3.2 Hydrology and Water Quality

This section of the EIR discusses the proposed Project relative to the existing regional and local drainage/ hydrological and water quality conditions of the Project corridor and its surroundings; potential Project impacts to these resources; and mitigation measures to reduce significant impacts. The analysis in this section is based on the Preliminary Drainage Report and Storm Water Quality Management Plan (SWQMP) for the Project, prepared by MBI (Appendix F).

3.2.1 Existing Conditions

3.2.1.1 Existing Hydrology and Water Quality Environment

Regional Hydrology

The City is situated entirely within the Carlsbad Hydrological Unit (HU) and is split between the San Marcos Hydrological Area (HA), Batiquitos Subunit (HAS 904.51) to the north and the Escondido Creek HA, San Elijo Subunit (HAS 904.61) to the south[1]. The City is naturally divided by eight distinct drainage areas (sub-basins): Cardiff, Lower Escondido, La Orilla, La Costa South, Leucadia, Encinitas, Rancho Santa Fe and Lux Canyon sub-basins. Generally, the City drains to three creeks: Cottonwood Creek, Encinitas Creek and Escondido Creek. Cottonwood Creek drains the heart of Encinitas and discharges to the Pacific Ocean at Moonlight Beach. Encinitas Creek drains the north-central portion of the City into Batiquitos Lagoon. Escondido Creek drains the southern and northeast (Olivenhain) portion of the City into San Elijo Lagoon.

Local Setting

The Project corridor is within the 22,120-acre (31.4-square mile) Batiquitos Hydrologic Sub-Area (HSA 904.51). The 20.5-acre corridor accounts for approximately 0.09% of the local watershed area. Table 3.2-1, Project Watershed, summarizes the area occupied by the Project corridor inside the watershed. Figure 3.2-1, Watershed Vicinity Map, illustrates the Project location within the Batiquitos Subunit (HSA 904.51).

TABLE 3.2-1. PROJECT WATERSHED

Area	Area (acres)	Percent of Total (%)
Batiquitos HSA 904.51	22,120	100%
Subject Property	20.5	0.093%
Existing Impervious Area	14.7	0.066%
Proposed Impervious Area	14.0	0.063%

[1] City of Encinitas. 2010. *General Plan Update Current Conditions Report.* Chapter 14, Hydrology and Water Quality, Exhibit 14-1 (pages 14-16).

Drainage

Runoff from the Project corridor either drains to existing storm drain inlets or ponds in the flatter areas of North Coast Highway 101. The existing drainage areas and nodes[2] are illustrated on Figures 3.2-2a through 3.2-2e, Existing Hydrology Map. The runoff to nodes 100 through 110 flows to curb or grate inlets, primarily via gutter flow (Figures 3.2-2e, 3.2-2d, and 3.2-2c, respectively). Runoff to node 102 channelizes in existing pervious areas and flows to a grate inlet (Figure 3.2-2e). The flow from all of these nodes enters an existing storm drain system and travels north to outfall north of La Costa Avenue.

The runoff to node 800 flows to an existing curb inlet located south of A Street, on the west side of the roadway (Figure 3.2-2a). The runoff channelizes at the edge of pavement before entering the gutter at A Street, which conveys the flow to the curb inlet. The flow travels south after entering the storm drain system and outfalls south of B Street.

The runoff to node 900 flows to an existing curb inlet south of A Street on the east side of the roadway (Figure 3.2-2a). The runoff channelizes at the edge of pavement before entering the gutter at A Street, which conveys the flow to the curb inlet. The flow travels east after entering the storm drain system.

The runoff to node 200 flows onto Jasper Street and into grate inlets in the alleys branching off to the north and south (Figure 3.2-2c). The flow travels to Jasper Street in either the gutter on the west side of Highway 101 or channelizes on the east side before crossing the roadway and flowing onto Jasper Street. After entering the storm drain system the flow travels to the north and outfalls north of La Costa Avenue.

The runoff to node 300 flows onto West Leucadia Boulevard and to a cross-gutter that conveys flow to a grate inlet in Leucadia Roadside Park (Figure 3.2-2c). The flow travels to West Leucadia Boulevard in either the gutter on the west side of Highway 101 or channelizes on the east side before crossing Highway 101 and flowing onto West Leucadia Blvd. After entering the storm drain system, the flow travels to the north and outfalls north of La Costa Avenue.

The runoff to node 400 flows in a gutter on the west side of Highway 101 onto Europa Street to a grate inlet (Figure 3.2-2c). The runoff to node 401 flows in a gutter on the west side of Highway 101 onto Daphne Street, and then into a gutter that conveys the flow to the grate inlet on Europa Street. After entering the storm drain system the flow travels to the north and outfalls north of La Costa Avenue.

The runoff to node 500 flows in a gutter on the west side of Highway 101 onto Cadmus Street to a cross-gutter that conveys flow to an inlet (Figure 3.2-2b). After entering the storm drain system the flow travels to the north and outfalls north of La Costa Avenue.

The runoff to node 600 flows in a gutter on the west side of Highway 101 onto Basil Street and enters a cross-gutter that conveys flow to a curb inlet (Figure 3.2-2b). The runoff to node 601 flows in a gutter on the west side of Highway 101 onto Athena Street. It then enters a cross-gutter that conveys flow to a curb inlet. After entering the storm drain system, the runoff from both nodes travels to the north and outfalls north of La Costa Avenue.

[2] Nodes represent ponds and specific locations in the drainage network such as along channels, streams, rivers, and junctions in pipe systems.

The runoff to node 602 flows onto North Court, and then travels in a series of gutters to discharge at Moonlight Beach (Figure 3.2-2b). After entering the storm drain system the flow travels to the north and outfalls north of La Costa Avenue.

The runoff to node 700 flows off of Highway 101 and onto El Portal Street. The runoff to node 701 flows off of Highway 101 and onto Marcheta Street (Figures 3.2-2a and 3.2-2b). The flow from both nodes travels in a series of gutters to discharge to Cottonwood Creek at Moonlight Beach.

The runoff from nodes 1000 to 1800 sheet flows off the east side of the roadway and channelizes to natural sump areas between Highway 101 and the train tracks (Figures 3.2-2b, 3.2-2d and 3.2-2e). While these sump areas infiltrate the majority of the runoff volume, localized ponding occurs in areas with flat slopes.

Flooding

As illustrated on Figures 3.2-3a and 3.2-3b, Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (FIRM) Map, FEMA has not mapped any Special Flood Hazard Areas through the Project corridor, which is designated within Zone X (Other Areas) and is therefore determined to be outside the FEMA mapped 100-year floodplain. However, the project does encroach into the existing 10-year and 100-year Leucadia floodplains, as identified by the *Hydrologic and Hydraulic Study for Leucadia Drainage Improvement Alternatives* (Rick Engineering 2004); refer to Figures 3.2-3c and 3.2-3d.

In the existing condition, localized flooding occurs along the project area. The proposed street improvements will function to direct the runoff into bioretention areas, and reduce surface flooding. Proposed bioretention areas have been sized to ensure that runoff is contained within the street right-of-way and does not have an adverse impact to the limits of the Special Flood boundaries identified by the Rick Engineering study, or to private properties within the Special Flood area.

Groundwater

The Project corridor is approximately 72% impervious in the existing condition (Figures 3.2-2a through 3.2-2e), but does not occur within the Batiquitos Lagoon Valley or San Elijo Valley groundwater basins[1].

Surface Water Quality

In general, storm water can potentially contain a host of pollutants such as trash and debris, bacteria and viruses, oil and grease, sediments, nutrients, metals and toxic chemicals. These contaminants can adversely affect receiving and coastal waters, flora and fauna, and public health. Water quality issues are especially prevalent during rainy periods; however, with non-storm water urban runoff (i.e., irrigation or car washing) also entering the storm drain system, storm water pollution can be a year-round problem. Combinations of urban runoff, agricultural runoff, sewage spills, livestock and domestic animals affect water quality within the Batiquitos Subunit (HSA 904.51).

Section 401, Water Quality Certification. Section 401 of the CWA requires that, prior to issuance of any federal permit or license, any activity (including river or stream crossing during road, pipeline, or transmission line construction) which may result in discharges into waters of the United States must be certified by the State, as administered by the RWQCB. This certification ensures that the proposed activity does not violate State and/or federal water quality standards.

