

# **STORM DRAINS IN LEUCADIA**

## ***SUMMARY***

The coastal community of Leucadia has a chronic history of rainwater flooding. This occurs primarily in the vicinity of its main north-south routes, N. Coast Highway 101 and N. Vulcan Avenue. These two routes are separated by the single railroad track of the North County Transit District (NCTD). Citizens have initiated numerous requests and ideas for improvement over the years.

The 2011/2012 San Diego County Grand Jury (Grand Jury) conducted a detailed review of Leucadia's flooding that examined several issues, including past efforts to improve drainage. The Grand Jury found that existing storm water infrastructure is not sufficient to serve the needs of Leucadia. No currently-funded capital projects address Leucadia's storm drains.

There is an immediate need for a comprehensive plan to improve drainage. One detailed recommendation includes a limited scope project to relieve rain accumulation at the lowest point, a location known as Leucadia Roadside Park. This involves drilling a drainage outlet westward through the bluff base that would empty onto the beach. A wider range suggestion involves formation of a Special Assessment District to fund storm water drainage improvements in Leucadia.

## ***INTRODUCTION***

Leucadia is a community within the City of Encinitas in north coastal San Diego County. It is the northwestern part of the City with boundaries generally defined as (1) from Interstate 5, west to the ocean and (2) between the freeway-access streets of Encinitas Boulevard to the south and La Costa Avenue to the north. Since it was first settled, this part of Leucadia in Encinitas has been subject to rainwater inundation. Despite the profusion of possible storm drain fixes, Leucadia has never achieved a consistently workable system.

## ***PROCEDURE***

The Grand Jury interviewed a number of stakeholders in the Leucadia storm drain system, including citizens and design professionals. City government personnel were questioned as to current and future plans for infrastructure improvement. Agencies such as the California Coastal Commission and the North County Transit District also were contacted for supporting information.

Documents were obtained from these sources in addition to published information from public web sites:

- Leucadia Drainage & Sewer Force Main, CMD95A & CEE97A, (The “Leucadia Drainage Project”), by W.A. Pasco Engineering, Inc., Plan Sheets 1 through 27, dated 8/3/2001.
- Preliminary Hydrologic and Hydraulic Study for Coast Highway 101 in the City of Encinitas, California by Rick Engineering Company, dated June 25, 2003.
- Addendum to Hydrologic and Hydraulic Study for Leucadia Drainage Improvement Alternatives, Encinitas, California by Rick Engineering Company, dated January 28, 2005.
- “FLOOD DAMAGE: Evolving laws and policies for an ever-present risk,” Article by J. David Rogers, Presented at the San Francisco Insurance Claims Forum, April 16, 1997.
- Special Assessment District (SAD), Re: California Property Tax Information, [www.californiataxdata.com](http://www.californiataxdata.com).

Field trips brought jurors in small groups to the Leucadia area. Existing storm water drain facilities were examined first-hand.

The Grand Jury addressed what improvements were feasible for the area’s drains. Complex flood analyses had been prepared by the Rick Engineering Company in the 2003/2005 timeframe. Special Assessment Districts (SADs) were reviewed as a possible source of funding.

## ***DISCUSSION***

### ***Early Work, Including the Leucadia Drainage Project***

Between Encinitas Boulevard and La Costa Avenue, a distance of about 2.5 miles, the area along the railroad corridor follows a gentle plateau that flows downward to the north. Steep bluffs rise to the west and parallel the ocean. Toward the east, ground level slopes upward gradually to Interstate 5. A third main road, Leucadia Boulevard, lies about midway between the other two. Leucadia Boulevard runs westward from the I-5 interchange, through Leucadia Roadside Park, and terminates at the bluff crest in a spot known as Beacons Beach (See area map—Attachment A).

Much of the Leucadia rain water flooding occurs west of N. Coast Highway 101. Topography undulates northward, forming a series of shallow low areas (i.e. “sumps”) adjacent to the road. The most troublesome low-point is at Leucadia Roadside Park where Leucadia Boulevard crosses Highway 101.

