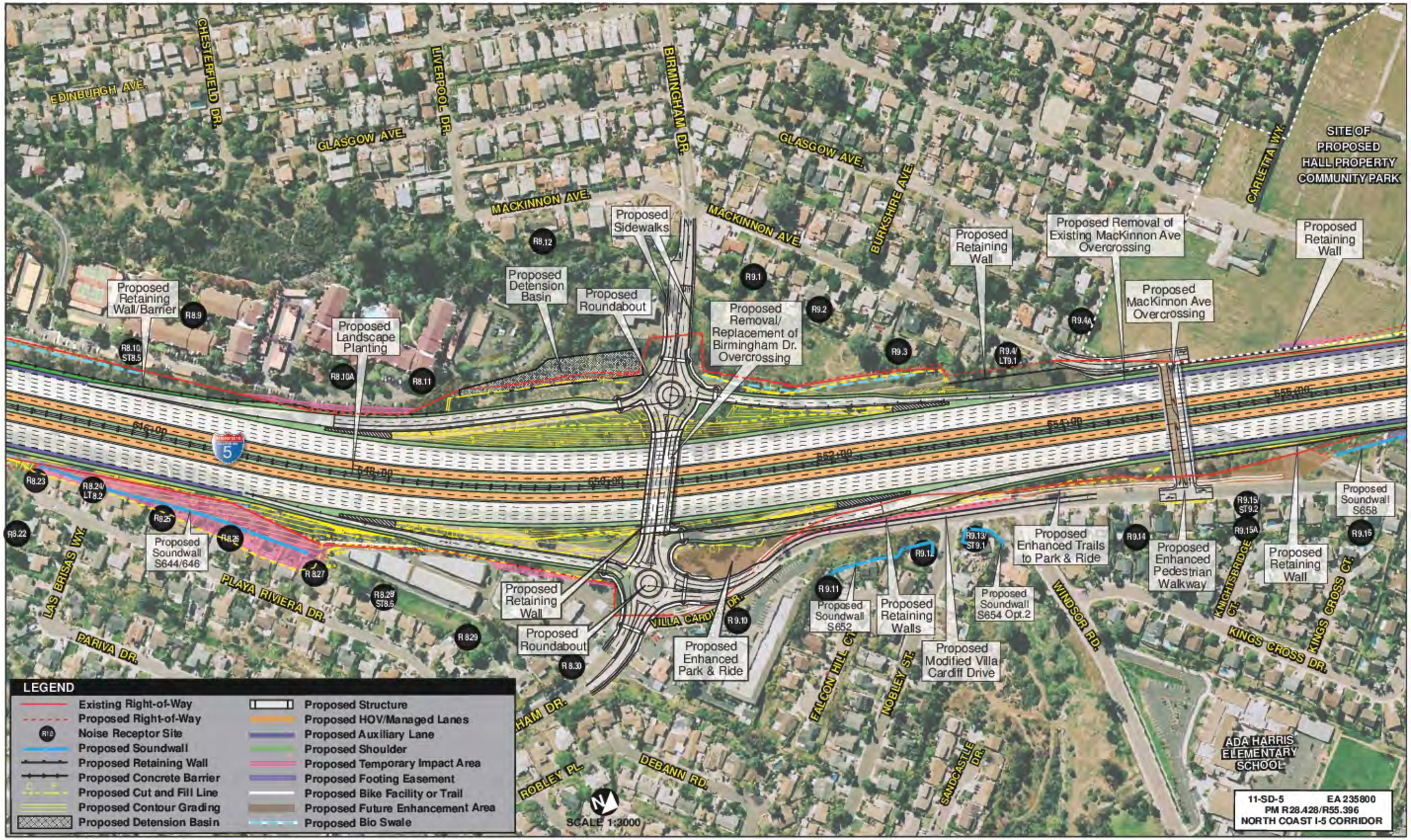


Figure 2-2.14s Option 1 Project Features Map: 10+4 Buffer Alternative

Figure K-19, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

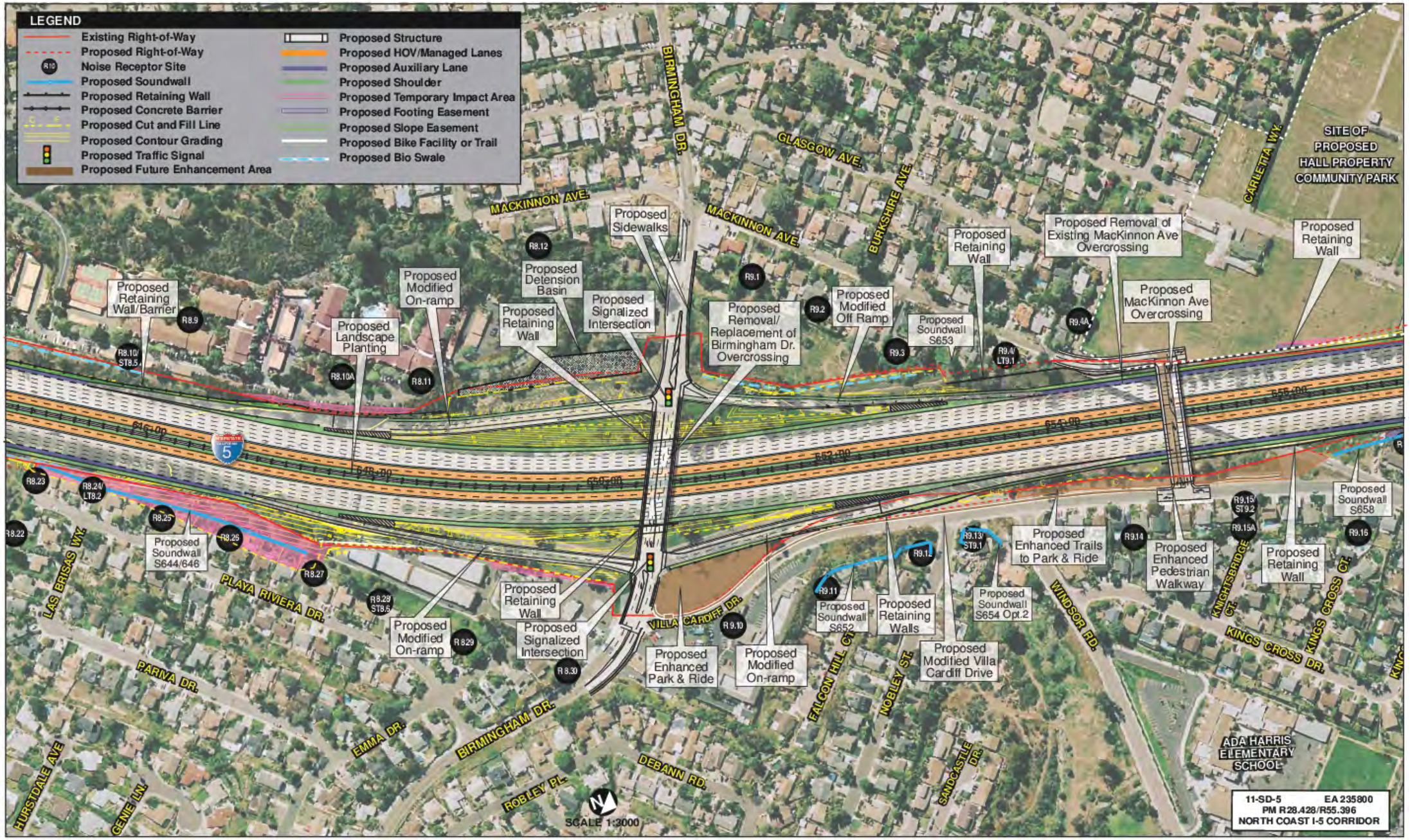


Figure 2-2.14s Option 2 Project Features Map: 10+4 Buffer Alternative

Figure K-20, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

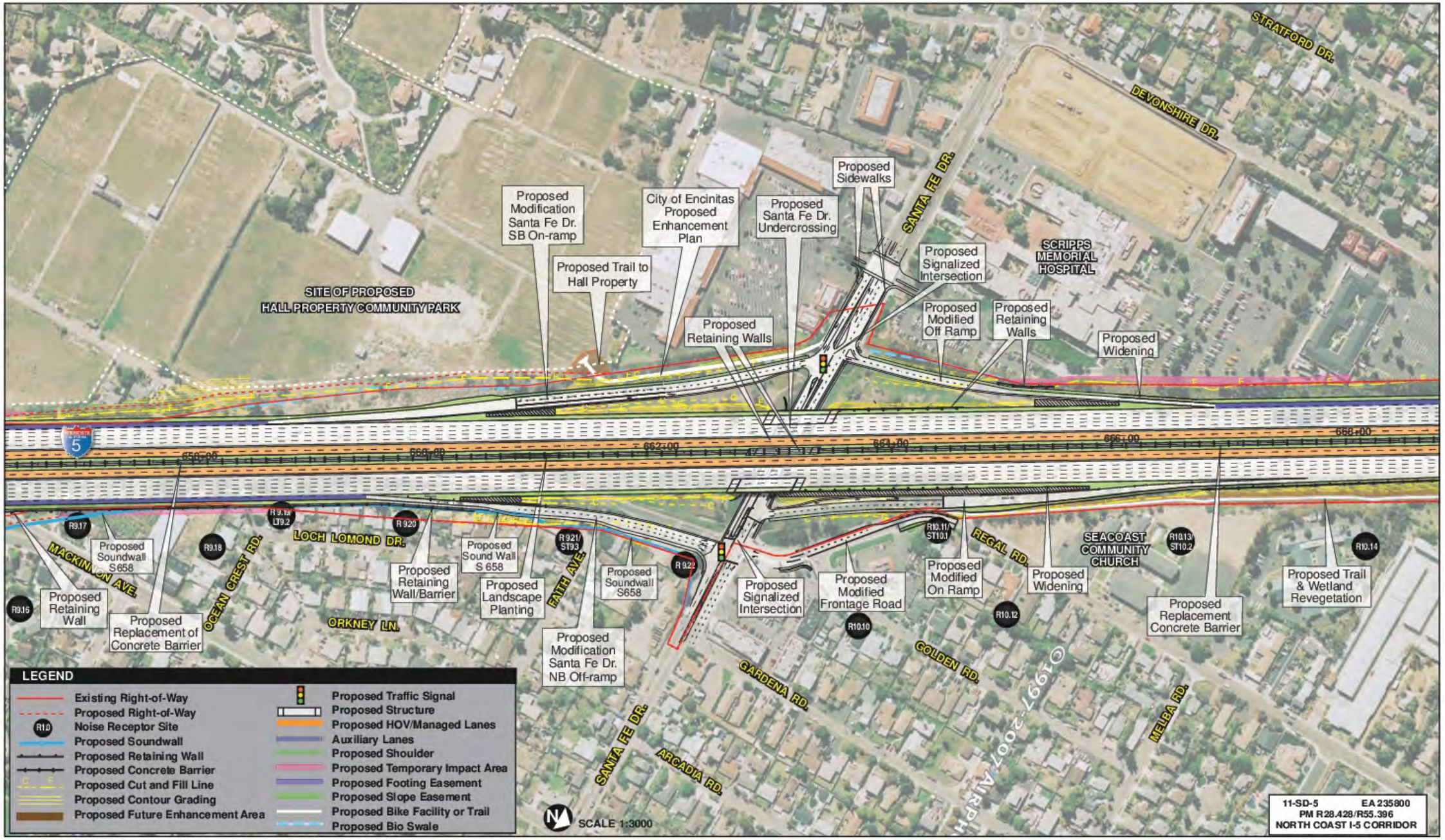


Figure 2-2.14t Project Features Map: 10+4 Buffer Alternative

Figure K-21, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

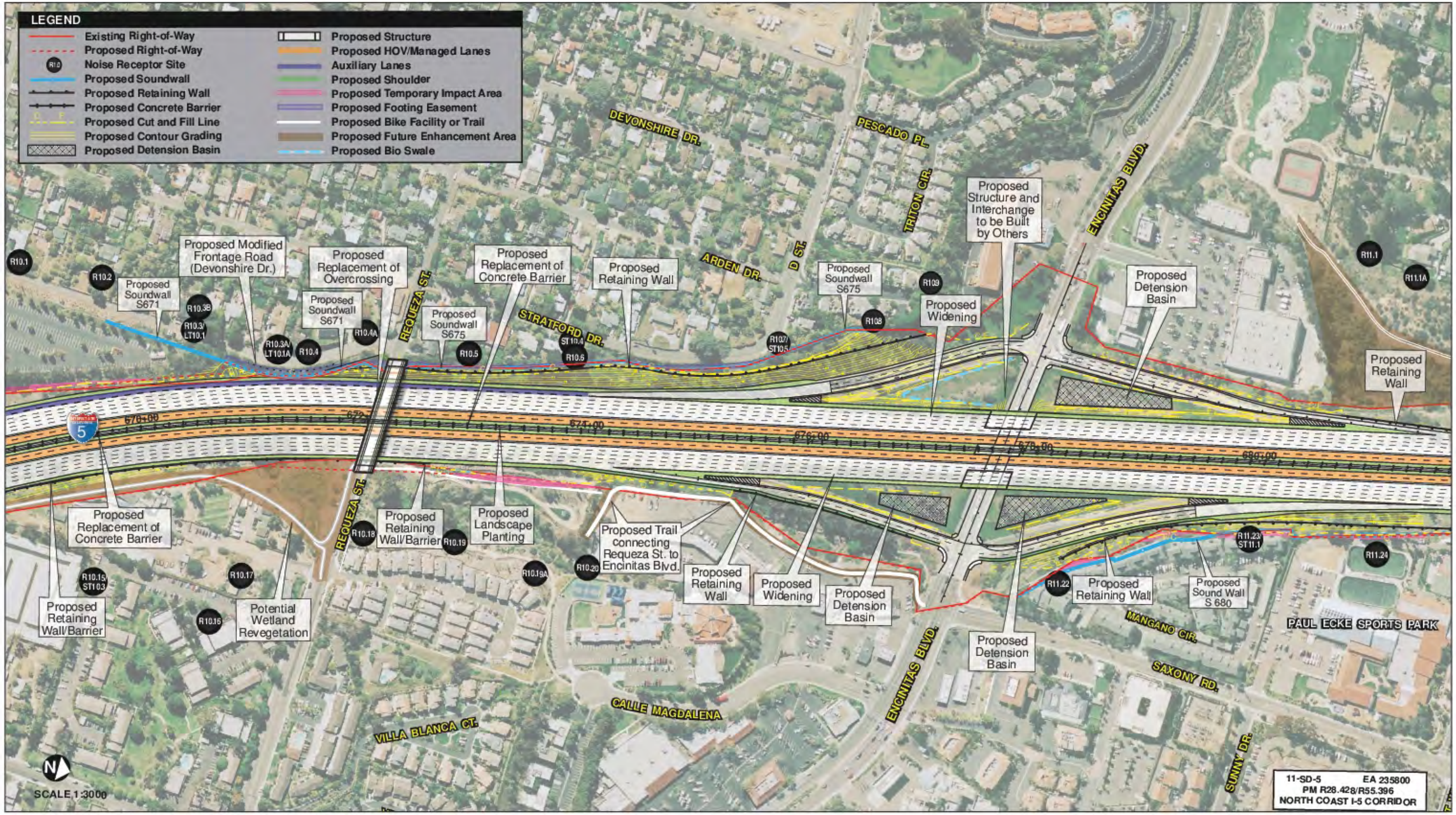


Figure 2-2.14u Project Features Map: 10+4 Buffer Alternative

Figure K-22, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

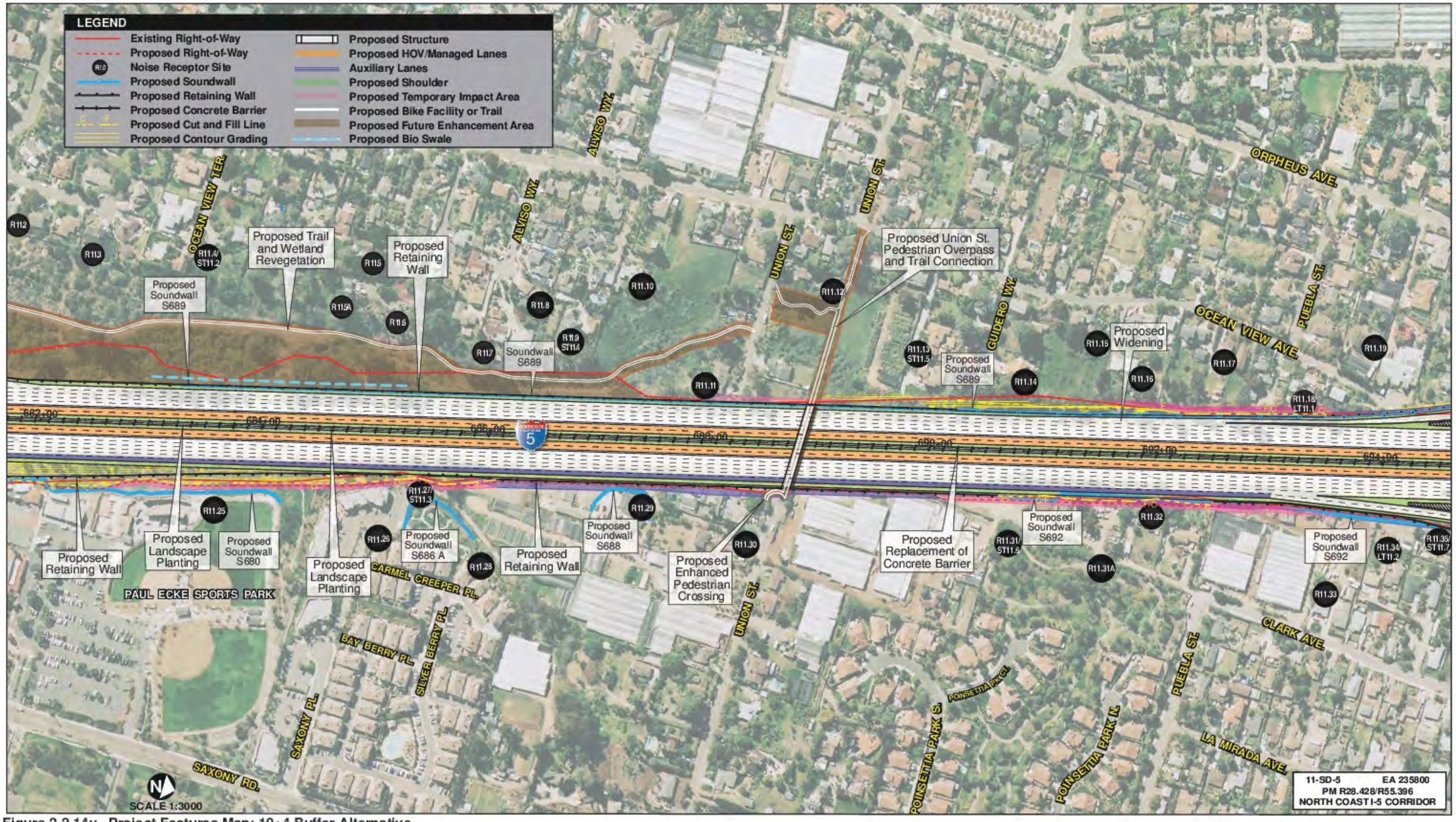


Figure 2-2.14v Project Features Map: 10+4 Buffer Alternative

Figure K-23, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

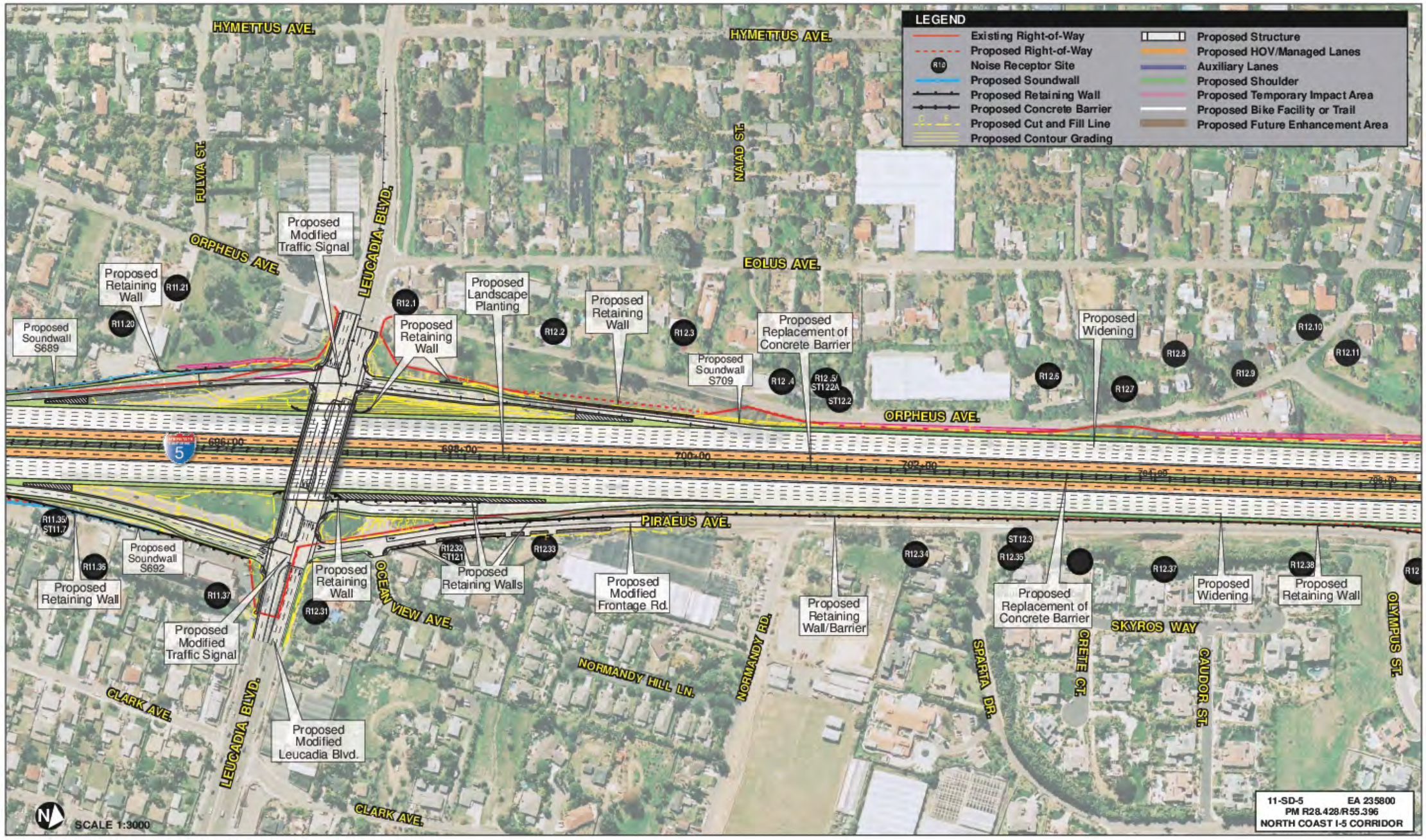


Figure 2-2.14w Project Features Map: 10+4 Buffer Alternative

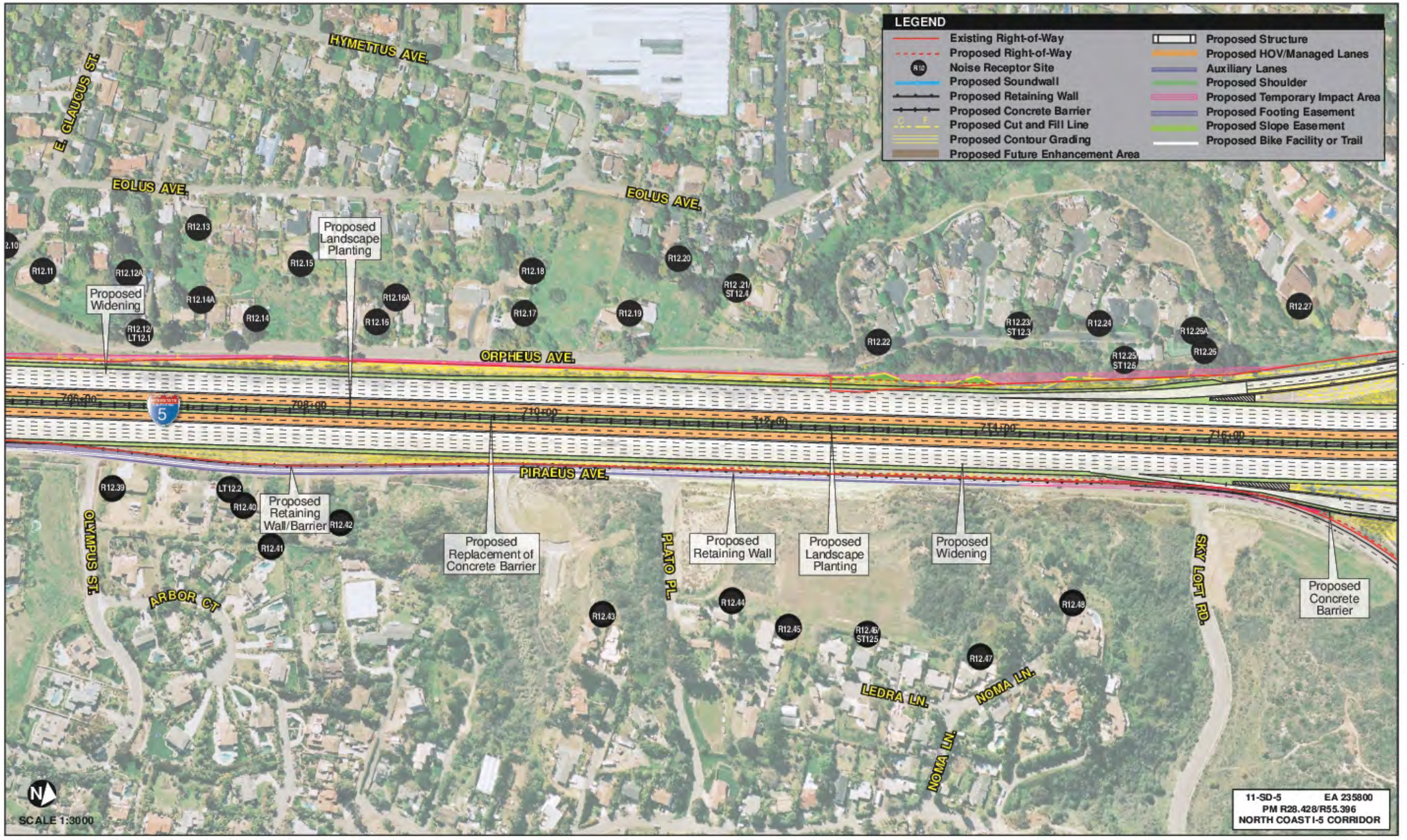


Figure 2-2.14x Project Features Map: 10+4 Buffer Alternative

Figure K-25, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

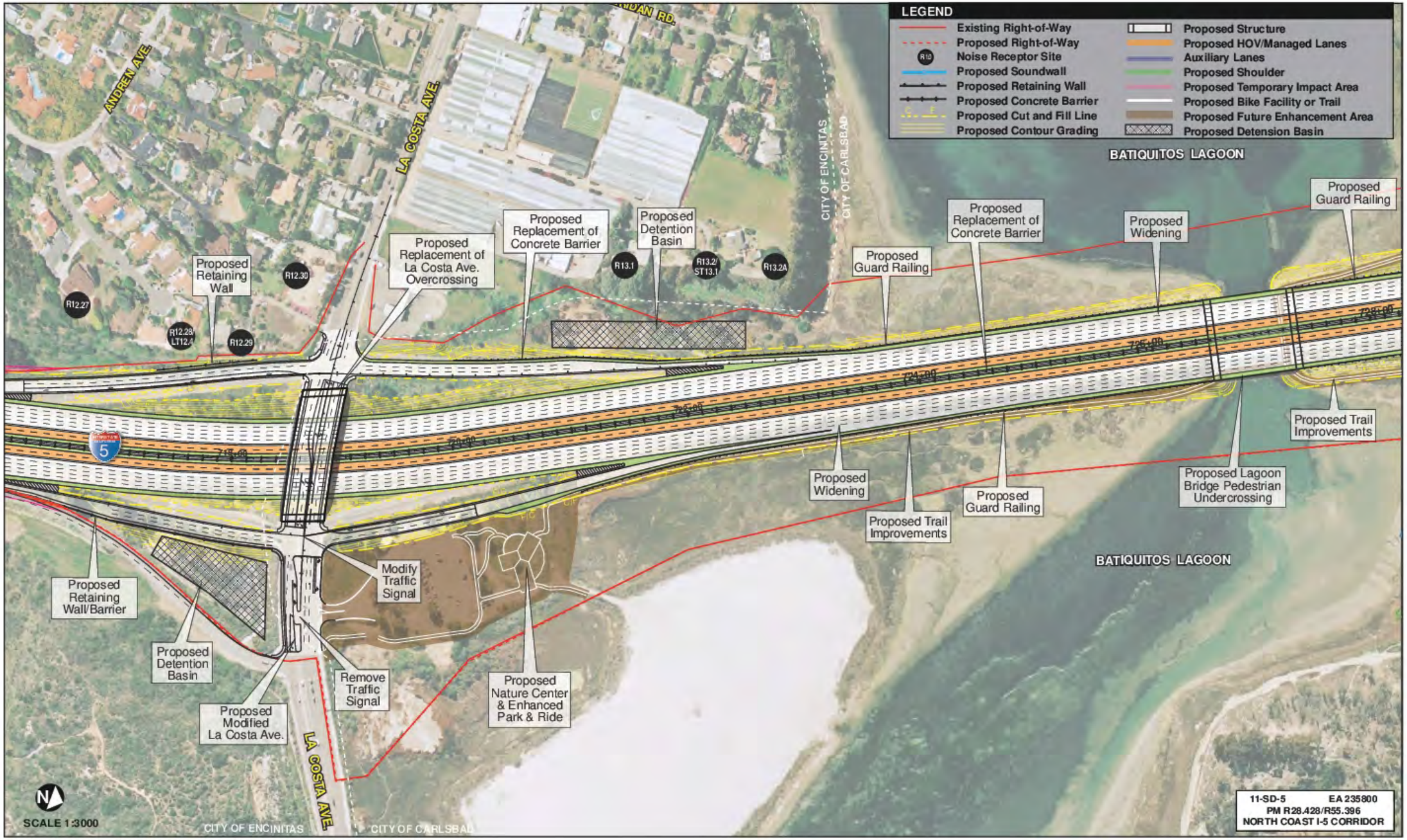


Figure 2-2.14y Project Features Map: 10+4 Buffer Alternative

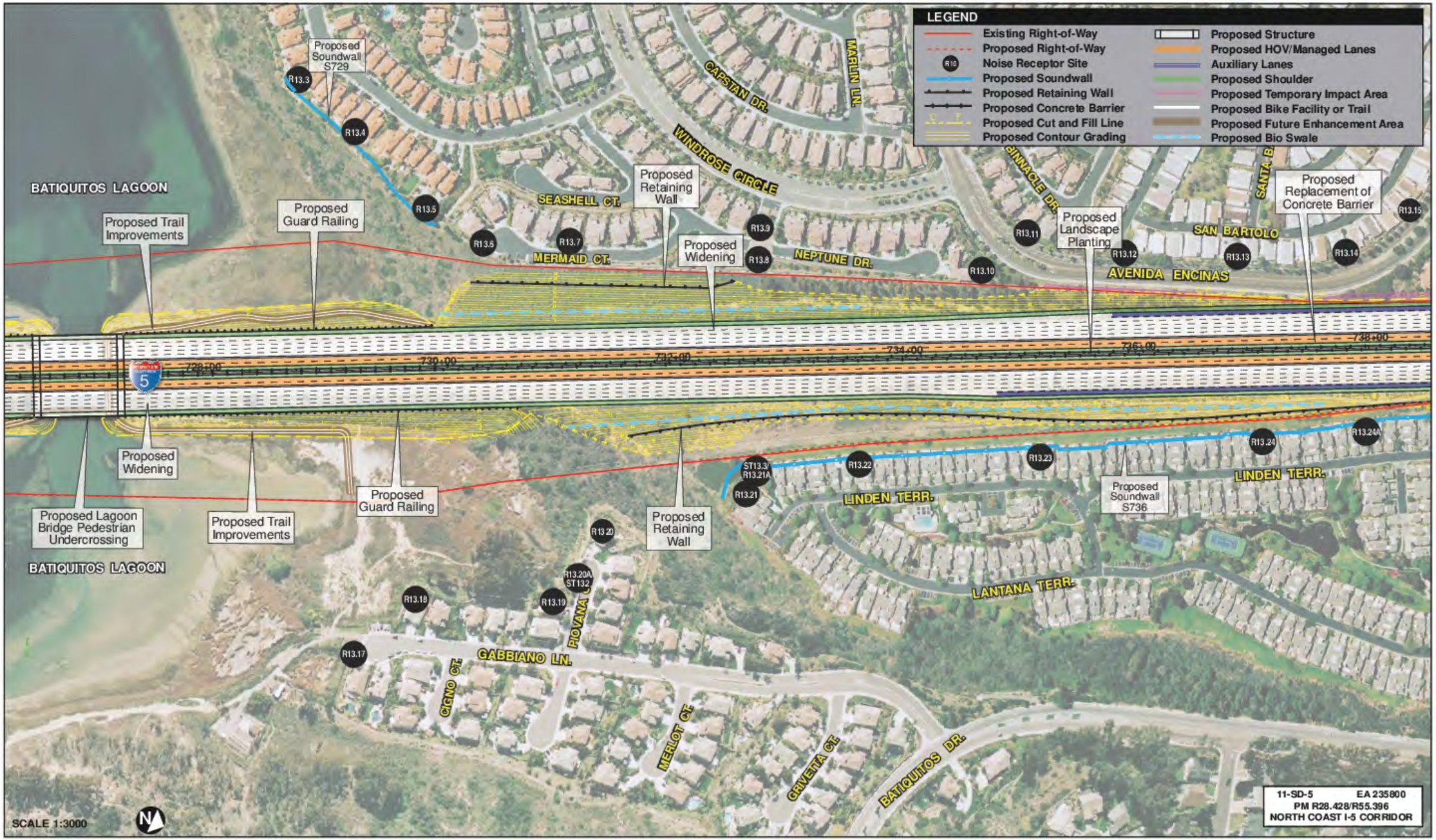


Figure 2-2.14z Project Features Map: 10+4 Buffer Alternative

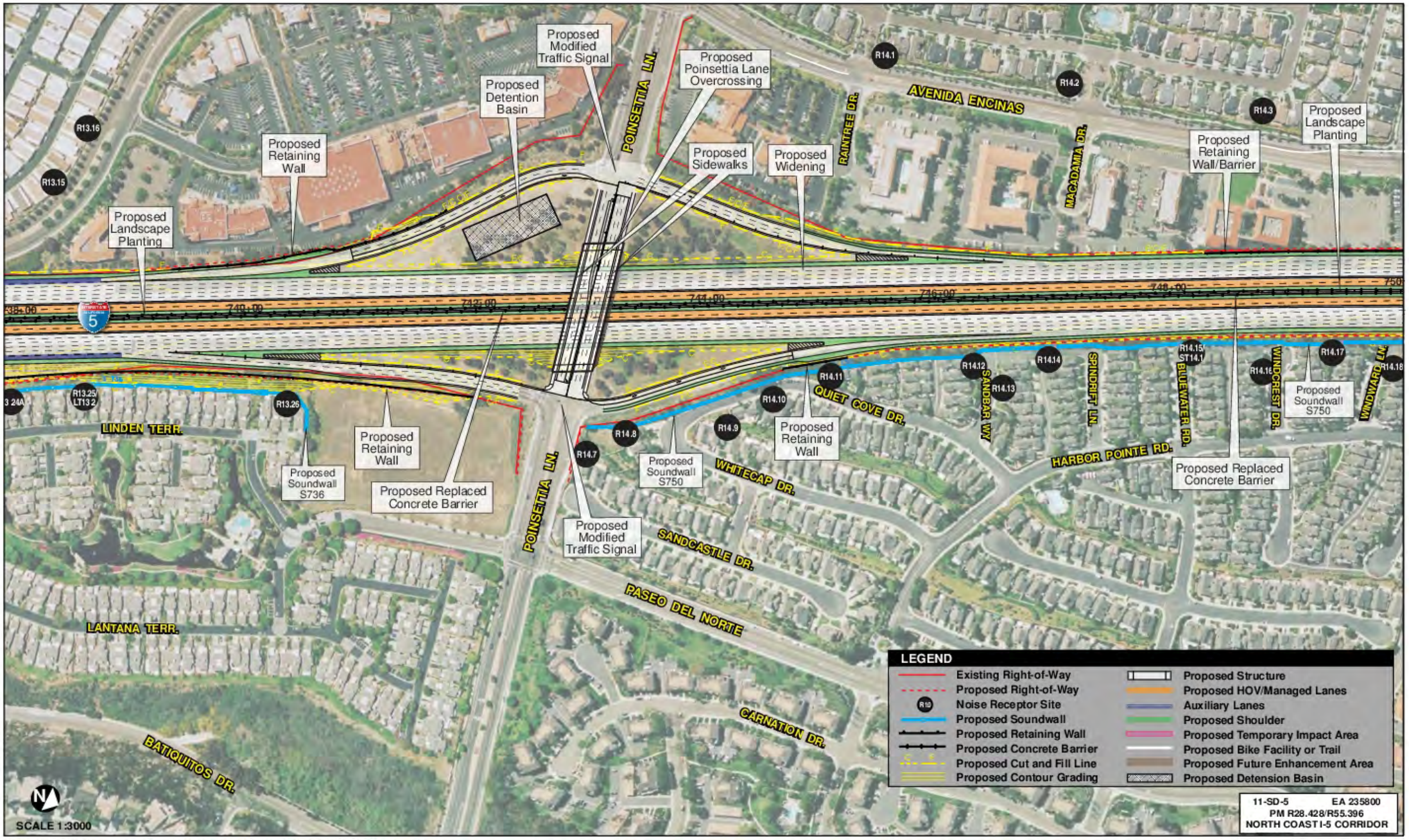


Figure 2-2.14aa Project Features Map: 10+4 Buffer Alternative

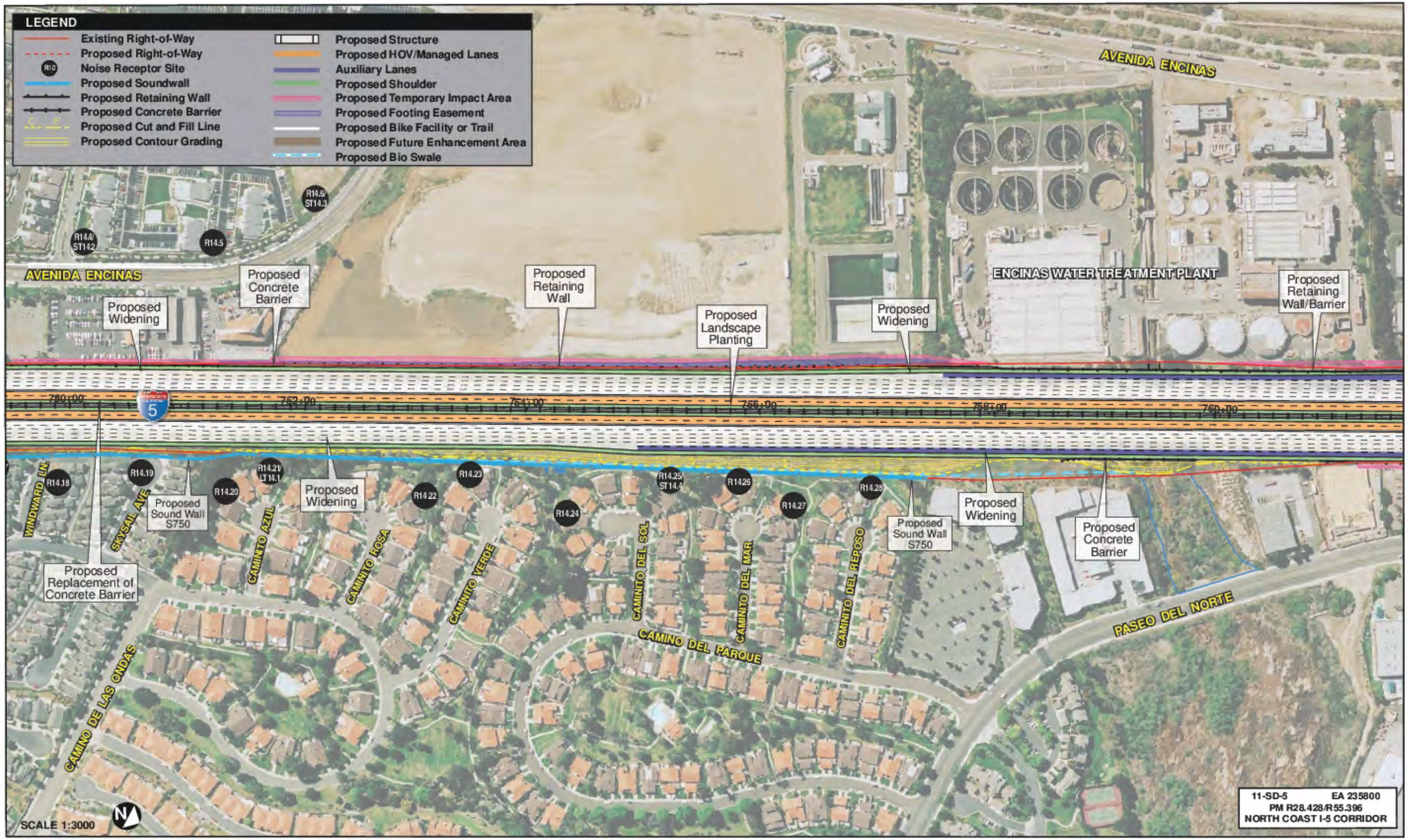


Figure 2-2.14ab Project Features Map: 10+4 Buffer Alternative

Figure K-29, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

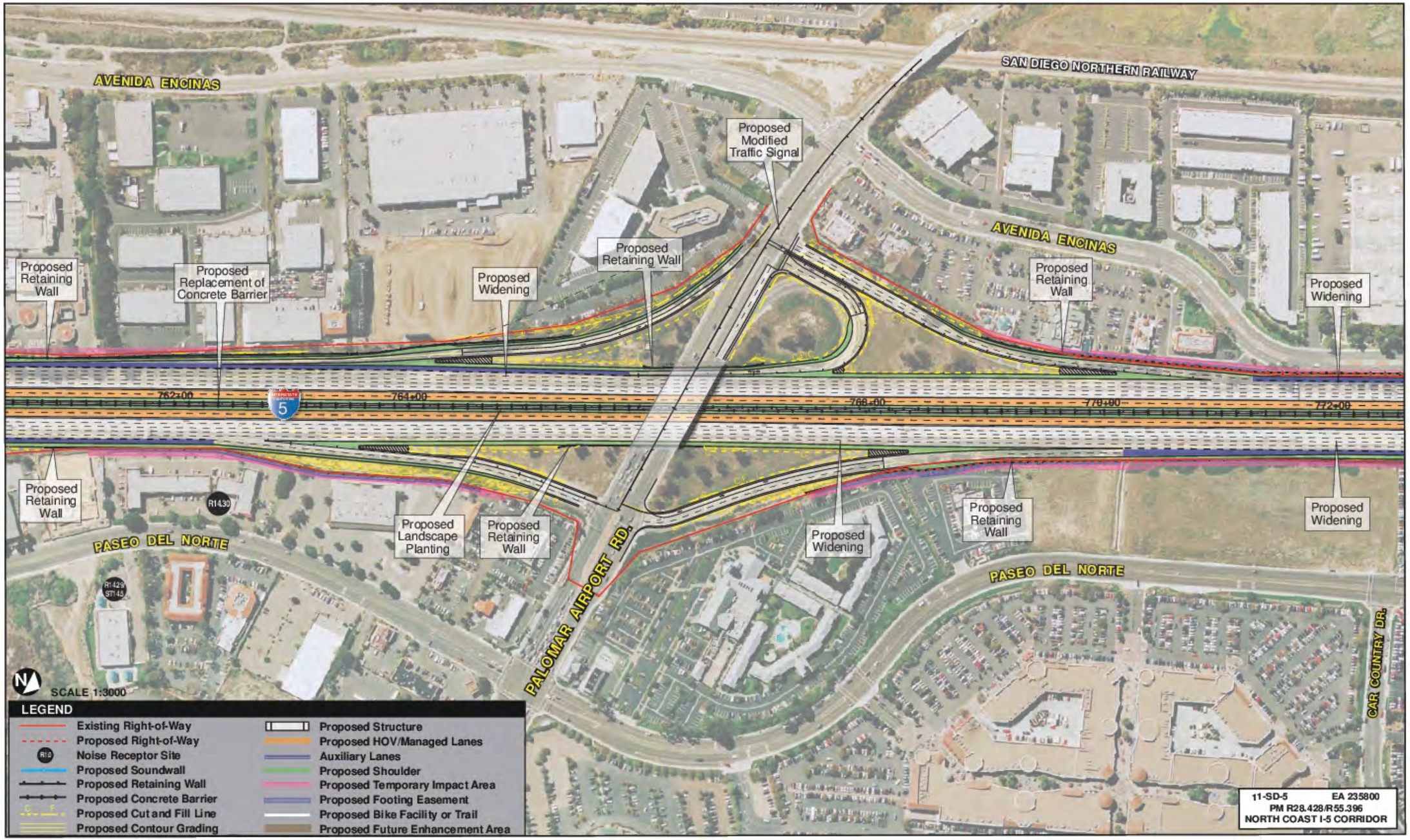


Figure 2-2.14ac Project Features Map: 10+4 Buffer Alternative

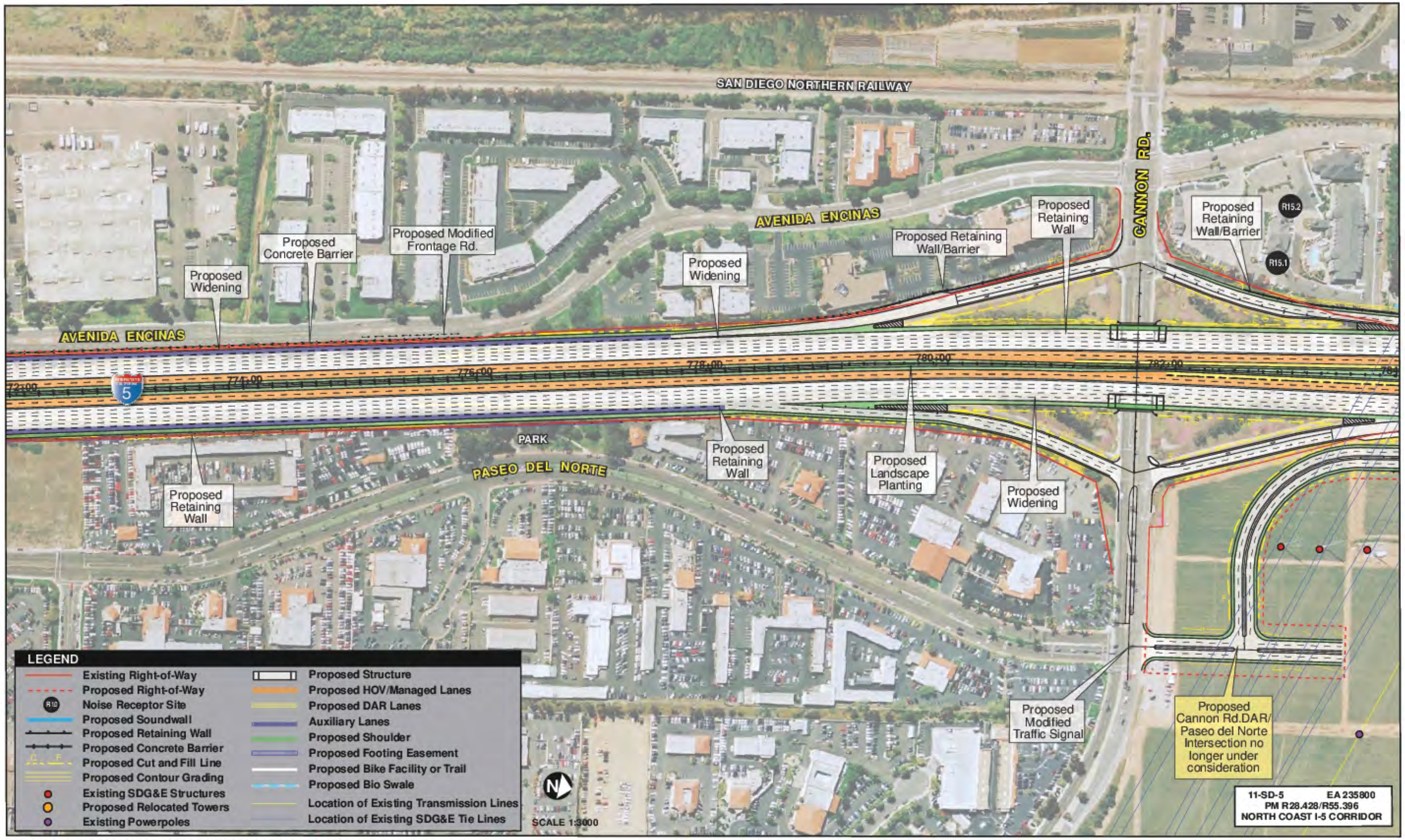


Figure 2-2.14ad Project Features Map: 10+4 Buffer Alternative

Figure K-31, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

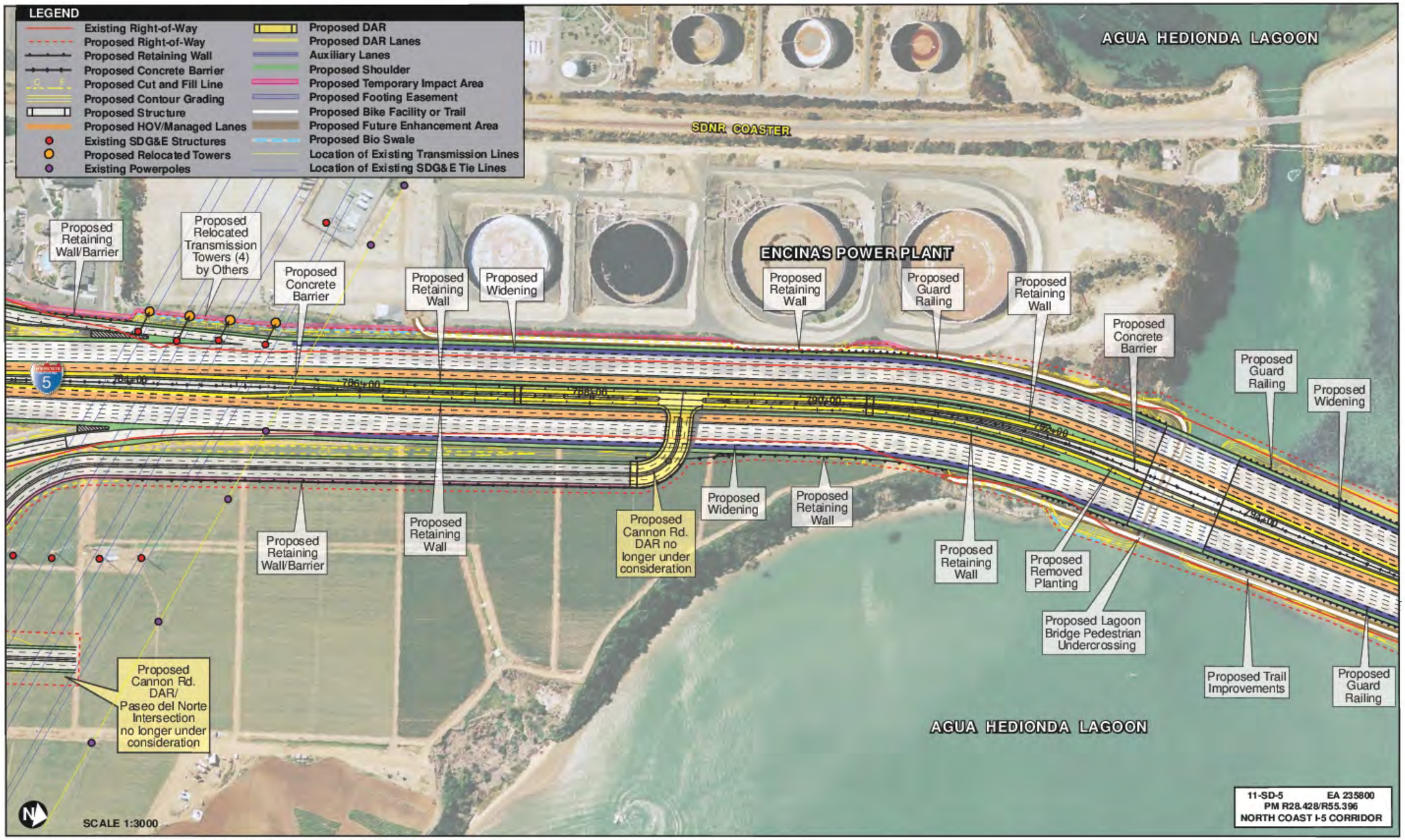


Figure 2-2.14ae Project Features Map: 10+4 Buffer Alternative

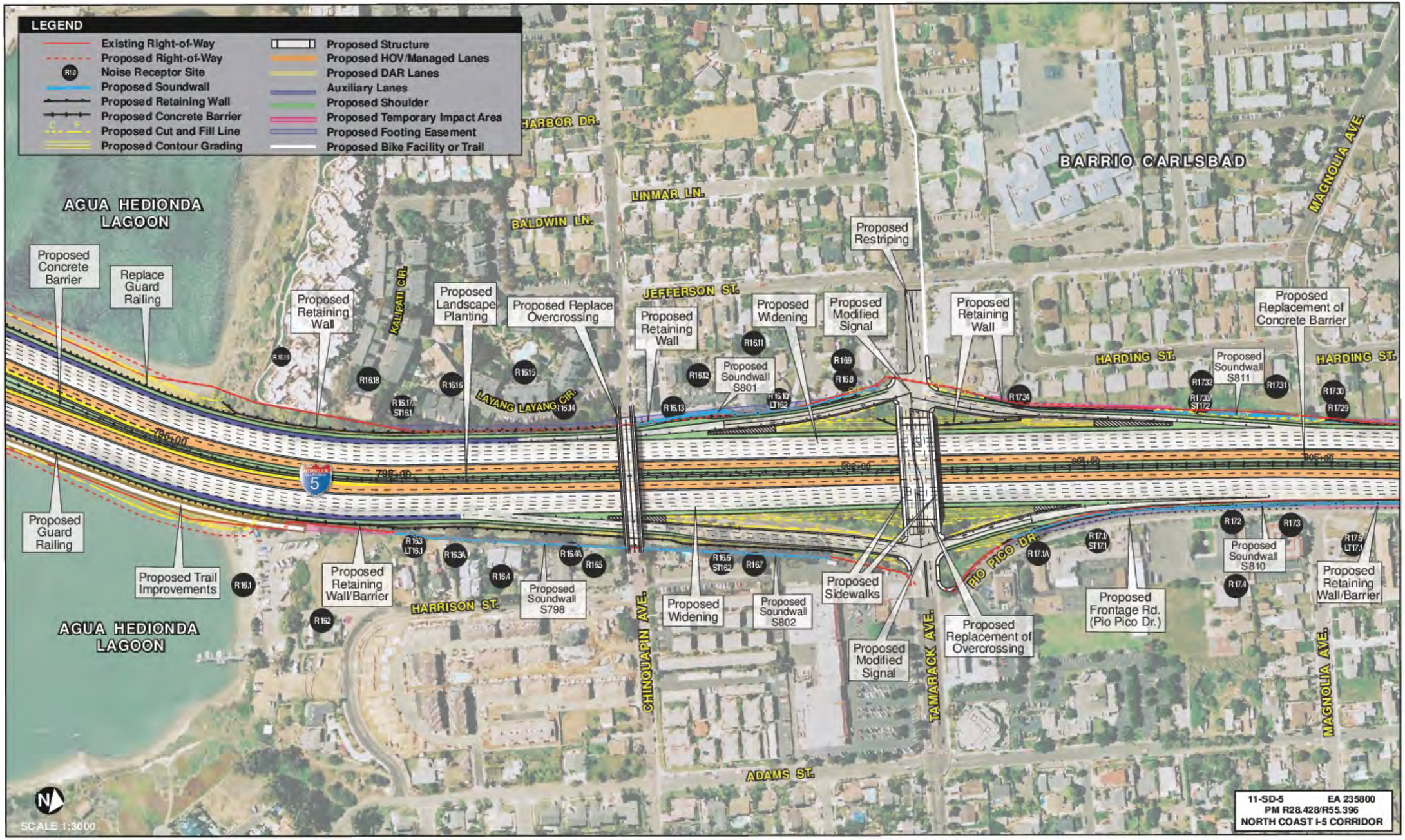


Figure 2-2.14af Project Features Map: 10+4 Buffer Alternative

Figure K-33, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

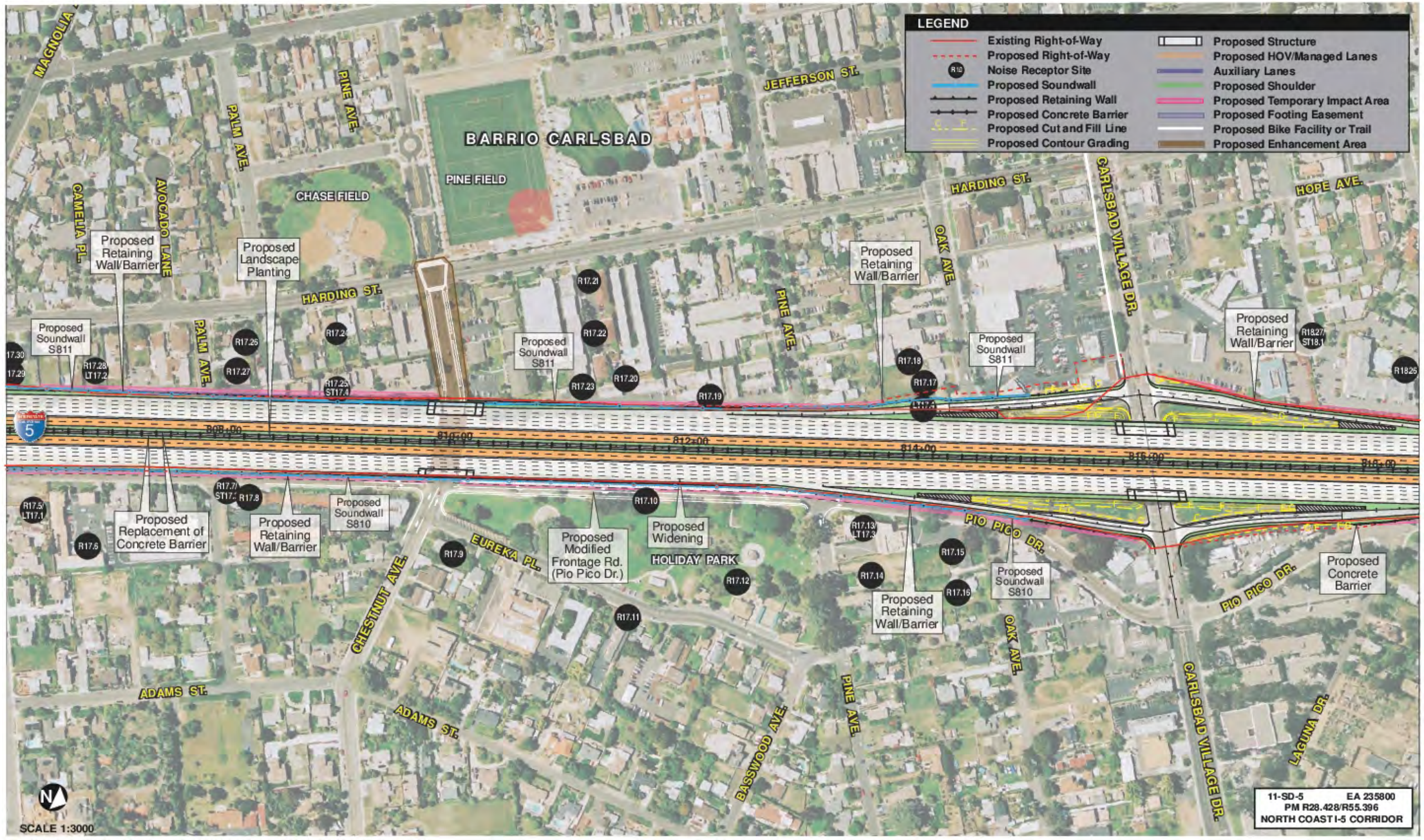


Figure 2-2.14ag Project Features Map: 10+4 Buffer Alternative

Figure K-34, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

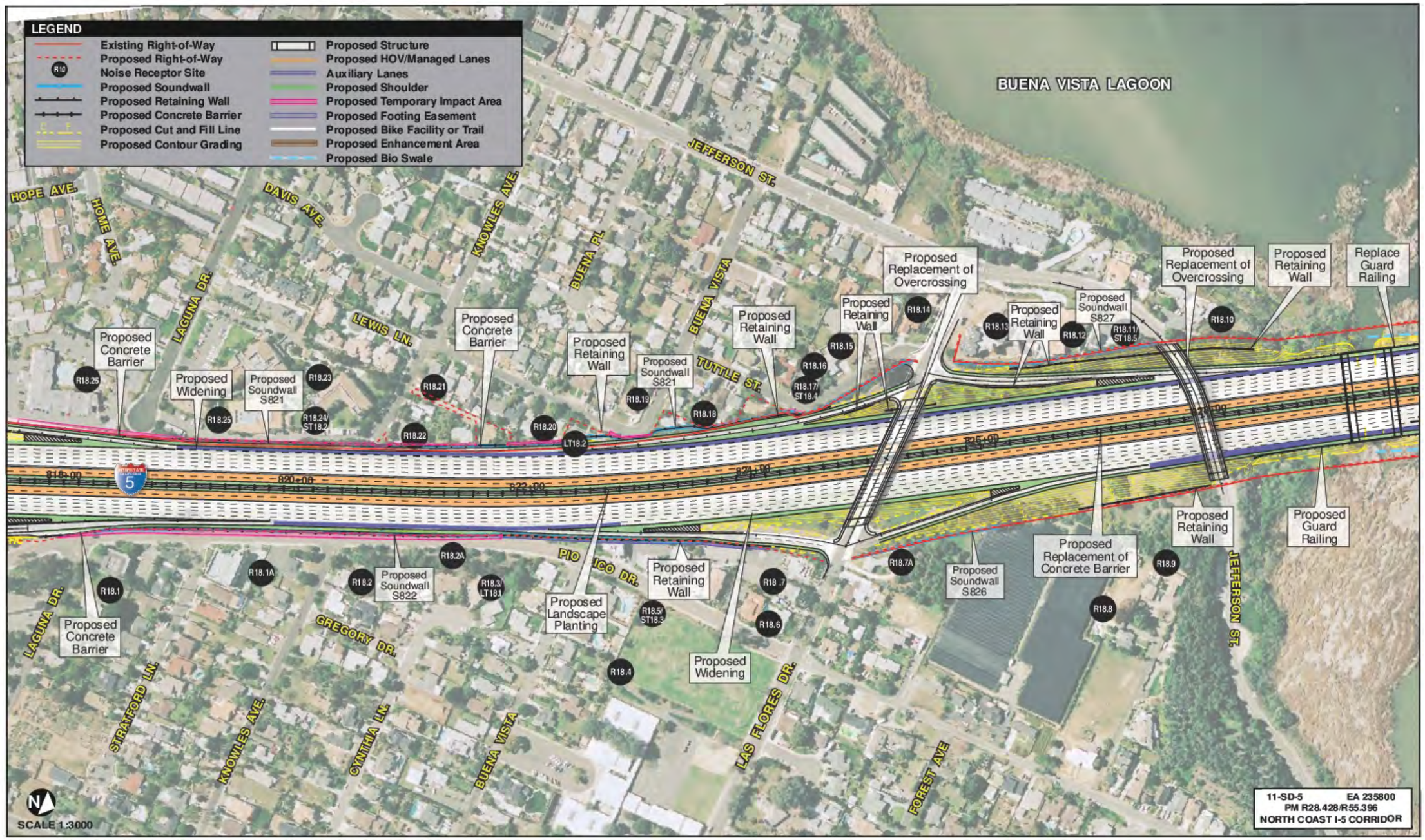


Figure 2-2.14ah Project Features Map: 10+4 Buffer Alternative

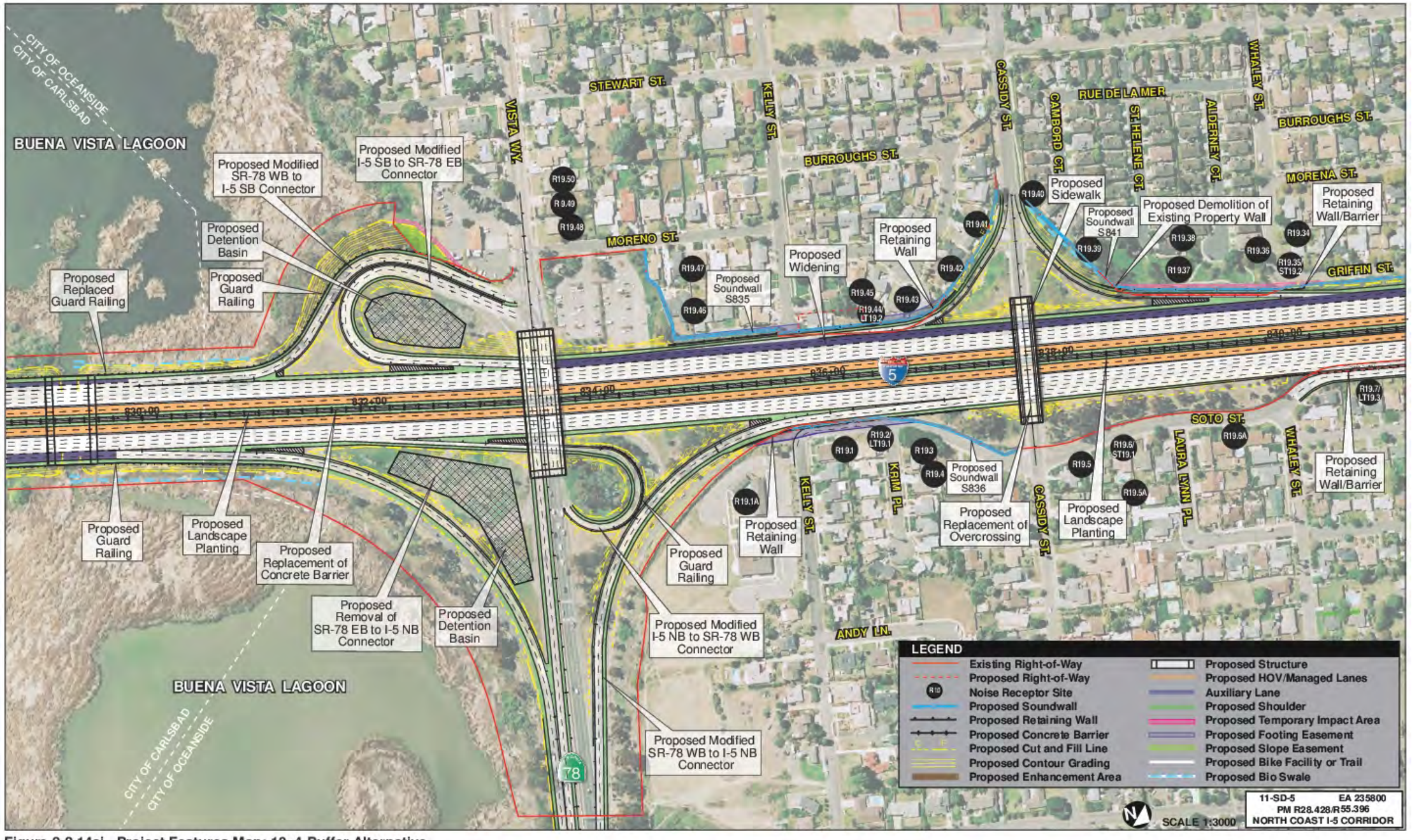


Figure 2-2.14ai Project Features Map: 10+4 Buffer Alternative

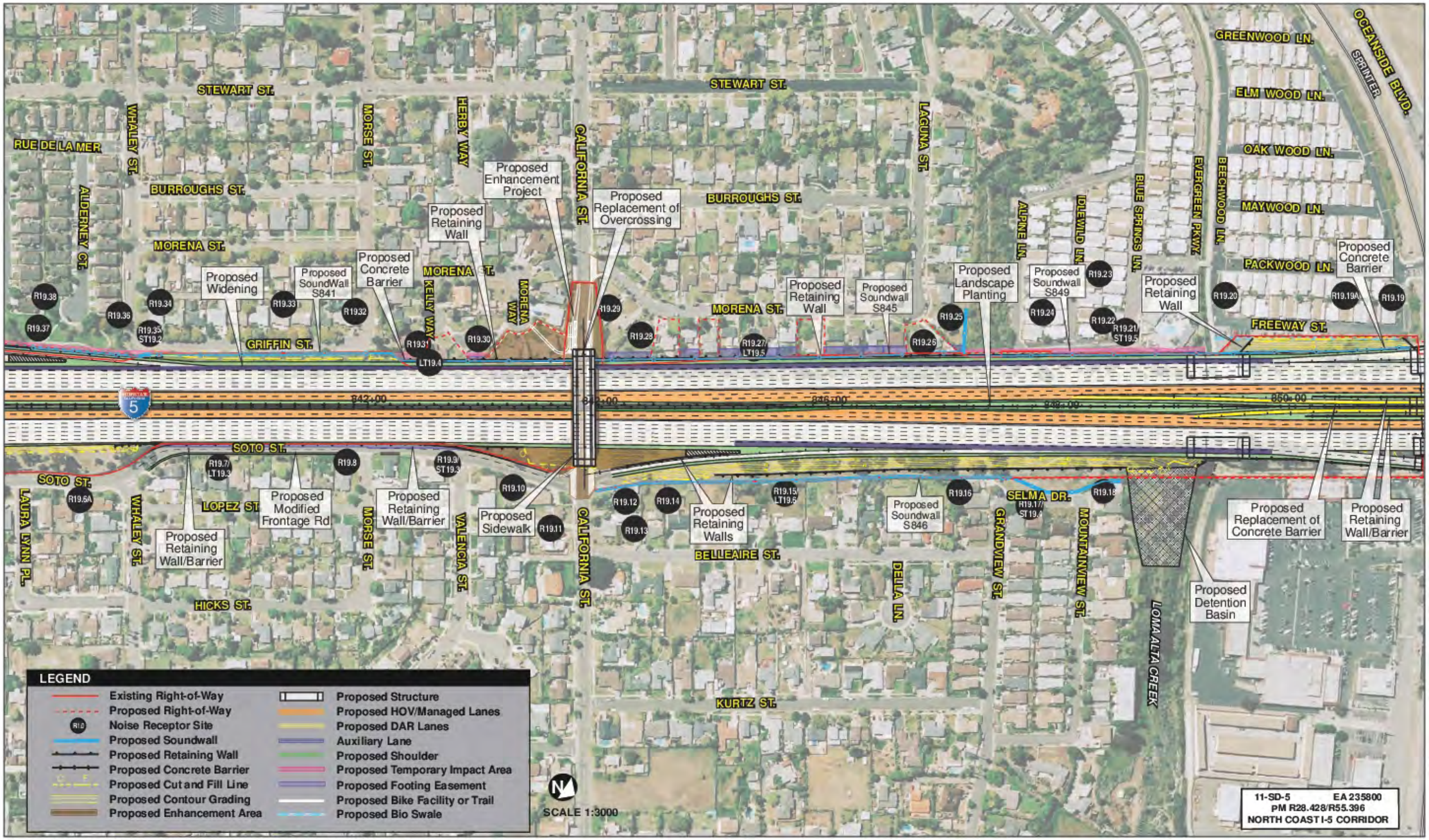


Figure 2-2.14aj Project Features Map: 10+4 Buffer Alternative

Figure K-37, Draft EIR/EIS – Project Features Map: 10+4 Buffer Alternative

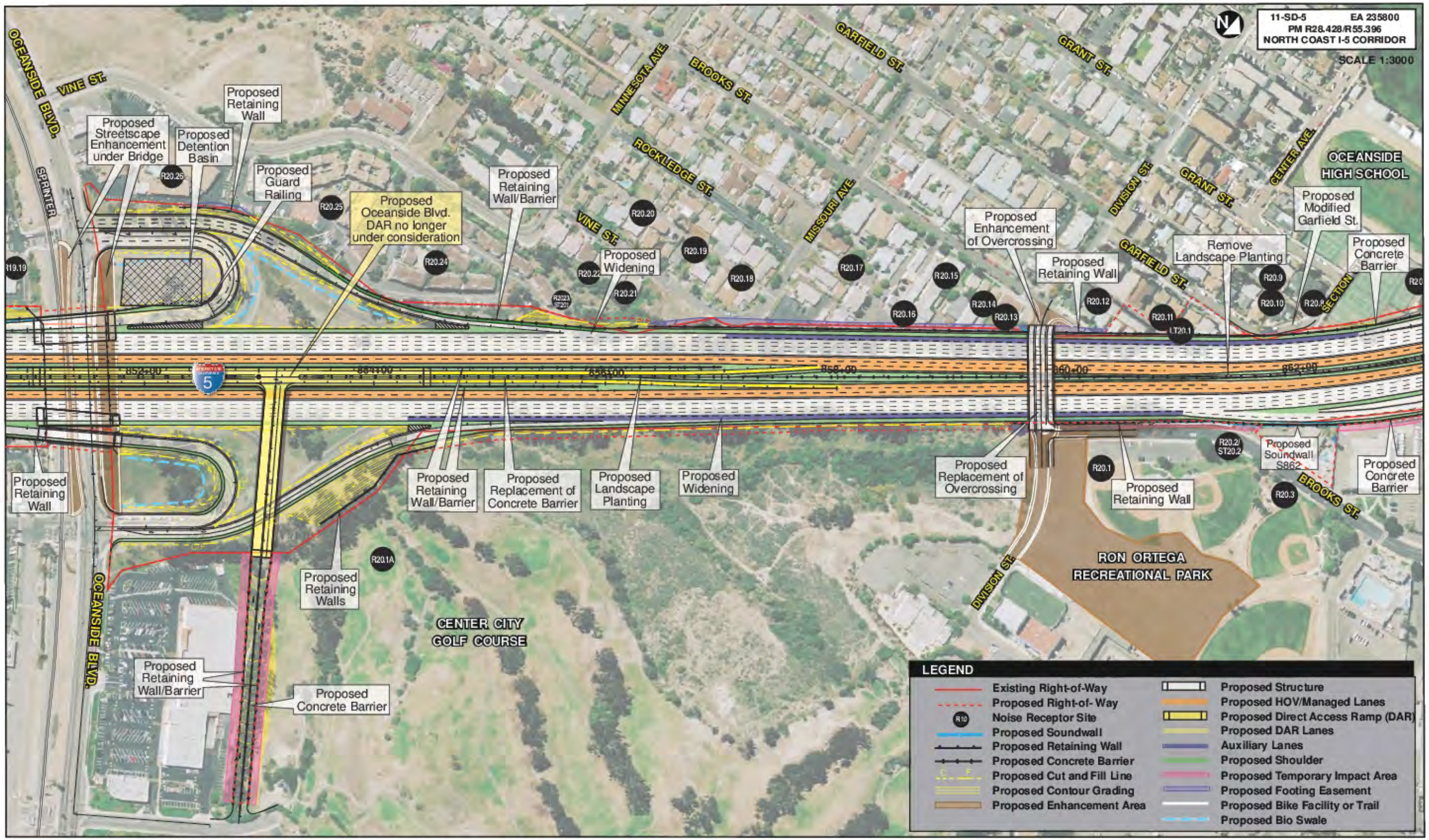


Figure 2-2.14ak Project Features Map: 10+4 Buffer Alternative

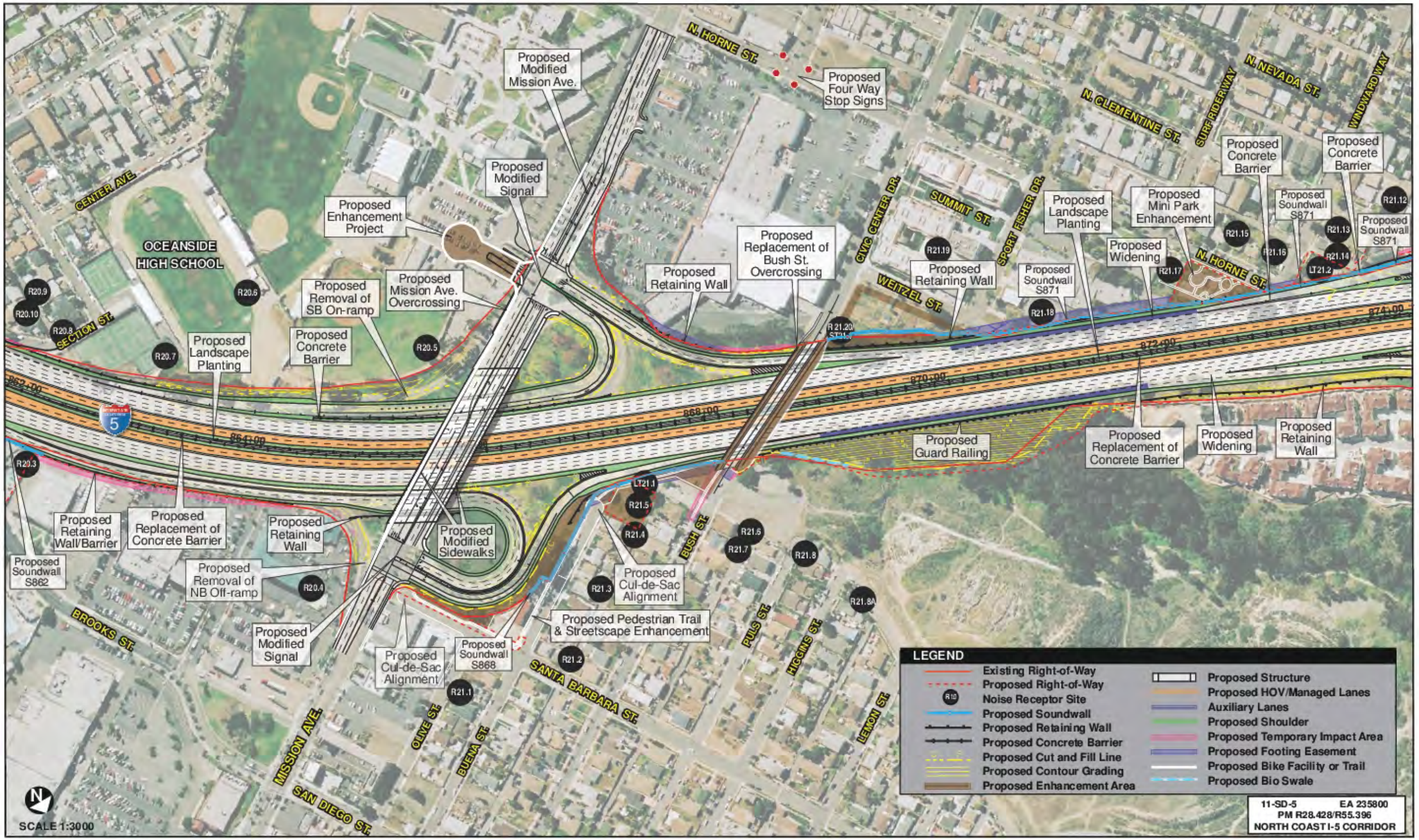


Figure 2-2.14al Project Features Map: 10+4 Buffer Alternative

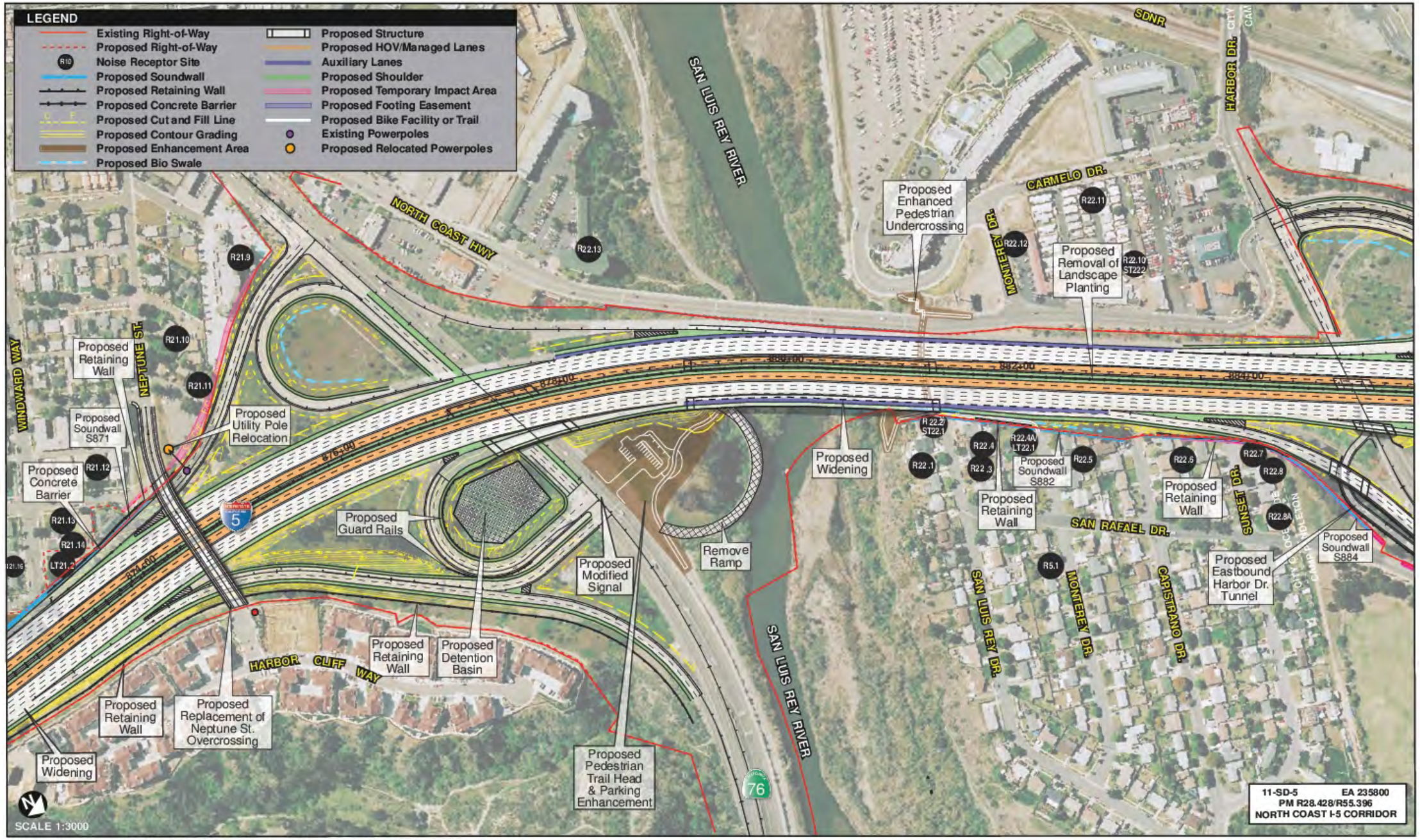


Figure 2-2.14am Project Features Map: 10+4 Buffer Alternative

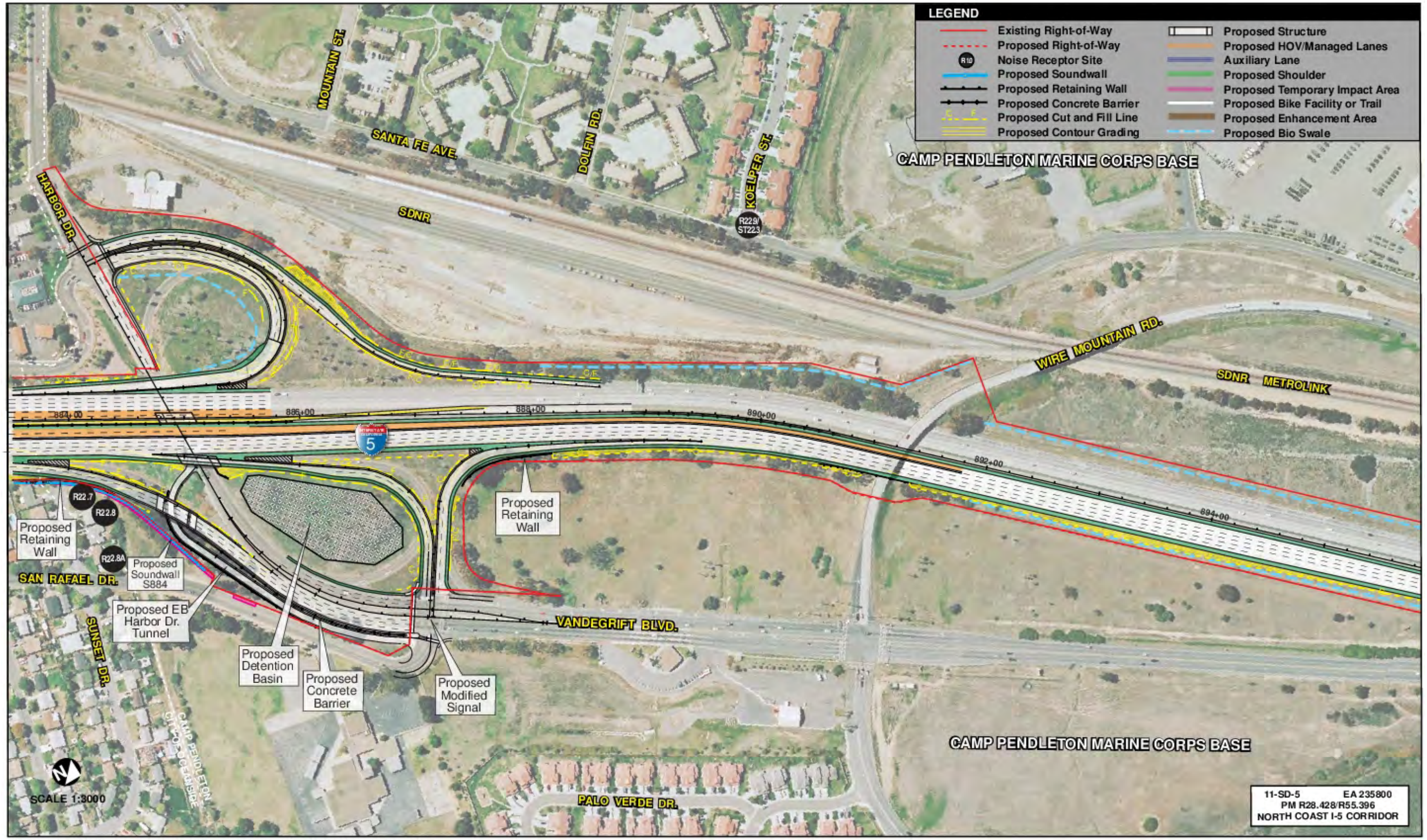


Figure 2-2.14an Project Features Map: 10+4 Buffer Alternative

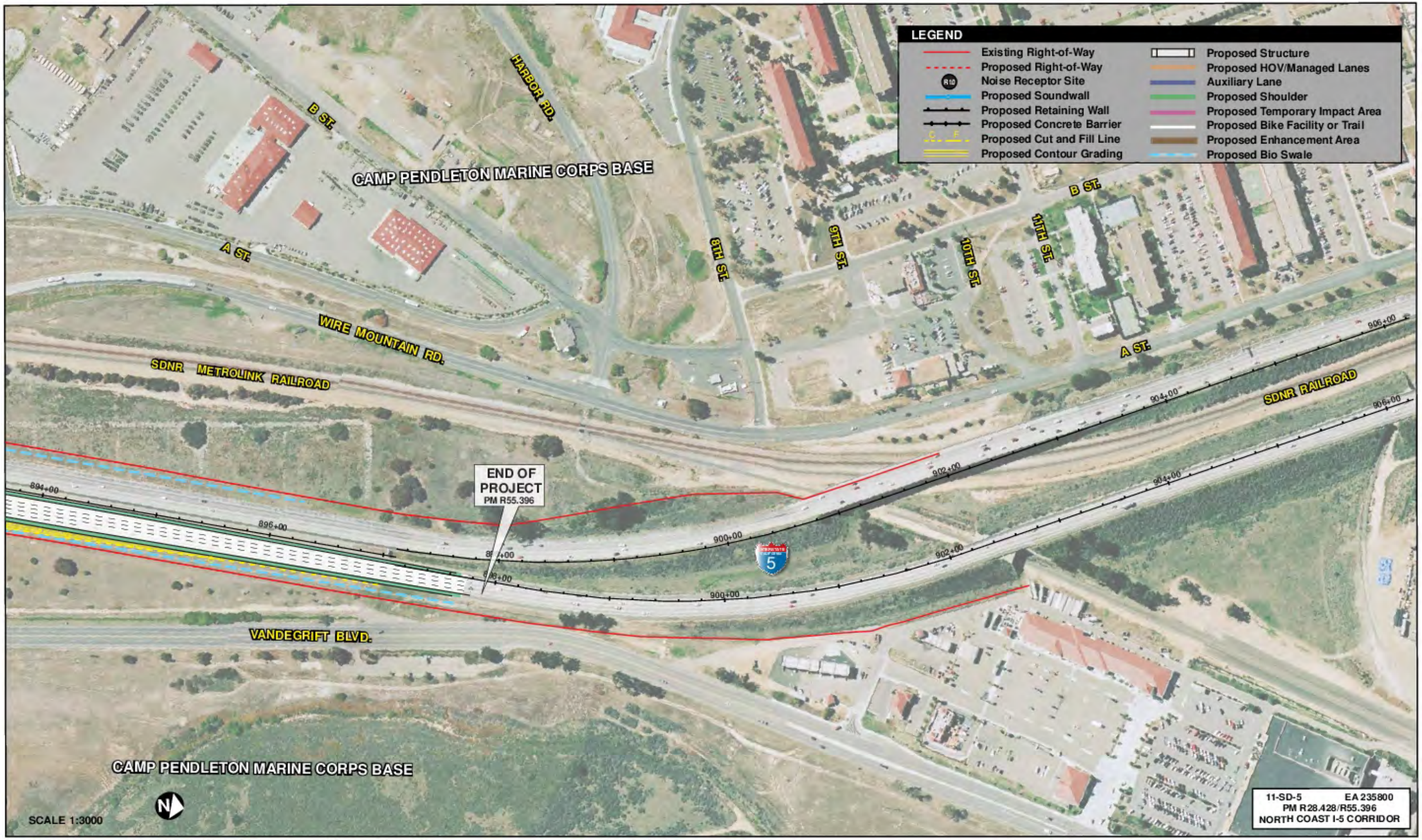


Figure 2-2.14ao Project Features Map: 10+4 Buffer Alternative

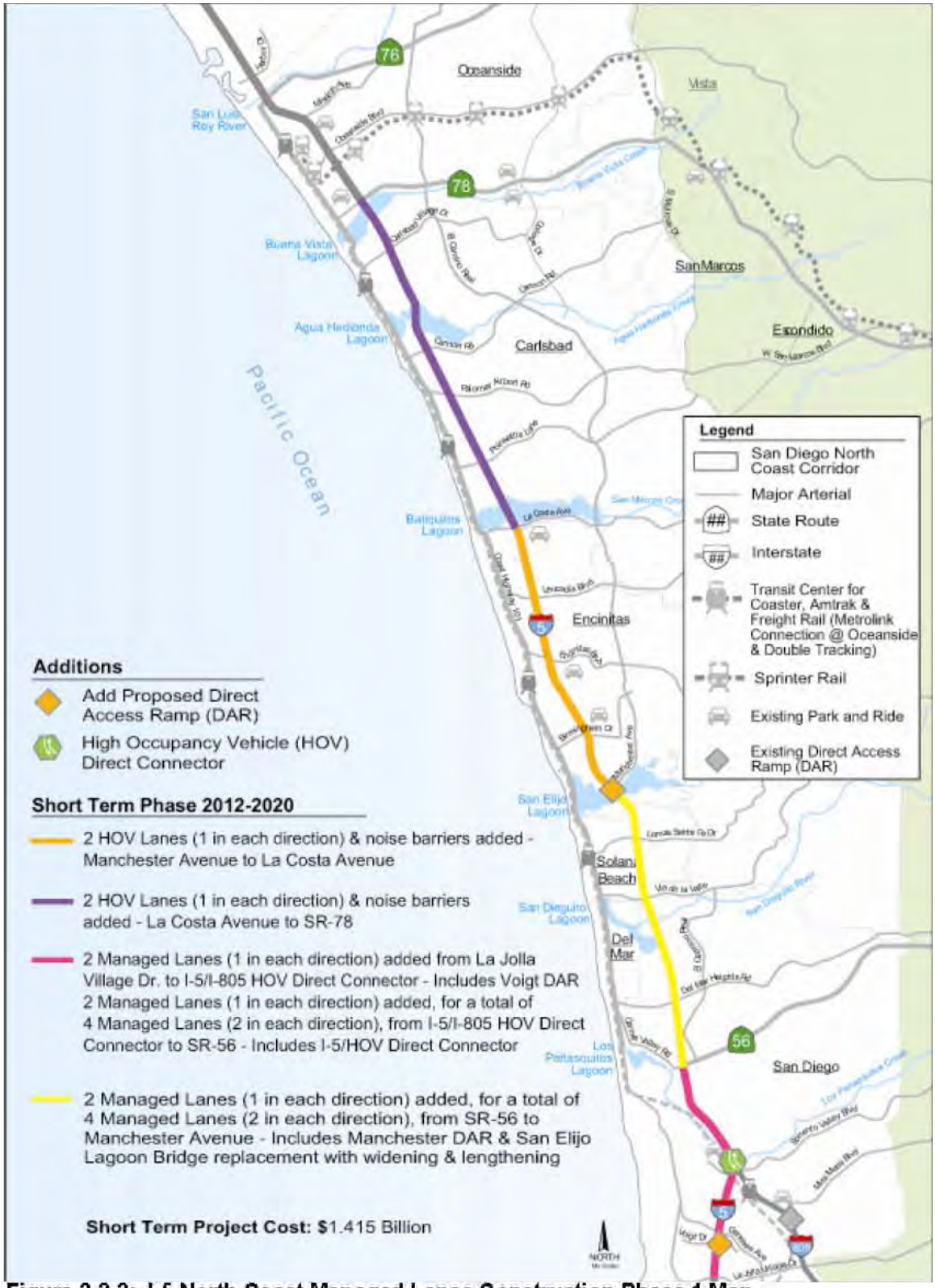


Figure 2-2.3: I-5 North Coast Managed Lanes Construction Phase 1 Map

Figure K-43, Draft EIR/EIS – I-5 North Coast Managed Lanes Construction Phase 1 Map

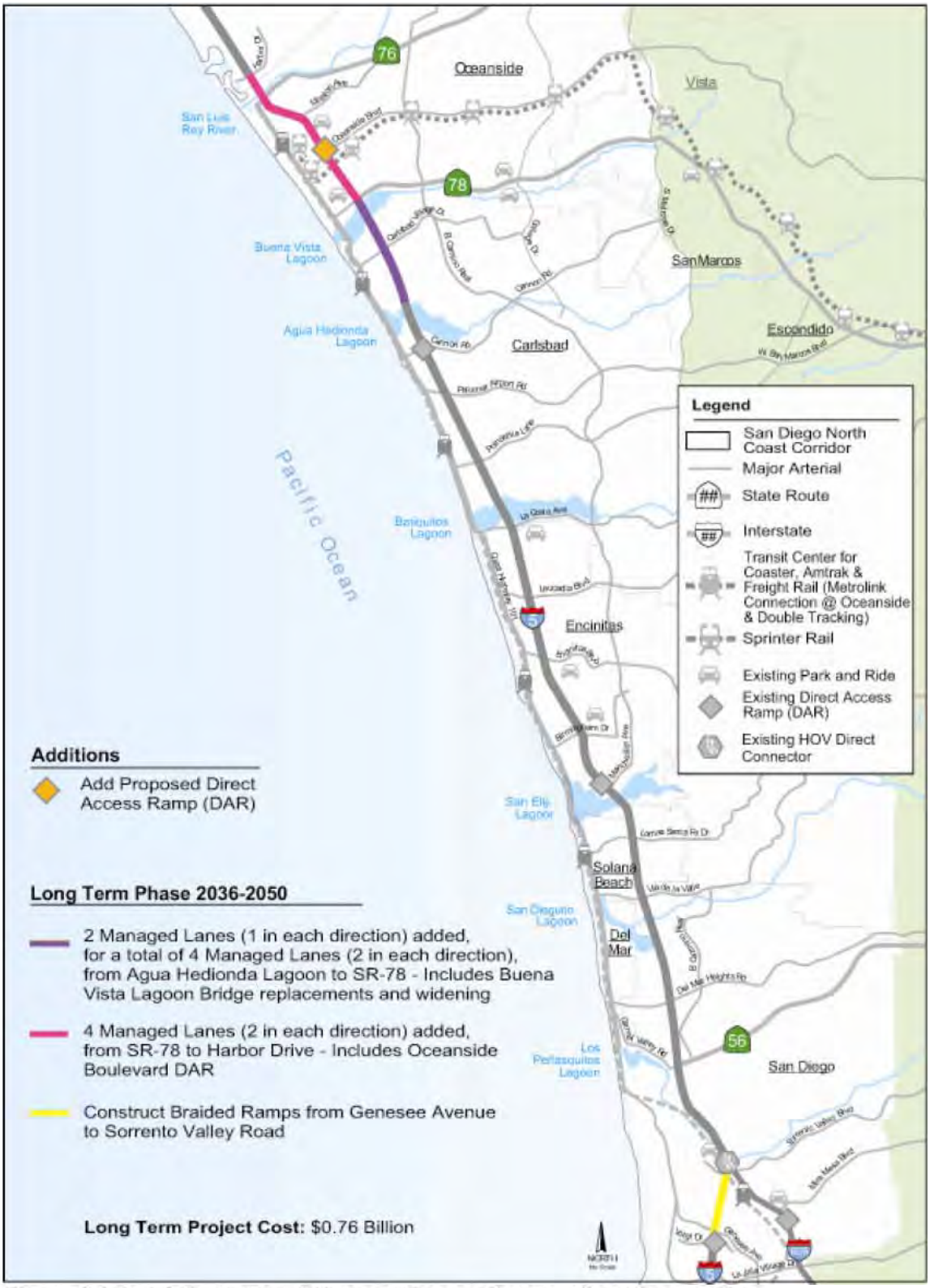


Figure 2-2.4: I-5 North Coast Managed Lanes Construction Phase 2 Map

Figure 2-2.5: I-5 North Coast Managed Lanes Construction Phase 3 Map

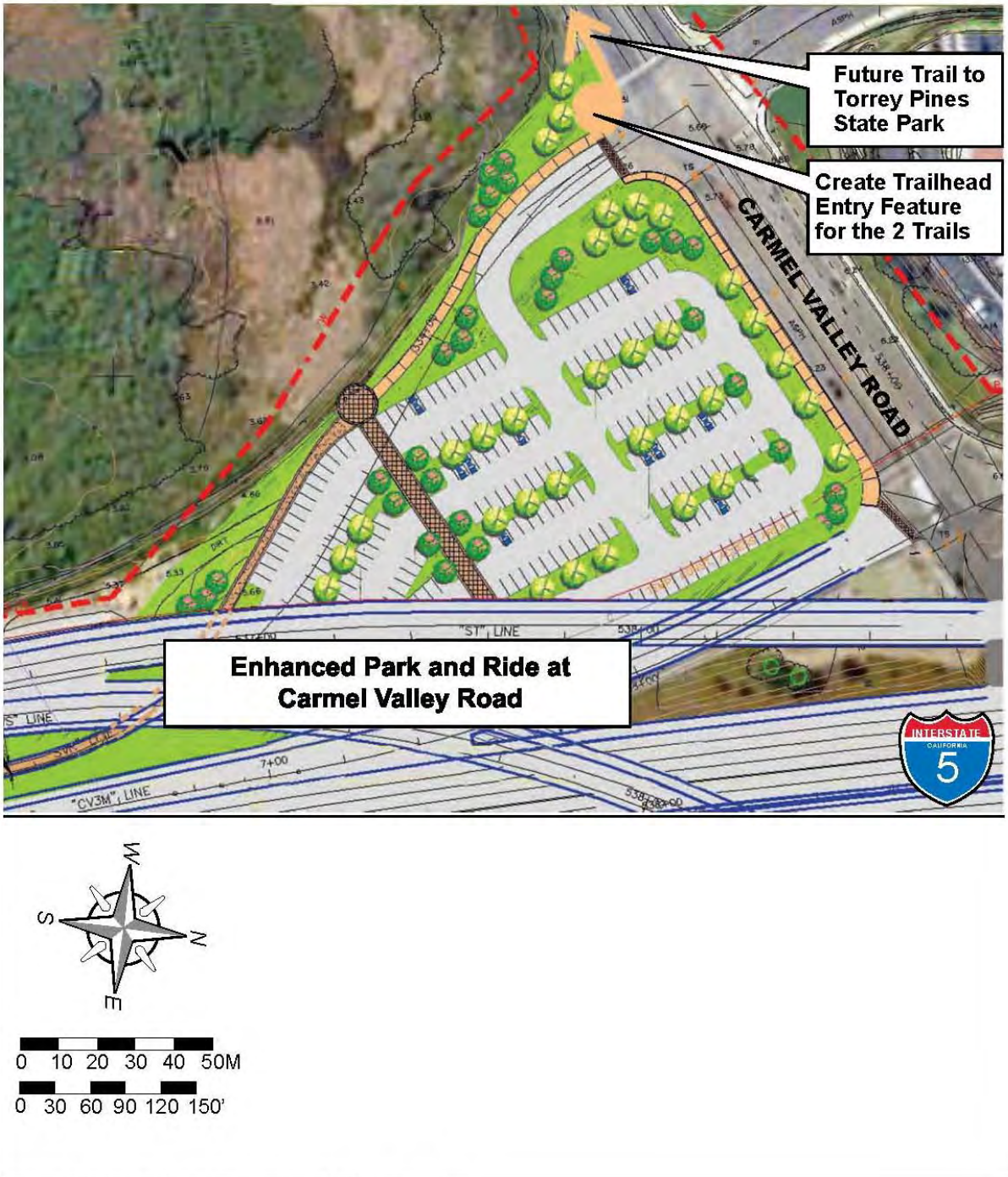
Figure 3-7.50: Key View #5 - I-5 at Manchester Avenue: Existing view looking north

Figure 3-7.51: Key View #5 - I-5 at Manchester Avenue: Proposed view looking north

Figure K-46, Draft EIR/EIS – Key View 5 - at Manchester Avenue: Existing and Proposed Views

Figure 3-7.74: Key View 16 - I-5 at Oceanside Boulevard: Existing view looking south

Figure 3-7.75: Key View 16 - I-5 at Oceanside Boulevard: Proposed view looking south



Appendix B-1: Parking Area at Carmel Valley Road

Appendix B-2: Parking Area at La Costa Avenue

Appendix B-3: Parking Area at State Route 76

Appendix L:
Design Guidelines: I-5 NCC Project

Design Guidelines

Interstate 5 North Coast Corridor Project

September 2013

Prepared by: Caltrans District 11 | T.Y. Lin International | Safdie Rabines Architects | Estrada Land Planning

Design Guidelines

Interstate 5 North Coast Corridor Project

Prepared by:

Caltrans District 11
4050 Taylor Street
San Diego, CA 92110

T.Y. Lin International
404 Camino del Rio South, Suite 700
San Diego, CA 92108 | 619.692.1920

Safdie Rabines Architects
925 Ft. Stockton Drive
San Diego, CA 92123 | 619.297.6153

Estrada Land Planning
755 Broadway Circle, Suite 300
San Diego, CA 92101 | 619.236.0143

Design Guidelines
Interstate 5 North Coast Corridor Project

Table of Contents

I. Project Background

A. Introduction. 1
B. Purpose. 1
C. Components & Products. 1
D. The Proposed Project. 2
E. Previous Relevant Documents. . . 3
F. Use of Proprietary Items. 4

II. Design Parameters

A. Design Goals & Objectives. 5
B. Design Context. 6
i. Regional Context. 6
ii. Corridor Context. 7
- Scenic Resources. 8
- Adjacent Land Uses. 11
- Human Context. 13
C. Design Principles. 14
i. Prioritize Space. 14
ii. Emphasize Form. 15
iii. Communicate Place. 16
D. Design Themes. 17
i. Corridor Theme Elements. 17
ii. Corridor Theme Priorities. 19
iii. Corridor Theme Units. 20
- Southern Bluff Theme. 21
- Coastal Mesa Theme. 22
- Northern Urban Theme. 23

III. Design Concepts

A. Bridges. 25
i. General Bridge Issues. 25
ii. Lagoon Bridges. 26
- High Clearance. 26
- Shallow Clearance. 28
iii. Gateway Undercrossings. 30
iv. Gateway Overcrossing - Mission Ave, Oceanside. 32
v. Typical Freeway Overcrossing. 33
- Southern Bluff Theme. 33
- Coastal Mesa Theme. 34
- Northern Urban Theme. 35
vi. Typical Freeway Undercrossing. 36
vii. Typical Bridge Details. 37
- Southern Bluff Theme. 38
- Coastal Mesa Theme. 39
- Northern Urban Theme. 40
B. Walls. 41
i. Theme Unit Specific Wall Concepts. . . . 41
- Southern Bluff Theme. 41
- Coastal Mesa Theme. 44
- Northern Urban Theme. 47
ii. Barriers. 49
C. Urban Design. 52
D. Landscape. 57
i. Coastal Native Landscape Theme. 59
ii. Standard Landscape Treatment. 60
iii. Enhanced Landscape Treatment. 61
iv. Plant Material. 67
v. Corridor Landscape Concept. 71

IV. Maintenance. 90

V. Next Steps. 91

Design Guidelines
Interstate 5 North Coast Corridor Project

Project Background

I. Project Background

A. Introduction

Millions of people per year travel the Interstate-5 (I-5) corridor from San Diego to Camp Pendleton. Most of these people will experience the corridor on a daily basis. In some cases, over an hour a day is spent on this corridor. A major part of their experience is created as a direct result of the immediate freeway environment. What should the travel experience be like? What should people feel? What are the elements that will create this experience? These design guidelines will guide the design and planning of the various physical elements that will affect not only vehicle drivers and passengers, but also those surrounding the freeway corridor.