Section 402, National Pollutant Discharge Elimination System (NPDES). Section 402 of the CWA authorizes the State Water Resources Board (SWRCB) to issue a NPDES General Construction Storm Water Permit (Order 2012-0006-DWQ), referred to as the "General Construction Permit." NPDES regulations are administered by the San Diego RWQCB. Disturbance of one or more acres triggers NPDES coverage under the General Construction Permit which requires:

- Filing of a Notice of Intent (NOI) with SWRCB;
- Implementation of a Storm Water Pollution Prevention Plan (SWPPP) that specifies Best Management Practices (BMPs) to prevent grading/construction-related pollutants (including sediment from erosion) from contacting storm water and moving offsite into receiving waters, as well as elimination/reduction of non-storm water discharges; and
- Inspections of all BMPs.

The General Construction Permit also contains requirements for post-construction storm water management in the form of long-term BMPs, particularly for impervious surface runoff.

Section 404, Discharge of Dredged or Fill Materials. Section 404 of the CWA establishes programs to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. For purposes of Section 404, the limits of non-tidal waters extend to the Ordinary High Water Mark (OHWM), established by the fluctuation of water and indicated by physical characteristics, such as natural line impressed on the bank, changes in the character of the soil, and presence of debris flow. When an application for a Section 404 permit is made, the applicant must show it has:

- Taken steps to avoid impacts to wetlands or waters of the United States where practicable;
- Minimized unavoidable impacts on waters of the United States and wetlands; and,
- Provided mitigation for unavoidable impacts.

Section 404 of the CWA requires a permit for construction activities involving placement of any kind of fill material into waters of the United States or wetlands. A Water Quality Certification pursuant to Section 401 of the CWA is required for Section 404 permit actions. If applicable, construction would also require a request for Water Quality Certification (or waiver thereof) from the San Diego RWQCB.

Section 303, Water Quality Standards and Implementation Plans. Section 303(d) of the CWA (33 USC 1250, et seq., at 1313(d)) requires states to identify "impaired" water bodies as those which do not meet water quality standards. States are required to compile this information in a list and submit the list to the U.S. Environmental Protection Agency (USEPA) for review and approval. This list is known as the Section 303(d) List of Impaired Water Bodies. As part of this listing process, states are required to prioritize waters and watersheds for future development of Total Maximum Daily loads (TMDL) requirements. The SWRCB and RWQCBs have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list, and to develop TMDL requirements.

The impaired water bodies into which runoff flows from the Project corridor are listed in Table 3.2-2, 303(d) List of Impaired Water Quality Segments for the Project Area.

TABLE 3.2-2. 303(D) LIST OF IMPAIRED WATER QUALITY SEGMENTS FOR THE PROJECT AREA

Name	Pollutant/Stressor	Potential Sources	Estimated Size Affected
San Marcos Creek	DDE, Phosphorous, Selenium	Source Unknown; Nonpoint/Point Source, Urban Runoff/Storm Sewers; Source Unknown	19 Miles

Source: *Final 2010 Clean Water Act Sections 305(b) and 303(d) Integrated Report*.
http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/category5_report.shtml

National Flood Insurance Program (NFIP). The NFIP enables participating communities to purchase flood insurance. Flood insurance rates are set according to flood-prone status of property as indicated by a FIRM developed by FEMA) FIRMs identify the estimated limits of the 100-year floodplain for mapped watercourses, among other flood hazards. As a condition of participation in the NFIP, communities must adopt regulations for floodplain development intended to reduce flood damage for new development through such measures as flood proofing, elevation on fill, or floodplain avoidance. The City participates in the NFIP.

State

Coastal Zone Act Reauthorization Amendments

While storm water and urban runoff is regulated by the NPDES permitting program, virtually all other nonpoint sources are subject to the Coastal Nonpoint Pollution Control Program (CNPCP) under Coastal Zone Act Reauthorization Amendments (CZARA). Section 6217 of the federal CZARA established the CNPCP, which requires the USEPA to develop, and the states to implement, BMPs to control nonpoint source pollution in coastal waters. The definition of coastal waters in California was expanded to include the entire State. Pursuant to Section 6217(g) of CZARA, six major categories of nonpoint sources addressed by CZARA include agriculture, forestry, urban areas, marinas, hydromodification (HMP) projects and wetlands.

Porter-Cologne Water Quality Control Act

The SWRCB regulates water quality through the Porter-Cologne Water Quality Act which contains a complete framework for the regulation of waste discharges to both surface waters and groundwater of the State. On a regional level, the Project falls under the jurisdiction of the San Diego RWQCB which is responsible for implementation of State and federal water quality protection statutes, regulations and guidelines. The San Diego Region has developed a Water Quality Control Plan (Basin Plan) to show how the surface and ground waters in the region should be managed to provide the highest water quality reasonably possible. The Basin Plan lists the various beneficial uses of water within the region, describes the water quality which must be maintained to allow those uses, describes the programs, projects, and other actions which are necessary to achieve the standards established in this plan, and summarizes plans and policies to protect water quality. According to the Basin Plan, present and future beneficial uses associated with Cottonwood Creek and the reach of the Pacific Ocean parallel to the Project corridor (which receives runoff from the lands within and in the vicinity of the corridor) include municipal and domestic supply

(MUN), agricultural supply (AGR), industrial service supply (IND), water contact recreation (REC-1), non-contact water recreation (REC-2), warm freshwater habitat (WARM), cold freshwater habitat (COLD), and wildlife habitat (WILD).

Section 13260 of the Porter-Cologne Water Quality Act requires that any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the State, other than into a community sewer system, must submit a report of waste discharge to the applicable RWQCB. "Waste" is defined in the Basin Plan to include any waste or deleterious material including, but not limited to, waste earthen materials (such as soil, silt, clay, rock, or other organic or mineral material) and any other waste as defined in Section 13050(d) of the Porter-Cologne Water Quality Act.

Local

San Diego Municipal Storm Water Permit

This Municipal Storm Water Permit[3] (Order R9-2015-0100) requires that each Watershed Management Area (WMA) copermittee covered under the permit prepare a Water Quality Improvement Plan (WQIP) which identifies priority and highest priority water quality conditions and strategies that will be implemented with associated goals to demonstrate progress towards addressing the conditions in the watershed.

In February 2016, the County of San Diego (as the Municipal Storm Water Permit permittee representing all San Diego County cities) approved a Model BMP Design Manual in accordance with the Municipal Storm Water Permit. The Model BMP Design Manual identifies mitigation strategies to protect storm water quality for new development and significant redevelopment in the San Diego region. The Model BMP Design Manual outlines a template for municipalities in the San Diego region to follow in preparing their respective BMP Design Manuals, and it establishes a series of source control, site design, and treatment control BMPs to be implemented by all Priority Development Projects (PDP).

The City's local *BMP Design Manual*, adapted from the Countywide Model BMP Design Manual, and adopted in February 2016, provides guidance on specific design measures to reduce development impacts with regard to treating storm water runoff and maintaining water quality.

City General Plan

The City General Plan addresses multiple water quality and watershed protection principles and proactive policies that pertain to water pollution and land use decisions. The policies place limits on disturbances to drainage systems and strive to avoid development in areas susceptible to erosion and sediment loss. The General Plan also discourages the use of large impervious surfaces, minimizing the transport of urban runoff and pollutants. The relevant hydrology/water quality goal and policies are listed in Section 2.3 of this EIR and are from the Resource Management Element (Goals 1-2 and Policies 1.1, 2.1 and 2.3); Circulation Element (Policy 1.19); and Public Safety Element (Policies 1.4 and 1.15). The City implements these relevant General Plan policies via the City's Municipal Code, *BMP Design Manual*, and other various land use plans and permits.

[3] http://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/
Accessed October 20, 2016.

North 101 Corridor Specific Plan (N101SP)

The N101SP addresses the unique aspects, problems, and opportunities of the North Highway 101 Corridor within the Leucadia community in order to maintain its identity, community character and scale, while fostering commercial revitalization of the corridor. Goals of N101SP Section 2.2.4 (Infrastructure and Public Safety) that are applicable to drainage issues are as follows:

A. Eliminate flooding and improve drainage.
B. Underground utilities and provide more lighting

City Municipal Code

Chapter 20.08 of the City Municipal Code (Watercourse Protection, Storm Water Management and Discharge Control Ordinance) regulates discharges into the storm water conveyance system and downstream receiving waters to preserve and enhance water quality for beneficial uses and protect the health, safety and welfare of the public by:

- Prohibiting non-storm water discharges to the storm water conveyance system;
- Eliminating pollutants in storm water to the maximum extent practicable, including pollutants from both point and non-point sources;
- Prohibiting activities which cause, or contribute to, exceedance of State and federal Receiving Water quality objectives; and
- Protecting watercourses from disturbance and pollution.

Chapter 20.08 establishes the City's legal authority to enforce a wide spectrum of storm water and water quality related requirements, and defines minimum BMP standards for various community sectors including residential, commercial, construction, municipal and development activities.

