Leucadia Stormwater
WORKING DRAFT

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1 Background

Note to the Reader: This history is the author's current understanding of the folklore and anecdotes about the stormwater problems in Leucadia. While there is some documentation summarized best in the Rick Engineering study, that summary is now dated and no longer reflects the state of the current system, such as it is. Consequently, the sequence of events is roughly correct, part of the reason for exposing it here in narrative form is to submit it to criticism and correction.

Leucadia has a long history of stormwater problems that are fundamentally due to its topography, railroad right-of-way, coastal proximity and infrastructure mismanagement. As Figures 1, 2 show, Leucadia is a watershed characterized by surfacewater channels that isolate the higher elevations between the Interstate 5 freeway to the east and the sandstone coastal bluffs to the west. Floodwater channels exist in the low-lying areas along the railroad tracks and HWY101 and intrude into the residential and commercial properties on both sides of the railroad track although to a much greater degree on the west side of HWY101.

Figure 1: Leucadia and Old Encinitas. Batiquitos Lagoon, to the north, is at the left edge of the figure. Railroad tracks are in green.

Figure 2: Topography of Leucadia and Old Encinitas. Here the railroad tracks are in yellow.

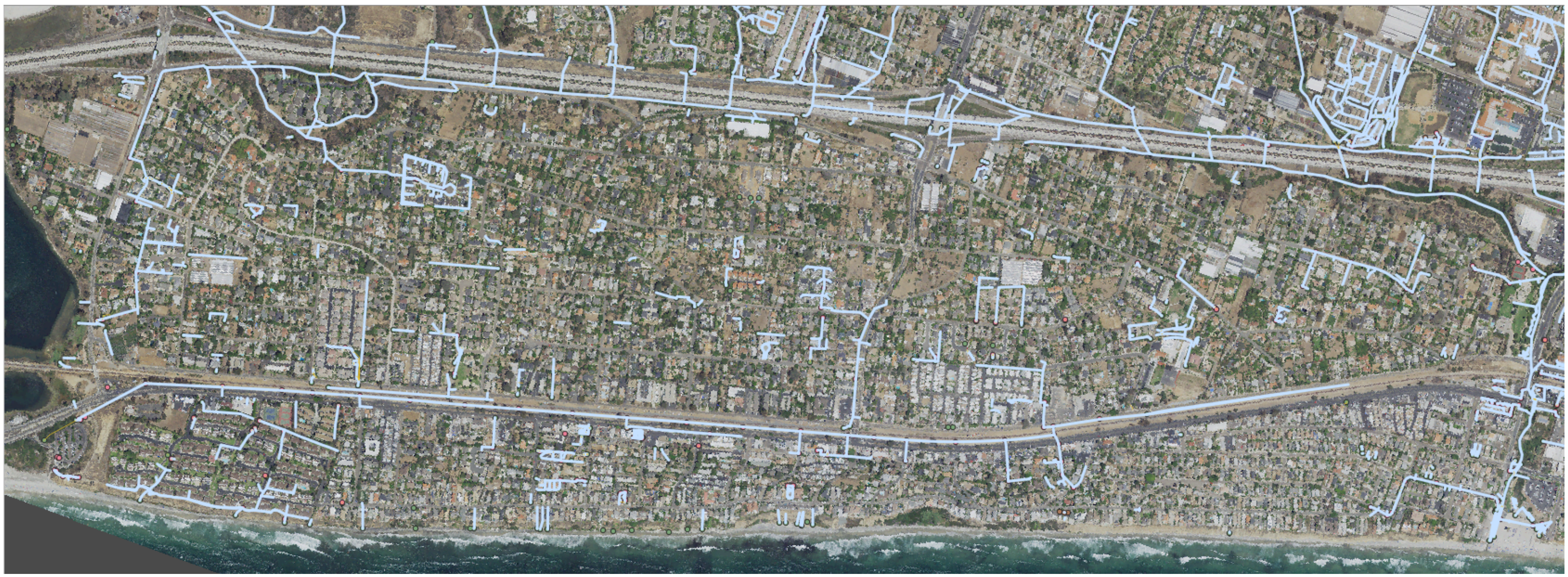

Figure 3: Storm sewer system in vicinity of Leucadia from a City of Encinitas GIS database circa 2018.