An example of an inland view from I-5 (a view of bluffs north of San Elijo lagoon)

The I-5 North Coast Corridor, which stretches from Oceanside to San Diego, is unlike any other freeway corridor. The vertical fluctuations of freeway create a very unique experience for the freeway user. As opposed to a more typical freeway corridor such as the Interstate 405 corridor in the Los Angeles area, the I-5 North Coast Corridor maintains a unique rhythm between developed areas and open lagoon areas. In addition, there are many opportunities for the freeway viewer to experience views of the Pacific Ocean to the west. This is particularly true while traveling through the lagoon areas. These two factors alone create a freeway experience that, to the extent possible, should be retained and/or enhanced. Construction of standard freeway elements such as bridges and walls could diminish the uniqueness of this corridor.

An example of a lagoon and ocean view from I-5 (looking west at Batiquitos Lagoon)

Accordingly then, steps should be taken to ensure that this corridor maintain its uniqueness. These design guidelines will be a mechanism that will guide future physical improvements to the I-5 North Coast Corridor.

B. Purpose

The purpose of the design guidelines is to define and refine the visual mitigation measures contained in the I-5 North Coast Corridor Visual Impact Assessment (I-5NCVIA) in a way that meets the needs of internal and external stakeholders. These mitigation measures build upon the notion that the character of the I-5 North Coast Corridor is special and should be protected. These guidelines are intended to guide engineers, architects and landscape architects that will design the physical elements of the corridor improvements.

C. Components and Products

Planning

Product: An overall corridor site analysis and design concept plan that identifies corridor themes and context sensitive solutions.

Architecture

Product: Design concepts for features would include structures, retaining walls, noise walls, lighting, and other freeway appurtenances.

Landscaping

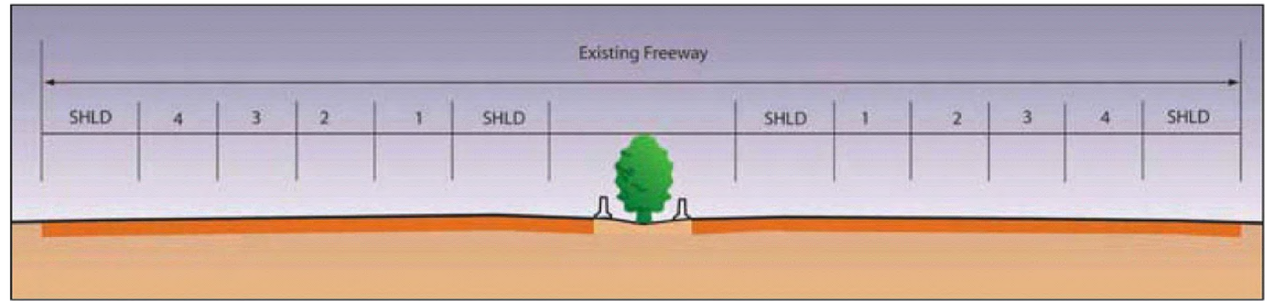
Product: A landscape design concept that addresses interface with communities (entries and edges), preservation of environmental resources (visual and biological), conservation of natural resources (water use, storm water pollution prevention and water harvesting), and sustainability (levels of maintenance).

Urban Design

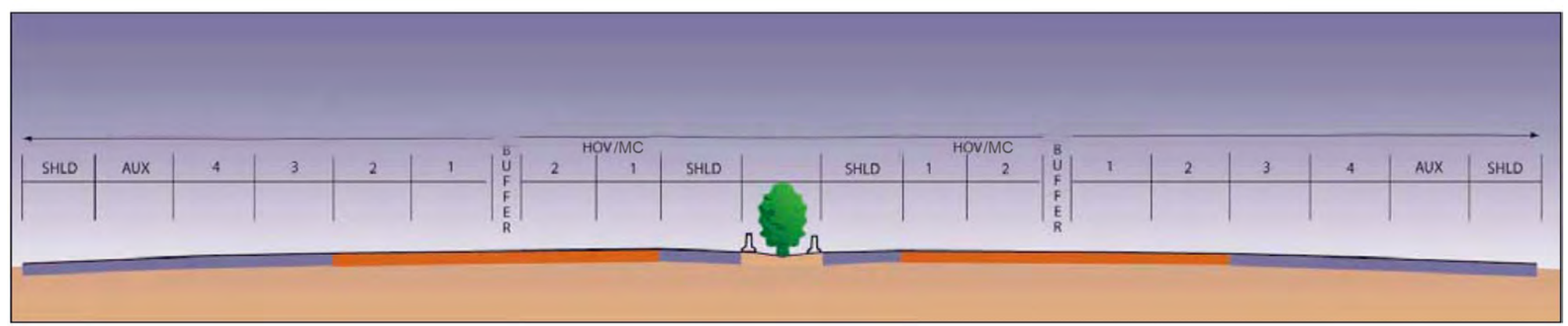
Product: Interchange design guidelines that address pedestrian and bicycle facilities, streetscape features, urban design amenities, community identity features, and specialized landscape features.

D. The Proposed Project

I-5 is proposed to be improved for 27 miles from La Jolla Village Drive in San Diego to Harbor Drive in Oceanside. The California Department of Transportation (Caltrans) proposes to construct one to two High–Occupancy Vehicle (HOV / Managed) lanes, for an ultimate configuration of two HOV/Managed Lanes in each direction on I- 5 from La Jolla Village Drive in the City of San Diego to Harbor Drive in Oceanside. The project also proposes Direct Access Ramps (DARs) at Voigt Drive, Manchester Avenue, and auxiliary lanes at various locations. Essentially, 8 lanes plus 4 HOV/Managed lanes will be constructed as part of this project.



Existing Cross Section



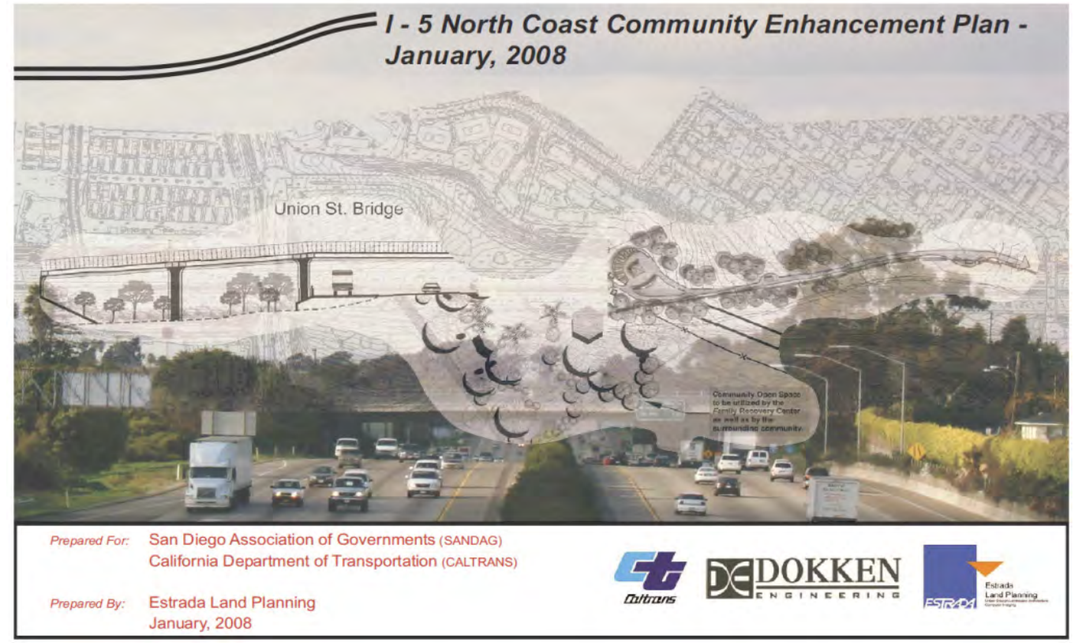
Proposed Project: 8+4 with Buffer - Eight general purpose lanes and four HOV/Managed lanes separated by 1.2m (4 ft) wide striped buffer zones

E. Previous Relevant Documents

Interstate 5 North Coast Community Enhancement Plan (Completed 2008)

Caltrans studied the feasibility of development project concepts that, if implemented, would improve how the project would interface with adjacent communities. The purpose of the I-5 North Coast Community Enhancement Plan was to look at ways that the proposed freeway project could improve the urban design character of the I-5 North Coast Corridor Project through the implementation of synergy projects.

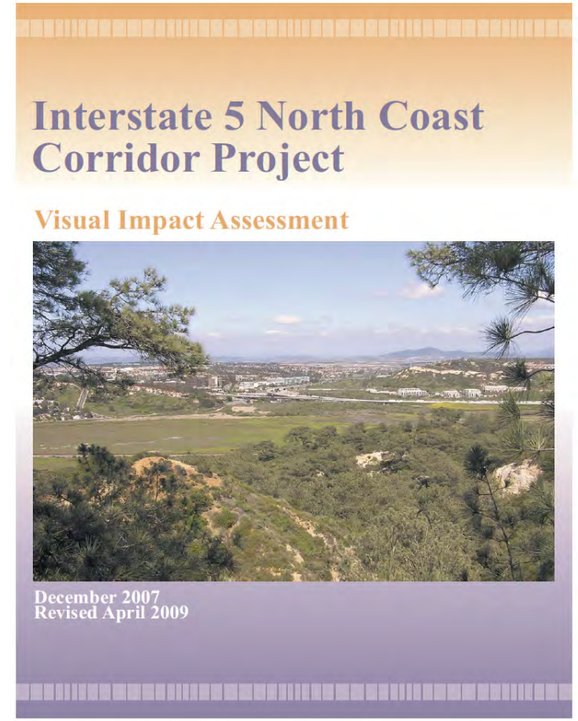
(cover page shown at right)



Interstate 5 North Coast Visual Impact Assessment (Completed 2009)

The purpose of this study, prepared by Caltrans staff, was to assess the visual impacts of the proposed project and to propose measures to mitigate any adverse visual impacts associated with the construction of the Interstate 5 North Coast freeway improvements on the surrounding visual environment.

(cover page shown at right)



F. Use of Proprietary Items

The I-5 North Coast Design Guidelines proposes freeway design themes and components that the California Coastal Commission considers necessary to meet the requirements of the California Coastal Act. The actual appearance of the freeway is the measure of the project's compliance with the Coastal Permit.

The project is expected to be implemented over the course of many years and will consist of many separate construction projects. Each project will be governed by a separate contract and set of specifications interpreted and implemented by a different contractor and oversight engineer. Under the best of conditions, it is difficult to achieve the desired appearance of a freeway feature using a standard performance specification because the specification is quantitative in nature, while the item specified is characterized by its visual appearance and can be rightly judged solely by qualitative criteria. Implementing a set of visual design guidelines such as these for a multi-year multi-contract project by the exclusive use of standard performance specifications would be an unrealistic challenge.

To insure that the various construction phases of the project successfully and consistently implement these Guidelines and thereby comply with the Coastal Permit, certain proprietary items must be specified. Decorative light fixtures, benches, fencing, plant containers, and other types of site furnishings that have a necessary quality of appearance or function would merit a proprietary specification. In addition, certain patented construction systems or processes used to produce features such as unique concrete colors and surfaces, and other proprietary products used to produce decorative finished surfaces such as paints, stains, and tiles also need to be specified as such in order to maintain visual consistency and implement the design objectives contained in the Guidelines.

Some proprietary products proposed for this project will be maintained by others. Using proprietary specifications ensures the quality of each product and provides equipment that a local agency will be more likely to accept into their maintenance inventory. Products will be selected in consultation with partner agencies regarding performance characteristics, consistency with equipment in existing inventories, durability, energy use, and ease of maintenance.

The following products shall be used on the I-5/Genesee Avenue interchange improvement project, currently in design. It is the first I-5 North Coast corridor project to be governed by these guidelines. As public comment is incorporated and future projects are designed, this document will be amended to include additional proprietary items.

Lighting

Louis Poulsen Kipp Post Light

Kim Lighting Altitude Post Light

Louis Poulsen Skot Maxi Wall Light

Architectural Area Lighting Step Light

BK Lighting HP2 LED In-Grade Uplight

Bollard

Louis Poulsen Bysted Bollard

Exposed Aggregate Sidewalk Paving

Lithocrete #05-072C

Lithocrete #12-015D-SD

Integral Concrete Color for Walls and Structures

Davis Color #5447- Mesa Buff

Design Guidelines
Interstate 5 North Coast Corridor Project

Design Parameters

II. Design Parameters

A. Design Goals and Objectives

The basis for these design guidelines are the following overall goals and objectives. These are general in nature and provide an overall framework on which design decisions were based.

Promote Sustainability

- Designs for structural components will be similar and modular to achieve economy of scale.
- Design elements that are easy to build and maintain will be used.
- Drought tolerant plant material will be utilized.
- Water harvesting and soil conservation practices will be implemented.

Maintain Consistency

- Designs will seek to use or modify standard freeway features.
- Designs will seek to achieve a balance between Caltrans policies and community goals.

Preserve Visual Quality

- *Create Opportunities for Freeway Replacement Planting*

  Since some existing landscape areas will be lost due to the proposed improvements, the location, quality and sustainability of any new landscaping will be a critical part of maintaining and enhancing the character of the corridor. This will necessitate the need for using drought tolerant and native plants for any freeway landscape replacement. This will include planting behind barriers (planting strips and planting pockets).

Establish an Overall Corridor Theme

- Create an overall theme for the entire corridor while creating opportunities for local enhancement as described below.

Reflect Local Character and Identity

- The local streets adjacent to the corridor will have opportunities to enhance the local character by incorporating design elements that are either unique to the immediate community or are indentified with it.

Provide Opportunities for Enhancement

- When appropriate, provide two sets of design alternatives to the public based on life cycle cost. One option, the baseline option, will feature components that would receive normal levels of maintenance by Caltrans forces. The other option will feature enhanced or specialized components that local agencies will agree to maintain.

Address North Coast Corridor Constraints

- Design within existing maintenance and water resources
- Avoid the use of invasive species
- Minimize footprint/right-of-way impacts
- Enhancements at the gateway to be maintained by local cities

Create a Living Document

- As with any large scale highway project, the I-5 North Coast Corridor Project is expected to be implemented in multiple phases over the course of many years. The purpose of this document is to define and refine the mitigation requirements of the I-5 North Coast Visual Impact Assessment. It is not intended in any way to be the final word, but instead, a work in progress. It is written to be the basis for shareholder comment, and will be amended accordingly. During the design process, shareholder interaction will continue, guidelines will become more and more specific, locally oriented design details will be added, and a design palette of specific features and products will be developed.

Important Note:

Enhancements will be incorporated into the I-5 North Coast Project if local agencies accept responsibility for maintaining them in perpetuity.

Enhancements or Enhanced Features are defined as freeway appurtenances or aesthetic features that are not contained in the Caltrans Standard Plans or Caltrans Design Manuals. Items such as decorative fencing, lighting, and street furniture are considered to be enhancements. Decorative surfaces and materials such as ceramic tile and colored plexiglass are also enhancements. In contrast, alternate bridge structure types, colored structural concrete, steel plates or solid glass blocks embedded in concrete, and concrete architectural features that can be sustained with current Caltrans maintenance practices are considered to be standard features.

Freeway landscaping that requires higher than standard levels of maintenance is also considered to be an enhancement and would be maintained in perpetuity by a local agency.

B. Design Context

Regional Context

Landscape

The northern coast of San Diego County is generally perceived as a series of coastal communities linked by the old Coast Highway and I-5 transportation corridors. Its natural landscape is characterized by the Pacific Ocean and natural features formed by the action of water on earth. Sandy beaches, sandstone bluffs, coastal lagoons, broad river valleys, steep canyons, expansive mesas, and rolling foothills constitute the predominant natural landforms.

Typical beach and adjacent bluffs in Encinitas

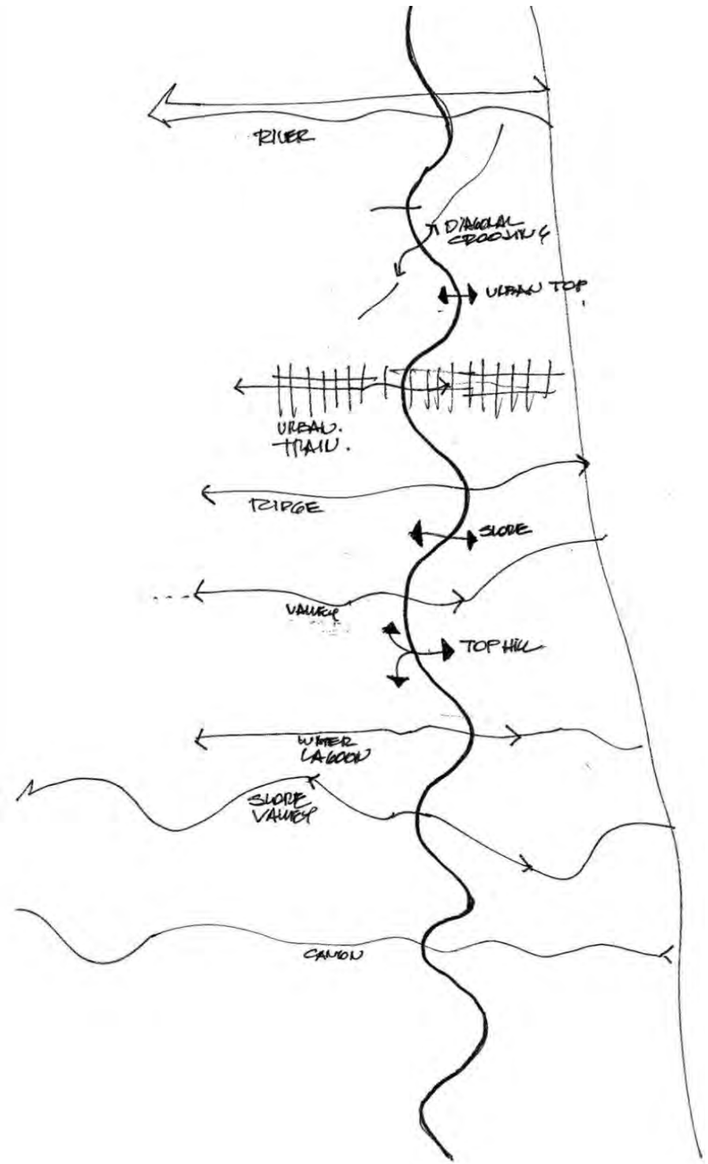
Vegetation consists of a wide range of native and introduced plant species. The characteristic native plant communities are coastal sage scrub and maritime sage scrub, and the signature native plant is the rare Torrey Pine, which grows naturally only on the coastal bluffs of La Jolla and Del Mar and on Santa Rosa Island. The mild coastal climate allows exotic cultivated plants to thrive, and the area is noted for its unique ornamental horticulture industry exemplified by the poinsettia farms of Encinitas and flower fields of Carlsbad. The seacoast is considered by many to be among the most scenic in the world, and the region is a major tourist destination. The I-5 freeway corridor passes through San Diego's North County coastal communities whose visual components establish the character of the corridor. Although each community has a unique visual identity, a powerful unity is also present because of shared landform components.

Native vegetation mixed with non-native vegetation creates a unique backdrop at Batiquitos Lagoon

Because of its outstanding climate and scenery, this portion of the California coast has taken on a cultural significance. The California dream of sun, surf, and the freedom of the open highway took form here and in similar communities up the coast. The scenic landscape components, both natural and man-made, continue to draw new visitors and residents each year. The coastal landscape, coastal communities, and unifying ribbon of highway are highly valued regionally, nationally, and globally.

Corridor Context

I-5 is a very unique freeway corridor. Its proximity to the Pacific Ocean and the various development patterns and topographic changes that the corridor traverses create a rhythmic pattern. The basic rhythm is one of lagoon to mesa top to lagoon to mesa top. In addition, the I-5 corridor parallels, at an equal distance throughout the corridor, the Pacific Ocean to the west. When one travels the corridor, the Pacific Ocean becomes quite visible while within the lagoon segments. By contrast, the Pacific Ocean is rarely visible from the mesa tops that are in between the lagoons. Unlike most urban freeway corridors that consistently travel through highly urbanized areas, the I- 5 corridor rhythm creates a highly unique traveling experience. The I-5 corridor is linked by a series of valleys, crests, and canyons that roll gently across its path. The corridor is bisected into natural segments at the east-west flowing lagoons and valleys that connect the water, natural biology, and trails to the Ocean. These natural rhythms become the basis for understanding and realizing the corridor in its new built form. It is therefore critical that any future freeway construction be designed to ensure that the visual quality of the corridor honors this unique environment.

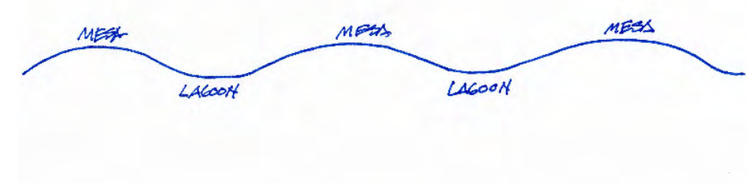


A graphic illustrating the context of the corridor

Where each crossing intersects the path of the corridor, special attention to how the roadway, retaining walls and roadway infrastructure interact with these natural forms must be considered. Where the canyon, valley or lagoon intersect the corridor, the correct approach to organizing these elements is fundamental. Preserving the connections, light, openness and views from the corridor and to the corridor should be a key consideration.

The Rhythm of the Land

The unique rhythm of the corridor, that is the pattern created between the lagoons and the mesas in-between the lagoons, is one element that gives the I-5 corridor its uniqueness. There are low spots at the lagoons, then high spots at the mesas, then low spots again in the lagoons. This pattern repeats creating a unique spatial experience for the I-5 traveler. This rhythm is not only vertical as shown in the following graphic, but also horizontal. The lagoon areas open up while the mesa tops enclose.



The vertical rhythm of the natural landscape

The horizontal rhythm of the natural landscape

Scenic Resources

The I-5 corridor within the project area is part of the California Scenic Highway System and is eligible for designation as an Official Scenic Highway. A scenic resource may be an object, set of objects or a whole landscape that has exceptional visual quality, character, uniqueness, cultural significance, or historical value. The following visual elements of the I-5 North Coast Corridor project viewshed have been identified as Scenic Resources:

The Pacific Ocean

The I-5 freeway provides visual access to the ocean for hundreds of thousands of people each day. These views orient the viewer in the landscape and introduce visitors to the visual character of the region. Views such as these are rarely experienced while traveling on a major urban freeway and establish the corridor's unique visual identity.

Ocean views from the freeway occur at the following locations:

- Northbound lanes between Carmel Mountain Road and SR-56
- Northbound lanes between Del Mar Heights Road and San Dieguito River Bridge
- Southbound lanes between Via de la Valle and Lomas Santa Fe
- Northbound lanes between Lomas Santa Fe and Manchester Avenue
- Southbound lanes between Manchester Avenue and Birmingham Drive
- Vista Point adjacent to southbound lanes north of Manchester Avenue
- MacKinnon Avenue overcrossing
- All lanes at Encinitas Boulevard
- Southbound lanes between La Costa Avenue and Poinsettia Lane
- Southbound lanes at Oceanside Boulevard
- All lanes at the San Luis Rey River bridge

View of the ocean from I-5 overlooking the Penasquitos Lagoon

Image from the I-5 Visual Impact Analysis showing the views along the I-5

Coastal Wetlands

The coastal lagoons in the project area are some of the last surviving wetlands of their kind in southern California. The freeway also traverses two rivers that flow throughout the year, which is an unusual visual experience for southern Californians. Not only are the wetlands a rare commodity, the expansive open space associated with them offer relief from views of urban development and also serve as view corridors from freeway to foothills.

This scenic resource exists at the following locations:

- Penasquitos Lagoon in San Diego
- San Dieguito Lagoon in San Diego
- San Elijo Lagoon in Encinitas
- Batiquitos Lagoon in Carlsbad
- Agua Hedionda Lagoon in Carlsbad
- Buena Vista Lagoon in Oceanside
- San Luis Rey River in Oceanside

San Dieguito Lagoon

Torrey Pines State Reserve

The vivid sight of native Torrey Pines clinging to the picturesque sandstone bluff headland at Penasquitos Lagoon is considered to be one of the region's scenic treasures. The Reserve is visible from Sorrento Valley and Carmel Valley.

Torrey Pines State Reserve

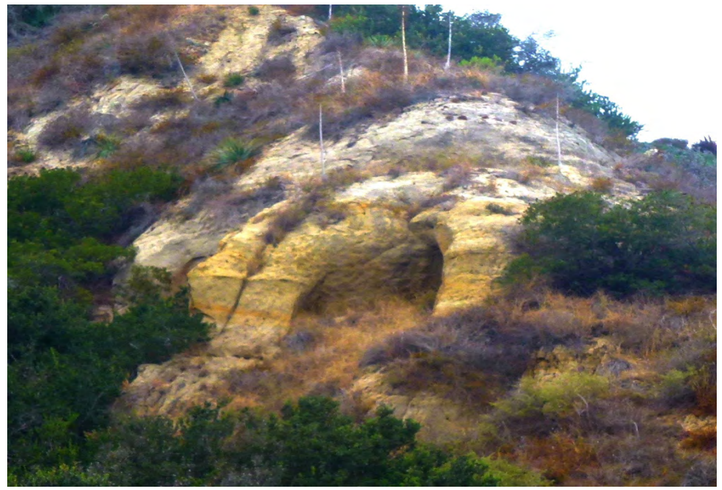
Coastal Bluffs

The bluffs are ancient marine terraces cut by the sea and are composed primarily of cream-colored Torrey sandstone capped by a denser layer of rust red Linda Vista formation that contains protruding horizontal bands of cobblestones. These picturesque eroded cliffs are found near coastal beaches, lagoons, and rivers. The distinctive eroded appearance of the sandstone bluffs also appears in old road cuts and to a lesser extent on some freeway cut slopes.

Eroded sandstone is an iconic image of north coastal San Diego, and is particularly associated with the Torrey Pines, Del Mar and Solana Beach communities.

Areas in which this scenic resource exists are:

- Torrey Pines State Reserve
- Southern slopes of the San Dieguito River Valley
- Native slopes of the San Elijo Valley
- Native slopes adjacent to the northbound freeway lanes between Manchester Avenue and Birmingham Drive



Coastal Bluffs near MiraCosta College in Encinitas

Agricultural Land

The strawberry fields situated along I-5 near Manchester Avenue in Encinitas and Cannon Road in Carlsbad contribute significantly to the rural character of the corridor. They are highly visible artifacts of historic land uses, are in visual harmony with adjacent lagoons, and provide relief from the visual patterns of urban development. As development continues to displace agriculture in southern California, their uniqueness and value as a scenic resource increases.

Agricultural areas in Carlsbad

Encinitas and Leucadia Hillside Neighborhoods

These neighborhoods exemplify Encinitas' unique historic identity as a center of exotic horticulture and embody a vision of California living that has drawn millions of residents and tourists to the region over the years. The older homes in this area were built early in the twentieth century on large parcels of several acres that were utilized as avocado groves, exotic plant nurseries, or commercial greenhouse space. The homes were sited atop a coastal ridge that afforded views of the ocean to the west and mountains to the east. Most were designed in the romantic Spanish Colonial style and featured outdoor living areas surrounded by lush tropical landscaping that took full advantage of the mild year-round climate. Today, the visual character of the scene survives despite intense urban development that has occurred elsewhere along the coast. A few parcels have been subject to residential infill projects, but the original homes, large stands of tall trees, and some of the avocado groves, nurseries, and greenhouses remain. This is a viewshed that would not at first glance be considered scenic, yet it retains a high level of vividness due to the rarity of residential open space near the coast and the glimpse of the area's history that it affords.

Views of this resource are available from the freeway between Encinitas Boulevard and La Costa Avenue.

Leucadia Hills

Many natural and man-made landmarks occur throughout the corridor that have the potential to be embedded in these guidelines as design rationale. For example, the Del Mar Fairgrounds, the Oceanside City Hall, the Cedros Design District and the Solana Beach train station all are unique elements within each of the adjacent cities. However, for the purposes of these guidelines, a landmark is a place that can be viewed from the corridor itself that has developed as a place marker for the I-5 traveler. These landmarks include the following places.

Carlsbad Village

Holiday Park is at the heart of Carlsbad Village, and is in large part responsible for its scenic designation. The park is visible from the elevated northbound freeway lanes, but its many tall, mature trees are also visible to southbound travelers as well. The village that surrounds the park was developed in the first half of the twentieth century and is what urban planners now call a traditional or livable community. This means that commercial and residential land uses coexist, streets are relatively narrow and shaded with large trees, parking lots and commercial signage are barely noticeable, and commercial buildings are in scale with nearby custom-built single family homes. Freeway landscaping screens the sight of moving traffic from the community, and large trees enable it to be consistent with the Village's visual character. This scene forms a sharp contrast to the more contemporary and commonplace land use patterns and building types found in the Carlsbad Mesa landscape unit to the south.

Holiday Park in Carlsbad Village

Freeway Median Oleanders

As southbound freeway travelers approach the city of Oceanside, they are introduced to San Diego's metropolitan region by lush freeway landscaping of a type they did not experience as they passed through urban areas to the north. The route seems to change from a standard freeway to a green parkway principally due to the presence of large, flowering oleander shrubs in the median. Oleanders reduce the scale of the freeway by half as they screen views of oncoming traffic. They provide cooling visual relief with their soft, green, non-reflective, undulating, natural appearance. They are a visual link to scenic areas adjacent to the freeway. Median oleanders are an I-5 freeway feature unique to San Diego and vividly communicate the region's distinctive landscape character and civic identity to millions of visitors each year. The oleanders extend from Harbor Drive interchange in Oceanside to San Dieguito River Bridge in San Diego, and again from Genesee Drive interchange in San Diego past the southerly project limit.

Median Oleanders in Encinitas

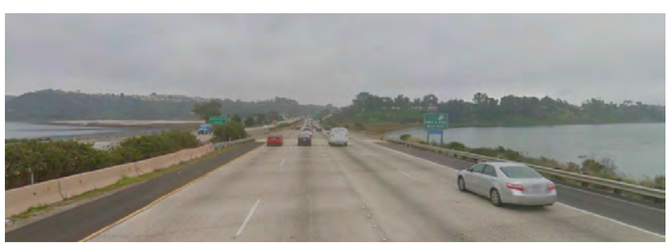
Adjacent Land Uses

There are several major types of conditions that occur adjacent to the I-5 corridor.

Lagoons

As mentioned previously, the various lagoons that occur throughout the corridor are perhaps the single most important element that gives the I-5 corridor its uniqueness. Accordingly then, freeway improvements within this unique environment must be carefully designed. As mentioned previously, the lagoon segments represent the area within which the various landscape sections transition between each other. An abrupt change between the freeway character within the lagoon section and the adjacent more developed sections is not desirable. Gradual transitions between the various themes are critical to keeping the overall character of the corridor intact. The sections within the lagoons must be as visually unobstructed as possible. One must feel as though they are “floating” across the lagoons as they are traversed. In addition, the bridges that cross to lagoons must not be massive and bulky, but rather express an open, more natural feeling, particularly to those that are traveling east and west under the freeway.

San Elijo Lagoon from Manchester Boulevard



Batiquitos Lagoon looking south from I-5

Other Open Spaces

In addition to the lagoons, there are many places where development does not occur immediately adjacent to the freeway. In some cases, the open spaces are more native and natural, such as just north of Encinitas Boulevard along Cottonwood Creek. In other cases, the open space adjacent to the freeway is more refined and manicured, like Holiday Park in the City of Carlsbad. The treatment of the walls and landscaping adjacent to these two very distinct areas must be designed accordingly. Ornamental landscapes within the freeway right-of-way should not be constructed adjacent to natural and native areas. Similarly, native planting may not be appropriate immediately adjacent to existing homes.

Cottonwood Creek adjacent to the freeway on Encinitas

Residential

There are two major types of residential development adjacent to the freeway. Many areas are denser and contain multiple attached and multi-story homes.

Example of higher density residential adjacent to the freeway in Oceanside

Other areas contain lower density single-family residential homes. In most cases the residential units back up to the freeway, however in some locations a frontage road provides some distance and the buffer between the freeway and the sections themselves. In some cases an intensive wall will be required to provide the required noise control. However, there are situations where because of topography, the sound walls need not be as large and dominating. Typically, the need to mitigate the freeway noise is highest next to these residential areas as well as park and recreation areas as discussed below.

Example of low density residential adjacent to the freeway in Carlsbad

Office/Industrial/Commercial

The existence of intensive industrial commercial uses adjacent to the freeway requires a different treatment than other areas. For example, blocking views of adjacent commerical areas is not necessarily desired from a marketing visibility standpoint. Adjacent businesses frequently rely on visual contact from freeway users to survive. Accordingly, treatments along these sections should be as open and unobstructed as possible without negatively affecting the experience of the commercial or industrial user. For example, freeway noise along a car dealership freeway interface is not as critical as one where outdoor eating areas are adjacent to the freeway.

Example of office uses next to the freeway in Carlsbad

Park and Recreation Areas

Parks occur along various places within the corridor. In situations where highly intense recreational uses, such as a playground occurs, considerable buffering is required from a sound and visual perspective. It is important that the benefit received from utilizing these parks not be compromised by negative impacts of the freeway. The relationship can be seen two ways. While views of adjacent park areas are important for freeway travelers to experience, it is also critical that park users not be negatively impacted by the freeway.

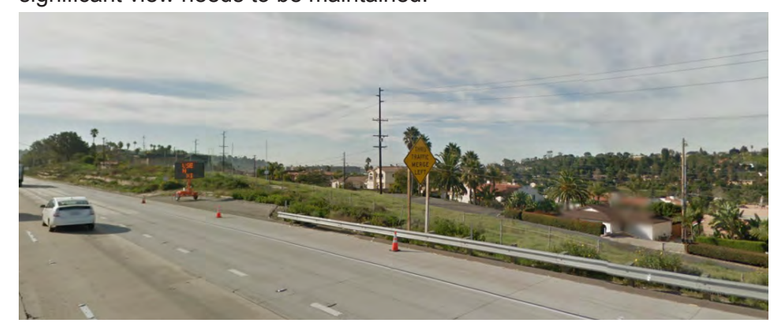
Holiday Park in Carlsbad

Other Uses

Frontage roads along the freeway help to provide distance between the freeway and adjacent uses. However this can also result in a greater number of viewers being negatively impacted by large retaining and sound walls. The situation occurs along Ida Avenue in Solana Beach.

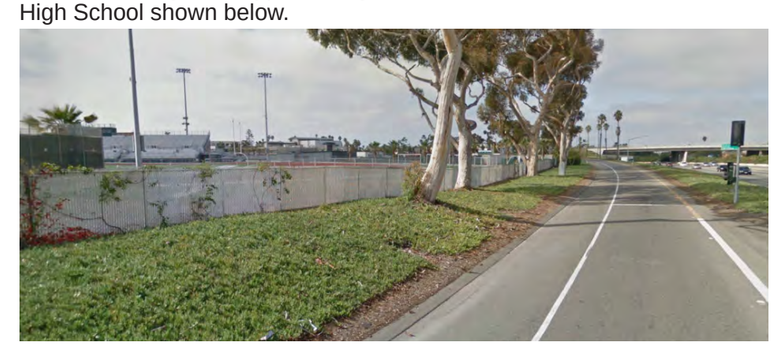
Example of a frontage road in Carlsbad

At times, distant views of the ocean occur from other portions of the freeway that are not within the lagoon sections themselves. Traveling southbound above Ida Avenue in Solana Beach is an example where a distant significant view needs to be maintained.



Distant view of the ocean from a non-lagoon area in Solana Beach

There are many other types of adjacent land uses such as Oceanside High School shown below.



Oceanside High School

Human Context

In addition to the strict physical aspects of the corridor, it is important to understand what the freeway traveler experiences when traveling the corridor. Basically, the experience can be divided into three categories, the experience of space, the experience of speed, and the experience of scale. These are discussed in the following paragraph. However, why is this important? In developing these guidelines, three major questions need to be asked.

- Should all of the proposed improvements within the corridor look and feel the same?
- Should there be a different character to the improvements throughout the corridor?
- Where does one character begin and another end?

In order to answer these questions, the current experience needs to be clearly understood.

The Experience of Space

As discussed earlier, the corridor travels up and down in a rhythmic pattern. Generally, as the freeway elevation rises, it cuts through natural topography with views of manufactured slopes. As the freeway descends, natural topography drops away to allow distant views. This creates an alternating feeling of spatial compression and expansion.

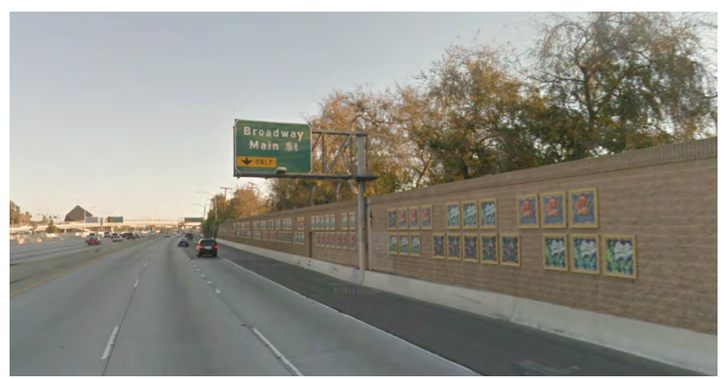
An example of an “up” view in Oceanside

“Up” views (high freeway elevations) are enclosed with more vegetation, topography and structure compressing the immediate viewshed. By comparison, “down” views (views when in the lower areas) tend to be expansive, open, creating a feeling of floating over the lagoons. Therefore the project design should preseve these experiences. For example, tree planting should be concentrated in the enclosed “up” areas, and minimized in “down” areas with distant views.

Example of an expansive view in a low-lying area between Encinitas and Carlsbad

The Experience of Speed

The corridor is experienced while traveling at high speeds. Speed compresses distance, which affects design. For example the curve of a wall is magnified, while the details on its surface are diminished. Landscape plan textures and patterns that are too small or too busy will become a distraction. Because of the speed of the traveler, the visual experience is compressed in time into a single brief impression.



Intricate detail is not perceived by the freeway traveler along I-5 in this example in Orange County

The Experience of Scale

While traveling on the freeway, the horizontal is emphasized creating a need for vertical elements to balance the composition. By contrast, the experience of being in a community adjacent to the freeway results in the vertical being emphasized, creating the need for buffers and scale elements.

The horizontal is emphasized next to the freeway creating a need for vertical elements

The vertical is emphasized next to the freeway creating the need for buffers and scale elements as shown in this example along I-15 in Mira Mesa

C. Design Principles

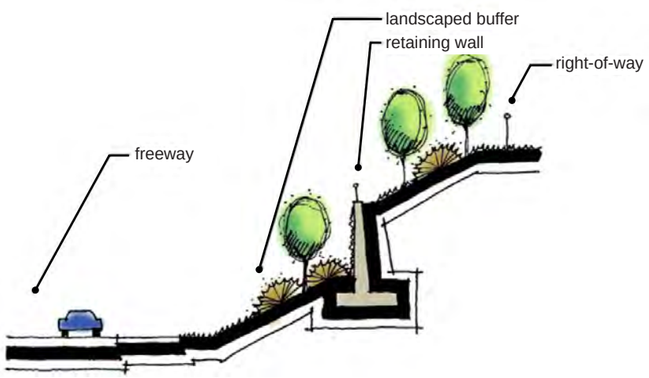
Prioritize Spatial Quality

A. Separate Walls from Viewers

The use of mid slope cut retaining, mid slope fill retaining, noise berm/wall combo, and transparent noise walls should be encouraged.

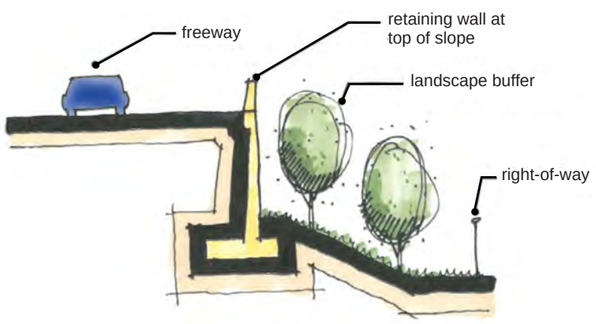
Mid-slope Retaining Walls in Cut Sections

Retaining walls should be located at mid slope wherever possible in cut sections to provide a buffer area for landscape screening between the wall and freeway.



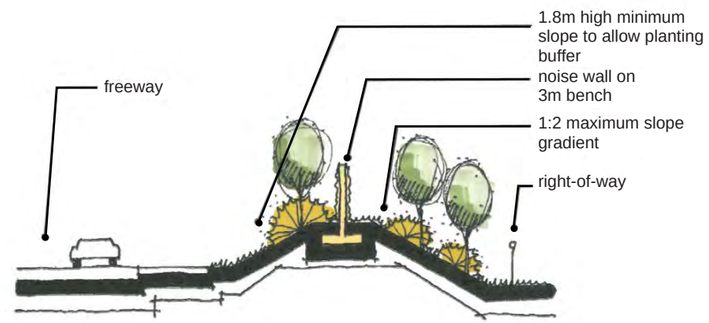
Top-of-slope Retaining Walls in Fill Sections

Retaining walls should be located at the top of slope wherever possible in fill sections to provide a buffer area for landscape screening between the wall and the community.



Noise Berm/Wall Combinations

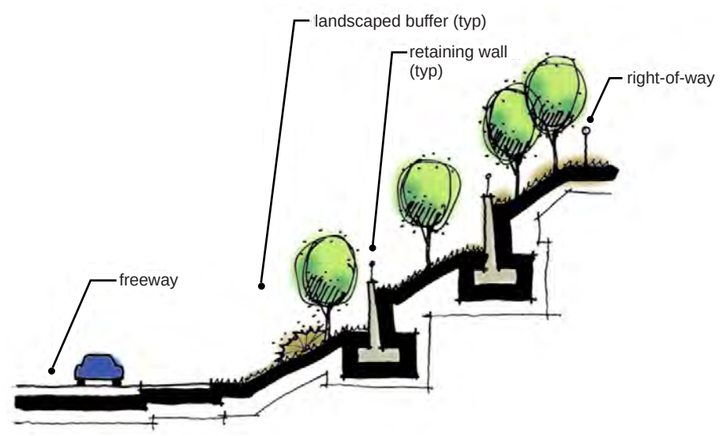
This barrier configuration is preferable in situations where a tall retaining wall at the toe of slope would create a visual impact to an adjacent property. To be effective, this option should incorporate a berm with a 1:2 slope on the freeway side that is 1.8m (6 ft.) high (minimum). This size berm should allow enough space to provide screening shrubs in front of the wall.



B. Create Buffers and Planting Strips

Terraced Retaining Walls

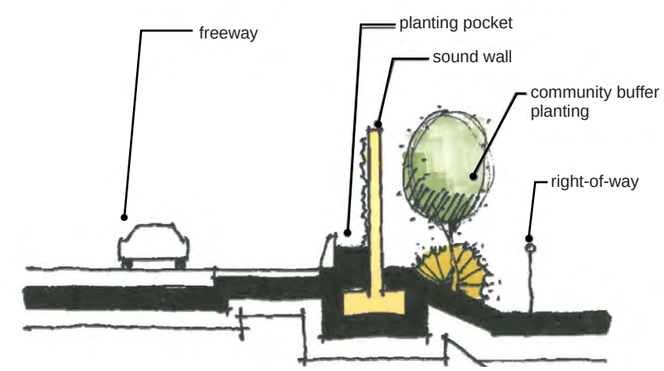
Where site conditions are favorable, retaining walls over 6m (20 ft.) in height should be divided into separate structures sufficiently offset from one another to create a planting area between the two.



These walls should not be constructed in one vertical plane. The use of terracing forms that curve with the landform and disappear into the slope help accentuate the smooth flowing rhythms of the corridor and avoid abrupt conflicts with the contours. This is keeping with the overall theme of blending in with the unique natural environment of the I-5 corridor. Retaining walls and sound walls are the most important elements that will establish what a traveler within the corridor experiences and remembers.

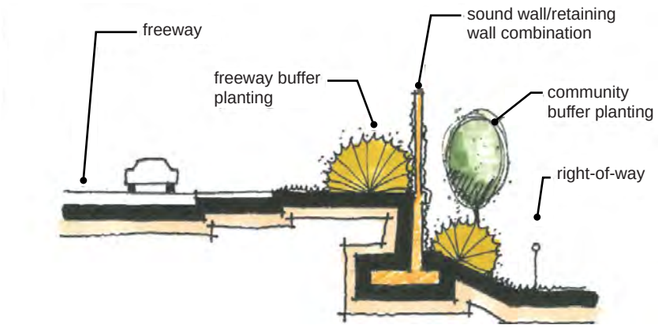
Noise Wall Planting Pockets

Where right-of-way is too narrow to employ the configurations listed above, a minimum 1.5m (5 ft.) wide planting area should be provided between the back of the barrier and the face of the wall.



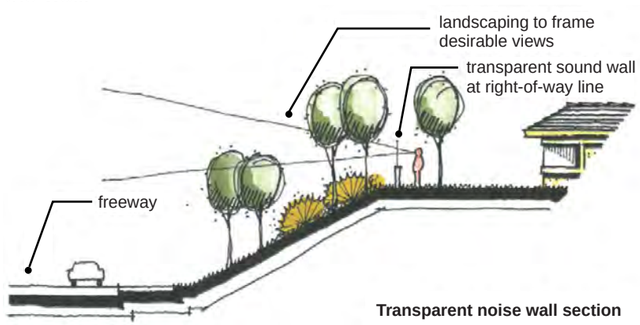
Noise Wall Landscape Buffers

In cases where berms are entirely unfeasible, sound walls should incorporate planting on both sides. In some cases, retaining walls and/or a concrete barrier at the edge of shoulder may be needed to provide the required planting space.



Transparent Noise Walls

In some cases, these walls need to be transparent. Translucent materials can be placed on top of noise walls to reduce their apparent height and create a greater sense of openness. Translucent materials should be placed above areas of potential vehicle impact, out of easy reach, and should consist of vandal-resistant materials. In addition, special treatments such as articulation or perforations can be used to improve the visual appearance of the wall.



Transparent noise wall section

Emphasize Form versus Surface

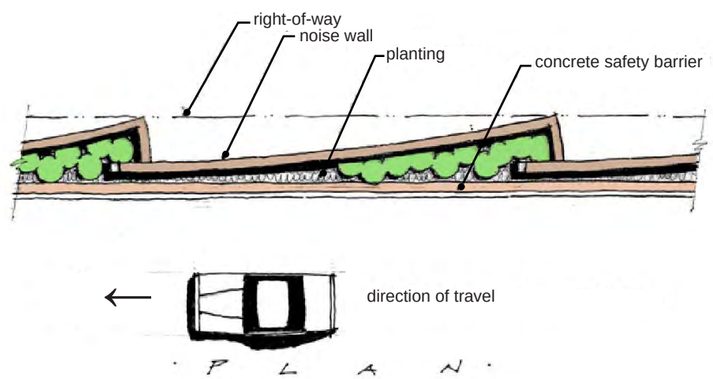
The structural elements should be designed as three dimensional forms rather than flat canvases. An example would be how a retaining wall transitions into adjacent slopes. Rather than force a rigid geometric plan onto the natural terrain of an adjacent hillside, retaining walls should respect the contours of the natural hillside to give the appearance of the wall growing from the hillside.

A. Use Varied Wall Alignments

Noise Wall Articulated Layout/Varied Profile

The use of setbacks and return sections in wall layouts reduces the monotonous visual effect of a single wall surface and helps reduce its apparent scale. This design can be used with a varied top of wall profile to further increase visual interest.

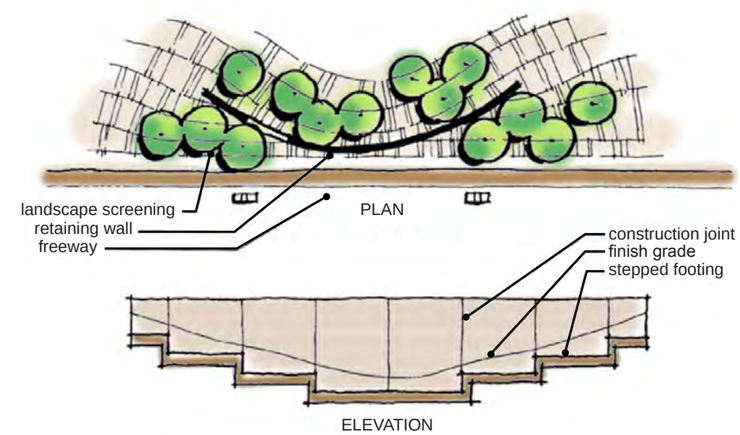
This design option is only feasible when right-of-way is available.



B. Create Sculptural Wall Forms

Terrain Contoured Retaining Walls in Cut Sections

Retaining walls that follow the contours of the topography and maintain a constant elevation at the top of the wall would be used where appropriate. Wall layouts and profiles should be composed of long radius curves, with no tangents or points of intersection. Wall faces should be battered at a 1:12 minimum horizontal/vertical ratio. Walls should be located at mid-slope. This type of wall is visually compatible with surrounding terrain and provides room at the base for a slope that contains landscape screening.



Communicate the Essence of a Place through Forms, Not Images

The third major principle is perhaps the most critical. The true essence and spirit of a place should be clear without the need for signs, murals or cliché images on walls (i.e. seagulls or palm trees). The basic form of the freeway structural elements should be derived from the place itself.

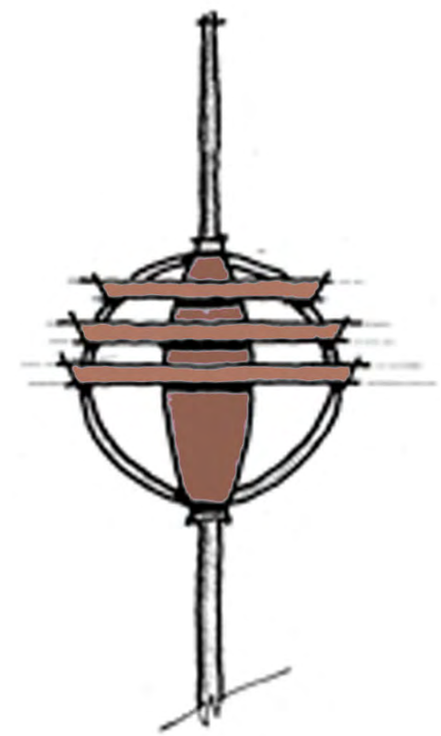
In Solana Beach, the rational character of the surrounding bluffs was the basis for the design of the walls

Place Community Identity Elements in the Community

Each community has the opportunity to enhance the retaining walls by incorporating unique community elements into their walls. For example, Solana Beach incorporated mosaics into their walls as shown below. In these types of cases, maintenance responsibility for enhancements falls to the local cities.

Solana Beach Mosaic Walls

Each community also has the opportunity to add unique community design elements. These kind of enhancements could also be used on bridges within the bridge fencing. An example of enhanced finial is shown below.



"Carlsbad Ranunculus"
Finial Detail

D. Design Themes

Corridor Theme Elements

Several design features will be utilized throughout the corridor to preserve the natural visual characteristics of the existing freeway and create a unifying visual thread for those traveling the corridor.

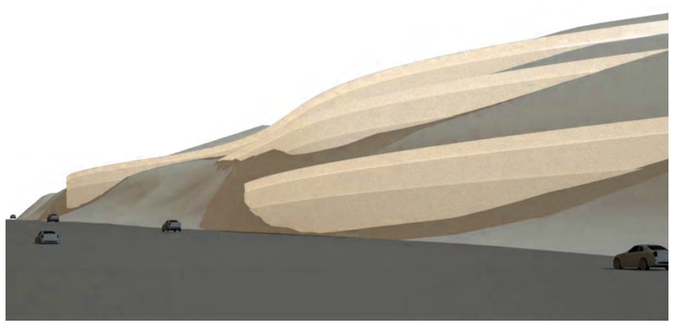
Terrain Contoured Retaining Walls

Alignment – Walls facing the freeway will be setback from travelers as much as possible to allow room for planting buffers and minimize the visual prominence of each wall.

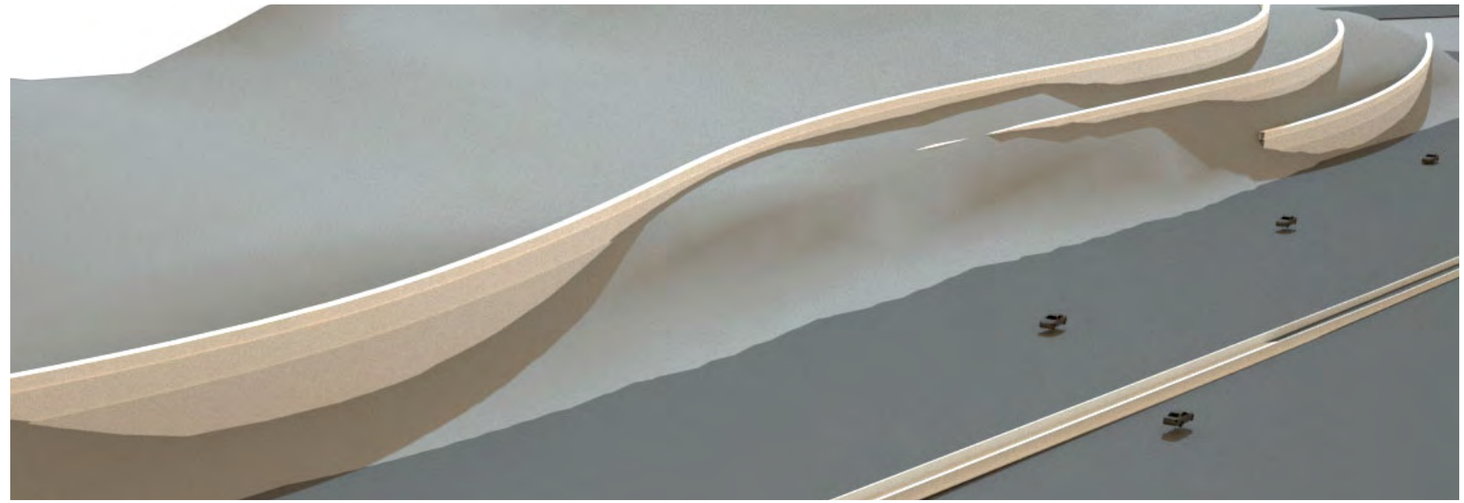
Layout – Walls will possess a natural, organic character by following the contours of natural topography. The layout will consist of long radius curves, and the use of tangent sections (straight lines) will be avoided if at all possible.

Profile – Since the wall layout will ideally follow a single topographic contour, the top of the wall will remain at that elevation and be essentially level. Wall height variations will become apparent at the bottom of the wall. When wall layouts must vary from adjacent contours, top of wall profiles should be kept at less than 10% if at all possible. The top of wall profile will consist of long radius curves, and use of tangent sections will be avoided.

Battered vertical surfaces – Wall surfaces will slope away from the viewer at a minimum of 1 foot horizontal change for every 12 feet of wall height. This will also contribute to a wall's natural appearance.



An example of terrain contoured retaining wall



An example of terrain contoured retaining wall

Indigenous Slopes

Natural contour grading should be practiced whenever space allows. In areas where slopes are cut into Torrey sandstone, large steps will be utilized to replicate the appearance of coastal bluffs and to detain eroded soils on flat benches created by the steps. Slope benches will also promote effective plant establishment.

Slope planting should consist of drought tolerant, non-invasive species that are historically associated and visually compatible with adjacent communities.

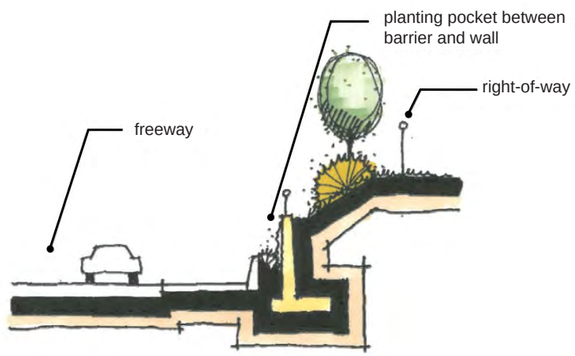
Example of revegetated slope just north of Carmel Mountain Road

Example of revegetated slope in Encinitas

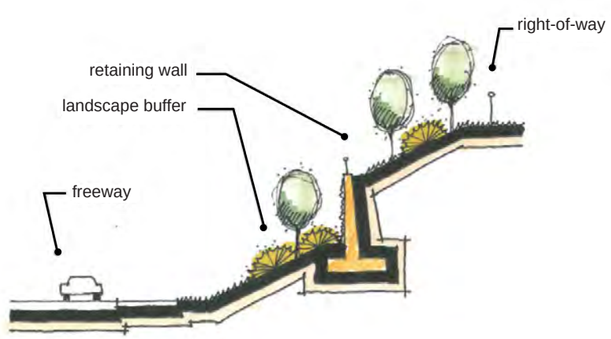
Spatial Buffers

Walls and freeway edges – A number of design solutions will be used to create space between the edge of freeway shoulder or concrete barrier and an adjacent retaining or noise wall in an effort to avoid the urbanizing effect to propose built forms. These techniques are found in the Visual Impact Assessment and include mid-slope retaining walls, articulated layout walls, wall/barrier pockets (planted or non-planted) and wall/barrier setbacks.

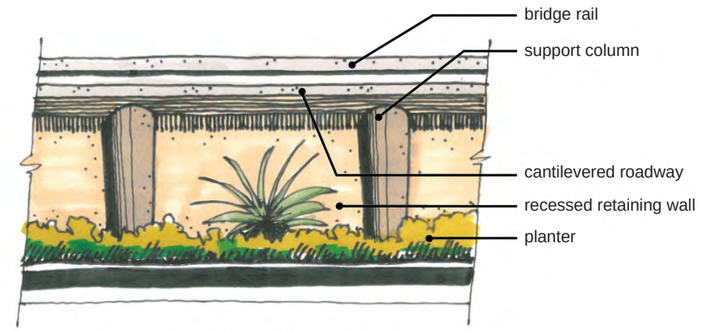
Walls and Community Edges – Buffers will be created between freeway retaining walls and adjacent properties by placing the wall at or near the edge of freeway shoulder if possible. This and other buffer strategies are contained in the Visual Impact Assessment. In particularly sensitive areas, the use of viaduct retaining walls will be considered.



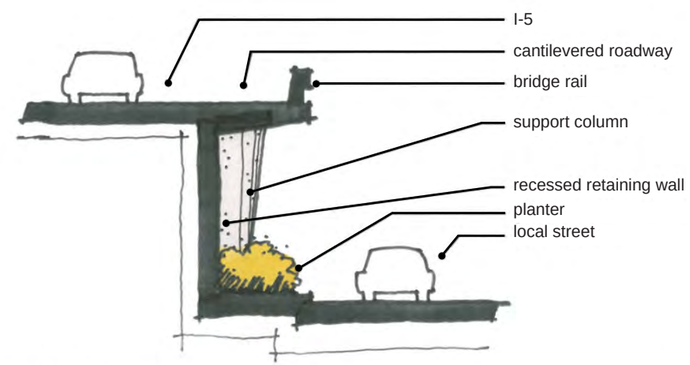
Retaining wall/Barrier planting pocket section



Mid slope retaining wall section



Viaduct retaining wall Elevation

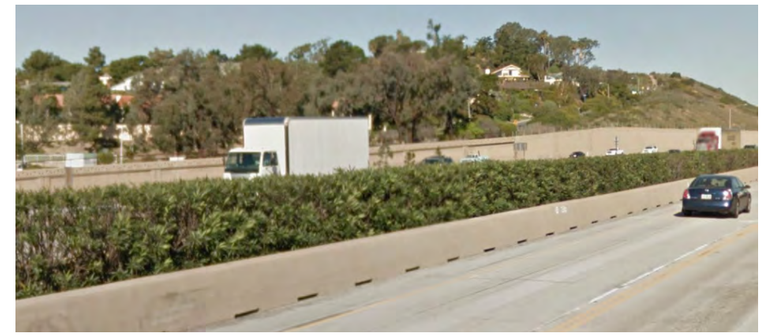


Viaduct retaining wall Section

Median Planting

Preserve Existing Planting – Median oleanders now reduce the scale of the freeway by screening travelers from views of oncoming traffic. They also provide a soft, organic, colorful visual relief from the hard reflective concrete surfaces of the roadway. This role will become increasingly important as the freeway expands.

Protect with Enhanced Median Barrier – A concrete median barrier will protect median planting and will be integrally colored with an earth tone and be finished with a sandblast texture to give it a natural appearance.



Example of median planting in Solana Beach

Color

Concrete surfaces visible to the public will be integrally colored to be compatible with local design themes. Most of the corridor features will be colored in earth tones consistent with characteristic coastal bluffs. Enhanced metal surfaces will mostly consist of weathering steel, which possesses a deep rich patina which denotes the beauty that can result from the work of nature over time.

Example of Solana Beach wall

Corridor Theme Priorities

Primary importance in the hierarchy of corridor design.

The three most important elements that need special attention and will have the most impact on the character of the corridor include the community gateways, the lagoon bridge crossings and the retaining/sound walls.

Community Gateways

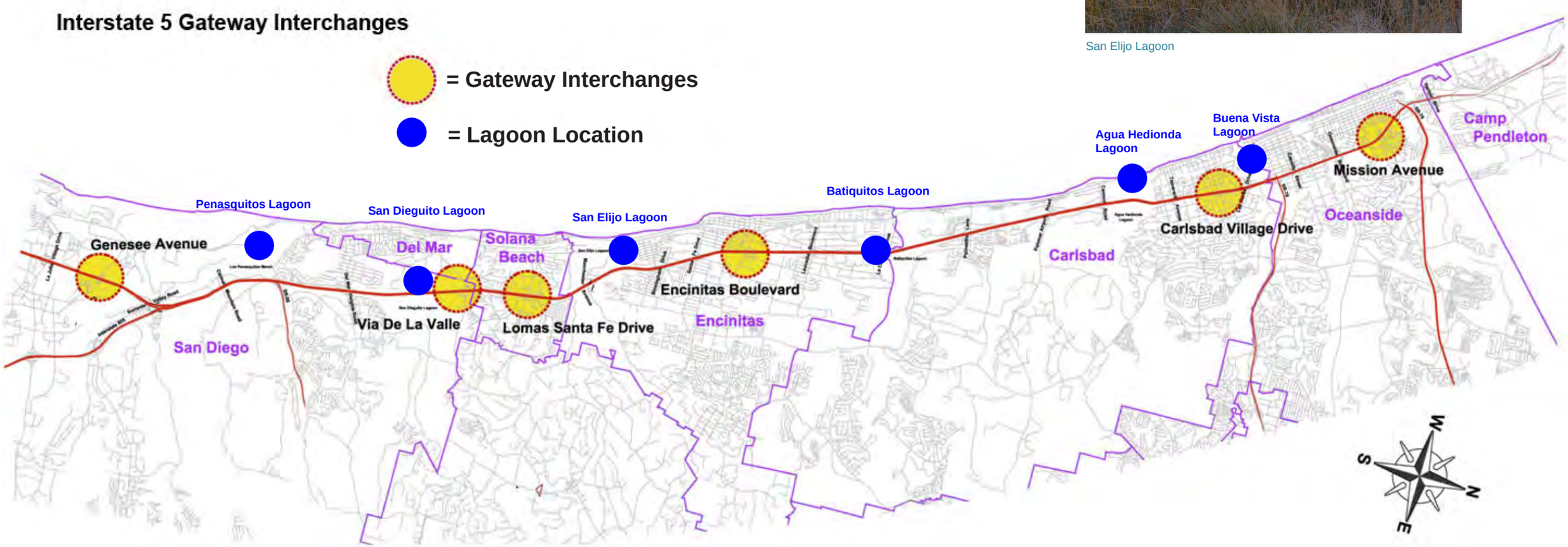
These interchanges provide major access to town centers/historic villages that characterize the specific communities. The Gateways are located at:

- Genesee Avenue
- Via De La Valle
- Lomas Santa Fe Drive
- Encinitas Boulevard
- Carlsbad Village Drive
- Mission Avenue

Lagoon Bridge Crossings

Lagoons make this portion of I-5 unique. Nowhere else in southern California do freeway travelers experience this sequence of views. Because of this uniqueness, as well as the scenic quality of the views both on and off the freeway, the proposed lagoon bridges merit special treatment.

San Elijo Lagoon



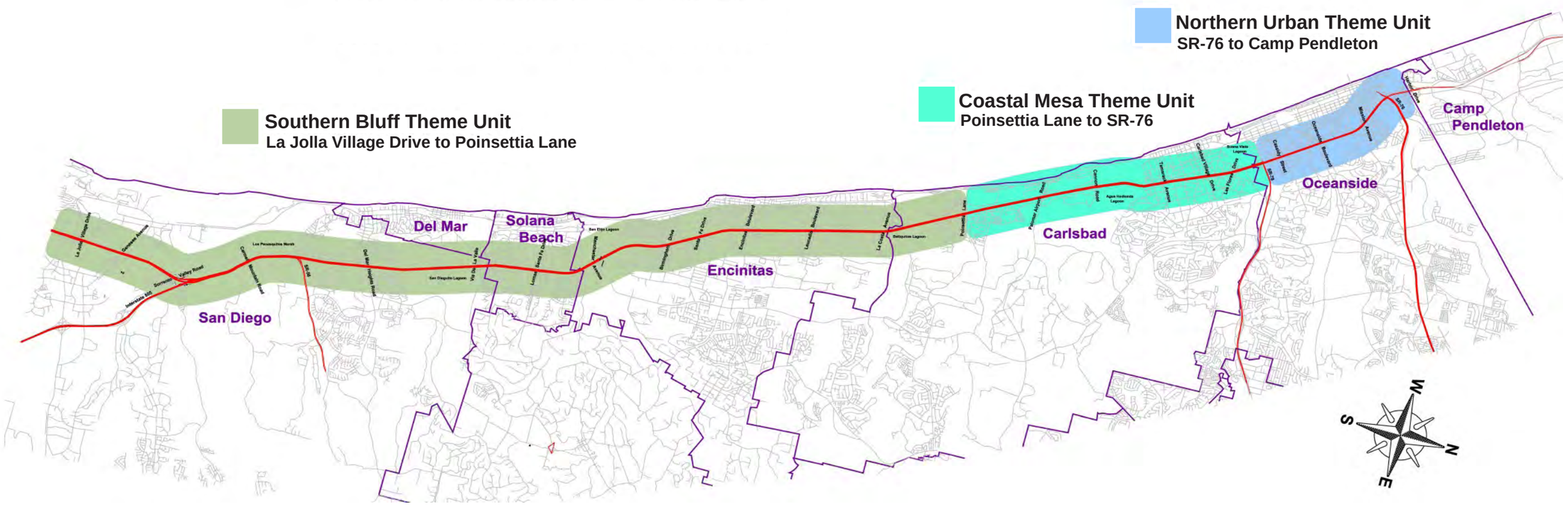
Corridor Theme Units

The I-5 North Coast Corridor possesses an overall natural, open, coastal character, but the perceptive traveler can sense subtle variations in those attributes. Residents that make their home along this portion of the coast are well aware of qualities that make their individual communities unique. For example, native landscapes in the south subtly morph to more cultivated and park-like natural forms to the north. As one travels south, the corridor begins with pleasing views of a modern resort marina and ends with the ancient beauty of Torrey Pines State Reserve. The result is a corridor that possesses an overall visual unity, but is far from being uniform. These guidelines seek to reflect this pleasant duality.

The entire corridor is divided into three basic Theme Units. The Theme Units designated by these guidelines bear no relationship to political boundaries such as city limits, but are determined by the visual character of the landscape. The following existing characteristics were used as determinants to establish the Theme Units.

- Natural landscape character (topography, bluffs, vegetation, color, etc.)
- Visual character of adjacent land uses (the degree of urban character)
- Proximity and nature of adjacent land uses

This designation does not imply that the character within the entire Theme Unit is entirely the same. There are sections within each Theme Unit that are unique and result in variations within each Unit. These variations contribute to the character of each unit, but are not as distinctive on their own. Each of the three Theme Units are shown in the graphic below.



Description of Theme Units

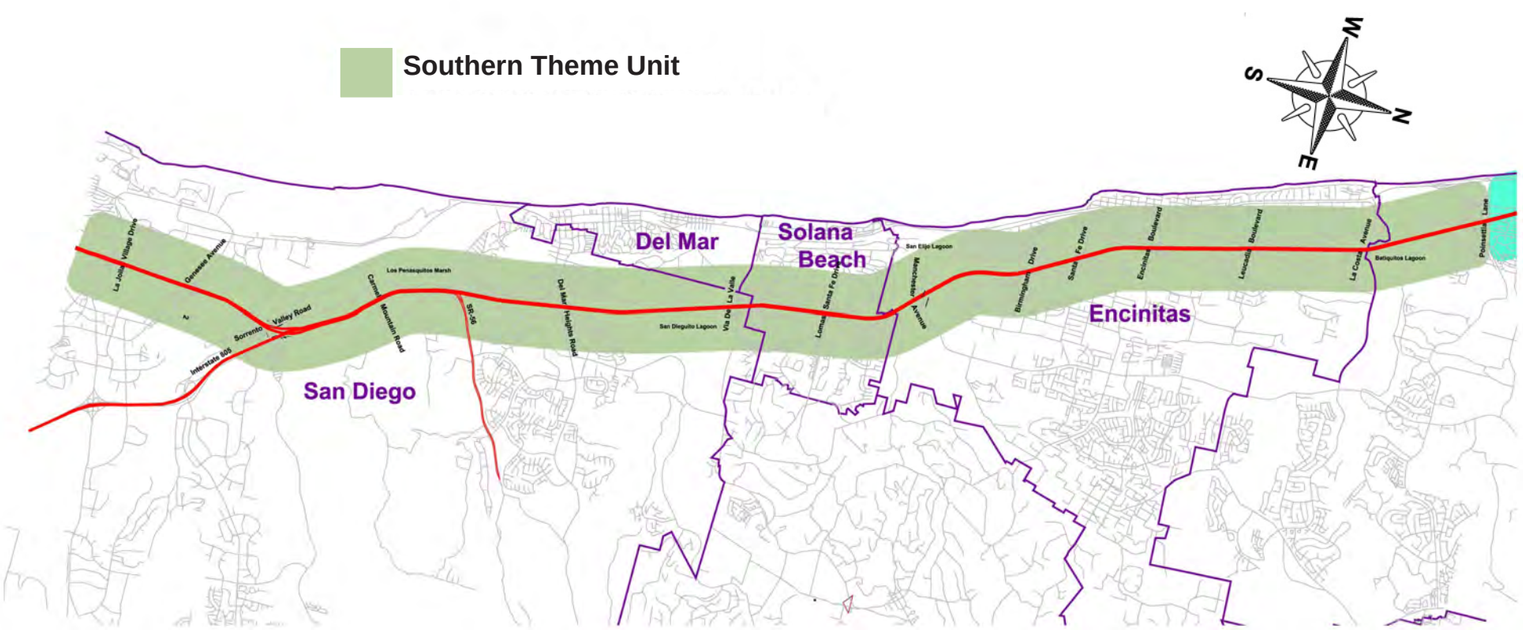
Southern Bluff Theme Unit - La Jolla Village Drive in La Jolla to Poinsettia Lane in Carlsbad

This portion of the corridor is best characterized by coastal bluffs of Torrey sandstone that buttress the coast as well as river valley slopes farther inland. The design of corridor retaining walls is meant to recall these iconic forms. The weathered, eroded quality of bluffs will be reflected in architecture pilasters, rough surface textures, integral earth tones, and weathered steel ancillary materials. This earthen theme will be carried through the bridges and sound walls as well. Bridges will utilize the integral earth tones in the cast-in-place concrete structures with accents of the textures that characterize the corridor retaining walls throughout this section. Steel railing elements will be comprised of weathered steel and fine mesh materials will help to emphasize transparency and highlight the connection to the sky.

Torrey Pines State Reserve

Encinitas Cantebria Gardens Trail

San Elijo Hills



Southern Bluff Theme Unit

Coastal Mesa Theme Unit - Poinsettia Lane in Carlsbad to State Route 78 in Oceanside

North of Batiquitos Lagoon, upland topography shifts from rolling hill to expansive coastal mesa. Extensive commercial development and an older, tree lined, established urban village border the freeway on these flatlands. Between them, Agua Hediona lagoon and adjoining agricultural fields form a natural punctuation mark. Also punctuating the sky is the Encina power plant exhaust stack that has been an orienting feature for over fifty years. This vertical element combines with the coast highway, Carlsbad State Beach, and Carlsbad sea wall to form a visual signature of coastal Carlsbad.

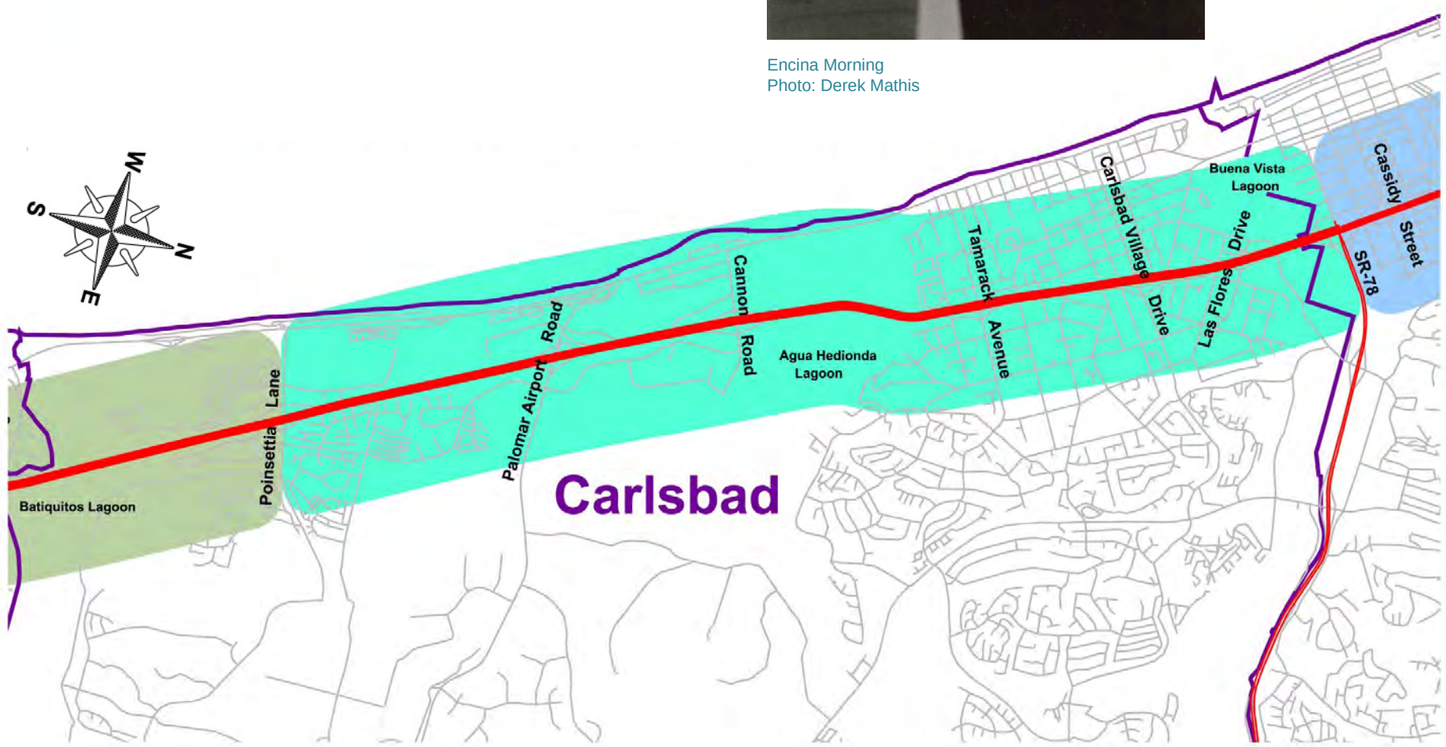
Design themes for this unit will be inspired by the areas natural coastal forms that harmonize with the rhythm of land and sea. In key locations, sound walls will use cast-in-place construction to enable an organic, free-form design vocabulary to be used. Bridge pedestrian screening will be composed of natural curved forms that harmonize with the rhythm of land and sea.

Encina Morning
Photo: Derek Mathis

Encina Creek Bridge

Example of flower in Carlsbad

Carlsbad Flower fields



Coastal Mesa Theme Unit

Northern Urban Theme Unit - State Route 78 to Vandegrift Boulevard in Oceanside

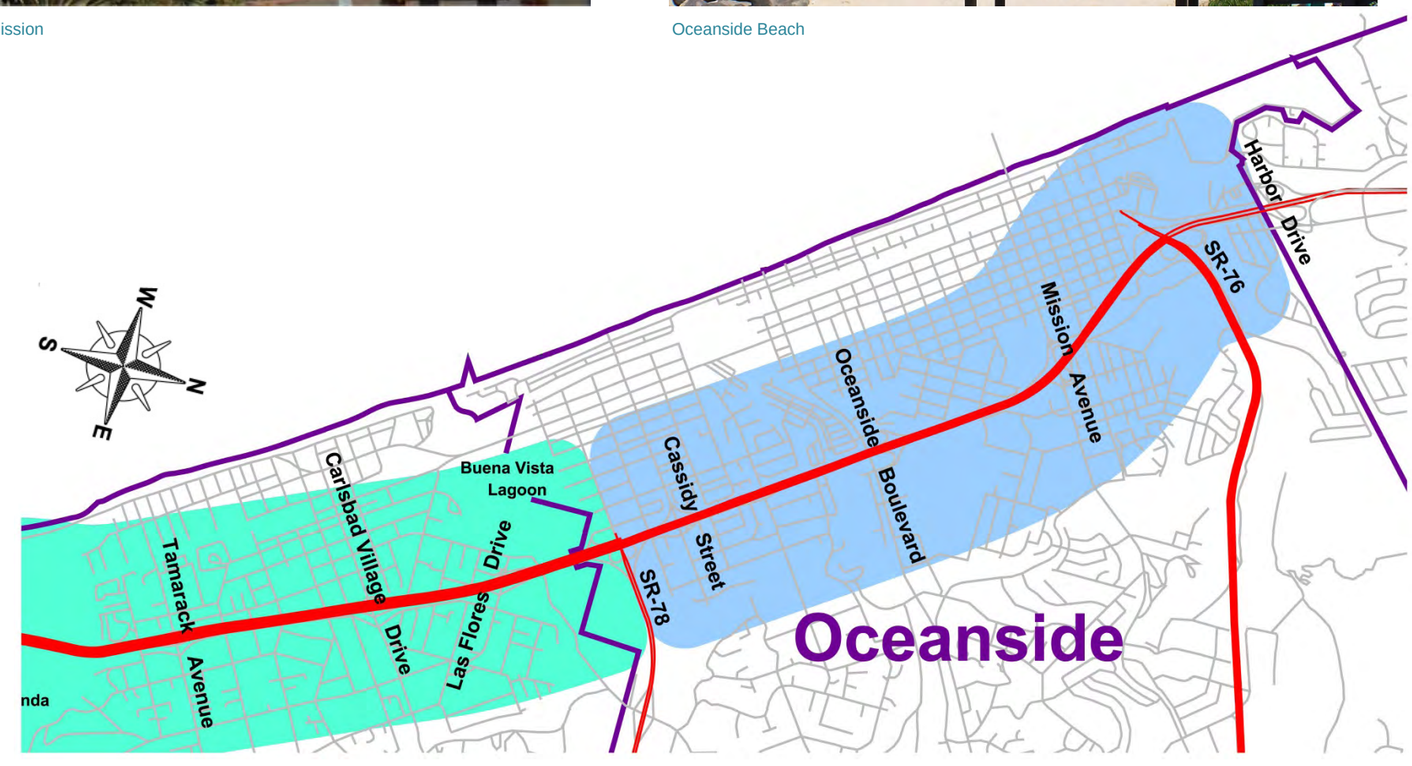
In this unit, coastal bluffs recede, and broad sand beaches lined with development are characteristic. In general, a more urban quality appears both on the coast and along the freeway corridor. The Strand, the Oceanside Pier, and Oceanside Harbor establish coastal character. This unit also is home to the most significant architecture in the corridor. Mission San Luis Rey inspired the works of Irving Gill, which in turn inspired Charles Moore's Oceanside Civic Center. All combine to form a rich architectural heritage and historical continuity.

Freeway architecture will exhibit more tectonic forms than other units of the corridor consistent with the immediate context. Rectilinear forms, smoother surfaces, lighter colors, and refined ancillary materials such as ceramic tile and galvanized steel will distinguish this unit from the others.

San Luis Rey Mission

Oceanside Beach

Oceanside City Hall



Northern Urban Theme Unit

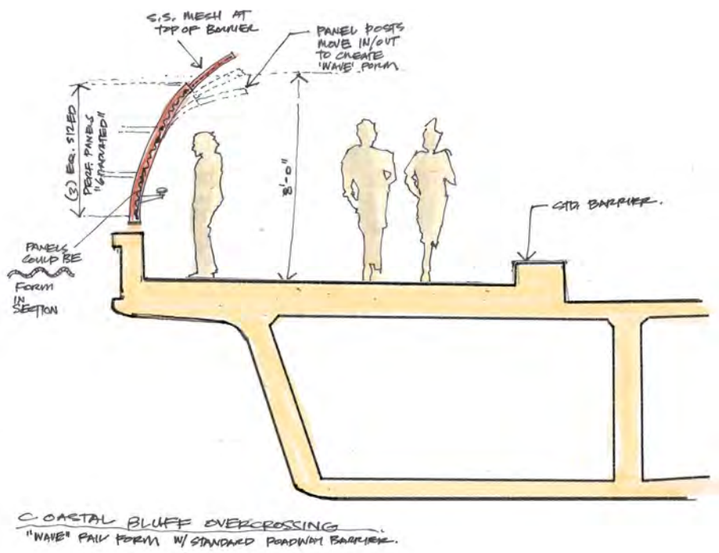
Design Guidelines
Interstate 5 North Coast Corridor Project

Design Concepts

III. Design Concepts

The major design features that will visually define the corridor include retaining walls, sound walls, bridges and landscaping. This is particularly true from the realm of the freeway traveler. Just as critical will be the view from the pedestrian realm. The elements that define this pedestrian realm include sidewalks, bollards, street furniture and other typical streetscape features. Each major design feature will be discussed with design concepts recommended in the form of sketches, renderings and associated text.

The design concepts were carefully developed to respond to the surrounding physical environment of the corridor. For example, the lagoons are such a special and unique feature within the corridor that future bridges crossing the lagoons are designed to respect and enhance the characteristics of each lagoon. As seen in the rendering for the lagoon bridge, the immediate views of the lagoon as well as the distant views of the ocean can be honored and enhanced by a well designed bridge.



An example of pedestrian realm recommendations

Similarly, each of the other major elements such as retaining walls and sound walls were designed to respect the environment that the corridor sits within.

A lagoon bridge rendering

In addition to the visual character and function from and for the freeway, the proposed freeway improvements need to respond to adjacent community and pedestrian needs. Renderings and sketches are used in this document to help illustrate the importance of the pedestrian experience.

A freeway overcrossing rendering (Coastal Mesa Theme)

The use of an * within this section indicates that the highlighted feature is an enhanced item, not a standard. Some design elements that are indicated are standard while the enhnaced items are optional if the associated city wishes to maintain the item.

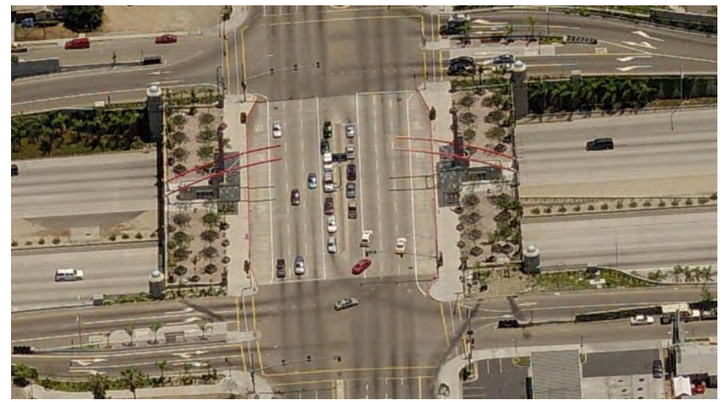
A. Bridges

General Bridge Design Issues

Throughout history, bridges have provided connectivity between people and places. They have the potential to define cities, such as the Golden Gate Bridge has done in San Francisco. Highway bridges have long had the ability to create memorable driving experiences and create visual landmarks for the freeway traveler.

The West Lilac Road Bridge over Interstate 15

In addition, where the construction of freeway bridges has divided communities, a good bridge design can help heal those separate connections. As seen to the right, an excellent example of a bridge helping to reconnect a neighborhood is the El Cajon Boulevard bridge overcrossing at SR-15 in San Diego.



A simple widening of a bridge can help to reconnect neighborhoods

Most bridges within the I-5 corridor will need to be reconstructed due to the expanded width of the freeway. After the visual dominance of the walls within the corridor, the aesthetic appearance of the bridges will be the next most memorable feature as one travels the I-5 corridor. As such, the proposed bridges have been evaluated using the following factors:

- Type (overcrossing, undercrossing, lagoon, etc)
- Location along the corridor (significance/gateway)
- Shape (box, haunched box, other)

The I-5 Corridor has three basic bridge types that are described in these design guidelines:

- Lagoon bridges (high clearance and shallow clearance)
- Gateway bridges
- Non-gateway bridges

The lagoon type bridges include those listed in the chart below. All lagoon bridges to be replaced will see a reduction in the frequency of columns. Reducing columns and obstructions in the lagoons is a goal, however the extent of this may be limited due to freeboard requirements. In the case of San Dieguito, opportunities to enhance the widening will be studied.

	Clearance				
Lagoon Bridge	**High**	**Shallow**	**Pedestrian Facility**	**Replaced**	**Widened**
San Dieguito Lagoon		●	●		●
San Elijo Lagoon	●		●	●	
Batiquitos Lagoon		●	●	●	
Agua Hedionda Lagoon		●	●	●	
Buena Vista Lagoon		●		●	

View of lagoon bridge at lagoon

Lagoon Bridges – High Clearance

Haunched Box Bridge

These bridges and crossings interface with the environmentally sensitive lands and thus should be designed in a way that elevates and enhances these areas. The use of a haunched box construction with an arch like aesthetic feature on the exterior of the superstructure and a tapered column shape is illustrated. These features are intended to promote a solution that allows the structure to simulate the effect of an arch by touching on the waters and land while at the same time satisfying clearance requirements over city streets and trails. Special attention to the use of concrete with integral colors that take cues from the surroundings should enhance the view of the structure from within the lagoon/valley.

The San Elijo Lagoon Bridge at Manchester Avenue was chosen as the example bridge by which all lagoon bridges should be built.

The Experience

In these landscape section transitions, the lagoon bridges are viewed from the surrounding communities, trails and from within the wetland itself. It is important that these structures are as visually unobtrusive as possible. The notion of an exposed arch structure is presented here to reinforce a transparency and fluidity over the water. The structures should feel as if they are floating about lagoons. From the corridor, these bridges and the infrastructure should dematerialize in a way as to emphasize the open character and views to the lagoon valleys as much as possible.

The Opportunities

These crossings lend themselves to having long spans. It is recommended that the structural system emphasize this long span nature to provide light, air, and views that penetrate the area below the bridge. In order to emphasize the openness and light below the bridge, the bridge type should allow for a gap in the roadway construction wherever possible. This bridge type could be implemented in each of the lagoon sections for consistency. The design and construction of this haunched box structural system is widely accepted for long span standard bridges while maintaining uniqueness in form and aesthetics. Careful study of the site-specific colors, materials, landscape and texture is required. These cues from nature should inform the designer of these structures in selecting material and finishes for the structure.

View of lagoon bridge looking south-west

View of lagoon bridge looking south-east

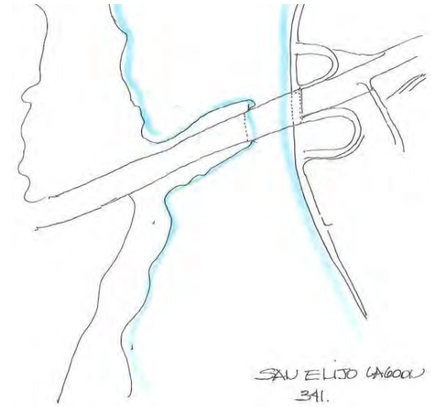


Diagram plans of lagoon crossings

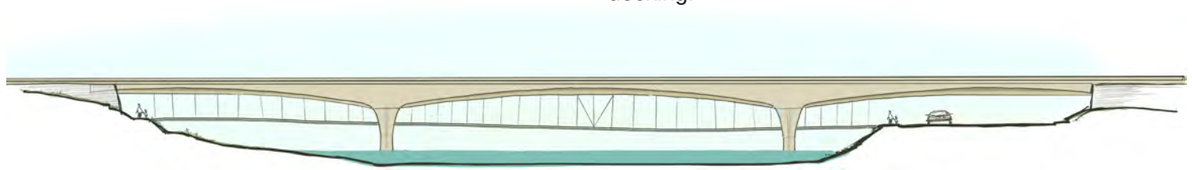
View of lagoon bridges at lagoon edge

Lagoon Bridge – High Clearance with Pedestrian Crossing

These lagoon crossings also provide unique opportunities to enhance connectivity for trail users, nature lovers, hikers, runners, equestrians, and wildlife. Two types of lagoon crossings have been identified: low crossings and high crossings. Each of these crossing types requires a slightly different approach to how the inter-connectivity of the trails can be implemented. Each type is illustrated to show how these crossings can be achieved in a careful manner that enriches the experience for the users.

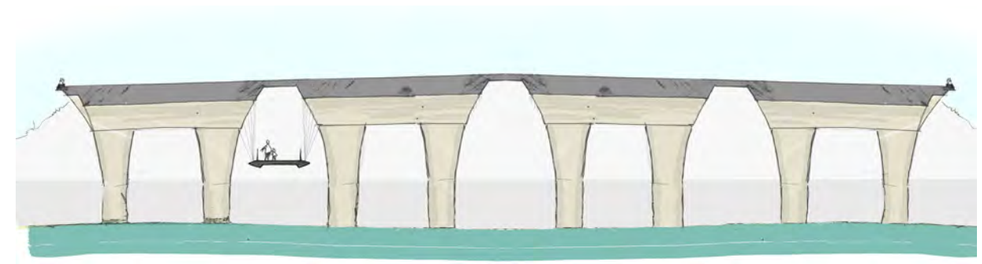
At the lagoon crossings, pedestrian connections will be constructed and accommodated below the bridge structure. One way that this structure may be attached to the bridge superstructure is by suspending the pedestrian bridge from the roadway haunched box bridges. As indicated in the views on this page, this could be achieved by allowing the pedestrian bridge to occupy the space between the tapered box sections – this affords more volume above the pedestrian bridge and gives those users a richer experience.