Chapter 23.24 (Grading, Erosion and Sediment Control Ordinance 88-16) requirements that are applicable to drainage issues are as follows:

- **Sections 23.24.150 and 23.24.160.** The applicant must submit interim and final erosion and sediment control plans.
- **Section 23.24.200.** The applicant must submit a proposed schedule for installation of all interim and final erosion and sediment control measures.
- **Section 23.24.370.** Limits grading between October 1 of any year and April 15 of the following year, unless the plans for such work includes desilting basins or other temporary drainage or control measures.
- **Section 23.24.380.** Provides guidelines for erosion and sediment control measures during and following construction

3.2.2 Analysis of Project Effects and Determination as to Significance

Guidelines for the Determination of Significance

A project would be considered to have a significant impact if it would:

1. Violate any water quality standards or waste discharge requirements;
2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or offsite;
4. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
5. Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
6. Otherwise substantially degrade water quality;
7. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or FIRM or other flood hazard delineation map;
8. Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
9. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam;
10. Inundation by seiche, tsunami, or mudflow; or
11. Result on cumulatively considerable impacts on hydrology and water quality.

Analysis

Issue 1: Violate any water quality standards or waste discharge requirements.

A SWQMP has been prepared for the Project (Appendix F) which identifies pollutants of concern due to grading/construction activities and urban runoff (Table 3.2-3). Potential water quality impacts associated with short-term grading and construction activities include discharge of construction-related sediment and hazardous materials (e.g., fuels). However, with implementation of BMPs during construction as required by a SWPPP, such water quality impacts would be reduced to less than significant.

TABLE 3.2-3. PROJECT POLLUTANTS OF CONCERN

Pollutant Category	Anticipated (X)	Potential (P)	Surface Water Impairments
Sediments	X		
Nutrients		X	Phosphorous
Heavy Metals	X		Selenium
Organic Compounds	X		
Trash & Debris	X		
Oxygen Demanding Substances		X	
Oil & Grease	X		
Bacteria & Viruses			
Pesticides			DDE

Three paved parking pockets are proposed within NCTD ROW along the east side of the Project corridor. Under existing conditions, informal parking occurs in these dirt areas. As such, construction of the paved parking areas would reduce erosion and sedimentation. To compensate for the reduction in storm water infiltration from the additional impervious (paved) parking pockets, the proposed paved surfaces would use pervious materials.

Additional urban runoff pollutants within the Project corridor would include litter, trash and debris; bacteria and viruses from pet feces; oil, grease, metals, and toxic chemicals from vehicle hydrocarbons; sediments, nutrients, pesticides and fertilizers from landscaped areas (Table 3.2-2). However, bioretention areas are proposed in landscaping and other locations within the Project corridor as shown in Figures 3.2-2a through 3.2-2e. Runoff entering the bioretention areas would percolate through an 18-inch biofiltration soil layer prior to entering perforated underdrain pipes connecting to upgraded storm drains. The bioretention areas would allow for 10 inches of ponding. Peak runoff would enter an overflow catch basin set 10 inches above finish grade. The proposed bioretention would provide water quality treatment as well as flow control measures. Additionally, the SWQMP (Appendix F) identifies source control BMPs to further limit the adverse impacts of these potential pollutant sources including, but not limited to: grouping of plants with similar water requirements to reduce excess irrigation runoff and promote surface infiltration; regular sweeping of sidewalks and streets to prevent the accumulation of litter and debris; and labeling all new storm drain inlets/catch basins with the message “No Dumping – Drains to Ocean” or equivalent message.

With the above proposed improvements to the existing storm drain system, which would limit the amount of pollutants draining to nearby surface waters, the proposed Project would not result in violation of water quality standards or waste discharge requirements, and potential impacts to water quality would be reduced to less than significant.

Issue 2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells

would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

Project implementation would not include development activities that could otherwise deplete groundwater supplies. The Project corridor is currently developed with approximately 72% of the area covered with impervious materials. The Project would add approximately 0.7 acre of pervious area to the Project corridor in the form of landscaped planters, decreasing the overall impervious area by approximately 4%, for a total 68% impervious area, compared to the existing 72%. According to the SWQMP (Appendix F), the proposed landscape design would involve native plants and other ornamental species with low water requirements. The landscape irrigation system would use programmable timers and automatic valves to shut-off water in case of rapid pressure drop, indicating possible water leaks. With the above proposed improvements, which would increase pervious area in the Project corridor, the proposed Project would not interfere substantially with groundwater recharge, and potential impacts to groundwater supplies would be reduced to less than significant.

Issue 3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or offsite.

As discussed in Issue 1 above, with implementation of BMPs during construction as required by a SWPPP, and with installation of bioretention basins throughout the Project corridor, the proposed Project would not result in substantial erosion or siltation on or offsite, and such potential such water quality impacts would be reduced to less than significant.

Issue 4: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite.

As evaluated in the Preliminary Drainage Report (Appendix F), the proposed Project would maintain existing grades along the west side of the Project corridor although the roadway profile would be slightly raised along the east side to keep positive runoff flows towards/into proposed curbs/gutters. Curb cuts would direct runoff to bioretention areas, which would be connected to storm drain piping.

The bioretention areas will reduce the flowrate of stormwater leaving the site to pre-development levels. In addition, the bioretention areas provide flood-control by retaining stormwater runoff, prior to discharging to the downstream storm drain piping. The increase in stormwater storage provided by the bioretention areas will reduce flooding in the corridor and mitigate any increase in runoff volume caused by the street improvements. The runoff from North Coast Highway 101 would be contained in the curb and gutter and bioretention area storage within the right-of way. There would be no increase in flooding on any private properties adjacent to Highway 101. Therefore, potential drainage impacts would be reduced to less than significant.

Issue 5: Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

As evaluated in the Preliminary Drainage Report (Appendix F), the proposed drainage improvements include additional curbs/gutters, bioretention areas, and storm drain inlets to capture and convey storm water runoff into upgraded storm drains. In accordance with hydromodification management requirements of the MS4 Permit, the bioretention areas would serve as flow-control BMPs. Runoff leaving the site during storm events less than or equal to the 10-year storm will be reduced to pre-development levels. In addition, the Project would decrease the overall impervious area by approximately 4% through the addition of landscaped and bioretention areas, thereby reducing the runoff coefficient. The proposed 100-year flowrate from the site is less than the existing condition. Therefore, the proposed Project would not create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems, and such potential such drainage impacts would be reduced to less than significant.

As discussed in Issues 1 and 3 above, potential water quality impacts associated with polluted runoff would be reduced to less than significant.

Issue 6: Otherwise substantially degrade water quality.

Please refer to Issues 1 and 3 above.

Issue 7: Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or FIRM or other flood hazard delineation map.

This issue is not applicable to the proposed Project.

Issue 8: Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

This issue is not applicable to the proposed Project.

Issue 9: Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

This issue is not applicable to the proposed Project.

Issue 10: Inundation by seiche, tsunami, or mudflow.

There is no risk of inundation of the Project corridor by seiche or mudflow. According to the *Tsunami Inundation Map for Emergency Planning - Encinitas Quadrangle*[4], the Project corridor is not located within an area at risk of inundation by a tsunami.

[4] http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/SanDiego/Documents/Tsunami_Inundation_Encinitas_Quad_SanDiego.pdf. Accessed October 20, 2016.

3.2.3 Cumulative Impact Analysis

3.2.3.1 Cumulative Setting

The geographic scope for cumulative hydrology and water quality impacts includes the projects in Figure 2-2 and Table 2-9. It is assumed that appropriate storm water BMPs and drainage improvements would be implemented and conditions of approval required for these cumulative projects in accordance with applicable local, State and federal regulations. Therefore, the baseline cumulative impacts associated with hydrology and water quality in the cumulative impact area would be less than significant.

Issue 11: Result in hydrology and water quality impacts that are individually limited, but cumulatively considerable.

With implementation of the proposed drainage and water quality improvements described above, including slightly raised roadway profile along the east side of the Project corridor, new curbs/gutters, additional landscaping and bioretention areas, and increase in storm drain inlets, potential Project impacts associated with hydrology and water quality would be reduced to less than significant. Therefore, in combination with the cumulative projects in Figure 2-2, potential Project impacts associated with hydrology and water quality would not be cumulatively considerable.