In 2003 the City of Encinitas had finished the Leucadia Drainage Project, which installed a primary drain pipe (trunk line) of 24” diameter that flowed north. Water flows directly into Batiquitos Lagoon at the border with the City of Carlsbad. A maximum 24” outlet to the lagoon was dictated by the Coastal Commission. Analyses had determined that a much larger storm system with an outlet on the order of 9’ diameter would be required to

accommodate 100-year floods for this large watershed. As a result the project was forced into under-design from the beginning.

Nonetheless, the Project consolidated a number of previously-built drainage features. Connection Points 1 through 4 numbered from south to north brought all of these into the new system. Also, several new lateral branches with letter designations (i.e. Lines A through G) were added at the south sector. These connect to the main trunk line at sunken vaults. Anticipating some back-up water due to the 24” outlet restriction, each of the branch lines were equipped with flexible neoprene check valves (“Tide Flex Valves”) where they connected at the vaults. These prevent reverse-flow back into the upstream branch lines whenever the main trunk line itself becomes over-loaded.

Early on, a permanent electric pump had been installed near Phoebe Street to the west of N. Coast Highway 101. This pump lifts rainwater collected from three low points in that vicinity and now discharges into the main trunk line (Connection 2). The Leucadia Drainage Project instituted improvements to this pump station with newer, larger pumps.

The new pumps included grinding features to reduce any debris that might enter the system, in short – make the water flow more easily. Smaller diameter, nuisance drain systems (NDSs) had been designed and built at various times, also. These designs were often the work of citizens with concurrence of the City of Encinitas to ease localized flooding, such as near Leucadia Roadside Park.

Amidst this network of pumps, valves, and piping, yet another storm drain feature was constructed in 2004. This took the form of an open ditch at the south that starts near Orpheus Park. Storm water then flows northward, which during heavier rains causes water to pond near a mobile home park and the Paul Ecke School. Flow direction of this ditch has been the subject of some controversy and is discussed later in this report.

#### ***More Modifications and More Studies***

Despite these many efforts the entire system came under review again in 2003–2005. The recently built Leucadia Drainage Project unexpectedly led to rainwater collection at new and unfamiliar locations. Citizens were surprised and in some cases upset. Encinitas hired the Rick Engineering Company to study Leucadia flooding under the new system. They performed a full hydrological analysis of the watershed.

An early finding by Rick Engineering (RE) showed that segments of the system needed to have their water flows slowed down. Surges from several branch feeders tended to overload downstream locations along the new trunk line. One fix recommended installation of flow-limiting orifices at these points. This way the overall capability was maintained and drainage eventually occurred, but at a slower rate.

Another modification involved installation of a new drain system valve. Located south of Leucadia Boulevard and east of the railroad, this “sluice-gate” allows an under-the-

railroad cross-connection between east-side storm drain piping and the nuisance drain system (NDS) near Leucadia Roadside Park. This valve is normally shut and, under most storm conditions, opening this valve would overload the local NDS. Flooding at the Park and vicinity would occur – virtually every time it rains.

During heavier rain events (typically greater than 0.5-inch) emergency crews from the Encinitas Fire Department install a portable gas-powered pump at the Park.<sup>1</sup> Under these conditions, the pump lifts water upward through temporary hoses laid out on Leucadia Boulevard. At the crest of the Beacons Beach bluff, these hoses are connected to semi-permanent piping that directs the pumped unfiltered water to a beach-level outlet. From there water flows out to the ocean. In December 2011, flooding occurred at Leucadia Roadside Park during a one-inch rainstorm. First-Responder crews were called out to man the pump.

But the RE study went much further than to identify quick solutions. Using computer hydrological techniques, it analyzed the entire drainage system. Detailed reports and an extensive map showed the extent of flooding anticipated during 10-year and 100-year storm events for Leucadia. Much interest focused on protecting property parcels from flooding. Currently some 116 parcels are at risk during a 10-year storm and 152 parcels are at risk in the 100-year floodplain.