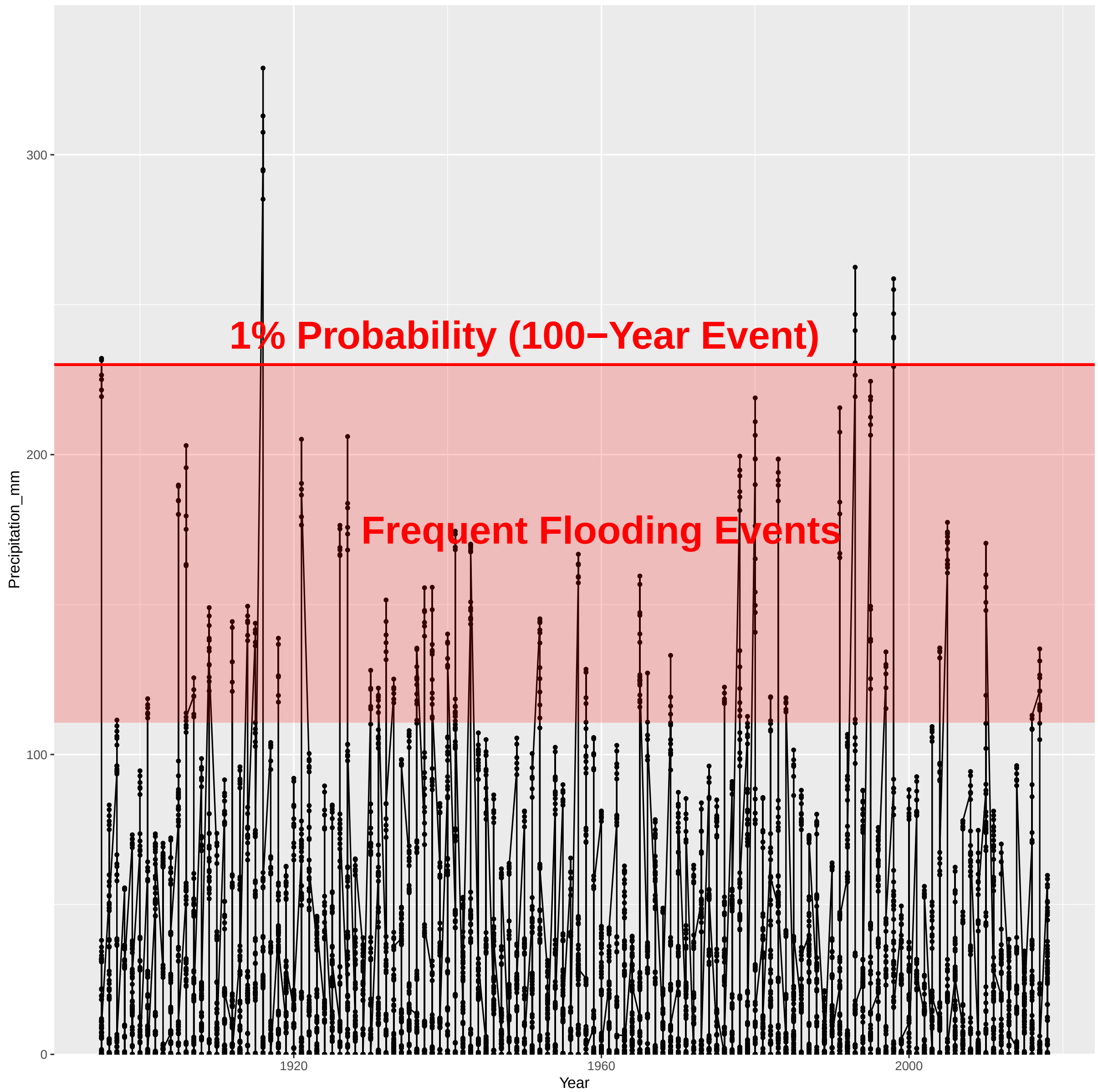

Figure 4: Monthly precipitation record for Leucadia (1895-Present). This figure also contrasts the 100-year flood events with more frequent flooding events.