In the post-development condition, BMPs are proposed in the form of bioretention areas. The proposed bioretention areas would be located throughout the project area, intercepting runoff from the improved roadway (via curb cuts) and sidewalk, prior to discharging to the underground storm drain and downstream receiving waters. Each bioretention area would consist of 10” surface ponding, 18” biofiltration soil, variable depth gravel layer (12” minimum), perforated underdrain pipe, and overflow atrium drain. Runoff would filter through the soil and gravel layers, and low flows would infiltrate in the underlying subgrade. The underdrain would help convey stored runoff that is not able to infiltrate.

The bioretention areas have been sized to comply with the MS4 hydromodification management requirements. In addition, storage attenuates the peak runoff volume, keeps runoff with the street right-of-way, and prevents adverse impacts on private properties.

3.2.4 Mitigation Measures

With implementation of the proposed drainage and water quality improvements described above, including slightly raised roadway profile along the east side of the Project corridor, new curbs/gutters, additional landscaping and bioretention areas, and increase in storm drain inlets, potential Project impacts associated with hydrology and water quality would be reduced to less than significant. Therefore, no mitigation measures are required.

3.2.5 Conclusions

The proposed drainage and water quality improvements described above, including slightly raised roadway profile along the east side of the Project corridor, new curbs/gutters, additional landscaping and bioretention areas, increase in storm drain inlets, and upgraded storm drains would provide water quality treatment, storm water flow control measures would reduce the runoff coefficient, resulting in no net increase in peak flows and alleviating existing ponding and flooding problems within the public ROW and on private

properties along the corridor. Therefore, potential hydrology and water quality impacts associated with the Project would be reduced to less than significant, and no mitigation measures are required.

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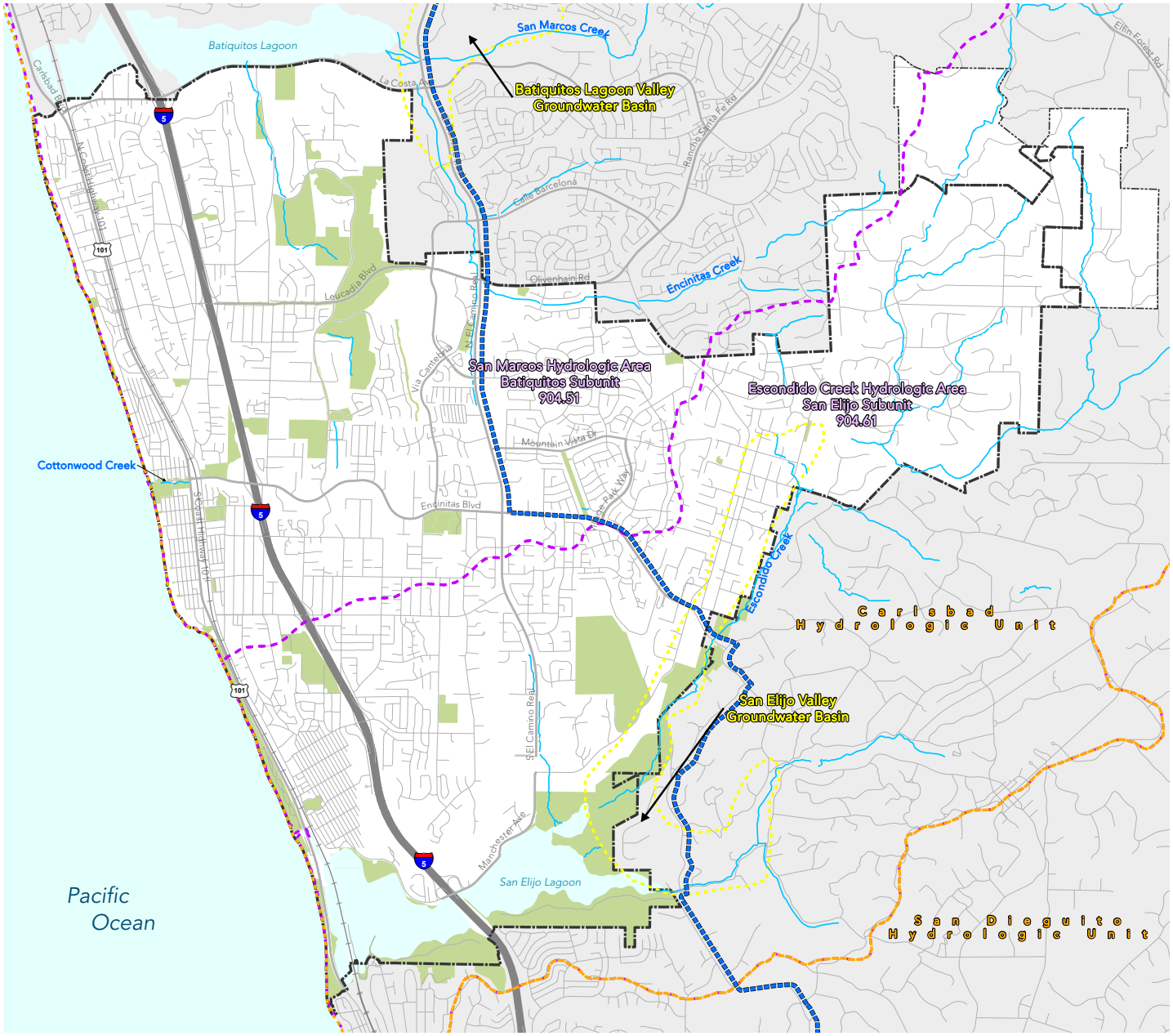
City of Encinitas. *Engineering Design Manual, Chapter 7: BMP Design Manual.* February 2016.



Hydrological Features within the City of Encinitas

- City Limits
- Sphere of Influence
- Parks and Open Space
- Waterbodies
- Streams
- Roads
- Railroad
- Coastal Zone Boundary
- Groundwater Basins
- Watershed boundaries
- Hydrologic Area

0 0.25 0.5 1 Miles

20 50 Acres

N

Source: City of Encinitas; MIG, Inc.
Date: October 2010

encinitas
yesterday...today...tomorrow
ENCINITAS 2035 GENERAL PLAN UPDATE

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North Coast Highway 101 Streetscape Improvement Project

WATERSHED VICINITY MAP

Figure 3.2-1

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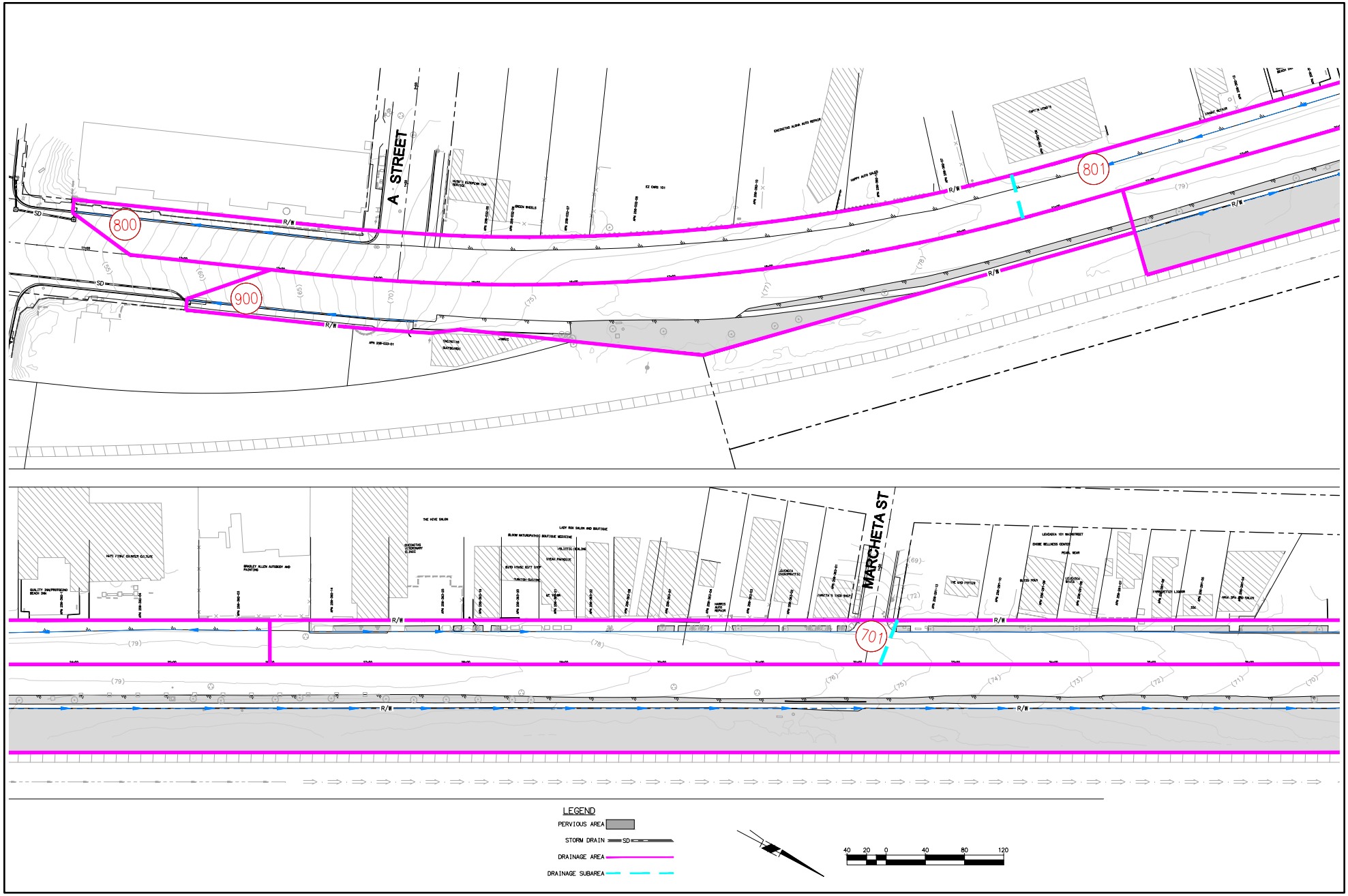