The notion of a simple hanging structure that sits lightly above the water contrasts with the heavier concrete arch forms and emphasizes its lighter pedestrian function. The materials of the pedestrian bridge form should also contrast with the concrete bridge form with warmer, more natural finishes of weathered steel, light stainless steel mesh, and wood decking.

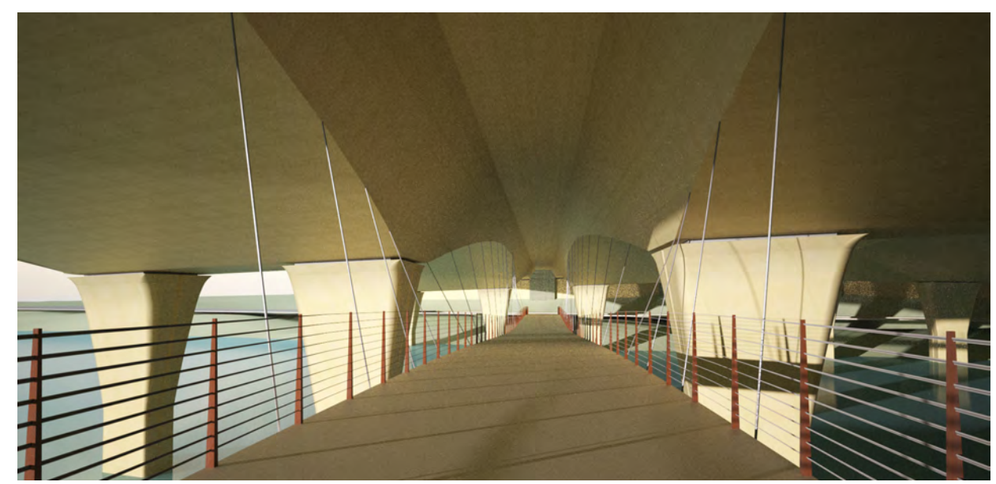


Possible pedestrian crossing across lagoon

Pedestrian bridge suspended from main structure



Pedestrian bridge under main bridge deck



View from pedestrian bridge suspended from main structure looking north

* Non-structural elements of pedestrian crossings would be maintained by a local agency.

View of the pedestrian walkway adjacent to the lagoon bridge.

Lagoon Bridge – Shallow Clearance

Tapered Box

The shallow lagoon bridges require a special design approach that still allows pedestrian users to cross from east to west and south to north and maximizes the use of the volumes under the bridge to create a space that does not feel cave-like. The Batiquitos Lagoon crossing is an example for the low lagoon bridge type. A tapered box bridge that begins its springings above the 100-year flood line is envisioned. The use of the tapered section adds needed height and articulation to the underneath portion of the bridge, enhancing the user experience from below.

The Experience

As with the haunched box girder lagoon bridge options that have higher clearances, these bridges are viewed from the surrounding communities, trails and from within the wetland itself. The structures should attempt to allow light and air to filter underneath the bridges. In addition, the structures should evoke the colors of the landforms, surrounding nature and feel like inviting places to cross beneath. Given the low profile and clearances of these bridges, this is a particular challenge.

The Opportunities

The structural solution for these crossings should attempt to minimize the number of times the water is interrupted by columns. Following is an example of a tapered box that has planar sloped soffits that create interest from below as well as allowing more air and light to penetrate underneath the crossings. The resulting geometry of the underneath side of the roadway will be appreciated by the users of the trail system. In addition, the roadway above has been separated to allow a band of light to break the otherwise dark recess. The use of integral colored concrete that recalls the natural bluff colors is used on the superstructure to further reinforce the bridges' connection to the place. Where the bridge touches the water, the columns have been stained to symbolize the mud that they rise from.

Shallow Lagoon Bridges with Pedestrian Crossings

Several lagoon bridges are low slung and the cars pass above the lagoon's very shallow clearances. Due to these shallow clearances, accommodations for pedestrian trail users will need special consideration. As illustrated here, the concept for the Batiquitos Lagoon crossing indicates how the pedestrian trail should attach parallel to the bridge structure on the west side. Sloped walkways are utilized to raise the pedestrian path above the waterway. Care has been taken to allow the pedestrian walking path adjacent to the highway to be lower than the roadway to provide greater separation between the pedestrians and the vehicles. In addition, the pedestrian path has been constructed out of lighter and more human-scale materials in order to accentuate a clear hierarchy between that of the roadway and that of the trail. The pathway could be supported by a series of cantilevered steel beams that support either hardwood decking or a lightweight aluminum bar grating. The path rail system is appointed with a lightweight cable rail system that allows for maximum visibility to the surrounding nature preserve.

* Non-structural elements of pedestrian crossings would be maintained by a local agency.

Lagoon Bridge – Shallow Clearance Cont.

Elevation view of the lagoon bridge.

The form of the lagoon bridge with an adjacent pedestrian walkway.

* Non-structural elements of pedestrian crossings would be maintained by a local agency.

Gateway Undercrossings

Three freeway undercrossing locations have been identified as potential candidates for the incorporation of gateway interchanges. These locations are significant because they represent primary entries to the communities they serve. The three undercrossings are Via de la Valle, Encinitas Boulevard, and Carlsbad Village Drive.

It is vital that these crossings visually communicate their role as gateways to freeway drivers as well as those using local surface streets. On local surface streets, gateway crossings should provide both bicycle and pedestrian-friendly elements. The associated intersections should be visually prominent, while at the same time providing enhanced human-scale elements such as lighting and material textures. Shown here, these concepts illustrate how modifying the typical freeway bridge to create a three-span undercrossing with tapered grading up to bridge abutment seats can create a pedestrian friendly zone, and at the same time open up the undercrossing to allow for both natural light and views through the space.

There will be two options for landscape treatments. The standard option reflects current Caltrans landscape treatment elements. However, if a City agrees to provide maintenance, an enhanced landscape option is possible. Please refer to Section III. Design Concepts: Landscape, pages 64 and 65 for examples.

The significance of these entry points will be communicated to freeway drivers through the use of gateway features. The exhibit shown here illustrates the use a of a vertical tower element. However, specific guidelines for the final designs will be determined with input from Resource Agencies, City Staff and input from the Community.

Street view of a gateway undercrossing with vertical entry feature.

Freeway view of a gateway undercrossing.

* Monuments and other non-standard gateway features would be maintained by a local agency.

Gateway Undercrossings Cont.

At Gateway undercrossings, the color, texture, finishes and cross-sectional geometries of the crossings and associated retaining walls will remain consistent with the design guidelines set for the corresponding Theme Unit. In addition to the notion of creating a gateway feature, these interchange designs will incorporate pedestrian enhancements. These examples illustrate how the undercrossing will be opened up by the use of 2:1 slopes at abutments which will allow for more light and views through the structure. An arcade of columns that carry the bridge spans reinforce the pedestrian experience. Columns could be located between the traffic lanes and the sidewalk to further emphasize the separation of pedestrians from motorists. Materials, finishes, lighting, and the use of details throughout these pedestrian linkages should be enhanced throughout the Gateway locations.

Gateway undercrossing bridge deck section

View of gateway from approach with columns at front of sidewalk

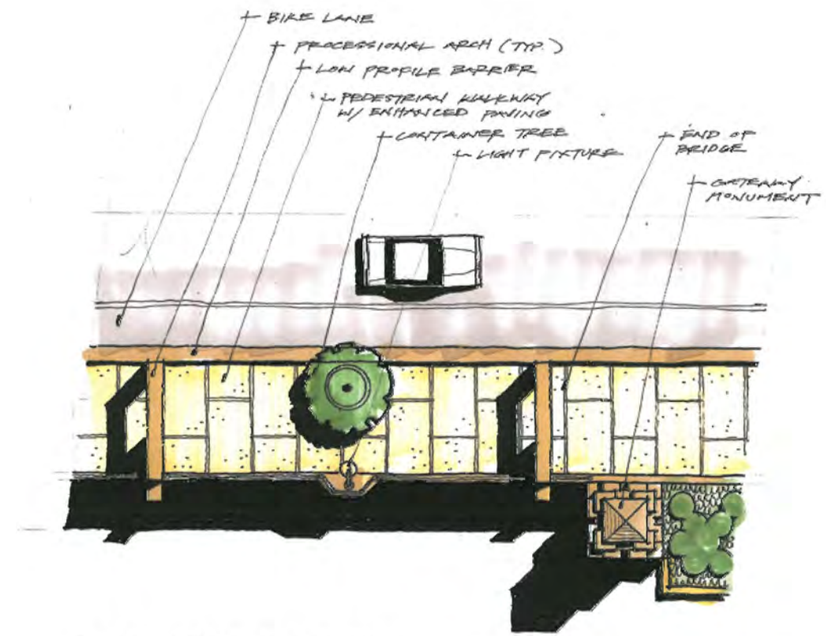
View of gateway from approach with columns at back of sidewalk

Gateway Overcrossing – Mission Avenue, Oceanside

The sole gateway overcrossing in the I-5 North Coast Corridor is located in Oceanside at the Mission Avenue interchange. Mission Avenue connects the freeway to Oceanside's historic town center. It also serves as a primary pedestrian route from nearby Oceanside High School to residential areas east of I-5. These factors shaped the design for the proposed reconstructed overcrossing. The first design objective is to reflect the character of Oceanside's rich architectural heritage through the use of context sensitive structural forms. Second, the design seeks to indicate to freeway viewers the importance of Mission Avenue as a gateway by incorporating monumental bridge pylons that serve as way-finding features and distinctive entry elements. Third, the importance of pedestrian circulation is celebrated by a tree lined archway that forms a processional promenade protected from vehicular traffic and containing visual enhancements that can be fully appreciated at a human scale and walking pace. These include colorful tile work, decorative walkway light fixtures, and artfully designed bridge fencing.

View of the monument's composition, including ceramic tiles, vertical formliner texture, and sandblasted concrete

The gateway overcrossing features a processional arch along the pedestrian path and is anchored by four monumental structures at the edges on each side



I-5 North Coast
Gateway Overcrossing Concept Plan

View of pedestrian crossing featuring the enhanced paving, tree planters and light fixtures enclosed between a decorative fence and low profile barrier adjacent to the roadside.

* Non-standard features located above bridge decks would require maintenance by a local agency

Perspective of overcrossing from Interstate

Typical Freeway Overcrossing Southern Bluff Theme

All Overcrossings in both the Southern Bluff and Coastal Mesa Theme areas will employ the use of a standardized box girder section with tapered faces and cantilevered perimeter edge conditions. This structural system and design response represents a typology that has been widely accepted by the engineering and construction communities as efficient and cost effective approaches to spanning freeway conditions.

Although these structures may use a familiar framework as a basis of design, the design guidelines describe how the bridges will be architecturally customized, reflecting the particular theme unit design intents. The bridge structure itself will utilize integrally colored concrete that will reflect the natural colors in the local coastal bluffs. Columns located at center-span employ a central arch motif that can be adapted depending on the width of the bridge deck being carried. For instance, at this location the arch is infilled with concrete, but at a wider overcrossing the arches may separate and allow for an actual opening between columns.

Shown here, the Southern Bluff overcrossings bring forth the textured wall cap details seen in the adjacent retaining wall design guidelines. The random tile pattern is used within the concrete band that runs the length of the bridge barrier rail. This band, known as an entablature in classical architecture, is recessed allowing the depth to emphasize this design element by allowing shade and shadow play across their uneven surfaces. In addition, these overcrossings utilize weathering steel as seen in adjacent wall tiles to create an outward leaning post and panel system to further strengthen the connection to the adjacent retaining wall design motifs.

View from center median

Aerial view of overcrossing

Southern Bluff bridge deck section

Perspective of overcrossing from Interstate

Typical Freeway Overcrossing Coastal Mesa Theme

As with the Southern Bluff, the Coastal Mesa Theme has a similar standardized box girder section with tapered faces and cantilevered perimeter edge conditions. This structural system and design response represents a typology that has been widely accepted by the engineering and construction communities as efficient and cost effective approaches to spanning freeway conditions.

The colors and design approach to the columns are the same as the Southern Bluff Theme.

The Coastal Mesa Theme overcrossings bring forth the arching/wave details seen in the adjacent retaining wall design guidelines. The arching/wave motif forms is used within the recessed concrete band that runs the length of the bridge barrier rail. Similar to the Southern Bluff Theme, a similar entablature element is created. This recessed pattern emphasizes the wave design element by allowing light and shadows to play across their uneven surfaces. The design theme continues in an inward facing wave form that creates the pedestrian fencing system. The fence material recalls the color of the weathering steel tiles seen in adjacent walls. See page 39 for additional details on proposed pedestrian fencing.

View from center median

Aerial view of overcrossing

Coastal Mesa bridge deck section

Perspective of overcrossing from Interstate

Typical Freeway Overcrossing Northern Urban Theme

Throughout the Northern Urban Theme unit, the bridge overcrossing structures shift from the bluff inspired colors and textures to the more urbanistic context. The structure and the architecture draws inspiration from the built environment as seen in the Mission San Luis Rey, City Hall, and other works.

A lighter/warm grey color is utilized to create a marked difference between the other bridge structures. In addition, the shapes of both the bridge box itself and the column supports are changed to a rectangular section which has been detailed with crisp edges that further reinforce the tectonic feel of the urban context. The railing and fencing system use a deep blue vertical picket and pedestrian scale lighting to form a unique edge condition over the freeway. The ends of these Northern Urban Theme units are anchored by a strong post design element that recalls some of the architecture seen in the Oceanside Civic Center.

Perspective from bridge approach

Aerial view of overcrossing

Northern Urban bridge deck section

Typical Freeway Undercrossings

At typical freeway undercrossings (at non-gateway locations), the color, texture, finishes and cross-sectional geometries of the crossings and associated retaining walls will remain consistent with the design guidelines set for the corresponding Theme Unit. The concepts shown illustrate both a two-span and a single-span condition. Preference should always favor the two-span option with tapered grading up to the bridge abutments as this variation allows for more light and visibility beneath the freeway. Constraints at each undercrossing location will influence the selection of the actual bridge type and number of spans. In locations where the right-of-way is limited or other factors necessitate an abbreviated crossing, the single-span option with vertical abutment walls may provide the only solution.

View of one-span undercrossing from approach

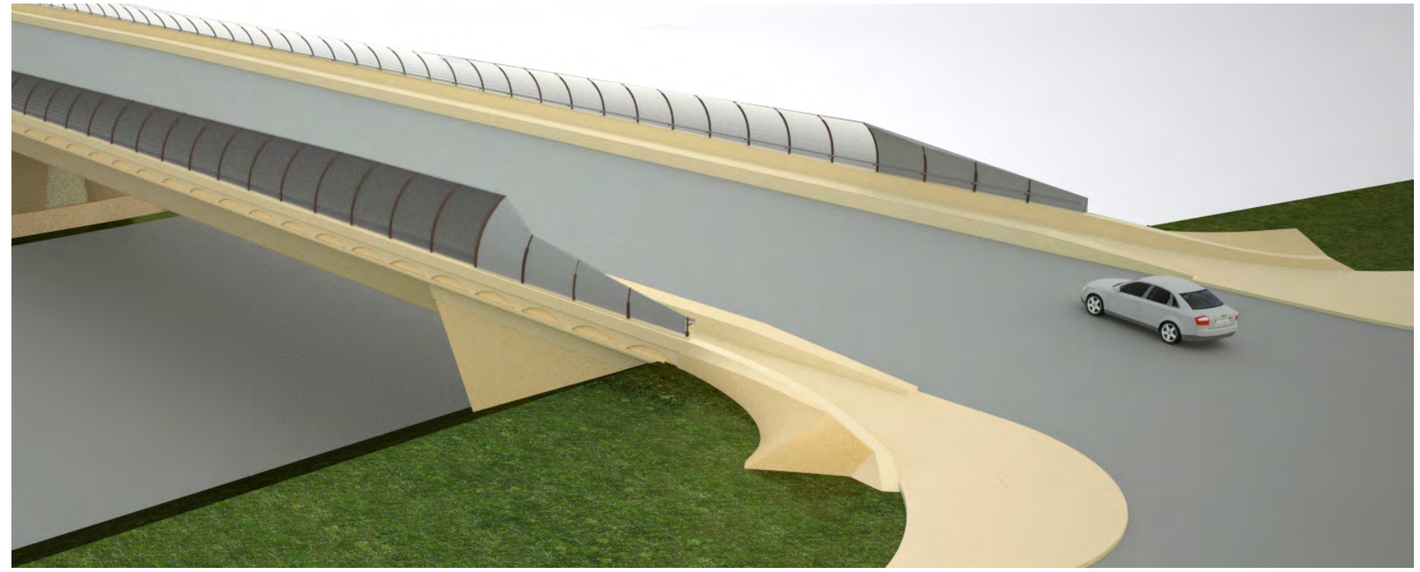
View of two-span undercrossing from approach

View of one-span undercrossing from approach

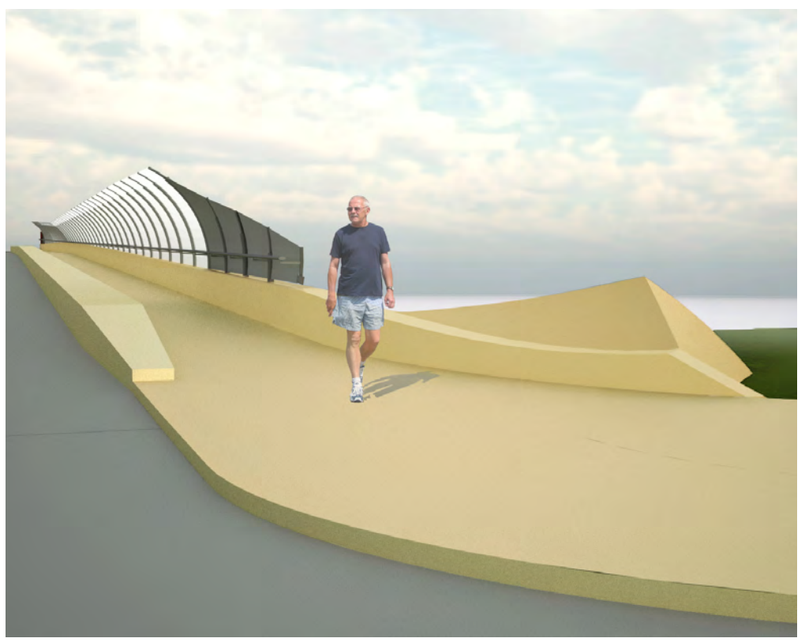
Typical Bridge Details

Typical Overcrossing Landings

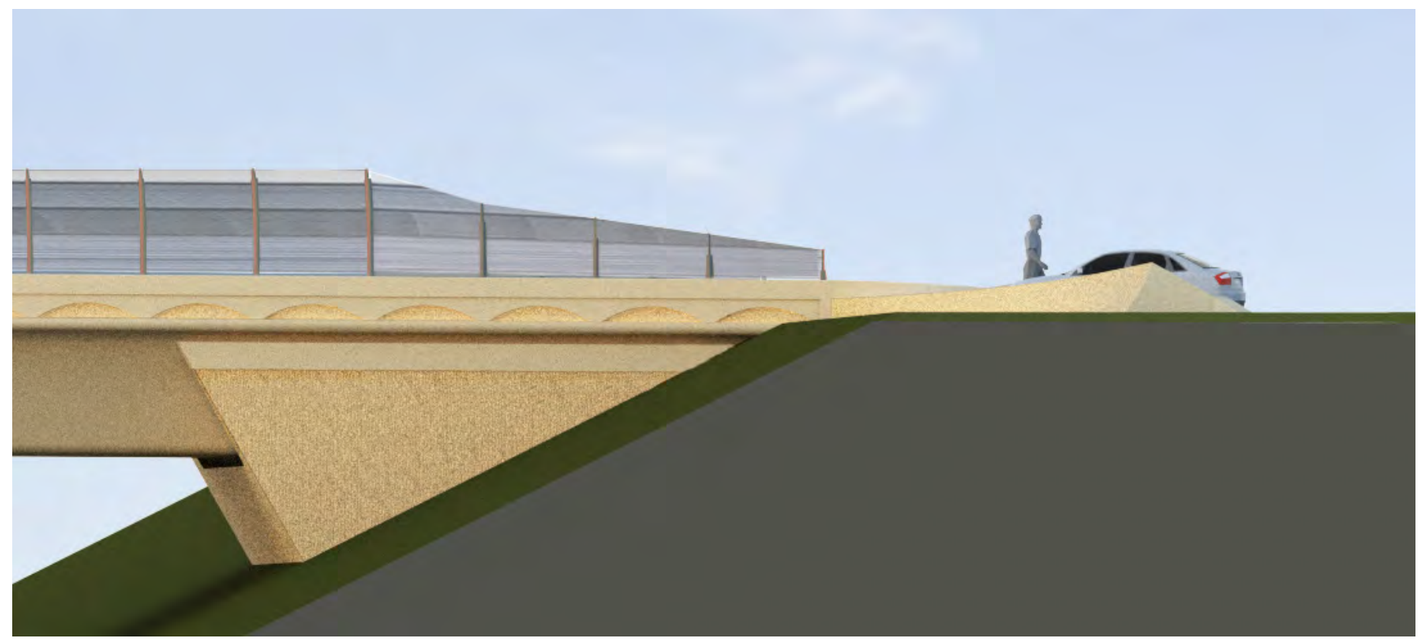
At every overcrossing, special attention must be paid to how the bridge form transitions to the neighborhood streets. Here, it is shown how the abutment type engages the slope and how the bridge barrier concrete can be varied to help anchor the bridge to the land as well as create a welcoming form for pedestrians. In addition, these areas are transitional zones where the barriers can begin to taper from the 8 foot height requirement down to a 42 inch pedestrian scale rail. This could be a location that the local jurisdiction could choose to enhance the bridge rail with artwork that expresses community character.



Aerial view of bridge landing treatment



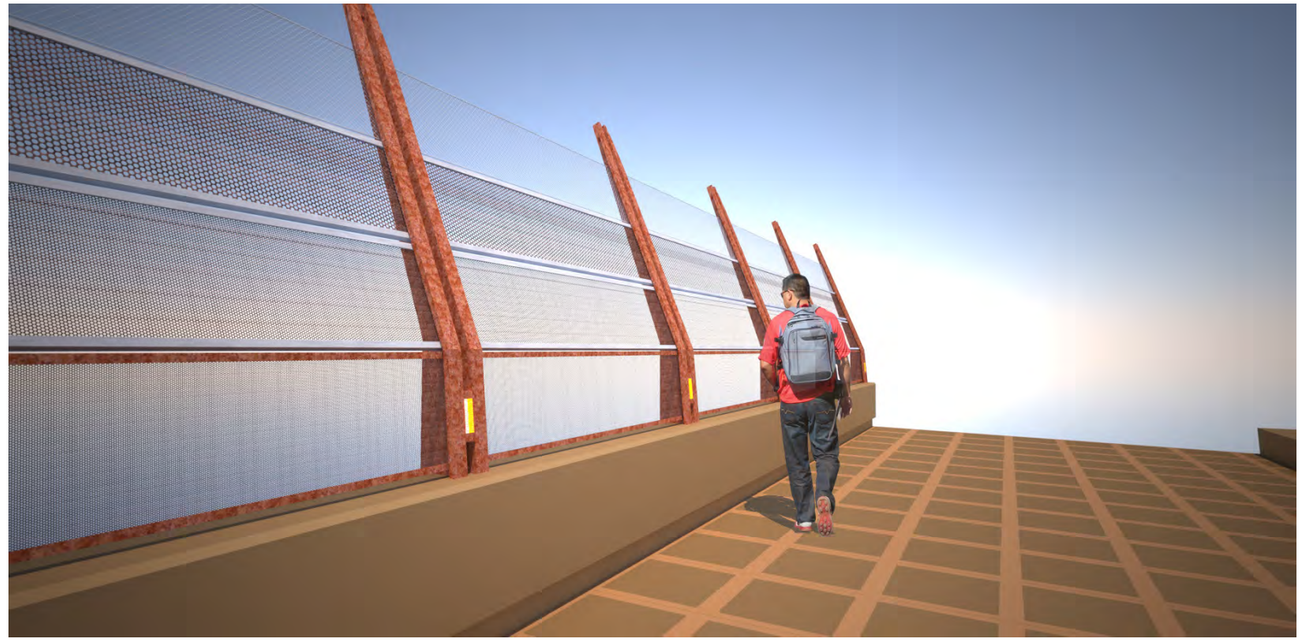
Enlarged view of bridge landing treatment showing pedestrian zone



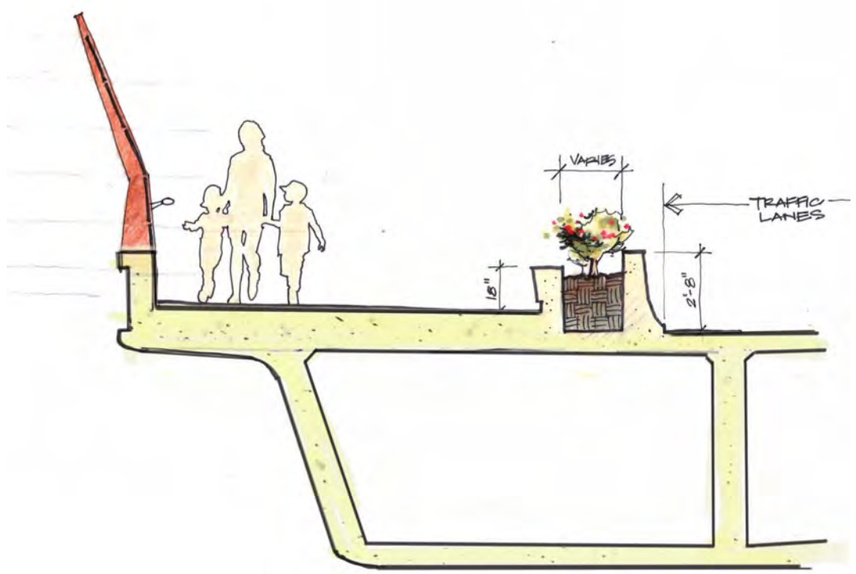
Elevation view of bridge landing treatment

Southern Bluff Overcrossing Details

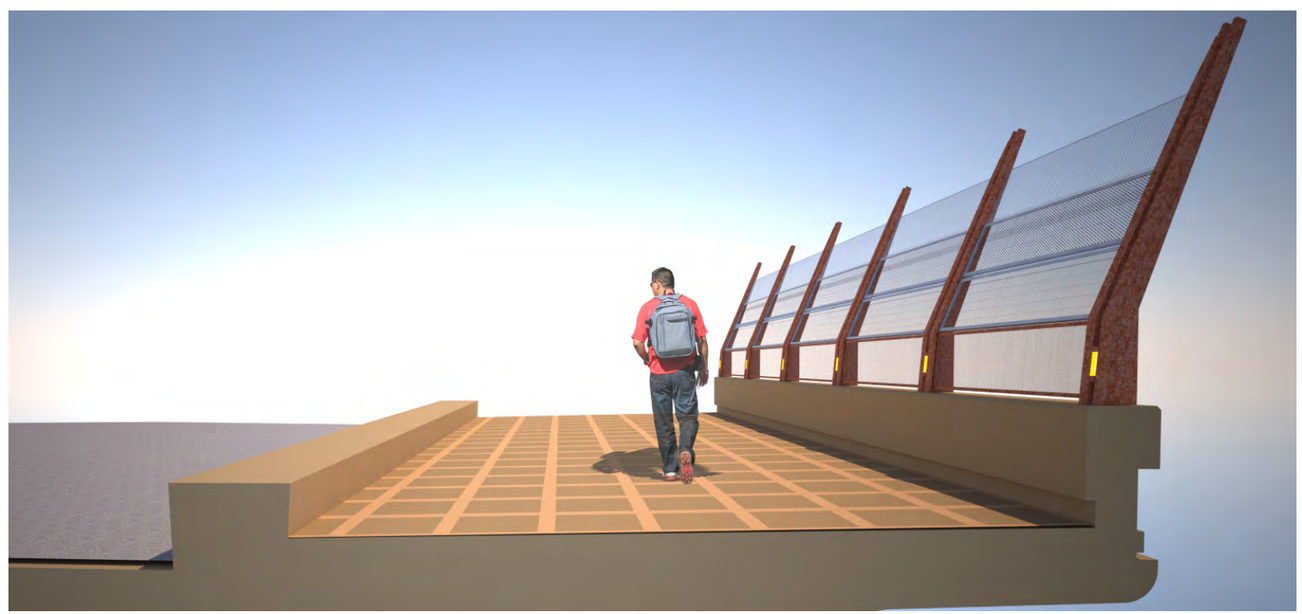
The Southern Bluff Bridge pedestrian barriers are intended to accentuate the local coastal bluffs. By angling outward, the bridge user gets a broader sense of openness to the sky and neighborhoods beyond. As these groups of bridges begin the transition toward the more urban sections, the forms of the double posts' vertical elements are more linear in nature. The barrier itself is intended to be made up of a series of four bands of translucent materials that vary in their degrees of opacity. The lowest portion of the rail is more opaque and as the bands ascend to the high point, the material becomes almost transparent (all while meeting the 1" minimum spacing for fence materials). The lower section is made of up a weathering steel perforated metal panel that spans between posts. The two middle panels are made of perforated steel panels in a silvery powder-coated finish with the upper perforated panel being more transparent than the lower. Finally, a stainless steel mesh that is highly transparent is utilized at the uppermost panel. The views shown here indicate an enhanced pedestrian section that incorporates a landscape buffer between the roadway and the pedestrian path. In addition, low cut-off lighting sandwiches between the double posts to create a soft and consistent glow on the path.



View of pedestrian walkway and angled barrier



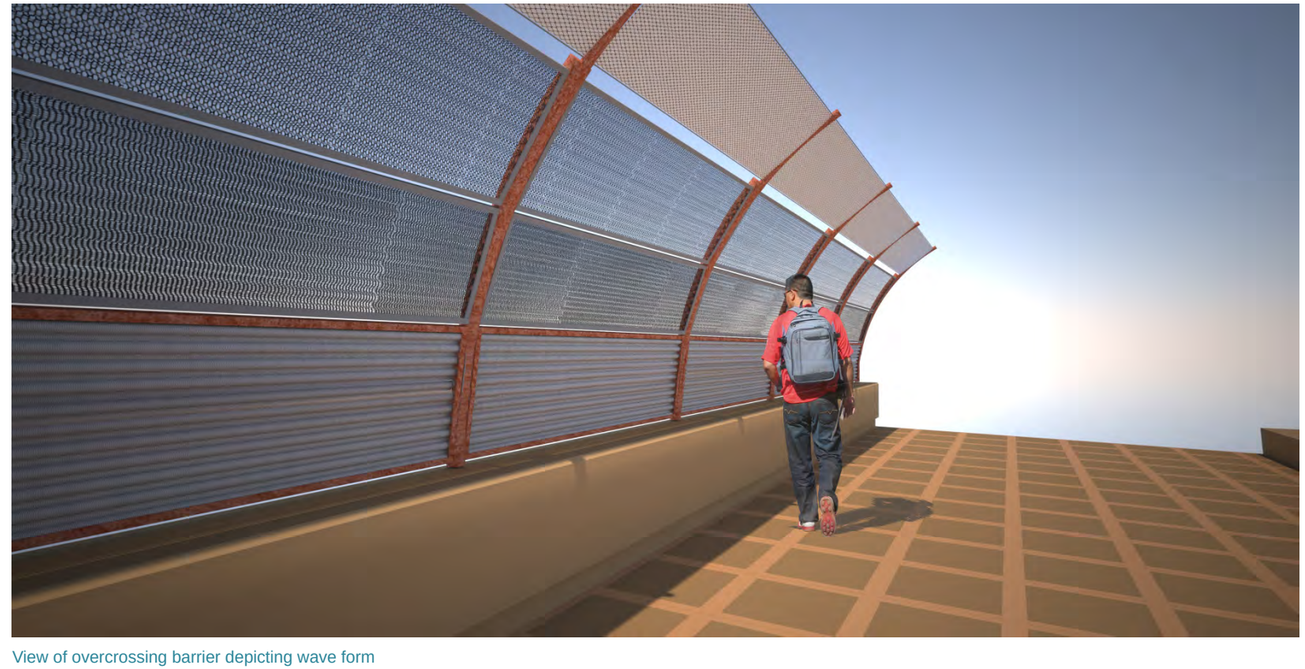
Conceptual sketch of overcrossing section



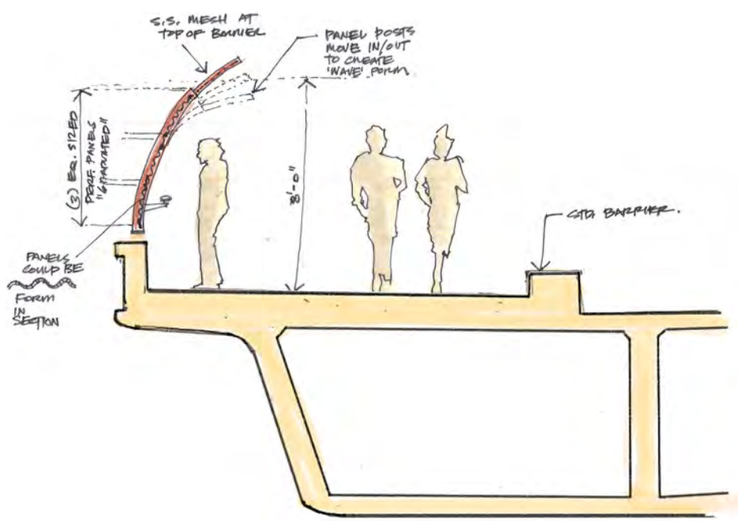
View of pedestrian walkway with adjacent road

Coastal Mesa Overcrossing Details

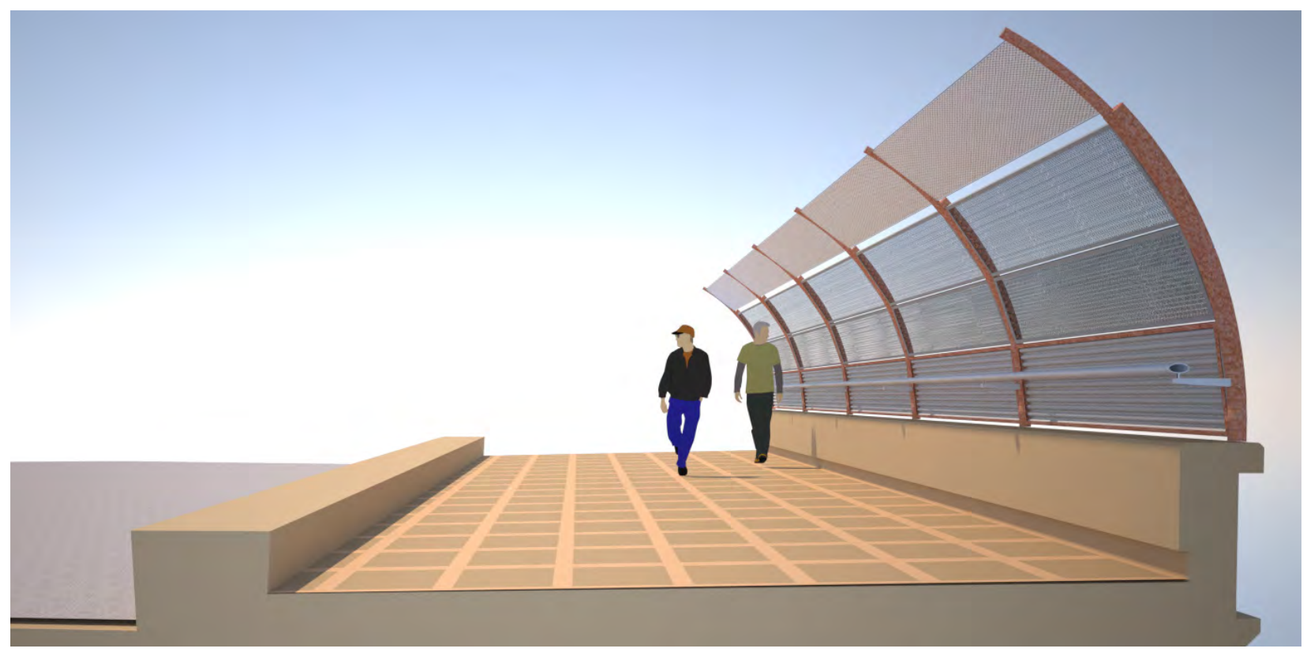
The Coastal Mesa Bridge pedestrian barriers are intended to evoke the curvature of a wave form. A series of weathering steel pipe sections are constructed with varying radii to further give the sense of movement to the bridge rail. Similar to the Southern Bluff Bridge, the same material selection of ascending graduated panels is used. This allows for some consistency of materials throughout the corridor while allowing the forms to provide variety. Pedestrian scale lighting is located just inside the low barrier that separates the vehicles from the pedestrian realm. The selection of the forms of the light fixture and pole accentuates the curvilinear wave form, therefore; the rounded form of the light fixture and curved light pole further defines the pedestrian realm.



View of overcrossing barrier depicting wave form



Conceptual sketch of overcrossing section

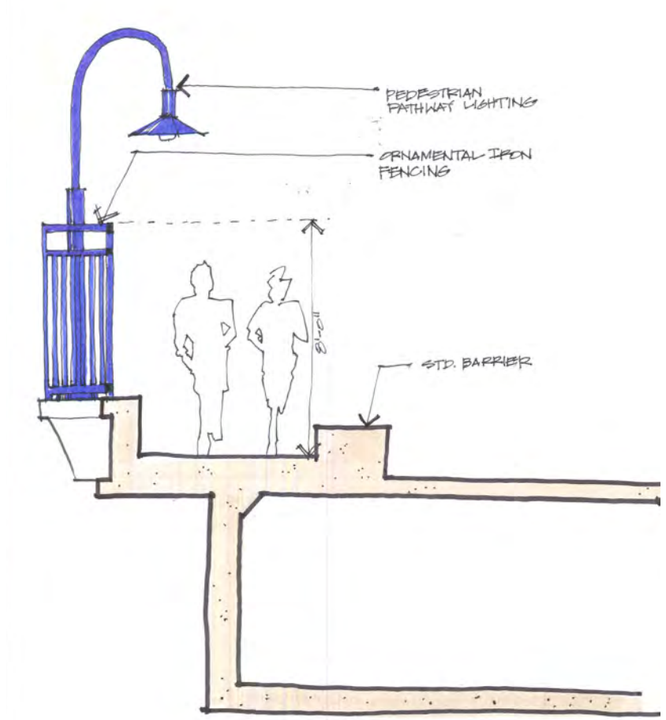


View of pedestrian walkway and curved barrier

Northern Urban Overcrossing Details

The Northern Urban Bridge pedestrian barriers draw their inspiration from the colors and texture of the urban context and in particular the Oceanside Civic Center and the Mission San Luis Rey. The pilasters at the ends of the bridge echo some of the same forms seen in those architectural examples. Bridge pedestrian rails are simple vertical ornamental iron pickets that are pre-finished in a vibrant blue finish that contrasts against the crisp light/warm grey cement that forms the bridge structure. Pedestrian scaled lighting has been incorporated into the bridge structure and utilizes the same blue finish as the railing material.

View of pedestrian walkway and barrier



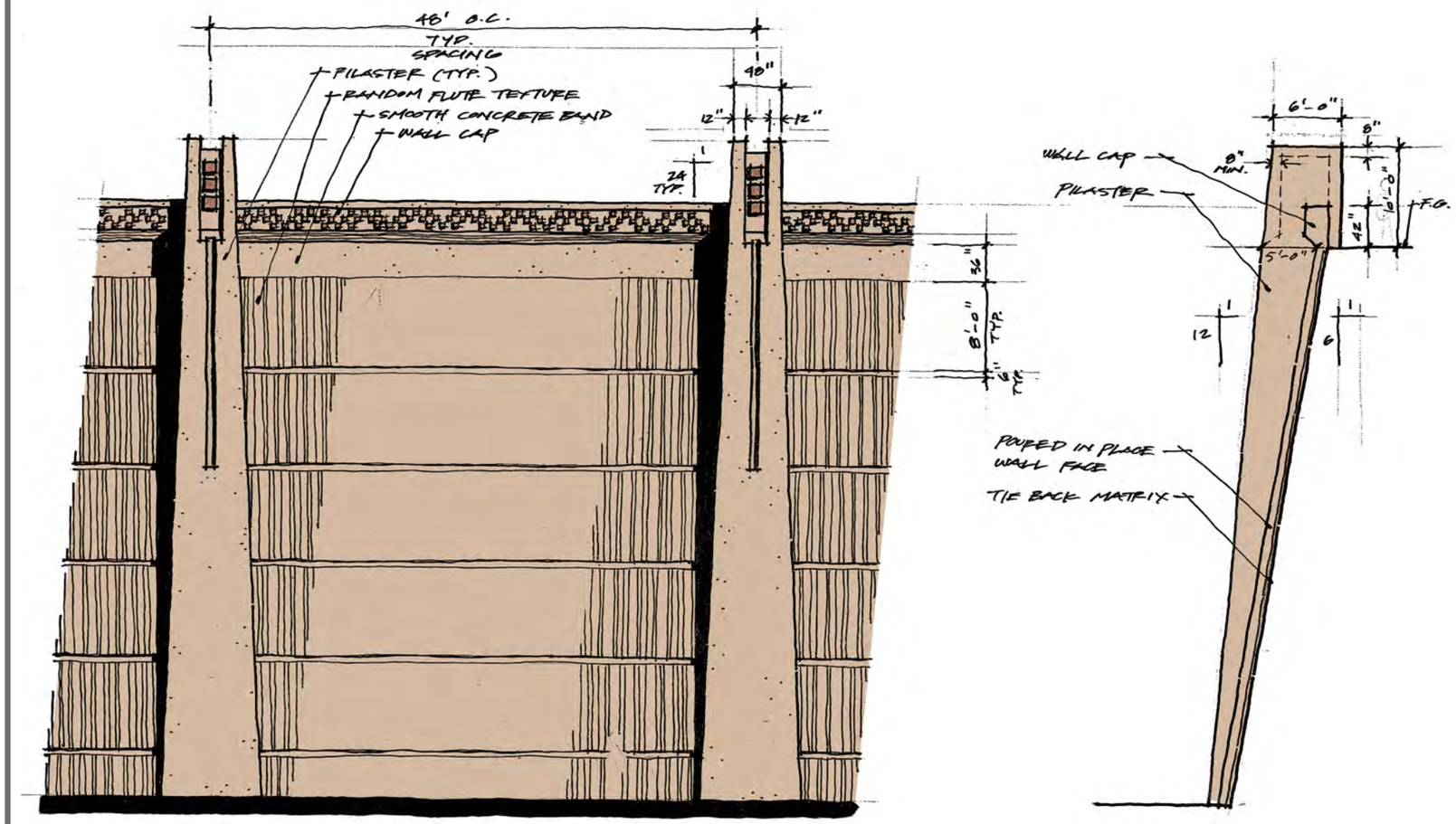
Conceptual sketch of overcrossing section

B. Walls

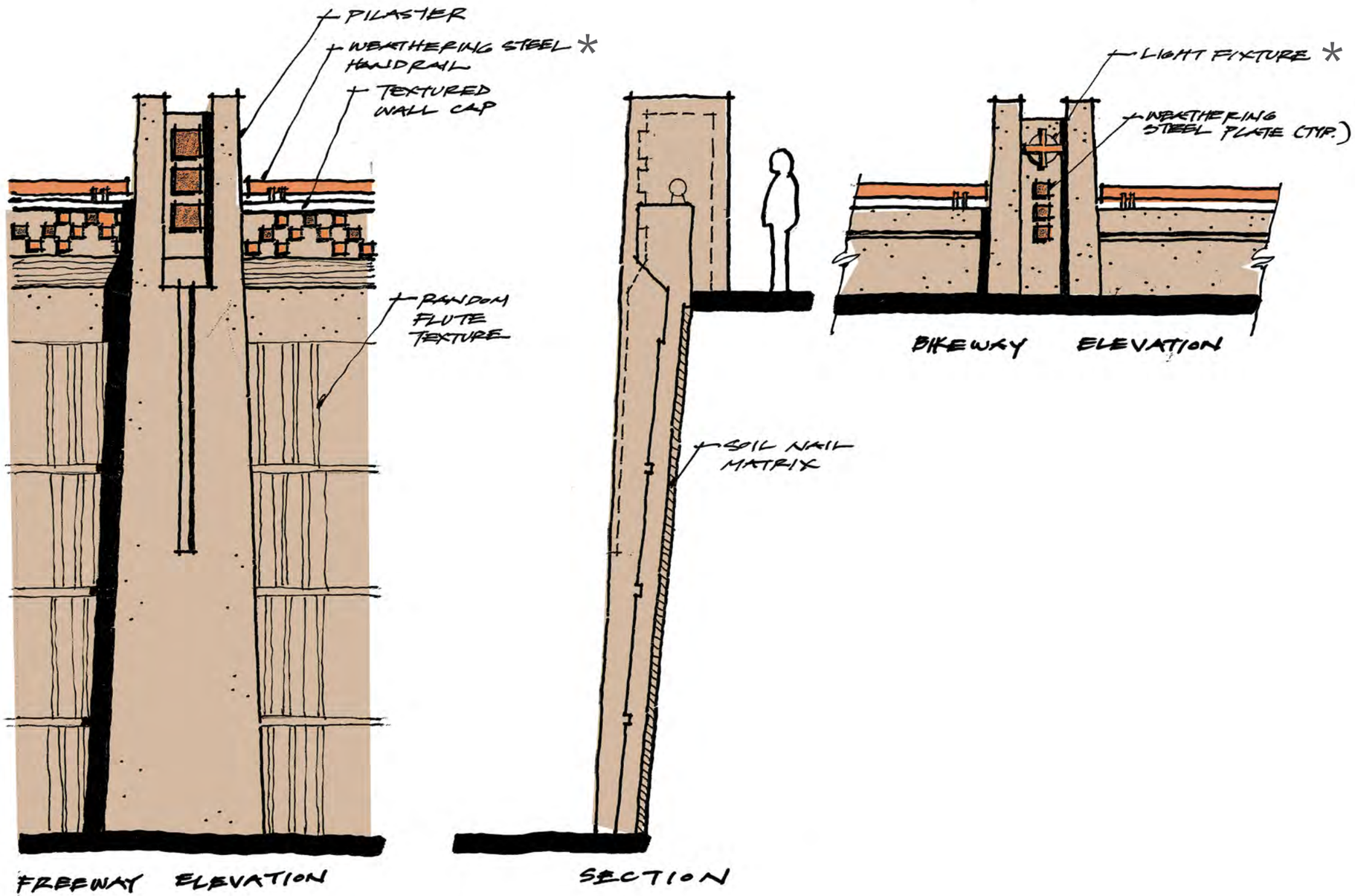
Theme Unit Specific Wall Concepts

This section describes concepts for both sound walls and retaining walls. There are 3 different types of wall characters throughout the corridor. A Southern Bluff theme, a Coastal Mesa theme and a Northern Urban theme. The design theme for the Southern Bluff Unit will build on the success of the existing Lomas Santa Fe Drive interchange. Wall surfaces will be designed to harmonize with the earth form theme of the corridor. The Carroll Canyon interchange improvements now under construction and the I-5/Genesee interchange now in design carry forward these themes, which are illustrated following.

The Lomas Santa Fe interchange retaining walls in Solana Beach



Southern Bluff Theme Unit
Scripps Retaining Wall Concept



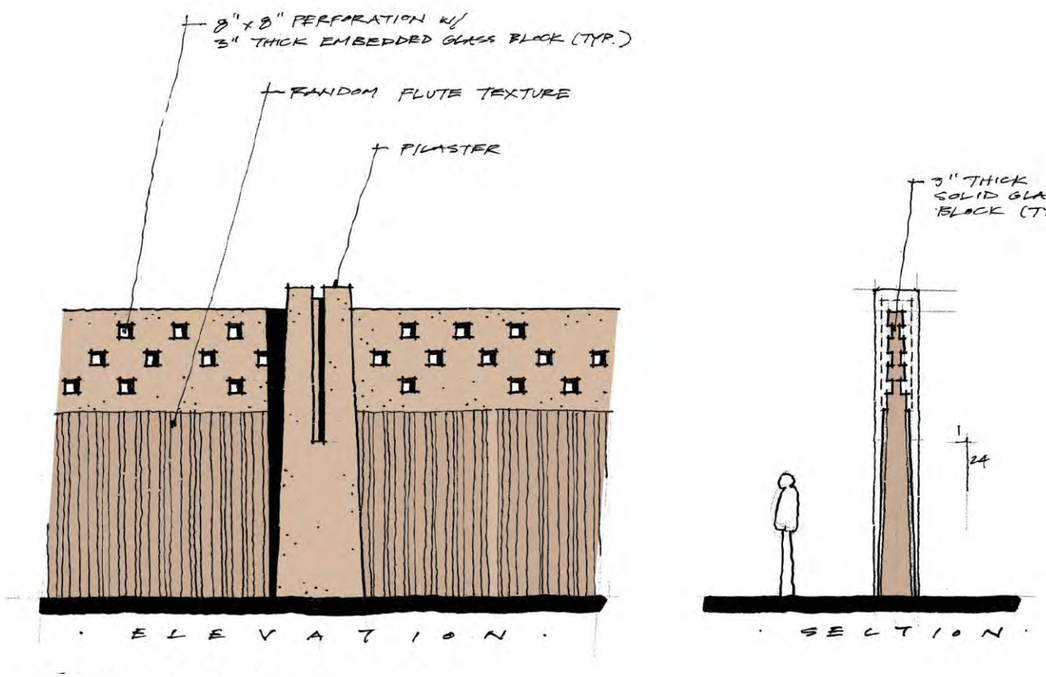
Southern Bluff Theme Unit
Lower Bike Path Retaining Wall Concept

* Enhanced feature, requires maintenance agreement from local cities.

Noise Walls on Caltrans Right-of-Way

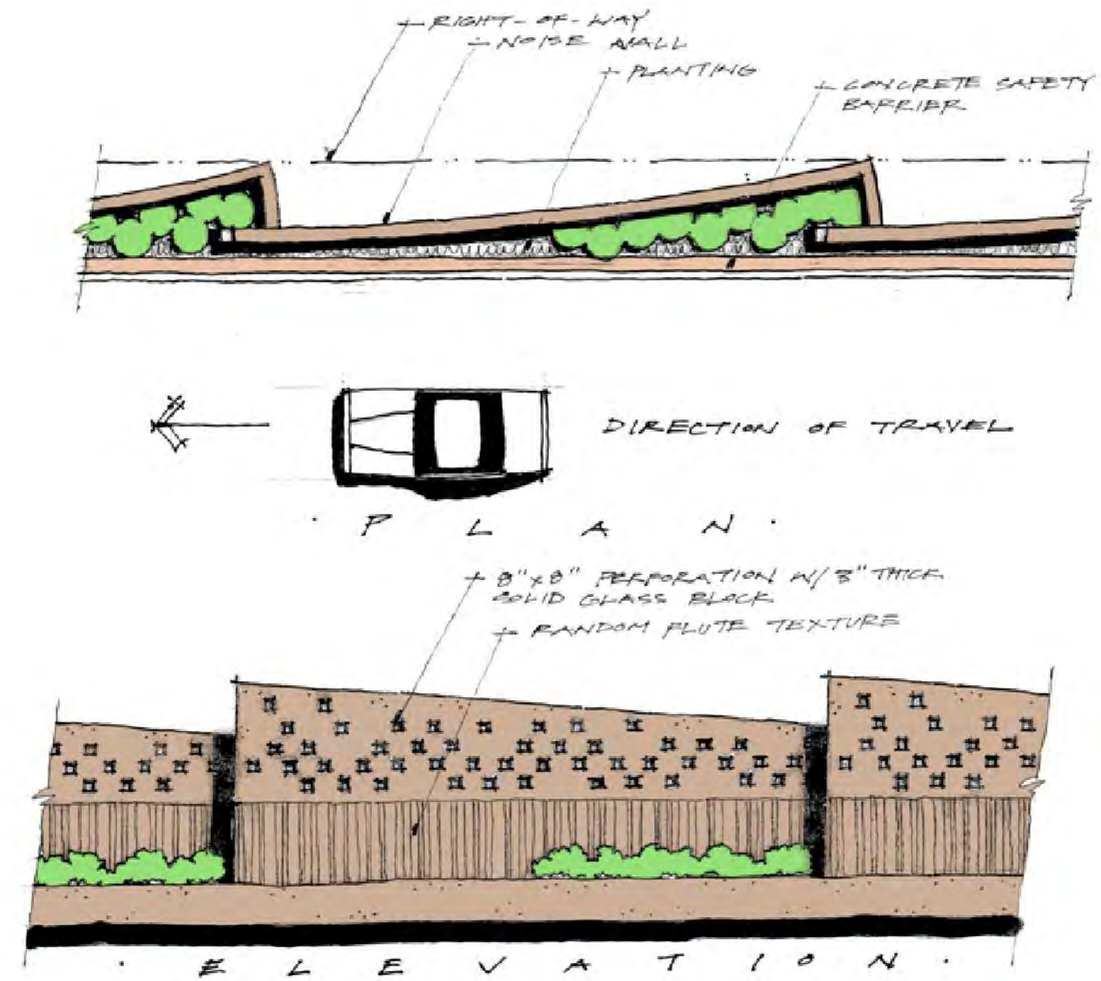
Wall designs for the Southern Theme Units seek to be compatible with the earthform appearance of retaining walls while adding a quality of transparency to further reduce the walls' apparent height.

For constrained right-of-way conditions, the following poured-in-place perforated soundwall can be used in the Southern Bluff Theme Unit.



Southern Bluff Theme Unit
Poured-in-Place Perforated Noise Wall

For other non-constrained right-of-way conditions, the following articulated poured-in-place perforated soundwall can be used in the Southern Theme Unit.

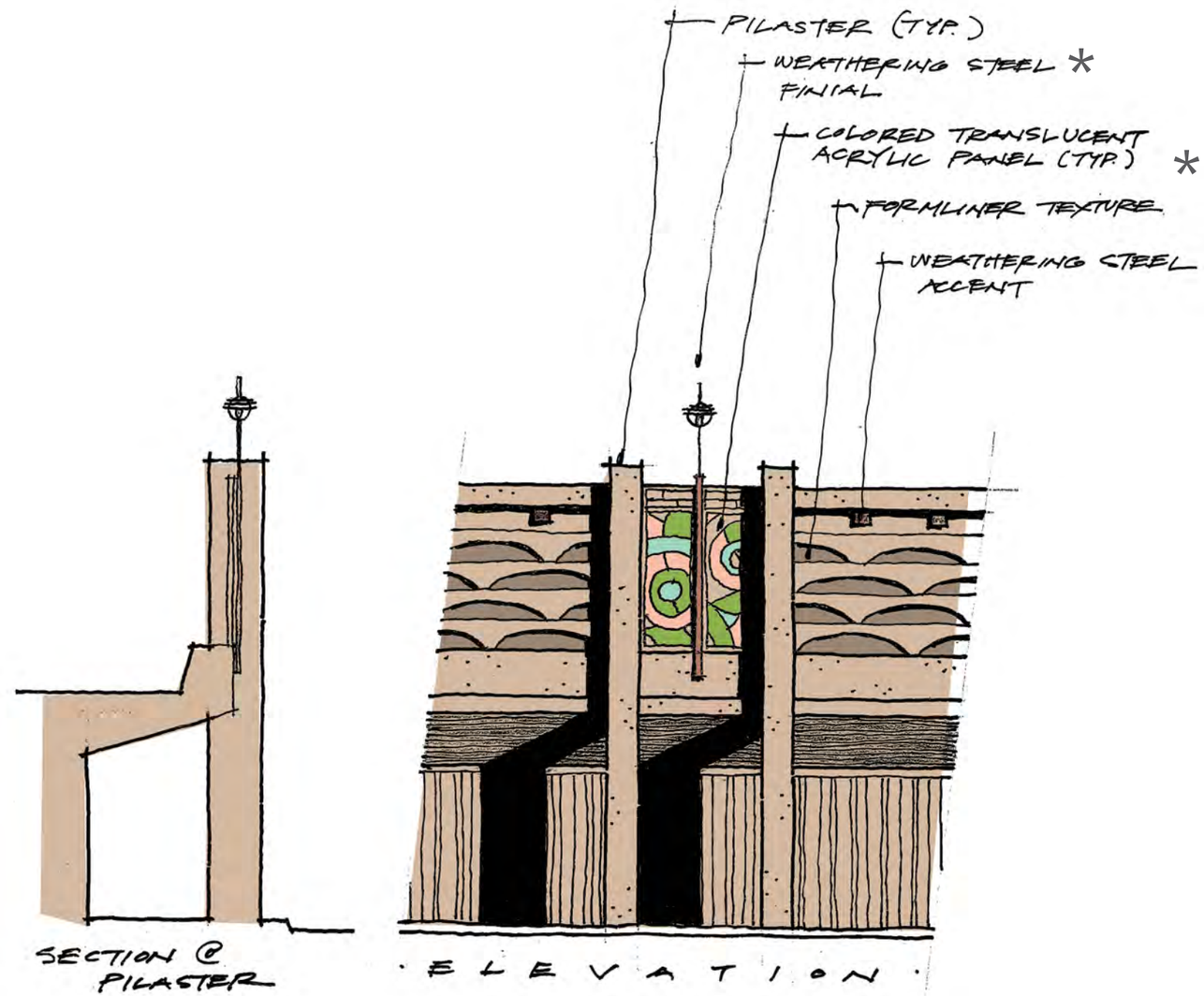


Southern Bluff Theme Unit
Articulated Perforated Noise Wall

Viaduct Retaining Walls (Coastal Mesa Theme Unit)

In areas where insufficient space exists to include planting buffers between freeway retaining walls and adjacent community features such as frontage roads, the use of viaduct retaining walls would be considered. Viaduct retaining walls would cantilever the roadway to form a wall recess in which spatial articulation and planting can occur.

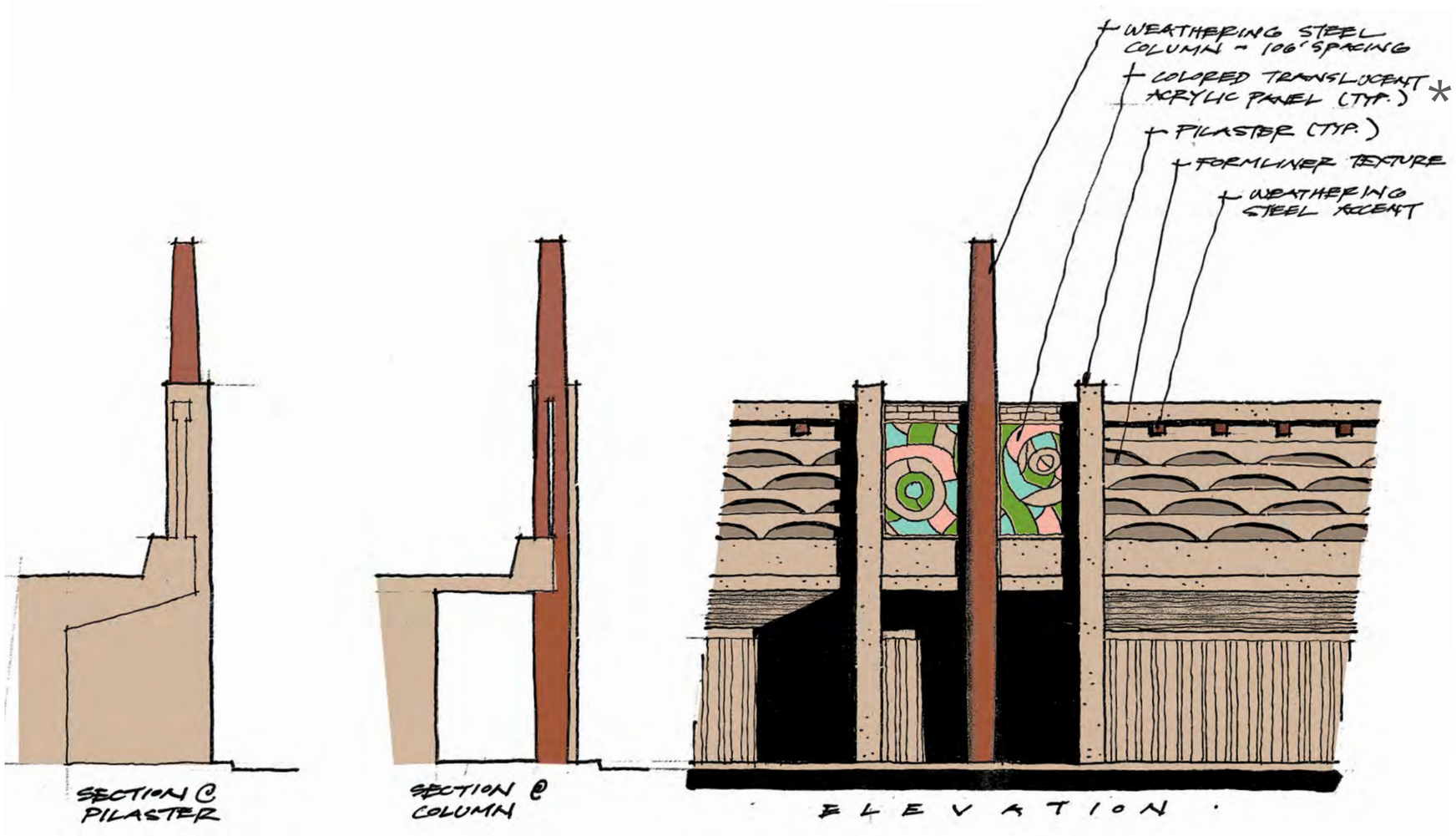
The view from Pio Pico in Carlsbad where a viaduct wall would be used



Coastal Mesa Theme Unit

Cantilevered Retaining Wall/Noise Wall at Pio Pico
Secondary Plaster Unit

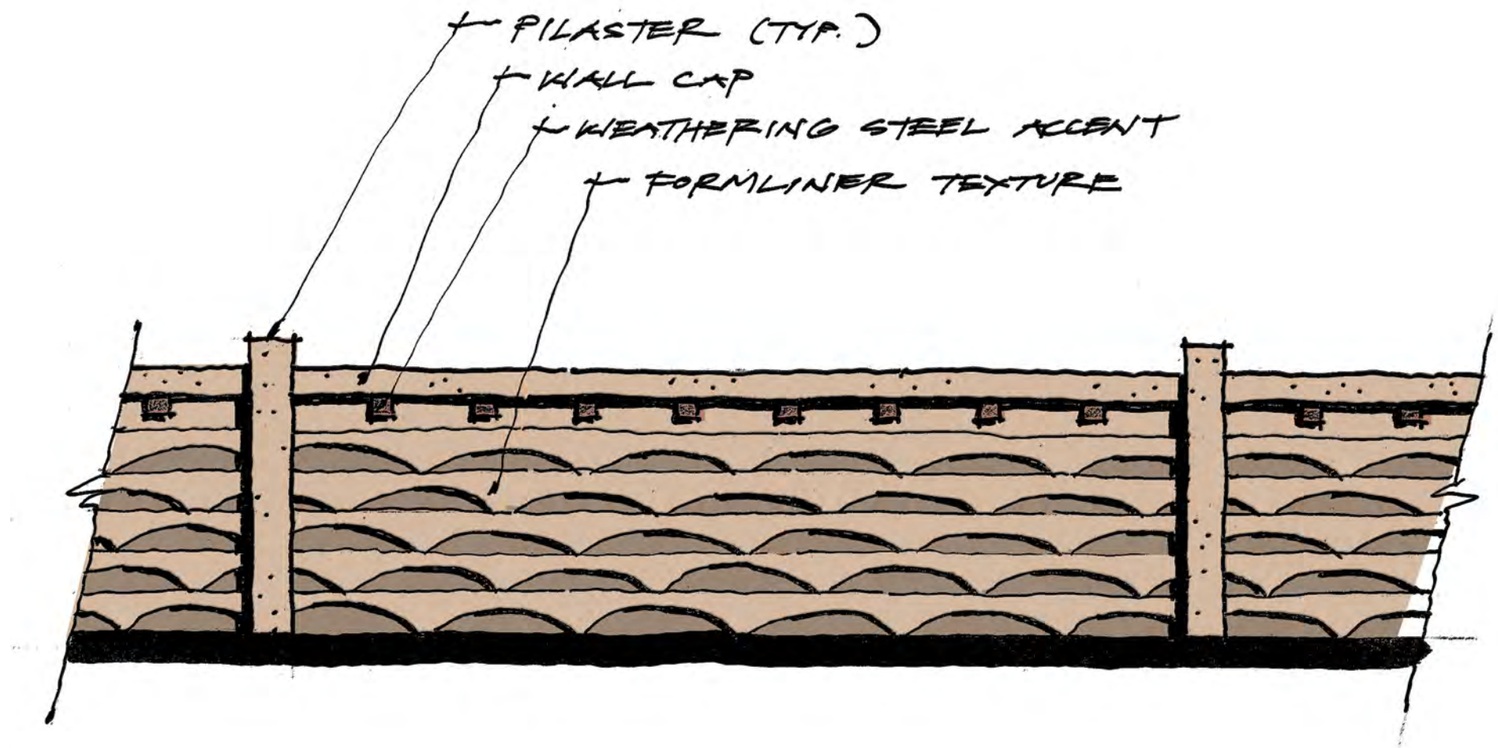
* Enhanced feature, requires maintenance agreement from local cities.



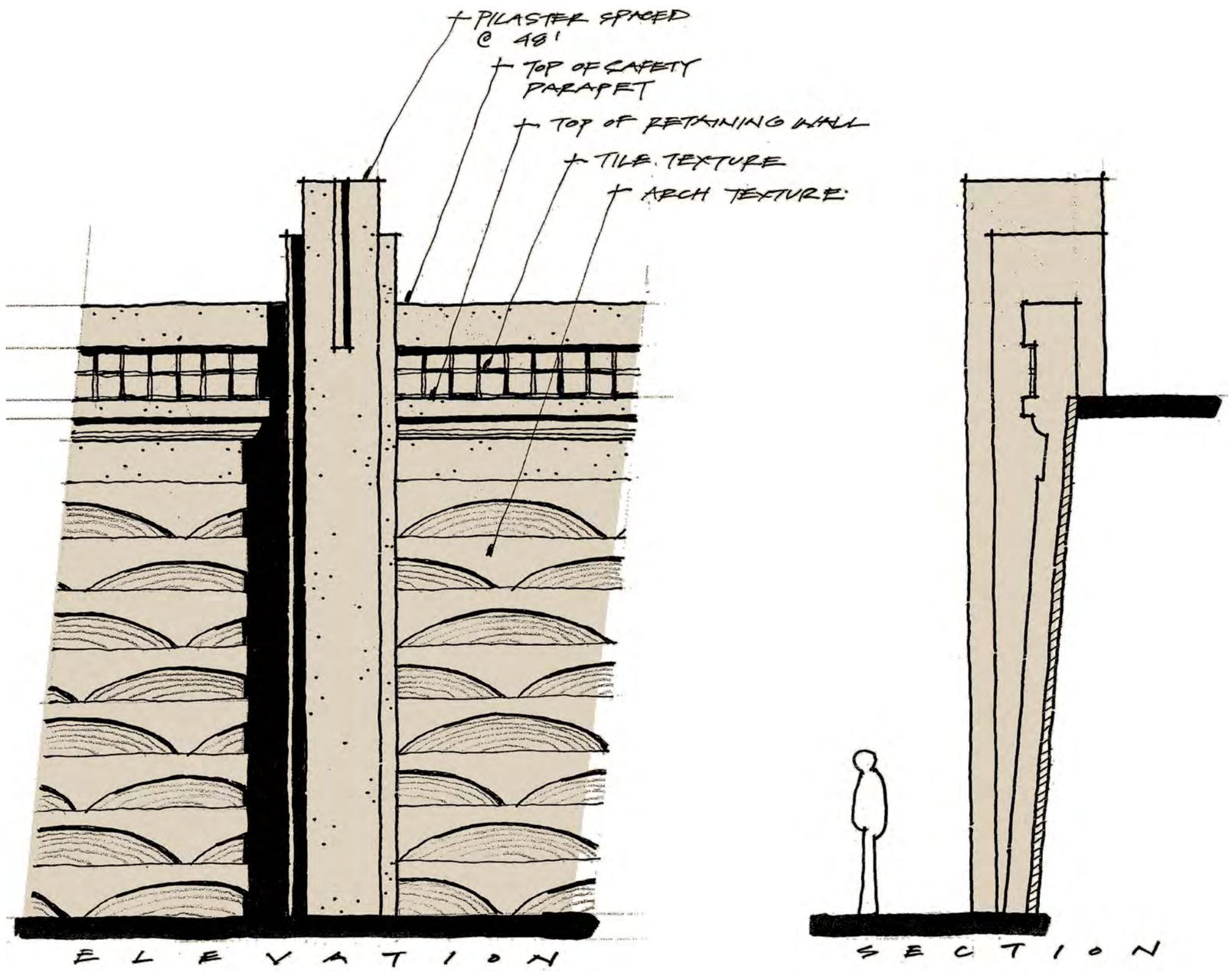
Coastal Mesa Theme Unit

Cantilevered Retaining Wall/ Noise Wall at Pio Pico
Primary Pilaster/Column

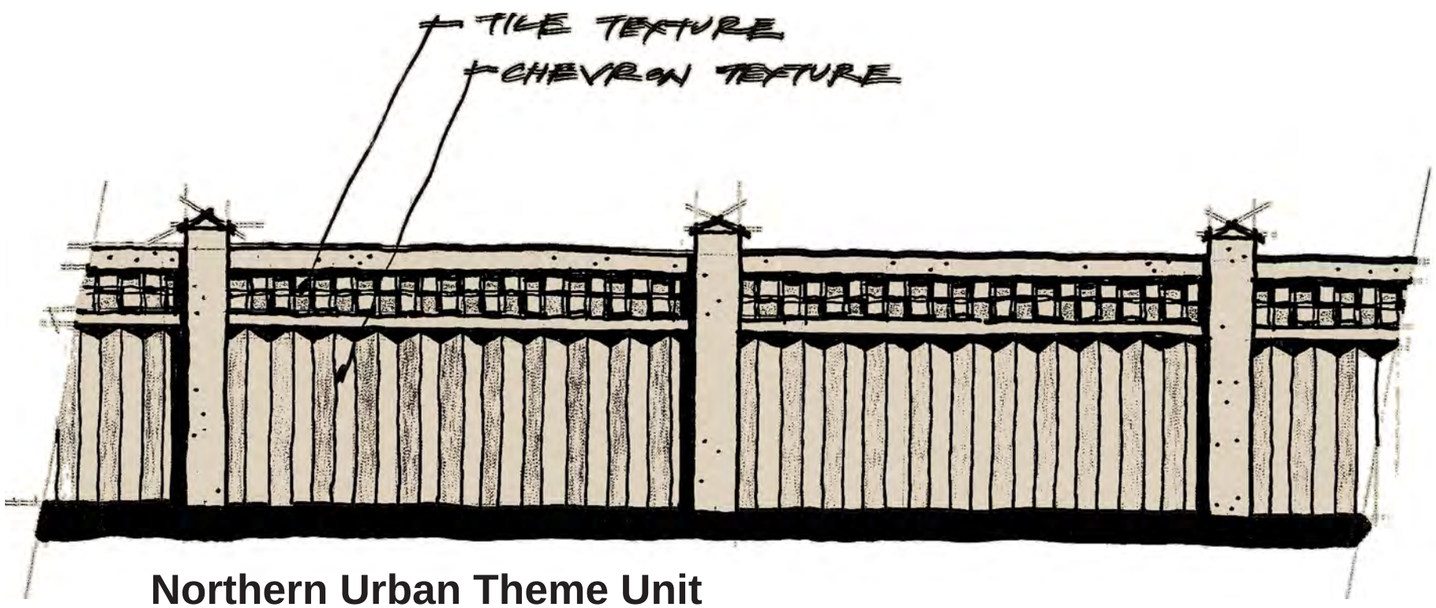
* Enhanced feature, requires maintenance agreement from local cities.



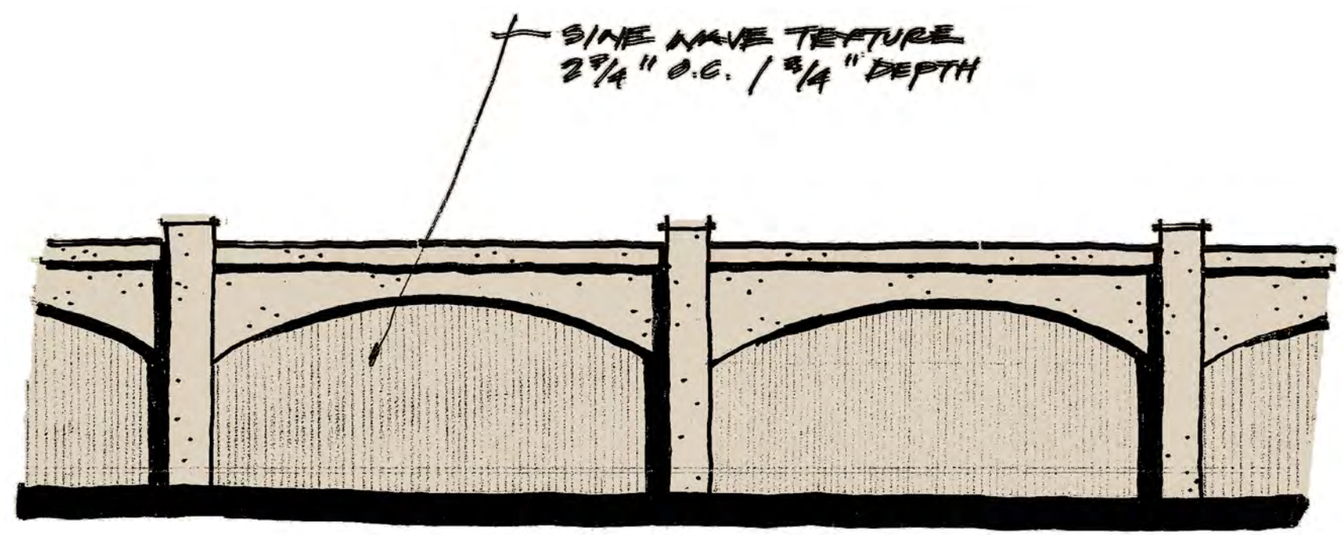
Coastal Mesa Theme Unit
Noise Wall/Retaining Wall Concept



Northern Urban Theme Unit
Retaining Wall Concept



Northern Urban Theme Unit
Noise Wall Alt 1

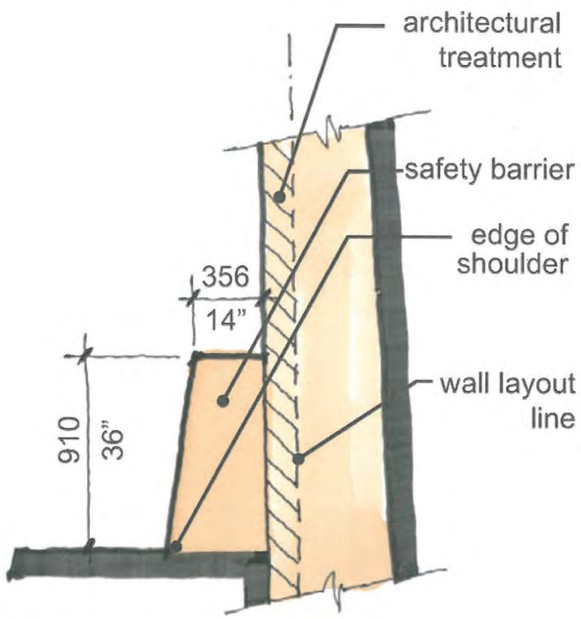


Northern Urban Theme Unit
Noise Wall Alt 2

Barriers (Bridge & Median)

Retaining Wall/Barrier Setbacks

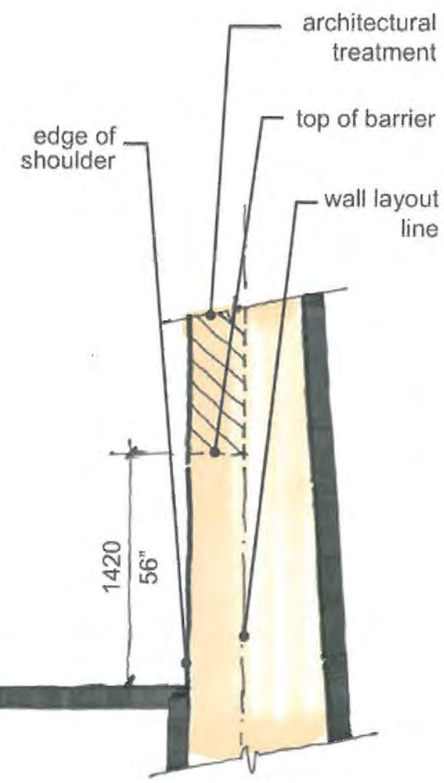
In areas too narrow to place a planting pocket, the retaining wall should be recessed behind the face of barrier at a sufficient distance to allow architectural features to be included on the face of the retaining wall.



Barrier setback section

Vertical Concrete Safety Barriers

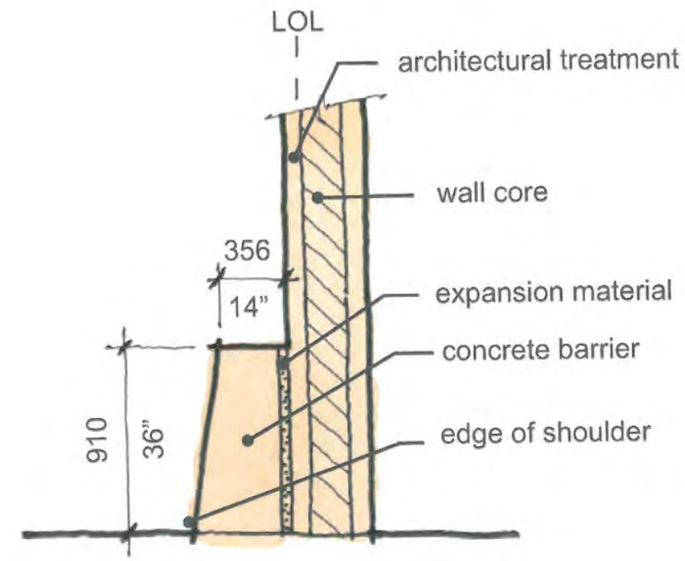
In constrained areas, vertical concrete safety barriers should be considered. Vertical barriers add 300 mm (12") of additional width in which architectural elements such as mechanically stabilized earth wall panel relief, pilasters, and wall caps can be included.



Vertical concrete safety barrier section

Noise Wall/Barrier Setbacks

In areas too narrow to place a planting pocket, the noise wall should be recessed behind the face of the barrier at a sufficient distance to allow architectural features to be included on the face of the noise wall. Placing a noise wall directly on top of a concrete barrier should be avoided if at all possible



Although by no means elegant, roadway and bridge barriers provide the necessary safety for the public user in the freeway setting. Standard heights and geometry reflect crash tested performance required at freeway speeds. Barriers will generally conform to existing Caltrans standards due to FHWA and Caltrans liability requirements. However, with some forethought, barriers can be integrated in the overall user experience using similar themes and materials developed for the bridge and retaining wall elements.

Alternative Railings and Access Control Barriers

Alternatives to standard cable rail barrier can be used to complement enhanced wall designs. Options could include integral solid concrete parapets or alternative metal materials. Depending on the location, integral color and alternative railing materials can be used to customize the freeway and enhance the pedestrian experience. In particular, bridge barriers at lagoon crossings should be “see through” to preserve existing views. Caltrans Type 80 barrier is an example of see-through a post-and-beam system. Use of integral color should be considered to emphasize or blend the barriers into the overall bridge form.

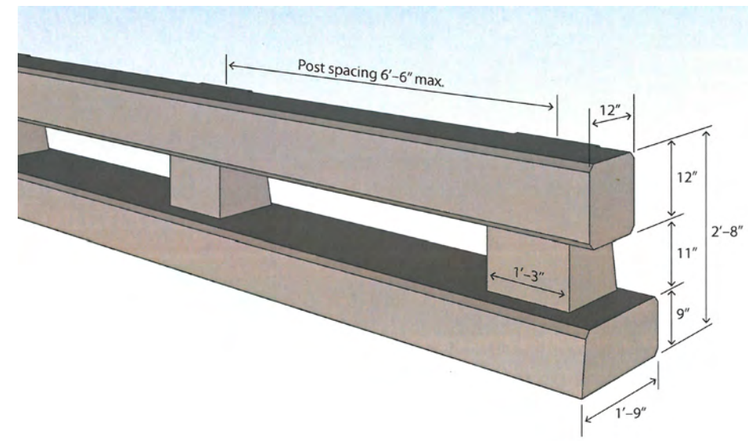
Alternative access control barrier in Solana Beach

Low Profile and See-through Safety Barriers

Low profile (e.g. Caltrans Type 60S) or see-through (e.g. Caltrans Type 80) safety barriers should be used if at all possible in areas where standard height barriers would diminish views of scenic resources from the freeway.

An example of a barrier maintaining an open view over Lake Hodges

Example of Type 80 Concrete Barrier in coastal areas



Example of Type 80 Concrete Barrier dimensions

Coastal Commission

The California Coastal Act of 1976 established specific policies for guiding the Commission's planning and regulatory responsibilities. Section 30251 of the Act, in particular, addresses the design and aesthetics of bridge railings and barriers. It specifies that "the scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance." Provisions of the Act give clear policy direction for siting and designing development to achieve the objectives listed below.

- Views both of and from the ocean and scenic areas should be protected.
- The alteration of natural landforms should be minimized.
- Development should be designed and sited to ensure compatibility with the context of the surrounding area.
- Visual qualities in visually degraded areas should be enhanced.
- Development in highly scenic areas should be subordinate to the character of its setting.

In general, there are several guiding principles that can be followed to help meet Coastal Act and Local Coastal Program scenic and visual quality policies as the pertain to bridge designs. Some of these are briefly summarized below.

- Visibility for users of the bridge may be the single most important consideration. Where the primary scenic resource is the public view from the bridge deck, the railing should be designed to minimize impairmentof such views. Rail elements should be as thin as possible and should avoid "blocky" forms. In addition to keeping the railing as unobtrusive as possible, the design and materials should be selected to harmonize with surroundings (while meeting all essential safety requirements).
- The lowest possible railing heights should be applied, consistent with the minimum allowable height for the class of anticipated users (i.e., motor vehicle, bicycle, or pedestrian).
- Appropriate color and texture can assist in visually blending railings with their surroundings. Metal railings can be treated to create a weatherized look; concrete elements can be stamped and colorized to match the surrounding landscape or to simulate appropriate materials (e.g., wood grain, stone).
- Curved and arched elements, where appropriate, can create a graceful and pleasing structure.
- Views of bridges from public areas are also important considerations. Ensuring the architectural and visual compatibility of railings with the underlying bridge structure is essential. Within the parameters of engineering and safety requirements, the scale and style of all bridge elements should be subordinate to and harmonious with the character of the surrounding area.
- Because of the loss of many historic and attractive bridges throughout California, railing designs should seek to incorporate elements of historic bridge where such an approach is consistent with modern safety standards. As appropriate, scale, materials, and other factors that evoke traditional bridge forms in California should be explored.
- A coherent and unified railing design that incorporates the elements necessary for pedestrian and bicycle safety is preferable to simply adding decorative elements onto existing vehicle barrier designs.

C. Urban Design and the Pedestrian Realm

An important part of any freeway interchange or bridge crossing is the treatment of the pedestrian realm. To truly be a complete street, the pedestrian realm must be carefully considered in every design.

Some of the following design concepts have been extracted from a variety of urban design guidelines that have been prepared by transportation agencies across the country.

Implement Sustainable Practices

Sustainable processes or states can be maintained indefinitely at a specific level. Sustainable design for streetscape affects the flow of stormwater through the area, the materials used, and the consumption or renewal of energy and resources. Elements of sustainable streetscape design include:

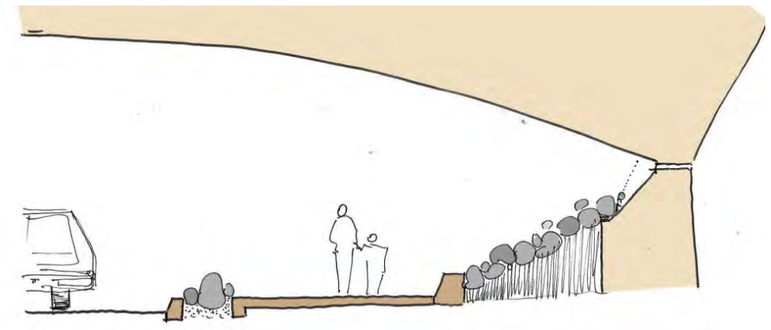
- Stormwater management
- Use of sustainable materials
- Low water use and low maintenance plant material

Use Cohesive Design Elements

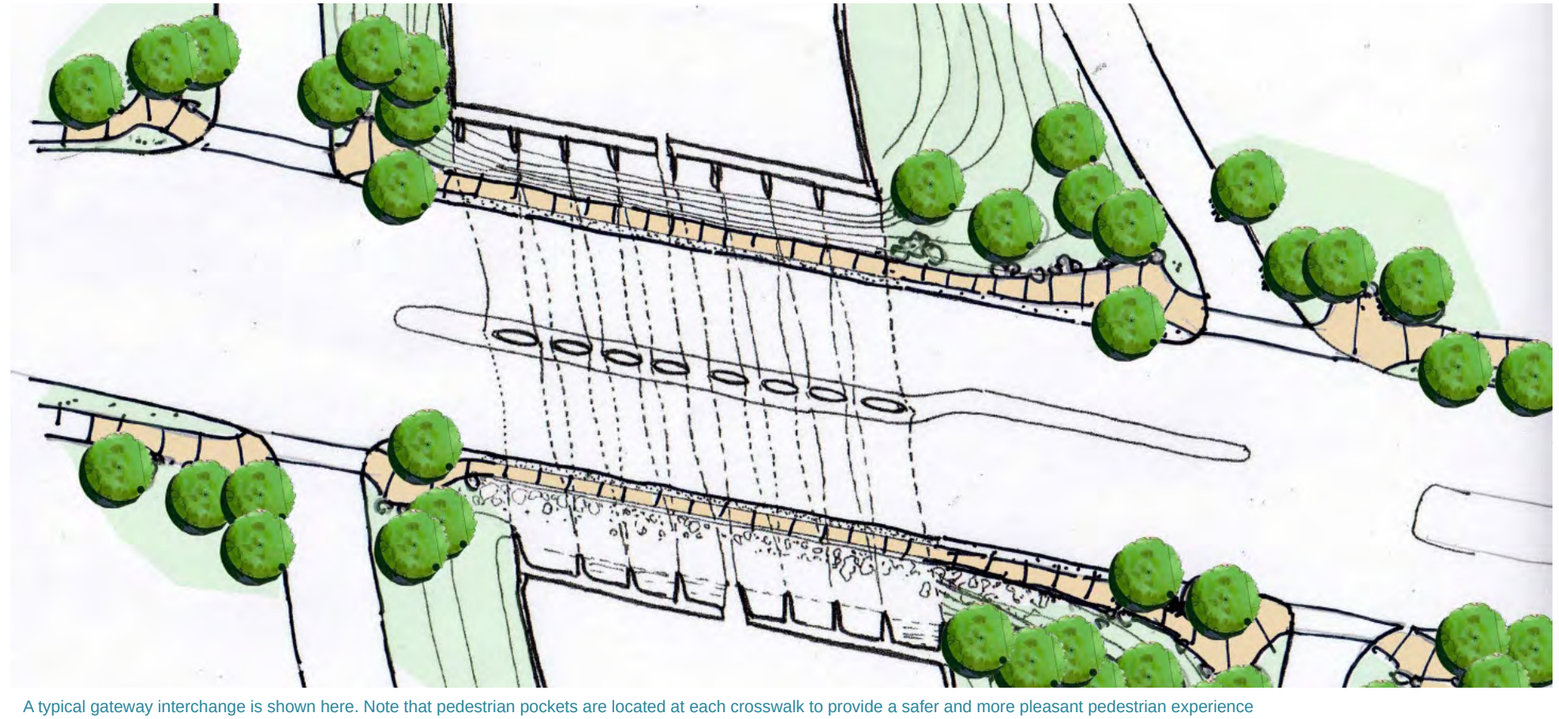
- A well-designed pedestrian realm includes:
- Well-defined edges between pedestrian and vehicle domains.
- A rhythmic and logical use of trees, furniture, paving and planting.
- Attractive and functionally appropriate street lighting.
- A consistent and harmonious family of street furnishings.
- A hierarchy of spaces that helps define the use of the streetscape.
- Attractive and durable materials, varied to reflect functional and aesthetic needs.

There are a number of ways to create an appropriate pedestrian realm within a complete street freeway intersection. These include:

- Strong spatial definition of outdoor “rooms” and “hallways” generated through strong edges, appropriate walls, fences, plantings, etc. as well as overhead tree canopies. Rooms developed in a hierarchy of sizes and intended uses provide a wide variety of pedestrian experiences in streetscape settings.
- A sense of unity that emerges from consistent textures, colors and forms in trees and other plantings, furniture, paving and other elements.
- Strong rhythms created by regular repetitions of features and dimensions, such as streetlights, hard and landscape surfaces and height of elements.
- Strategic use of dominant streetscape features (flowers, signage/banners, etc.) to focus pedestrian or driver attention to information, safety considerations, etc.



Section under bridge showing enhanced pedestrian treatment



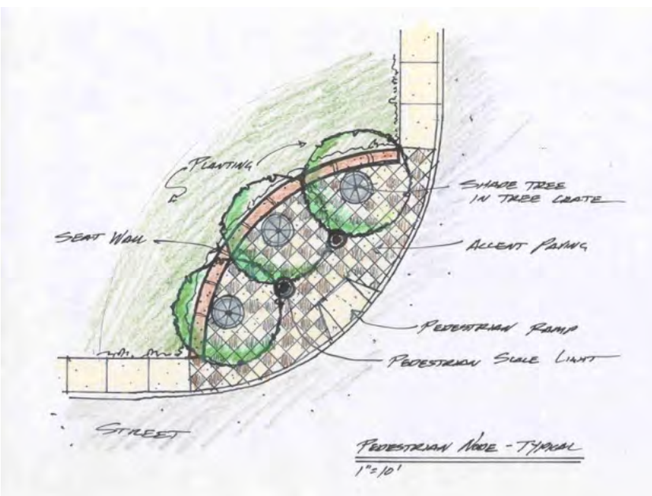
A typical gateway interchange is shown here. Note that pedestrian pockets are located at each crosswalk to provide a safer and more pleasant pedestrian experience

General Design Concepts

- Provide pedestrian-scaled lighting to create a separation from street traffic and spatial definition that is human scale. Pedestrian-scale street lights should be lower than conventional street lights and provide more illumination of the sidewalk. Pedestrian-scale street lights are lower and more closely spaced than conventional street lights. To provide identity to certain districts, consider special light standards such as antique replicas, etc. Provide lighting over crosswalks.

- Provide continuity of streetscape features along the length of a street, particularly Gateway Interchanges.

- Provide opportunities for “stationary” pedestrian activities. These generally can occur at off and on-ramp intersections and at special locations such as under a lagoon bridge.



Pedestrian nodes can be designed in a variety of ways. Small walls can be constructed that also provide opportunities for seating.

Pavement Treatments

Pavement treatments, including colored or textured pavements, brick pavers, and interlocking pavers represent a step up from standard crosswalk treatments such as paint markings. These options are available if the adjacent city wished to upgrade to an enhanced design. Although usually more costly to implement and maintain, they can enhance a complete street by more visibly establishing spaces for bicycles and pedestrians.

These special treatments can also have traffic calming effects at key locations. Linking the design of these treatments with the architectural character of surrounding land uses creates an even more attractive and cohesive complete street. Inserting artistic design treatments intermittently, rather than along the entire sidewalk, is also a cost-effective way to enhance the streetscape.

Treatments such as raised brick pavers should not be used in bicycle lanes, as they can be hazardous or uncomfortable for bicyclists to navigate. They should also be carefully evaluated in their use for pedestrian crosswalks to ensure they are not excessively slippery in wet conditions. Likewise, decorative sidewalk or crosswalk treatments should not interfere with ADA compliance.

Special Considerations for Younger, Older, and Disabled Pedestrians

When streets are designed primarily for vehicles, they become barriers for children, who cannot safely walk or bicycle along or across them.

Even when streets have been designed with basic pedestrian facilities, they often do not fully consider the needs of the growing population of older Americans. Street crossings are often long, sidewalks are absent or blocked by fixed objects, and transit stops have no place to sit. Older Americans need the public right-of-way to better serve them by providing safe places to walk, bicycle, and by designing streets to better accommodate older drivers.

Incomplete streets are a constant source of frustration and danger for people with disabilities. They often are difficult to navigate for people who use wheelchairs, can’t see well, or for older people who move more slowly. Complete streets should be safe and comfortable for everyone to use – particularly for these younger, older and disabled people who cannot choose to drive.

Seating

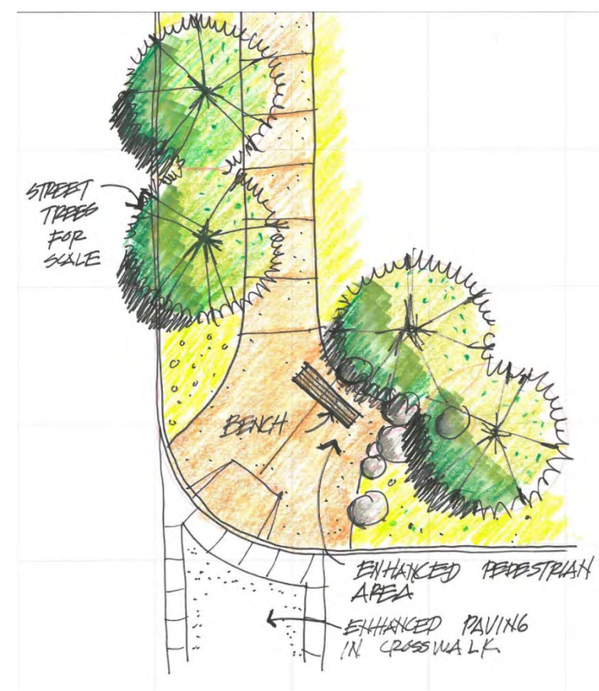
Benches in the streetscape provide outdoor seating for more than one person, with or without backs and/or arm rests. Although most pedestrians desire to travel through a freeway intersection as fast as possible, it is sometimes necessary to create pedestrian refuges as distances through a freeway interchange can be quite long.

- Benches should provide comfortable, low maintenance seating. They should be built of durable, non-abrasive materials that withstand cracking, rotting, or sagging. Wood, nails or wire should be avoided in construction or repair of benches in the streetscape.

- Seating surfaces should be 16 to 18 inches high and should have a minimum depth of 16 inches for seats without backs, 14 inches for seats with backs.

- Seating walls, ledges, steps, or terraces should be between 12 and 20 inches high and at least 16 inches deep when possible. Two-sided seating walls should be at least 30 inches wide. Benches should avoid sharp edges.

- Place seating in functional and accessible locations. Users should be able to reach seating directly from public sidewalks or pathways in all weather conditions.



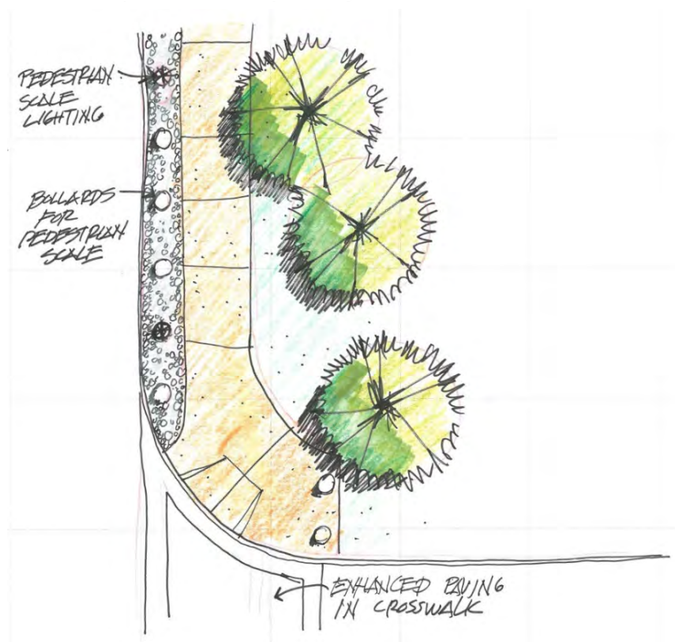
Seating cont.

- Benches should be convenient to and accessible from, but not obstruct the pedestrian pathway.
- Use materials that complement other streetscape elements such as streetlights, trash and recycle receptacles, bicycle racks, railings, and surrounding structures.
- Locate benches logically. Potential locations include places intended for gathering, logical resting places along sidewalks and pathways.
- When possible, locate benches near lighting and plantings, making them more useful at night and improving observability. Trees provide shade during the day and some shelter from rain.
- Benches with backs and armrests are generally more comfortable for people with physical disabilities. Benches without backs allow people to face different directions. Armrests or dividers discourage sleeping but can restrict seating and reduce flexibility and comfort.
- Bench design should emphasize comfort, straightforward form and detail, maintenance, durability and resistance to vandalism.

Bollards

Bollards help prevent vehicle encroachment into pedestrian areas, discourage pedestrians from entering a street and provide pattern and a sense of rhythm.

- Bollards should coordinate with other street furnishings.
- Bollards should be finished in a durable finish consistent with the other street furniture.
- Placement of bollards shall be a minimum of 2 feet from the curb zone. Spacing of bollards should be 5 feet minimum from each other.
- Use bollards as part of a designed environment to avoid cluttering the streetscape.
- Bollards should not create hazardous and unexpected obstacles to pedestrians, cyclists, and other non-motorized users.
- Incorporate contrasting detail at base or waist level to aid people with sight impairments.
- Lighted bollards provide useful light for pedestrians and motorists and emphasize travel pathways.