1.1 History of Leucadia Flooding

In the mid-1990's, efforts began to mitigate the chronic storm flooding in Leucadia, possibly motivated by the impact of the heavy rains in the El Nino events of the late 1980 and early 1990s (Figure 4).

In 1998, there was a proposal to install a large diameter (10 foot) stormwater system to dump stormwater into Batiquitos Lagoon. That was not implemented presumably because it would not be permitted by the California Coastal Commission (CCC) and perhaps the Regional Water Quality Control Board (RWQCB) and was expensive. Instead, a *nuisance drain system* was built to remove water from the Leucadia Park area and dump it out at Ponto, on the west side of HWY101, in an area referred to as a *sand-pit*. The nuisance drain idea was pursued since it did not require the same permitting as the large system would have required,

Figure 5: Montage of flooding events in Leucadia (cf. Fig 4)

were it ever to be built, and was much less costly.

In 1999, a low-flow, Leucadia Storm Drain System was designed by City of Encinitas with Pasco Engineering and approved by the California Coastal Commission. In 2002, this system was built with Tide-Flex valves added and called the *Pasco Fiasco* since, presumably, it did not work well.

In 2003, City of Encinitas put in 24-inch pipe and disconnected a pipe at Grandview although this latter action is uncertain (Figure 3). This was the year that Rick Engineering published a study under contract to

