

## INDIVIDUAL WATER QUALITY ASSESSMENT REPORT

**Site Name/Facility:** Tijuana River Pilot Channel and Smuggler's Gulch Channel

**Master Program Map No.:** 138a, 138b, 138c (Tijuana River Pilot Channel) and 138 and 139 (Smuggler's Gulch Channel)

**Date:** December 21, 2012

**Civil Engineer:** Matt Moore  
(name, company, phone number): URS Corporation  
858-812-9292

**Registered Civil Engineer Number & Expiration Date** RCE No. 56780, Exp. 6/30/2013  
(place stamp here):



**\*Instructions:** This form must be completed for each target facility following the completion of the Individual Maintenance Plan (IMP) report form and prior to any work being conducted at the facility. Attach additional sheets if needed.

### EXISTING CONDITIONS

The City of San Diego (City) has developed the Master Storm Water System Maintenance Program (MMP) (City of San Diego 2011a) to govern channel operation and maintenance activities in an efficient, economic, environmentally and aesthetically acceptable manner to provide flood control for the protection of life and property. This document provides a summary of the Individual Water Quality Assessment (IWQA) components conducted within the Tijuana River Pilot (Pilot) Channel and the Smuggler's Gulch (SG) Channel to comply with the MMP's Programmatic Environmental Impact Report (PEIR) (City of San Diego 2011b).

IWQA procedures under the MMP provide a methodology for a water quality management model to evaluate potential water quality benefits and impacts associated with channel maintenance activities. The site-specific field measurements and conditions provides the analytical data to determine a storm water facility's pollutant reduction potential and water quality benefits due to sediment removal; and compare it to the estimated loss of temporary pollutant sorption/retention capacity as a result of channel maintenance. The IWQA procedures are documented in the *Standard Operating Procedure (SOP) To Conduct Water Quality Assessment and Quantification Model for Flood Channel Maintenance* found in Appendix A of the Water Quality Assessment - White Paper (Appendix F of the PEIR). The SOP identifies two specific criteria for IWQA component implementation, including; 1) facility must have fairly consistent dry weather (low) flows, and 2) have vegetation capable of assimilation of pollutants. As described below, current conditions in the Pilot and SG Channels do not meet these

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criteria. Accordingly, the City has implemented modified sampling and analysis procedures in order to quantify the potential water quality benefits and impacts of channel maintenance activities.

#### Project Description:

The channels associated with this assessment report are located in the Tijuana River Valley (Valley), within the jurisdiction of the City of San Diego (City) (Figure 1). The Tijuana River watershed covers an area of approximately 1,725 square miles, of which 73 percent is located in Mexico and 27 percent in the United States. The main Tijuana River flows in a northwesterly direction from the international border into the Valley and City jurisdiction. Approximately 21.9 square miles of the watershed (~1% of the total watershed area) is within City jurisdiction.

The Tijuana River National Estuarine Research Reserve (TRNERR) and a portion of the City of Imperial Beach are generally west of the project area located adjacent to the Tijuana River's discharge to the Pacific Ocean. The Otay-Nestor community and the United States Naval Outlying Landing Field Imperial Beach are located north of the project area; and the community of San Ysidro is located to the east.

The Pilot Channel is included on MMP Maps 138a through 138c and the SG Channel is included on MMP Maps 138 and 139 (City of San Diego 2011a). The Pilot and SG Channels are generally located in the Valley roughly bordered by Hollister Street to the east and Monument Road to the south. The Tijuana River low flow channel splits into what are commonly referred to as the Tijuana River's Northern and Southern Channels approximately 800 feet east of Hollister Street. The Pilot Channel follows the Southern Channel.

The Valley, including the project area, is within the Federal Emergency Management Agency's (FEMA) Special Flood Hazard Areas Subject to Inundation by the 1-percent Annual Chance Flood (100-year floodplain). The project areas are zoned OF-1-1 (Open Space-Floodplain) and AR-1-1 (Agricultural/Residential); and are designated for Open Space and Agricultural land uses in the Tijuana River Valley Land Use Plan. In addition, the project area is within the boundaries of the County of San Diego's 2.7 square mile Tijuana River Valley Regional Park (Regional Park). The project area is also within the City's Multiple Species Conservation Program's Multi-Habitat Planning Area (MHPA).