Michael Baker INTERNATIONAL

Source: Preliminary Drainage Study, Michael Baker International, 11/30/2016
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North Coast Highway 101 Streetscape Improvement Project

EXISTING HYDROLOGY MAP

Figure 3.2-2a

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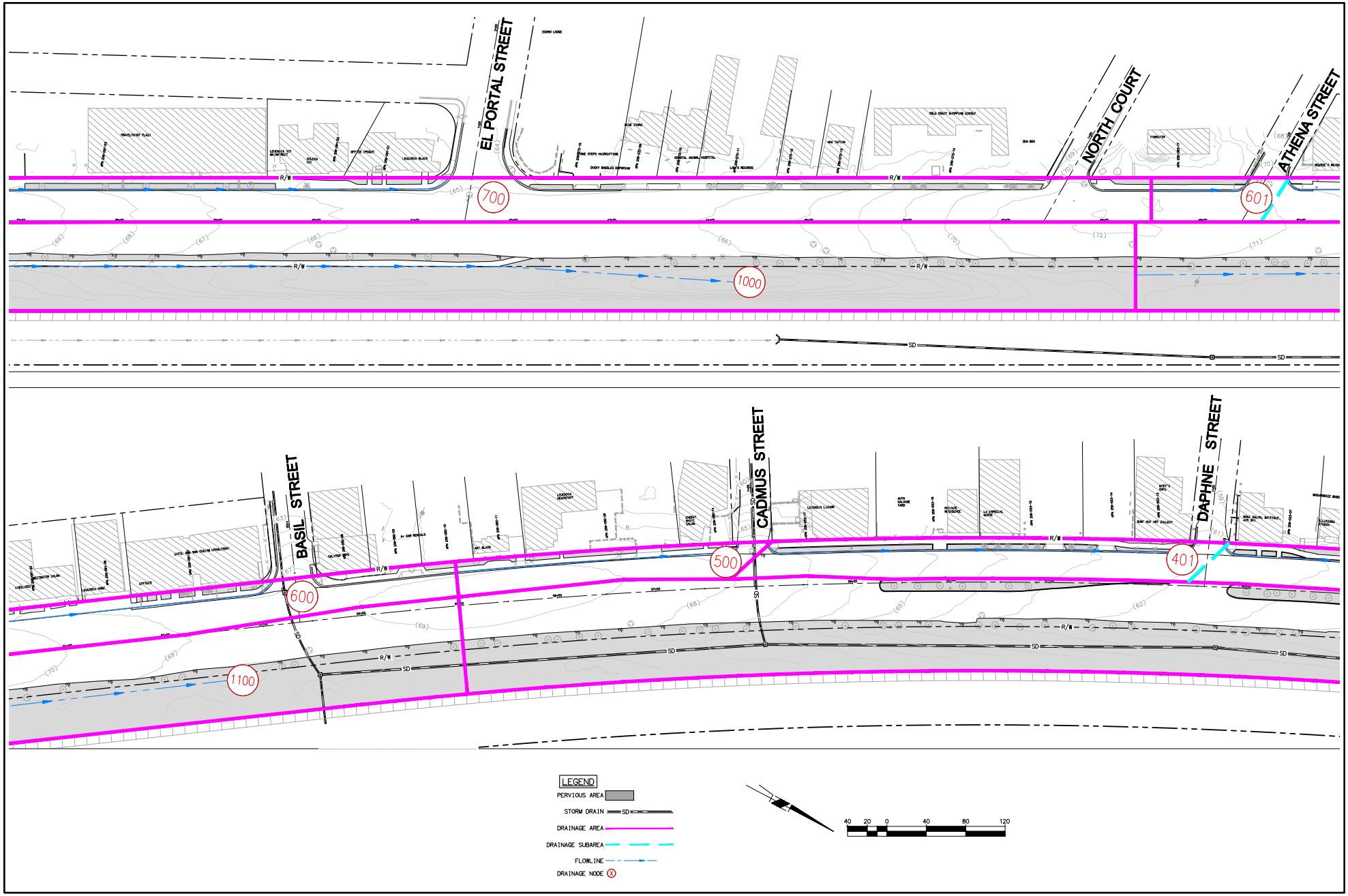

Michael Baker INTERNATIONAL

Source: Preliminary Drainage Study, Michael Baker International, 11/30/2016

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North Coast Highway 101 Streetscape Improvement Project

EXISTING HYDROLOGY MAP

Figure 3.2-2b

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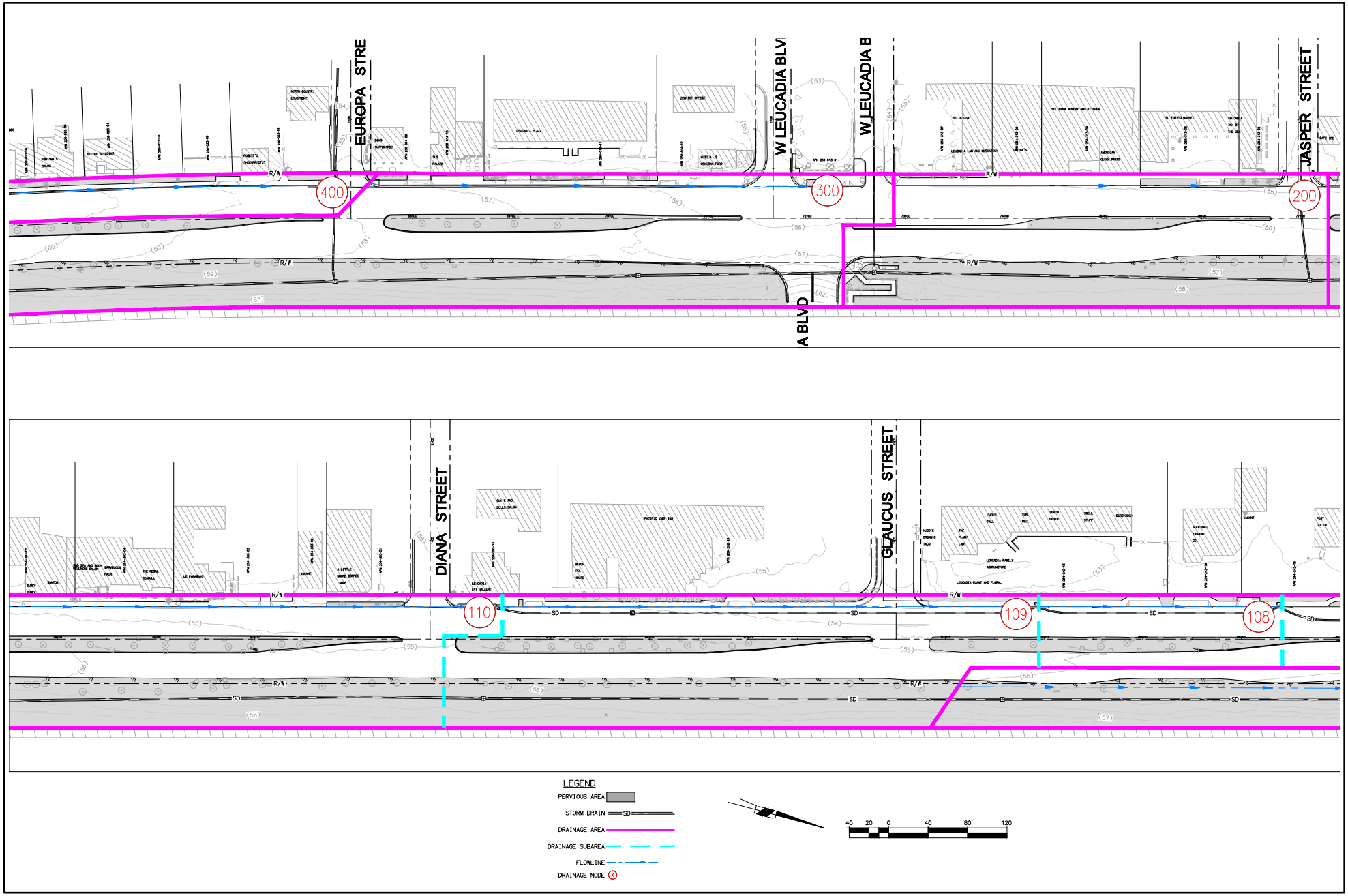