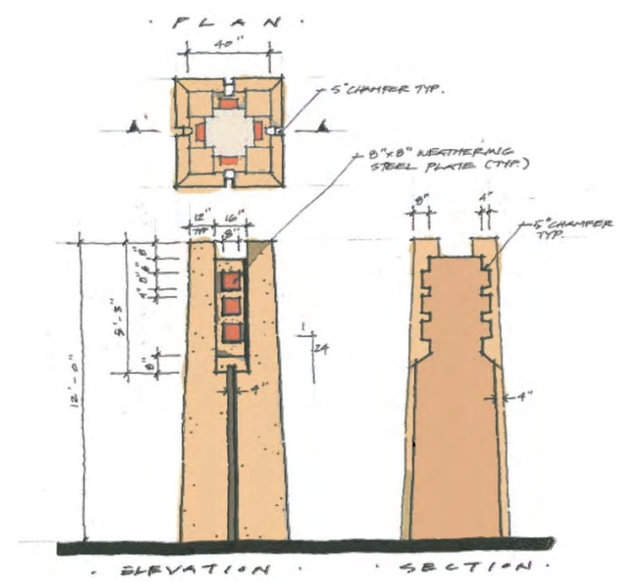
Bicycles

Bicycles provide safe, comfortable mobility opportunities for a range of users and are considered a fundamental part of a complete street and need to be carefully considered in the design of all I-5 interchanges and bridges.

Bicycle travel on sidewalks should be generally discouraged, even if the sidewalk width meets the width requirements of a shared multi-use path. Bicycles on sidewalks travel at higher speeds than pedestrians, creating the potential for serious injury. Bicyclists might collide with obstacles on sidewalks including street furniture, sign posts, etc. Additionally, drivers do not expect bicyclists on sidewalks, creating conflicts at intersections and driveways. For these reasons, it is desirable to provide a bike lane adjacent to the traveled way within all freeway interchanges.

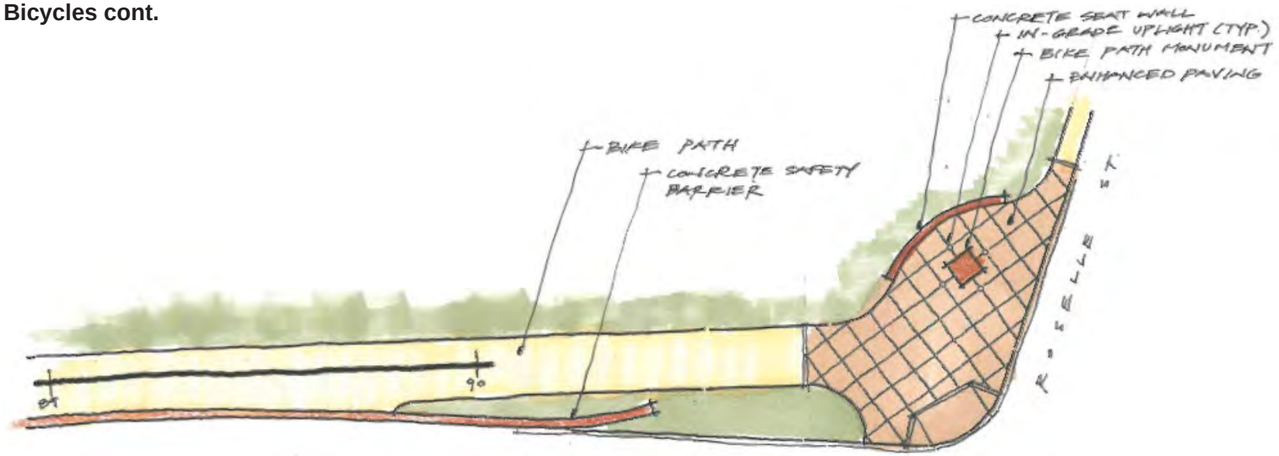
Colored surfaces may be used to define a bicycle lane. Lanes should be clearly and simply marked. Lanes should be a minimum of five feet wide. Lanes should be clear of hazards such as sewer grates with long openings in the direction of bicycle travel.

Within the Southern Bluff unit, bike path nodes will also be provided at the Genesee interchange. These areas provide a special place and identity. In addition, they will also incorporate a monument structure to help provide a unique community identity.

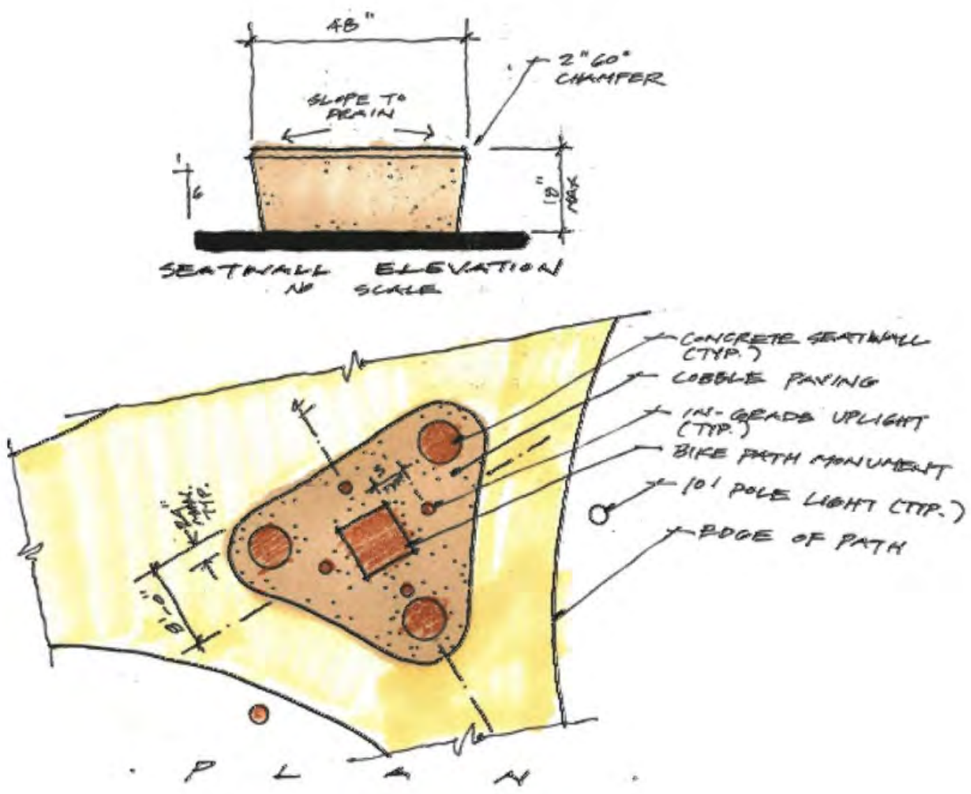


Example of bike path monument

Bicycles cont.



Example of conceptual plan of bicycle path node at Roselle



Example of bicycle path node.

Lighting

Studies have shown that the presence of lighting not only reduces the risk of traffic crashes, but also their severity. In most cases, roadway street lighting can be designed to illuminate the sidewalk area as well. The visibility needs of both pedestrian and motorist should be considered. The addition of lower level, pedestrian-scale lighting to streetlights with emphasis on crossing and intersections may be employed to generate a desired ambiance and create a sense of security, pedestrian scale and rhythm. Lighting should provide both safety illumination of the traveled way and intersections, as well as pedestrian-scaled decorative light standards illuminating the pedestrian way where appropriate. Lighting should be carefully coordinated with landscaping design to ensure its effectiveness.

Lighting is important in urban environments. Appropriate lighting levels promote a feeling of comfort and security and encourage pedestrian activity. Illuminating bridge and wall facades can highlight interesting architectural features and strengthen the character of a community. Proper lighting also directs ambient light to the vertical plane at eye level, creating higher visual contrast and recognition of faces. Proper lighting levels in pedestrian areas also provide visual cues to motorists, reducing areas of shadow that hide pedestrians from view. Light may be used to illuminate specified objects, such as public art; create an atmosphere; or provide subtle directional information.

Basic lighting concepts include the following:

- Ensure pedestrian walkways and crossways are sufficiently lit
- Install lighting on both sides of streets
- Provide enough illumination to light all four corners of urban intersections with striped crosswalks.
- Lighting should be installed no closer than 2-1/2 feet to a curb to provide adequate clearance for vehicles.
- Low mount fixtures provide for better uniformity and vertical surface illumination.
- Fixture location and mounting height, fixture type, and lamp intensity should optimize light distribution and minimize glare. Uplighting can be provided from above-ground fixtures or from well lights with louvers. Well lights reduce street clutter.
- Light source should not be visible. Use wells or low lying vegetation to hide fixtures.
- The concept of “dark skies” minimizes extraneous light and directs light to areas and surfaces that should be illuminated.

Crossings

Crossings provide safer domains for pedestrians crossing intersections by defining and delineating pedestrian paths across streets.

- Full or partial medians can act as mid-crossing refuges for pedestrians when crossing streets.
- Crosswalks may be defined by contrasting pavement colors or patterns, such as gridded scoring pattern. Brick pavers in crosswalks are not recommended. Experience indicates that brick pavers are easily damaged during routine maintenance of the street. However, contrasting treatments using more conventional materials can improve visibility and create texture in the streetscape.

Fencing

Typically Caltrans has provided metal fencing as a means to define the right-of-way for the freeway. In most cases this standard would still be implemented. Alternatives to this type of fencing are possible if the adjacent Cities are willing to provide maintenance. These alternative fencing types might be used in conjunction with future residential or commercial projects that are adjacent to the I-5 right-of-way.

Coordinate Maintenance with Design

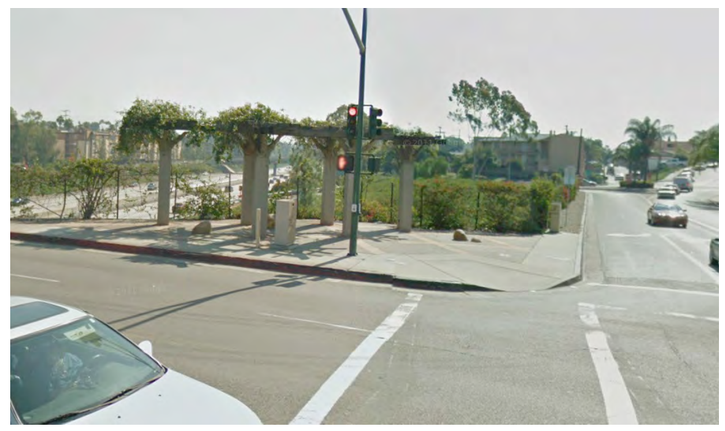
A quality streetscape must continue to look good over time. Long-term maintenance is a critical design determinant and is a serious matter for both the City and the local community. Community stewardship can help stretch city resources, and neighborhoods should be involved in both the design and maintenance processes.

A maintenance agreement process should be a part of project design. The agency ultimately responsible for maintenance should provide input to the project team. In addition, initial maintenance should be part of construction contracts.

Community Gateway Interchange

These interchanges are the primary symbolic entries into each municipality. Community gateway treatments for the I-5 corridor will occur at five locations as described in the General Bridge Design Issues section. All five locations are regional gateways into the adjacent communities from the I-5 corridor. These locations will also be points of first impression of the community from the corridor. As such, it is important that an initial statement be made that identifies the uniqueness of each City. Detail should be given to the walls, fencing, lighting and the bridge design as described earlier. Variations in these elements will allow for each of the municipalities to establish its own unique “statement”. Some of these variations may include art elements that are incorporated into the design of the bridge.

The pedestrian realm, that is walking and bicycling, needs to be given the upmost importance within these ceremonial gateways. Sidewalks must be wide with separate bike lanes provided.



Trellises can also be used at key interchanges to enhance community entries

D. Landscape

General Concepts

The purpose of these landscape guidelines is to integrate landscape into the project and reinforce the natural character of the corridor. The landscape should be:

- Predominantly California native plant material
- Sustainable, low maintenance and cost effective
- Ecologically sound
- Appropriately designed for highway uses
- Functional and provide value
- Safe for all users

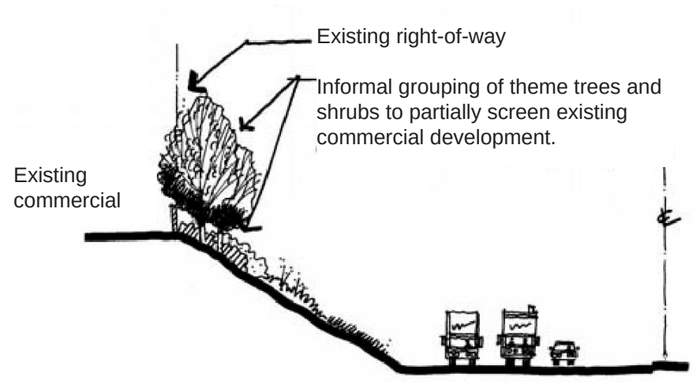
A well designed landscape corridor becomes an important component of the entire freeway and community street network. It is one of the key elements that contribute to the character of an area – the combination of landscape and built form helps provide a unique sense of place of value to the community.

- It helps integrate or fit the freeway into its setting.
- It provides structure and a three dimensional scale to the corridor.
- It helps unify the road corridor environment, providing interest and a milestone to users as well as helping create a simple strong and intuitive driving experience.
- It is valuable in terms of impact mitigation. It screens undesirable views of roads and traffic, helps filter air and water pollutants, suppresses weed growth, helps reconnect habitat, and can help recover threatened species.
- It can contribute to a safer road, for example, by screening headlight glare, slowing errant vehicles and helping create an intuitive, self-explaining driving experience.
- It helps stabilize slopes and minimize erosion.

The objective of the landscape concept is to improve the visual experience from the freeway while providing a design that reflects the unique qualities within the corridor. The landscape concept plan will improve the visual experience by providing an effective means for screening unsightly adjacent land uses, utilities and appurtenances while focusing and protecting views to major landmarks and natural features. In addition, it will be critical that non-invasive species be utilized so the sensitive habitats that occur within the corridor are not negatively impacted.

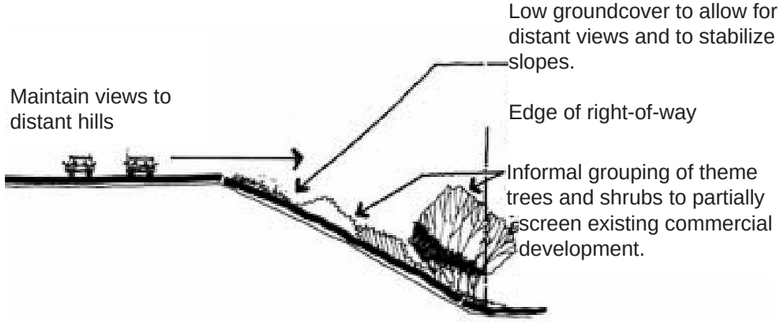
Typical Issues

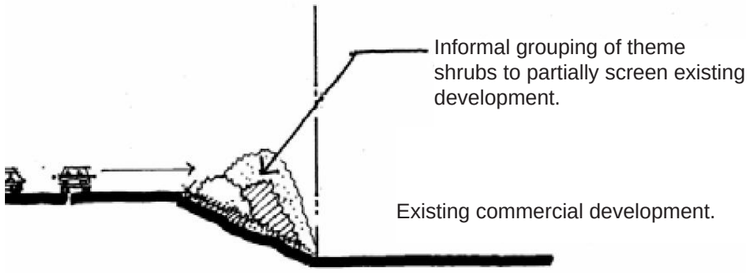
Foreground screening would be necessary while maintaining distant views



Plant material at top of slopes can screen unwanted views

Views of the lagoons should not be blocked by landscaping





Plant material close to the freeway could block unsightly foreground views

An example of a view that requires screening with plant material

Views to adjacent natural areas should remain open. This is a view looking east of the Batiquitos Lagoon.

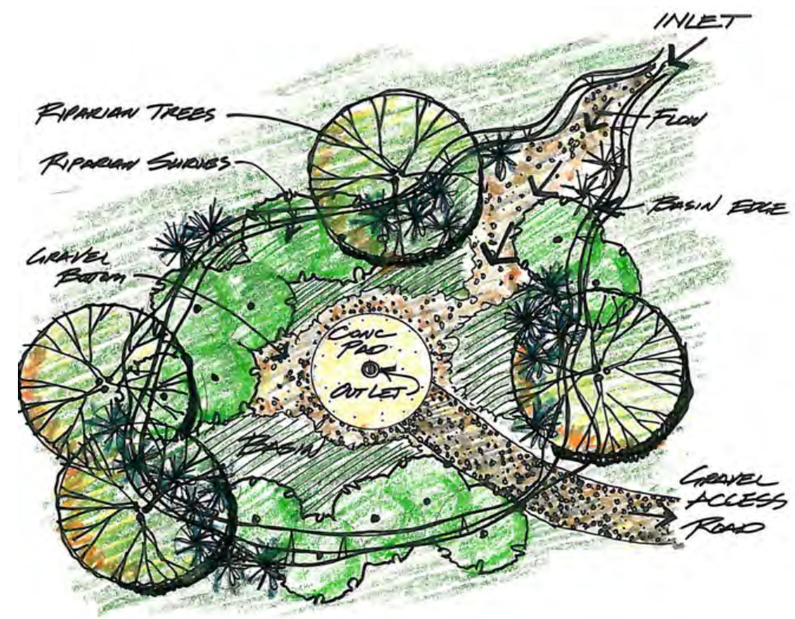
The visual impact of tall manufactured slopes can be mitigated by plant material

Slope Paving

Rounded creek cobble could be used where possible for slope paving under the bridge structures and in areas of the project that are too shady to plant

Water Harvesting Basins

To help collect and retain rain water in low lying areas for landscape irrigation purposes, water harvesting basins could be provided in areas where appropriate.



This is an example of a typical water harvesting basin within an interchange

Coastal Native Landscape Theme

General Concepts

The design goal is to connect the freeway viewer with the coastal experience through landscape design and architectural treatment that considers local topography, weather, vegetation and the unique north coast communities. A California native plant palette is proposed for natural and developed areas. The landscape should:

- Live in harmony with the coastal native setting and provide a sense of place
- Soften walls and built features with native plants adapted to dry summers and winter rains
- Seamlessly blend with native slopes and frame views to lagoons
- Thrive despite the challenge of erodible soils, water restrictions and low maintenance
- Feature signature native plants found in the local natural setting such as torrey pines, sycamores, lemonade berry, toyon and coastal sage scrub

View of freeway entry with signature native trees

Native slope planting in Spring

Signature native plants

These three large-scale natives are signature plants of the I-5 North Coast. They will be used as theme plants to unify the planting design of natural, transitional, and developed areas.

Pinus torreyana
Torrey Pine

Platanus acerifoia
Western Sycamore

Rhus integrifolia
Lemonade Berry

Standard Landscape Treatment

General Concepts

Standard Landscape treatment is typically simple and deliberately low key. Torrey pines and oaks are randomly planted in gray-green native ground covers or coastal sage scrub. The landscape should:

- Be sustainable, low maintenance and require minimal irrigation
- Promote fire safety and weed suppression
- Blend with native slope vegetation and urban landscapes
- Control erosion and improve water quality
- Utilize appropriate native plants with long life spans

View of standard landscape after five years

View of standard landscape after one year

Typical Accent Plants

These three coastal sage scrub plants with aromatic foliage and spring flowers are used as accent plants for standard landscapes. In summer, without irrigation, they go dormant and may drop leaves or turn olive brown.

Eriogonum fasciculatum
Coast Buckwheat

Encelia californica
Bush Sunflower

Salvia clevelandii
Cleveland Sage

Enhanced Landscape Treatment

General Concepts

Enhanced landscape treatment is an opportunity for each community to create a unique entry experience with special landscape plantings and design features. The landscape should:

- Be sustainable, low maintenance and drought tolerant
- Utilize select native hybrid cultivars with a well-mannered appearance during summer dormancy
- Feature enhanced pavings, decorative rock mulches, accent boulders and specimen trees
- Incorporate pedestrian lighting, street furnishings, container plants and custom architectural treatment
- Must be maintained and irrigated by a local agency through a Landscape Maintenance Agreement

View of enhanced landscape after one year

View of enhanced landscape after five years

Typical Accent Plants

These three cultivars are examples of native plant selections with a more refined appearance suitable for enhanced landscapes in developed areas.

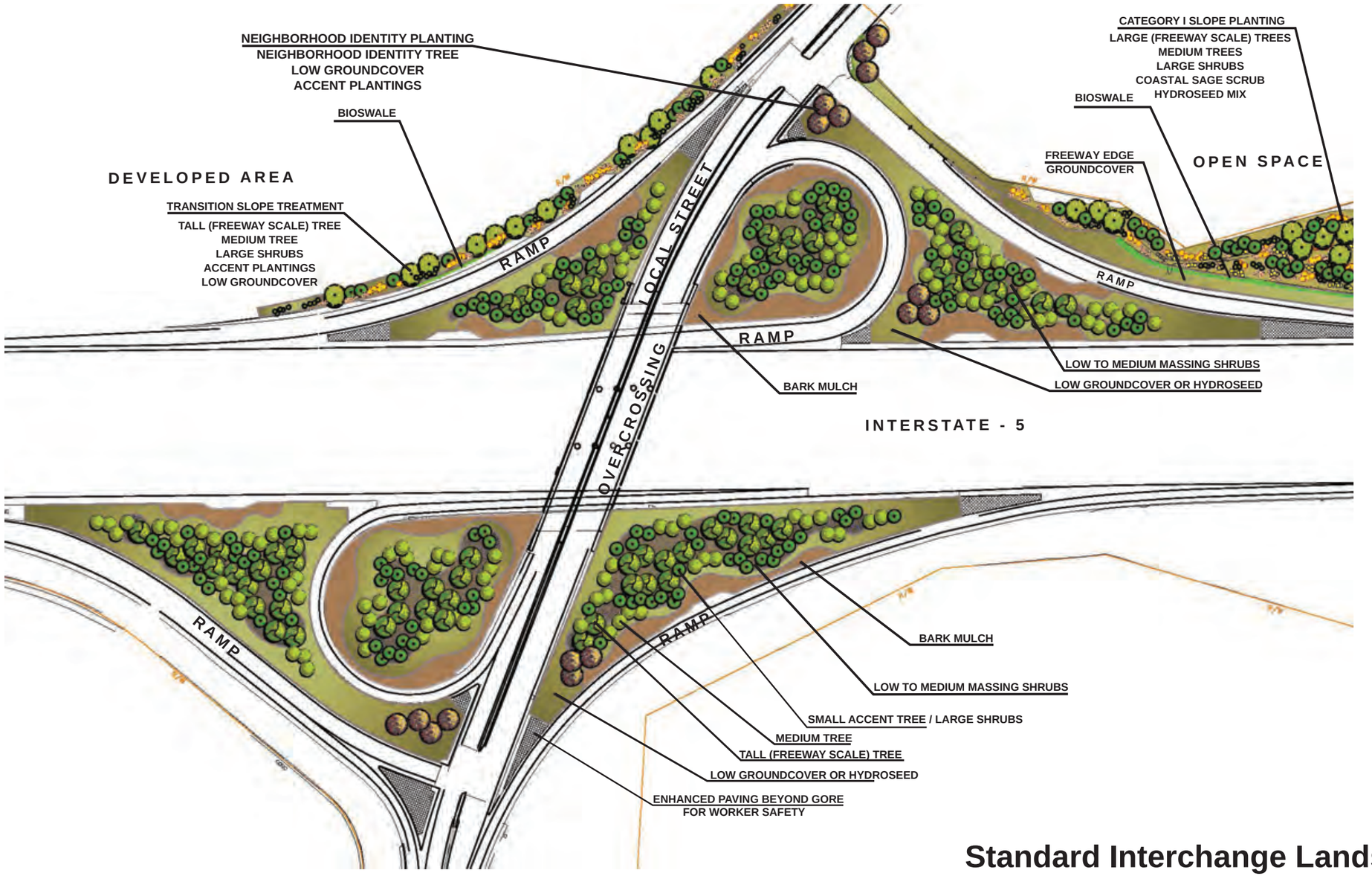
Manzanita Cultivar

California Lilac Cultivar

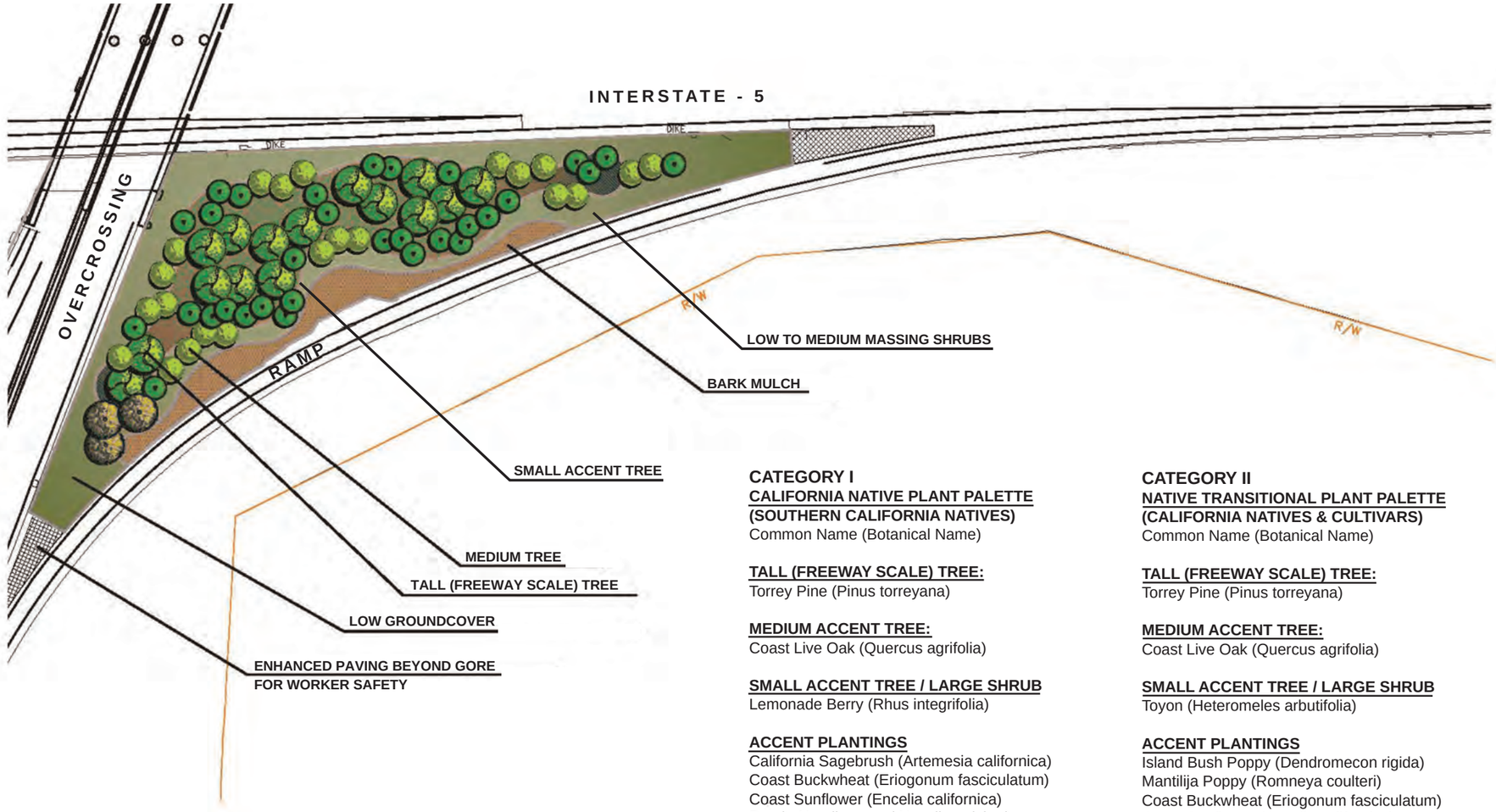
Monkey Flower Cultivar

Typical Interchange Planting Plan

There will be 2 options for landscape treatments. The standard option is a basic Caltrans landscape treatment. However, if a City wishes to provide for the maintenance, an enhanced option is possible. Following is a typical interchange with both options shown.



Standard Interchange Landscape Concept



CATEGORY I
CALIFORNIA NATIVE PLANT PALETTE
(SOUTHERN CALIFORNIA NATIVES)
Common Name (Botanical Name)

TALL (FREEWAY SCALE) TREE:
Torrey Pine (Pinus torreyana)

MEDIUM ACCENT TREE:
Coast Live Oak (Quercus agrifolia)

SMALL ACCENT TREE / LARGE SHRUB
Lemonade Berry (Rhus integrifolia)

ACCENT PLANTINGS
California Sagebrush (Artemesia californica)
Coast Buckwheat (Eriogonum fasciculatum)
Coast Sunflower (Encelia californica)
Purple Needlegrass (Nasella pulchra)
Deergrass (Muhlenbergia rigens)
Cleveland Sage (Salvia clevelandii)

SHRUBBY GROUNDCOVER
Black Sage (Salvia mellifera)

LOW GROUNDCOVER
Native Color Hydroseed Mix

BIOSWALES
Native Sod

CATEGORY II
NATIVE TRANSITIONAL PLANT PALETTE
(CALIFORNIA NATIVES & CULTIVARS)
Common Name (Botanical Name)

TALL (FREEWAY SCALE) TREE:
Torrey Pine (Pinus torreyana)

MEDIUM ACCENT TREE:
Coast Live Oak (Quercus agrifolia)

SMALL ACCENT TREE / LARGE SHRUB
Toyon (Heteromeles arbutifolia)

ACCENT PLANTINGS
Island Bush Poppy (Dendromecon rigida)
Mantilija Poppy (Romneya coulteri)
Coast Buckwheat (Eriogonum fasciculatum)
Coast Sunflower (Encelia californica)

LOW SHRUBBY GROUNDCOVER
Dwarf Coyote Brush (Baccharis pilularis)

LOW GROUNDCOVER
Bees Bliss Sage (Salvia 'Bees Bliss')

BIOSWALES
Native Sod

CATEGORY III
STANDARD LANDSCAPE PLANT PALETTE
(CALIFORNIA NATIVES & CULTIVARS)
Common Name (Botanical Name)

TALL (FREEWAY SCALE) TREE:
Torrey Pine (Pinus torreyana)
California Sycamore (Plantanus recemosa)
Western Cottonwood (Populus fremontii)

MEDIUM ACCENT TREE:
Coast Live Oak (Quercus agrifolia)

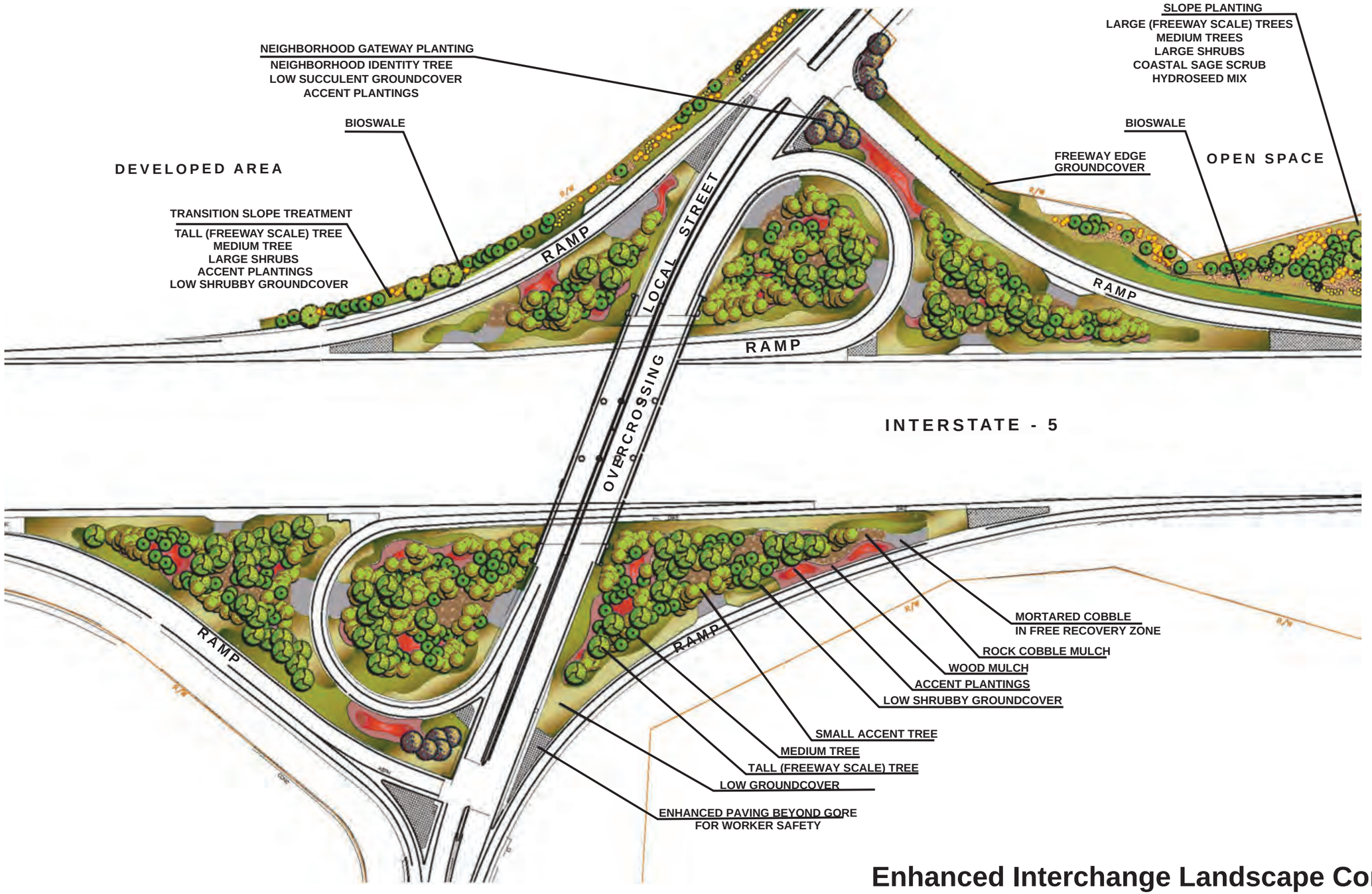
SMALL ACCENT TREE / LARGE SHRUB
Laurel Sumac (Malosma laurina)

ACCENT PLANTINGS
Island Bush Poppy (Dendromecon rigida)
Bush Sunflower (Encelia californica)
Canyon Silver Yarrow (Eriophyllum 'Canyon Silver')
Allen Chickering Sage (Salvia clevelandii 'Allen Chickering')

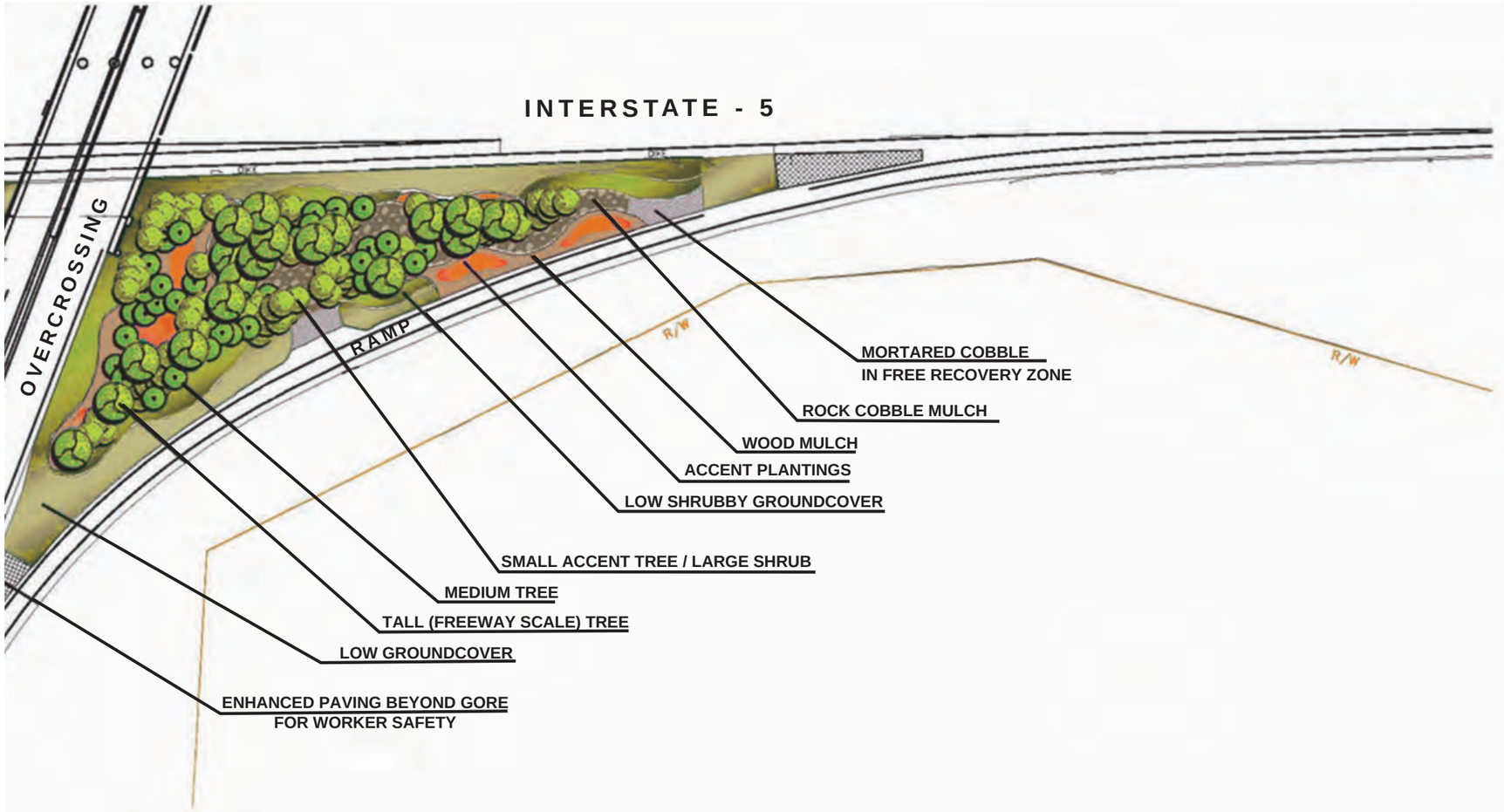
LOW GROUNDCOVER
Dwarf Coyote Brush (Baccharis pilularis)

BIOSWALES
Native Sod

Standard Interchange Landscape Concept



Enhanced Interchange Landscape Concept



CATEGORY IV
ENHANCED LANDSCAPE PLANT PALETTE
(CALIFORNIA NATIVES & CULTIVARS)
Common Name (Botanical Name)

TALL (FREEWAY SCALE) TREE:
Torrey Pine (Pinus torreyana)
California Sycamore (Plantanus recemosa)
Western Cottonwood (Populus fremontii)
California Fan Palm (Washingtonia fillifera)

MEDIUM ACCENT TREE:
Coast Live Oak (Quercus agrifolia)

SMALL ACCENT TREE / LARGE SHRUB
California Lilac (Ceanothus cultivars)

ACCENT PLANTINGS
Saint Catherine's Lace (Eriogonum giganteum)
Island Snapdragon Cultivars (Galvezia speciosa)
California Fuchsia Cultivars (Epilobium canum)
Canyon Silver Yarrow (Eriophyllum 'Canyon Silver')
Allen Chickering Sage (Salvia clevelandii 'Allen Chickering')

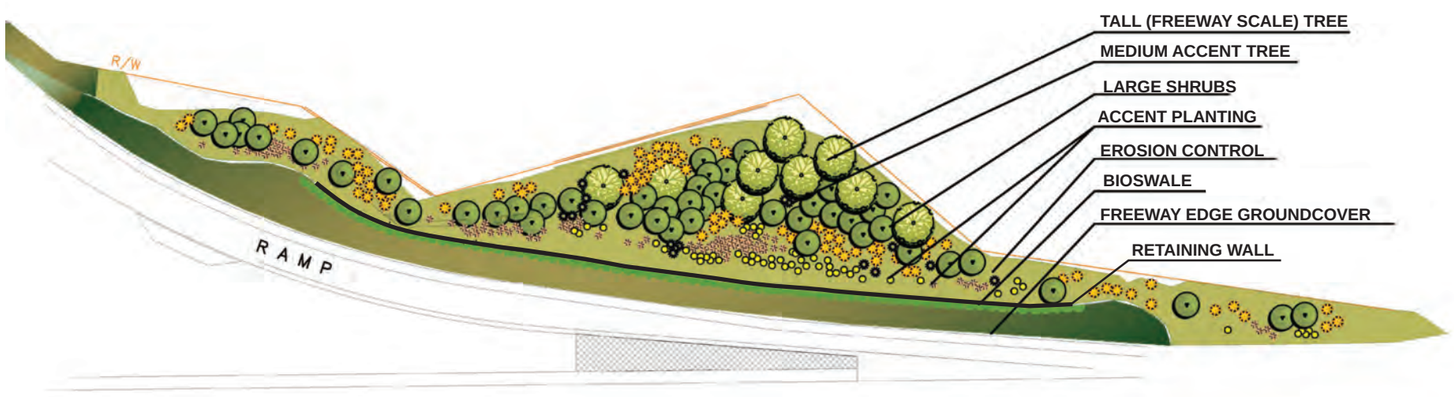
LOW SHRUBBY GOUNDCOVER
Dwarf Coyote Brush (Baccharis pilularis 'Pigeon Point')

LOW GROUNDCOVER
Little Sur Manzanita (Arctostaphylos 'Little Sur')

BIOSWALES
White Yarrow (Achillea Millefolium)
California Meadow Sedge (Carex Pansa)

Enhanced Interchange Landscape Concept

Adjacent Land Use: OPEN SPACE OR DEVELOPED
Caltrans Slope Treatment: NATIVE



NATIVE PLANT PALETTE

Common Name (Botanical Name)

TALL (FREEWAY SCALE) TREE:
Torrey Pine (Pinus torreyana)

MEDIUM ACCENT TREE:
Coast Live Oak (Quercus agrifolia)

LARGE SHRUB
Toyon (Heteromeles arbutifolia)
Laurel Sumac (Malosma laurina)
Lemonade Berry (Rhus integrifolia)

ACCENT PLANTINGS
California Sagebrush (Artemesia californica)
Coast Sunflower (Encelia californica)
Bladderpod (Isomeris arbutifolia)
Red Monkeyflower (Mimulus aurantiacus)
Coyote Brush (Baccharis pilularis)

EROSION CONTROL NATIVE HYDROSEED
Coastal Sagebrush (Artemesia californica)
Beach Evening Primrose (Camissonia cheiranthifolia)
Coast Sunflower (Encelia californica)
Coast Buckwheat (Erigonum fasciculatum)
California Poppy (Eschscholzia californica)
Salt Heliotrope (Heliotropium curassavicum)
Spreading Goldenbrush (Isocoma menziesii)
Goldfields (Lasthenia californica)
Deerweed (Lotus scoparius)
Purple Needlegrass (Nassella pulchra)

BIOSWALES
Native Sod

FREEWAY EDGE GROUNDCOVER
Creeping Sage(Salvia sonomensis)
Native Color Hydroseed Mix

Freeway Slope Treatment Concept

Plant Material

Landscape concepts are presented here on a typical issue approach. There are basically four different types of landscape areas with a variety of specific treatments. Specific plant species are listed in the following plant matrices.

Plant Categories

- **Category I (California Native):** California Coastal Native Plants. Adjacent to native habitat. Plants and seed are used for revegetation. Requires no irrigation after plant establishment. Will receive minimal maintenance.
- **Category II (Native Transitional):** Mixed California Natives and California Native Cultivars. Used at interchanges with views of native areas and at slopes with freeway walls. Walls may have vines to discourage graffiti. Plants and seed are used for revegetation. Requires minimal irrigation once established. Will receive minimal maintenance.
- **Category III (Standard Landscape):** Mixed California Natives and California Native Cultivars. Used at urban interchanges. Accent areas and pedestrian/bike nodes may have ornamental native plantings. Walls may have vines to discourage graffiti. Low native groundcovers at freeway edges require irrigation to suppress weeds/fire. Flat areas may be mowed or mulched with wood chips. Requires low amounts of irrigation once established. Will receive low maintenance and minimal weeding after establishment.
- **Category IV (Enhanced Landscape):** Mixed California Natives and California Native Cultivars. May be used at city gateway interchanges, city streets and medians, accent areas and pedestrian/bike nodes. Includes Category III plants and ornamental natives. Receives regular maintenance and weeding. Decorative rock mulches and pavings may be used in accent areas. This above-standard enhanced landscape requires a Landscape Maintenance Agreement for landscaping in State right-of-way. Requires low amounts of irrigation once established.

BOTANICAL NAME	COMMON NAME	CATEGORY			
		I	II	III	IV
TREES (TALL)					
Pinus torreyana	Torrey Pine	x	x	x	x
Platanus racemosa	California Sycamore		x	x	x
Populus fremontii	Western Cottonwood		x	x	x
Washington fillifera	California Fan Palm				x
TREES (MEDIUM)					
Palos Verde 'Desert Museum'	Desert Museum Palos Verde			x	x
Quercus agrifolia	Coast Live Oak	x	x	x	x
TREES (SMALL)					
Ceanothus 'Ray Hartman'	California Lilac (multi trunk)			x	x
Heteromeles arbutifolia	Toyon (multi trunk)	x	x	x	x
Sambucus mexicana	Blue Elderberry	x	x		

Plant Categories

- **Category I (California Native):** California Coastal Native Plants. Adjacent to native habitat. Plants and seed are used for revegetation. Requires no irrigation after plant establishment. Will receive minimal maintenance.
- **Category II (Native Transitional):** Mixed California Natives and California Native Cultivars. Used at interchanges with views of native areas and at slopes with freeway walls. Walls may have vines to discourage graffiti. Plants and seed are used for revegetation. Requires minimal irrigation once established. Will receive minimal maintenance.
- **Category III (Standard Landscape):** Mixed California Natives and California Native Cultivars. Used at urban interchanges. Accent areas and pedestrian/bike nodes may have ornamental native plantings. Walls may have vines to discourage graffiti. Low native groundcovers at freeway edges require irrigation to suppress weeds/fire. Flat areas may be mowed or mulched with wood chips. Requires low amounts of irrigation once established. Will receive low maintenance and minimal weeding after establishment.
- **Category IV (Enhanced Landscape):** Mixed California Natives and California Native Cultivars. May be used at city gateway interchanges, city streets and medians, accent areas and pedestrian/bike nodes. Includes Category III plants and ornamental natives. Receives regular maintenance and weeding. Decorative rock mulches and pavings may be used in accent areas. This above-standard enhanced landscape requires a Landscape Maintenance Agreement for landscaping in State right-of-way. Requires low amounts of irrigation once established.

BOTANICAL NAME	COMMON NAME	CATEGORY			
		I	II	III	IV
SHRUBS (LARGE)					
Atriplex canescens	Four-Wing Saltbush	x	x		
Baccharis salicifolia	Mule Fat	x	x		
Comarostaphylos diversifolia	Summer Holly	x	x	x	x
Heteromeles arbutifolia	Toyon	x	x	x	x
Malocothamnus fasciculatus	Bush Mallow	x	x		
Malosma laurina	Laurel Sumac	x	x	x	x
Prunus iliciflia	Holly Leaf Cherry	x	x		
Prunus lyonii	Cataline Cherry			x	x
Rhus integrifolia	Lemonade Berry	x	x	x	
SHRUBS (MEDIUM)					
Arctostaphylos 'Sunset'	Sunset Manzanita			x	x
Rhamnus californica	California Coffeeberry	x	x		
Rhamnus californica 'Mound San Bruno'	California Coffeeberry			x	x
Rhamnus californica 'Leatherleaf'	California Coffeeberry			x	x
Ribes vigurnifolium	Catalina Current			x	x
SHRUBS (COASTAL SAGE SCRUB)					
Artemisia californica	Coastal Sagebrush	x	x	x	x
Baccharis sarothroides	Broom Baccharis	x	x	x	x
Baccharis pilularis	Coyote Bush	x	x	x	x
Encelia californica	Bush Sunflower	x	x	x	x
Eruiductyon crassifolium	Felt-Leaf Yerba Santa	x	x		
Eriogonium fasciculatum 'fasciculatum'	California Bushwheat	x	x	x	x
Isocoma menziesii	San Diego Goldenbush	x	x		
Isomeris arborea	Bladderpod	x	x		
Iva hayesiana	San Diego March-Elder	x	x		
Minimus aurantiacus	Sticky Red Monkey Flower	x	x		
Salvia apiana	White Sage	x	x	x	x
Salvia clevelandii	Cleveland Sage	x	x	x	x
Salvia mellifera	Black Sage	x	x		
Viguiera laciniata	San Diego Sunflower	x	x	x	x

Plant Categories

- **Category I (California Native):** California Coastal Native Plants. Adjacent to native habitat. Plants and seed are used for revegetation. Requires no irrigation after plant establishment. Will receive minimal maintenance.
- **Category II (Native Transitional):** Mixed California Natives and California Native Cultivars. Used at interchanges with views of native areas and at slopes with freeway walls. Walls may have vines to discourage graffiti. Plants and seed are used for revegetation. Requires minimal irrigation once established. Will receive minimal maintenance.
- **Category III (Standard Landscape):** Mixed California Natives and California Native Cultivars. Used at urban interchanges. Accent areas and pedestrian/bike nodes may have ornamental native plantings. Walls may have vines to discourage graffiti. Low native groundcovers at freeway edges require irrigation to suppress weeds/fire. Flat areas may be mowed or mulched with wood chips. Requires low amounts of irrigation once established. Will receive low maintenance and minimal weeding after establishment.
- **Category IV (Enhanced Landscape):** Mixed California Natives and California Native Cultivars. May be used at city gateway interchanges, city streets and medians, accent areas and pedestrian/bike nodes. Includes Category III plants and ornamental natives. Receives regular maintenance and weeding. Decorative rock mulches and pavings may be used in accent areas. This above-standard enhanced landscape requires a Landscape Maintenance Agreement for landscaping in State right-of-way. Requires low amounts of irrigation once established.

BOTANICAL NAME	COMMON NAME	CATEGORY			
		I	II	III	IV
SHRUBS (GROUNDCOVER)					
Arctostaphylos 'Carmel Sur'	Little Sur Manzanita			x	x
Baccharis pilularis 'Piegon Point'	Dwarf Coyote Brush		x	x	x
Ceanothus griseus 'Anchor Bay'	Creeping Wild Lilac			x	x
Erigonum 'Theodore Payne'	Creeping California Buckwheat			x	x
Rhamnus californica 'Seaview Improved'	Creeping California Coffeeberry				x
Salvia 'Bees Bliss'	Bees Bliss Sage		x	x	x
Salvia mellifera 'Tera Seca'	Terra Seca Sage		x	x	x
Salvia leucophylla 'Point Sal Spreader'	Point Sal Sage		x	x	x
Salvia sonomensis	Creeping Sage	x	x	x	x
CACTI & SUCCULENTS					
Agave shawii	Shaw Agave	x	x		
Dudleya edulis	Lady Fingers	x	x		
Dudleya pulverulenta	Chalk Lettuce	x	x		
Hesperoyucca whipplei	Our Lords Candle	x	x		
Yucca schidigera	Mojave Yucca	x	x		
FLOWERING ACCENT PERENNIALS					
Achillea millefolia	White Yarrow			x	x
Coreopsis maritima	San Diego Sea Dahlia	x	x	x	x
Dendromecon rigida	Island Bush Poppy	x	x	x	x
Encelia californica	Bush Sunflower	x	x	x	x
Epilobium canum	California Fuschia	x	x		
Eriogonium giganteum	St. Catherine's Lace			x	x
Eriophyllum confertiflorum	Golden Yarrow	x	x		
Eriophyllum nevinii 'Canyon Silver'	Canyon Silver Yarrow			x	x
Galvezia speciosa 'Firecracker'	Island Snapdragon			x	x
Gnaphalium californicum	California Everlasting	x	x		
Mimulus aurantiacus	Sticky Red Monkey Flower	x	x		
Romneya coulteri	Matilija Poppy	x	x	x	x
Salvia clevelandii	Cleveland Sage	x	x	x	x
Salvia clevelandii 'Allan Chickering'	Cleveland Sage			x	x

Plant Categories

- **Category I (California Native):** California Coastal Native Plants. Adjacent to native habitat. Plants and seed are used for revegetation. Requires no irrigation after plant establishment. Will receive minimal maintenance.
- **Category II (Native Transitional):** Mixed California Natives and California Native Cultivars. Used at interchanges with views of native areas and at slopes with freeway walls. Walls may have vines to discourage graffiti. Plants and seed are used for revegetation. Requires minimal irrigation once established. Will receive minimal maintenance.
- **Category III (Standard Landscape):** Mixed California Natives and California Native Cultivars. Used at urban interchanges. Accent areas and pedestrian/bike nodes may have ornamental native plantings. Walls may have vines to discourage graffiti. Low native groundcovers at freeway edges require irrigation to suppress weeds/fire. Flat areas may be mowed or mulched with wood chips. Requires low amounts of irrigation once established. Will receive low maintenance and minimal weeding after establishment.
- **Category IV (Enhanced Landscape):** Mixed California Natives and California Native Cultivars. May be used at city gateway interchanges, city streets and medians, accent areas and pedestrian/bike nodes. Includes Category III plants and ornamental natives. Receives regular maintenance and weeding. Decorative rock mulches and pavings may be used in accent areas. This above-standard enhanced landscape requires a Landscape Maintenance Agreement for landscaping in State right-of-way. Requires low amounts of irrigation once established.

BOTANICAL NAME	COMMON NAME	CATEGORY			
		I	II	III	IV
GRASSES, RUSHES, SEDGES - (Bioswales*)					
Aristida purpurea	Purple Three-Awn	x	x		
Carex pansa*	California Meadow Sedge			x	x
Festuca glauca	Blue Fescue			x	x
Festuca rubra*	Molate Fescue	x	x	x	
Koeleria macrantha*	June Grass	x	x	x	
Muhlenbergia rigens	Deer Grass	x	x	x	
Nasella lepida	Foothill Needle Grass	x	x	x	
Nasella pulchra*	Purple Needle Grass	x	x	x	
Sporbolus airoides	Alkali Sacaton	x	x		
ANNUAL/PERENNIAL COLOR - SEEDED					
Abronia maritima	Sand Verbena	x	x		
Camissonia cheiranthifolia	Beach Evening Primrose	x	x		
Encelia californica	Bush Sunflower	x	x		
Eremocarpus setigerus	Dove Weed	x	x		
Eriogonum fasciculatum	California Buckwheat	x	x		
Eriophyllum confertiflorum	Golden Yarrow	x	x		
Eschscholzia californica	California Poppy	x	x		
Dichelostemma pulchellum	Blue Dicks	x	x		
Gnaphalium californicum	Cudweed	x	x		
Heliotropium curassavicum	Salt Heliotrope	x	x		
Isocoma menziessi var. menziessi	Spreading Goldenbush	x	x		
Lasthenia californica	Goldfields	x	x		
Layia platyglossa	Tidytips	x	x		
Lotus scoparius	Deerweed	x	x		
Nasella pulchra	Purple Needlegrass	x	x		
Sisyrinchium bellum	Blue Eyed Grass	x	x		
Viguiera laciniata	San Diego Sunflower	x	x		

Corridor Landscape Concept

The basic landscape types for the entire corridor are depicted in the following plans. They are conceptual in nature and are intended to provide an overall framework for the basis of future plant material selection within the corridor.

Category I (California Native): Southern California Native Plants

This landscape type will be used at areas adjacent to native habitat. The new landscaping would look natural and harmonize with the existing native vegetation. Requires no irrigation once established.

The landscape planting theme has the following characteristics:

- Plants and seed will be native to the coastal zone of San Diego and Orange County.
- Planting design will be site specific and species will be selected with input by a biologist.
- Walls will be screened with native shrubs where space allows.
- Biofiltration swales will be planted with native sod. Swales may be planted with native seed only if irrigation is not feasible.
- Plantings will typically receive three to five years of plant establishment which will include irrigation and weeding.
- After plant establishment, no weeding or overhead spray irrigation will be provided. Trees could be irrigated by a bubbler system.
- Maintenance includes permanent bmp maintenance, trash pickup and mowing or brush removal as directed by the Fire Marshal.

Category II (Native Transitional): Mixed California Natives with drought tolerant California Native Cultivars

Native Transitional is used at interchanges with views of native areas and at slopes with views of freeway walls. The new plantings create a visual transition from native to urban landscapes. Requires minimal water once established.

The landscape planting theme has the following characteristics:

- The dominant plant type is California native plants and drought tolerant native cultivars. Seed is native to the coastal zone of San Diego and Orange County.
- Planting design will be site specific. A biologist will review the design and may provide input on the plant palette where transitional plantings occur near Category I (Native) plantings.
- Native tree species will be planted to take advantage of drainage water. Riparian trees (Sycamores and Cottonwood) will be planted at low areas. Torrey Pines will be the dominant tree. Slopes will be planted with Torrey Pines and Oaks.
- Walls will be screened with native shrubs where space allows. Vine plantings to deter graffiti may occur at walls in urban areas or where space is limited. Although a native vine is the design preference, a non-native, non-invasive vine will be used. It has been determined that native vines cannot cling to the walls.
- Biofiltration swales will be planted with native sod.
- Plantings will typically receive three to five years of plant establishment which will include irrigation and weeding.
- After plant establishment, some overhead spray irrigation will occur at firebreak plantings. Trees will be irrigated by bubblers.
- Standard Caltrans Maintenance includes trash pickup, permanent bmp maintenance, irrigation work and brush removal as required by the Fire Marshal.

Category III (Standard Landscape): California Natives with drought tolerant California Native Cultivars

This landscape type will be used at interchanges with a more refined, urban setting. The landscape design will blend with local community landscape themes. Requires low amounts of irrigation once established.

The landscape planting theme has the following characteristics:

- The standard landscape plant palette is mixed California natives and dought tolerant native cultivars. Ornamental native trees, and shrubs and succulents can be used as accents.
- Walls will be screened with native shrubs where space allows. Vine plantings will be used to deter graffiti at walls.
- Freeway edges will have permanently irrigated, spreading native groundcovers to suppress weeds and fire.
- Biofiltration swales will be planted with native sod or mixed native sod and flowering native perennials.
- Plantings will typically receive three to five years of plant establishment which will include irrigation and weeding.
- After plant establishment, low amounts of supplemental water will be required. Overhead spray irrigation will be used at native shrub and groundcover areas. Trees will have a bubbler irrigation system. Receives Standard Caltrans Maintenance and no weeding.

Category IV (Enhanced Landscape): California Natives with drought tolerant California Native Ornamental plantings

Used at gateway interchanges and landscapes maintained by others. Requires low amounts of irrigation once established.

The landscape planting theme has the following characteristics:

- Includes Category III plants, decorative rock mulches and regular landscape maintenance to complement the local community landscaping. May include street trees, median plantings and gateway accent plantings. Requires a city Maintenance Agreement for enhanced landscaping in State right of way.

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 1 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 2 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 3 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 4 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 5 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

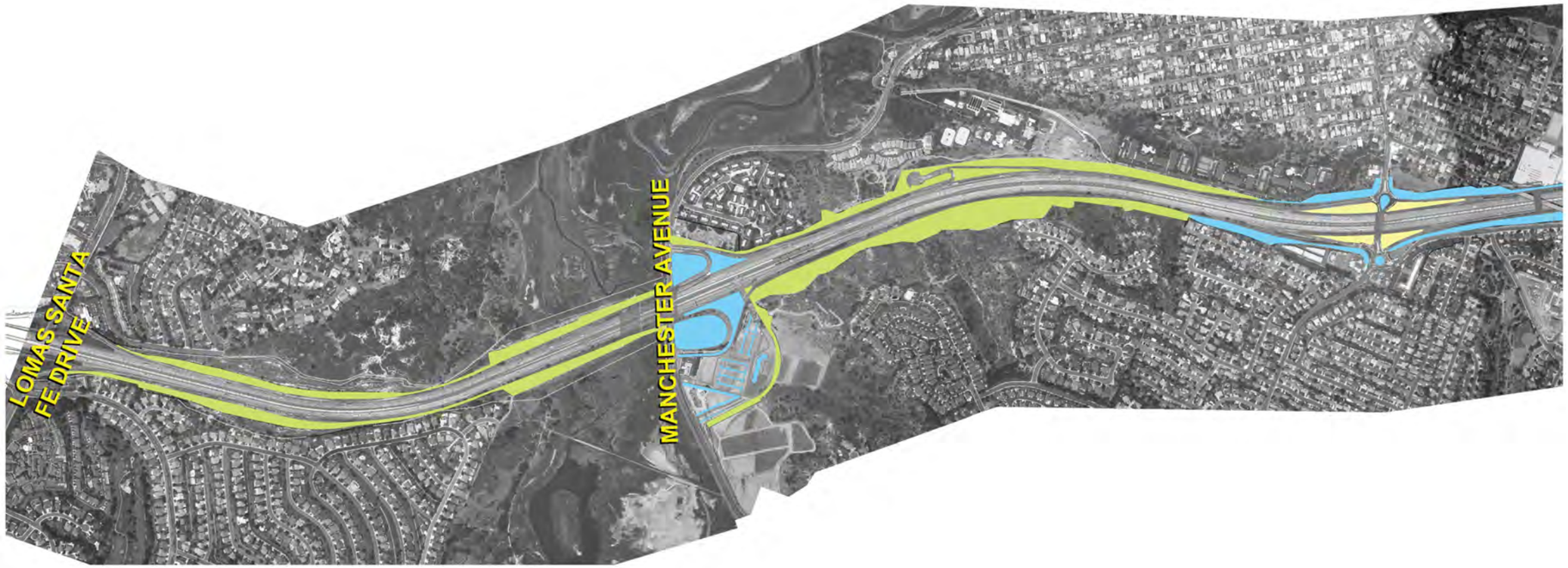
Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 6 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 7 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 8 of 18



Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 9 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

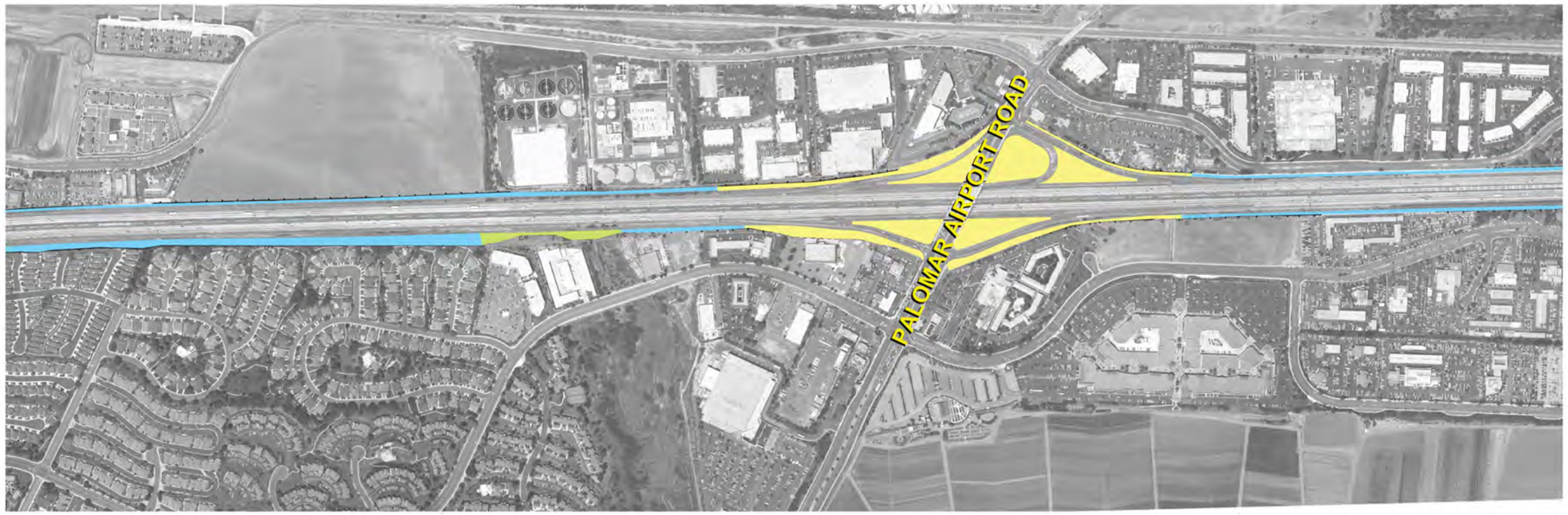
Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 10 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 11 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 12 of 18



Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 13 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 14 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 15 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 16 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 17 of 18

Category I (California Native): Used for revegetation near native habitat. California coastal native plants and hydroseed. No irrigation once established.
Category II (Native Transitional): Used at interchanges near native areas and at slopes with freeway walls. California natives/ cultivar plants and hydroseed receive minimal maintenance. Walls have no vines. Requires minimal irrigation once established.
Category III (Standard Landscape): Used at urban interchanges. California native/cultivar plants with mulch areas receive low maintenance once established. Requires low amounts of irrigation once established.
Category IV (Enhanced Landscape): Used at gateway interchanges and landscapes maintained by others. California native/ ornamental plantings receive regular maintenance and weeding. Decorative rock mulches and pavings are used. Above standard landscape in State right-of-way requires a Landscape Maintenance Agreement. Requires low amounts of irrigation.

Design Guidelines
Interstate 5 North Coast Corridor Project
Sheet 18 of 18

Design Guidelines
Interstate 5 North Coast Corridor Project

Maintenance

IV. Maintenance

When features of the design include components that are not standard of Caltrans plans, these features are deemed as enhanced. Caltrans will install the ehanced components with the understanding that the local cities will be responsible for the upkeeping and maintenance of the advanced features. The details of these maintenance issues will be specified in a maintenance agreement between Caltrans and the local agencies.

The purpose of this section is to identify those design features that, if implemented, must be maintained by the local communities.

Retaining Walls, Noise Walls, Structures and Fences

- Integrally colored concrete, heavy textured concrete surfaces, and alternative materials are proposed for retaining walls and noise walls to reduce the effectiveness and thus discourage graffiti.
- Planting pockets used in front of retaining walls at freeway level will incorporate low water plantings that further discourage graffiti.
- Rust staining of wall concrete caused by weathering steel elements is anticipated. This is a desired effect and does not require further maintenance over the life cycle of the structure.
- Transparent noise walls that feature operable casement windows and are constructed along the Right-of-Way boundary could be maintained (cleaned) by property owners.
- Maintenance requirements for the smooth tapered box bridge will be the same as Caltrans typical box girder bridges. The bridge form will allow ready access to inspect bearings, joints, etc.
- Rust staining of bridge concrete caused by weathering steel elements is anticipated. This is a desired effect and does not require further maintenance over the life cycle of the structure.

Lagoon Bridges

- A haunched box shape is proposed for the lagoon bridge with high clearance to utilize a standard design and construction method. The inspection and maintenance required for this bridge will also be similar to any standard freeway bridge.
- Pedestrian bridges that are suspended from or supported by the freeway bridge will use multiple materials and will require additional inspection. Use of alternative materials such as composite or recycled lumber decking should be considered to maximize sustainability and minimize maintenance.

Landscape

- California native, non-invasive material will be utilized.
- Drought tolerant plant material will be utilized.
- Water harvesting and soil conservation practices will be implemented.
- Landscape will be sustainable.
- Increase shared maintenance responsibilities with local communties.
- Increase the use of non-vegetative treatments.

Design Guidelines
Interstate 5 North Coast Corridor Project

Next Steps

V. Next Steps

The following represent potential next steps for this document.

- Submit Draft Design Guidelines to City Staff for review
- Submit Draft Design Guidelines to resource agencies for review
- Include Design Guidelines in the North Coast Corridor Public Works Plan for public review
- Conduct Feasibility/Constructability Study for the San Elijo Lagoon Haunched Box Bridge Concept
- Work with Cities and communities to address their comments on Design Guidelines
- Formal Submittal of Design Guidelines with Public Works Plan to the California Coastal Commission
- Initiate Design for first phase of project

Design Guidelines

Interstate 5 North Coast Corridor Project

Appendix M:
Clean Water Act – Section 404(b)(1) Alternatives Analysis Evaluation and LEDPA Identification

Section 404(b)(1) Alternatives Analysis

Interstate 5 North Coast Corridor Project

San Diego County, California

11-SD-5-KP PM R28.4/R55/4

EA 235800

June 2013

Table of Contents

Section **Page**

Chapter 1 Introduction....1

Section 404(b)(1) Regulatory Background....1

Organization of Report....3

Chapter 2 Purpose and Need....5

Project Purpose....5

Basic Project Purpose....5

Overall Project Purpose....6

Chapter 3 Proposed Action and Alternatives....7

Alternatives Development/Background....7

Resource Agency Decisions on Alternatives....7

Environmental Review....7

Alternatives Considered in Detail in the DEIR/DEIS....8

Identification of the Locally Preferred Alternative....13

Proposed Section 404 Discharges and Section 404 (b)(1) Alternatives Analysis....14

Proposed Section 404 Discharges Requiring an ACOE Permit....14

Section 404(b)(1) Alternatives Analysis....16

On-Site and Off-Site Special Aquatic Sites Avoidance Alternatives....16

Section 404 (b)(1) Guidelines: Requirements, Restrictions, and Factual Determinations....19

A proposed discharge may not be permitted by the ACOE if it would cause or contribute to severe degradation to waters of the U.S., which is based on the factual determinations, evaluations, and tests required by Subparts B and G, after consideration of Subparts C-F. This requires considering individual and collective or cumulative effects. In addition, a discharge may not be permitted by the ACOE unless appropriate and practicable steps have been taken to minimize potential adverse effects of the discharge on the aquatic ecosystem (Subpart H in the Guidelines identifies such possible steps)....20

Chapter 4 Environmental Effects of the Proposed Action and Alternatives....21

Waters of the U.S. Impacts....21

Subpart C: Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem....21

Substrate....22

Suspended Particulates/Turbidity....24
Contaminants....25
Water....28
Current Patterns and Water Circulation....30
Salinity Gradients....30
Subpart D: Potential Impacts on Biological Characteristics of the Aquatic Ecosystem....31
Direct Impacts on Federally Listed Threatened and Endangered Species....31
Indirect Impacts on Threatened or Endangered Species....33
Impacts on Critical Habitat....36
Comparison/Summary of Impacts on Federally Listed Threatened and Endangered Species....37
Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web....38
Comparison of Impacts on Fish, Crustacans, Mollusks, and Other Aquatic Organisms in the Food Web....39
Impacts on Essential Fish Habitat....41
Other Wildlife and Wildlife Corridors....42
Subpart E: Potential Impacts on Special Aquatic Sites....44
Subpart F: Potential Effects on Human Use Characteristics....45
Municipal and Private Water Supplies....45
Recreational and Commercial Fisheries....45
Water-Related Recreation....45
Aesthetics....46
Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves....47
Subpart G: Evaluation and Testing....49
Evaluation and Testing....49
Cumulative Impacts Assessment....50
Visual/Aesthetic Resources....51
Natural Biological Communities....60
Water Quality....61
Wetlands and Other Waters of the U.S....62
Subpart H: Actions Taken to Minimize Adverse Effects....63

Design Iterations and Wetland/Special Aquatic Site/Other Waters Impact Minimization Efforts....63

Conservation Measures 64

Compensatory Mitigation....68

Funding....69

Preliminary LEDPA Identification and Consideration of Other Section 404 Discharge Requirements/Restrictions....70

Attachment A. Biological Opinion for the Interstate 5 North Coast Corridor Project

List of Tables

Table 1. Existing and Optimized Channel Dimensions.....11
Table 2. Esimated Dredge Spoil Volumes for Project/Build Alternatives (Cubic Feet).....12
Table 3. Permanent Impacts to Waters of the U.S. (Acres).....14
Table 4. Permanent Impacts to Waters of the U.S. by Watershed (Acres).....15
Table 5. Summary of Impacts on Waters of the U.S. by Alternatives 17
Table 6. Watershed Characteristics.....22
Table 7. Impaired Water Bodies, Constituents of Concern, and TDCs 28
Table 8. Flood Elevation Effects, All Alternatives.....29
Table 9. Direct Impacts to Threatened and Endangered Species[1].....32
Table 10. Permanent and Temporary Impacts to Eelgrass (Acres) 40
Table 11. Projects in DEIR/DEIS Cumulative Impacts Analysis.....52
Table 12. Wetland Reestablishment Allowed by Replacement of Bridges, All Alternatives 68

Chapter 1
Introduction

The California Department of Transportation (Caltrans), in coordination with the Federal Highway Administration (FHWA), is proposing improvements to maintain or improve existing and future traffic operations on the existing Interstate 5 (I-5) freeway from La Jolla Village Drive in San Diego to Harbor Drive in Oceanside/Camp Pendleton, extending approximately 27 miles (PM R28.4 to R55.4). The proposed project improvements include construction, operation, and maintenance of two High Occupancy Vehicle/Managed Lanes (HOV/Managed Lanes) in each direction, auxiliary lanes where needed, and one general-purpose lane in each direction (for two of the four build alternatives). All build alternatives developed by the project proponent would have a number of design elements in common. Each build alternative would include the following design elements[1]:

- Eight to 10 general-purpose lanes (lanes available to all users of the facility); the 8 + 4 with Barrier and the 8+4 with Buffer alternatives would not add general purpose lanes, but might add auxiliary lanes and would add HOV/Managed Lanes;
- Two HOV/Managed Lanes (lanes restricted to vehicles, motorcycles, and buses with multiple passengers, or to single passengers paying an access fee) going both north and south;
- Auxiliary lanes (to eliminate weaving) as necessary;
- Permanent barriers or painted buffers between the general-purpose and HOV/Managed Lanes;
- Noise barriers, ramp meters, utility relocations and avoidance, drainage facilities, transit opportunities, and value pricing for single-occupancy vehicle use of HOV/Managed Lanes; and
- Direct access ramps (DARs) that enable grade-separated, direct access from local streets or park-and-ride facilities to HOV/Managed Lanes at Voigt Drive and Manchester Avenue.

Section 404(b)(1) Regulatory Background

The purpose of Section 404(b)(1) of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of waters of the U.S. through the control of discharges of dredged and fill material (33 United States Code [USC] 1344). To fulfill this purpose, dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such a discharge would not have an unacceptable adverse impact either individually or cumulatively.

More specifically, Section 404 of the Clean Water Act (CWA) authorizes the U.S Army Corps of Engineers (ACOE) to issue permits for the discharge of dredged or fill materials into waters of the United States (waters of the U.S.), including wetlands Waters of the U.S., defined at 33 *Code of Federal Regulations* (CFR). §328, and as clarified by *Rapanos v. United States* (547 U.S. 715 [2006]), *Carabell v.*

[1] These design elements are general features of the freeway and freeway access design only. A more complete listing and description of features common to all build alternatives is in Chapter 3 under "Features Common to the Build Alternatives."

United States (126 S. Ct. 2208 [2006]), and *Solid Waste Agency of Northern Cook County v. United States* (531 U.S. 159 [2001]) include coastal and inland waters, lakes, rivers, and streams, including adjacent wetlands and tributaries.

The U.S. Environmental Protection Agency (EPA) Section 404(b)(1) Guidelines (40 CFR 230 *et seq.*) are the substantive environmental criteria used by the ACOE to evaluate permit applications involving the discharge of dredged[2] or fill material into waters of the U.S. Under these guidelines, an analysis of practicable alternatives is the primary tool used to determine whether a proposed discharge can be authorized.

The Section 404(b)(1) Guidelines prohibit discharges of dredged or fill material into waters of the U.S. if a practicable alternative to the proposed discharge exists that would have less adverse impacts on the aquatic ecosystem, including wetlands, as long as the alternative does not have other significant adverse environmental impacts (40 CFR § 230[a]). An alternative is considered practicable if it is available and capable of being implemented after considering cost, existing technology, and logistics in light of overall project purpose (40 CFR § 230[a][2]).

The Section 404(b)(1) Guidelines direct a sequential approach to project planning that considers mitigation measures only after the project proponent shows no practicable alternatives are available to achieve the overall project purpose with less environmental impacts. Once it is determined that no practicable alternatives are available, the guidelines then require that appropriate and practicable steps be taken to minimize potential adverse effects on the aquatic ecosystem (40 CFR § 230.10[d]). Such steps may include actions controlling discharge location, material to be discharged, the fate of material after discharge or method of dispersion, and actions related to technology, plant and animal populations, or human use (40 CFR §§ 230.70-230.77).

Beyond the requirement for demonstrating that no practicable less environmentally damaging alternatives to the proposed discharge exist, the Section 404(b)(1) Guidelines also require the ACOE to compile findings related to the environmental impacts of discharges of dredged or fill material into waters of the U.S. The ACOE must make findings concerning the anticipated changes caused by the discharge to the physical and chemical substrate and to the biological and human use characteristics of the discharge site.

These guidelines also indicate that the level of effort associated with the preparation of the alternatives analysis be commensurate with the significance of the impact and/or discharge activity (40 CFR § 230.6(b)). The following Section 404(b)(1) alternatives analysis shows that all of the build alternatives propose discharges into wetlands or other waters of the U.S., and that of the four build alternatives developed by the proponent of the Interstate 5 North Coast Corridor (I-5 NCC) project, the 8 + 4 with Buffer Alternative has been preliminarily determined to be the least environmentally damaging

[2] In many cases dredging does not generate a Clean Water Act Section 404-regulated discharge; specifically when material generated by dredging would only be considered by the U.S. Army Corps of Engineers to result in "incidental fallback" relative to the dredge location and when disposal of the dredged material would not generate a discharge into waters of the U.S. (e.g., disposal of dredged material at an upland location would not generate return water to a water of the U.S. from the disposal location).

practicable alternative (LEDPA). The No Build Alternative (which is also the No Federal Action Alternative for the purposes of NEPA and Section 404 (b)(1) analysis [40 CFR 230]), would not involve any discharge of dredge or fill material into wetlands and other waters of the U.S., but it would not achieve the overall purpose of the proposed project and therefore is not considered practicable.

Organization of Report

This Section 404(b)(1) alternatives analysis is based primarily on the findings of the Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIR/DEIS) and a Draft Supplemental Environmental Impact Statement/Draft Environmental Impact Report (SDEIR/SDEIS) for the I-5 NCC Project prepared for Caltrans and ACOE. The impact evaluations herein are summarized from the DEIR/DEIS and the SDEIR/SDEIS for the proposed Project and its alternatives, and the Section 404(b)(1) alternatives analysis is not intended to be a stand-alone document.

The DEIR/DEIS and the SDEIR/SDEIS were prepared by Caltrans and FHWA in accordance with the requirements of the National Environmental Policy Act (NEPA) (42 USC 4341 *et seq*.) and in conformance with the Council for Environmental Quality (CEQ) Guidelines. When adopted and certified, the Final EIR/EIS (including the Final SEIR/SEIS) would also fulfill the requirements of the California Environmental Quality Act (CEQA) (California Public Resources Code [PRC] 21000 et seq.) and the Guidelines for Implementation of the California Environmental Quality Act of 1970 (CEQA Guidelines) (14 California Code of Regulations [CCR] 15000 et seq.).

This document provides information and analysis that will allow the ACOE to make a determination of the LEDPA. Chapter 1 provides the **Introduction**, including the proposed project background, Section 404(b)(1) regulatory background, and this organization section. Chapter 2 provides the **Basic and Overall Project Purpose**. Chapter 3 discusses the **Proposed Action and Alternatives** including the components of the proposed project and alternatives to the proposed project. Chapter 4 discusses the **Environmental Effects of the Proposed Action and Alternatives**, as set forth in Subparts C through H of the Section 404(b)(1) Guidelines, and concludes with a brief rationale supporting the preliminarily identified LEDPA.

This page intentionally left blank.

Chapter 2
Purpose and Need

Project Purpose

The proposed project purpose frames the scope of the Section 404 (b)(1) alternatives analysis. For CWA Section 404(b)(1) evaluations, project purpose is expressed in terms of "basic purpose" and "overall purpose." While these terms are not strictly defined in the guidelines, in practical application, they are generally defined as presented in the following sections.

Basic Project Purpose

The basic project purpose comprises the fundamental, essential, or irreducible purpose of the proposed project, and is used by the ACOE to determine whether the applicant's project is water-dependent. The Section 404(b)(1) Guidelines state that if an activity associated with the discharge proposed for a water body does not require access or proximity to, or siting within, water to fulfill its basic purpose, the activity is not water dependent. Non-water-dependent activities that would impact special aquatic sites are subject to a more rigorous level of Section 404(b)(1) alternatives analysis.

The term "special aquatic sites," as defined by the Section 404(b)(1) Guidelines, includes "geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values." The Guidelines specifically name sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes as special aquatic sites. Special aquatic sites occur within the ACOE's geographic jurisdiction at the six lagoon systems and the San Luis Rey River, including wetlands, mud flats, and eelgrass beds (vegetated shallows). Wetlands and mud flats also occur in other creeks and drainages that would be affected along the freeway corridor.

The basic project purpose in this case is "freeway mobility improvements." Since the basic project purpose presumably could be achieved without affecting the special aquatic sites associated with the coast, consisting of the Los Peñasquitos, San Dieguito, San Elijo, Agua Hedionda, Batiquitos, and Buena Vista lagoon systems, the San Luis Rey River, and a number of smaller drainages (San Clemente Creek tributary, Cottonwood Creek, Encinas Creek, and Loma Alta Creek), the project is not water dependent. Because the activity is not water dependent and proposes to impact special aquatic sites by the Clean Water Act Section 404 discharge of dredged or fill material, the applicant is required to rebut the presumptions that: (1) at least one practicable alternative is available that would not impact special aquatic sites, and (2) an alternative not impacting special aquatic sites would have less impact on the aquatic ecosystem. Rebutting the presumptions requires considering off-site and on-site alternatives in evaluating compliance with the Section 404(b)(1) Guidelines.

Overall Project Purpose

The overall project purpose serves as the basis for the ACOE's Section 404(b)(1) alternatives analysis and is determined by further defining the basic project purpose in a manner that more specifically describes the applicant's goals and accounts for logistical considerations for the project, and which allows a reasonable range of alternatives to be analyzed. It is critical that the overall project purpose be defined to provide for a meaningful evaluation of alternatives. It should not be so narrowly defined as to give undue deference to the applicant's wishes, thereby unreasonably limiting the consideration of alternatives. Conversely, it should not be so broadly defined as to render the evaluation unreasonable and meaningless (e.g., to make money).

The overall project purpose is to improve existing and future traffic conditions in the I-5 North Coast Corridor and improve the safe and efficient local and regional movement of people and goods. More specifically, the overall project purpose includes the following six elements/objectives:

- Maintain or improve future 2035 traffic levels of service compared to existing levels of service;
- Maintain or improve travel times within the corridor;
- Provide a facility that is compatible with bus rapid transit and other modal options;
- Provide consistency with the San Diego Regional 2050 Transportation Plan where feasible and in compliance with federal and state regulations;
- Maintain the facility as an effective link in the national Strategic Highway Network; and
- Protect and/or enhance the human and natural environment along the I-5 NCC.

In December of 2004, Caltrans formally requested concurrence on the project purpose[3] and need from the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service (NMFS), the Environmental Protection Agency (EPA), and the U.S. Army Corps of Engineers (ACOE). In December 2004 and January 2005, Caltrans received letters of concurrence from each of these agencies. The years stated in the project objectives have been revised from those with which the agencies concurred to reflect updated construction phasing from 2030 to 2035 and the 2050 Regional Transportation Plan that was adopted in October 2011.

[3] Per a December 10, 2004 interagency Memorandum of Understanding integrating NEPA and Section 404 of the Clean Water Act in transportation planning, programming, and implementing stages for federal aid surface transportation projects requiring a Section 404 permit, the NEPA project purpose also serves as the overall project purpose for the proposed action.

Chapter 3
Proposed Action and Alternatives

Alternatives Development/Background

Resource Agency Decisions on Alternatives

On December 10, 2004, Caltrans and Caltrans staff on behalf of FHWA signed an interagency Memorandum of Understanding (MOU) committing to integrate the National Environmental Policy Act (NEPA) and Section 404 of the CWA in transportation planning, programming, and implementing stages for federal aid surface transportation projects that require a permit under Section 404. Under the MOU process, signatory agencies FHWA, USFWS, NOAA, ACOE, and EPA were asked to concur on the following two milestones: (1) purpose and need statement and (2) identification of the range of alternatives and consideration of the criteria used to select and analyze the alternatives to be studied in the DEIR/DEIS and a SDEIR/SDEIS.

On April 24, 2005, Caltrans formally requested concurrence with the screening criteria for alternatives selected for the DEIR/DEIS from USFWS, NOAA, ACOE, and EPA. Letters of concurrence from each of these agencies were received in April, May, and June 2005. On August 1, 2006, Caltrans formally requested concurrence with the range of alternatives selected for the DEIR/DEIS from USFWS, NOAA, ACOE, and EPA. Letters of concurrence from each of these agencies were received in August 2006. Concurrence on the preliminary LEDPA Determination and Conceptual Mitigation Plan will be requested after review by the federal agencies.

Many project alternatives were considered by Caltrans as discussed in the DEIR/DEIS. Of these, four build alternatives and the No Build Alternative were carried forward for detailed study in the DEIR/DEIS. For purposes of the present Section 404(b)(1) analysis, the No Build Alternative is equivalent to the No Federal Action Alternative. The resource agency representatives concurred that these five project alternatives were sufficient for the DEIR/DEIS and could be carried forward for further detailed study. No further alternatives were suggested by the agencies.

Environmental Review

A DEIR/DEIS was prepared for the I-5 NCC project by Caltrans and FHWA and released for public review on July 9, 2010. In July 2011, Caltrans identified the 8+4 with Buffer Alternative (i.e., the proposed action) described in the DEIR/DEIS as the Locally Preferred Alternative (LPA). To provide additional information, Caltrans and FHWA decided to prepare an SDEIR/SDEIS covering the build alternatives' effects on the six coastal lagoons (Los Peñasquitos, San Dieguito, San Elijo, Agua Hedionda, Batiquitos, and Buena Vista) crossed by the project. Refinement of the LPA project design continued between public review circulation of the DEIR/DEIS and that of the SDEIR/SDEIS. In this document, the 8+4 Buffer Alternative described in the DEIR/DEIS and the revised 8+4 with Buffer Alternative described in the SDEIR/SDEIS are distinguished where relevant to the analysis.

Alternatives Considered in Detail in the DEIR/DEIS

Four build alternatives were described and analyzed co-equally in the DEIR/DEIS. These alternatives proposed the following:

- Eight to 10 general-purpose lanes (lanes available to all users of the facility);
- Two managed lanes (lanes restricted to vehicles, motorcycles, and buses with multiple passengers, or to single passengers paying an access fee) going both north and south;
- Auxiliary lanes (to eliminate weaving) as necessary;
- Use of permanent barriers or painted buffers between the general purpose and HOV/Managed Lanes; and
- DARs that enable grade-separated, direct access from local streets or park and ride facilities to HOV/Managed Lanes at Voigt Drive and Manchester Avenue.

These feasible and practicable alternatives were fully evaluated in the DEIR/DEIS and are described below.

10 + 4 with Barrier Alternative

The 10 + 4 with Barrier Alternative would build one general-purpose lane in each direction on I-5 from south of Del Mar Heights Road in San Diego to State Route 78 (SR-78) in Oceanside. Two HOV/Managed Lanes would be built in each direction from north of the Interstate 805 (I-805)/I-5 freeway-to-freeway connector in San Diego to Harbor Drive/Vandegrift Boulevard in Oceanside. This alternative would separate HOV/Managed Lanes from general-purpose lanes with a concrete barrier for most of its length, and a variable painted buffer in lieu of a barrier from Voigt Drive to Del Mar Heights Road and from SR-78 to Harbor Drive/Vandegrift Boulevard. The projected cost (right-of-way, support, and construction) for this alternative was estimated in the DEIR/DEIS as approximately $4.3 billion in 2010 dollars.

10 + 4 with Buffer Alternative

The 10 + 4 with Buffer Alternative would add the same number of through lanes (one general-purpose and two HOV/Managed Lanes in each direction) and function similarly to the 10 + 4 with Barrier Alternative, but would use a painted buffer to separate HOV/Managed Lanes from general-purpose lanes for the entire length of the project. The projected cost (right-of-way, support, and construction) for the alternative was estimated in the DEIR/DEIS as approximately $3.5 billion in 2010 dollars.

8 + 4 with Barrier Alternative

The 8 + 4 with Barrier Alternative would not add any general-purpose lanes to the existing highway. Two HOV/Managed Lanes would be added in each direction, separated from general-purpose lanes by a concrete barrier similar to the one described above for the 10 + 4 with Barrier Alternative. The solid barrier and extra shoulder on either side of the barrier and the weaving necessary for ingress and egress to the HOV/Managed Lanes increases the footprint of the barrier alternatives. The projected cost (right-of-

way, support, and construction) for this alternative was estimated in the DEIR/DEIS as approximately $4.1 billion in 2010 dollars.

8 + 4 with Buffer Alternative (Proposed Project/Proposed Action)

The 8 + 4 with Buffer Alternative would not add any general-purpose lanes to the existing highway. It would function similarly to the 8 + 4 with Barrier Alternative but would separate HOV/Managed Lanes from general-purpose lanes with a variable painted buffer for the entire length of the project. As noted, Caltrans identified this alternative as the LPA because it best meets the project purpose and need, and because it minimizes potential environmental impacts that would result from construction of the project. The projected cost (right-of-way, support, and construction) for this alternative was estimated in the DEIR/DEIS as approximately $3.3 billion in 2010 dollars.

Features Common to the Build Alternatives

All four build alternatives would also include natural and human community enhancements, some of which would affect waters of the U.S. These include pedestrian, bicycle, park and ride, gateway, streetscape, and park enhancements. The North Coast Bikeway is a regional enhancement that would complement the Coastal Rail Trail and the El Camino Bicycle Corridor, as well as the California Coastal Trail. Implementation of the community enhancements would depend on reaching a maintenance agreement with the affected city.

Each of the build alternatives would include braided ramps between the Roselle Street and Genesee Avenue bridges, DARs, and auxiliary lanes that have been specifically included in the assessment of project impacts in the DEIS. DARs would allow buses, carpools, and other users of the HOV/Managed Lanes to directly access the HOV/Managed Lanes without moving through general-purpose lanes. Numerous other design elements, including ramp meters, utility relocations, noise barriers, retaining walls, drainage and water treatment features, auxiliary lanes, and signage, would not result in appreciable environmental impacts. All build alternatives would have the following design elements:

- One additional HOV/Managed Lane in each direction from Voigt Drive to just north of Lomas Santa Fe Drive.
- Two HOV/Managed Lanes in each direction from just north of Lomas Santa Fe Drive to Harbor Drive/Vandegrift Boulevard.
- Separation of general-purpose lanes from HOV/Managed Lanes from near La Jolla Village Drive to Del Mar Heights Road, and from SR-78 to near Harbor Boulevard, by a buffer varying in width up to 4 feet.
- Provision of a continuous HOV lane for I-5, with a freeway-to-freeway connector (flyover) crossing over the I-5/I-805 merge and connecting the proposed project HOV/Managed Lanes to existing I-5 HOV lanes just north of that merge.
- DARs for grade-separated interchanges into managed lanes, thereby allowing direct access to the HOV/Managed Lanes without weaving across general-purpose lanes at Voigt Drive and

Manchester Avenue. The DARs would be compatible with carpools, bus transit, and value pricing, and would support HOV/Managed Lanes. (The Manchester Avenue DAR was redesigned to reduce environmental impacts since circulation of the DEIR/DEIS.)

- Intermediate access points (IAPs) located at Carmel Valley Road, Lomas Santa Fe Drive, Birmingham Drive, Poinsettia Lane, Tamarack Drive (southbound only), and SR-78; at-grade access points at the ends of the HOV/Managed Lanes near La Jolla Village Drive and Harbor Drive.
- Intelligent Transportation System (ITS) components, such as toll collection equipment, to allow single-occupancy vehicle users to purchase use of HOV/Managed Lanes. ITS components include overhead suspended scanner devices such as gantries, traffic monitoring stations, ramp meters, closed circuit television to view traffic on the facility and to help manage the traffic, changeable message signs to display the tolls, and loop detectors to measure traffic volume and speed.
- Twelve-foot-wide auxiliary lanes (as needed in 14 locations: five southbound, four northbound, and five both north- and southbound) and 10- to 12-foot-wide shoulders.
- New park and ride facilities at Manchester Avenue and State Route 76 (SR-76), and enhanced park and ride facilities at other locations.
- Reconfiguration of various local interchanges to improve vehicular, pedestrian, and bicycle circulation at northbound ramps for Leucadia Boulevard and La Costa Avenue; at southbound ramps for Roselle Street, Manchester Avenue, Encinitas Boulevard, Palomar Airport Road, and Oceanside Boulevard; and at both north- and southbound ramps at Genesee Avenue, Del Mar Heights Road, Via de la Valle, Birmingham Drive, Santa Fe Drive, Tamarack Drive, Carlsbad Village Drive, Mission Avenue, SR-76, and Harbor Drive.
- Widening or replacement of lagoon bridges at Los Peñasquitos, San Dieguito, San Elijo, Batiquitos, Agua Hedionda, and Buena Vista Lagoons.
- Ramp metering at various on-ramps (with ultimate metering at all 58 on-ramps at buildout), retaining walls (to reduce property acquisition needs, stabilize slopes, minimize impacts, and accommodate engineered structures), barriers, guard rails/end treatments, crash cushions, bridge rails, and signage, installed as appropriate and as needed.
- Project-related drainage abandonment or improvement including extension, replacement, or lining, with new drainage facilities constructed adjacent to cross roads (facility examples include storm drain inlets, storm ditches, rock slope protection, and headwalls).
- Relocation of existing overhead or underground utilities (water, sewer, gas, electricity telephone, and other communications), as needed and within existing utility easements, as possible.
- Proposed sound barriers as described in the DEIR/DEIS with specifics dependent on final design.

- Bioswales and/or detention basins for treatment of storm water runoff with specifics dependent on final design.
- Increasing the lagoon channel cross sections beneath the I-5 bridges at San Elijo, Batiquitos, and Buena Vista Lagoons by abutment fill removal and dredging of the existing channel.

All bridge abutments would be armored with riprap; this is the existing condition. No channel bottom armoring would be employed, and bottom armoring currently present at the Batiquitos Lagoon channel beneath the I-5 bridge would be removed.

At three lagoons, San Elijo, Batiquitos, and Buena Vista, removal of fill (including riprap, concrete, and soil) on existing abutments and non-Section-regulated dredging are proposed to optimize the lagoon tidal channels under the bridges to allow maximum fluvial (flood) and tidal flows for restoration of the lagoons. Anticipated LOSSAN (Los Angeles to San Diego) railroad bridge improvements were taken into account. Caltrans conducted optimization studies of the appropriate channel width and depth to achieve the optimum tidal and fluvial flows. At Batiquitos Lagoon, the proposed channel dimensions and associated bridge lengths are the same for all I-5 NCC build alternatives; only the bridge widths would vary. At Buena Vista Lagoon, the channel modification would be the same at I-5 for a reasonable range of lagoon restoration alternatives. At San Elijo Lagoon, fill removal and dredging would optimize fluvial and tidal flows for each of the proposed restoration alternatives. The I-5 NCC project would allow for lagoon restoration with any of the proposed alternatives, but the choice of restoration alternatives would not be a part of, and would not be influenced by, the I-5 NCC project. Table 1 shows the channel dimensions calculated by the optimization studies. The Locally Preferred Alternative (discussed below) assumes a channel width of 261 feet at San Elijo Lagoon, which would accommodate any of the restoration project alternatives.

Table 1. Existing and Optimized Channel Dimensions

Lagoon	Existing		Optimized	
	Channel Bottom Width	Channel Bottom Depth	Channel Bottom Width	Channel Bottom Depth
San Elijo Lagoon	130 feet	0.74 feet	--	--
Restoration Alternative 1A	130 feet	0.74 feet	130 feet	-6.0 feet
Restoration Alternative 1B	130 feet	0.74 feet	261 feet	-6.0 feet
Restoration Alternative 2A	130 feet	0.74 feet	261 feet	-6.5 feet
Batiquitos Lagoon	74 feet	-5.3 feet	134 feet	-7.0 feet
Buena Vista Lagoon*	24 feet	-2.0 feet	105 feet	-6.0 feet

All elevations in North American Vertical Datum of 1988

* Compatible with all proposed lagoon restoration alternatives.

Table 2 presents the estimates of volume of dredge material that would be removed at each lagoon by build alternative. It is not currently known exactly where the dredged material would be disposed of, but it is not expected to be disposed of in waters of the U.S. or at an upland location in such a manner that it could generate return water to a water of the U.S. (i.e., no Section 404-regulated discharge is anticipated from dredge material storage or disposal).

While a Section 404 discharge is not anticipated from the dredging or disposal activities, dredging would remove the existing substrate and any organisms inhabiting it. The channels are underlain by alluvium, and dredging would not substantially change the physical and chemical character of the substrate. Tidal flushing would reconstitute the substrate by moving sediment into and through the channels, and organisms would be expected to recolonize the channels from adjacent lagoon areas. Riprap currently on the bottom of the Batiquitos channel would be removed and subsequent dredging to remove additional sediment would be completed. Tidal and fluvial flows and sediment movement would allow organisms to recolonize after construction.

Table 2. Estimated Dredge Spoil Volumes for Project/Build Alternatives (Cubic Feet)

Dredge Volume	10 + 4 with Barrier	10 + 4 with Buffer	8 + 4 with Barrier	8 + 4 with Buffer
San Elijo (Alternative 2A)	33,759	30,492	31,799	27,878
Batiquitos with HOV Lanes	88,862	81,457	81,457	81,457
Batiquitos without HOV Lanes	88.862	79,976	81,457	77,014
Buena Vista with HOV Lanes	106,286	106,286	106,286	106,286
Buena Vista without HOV Lanes	92,347	92,347	92,347	92,347

No Build Alternative/No Federal Action Alternative

As with NEPA, the Section 404(b)(1) Guidelines require development and evaluation of a No Action Alternative (i.e., the conditions reasonably anticipated to prevail in the absence of an ACOE permit). Proposed project improvements consisting of the four HOV/Managed Lanes, DARs, IAPs, auxiliary lanes, drainage upgrades, bridge improvements, community enhancements, etc., would not be constructed under the No Build Alternative (which, as noted in Chapter 1, is also the No Federal Action Alternative for the purposes of NEPA and Section 404 (b)(1) analysis [40 CFR 230]). The existing multipurpose lanes (generally four in each direction) and the configuration of most of the intersections along the corridor would remain in their current condition. Routine maintenance would continue. Although proposed project improvements would not be implemented, a number of interchange, operations, and rail projects separately proposed and cleared under other CEQA/NEPA environmental documents potentially would move forward.

