HDR | ONE COMPANY *Many Solutions*℠

Technical Memo

To: Kirk Norman	
From: Bill Young	Project: J-Street Drain Channel
CC:	
Date: 10/11/11	Job No: 75217

Control Water Surface Elevations for J Street Drain Design

The J Street Drain project involves providing engineering design to reconstruct approximately 2.2 miles of J Street Drain Channel from it's outlet at Ormond Beach to Redwood Street in the City of Oxnard. The existing J Street Drain is under capacity and needs to be improved. A sand berm created by wave action prevents J Street Drain from outletting to the ocean. The resulting backwater reduces the channel capacity.
In addition, the channel's existing capacity was estimated at 500-600 cfs which is equivalent to a 5-year storm (per URS Channel Improvement Study).

The proposed improvements will include designing an open reinforced concrete channel that will accommodate a 100-year storm event with the condition of a berm breaching effect at it's outlet at Ormond Beach. The invert of the proposed channel will be dropped by approximately 3 feet and have a bottom width of 22 to 49.5 feet.

The existing J Street Drain Channel lining terminates near the Hueneme Drain Confluence. The earthen channel connects to the Ormond Beach Lagoon, where it then meets a confluence point with the Oxnard Industrial Drain (OID). The naturally created sand berm between Ormond Beach Lagoon and the Pacific Ocean prevents flows from directly draining to the ocean except when the berm breaches. During the rainy season minor storm events will produce enough runoff volume to fill the Ormond Beach Lagoon, which can cause the berm to breach. An ocean outlet will then be naturally created to allow the storm flows to outlet to the ocean.

The hydraulics for the improved channel were initially analyzed using the Los Angeles County Flood Control District "Water Surface Pressure Gradient" (WSPG) Program. A Hydraulic Control of 9.6 NGVD at the end of the channel lining was provided by the HDR's Coastal Engineering Group was used for the hydraulic analysis. This control water surface was developed using the MHHW of 5.3 NAVD at the existing natural breach location approximately one-half mile southeast along the beach from J Street Drain.

IPCC (2007) predicts eustatic sea level rise over the next 100 years between 0.6 ft and 1.9 ft with a central value of 1.1 ft. The National Oceanic and Atmospheric Administration's (NOAA) Center for Operational Oceanographic Products and Services (2008) reports that historic measured relative sea level rise at the Santa Barbara tide gauge is approximately 0.91 feet per century and approximately 0.52 feet per century at Santa Monica. Relative sea level rise is the combined relative change in water level including effects of subsidence or uplift. Ground water withdrawal and oil and gas production have been named as the primary source of subsidence within the Oxnard Plain (Hanson 1992). Hanson (1992) also indicates that tectonic activity is a minor contributor to subsidence and uplift within the Oxnard Plain. Available data indicates that MHHW is rising 19% faster than MSL for a mean anticipated rise of 1.3 ft over then next century (Coastal Conservancy Undated-B).
Sea level rise likely will not significantly affect the elevation of the beach adjacent the lagoon over the next 100 years. Rise of MHHW by 1.3 ft should be considered as the lower limit for lagoon water level during a storm.

Measured long-term mean sea level rise at nearby tidal stations is less than 1 ft per century. IPCC (2007) predicts eustatic sea level rise of 1.1 ft over the next 100 years. Sea level rise likely will not significantly affect the elevation of the beach adjacent the lagoon over the next 100 years. Rise of MHHW by 1.3 ft should be considered to determine the lower limit for lagoon water level during a storm.

A1. Tides

Tidal elevation and datum information were obtained from the NOAA tide gauge in Santa Barbara, CA and at the NOAA tide gauge in Santa Monica, CA. The water level analysis, shown in Figure A.6, is based on four years of verified historical data at Santa Barbara, and ten years of verified historical data from Santa Monica. Water level statistics were calculated using the average hourly water level reported at each station. Based on these data, percent exceedance of water level was calculated. Tides in the region are predominately semi-diurnal, with two high tides and two low tides occurring per day. Tidal datums and the greater diurnal tidal range, defined as the difference between MHHW (mean higher high water) and MLLW (mean lower low water), at both gauges are summarized in Table A.1.

Water level data was collected inside the lagoon in an effort to compare with water level at the tide gauges and to calibrate the numerical model. The water level data inside the lagoon would have provided a time history of flow into the lagoon depending on the weather during deployment. Water level in the ocean is generally much lower than the elevation of the beach crest.

Figure A.6. Water level frequency of exceedance

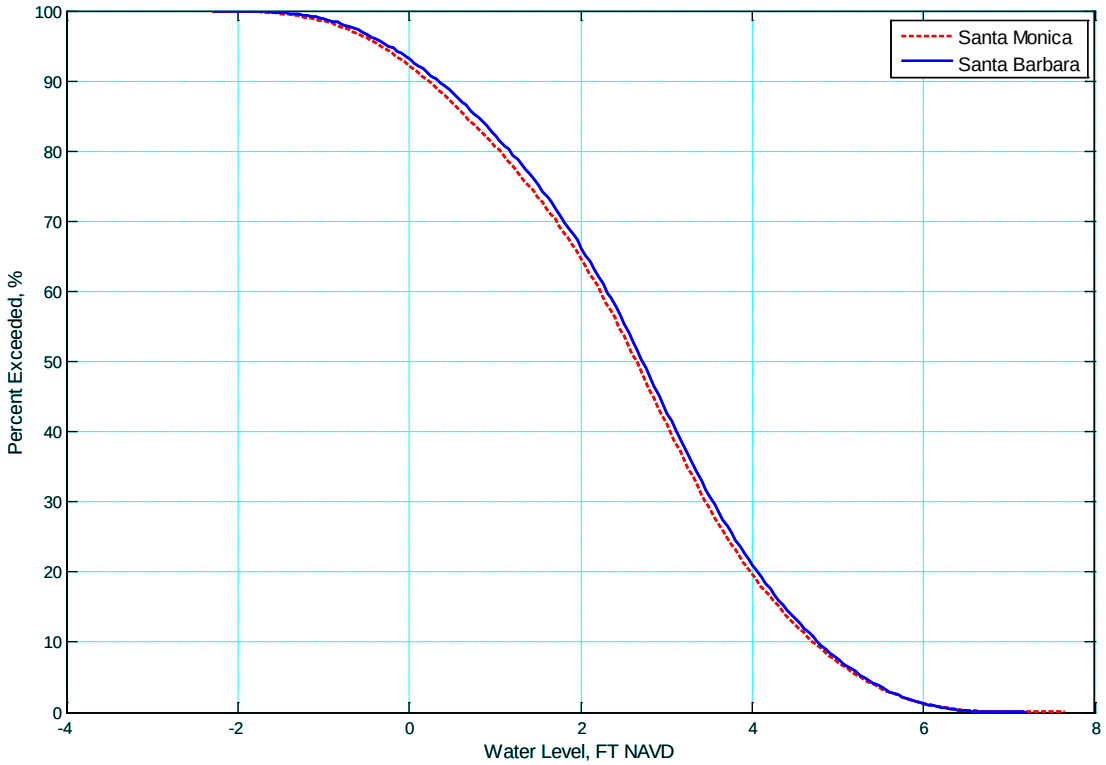

Table A.1. Tidal datums and range.						
Station Name	**MHHW, ft NAVD**	**MHW, ft NAVD**	**MSL, ft NAVD**	**MLW, ft NAVD**	**MLLW, ft NAVD**	**Tide Range, ft**
Santa Barbara	5.30	4.54	2.69	0.89	-0.09	5.39
Santa Monica	5.24	4.50	2.60	0.74	-0.19	5.43