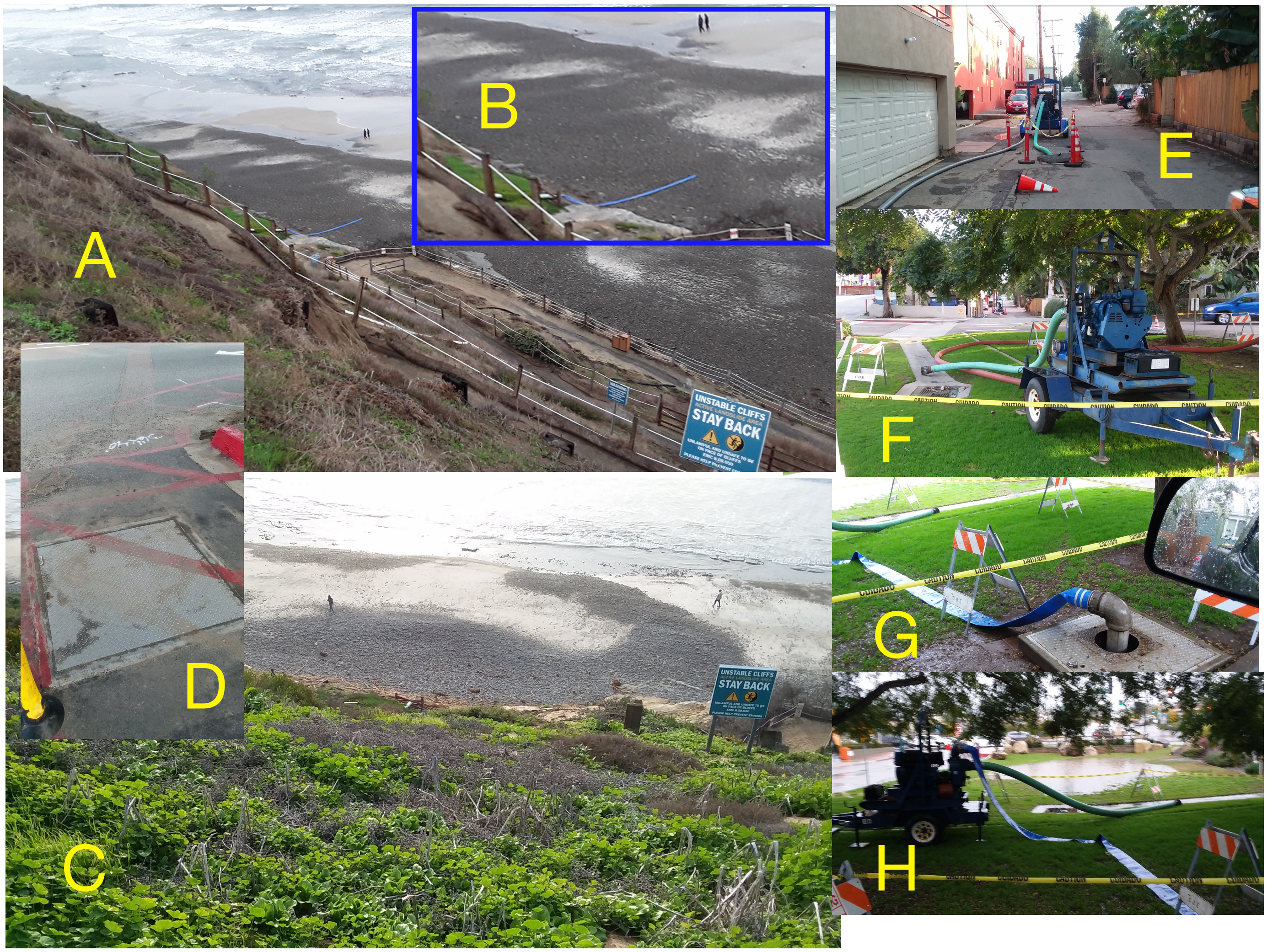

Figure 6: Stormwater pumping on to the beach at Beacons. (A) Blue outfall pipe on beach at Beacons. (B) Close-up of pipe. (C) No pipe on beach. (D) Pipe access manhole in Beacons parking lot. (E) Portable, City-operated pump in alley across from Leucadia Park shown flooded in Figure 5. (F) Portable, City-operated pump in Leucadia Park with connections to outfall pipe at Beacons (G), (H).

COE to look at the problem overall.

In 2004, a $1.4M Rick Engineering Study was commissioned to make the low-flow Pasco system work. This involved adding a sluice gate valve at RCP on Vulcan along with orifice plates to reduce flow rates and a trench east of railroad to divert flow south (north?). Dudek Engineering was involved in the construction. This study employed the HEC-RAS modeling system and provided substantive detail about the model configuration and the run results.

In 2006, railroad ballast problems emerged due to diverted flow in the trench so the trench was Gunite-ed to stablilize ballast by the railroad. This dramatically increased flow in the trench since it was now lined with impervious material and it no longer functioned as a dispersive, infiltrative system component. Instead of acting as a slow drain, it became a static sump which could back up.

From 2008-2010, residents on the west side opposed operation of the stormwater system as it was causing flooding due to overloading when the sluice gate was used to clear Old Encinitas water.

During 2011-2012, the San Diego County Grand Jury [?] recommended that the City Council of Encinitas take the actions to (1) develop an immediate plan to solve Leucadia's storm water (sic) flooding, (2) include storm water flow through the bluff at Leucadia Roadside Park as part of an overall storm drain fix, and (3) explore storm drain capital improvement tax funding for Leucadia via formation of a Special Assessment District. At the time, Jerome Stocks was Mayor and Tony Kranz ran for City Council on fixing drainage. June 20, 2012 Kranz requested the San Diego Grand Jury finding against Encinitas's handling of Leucadia storm drains be addressed and the public should be involved in the Encinitas response to the Grand Jury. Councilwoman Teresa Barth requested this be placed on an upcoming agenda and the resulting interaction during the council meeting is available in the video from the Encinitas City Council Meeting, June 20, 2012. The grand jury findings and recommendations were ignored.

In 2015, TetraTech did a study for the COE to evaluate alternatives for the Vulcan flooding [?]. This study used the HEC-HMS model and was fairly light-weight in details but focused strongly on bioretention and LID approaches to mitigating the stormwater problem.

During 2016-2017, the COE Engineering department, Ed Dean, designed a pipe from Union and Vulcan to the 78 inch pipe at Leucadia Pizza draining to Cottonwood Creek but this was never implemented. In 2018, Ed Wimmer replaced Chris Magnitsky (sp?) and that more or less brings us up to today.

In July, 2018, I reviewed the hydrology section of the Streetscape EIR and deemed it specious and inadequate. This report was sent to the COE and to the Coastal Commission as part of the hearing on the coastal development permit (CDP) exemption requested by the COE to implement the Streetscape project.