The project consists of maintenance and dredging of the Pilot and SG channels to remove anthropogenic-derived sediment and trash that accumulates as a result of development and other practices in the upstream watershed. The removal of sediment and trash is conducted to maintain flow conveyance capacities and reduce the risk of flooding to public and private infrastructure in the Valley.

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<b>EXISTING CONDITIONS</b>
<b>Description of creek/channel geometry(length, width, and depth):</b>
<u>Pilot Channel</u> <p>The Pilot Channel was originally excavated in 1993 within the Southern Channel. It has been irregularly maintained since that time as an earthen trapezoidal channel that is approximately 5 feet deep, with a 23-foot top width, and a 15-foot streambed width. According to the MMP, the Pilot Channel was constructed to divert wet-weather flows from 2- to 5-year storm events into the Southern Channel (City of San Diego 2011b). The Pilot Channel stretches from 100 feet east to 5,300 feet west of Hollister Street for a total length of 5,400 feet and it flows roughly in an east-west direction.</p>
<u>SG Channel</u> <p>The SG Channel is an existing historical agricultural channel with manufactured berms. The contributing sub-watershed area is approximately 6.7 square miles, primarily located south of the international border within Canon de los Mataderos. The SG Channel, as originally constructed, is an earthen channel approximately 20 feet wide and 15 feet deep. The SG Channel is tributary to the South Channel and flows in a northerly direction, from the international border past Monument Road until it confluences with the Pilot Channel. The portion of the SG Channel maintained by the City extends for a distance of approximately 3,040 feet.</p>
<b>Existing Conditions:</b>
<p>The Tijuana River Watershed Management Area (WMA) is located in the southern portion of San Diego County. Surface waters in the Tijuana River WMA are subject to comply with the Water Quality Control Plan for the San Diego Basin (Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for receiving waters. Based on water quality data collected within the Tijuana WMA, the Tijuana River is classified as a Category I (impaired) watershed due to a wide variety of water quality problems. Stormwater flows in the Tijuana River contain high concentrations of sediment, trash, coliform bacteria, trace metals (copper, lead, zinc, chromium, nickel, and cadmium), PCBs, and other urban, agricultural, and industrial pollutants. Sources of pollutants include non-point agricultural sources on the U.S. side of the border and a large variety of point and non-point sources on the Mexican side of the border.</p> <p>During the site visit and sediment sampling activities conducted on November 14, 2012, it was observed that the SG Channel streambed was generally dry, unvegetated, and filled with sediment intermixed with trash and waste tires. The Pilot Channel was similarly dry</p>

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along most of its length and filled with sediment containing trash and waste tires along the majority of the length.

In some areas near the eastern and western ends of the Pilot Channel there were fallen trees and invasive plant species such as castor bean and arundo. Ponded water was observed in the Pilot Channel immediately east and west of the Hollister Bridge.

In March 2009, United States Customs and Border Protection engineers completed a dry weather diversion structure at the SG Channel crossing at the international border. The purpose of this structure is to divert up to 21.5 cubic feet per second or 14 million gallons per day of dry weather flows from Mexico to the sanitary sewer. This infrastructure prevents dry weather flows from entering the SG Channel and essentially eliminates direct dry weather input to the Pilot Channel.

Within the context of the IWQA components, this elimination of dry weather flow, combined with the fact that much of the SG Channel is void of vegetation and the Pilot Channel harbors primarily non-native and invasive plant species, there is little potential for water quality impacts from channel maintenance resulting from the loss of pollutant assimilative capacity through vegetation removal.

#### **Description of Sediment Sampling Activities (locations (s), depth, shipment/delivery to laboratory(s)):**

Given the relatively unique existing conditions of the SG Channel and Pilot Channel where dry weather flows are generally diverted to the sanitary sewer, the City employed a sediment characterization-based sampling strategy. The purpose of the sampling activities was to characterize site-specific conditions to evaluate potential water quality benefits of channel maintenance.