Most significantly, this study proposed various capital improvements as solutions. These appeared in both the Preliminary report of June 25, 2003, and the Addendum report of January 28, 2005. Alternatives included:

- Through-the-buff overflow drain at Leucadia Roadside Park
- Re-grading the NCTD right of way
- Re-grading along Highway 101 (two options)
- Massive upsizing of the existing system (the 10-year / 100-year floods)
- Combinations of some plans

The 100-year option, if constructed, would create the new 9' diameter outlet pipe to Batiquitos Lagoon noted earlier in this report. Table 1 is extracted (“Table 9”) from the RE report. The various alternatives included cost estimates.

Installation methods typically break down into two main types. “Conventional” work digs a trench, places piping or other utility structure(s), then buries and re-grades. “Tunneling” involves any of several specific kinds of boring techniques that run the full length of a project, in some instances over a mile. To date, Encinitas has not pursued any of these alternatives. Nor did the Grand Jury attempt to scrutinize all these complex options.

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<sup>1</sup> City of Encinitas Public Works / San Dieguito Water District, Standard Operating Procedures, **Inclement Weather Action Plan**, PW-08, Dated 1/24/2008

The table highlights the relative costs versus benefits among plans, even for 2005 dollars. What emerges is that **Alternative 1**, a 4' diameter tunnel drilled through the bluff at Leucadia Park, provides the most benefit (60% of affected parcels) for the most frequent (10-year) storms for the least cost (\$1.5 -- \$2.5 million, ca 2005). Storm water would drain by gravity from this low point, eliminating the need for emergency crews. Bluff tunneling is acceptable to the Coastal Commission.<sup>2</sup>

### ***NCTD Rail System***

Some controversy accompanied the 2004 south-end drainage ditch as noted earlier. Northward flow was challenged as being counter to natural surface runoff. Conflicting opinions insisted the original design concept in the 1995 timeframe was to flow south from Orpheus. Under such a design, storm water would drain into Cottonwood Creek Park at Encinitas Boulevard, and eventually to the ocean at Moonlight Beach. Given the generally level topography, this concept is technologically doable. Citizens have proposed this idea before. The primary hindrance comes from a long-accepted California case law provision about natural watersheds.<sup>3</sup> Runoff from one is not allowed to flow into another. The Grand Jury needed verification as to which flow scenario is most consistent with the facts.

The north-south train track has been in place well over one hundred years. Because the track bed has minimal cuts and fills, it approximates original surface topography. The Grand Jury obtained current rail elevation data to help corroborate assumptions about natural storm water runoff.<sup>4</sup> Results confirmed a generally northward surface flow. Once past an initial dip near the Encinitas Boulevard Bridge, the highest rail elevation occurs about one-third mile north near Orpheus Avenue. From there rails descend 15 vertical feet to Leucadia Boulevard then continue down until they pass under the La Costa Avenue Bridge.

The rail system in many ways dominates the Leucadia corridor. One alternative shown in the RE table, **Alt 2 – Option A**, involved re-grading the NCTD property. However, one of the Grand Jury interviewees stated that Encinitas could no longer build storm water drain improvements within this 100 ft. Right-of-Way. But yet another witness mentioned a possible future benefit. Hypothetically, NCTD might someday construct a sunken, dual-track option through Leucadia. This would be similar to work done several years ago in Solana Beach to the south. If ever completed, it would create a deep, permanent, low-point ditch through Leucadia. In addition to eliminating the grade crossing at Leucadia

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<sup>2</sup> Coastal Commission letter to the City of Encinitas, Subject: Highway 101 Corridor Drainage Plan Proposed Negative Declaration, dated November 21, 1995

<sup>3</sup> Keys v. Romley, 64 CAL.2D 396, 04/11/1966

<sup>4</sup> North San Diego County Transit District (NCTD), San Diego Northern Track Chart, NCTD Track Chart 07.dgn, Date: 3-May-2004

Boulevard, such a mega-project would probably resolve most if not all of the district's storm water problems.