In late 2019, the COE contracted with Q3 to perform a hurry-up hydrological analysis of the Leucadia stormwater problems as part of a longer, larger hydrological analysis. The goal was to speed-up the analysis so the problem could be addressed within the Streetscape project without causing delays to that project. The currently proposed solution is to put a large diameter pipe under HWY101 and terminate it in the Batiquitos Lagoon without treatment.

Today, there are four (4) methods of disposing of the stormwater. They are: (1) gravity-fed flow to an outfall pipe at Ponto (north) with input from multiple inlets including the Leucadia Park cistern. Although there are two pipes at this outfall location, only one of these pipes, the 24-inch diameter pipe, is believed to be in operation at the time of this writing. (2) Vulcan/Union Sluice Valve (east of the railroad near Union Street and Vulcan Avenue). (3) Event-related pumping of stormwater out of the cistern in Leucadia Park over the bluff onto the beach at Beacon Beach. (4) Cottonwood Creek Outfall (south), In summary, the claim is made that Vulcan floods because of the Old Encinitas flooding problem but the Leucadia system works as long as the sluice valve is not employed to relieve the flooding east of the railroad.

2 Scientific Background

The main issues about appropriate management of stormwater pertain to the following questions: (1) What is the volume of stormwater that must be handled? (2) What is it contaminated with and where is it coming from? (3) How concentrated are the contaminants? (4) What methods are required to minmize the hazards of coastal pollution by storms? [?] [?]

2.1 Pollutants

[?] [?] Toxic pollutants are listed in Electronic Code of Federal Regulations (e-CFR), Title 40/Chapter I/Subchapter N/Part 401/§401.15, Title 40: Protection of Environment,PART 401—GENERAL PROVISIONS. These include: (1) Acenaphthene (2) Acrolein (3) Acrylonitrile (4) Aldrin/Dieldrin1 (5) Antimony and compounds (6) Arsenic and compounds (7) Asbestos (8) Benzene (9) Benzidine (10) Beryllium and compounds (11) Cadmium and compounds (12) Carbon tetrachloride (13) Chlordane (technical mixture and

TABLE 3-3 Relative Sources of Parameters of Concern for Different Land Uses in Urban Areas

Problem Parameter	Residential	Commercial	Industrial	Freeway	Construction
High flow rates (energy)	Low	High	Moderate	High	Moderate
Large runoff volumes	Low	High	Moderate	High	Moderate
Debris (floatables and gross solids)	High	High	Low	Moderate	High
Sediment	Low	Moderate	Low	Low	Very high
Inappropriate discharges (mostly sewage and cleaning wastes)	Moderate	High	Moderate	Low	Low
Microorganisms	High	Moderate	Moderate	Low	Low
Toxicants (heavy metals/organics)	Low	Moderate	High	High	Moderate
Nutrients (eutrophication)	Moderate	Moderate	Low	Low	Moderate
Organic debris (SOD and DO)	High	Low	Low	Low	Moderate
Heat (elevated water temperature)	Moderate	High	Moderate	High	Low

NOTE: SOD, sediment oxygen demand; DO, dissolved oxygen.
SOURCE: Summarized from Burton and Pitt (2002), Pitt et al. (2008), and CWP and Pitt (2008).

Figure 7: Examples of stormwater parameters of concern [**?**].