Five locations as indicated on Attachment 1 were selected for sediment sampling activities. These locations were deemed representative of the sediment characteristics within the SG and Pilot Channels. The locations were selected based on visual observation of the sediment characteristics and channel features including vegetation, hydrosoil, and hydroperiod. Further, sampling and analyses activities conducted during previous channel clearing activities have indicated that accumulated sediment in these channels generally does not have levels of potential pollutants that exceed human health or ecological risk screening criteria (City of San Diego 2010). Based on these results and the existing conditions, five samples were deemed appropriate for characterization of sediments channel for the purpose of the IWQA. It should be noted that this sample strategy resulted in collection of fewer samples than described in the SOP.

The five soil borings were advanced on November 14, 2012 (Attachment 1). Three borings (SG-1, TJ-1, and TJ-2) were advanced by Tri-County Drilling using a limited

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access, rubber-tracked, hollow-stem auger drill rig. Two boring locations (SG-2 and TJ-3) were not accessible with the drill rig and were advanced using a stainless-steel hand auger. The borings were advanced to a depth of between two and five feet. The depth of each boring was estimated in the field based on best professional judgment of sediment accumulation in the channel relative to design dimensions. Borings SG-1 and SG-2 were drilled along the SG Channel north and south, respectively of the Disney Crossing. Borings TJ-1 and TJ-2 were drilled along the Pilot Channel. Boring TJ-1 was located approximately 250 feet east and boring TJ-2 was located approximately 350 feet west of the confluence with the SG Channel. Boring TJ-3 was located approximately 1,000 feet west of the confluence. Sediment samples from this boring were archived for possible analyses. A photo log of the November 14, 2012 site visit is included in Attachment 2.

The borings were logged by a URS geologist under the oversight of a California Professional Geologist in accordance with the Unified Soil Classification System (USCS). Sediment samples were collected continuously from each of the borings using a standard penetration sampler fitted with stainless-steel tubes to the total depth drilled. Boring logs can be found in Attachment 3. Bulk sediment samples were collected prior to drilling at the location of borings SG-1 and TJ-2 for grain-size analyses in accordance with ASTM-D6913-04. These samples were collected using a shovel from the ground surface to 1.5 feet below ground surface and placing the soil into two 5-gallon buckets per location. Lids were placed on the buckets and each was labeled with a sample ID and sample depth. Grain-size gradation curves are provided in Attachment 4.

The sediment from each sample interval was placed into a clean stainless steel bowl and then homogenized using a clean wooden spoon. After the sediment was homogenized it was split into two, laboratory-supplied, clean 8-ounce glass jars that were labeled with the sample ID. The samples were placed in an insulated cooler with ice and maintained at 4 degrees C and transported under chain-of-custody (COC) procedures. COC documentation can be found in Attachment 5. Some sediment was placed into a resealable plastic bag, disaggregated and then monitored for the presence of organic vapors using a Photo Ionization Detector (PID). Sampling equipment was decontaminated before and after each sample was collected by rinsing with an Alconox (non-phosphate) detergent solution followed by twice rinsing with distilled water. Rinse water was collected and disposed of in accordance with applicable local, state and federal guidelines.

Sediment chemical analyses were conducted by Pat-Chem Laboratories, Inc. of Moorpark, California, a state-accredited laboratory. The samples were analyzed for the constituents identified in the SOP. In addition, the samples were also analyzed for organochlorine pesticides by EPA Method 8081. The laboratory analytical and tabulated results of indicated constituents can be found in Attachment 6.

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<b>EXISTING CONDITIONS</b>
<b>Description of Flow Measurement Activities (location(s) and equipment):</b>
<p>As described above, the SG Channel and Pilot Channel generally do not experience dry weather flows as a result of dry weather diversion structures adjacent to the international border. There was no flowing water, nor evidence of recently flowing water in the SG Channel and Pilot Channel during the sediment sampling activity visit on November 14, 2012. Accordingly, flow measurement activities were not conducted as part of this IWQA.</p>
<b>Description of Volume Measurement Activities (interval, total number, equipment):</b>
<p>The SG and Pilot channels do not behave like natural treatment systems as described in the PEIR's Water Quality Assessment - White Paper. As mentioned above, the SG and Pilot Channels generally do not experience dry weather flows as a result of dry weather diversion structures adjacent to the international border. There was no flowing water, nor evidence of recently flowing water in the SG Channel or Pilot Channel during the sediment sampling activity visit on November 14, 2012. Accordingly, volume measurement activities were not conducted as part of this IWQA.</p>
<b>Description of Water Quality Sampling Activities (location(s), shipment/delivery to laboratory(s)):</b>
<p>As described above, the SG Channel and Pilot Channel generally do not experience dry weather flows as a result of dry weather diversion structures adjacent to the international border. There was no flowing water, nor evidence of recently flowing water in the SG Channel or Pilot Channel during the sediment sampling activity visit on November 14, 2012.</p> <p>Standing water is present in a limited area of the Pilot Channel during dry weather conditions. Sampling from these locations is not representative of water quality conditions consistent with the criteria outlined in the SOP. The purpose of water quality sampling in storm water facilities is to evaluate potential to improve water quality through sequestration of pollutants by vegetation within the channel. This is accomplished by collecting water quality samples at the upstream and downstream edges of the facility. Water quality samples collected from ponded water only provide data on the water quality for each specific pool. This data will not be an accurate representation of the pollutant removal capacity of the SG and Pilot Channels. Accordingly, water quality sampling activities were not conducted as part of this IWQA.</p>