As noted above, Caltrans-funded studies show that San Elijo, Batiquitos, and Buena Vista Lagoons would benefit from replacing the existing bridges with longer bridges and from increased channel cross-sections at these locations. These improvements, which would not involve a Section 404-regulated discharge, are proposed for all the build alternatives and would increase tidal flushing and fluvial flows, benefiting water quality, and promote habitat reestablishment efforts in the lagoons. These bridge-related channel improvements would not occur with the No Build Alternative.

Without the proposed additional through lanes on I-5, the anticipated increase in traffic volumes would be expected to result in additional congestion with longer delays. Proposed improvements related to pedestrian and bike paths would not occur. Similarly, improvements to the planned transit system would not be supported without the project DARs and managed lanes. As noted, under this alternative, there

would not be any replacement of/change to the lagoon bridges, so there would be no optimization/increasing of bridge lengths or channel configurations/cross-sections at San Elijo, Batiquitos, or Buena Vista Lagoons, intended to improve tidal and fluvial flows and also to accommodate separately evaluated large restoration projects at these locations. Because there would be no bridge-related improvements, the No Build Alternative would not meet the project's purpose and need and was eliminated from consideration as a feasible alternative in the DEIR/DEIS. Similarly, it is not considered a practicable alternative under the Section 404(b)(1) Guidelines; however, it is carried forward in the Section 404(b)(1) analysis as representing the reasonably anticipated conditions to occur in the area in the absence of Federal action (i.e., it is the federal baseline of comparison in evaluating the alternatives, including the proposed project/Locally Preferred Alternative).

Identification of the Locally Preferred Alternative

As noted above, in July 2011, Caltrans identified the 8 + 4 with Buffer Alternative described in the DEIR/DEIS and refined to further minimize impacts as the LPA, because it meets the minimum design requirements and it fulfills the proposed project's purpose and need. In letters to EPA, USFWS, NOAA, and ACOE dated February 28, 2011, Caltrans asked for concurrence on the selection. The 8 + 4 with Buffer Alternative would require less right-of-way, resulting in the least or lowest impacts of all the build alternatives for the following issue or resource areas:

- Park and recreational facilities
- Farmland
- Floodplain effects related to roadway widening, fill slopes, and bridge column impacts into waterways
- Sensitive species' critical habitat
- Permanent effects to sensitive upland habitats
- Permanent effects to sensitive wetland habitats (as well as eelgrass)
- Permanent effects to jurisdictional waters
- Sensitive individual plants
- Section 4(f) resources
- Residential and business displacement
- Increase in impervious area

The 8 + 4 with Buffer Alternative also allowed for the largest available space for water quality treatment. Costs have been reduced for the 8 + 4 with Buffer Alternative, principally by elimination of two DARs proposed in the DEIR/DEIS. However, projected total costs were increased by optimization of bridge length combined with widening and dredging the channels at San Elijo, Batiquitos, and Buena Vista Lagoons, and the addition of the North Coast Bikeway to the project. The 8 + 4 with Buffer Alternative is currently projected to cost approximately $3.5 billion (right-of-way, support, and construction in 2010 dollars), compared to the $3.3 billion cost estimated in the DEIR/DEIS.

In terms of impacts to wetlands and other waters of the U.S., the 8 + 4 with Buffer Alternative described in the DEIR/DEIS would impact the least acreage of the four build alternatives. Refinements in design since the selection of the 8 + 4 with Buffer Alternative as the LPA have further reduced direct and indirect impacts to waters of the U.S. Table 3 compares the acreage of permanent impacts on ACOE jurisdictional wetlands and other waters of the U.S. for the four build alternatives. In the DEIR/DEIS, permanent impact calculations were based on designating the whole bridge footprint as permanent impact. The impacts were later refined and reduced based on more complete design information, including more precise areas of impact rather than the entire bridge footprint. This refined information included column and abutment locations, staging areas, and bridge optimization. The resulting reduction in impacts is shown in Table 3.

Table 3. Permanent Impacts to Waters of the U.S. (Acres)

Impacts	10 + 4 with Barrier	10 + 4 with Buffer	8 + 4 with Barrier	8 + 4 with Buffer
DEIR/DEIS	28.86	24.89	26.74	22.97
Recalculated	19.69	16.68	17.95	14.13

Under both the gross and refined calculations, the 8 + 4 with Buffer Alternative would have less acreage of permanent direct impacts (through discharges of fill) on jurisdictional waters of the U.S. than the other build alternatives.

Proposed Section 404 Discharges and Section 404 (b)(1) Alternatives Analysis

Proposed Section 404 Discharges Requiring an ACOE Permit

Implementation of each of the four build alternatives, including the proposed project, would result in CWA Section 404 discharges of fill material into waters of the U.S. (see Table 3). As shown in Table 3, permanent impacts to waters of the U.S. for the 8 + 4 with Buffer Alternative are lower than for the other three build alternatives, with differences of 2.55 acres for the 10 + 4 with Buffer Alternative, 5.56 acres for the 10 +4 with Barrier Alternative, and 3.82 acres for the 8 + 4 with Barrier Alternative, based on refined calculations incorporating column and abutment fill rather than the entire bridge footprints (i.e., some of the footprint area in each case would only be affected temporarily).

During the NEPA Section 404 meetings with the MOU signatory agencies, ACOE expressed an interest in the amount of proposed impacts to jurisdictional waters of the U.S. in each of the 11 affected watersheds. Aquatic resource loss would result from placement of roadway fill, bridge columns, and bridge abutments in aquatic resources at the locations shown in Table 4. Watersheds, for completing these calculations, are delimited as high point to high point (in elevation) in the project area that drains into a particular water body.

Table 4. Permanent Impacts to Waters of the U.S. by Watershed (Acres)

Watershed	Type	10 + 4 with Barrier	10 + 4 with Buffer	8 + 4 with Barrier	8 + 4 with Buffer
San Clemente: Roadway fill in unnamed drainage south of Voigt, east of I-5	Other Waters	0.00	0.00	0.00	0.00
	Wetland	0.01	0.01	0.01	0.01
Los Peñasquitos: Roadway fill in unnamed drainage west of I-5 and south of Genesee Avenue and Los Peñasquitos Creek.	Other Waters	0.11	0.11	0.11	0.11
	Wetland	0.44	0.44	0.44	0.44
San Dieguito River: Roadway fill along drainages north and south of the river along I-5. Piers for widened bridge within the river.	Other Waters	0.03	0.03	0.03	0.03
	Wetland	3.74	2.98	3.54	2.96
San Elijo Lagoon: Roadway fill on either side of I-5 .Columns for new bridge.	Other Waters	0.00	0.00	0.00	0.00
	Wetland	1.45	0.68	0.76	0.60
Cottonwood Creek: Roadway fill east of I-5 between Santa Fe and Encinitas Blvd. and west of I-5 north of Encinitas Blvd.	Other Waters	0.08	0.08	0.08	0.05
	Wetland	0.43	0.32	0.38	0.29
Batiquitos Lagoon: Roadway fill on either side of I-5. Columns for new bridge.	Other Waters	0.27	0.27	0.27	0.24
	Wetland	4.93	4.58	4.65	2.89
Encina Creek: Lengthen culvert on either side of I-5 roadway fill. Fill in unnamed drainage immediately adjacent to I-5 and parallel to the freeway; drainage would be put in pipe.	Other Waters	0.14	0.13	0.13	0.12
	Wetland	1.49	1.46	1.47	1.46
Agua Hedionda Lagoon: Roadway fill on either side of I-5. Columns for new bridge.	Other Waters	5.20	4.22	4.71	3.56
	Wetland	0.00	0.00	0.00	0.00
Buena Vista Lagoon: Roadway fill on either side of I-5. Columns for new bridge.	Other Waters	0.00	0.00	0.00	0.00
	Wetland	1.28	1.28	1.28	1.28
Loma Alta Creek: Columns for new bridge.	Other Waters	0.07	0.07	0.07	0.07
	Wetland	0.00	0.00	0.00	0.00
San Luis Rey River : Columns for widened bridge.	Other Waters	0.02	0.02	0.02	0.02
	Wetland	0.00	0.00	0.00	0.00
Totals	Other Waters	5.92	4.93	5.42	4.20
	Wetland	13.77	11.75	12.53	9.93
	All	**19.69**	**16.68**	**17.95**	**14.13**

As shown in Table 4, the proposed project footprint in waters of the U.S. is the same in the San Clemente, Los Peñasquitos, Loma Alta, Buena Vista, and San Luis Rey watersheds for all alternatives. According to the totals, the 8 + 4 with Buffer Alternative would permanently impact the fewest acres of ACOE jurisdictional waters of the U.S. in the other watersheds. Therefore, as shown in Table 4, the 8 + 4 with Buffer Alternative would have the least permanent impacts on waters of the U.S. in 6 of the 11 watersheds, and the lowest impacts overall on both other waters of the U.S. (4.20 acres) and jurisdictional wetlands (9.93 acres).

It is important to keep in mind that while all the build alternatives include dredging and removal of fill adjacent to the inlet channels under the three bridges at San Elijo, Buena Vista, and Batiquitos Lagoons, as discussed above in "Features Common to the Build Alternatives" and further in Chapter 4 (Subpart G: Evaluation and Testing), neither the proposed dredging nor the associated disposal activity would generate a Section 404-regulated discharge, and they are therefore not evaluated as such in this Section 404(b)(1) analysis of alternatives; they are, however, included and evaluated as reasonably foreseeable activities occurring in the Study Area in the cumulative impact assessment section in Chapter 4.

As noted previously, the No Build Alternative would not result in any aquatic resource loss. It represents the conditions reasonably expected to prevail in the area in the absence of Federal action, and specifically for the Section 404(b)(1) analysis, the issuance of a Corps permit.

Section 404(b)(1) Alternatives Analysis

This alternatives analysis was prepared in accordance with 40 CFR Part 230, Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (the Guidelines). It succinctly states and evaluates information regarding the effects of proposed discharge of dredged or fill material into waters of the U.S., including wetlands. As such, as noted in Chapter 1, it is not meant to stand alone and relies heavily on information provided in the DEIR/DEIS, SDEIR/SDEIS, and Biological Assessment.

As also noted in Chapter 1, pursuant to Section 404(b)(1) of the CWA, the ACOE may only authorize the practicable alternative with the least damage to aquatic resources unless it has other significant adverse environmental consequences; with practicable alternatives being those that are available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose.

As noted in Chapter 2, because the basic purpose of the proposed activity is not water dependent and would discharge dredged or fill material into special aquatic sites, it is necessary to rebut the following presumptions: (1) alternatives for non-water dependent activities that do not involve special aquatic sites are available and (2) alternatives that do not involve special aquatic sites have less impact on the aquatic environment.

On-Site and Off-Site Special Aquatic Sites Avoidance Alternatives

An alternative that would avoid all impacts to special aquatic sites could conceptually involve one of two options. One option would be to increase the length of the bridges that would need to be replaced and widened within the I-5 NCC (i.e., on-site) to completely avoid any direct impacts to special aquatic sites, and to construct those bridges without placing any columns, abutments, or other fill into special aquatic sites. Such an option was not considered practicable, since the costs of alternative means of bridge construction (i.e., bridges using wide spans without in-special aquatic site columns or abutments such as suspension or cantilevered bridges) would be comparatively very much higher (more than 6 times higher just for bridges that would remove all fill and still have columns in wetland (SEIR). Similarly, it would not be practicable from a cost perspective to avoid all non-special aquatic site waters of the U.S. Thus,

Caltrans decided to pursue a more practicable and less costly design approach that would lengthen the bridges over the most important and extensive special aquatic sites (maximize avoidance), the lagoons and the San Luis Rey River, and to increase their channel cross sections (which, as noted, would not involve a Section 404 discharge), to maintain and improve the aquatic functions of the lagoons and river.

The other avoidance option would be to construct an entire new freeway between the start and end points of the I-5 NCC at a location far enough inland (up to 3 miles from the current I-5 corridor) to avoid the lagoons (i.e., off-site). Even in that location, new bridges would have to span extensive wetlands, other special aquatic sites, and other waters of the U.S.. Similar considerations of costs associated with lengthening bridges in the existing I-5 NCC would apply to this alternative, and costs associated with acquiring rights-of-way and relocating residences and businesses would be extremely high, (several orders of magnitude higher) would have substantial impacts to the social and natural environments aside from special aquatic sites, would require extensive take of private property, and would be incompatible with local and regional planning. A new inland freeway corridor would divide established neighborhoods, disrupt the current local and regional transportation network, and leave the fate of the current I-5 freeway corridor uncertain.

Thus, Caltrans considered both on-site and off-site alternatives for complete avoidance of wetlands and other special aquatic sites, and found them impracticable for reasons of cost, for on-site alternatives, and of cost and other significant adverse environmental impacts, for off-site alternatives. In fact, consultation between Caltrans and the other signatory agencies (USFWS, ACOE, NOAA, and EPA) during the NEPA Section 404 MOU integration process resulted in agreement that there was no practicable alternative that would meet the purpose and need of the proposed project while avoiding all impacts to wetlands and other waters of the U.S., including non-wetland special aquatic sites.

On-Site Build Alternatives

The Section 404(b)(1) alternatives analysis below compares the impacts of each of the on-site build alternatives and the No Build Alternative and preliminarily identifies the 8 + 4 with Buffer Alternative as the LEDPA. This identification is made on the basis of the relative severity of impacts on various environmental functional components of wetlands and other waters of the U.S., as discussed more fully in Chapter 4, Subparts C through F, and summarized in Table 5.

Table 5. Summary of Impacts on Waters of the U.S. by Alternatives

Functional Component	No Federal Action	Preliminary Least Environmentally Damaging Alternative (Build Alternatives)
Waters of the U.S.	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Subpart C: Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem		

Substrate	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Suspended Particulates/ Turbidity	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Contaminants	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Water	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Current Patterns and Water Circulation	No Effect	No discernible difference among build alternatives
Salinity Gradients	No Effect	No discernible difference among build alternatives
Subpart D: Potential Impacts on Biological Characteristics of the Aquatic Ecosystem		
Federally Listed Endangered Species	No Effect	Similar on species and territories; least overall acreage of impacts preferred; least damaging: 8 + 4 with Buffer
Critical Habitat, Overall	No Effect	Least overall acreage of impacts preferred; least damaging: 8 + 4 with Buffer
Coastal California Gnatcatcher	No Effect	Least overall acreage of impacts preferred; least damaging:8 + 4 with Buffer (31.7 acres)
Southwestern Willow Flycatcher and Least Bell's Vireo	No Effect	Build alternatives equal in impact
Tidewater Goby	No Effect	Build alternatives equal in impact
Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Impacts on Eelgrass and Other Essential Fish Habitat	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Eelgrass Beds	No Effect	Slight advantage to lowest acreage of direct impact: 8+ 4 with Barrier and 8 + 4 with Buffer (see Table 10)
Essential Fish Habitat	No Effect	Impacts proportional to project footprint in waters of U.S.; least damaging: 8 + 4 with Buffer (see acreage comparison in Table 3)
Other Wildlife and Wildlife Corridors	No Effect	Incremental difference in bridge width would give advantage to 8+ 4 with Barrier and 8 + 4 with Buffer
Subpart E: Potential Impact on Special Aquatic Sites		
Special Aquatic Sites	No Effect	Impacts proportional to project footprint in special aquatic sites; least damaging: 8 + 4 with Buffer (see acreage comparison in

		Table 3)
Subpart F: Potential Effects on Human Use Characteristics		
Municipal and Private Water Supplies	No Effect	No effect by any build alternatives
Recreational and Commercial Fisheries	No Effect	No discernible difference among build alternatives
Water-Related Recreation	No Effect	No discernible difference among build alternatives
Aesthetics	No Effect	No discernible difference among build alternatives
Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves	No Effect	No discernible difference among build alternatives

According to Table 5 and subsequent sections of this analysis, in the preliminary Subpart C through Subpart F evaluation of build alternatives, the 8 + 4 with Buffer Alternative is either least environmentally damaging of the practicable build alternatives or equal/indistinguishable in environmental effects to the other build alternatives for each factor evaluated. Moreover, review of Table 5-listed components or factors demonstrates that more than half of them would be least damaging under the 8 + 4 with Buffer Alternative, while the effects for the remaining components or factors would be indistinguishable or would be no effects among the build alternatives. This supports the preliminary finding that the 8 + 4 with Buffer Alternative is the LEDPA.

Section 404 (b)(1) Guidelines: Requirements, Restrictions, and Factual Determinations

As noted above, the Section 404(b)(1) Guidelines require the proposed project/discharge to be defined as water dependent or non-water dependent. Under the Guidelines, non-water dependent, practicable alternatives not involving special aquatic sites are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise. Highway and transit projects generally are not water-dependent activities, and many do, as with the proposed project, impact special aquatic sites.

Also as noted above, for a non-water dependent discharge, it is the applicant's responsibility, through the Section 404(b)(1) alternative analysis, to show that alternatives avoiding special aquatic sites are not practicable, are not available, or are not less environmentally damaging (rebutting presumptions). As discussed above, alternatives completely avoiding special aquatic sites or other waters of the U.S. are impracticable onsite in terms of cost, and offsite in terms of cost as well as the greater environmental impacts anticipated from locating this section of freeway at another/inland location. Of the four on-site build alternatives, the 8 +4 with Buffer Alternative would have the least impacts or indistinguishable

impacts for the resource or issue areas evaluated. Furthermore, no discharge would be permitted if it does any of the following (restrictions):

- Violates any applicable state water quality standard,
- Violates any applicable toxic effluent standard or prohibition under Section 307 of the CWA,
- Jeopardizes the continued existence of endangered or threatened species under the Endangered Species Act or results in likely destruction or adverse modification of designated critical habitat, or
- Lacks sufficient information to determine compliance with the Guidelines.

The Guidelines also require the alternatives analysis to make factual determinations regarding the following, which are provided in Chapter 4:

- Physical substrate
- Water circulation
- Suspended particulates/turbidity
- Contaminants
- Aquatic ecosystem and organisms
- Proposed disposal site
- Cumulative effects on the aquatic ecosystem
- Secondary effects on the aquatic ecosystem
- Current patterns and water circulation
- Salinity gradients

A proposed discharge may not be permitted by the ACOE if it would cause or contribute to severe degradation to waters of the U.S., which is based on the factual determinations, evaluations, and tests required by Subparts B and G, after consideration of Subparts C-F. This requires considering individual and collective or cumulative effects. In addition, a discharge may not be permitted by the ACOE unless appropriate and practicable steps have been taken to minimize potential adverse effects of the discharge on the aquatic ecosystem (Subpart H in the Guidelines identifies such possible steps).

Chapter 4
Environmental Effects of the Proposed Action and Alternatives

Waters of the U.S. Impacts

As noted in Chapter 1, the purpose of the Section 404(b)(1) Guidelines is to restore and maintain the chemical, physical, and biological integrity of the waters of the U.S. through the control of discharges of dredged or fill material. Except as provided under CWA Section 404(b)(2), no discharge of dredged or fill material will be permitted if there is a practicable alternative to the proposed discharge that would have a less-adverse impact on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences. In accordance with the Section 404(b)(1) Guidelines, the potential short-term or long-term effects of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment must be determined.

The potential for environmental impacts as a result of construction and operation of the 8+4 with Buffer Alternative (proposed action) or an alternative have been analyzed in the DEIS/DEIR and SDEIR/SDEIS for the I-5 NCC project. The following discussion provides the location of the analysis in the document for each of the factors or criteria that must be considered, as set forth in Subparts C through H of the Section 404(b)(1) Guidelines (Subpart I does not apply to this case). In all cases of the analysis for Subparts C through H, the No Build Alternative would have no Section 404-related effects on the resources/issues being evaluated because it does not include any discharges of dredge or fill material into waters of the U.S. As noted previously, it represents the no federal action (i.e., no ACOE permit) or baseline conditions against which other (build) alternatives are compared and evaluated.

Subpart C: Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem

The Study Area for the project extends from I-5/La Jolla Village Drive at the southern end to Vandegrift Boulevard at the northern end, and extends out 500 feet from the edge of pavement on average. Aquatic resources in each of the 11 watersheds in the Study Area (Table 4) would be directly affected by construction, including the effects of cut and fill grading, placement of culverts, and construction of bridges. These drainages would also receive runoff from construction sites and from the completed roadway, bridges, and related features. Table 6 lists the affected watersheds and their characteristics in the Study Area.

Table 6. Watershed Characteristics

Watershed	Characteristics
San Clemente Creek	Fed by urban runoff, small and disturbed: limited area of wildlife habitat; some water quality improvement functions.
Los Peñasquitos Lagoon	Fed by a number of creeks containing important wildlife habitat for threatened and endangered species, migratory birds, large mammals, and many different wildlife species; flood relief; water quality improvement.
San Dieguito Lagoon	Important wildlife habitat for threatened and endangered species, migratory birds, large mammals, and many different wildlife species; flood relief; water quality improvement. Restoration project to improve wildlife habitat has been completed.
San Elijo Lagoon	Important wildlife habitat for threatened and endangered species, migratory birds, large mammals, and many different wildlife species; flood relief; water quality improvement. Slopes function as wildlife corridors.
Cottonwood Creek	In culverts and channels near I-5: little flood relief, water quality improvement, or wildlife habitat except in newly established channels in Cottonwood Park west of I-5; Moonlight Creek tributary: some riparian bird species habitat; some water quality improvement and flood relief.
Batiquitos Lagoon	Open water and wetlands: important wildlife habitat for threatened and endangered species, migratory birds, large mammals, and many different wildlife species; flood relief; water quality improvements; slopes function as wildlife corridors.
Encina Creek	Mostly disturbed and channelized; limited wildlife habitat, water quality improvements, and flood relief.
Aqua Hedionda Lagoon	Primarily open water with little wetland: habitat for wildlife, including waterfowl and shorebirds, with eelgrass for fish habitat; water quality improvement; flood relief.
Buena Vista Lagoon	Freshwater lagoon with tidal weir separating from ocean: habitat for wildlife species; water quality improvement; flood relief
Loma Alta Creek	Highly disturbed; minimal water quality improvement and flood relief.
San Luis Rey River	True perennial river with open water, freshwater marsh, arundo scrub, riparian habitat: important wildlife habitat for threatened and endangered species, migratory birds, large mammals, and many different wildlife species; flood relief; water quality improvements; arundo removal project under way upstream.

A total of 30 plant communities, with eight occurring in both disturbed and undisturbed condition, were identified within the Study Area. In addition to the plant communities, several communities with little or no vegetation were identified, including mud flat, salt flat, open water, and unvegetated or other waters of the U.S.

Substrate

Aquatic ecosystem substrates underlie open waters of the U.S. and constitute the ground surface in wetlands. Substrates include physical, chemical, and organic materials necessary for the sustenance of the ecosystem. Dredging or deposit of fill can alter or eliminate its functions, and alterations in substrate elevation and composition can result in changes in water circulation, depth, currents, or temperature and can adversely affect benthic conditions and organisms.

The lagoons and the San Luis Rey River in the project area are natural, although channels have been affected by urbanization in the coastal corridor, including construction of I-5, the railroad, and other road crossings west of I-5. Currently, there is riprap armoring of the abutments at all of the lagoon bridges, and at Batiquitos Lagoon, the channel bottom is also armored by riprap. In the lagoons, the alluvial substrate

is characterized by increased sedimentation from upstream urban development. All of the minor drainages are degraded to some extent and characterized by vegetation removal, invasion by nonnative species, and encroachment from nearby urban development. Additional information on the lagoons, the San Luis Rey River, and the minor drainages may be found in Sections 3.9, "Hydrology/Drainage (and Floodplains);" 3.10, "Water Quality and Storm Water Runoff;" and 3.18, "Wetlands and Other Waters" of the DEIR/DEIS and Section 3.1, "Supplemental Information Related to Lagoons," of the SDEIR/SDEIS.

Permanent impacts would occur to substrates from the placement of road improvements such as structural fill, culverts, and bridge piers and abutments for each of the build alternatives in the acreage shown in Tables 3 and 4. Temporary impacts to substrate would also occur along and adjacent to waters of the U.S. from freeway construction, but these areas would be restored to pre-project grades and revegetated with native plant species following construction activity. Riprap armoring of all bridge abutments would be included in all build alternatives, but under the bridges, no channel bottom armoring would be employed. Construction of any build alternative, due to ground and vegetative cover removal, could result in scour, sedimentation, and increased rates or volumes of runoff that could impact substrates during construction and could adversely alter the substrate downstream from the direct effects of scour or from the precipitation of silt or contaminants.

Construction of the I-5 NCC project would permanently impact waters of the U.S. in the smaller drainages (San Clemente Creek tributary, Cottonwood Creek, Encina Creek, and Loma Alta Creek) (see Table 4). The minor drainages are mostly non-wetland waters with some disturbed wetlands on the fringes. Fill would be placed in Cottonwood Creek and a drainage that flows into Encina Creek, and Encina Creek in the project area would be placed in a pipe. Wetlands and other waters of the U.S. would be reestablished at Old Sorrento Valley Road following replacement of culverts with a long bridge, including removal of fill placed on top of appropriate substrate. Similar reestablishment would be implemented where the substrate would be temporarily disturbed by construction activity to construct abutments and bridge columns in waters of the U.S. at the six lagoons and the San Luis Rey River.

Comparison of Substrate Impacts

Permanent direct impacts to the substrate would result from roadway fill and placement of columns and abutments. Permanent substrate impacts from the 8 + 4 with Buffer Alternative would be lower than from the other three build alternatives (Table 4). Project effects from any of the build alternatives on the channels within the lagoons, and on temporarily disturbed wetland and other water-associated substrate elsewhere, would not adversely affect substrate functions or services after restoration of the areas temporarily impacted under any of the build alternatives.

Indirect or secondary impacts could result from roadway runoff and human activity from increased access to the wetlands and other waters of the U.S. However, in the case of any build alternative, minimization measures would reduce these impacts to the maximum extent practicable. Any build alternative would include fencing to restrict access to wetlands and other waters of the U.S. from the roadway, trails, and use areas, and would employ BMPs to control adverse effects from runoff. Potential effects of the I-5

NCC project related to runoff and BMPs to be employed by the project are discussed in Section 3.10, "Water Quality and Storm Water Runoff," of the DEIR/DEIS.

All the build alternatives would adversely affect substrate functions and services during construction. The 8 + 4 with Buffer Alternative would permanently affect the least acreage of substrate, compared to the other build alternatives. Temporarily affected areas would be restored to pre-project grades and revegetated with native plant species following construction activity.

Suspended Particulates/Turbidity

Under current conditions, turbidity occurs in water bodies in the I-5 NCC during rain events, usually in the winter season, when most precipitation occurs in the San Diego region. At San Dieguito, San Elijo, and Batiquitos Lagoons, dredging for restoration and maintenance projects has been conducted; such dredging may produce turbidity. Periodically, the ocean inlets at Los Peñasquitos, San Dieguito, Agua Hedionda, and Batiquitos Lagoons are dredged to maintain or increase tidal flushing of the lagoons; since the inlets are downstream, turbidity from dredging of the inlets does not affect the I-5 NCC project area. Both dredging and storm water runoff are periodic events. Most of the time, turbidity is not elevated in the wetlands and other waters of the U.S. in the project area.

With the inclusion of BMPs, the project would not negatively affect water quality in the corridor on a long-term basis. Disturbance of wetlands and other waters of the U.S. during construction might create turbid conditions that could reduce light penetration in affected waters, adversely affecting aquatic organisms by lowering photosynthesis, increasing temperatures, lowering oxygen levels and primary aquatic system productivity, and interfering with feeding activity for sighted organisms. Because of larger areas of disturbance in wetlands and other waters, the alternatives with the widest construction footprints (i.e., 10 + 4 with Barrier and 8 +4 with Barrier Alternatives) would have a greater potential for these effects. Temporary BMPs (soil stabilization, sediment control, wind erosion control, tracking control, non-storm-water management, and waste management and materials pollution control) would be implemented to contain both storm water and non-storm-water discharges during construction in all areas of construction for all build alternatives.

Upon completion of construction, all temporarily disturbed areas would be stabilized or reestablished under all build alternatives. During the project development process, expected storm water runoff onto the project site was calculated and, where possible, appropriate control measures (such as gravel bag berms to stop concentrated flow and sediment) would be implemented and maintained to convey concentrated flows around or through the site in a manner that would not cause additional erosion. The statewide Storm Water Management Plan (SWMP) describes how Caltrans would comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit (Order 99-06-DWQ).

Preliminary design of the build alternatives has incorporated bioswales adjacent to traffic lanes and in loop ramps for the management of runoff water quality. During the further design phases, as required by the SWMP, treatment BMPs (biofiltration by strips or swales, infiltration devices, detention devices, traction sand traps, media filters, multi-chamber treatment, wet basins, dry weather flow devices, and

gross solid removal devices) would be incorporated into any of the build alternatives as appropriate. Vegetated biofiltration (strips and/or swales) would be incorporated to treat roadway runoff. As design progresses, the BMP locations would be evaluated and refined.

Turbidity and sedimentation are of particular concern in waters of the U.S. associated with the six lagoons, the San Luis Rey River, and smaller drainages containing wetlands and other waters of the U.S. Where areas of active construction for abutments or bridge supports would be located, cofferdams, silt curtains, or other sediment barriers would be employed to avoid the discharge or deposit of excessive sediment or spoils into adjacent waters of the U.S. In the San Luis Rey River and the lagoons, flow channels of dimensions sufficient for continued fish movement would be maintained throughout construction.

Comparison of Suspended Particulates/Turbidity Impacts

Construction activity capable of producing direct impacts related to suspended particulates and turbidity in waters of the U.S. include the placement of fill, channel armoring, and construction of bridge columns and abutments. Indirect impacts could occur if sediment or other suspended material were allowed to reach waters of the U.S. during construction or in runoff from the completed project.

During construction of any of the build alternatives, temporary BMPs (soil stabilization, sediment control, wind erosion control, tracking control, non-storm-water management, and waste management and materials pollution control) would be included and implemented as part of the project for any of the build alternatives to contain both storm water and non-storm-water discharges. All temporarily disturbed areas would be stabilized with reestablished native vegetation upon completion of construction. Maintenance, design pollution prevention, construction, and treatment BMPs to be employed by the build alternatives are described in Section 3.10 , "Water Quality and Storm Water Runoff," of the DEIR/DEIS.

Construction and operational impacts would be adverse, minor, and temporary under ordinary circumstances and would be controlled by BMPs. Unanticipated storms of high intensity could increase the possibility of more severe adverse impacts with respect to suspended particulates/turbidity. In wetlands and waters of the U.S., the intensity of impacts would generally be greater in the build alternatives with larger footprints (i.e., 10 +4 with Barrier and 8 + 4 with Barrier Alternatives). The 8 + 4 with Buffer Alternative, with the smallest footprint, would be expected to have the least impacts. In general, however, the maximum practical means to control particulates and turbidity impacts would be employed for whichever build alternative is chosen.

Contaminants

Section 3.13 of the DEIR/DEIS found the following sources of contaminants occur or have the potential to occur in the I-5 NCC project area:

- Aerially deposited lead
- Petroleum hydrocarbons
- Landfills

- Pesticides and herbicides
- Chemical spills
- Asbestos
- Lead
- Treated wood

Some of these contaminants may occur in or near ACOE jurisdictional areas. For instance, aerially deposited lead may be present in soils adjacent to the freeway; chemical spills from motor vehicles may have occurred at any location along the roadway; and asbestos, lead in paint, and treated wood could be found in bridges, paints, and guardrails.

All build alternatives of the project have the potential to introduce contaminants into waters of the U.S. during construction, operation, and maintenance. Direct impacts would result from contaminant spills or migration into waters of the U.S. during construction or operations. Indirect impacts could result from the transport of contaminants into waters of the U.S. in runoff from existing sources or from the roadway surface. BMPs would be evaluated, implemented, and maintained to address these impacts during the planning and design, construction, and operational phases regardless of the build alternative chosen. Pollutants generated anywhere during any phase of the build alternatives could potentially reach receiving waters of the U.S.

Pollutants that could be generated during construction activities include vehicle fluids, asphaltic emulsions from paving activities, concrete curing compounds, solvents and thinners, paint, sandblasting material, landscaping materials, treated lumber, rubble, contaminated soil or rock, and general litter.

During operation, potential sources of pollutants in highway runoff include sediment from natural erosion; nutrients (nitrogen and phosphorus) from tree leaves, mineralized organic matter in soil, fertilizers, runoff, nitrite from automobile exhausts, atmospheric deposition, emulsifiers, and surfactants; pesticides; and metals (dissolved and particulate) from combustion products of fossil fuels, wear particles from brake pads, and corrosion. These pollutants could be generated by both highway users and Caltrans maintenance activities.

The size of the construction zone and the amount of impervious surface area in the completed project are rough measures of each alternative's potential to generate pollutants in runoff. Alternative 10 + 4 with Barrier would have the largest construction zone and additional impervious area, while the SDEIR/SDEIS LPA 8 + 4 with Buffer would have the area lowest in both categories.

As design of any of the chosen build alternative proceeds, standard technology-based, non-treatment controls selected to reduce pollutant discharges to the maximum extent practicable would be incorporated. The objective of these design pollution prevention BMPs is to prevent downstream erosion, stabilize disturbed soil areas, and maximize vegetated surfaces by preservation or restoration consistent with Caltrans policies. As required by Caltrans' Statewide Storm Water Management Plan, typical design pollution prevention practices include consideration of downstream effects related to increased flow;

preservation of existing vegetation; concentrating flow conveyance systems; use of ditches, berms, dikes and swales as appropriate and practicable; utilizing overside drains, flared culvert end sections, outlet protection/velocity dissipation devices, and slope/surface protection systems; increased vegetated surfaces; and minimizing hard surfaces.

During design, if a build alternative were chosen, Caltrans would examine existing treatment BMPs employed on I-5 in the NCC. As part of the chosen alternative, Caltrans would maximize treatment BMP locations to the maximum extent practicable.

During construction, there is potential for storm water and non-storm-water discharges to occur by any of the four build alternatives. Caltrans would implement various construction site BMPs, as appropriate, during construction to reduce the impacts. These temporary control practices would be consistent with the BMPs and control practices required under the State of California NPDES General Permit for Storm Water Discharges Associated with Construction Activity. The BMPs would be selected from several categories covering temporary soil stabilization, temporary sediment control, wind erosion control, tracking control, non-storm-water management, waste management, and materials pollution control.

Treatment BMPs must be included in any of the build alternatives to prevent or minimize the long-term potential impacts from Caltrans facilities or activities. Approved treatment BMPs that are technically and fiscally feasible for all of the build alternatives include biofiltration systems, multi-chambered treatment drains, infiltration devices, wet basins, detention devices, traction sand traps, dry weather flow diversions, media filters, and gross solid removal devices.

As design proceeds, if a build alternative were chosen, BMPs would be evaluated for effectiveness, applicability, and practicality. Where treatment BMPs cannot be incorporated, preservation or restoration of vegetation would be maximized and every effort would be made to ensure the successful establishment of landscaping and erosion control throughout the project limits. The chosen build alternative would also consider any future treatment BMPs that might be approved by Caltrans from the ongoing research and monitoring program during the design phase.

Most highway maintenance is performed by small crews with minimal soil disturbance. Maintenance BMPs are preventive measures to reduce the amount of pollutants discharged to surface waters through Caltrans storm water drainage systems. Maintenance BMPs would be ongoing for the life of the facility and would conform to Caltrans' "Storm Water Quality Handbook, Maintenance Staff Guide." The Guide provides detailed instructions on how to implement maintenance BMPs to facility operations and highway activities.

Comparison of Contaminant Impacts

All build alternatives of the project have the potential to introduce contaminants into waters of the U.S. during construction, operation, and maintenance. Direct impacts would result from contaminant or polluted material spills or migration into waters of the U.S. during construction or operations. Indirect

impacts could result from the transport of contaminants into waters of the U.S. in runoff, by wind, or by other means from existing sources or from the roadway surface.

Avoidance measures and measures to minimize contaminant impacts are discussed in Section 3.13, "Hazardous Waste/Materials," of the DEIR/DEIS. BMPs would be evaluated, implemented, and maintained to address these impacts during the planning and design, construction, and operational phases regardless of the build alternative chosen. Pollutants generated anywhere during any phase of the build alternatives could potentially reach receiving waters of the U.S.

Any project build alternative would be required, through permitting requirements and the Caltrans water quality permit, to employ the most effective reasonable and feasible BMPs to reduce contaminant loadings of runoff discharged into the watershed systems in the I-5 NCC corridor. Because the BMPs would be required of all build alternatives, they are included in the project. In general, water quality controls would be required equally of all the build alternatives, but the SDEIR/SDEIS 8 + 4 with Buffer, by virtue of its smaller construction footprint and smaller area of impervious surfaces, would have the least impacts to waters of the U.S.

Water

Section 3.10, "Water Quality and Storm Water Runoff," of the DEIR/DEIS discusses water quality of water bodies on the Clean Water Act Section 303(d) List of Water Quality Limited Segments. Caltrans runoff characterization studies identified pollutants that are discharging with a load or a concentration that commonly exceeds allowable standards and which are considered treatable by Caltrans approved treatment BMPs. These pollutants are referred to as Targeted Design Constituents (TDCs), which include sediment, metals (total and dissolved zinc, lead and copper), nitrogen, phosphorus, and general metals. Table 7 lists the 303(d) impaired receiving water bodies in the project area and the TDCs associated with them.

Table 7. Impaired Water Bodies, Constituents of Concern, and TDCs

Impaired Water Body	Constituents of Concern	TDCs
Los Peñasquitos Creek	Phosphate, Total Dissolved Solids	Phosphate, Total Dissolved Solids
Los Peñasquitos Lagoon	Sedimentation, Siltation	Sedimentation, Siltation
Soledad Canyon Creek	Sediment, Toxicity	N/A
Pacific Ocean Shoreline/San Dieguito	Indicator Bacteria	N/A
San Elijo Lagoon	Indicator Bacteria, Sedimentation, Siltation, Eutrophic	Sedimentation, Siltation
Agua Hedionda Lagoon	Indicator Bacteria, Sedimentation, Siltation	Sedimentation, Siltation
Buena Vista Lagoon	Indicator Bacteria, Sedimentation, Siltation, Nutrients	Sedimentation, Siltation, Nutrients
Loma Alta Slough	Indicator Bacteria, Eutrophic	N/A
Pacific Ocean Shoreline/San Luis Rey	Indicator Bacteria	N/A
San Luis Rey River	Chloride, Total Dissolved Solids	N/A

Discharge of materials into the aquatic ecosystem could result in loss of functions and values, alter current and flow patterns, change water circulation in the ecosystem, change fluctuation patterns, and, in coastal areas, affect salinity gradients. Design of the build alternatives would not substantially change drainage patterns in any of the aquatic systems. When construction is complete, the pattern of flow would not be changed at San Dieguito and Agua Hedionda Lagoons and the San Luis Rey River. Restrictions to flood flows from the existing culverts on Carmel Creek would be removed and replaced with a bridge at the Los Peñasquitos Lagoon system and allow the streams feeding the lagoon to flow more freely. Although not resulting in a Section 404 discharge, the increased channel cross-sections at San Elijo, Batiquitos, and Buena Vista Lagoons would have a beneficial effect on tidal and fluvial flows.

Where construction impacts waters of the U.S., stream and floodplain characteristics could be affected. These effects would be the same for all build alternatives. Table 8 summarizes floodplain changes the project would cause to all waters of the U.S. affected by any of the four build alternatives. Changes in each of these locations to the floodplain and water elevation would be minimal and would not cause significant adverse effects on waters of the U.S.

Table 8. Flood Elevation Effects, All Alternatives

Water of the U.S.	Floodplain Surface Elevation Change	Floodplain Boundary Change	Base Floodplain Change
Soledad Canyon Creek	+0.04 foot	No significant change	No change
Los Peñasquitos Creek	No change	No change	No change
Carmel Valley Creek	No change	No change	-4.4 feet
San Dieguito River	+0.30 foot	Negligible	Negligible
San Elijo Lagoon	+0.30 foot	No change	No change
Cottonwood Creek	No change	No change	No change
Batiquitos Lagoon	No change	No change	-0.70 foot
Encinas Creek	+0.22 foot	Negligible	Negligible
Agua Hedionda Lagoon	+0.10 foot	No change	No change
Loma Alta Creek	+0.04 foot	No change	No change
San Luis Rey River	+0.03 foot	No change	No change

The near-coastal location of the lagoon and San Luis Rey River crossings indicate that the new I-5 structures and channel alterations would be adequate to accommodate a 100-year flood. Caltrans design studies examined the combination of a 100-year flood with the maximum sea level rise prediction of 55 inches (4.5 feet) in 2100 by the state of California and found that tidal and flood flows would not be significantly impeded at the crossing of waters of the U.S. for any of the alternatives. Freeboard (the distance between maximum water surface elevation and lowest part of the bridge deck) would be adequate at all structures except at Carmel Creek, and there would be minimal potential for erosion, storm surge, tidal inundation, or flooding. At Carmel Creek, freeboard would be deficient for a 100-year flood plus a 55-inch sea level rise, but would be improved over existing conditions.

Comparison of Water Impacts

No significant direct or indirect adverse effects would result in waters of the U.S. from changes in structures and crossings of the lagoons and San Luis Rey River under any of the build alternatives. Less

structure width would allow the greatest freeboard, due to deck curvature for drainage, so the 8 + 4 with Buffer alternative would provide the greatest freeboard. Larger build alternatives would have higher indirect impacts from runoff from increased amounts of impervious surfaces. As noted, all build alternatives would improve freeboard at Carmel Creek compared to the No Build Alternative, but it would still be deficient for all the alternatives. Additional information on water related to the effects of the build alternatives may be found in the DEIR/DEIS under Section 3.9, "Hydrology/Drainage (and Floodplains)," and Section 3.10, "Water Quality and Storm Water Runoff," and in the SDEIR/SDEIS in Section 3.1, "Supplemental Information Related to Lagoons."

Current Patterns and Water Circulation

Channels under the I-5 bridges currently serve to allow circulation of water between the parts of the lagoons east and west of the freeway. At the San Luis Rey River, the river current flows east to west to allow discharge into the Pacific Ocean. Other structures, such as the railroad and highway bridges, also play a part in determining these current and water circulation patterns.

During widening and construction of the proposed bridges, all build alternatives may temporarily and partially obstruct normal current and circulation patterns by placement of columns and falsework and other construction activity at all bridge locations. Adequate channels would be maintained at all times during construction to allow water level fluctuation, current flow, and circulation within the lagoons to occur under both essentially normal conditions and fluvial (flood) conditions.

After construction is completed, conditions in the channel under the bridges would be restored to preconstruction conditions at all bridge crossings except at San Elijo, Batiquitos, and Buena Vista Lagoons. The project, including increasing the channel cross-sections under the bridges in those three lagoons (which would not result in a Section 404 discharge), would optimize the potential for channel flows under the bridges. The optimized channels proposed at both I-5 and the railroad bridge would enhance tidal and fluvial flows, reduce residence times, and reduce tidal muting.

Comparison of Current Patterns and Water Circulation Impacts

Changes to current patterns and water circulation in wetlands and other waters of the U.S. would be the same for each of the build alternatives and, independent of other future projects that would alter the configuration of the lagoon and stream channels, would not directly or indirectly substantially alter existing current patterns and water circulation. Additional discussion of water circulation may be found in Section 3.9, "Hydrology/Drainage (and Floodplains)," of the DEIR/DEIS and in Section 3.1, "Supplemental Information Related to Lagoons," in the SDEIR/SDEIS.

Salinity Gradients

All of the lagoons demonstrate some degree of salinity from being open or partially open at times to influx of saltwater from the Pacific Ocean, except Buena Vista Lagoon, which currently is mainly a fresh-water system. The San Luis Rey River and Loma Alta Creek are also subject to ocean tidal influences to some extent. Among the lagoons, only Agua Hedionda and Batiquitos have stable inlet structures that are regularly maintained to allow regular saltwater influx into the lagoon from the Pacific Ocean. Salinity

gradients vary with a number of factors, including strength of tides; the amount of freshwater entering the lagoons and other water bodies from freshwater runoff, stream flows, and precipitation; condition of the openings to the sea; evaporation within the water bodies; and other factors.

As explained under "Current Patterns and Water Circulation" above, tidal flushing of the majority of the lagoons will not change as a result of the proposed I-5 NCC project. Batiquitos Lagoon will have enhanced tidal and fluvial circulation as a result of changes to/at the I-5 bridge. Elsewhere, salinity gradients in water bodies crossed by the proposed I-5 NCC project would not permanently change. The effect of any of the build alternatives on salinity gradient in wetlands and other waters of the U.S would be minimal and equal for all build alternatives.

Comparison of Salinity Gradients Impacts

No direct or indirect changes to the connection of wetlands and other waters of the U.S. to openings to the Pacific Ocean are proposed and, independent of other future projects that would alter the configuration of those openings, the I-5 NCC project would not substantially alter salinity gradients in wetlands and waters of the U.S. Any changes, which would be expected to be minimal, would be equal for all build alternatives. Additional discussion related to this issue may be found in Section 3.9, "Hydrology/Drainage (and Floodplains)," of the DEIR/DEIS and in Section 3.1, "Supplemental Information Related to Lagoons," in the SDEIR/SDEIS.

Subpart D: Potential Impacts on Biological Characteristics of the Aquatic Ecosystem

Surveys for federally listed species were conducted within the Study Area for the DEIR/DEIS and were updated as recently as 2012. One federally endangered plant species and two federally listed bird species, as described below, would be directly impacted by temporary construction activities and permanent habitat impacts. Four additional bird species and two fish species may be indirectly impacted by construction of the project. Critical habitat designated by USFWS for three bird species and one fish species could be affected by the project. The No Build Alternative would not have temporary, permanent, direct, or indirect impacts on federally listed threatened or endangered species, or critical habitats.

Not all the surveys included in the species reported below are recent. USFWS issued a Biological Opinion (BO) (FWS-SDG-08BO 1 00-12F0547) on the 8 + 4 with Buffer Alternative (LPA) on December 31, 2012. Recognizing the extended construction schedule for the proposed work, USFWS will require that surveys for federally listed as threatened and endangered species, their critical habitat, known habitat, and suitable habitat that could be affected by the project be conducted within one year of the start of construction in any location, during construction, and after construction. The USFWS did not make any jeopardy determinations associated with the proposed project/LPA.

Direct Impacts on Federally Listed Threatened and Endangered Species

For all the build alternatives, construction activity within the construction footprint of the project would result in direct, permanent impacts on federally listed species. Noise generated by construction activities

may result in direct, temporary impacts on federally listed species. Species that would experience direct permanent and temporary impacts from the build alternatives are discussed below and impacts are shown in Table 9.

Table 9. Direct Impacts to Threatened and Endangered Species[1]

Species	10+4 with Barrier	10+4 with Buffer	8+4 with Barrier	8+4 with Buffer
Del Mar Manzanita, Permanent[2]	6 plants[3]	6 plants[3]	6 plants[3]	6 plants[3]
Light-footed clapper rail, Permanent	1 pair, Batiquitos; 1 territory, San Elijo	1 pair, Batiquitos	1 pair, Batiquitos; 1 territory, San Elijo	1 pair, Batiquitos
Light-footed clapper rail, Temporary	2 territories, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista	2 territories, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista	1 territory, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista	1 territory, San Elijo; 1 territory, Batiquitos; 1 individual, Buena Vista
Coastal California gnatcatcher, Permanent	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos	1 territory, Genesee; 3-4 territories, San Dieguito; 4-6 territories, San Elijo; 4 territories, Batiquitos
Tidewater goby	habitat	habitat	habitat	habitat

[1] Impacts to critical habitat are discussed separately below.

[2] Within temporary impact footprint, but would be removed; considered permanent

[3] May be avoidable during construction

Threatened and Endangered Species Directly Impacted

Del Mar Manzanita *(Arctostaphylos glandulosa* ssp. *crassifolia)*

Del Mar manzanita is federally listed as endangered. This plant is restricted to San Diego County and northern Baja California. This species is a fire-adapted shrub restricted to sandstone terraces and bluffs, and is associated with a subtype of chaparral known as southern maritime chaparral. About 25 populations exist in San Diego County, including nearby areas at Del Mar and the Torrey Pines State Reserve. Del Mar manzanita is also considered endangered by the California Native Plant Society. In the Study Area, approximately 70 plants were observed at the top of the slopes on both sides of I-5, just north of Del Mar Heights Road to Birmingham Drive.

Six plants are growing along a brow ditch at the northwestern corner of the Del Mar Heights interchange that would probably be replaced during construction. Plants in the construction footprint would be removed and thus are considered permanently impacted, but it may be possible to avoid the plants during construction (Table 9). If impacts to the plants cannot be avoided, seed would be collected and transplanted to suitable habitat. Success in transplanting this species, however, is difficult to achieve.

Coastal California Gnatcatcher (*Polioptila californica californica*)

Coastal California gnatcatcher is listed as threatened by the USFWS. It is a nonmigratory resident whose range covers the coastal plains of southern California and northern Baja California. In San Diego County, it occurs in coastal lowlands generally below 1,968 feet and is an obligate resident of coastal sage scrub. It may utilize other vegetation types such as chaparral and riparian habitats for portions of its territory. The decline of the coastal California gnatcatcher is attributed to the loss and fragmentation of coastal sage scrub due to urban and agricultural development.

California gnatcatchers were generally found along the fill slopes and a few cut slopes adjacent to the lagoons and in a few adjacent canyons with coastal sage scrub habitat. Multiple protocol surveys in the corridor have been completed during multiple years, including 2003, 2005, 2007, 2008, and 2012. There is critical habitat for the coastal California gnatcatcher surrounding San Elijo Lagoon, just south of Batiquitos Lagoon, and near the San Luis Rey River.

Light-footed Clapper Rail (*Rallus longirostris levipes*)

Light-footed clapper rail is listed as endangered by USFWS. The species occurred historically along the southern California coast from Santa Barbara County south to San Quintin, Baja California. Populations have declined due to limited distribution, and destruction and degradation of coastal salt marsh habitat. About 253 pairs were reported in 2000; 90 percent of these were reported in just three wetland areas: Anaheim Bay and Newport Bay in Orange County and Tijuana Estuary in San Diego County.

Light-footed clapper rails are typically found in salt marshes dominated by cordgrass (*Spartina foliosa*), but can also be found in habitats dominated by cattail (*Typha* sp.). Focused surveys for the light-footed clapper rail were completed within 500 feet of I-5 along the San Luis Rey River, Buena Vista Lagoon, Batiquitos Lagoon, San Elijo Lagoon, and San Dieguito Lagoon in 2003, and in Los Peñasquitos Lagoon in 2004 (Table 9).

Updated information from surveys done in 2011 at Batiquitos, Agua Hedionda, and Buena Vista Lagoons identified additional light-footed clapper rail at Batiquitos Lagoon. Light-footed clapper rails were observed adjacent to the park and ride at La Costa, next to the freeway slope northeast of the bridge and on the north shore of the east basin. Light-footed clapper rail have moved closer to I-5 within the past 8 years with the increase in cordgrass-dominated low marsh adjacent to the fill slopes. It appears that appropriate habitat is more important than noise levels to the clapper rails. During 2011, the light-footed clapper rail location at the southwestern corner of the I-5/SR-78 Interchange was not detected. The clapper rail locations at Agua Hedionda were more than 3,000 feet from the project area.

Table 9 presents a comparison of impacts on the federally listed species described above.

Indirect Impacts on Threatened or Endangered Species

Indirect impacts to sensitive species can result from increased lighting, increased exposure to invasive species and trash or debris, edge effects, increased potential for pollution from storm water runoff, and long-term increases in noise. I-5 is currently 8 to 10 lanes in width across the lagoons, and is already

causing impacts from increased nighttime lighting, increased access from invasive species, and edge effects where habitats are bisected. Most of the remaining corridor has been developed for urban uses that produce much the same impacts on native habitats. Many of the impacts associated with construction would be temporary, but direct, and those that occur with long-term operation of the freeway would be permanent but indirect.

In the areas where the direct effects on federally listed species would occur, indirect effects would occur to the same species (coastal California gnatcatcher and light-footed clapper rail) occupying the same habitats adjacent to the construction footprint. Generally, this habitat is in the same location but the areas of impact would be somewhat different in some locations depending on a given build alternative's actual footprint: greater where the footprint is larger than where it is smaller.

Additional federally listed species may occupy habitat that is not directly affected by the build alternatives but is near enough to be affected indirectly. Those species and the area of potential effects on their habitat are described below.

California Least Tern (*Sterna antillarum browni*)

The California least tern, federally and state listed as endangered, historically nested on coastal beaches from Monterey County to Cabo San Lucas, Baja California. California least terns are migratory and return to San Diego in early April to breed and raise young before leaving in mid-September. The San Dieguito Ecological Reserve has a colony of California least terns managed by the California Department of Fish and Wildlife (CDFW). There are also known nesting areas for California least terns in San Elijo and Batiquitos Lagoons. The breeding areas are outside of the grading limits of any of I-5 NCC build alternatives; however, some foraging habitat may be impacted during construction. The nesting area east of I-5 at Batiquitos is used annually and is in proximity to construction activities. California least terns were observed foraging in San Elijo and Batiquitos Lagoon within the Study Area in 2003.

Western Snowy Plover (*Charadrius alexandrinus nivosus*)

The Pacific coast population of the western snowy plover was listed as federally threatened in 1993. Western snowy plovers forage on both the dry sand of the upper beach and along the wet sand at the beach-surf interface. In Orange and San Diego Counties, the western snowy plover is a common winter migrant and winter visitor and a fairly common localized breeding resident. There is western snowy plover nesting habitat at San Dieguito, San Elijo, and Batiquitos Lagoons; however, the nesting habitat is outside of the permanent and temporary impact areas of any of the build alternatives. Some foraging habitat for this species may be impacted by this project's build alternatives at Batiquitos and Agua Hedionda Lagoons.

Least Bell's Vireo (*Vireo bellii pusillus*)

The least Bell's vireo was once widespread from Tehama County in northern California to northwestern Baja California. This migratory species nests in willows, also using a variety of other shrub and tree species for nest placement. Two vireo territories were detected in the willow woodland east of I-5 near the San Dieguito River; however, they are outside the Study Area. Protocol surveys for least Bell's vireo

along Moonlight Creek in Encinitas were negative in both 2003 and 2004. Least Bell's vireos were detected during coastal California gnatcatcher protocol surveys near Brooks Street and Lawrence Canyon in Oceanside in small patches of riparian habitat. The vireos were at least 426 feet and 738 feet from I-5, respectively. Surveys in the Study Area for the project at the San Luis Rey River did not detect the species. The closest known location to I-5 is approximately 1,500 feet upstream, and there is designated critical habitat for the least Bell's vireo within the project footprints for all build alternatives.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The southwestern willow flycatcher is listed as state and federally endangered. This subspecies is an uncommon spring and fall migrant and a very rare summer resident. It is found among trees or large shrubs throughout San Diego County. Nesting is restricted to willow thickets in riparian woodland; the local breeding population in San Diego County is now extremely small. Surveys for southwestern willow flycatcher were completed in the riparian habitat in the San Luis Rey River after a willow flycatcher was heard vocalizing during a wetland survey in 2004. However, subsequent surveys did not detect southwestern willow flycatcher again; the observation could have been either a migrating willow flycatcher (*Empidonax traillii*) or a southwestern willow flycatcher. No other suitable habitat is present within the Study Area. The San Elijo Lagoon Conservancy has records of migrant southwestern willow flycatchers at San Elijo Lagoon outside the Study Area.

Tidewater Goby (*Eucyclobobius newberryi*)

Tidewater goby is listed as endangered by USFWS and is a California Species of Special Concern. This small, nondescript fish is endemic to coastal lagoons and lower stream reaches in brackish to fresh, slow moving to still, but not stagnant, water. In San Diego County, tidewater gobies have historically been recorded from San Mateo, San Onofre, and Las Pulgas Creeks on Marine Corps Base Camp Pendleton, and at Aqua Hedionda and Buena Vista Lagoons. No tidewater gobies were observed during fishery surveys at San Elijo, Batiquitos, or Agua Hedionda Lagoons. Due to these lagoons' large size, depth, and large numbers of predatory fish, tidewater goby are not anticipated within the Study Area at any of the six lagoons.

Tidewater gobies were recently discovered in the San Luis Rey River, where they were presumed extant. In October 2011, USFWS proposed designation of 56 acres of the lower San Luis Rey River as critical habitat for the species. The proposed critical habitat includes the river from the ocean to about 2,000 feet upstream from I-5. Construction of the LPA at the bridge would temporarily impact about 0.2 acre of critical habitat, and permanent footings in the river would permanently impact approximately 500 square feet of critical habitat. Construction of any of the other build alternatives would impact at least as much critical habitat. Any work within the water of San Luis Rey River would be enclosed in coffer dams or other method to minimize sediment discharge within the water column. Protocol surveys for tidewater goby were completed in summer 2012 at Batiquitos and Buena Vista Lagoons at the request of USFWS. There was no suitable habitat for tidewater goby at Batiquitos Lagoon within the Study Area, and no tidewater gobies were identified in protocol surveys at Buena Vista Lagoon.

Southern Steelhead Trout (*Oncorhynchus mykiss*)

Steelhead trout were historically found from Alaska to Baja California, Mexico; southern steelhead trout used coastal drainages from south of San Francisco Bay to Baja California. Urbanization and alteration of the streams from the headwaters to the coast are the major factors affecting the steelhead populations. NMFS listed the southern steelhead trout within the southern California steelhead evolutionarily significant unit (ESU) as federally endangered in 1997. In 2002, the range of the southern California steelhead ESU was extended to Baja California, Mexico. In May 2007, a steelhead trout was reported by CDFW personnel in the lower San Luis Rey River and the species is presumed extant there. The species is not expected to occur in any other water body affected by the any of the build alternatives.

Construction at the San Luis Rey River bridge would be conducted as described above in the tidewater goby discussion. Under the proposed construction conditions, no direct and minimal indirect impacts are anticipated to southern steelhead from construction of I-5 at the San Luis Rey River Bridge.

Impacts on Critical Habitat

The project would affect critical habitat for coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and tidewater goby. Critical habitat is any geographic location designated by USFWS as critical to the continued existence of a federally listed threatened or endangered species.

Coastal California Gnatcatcher

Critical habitat for coastal California gnatcatcher is present within the Study Area at San Elijo Lagoon, just south of Batiquitos Lagoon, and near the San Luis Rey River. Designated critical habitat for coastal California gnatcatcher includes the freeway, the lagoons, and other habitats that do not exhibit primary constituent elements of gnatcatcher habitat[4]. To determine permanent impacts to critical habitat for the coastal California gnatcatcher, only those upland habitats with the primary constituent elements were counted. Impacts on upland critical habitat with primary constituent elements would be 37.3 acres for the 10 + 4 with Barrier Alternative, 33.5 acres for the 10 + 4 with Buffer Alternative, 34.3 acres for the 8 + 4 with Barrier Alternative, and 31.7 acres for the 8 + 4 with Buffer Alternative.

Southwestern Willow Flycatcher and Least Bell's Vireo

Some designated critical habitat for southwestern willow flycatcher and least Bell's vireo is near the San Luis Rey River. Much of the critical habitat mapped by USFWS is in areas that are currently developed or vegetated with ornamental vegetation such as ice plant, and they do not have the primary constituent elements of critical habitat. Permanent impacts to 0.03 acre of least Bell's vireo and southwestern willow flycatcher critical habitat with primary constituent elements would occur. An additional 0.25 acre of southwestern willow flycatcher and 0.20 acre of least Bell's vireo critical habitat would temporarily be impacted during construction. Impacts from the four build alternatives would be the same in these areas.

[4] Primary constituent elements are the physical or biological features essential to the conservation of a species, on which its designated or proposed critical habitat is based.

Tidewater Goby

As stated above, construction of each of the build alternatives at the San Luis Rey River bridge would temporarily impact about 0.2 acre of critical habitat, and permanent footings in the river would permanently impact approximately 500 square feet of critical habitat with primary constituent elements. An additional 1.55 acres of proposed critical habitat that does not have primary constituent elements for goby would also be impacted by all build alternatives.

Comparison/Summary of Impacts on Federally Listed Threatened and Endangered Species

For a summary of direct impacts of the build alternatives on federally listed threatened and endangered species, see Table 9. Each of the build alternatives would impact the same six Del Mar manzanita plants. For all build alternatives, it may be possible to avoid impacts to the species by refining the design and monitoring during construction to determine where the plants are growing. However, the plants are growing along an existing brow ditch that would likely need to be removed and replaced.

All build alternatives would permanently impact one pair of light-footed clapper rail; the 10 + 4 with Barrier Alternative and 8 + 4 with Barrier Alternative would also permanently impact one additional clapper rail territory. The two barrier alternatives would each affect one clapper rail territory, while neither of the two buffer alternatives would affect a territory. Thus, the 8 + 4 with Buffer and 10 + 4 with Buffer Alternatives would have the least impact on light-footed clapper rail. All build alternatives would affect the same number of territories of coastal California gnatcatcher. However, as the footprints of the alternatives decrease, so does the amount of impact to any one California gnatcatcher territory.

Indirect project impacts would affect federally listed threatened and endangered species habitat in the same general locations for all build alternatives. Direct plus indirect impacts would generally be greater with an increase in the construction footprint, since a larger footprint would extend farther into adjacent habitat. The 10 + 4 with Barrier Alternative would have the largest footprint, and the 8 + 4 with Buffer Alternative would have the least. The same issue of relative footprint size affects impacts on designated or proposed critical habitat for coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, and tidewater goby: the 10 + 4 with Barrier Alternative would have the greatest impact on critical habitat, and the 8 + 4 with Buffer Alternative would have the least.

Overall, the degree of impacts does not vary greatly between the build alternatives, but, as a general rule, the alternative with the smallest construction footprint, the 8 + 4 with Buffer Alternative, would be the least environmentally damaging in terms of impacts to federally listed species and designated critical habitat. USFWS, in the BO for the I-5 NCC 8 + 4 with Buffer Alternative, states:

> Based on conservation measures committed to by Caltrans, we concur with your determination that the proposed project is not likely to adversely affect the federally endangered least Bell's vireo *(Vireo bellii pusillus,* vireo), southwestern willow flycatcher *(Empidonax traillii extimus;* flycatcher), and California least tern *[Sternula (=Sterna) antillarum browni];* the federally threatened western snowy plover [*Charadrius nivosus*

(= *alexandrinus) nivosus];* designated critical habitat for the vireo and flycatcher; and proposed critical habitat for the flycatcher.

Regarding the Del Mar Manzanita, the BO states, "we do not expect the habitat loss and destruction of plants associated with the project to appreciably reduce the number of individuals, reproduction, or distribution of manzanita in the action area or across its range."

Additional information regarding the proposed project's effects on federally listed threatened and endangered species is included in Section 3.9, "Threatened and Endangered Species," in the DEIR/DEIS and in Section 3.1, "Supplemental Information Related to Lagoons," in the SDEIR/SDEIS.

Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web

The lagoons in the Study Area are home to a large variety and abundance of aquatic organisms. When open to the sea, the coastal lagoons serve as nurseries for many aquatic species. Marine species may be found where lagoon inlets are permanently or sporadically open to the ocean. Fish fauna in San Dieguito Lagoon change seasonally based on river flows, condition of the lagoon mouth, and salinity. Variations in temperature and salinity are due to seasonal freshwater influx and intermittent oceanic tidal influence in San Elijo Lagoon favor hardy estuarine species. Batiquitos Lagoon supports a number of marine fish species, as does Agua Hedionda Lagoon. Buena Vista Lagoon generally lacks oceanic tidal influx, so that few marine fish species are expected there. Epibenthic macroinvertebrates are a common feature in southern California coastal lagoons. These may include various insect larvae, the common crayfish, bay shrimp, gastropods, crustaceans, bivalves, and echinoderms. At times where there is no regular tidal influx, as at San Elijo Lagoon east of I-5, epibenthic macroinvertebrates seem to be sparse; in lagoons where there is tidal influence, such as Batiquitos and Agua Hedionda Lagoons, the population is more varied and numerous.

All of the build alternatives would result in permanent, direct impacts to aquatic species. These impacts would result from the permanent loss of individual organisms and their habitat during and after construction from construction of the roadway and bridges and placement of roadway fill and bridge columns and abutments. Permanent, indirect impacts to aquatic organisms could occur from increased pollution runoff due to additional highway traffic, resulting in potential loss of individual species and increased nonnative species plant intrusion, with potential loss of the habitats necessary to support these species.

Temporary impacts to aquatic organisms in the food web could result from turbidity, sedimentation, pollution, and contamination that could occur during construction and operation of the proposed facility. Such threats to aquatic organisms are discussed above in "Potential Changes on Physical and Chemical Characteristics of the Aquatic Ecosystem." Where bridges are widened or replaced with wider bridges permanent impacts could result from increased shading of the biological resources located beneath proposed bridges over riparian, wetland, and other aquatic areas. Increased column and abutment surfaces could provide beneficial effects for some organisms by providing new encrusting habitat.

Shading currently occurs at all of the lagoon crossings; however, additional shading and shadows would be cast on eastern and western sides of north/south-oriented bridges and beneath the bridges. Shading from the expanded bridge footprints would have a permanent indirect effect on vegetation and benthic communities, decreasing overall productivity for some. Increased shading could particularly affect organisms with little or low motility. Shading from bridges would reduce and remove established salt marsh/brackish marsh vegetation and alter water temperatures in the channels directly below. Although some direct sunlight would continue to illuminate the edges underneath the widened bridges (early morning on the east side, late afternoon on the west side), the habitat directly underneath the widened bridge is assumed to be indirectly impacted by shading. The additional shading could cause decreases in plant growth and invertebrate abundance in the shaded areas for some species and have a beneficial effect for others, such as providing a lower-light and cooler environment for organisms preferring such conditions, and providing bridge columns and abutment riprap for habitat.

Comparison of Impacts on Fish, Crustacans, Mollusks, and Other Aquatic Organisms in the Food Web

Indirect effects such as increased light, shading, and pollution associated with the roadway are classified as edge effects. I-5 is currently eight to ten lanes in width across the lagoons and already causes increased nighttime lighting, increased access from invasive species, bisected habitats, and other edge effects. Increased development in much of the rest of the freeway corridor has further encroached on these habitats. The increase in edge effects on waters of the U.S. would vary among the build alternatives, roughly in proportion to the size of the construction footprint of each alternative. Thus the effects would be lowest for the 8 + 4 with Buffer Alternative and highest for the 10 + 4 with Barrier Alternative. Direct effects, such as road fill, columns, and abutments and construction within the aquatic environment, on aquatic organisms would be predominantly in open water and subtidal habitats proportional to the size of the impact of the particular build alternative. Additional analysis on this issue may be found in Section 3.17, “Natural Communities,” and 3.20, “Animal Species,” in the DEIR/DEIS.

Impacts on Eelgrass and Other Essential Fish Habitat

Impacts on Eelgrass (*Zostera marina*) Beds

Eelgrass beds are recognized by NMFS as important ecological communities in shallow bays and estuaries because of their multiple biological and physical values. As vegetated shallows, eelgrass beds are special aquatic sites pursuant to the Section 404(b)(1) Guidelines. Eelgrass habitat functions as an important structural environment for resident bay and estuarine species. Eelgrass is a nursery area for many finfish and shellfish species, including those that are resident within bays and estuaries, as well as for oceanic species that enter estuaries to breed or spawn. Eelgrass beds are protected by specific regulations concerning impacts and mitigation.

Due to the variability in eelgrass distributions, surveys before and after construction are required by the regulatory agencies to make the final determination of impacts to eelgrass. To establish a baseline for the build alternatives, subtidal portions of the Study Area lagoons were surveyed in 2006 for eelgrass and

possible toxic algae (*Caulerpa taxifolia*) distributions. Regulatory agencies would require updated surveys before construction, as well as during and after construction to determine eelgrass impacts.

Eelgrass was mapped within the Batiquitos Lagoon sampling area in April 2006. Eelgrass does not grow in the channel leading up to, under, or past the bridge due to depth and high current velocities. However, eelgrass beds fringing the shoals adjacent to the deeper channels in the area of the I-5 bridge are extremely dense compared to beds found in most systems of southern California. This high density is believed to be related to ideal light and current environments.

As in Batiquitos Lagoon, eelgrass does not grow in the channel leading up to, under, or past the bridge at Agua Hedionda Lagoon. Agua Hedionda eelgrass was primarily restricted to fringing shoreline beds along the shore of both the east basin and central basin of the lagoon. The eelgrass appeared healthy, of moderate stature, and generally free from epiphytes. The present distribution of eelgrass covered approximately 10 percent of the area that has been known to support eelgrass during surveys conducted in recent years. In September 2003, the area investigated in the present survey supported a total of 8.31 acres of eelgrass. A large-scale dieback of eelgrass occurred in 2005 in Agua Hedionda Lagoon, and the eelgrass has not yet recovered to the distribution of prior years. Therefore, it appears that the recent distribution of eelgrass is considerably more restricted than it would likely be in coming years. In the Study Area, eelgrass beds are near the lagoon shore north of the I-5 bridge. Table 10 lists expected impacts to eelgrass beds by the four build alternatives, based on the most current surveys.

Comparison of Impacts on Eelgrass Beds

As Table 10 shows, the acreage of eelgrass beds affected would be very close among the build alternatives. As with effects on federally listed threatened and endangered species, the expected impacts would be slightly less for the buffer alternatives, with the 8+4 with Buffer Alternatives having slightly lower anticipated impacts. There are potential indirect impacts from disturbance of the substrate in the areas of bridge construction to adversely affect eelgrass beds due to turbidity, sedimentation and perturbation of currents. These effects are expected to be controlled to a less than significant level by BMPs and conservation measures included in the proposed project and applicable to all build alternatives. Additional discussion of eelgrass may be found in Section 3.17, “Natural Communities,” of the DEIR/DEIS.

Table 10. Permanent and Temporary Impacts to Eelgrass (Acres)

Location	10+4 with Barrier	10+4 with Buffer	8+4 with Barrier	8+4 with Buffer
	Permanent Impacts			
Agua Hedionda	0.22	0.07	0.20	0.07
Batiquitos	0.02	0.02	0.02	0.01
Total	0.24	0.09	0.22	0.08
	Temporary Impacts			
Agua Hedionda	0.15	0.13	0.14	0.13
Batiquitos	0.22	0.20	0.22	0.09
Total	0.37	0.33	0.36	0.22

Impacts on Essential Fish Habitat

Essential Fish Habitat (EFH) is identified in the Magnuson-Stevens Fishery Conservation and Management Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH has been identified for four groups of fish: Pacific salmon, Pacific groundfish, coastal pelagic species, and highly migratory species. The Pacific salmon group does not include steelhead trout, which is protected. The coastal pelagic group is the only EFH group present within the I-5 Study Area. The coastal pelagic species group includes northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*). Although not captured during eelgrass and fish sampling in the lagoons, northern anchovy, Pacific sardine, and jack mackerel have a potential to occur in San Dieguito, San Elijo, Batiquitos, and Agua Hedionda Lagoons within the Study Area. They are most likely to occur in the open water at Batiquitos and Agua Hedionda Lagoons, since those lagoons are continuously open to the ocean. The open water in all these lagoons and potentially in the San Luis Rey River may provide EFH.

Caltrans is engaged in ongoing consultation with NMFS regarding EFH in the I-5 NCC. Formal agreement has not been reached on EFH as of April 2013, but NMFS has agreed with Caltrans' assessment of EFH in the corridor and the two agencies have reached agreement on Caltrans proposed conservation measures. The assessment identifies San Dieguito, San Elijo, Batiquitos, and Agua Hedionda Lagoons and the San Luis Rey River as EFH. Smaller drainages in the corridor that flow into the Pacific Ocean (Encina Creek and Loma Alta Creek) do not contain EFH.

Replacement and construction of the longer bridges in the lagoons and river under all build alternatives would adversely affect EFH. Construction of new bridge pilings, fill placed along the abutments, and demolition of the bridges to be replaced could directly impact EFH. Bridge footprints are considered to cause permanent impacts. Shading by the wider bridges may reduce some habitats, such as eelgrass, used by fish; however, structure provided by bridge columns, currents, and temperature changes under the bridges may be favored by some fish species. Increased storm water runoff from the wider roadway could have indirect impacts, such as turbidity, sedimentation, freshwater influx, and possibly pollutants on EFH. BMPs for water quality would be part of the project and would control these indirect runoff impacts under all build alternatives. During construction of the bridges, falsework and some kind of work platform may be used, which could temporarily impact EFH.

Comparison of Impacts on Essential Fish Habitat

Impacts on EFH are difficult to quantify, since the boundaries of EFH in the waters affected are not clearly defined. Impacts on eelgrass, a particularly important kind of EFH, are quantified in Table 10. However, all of the build alternatives would have an impact on EFH, and it may be assumed that the area or degree of impact would be roughly equal to the impacts on jurisdictional waters of the U.S. As indicated in Table 4, the 8 +4 with Buffer Alternative would impact the smallest acreage (14.13 acres) of wetlands and other waters of the U.S directly affected. The 8 + 4 with Barrier Alternative would impact 17.95 acres, the 10 +4 with Buffer Alternative would impact 16.68 acres, and the 10 + 4 with Barrier Alternative would impact 19.69 acres of wetlands and waters of the U.S. As noted, increased storm water

runoff from the wider roadway, such as turbidity, sedimentation, freshwater influx, and possibly pollutants, could have indirect impacts on EFH as well. BMPs for water quality would be part of the project and would control these indirect runoff impacts under all build alternatives. Additional discussion of EFH may be found in the DEIR/DEIS in Section 3.20, "Animal Species." Impacts on eelgrass, a particularly important kind of EFH, are discussed in the preceding section, and are referred to again, along with other special aquatic sites, below in Subpart E and in Section 3.17, "Natural Communities," in the DEIR/DEIS.

Other Wildlife and Wildlife Corridors

The Study Area has a diverse assemblage of wildlife species that use a wide variety of habitats. Many migratory birds use the lagoons as they travel along the Pacific Flyway, as well as resident species such as the light-footed clapper rail and the Belding's Savannah sparrow. Many species of waterfowl, shorebirds, and marsh species can be found within the lagoon habitats. Some of the more common species observed include great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), willet (*Catoptrophorus semipalmatus*), red-winged blackbird (*Agelaius phoeniceus*), American coot (*Fulica americana*), northern pintail (*Anas acuta*), American widgeon (*Anas americana*), black-necked stilt (*Himantopus mexicanus*), and many others. Cliff swallows (*Hirundo pyrrhonota*), northern rough-winged swallows (*Stelgidopteryx serripennis*), and white-throated swifts (*Aeronautes saxatalis*) have also been observed nesting within or on several of the bridges, primarily over the lagoons. No sign of bats was observed at any of the lagoon bridges.

Several other bird species were observed around the margins of the lagoons in southern willow scrub, including the yellow warbler (*Dendroica petechia*), Nuttall's woodpecker (*Picoides nuttallii*), song sparrow (*Melospiza melodia*), common yellowthroat (*Geothlypis trichas*), black-headed grosbeak (*Pheucticus melanocephalus*), and lesser goldfinch (*Carduelis psaltria*). The amount of riparian habitat in and around the lagoons is limited; however, there are several creeks and the San Luis Rey River within the project Study Area that support many of these species.

The coastal sage scrub and other upland habitats particularly around the lagoons also support a diverse group of reptiles, birds, and mammals. Mammals that were commonly detected within the Study Area include striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), desert cottontail (*Sylvilagus audubonii*), and many small rodents. Reptiles observed during field surveys include the western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*), southern Pacific rattlesnake (*Crotalus viridis*), and San Diego horned lizard (*Phrynosoma coronatum blainvillei*). Commonly observed upland bird species include coastal California gnatcatcher, bushtit (*Psaltriparus minimus*), wrentit (*Chamaea fasciata*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), red-tailed hawk (*Buteo jamaicensis*), white-tailed kite (*Elanus leucurus majusculus*), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), California towhee (*Pipilo crissalis*), and Anna's hummingbird (*Calypte anna*).

The coastal lagoons and San Luis Rey River and their associated wildlife habitats are of great importance to the biological value of the I-5 NCC project area. The smaller drainages (San Clemente Creek tributary, Cottonwood Creek, Encina Creek, and Loma Alta Creek) are generally degraded, isolated, and near urban development, which limits their function as wildlife habitat or wildlife corridors. Most of the large areas of open space with natural vegetation in the coastal area are adjacent to or near the lagoons. San Luis Rey River open space extends far inland and serves as a major regional corridor for wildlife movement in northern San Diego County. These waters not only provide biological value as habitat for resident species but also allow for migration, genetic exchange, and general movement of both common and sensitive wildlife. Provision of corridors for wildlife movement greatly increases the biological value of the project area. Such movement ensures the continual sharing of genetic information that helps maintain genetic diversity and reduces the probability of species extinction. Wildlife corridors provide a link between habitat patches, increasing the area available for dispersal, foraging, and breeding. For smaller animals, the corridor itself may provide the habitat needed to sustain viable populations.

The presence of water within the corridors greatly increases the value of the habitat. High-quality native upland habitat, particularly sage scrub that persists within the project area, also contributes to the width and habitat diversity of the corridor. Native trees such as cottonwoods, sycamores, and willows provide shelter, nesting and foraging areas, and perches for songbirds and raptors.

Discharge of fill material associated with all of the build alternatives may eliminate or change breeding and nesting areas, destroy escape cover, alter travel corridors, or remove preferred food sources for resident aquatic species and associated other species. These species may be affected by the factors discussed in "Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem," above.

Impacts from all build alternatives would result in temporary and permanent impacts to the lagoons and San Luis Rey River regional wildlife corridors; the varied wildlife habitat associated with the lagoons and river; and adjacent, smaller, local wildlife corridors. These impacts (direct and indirect) include the loss of habitats, reduction or fragmentation of habitat connectivity, and increased edge effects within these corridors. The extent to which these impacts affect species or suites of species is variable, due to the varying mobility of species and the varying tolerance for habitat reduction and edge effects.

Impacts to local corridor crossings between the waters, wetlands, and uplands could affect small mammals, reptiles, and amphibians. Bird species movement is not as likely to be adversely affected by movement corridor impacts, as most can fly over the roadway. Overall, I-5 currently separates areas of local habitat throughout the project area and serves as a barrier to east-west wildlife movement. The lagoons, the river, and the creeks are potential corridors for wildlife to cross under the freeway. Widening I-5 would not cut off these corridors and would incorporate new or wider benches that could improve wildlife movement; the bridges over San Elijo, Batiquitos, and Buena Vista Lagoons would be longer, which could slightly benefit such movement.

Studies have found that wildlife, especially large mammals, use wildlife crossings and corridors that are wider in relation to the length of the crossing. Wildlife currently use steep, narrow abutments at most of the lagoon and the San Luis Rey River bridges. Where bridges at the lagoons are being replaced, they would be designed with a bench from 12 to 16 feet wide at one or both abutments to facilitate wildlife movement. In some cases, these benches may also incorporate hiking trails. Although wildlife avoid people, wildlife would generally use the trails under the bridges at night, and the hikers would generally use them during the day. Corridors at locations where bridges would not be replaced—San Dieguito Lagoon and San Luis Rey River—would not be further constrained since large areas are already available for wildlife movement and minimal increases to bridge width are proposed.

The incremental change in the width of the bridges among the four build alternatives would have an incremental effect to wildlife using these bridge locations for crossings. The increase is largest for the 10 + 4 alternatives. The 8 + 4 alternatives would be less environmentally damaging with respect to wildlife movement, and the SDEIR/SDEIS 8 + 4 with Buffer would be least impacting. Wildlife crossings are discussed in Section 3.17, "Natural Communities," of the DEIR/DEIS.

Subpart E: Potential Impacts on Special Aquatic Sites

All wetlands, mud flats, and vegetated shallows (eelgrass) associated with the lagoon systems, the San Luis Rey riverine system, and smaller drainages in ACOE jurisdictional areas are considered special aquatic sites. All build alternatives would have permanent and temporary impacts on these sites. Direct, permanent impacts on special aquatic sites would eliminate the biological productivity in these areas and possess the potential to indirectly impact them by introducing contaminants or pollutants and increasing suspended particulates or turbidity. The 8 + 4 with Buffer Alternative would have the lowest impacts of the build alternatives on special aquatic sites while the 10 + 4 with Barrier Alternative would have the most impacts, as shown in Table 11; the 8 + 4 with Barrier and 10 + 4 with Buffer Alternatives would be in-between with respect to impacts, with the former having slightly higher impacts than the latter.

Table 11. Impacts to Special Aquatic Sites (acres)

Location	10+4 with Barrier	10+4 with Buffer	8+4 with Barrier	8+4 with Buffer
	Permanent Impacts			
Wetlands	13.77	11.75	12.53	9.93
Mudflat	2.68	2.49	2.61	2.32
Eelgrass	0.24	0.09	0.22	0.08
Total Permanent	**16.69**	**14.33**	**15.36**	**12.33**
	Temporary Impacts			
Wetlands	10.96	10.14	10.66	8.51
Mudflat	0.53	0.46	0.49	0.37
Eelgrass	0.37	0.33	0.36	0.22
Total Temporary	**11.86**	**10.93**	**11.51**	**9.10**

Subpart F: Potential Effects on Human Use Characteristics

Municipal and Private Water Supplies

Surface water in the I-5 NCC project area is not used for municipal or private water supplies. The City of Oceanside operates a well field to extract groundwater from the San Luis Rey River's aquifer, treat it by reverse osmosis, and use it to augment the city's potable water supply. The well field is located well upstream from the I-5 NCC project area. Neither the construction nor operation of any of the proposed build alternatives would affect (directly or indirectly) municipal or private potable water supplies. Hydrology and drainage are discussed in Section 3.9 of the DEIR/DEIS.

Recreational and Commercial Fisheries

No recreational and commercial fishing is allowed in most of the lagoons and the stretch of the San Luis Rey River that would be affected by the build alternatives. No fish are known to inhabit the smaller drainages. In the western basin of Agua Hedionda Lagoon, bound by Pacific Highway to the west and the railroad bridge to the east, there is a commercial shellfish farm, aquaculture, and a marine fish hatchery. Recreational fishing is allowed in the lagoon's eastern basin, east of the I-5 bridge. San Elijo Lagoon is a reserve, with recreational fishing allowed in certain areas. Lagoons with mouths open to the ocean may be important nurseries for spawning and juvenile gamefish and commercially important marine species.

Placement of bridge support columns in any of the lagoons during construction could limit the functions of the lagoons as ancillary support for marine fisheries. With control of sediment release and turbidity by BMPs for water quality control, the commercial fishery enterprises at Agua Hedionda Lagoon would not be adversely affected during construction. None of the build alternatives would permanently affect current recreational or marine fisheries. The temporary impacts would be localized to the vicinity of the bridges (direct and indirect), and due to their limited extent and duration, as well as the BMPs that would be implemented and maintained, would be expected to have less than significant effects on fisheries. Recreational uses in the Study Area for the I-5 NCC project are discussed in Section 3.1, "Land Use," of the DEIR/DEIS and the Supplemental Information Related to Lagoons," in the SDEIR/SDEIS.

Water-Related Recreation

In the middle basin at Agua Hedionda Lagoon, between the railroad bridge and the I-5 bridge, kayaks are used at a YMCA summer camp. A small boat marina is located in the eastern basin where active recreation, such as boating, water skiing and wake boarding, personal watercraft use, sailing, and windsurfing, is allowed. Small recreational vessels are allowed in the Agua Hedionda basins, but no vessels travel between the basins due to historic hydrologic siltation, growth of plant species obstructing passage, and human activity in the area.

Except at Agua Hedionda Lagoon, there is little or no human water-related recreational activity formally practiced at any of the waters in the project area inland from the ocean beaches. None of the lagoons are considered navigable by the U.S. Coast Guard. Predominant water-related recreation is passive, such as photography, hiking, running, and wildlife viewing, and these activities occur at all aquatic locations in the project Study Area.

Personal water craft are not allowed in San Elijo Lagoon. The mouth frequently closes and the channel is narrow and not very deep at low tide. There is no place to launch a motorized vessel. The majority of the lagoon is an ecological reserve and is not open to active recreational use, although small water craft may be used by biologists or other scientists reconnoitering, surveying, or monitoring the lagoon.

Only small watercraft can navigate the San Dieguito River in the project area. Kayaks or canoes can navigate the lagoon channel, but, during resource surveys for the I-5 NCC project, the only vessels observed within the lagoon were platforms used for sampling fish and invertebrates related to the large restoration project that began in 2007.

Buena Vista Lagoon is a reserve and no recreational vessels are allowed to operate in it except for scientific monitoring. Only kayaks and canoes can navigate the lagoon due to thick vegetation, low bridges, and shallow water in some areas.

Batiquitos Lagoon is also an ecological reserve. The only motorized vessels allowed are dredges that remove sediment from the lagoon and small craft for scientific monitoring of the lagoon. Only small personal water craft or small motorized boats can navigate under the lagoon's bridges.

There is currently little or no use of the San Luis Rey River by any vessels. Upstream of the I-5 bridge, vegetation is dense and the river is not navigable except possibly by kayaks or canoes.

In short, none of the build alternatives would have a discernible difference on water-related recreation, and any minor potential effects (direct or indirect) would be temporary and localized to the vicinity of the bridges. Recreational uses in the Study Area for the I-5 NCC project are discussed in Section 3.1, "Land Use," of the DEIR/DEIS.

Aesthetics

Segments of I-5 in the project area offer expansive views of river valleys, coastal lagoons, beaches, and other natural scenic resources unmatched by any other freeway in southern California. In development near the lagoons, large retaining walls and noise walls are mostly absent, except near Lomas Santa Fe Drive where large retaining walls were recently constructed. Throughout most of the corridor, however, both developed and natural landscape features remain in the forefront, opening scenic views from the road and screening views of the freeway from adjacent communities.

The principal ACOE jurisdictional areas are the lagoon systems, with a small amount of active water-related recreation but predominantly passive uses such as hiking and wildlife viewing, largely restricted to pathways and walks. Some pathways and walks are not officially developed and some are formally developed by conservation organizations. The I-5 bridges over all the lagoons are noticeable features of the westward viewscapes almost everywhere east of the railroad bridges in/over the ACOE jurisdictional areas and open water of the lagoons.

New bridges would be built at Los Peñasquitos Creek, and a new bicycle bridge would be constructed at Old Sorrento Valley Road across Carmel Creek to replace the culverts currently there. At Carmel Creek

and San Dieguito, San Elijo, Batiquitos, Agua Hedionda, and Buena Vista Lagoons, the I-5 bridges would be wider than the existing ones by 15 feet (at Carmel Creek) to 196.1 feet. The existing bridges at San Elijo, Batiquitos, Agua Hedionda, and Buena Vista Lagoons would be replaced, and the remaining bridges would be widened. The existing bridges at San Elijo, Batiquitos, and Buena Vista Lagoons would be replaced with longer bridges.

The completed bridges would remain prominent features in westward views from ACOE jurisdictional areas. Since those views are mostly of the sides of the bridges that run north and south, widening would not make the bridges more visually prominent than they are now. Lengthened bridges at three of the lagoons would remove abutments and fill along or near the water, replacing them with a longer overall span that, for viewers at lagoon or nearby ground level, could open up westerly views under these bridges. Retaining walls would be smaller for the 8 + 4 with Buffer Alternative; larger retaining walls would be needed for the other build alternatives, with the scale mostly determined by the size of the overall alternative footprint.

During construction, views of the bridge sites would include falsework, scaffolding, construction vehicles, workmen, and similar features common at construction sites. These features would be obtrusive in views of the freeway from ACOE jurisdictional areas, but would be temporary, localized to the bridge vicinity, and visible only during construction.

Some visible turbidity may occur near the bridges during construction, but because BMPs to minimize such indirect effects, including coffer dams where advisable, would be employed, sediment plumes visible at significant distances from the construction areas would be avoided. Any such effects would be transient and of limited scale in the vicinity of the bridges, disappearing with the cessation of construction. Excessive turbidity would not be expected from the constructed facility under any build alternative and would be absent in the No Build Alternative. There would not be any long term operational effects from work in and around waters of the U.S., although, as noted for all the build alternatives, the views westerly under the new bridges at San Elijo, Batiquitos, and Buena Vista Lagoons could benefit from the longer bridges at those locations. A full discussion of the visual effects of the I-5 NCC build alternatives is found in Section 3.7, "Visual/Aesthetics," of the DEIR/DEIS.

Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

Caltrans on behalf of FHWA has identified and evaluated the I-5-NCC project's potential effects on parks and recreational facilities in Section 3.1, "Land Use," in the DEIR/DEIS, including natural preserves and active municipal parks in the corridor and has continued coordination with the officials with jurisdiction for these resources. Six municipalities within the project area contain parklands and recreational facilities. The proposed project would have minor, direct impacts on four of these facilities. Indirect effects, such as noise, glare and lighting would also be minor and would not affect the functions of these areas. The effects of the build alternatives on each of the four facilities are discussed below.

San Dieguito River Park

None of the four build alternatives would impede the ability of the San Dieguito River Park to function as a publicly owned regional open space park. Access to the park would not be impeded temporarily or permanently. The proposed project, when complete, would not interfere with existing trails or planned trails. There may be some temporary, short term interruption of trail use under the I-5 bridge during construction and some impacts would occur to the area on the west side of I-5 just north of the San Dieguito River during construction of the connection of the I-5 North Coast Bike Trail (I-5 NC Bike Trail) to the existing trail. The 8 + 4 with Buffer would not impact the Coast-to Crest trail on the east side along I-5; however, the other build alternatives might have a temporary construction easement to build a retaining wall to ensure the trail is not permanently impacted. The location of the crossing of the park by I-5 would remain the same, and none of the build alternatives would substantially alter views from the river park. Increases in noise levels would not be noticeable to park users. Areas of natural vegetation disturbed during construction (temporary) would be reestablished with native plant species.

San Elijo Lagoon Ecological Reserve

All of the build alternatives would remove up to 0.13 acre of land from the San Elijo Lagoon Ecological Reserve south of the lagoon on the west side for the I-5 NC Bike Trail and for fill at the shoulders of the freeway. None of the effects of the alternatives would impede the ability of the reserve to function ecologically. None of the build alternatives would adversely affect existing trailheads or designated trails at the San Elijo Ecological Reserve; all the build alternatives include enhancement of the reserve's user access and trails. New trails and bridge crossings would be added. An illegal trail under the bridge would be closed during bridge construction, at least temporarily; however, a new legal trail would be constructed on a bench under the bridge as a secondary use of the land. The visual character of the reserve would not be measurably altered by the freeway improvements. A very small quantity of vegetation would be removed, but would be reestablished after completion of construction. Increases in traffic-related noise would not be noticeable to park users and would not impair the wildlife habitat functions of the reserve. It is not expected that the use of up to 0.13 acre of reserve land would impact any of the activities, features, or attributes of the reserve.

Paul Ecke Sports Park and YMCA

Three of the four build alternatives might remove 0.57 acre of the sports park property, none of which is usable for park activities, for freeway shoulders and grading of the slope. The 8+4 with Buffer Alternative avoids any use of the park land. Access to the existing park and its visual character would be unaffected. Increases in traffic-related noise would not be noticeable to park users.

Agua Hedionda Lagoon

Agua Hedionda Lagoon is under private ownership but is leased to the City of Carlsbad for recreational and commercial uses. CDFW and Hubbs/Sea World jointly manage a white seabass research facility in the lagoon, and CDFW also manages a 186-acre ecological reserve at the eastern end of the lagoon. The grading for slope and some fill for the build alternatives would remove up to 2.22 acres of the lagoon property, but would not affect the 186-acre CDFG Ecological Reserve. Public and private access to the

lagoon would be increased along the new trail on the east side of I-5. The proposed project would not interfere with existing trails or planned trails. The visual character of the lagoon would be unchanged; the use of small amounts of City leasehold land would simply extend the Caltrans right-of-way boundary outward slightly and ultimately result in a view of the area adjacent to I-5 very similar to the existing condition. As noted in Section 3.1, "Land Use," of the DEIR/DEIS, none of the build alternatives would significantly affect any of the lagoon activities, features, or resources, or any public or private access to the lagoon. On completion of construction, visual character of the lagoon would be unchanged from the existing condition.

Applicable Regulations

Caltrans and FHWA have a statutory obligation to conform to the requirements of the California Public Park Preservation Act of 1971 (Public Resources Code § 5400 et seq.), which provides that a public agency that acquires public parkland for non-park use must either pay compensation that is sufficient to acquire substantially equivalent substitute parkland or provide substitute parkland of comparable characteristics.

In addition, Section 4(f) of the Department of Transportation Act of 1966 (49 United States Code 303) states that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over resource), only if the following occurs:

- there is no prudent and feasible alternative to using that land, and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
- consideration of any impact avoidance, minimization, and mitigation or enhancement measures, results in a *de minimis* impact on a Section 4(f) property.

In summary, impacts of any of the build alternatives on Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves are either nonexistent or not significant and any approved build alternative would conform to the federal requirements for use of park property.

Subpart G: Evaluation and Testing

Evaluation and Testing

To minimize impacts to special aquatic sites and other waters of the U.S., fill material composed of sand, soil, gravel, or other naturally occurring inert material should be evaluated to ensure that it is free of

chemical, biological, or other contaminants. The extraction site should be examined to assess whether it is sufficiently removed from sources of pollution to provide reasonable assurance that the discharge material is not a carrier of contaminants. If the evaluation described above indicates the material is not a carrier of contaminants, then the required determinations pertaining to the presence or absence of contaminants can be made without testing. Evaluation must be in accordance with the requirements of 40 CFR Section 230.60 and, if testing is required, it must comply with the requirements of 40 CFR Section 230.61.

Evaluation and testing have not been conducted for the proposed project. Caltrans would follow the required procedures to ensure that no adverse impacts related to the deposit of fill material into waters of the U.S. would occur. All fill material deposited into waters of the U.S. would be evaluated for the presence of contaminants, and if the evaluation showed that the material was or could be contaminated, it would be tested for chemical, biological, and other contaminants before deposit. Contaminated material would not be deposited into waters of the U.S.

The I-5 NCC project grading will have surplus cut material than will be used as fill to construct the project, so all suitable cut material would be used on-site for roadway fill, if possible. Widening and deepening of the channels under the bridges at San Elijo, Batiquitos, and Buena Vista Lagoons would involve the removal of sediment by dredging. Dredge material would be removed from the channels with no more than incidental fallback, and would either be placed in upland areas in such a manner that there would be no return flow to waters of the U.S., or disposed of appropriately in an upland landfill with no possibility of return to waters of the U.S. Moreover, any barge, scow, or similar vessel used to temporarily store and/or haul the dredged material would be operated in a manner that precludes the spilling or other release of dredged material or associated water back into waters of the U.S. Therefore, no Section 404 discharge into waters of the U.S. would occur from the dredging or material handling or disposal from any of the build alternatives.

Cumulative Impacts Assessment

The DEIR/DEIS for the project considered 14 other past, present, and reasonably foreseeable projects within the I-5 NCC likely to be affected by the proposed project or other build alternative. The cumulative impacts discussion from the DEIR/DEIS (Section 3.25, pp. 3.25-1 through 3.25-6) is hereby incorporated by reference. Environmental issue areas with a potential for cumulative impacts when considered in conjunction with the I-5 NCC project were identified. The DEIR/DEIS defined a Resource Study Area (RSA) within which impacts on specific resources by the cumulative projects would interact for each cumulative issue. The results for issues relevant to the analysis are presented in Table 11; specifically relevant issues are visual/aesthetics, natural biological communities, water quality, and wetlands/other special aquatic sites. The DEIR/DEIS conclusions regarding the issues of relevance to this analysis are summarized briefly below. The No Build Alternative would not result in a change in physical conditions and would therefore result in no cumulative impacts.

Visual/Aesthetic Resources

Several planned projects in or near the project limits could have visual impacts. The I-5/Genesee Avenue Bridge Widening and Interchange Improvement, I-5/SR-56 Interchange, I-5/SR-78 Interchange, and the recently completed I-5 Lomas Santa Fe Road Interchange projects would all potentially contribute to visual impacts along the I-5 corridor. The LOSSAN project would affect visual quality in the lagoon areas by replacing or modifying railroad bridges near and across the lagoons, depending on design. Other projects that are located within the RSA, but would not contribute to overall visual impacts to ACOE jurisdictional areas, include the Riverview Office Project in Del Mar, the Mixed-Use Solana Beach Train Station, Beacon's Beach Access Project in Encinitas, the construction of the Northern Inlet Jetty in Carlsbad, and the Oceanside Pier Resort. These projects, although located within the RSA, are not located within the viewsheds of ACOE jurisdictional areas and would not contribute to cumulative visual effects associated with the proposed project under any of the build alternatives. Sensitive design of the LOSSAN bridges, combined with the longer-span bridges proposed by the I-5 NCC project, could result in no overall adverse impacts to visual resources in views from ACOE jurisdictional areas for all I-5 NCC build alternatives.