metabolites) (14) Chlorinated benzenes (other than di-chlorobenzenes) (15) Chlorinated ethanes (including 1,2-di-chloroethane, 1,1,1-trichloroethane, and hexachloroethane) (16) Chloroalkyl ethers (chloroethyl and mixed ethers) (17) Chlorinated naphthalene (18) Chlorinated phenols (other than those listed elsewhere; includes trichlorophenols and chlorinated cresols) (19) Chloroform (20) 2-chlorophenol (21) Chromium and compounds (22) Copper and compounds (23) Cyanides (24) DDT and metabolites (25) Dichlorobenzenes (1,2-, 1,3-, and 1,4-di-chlorobenzenes) (26) Dichlorobenzidine (27) Dichloroethylenes (1,1-, and 1,2-dichloroethylene) (28) 2,4-dichlorophenol (29) Dichloropropane and dichloropropene (30) 2,4-dimethylphenol (31) Dinitrotoluene (32) Diphenylhydrazine (33) Endosulfan and metabolites (34) Endrin and metabolites1 (35) Ethylbenzene (36) Fluoranthene (37) Haloethers (other than those listed elsewhere; includes chlorophenylphenyl ethers, bromophenylphenyl ether, bis(dichloroisopropyl) ether, bis-(chloroethoxy) methane and polychlorinated diphenyl ethers) (38) Halomethanes (other than those listed elsewhere; includes methylene chloride, methylchloride, methylbromide, bromoform, dichlorobromomethane (39) Heptachlor and metabolites (40) Hexachlorobutadiene (41) Hexachlorocyclohexane (42) Hexachlorocyclopentadiene (43) Isophorone (44) Lead and compounds (45) Mercury and compounds (46) Naphthalene (47) Nickel and compounds (48) Nitrobenzene (49) Nitrophenols (including 2,4-dinitrophenol, dinitrocresol) (50) Nitrosamines (51) Pentachlorophenol (52) Phenol (53) Phthalate esters (54) Polychlorinated biphenyls (PCBs) (55) Polynuclear aromatic hydrocarbons (including benzanthracenes, benzopyrenes, benzofluoranthene, chrysenes, dibenzanthracenes, and indenopyrenes) (56) Selenium and compounds (57) Silver and compounds (58) 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (59) Tetrachloroethylene (60) Thallium and compounds (61) Toluene (62) Toxaphene (63) Trichloroethylene (64) Vinyl chloride (65) Zinc and compounds

3 Regulations

3.1 Federal

The Federal Clean Water Act (Clean Water Act) prohibits certain discharges of storm water containing pollutants except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES stormwater program regulates some stormwater discharges from three potential sources: municipal separate storm sewer systems (MS4s), construction activities, and industrial activities.

The National Pollutant Discharge Elimination System (NPDES) regulates storm water discharges from municipal separate storm sewer systems (MS4s) throughout the country. U.S. EPA defines an MS4 as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) owned or operated by a State (40 CFR 122.26(b)(8)).

Pursuant to the Federal Water Pollution Control Act (Clean Water Act) section 402(p), storm water permits are required for discharges from an MS4 serving a population of 100,000 or more. The Municipal Storm Water Program manages the Phase I Permit Program (serving municipalities over 100,000 people), the Phase II Permit Program (for municipalities less than 100,000), and the Statewide Storm Water Permit for the State of California Department of Transportation. The State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (collectively, the Water Boards) implement and enforce the Municipal Storm Water Program.

3.2 California

The California State Water Resources Control Board Storm Water Program provides guidance on the regulatory framework for handling stormwater. *Storm water is defined by US EPA as the runoff generated when precipitation from rain and snowmelt events flows over land or impervious surfaces without percolating into the ground. Storm water is often considered a nuisance because it mobilizes pollutants such as motor oil and trash. In most cases, storm water flows directly to water bodies through sewer systems, contributing a major source of pollution to rivers, lakes, and the ocean. Storm water discharges in California are regulated through National Pollutant Discharge Elimination System (NPDES) permits. However, storm water may also act as a resource and recharge to groundwater when properly managed. The Water Boards are actively involved in initiatives to improve the management of storm water as a resource. For more information read our Storm Water Management Fact Sheet*

3.2.1 California Coastal Commission

According to LUP Update Guide, Section 3. Water Quality Protection:

The Coastal Act requires the protection and enhancement of marine and coastal water resources, including water quality. Nonpoint source (NPS) pollution, also called polluted runoff, is the nation's leading cause of water pollution both at the coast and inland. As stormwater runoff flows across the land, it picks up natural and human-made pollutants originating from many diffuse sources, and may transport these pollutants into coastal waters, including the ocean, rivers, streams, wetlands, estuaries, lakes, and groundwater.

Protection of coastal water resources requires not only minimizing pollutants in runoff, but also minimizing alterations in a site's natural hydrologic balance, including the runoff flow regime (i.e., runoff volume, flow rate, timing, and duration). Because of the dispersed nature of NPS pollution and the cumulative impact of changes in runoff flows within a watershed, managing land uses both on a site-specific and a regional level is critical.