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**Description of Wetland Assessment (Existing) Activities (personnel, general conditions):**

Using the results of the IBA site survey, both the SG and Pilot Channels were assessed according to the scoring system laid in the SOP. Three macrofeatures of wetland treatment systems were assessed: existing vegetation, hydrosol, and hydroperiod. Scores for these features are presented in Table 1. Scoring criteria definitions are found in Attachment 7.

**Table 1. Existing Wetland Macrofeature Assessment Matrix**

Wetland Macrofeature	SG Channel	Tijuana Pilot Channel
Existing Vegetation	0	1
Hydrosol	2	1
Hydroperiod	0	1
<b>Total Score</b>	<b>2</b>	<b>3</b>

**SG Channel**

Due to lack of vegetation, high sediment deposition, and lack of flow in the SG Channel during dry weather conditions, the overall rating for the SG Channel is two. According the SOP, this equals a “poor” rating and does not provide evidence that the existing conditions provide adequate conditions for sorption and deposition of suspended solids and associated constituents of concern.

**Pilot Channel**

Due to the presence of highly invasive non-native vegetation, high sediment deposition, and lack of flow in the Pilot Channel during dry weather conditions, the overall rating for the SG Channel is three. According the SOP, this equals a “fair” rating and does not provide evidence that the existing conditions provide adequate conditions for significant sorption and deposition of suspended solids and associated constituents of concern.

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##### **Description of Wetland Assessment (Recovery) Activities (personnel, general conditions):**

The City has been responsible for maintaining the SG and Pilot Channels for nearly two decades. During this period, the City has irregularly maintained portions of each channel. In recent years, stormwater flow and associated sediment deposition dynamics have resulted in rapid sedimentation of the SG and Pilot Channels.

As an example, in October through November 2009 the City removed a combined 30,000 cubic yards of accumulated sediment, trash and non-native vegetation, from a significant portion of the SG and Pilot Channel project footprint. Subsequent storm events in November and December 2009 deposited a significant amount of sediment in the two channels, reducing channel capacity and demonstrating that the SG and Pilot Channels generally aggrade sediment and trash during storm events (Figure 1).

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**Figure 1. Example of the sediment accumulation cycle in the SG Channel.**

Accordingly, some aspects of the SOP-based Existing Maintenance Storm Water Facility- Recovery Scoring System are not applicable to the SG and Pilot Channels (Table 2). Specifically, the existing vegetation recovery score is primarily based on the recovery potential for existing terrestrial and/or wetland vegetation. The scoring system does not adequately provide characterization guidance for situations where existing vegetation is not present or is primarily composed of invasive non-native vegetation.

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**Table 2. Recovery Wetland Macrofeature Assessment Matrix**

Wetland Macrofeature	SG Channel	Tijuana Pilot Channel
Existing Vegetation	NA <sup>1</sup>	NA <sup>2</sup>
Hydrosoil	1	1
Hydroperiod	1	1
Total Score	--	--

<sup>1</sup> The SOP does not identify a score for recovery to a non-vegetated state.

<sup>2</sup> The SOP does not identify a score for recovery to a vegetated state primarily composed invasive non-native vegetation.