### ***Current Conditions***

The storm water drain system in Leucadia remains substantially unchanged since 2004. Recent civic improvements in the area consist of a better-designed railroad grade crossing at Leucadia Avenue and a scenic beautification project along the north-south corridor.

As currently designed and operated the storm drain system requires a delicate balancing act that evens-out water distribution for most rain events. The best hope is to minimize water accumulation wherever feasible. Water cannot drain out quickly enough for any significant storm without water impounding in some places. And this must be accompanied by First-Responder actions (i.e. Fire Department) in any case.

All-in-all the Grand Jury found no shortage of ideas about improving Leucadia's storm drains. As with most projects there are multiple ways to reach a solution. And controversy always emerges, seemingly without limit.

**Alternative 1** of Table 9 in the RE Addendum report promises the most improvement for the least cost. In their 2003 report, RE went so far as to show a photo-simulation of how the outfall structure would look from the beach. Despite Coastal Commission concurrence with this approach, some views still resist any horizontal drilling through the westward bluff. Soil de-stabilization and potentially unknown geologic conditions are the stated reasons.

Cost of any improvement always becomes an issue, especially for a moderate-size city whose annual budget runs typically less than \$60 million. Earlier efforts to establish a Redevelopment Zone for Leucadia had been rejected. Also, recent budgetary events (ca. 2011) at the State level effectively eliminated Redevelopment. Creating a Special Assessment District (S.A.D.) for Leucadia storm drain improvement remains feasible, however. To date Encinitas has not implemented this method of tax-levying.

**Table 1: 2004 Summary of Benefits and Costs for Each Alternative**

<b>Alternative</b>	<b>Existing Parcels In 10- Year Storm</b>	<b>% Parcels Removed 10-year Storm</b>	<b>Existing Parcels in 100-year Floodplain</b>	<b>% Parcels Removed 100-year Storm</b>	<b>Approx. Reduction in Flood Depth 100-year (ft.)</b>	<b>Cost Estimate</b>
<b>Alt 1</b> Leucadia Overflow	116	60%	152	3%	0.1	\$1.5 - \$2.5 M
<b>Alt 2 – Option A</b> NCTD Grading	116	0%	152	16%	1.1	\$1 M
<b>Alt 2 – Option B</b> Hwy 101 Grading	116	2%	152	18%	2.1	\$3.5 M
<b>Alt 2 – Option C</b> Hwy 101 Grading	116	16%	152	28%	2.2	\$4.5 M
<b>Alt 3</b> 100-yr Storm Drain System	116	100%	152	100%	N/A	\$30 – \$34 M (tunneling methods) \$34 – 39 M (3-phase tunneling) \$40 M (conventional methods) \$42 M (3-phase conventional)
<b>Alt 4</b> 10-yr Storm Drain System	116	100%	152	7%	0.4	\$18 - \$22 M (tunneling methods) \$36 M (conventional methods)
<b>Alt 5</b> Alt 1 + Alt 2, Option C	116	75%	152	31%	2.2	\$6 - \$7 M

**(Storm Water Drainage Capital Improvements: Table 9 of “Addendum to Hydraulic Study for Leucadia Drainage Improvement Alternatives, Encinitas, California, by Rick Engineering Company, January 28, 2005)**

RE's recommendation in 2005 advocated construction of the full-scale, 100-year drain system. But in addition to the great cost, some question whether such a large, 9' diameter outfall pipe into Batiquitos Lagoon would ever meet with Coastal Commission approval.

### ***FACTS AND FINDINGS***

***Fact:*** The Leucadia district of Encinitas floods routinely during storm events.

***Fact:*** First-Responder, emergency personnel mobilize in Leucadia for rain events that exceed 0.5 inches.

***Fact:*** The most recent Leucadia storm drain modifications were completed in 2004.

***Fact:*** Extensive engineering studies completed in 2005 identified areas in Leucadia that remain vulnerable to inundation during storms.