In California, the Coastal Commission and the State Water Resources Control Board (State Water Board), in coordination with the nine Regional Water Quality Control Boards (Regional Water Boards), have developed a state NPS Program that provides a coordinated statewide approach to managing NPS pollution, and conforms to federal Clean Water Act and Coastal Zone Management Act requirements for states to address NPS pollution. Many California state agencies are working collaboratively to implement the state's NPS Program Plan. These efforts include the Storm Water and Total Maximum Daily Load (TMDL) programs administered by the State and Regional Water Boards statewide, as well as coastal specific development planning and permitting programs of the Coastal Commission.

In the coastal zone, certified Local Coastal Programs (LCPs) are a key mechanism for achieving a high standard for coastal water resource protection. LCPs provide an important planning and regulatory framework for enhancing coastal NPS pollution control and minimizing changes in watershed hydrology that may adversely impact coastal resources. LCPs should be updated to include policies, standards, and ordinances that establish coastal water resource protection strategies and priorities for development, both during construction and over the life of a project.

3.2.2 San Diego Regional Water Quality Control Board (SD-RWQCB)

In response to an inquiry regarding pumping stormwater over the bluff onto the beach at Beacons, the San Diego Regional Water Quality Control Board responded:

According to the Regional MS4 Permit, outfall, storm water, and non-storm water are all included. The COE has a permit to discharge to their MS4 system from the ***San Diego Water Board****. The outfall and pump you described would fall under our permit regulatory requirements regardless of the size of the outfall. The definition of MS4 includes facilities owned and operated by the City. It is not defined by a size.*

We would expect the City as an agency under our Regional MS4 Permit to implement BMPs to the MEP for this system, inclusive of implement its requirements in its JRMP and the BMP Design Manual when applied to projects that meet certain criteria to reduce pollutants in storm water. If the City is not implementing its policies, procedures and ordinances it is also not meeting the MEP standard to reduce pollutants in storm water.

Water Quality Improvement Plan, the City included its JRMP in this Plan to meet the numeric goals and schedules of the high priority water quality conditions. The City is in the Carlsbad WQIP: `https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/wqip.html`

Regional MS4 Permit, provision E contains the JRMP requirements. Provision E. 3 development planning addresses structural BMP design requirements and flow control for projects that meet certain size and land use triggers. `https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/docs/2015-1118_AmendedOrder_R9-2013-0001_COMPLETE.pdf`

In general, we would consider what you described to fall under the definition of storm water and not non-storm water.

3.2.3 Encinitas

The City of Encinitas has municipal code specifying Stormwater Management requirements.

4 City of Encinitas Stormwater Outfalls: New Construction and Major Modifications

The current storm sewer outfall for Leucadia is at Ponto (Figure 12, 9). The COE has contracted for hydrologic analysis and storm sewer design work under the Streetscape project, it has already begun development of modifications to the Batiquitos Lagoon outfalls (Fig. 8, 10, 11) under the cover of other construction without disclosing it it in the context of the the Streetscape Coastal Development Permit. These major modifications fly in the face of the claim of no-impact attendant on the recent modification to the Streetscape EIR filed with the Coastal Commission November, 2019.