Based on these scores, it is estimated that the total recovery score for the SG and Pilot Channels is between two and four, or a “poor” to “fair” rating. These scores provide evidence that the recovery conditions will not provide adequate conditions for significant sorption and deposition of suspended solids and associated constituents of concern.

**Sediment Pollutant Loading Estimates:**

Four of the five sediment samples were analyzed for the constituents identified in the SOP. Based on analytical results of previous City sampling activities in the area, pesticides were also added to the constituent list.

The analytical results generally indicate that the sampled sediment in the SG and Pilot Channels do not contain constituents in concentrations greater than the screening criteria for human health. The metal Arsenic does appear to be present in the accumulated soil in concentrations that exceed the California and Regional Screening Levels (RSL) (Attachment 6). It should be noted that background soil in many areas of the U.S., including California, contains arsenic at concentrations above the California Human Health Screening Level (CHHSL). The concentrations of arsenic detected in the samples ranged from 1.9 to 4.8 mg/kg. The Department of Toxic Substances Control (DTSC) conducted a background study of arsenic at school sites in the Los Angeles Unified School District that found that concentrations generally below approximately 6 mg/kg represent background conditions (DTSC 2005). In San Diego County, background arsenic concentrations can be as high as 11 mg/kg (URS, 2010). DTSC typically requires further action if arsenic concentrations are generally above 15 to 20 mg/kg. Attachment 8 provides the calculation sheet for the removal volumes and sediment pollutant loading estimates.

It should be noted that due to the lack of dry weather flow and presence of only limited existing vegetation in the SG and Pilot Channels, the general outcome of the activities

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conducted for this IWQA provide an estimate of the benefit of sediment removal. Loss of temporary sorption/retention capacity (impact) of vegetation and sediment removal by the proposed maintenance activity is not present. The current channel conditions do not allow for significant natural pollutant load removal in dry weather. Accordingly, based on evaluation of the criteria outlined in the SOP, evaluation of existing and estimated recovery conditions, and using best professional judgment, the proposed maintenance activities will provide an overall pollutant reduction benefit. This outcome is based on the fact that sediment (and associated pollutant) removal is greater than the estimated loss of temporary sorption/retention capacity (benefit>impact) in the SG and Pilot Channels.

#### MAINTENANCE IMPACTS

##### Evaluation of Benefits/Impacts:

**Are there constituents that have potential impacts greater than benefits?**

YES

NO

**If so, identify constituents here and compare measured concentrations to thresholds.**

As described above, the IWQA is intended to serve as a framework for evaluating pollutant reduction potential and water quality benefits due to sediment removal (potential water quality benefit for implementing channel maintenance activities) in comparison with the estimated loss of temporary pollutant sorption/retention capacity as a result of channel maintenance (potential water quality impacts associated with channel maintenance activities). Given the presence of the dry weather diversion upstream of the SG Channel and general lack of flowing water within the SG and Pilot Channels, there is no estimated loss of temporary pollutant sorption/retention capacity as a result of channel maintenance activities in these channels. Additionally, there is pollutant reduction benefit due to sediment (and associated pollutant) removal as a result of the proposed maintenance activities.

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#### MITIGATION

**Conclusion/Recommendations (Describe the limits of recommended maintenance, degree to which native vegetation within the facility can be retained, and capacity of maintained channel):**

IWQA procedures under the MMP provide a methodology for a water quality management model to evaluate potential water quality benefits and impacts associated with channel maintenance activities. Current site conditions (lack of dry weather low flows) in the Pilot Channel and SG Channel do not meet the implementation criteria set forth in the PEIR's Water Quality Assessment –White Paper. Accordingly, the City modified sampling and analysis procedures to quantify the potential water quality benefits of channel maintenance activities related to sediment and non-native vegetation removal. The results of the IWQA process shows there is no estimated loss of temporary pollutant sorption/retention capacity and there is pollutant reduction benefit due to sediment removal as a result of the proposed maintenance activities.

Even given this conclusion, the City has agreed to implement a suite of water quality improvement activities in the Coastal Zone to offset potential effects associated with the proposed project. These activities were required as part of the California Coastal Commission Coastal Development Permit (CDP No. A-6-NOC-11-086). The City proposes to utilize a suite of pollution prevention, source control, and treatment BMPs to address sediment and other pollutant inputs to the SG and Pilot Channel area drainages within the coastal zone (Table 3). The selected activity suite was derived from evaluation of current water quality improvement activities in each drainage area and synthesis of City-wide programmatic findings.