Table 11. Projects in DEIR/DEIS Cumulative Impacts Analysis

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
City of San Diego				
Scripps Hospital La Jolla Master Plan	Genesee Avenue and I-5	Demolition of existing hospital and construction of three hospital towers, two medical office buildings, outpatient care pavilion and additional parking	Visual Resources – Cumulative impacts related to aesthetics/neighborhood character and lighting/glare identified as less than significant. Traffic – Less than significant impacts	DEIR Public Review ends January 4, 2013; Initial construction projected for 2015
Flowerhill Mall Expansion Project	Santa Fe Avenue and I-5	Demolition of movie theater, improvements to existing retail center and construction of new grocery store, 400-space parking structure, 28,000-square-foot medical space and 8,000 square feet of retail space	Visual Resources – No cumulative impacts identified for neighborhood character/visual effects. Traffic – Less than significant impacts	Final Recirculated EIR complete February 2011; Construction completion projected for early 2013
One Paseo Project	Del Mar Heights Road and El Camino Real	Construction of mixed-use, office, and retail uses	Visual Resources – Cumulative impacts related to viewsheds and neighborhood character identified as less than significant. Traffic – Less than significant impacts	DEIR Public Review ended May 14, 2012; FEIR under preparation as of December 2012 with no projected EIR completion or project construction dates
Via De La Valle Road widening	Via De La Valle from El Camino Real west to San Andreas Drive	Widening of existing two-lane road segment to four lanes	Information to be made available once environmental review document prepared; anticipated that this project will have less than significant impacts for visual and traffic.	Project is in review phase
San Dieguito River Park Nature Center	Via De La Valle and San Andreas Drive	Construction of nature center, parking and educational facilities	Visual Resources – Less than significant impacts Natural Communities – Less than significant impacts due to graded condition of site Traffic – Less than significant impacts	Project is in review phase

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
City of Del Mar				
Riverview Offices Project	Jimmy Durante Boulevard and San Dieguito Drive	Construction of two multi-level commercial office buildings at the southeast corner of the intersection	Visual Resources – Potential impacts not identified Natural Communities - Potential impacts mitigated to less than significant Traffic – Less than significant impacts	DEIR completed in December 2007; site remains undeveloped
22nd District Agricultural Association Fairgrounds and Horsepark Master Plan	Via De La Valle and Jimmy Durante Boulevard and Via De La Valle and El Camino Real	Renovation of existing exhibit halls and barns; construction of office/ticket box space, (potential) hotel, health club, and fire station; restoration of salt marsh habitat; enhanced parking and support for seasonal train platform	Visual Resources – Less than significant impacts to I-5 corridor associated with new construction near freeway. Significant impacts related to new light and glare sources. Natural Communities – Direct removal of 0.16 acre of native vegetation communities, including Diegan coastal sage scrub, southern coastal salt marsh and riparian habitat. Indirect impacts to riparian habitat in Stevens Creek (0.04 acre). Wetlands and Other Waters – Temporary and permanent impacts to jurisdictional areas, including up to 0.49 acre of federal and state waters.	Project approved in April 2011; CEQA litigation settled in December 2012
City of Solana Beach				
Solana Beach Gateway Resort Project	Highway 101 and E. Circle Drive	Construction of 30-unit hotel development with associated clubhouse, outdoor pool, and spa	Wetlands and Other Waters – Substantial loss of wetlands from San Elijo Lagoon.	Project terminated. Site purchased by San Elijo Lagoon Conservancy for dedication as an open space park in December 2011
Mixed-Use Solana Beach Train Station	Lomas Santa Fe Drive and North Cedros Avenue	Parking facility and mixed-use, transit-oriented development	Visual Resources –Substantial visual impact; cumulative impacts to visual/aesthetics associated with proposed building heights which are incongruent with surrounding land uses.	Approved

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
U.S. Army Corps of Engineers, Encinitas and Solana Beach Shoreline Protection Project	Up to 8 miles of shoreline in the cities of Encinitas and Solana Beach	Restoration of shoreline to reduce storm-related wave attack and shoreline erosion along the base of the associated bluffs and beaches. Both structural and non-structural approaches to be considered, including off-shore sand dredging local beach replenishment over a 50 year period, and notch infills	Information to be made available once environmental review document prepared	Environmental review phase pending
City of Encinitas				
Hall Property Community Park	Santa Fe Drive and I-5	44 acres of public park, including skate park, dog park, and fields for soccer, softball, baseball and unrestricted play	Visual Resources –Substantial visual impact cumulative impacts to visual/aesthetics associated with light and glare extending to adjacent properties.	Final EIR approved 2008, Coastal Commission approval finalized in 2009, construction began August 2012 and is scheduled for completion by the end of 2013
Coral Cove Residential Project	Ashbury Street and Vulcan Avenue	69 units on a 10-acre project site	Wetlands and Other Waters – Substantial water quality impacts during construction.	Project approved 2006; site graded but remains undeveloped
Scripps Hospital Encinitas Master Plan	Santa Fe Avenue and I-5	Modification and expansion of existing hospital; including two-story facility for emergency department and medical-surgical beds, new central energy plant and various infrastructure improvements	No significant cumulative impacts identified for visual resources, natural communities, or wetlands/other waters	Second phase of construction to be completed by 2014.
North 101 Corridor Streetscape Improvement	Highway 101 from A Street to La Costa Avenue	Landscaping and circulation improvements	Visual Resources – Beneficial effects to aesthetics of road.	Project approved; construction began June 2012
City of Carlsbad				
Northern Inlet Jetty Restoration	Agua Hedionda Lagoon	Reconstruction/seaward extension of existing northern tidal inlet jetty	Visual Resources – Potential impact due to decreased beach width south of northern inlet. Natural Communities – Loss of surfgrass habitat offshore of North Beach. Wetlands and Other Waters – Potential for decreased beach width at Middle Beach and South Beach from deflection.	Project in review phase

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
Agua Hedionda Sewer Lift Station and Force Main Replacement	Between Agua Hedionda Lagoon and the Encina Water Pollution Control Facility	Approximately 2.35 linear miles of sewer trunk line, a 50-million gallon per day sewer lift station, a 140-foot sewer support bridge, and associated improvements	No known information available on the status of the CEQA document or related cumulative issues/impacts	Project MND approved by City December 2011
Westfield Carlsbad Project	El Camino Real and Marron Road	Renovation of existing shopping center, including construction of 35,417 square foot expansion	Visual Resources – No impacts to scenic vistas, corridors or resources. Natural Communities – No impacts to natural communities. Wetlands or Other Waters – No impacts to jurisdictional areas.	Project in review phase; construction projected for Spring 2013.
Caruso Affiliated Project	Cannon Road and I-5	Retail and possible housing project on site occupied by agricultural fields	N/A	Application not yet submitted for review.
Carlsbad Energy Center Project (CECP)	Cannon Road and I-5	Construction of 558 Megawatt (MW) generating facility on site of existing Encina Power Station, including retirement of boiler units at existing facility	Visual Resources – Significant impacts from construction of new generating facility identified in the California Energy Commission (CEC) final decision document dated June 2012 (CEC-800-2011-004-CMF).	The CEC adopted the final decision for the CECP on May 31, 2012 The CEC will serve as CEQA lead agency during the CECP licensing.
City of Oceanside				
Oceanside Pier Resort	Pacific Street and Pier View Way	Development of 136 timeshare units, 32 hotel units, 4780 square feet of restaurant space, and 7730 square feet of retail space	Visual Resources – Substantial visual impact due to mid-rise towers. Incongruent with current visual character.	Project completed
Mesa Ridge Project	Mesa Drive and Foussat	Development of 70 townhomes on a 23.8-ac site	Natural Communities – Project results in permanent loss of 12.20 ac of non-native grassland. Mitigation to occur at a 0.5:1 ratio.	EIR approved 2008; site at northeast corner of Mesa Drive and Foussat Road remains undeveloped
Inns at Buena Vista Creek	Jefferson Avenue and SR-78	Construction of a business hotel, an extended stay hotel, and a family-oriented vacation-type hotel for a total of 426 rooms	N/A	Application under review

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
Caltrans Highway Projects				
I-5/Genesee Bridge Widening and Interchange Improvement	City of San Diego at I-5/Genesee Avenue Interchange	Reconstruction of existing Genesee Avenue Interchange; add southeast and northwest loops; signalize interchange	Visual Resources – Potential impacts due to retaining walls and structures mitigated to less than significant. Cumulative impacts concluded to not be substantial. Natural Communities – Potential impacts to coastal sage scrub, coyote brush scrub, and non-native grassland mitigated to less than significant. Cumulative impacts concluded to not be substantial. Wetlands and Other Waters – Potential impacts to southern willow scrub and non-wetland streambed mitigated to less than significant. Cumulative impacts concluded to not be substantial.	MND/EA approved June 2011; construction is scheduled for Fall 2013
I-5/SR-56 Direct Connectors	City of San Diego I-5/SR-56 Interchange	Construct HOV/Managed Lanes freeway-to-freeway connectors via direct ramps or local street connections	Visual Resources – Potential impacts due to reduction in screen plantings, retaining walls, and soundwalls not mitigated to less than substantial; cumulative impacts would occur Natural Communities - Potential impacts to coastal sage scrub, southern mixed chaparral, and southern maritime chaparral mitigated to less than substantial. The proposed project was concluded to not result in significant adverse cumulative impacts to natural communities.	Draft EIR/EIS completed public review; environmental estimated completion in late 2013
I-5/Lomas Santa Fe Drive Interchange	City of Solana Beach at interchange of I-5 and Lomas Santa Fe Drive	Construct Auxiliary lanes and modify existing interchange	Visual Resources – Overall moderate adverse effect of visual quality of moderate extended duration due to the introduction of new structures and improvement of existing structures.	Project completed

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
I-5/SR-78 Interchange	I-5 at SR-78	Direct connectors, potentially by construction of a Managed Lane/HOV Connector, between I-5 and SR-78	Visual Resources – Potential impacts due to Managed Lane/HOV Connector ramps. Wetlands and Other Waters – Potential impacts to wetlands.	Preliminary design phase; environmental review set to begin in Spring 2013
LOSSAN				
Los Angeles to San Diego (LOSSAN) Rail Improvement, including the projects listed below in the North Coast Corridor*	From Los Angeles to San Diego	Program-level evaluation of double-tracking of railroad tracks and other improvements including bridge and track replacements, new platforms, pedestrian undercrossings, and other safety and operational enhancements	Programmatic document identified cumulative effects for overall project, applicable to all projects listed below. Community Cohesion – Possible impacts include displacement of commercial and residential properties; community and neighborhood disruption. Visual Resources – Potentially significant cumulative impacts to visual/aesthetics. Natural Communities – Potential impacts to several sensitive biological species and habitats. Wetlands and Other Waters – Potential impacts to several water resources and wetlands.	Environmental completed 2009
Eastbrook to Shell Double Track (San Luis Rey River Bridge)	North Oceanside Double Track *(Eastbrook to Shell)*	Add approximately 0.5 mile of second track just south of SR 76 to south of Harbor Drive and replace San Luis Rey River Bridge	Cumulative effects identified in programmatic document as described above	Design completion Fall 2014
San Luis Rey Transit Center	Vandegrift Boulevard and North River Road	New bus transit facility including four covered shelters with seating and restrooms	Cumulative effects identified in programmatic document as described above	Construction began April 2012, estimated completion Spring 2013
Oceanside Through Track	Oceanside Transit Center	Add platform and third track to accommodate COASTER and/or Metrolink trains	Cumulative effects identified in programmatic document as described above	Construction to begin early 2013
Carlsbad Village Double Track	From Carlsbad Village Drive to the north	1.1 miles of double track, including a new rail bridge across the Buena Vista Lagoon	Cumulative effects identified in programmatic document as described above	Design completion late 2014

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
Carlsbad Double Track	From Carlsbad Village southward past Cannon Road	1.9-mile second main track and a new rail bridge over the Agua Hedionda Lagoon.	Cumulative effects identified in programmatic document as described above	Construction completed Spring 2012
Poinsettia Station Improvement	Poinsettia Station in Carlsbad	Improve station to include new grade-separated pedestrian crossing and signals	Cumulative effects identified in programmatic document as described above	Construction to begin late 2013
Encinitas Pedestrian Crossing (Santa Fe)	Santa Fe Drive as well as at El Portal Street, Montgomery Avenue, and Hillcrest Drive.	Four grade-separated pedestrian crossings including utility relocation, underpasses, landscape improvements, environmental mitigation, and street crossing improvements on adjacent roadways	Cumulative effects identified in programmatic document as described above	Completion of Santa Fe Drive undercrossing construction in early 2013
San Elijo Lagoon Double Track	Cardiff to Craven	Add 1.5 miles of second track, enhance existing pedestrian crossing at Chesterfield Drive and replace San Elijo Lagoon Bridge	Cumulative effects identified in programmatic document as described above	Construction to begin late 2014
San Dieguito Double Track and Platform	From just south of Dahlia Street in Solana Beach and continuing 1.1 miles south across the San Dieguito Lagoon	Replace 96-year-old San Dieguito Railway River Bridge wooden trestle, add 1.1 mile of second mainline rail track south of Solana Beach, and add a special events platform at the Del Mar Fairgrounds for NCTD COASTER and Amtrak Pacific Surfliner trains.	Cumulative effects identified in programmatic document as described above	Environmental completion early 2014
Del Mar Bluffs Stabilization 3	Between Seagrove Park and Torrey Pines State Beach in the City of Del Mar	Stabilize portions of the 1.6 miles of coastal bluffs with soldier piles and an architecturally enhanced pile cap	Cumulative effects identified in programmatic document as described above	Construction completed Spring 2012
Los Peñasquitos Lagoon Bridges	Los Peñasquitos Lagoon	Replacement of three aging railroad bridges	Cumulative effects identified in programmatic document as described above	Design in process
Sorrento Valley Double Track	From the Sorrento Valley Station to approximately 1.1 miles to the north	Add a second mainline rail track, raise portions of track bed, replace three wooden trestle bridges, install embankment protection system along the westerly side of the track adjacent to Los Peñasquitos Creek, build retaining walls adjacent to the tracks near the parking lots	Cumulative effects identified in programmatic document as described above	Construction to begin Fall 2013 and completed by mid-2015

Project	Location	Proposed Development	Identified Cumulative Impacts	Project Status (January 2013)
Sorrento to Miramar Phase 1	Between the Sorrento Valley Station and Miramar Road in the City of San Diego in two phases	Add 1.1 miles of second track and replace a wooden trestle bridge south of the Sorrento Valley COASTER station	Cumulative effects identified in programmatic document as described above	Construction completion late 2013
Sorrento to Miramar Phase 2	Between the Sorrento Valley Station and Miramar Road in the City of San Diego in two phases	Add 2.0 miles of passing track to the coastal rail corridor between I-805 and Miramar Road and straighten the sharp curves in this segment	Cumulative effects identified in programmatic document as described above	Design completion early 2015

Natural Biological Communities

Development over time throughout the coastal region has reduced the amount of native habitat and species in the region and also has limited the ability to expand habitat around the lagoons and large open space areas. These past impacts are considered cumulatively significant. However, there is currently a large effort to reestablish salt marsh habitat around San Dieguito Lagoon, and there are plans to restore San Elijo, Agua Hedionda, and Buena Vista Lagoons. Planned restoration projects for San Elijo and Buena Vista Lagoons propose to reduce tidal muting and increase fluvial and tidal flows and wetland/other special aquatic sites in the lagoons. Projects within the corridor with the potential to directly contribute to incremental cumulative impacts to natural biological communities in ACOE jurisdictional areas include the LOSSAN railroad double-tracking and the construction of the connector ramps at I-5 and SR-78 near Buena Vista Lagoon.

Where the San Elijo, Batiquitos, and Buena Vista Lagoon channels would be dredged and widened to optimize tidal and fluvial flows, many benthic organisms would be impacted by construction but would be expected to recolonize the channel after completion of construction. If projects that would disturb the substrate in the San Elijo, Batiquitos, and Buena Vista Lagoons are constructed at the same time or nearly the same time as the I-5 NCC project, there would likely be cumulative impacts on such organisms. Because the construction schedules for such projects other than the I-5 NCC project are speculative, the occurrence or severity of such cumulative impacts is uncertain, but any such effect would be expected to be temporary.

The LOSSAN project, combined with any of the build alternatives of the I-5 NCC project, has the potential to incrementally impact additional aquatic habitats and sensitive species. The I-5/SR-78 interchange project intends to cross wetland habitat and other special aquatic sites at Buena Vista Lagoon with abutments outside the wetland areas; however, wetlands/other special aquatic sites would still be impacted by bridge columns. Mitigation for the I-5/SR-78 interchange project would occur in advance of that project, combined with mitigation for the I-5 NCC project. The LOSSAN project may build longer railroad bridges and remove some of the fill in the coastal lagoons in the I-5 NCC project area. There is a programmatic environmental document for the LOSSAN project that anticipates significant wetland and other sensitive natural-communities impacts along the corridor. Two smaller foreseeable future projects, the Northern Inlet Jetty Restoration in Carlsbad and the Mesa Ridge Project in Oceanside, would also contribute to loss of habitat in the RSA.

Depending on the alternative, the I-5 NCC project would have an incremental contribution of up to 19.69 acres of wetland loss and 96.79 acres of sensitive upland loss (10 + 4 with Barrier Alternative). The incremental loss contributing to cumulative impacts would be lowest for the SDEIR/SDEIS 8 + 4 with Buffer Alternative, with a loss of 62.57 acres of sensitive upland and 14.13 acres of wetlands and other waters of the U.S. However, the loss of waters of the U.S. associated with each build alternative would be offset by approximately 2.52 acres onsite as a result of the channel inlet widening activities under the San Elijo Lagoon, Batiquitos Lagoon, Buena Vista Lagoon, and Carmel Creek bridges (see Table 12 below for specific acreages by location). For LOSSAN, similar impacts to wetlands and other waters of the U.S.

have been conservatively estimated at 27 acres. The I-5 NCC project would impact territories of coastal California gnatcatcher and light-footed clapper rail; LOSSAN could also contribute to impacts to these species. Within each of the 11 identified watersheds, the impacts are relatively small; however, within the cumulative projects RSA, the contribution of I-5 NCC project impacts to natural communities and sensitive species would be cumulatively considerable.

Construction schedules for both LOSSAN and the I-5 NCC project are long-term estimates and are subject to change due to a number of factors, including funding. LOSSAN would be parallel to the I-5 NCC and its construction would affect the same lagoons, the San Luis Rey River, and some of the smaller drainages, and LOSSAN construction in some of these areas could occur at the same time as construction of the I-5 NCC project. Some of the other future cumulative projects could also be under construction at the same time as either the I-5 NCC or LOSSAN projects or both. While the uncertainty of the schedules for the various projects does not allow for quantitative assessment of impacts, construction impacts of the I-5 NCC project in combination with other projects could be cumulatively considerable.

The BO issued for the 8 + 4 with Buffer Alternative states that USFWS considered the "effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area." The BO concludes that "Federal actions that are unrelated to the proposed action are not considered…because they require separate consultation pursuant to section 7 of the [ESA]" and that USFWS is "unaware of any future non-Federal actions that are reasonably certain to occur within the action area and may affect gnatcatchers, rails, gobies, manzanita, and critical habitat for the gnatcatcher and goby."

As discussed in Subpart H below, Caltrans plans for the I-5 NCC project and the LOSSAN project are being coordinated with resource and regulatory agencies planning and executing regional restoration and enhancement work. Nonetheless, without mitigation, the I-5 NCC project, LOSSAN, and other transportation projects in the I-5 NCC would contribute to the loss of natural biological communities in the I-5 corridor in San Diego County. A Resource Enhancement and Mitigation Program (REMP) is being developed collaboratively for the I-5 NCC project, LOSSAN rail project, smaller transportation projects, and the lagoon restoration projects (being separately planned and evaluated), which, if implemented, would be expected to compensate for unavoidable impacts natural biological communities associated with the I-5 NCC project and others in this corridor (See Subpart H, below).

Water Quality

The build alternatives for the I-5 NCC project, as noted earlier in this analysis, would incorporate BMPs and design features to reduce the significance of impacts on water quality. This would include, wherever there is deposit of fill material into waters of the U.S., measures required by conditions of permits from ACOE as well as other agencies such as CCC and RWQCB. Dredging to deepen and widen the lagoon channels below the proposed I-5 bridges at San Elijo, Batiquitos, and Buena Vista Lagoons might not require a Section 404 permit from ACOE if it adheres to conditions to protect water quality discussed in Subpart H (below) of this analysis.

Projects such as LOSSAN and the restoration plans for San Elijo Lagoon and Buena Vista Lagoon would have the potential for the same kind of water quality construction impacts that could occur, absent minimization and avoidance measures, as a result of the I-5 NCC project, as discussed elsewhere in this analysis, if they were to take place in the same or nearly the same time period as the I-5 NCC construction. However, any such project would be subject to the same agency and regulatory oversight as the I-5 NCC project, so that cumulative water quality impacts during construction would be reduced to a less than significant level.

The channel optimization at the I-5 NCC bridge crossings of the San Elijo, Batiquitos, and Buena Vista Lagoons have been designed to complement any version of the known restoration plans for those lagoons, and the LOSSAN project is also committed to complement the restoration plans. In combination with the restoration plans for these three lagoons, the channel optimization proposed by any of the proposed build alternatives of the I-5 NCC project, would increase tidal and fluvial flows within the lagoons and would be expected to result in long-term water quality improvements.

Wetlands and Other Waters of the U.S.

As noted in Natural Biological Communities, development over time throughout the coastal region has reduced the amount of native habitats, including wetlands and other waters of the U.S., in the region and also has limited the ability to expand such habitats around the lagoons and large open space areas. These past impacts are considered cumulatively significant. However, there is currently a large effort to reestablish salt marsh habitat around San Dieguito Lagoon, and there are plans to restore aquatic habitats in the San Elijo, Agua Hedionda, and Buena Vista Lagoons. The San Dieguito Wetlands Restoration Project was constructed at San Dieguito Lagoon in 2008. Planned restoration projects for San Elijo and Buena Vista Lagoons propose to reduce tidal muting and increase fluvial and tidal flows and wetland/other special aquatic sites in the lagoons. As discussed further below, San Diego regional planning entities are discussing a comprehensive study of all lagoons and identification of specific restoration opportunities within each.

Project impacts to wetlands and other waters of the U.S. would occur at the six lagoons, as well as the San Luis Rey River, Loma Alta Creek, Encina Creek, Cottonwood Creek, and other more minor drainages. The majority of project impacts to wetland habitats/other special aquatic sites would be associated with widening of the freeway corridor at the lagoons. Impacts to southern coastal salt marsh, coastal brackish marsh, coastal brackish marsh (disturbed), mud flat, and open water are primarily related to impacts at the lagoons. Overall, the proposed project would permanently impact, depending on the build alternative, 14.13 to 19.69 acres of wetland habitats and other waters of the U.S. (Table 3). The loss of waters of the U.S. associated with each build alternative would be offset by approximately 2.52 acres onsite as a result of the channel widening activities under the San Elijo Lagoon, Batiquitos Lagoon, Buena Vista Lagoon, and Carmel Creek bridges (see Table 12 below for specific acreages by location).

Other transportation projects may contribute to cumulative impacts to lagoon wetlands. The I-5/Genesee Bridge Widening and Interchange Improvements project would contribute to wetland impacts upstream of Los Peñasquitos Lagoon. The LOSSAN project could impact up to 27 acres of wetlands and other waters of the U.S., some of which are within the wetlands and other waters of the U.S that would be affected by the I-5 NCC project.

As discussed in Subpart H below, Caltrans plans for the I-5 NCC project and the LOSSAN project are being coordinated with the resource and regulatory agencies planning and executing regional restoration and enhancement work. Nonetheless, without mitigation, the I-5 NCC project, LOSSAN, and other transportation projects in the I-5 NCC would contribute to the loss of wetlands and other waters of the U.S. in the I-5 corridor in San Diego County. A REMP is being developed collaboratively for the I-5 NCC project, LOSSAN rail project, smaller transportation projects, and the lagoon restoration projects, which, if implemented, would be expected to compensate for the unavoidable impacts to wetlands and other waters of the U.S. (and State) associated with these projects (See Subpart H, below).

Subpart H: Actions Taken to Minimize Adverse Effects

Design Iterations and Wetland/Special Aquatic Site/Other Waters Impact Minimization Efforts

Many impacts of the proposed widening of the I-5 lagoon crossings, with respect to ACOE and state jurisdictional habitats, would be unavoidable because I-5 is an existing north-south transportation corridor that transects the east-west lagoons and other drainages. An effort to minimize impacts was an objective of the design effort for each of the build alternatives in the DEIR/DEIS. The following minimization efforts have been included in the project plans and would apply to each of the four build alternatives:

- To minimize impacts to all sensitive habitats, the freeway slopes were designed at a steeper 2:1 grade versus the standard 4:1 grade.
- To further minimize impacts, retaining walls were also included in the project design on cut slopes, but could not be used on fill slopes. Through analysis of lagoon sediment data from geotechnical borings, it was determined that lagoon soil liquefaction would prevent the use of large retaining walls to minimize the roadbed fill in the lagoon. Soil liquefaction requires that any structures taller than approximately 6 feet have support piles that are driven to bedrock, which is located at a depth of over 100 feet. All pilings for the bridge supports would be driven to this depth, but this would not be practical for retaining walls.
- Riprap is currently used to protect the existing abutments of the I-5 bridges, and would also be used to protect the abutments of the proposed bridges. Due to the depth of bridge pilings, riprap is not required to armor the channel bottoms (the current condition at the Batiquitos Lagoon channel).
- To avoid impacts to wetlands /other aquatic sites from fill associated with creation of 12-foot-wide bike/pedestrian paths, short retaining walls (6 feet or lower in height) would be used. In

addition, bike/pedestrian paths would be attached to the existing I-5 bridge structure where they directly cross over the lagoons, eliminating additional impacts to waters of the U.S.

- Caltrans funded studies to determine the optimum channel dimensions/cross-sections, combined with bridge lengths, to optimize tidal flushing and flood condition flows at the lagoons. At three lagoons, San Elijo, Batiquitos, and Buena Vista, where the results showed longer bridges would be needed, the longer bridges and channel design were integrated into the proposed project.
- Removal of the DAR at Cannon Road reduced the originally contemplated wetland/other special aquatic site impacts at Agua Hedionda Lagoon.
- The proposed project/LPA was designed to Caltrans standards to ensure the smallest-impact footprint. In addition, design exceptions were requested, reducing the footprint even more at spot locations.
- Auxiliary lanes were identified at only the locations where Caltrans standards require them for traffic purposes.
- DARs were designed to have a smaller central structure where vehicles leave and enter I-5 within the centermost lane. For example, instead of having two bridges, one for northbound and one for southbound traffic, these were combined to further reduce the project footprint.
- The DAR at Manchester Avenue was redesigned to be below grade, which shifted the alignment north, away from San Elijo Lagoon. In addition, the park and ride lot was reduced from 470 parking spaces to 150 parking spaces to further reduce the paved footprint.
- Additional funds were obtained to move replacement of the Batiquitos Lagoon Bridge to the first Phase of construction (prior to construction of a proposed HOV lane in the median). This would reduce the overall bridge widths required for staging the bridge replacements, thus reducing wetland/other special aquatic site impacts by more than one acre.

Buena Vista Lagoon was also proposed as a candidate to obtain funds to replace this bridge during the first phase of construction. However, due to funding shortfalls, and the proposed interchange improvements at I-5 and State Route 78, adjacent to the lagoon, a wider bridge may be necessary in the future. Because auxiliary lanes in each direction are proposed at Agua Hedionda Lagoon, resulting in the need for a wider finished bridge, accelerated timing of bridge replacement would not minimize wetland/other special aquatic site impacts at this location. The option to advance Buena Vista Lagoon Bridge is still being pursued, but it depends on finding funding and the I-5/78 interchange project; therefore, the larger footprint (conservative) is used for impact quantification in the current analysis.

Conservation Measures

The following conservation measures would be required for implementation of any of the four build alternatives, as proposed by Caltrans and FHWA.

1. All native habitats outside the permanent and temporary construction limits would be designated as Environmentally Sensitive Areas (ESAs) on project maps. ESAs would be temporarily fenced during construction with orange plastic snow fence. No access would be allowed within the ESAs.

2. Due to the phased nature and duration of the project, preconstruction surveys would be completed to confirm sensitive species locations. This would ensure that the incidental take of species allowed by USFWS (BO) is accurate .

3. All removal of native vegetation or nonnative shrubs and trees within the impact areas would be completed outside of the bird breeding season (February 15 through September 15), if possible, to avoid impacts to nesting birds. Otherwise, a qualified biologist would thoroughly survey all vegetation during preconstruction surveys to ensure no nesting birds are on site. If nesting birds are identified on site, vegetation removal would be delayed until the chicks have fledged or the nest has failed.

4. Exclusion devices would be installed on bridge drain holes and ledges of bridges to be demolished during the nonbreeding season (September 1 through February 15) to prevent swallows, swifts, and any other birds or bats from nesting on or in them.

5. If pile driving is necessary for construction of bridge falsework and/or coffer dams for construction of cast-in-drilled hole bridge pilings, all pile driving near the lagoons would be completed outside the bird breeding season (February 15 through September 15) to minimize construction noise impacts to resident bird species.

6. Noise barriers would be installed at the edge of temporary impact areas near ESAs where feasible, depending on inundation and effective heights required for walls. Noise walls would not be effective where fill slopes are significantly higher than the affected area.

7. A channel large enough for fish movement would be kept open throughout construction at the San Luis Rey River and all of the lagoons.

8. Coffer dams, silt curtains, and/or other barriers would be used around column construction in the river or lagoons to contain sediment and debris.

9. All debris from the replacement of old bridges or construction of new bridges would be contained, so debris does not fall into rivers, streams, and lagoons.

10. During bridge construction activities in water at all lagoons and the San Luis Rey River, bubble curtains or other methods to minimize acoustical impacts to aquatic species would be implemented. These measures would be developed in conjunction with the resource agencies when the project design and construction methodology is further developed.

11. Preconstruction eelgrass surveys would be completed at all lagoons with the exception of Buena Vista Lagoon. In lagoons were eelgrass is identified in proximity to I-5 widening, eelgrass

surveys would continue during and after construction. If eelgrass is identified, mitigation would be implemented in accordance with the Resource Management Enhancement Management Program (REMP).

12. *Caulerpa* surveys would be completed before and after construction at each of the lagoons to ensure there is no infestation within the project limits. If *Caulerpa* is found, measures would be implemented to eradicate it from the area in coordination with the Regional Water Quality Control Board (RWQCB), NMFS, and CDFW.

13. Special care would be taken when transporting, using, and disposing of soils with invasive weed seeds. All heavy equipment would be washed and cleaned of debris before entering a lagoon area to minimize spread of invasive weeds.

14. A qualified biologist would be made available for both the preconstruction and construction phases to review grading plans, address protection of sensitive biological resources, and monitor ongoing work. The biologist shall be familiar with the habitats, plants, and wildlife of the project area, and shall maintain communications with the resident engineer, to ensure that issues relating to biological resources are appropriately and lawfully managed.

15. Bioswale locations have been identified along the freeway lanes and in loop ramps. Detention basins in loop ramps may also be constructed. Construction of these facilities would minimize potential impacts related to highway runoff constituents into wetlands.

16. Appropriate BMPs would be used to control erosion, sedimentation, and debris movement offsite into waters of the U.S. No eroded material, sediment, or debris would be allowed to enter the creeks, rivers, or lagoons.

17. Cut slopes would be revegetated with native upland habitats with composition similar to those habitats within the Study Area. Fill slopes and areas adjacent to wetlands and drainages would be revegetated with appropriate native upland and wetland species, similar to those currently found on site. The revegetated areas would have temporary irrigation and would be planted with native container plants and seeds selected by the qualified restoration biologist. At least 3 years of plant establishment/ maintenance on these slopes would be provided to control invasive weeds. Bioswales and detention basins would be planted with appropriate native species as determined by the qualified restoration biologist and storm water personnel. Slopes adjacent to developed urban areas would be vegetated with native and drought-tolerant noninvasive species selected by the qualified restoration biologist and landscape architect. Interchanges located in urban areas would be landscaped with native or ornamental noninvasive species. More than 86 acres of large slopes near lagoons and other open space would be revegetated with coastal sage scrub.

18. Duff from areas with coastal sage scrub, maritime succulent scrub, and maritime chaparral may be salvaged to the extent practicable to aid in revegetating slopes with native habitats. However, populations of African veldt grass and onion weed are expanding within the corridor, and duff would not be used from areas with infestations of these species, such as the areas between Del Mar Heights and Birmingham Drive.

19. All temporary impact areas would be revegetated with native species and reestablished to preexisting conditions, including return to original grade, as feasible.

20. Fueling of construction equipment would only occur at a designated area greater than 100 feet from drainages, lagoons, and associated plant communities to preclude adverse water quality impacts as required under Caltrans Storm Water Manuals and Specifications.

21. If lighting for construction is used at night, it would be shielded and directed away from ESAs and limited to the minimum amount needed for work.

22. Dust generated by construction operations would be controlled with construction site BMPs.

23. All trails would be fenced and signed to keep pedestrians on the trails and out of adjacent habitats. No night lighting would be used on trails. Some daytime lighting may be used under bridges for safety.

24. In dredging of waters of the U.S., no more than incidental fallback of dredged material would be allowed. Sediment would be placed in a Baker tank to separate sediment from water prior to disposal. Any barge, scow, or similar vessel used to temporarily store and/or haul the dredged material would be operated in a manner that precludes the spilling or other release of dredged material or the associated water back into waters of the U.S. Disposal of sediment either on the project site or offsite would be allowed only at sites with no possibility of return to waters of the U.S.

At San Elijo, Batiquitos, and Buena Vista Lagoons, bridge replacement, including bridge lengthening and channel optimization (wider and deeper), would involve removal of existing bridge abutments and removal of fill material from uplands immediately adjacent to waters of the U.S., which would allow establishment or reestablishment of wetlands and other waters of the U.S. in the removal areas. The new bike bridge proposed as part of this project on Old Sorrento Valley Road at Carmel Creek would replace existing culverts, also allowing reestablishment of wetlands and other waters of the U.S. The acreage suitable for reestablishment would be the same for all build alternatives, as presented in Table 12. These increases in waters of the U.S. would occur immediately in the vicinity where aquatic resource impacts would occur at San Elijo Lagoon, Batiquitos Lagoon, Buena Vista Lagoon, and Carmel Creek.

Table 12. Wetland Reestablishment Allowed by Replacement of Bridges, All Alternatives

Location	Wetlands Established
San Elijo Lagoon	1.10 acres
Batiquitos Lagoon	0.54 acre
Buena Vista Lagoon	0.47 acre
Carmel Creek	0.41 acre
Total	**2.52 acres**

Conservation measures would also be required for the 8+4 with Buffer Alternative by the BO issued by the USFWS (Attachment A).

Compensatory Mitigation

Overview

Caltrans worked collaboratively with various resource and regulatory agencies to develop the North Coast Corridor REMP to mitigate the unavoidable natural resource impacts of the I-5 NCC project, the LOSSAN rail project, and other surface transportation projects in the NCC. The program document describing the full scope of the REMP is attached. This overview describes the overarching concepts guiding the REMP and its implementation.

The 30 miles of coastline and coastal zone where the NCC is located contain unique and significant marine and environmentally sensitive resources. The Public Works Plan/Transportation Resource Enhancement Program (PWP/TREP) being developed under the California Coastal Act will identify and coordinate all of the surface transportation construction projects within the I-5 NCC and implement mitigation for impacts under one umbrella for California Coastal Commission permitting and federal consistency with the Coastal Act. Impacts of both the I-5 NCC project and the LOSSAN double-tracking project, along with some other projects (trails, train stations) would be mitigated through the REMP.

The REMP provides for mitigation planning and implementation through the I-5 NCC PWP/TREP process and the permitting processes of other regulatory and resource agencies to effectively mitigate I-5 NCC project impacts by addressing regionally significant resource establishment, restoration, enhancement, and preservation needs. Six major lagoon systems in the NCC coastal zone represent some of southern California's most significant remaining natural resource areas. REMP measures include strategically acquiring reestablishment opportunities, preserving existing environmentally sensitive habitat areas, enhancing lagoon system function and values through transportation facility infrastructure improvements, and facilitating restoration plans, all within the I-5 NCC coastal zone area.

Protection of the I-5 NCC's lagoon systems from potential future degradation and enhancement and expansion of habitat in these systems require comprehensive action, with mitigation efforts focused less on ratio-based mitigation and more on ecosystem-wide enhancements. Given the unique ecological value of the I-5 NCC's lagoons, the benefits of improving the ecological function of the systems would exceed the benefits of pursuing only ratio-based mitigation efforts on the relatively small, fragmented, and isolated land areas remaining in the I-5 NCC that are suitable for biological establishment or

reestablishment. Using a broader, systemic approach to mitigation planning would also be in keeping with the 2008 Corps/USEPA Mitigation Rule.

REMP measures include strategically acquiring establishment and reestablishment opportunities, preserving existing environmentally sensitive resource areas, and potentially enhancing lagoon system function and values through optimized design of transportation facility infrastructure improvements and facilitation of large-scale restoration plans. The latter includes widening and deepening the inlet channels under the bridges at San Elijo, Batiquitos, and Buena Vista Lagoons to increase tidal and fluvial flows, which would improve hydraulic conditions at and through these locations and would accommodate and support the separate restoration projects being planned for these areas. As part of the REMP, an endowment would be established to increase the capacity for long-term stewardship of I-5 NCC resources for the foreseeable future, as well as funding of a Scientific Advisory Committee to evaluate, prioritize, and oversee implementation of the mitigation program. Given that multiple surface transportation projects (I-5 NCC, LOSSAN, etc.) in the corridor are being considered by the various resource and regulatory agencies in developing the REMP, there are sufficient opportunities identified in the REMP to compensate for all the Section 404-regulated impacts to waters of the U.S. associated with the I-5 NCC project.

Funding

The *TransNet* Extension Ordinance approved by San Diego voters in November 2004 established an Environmental Mitigation Program (EMP) for the advancement of mitigation for resource impacts associated with regional and local transportation projects. The REMP is structured to support the region's efforts to develop a comprehensive regional mitigation strategy using the *TransNet* EMP, to be implemented as an integrated element of the PWP/TREMP Implementation Plan for the I-5 NCC project. The REP prioritizes expenditure of EMP funds on a corridor-wide level, with an emphasis on advanced habitat establishment, restoration, preservation/enhancement, and improving the ecology of sensitive I-5 NCC habitats through funding of system-wide restoration plans, endowments, and a Scientific Advisory Committee. Optimized transportation facility infrastructure specifically designed to enhance lagoon system function and values are also proposed as part of this program to ensure avoidance and minimization of project impacts, but would be funded through capital expenditures.

The PWP/TREP includes formation of a REMP Working Group to serve as an oversight committee that would include resource and regulatory agency personnel. The REMP Working Group would provide oversight and advisory assistance for coordinating and implementing the specific REMP requirements in the I-5 NCC. The REMP Working Group would include staff representatives of federal and state agencies that are directly involved in permitting transportation projects, including USFWS, ACOE, CDFW, the California Wildlife Conservation Board, the Regional Water Quality Control Board, and the California Coastal Commission.

The REMP Working Group would provide REMP project implementation and monitoring oversight, and advise the San Diego Association of Governments (SANDAG) and Caltrans on potential resource benefits of new mitigation or enhancement opportunities that may be determined necessary as

contingency mitigation, and/or those warranting consideration for incorporation into the REMP given their unique value. The REMP Working Group would also prioritize and coordinate disbursement of REMP funds for the San Elijo and Buena Vista Lagoon Restoration Projects, which are going through separate environmental review and planning processes.

A separate endowment may be established through SANDAG's EMP to fund an independent Scientific Advisory Committee to provide for expenses of researchers charged with conducting research, study, and evaluation of the REMP's effectiveness and success.

As detailed in the attached REMP document, the REMP provides the planning and implementation framework to ensure that the most valuable, highest-quality mitigation opportunities in the I-5 NCC are identified, secured, and prioritized for implementation in a cost-effective manner, using available mitigation funding to maximize benefits to the corridor's natural resources.

Preliminary LEDPA Identification and Consideration of Other Section 404 Discharge Requirements/Restrictions

As discussed in Chapters 1-3, four feasible build alternatives were evaluated in the DEIR/DEIS and SEIR/SEIS with the consent of ACOE, USFWS, NOAA, and EPA. These alternatives are also practicable in consideration of the Section 404(b)(1) Guidelines. Since the aquatic resource full avoidance alternatives are not practicable, and because each of the I–5 NCC build alternatives would result in some aquatic resource loss, the practicable alternative with the least damage to aquatic resources must be identified as the LEDPA, unless it has other significant adverse environmental consequences. Because the location of the I–5 NCC is fixed and the use of the areas already developed for the existing freeway would minimize impacts to natural habitats, including wetlands and other waters of the U.S., the DEIR/DEIS build alternatives are the only practicable alternatives (i.e., (1) other locations or corridors would not be practicable to construct and would result in more impacts [building new bridges and roadway at a different location] to the aquatic ecosystem and (2) complete avoidance of wetlands and other waters of the U.S. in the existing I-5 NCC would not be practicable to construct and would be far more costly). As noted, the No Build Alternative would not be practicable in light of the overall project purpose. Based on preliminary analysis and as discussed in detail in Chapter 3, the least environmentally damaging of these build alternatives appears to be the 8 + 4 with Buffer Alternative, especially with the design modifications described in SEIR/SEIS. The 8 + 4 with Buffer Alternative would have the least acreage of impacts on natural resources overall and the least acreage of impacts/Section 404 discharges to wetlands, other special aquatic sites, and overall waters of the U.S. (Tables 3-5). Therefore, the 8 + 4 with Buffer Alternative appears to be the Least Environmentally Damaging Practicable Alternative based on the analysis of alternatives.

It is also expected this alternative would meet the other requirements/restrictions specified in the Section 404(b)(1) Guidelines. Specifically, the issued Biological Opinion supports that the 8 + 4 with Buffer Alternative would not jeopardize the continued existence of any federally listed as endangered or threatened species or adversely modify designated critical habitat of any federally listed species, as

required. It is not expected any marine sanctuaries would be affected by this alternative (or any build alternative). Issuance of a Section 401 Water Quality Certification by the San Diego Regional Water Quality Control Board, which is required before an ACOE permit can be issued, would confirm it would not violate any applicable state water quality standard and would not violate any applicable toxic effluent standard or prohibition under Section 307 of the CWA, although with the various BMPs identified in Subpart C-H determinations, it is not expected a violation of applicable standards would occur. Moreover, considering the factual determinations in Subparts C-H, including the cumulative impact assessment, and the actions to minimize impacts specified in Subpart H, it is expected the 8 + 4 with Buffer Alternative would not result in severe degradation of waters of the U.S., as required by the Section 404(b)(1) Guidelines.

This page intentionally left blank.

Attachment A

Biological Opinion for the Interstate 5 North Coast Corridor Project

See Appendix O of the I-5 Final EIR/EIS

Appendix N:
ACOE Jurisdictional Delineation Verification

DEPARTMENT OF THE ARMY

October 20, 2009

REPLY TO
ATTENTION OF
Office of the Chief
Regulatory Division

Bruce April
Chief, Environmental Stewardship Branch
North Coast Environmental Division
Caltrans, District 11 - San Diego
4050 Taylor Street, MS-242
San Diego, California 92110

Dear Mr. April:

Reference is made to your submittal (File No. SPL-2004-01089-SJH) dated September 24, 2008, requesting verification of the jurisdictional limits of the Section 404 of the Clean Water Act (CWA) for a number of water bodies, tributaries and wetlands occurring within the **Interstate 5 (I-5)North Coast Corridor Widening Project** study area located in the County of San Diego, along 26-miles of the I-5, from the I-805 (Mira Mesa Blvd. & La Jolla Village) to I-5 at Vandergrift Blvd., in the City of Oceanside, California. Your jurisdictional determination request is a formal concurrence point specified in the multi-agency collaborative process to integrate and streamline the requirements of the National Environmental Policy Act and Section 404 of the CWA for Surface Transportation Projects in the State of California. This letter of verification fulfills this concurrence point.

Based on our May 26, 2009 site visit and information furnished to our office, including the September 2008 jurisdictional delineation report entitled *"Interstate 5 North Coast Corridor Project Federal Wetland Delineation and Non-wetland Waters Report,"* we have determined that your proposed project does discharge dredged or fill material into a water of the United States (U.S.). Therefore, the project is subject to our jurisdiction under Section 404 of the Clean Water Act (CWA) and a Department of the Army (DA) permit is required from our office. According to the delineation report, the I-5 would result in the placement of fill material into the following water bodies, tributaries, and adjacent wetlands: San Clemente Creek, Los Penasquitos Lagoon, San Dieguito Lagoon, San Elijo Lagoon, Cottonwood Creek, Batiquitos Lagoon, Encina Creek, Agua Hedionda Lagoon, Buena Vista Lagoon, Loma Alta Creek, and the San Luis Rey River. Preliminary estimates indicate a range of approximately 22.97 to 28.86 acres of waters of the U.S., including wetlands, would be permanently impacted by the proposed I-5, depending on the alternative selected. Similarly, approximately 13.55 acres to 16.05 acres of waters of the U.S., including wetlands, would be temporarily impacted.

The enclosed tables list the waters of the United States, including wetlands, regulated by Section 404 of the CWA. Specifically, Table 1 identifies the permanent and temporary impacts to jurisdictional waters, including wetlands, occurring within each of the proposed I-5 project alternatives under consideration, Table 2 identifies permanent impacts to jurisdictional waters by watershed, and Table 3 identifies the I-5 jurisdictional watershed acreages. All tables referenced in this letter correspond to figures and maps compiled in the I-5 Federal Wetland Delineation and Non-wetland Waters Report (Caltrans, September 2008). The subject report

subject report will be retained in our office files as part of the project's official administrative record and the Corps' approved jurisdictional delineation/determination.

This delineation/determination has been conducted to identify the limits of the Corps jurisdiction for the particular site identified in this request. This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

This letter contains an approved jurisdictional determination for the **Interstate 5 (I-5) North Coast Corridor Widening Project**. If you object to this decision, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet (Appendix A) and Request for Appeal (RFA) form. If you request to appeal this decision you must submit a completed RFA form to the Corps South Pacific Division Office at the following address:

Tom Cavanaugh
Administrative Appeal Review Officer,
U.S. Army Corps of Engineers
South Pacific Division, CESPD-PDS-O, 2042B
1455 Market Street, San Francisco, California 94103-1399

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 C.F.R. Part 331.5, and that it has been received by the Division Office within 60 days of the date on the NAP. Should you decide to submit an RFA form, it must be received at the above address by December 20, 2009. It is not necessary to submit an RFA form to the Division office if you do not object to the decision in this letter.

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. If you wish to submit new information regarding the approved jurisdictional determination for this site, please submit this information to Stephanie Hall at the letterhead address by December 20, 2009. The Corps will consider any new information so submitted and respond within 60 days by either revising the prior determination, if appropriate, or reissuing the prior determination. A revised or reissued jurisdictional determination can be appealed as described above.

If you have any questions, please contact Stephanie Hall of my staff at 213-452-3410 or via e-mail at Stephanie.J.Hall@usace.army.mil.

Please be advised that you can now comment on your experience with Regulatory Division by accessing the Corps web-based customer survey form at: http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Mark D. Cohen
Assistant Deputy Chief,
Regulatory Division

Enclosures

ENCLOSURE 1

Tables 1 through 3

Table 1. Permanent and Temporary Impacts to ACOE Jurisdictional Waters of the U.S.

	8+4 buffer	10+4 buffer	8+4 barrier	10+4 barrier
Permanent	acres	acres	acres	acres
other waters of the US	10.58	11.82	12.79	12.95
wetland	12.39	13.07	13.95	15.90
Total	22.97	24.89	26.74	28.86
Temporary				
other waters of the US	4.74	4.46	4.38	4.30
wetland	9.10	11.60	11.20	9.25
Total	13.84	16.05	15.58	13.55

Table 2. Permanent Impacts to ACOE Jurisdictional Waters of the U.S. by Watershed

Watershed	Jurisdiction	8+4 buffer acres	10+4 buffer acres	8+4 barrier acres	10+4 barrier acres
San Clemente Creek	other waters of the U.S.	0.00	0.00	0.00	0.00
	Wetland	0.01	0.01	0.01	0.01
Los Peñasquitos Lagoon	other waters of the U.S.	2.14	2.14	2.14	2.14
	Wetland	2.20	2.20	2.20	2.20
San Dieguito Lagoon	other waters of the U.S.	1.05	1.09	1.13	1.17
	Wetland	2.46	2.61	2.28	3.14
San Elijo Lagoon	other waters of the U.S.	0.60	0.64	0.66	0.70
	Wetland	1.18	1.55	1.74	2.37
Cottonwood Creek	other waters of the U.S.	0.03	0.03	0.03	0.04
	Wetland	0.26	0.27	0.23	0.38
Batiquitos Lagoon	other waters of the U.S.	0.97	1.05	1.21	1.11
	Wetland	3.60	3.71	4.81	5.06
Encina Creek	other waters of the U.S.	0.08	0.10	0.11	0.13
	Wetland	1.42	1.46	1.44	1.49
Agua Hedionda Lagoon	other waters of the U.S.	4.32	5.36	6.12	6.28
	Wetland	0.00	0.00	0.00	0.00
Buena Vista Lagoon	other waters of the U.S.	0.30	0.30	0.30	0.30
	Wetland	0.57	0.57	0.57	0.57
Loma Alta Creek	other waters of the U.S.	0.26	0.26	0.26	0.26
	Wetland	0.03	0.03	0.03	0.03
San Luis Rey River	other waters of the U.S.	0.84	0.84	0.84	0.84
	Wetland	0.65	0.65	0.65	0.65
Total		22.97	24.89	26.74	28.86
Subtotal	other waters of the U.S.	10.58	11.82	12.79	12.95
Subtotal	Wetland	12.39	13.07	13.95	15.90

Table 3. I-5 North Coast Corridor Drainages/Watershed ACOE Jurisdictional Acreage

Watershed/Drainage	Drainage ID	Latitude	Longitude	Area Reviewed (acres)	Wetland (acres)	Non-wetland WUS (acres)	Total (acres)
San Clemente Creek	**SCC**						
Voight –unnamed drainage	SCC-D1	32.8823	-117.2248	0.5	0.02		0.02
Los Peñasquitos Lagoon	**LPL**						
Genesee Unnamed Drainage	LPL-D1	32.8940	-117.227	18	2.44	0.5	2.94
Soledad Creek	LPL-D2	32.9006	-117.2234	5.0		2.44	2.44
Los Penasquitos Creek	LPL-D3	32.9042	-117.2237	5.0	2.02		2.02
Carmel Creek	LPL-D4	32.9297	-117.2405	42	30.92	1.54	32.46
San Dieguito Lagoon	**SDL**						
San Dieguito River	SDL-D1	32.9729	-117.2504	11	2.19	5.41	7.6
Drainage SE of San Dieguito River	SDL-D2	32.9683	-117.2478	10	1.77		1.77
Drainage NW of San Dieguito River	SDL-D3	32.9743	-117.2504	7.8	1.96		1.96
Drainage NE of San Dieguito River	SDL-D4	32.9763	-117.2510	7.8	2.08		2.08
San Elijo Lagoon	**SEL-D1**	33.0101	-117.2643	45.0	25.90	2.03	27.93
Unnamed drainage from South	SEL-D2	33.0069	-117.2619	1.0	0.02		0.02
Drainage Parallel to Manchester	SEL-D3	33.0118	-117.262	2.0	0.45		0.45
Drainage north of Manchester	SEL-D4	33.0132	-117.2685	1.0	0.15		0.15
Cottonwood Creek	**CC-D1**	33.0475	-117.2859	1.0		0.07	0.07
Drainage S of Requeza OC	CC-D2	33.0431	-117.2850	8.0	0.91		0.91
Moonlight Creek	CC-D3	33.0515	-117.2890	22.0	2.28	0.092	2.37
Batiquitos Lagoon	**BL-D1**	33.0907	-117.3023	100.0	29.38	39.3	68.68
Encina Creek	**EC-D1**	33.1169	-117.3181	3.0	0.45	0.22	0.67
Drainage to Encina Creek	EC-D2	33.1148	-117.3171	16.0	1.33	0.12	1.45
Agua Hedionda Lagoon	**AHL-D1**	33.0907	-117.3023	51.0		35.6	35.6

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Bruce April, Caltrans, District 11 - San Diego	File Number: SPL-2004-01089-SJH	Date: 10/20/2009

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

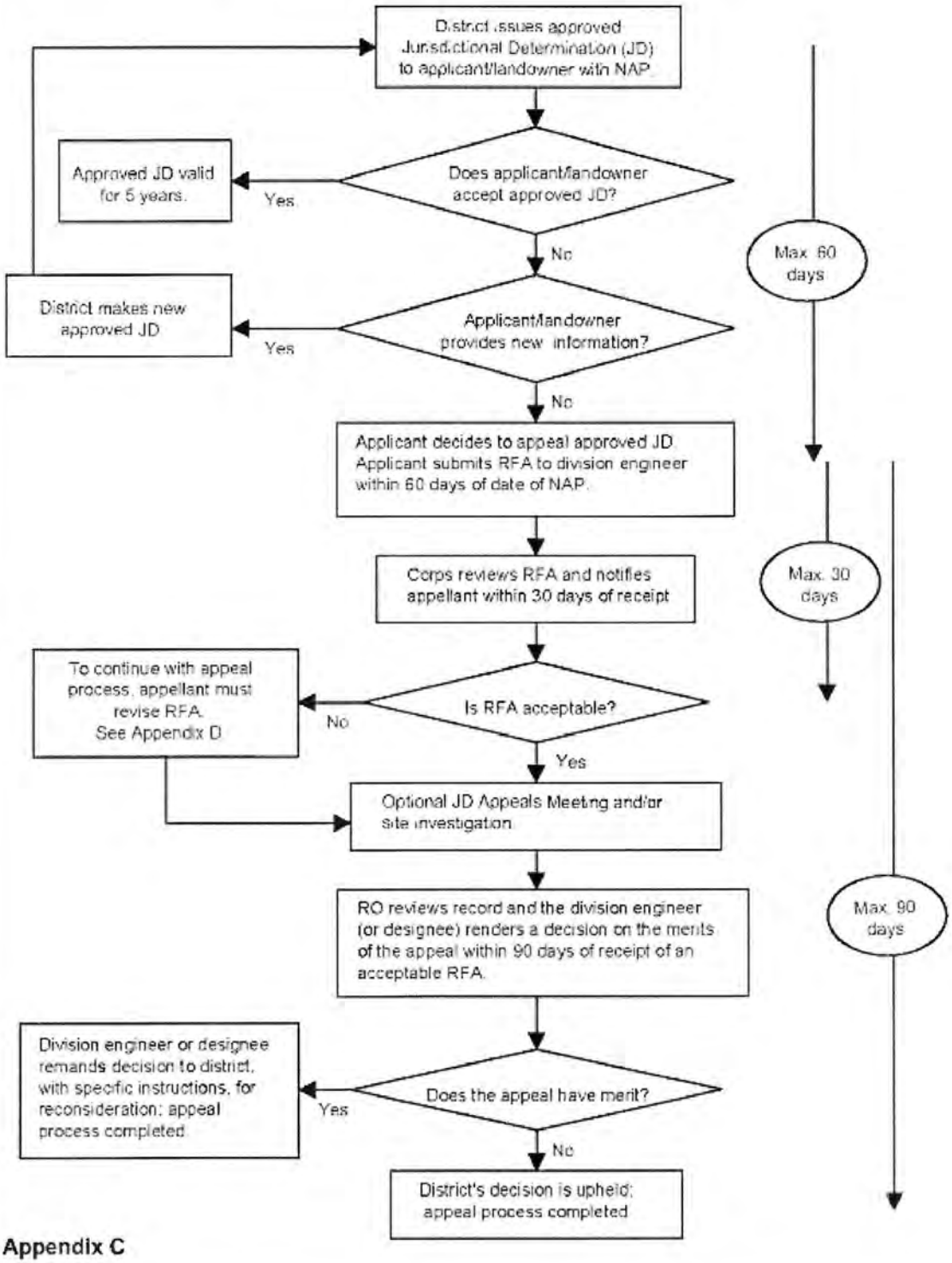
POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
DISTRICT ENGINEER Los Angeles District, Corps of Engineers ATTN: Chief, Regulatory Division P.O. Box 532711 Los Angeles, CA 90053-2325 Tel. (213) 452-3425	DIVISION ENGINEER South Pacific Division, Corps of Engineers ATTN: Tom Cavanaugh Administrative Appeal Review Officer, South Pacific Division, CESPD-PDS-O, 2042B 1455 Market Street, San Francisco, California 94103-1399 Tel. (415) 503-6574 Email: thomas.j.cavanaugh@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

Administrative Appeal Process for Approved Jurisdictional Determinations



Appendix C

Figure 1. I-5 North Coast Corridor Project

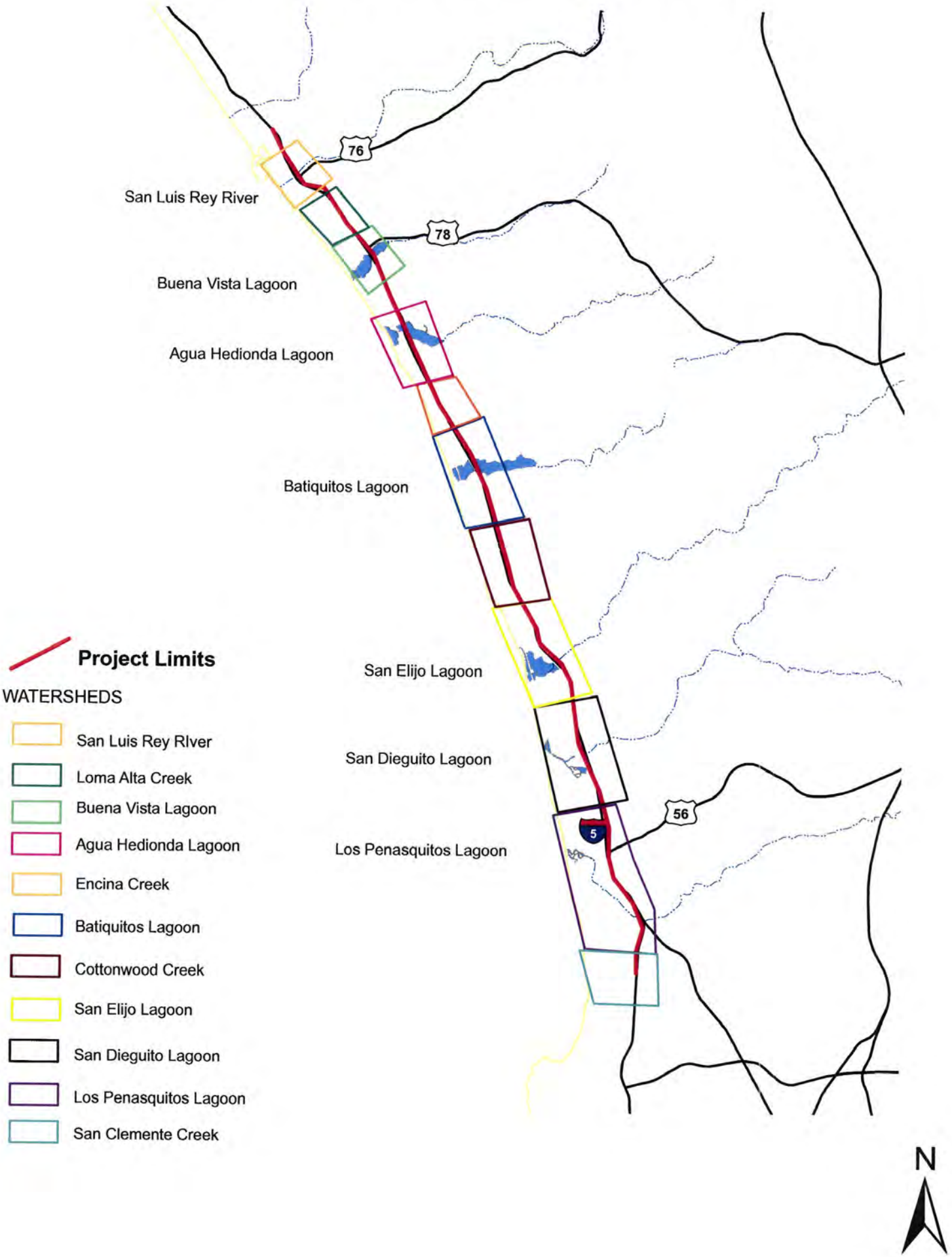


Figure 2. Voight/San Clemente Creek Jurisdictional Wetlands and Other Waters of the U.S.

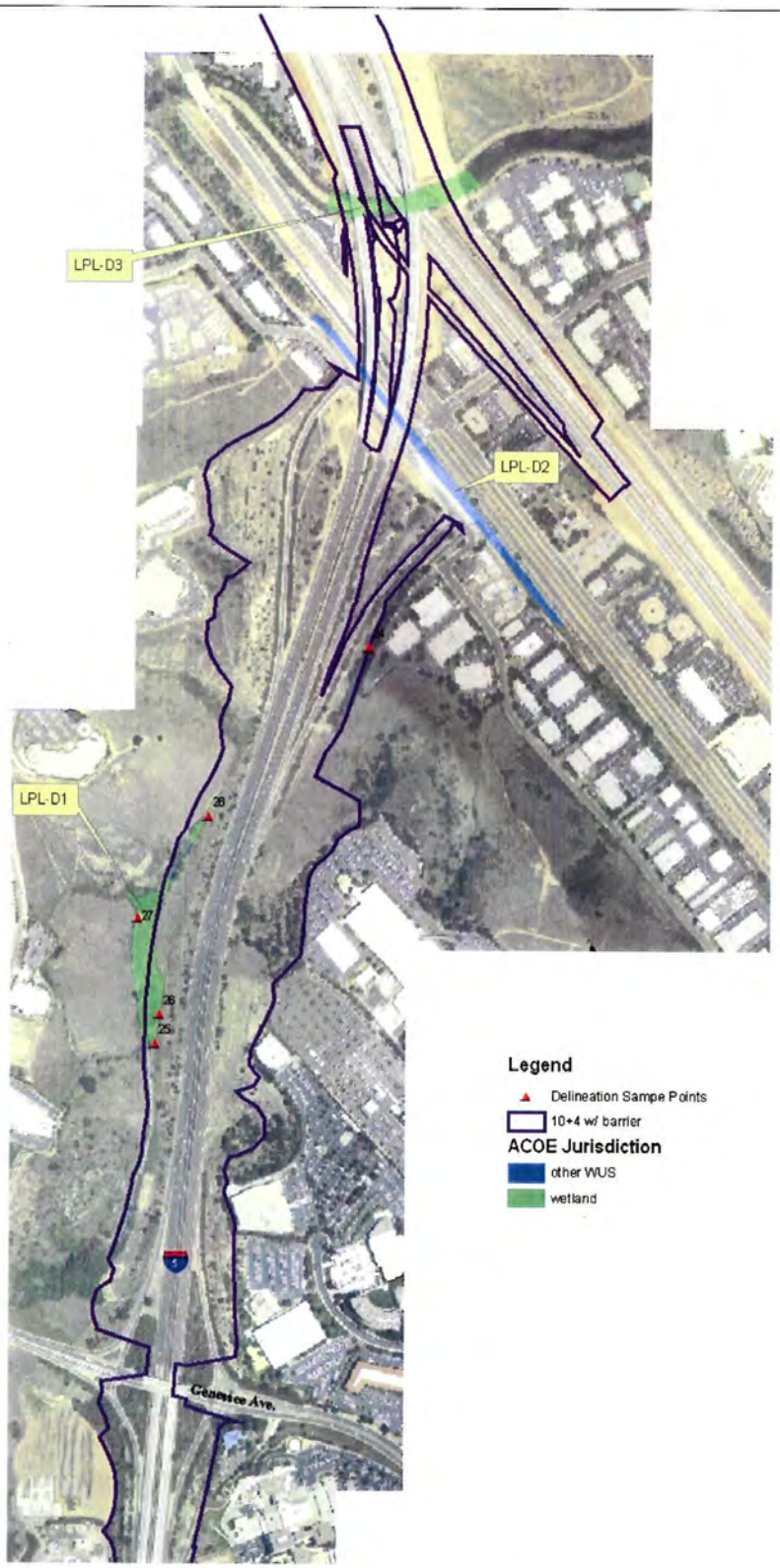


Figure 3. North of Genesee Jurisdictional Wetlands and Other Waters of the US.

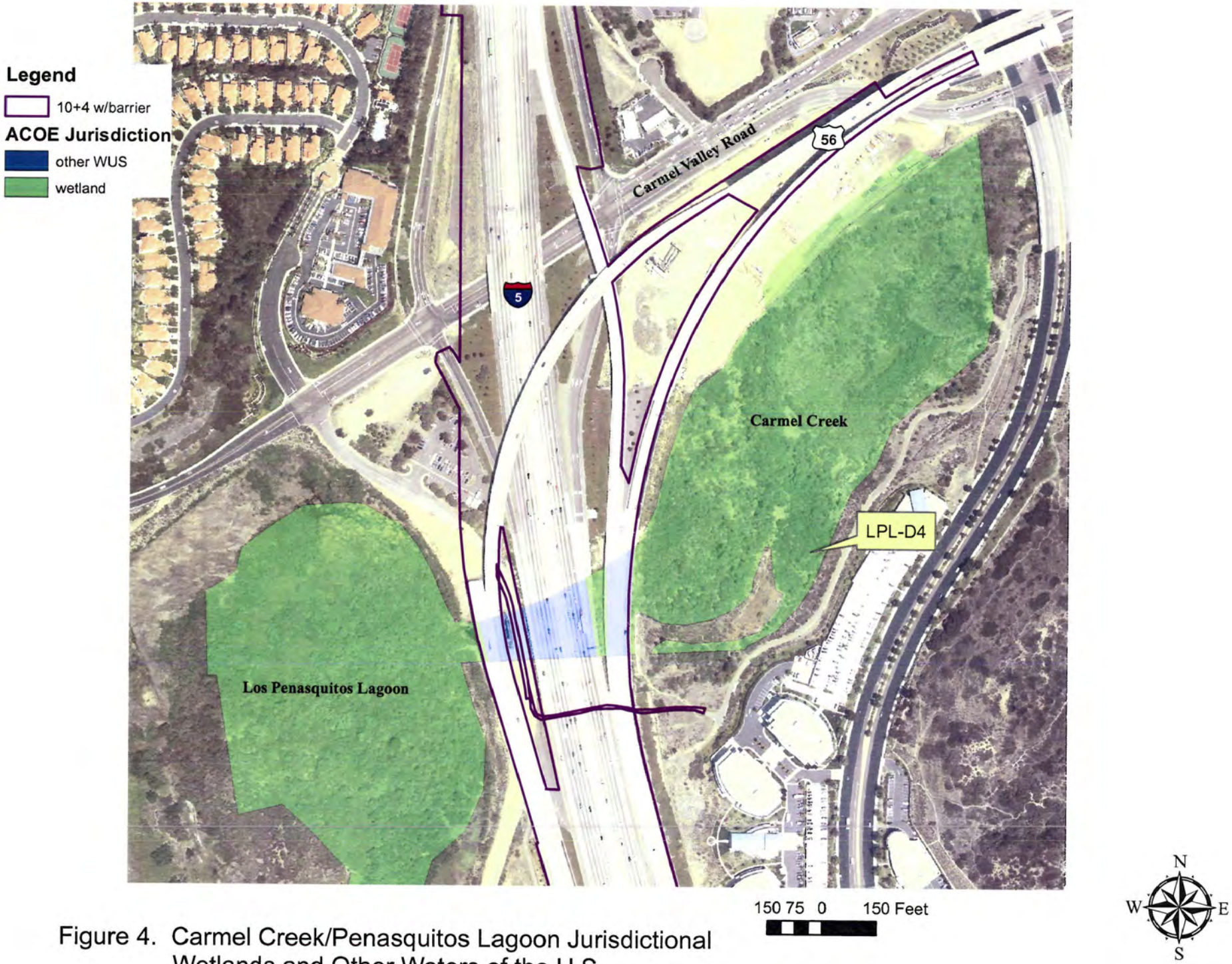


Figure 4. Carmel Creek/Penasquitos Lagoon Jurisdictional Wetlands and Other Waters of the U.S.

Figure 5. San Dieguito Lagoon Jurisdictional Wetlands and Other Waters of the US.

Figure 6. San Elijo Lagoon Jurisdictional Wetlands and Other Waters of the US.

Figure 7. Cottonwood Creek/Requeza Jurisdictional Wetlands and Other Waters of the US.

Figure 8. Moonlight Creek Jurisdictional Wetlands and Other Waters of the US.

Figure 9. Batiquitos Lagoon Jurisdictional Wetlands and Other Waters of the US.

Figure 10. Encina Creek Jurisdictional Wetlands and Other Waters of the US.

Figure 11. Agua Hedionda Lagoon Jurisdictional Wetlands and Other Waters of the US.

Legend

- Delineation Sample Points
- 10+4 w/ barrier

ACOE Jurisdiction

- other WUS
- wetland

350 175 0 350 Feet

N W E S

Figure 12. Buena Vista Lagoon Jurisdictional Wetlands and Other Waters of the US.

400 200 0 400 Feet

Figure 13. Loma Alta Creek Jurisdictional Wetlands and Other Waters of the US.

N
W E
S

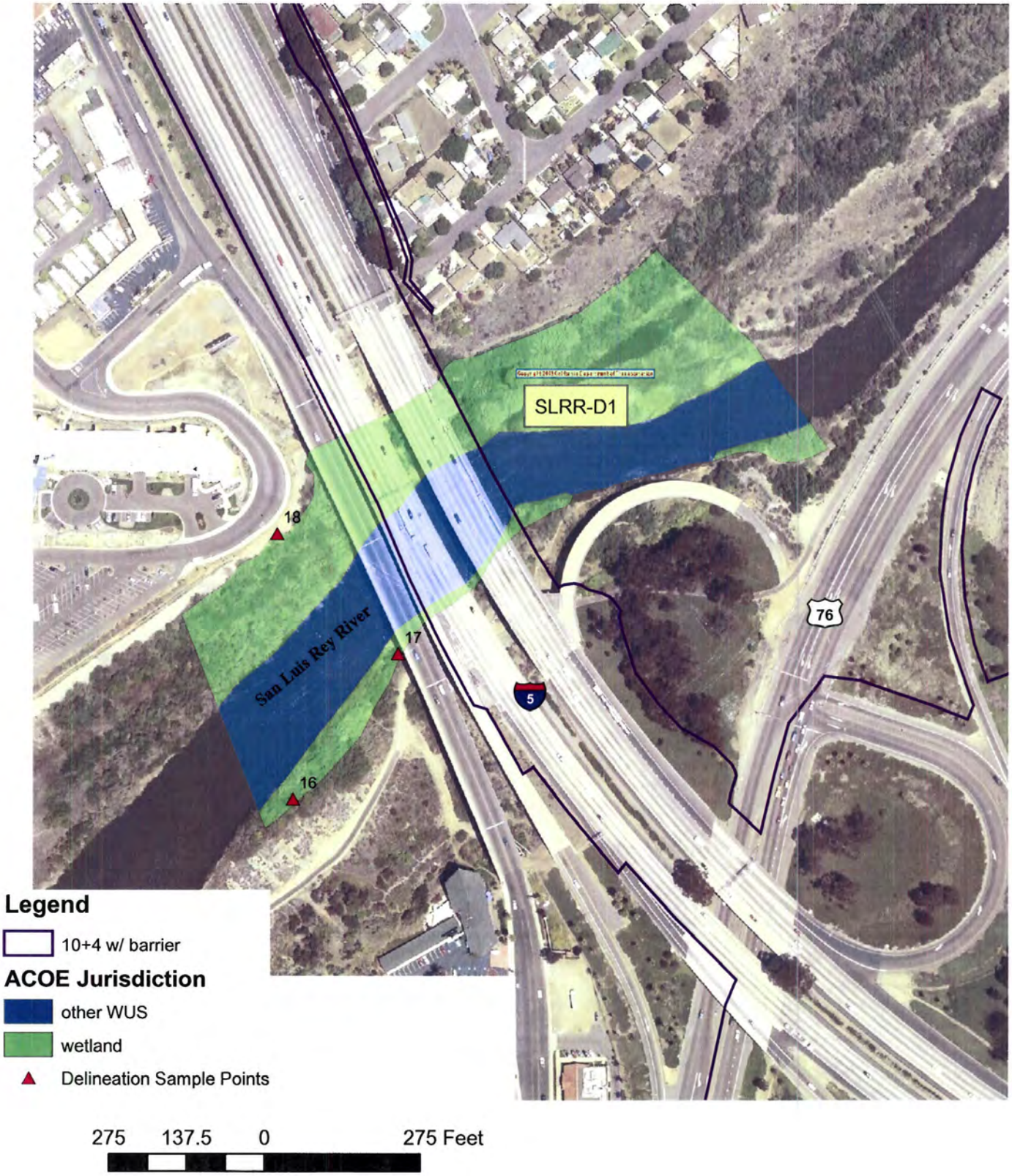


Figure 14. San Luis Rey River Jurisdictional Wetlands and Other Waters of the US.

Appendix O:
Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-SDG-08B0100-12F0547

DEC 3 1 2012

Mr. Vincent P. Mammano
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
650 Capitol Mall, Suite 4-100
Sacramento, California 95814

Attention: Mr. Larry Vinzant, (11-SD-5; PM 28.4-55.4)

Subject: Formal Section 7 Consultation and Conference for the Interstate 5 North Coast Corridor Project, San Diego County, California

Dear Mr. Mammano:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological and conference opinion based on our review of the Interstate 5 (I-5) North Coast Corridor Project and its effects on the federally threatened coastal California gnatcatcher (*Polioptila californica californica*, gnatcatcher), federally endangered light-footed clapper rail (*Rallus longirostris levipes*, rail), tidewater goby (*Eucyclogobius newberryi*, goby), Del Mar manzanita (*Arctostaphylos glandulosa* subsp. *crassifolia*, manzanita), designated critical habitat for the gnatcatcher, and proposed critical habitat for the goby, in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). The California Department of Transportation (Caltrans) is receiving Federal funds through the Federal Highway Administration (FHWA) for the project. We initiated consultation on August 20, 2012, which is the day we received your August 16, 2012, request for consultation.

Based on conservation measures committed to by Caltrans, we concur with your determination that the proposed project is not likely to adversely affect the federally endangered least Bell's vireo (*Vireo bellii pusillus*, vireo), southwestern willow flycatcher (*Empidonax traillii extimus;* flycatcher), and California least tern [*Sternula* (= *Sterna*) *antillarum browni*]; the federally threatened western snowy plover [*Charadrius nivosus* (= *alexandrinus*) *nivosus*]; designated critical habitat for the vireo and flycatcher; and proposed critical habitat for the flycatcher (Enclosure). The project will affect habitat suitable for vireo and flycatcher, but the project is not scheduled to commence until 2014 and will be constructed in phases over approximately 21 years. Due to the expected delay between consultation with our agency and initiation of

project impacts, Caltrans has agreed to conduct protocol surveys for the vireo and flycatcher within 1 year prior to the commencement of vegetation clearing and construction activities for each project phase in and adjacent to suitable habitat for these species. FHWA/Caltrans will reinitiate consultation if either the vireo or flycatcher are observed in the project impact footprint and/or implement conservation measures to avoid and minimize impacts to these species if either is found within 500 feet of the project impact footprint. Therefore, the vireo and flycatcher are not addressed in this biological opinion.

There is potential habitat for the federally endangered pacific pocket mouse (*Perognathus longimembris pacificus*) at the San Elijo Uplands restoration site. Caltrans has agreed to: conduct protocol surveys for the pacific pocket mouse during the 2013 survey season. If presence is confirmed, Caltrans will either design restoration work to avoid / benefit this species or relocate the proposed restoration to an alternate site with the review and approval of the Carlsbad Fish and Wildlife Office (CFWO). Therefore, the pacific pocket mouse is not addressed in this biological opinion.

This biological opinion is based on information provided in: 1) *I-5 North Coast Corridor Project Biological Assessment* (Caltrans 2012a, BA); 2) *Interstate 5 North Coast Corridor Project Draft Environmental Impact Report/ Environmental Impact Statement* (Caltrans 2010, DEIS); 3) *Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement* (Caltrans 2012b, SDEIS); and 4) other sources of information including survey reports, technical reviews, and email correspondence. A complete project file of this consultation is maintained at the CFWO.

CONSULTATION HISTORY

Extensive and early coordination between Caltrans and the CFWO occurred on the project. The following chronology reflects a summary of significant events.

2003-2012	A series of coordination meetings was held between Caltrans, the CFWO, and other regulatory agencies in accordance with the NEPA/404 MOU Integration Process[1]. The proposed project's purpose and need, selection criteria, and range of alternatives were developed and refined during these meetings in order to minimize impacts to biological resources.
May 10, 2004	The CFWO provided written agreement to act as a Cooperating Agency pursuant to the NEPA/404 MOU Integration Process for the project.

[1] In May 1992, the U.S. Department of Transportation, the U.S. Department of Army-Civil Works, and the U.S. Environmental Protection Agency (EPA) adopted a policy to improve interagency coordination and to integrate the National Environmental Policy Act (NEPA) and the Clean Water Act (CWA) Section 404 procedures. A Memorandum of Understanding (MOU) was developed for Arizona, California, and Nevada. As of 2006, Nevada and Arizona are no longer signatories.

Nov 18, 2004	The CFWO provided written comments on the Notice of Preparation of a DEIS for the project.
Jan 3, 2005	The CFWO provided written concurrence on the purpose and need for the project.
Jan 26, 2005	The CFWO provided a list of endangered and threatened species expected to be present in or near the proposed action area.
May 25, 2005	The CFWO provided written concurrence on the screening criteria for the project.
Oct 3, 2005	The CFWO provided written comments on the vegetation mapping conducted for the project.
Aug 24, 2006	The CFWO provided written concurrence on the range of alternatives for the project.
Dec 20, 2007	The CFWO consulted informally on geotechnical borings for the project, which were proposed to evaluate subsurface conditions at seven locations along the project.
Nov 13, 2007	The CFWO provided a list of endangered and threatened species and their critical habitats expected to be present in or near the proposed action area.
Sept 23, 2010	Representatives from Caltrans and the CFWO attended an onsite meeting to discuss the proposed project, impacts to listed species and critical habitats, and wildlife connectivity.
Sept 30, 2010	The Department of the Interior provided written comments, including specific comments provided by CFWO, on the DEIS for the project.
Nov 23, 2010	The CFWO provided written comments on the preliminary draft public works plan for the project.
Apr 25, 2011	The CFWO provided guidance regarding technical reviews prepared to inform bridge design and assist with the identification of restoration and mitigation opportunities for the project.
May 24, 2011	The CFWO provided a technical review to further inform bridge design and assist with the identification of restoration and mitigation opportunities for the project.

Aug 8, 2011	The CFWO provided comments on the draft lagoon bridge matrices prepared for the project.
Dec 15, 2011	The CFWO provided comments on the draft Resource Enhancement Program (REP) for the project.
Feb 24, 2012	The CFWO provided comments on the San Dieguito Lagoon feasibility study for the project.
June 28, 2012	The CFWO provided comments on the Mitigation Site Assessments for the project.
July 2, 2012	The CFWO provided an updated list of endangered and threatened species and their critical habitats expected to be present in or near the proposed action area.
July 6, 2012	The CFWO provided additional comments on the draft REP for the project.
Aug 20, 2012	FHWA provided a letter dated August 16, 2012, requesting initiation of formal consultation on the proposed action, together with the BA.
Sept 6, 2012	The CFWO provided a letter acknowledging initiation of formal consultation on the project, including a list of information requested in the first 90 days of consultation.
Oct 15, 2012	The CFWO provided comments on the SDEIS for the project.
Dec 19, 2012	The CFWO provided the *Description of the Proposed Action* section of the draft biological opinion to FHWA and Caltrans for review. Within this section, Conservation Measures, which Caltrans has committed to implement to avoid and minimize impacts to listed species, are described. Comments provided by the FHWA and Caltrans on this section of the draft biological opinion are addressed in this final biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Using Federal funds provided through the FHWA, Caltrans proposes to construct the I-5 North Coast Corridor Project, which will widen the I-5 over a distance of 27 miles between La Jolla Village Drive at Post Mile (PM) 28.4 and Harbor Drive / Vandegrift overpass at PM 55.4 north of the City of Oceanside, in San Diego County (Figure 1). Construction of the project will result in the addition of two high occupancy vehicle (HOV) lanes in each direction to the existing 8-

lane freeway (Figures 2-4). The project also includes the addition of auxiliary lanes, two direct access ramps (DARs), park and ride facilities, bike and pedestrian trails, soundwalls, bioswales, and community enhancements such as parks and pedestrian overpasses (Figures 2-6). Project work will be constructed in three phases, beginning in 2014 and ending in 2035 (Table 1).

Table 1. Permanent Construction Impacts by Phase and Estimated Construction Time Period

Phase	Construction	Estimated Construction time period	Impacts (Permanent cut/fill)	
			Wetland	Sensitive Upland
1A	Ultimate widening from just north of Lomas Santa Fe to Union Street (includes Manchester DAR, bike paths, trails and new bridge at San Elijo.)	2014-2017	0.53 -1.1*	22.08
1B	1 NB/SB HOV in median, from Union to SR-78 interchange	2014-2017	0.79	1.06
1C	Ultimate widening from La Jolla Village Drive to 5/805 merge (includes Voight DAR and flyover over Peñasquitos Creek. Does not include braided ramps at Genesee.)	2015-2020	0.13	0.57
2A	Ultimate widening from 5/805 merge to SR-56 (Includes new Sorrento Valley Road bike / maintenance vehicle bridge, trails under I-5 at Carmel Creek, widening of I-5 at Carmel Creek, and trail under merge.)	2020-2022	-0.41*	0.99
2B	Ultimate widening from SR-56 to Lomas Santa Fe (includes San Dieguito widening and bike paths / trails).	2020-2025	3.59	20.60
2C	Ultimate widening from Union to Palomar Airport Road	2025-2030	1.33	3.28
2D	Batiquitos Bridge Replacement	2025-2030	4.78 -0.54*	9.91
3A	Ultimate widening from just north of Palomar Airport Road to SR-76	2030-2035	0.85	0.09
3B	Agua Hedionda Bridge	2030-2035	3.77	0.68
3C	Buena Vista Bridge	2030-2035	1.14 -0.47*	0
3D	Roselle to Genesee braided ramps	2030-2035	1.11	5.57
	Total		**20.12 -2.52***	**64.83**
	Net Total		**17.6**	**64.83**

*Wetland creation from bridge lengthening.

While the DEIS for the proposed project includes several alternatives, section 7 consultation has been requested for the 8+4 with buffer alternative (the Locally Preferred Alternative), which includes the following design features and elements:

- One additional HOV/Managed Lane in each direction from La Jolla Village Drive to just north of Lomas Santa Fe Drive.

- Two HOV/Managed Lanes in each direction from just north of Lomas Santa Fe Drive to Harbor Drive/Vandegrift Boulevard.

- Separation of general purpose lanes from HOV/Managed Lanes from near La Jolla Village Drive to Del Mar Heights Road, and from State Route 78 (SR-78) to near Harbor Boulevard, by a buffer varying in width up to 5 feet.

- Provision of a continuous HOV lane in each direction through the I-5 / I-805 junction with a freeway-to-freeway connector (flyover), crossing over the I-5 / I-805 merge and connecting the proposed project HOV/Managed Lanes to existing HOV lanes just north of that merge.

- DARs from grade-separated interchanges into Managed Lanes, thereby allowing direct access to the HOV/Managed Lanes without weaving across general-purpose lanes at Voigt Drive and Manchester Avenue. The DARs are compatible with carpools, bus transit, and value pricing, and will support HOV/Managed Lanes.

- Intermediate access points (IAPs) or at-grade access located near Carmel Mountain Road, Del Mar Heights Road-Via de la Valle, Lomas Santa Fe Drive, Santa Fe Drive, Poinsettia Lane, Tamarack Avenue, and Oceanside Boulevard; and access points at the ends of HOV/Managed Lanes at La Jolla Village Drive and Harbor Drive.

- Intelligent Transportation System (ITS) components, such as toll collection equipment, to allow single-occupancy vehicle users to purchase use of HOV/Managed Lanes (including overhead suspended scanner devices such as gantries, traffic monitoring stations, ramp meters, closed circuit television [CCTV] to view traffic on the facility and to help manage the traffic, changeable message signs [CMSs] to display the tolls, and loop detectors to measure traffic volume and speed).

- Twelve-foot-wide auxiliary, acceleration, and deceleration lanes (as needed in 14 locations; 5 southbound, 4 northbound, and 5 both north- and southbound) and 10- to 12- foot-wide shoulders.

- New park and ride facilities at Manchester Avenue and State Route 76 (SR-76) and enhanced park and ride facilities at Carmel Valley Road, Birmingham Drive, and La Costa Avenue.

- Reconfiguration of various local interchanges to improve vehicular, pedestrian, and bicycle circulation at northbound ramps for Leucadia Boulevard and La Costa Avenue; at southbound ramps for Roselle Street, Manchester Avenue, Encinitas Boulevard, Palomar

Airport Road and Oceanside Boulevard; and at both north- and southbound ramps at Genesee Avenue, Del Mar Heights Road, Via de la Valle, Birmingham Drive, Santa Fe Drive, Tamarack Drive, Carlsbad Village Drive, Mission Avenue, SR-76, and Harbor Drive.

- Redesign of lagoon bridges at Los Peñasquitos, San Dieguito, San Elijo, Batiquitos, Agua Hedionda, and Buena Vista lagoons.

- Ramp metering at various on-ramps (with ultimate metering at all 58 on-ramps at buildout), retaining walls (to reduce property acquisition needs, stabilize slopes, minimize impacts, and accommodate engineered structures), barriers, guard rails/end treatments, crash cushions, bridge rails, and signage, installed as appropriate and as needed.

- Project-related drainage abandonment or improvement including extension, replacement, or lining, with new drainage facilities constructed adjacent to cross roads (facility examples include storm drain inlets, storm ditches, rock slope protection, and headwalls).

- Relocation of existing overhead or underground utilities (water, sewer, gas, electricity telephone, and other communications), as needed and within existing utility easements, as possible.

- Sound barriers.

The project will permanently and temporarily impact approximately 20.12 acres and 13.59 acres of wetland habitats, respectively. Approximately 64.83 acres and 16.62 acres of sensitive upland habitats will also be permanently and temporarily impacted by the project, respectively (Table 2). Cut and fill slopes are included within the permanent impact area. The project will impact listed species and designated critical habitats as summarized in Tables 3 and 4 and shown in Figures 7-21.

Table 2. Summary of Permanent and Temporary Impacts to Sensitive Vegetation Communities from the Proposed Project

Vegetation Communities and Cover Type[1]	Project Impacts	
	Permanent Impacts	**Temporary Impacts**
Wetland Habitat	acres	acres
Arundo scrub	0.14	0.21
Coastal brackish marsh	1.31	0.58
Coastal brackish marsh (disturbed)	3.53	1.54
Drainage ditch	1.24	0.66
Disturbed wetland	1.76	0.73
Freshwater marsh	0.62	1.36
Freshwater marsh (disturbed)	0.54	0.38
Mudflat	2.36	0.44

Mulefat scrub	0.21	0.00
Open water	1.50	2.69
Salt flat	0.03	0.04
Coastal salt marsh	4.43	2.33
Salt marsh transition	0.06	0.21
Southern willow scrub	0.26	0.15
Southern willow scrub (disturbed)	1.25	1.38
Southern willow scrub/freshwater marsh	0.35	0.80
Tidal riprap at bridge abutments	0.22	0.03
Unvegetated channel	0.32	0.08
Wetland Total	***20.12***	***13.59***
Sensitive Upland Habitat		
Baccharis scrub	0.45	0.14
Baccharis scrub (disturbed)	1.02	1.01
Coastal Sage Scrub	12.14	4.06
Coastal Sage Scrub (disturbed)	48.06	9.20
Maritime succulent scrub	0.28	0.22
Native grassland	0.01	0.15
Southern maritime chaparral	1.82	0.47
Southern maritime chaparral (disturbed)	1.05	1.37
Sensitive Upland Total	***64.83***	***16.62***

[1] The vegetation communities listed consist of a number of vegetation alliances and related associations that occur within the Northern Foothills Ecoregion of Western San Diego County as described in Sproul et al. 2011.

Table 3. Impacts to Federally Listed Species

Species	**Project Impacts[1]**	
	Permanent	**Temporary**
Coastal California Gnatcatcher[2]	15	
Light-footed Clapper Rail	1	3
Tidewater Goby[3]	5	
Del Mar manzanita	6	0

[1] Reported as territories for gnatcatcher and rail and individuals for goby and manzanita.
[2] Portions of 15 territories will be permanently and/or temporarily impacted by the project.
[3] All gobies will be captured and relocated out of the project work area in the San Luis Rey River with accidental death of no more than 1 percent of gobies relocated and with goby mortality not to exceed a total of 5 individuals.

Table 4. Impacts to Designated Critical Habitat

Critical Habitat	**Project Impacts**	
	Permanent	**Temporary**
Coastal California Gnatcatcher	34.0 acres[1]	9.0 acres
Tidewater Goby	500 square feet (pilings) 0.3 acre (bridge shading)	1.75 acres[1]

[1] Not all critcal habitat that will be impacted includes Primary Constituent Elements.

Caltrans has prepared a draft REP to support a regional approach to offset impacts from proposed transportation improvements including the I-5 North Coast Corridor Project, Los Angeles to San Diego Rail Corridor (LOSSAN), and I-5 / State Route-78 Interchange Project. The REP includes options for allocating funding from the San Diego Association of Government's (SANDAG) Environmental Mitigation Program (EMP) for a variety of regionally significant creation, restoration and preservation/enhancement opportunities. The TransNet Extension Ordinance, approved by the San Diego voters in November 2004, established the EMP to advance conservation to offset resource impacts associated with regional and local transportation projects. The REP is structured to support the region's efforts to develop a comprehensive regional conservation strategy to offset impacts of the regional and local transportation projects using the TransNet EMP. The REP includes creation, restoration, and preservation/enhancement of wetland and upland habitats to offset impacts to listed species and their habitats from the I-5 North Coast Corridor Project (Table 5). Implementation of specific conservation measures to offset project impacts will commence between 2013 and 2015 (Table 5) while the project impacts are phased over 21 years starting in 2014 (Table 2), such that the conservation gains anticipated are phased in advance of project impacts over time.

The REP also includes funding for large-scale lagoon restoration and lagoon management endowments that will provide a substantial additional benefit to listed species affected by the I-5 North Coast Corridor Project and their habitats. Large-scale lagoon restoration planning efforts at San Elijo and Buena Vista Lagoons are in process[2], and final cost estimates are not available at this time. The REP states, "In the context of the regional lagoon systems of the North Coast Corridor and their proximity to the ocean, the intent of the large-scale lagoon enhancement funding is to promote the ecological health and hydrological connectivity of the lagoons and to enhance habitat for listed species." The REP also states, "Large-scale lagoon restoration will only be eligible for this funding if it will result in created or restored habitat that is in alignment with resource needs in the corridor and impacts caused by the North Coast Corridor program of projects." Large-scale lagoon restoration funding from the REP will be used solely for salt water lagoon restoration efforts, which will restore tidally-influenced habitats that are comparable with project impacts, for the benefit of listed species. Allocation of funding for large-scale lagoon restoration will be overseen by a REP oversight committee, which will include a representative from the CFWO.

[2] The San Elijo Lagoon Restoration Project is in planning through a joint effort of the San Elijo Lagoon Conservancy, project stakeholders, the California State Coastal Conservancy and SANDAG. The Buena Vista Lagoon Restoration Project is in planning through a joint effort of the Buena Vista Lagoon Foundation, project stakeholders, the California Coastal Conservancy, and SANDAG.

Table 5. Conservation Measures for the I-5 North Coast Corridor Project from the REP

Conservation Measure/Location		Coastal Wetland Created	Coastal Wetland Restored	Coastal Wetland Preserved	Upland Created	Upland Restored	Upland Preserved/ Enhanced	Begin Construction	Projected to Meet Criteria
Creation, Restoration & Preservation/ Enhancement by Watershed[1]		**Wetland (acres)**			**Upland (acres)**				
Los Peñasquitos	Deer Canyon II				10			Fall 2013	Winter 2019
	Dean Family Trust				14.73		1.5	Fall 2013	Winter 2019
San Dieguito	San Dieguito W19	12.26						Fall 2015	Winter 2022
San Elijo	Laser*			0.02			4.1	Already Preserved*	
	Upland Restoration around Lagoon†				30			Fall 2014	Winter 2020
Batiquitos	La Costa*						18.8	Already Preserved*	
Agua Hedionda	Hallmark	4.37	0.97		3.5	6.6		Fall 2014	Winter 2021
	Sub Total	**16.63**	**0.97**	**0.02**	**58.23**	**6.6**	**24.4**		
Lagoon Restoration[2]									
San Elijo	Restoration	$90 Million						Fall 2015	
	New PCH outlet at lagoon							If selected, Fall 2015, concurrent with restoration	
Buena Vista	Restoration							Timing depends on Planning and process	
Lagoon Management/ Endowment[3]									
Regional Lagoon Maintenance Program		$10 Million Non-wasting endowment for Batiquitos and Los Peñasquitos						2015 Endowment established	
Project Prioritization/Lagoon Management Technical Support[4]									
Scientific Advisory Committee		$1.0 Million						2014	

* Sites are in gnatcatcher critical habitat and are already purchased and protected from development.
† Or another site approved by the CFWO that will provide an equivalent or greater benefit to gnatcatchers and their critical habitat.
1. All creation, restoration, preservation/enhancement sites include funding for long-term maintenance and management efforts.
2. These restoration planning efforts are in process, and final cost estimates are not available at this time. However, it is acknowledged that a large-scale lagoon restoration will be funded in full through the REP. Potential restoration at Buena Vista Lagoon will be eligible for inclusion in the REP providing the Buena Vista project results in created or restored habitat that is in alignment with resource needs in the corridor (and impacts caused by the North Coast Corridor program of improvements).
3. This cost could be increased if Southern California Edison requires the San Diego Association of Governments to pay for a portion of lagoon mouth restoration. The endowment will be used for lagoon inlet maintenance and dredging.
4. An interagency advisory committee will be formed to evaluate, prioritize, and oversee the implementation of the potential creation, restoration, and preservation/enhancement projects.

Conservation Measures

Caltrans[3] is the project proponent responsible for constructing the project and implementing associated conservation to offset the impacts of the project. Thus, Caltrans has agreed to implement the following conservation measures as part of the proposed action to avoid, minimize, and offset impacts to gnatcatchers, rails, gobies, manzanita, designated critical habitat for the gnatcatcher, and proposed critical habitat for the goby:

Avoidance and Minimization through Project Design

1. To minimize impacts to all habitats, 2:1 slopes will be used along the freeway and retaining walls will be used on cut slopes.

2. No riprap will be used in channel bottoms for bridge construction to minimize impacts to aquatic habitats.

3. Retaining walls 6 feet or lower in height will be used as feasible on fill slopes within lagoons to minimize impacts to aquatic habitats from the bike/pedestrian path. Retaining walls will also be used as feasible on cut slopes through coastal mesas to minimize project impacts to sensitive upland habitats.

4. The I-5 lagoon bridges will be lengthened to accommodate a channel bottom width of at least 261, 134, and 105 feet at San Elijo, Batiquitos, and Buena Vista Lagoons, respectively, consistent with the recommendations in the lagoon bridge optimization studies (Moffatt & Nichol 2012a and b, Everest International Consultants, Inc. 2012).

5. Project work within open water habitat in the San Luis Rey River in occupied goby critical habitat will be minimized to approximately 500 square feet of permanent impacts from bridge pilings, 0.3 acre of bridge shading, and 0.2 acre of temporary impacts. Cofferdams at bridge footings will be used such that project construction will not require diversion or relocation of the active channel. The project will not conduct actions that will result in the breach of seasonal San Luis Rey River estuary berms. Construction berms will not be used within the San Luis Rey River and all lagoons to minimize impacts on the active channel and avoid sedimentation impacts.

6. Project landscaping will follow the provisions set forth in Executive Order 13112, which mandates preventing the introduction of and controlling the spread of invasive plant species on highway Right-of-ways. No invasive species listed in the National Invasive Species Management Plan, the State of California Noxious Weed List, or the California Invasive

[3] Caltrans is working in conjunction with the FHWA and will receive Federal funds through the FHWA for the project.

Plant Council's (Cal-IPC) Invasive Plant Inventory list will be included in the landscaping plans for the proposed project. Landscaping will not use plants that require intensive irrigation, fertilizers, or pesticides adjacent to preserve areas, and water runoff from landscaped areas will be directed away from adjacent native habitats and contained and/or treated within the development footprint.

7. Permanent project lighting will be of the lowest illumination necessary for safety and will be directed toward the roadway, Park and Ride's, and other project facilities, and away from sensitive habitats. Light glare shields will be used to reduce the extent of illumination into sensitive habitats. Lighting adjacent to lagoons will be fitted with bird control spikes to ensure that raptors will not be able to use lighting as a perch to prey on listed bird species. With the exception of pathway lighting for the North Coast Bikeway, there will be no night lighting of trails within lagoons, wildlife corridors, and sensitive habitat areas. Pathway lighting for the North Coast Bikeway will be of the lowest illumination necessary for safety and will be designed to avoid light spill into adjacent sensitive habitats and wildlife movement areas. Caltrans will coordinate with the CFWO regarding the design of pathway lighting for the North Coast Bikeway to ensure that the lighting will not negatively affect wildlife movement in the project area. Caltrans will review the permanent lighting plans and then submit them to the CFWO for review and approval.

8. All pedestrian trails and bike paths will be fenced in a manner that will encourage users to remain on the trails and paths. In areas where wildlife movement is expected, such as along river and lagoon bridge benches, fencing will be designed in a manner that will encourage users to remain on the trails and paths but which will not preclude wildlife from moving through habitat areas and accessing pedestrian benches during flood events (e.g., spilt rail fencing). Signage will be posted and maintained at conspicuous locations to inform users about adjacent sensitive habitats and species as well as access restrictions. Plans for fencing and signage for each phase of project construction will be submitted to the CFWO for approval at least 5 days prior to initiating project impacts in each phase. Fencing and signage will be installed prior to completion of each phase of project construction.

9. The following wildlife connectivity features will be constructed to ensure that ecosystem functions are maintained for the benefit of listed species:

    a. At Carmel Creek, a 10-foot-wide bench will be constructed at the south bridge abutment, and the existing 8-foot-wide bench at the north bridge abutment will be maintained. The south bench will be modified to allow for usage by pedestrians and bikes and is expected to provide for wildlife usage at night and during flood events. The project will elevate the Sorrento Valley Road Bike Path Connector to the west of the bridge and remove

sediment under and southwest of the bike path to remove an existing constraint to flood flows and to improve wildlife connectivity from east to west.

b. At the proposed bridge over Los Penasquitos and Soledad Creeks, the existing bridge provides for a substantial dry movement area with a 2:1 slope to the north, which will be maintained. A new 16-foot-wide bench may be added at the south bridge abutment for both pedestrians and wildlife depending upon clearance.

c. At San Dieguito Lagoon, the existing bridge provides for a substantial dry movement area to the south, and an existing 12-foot-wide pedestrian pathway will be maintained to the north that is expected to provide for wildlife movement at night and during flood events. Existing pier walls constrain visibility and openness under the bridge. If possible, Caltrans will cut openings in existing and proposed pier walls to improve visibility and openness. The south bank of the channel will not be armored.

d. At San Elijo Lagoon, a 12-foot-wide wildlife bench will be constructed to the south, and existing pedestrian pathways to the north and south will be maintained and are expected to provide for wildlife movement at night and during flood events.

e. At Batiquitos Lagoon, a16-foot-wide wildlife bench will be constructed on the south bridge abutment and a 16-foot wide pedestrian path will be maintained on the north bridge abutment that is expected to provide for wildlife movement at night and during flood events.

f. At Agua Hedionda Lagoon, 16-foot-wide benches for pedestrian and wildlife use will be constructed at both the north and south bridge abutments.

g. At Buena Vista Lagoon, 16-foot-wide benches for wildlife movement will be constructed at both the north and south bridge abutments.

h. At the San Luis Rey River, a pedestrian trail will be constructed mid-slope on the north bridge abutment that is expected to provide for wildlife movement at night and during flood events.

i. Bridges where wildlife movement is expected will use columns rather than pier walls to improve visibility and openness and encourage usage by wildlife, including Carmel Creek, Los Peñasquitos and Soledad Creeks, and all lagoons (with the exception of San Dieguito Lagoon and the San Luis Rey River where pier walls may be required for stability).

j. To the maximum extent feasible, rock slope protection will be avoided at wildlife benches. If rock slope protection is required, modifications (e.g., small pebble, dirt, soil

covered rip rap, or grouted movement pathways) will be made such that animals of all sizes can use the wildlife benches.

k. Monitoring will be conducted on the effectiveness of the wildlife connectivity features such that the effectiveness of wildlife connectivity features can be improved and to inform decision-making for future projects. This monitoring will include research on the degree to which various undercrossings are used by target species. Remote cameras will be used to document use of wildlife undercrossings. Monitoring will be conducted over a minimum of 5 years following construction of each wildlife connectivity feature to allow wildlife to become accustomed to the wildlife connectivity features. Annual monitoring reports, including photographs, modifications made to wildlife connectivity features to improve their functionality, and recommendations, will be provided to the CFWO each year for the duration of the 5-year monitoring period following each phase of project construction.

l. Wildlife benches will be maintained in perpetuity to ensure that wildlife connectivity in the project area is not lost over time. The wildlife connectivity plan will include a detailed explanation of how wildlife benches will be maintained and how the maintenance will be funded.