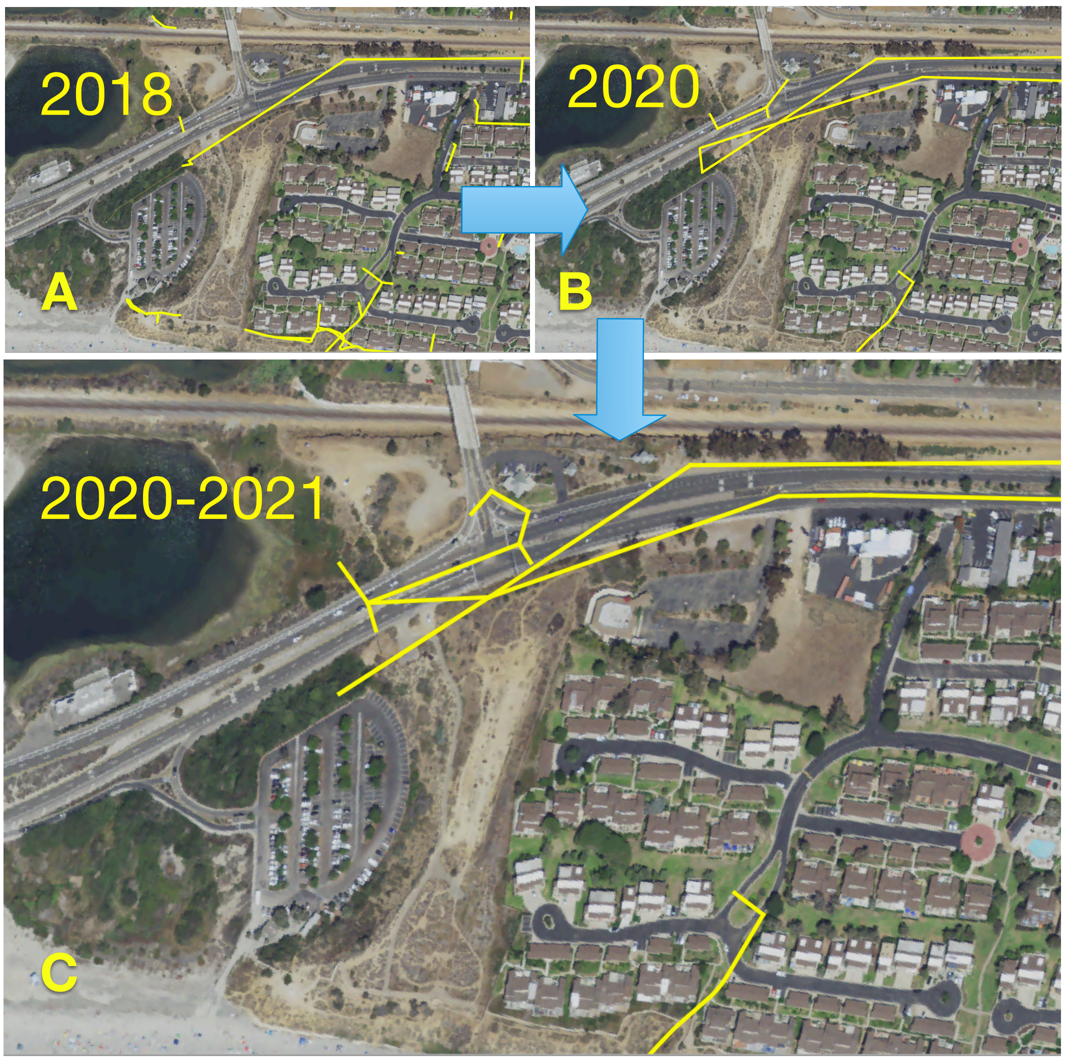

Figure 8: Stormdrain outfall development at La Costa Avenue and HWY 101. (A) City of Encinitas (COE) GIS database representation in 2018. (B) Represented as 'Existing' in contractor submission to COE in December 2019 but actually under construction in January 2020 (cf. Figs 10, 11). (C) Proposed $5M stormdrain outfalls now being designed under $667K add-on to M. Baker Streetscape contract.

Figure 9: Storm sewer outfall into Batiquitos Lagoon.

Figure 10: New construction east of HWY101 into Batiquitos Lagoon. This work was interrupted by the Regional Water Quality Control Board.

Figure 11: New construction on 2020-01-17 undercover.

Figure 12: Pre-existing disconnected infrastructure.

4.1 Long-Term Monitoring Program

There is only one water quality monitoring location in the area and that is located at Moonlight Beach for Cottonwood Creek bacteria.

A monitoring program for Batiquitos Lagoon should include components for (i) biological (viruses, bacteria, metabolites) (ii) chemical (aromatics, aliphatics, metals, long-lived toxics) (iii) physical (sediment, erosion, concentrating sinks)

1. Sampling sites
   (a) Grab-sampling of water and sediments (3-4) along a transect anchored at each and running in the direction of water flow.
   (b) Grab-sampling of water flowing from the outfalls.
   (c) Grab-sampling of water from the inlet to lagoon backwater on tidal cycle (in, null, out) during wet and dry weather in association with storm events (before, during, after).
2. Number of samples ≥ 12: 3 transects with 4 samples each
3. Small boat required for sampling in lagoon (maybe rowboat, need dry surface for labelling and computer equipment).

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