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<b>MITIGATION</b>				
<b>Table 3. Proposed Water Quality Improvement Activities in the SG and Pilot Channel Drainages.</b>				
<b>Priority Channel Area Drainage</b>	<b>Water Quality Activity Type</b>	<b>Description</b>	<b>Implementation Frequency</b>	<b>Duration</b>
Tijuana River	Pollution Prevention	Commercial and residential property sediment reduction outreach distribution.	250 parcels	Approximately one month prior to maintenance initiation.
	Source Control	Street sweeping improvements-targeted vacuum-assisted/regenerative air machine usage.	5.0 -curb miles	One year subsequent to sediment removal maintenance events.
	Source Control	Municipal and bi-national agency collaboration through Tijuana River Valley Recovery Team to address sediment and trash.	Ongoing	Five years.
	Treatment	Enhanced catch basin inspection and as-needed cleaning implementation.	10 inlet locations	One year subsequent to sediment removal maintenance events.
City-wide	Special Study	Evaluate the need and potential effectiveness of implementing slope stabilization measures and small scale water quality basin BMPs on City-owned parcels within the priority channel drainage areas.	To be determined	One year subsequent to sediment removal maintenance event for each priority channel segment.

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<b>MITIGATION</b>				
<b>Table 3. Proposed Water Quality Improvement Activities in the SG and Pilot Channel Drainages (Continued)</b>				
<b>Priority Channel Area Drainage</b>	<b>Water Quality Activity Type</b>	<b>Description</b>	<b>Implementation Frequency</b>	<b>Duration</b>
City-wide	Special Study	Degraded canyon area municipal separate storm sewer (MS4) outfall evaluation and improvement process.	To be determined	One year subsequent to sediment removal maintenance event for one priority channel segment
City-wide	Pilot Implementation Study	Conduct repairs on a prioritized representative degraded outfall to determine the relative level of planning, engineering and implementation effort needed to address identified canyon-area outfall problems.	1 outfall location	Five years.

In addition, the City will be implementing a five year receiving water monitoring plan in accordance with its Clean Water Act Section 401 Water Quality Certification (RWQCB 2012) for the project area. Applicable PEIR mitigation measures can be found in their entirety in Attachment 9. No water quality impacts were identified as a result of maintenance, therefore there are no additional mitigation efforts required by this IWQA.

Attachment 2 of the IMP includes all additional permits and their conditions which must be incorporated.

<b>ADDITIONAL COMMENTS OR RECOMMENDATIONS</b>
<p>The PEIR Water Quality Assessment – White Paper’s Standard <i>Operating Procedures to Conduct Water Quality Assessment and Quantification Model</i> acknowledges that site conditions may require modifications to the procedures. The procedures described in this document were modified from the original SOP based on existing site-specific conditions found in the SG and Pilot Channels.</p>

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<b>REFERENCES</b>	
California Coastal Commission. 2012. Permit Number A-6-NOC-11-086. San Diego, California.	
City of San Diego. 2010. Pilot Channel Borings and Sediment Characterization Report. Document ID# CSD-TM-09-URS09-01.D1.	
City of San Diego. 2011a. Master Storm Water Maintenance Program. San Diego, California: October 2011	
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California Regional Water Quality Control Board San Diego Region (RWQCB). 2012. Tijuana River Valley Channel Maintenance, Water Quality Certification 09C-077 WDID Number 9000001976.	
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URS Corporation for: California Department of Resources Recycling and Recovery. 2010. Report of Trash, Waste Tire and Sediment Characterization Tijuana River Valley. San Diego, California.	

<b>ATTACHMENTS</b>	
Attachment 1	Project Overview Map
Attachment 2	Site Visit Photo Log
Attachment 3	Sediment Sample Boring Logs
Attachment 4	Sediment Sample Grain Size Distribution Curve and Sieve Analyses
Attachment 5	Sediment Sample Chain of Custody Form
Attachment 6	Sediment Sample Constituent List and Results
Attachment 7	Wetland Assessment Scoring Criteria
Attachment 8	Sediment Pollutant Loading Calculations
Attachment 9	Applicable PEIR Mitigation Measures