Michael Baker INTERNATIONAL

Source: Preliminary Drainage Study, Michael Baker International, 11/30/2016

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North Coast Highway 101 Streetscape Improvement Project

EXISTING HYDROLOGY MAP

Figure 3.2-2c

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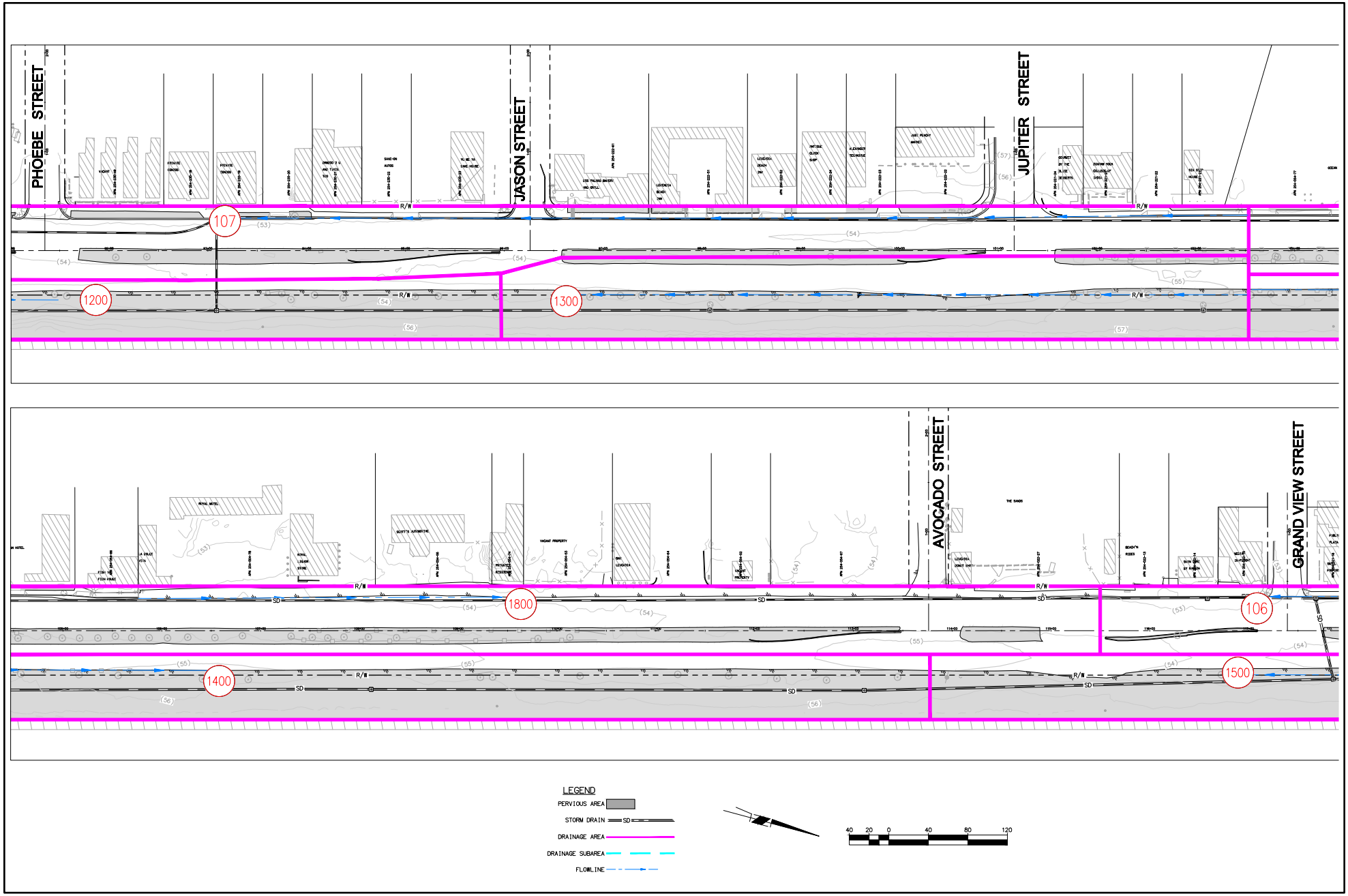

Michael Baker INTERNATIONAL

Source: Preliminary Drainage Study, Michael Baker International, 11/30/2016
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North Coast Highway 101 Streetscape Improvement Project

EXISTING HYDROLOGY MAP

Figure 3.2-2d

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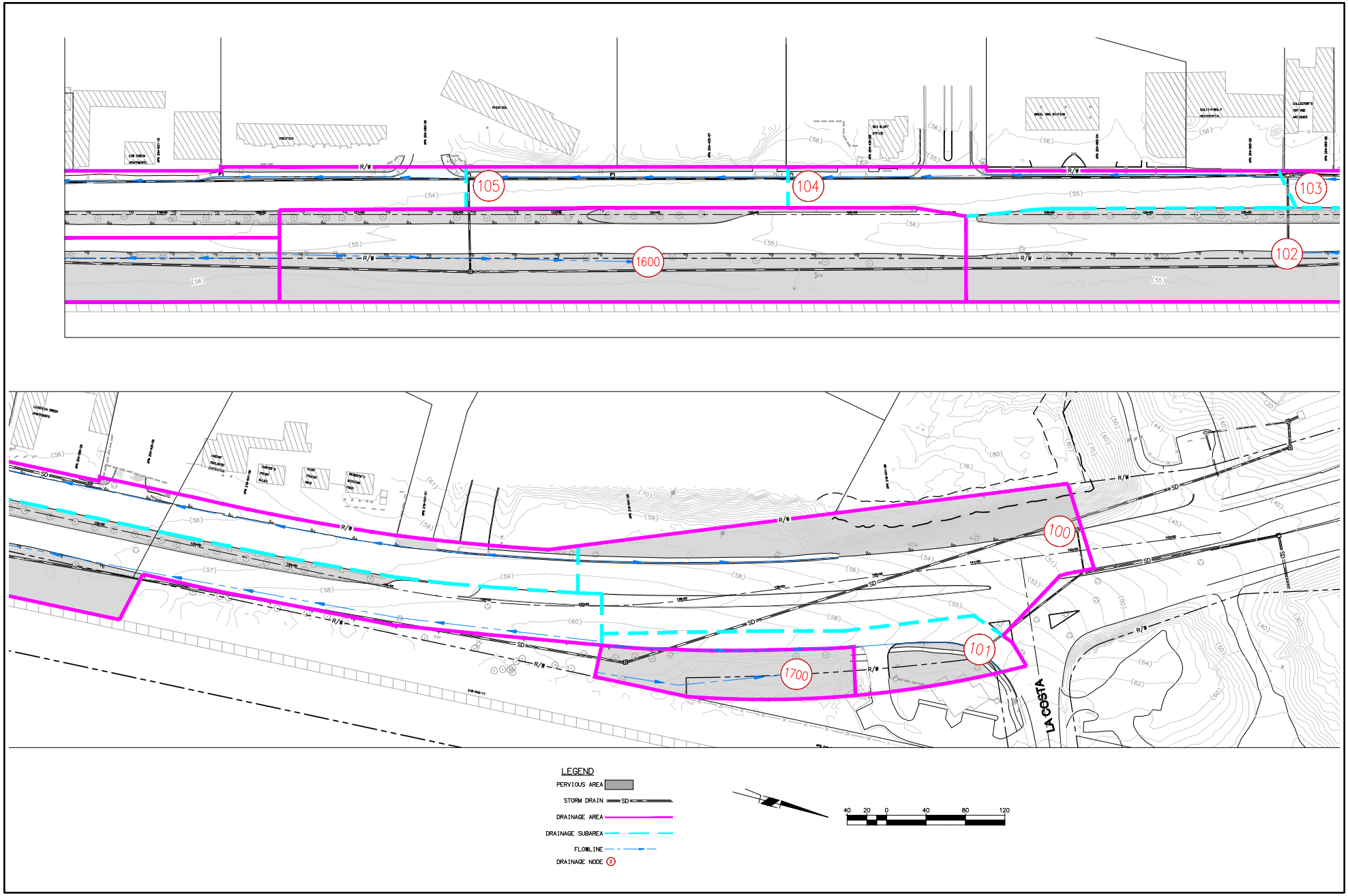