**Finding 01:** Further improvements to the Leucadia storm water drainage system are necessary.

***Fact:*** Leucadia storm drain design choices are hampered by the 24" diameter size limit imposed on outfall piping to Batiquitos Lagoon due to a California Coastal Commission ruling.

***Fact:*** Water flow near the north end outlet over-loads for most storm scenarios.

***Fact:*** Micro-tunneling through the Leucadia ocean bluffs for purposes of storm drain installation is acceptable to the California Coastal Commission.

***Fact:*** Constructing an overflow drain for Leucadia Roadside Park westward through the bluff at Beacons Beach was an alternative recommended by a major engineering study.

**Finding 02:** Storm drainage through the Leucadia bluffs at Beacons Beach and possibly at other locations should be considered by the City of Encinitas.

***Fact:*** No capital improvements to the Leucadia storm water system are currently funded.

***Fact:*** Special Assessment Districts (S.A.D.s) may be established by a governing agency to levy taxes for specific infrastructure improvements, such as storm water drains.

**Finding 03:** Funding Leucadia storm water drainage work through a Special Assessment District (S.A.D.) is an option for the City of Encinitas.

## ***RECOMMENDATIONS***

**The 2011/2012 San Diego County Grand Jury recommends the City Council of Encinitas take the following actions:**

- 12-42:                    Develop an immediate plan of action or Council resolution to solve Leucadia's storm water flooding.**
- 12-43:                    Include storm water flow through the bluff at Leucadia Roadside Park as part of an overall storm drain fix.**
- 12-44:                    Explore storm drain, capital improvement tax funding for Leucadia via formation of a Special Assessment District.**

## ***REQUIREMENTS AND INSTRUCTIONS***

The California Penal Code §933(c) requires any public agency which the Grand Jury has reviewed, and about which it has issued a final report, to comment to the Presiding Judge of the Superior Court on the findings and recommendations pertaining to matters under the control of the agency. Such comment shall be made *no later than 90 days* after the Grand Jury publishes its report (filed with the Clerk of the Court); except that in the case of a report containing findings and recommendations pertaining to a department or agency headed by an elected County official (e.g. District Attorney, Sheriff, etc.), such comment shall be made *within 60 days* to the Presiding Judge with an information copy sent to the Board of Supervisors.

Furthermore, California Penal Code §933.05(a), (b), (c), details, as follows, the manner in which such comment(s) are to be made:

- (a) As to each grand jury finding, the responding person or entity shall indicate one of the following:
- (1) The respondent agrees with the finding
  - (2) The respondent disagrees wholly or partially with the finding, in which case the response shall specify the portion of the finding that is disputed and shall include an explanation of the reasons therefor.
- (b) As to each grand jury recommendation, the responding person or entity shall report one of the following actions:
- (1) The recommendation has been implemented, with a summary regarding the implemented action.
  - (2) The recommendation has not yet been implemented, but will be implemented in the future, with a time frame for implementation.
  - (3) The recommendation requires further analysis, with an explanation and the scope and parameters of an analysis or study, and a time frame for the matter to be prepared for discussion by the officer or head of the agency or

department being investigated or reviewed, including the governing body of the public agency when applicable. This time frame shall not exceed six months from the date of publication of the grand jury report.

(4) The recommendation will not be implemented because it is not warranted or is not reasonable, with an explanation therefor.

(c) If a finding or recommendation of the grand jury addresses budgetary or personnel matters of a county agency or department headed by an elected officer, both the agency or department head and the Board of Supervisors shall respond if requested by the grand jury, but the response of the Board of Supervisors shall address only those budgetary or personnel matters over which it has some decision making authority. The response of the elected agency or department head shall address all aspects of the findings or recommendations affecting his or her agency or department.

Comments to the Presiding Judge of the Superior Court in compliance with the Penal Code §933.05 are required from the:

<b><u>Responding Agency</u></b>	<b><u>Recommendations</u></b>	<b><u>Date</u></b>
<b>Encinitas City Council</b>	<b>12-42 through 12-44</b>	<b>8/23/12</b>

**Filed: May 29, 2012**