10. Caltrans will submit final project design plans to the CFWO for review and approval, based on the draft plans dated August 22, 2012, with the following revisions: 1) measures, such as the use of fabric weed barriers and mulch, will be incorporated into the design plans to limit the establishment and spread of invasive species along the oleander median; 2) gateway undercrossings and overcrossings adjacent to lagoons will not include decorative night lighting or vertical features that may be used as a perch by raptors to prey upon listed species; 3) the design and elevation of suspended pedestrian bridges will not impede access by maintenance dredges at lagoons; 4) invasive species will be removed from planting palettes; 5) plans will clearly show that areas of temporary impact to native habitats will be replanted with native species; and 6) plans will specify that the height of vegetation planted near coastal lagoons will be limited (e.g., coastal sage and chaparral species up to approximately 8 feet in height) to prevent perching and predation by raptors on listed species.

Updated Surveys and Avoidance and Minimization during Vegetation Clearing/Project Construction

11. Because the project is expected to start in 2014 and be phased over approximately 21 years, Caltrans will conduct updated surveys for the gnatcatcher, rail, and manzanita within 1 year prior to the commencement of vegetation clearing and construction activities for each project phase to ensure that survey information remains up to date. FHWA and Caltrans acknowledge that section 7 consultation will be reinitiated if survey results indicate that

additional impacts to these species may occur beyond those addressed in this biological opinion[4].

12. *Caulerpa taxifolia* surveys will be completed before and after construction at each of the lagoons to ensure there is no infestation within project limits. If *Caulerpa taxifolia* is found, measures will be implemented to eradicate it from the area.

13. Prior to construction equipment entering open water habitat in the San Luis Rey River, all gobies within the project impact footprint will be captured and relocated to a proximal and safe location, and gobies will be excluded from re-entering the project impact footprint. Caltrans will submit a goby capture, relocation and exclusion plan to the CFWO for review and approval. The plan will include relocation of native species and removal of non-native species captured with gobies during the relocation effort. Capture methods will follow commonly accepted techniques for fish capture such as seining. The plan will be prepared and implementation will be overseen by a CFWO-approved biologist knowledgeable of goby biology and ecology.

14. Prior to construction in areas with manzanita, all manzanita in the project impact footprint (including the approximately 6 individuals currently known and any other individuals found in updated surveys) will be salvaged and translocated to the Dean property, which is near the currently known salvage locations. Caltrans will submit a manzanita translocation plan to the CFWO for review and approval. The plan will be prepared and implementation will be overseen by a CFWO-approved biologist knowledgeable of manzanita biology and ecology and translocating sensitive plant species. There has been limited success with translocation of this species; therefore, seed will be collected prior to impacts and used to propagate additional plants at a facility that has experience working with manzanita and specializes in the propagation of native plants. The manzanita plants grown from seed will also be planted at the Dean property. A field review will be conducted with the CFWO to review and approve the locations where the manzanita plants will be planted on the Dean property. The translocated manzanita population will be monitored for a minimum of 5 years to document success or failure of the translocation efforts.

15. The clearing and grubbing of native wetland and riparian habitats will occur between September 16 and March 14 and the clearing and grubbing of native upland habitats for the project will occur between September 1 and February 14, to avoid the rail and gnatcatcher breeding seasons, respectively [or sooner than September 16 or September 1, if a biologist knowledgeable of gnatcatcher and rail biology and ecology approved by the CFWO demonstrates to the satisfaction of the CFWO that all rail or gnatcatcher nesting is complete].

---

[4] The goby is a short-lived species that is subject to variability in local abundance and seasonal changes in distribution and abundance. The San Luis Rey River estuary has been determined to be occupied by the goby, and due to this variability in abundance from year to year and the long construction period for the project, the CFWO has determined that repeat surveys will not provide any new information relating to occupancy or abundance that would support the need to reinitiate consultation for this species. In accordance with this determination, Caltrans has not proposed to conduct updated surveys for goby.

Caltrans will submit the biologist's name, address, telephone number, and work schedule on the project to the CFWO at least 5 working days prior to initiating project impacts.

16. Pile driving for bridge construction near the lagoons and San Luis Rey River will be completed between September 16 and February 14 to minimize construction noise impacts to rail and gnatcatcher breeding. Pile driving may commence earlier in the fall if a biologist knowledgeable of gnatcatcher and rail biology and ecology approved by the CFWO demonstrates to the satisfaction of the CFWO that all rail and gnatcatcher breeding is complete within the area where construction noise will exceed ambient levels as a result of pile driving. Caltrans will submit the biologist's name, address, telephone number, and work schedule on the project to the CFWO at least 5 working days prior to initiating project impacts.

17. Noise barriers will be installed at the edge of temporary impact areas near sensitive resources where feasible depending on inundation and effective heights required for walls. Noise walls would not be effective where fill slopes are significantly higher than impact areas.

18. All construction equipment used for the project will be equipped with properly operating and maintained mufflers.

19. During in-water bridge construction activities at all lagoons and the San Luis Rey River, bubble curtains or other methods to minimize acoustical impacts to aquatic species will be implemented. These measures will be developed in coordination with the CFWO when project design and construction methodology is further developed.

20. If nighttime construction is necessary, all lighting used at night for project construction (e.g., staging areas, equipment storage sites, roadway) will be selectively placed and directed onto the roadway or construction site and away from sensitive habitats. Light glare shields will be used to reduce the extent of illumination into sensitive habitats.

21. Appropriate best management practices (BMPs) will be used to control erosion and sedimentation and to capture debris and contaminants from bridge demolition and construction to prevent their deposition in coastal lagoons and waterways. No sediment or debris will be allowed to enter lagoons, creeks, rivers, or other drainages. All debris from the demolition and construction of bridges will be contained so that it does not fall into channels. Appropriate BMPs will be used during construction to limit the spread of resuspended sediment and contain debris. These may include cofferdams, blasting mats, silt curtains, turbidity curtains and/or other barriers. Water within cofferdams will not be returned to the San Luis Rey River or lagoons until it is clear and clean. This may be accomplished through the use of desiltation tanks or other appropriate measures. Collected sediments will be removed from the site and disposed of properly. BMPs (e.g., gravel bags) will be used at the discharge point to avoid erosion.

22. Erosion and sediment control devices used for the proposed project, including fiber rolls and bonded fiber matrix, will be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard.

23. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will be restricted to designated areas that are a minimum of 100 feet from drainages/lagoons and associated plant communities, to preclude adverse water quality impacts. Fuel cans and fueling of tools will not be allowed inside the drainages.

24. Impacts from fugitive dust will be avoided and minimized through watering and other appropriate BMPs.

25. Cationic polymers are attracted to the hemoglobin in fish gills and can cause suffocation at relatively low concentrations. Cationic polymers will not be used for dust control.

26. Bioswales and detention basins will be placed to avoid impacts to wetlands (e.g., these features will not be located at the base of slope within lagoons).

27. The project site will be kept as clear of debris as possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site. All spoils and material disposal will be disposed of properly.

28. If fill must be borrowed from or disposed of offsite, the construction contractor will identify any necessary borrow and disposal sites and provide this information to Caltrans for review. Caltrans will review borrow and disposal site information and submit the information to the CFWO. If borrow or disposal activities may affect a listed species or critical habitat, FHWA/Caltrans will reinitiate section 7 consultation[5].

29. Contractors and construction personnel will strictly limit their activities, vehicles, equipment, and construction materials to the fenced project footprint.

30. Project personnel will be prohibited from bringing domestic pets to construction sites to ensure that domestic pets do not disturb or depredate wildlife in adjacent habitats.

31. A CFWO-approved biologist (Biological Monitor[6]) will be on site during: a) initial clearing and grubbing; and b) weekly during project construction within 500 feet of offsite gnatcatcher, rail, goby, and manzanita habitat to ensure compliance with all conservation measures. Caltrans will submit the biologist's name, address, telephone number, and work schedule on the project to the CFWO at least 5 working days prior to initiating project impacts. The contract of the Biological Monitor will allow direct communication with the

[5] Under the current process, FHWA would reinitiate formal consultation and Caltrans (acting for FHWA) would reinitiate informal consultation.

[6] The Biological Monitor will be familiar with the federally listed species potentially affected by the project (i.e., gnatcatcher, rail, goby and manzanita) and with the habitats that support these species.

CFWO at any time regarding the proposed project. The Biological Monitor will be provided with a copy of this consultation. The Biological Monitor and a Caltrans Project Biologist[7] will be available during pre-construction and construction phases to review grading plans, address protection of sensitive biological resources, monitor ongoing work, and maintain communications with the Resident Engineer to ensure that issues relating to biological resources are appropriately and lawfully managed. The Biological Monitor will perform the following duties :

a. Perform a minimum of three focused preconstruction surveys, on separate days, to determine the presence of gnatcatchers or rails in the project impact footprint. Surveys will begin a maximum of 30 days prior to performing vegetation clearing/grubbing, and one survey will be conducted the day immediately prior to the initiation of vegetation clearing. If any gnatcatchers or rails are found in the project impact footprint, the Biological Monitor will direct construction personnel to begin vegetation clearing/grubbing in an area away from the gnatcatchers and/or rails. It will be the responsibility of the Biological Monitor to ensure that gnatcatchers and rails will not be injured or killed by vegetation clearing/grubbing. The Biological Monitor will also record the number and location of gnatcatchers and rails disturbed by vegetation clearing/grubbing. Caltrans will notify the CFWO at least 7 days prior to vegetation clearing/grubbing to allow the CFWO to coordinate with the Caltrans Project Biologist on potential bird flushing activities;

b. Oversee installation of and inspect the construction fencing and erosion control measures a minimum of once per week to ensure that any breaks in the fencing or erosion control measures are repaired immediately and that rails have not entered the project impact footprint;

c. Implement the goby capture, relocation and exclusion plan; and manzanita translocation plan;

d. Periodically monitor the work area to ensure that work activities do not generate excessive amounts of dust;

e. Train all contractors and construction personnel on the biological resources associated with the project and ensure that training is implemented by construction personnel. At a minimum, training will include: 1) the purpose for resource protection; 2) a description of the gnatcatcher, rail, goby, and manzanita and their habitats; 3) the conservation measures that should be implemented during project construction to conserve the

[7] The Caltrans Project Biologist will be a Caltrans biologist familiar with the federally listed species potentially affected by the project and with the habitats that support these species; he/she will be the primary contact for the CFWO during project implementation.

gnatcatcher, rail, goby, and manzanita, including strictly limiting activities, vehicles, equipment, and construction materials to the fenced project footprint to avoid sensitive resource areas in the field (i.e., avoided areas delineated on maps or on the project site by fencing); 4) environmentally responsible construction practices; 5) the protocol to resolve conflicts that may arise at any time during the construction process; and 6) the general provisions of the Act, the need to adhere to the provisions of the Act, and the penalties associated with violating the Act;

f. Request that the Resident Engineer halt work, if necessary, and confer with the Caltrans Project Biologist and the CFWO to ensure the proper implementation of species and habitat protection measures. The Caltrans Project Biologist will report any non-compliance issue to the CFWO within 24 hours of its occurrence;

g. Monitor the project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid their inadvertent spread in association with the project. Such measures may include inspection and cleaning of construction equipment and use of eradication strategies. All heavy equipment will be washed and cleaned of debris prior to entering a lagoon area to minimize the spread of invasive weeds;

h. Submit monthly email reports (including photographs of impact areas) to the Caltrans Project Biologist during clearing of, and construction within, 500 feet of gnatcatcher, rail, goby, and manzanita habitats. The monthly reports will document that authorized impacts were not exceeded and general compliance with all conditions. The reports will also outline the location of construction activities, the type of construction that occurred, and equipment used. These reports will specify numbers, locations, and sex of gnatcatchers, rails, and gobies (if observed), their observed behavior (especially in relation to construction activities), and remedial measures employed to avoid and minimize impacts to these species. The Caltrans Project Biologist will review reports and forward them to the CFWO. Raw field notes should be available upon request by the CFWO; and

i. Submit a final report to Caltrans Project Biologist within 120 days of the completion of construction for each project phase that includes: photographs of habitat areas that were to be avoided and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved. As-built construction drawings with an overlay of habitat that was impacted and avoided will be provided as well once they have been completed. The Caltrans Project Biologist will review the report and forward it to the CFWO.

32. All native or sensitive habitats outside and adjacent to the permanent and temporary construction limits will be designated as Environmentally Sensitive Areas (ESAs) on project maps. ESAs will be temporarily fenced during construction with orange plastic snow fence, orange silt fencing, or in areas of flowing water, with stakes and flagging. No personnel, equipment or debris will be allowed within the ESAs. Fencing and flagging will be installed in a manner that does not impact habitats to be avoided and such that it is clearly visible to personnel on foot and operating heavy equipment. At the bridge construction areas where there is the potential for rail movement under the bridges, fencing will be installed in a manner that will direct rails to the open channel under bridges to the extent feasible. Caltrans will submit to the CFWO for approval, at least 5 days prior to initiating project impacts (except for impacts resulting from clearing to install temporary fencing), the final plans for initial clearing and grubbing of habitat and project construction. These final plans will include photographs that show the fenced and flagged limits of impact and all areas to be impacted or avoided. If work occurs beyond the fenced or demarcated limits of impact all work will cease until the problem has been remedied to the satisfaction of the CFWO. Temporary construction fencing and markers will be maintained in good repair until the completion of each phase of project construction and removed upon completion of each project phase.

33. During project construction all invasive species included on National Invasive Species Management Plan, the State of California Noxious Weed List, and the California Invasive Plant Council's (Cal-IPC) Invasive Plant Inventory list found growing within the project right-of-way will be removed. Weed removal will be conducted within the project right-of-way at least once per year during the construction period. Special care will be taken during transport, use, and disposal of soils containing invasive weed seeds and all weedy vegetation removed during construction will be properly disposed of to prevent spread into areas outside of the construction area.

34. A channel large enough for fish and rail movement will be kept open throughout project construction in the San Luis Rey River and each of the lagoons. Prior to initiation of construction in the San Luis Rey River and each of the lagoons, Caltrans will submit a plan to the CFWO for maintaining a channel for fish and/or rail movement in the San Luis Rey River and each of the lagoons.

Measures to Offset Impacts to Listed Species and their Habitats

35. Permanent and temporary impacts to gnatcatchers, rails, gobies, manzanita, and critical habitat for the gnatcatcher and goby (as summarized in Tables 3 and 4 above) resulting from the I-5 North Coast Corridor Project will be offset through habitat creation restoration, and preservation/enhancement as shown in Table 5 and Figures 22-31. Implementation of these

conservation measures is phased ahead of project impacts. In addition, large-scale lagoon restoration and lagoon management endowments shown in Table 5 above will be implemented to provide additional conservation to offset impacts from the I-5 North Coast Corridor Project, Los Angeles to San Diego Rail Corridor, and I-5 / State Route-78 Interchange Project (with project elements as listed in the REP).

36. Caltrans will submit draft San Dieguito Lagoon W19, Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa wetland and upland creation / restoration / enhancement plans to the CFWO for review and approval prior to initiating project impacts. Caltrans will provide the final plans to the CFWO. The final plans will include the following information and conditions:

    a. All final specifications and topographic-based grading, planting and irrigation plans (0.5-foot contours and typical cross-sections for wetlands and 10-foot contours for uplands) for the creation/restoration/enhancement sites. All wetland mitigation areas will be graded to the same elevation as adjacent existing Corps jurisdictional wetlands areas, and/or to within 1-foot of the groundwater table, and will be left in a rough grade state with micro topographic relief (including channels for wetlands) that mimics natural topography. All upland habitat creation/restoration/enhancement sites will be prepared for planting by decompacting the top soil in a way that mimics natural upland habitat top soil to the maximum extent practicable while maintaining slope stability. Topsoil and plant materials salvaged from the impacted areas (including live herbaceous, shrub and tree species) will be transplanted to, and/or used as a seed/cutting source for, the creation and enhancement areas to the maximum extent practicable. Planting and irrigation will not be installed until the CFWO has approved of the site grading. All plantings will be installed in a way that mimics natural plant distribution and not in rows.

    b. Planting palettes (plant species, size and number/acre) and seed mix (plant species and pounds/acre). The multitude of plant palettes proposed in the draft plans will include native species specifically associated with the habitat type(s). Unless otherwise approved by the CFWO, only locally native species (no cultivars) obtained within San Diego County available from as close to the project area as possible will be used. The source and proof of local nativeness of all plant material and seed will be provided.

    c. Container plant survival will be 80 percent of the initial plantings for the first 5 years. At the first and second anniversary of plant installation, all dead plants will be replaced unless their function has been replaced by natural recruitment.

    d. A final implementation schedule that indicates when all native habitat impacts, as well as native habitat creation / restoration / enhancement grading, planting and irrigation will begin and end. Necessary site preparation and planting will be completed during the

concurrent or next planting season (i.e., late fall to early spring) after receiving the CFWO's approval of grading.

e. Five years of success criteria for creation / restoration / enhancement areas including: separate percent cover criteria for herbaceous understory, shrub midstory, and tree overstory, and a total percent absolute cover for all three layers at the end of 5 years for wetlands, and a total percent absolute cover for uplands; evidence of natural recruitment of multiple species for all habitat types; 0 percent coverage will be maintained for Cal-IPC's "Invasive Plant Inventory" species, and no more than 10 percent coverage for other exotic/weed species.

f. A minimum 5 years of maintenance and monitoring of creation / restoration / enhancement areas, unless success criteria are met earlier and all artificial water supplies have been off for at least 2 years.

g. A qualitative and quantitative vegetation monitoring plan with a map of proposed sampling locations. Photo points will be used for qualitative monitoring and stratified-random sampling will be used for all quantitative monitoring.

h. Contingency measures in the event of creation/restoration/enhancement failure.

i. Annual mitigation maintenance and monitoring reports will be submitted to the CFWO no later than December 1 of each year.

j. If maintenance of a wetland creation / restoration / enhancement area potentially occupied by rails is necessary between March 15 and September 15, a biologist with knowledge of rail biology and ecology and approved by the CFWO will survey for rails within the creation / restoration / enhancement area, access paths to it, and other areas susceptible to disturbances by creation / restoration / enhancement site maintenance. Surveys will consist of three visits separated by 2 weeks starting April 1 of each maintenance/monitoring year. Restoration work will be allowed to continue on the site during the survey period. However, if rails are found during any of the visits, the applicant will notify and coordinate with the CFWO to identify measures to avoid and/or minimize effects to the rail (e.g., nests and an appropriate buffer will be flagged by the biologist and avoided by the maintenance work).

k. If maintenance of a coastal sage scrub restoration / enhancement area is necessary between February 15 and August 31, a biologist with knowledge of the biology and ecology of gnatcatchers and approved by the CFWO will survey for gnatcatchers within the creation / restoration / enhancement area, access paths to it, and other areas susceptible to disturbances by site maintenance. Surveys will consist of three visits

separated by 2 weeks starting March 1 of each maintenance/monitoring year. Work will be allowed to continue on the site during the survey period. However, if gnatcatchers are found during any of the visits, Caltrans will notify and coordinate with the CFWO to identify measures to avoid and/or minimize effects to the gnatcatcher (e.g., nests and an appropriate buffer will be flagged by the biologist and avoided by the maintenance work).

37. Perpetual biological conservation easements or other conservation mechanisms acceptable to the CFWO will be recorded over the areas created, restored, and/or preserved / enhanced by the project at the San Dieguito Lagoon W19, Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa properties. The conservation mechanisms will specify that no easements or activities (e.g., fuel modification zones, public trails, drainage facilities, walls, maintenance access roads, utility easements) that will result in soil disturbance and/or native vegetation removal will be allowed within the biological conservation easement areas, with exceptions as documented in the Constraints sections of Mitigation Site Assessments for these properties and where the acreage of impacts is not included in the mitigation acreage totals in Table 5 above. Draft Mitigation Site Assessments have been provided to the CFWO for our review and comment. A copy of final Mitigation Site Assessments will be provided to the CFWO that clearly document constraints and demonstrate compliance with the requirement that the acreage of impacts resulting from constraints is not included in the mitigation acreage totals in Table 5 above. Revised draft conservation mechanisms will be provided to the CFWO for review and approval. Caltrans will also submit the final conservation mechanisms to the CFWO. Caltrans anticipates that they will not be able to place the conservation easements or other conservation mechanisms for these properties prior to initiating project impacts; however, annual reports will be provided on their status until the conservation mechanisms are recorded over the properties, which will occur either within 1-year of the issuance of this biological opinion, or within 1-year of purchase of each property, unless a written extension is requested by Caltrans showing good faith efforts to achieve the recordation and the extension request is granted by the CFWO.

38. Caltrans will prepare and implement perpetual management, maintenance, and monitoring plans for the San Dieguito Lagoon W19, Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa properties. Caltrans will also establish non-wasting endowments for amounts approved by the CFWO based on Property Analysis Records (PAR) (Center for Natural Lands Management ©1998) or similar cost estimation methods, to secure the ongoing funding for the perpetual management, maintenance and monitoring of these properties. Caltrans will submit draft long-term management plans for the properties to the CFWO for review and approval. The long-term management plans will include, but not be limited to, the following: 1) the PAR or other cost estimation results for the non-wasting endowment; 2) proposed land manager's name, qualifications, business address, and contact

information; 3) method of protecting the resources in perpetuity (e.g., conservation easement), monitoring schedule, measures to prevent human and exotic species encroachment, funding mechanism, and contingency measures should problems occur. Caltrans will submit the final long-term management plans to the CFWO. Caltrans anticipates that the long-term management plans will not be prepared prior to initiating project impacts; however, annual reports will be provided on their status until the final management plans have been provided and the endowments have been established, which is anticipated to occur when the projects are projected to meet criteria (as documented in Table 5 above) and will occur within 1 year of achieving applicable success criteria for each property.

39. Caltrans will establish a non-wasting endowment for an amount approved by the CFWO, based on reliable and current estimates of maintenance costs, for long-term maintenance of Batiquitos and Los Peñasquitos Lagoons, including lagoon inlet maintenance and dredging. Caltrans will submit the estimates and information to demonstrate that the endowment will be non-wasting, and will adequately cover the costs of maintenance, to the CFWO for review and approval. Caltrans will make the endowment available for use within 1 year of establishment of the endowment, which will be established no later than December 1, 2015. Any delay in availability of funds will be reviewed and approved by the CFWO.

40. Caltrans will fund, in full, a large-scale salt water lagoon restoration at San Elijo Lagoon and/or Buena Vista Lagoon through the REP[8]. Caltrans will submit revised drafts of the REP to the CFWO for review and comment. Large-scale lagoon restoration funding will be used solely for salt water lagoon restoration, which will restore tidally-influenced habitats that are comparable with project impacts, for the benefit of listed species. Allocation of funding for large-scale salt water lagoon restoration will be determined, in coordination with the CFWO, prior to initiating project impacts. Caltrans will submit a copy of the final REP and funding proposal to the CFWO for review and approval.

41. Caltrans will establish non-wasting endowments for amounts approved by the CFWO, based on reliable and current estimates of maintenance costs, for long-term maintenance of the large-scale lagoon restoration at San Elijo Lagoon and/or Buena Vista Lagoon. Caltrans will submit the endowment estimates to the CFWO for review and approval. The endowments are anticipated to be established during the year in which the large-scale lagoon restoration work is completed and no later than December 1, 2019 unless a written extension is requested by Caltrans showing good faith efforts to establish the endowment and the extension request is granted by the CFWO. Funds will be available for use within one year of establishment of the endowments.

[8] A separate section 7 consultation with the Federal lead agency for the restoration project will be required to address impacts to listed species resulting from large-scale lagoon restoration.

42. All areas of temporary impact, as quantified in Table 2 above, will be revegetated and restored with native species. These areas will be returned to original grade, as feasible. Prior to initiating project impacts, a restoration plan will be developed for the temporary impact areas. The plan will be submitted to the CFWO for review and approval. This plan will include a detailed description of restoration methods, slope stabilization, and erosion control, criteria for restoration to be considered successful, and monitoring protocol(s). Following the completion of construction activities within each area of impact, the restoration plan will be implemented for a minimum of 5 years, unless success criteria are met earlier and all artificial water has been off for at least 2 years. Temporary impact areas will be planted as soon as possible following re-grading after completion of construction to prevent encroachment by nonnative plants.

43. Cut and fill slopes adjacent to native habitats will be revegetated with native habitats with similar composition to those within the project study area as feasible, including over 86 acres of slopes near lagoons and other open space that will be revegetated with coastal sage scrub. Duff and rare plants from areas with coastal sage scrub, maritime succulent scrub, and maritime chaparral may be salvaged from the project impact footprint to the extent practicable to aid in revegetating slopes with native habitats (excluding areas with invasive nonnative species such as African veldt grass and onion weed). The revegetated areas will have temporary irrigation and will be planted with native container plants and seeds selected in coordination with the Caltrans Project Biologist. At least 3 years of plant establishment/ maintenance on these slopes will be conducted to control nonnative plants. Bioswales and detention basins will be planted with appropriate species as determined in coordination with the Caltrans Project Biologist and storm water pollution prevention professional. These areas will be planted as soon as possible following completed construction to prevent encroachment by nonnative plants. Slopes and interchanges located adjacent to developed urban areas will be planted with native and drought tolerant non-invasive species selected by the biologist and landscape architect.

Action Area

According to 50 CFR § 402.02 pursuant to section 7 of the Act, the “action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area. For this project, we have defined the action area to be the 27 mile project site, which includes 64.83 acres of permanent and 16.62 acres of temporary impacts to sensitive native upland habitats and 20.12 acres of permanent and 13.59 acres of temporary impacts to wetland habitats. The action area also includes the surrounding habitat within about 500 feet, which may be exposed to project-related effects such as increased noise, light, and dust levels and human activity during project construction and operation of the facilities. In addition, the action area includes the San Dieguito Lagoon W19,

Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa conservation properties, which are located in proximity to the project site in coastal San Diego County, California (Figures 22-23). The Regional Lagoon Maintenance Program at Batiquitos and Los Peñasquitos Lagoons and the large-scale lagoon restoration at San Elijo and Buena Vista Lagoons are also addressed below.

STATUS OF THE SPECIES/CRITICAL HABITAT

The status of the gnatcatcher was described in detail in a biological opinion for the Caltrans-sponsored State Route 76 Melrose Drive to South Mission Highway Improvement Project, San Diego County, California (FWS-SDG-08B0136-08F0900, dated October 1, 2008). The status of the goby was described in detail in a biological opinion for the Caltrans-sponsored Bridge Repairs at San Mateo Creek and Interstate Highway 5, San Diego County, California (FWS-MCBCP-3062.2, dated December 19, 2002). Additional information can be found in the recovery plans for the rail and goby (Service 1985, 2005) and the 5-year reviews for the gnatcatcher, rail, goby and manzanita. Please refer to these documents for detailed information on the life history requirements of the species, threats to the species, and conservation needs of the species.

Updated information on species' numbers and distribution, critical habitat, threats and conservation needs since issuance of the 2008 and 2002 biological opinions is summarized below to provide context to this biological opinion and is generally taken from the 5-year reviews for the gnatcatcher, rail, goby, and manzanita (Service 2010a, 2009, 2007a, 2010b).

Summary of Species' Distribution and Numbers Range-wide, Critical Habitat, Threats and Conservation Needs

Coastal California Gnatcatcher

The gnatcatcher occurs in coastal sage scrub and associated habitats from southern Ventura County to Baja California, Mexico. In 1993, the Service estimated that about 2,562 gnatcatcher pairs remained in the United States, with the highest densities occurring in Orange and San Diego counties (Service 1993). In a recent study using more rigorous sampling techniques, Winchell and Doherty (2008) estimated there were 1,324 (95 percent confidence interval: 976–1,673) gnatcatcher pairs over an 111,006-acre area on public and quasi-public lands in Orange and San Diego counties. Their sampling frame covered only a portion of the U.S. range, focusing on the coast, and was limited to 1 year. Although it is not valid to extrapolate beyond the sampling frame, especially in light of known differences in population densities across the range of the gnatcatcher (Atwood 1992), it is likely there are more gnatcatchers in the U.S. portion of the range than was suggested by earlier estimates; Winchell and Doherty (2008) estimated nearly as many gnatcatchers in the portion of the U.S. range sampled in their study as was originally estimated for the entire U.S. range. We are not aware of any recent estimates of gnatcatcher populations in Baja California.

Critical habitat for the gnatcatcher was designated on December 19, 2007 (Service 2007b). There are 11 designated critical habitat units for the gnatcatcher that include 197,303 acres of Federal, State, local, and private land in Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. Designated critical habitat includes habitat throughout the species' range in a variety of climatic zones and vegetation types to preserve the genetic and behavioral diversity that currently exists within the species. The individual units contain essential habitat for the gnatcatcher and help to identify special management considerations for the species. The project is located within and adjacent to Unit 3 of designated gnatcatcher critical habitat.

Unit 3 [planning area for the North San Diego County Multiple Habitat Conservation Plan (MHCP) in northwestern San Diego County] includes 17,325 acres and contains the last significant gnatcatcher populations remaining south of Marine Corps Base Camp Pendleton abutting the coast. Coastal populations of the gnatcatcher have been found to be denser than inland locales (Preston et al. 1998), and they are essential to support more inland populations through emigration. This unit also provides connectivity between significant populations at Marine Corps Base Camp Pendleton (adjacent to Unit 5), San Diego Multiple Species Conservation Program (MSCP) reserve areas in Unit 1, and populations in northern San Diego County (Unit 4). Specific information for each of the remaining critical habitat units can be found within the final rule designating critical habitat for the gnatcatcher (Service 2007b). This unit may require special management considerations or protection to minimize impacts associated with habitat type conversion and degradation occurring in conjunction with urban and agricultural development.

Primary Constituent Elements (PCEs) for the gnatcatcher are those habitat components that are essential for the primary biological needs of foraging, nesting, rearing of young, intra-specific communication, roosting, dispersal, genetic exchange, or sheltering. These include: 1) sage scrub habitats that provide space for individual and population growth, normal behavior, breeding, reproduction, nesting, dispersal, and foraging; and 2) non-sage scrub habitats such as chaparral, grassland, and riparian areas, in proximity to sage scrub habitats that provide space for dispersal, foraging, and nesting.

Although declines in numbers and distribution of the gnatcatcher have resulted from numerous factors, the current significant threats of the gnatcatcher include habitat fragmentation and degradation, which can lead to type conversion (Service 2010a). Several stressors, including livestock grazing, anthropogenic atmospheric pollutants, and wildland fire, can lead to type conversion of gnatcatcher habitat. As regional Habitat Conservation Plans (HCPs) permitted under section 10(a)(1)(B) of the Act and under the State of California's Natural Community Conservation Planning (NCCP) Act are implemented over time, an increasing amount of habitat will receive beneficial management that will address these threats. However, these plans are mostly in the early stages of implementation or are still in development. Therefore, the gnatcatcher continues to meet the definition of threatened, and no change in listing status was made following our 5-year review (Service 2010a).

Light-footed Clapper Rail

The rail occurs in coastal marsh habitat in California, ranging from Ventura County in the north to the Mexican border in the south. When annual statewide rail censuses began in 1980, 203 pairs of rails were detected within 11 coastal wetlands surveyed (Service 2009). Since 1980, the lowest number of pairs detected was 142 in 1985 when 14 coastal wetlands were surveyed (Service 2009). The highest number of pairs detected was 520 in 2012 when the census surveyed 30 coastal wetlands (Zembal and Hoffman 2012). Approximately 92 percent of the rail pairs counted in 2012 were found in only 9 of the 30 coastal wetlands surveyed. These coastal wetlands include, from north to south; Mugu Lagoon, Seal Beach National Wildlife Refuge, Upper Newport Bay, Batiquitos Lagoon, San Elijo Lagoon, San Dieguito Lagoon, Los Peñasquitos Lagoon, Kendall-Frost Mission Bay Marsh Reserve, and Tijuana Slough National Wildlife Refuge. Rails have been documented in two coastal wetlands in Baja California, Mexico (Zembal and Massey 1986); however the status of the rail in Mexico is not well documented and an abundance estimate is unavailable (Service 2009).

At the current time, small population sizes, isolation, and habitat quality are the predominant factors limiting rail abundance. Progress has been made to increase the number of rails since listing, and regulatory mechanisms have been successful at stopping destruction and degradation of marsh lands. Conservation efforts have included habitat restoration, installing artificial nesting platforms, captive breeding and translocation, predator control, and annual range wide censuses. However, in its best year since listing, the rail population was only 65 percent of the way to the 800 pairs suggested by the recovery plan for downlisting despite these conservation efforts. Therefore, the rail continues to meet the definition of endangered, and no change in listing status was made following our five-year review (Service 2009).

Tidewater Goby

The goby is generally restricted to brackish water habitats in California's coastal lagoons and streams, ranging from Tillas Slough at the mouth of the Smith River (Del Norte County, near the California/Oregon border) in the north (Service 2007a) to the San Luis Rey River Estuary (San Diego County) in the south (Lafferty 2010). Because of the variability in local abundance and seasonal changes in distribution and abundance, it is difficult to derive population size estimates for this short-lived species (Service 2007a). When the species was listed in 1994, 48 localities were known to be occupied by the goby (Service 2007a). Currently, 106 localities are presumed to be occupied (Smith, *in litt*. 2007). Gobies have not been documented in Mexico or Oregon despite extensive surveys outside of California (Service 2005).

The action area does not support designated critical habitat for the goby. A proposed revision to critical habitat for the goby was published on October 19, 2011 (Service 2011). There are 65 proposed critical habitat units for the goby that include 12,157 acres of Federal, State, local, and private land in Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties, California. Proposed critical habitat includes habitat throughout the species' range to

preserve the genetic diversity that currently exists within the species. The individual units contain essential habitat for the goby and help to identify special management considerations for the species. The project is located within and adjacent to Unit SAN-1 of proposed goby critical habitat.

Unit SAN-1 (San Luis Rey River) includes 56 acres and contains the southernmost habitat known to be occupied by the species. This unit allows for connectivity between tidewater goby source populations and supports gene flow and metapopulation dynamics of the genetically unique South Coast Recovery Unit described in the recovery plan for the species (Service 2005). Unit SAN-1 supports a goby population and may help facilitate colonization of currently unoccupied locations to the south. Specific information for each of the remaining critical habitat units can be found within the proposed rule (Service 2011).

The PCEs for the goby are those habitat components that provide for the species' life-history processes of foraging, reproducing, development of offspring, dispersal, genetic exchange, or sheltering. The PCEs for goby have been defined as: Persistent, shallow (in the range of approximately 0.3 to 6.6 feet), still-to-slow-moving, lagoons, estuaries, and coastal streams ranging in salinity from 0.5 parts per thousand to about 12 parts per thousand, which provides adequate space for normal behavior and individual and population growth that contain: (a) Substrates (e.g., sand, silt, mud) suitable for the construction of burrows for reproduction; (b) Submerged and emergent aquatic vegetation, such as *Potamogeton pectinatus, Ruppia maritima, Typha latifolia,* and *Scirpus* spp., that provides protection from predators and high flow events; or (c) Presence of a sandbar(s) across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes or partially closes the lagoon or estuary, thereby providing relatively stable water levels and salinity.

The current significant threats to the goby include limited loss and alteration of habitat resulting from development projects, flood control, anthropomorphic breaching of coastal lagoons, and freshwater withdrawal. Predation by and competition with native and non-native species also continues to be a concern. In addition, the metapopulation dynamics aspect of goby biology results in localized extirpation events and subsequent recolonized from adjacent occupied areas. Habitat loss can isolate the subpopulations that make up a metapopulation such that local extirpations may become permanent because they are outside of the recolonization ability of the species. However, based on the more than doubling of the number of occupied localities since the goby was listed (from 48 to 106), we now consider the species to be more resilient to perturbations and climatic factors than previously believed. Our 5-year review for the species recommends downlisting the species to threatened, but deferring action until taxonomic research is published to allow for review of taxonomic changes of the listed entity prior to publication of a proposed downlisting rule. In addition, conservation needs for the species remain, including continued monitoring, in particular during and after drought events, and developing a metapopulation viability analysis to gain a better understanding of tidewater goby metapopulation dynamics. Therefore, at this time, the goby remains endangered, and no change in listing status was made following our 5-year review (Service 2007a).

Del Mar Manzanita

Del Mar manzanita is associated with southern maritime chaparral and occurs on sandstone terraces and bluffs. In 1996, when the species was listed, 17 occurrences were known which supported 9,400 to 10,300 individuals (Service 1996). Currently, 50 occurrences in the United States are considered extant or presumed extant and we have no current population estimates (Service 2010b). The species range extends from the City of Carlsbad south along the coast to Torrey Pines State Reserve, east to Marine Corps Air Station Miramar, and southeast to Mission Trails Regional Park in San Diego County, California. The status of Del Mar manzanita in Mexico is not well documented. Prior to 1982, the species was reported from five localities in northwestern Baja California, Mexico, from the border just east of Tijuana, south 25 miles to Cerro el Coronel and Mesa Descanso. The listing rule states that while little is known about these occurrences, this region in Mexico was severely impacted by the same factors (urban and agricultural development) that had been affecting the United States populations (Service 1996). Currently, we have no additional information about these occurrences and no new occurrences have been reported from Mexico.

The current significant threats to manzanita include habitat destruction and fragmentation from development, fuel modification practices, human access, and military training. In addition, altered fire regime and small population size threaten the species. The lack of a natural fire regime is likely related to the threat of small population size as evidenced by the lack of seedlings in populations. In some locations, individuals are old with elongated stems with significant dead portions and small leaf canopies. A decrease in the number of individuals at many locations, coupled with a lack of evidence of reproduction, suggests that manzanita still faces a high degree of threat. Therefore, manzanita continues to meet the definition of endangered, and no change in listing status was made following our 5-year review (Service 2010b).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions that are contemporaneous with the consultation in progress.

Project Site Characteristics and Surrounding Land Uses

The Biological Study Area (BSA) for the project totals approximately 4,714 acres and includes the footprint of the proposed project along I-5 from La Jolla Village Drive in the south to Vandegrift Boulevard in the north, and extends out approximately 500 feet from the edge of pavement on average, with a wider extent at rivers and lagoons, and a narrower extent in developed areas. The BSA encompasses portions of several drainages that cross under I-5 before terminating in the ocean, including Los Peñasquitos Creek, Carmel Valley Creek, and the San

Luis Rey River. The project also crosses five coastal lagoons, San Dieguito, San Elijo, Batiquitos, Agua Hedionda, and Buena Vista, and is adjacent to the eastern border of a sixth lagoon, Los Peñasquitos. These drainages and lagoons provide connectivity for wildlife movement from inland San Diego County to the coastal region. The overall topography of the project area rises and falls between the numerous drainages and lagoons and adjacent coastal mesas. Elevation in the BSA ranges from sea level to terrace elevations of up to 328 feet above mean sea level (AMSL).

Soils within the BSA are dominated by sandy or loamy clays that are derived from unconsolidated marine sandstones and shales (Bowman 1973). A broad range of vegetation communities and other cover types were identified within the BSA during the surveys, including native riparian and wetland, native upland, and nonnative vegetation types such as ornamental and nonnative grassland (Table 1). Gnatcatcher, rail, goby, and manzanita all occur within the BSA along the I-5 North Coast Corridor.

The environmental baseline is expected to change during the 21-year duration of the project, depending on when impacts occur. Updated surveys will be done prior to each project phase to determine if the environmental baseline has changed.

Relationship to Regional Preserves

The project passes through the planning areas for two regional habitat conservation plans, the City of San Diego's MSCP Subarea Plan and the northwestern San Diego County MHCP. These programs constitute subregional plans under the State of California's Natural Community Conservation Planning Act of 1991. The California Department of Fish and Game's Natural Community Conservation Planning program (NCCP) (CDFG 2007) is a cooperative effort between public and private entities to protect habitats and species. The program's primary objective is to conserve local and regional biological diversity while accommodating compatible land use. The NCCP attempts to prevent/resolve issues related to species' listings by concentrating on the long-term stability of wildlife and plant communities, and including key interests in the process.

The MSCP is a comprehensive habitat conservation planning program that provides for a streamlined process to authorize incidental take for urban development and for the conservation of multiple species and their habitats within a 582,243-acre planning area in southwestern San Diego County. Each subarea plan prepared pursuant to the MSCP is intended to serve as a multiple species habitat conservation plan (HCP) pursuant to Section 10(a)(2)(A) of the Act. The MSCP covers southwestern San Diego County from the San Dieguito River Valley to Mexico, and eastward from the Pacific Ocean to national forest lands. In 1997, the Service issued a section 10(a)(1)(B) permit for the City of San Diego's MSCP Subarea Plan.

Like the MSCP, the MHCP is a regional habitat conservation plan that provides for a streamlined process to authorize incidental take for urban development and for the conservation of multiple species and their habitats. The planning area for the MHCP covers 111,908 acres in

northwestern San Diego County. Each subarea plan prepared pursuant to the MHCP is also intended to serve as a multiple species HCP pursuant to Section 10(a)(2)(A) of the Act. The City of Carlsbad is the only participating jurisdiction that has completed a subarea plan (i.e., the Carlsbad Habitat Management Plan) for which the Service issued a section 10(a)(1)(B) permit in 2004. The other two jurisdictions within the project area, the cities of Oceanside and Encinitas, are working on draft subarea plans at this time.

Within the MSCP and MHCP, lands have been identified that are targeted for conservation with the objective of creating a connected system of habitats in a manner that maximizes the protection of sensitive species. These lands are referred to as the Multi-Habitat Planning Area (MHPA) of the MSCP and the Focused Planning Area (FPA) of the MHCP. While the proposed project will result in some impacts to MHPA and FPA lands, most project impacts will occur within the existing right-of-way of I-5, which does not include these land designations. However, there are numerous important regional wildlife corridors that provide connectivity for wildlife movement from inland San Diego County to the coastal region and are identified as MHPA or FPA lands outside of the I-5 right-of-way along the project alignment. These include the six coastal lagoons traversed by the project, Los Peñasquitos Creek, Carmel Valley Creek, and the San Luis Rey River.

Status of Species and Critical Habitats within the Action Area

Coastal California Gnatcatcher

Gnatcatchers were detected in the BSA during protocol surveys conducted from 2003 to 2012 (Caltrans 2003a, 2003b, 2004, 2005, 2008a, 2008b, 2009, 2012a). Gnatcatchers were observed along fill slopes and cut slopes adjacent to lagoons and in adjacent canyons with coastal sage scrub (Figures 7-15). A total of 15 gnatcatcher territories were documented within the action area for the project.

A total of 43 acres in Unit 3 of designated critical habitat for the gnatcatcher is located within the action area for the project, of which 36.7 acres contain PCEs of critical habitat and the remaining 6.3 acres consists of disturbed habitat [consisting of stands of broad-leaved weeds such as mustard (*Brassica* sp.)] that lack PCEs. Of the area with PCEs, 6.1 acres are nonnative grassland, which are likely used for gnatcatcher dispersal and foraging but not breeding.

Light-footed Clapper Rail

Rails were observed in Los Peñasquitos, San Elijo, Batiquitos, and Buena Vista Lagoons within the BSA during focused surveys conducted between 2003 and 2011 (Konecny Biological Services 2003, 2005, 2007; Zembal 2003, 2011; Caltrans 2012a) (Figures 7-15). Rails were observed in coastal marsh habitats within these lagoons and are expected to use the project area for foraging, breeding, and sheltering. Rails are also known to occur within San Dieguito Lagoon, Agua Hedionda Lagoon, and the San Luis Rey River, outside of the BSA for the project (Zembal and Hoffman 2012). Two pairs of rails were observed within the project's impact

footprint at Batiquitos Lagoon, one pair was observed within the project's impact footprint at San Elijo Lagoon, and one pair was observed within the project's impact footprint at Buena Vista Lagoon.

Tidewater Goby

Gobies were observed in the San Luis Rey River estuary, just south of Oceanside Harbor, in 2010 (Lafferty 2010), and are expected to use the project area for foraging, reproducing, development of offspring, dispersal, and sheltering. The species had not been observed at this location since 1958 (Service 2005). Surveys in 2010 in the San Luis Rey River were conducted on a single day as a part of a larger survey effort in the Camp Pendleton area, and the number of individuals observed in the San Luis Rey River was not reported. As a result of these positive surveys, suitable habitat in the San Luis Rey River estuary in the project area is now known to be occupied by the goby, and occupancy by the species is not disputed by FHWA or Caltrans. As noted in the Status of the Species above, this is a short-lived species that is subject to variability in local abundance and seasonal changes in distribution and abundance, which makes it difficult to derive population size estimates (Service 2007a). Surveys were conducted in coastal lagoons traversed by the project where suitable habitat occurred with negative results (Merkel and Associates, Inc. 2012).

A total of approximately 2.06 acres of the project site is within Unit SAN-1 of proposed goby critical habitat. Of this area, 0.51 acre includes PCEs of critical habitat and the remaining 1.55 acres do not.

Del Mar Manzanita

Rare plant surveys in 2012 documented a total of 41 Del Mar Manzanita plants in patches within the BSA north of Del Mar Heights Road (Figure 16) and east of I-5 in the vicinity of the San Elijo Viewpoint (Figure 17) (Caltrans 2012a). Of these, six Del Mar Manzanita plants were observed growing along the brow ditch at the northwestern corner of the Del Mar Heights interchange within the project impact footprint, and the remaining (Caltrans 2012a) 35 plants were observed outside of the project impact footprint.

Proposed Offsite Conservation

Caltrans will provide for the restoration/enhancement and perpetual conservation and management of the following lands, or fund restoration and enhancement work, as detailed in Table 5 above, to offset impacts of the project on gnatcatchers, rails, gobies, manzanita, designated critical habitat for the gnatcatcher, and proposed critical habitat for the goby. All constraints on the offsite conservation properties such as existing easements and trails are documented and mapped in the Constraints/Existing Utilities/Infrastructure/Easements section of the Mitigation Site Assessment (Dudek 2012) and are not included in the offset acreage totals in Table 5 of this biological opinion.

San Dieguito Lagoon W19

The San Dieguito Lagoon W19 Property consists of a total of approximately 107 acres and is located east of I-5, south of Via De La Valle and the San Dieguito River, and west of El Camino Real, in the eastern portion of San Dieguito Lagoon, in the MHPA of the City of San Diego's Subarea Plan boundary (Figure 24). The majority of the site has been previously disturbed by agricultural activities. Habitats on the property are mapped and quantified in Figure 24.

The property does not contain any critical habitat. The California Natural Diversity Database includes records for listed species in the vicinity of the property, including the gnatcatcher, rail, and vireo (CNDDB 2011). Surveys conducted in 2012 for the rail documented approximately 45 pairs of rails directly upstream of the project site within freshwater marsh habitat east of El Camino Real (Zembal and Hoffman 2012).

Hallmark

The Hallmark Property consists of three parcels located along the margins of the northeastern portion of Agua Hedionda Lagoon in the City of Carlsbad. The western parcel (Hallmark West) is approximately 11.1 acres in size and is located between Park Drive and Agua Hedionda Lagoon. The other two parcels (Hallmark East), totaling 8.2 acres, are next to one another between the lagoon and the neighborhoods along Via Hinton and Via Marta (Figures 25, 26).

The Hallmark East parcel is located within the FPA of the City of Carlsbad's Habitat Management Plan boundary and supports coastal sage scrub, baccharis scrub, freshwater marsh, coastal brackish marsh, riparian forest, nonnative woodland, ornamental, disturbed habitat, and bare ground. The Hallmark West parcel is composed of coastal sage scrub, salt marsh, salt marsh transition, freshwater marsh, southern willow scrub, disturbed habitat, and bare ground, as mapped and quantified in the Mitigation Site Assessment for the properties (Dudek 2012).

The Hallmark Property does not contain any designated critical habitat. Three pairs of gnatcatchers were identified on the Hallmark Property (Dudek 2012).

Dean

The Dean Property is approximately 23.11 acres in size and is located along and immediately east of the I-5 right-of-way between Del Mar Heights Road and the I-5 San Dieguito Lagoon Bridge in the MHPA of the City of San Diego Subarea Plan boundary (Figure 28). It is dominated by disturbed habitat and disturbed baccharis scrub with a small area of coastal sage scrub/southern maritime chaparral in the southeastern comer of the parcel and some bare ground on the road around the perimeter (Figure 28). The Dean Property does not contain any critical habitat. Two individual gnatcatchers were identified on the Dean Property (Caltrans 2009).

San Elijo Uplands

The San Elijo Uplands Property totals approximately 30 acres in size and is located in the uplands around San Elijo Lagoon both east and west of I-5 in the proposed FPA of the City of Encinitas' draft Subarea Plan boundary (Figure 31). While the San Elijo Uplands Property is dominated by nonnative species, it does support 2.49 acres in Unit 3 of gnatcatcher critical habitat, which could provide foraging and dispersal habitat for gnatcatchers. We have not yet received a mitigation site assessment or species survey information for the San Elijo Uplands. However, a mitigation site assessment will be provided per Conservation Measure 37 of this biological opinion, and surveys for pacific pocket mouse will be conducted as described in the introduction section (i.e., on page 2) of this document.

Deer Canyon II

The Deer Canyon II Property is approximately 14.6 acres in size and is located south of State Route 56 and McGonigle Canyon in the MHPA of the City of San Diego's Subarea Plan boundary (Figure 27). It is dominated by nonnative grassland habitat, with a few small patches of disturbed Diegan coastal sage scrub along the eastern and southern borders. The Deer Canyon II Property does not contain any critical habitat. No sensitive species currently occur on the parcel due to its disturbed nature (Dudek 2012).

Laser

The Laser Property consists of two parcels that total 4.98 acres in size and are located west of Interstate 5 (I-5) and north and east of Manchester Avenue in the proposed FPA of the City of Encinitas' draft Subarea Plan boundary (Figure 29). It is dominated by coastal sage scrub and coastal bluff scrub habitat. The Laser Property is located within Unit 3 of gnatcatcher critical habitat. Two gnatcatcher territories were identified on the Laser Property (Dudek 2012).

La Costa

The La Costa Property totals approximately 19.75 acres in size and is located east of I-5, south of La Costa Avenue and east of Piraeus Street in the proposed FPA of the City of Encinitas' draft Subarea Plan boundary (Figure 29). Diegan coastal sage scrub, southern maritime chaparral, chamise chaparral, and disturbed habitat communities were identified on the property. The La Costa Property is located within Unit 3 of gnatcatcher critical habitat. One pair of gnatcatchers was identified on the La Costa Property (Dudek 2012).

Batiquitos and Los Peñasquitos Lagoons

Batiquitos Lagoon is located in the City of Carlsbad, just north of the City of Encinitas, and comprises approximately 591 acres of coastal wetlands. Los Peñasquitos Lagoon includes approximately 463 acres of coastal wetlands and is located along the northwest border of the City of San Diego, just south of the City of Del Mar.

Major issues facing these lagoons are increased sedimentation from the alteration of the existing tidal prism (a result of existing transportation infrastructure) and the urbanization of the watershed, which has increased freshwater input into the lagoons from urban runoff. This can lead to sedimentation within the lagoons, seasonal closure of the lagoon mouths, and altered salinity levels. Maintaining the openings at the mouths of Batiquitos and Los Peñasquitos Lagoons has been identified as an important conservation need within the I-5 North Coast Corridor (Dudek 2012).

San Elijo Lagoon

San Elijo Lagoon is approximately 491 acres and is located in the City of Encinitas just north of Solana Beach. The lagoon is part of the larger San Elijo Lagoon Ecological Reserve that includes approximately 1,000 acres of wetland and upland habitats. San Elijo Lagoon is located in the proposed FPA of the City of Encinitas' draft Subarea Plan boundary.

San Elijo Lagoon Ecological Reserve is transitioning from open water and mudflat habitats to salt marsh and riparian habitat as a result of urban pressures. Transportation infrastructure contributes to restricted tidal flushing and degraded water quality in the reserve. The lagoon supports California least terns, gnatcatchers, and rails (Dudek 2012). Gnatcatcher and western snowy plover critical habitats are present in the lagoon.

Buena Vista Lagoon

Buena Vista Lagoon is approximately 203 acres and is located in the in the cities of Carlsbad and Oceanside. The lagoon is part of the Buena Vista Lagoon Ecological Reserve. Buena Vista Lagoon is located in the FPA of the City of Carlsbad's Habitat Management Plan boundary and the FPA of the City of Oceanside's draft Subarea Plan boundary.

Habitats present in or within the vicinity of Buena Vista Lagoon primarily include open water (estuarine and fresh), coastal brackish and freshwater marsh, southern riparian scrub, and Eucalyptus woodland (Dudek 2012). The lagoon supports gnatcatchers and rails (Dudek 2012). Proposed critical habitat for the flycatcher is present just east of the lagoon.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action, are later in time, and still reasonably certain to occur.

Construction and operation of the project will result in impacts to gnatcatcher, rail, goby, manzanita, designated gnatcatcher critical habitat, and proposed goby critical habitat (see Tables 3 and 4). Impacts to habitats located within the alignment footprint are considered to have permanent direct effects on species, and impacts to habitat located between the alignment and limits of disturbance (for construction access and grading) are considered to have temporary direct effects on species.

Operation of existing roadways can affect species and habitats through factors such as increased noise and lighting, changed hydrology, increased fire risk, invasion of exotic plants, habitat fragmentation, and creation of barriers to movement (e.g., Forman et al. 1997, Forman and Deblinger 2000). Given the potentially broad-reaching, long-term nature of such indirect impacts, they are difficult to quantitatively assess. Nonetheless, this analysis also considers project effects on habitat surrounding the direct impact area, within about 500 feet, which may be exposed to increased noise, light, and dust levels and human activity during project construction and operation of the facilities.

Direct and indirect impacts to the vegetation communities, species, and critical habitats summarized in Tables 2-4 will be offset through the conservation, restoration, and management of habitats for these species and their critical habitats as summarized in conservation measure 35 and Table 5. This document has discussed the importance of the six coastal lagoons traversed by the project, Los Peñasquitos Creek, Carmel Valley Creek, and the San Luis Rey River and associated native habitat communities, both as live-in habitat for listed species, and as regional wildlife corridors that provide connectivity for wildlife movement from inland San Diego County to the coastal region. The San Dieguito Lagoon W19, Hallmark, Dean, San Elijo Uplands, Deer Canyon, Laser, and La Costa conservation properties, the lagoon maintenance at Batiquitos and Los Peñasquitos Lagoons, and the regional lagoon restoration efforts at San Elijo and/or Buena Vista Lagoons are located in proximity to the project site in coastal San Diego County, California, and will complement regional conservation planning efforts (Figures 22-23). The project has also optimized the design of transportation facility infrastructure to enhance lagoon system functions and facilitate large-scale lagoon restoration. As summarized in conservation measure 4, lagoon bridges along the I-5 corridor will be lengthened to improve tidal and fluvial flows and enhance associated wetland habitat values. Further, as summarized in conservation measure 9, the project will implement numerous wildlife connectivity measures to maintain regional wildlife corridors. Implementation of the avoidance, minimization, and conservation measures that will compensate for project impacts is anticipated to improve the integrity of sensitive coastal habitats and maintain regional movement corridors, which will contribute to the conservation and recovery of listed species.

Because the project is expected to start in 2014 and be phased over approximately 21 years, Caltrans will conduct updated surveys for the gnatcatcher, rail, and manzanita within 1 year prior to the commencement of vegetation clearing and construction activities for each project phase to ensure that survey information remains up to date. FHWA and Caltrans acknowledge that section 7 consultation will be reinitiated if survey results indicate that additional impacts to these species may occur beyond those addressed in this biological opinion.

Coastal California Gnatcatcher

Direct Effects

Project Construction

Construction activities associated with the project are not anticipated to directly kill or injure adult gnatcatchers or destroy any active nests. A CFWO-approved gnatcatcher biologist will be present to ensure that gnatcatchers are not directly killed or injured during vegetation removal and other construction activities. The clearing and grubbing of native upland habitats will be conducted between September 16 and February 14 to avoid the gnatcatcher breeding season.

The project will permanently and temporarily impact 61.95 acres and 14.63 acres of gnatcatcher habitat, respectively, throughout the 27-mile-long project area. Permanent impacts consist of 12.14 acres of coastal sage scrub, 48.06 acres of disturbed coastal sage scrub, 0.28 acre of maritime succulent scrub, 0.45 acre of baccharis scrub, and 1.02 acres of disturbed baccharis scrub. Temporary impacts consist of 4.06 acres of coastal sage scrub, 9.20 acres of disturbed coastal sage scrub, 0.22 acre of maritime succulent scrub, 0.14 acre of baccharis scrub, and 1.01 acres of disturbed baccharis scrub.

A total of 15 gnatcatcher territories are located entirely or partially within the direct impact area for the proposed project (Caltrans 2012a) (Figures 7-15). In the first phase of construction (2014-2020), six gnatcatcher territories will be affected by the project, four territories at San Elijo Lagoon and two territories between Manchester Avenue and Birmingham Drive.

At San Elijo Lagoon, project construction will completely destroy the habitat supporting two gnatcatcher pairs and destroy approximately 75 percent of the habitat for two additional pairs (i.e. four gnatcatcher territories total). The new fill slope to the west of I-5, where two of the four territories now occur, will be bisected by the proposed north coast bikeway, which is a part of the project, and an existing trail will be maintained at the base of slope east of I-5. Between Manchester Avenue and Birmingham Drive, project construction will destroy approximately 75 percent of the habitat for one gnatcatcher pair and approximately 25 percent of the habitat for a second gnatcatcher pair.

In the second phase of construction (2020-2030), eight gnatcatcher territories will be affected by the project at San Dieguito and Batiquitos lagoons. Project construction will completely destroy the habitat supporting four gnatcatcher pairs at San Dieguito Lagoon. The new fill slope to the west of I-5, where the four territories now occur, will be bisected by the proposed north coast bikeway.

At Batiquitos Lagoon, project construction will destroy 100 percent of the habitat supporting two gnatcatcher pairs, approximately 75 percent of the habitat for a third pair, and approximately 25 percent of the habitat for a fourth pair. The new fill slope to the west of I-5, where two of the four territories now occur, will be bisected by the proposed north coast bikeway.

In the third and final phase of construction (2030-2035), habitat for a single gnatcatcher pair will be affected by the project on cut slopes between Genesee Avenue and Roselle Street. Project construction will destroy about 50 percent of the habitat supporting this pair. The north coast bikeway will follow the base of the new cut slope west of I-5, where the territory now occurs.

The territories of many of the 15 gnatcatcher pairs affected are on fill slopes adjacent to the affected lagoons, which will be replanted with native species following construction. Most of the impacts to these 15 pairs of gnatcatchers are considered permanent, however, because the habitat loss is significant to the individual gnatcatcher pairs and any potential recovery of the habitat will likely take at minimum 4-5 years as discussion below.

Although habitat removal will be conducted outside the gnatcatcher breeding season, gnatcatchers are non-migratory territorial birds, and removal of a substantial portion of a gnatcatcher pair's breeding territory will force the pair to expand their existing territory or establish a new territory, particularly during the breeding season, when territorial boundaries are better defined (Preston et al. 1998). Because gnatcatchers are distributed throughout much of the suitable habitat in the project area, it is likely that the gnatcatchers affected by habitat loss within their primary use areas will be forced to compete with resident gnatcatchers when attempting to expand an existing territory or establish a new territory. The 15 pairs will lose between 25 and 100 percent of their use areas. Because these displaced birds likely will be less able to find suitable habitat to forage and shelter in, we anticipate they will be more vulnerable to predation and otherwise may die or be injured. Overall, the phased loss of habitat supporting 15 gnatcatcher pairs will reduce the number of gnatcatchers supported in the general project area during each of the individual project phases. While not insignificant, impacts to 15 gnatcatcher pairs represent less than 1 percent of the rangewide estimate of gnatcatcher pairs.

Following construction of each phase, all temporarily impacted habitats, including coastal sage scrub (14.63 acres), will be restored. In addition, natural areas and, as indicated above, cut and fill slopes (more than 86 acres) located adjacent to lagoons, will be planted with native species. In total, over 100 acres of slopes near lagoons and other open space will be revegetated with coastal sage scrub.

Since restored coastal sage scrub usually takes a minimum of 4 to 5 years of growth before it is suitable for occupation by gnatcatchers (O'Connell and Erickson 1998, Miner et al. 1998), the anticipated temporary loss of 14.63 acres of coastal sage scrub available to gnatcatchers will likely further reduce the number and reproductive fitness of gnatcatchers supported in the project area during each project phase. However, because numerous breeding gnatcatcher pairs will remain in the intact habitat in the surrounding environment, we expect the temporarily impacted habitat and the revegetated slopes will be re-occupied as soon as it is mature enough to support gnatcatcher breeding. Overall, we do not expect the permanent and temporary loss of gnatcatcher habitat resulting from project construction to increase the local risk of gnatcatcher extirpation, and we expect gnatcatchers will continue to occupy the general project area. Thus, the project is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the species rangewide.

Caltrans will offset the permanent loss of habitat for 15 pairs of gnatcatchers (61.95 acres), and impacts to other native habitats on the site, through the creation, restoration and preservation/enhancement of a total of 89.23 acres of upland, comprised primarily of coastal sage scrub, with the exception of 16.23 acres of mixed coastal sage scrub / southern montane chaparral on the Dean property and 3.38 acres of chaparral on the La Costa property, as summarized in conservation measure 35 and Table 5. Although conservation of gnatcatcher and upland habitat off the project site will not avoid or minimize impacts to the individual gnatcatchers impacted by the project, the offsite conservation will permanently protect a total of 89.23 acres of upland, comprised primarily of coastal sage scrub. This coastal sage scrub is occupied and/or is likely to become occupied by gnatcatchers and thus will contribute to the conservation and recovery of the species.

Habitat Restoration

Temporarily impacted coastal sage scrub will be restored in association with the project. In addition, sage scrub habitat will be created and restored on the Hallmark, Dean, San Elijo Uplands, and Deer Canyon sites, and some enhancement may occur on the La Costa and Laser properties. These activities are expected to result in an overall benefit to the gnatcatcher, but they may result in minor disturbance of gnatcatchers that are adjacent to or within the sites. However, the project includes measures to ensure that gnatcatchers are not significantly disrupted during breeding activities and that no nests are destroyed as a result of creation, restoration, or enhancement activities.

Specifically, vegetation clearing will be conducted out of the gnatcatcher breeding season, with the exception of maintenance activities that may occur in association with habitat restoration and enhancement actions during the breeding season (e.g., weeding, treating weed re-sprouts with herbicide). If maintenance of a coastal sage scrub creation, restoration, or enhancement area is necessary between February 15 and August 31, a biologist with knowledge of the biology and ecology of gnatcatchers and approved by the CFWO will survey for gnatcatchers within the creation / restoration / enhancement area, access paths to it, and other areas susceptible to disturbances by site maintenance. Work will be allowed to continue on the site during the survey period. However, if gnatcatchers are found during any of the visits, Caltrans will notify and coordinate with the CFWO to identify measures to avoid and/or minimize effects to the gnatcatcher (e.g., nests and an appropriate buffer will be flagged by the biologist and avoided by the maintenance work). Therefore, effects to gnatcatcher associated with habitat creation, restoration or enhancement are anticipated to be insignificant.

Indirect Effects

Indirect effects include construction and operational lighting associated with the project that will impact the adjacent gnatcatcher habitat. Light that alters natural light patterns in ecosystems can lead to increased predation, disorientation, and disruption of inter-specific interactions (Longcore and Rich 2004). Night lighting for construction will be of the lowest illumination necessary for human safety, selectively placed, shielded and directed away from natural habitats. Permanent

safety lighting installed for the project will be lowest illumination necessary for safety and will be directed toward the facility and away from sensitive habitats. This is anticipated to minimize the impact of lighting on gnatcatcher behavior in adjacent habitat to the point where such effects are insignificant. For the purposes of section 7 consultation, an insignificant effect is one that is sufficiently small that a person would not be able to meaningfully measure, detect, or evaluate it.

Noise and vibrations associated with the use of heavy equipment during construction and operations of the proposed facilities have the potential to disrupt gnatcatcher behaviors in adjacent habitat by masking intraspecific communication and startling birds (e.g., see Dooling and Popper 2007 for a discussion of observed effects of highway noise on birds). However, gnatcatchers that occupy habitats adjacent to the existing I-5 freeway are subjected to existing noise and vibration and continue to occupy the habitat. Ambient noise measurements taken along the project area in and adjacent to lagoons range from a high of 84 dB(A) L_{eq} (on slopes adjacent to main lanes at San Elijo Lagoon) down to measurements in the mid-60's dB(A) L_{eq} in lagoons. Overall, the area within 500 feet of the I-5 is subject to noise levels greater or equal to 60 dB(A) L_{eq} (Caltrans 2010). Once construction is complete, project operations are anticipated to result in a minimal increase in existing noise levels of 1 to 3 dB(A) in most areas (Caltrans 2012a). This small increase should not result in an appreciable impact to gnatcatchers in the adjacent habitat. In addition, the project has incorporated measures to avoid and minimize noise impacts to listed species during construction, such as conducting pile driving adjacent to gnatcatcher habitat outside the gnatcatcher breeding season, use of noise walls, and ensuring construction equipment is equipped with properly maintained mufflers. These measures are anticipated to minimize the impact of construction noise on gnatcatcher behavior in adjacent habitat to the point where such effects are insignificant.

The project could increase the cover and number of invasive nonnative plant species in habitats adjacent to the project area. Nonnative species are now recognized as a threat to biodiversity in native plant communities, second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989, Scott and Wilcove 1998). Nonnative species often out-compete and exclude native species, potentially altering the structure of the vegetation, degrading or eliminating upland habitat used by the gnatcatcher, and providing food and cover for undesirable nonnative animals (Bossard et al. 2000). The project has incorporated measures to prevent the spread of nonnative species. A CFWO-approved biologist will monitor the project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid their inadvertent spread in association with the project. Invasive plants will not be used in project landscaping. Measures, such as the use of fabric weed barriers and mulch, will be used along the median to prevent the establishment and spread of weeds. Implementation of these measures is anticipated to minimize the impact of invasive species introduction resulting from project implementation on gnatcatcher habitat to the point where such effects are insignificant.

Additional indirect effects include an increase in wildfire and human encroachment from construction personnel and community enhancements such as improved trails and trailheads. Measures have been incorporated, such as construction fencing, trail fencing, and signage to avoid and minimize these impacts to gnatcatchers. The I-5 is an existing facility in a highly

populated area, so with the proposed conservation measures, any increase in habitat degradation associated with these factors is expected to be insignificant.

Critical Habitat

The project will result in permanent and temporary impacts to 43 acres [34 acres (27.7 acres with PCEs) and 9 acres (all with PCEs), respectively] within Unit 3 of designated critical habitat for the gnatcatcher. This acreage represents only approximately 0.2 percent of the designation within Unit 3 and just 0.02 percent of the total designation. This unit contains the last significant gnatcatcher populations remaining south of Marine Corps Base Camp Pendleton abutting the coast and provides connectivity between significant populations at Marine Corps Base Camp Pendleton (adjacent to Unit 5), MSCP reserve areas in Unit 1, and populations in northern San Diego County (Unit 4).

The project impacts to critical habitat and associated PCEs (sage scrub and non-sage scrub vegetation that provide space and resources for nesting, foraging, and dispersal) are not expected to substantially impact the functions of Unit 3 to support core gnatcatcher populations and provide connectivity between Marine Corps Base Camp Pendleton and Units 4 and 1.

Proposed conservation to offset impacts of the project, as summarized in Table 5, will include preservation/enhancement of 22.9 acres of gnatcatcher critical habitat on the Laser and La Costa properties, which are located entirely within Unit 3 of designated gnatcatcher critical habitat. In addition, though it is currently highly disturbed and was not included within the critical habitat designation, the restoration proposed on the 30-acre San Elijo Uplands properties (Table 5) will occur directly adjacent to gnatcatcher critical habitat near San Elijo Lagoon (Figure 31), helping to maintain gnatcatcher populations within and dispersal through Unit 3. Further, Caltrans has agreed to restore all of the project's temporary impact areas with native species, as well as more than 86 acres of cut and fill slopes within the project's permanent impact area. This will include extensive areas that are currently vegetated with nonnative species. The proposed restoration and preservation/enhancement will help maintain the functions of Unit 3 to support core gnatcatcher populations and provide connectivity between gnatcatchers at Marine Corps Base Camp Pendleton and in Units 4 and 1.

According to the final critical habitat rule (Service 2007b), the physical and biological features essential to the conservation of the species in Unit 3 may require special management considerations or protection to minimize impacts associated with habitat type conversion and degradation occurring in conjunction with urban and agricultural development. The measures to address indirect impacts and habitat degradation adjacent to the project area discussed in the indirect effects section above are expected to help minimize these potential impacts to Unit 3.

Effect on Recovery

There is no recovery plan for the gnatcatcher, but the project is consistent with the general recovery goals of maintaining core populations of gnatcatchers and maintaining connectivity

between these populations. As described above, the permanent loss of 61.95 acres of gnatcatcher habitat and loss of 15 gnatcatcher pairs, though not insignificant, is a relatively small impact in consideration of the thousands of acres of coastal sage and gnatcatcher territories (roughly 2,562 pairs) rangewide. Furthermore, the presence of substantial areas of occupied habitat adjacent to the impact area and restoration of temporary impact areas and cut/fill slopes initiated immediately following construction in each phase will help maintain and support local gnatcatcher populations in the project area throughout the 21-year project duration.

Caltrans will offset the impacts to gnatcatcher habitat, as well as impacts to other native upland habitats on the site, through creation, restoration and preservation/enhancement as summarized in conservation measure 35 and Table 5. This will include the preservation / creation / restoration of a total of 89.23 acres of upland, comprised primarily of coastal sage scrub. The conservation properties are in the vicinity of the corridor, and are either currently occupied by gnatcatchers, or are in areas where gnatcatchers are anticipated to move into the habitat following creation / restoration work. Thus, over the long-term, the project is expected to contribute to the conservation and recovery of the species by maintaining gnatcatcher breeding habitat and connectivity between core gnatcatcher populations in north coastal San Diego County.

Light-footed Clapper Rail

Direct Effects

Project Construction

Construction activities associated with the project are not anticipated to result in the death or injury of any rails or nests. A CFWO-approved rail biologist will be present to ensure that rails are not directly killed or injured during vegetation removal and other construction activities. The clearing and grubbing of native wetland and riparian habitats will be conducted between September 16 and March 14 to avoid the rail breeding season.

The project will permanently and temporarily impact 13.2 acres and 7.64 acres of coastal marsh rail habitats, respectively, throughout the 27-mile-long project area. Permanent impacts consist of 1.31 acres of coastal brackish marsh, 3.53 acres of disturbed coastal brackish marsh, 0.62 acre of freshwater marsh, 0.54 acre of disturbed freshwater marsh, 2.36 acres of mudflat, 4.43 acres of coastal salt marsh, 0.06 acre of salt marsh transition, and 0.35 acre of southern willow scrub/freshwater marsh. Temporary impacts consist of 0.58 acres of coastal brackish marsh, 1.54 acres of disturbed coastal brackish marsh, 1.36 acre of freshwater marsh, 0.38 acre of disturbed freshwater marsh, 0.44 acres of mudflat, 2.33 acres of coastal salt marsh, 0.21 acre of salt marsh transition, and 0.8 acre of southern willow scrub/freshwater marsh.

A total of four rail territories are located entirely or partially within the direct impact area for the proposed project (Caltrans 2012a). In the first phase of construction (2014-2020), approximately 20 percent of one rail territory will be temporarily impacted at San Elijo Lagoon.

In the second phase of construction (2020-2030), two rail territories will be affected by the project at Batiquitos Lagoon (unless the Batiquitos Lagoon bridge is advanced in the project schedule to minimize permanent project impacts, in which case these impacts would also occur in the first phase). A total of approximately 50 percent of one rail territory will be impacted (approximately 25 percent permanent and 25 percent temporary); and approximately 20 percent of another rail territory will be temporarily impacted.

In the third and final phase of construction (2030-2035), approximately 10 percent of one rail territory will be temporarily impacted at Buena Vista Lagoon (unless the Buena Vista Lagoon bridge is advanced in the project schedule to minimize permanent project impacts, in which case these impacts would also occur in the first project phase).

Although habitat removal will be conducted outside the rail nesting season, the rail is resident in its home marsh except under unusual circumstances (Zembal 1994). Within-marsh movements are also generally confined and usually no greater than 1,312 feet (Zembal et al. 1989). Several rail pairs occur adjacent to the territory at San Elijo Lagoon, which will be affected in phase 1 of construction. In addition, rail numbers have been increasing in recent years. By the time construction begins on phases 2 and 3 of the project, additional rail pairs may occur in the vicinity of the territories that will be affected by the project. Therefore, the rails affected by habitat loss within their primary use areas may not be able to find sufficient nearby habitat or may be forced to compete with other resident rails when attempting to expand an existing territory or establish a new territory.

One rail pair, at Batiquitos Lagoon, will lose 50 percent of its territory over the short term. This pair may be displaced from its territory, forced to compete with other resident rails, or be more vulnerable to predation resulting in death or injury. Three rail pairs, one each at San Elijo, Batiquitos, and Buena Vista Lagoons, will experience the loss of only 10 to 20 percent of their territories over the short term, and these pairs may be able to survive project construction impacts within the remaining and/or adjacent habitat. However, even if these birds survive the initial impact of habitat loss within their established territories, they could also experience increased territorial interactions and be harmed by the overall reduced availability of foraging and breeding habitat in the project area.

Following construction, all temporarily impacted habitats, including coastal marsh habitats, will be restored, though it may be many years (e.g., possibly 8 to 10 years according to some observations) until restored coastal marsh habitats are again suitable for rail nesting. Thus, the overall project impact anticipated is the permanent loss of habitat for one rail pair and the temporary loss of habitat for three rail pairs until the restored areas are again suitable for rail occupation. These permanent and temporary impacts will likely reduce the number of rails that can be supported in the general project area for a period of time but are not expected to increase the local risk of rail extirpation. Impacts to four rail pairs represent less than 1 percent of the rangewide estimate of rail pairs (approximately 520 pairs), and rails will continue to occupy the general project area; thus, the project is not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the species rangewide.

Caltrans will offset the impacts to rail habitat through creation and restoration of a total of 17.6 acres of coastal marsh, including 5.34 acres at Hallmark Property and 12.26 acres at San Dieguito W19 Property, with creation and restoration phased in advance of project impacts. Creation of habitat off the project site will not avoid or minimize impacts to the individual rails impacted by the project, but the offsite conservation will permanently protect a total of 17.6 acres of coastal marsh in areas where rails are anticipated to move into the habitat following creation / restoration work and contribute to the conservation and recovery of the species.

Lengthening the I-5 bridges over the lagoons and constructing wildlife movement benches under the bridges are expected to greatly benefit the rail and its habitat in the project area by improving the tidal exchange in the lagoons and the ability of rails to move between habitats to the west and east of the I-5 fills across the lagoons. Implementation of the regional lagoon maintenance program and large-scale lagoon restoration work will also benefit the rail and its habitat in the project area.

Habitat Restoration

Temporarily impacted coastal marsh communities will be restored in association with the project. In addition, coastal marsh communities will be created and restored on the San Dieguito Lagoon W19 and Hallmark sites. The Regional Lagoon Maintenance Program at Batiquitos and Los Penasquitos lagoons will also benefit coastal marsh communities and rails. Restoration activities are expected to result in an overall benefit to the rail, but they may result in minor disturbance of rails that are adjacent to restoration sites, or that move into these sites as restoration progresses. However, the project includes conservation measures to ensure that rails are not significantly disrupted during breeding activities and that no nests are destroyed as a result of creation and restoration activities. Vegetation clearing will be conducted out of the rail breeding season, with the exception of maintenance activities that may occur in association with habitat restoration and enhancement actions during the breeding season (e.g., weeding, treating weed re-sprouts with herbicide). If maintenance of a coastal marsh creation or restoration area is necessary between February 15 and August 31, a biologist with knowledge of the biology and ecology of rails and approved by the CFWO will survey for rails within the creation or restoration area, access paths to it, and other areas susceptible to disturbances by site maintenance. Work will be allowed to continue on the site during the survey period. However, if rails are found during any of the visits, Caltrans will notify and coordinate with the CFWO to identify measures to avoid and/or minimize effects to the rail (e.g., nests and an appropriate buffer will be flagged by the biologist and avoided by the maintenance work. Therefore, effects to rail associated with habitat creation or restoration at the San Dieguito Lagoon W19 and Hallmark and maintenance activities at Batiquitos and Los Peñasquitos lagoons are anticipated to be insignificant. Large-scale lagoon restoration is proposed in association with the project, which is also expected to benefit the rail[9].

[9] The large scale restoration work will be carried out in the future and will be subject to separate section 7 consultation to address any impacts to listed species, including rails. While rails may be disturbed or otherwise temporarily impacted, the overall effect of the restoration work is anticipated to be beneficial to rails because it will restore salt water lagoon habitat for this species.

Indirect Effects

Indirect effects include construction and operational lighting associated with the project that will impact the adjacent rail habitat. Light that alters natural light patterns in ecosystems can lead to increased predation, disorientation, and disruption of inter-specific interactions (Longcore and Rich 2004). Night lighting for construction will be of the lowest illumination necessary for human safety, selectively placed, shielded and directed away from natural habitats. Permanent safety lighting installed for the project will be lowest illumination necessary for safety and will be directed toward the facility and away from sensitive habitats. This is anticipated to minimize the impact of lighting on rail behavior in adjacent habitat to the point where such effects are insignificant.

Noise and vibrations associated with the use of heavy equipment during construction and operations of the proposed facilities have the potential to disrupt rail behaviors in adjacent habitat by masking intraspecific communication and startling birds (e.g., see Dooling and Popper 2007 for a discussion of observed effects of highway noise on birds). However, rails that occupy habitats adjacent to the existing I-5 freeway are subjected to existing noise and vibration and continue to occupy the habitat. Ambient noise measurements taken along the project area in and adjacent to lagoons range from a high of 84 dB(A) L_{eq} (on slopes adjacent to main lanes at San Elijo Lagoon) down to measurements in the mid-60's dB(A) L_{eq} in lagoons. Overall, the area within 500 feet of the I-5 is subject to noise levels greater or equal to 60 dB(A) L_{eq} (Caltrans 2010). Once construction is complete, project operations are anticipated to result in a minimal increase in existing noise levels of 1 to 3 dB(A) in most areas (Caltrans 2012a). This small increase should not result in an appreciable impact to rails in the adjacent habitat. In addition, the project has incorporated measures to avoid and minimize noise impacts to listed species during construction, such as conducting pile driving adjacent to rail habitat outside the rail breeding season, use of temporary noise walls during construction, and ensuring construction equipment is equipped with properly maintained mufflers. These measures are anticipated to minimize the impact of construction noise on rail behavior in adjacent habitat to the point where such effects are insignificant.

The project could also increase the cover and number of invasive nonnative plant species into habitats adjacent to the project area. Nonnative species are now recognized as a threat to biodiversity in native plant communities, second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989, Scott and Wilcove 1998). Nonnative species often out-compete and exclude native species, potentially altering the structure of the vegetation, degrading or eliminating wetland habitat used by the rail, and providing food and cover for undesirable non-native animals (Bossard et al. 2000). The project has incorporated measures to prevent the spread of nonnative species. A CFWO-approved biologist will monitor the project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid their inadvertent spread in association with the project. Invasive plants will not be used in project landscaping. Measures, such as the use of fabric weed barriers and mulch, will be used along the median to prevent the establishment and spread of weeds. Implementation of these measures is anticipated to minimize the impact of invasive species

introduction resulting from project implementation on rail habitat to the point where such effects are insignificant.

Bridge demolition and construction may affect channel water quality by erosion from the impact area and by disturbing channel bottom sediments, which could potentially contain contaminants. Staging of construction equipment could result in spills that could also adversely affect water quality. Measures will be implemented by Caltrans to prevent erosion, contain disturbed sediments, capture bridge debris, prevent and capture any spills, and limit staging to designated areas that are setback from drainages and lagoons. Implementation of these measures is anticipated to minimize these potential impacts to the level of insignificance.

Project construction and bridge work in lagoons has the potential to affect rail movement between habitats to the west and east of the I-5. However, berms will not be used for construction at the lagoons and San Luis Rey River, and an open channel will be maintained through the project area during bridge construction at the lagoons and San Luis Rey River. Rails are anticipated to be able to move through the project area during construction either by swimming through the open channel under bridges or by flight under the bridge or over I-5. Implementation of these measures is anticipated to minimize these potential impacts to the level of insignificance.

Additional indirect effects include an increase in human encroachment from construction personnel and community enhancements such as improved trails and trailheads. Measures have been incorporated, such as construction fencing, trail fencing, and signage to avoid and minimize these impacts to rails. The I-5 is an existing facility in a highly populated area, so with the proposed conservation measures, any increase in habitat degradation associated with these factors is expected to be insignificant.

Effect on Recovery

The proposed project is consistent with the recovery objectives identified in the recovery plan for the rail (Service 1985). The project will result in permanent and temporary losses of coastal marsh habitat and impact four rail pairs, but these impacts have been minimized. Moreover, the project will create and restore a total of 17.6 acres of coastal marsh communities in advance of project impacts, which will result in a net increase in the amount of habitat for rail.

Proposed habitat conservation, creation, restoration, and management will help accomplish the primary objective of the rail recovery plan, which is to increase the rail breeding population in California to at least 800 pairs by preserving, restoring, and/or creating approximately 10,000 acres of adequately protected and suitably managed wetland habitat. Specifically, the proposed habitat conservation, creation, restoration, and management will help accomplish recovery action 123, to preserve and manage habitat at Agua Hedionda Lagoon, through restoration on the Hallmark property. In addition, the project will help accomplish recovery action 256, to undertake appropriate actions to reestablish rails in San Dieguito Lagoon, such as identify land ownership and pursue appropriate protective measures, improve/restore tidal action, and create

low marsh including planting of cordgrass (*Spartina foliosa*) through restoration on the San Dieguito Lagoon W19 property.

The regional lagoon maintenance program for Batiquitos and Los Peñasquitos Lagoons will help accomplish recovery actions 254, undertake appropriate actions to reestablish rails at Batiquitos Lagoon, and 258, undertake appropriate actions to reestablish rails at Los Peñasquitos Lagoon, such as improve/restore tidal action. Bridge lengthening at San Elijo and Buena Vista lagoons will improve tidal and fluvial flows and enhance associated wetland habitat values, which will help accomplish recovery actions 124 and 254, at San Elijo Lagoon and Batiquitos lagoon, respectively, which call for improving and restoring tidal action. The proposed large-scale salt water lagoon restoration is also expected to benefit recovery of the rail.

The project will not substantially fragment existing populations or interfere with dispersal between populations, and rails are expected to move into the creation and restoration sites from adjacent occupied habitat. Thus, over the long-term, the project is expected to contribute to the conservation and recovery of the species by maintaining rail breeding habitat in north coastal San Diego County.

Tidewater Goby

Direct Effects

Project Construction

The goby is a short-lived species that is subject to variability in local abundance and seasonal changes in distribution and abundance, which makes it difficult to derive population size estimates (Service 2007a). Therefore, it is anticipated that the goby population subject to impacts from the project will experience population fluctuations making it difficult to determine the precise number of gobies that could be adversely affected at any given time. As discussed in the Environmental Baseline section, the San Luis Rey River population of gobies is recently rediscovered. Surveys in the San Luis Rey River were conducted on a single day as a part of a larger survey effort in the Camp Pendleton area and the number of individuals observed in the San Luis Rey River was not reported (Lafferty 2010). Because we do not have site specific data, and because goby populations fluctuate dramatically over time, it is difficult to accurately quantify the number of individuals that may be present within the project's impact area.

Because goby populations fluctuate dramatically over time, project-associated impacts to the species are evaluated primarily in terms of how much habitat will be affected. The project will permanently and temporarily impact 0.01 acre and 0.2 acre of open water goby habitat, respectively, from construction of bridge pilings in the San Luis Rey River. An additional 0.3 acre of open water habitat at the San Luis Rey River will also experience permanent effects from bridge shading.

Due to the difficulty of estimating the number of gobies in the project footprint and in the population as a whole, it is useful to consider the project impacts to goby habitat relative to available habitat along the San Luis Rey River when assessing the effects of the project on the population. The recovery plan for the tidewater goby estimates that the amount of suitable habitat in the San Luis Rey River encompasses about 15 to 25 acres. The permanent loss and shading of 0.01 acre and 0.3 acre of open water habitat, respectively, together represent approximately 1 to 2 percent of suitable goby habitat in the San Luis Rey River.

The project has incorporated measures to exclude gobies from the project footprint. These measures include installation of cofferdams, silt curtains, turbidity curtains and/or other barriers, and translocation of individuals out of the project work area to proximal and safe suitable habitat. Some gobies may be killed or injured during translocation activities, and gobies that are missed during translocation may be killed or injured during project construction. Translocation efforts will be conducted by individuals familiar with goby biology and ecology, whose qualifications will be subject to review by the CFWO. Therefore, we anticipate that very few gobies will be killed or injured during capture and relocation efforts. Due to the proposed avoidance and minimization measures, the small size of the work area within goby habitat, and the difficulty of detecting gobies that may be missed during translocation, we anticipate that no more than five gobies will be observed dead or injured during project monitoring.

Given the fact that a large amount of suitable goby breeding habitat will remain adjacent to the action area after project construction, and goby populations are naturally subject to large fluctuations in local abundance, we do not anticipate that the translocation of gobies from the impact footprint to suitable adjacent habitat will result in adverse impacts associated with overcrowding. In addition, we expect gobies to reoccupy the temporary impact area upon project completion.

Bridge shading may alter habitat by reducing light for vegetative growth and reducing water temperatures within the habitat below, and decrease the density of benthic invertebrates living within the shaded area (Struck et al. 2004). Reduction in temperature, vegetative cover, and density of benthic invertebrate prey could reduce the relative value of the habitat within shaded areas to the goby. However, the additional shaded areas are expected continue to support some vegetative cover and benthic invertebrate prey. Furthermore, gobies tolerate wide seasonal temperature variations, so it is likely that they will adjust to any temperature changes caused by the additional bridge shading. The area affected by the additional shading is also expected to continue to provide for goby movement underneath the bridge.

When estuary berms are breached, tidewater gobies can be stranded in shallow pools, breeding burrows can be left above the water level, water elevation and salinity levels can be affected, and strong tidal conditions can result, all of which can cause tidewater goby populations plummet (Service 2005). The project will not conduct actions that will breach the seasonal San Luis Rey River estuary berms. In addition, the project will not result in diversion of the active channel in the San Luis Rey River during construction, and construction berms will not be used within the San Luis Rey River, which will minimize impacts on the active channel and impacts from

sedimentation. A channel large enough for fish movement will be kept open throughout project construction within the project work area in the San Luis Rey River.

Due to the small size of the project work area within the occupied habitat and the incorporation of measures into project design that will avoid and minimize impacts to the goby, the project is expected to impact only a small fraction of the goby population on the San Luis Rey River and will have a limited effect on the availability of habitat in which the goby can breed, forage, and disperse.

Habitat Restoration

Following project construction, temporarily impacted habitats will be restored. Temporary impact areas within open water goby habitat will be returned to pre-existing conditions. Temporary impact areas adjacent to open water goby habitat will be revegetated with native species, including 0.8 acre of riparian and 0.85 acre of coastal sage scrub in areas that currently support ornamental vegetation and an abandoned freeway ramp. We do not anticipate any impacts to gobies resulting from the restoration of temporary impact areas beyond those that will result from the exclusion of gobies from the project work area, which were analyzed above.

Indirect Effects

Indirect effects include construction and operational lighting associated with the project that will impact the adjacent goby habitat. Light that alters natural light patterns in ecosystems can lead to increased predation, disorientation, and disruption of inter-specific interactions (Longcore and Rich 2004). Night lighting for construction will be of the lowest illumination necessary for human safety, selectively placed, shielded and directed away from natural habitats. Permanent safety lighting installed for the project will be the lowest illumination necessary for safety and will be directed toward the facility and away from sensitive habitats. This is anticipated to minimize the impact of lighting on goby behavior in adjacent habitat to the point where such effects are insignificant.

Noise and vibrations associated with the use of heavy equipment during construction and traffic noise during operations of the proposed facility have the potential to disrupt goby behaviors in adjacent habitat. The project has incorporated measures to minimize the effects of construction noise on gobies, such as the use of bubble curtains or other methods to minimize acoustical impacts to aquatic species. These measures are anticipated to minimize the impact of construction noise on goby behavior in adjacent habitat to the point where such effects are insignificant.

The project could also increase in the cover and number of invasive nonnative plant species in habitats adjacent to the project area. Nonnative species are now recognized as a threat to biodiversity in native plant communities, second only to direct habitat loss and fragmentation (Pimm and Gilpin 1989, Scott and Wilcove 1998). Nonnative species often out-compete and exclude native species, potentially altering the structure of the vegetation, degrading wetland

habitat, and providing food and cover for undesirable nonnative animals (Bossard et al. 2000). The project has incorporated measures to prevent the spread of nonnative species. A CFWO approved biologist will monitor the project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid their inadvertent spread in association with the project. Invasive plants will not be used in project landscaping. Measures, such as the use of fabric weed barriers and mulch, will be used along the median to prevent the establishment and spread of weeds. Implementation of these measures is anticipated to minimize the impact of invasive species introduction resulting from project implementation on goby habitat to the point where such effects are insignificant.

Bridge demolition and construction may affect water quality in the river channel by disturbing channel bottom sediments, which could potentially contain contaminants. Staging of construction equipment could result in spills that could adversely affect water quality. Erosion and runoff from construction can increase siltation in the creeks, smothering goby eggs, reducing visibility for predator avoidance, and decreasing available oxygen in the water for goby respiration. Measures will be implemented by Caltrans to prevent erosion, contain disturbed sediments, capture bridge debris, and limit staging to designated areas that are removed from the river. Implementation of these measures is anticipated to minimize these potential impacts to the level of insignificance.

Project construction and bridge work in the river has the potential to affect goby movement between habitats to the west and east of the freeway. However, the project work area within open water habitat is minimal, and construction berms will not be used for bridge construction in the San Luis Rey River. In addition, an open channel will be maintained through the project area during bridge construction at the San Luis Rey River. With the proposed measures, any increase in disturbance associated with project construction is not anticipated to create a barrier to goby movement during construction.

Additional indirect effects include an increase in human encroachment from construction personnel and community enhancements such as improved trails and trailheads. Measures have been incorporated, such as construction fencing, trail fencing, and signage to avoid and minimize these impacts to gobies and their habitats. The I-5 is an existing facility in a highly populated area, so with the proposed conservation measures, any increase in habitat degradation associated with these factors is expected to be insignificant.

Critical Habitat

A total of approximately 2.06 acres of the project site is within Unit SAN-1 of proposed goby critical habitat. Of this area, 0.51 acre includes PCEs of critical habitat and the remaining 1.55 acres do not. The project will permanently impact 0.01 acre within Unit SAN-1 of proposed critical habitat for the goby from the placement of new bridge pilings, and 0.3 acre will be subject to permanent impacts from bridge shading. Temporary impacts will also occur to 1.75 acres (0.2 acre with PCEs) of Unit SAN-1. The acreage of permanent impacts represents only approximately 0.6 percent of the designation within Unit SAN-1 and just 0.003 percent of the

total designation. This unit contains the southernmost habitat known to be occupied by the species, allows for connectivity between tidewater goby source populations, and supports gene flow and metapopulation dynamics of the genetically unique South Coast Recovery Unit. Unit SAN-1 supports a goby population and may help facilitate colonization of currently unoccupied locations to the south.

The project impacts to critical habitat and associated PCEs (persistent shallow still-to-slow moving estuary ranging in salinity from 0.5 to 12 parts per thousand with substrate suitable for burrow construction, submerged and emergent aquatic vegetation) are minor and are not expected to substantially impact the function of Unit SAN-1 to support a goby population, provide connectivity between tidewater goby source populations, and support gene flow and metapopulation dynamics of the genetically unique South Coast Recovery Unit. The impacts consist primarily of shading impacts in areas that are expected to maintain some habitat value for the goby. The temporary impact areas for the project will be restored once project construction is complete.

Effect on Recovery

The project is consistent with the recovery goal identified in the recovery plan for the goby to conserve and recover the tidewater goby throughout its range by managing threats and perpetuating viable metapopulations within each recovery unit while maintaining morphological and genetic adaptations to regional and local environmental conditions (Service 2005).

The project has been designed such that permanent impacts within goby habitat will be minimal, and temporary impact areas will be restored. Revegetation of 1.65 acres of temporary impact areas adjacent to open water goby habitat with native vegetation is also expected to benefit gobies in the San Luis Rey River. Measures incorporated into the project for the goby will avoid and minimize project impacts to the goby and manage project-related threats to the goby to ensure that the San Luis Rey River population is maintained.

Del Mar Manzanita

Direct Effects

<u>Project Construction</u>

The project will permanently and temporarily impact 2.87 acres and 1.84 acres of manzanita habitat, respectively, throughout the 27-mile-long project area. Permanent impacts consist of 1.82 acres of southern maritime chaparral and 1.05 acres of disturbed southern maritime chaparral. Temporary impacts consist of 0.47 acre of southern maritime chaparral and 1.37 acres of disturbed southern maritime chaparral.

Approximately six manzanita plants will be directly impacted by the project based on the most current survey data. An additional 35 manzanita plants were mapped within the BSA for the

project but will be avoided (Figures 16-17). The six plants within the project impact footprint are growing along the brow ditch at the northwestern corner of the Del Mar Heights Road interchange. It is likely that the brow ditch will have to be replaced as a part of the project. These impacts are anticipated to occur in phase 2B (2020-2025). As there is a 7-year delay before these impacts will occur, the number of manzanita individuals within the direct impact footprint could change. All manzanita within the project impact footprint will be salvaged and translocated to the Dean property. The Dean property is close to the salvage location and supports habitat appropriate for this species. A manzanita translocation plan will be prepared and provided to the CFWO for review and approval. The translocation will be implemented by a biologist with a history of translocating sensitive plant species. The locations where the manzanita plants will be transplanted will be approved by the CFWO.

There has been limited success with the salvage and translocation of this species. Therefore, seed will be collected prior to project impacts and used to propagate additional plants in a facility that has experience working with manzanita and specializes in the propagation of native plants, for introduction onto the Dean property. The Dean property will be restored, and permanently conserved and managed, which will benefit the translocated manzanita. The translocated manzanita population will be monitored for a minimum of 5 years to document success or failure of the translocation efforts. Since additional plants will be grown from seed and planted on the Dean Property, and because this property is in proximity to the impact area and supports habitat appropriate for the species, we believe the translocation / planting of manzanita on the Dean Property proposed as a part of this project has a high likelihood of success. In addition, seed collection and propagation for the Dean property will occur years in advance of project impacts, in approximately 2015, such that individuals grown from seed can be planted on the Dean property prior to the proposed salvage of individuals in the project impact area.

As stated in the status section above, at the time of listing, 9,400 to 10,300 manzanita individuals were known from 25 populations (Service 1996). Due to the discovery of a number of new occurrences, a total of 50 populations are now known, though we have no current estimates on population sizes (Service 2010b). The project will avoid most plants mapped within the BSA. The six individuals that will be impacted by the project represent only 0.06 percent of the total number of individuals known at listing and should represent an even smaller percentage of the number of individuals within the 50 occurrences now known rangewide. The habitat that will be impacted is degraded habitat within the brow ditch of the existing I-5. The translocated plants will be moved to the Dean property, which will be restored, conserved, and managed in perpetuity. Thus, we do not expect the habitat loss and destruction of plants associated with the project to appreciably reduce the number of individuals, reproduction, or distribution of manzanita in the action area or across its range.

Habitat Restoration

Temporarily impacted southern maritime chaparral will be restored in association with the project. Following the restoration of temporarily impacted areas, manzanita may recruit into the restored habitat areas from adjacent occupied habitat. In addition, 1.5 acres of chaparral habitat

will be preserved and enhanced, and 14.73 acres of mixed chaparral / coastal sage scrub habitat will be created on the Dean property, and manzanita plants will be salvaged and translocated onto the Dean property. Individuals started from seed will also be planted on the Dean Property. Although the Dean property does not currently support manzanita, the translocation and plantings from seed are anticipated to successfully establish manzanita plants on the Dean Property because the property is located in proximity to the occupied habitat, suitable habitat is currently present on 1.5 acres of the property, and planting will be conducted by experienced biologists who are familiar with the species. While some of the translocated and planted individuals may not survive the transplanting process, we do not anticipate any negative impacts to manzanita individuals from restoration activities. Restoration work will be overseen by an experienced biologist who will ensure that maintenance activities (e.g., treating weed re-sprouts with herbicide) do not negatively affect manzanita. Therefore, effects to manzanita associated with habitat restoration are anticipated to be insignificant.

Indirect Effects

Operational lighting installed for the project could increase light spill into the adjacent habitat, including habitats which could support manzanita. Light can affect a broad range of plant physiological responses, including seed germination, seedling development, induction of flowering, and rapid, membrane-based activities (Hopkins 1995). Therefore, there is potential for light pollution resulting from the project to have a negative impact on manzanita plants. Measures have been incorporated into the project to reduce light spill into the adjacent habitat. Permanent safety lighting installed for the project will be the lowest illumination necessary for safety and will be directed toward the facility and away from sensitive habitats. This is anticipated to minimize the impact of lighting on manzanita in the adjacent habitat to the point where such effects are insignificant.