Michael Baker INTERNATIONAL

Source: Preliminary Drainage Study, Michael Baker International, 11/30/2016
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North Coast Highway 101 Streetscape Improvement Project

EXISTING HYDROLOGY MAP

Figure 3.2-2e

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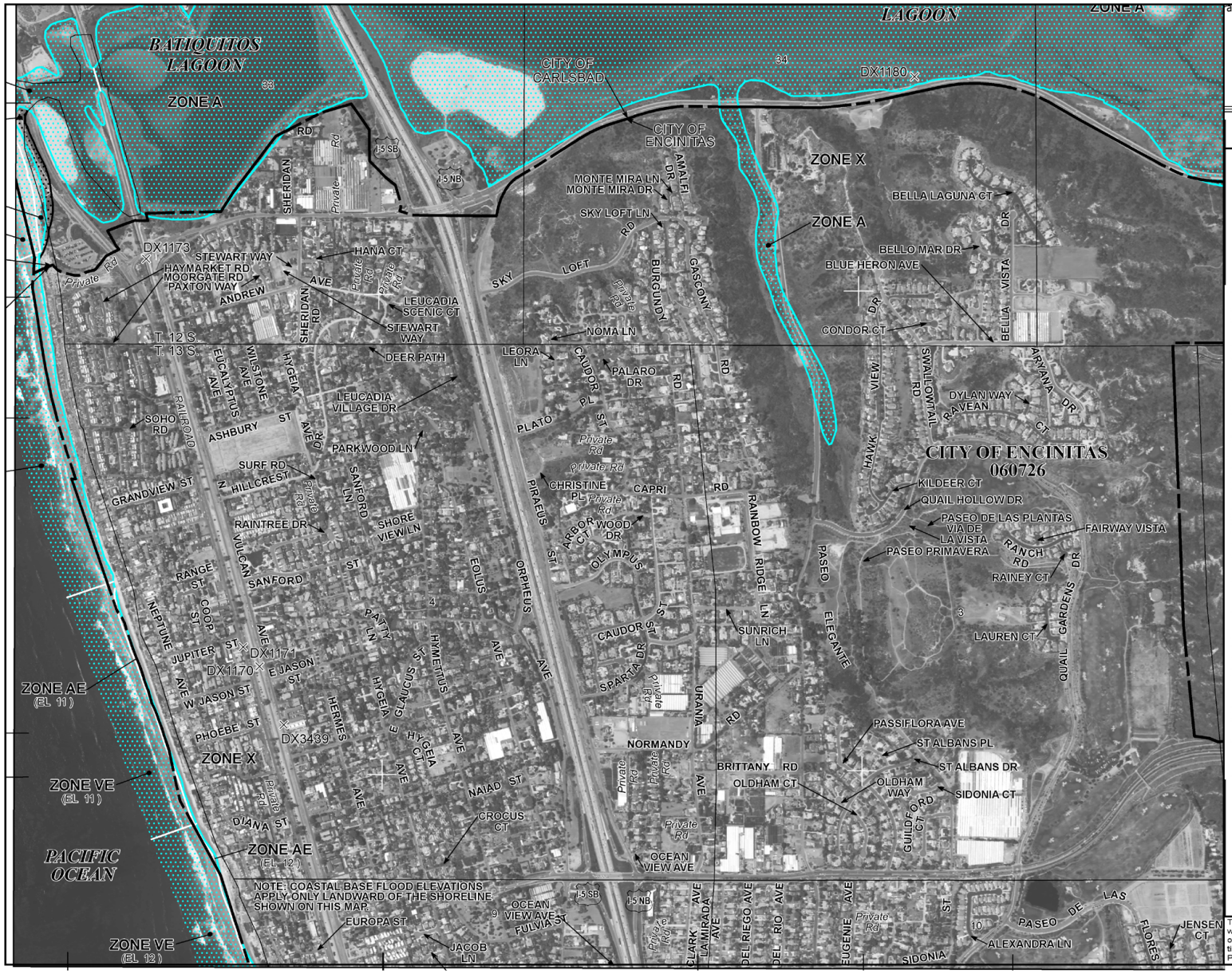

ance Program at 1-800-638-6620.

0 500 1,000 1,500 2,000 FEET

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

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North Coast Highway 101 Streetscape Improvement Project

FEMA FIRM MAP

Figure 3.2-3a

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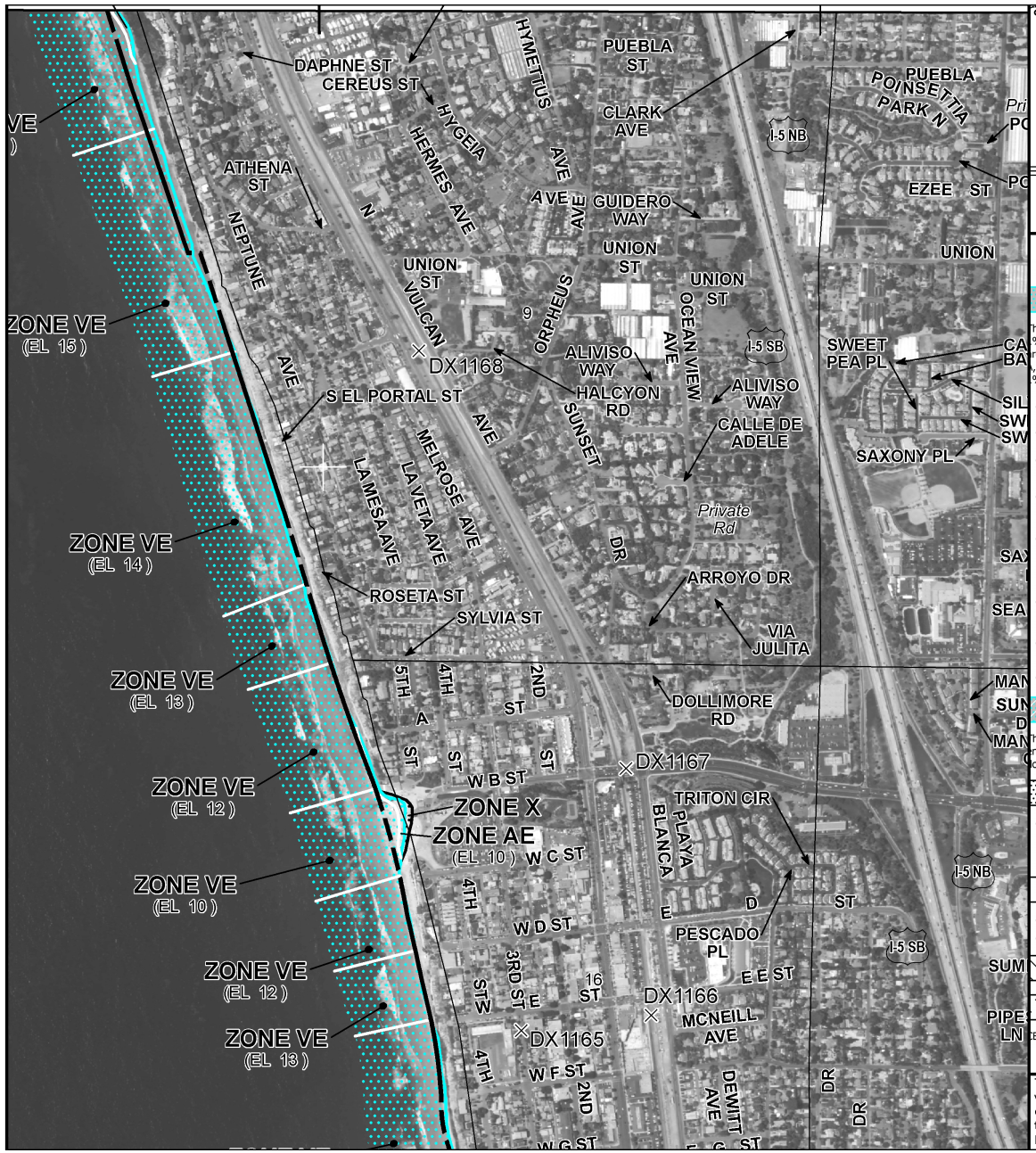

ance Program at 1-800-638-6620.