The project could also increase the cover and number of invasive nonnative plant species in habitats adjacent to the project area. Nonnative species can change plant community structure and can alter ecosystem processes, such as hydrology, fire intensity and frequency, soil process (deposition and erosion), nutrient cycling, and light availability (Cal-IPC 2006). Nonnatives constitute one of the primary threats to the manzanita (Service 1996). The project has incorporated measures to prevent the spread of nonnative species. A CFWO approved biologist will monitor the project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid their inadvertent spread in association with the project. Invasive plants will not be used in project landscaping. These measures are anticipated to minimize the impact of invasive species introduction resulting from project implementation on manzanita habitat to the point where such effects are insignificant.

Additional indirect effects include an increase in wildfire and human encroachment from construction personnel and community enhancements such as improved trails and trailheads. Measures have been incorporated, such as construction fencing, trail fencing, and signage to avoid and minimize these impacts to manzanita. The I-5 is an existing facility in a highly

populated area, so with the proposed conservation measures, any increase in habitat degradation associated with these factors is expected to be insignificant.

Effect on Recovery

There is no recovery plan for manzanita, but the project is consistent with the general recovery goals of maintaining remaining populations and conserving/restoring the habitat that supports them. As described above, the project will result in impacts to manzanita and its habitat. However, the impacts are small relative to the amount of individuals in the project area and rangewide. In addition, all of the manzanita plants within the area of direct impact for the project are anticipated to be translocated to adjacent suitable habitat. Substantial areas of occupied habitat will remain adjacent to the impact area, and restoration of temporary impact areas will be initiated immediately following construction.

Caltrans will offset the permanent direct loss of approximately six manzanita plants and 2.87 acres of southern maritime chaparral through the restoration, preservation, and management of 16.23 acres of mixed coastal sage scrub / southern maritime chaparral habitat at the Dean property into which manzanita will be introduced. Thus, over the long-term, the project is expected to contribute to the conservation and recovery of the species by maintaining the existing manzanita population adjacent to the project site and establishing a new manzanita population on the Dean property.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any future non-Federal actions that are reasonably certain to occur within the action area and may affect gnatcatchers, rails, gobies, manzanita, and critical habitat for the gnatcatcher and goby.

CONCLUSION

After reviewing the current status of the gnatcatcher, rail, goby, manzanita; designated critical habitat for the gnatcatcher; proposed critical habitat for the goby; the environmental baseline for the action area; effects of the proposed action; and the cumulative effects, it is our biological and conference opinion that the proposed action is not likely to jeopardize the continued existence of these species and is not likely to result in the destruction or adverse modification of designated critical habitat for the gnatcatcher or proposed critical habitat for the goby. We reached this conclusion by considering the following:

All Species

- Adverse effects to all federally listed species and associated designated and proposed critical habitat will be reduced by implementation of the avoidance and minimization measures identified in the "Project Description" of this biological opinion.

- The restoration of all temporary impact areas and more than 86 acres of cut and fill slopes within permanent impact areas with native species will help minimize and offset project impacts by restoring habitat for listed species to breed, forage, shelter, and disperse.

- Wildlife connectivity measures proposed in association with the project will ensure that ecosystem functions are maintained for the benefit of listed species and associated designated and proposed critical habitat.

- With the proposed conservation measures, project-related impacts to federally listed species will be fully offset, and we consider the project and associated conservation and restoration to be consistent with the recovery goals of the species.

Coastal California Gnatcatcher and Critical Habitat

- The project will permanently impact only 61.95 acres of sage scrub communities, out of many thousands of acres of coastal sage scrub gnatcatcher habitat rangewide.

- The project will temporarily impact only 14.63 acres of sage scrub communities, and these scrub communities will be restored, and within 4 to 5 years will again be suitable habitat for gnatcatcher breeding and foraging.

- Permanent and temporary project-related habitat loss and degradation will impact up to 15 gnatcatcher pairs, which represent less than 1 percent of the roughly 2,562 pairs rangewide.

- Impacts to occupied gnatcatcher habitat will be offset by creating, / restoring, and conserving 89.23 acres of sage scrub communities at the Deer Canyon, Dean, Laser, San Elijo Uplands, La Costa, and Hallmark properties.

- Impacts to gnatcatcher critical habitat within Unit 3 represent only a tiny fraction of the overall designation, and conservation of 22.9 acres of gnatcatcher critical habitat on the Laser and La Costa properties will benefit Unit 3. Further, restoration and conservation on the 30-acre San Elijo Uplands property will occur directly adjacent to, and is expected to improve the integrity and functioning of, Unit 3.

Light-footed Clapper Rail

- The project will permanently impact only 13.2 acres of coastal marsh habitats out of thousands of acres of coastal marsh rail habitat rangewide.

- The project will temporarily impact only 7.64 acres of coastal marsh habitats, these coastal marsh habitats will be restored, and within 8 to 10 years will again be suitable habitat for rail breeding and foraging.

- Permanent and temporary project-related habitat loss and degradation will impact up to four rail pairs, which represent less than 1 percent of the roughly 520 pairs rangewide.

- Impacts to occupied rail habitat will be offset by creating / restoring, and conserving 17.6 acres of coastal marsh habitats at the San Dieguito W19 and Hallmark properties.

- Lengthening of I-5 bridges at San Elijo, Batiquitos, and Buena Vista lagoons will improve tidal and fluvial flows, enhance associated wetland values, and facilitate large-scale lagoon restoration which will benefit the rail.

- Establishment of an endowment for long-term maintenance of Batiquitos and Los Peñasquitos lagoons, including lagoon inlet maintenance and dredging, will help to address sedimentation within these lagoons which will benefit the rail.

- Large-scale salt water lagoon restoration will promote the ecological health and hydrological connectivity of the restored lagoon and restore tidally-influenced habitats which will benefit the rail.

Tidewater Goby and Critical Habitat

- The project will permanently impact only 0.01 acre of open water goby habitat from construction of bridge pilings and 0.3 acre of open water goby habitat from bridge shading within the San Luis Rey River, out of the thousands of acres of goby habitat rangewide.

- The project will temporarily impact only 0.2 acre of open water habitat within the San Luis Rey River, and this area will be restored following construction and again be suitable habitat for goby breeding and foraging.

- Gobies in the direct impact area for the project will be translocated away from the construction footprint. Thus, gobies are expected to remain in the San Luis Rey River during and following project construction, and no appreciable reduction in the number of animals or distribution of the species is expected.

- Impacts to water quality will be addressed through implementation of BMPs to control erosion and sedimentation and to capture debris and contaminants from bridge construction.

- Impacts to goby critical habitat within Unit SAN-1 represent only a tiny fraction of the overall proposed critical habitat, and the project will not affect the function of critical habitat Unit SAN-1 to support a goby population or to provide connectivity between tidewater goby

source populations, and support gene flow and metapopulation dynamics of the genetically unique South Coast Recovery Unit.

Del Mar Manzanita

- The project will permanently impact only 2.87 acres of southern maritime chaparral manzanita habitat, and will temporarily impact 1.84 acres of southern maritime chaparral, out of thousands of acres of southern maritime chaparral habitat rangewide.

- Permanent and temporary project-related habitat loss will impact approximately 6 manzanita plants, which represents only 0.06 percent of the roughly 9,400 to 10,300 plants known at listing from within 25 populations, and should represent an even smaller percentage of the number of individuals within the 50 populations now known rangewide.

- Manzanita within the direct impact area for the project will be salvaged and translocated to the Dean property, which will be preserved and managed in perpetuity. In addition, seed will be collected prior to project impacts and used to propagate additional plants that will be planted on the Dean property.

- Impacts to southern maritime chaparral manzanita habitat will be offset by restoration, preservation, and management of 16.23 acres of mixed coastal sage scrub / southern maritime chaparral habitat at the Dean property into which manzanita will be introduced.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by FHWA and/or Caltrans for the exemption in section 7(o)(2) to apply. FHWA has the continuing duty to regulate the activity that is covered by this incidental take statement. If the FHWA fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure

compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

To monitor the impact of the incidental take, the FHWA or Caltrans must report the progress of the action and its impact on the species to the CFWO as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Coastal California Gnatcatcher

We anticipate that up to 15 gnatcatcher pairs, 6 pairs in phase 1, 8 pairs in phase 2, and 1 pair in phase 3, will be taken as a result of construction of the proposed project. However, if bridge construction is moved forward in project phasing to avoid impacts to coastal wetlands, the take of four pairs at Batiquitos Lagoon will occur in phase 1 for a total of 10 pairs in phase 1.

Incidental take is expected to be in the form of harm as defined in 50 CFR § 17.3, due to the direct loss of a portion of the sage scrub habitats occupied by these gnatcatchers. The take exemption will be exceeded if more than:

- six pairs of gnatcatchers are documented within the phase 1 project footprint prior to construction in phase 1 (unless bridge construction is moved forward in project phasing to avoid impacts to coastal wetlands in which case take of 4 pairs of gnatcatchers would be advanced from phase 2 to phase 1); or
- eight pairs of gnatcatchers are documented within the phase 2 project footprint prior to construction in phase 2; or
- one pair of gnatcatchers is documented within the phase 3 project footprint prior to construction in phase 3; or
- 61.95 acres of gnatcatcher-occupied scrub vegetation are permanently removed and 14.63 acres of gnatcatcher-occupied scrub vegetation are temporarily removed as a result of project implementation or if such removal is not consistent with Table 1 and Table 2.

Light-footed Clapper-Rail

We anticipate that up to four rail pairs, one pair in phase 1, two pairs in phase 2, and one pair in phase 3 will be taken as a result of construction of the proposed project. However, if bridge construction is moved forward in project phasing to avoid impacts to coastal wetlands, the take of all four pairs will occur in phase 1.

Incidental take is expected to be in the form of harm as defined in 50 CFR § 17.3, due to the direct loss of a portion of the coastal marsh habitats occupied by these rails.

The take exemption will be exceeded if more than:

- one pair of rails is documented within the phase 1 project footprint prior to construction in phase 1 (unless bridge construction is moved forward in project phasing to avoid impacts to coastal wetlands in which case take of all four pairs of rails will occur in phase 1); or
- two pairs are documented within the phase 2 project footprint prior to construction in phase 2; or
- one pair of rails is documented within the phase 3 project footprint prior to construction in phase 3; or
- 13.2 acres of rail-occupied coastal marsh vegetation are permanently removed and 7.64 acres of rail-occupied coastal marsh vegetation are temporarily removed as a result of project implementation or if such removal is not consistent with Table 1 and Table 2.

Tidewater Goby

The exact distribution and population size of gobies within the project impact area is difficult to determine due to the dynamic conditions associated with their biology. Because the goby is a short-lived species that is subject to variability in local abundance and seasonal changes in distribution and abundance, it is difficult to precisely quantify the amount of take that will occur during project work in the San Luis Rey River in phase 3 of the project. Nevertheless, based on the best available scientific information, we have established the following take exemptions for the goby:

- Capture and relocation of all gobies within the project impact area in the San Luis Rey River during construction of the I-5 North Coast Corridor project;
- Accidental death of no more than 1 percent of the gobies captured, not to exceed 5 goby deaths for the entire I-5 North Coast Corridor project.

Take in the form of harm is authorized as follows:

- The permanent removal of 500 square feet of open water goby habitat from construction of bridge pilings and permanent shading of 0.3 acre of open water goby habitat; and
- Temporary impacts to 0.2 acre of open water goby habitat.

EFFECT OF TAKE

In the accompanying biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the gnatcatcher, rail, or goby.

REASONABLE AND PRUDENT MEASURES

Caltrans will implement significant conservation measures as part of the proposed action to minimize the incidental take of gnatcatchers, rails, and gobies. In addition to these conservation

measures, the following reasonable and prudent measures are necessary to monitor and report the effects of the incidental take on gnatcatchers, rails, and gobies:

1. FHWA and/or Caltrans will monitor and report on compliance with the established take exemptions for gnatcatchers associated with the proposed action.

2. FHWA and/or Caltrans will monitor and report on compliance with the established take exemptions for rails associated with the proposed action.

3. FHWA and/or Caltrans will monitor and report on compliance with the established take exemptions for gobies associated with the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act FHWA and/or Caltrans must comply with the following terms and conditions which implement the reasonable and prudent measures described above.

Coastal California Gnatcatcher

1.1 Prior to initiating each phase of the proposed project, three preconstruction surveys will be conducted within all suitable gnatcatcher habitat within the footprint for that phase of the project, within 30 days prior to initiation of vegetation removal activities, to verify that no more than 6 gnatcatcher pairs in phase 1, 8 gnatcatcher pairs in phase 2, and 1 gnatcatcher pair in phase 3 (unless bridge construction is moved forward in project phasing to avoid impacts to coastal wetlands in which case take of 4 pairs of gnatcatchers would be advanced from phase 2 to phase 1), with 15 pairs in total, will be taken as a result of the project. Prior to initiating each phase of the project, FHWA and/or Caltrans will provide to the CFWO a map showing the distribution of gnatcatchers relative to the project footprint for that phase, an estimate of the number of gnatcatchers territories that will be impacted by the project in that phase, and the cumulative total of gnatcatcher territories impacted by the project to date, or confirm in writing that maps, distribution information, and the number of territories that will be impacted by the project as shown in the BA remain correct.

1.2 FHWA and/or Caltrans will notify the CFWO within 30 days of completing removal of gnatcatcher occupied habitat in each project phase. The purpose of this notification is to ensure that impacts to gnatcatcher-occupied habitat from the proposed project do not exceed the take exemptions.

Light-footed Clapper Rail

2.1 Prior to initiating each phase of the proposed project, three preconstruction surveys will be conducted within all suitable rail habitat within the footprint for that phase of the project, within 30 days prior to initiation of vegetation removal activities, to verify that no more

than one pair in phase 1, two pairs in phase 2, and one pair in phase 3 (unless bridge construction is moved forward in project phasing to avoid impacts to coastal wetlands in which case take of all four pairs of rails would occur in phase 1), with four pairs in total, will be taken as a result of the project. Prior to initiating each phase of the project, FHWA and/or Caltrans will provide to the CFWO a map showing the distribution of rails relative to the project footprint for that phase, an estimate of the number of rail territories that will be impacted by the project in that phase, and the cumulative total of rail territories impacted by the project to date, or confirm in writing that maps, distribution information, and the number of territories that will be impacted by the project as shown in the BA remain correct.

2.2 FHWA and/or Caltrans will notify the CFWO within 30 days of completing removal of rail occupied habitat in each project phase. The purpose of this notification is to ensure that impacts to rail-occupied habitat from the proposed project do not exceed the take thresholds.

Tidewater Goby

3.1 Within 30 calendar days of the completion of project activities within goby habitat, FHWA and/or Caltrans will provide the CFWO with a report documenting the area of goby habitat impacted, the number of dead or injured gobies observed in the action area, and the number of gobies captured and released. The report will include information on the general condition of all gobies that were killed, injured, and captured/released. It will also include an assessment of how or why gobies may have been injured or killed and information on where gobies were captured and released. Caltrans will report incidences of take (observed death or injury or capture and relocation of gobies) to the CFWO within 3 days. All field notes and other documentation generated by the biological monitor will be made available to the CFWO upon request. The purpose of this notification is to ensure that impacts to goby-occupied habitat from the proposed project do not exceed the take thresholds.

DISPOSITION OF SICK, INJURED, OR DEAD SPECIMENS

Upon locating dead, injured, or sick individuals of threatened or endangered species, initial notification must be made to our Division of Law Enforcement in either San Diego, California, at 619-557-5063 or in Torrance, California, at 310-328-6307 within 3 working days. Notification should also be sent by telephone and writing to this office in Carlsbad, California, at 6010 Hidden Valley Road, Suite 101, Carlsbad, California 92011, 760-431-9440. Written notification must be made within 5 calendar days and include the collection date and time, the location of the animal, and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. The remains of intact specimens shall be placed with educational or research institutions holding the appropriate State and Federal permits. Remains shall be placed with the San Diego Natural History Museum, San Diego.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution by the authorized biologist prior to implementation of the action.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. There is an option under consideration to reduce the wetland impacts of the project by advancing the replacement of the Batiquitos Lagoon and Buena Vista Lagoon bridges in the phasing plan so that bridge replacement would occur prior to construction of an HOV lane in the median instead of in later project phases. This would reduce the area of permanent impact for each bridge, as well as associated wetland impacts within these lagoons, as the bridge width necessary to accommodate construction-period traffic would be reduced. We request that the project funding necessary to avoid and minimize impacts to sensitive coastal wetlands be obtained and approved to advance the replacement of these lagoon bridges.

2. Most of the lagoon bridges and the San Luis Rey River bridge currently include a gap between north- and southbound lanes which will be closed by the proposed project. This will result in a darker and more confined space within the wildlife movement pathways under these bridges. We recommend that the costs (e.g., noise, run-off, artificial light spill) and benefits (e.g., infiltration of natural light, increase in perceived openness) of adding skylights to freeway medians at the lagoon bridges and San Luis Rey River bridge be examined, and that skylights be incorporated where benefits are determined to outweigh costs.

REINITIATION NOTICE

This concludes formal consultation regarding the I-5 North Coast Corridor Project as outlined in materials submitted to us. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; and (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

With regard to (3) above, if the large-scale salt water lagoon restoration project at San Elijo Lagoon and/or Buena Vista Lagoon described in Conservation Measure 40 is not carried forth as analyzed in this biological opinion (i.e., it is not feasible to carry out the salt water lagoon

restoration alternative to restore tidally-influenced habitats for the benefit of listed species), reinitiation of formal consultation will be warranted.

This document does not authorize take under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. §§ 703-712). In order to comply with the MBTA, Caltrans will avoid take of active nests by removing vegetation outside of the bird breeding season and by installing exclusion devices on bridge drain holes and ledges between September 16 and February 14 to prevent swallows, swifts, and any other birds from nesting on or within bridges that will be demolished.

If you have any questions regarding this biological opinion, please contact Sally Brown of this office at 760-431-9440, extension 278.

Sincerely,

Karen A. Goebel

For Jim A. Bartel
Field Supervisor

LITERATURE CITED

Atwood, J. L. 1992. A maximum estimate of the California gnatcatcher's population size in the United States. Western Birds 23:1–9.

Bossard, C., J. Randall, and M. Hoshovsky (eds). 2000. Invasive plants of California's wildlands. University of California Press. Berkeley, California. 360 pp.

Bowman, R. H. 1973. Soil survey of San Diego Area, California. USDA. Soil Conserv. Serv., Washington, DC. 104 pp. + Appendices.

Cal-IPC (California Invasive Plant Council). 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, CA. Available: www.cal-ipc.org.

Caltrans. 2003a. 45-Day Report for Permit Number TE003269-5 for Caltrans' Interstate 5 / Batiquitos Lagoon (San Diego Co., Calif.) – POSITIVE FINDINGS. 2+pp.

Caltrans. 2003b. 45-Day Report for the coastal California gnatcatcher (*Polioptila californica californica*) for I-5 Widening Project from Del Mar Heights Road to Oceanside, California. 7+pp.

Caltrans. 2004. 45-Day Report for Permit Number TE003269-5 for Caltrans' Interstate 5 / Batiquitos Lagoon (San Diego Co., Calif.) – SUPPLEMENTAL INFORMATION. 2pp.

Caltrans. 2005. 45-Day Report for the coastal California gnatcatcher (*Polioptila californica californica*) for I-5 Widening Project from Del Mar Heights Road to Oceanside, California. 5+pp.

Caltrans. 2008a. 45-Day Report for the coastal California gnatcatcher (*Polioptila californica californica*) for I-5 North Coast Corridor Project at San Dieguito Lagoon, San Diego, California. 4+pp.

Caltrans. 2008b. 45-Day Report for the coastal California gnatcatcher (*Polioptila californica californica*) for I-5 North Coast Project from Lomas Santa Fe to Birmingham Ave., Encinitas, California. 6pp.

Caltrans. 2009. 45-Day Report for the coastal California gnatcatcher (*Polioptila californica californica*) for I-5 North Coast Corridor Project at Dean Mitigation Parcel near San Dieguito Lagoon, San Diego, California. 3+pp.

Caltrans. 2010. Interstate 5 North Coast Corridor Project Draft Environmental Impact Report/ Environmental Impact Statement.

Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.

Caltrans. 2012b. Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement.

[CDFG] California Department of Fish and Game. 2007. Natural Community Conservation Planning (NCCP) [Internet]. Available from: http://www.dfg.ca.gov/nccp/.

[CNDDB] California Natural Diversity Database. 2011. California Department of Fish and Game Biogeographic Data Branch. Information Center for the Environment, Department of Environmental Science and Policy, University of California, Davis.

Dooling, R. J. and A. N. Popper. 2007. The effects of highway noise on birds. Prepared by Environmental BioAcoustics LLC for the California Department of Transportation, Sacramento, California. 74 pp.

Dudek. 2012. Final North Coast Corridor PWP/TREP Resource Enhancement Program Revised October 2012. 34+pp

Everest International Consultants, Inc. 2012. I-5 / SR-78 Interchange Preliminary Engineering I-5 Bridge Study at Buena Vista Lagoon Fluvial Hydraulics and Residence Time Analysis Draft Report. January 2012.

Forman, R. T. T. and R. D. Deblinger. 2000. The ecological road-effect zone for transportation planning and Massachusetts (USA) suburban highway. Conservation Biology 14:36-46.

Forman, R. T. T., D. S. Friedman, D. Fitzhenry, J. D. Martin, A. S. Chen, and L. E. Alexander. 1997. Ecological effects of roads: toward three summary indices and an overview for North America. *In* Canters, K., (ed.) Habitat Fragmentation and Infrastructure. Ministry of Transport, Public Works and Water Management, Delft, Netherlands. pp. 40-54.

Hopkins, William G. 1995. Introduction to Plant Physiology. 464 pp.

Konecny Biological Services. 2003. Results of a Year 2003 Focused Survey for the Light-Footed Clapper Rail at the Caltrans Interstate-5 Lane-Widening Project, San Diego County, California. 14pp.

Konecny Biological Services. 2005. Results of a Focused Field Survey for the Light-Footed Clapper Rail at the Caltrans Interstate-5 Lane Expansion Project at Los Peñasquitos Lagoon, San Diego County, California, 2005. 6pp.

Konecny Biological Services. 2007. Results of a Focused Field Survey for the Light-Footed Clapper Rail at the Caltrans State Route 56 Site at Interstate 5, San Diego County, California, 2007. 8pp.

Lafferty, K. 2010. Camp Pendleton Tidewater Goby Monitoring Project Report. 5+pp.

Longcore, T. and C. Rich. 2004. Ecological light pollution. Front Ecological Environment 2:191-198.

Merkel & Associates, Inc. 2012. I-5 Coastal Lagoons Tidewater Goby (*Eucyclogobius newberryi*) Comprehensive Suitability and Survey. 12pp.

Miner, K., A. Wolf, and R. Hirsch. 1998. Use of restored coastal sage scrub habitat by California gnatcatchers in a park setting. Western Birds 29:439-446.

Moffatt & Nichol. 2012a. Batiquitos Lagoon Bridge Optimization Study Draft Report. February 2012. 55pp.

Moffatt & Nichol. 2012b. San Elijo Lagoon Bridge Optimization Study Draft Report. February 2012. 89pp.

O'Connell, M. and R. Erickson. 1998. An example of the California gnatcatcher nesting in restored coastal sage scrub. Western Birds 29:434-438.

Pimm, S. L. and M. E. Gilpin. 1989. Theoretical issues in conservation biology. In: Roughgarden, J., R. May, and S. A. Levin (eds.). Perspectives in Ecological Theory. Princeton University Press, Princeton, New Jersey. pp. 287-305.

Preston, K., P. Mock, M. Grishaver, E. Bailey, and D. King. 1998. California gnatcatcher territorial behavior. Western Birds 29:242-257.

Scott, J. M. and D. S. Wilcove. 1998. Improving the future for endangered species. Bioscience. 48:579-80.

[Service] U.S. Fish and Wildlife Service. 1985. Recovery plan for the light-footed clapper rail. U.S. Fish and Wildlife Service, Portland, Oregon. 121pp.

[Service] U.S. Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; Determination of threatened status for the coastal California gnatcatcher; Final Rule. Federal Register 58:16742-16757.

[Service] U.S. Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; determination of endangered or threatened status for four southern maritime plant taxa from coastal southern California and northwestern Baja California, Mexico. Federal Register 61:52370-52384.

[Service] U.S. Fish and Wildlife Service. 2005. Recovery Plan for the Tidewater Goby (Eucyclogobius newberryi). U.S. Fish and Wildlife Service, Portland, Oregon. vi + 199 pp.

[Service] U.S. Fish and Wildlife Service. 2007a. Tidewater Goby (Eucyclogobius newberryi) 5-Year Review: Summary and Evaluation. Prepared by the Ventura Fish and Wildlife Office, Ventura, California. 50 pp.

[Service] U.S. Fish and Wildlife Service. 2007b. Endangered and threatened wildlife and plants; revised designation of critical habitat for the coastal California gnatcatcher (*Polioptila californica californica*); final rule. Federal Register 72:72010-72213.

[Service] U.S. Fish and Wildlife Service. 2009. Light-footed clapper rail (Rallus longirostris levipes) 5-Year Review: Summary and Evaluation. Prepared by the Carlsbad Fish and Wildlife Office, Carlsbad, California. 25 pp.

[Service] U.S. Fish and Wildlife Service. 2010a. Coastal California gnatcatcher (*Polioptila californica californica*) 5-year review: Summary and evaluation. Prepared by the Carlsbad Fish and Wildlife Office, Carlsbad, California. 51 pp.

[Service] U.S. Fish and Wildlife Service. 2010b. Arctostaphylos glandulosa subsp. crassifolia (Del Mar manzanita) 5-Year Review: Summary and Evaluation. Prepared by the Carlsbad Fish and Wildlife Office, Carlsbad, California. 43 pp.

[Service] U.S. Fish and Wildlife Service. 2011. Endangered and threatened wildlife and plants; designation of critical habitat for the Tidewater Goby; proposed rule. Federal Register 76:64996-65060.

Smith, Jerry. 29 January 2007. Associate Professor, Department of Biological Sciences, San Jose State University, San Jose, California. Peer review comments of critical habitat designation for tidewater goby. Submitted to the Ventura Fish and Wildlife Office, Ventura, California.

Struck, S. D., C. B. Craft, S. W. Broome, M. D. Sanclements, and J. N. Sacco. 2004. Effects of Bridge Shading on Estuarine Marsh Benthic Invertebrate Community Structure and Function. Environmental Management. Vol 34, No 1: 99-111.

Winchell, C. S. and P. F. Doherty. 2008. Using California gnatcatcher to test underlying models of habitat conservation plans. Journal of Wildlife Management 72:1322–1327.

Zembal, R. 2003/2011. Unpublished data on light-footed clapper rail locations.

Zembal, R. 1994. The light-footed clapper rail (*Rallus longirostris levipes*). U.S. Fish and Wildlife Service Publication.

Zembal, R., and S.M. Hoffman. 2012. Status and distribution of the Light-footed Clapper Rail in California, 2012 Season. CA Department of Fish and Game, Nongame Wildlife Program Report, 2012-12. Sacramento, CA. 20 pp.

Zembal, R. and B.W. Massey. 1986. Light-footed clapper rail census and study, 1986. Report to California Department of Fish and Game, Sacramento, California.

Zembal, R., B.W. Massey, and J.M. Fancher. 1989. Movements and activity patterns of the light-footed clapper rail. J. Wildl. Manage. 53:39-42.

ENCLOSURE

Section 7 Consultation
Interstate 5 North Coast Corridor Project
San Diego County, California
FWS-SDG-08B0100-12F0547

The following information supports the U.S. Fish and Wildlife Service's (Service) concurrence with the Federal Highway Administration's (FHWA) not likely to adversely affect determination for the federally endangered least Bell's vireo (*Vireo bellii pusillus*, vireo), southwestern willow flycatcher (*Empidonax traillii extimus;* flycatcher), California least tern [*Sternula* (= *Sterna*) *antillarum browni*, tern], federally threatened western snowy plover [*Charadrius nivosus* (= *alexandrinus*) *nivosus*, plover], designated critical habitat for the vireo and flycatcher, and proposed critical habitat for the flycatcher, in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), for the I-5 North Coast Corridor Project, San Diego County, California.

Vireo and its Designated Critical Habitat

Protocol surveys were conducted for vireo in 2003 and 2004 for the project with negative results [California Department of Transportation (Caltrans) 2003a, Caltrans 2004]. Vireos were incidentally observed in 2003 during gnatcatcher surveys in Lawrence Canyon and near Brooks Street, in Oceanside (Caltrans 2003b). In Lawrence Canyon, a juvenile vireo was detected approximately 738 feet from the project impact footprint. At this location, the occupied habitat is separated from the project area by a sizeable slope which creates a topographical barrier. Near Brooks Street, a male vireo was observed at a distance of approximately 426 feet from the project impact footprint. Three vireos were also incidentally observed during gnatcatcher surveys in 2001 and 2009 in habitat immediately north of the Dean offset parcel and approximately 675 feet east of the project impact footprint (Caltrans 2002, Caltrans 2009).

Although no breeding vireo were observed in the project impact footprint during surveys, the project will directly and indirectly impact potential breeding habitat along Moonlight Creek, in Encinitas, and at the San Luis Rey River, in Oceanside. Caltrans will conduct protocol surveys for the vireo within 1 year prior to the commencement of vegetation clearing and construction activities for the project in or within 500 feet of suitable habitat for the species. FHWA/Caltrans will reinitiate consultation with the Carlsbad Fish and Wildlife Office (CFWO) if vireos are observed in the project impact footprint. Project construction may also indirectly impact vireo in the adjacent habitat at Lawrence Canyon and near Brooks Street (e.g., effects associated with invasive species, noise, light, human encroachment, material disposal, and contaminant run-off). If vireos are observed within 500 feet of the project impact footprint, conservation measure 46 will be implemented to avoid and minimize impacts to this species.

In 1994, the Service designated areas at 10 locations, encompassing approximately 38,000 acres, in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties, California, as critical habitat for the vireo (Service 1994). In the action area, critical habitat is designated along the San Luis Rey River. The San Luis Rey area of designated critical habitat for the vireo includes approximately 6,000 acres of critical habitat along the San Luis Rey River between I-5 and Pala Road. This unit encompasses high quality habitat within the San Luis Rey River, which supports the third-largest population of vireos (233 territories, Service 2006) rangewide.

Primary Constituent Elements (PCEs) for the vireo are those habitat components that are essential for the primary biological needs of feeding, nesting, roosting and sheltering. These PCEs can be described as riparian woodland vegetation that generally contains both canopy and shrub layers and includes some associated upland habitats. Vireos meet their survival and reproductive needs (food, cover, nest sites, nestling and fledgling protection) within the riparian zone in most areas. In some areas they also forage in adjacent upland habitats, which may include sage scrub and grassland communities (Service 1994).

The project will permanently impact approximately 0.03 acre of designated critical habitat for the vireo with PCEs and an additional 3.5 acres of designated critical habitat lacking PCEs. The project will also temporarily impact approximately 0.2 acre of vireo critical habitat with PCEs and 3.9 acres lacking PCEs. Thus, though the area of critical habitat impacted is 7.63 acres, this represents only 0.02 percent of the total designation and most of the area impacted does not support PCEs. The areas lacking PCEs consists of developed / disturbed habitat, including a non-functional (blocked off) freeway loop ramp located south of the San Luis Rey River and east of I-5, and ornamental vegetation such as ice plant.

Only a very small amount of vireo critical habitat with PCEs will be permanently impacted by the project (0.03 acre). In addition, the minimal temporary impacts to 0.2 acre of vireo critical habitat critical habitat with PCEs will be restored following project construction. These minimal and largely temporary impacts will not affect the function of the San Luis Rey area of vireo critical habitat to support a core population of vireo and do not rise to a level of significance warranting further analysis through the formal consultation process.

Flycatcher and its Designated and Proposed Critical Habitat

A flycatcher was heard vocalizing in riparian habitat in the San Luis Rey River in June 2004 during general biological surveys for the project. Subsequent surveys did not detect the flycatcher again, and the one observed flycatcher is assumed to have been a migrant (Caltrans 2012). No other suitable habitat is present within the project study area.

Although no breeding flycatchers were observed in habitat in the project impact footprint during surveys, suitable breeding habitat is present at the San Luis Rey River. Caltrans will conduct protocol surveys for the flycatcher within 1 year prior to the commencement of vegetation clearing and construction activities for the project in or within 500 feet of suitable habitat for the

species. FHWA/Caltrans will reinitiate consultation if flycatchers are observed in the project impact footprint. Project construction may also indirectly impact flycatcher in the adjacent habitat at the San Luis Rey River (e.g., effects associated with invasive species, noise, light, human encroachment, material disposal, and contaminant run-off). If flycatchers are observed within 500 feet of the project impact footprint, conservation measure 46 will be implemented to avoid and minimize impacts to this species.

Critical habitat for the flycatcher was designated on October 19, 2005 (Service 2005). The critical habitat includes approximately 120,824 acres in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pinal, Pima, and Yavapai counties in Arizona; Kern, Santa Barbara, San Bernardino, and San Diego counties in southern California; Clark County in southeastern Nevada; Grant, Hidalgo, Mora, Rio Arriba, Socorro, Taos, and Valencia counties in New Mexico; and Washington County in southwestern Utah. Fifteen management units found in five recovery units were designated as critical habitat for the flycatcher. The five recovery units are: 1) Coastal California; 2) Basin and Mojave in California; 3) Lower Colorado River in Nevada, California/Arizona Border, Arizona, and Utah; 4) Gila in Arizona and New Mexico; and 5) Rio Grande in New Mexico.

The project is located within the San Diego Management Unit of the Coastal California Recovery Unit of southwestern willow flycatcher critical habitat. A total of 4,805 acres of critical habitat are designated within this management unit along the Santa Margarita River, San Luis Rey River, Pilgrim Creek, Agua Hedionda Creek, San Ysabel River, Temescal Creek, and Temecula Creek (Service 2005). This management unit encompasses a combination of large populations and other nearby stream segments with high quality habitat and smaller numbers of territories to provide for population connectivity, metapopulation stability, population growth, and protection against catastrophic loss.

PCEs for the flycatcher are those habitat components that are essential for the primary biological needs of feeding, nesting, roosting, and sheltering. Specifically, PCEs include riparian vegetation consisting of a variety of riparian trees and shrubs with dense riparian thickets, foliage, and canopy (PCE 1) and a variety of insect prey populations in or adjacent to riparian floodplains or moist environments (PCE 2) (Service 2005).

On August 15, 2011, revised critical habitat for the flycatcher was proposed (Service 2011). Revised proposed critical habitat for the flycatcher includes the riparian areas and streams that occur within the 100-year floodplain or flood-prone areas along approximately 2,090 stream miles in Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura Counties in California; Clark, Lincoln, and Nye Counties in southern Nevada; Kane, San Juan, and Washington Counties in southern Utah; Alamosa, Conejos, Costilla, La Plata, and Rio Grande Counties in southern Colorado; Apache, Cochise, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties in Arizona; and Catron, Cibola, Dona Ana, Grant, Hidalgo, McKinley, Mora, Rio Arriba, Santa Fe, San Juan, Sierra, Soccoro, Taos, and Valencia Counties in New Mexico.

Twenty-nine management units found in six recovery units are proposed as critical habitat for the flycatcher. The six recovery units are: 1) Coastal California; 2) Basin and Mojave; 3) Lower Colorado; 4) Upper Colorado; 5) Gila; and 6) Rio Grande. The project is located within the San Diego Management Unit of the Coastal California Recovery Unit of proposed flycatcher critical habitat. A total of 50.4 stream miles along 12 river segments are proposed within this management unit. This management unit provides habitat for metapopulation stability, gene connectivity through this portion of the flycatcher's range, protection against catastrophic population loss, and population growth and colonization potential.

The project will permanently impact approximately 0.03 acre of both the 2005 designated and 2011 proposed critical habitat for the flycatcher with PCEs, and an additional 0.19 acre of designated and proposed critical habitat lacking PCEs. Approximately 0.25 acre of designated and proposed flycatcher critical habitat with PCEs and 1.33 acres lacking PCEs will be temporarily impacted by the project. Thus, though the area of designated and proposed critical habitat impacted is 1.8 acres, most of the area impacted does not support PCEs. The area lacking PCEs consists of developed / disturbed habitat consisting of a non-functional (blocked off) freeway loop ramp located south of the San Luis Rey River and east of I-5, and ornamental vegetation such as ice plant.

Only a very small amount of flycatcher critical habitat will be permanently impacted by the project (0.03 acre). In addition, the minimal temporary impacts to 0.25 acre of flycatcher critical habitat will be restored following project construction. These minimal and largely temporary impacts will not affect the function of the designated or proposed critical habitat in maintaining a large population of flycatchers and providing population connectivity within the San Diego Management Unit of flycatcher critical habitat and do not rise to a level of significance warranting further analysis through the formal consultation process.

Tern and Plover

The tern and plover have been observed in and near the project impact area using foraging habitat in San Dieguito, San Elijo, Batiquitos, and Agua Hedionda lagoons. Terns were observed foraging within the project study area in San Elijo and Batiquitos lagoons in 2003, and plover foraging habitat may be affected by the project at Batiquitos and Agua Hedionda lagoons (Caltrans 2012). There are nesting areas for terns and plovers at San Dieguito, San Elijo, and Batiquitos lagoons. These nesting areas are outside of the direct impact footprint for the project, and the project is not anticipated to result in any direct impacts to suitable breeding habitat for the tern and plover. The nesting area east of I-5 and north of La Costa Avenue at Batiquitos Lagoon is used annually by terns and is located at a distance of approximately 250 feet from the closest point of proposed construction. There are small areas of designated critical habitat for plovers at San Dieguito, San Elijo, and Batiquitos lagoons; however, they too are outside of the direct impact footprint for the project.

Project construction may impact tern and plover foraging habitat in San Dieguito, San Elijo, Batiquitos, and Agua Hedionda lagoons. Terns forage in near shore ocean waters and in shallow

estuaries and lagoons (Massey 1987). The project will permanently impact 0.14 and 1.36 acres of open water foraging habitat at Batiquitos and Agua Hedionda lagoons, respectively, and will temporarily impact 0.21, 0.11, 1.04, 1.18, 0.06, and 0.09 acres of open water at San Dieguito, San Elijo, Batiquitos, Agua Hedionda, and Buena Vista lagoons and the San Luis Rey River, respectively.

Plovers forage in wet sand in the intertidal zone, dry sandy areas above high tide, salt pans, spoil sites, and the edges of salt marshes and salt ponds (Service 1993). The habitats that the project will affect that are most suitable for plover foraging are salt flat and mudflat habitats. The project will permanently impact 0.03 acre and temporarily impact 0.04 acre of salt flat foraging habitat at Batiquitos Lagoon. The project will also permanently impact 0.11 and 2.25 acres of mudflat foraging habitat at Batiquitos and Agua Hedionda lagoons, respectively, and temporarily impact 0.17 and 0.27 acre of mudflat, respectively, at these same lagoons. In addition, the project has the potential to result in indirect impacts to adjacent nesting habitat (e.g., effects associated with invasive species, landscaping, noise, light, human encroachment, material disposal, and contaminant run-off).

The following measures will be incorporated into the project to avoid and minimize impacts to the vireo, flycatcher, tern, plover, designated critical habitat for the vireo and flycatcher, and proposed critical habitat for the flycatcher. For ease of reference, the numbering below is a continuation of the numbering of the conservation measures in the associated biological opinion.

44. Protocol surveys for the vireo and flycatcher will be conducted within 1 year prior to the commencement of vegetation clearing and construction activities for the project in and adjacent to suitable habitat for the vireo and flycatcher.

45. If vireos and/or flycatchers are observed in the project impact footprint, FHWA/Caltrans will reinitiate consultation with the CFWO to address unanticipated impacts to these species.

46. If vireos and/or flycatchers are observed within 500 feet of the project impact footprint, the following measures will be implemented to avoid and minimize impacts to these species:

    Construction within 500 feet of habitat occupied by vireo and/or flycatcher will occur from September 1 to March 31 to avoid these species' breeding seasons. If project construction is necessary during these species' breeding seasons within 500 feet of habitat occupied by vireo and/or flycatcher, nesting surveys will be conducted to determine and document the presence/absence of breeding vireo and/or flycatcher. If active nests are identified within 500 feet of the noise generating construction activities and noise is in excess of 60 dBA hourly Leq or if noise is in excess of ambient noise levels if ambient noise levels exceed 60 dBA hourly Leq, noise attenuation structures will be installed at the noise source to reduce noise levels to 60 dBA hourly Leq or to ambient noise levels if ambient noise levels exceed 60 dBA hourly Leq at the nest location. Noise monitoring will occur during the breeding

season and be reported daily to the CFWO. A CFWO-approved biological monitor[10] will ensure that avoidance and minimization measures are implemented such that adverse effects to vireo and/or flycatcher do not occur as a result of the adjacent construction activities (e.g., noise and lighting). If the biological monitor suspects that avoidance and minimization measure are ineffective, and project activities may be adversely affecting these bird species, culpable activities will be suspended within 500 feet of active nesting territories until nesting activity is completed and fledglings are no longer in the area or until effective avoidance and minimization measures can be identified, implemented, and demonstrated to be effective. If measures cannot be identified, implemented and demonstrated to be effective to avoid adverse effects to the vireo and/or flycatcher, then project construction will stop until consultation has been completed with the CFWO to address unanticipated impacts to these species.

47. Permanent and temporary impacts to wetland and riparian habitats suitable for vireo, flycatcher, tern, and plover and impacts to critical habitat for the vireo and flycatcher (as summarized above) resulting from the I-5 North Coast Corridor Project will be offset through conservation and restoration as documented in the *Conservation Measures* section of the biological opinion, under the heading Conservation / Restoration / Management.

48. Measures included in the biological opinion to avoid and minimize project impacts to coastal California gnatcatcher (*Polioptila californica californica*, gnatcatcher), light-footed clapper rail (*Rallus longirostris levipes*, rail), tidewater goby (*Eucyclogobius newberryi*, goby), Del Mar manzanita (*Arctostaphylos glandulosa* subsp. *crassifolia*, manzanita), designated critical habitat for the gnatcatcher and goby, and other sensitive resources such as wetlands, aquatic resources, and rare plants (e.g., seasonal restrictions on vegetation clearing, temporary construction fencing, monitoring, restoration of temporary impact areas, preventing the spread of invasive species, restrictions on landscaping, construction noise, construction and operational lighting, human encroachment, material disposal, and best management practices) will also help avoid and minimize project impacts to the vireo, flycatcher, tern, plover, designated critical habitat for the vireo and flycatcher, and proposed critical habitat for the flycatcher.

With incorporation of these proposed conservation measures, potential impacts to vireo, flycatcher, tern, plover, designated critical habitat for the vireo and flycatcher, and proposed critical habitat for the flycatcher will be minimized to the point where such effects are insignificant. For the purposes of section 7 consultation, an insignificant effect is one that is sufficiently small that a person would not be able to meaningfully measure, detect, or evaluate it. Based on the site and species information and Caltrans' commitment to implement avoidance and minimization measures during the project, we concur with FHWA's determination that the project is not likely to adversely affect these listed species and critical habitats.

[10] The designated project biologist for conservation measure 46 will be a trained ornithologist with at least 40 hours in the field observing vireos and documented experience locating and monitoring vireo and flycatcher nests. In order to receive CFWO approval, the biologist's name, address, telephone number, and work schedule on the project must be submitted to the CFWO at least 5 working days prior to initiating project impacts.

LITERATURE CITED (ENCLOSURE)

Caltrans. 2002. Endangered Species Consultation Biological Assessment for the Interstate 5 Northbound Auxiliary Lane, Del Mar Heights Road to Via de la Valle. 29+pp.

Caltrans. 2003a. 45-Day Report for the least Bell's vireo (*Vireo belli pusillus*) for I-5 Widening Project from Del Mar Heights Road to Oceanside, California. 5+pp.

Caltrans. 2003b. 45-Day Report for the coastal California gnatcatcher (*Polioptila californica californica*) for I-5 Widening Project from Del Mar Heights Road to Oceanside, California. 7+pp.

Caltrans. 2004. 45-Day Report for the least Bell's vireo (*Vireo belli pusillus*) for I-5 Widening Project from Del Mar Heights Road to Oceanside, California. 5pp.

Caltrans. 2009. 45-Day Report for the coastal California gnatcatcher (*Polioptila californica californica*) for I-5 North Coast Corridor Project at Dean Mitigation Parcel near San Dieguito Lagoon, San Diego, California. 3+pp.

Caltrans. 2012. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.

Massey, R W. 1987. California least tern foraging study, Los Angeles Harbor, 1986/1987. Port of Los Angeles, Environmental Div.l Marine Ecological Consultants, Encinitas, CA

[Service] U.S. Fish and Wildlife Service. 1993. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Pacific Coast Population of the Western Snowy Plover; final rule. Federal Register 58:12864-12874.

[Service] U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; designation of critical habitat for the least Bell's vireo; final rule. Federal Register 59:4845-4867.

[Service] U.S. Fish and Wildlife Service. 2005. Endangered and threatened wildlife and plants; designation of critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*); final rule. Federal Register 70:60886-61009.

[Service] U.S. Fish and Wildlife Service. 2006. Least Bell's vireo (*Vireo bellii pusillus*) 5-year review: Summary and evaluation. Prepared by the Carlsbad Fish and Wildlife Office, Carlsbad, California. September 2006. 26 pp.

[Service] U.S. Fish and Wildlife Service. 2011. Endangered and threatened wildlife and plants; Designation of Revised Critical Habitat for Southwestern Willow Flycatcher; proposed rule. Federal Register 76:50542-50629.

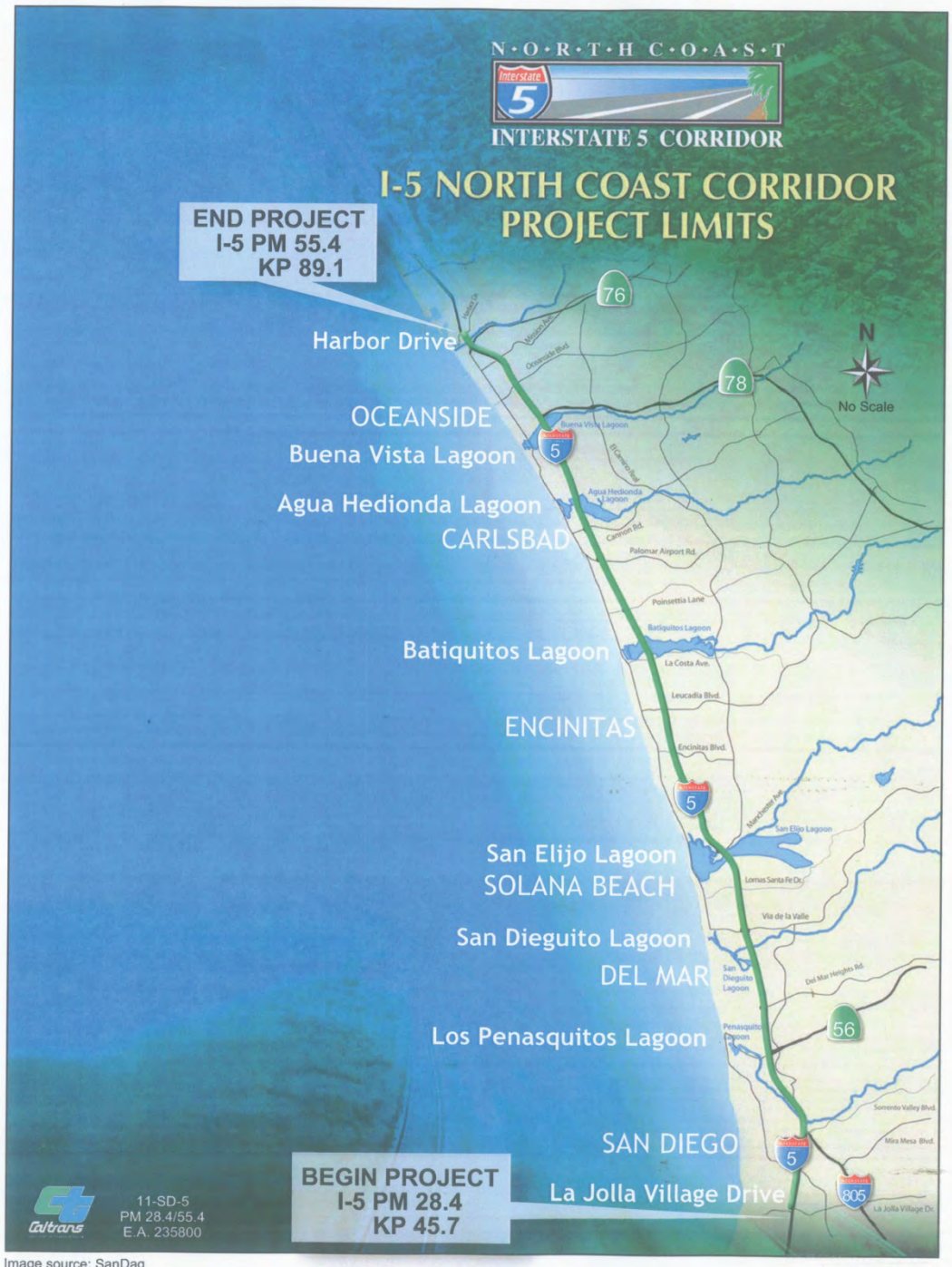


Image source: SanDag

FIGURE 1
PROJECT LOCATION MAP

(Source: Caltrans. 2012b. Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement)

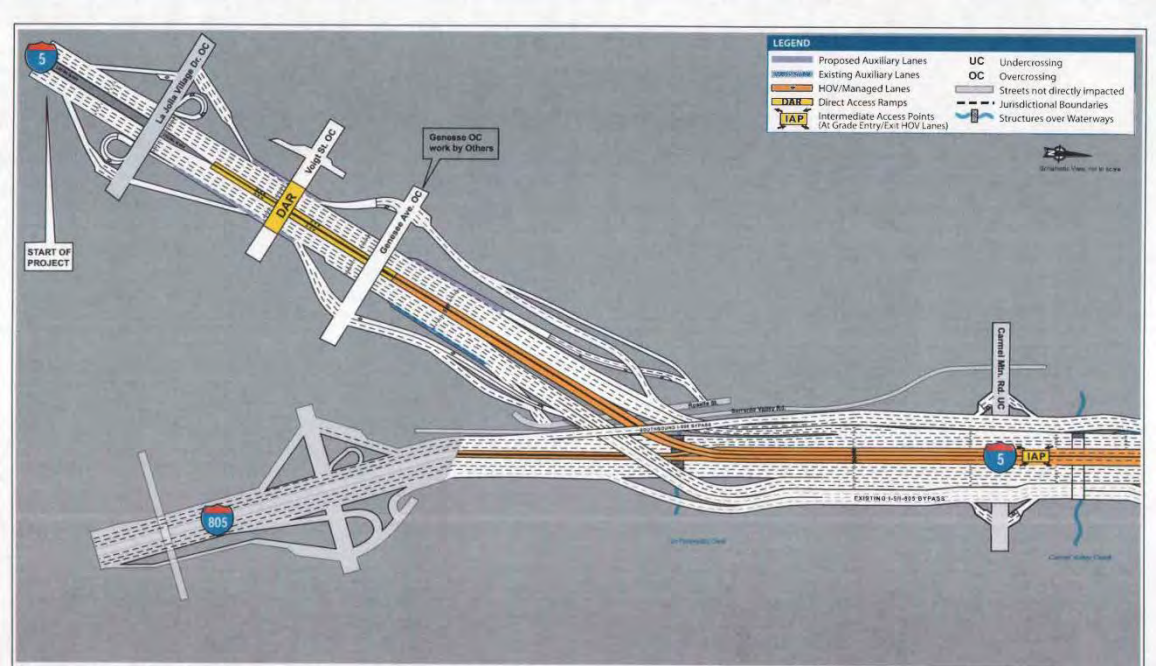


Figure 2. I-5 NCC Project Configuration (Source: Caltrans. 2012b. Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement)

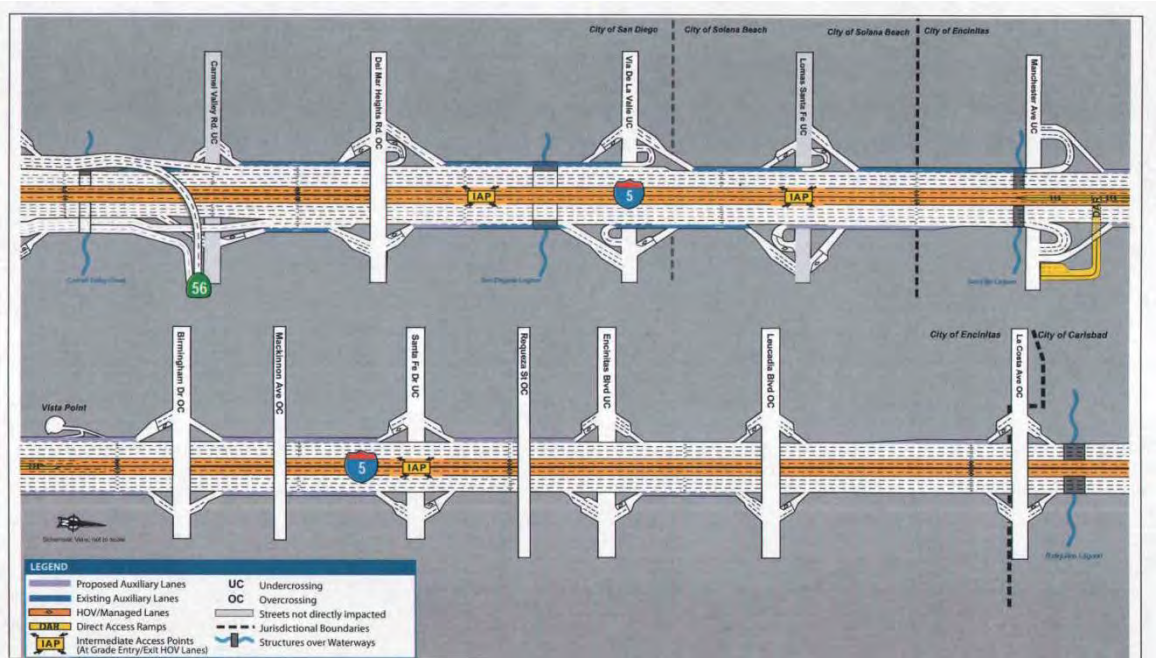


Figure 3. I-5 NCC Project Configuration (Source: Caltrans. 2012b. Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement)

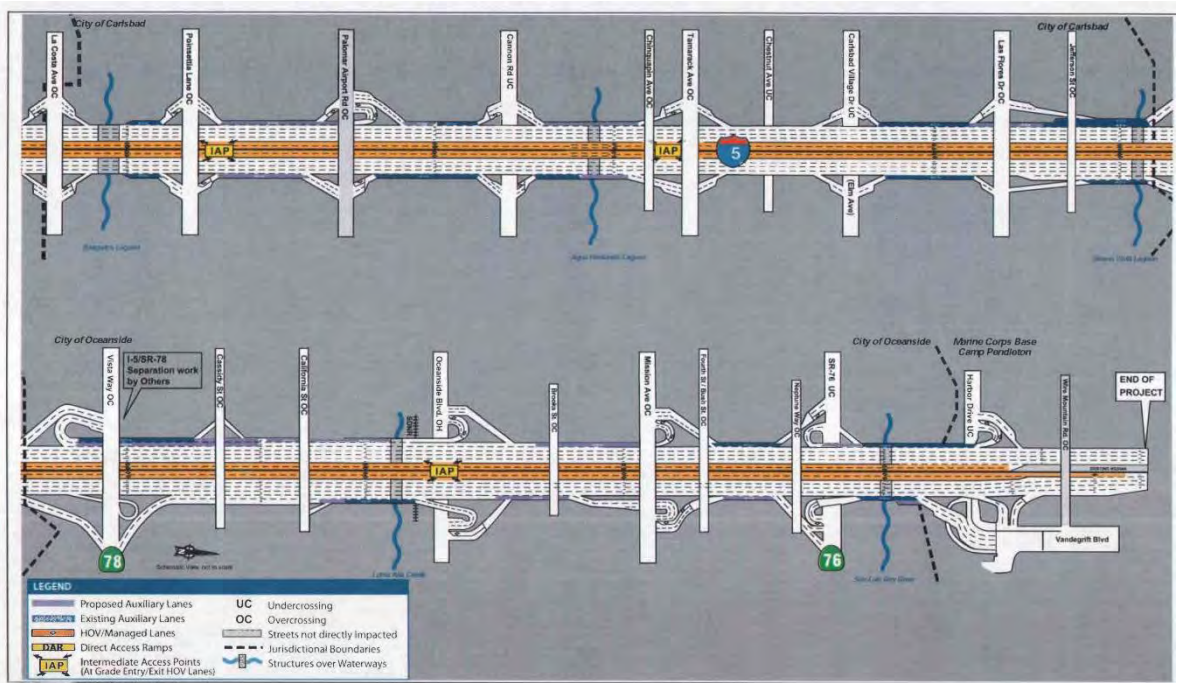


Figure 4. I-5 NCC Project Configuration (Source: Caltrans. 2012b. Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement)

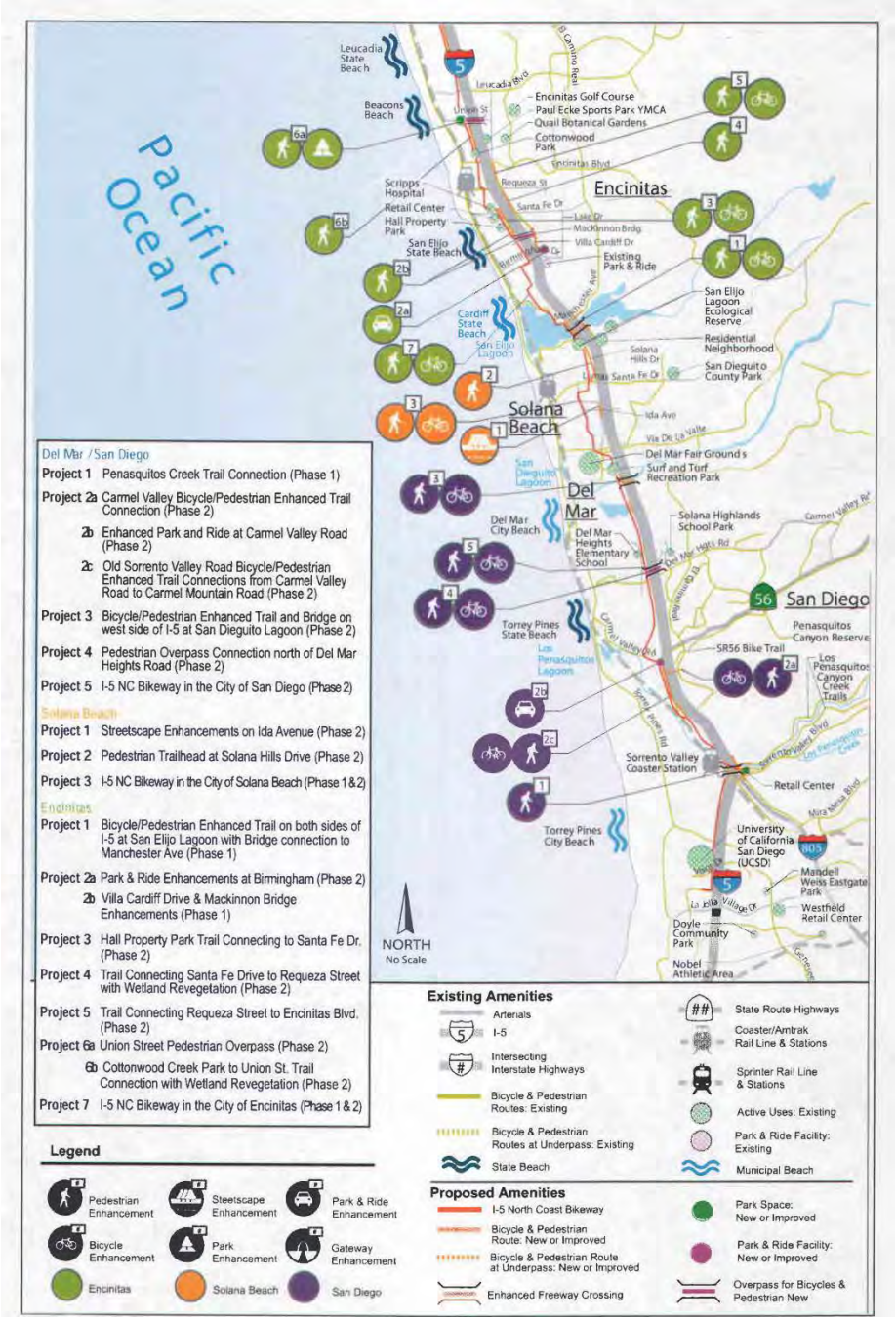


Figure 5. Community Enhancements Overview – South (Source: Caltrans. 2012b. Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement)

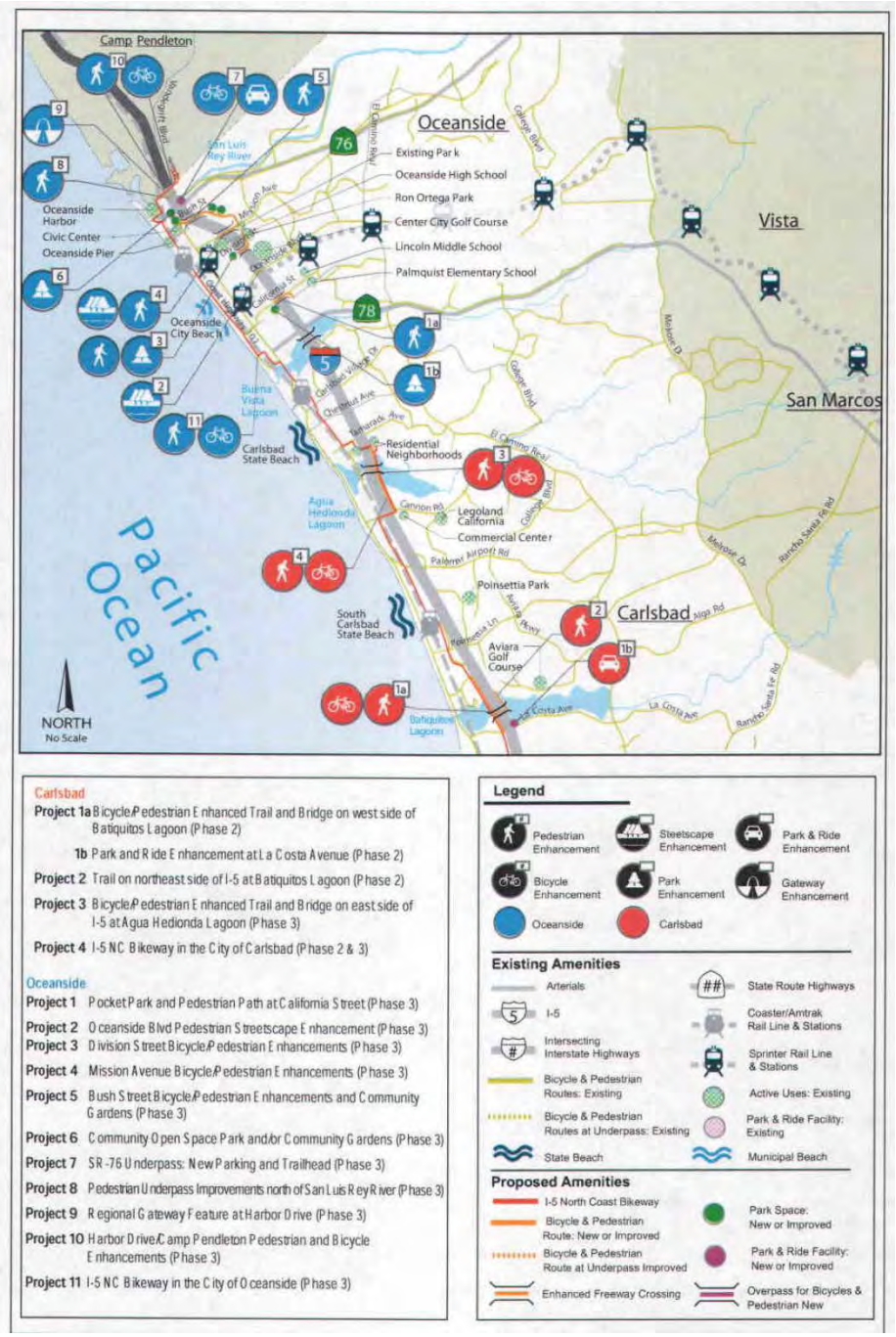


Figure 6. Community Enhancements Overview – North (Source: Caltrans. 2012b. Interstate 5 North Coast Corridor Project Supplemental Draft Environmental Impact Report/ Environmental Impact Statement)

Figure 7. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

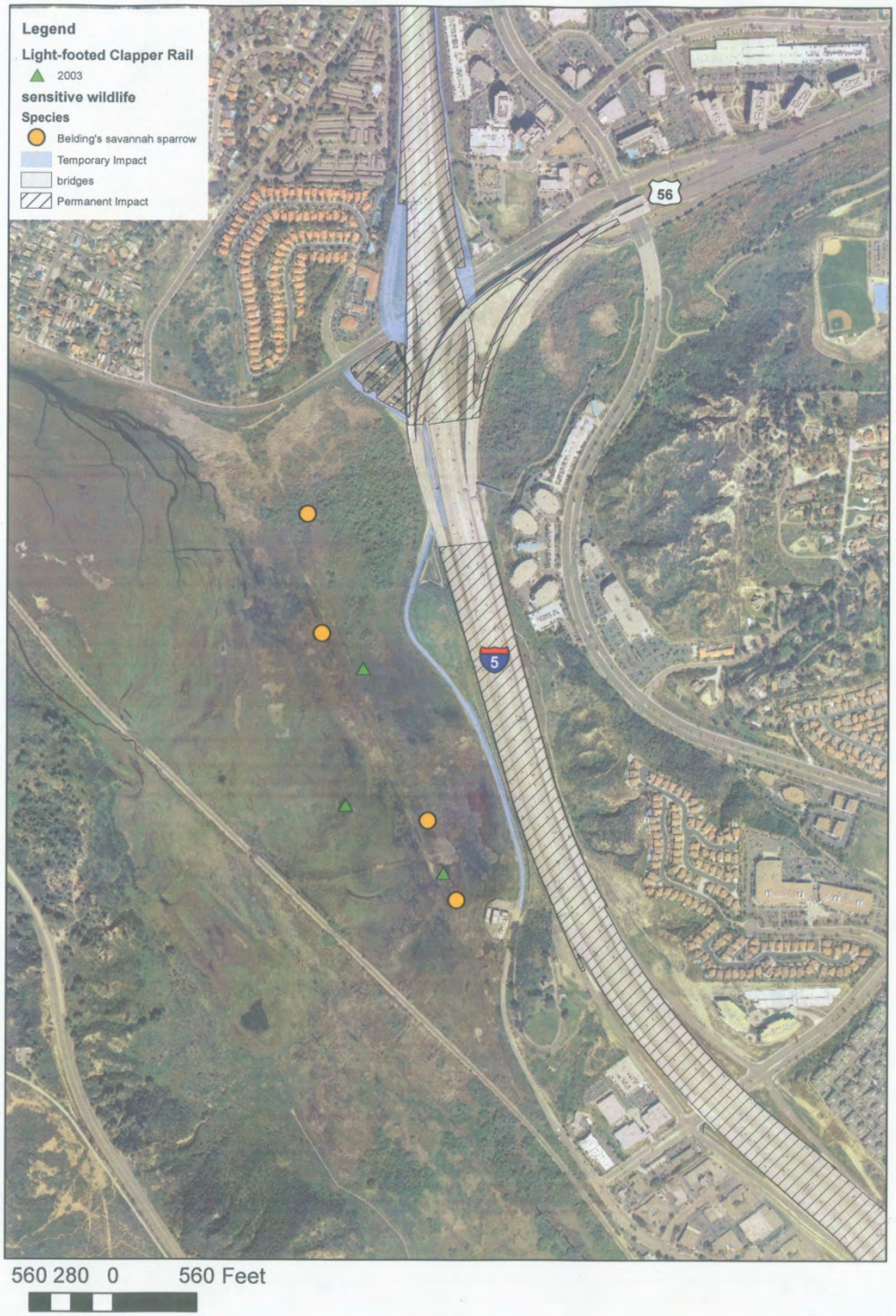


Figure 8. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 9. Threatened and Endangered Species and Project Impacts

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 10. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 11. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 12. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 13. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 14. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 15. **Threatened and Endangered Species and Project Impacts**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 16. Del Mar Manzanita Locations and Project Impacts

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

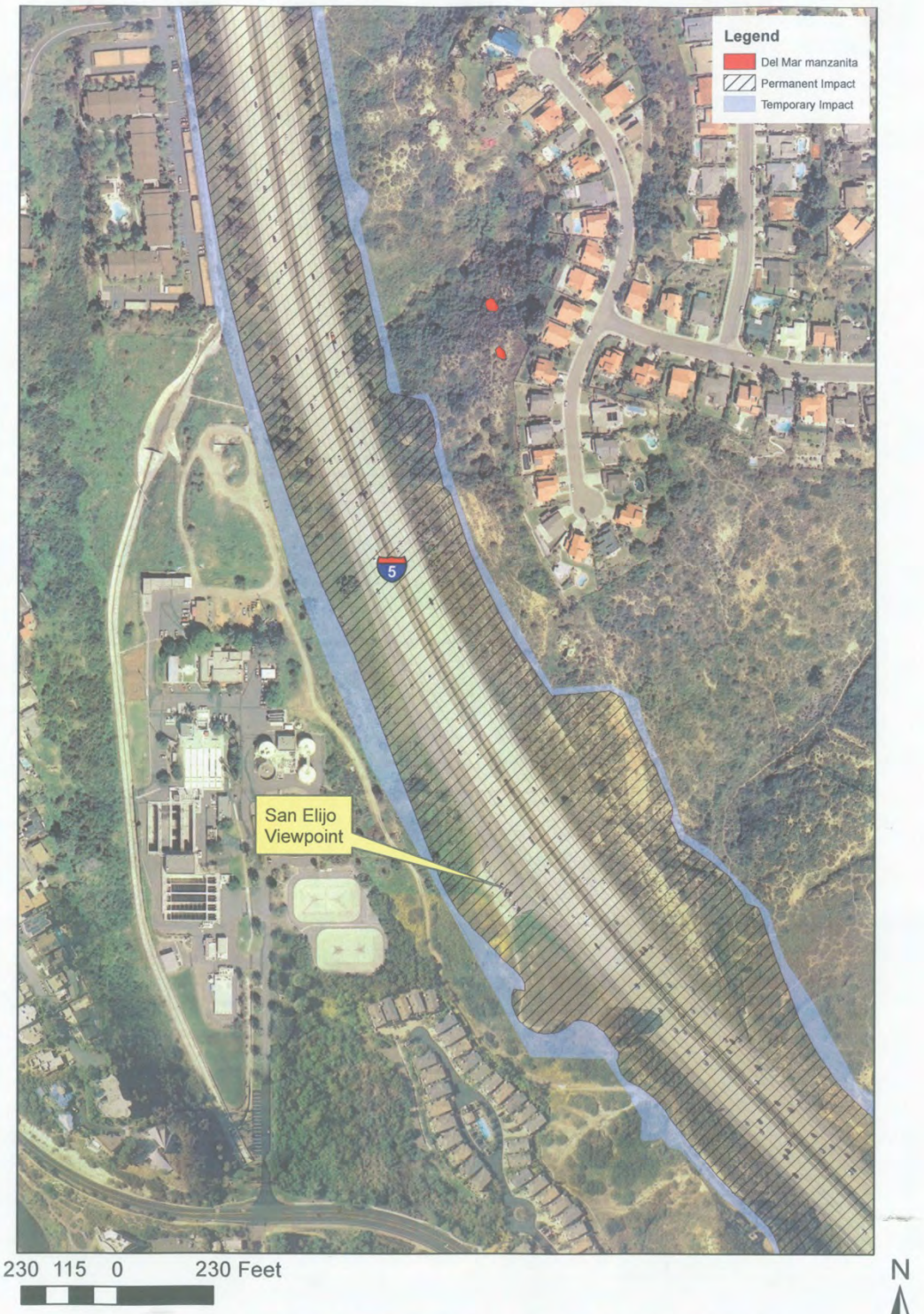


Figure 17. Del Mar Manzanita Locations and Project Impacts

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 18. **California Gnatcatcher Critical Habitat and Proposed Impacts at San Eljio Lagoon**

N

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 19. **California Gnatcatcher Critical Habitat and Proposed Impacts near Batiquitos Lagoon**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 20. **California Gnatcatcher Critical Habitat and Proposed Impacts between Oceanside Blvd. and SR 76**

N

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 21. **California Gnatcatcher, Least Bell's Vireo, Southwestern Willow Flycatcher, and Tidewater Goby Critical Habitat and Proposed Impacts Near the San Luis Rey River**

N

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

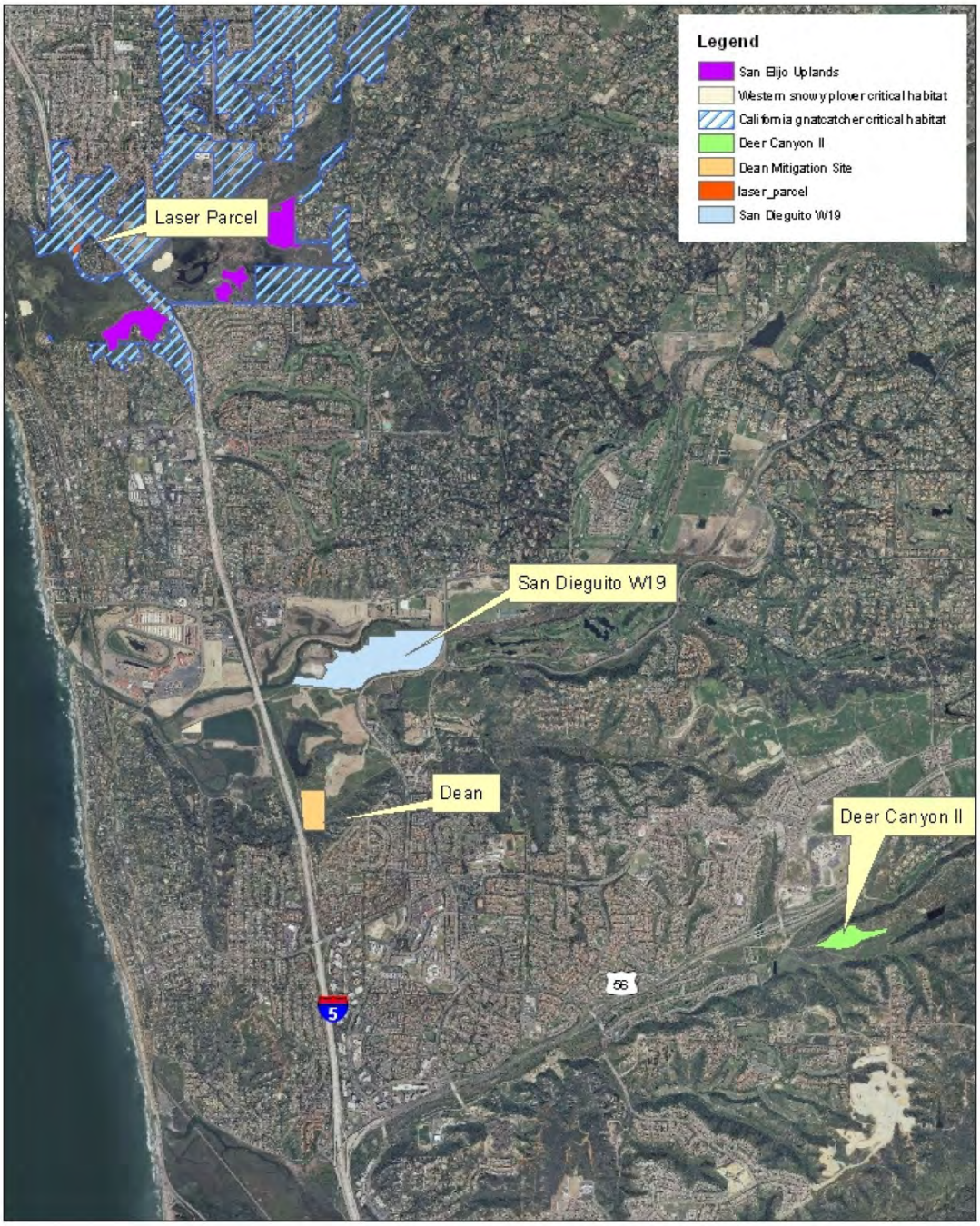


Figure 22. **Mitigation Parcels within the Los Penasquitos, San Dieguito, and San Elijo Watersheds**

N

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

Figure 23. **Mitigation Parcels within the Batiquitos and Agua Hedionda Watersheds with Critical Habitat**

N

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

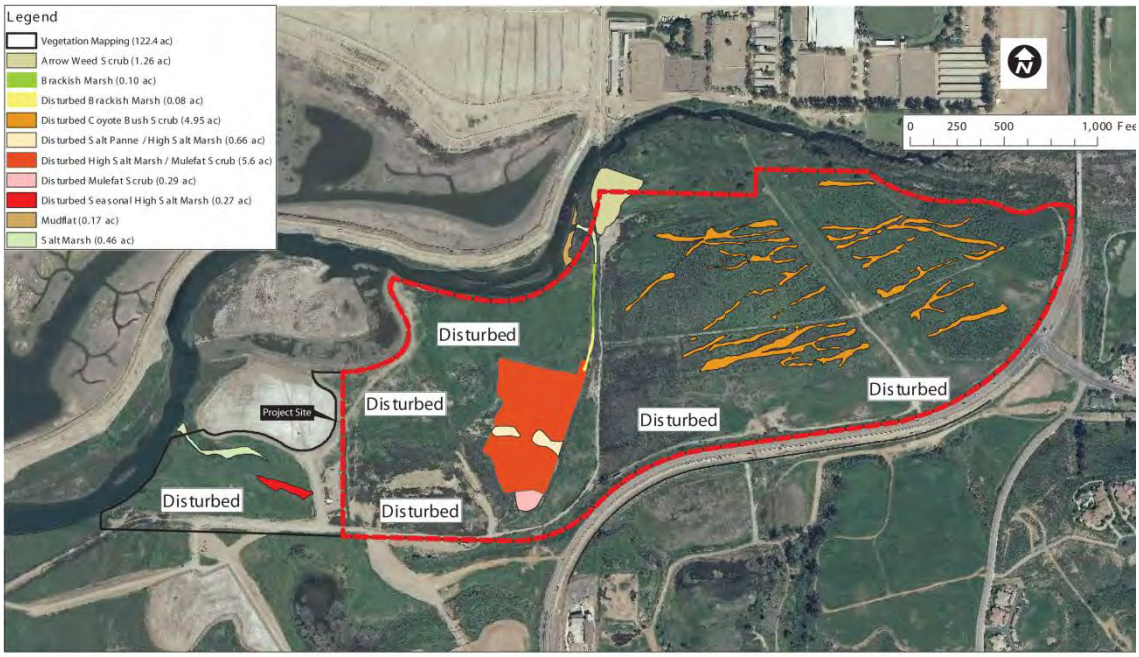


Figure 24. Existing Vegetation. (Source: Dudek. 2012. Final North Coast Corridor PWP/TREP Resource Enhancement Program Revised October 2012. 34+pp.)

Figure 25. Biological Resources on Hallmark West

★ California gnatcatcher

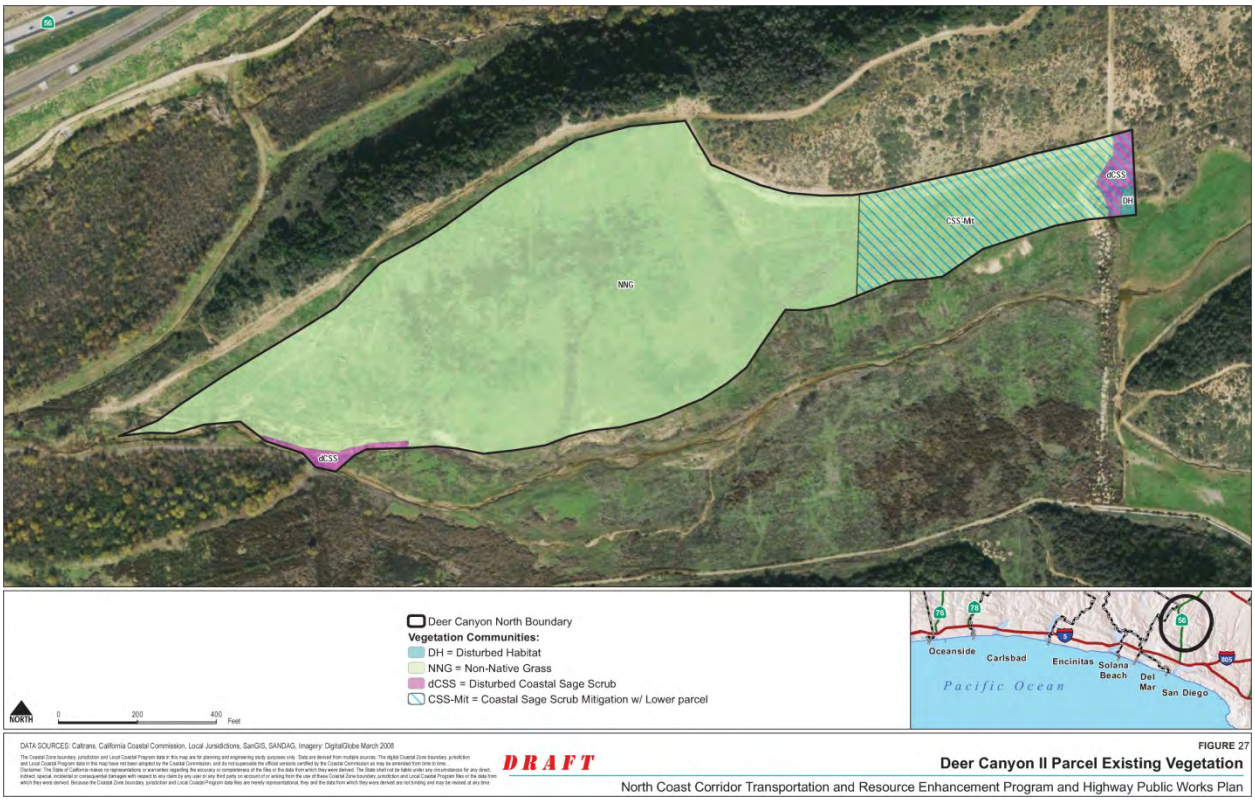
N

(Source: Dudek. 2012. Final North Coast Corridor PWP/TREP Resource Enhancement Program Revised October 2012. 34+pp.)

Figure 26. Biological Resources on Hallmark East

N

(Source: Dudek. 2012. Final North Coast Corridor PWP/TREP Resource Enhancement Program Revised October 2012. 34+pp.)



(Source: Dudek. 2012. Final North Coast Corridor PWP/TREP Resource Enhancement Program Revised October 2012. 34+pp.)

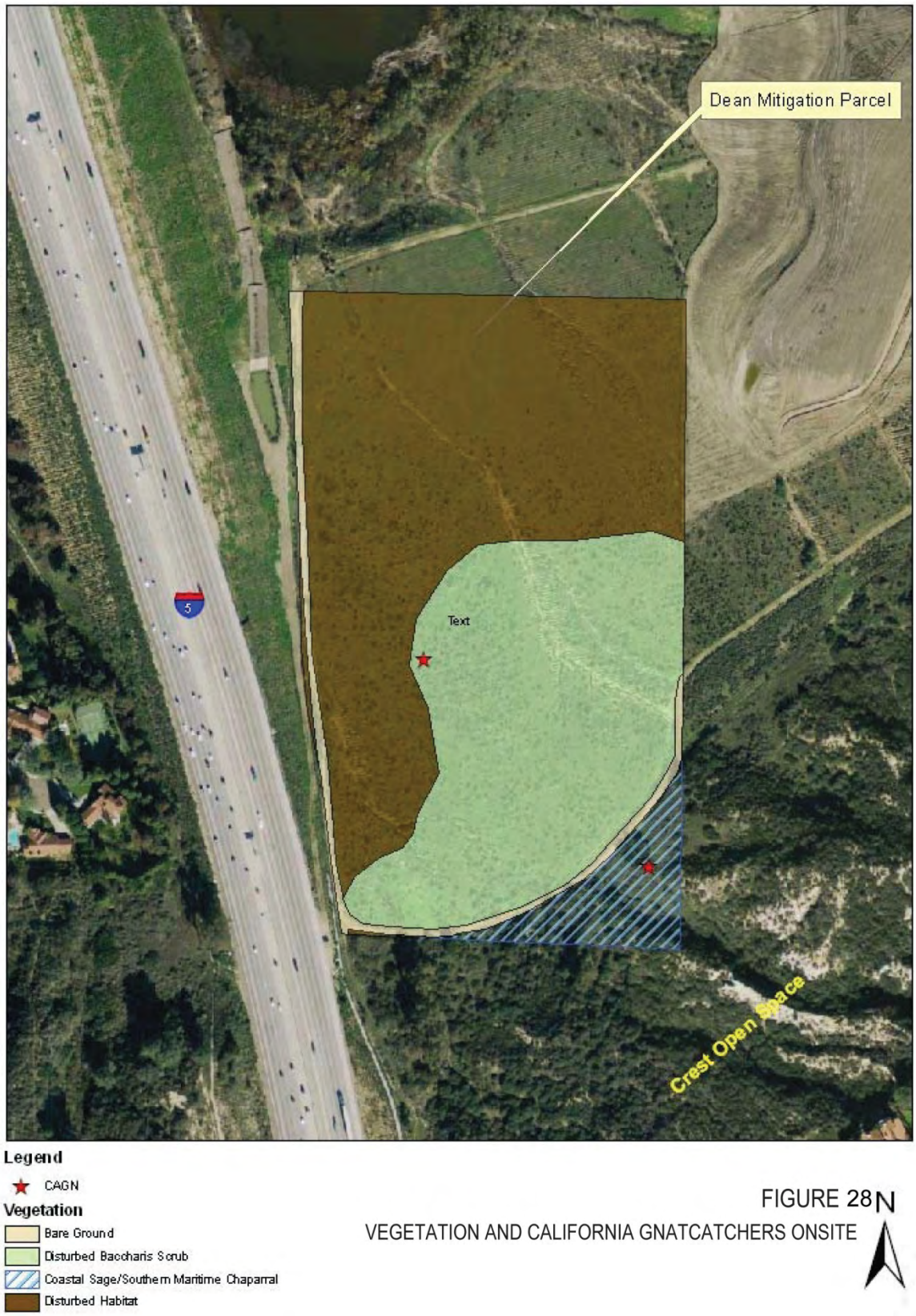


FIGURE 28
VEGETATION AND CALIFORNIA GNATCATCHERS ONSITE

(Source: Dudek. 2012. Final North Coast Corridor PWP/TREP Resource Enhancement Program Revised October 2012. 34+pp.)

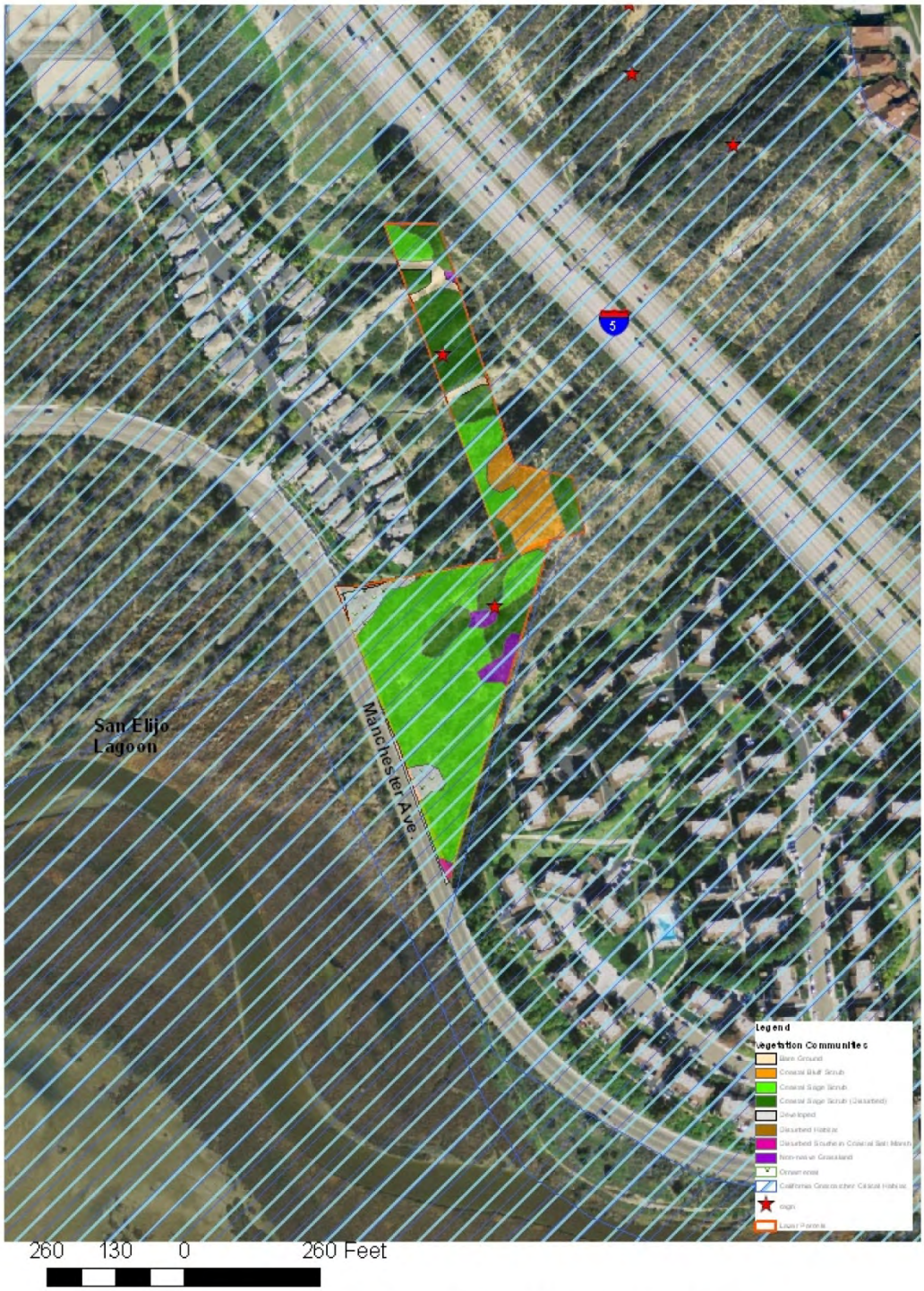


Figure 29. **Laser Mitigation Site with Existing Resources and California Gnatcatcher Critical Habitat**

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

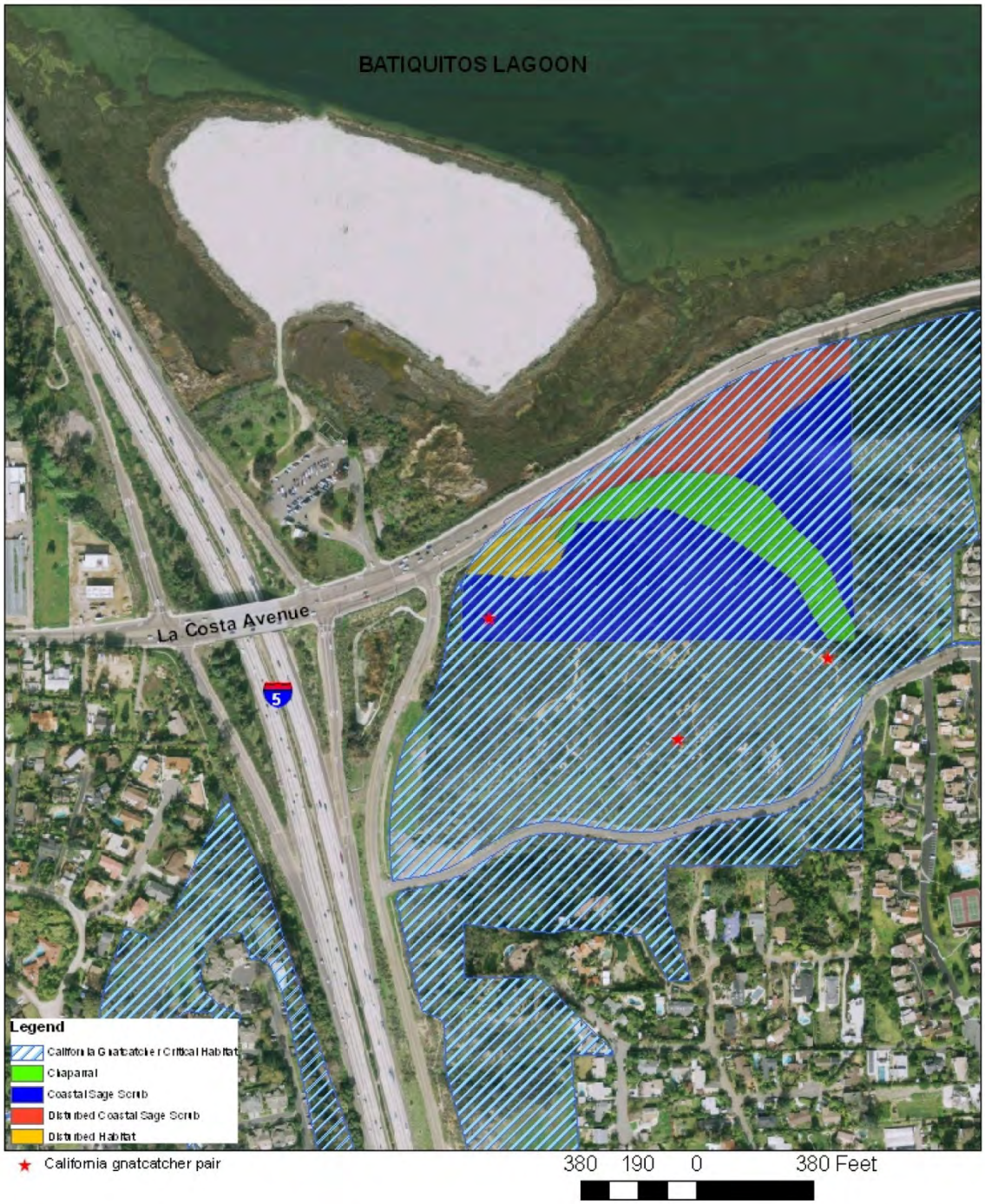


Figure 30. La Costa (Ayub) Mitigation Site with Existing Resources and California Gnatcatcher Critical Habitat

N

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)

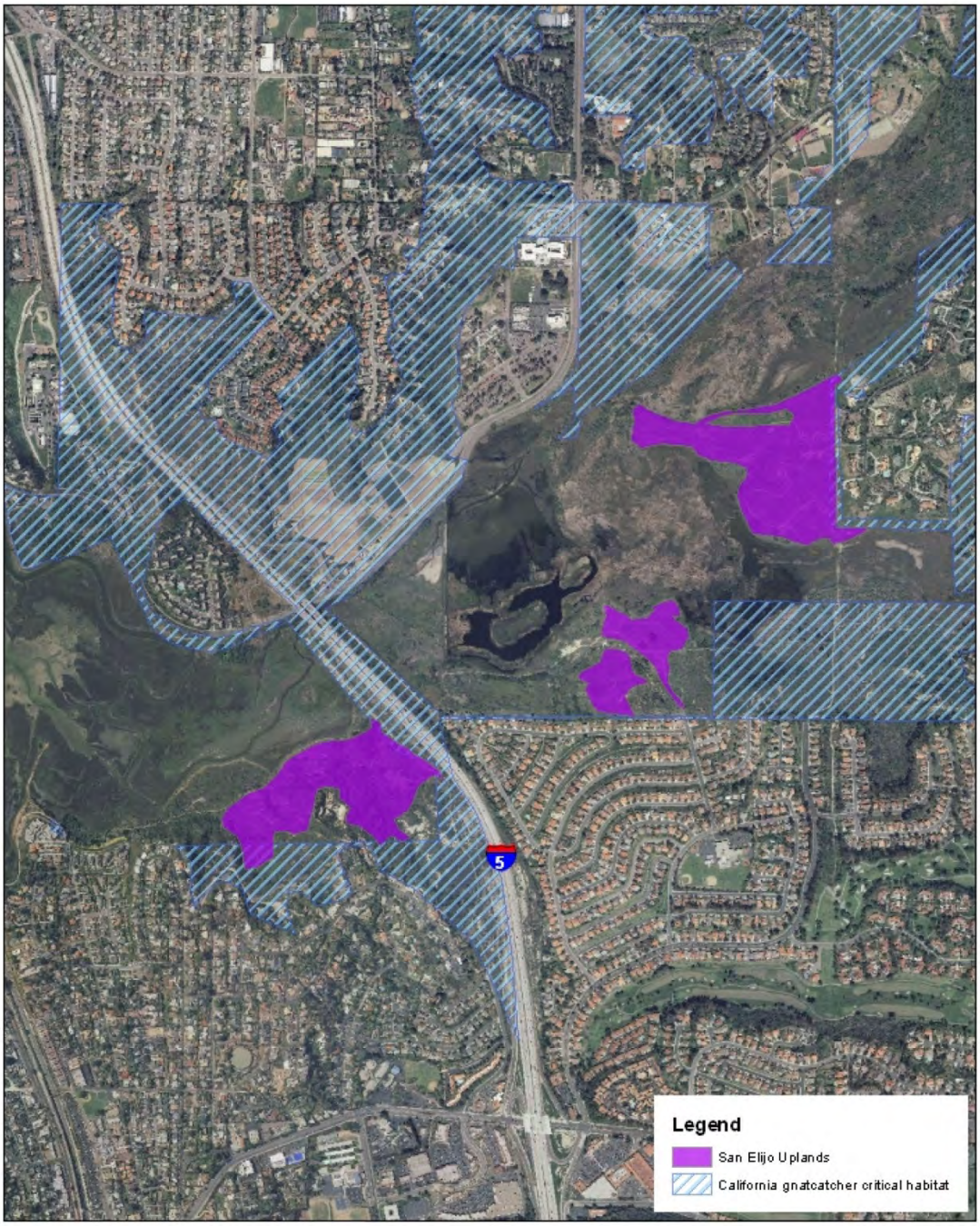


Figure 31. San Elijo Upland Parcels with Critical Habitat for California Gnatcatcher Critical Habitat

N

(Source: Caltrans. 2012a. I-5 North Coast Corridor Project Biological Assessment. 60+ pp.)