0 500 1,000 1,500 2,000 FEET

LEGEND

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The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
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ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
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North Coast Highway 101 Streetscape Improvement Project

FEMA FIRM MAP

Figure 3.2-3b

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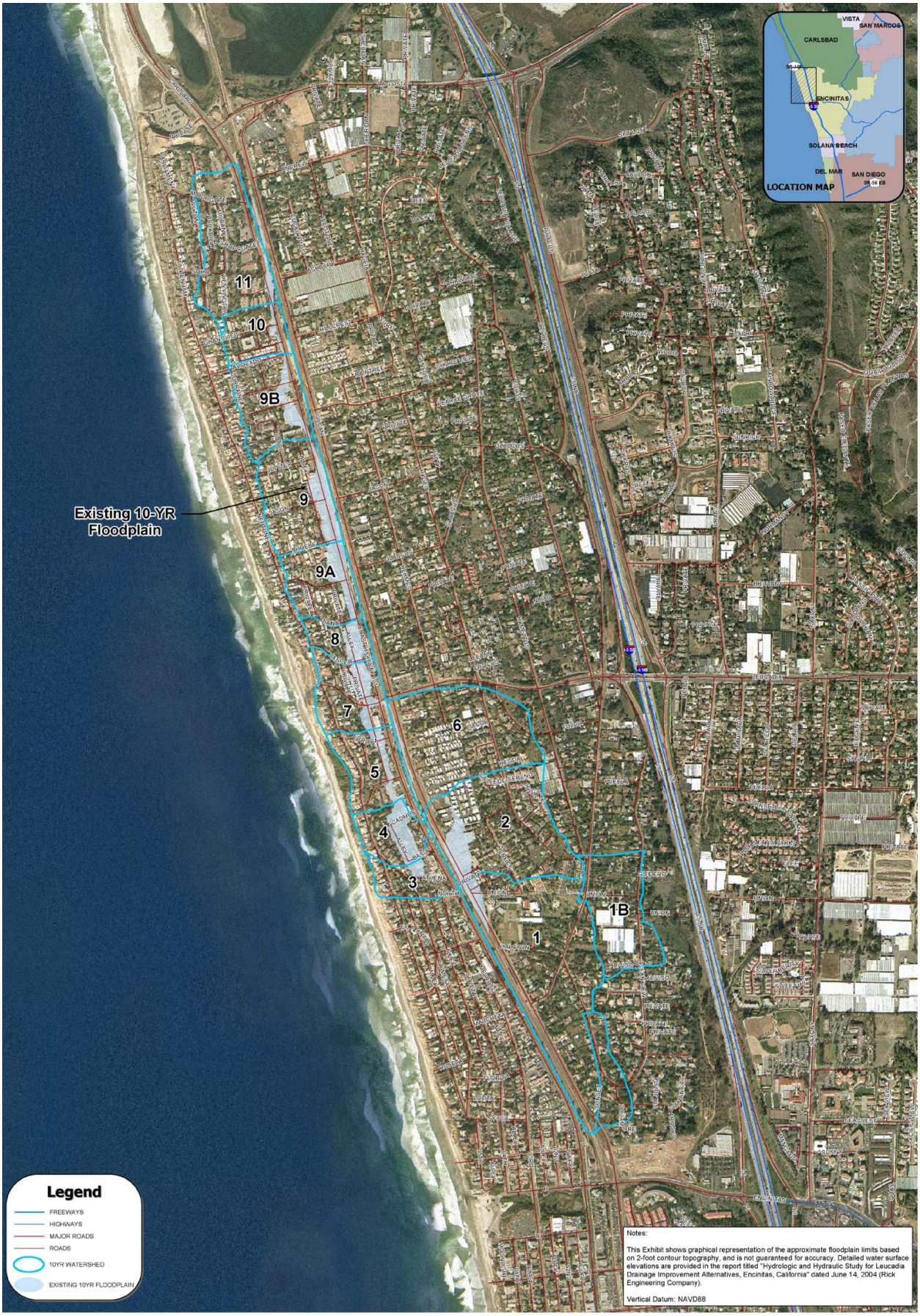

Michael Baker INTERNATIONAL

Source: Rick Engineering, 6/15/2004
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North Coast Highway 101 Streetscape Improvement Project

EXISTING 10-YEAR FLOODPLAIN AND WATERSHED MAP FOR LEUCADIA

Figure 3.2-3c

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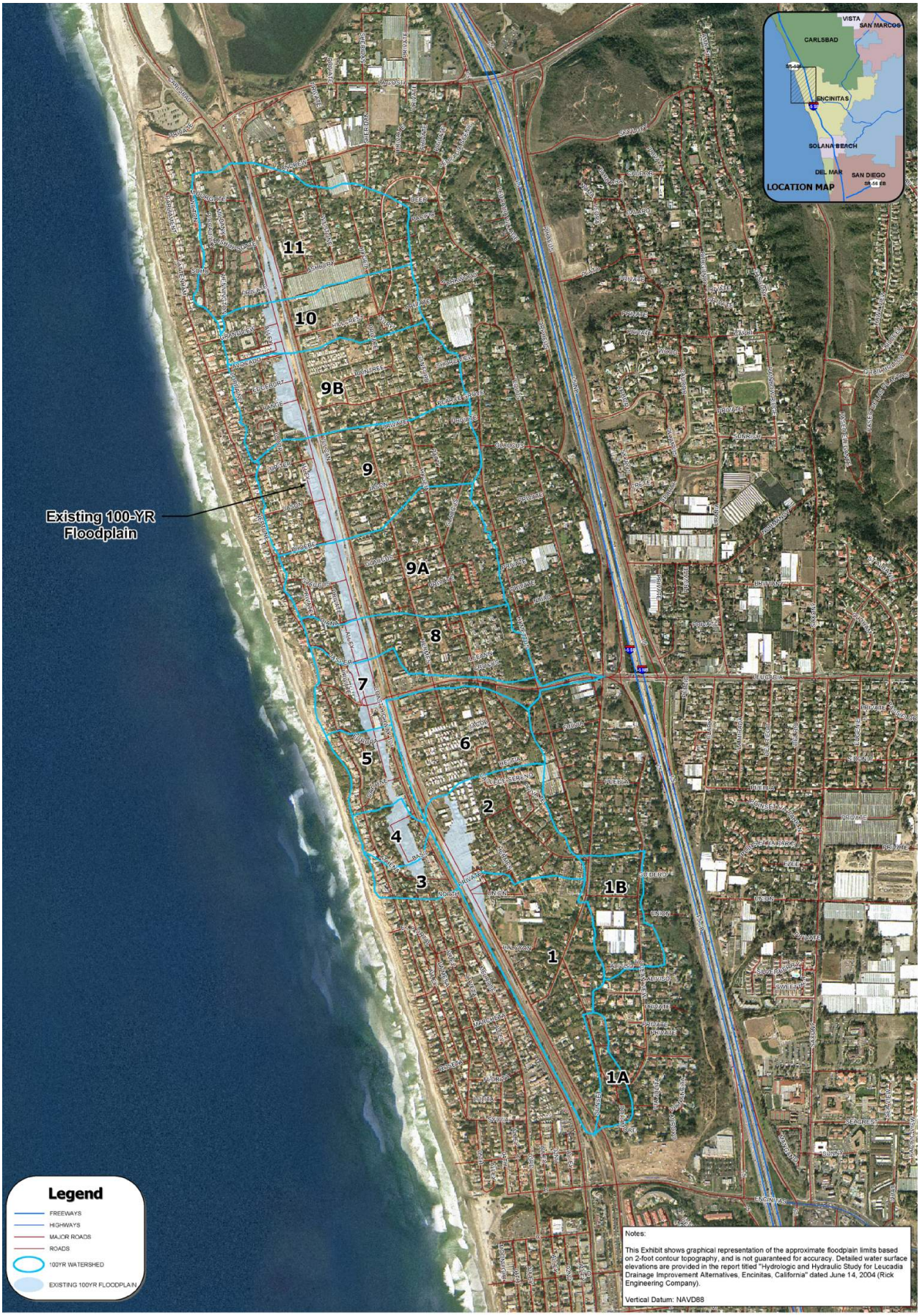

Michael Baker INTERNATIONAL

Source: Rick Engineering, 6/15/2004
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North Coast Highway 101 Streetscape Improvement Project

EXISTING 100-YEAR FLOODPLAIN AND WATERSHED MAP FOR LEUCADIA

Figure 3.2-3d

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