

AGENDA

**ENGINEERING COMMITTEE MEETING
LEUCADIA WASTEWATER DISTRICT
Wednesday, April 2, 2014 – 8:30 a.m.
1960 La Costa Avenue, Carlsbad, CA 92009**

- 1. Call to Order**
- 2. Roll Call**
- 3. Public Comment**
- 4. New Business**
 - A. Receive and file the Recycled Water Effluent Line Creek Crossing Project Preliminary Design Report completed by Infrastructure Engineering Corporation. (Pages 2 - 8)
- 5. Information Items**
 - A. La Costa Pump Station Rehabilitation Project – Verbal Report
 - B. Leucadia Pump Station Generator Replacement Project – Verbal Report
 - C. Gravity Line Rehabilitation Project – Verbal Report
 - D. B2 Force Main Replacement Project – Verbal Report
- 6. Director's Comments**
- 7. General Manager's Comments**
- 8. Adjournment**

MEMORANDUM

DATE: March 27, 2014
TO: Engineering Committee
FROM: Paul J. Bushee, General Manager 
SUBJECT: Recycled Water Effluent Line Creek Crossing Repair Project Preliminary Design Report

RECOMMENDATION:

Staff requests that the Engineering Committee recommend that the Board of Directors:

1. Receive and file the Recycled Water Effluent Line Creek Crossing Repair Project Preliminary Design Report completed by Infrastructure Engineering Corporation.
2. Discuss and take other action as appropriate.

DISCUSSION:

The Recycled Water Effluent Line Creek Crossing Repair project is included as a goal in the Fiscal Year 2014 Tactics & Action Plan.

The section of the recycled water effluent line that crosses San Marcos creek in the La Costa South Golf Course requires repair. The completion of the Batiquitos Lagoon Restoration in the late 1990s lowered the average water level of the lagoon. Consequently, the lower water level caused bank and stream-bed erosion in the upstream section of San Marcos Creek. The recycled water line that was previously buried two feet under the creek bed is now exposed. This section needs to be replaced to prevent possible damage from debris in the creek striking the exposed line. Additionally, in August 2011, staff observed indications of an underground water leak in the north east corner of the District's site. The leak was traced to a valve in the same recycled water effluent line. The repair of the valve was delayed until the renewal of the recycled water agreement with the City of Carlsbad was completed. The repairs of the valve and creek crossing have been combined into a single project to take advantage of efficiencies in design, construction and project administration.

In September 2013 the Board authorized executing an agreement with Infrastructure Engineering Corporation (IEC) to design the project. The first phase was to complete a Preliminary Design Report (PDR) for the project. Fusible polyvinyl chloride (PVC) pipe was selected to replace the exposed Asbestos Cement Pipe (ACP). IEC evaluated the two most feasible trenchless construction methods, jack and bore and Horizontal Directional Drilling (HDD), to install the pipeline under the creek bed. IEC recommends the following:

Replace the recycled water pipeline creek crossing with a new underground crossing in the same alignment as the existing line utilizing HDD. This recommendation is based on the following key points:

- HDD will avoid constructing deep work pits that would require over-excavation for a working platform, additional dewatering, and a significant amount of shoring.

- It is expected that HDD will minimize construction duration.
 - Jack and Bore – estimated 40 work days
 - HDD – estimated 20 work days
- HDD is expected to cost significantly less than jack and bore.
 - Estimated Jack and Bore cost - \$242,000
 - Estimated HDD cost - \$148,880
 - Estimated cost savings - \$93,120

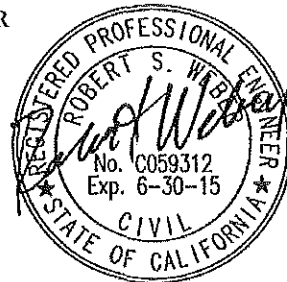
The PDR without attachments is included for your review. A complete copy of the PDR is available upon request. Jamie Fagnant, IEC, will present the details and recommendations of the PDR to the Engineering Committee. Once the PDR is received by the Board, IEC will transition into project design.

rym:PJB

Attachment

LEUCADIA WASTEWATER DISTRICT
RECYCLED WATER PIPELINE REPAIR

TECHNICAL MEMORANDUM NO. I



Date: December 16, 2013 – First Draft
February 27, 2014 – Second Draft
March 25, 2014 - Final

Subject: PRELIMINARY DESIGN OF THE RECYCLED WATER PIPELINE REPAIR

Prepared By: Ross Maxwell; Jamie Fagnant, P.E.
Reviewed By: Robert S. Weber, P.E.

PURPOSE

The purpose of this technical memorandum is to summarize the recommendations and provide estimated costs for repair of the existing 12” asbestos cement pipe (ACP) recycled water transmission main that crosses San Marcos Creek at the La Costa Resort and Spa.

BACKGROUND

The District provides recycled water to the La Costa Spa and Resort via a 12” ACP pipeline that runs from the District’s Gafner Treatment Plant to a recycled water pond located on the La Costa Resort and Spa’s southern golf course. The pipeline was constructed in 1961 and crosses under San Marcos Creek near where the line discharges to the recycled water pond. The creek bottom has eroded over time and a portion of the line is now fully exposed along the bottom of the creek and is susceptible to damage. There is a risk that the exposed pipeline may be ruptured by flow in the creek or vandalism. Since the typical operating level of the recycled water pond is above the pipeline in the creek, a pipeline rupture may cause the recycled water pond to empty into the creek.

The District retained IEC on September 16, 2013 to design a repair for the existing recycled water pipeline. The extent of the current project encompasses the following:

- Installation of an isolation valve between the pond and the creek crossing. This work was completed in November, 2013 allowing the District to isolate the recycled water pond upstream of the creek crossing.
- A new parallel creek crossing.
- Replacement of the leaking recycled water line isolation valve on the District’s Gafner Plant Site.
- At a review meeting for the second draft of the recycled water line preliminary design technical memorandum held at the District’s offices on March 13, 2014, the District requested IEC also include installation of a new blow off connection at the District’s Gafner Plant site.

SUMMARY

IEC recommends replacing the recycled water pipeline creek crossing with a new crossing in the same horizontal alignment as the existing line utilizing Horizontal Directional Drilling (HDD). This recommendation is based on the following key points:

- HDD will avoid constructing deep work pits that would require over-excavation for a working platform, additional dewatering, and a significant amount of shoring.
- It is expected that HDD will minimize construction duration.
- HDD is expected to cost significantly less than other feasible options considered in this technical memorandum.

IEC has evaluated the two most feasible trenchless construction methods: jack and bore and HDD. Further discussion of these methods is provided below.

HORIZONTAL DIRECTIONAL DRILLING (HDD)

HDD is a trenchless construction method utilizing a steerable soil drilling system with a horizontal drilling machine that is launched from the ground surface. There are three phases to installing a pipeline utilizing HDD. The first phase is to drill a small diameter pilot hole to control horizontal and vertical location of the pipeline. The second phase is to enlarge the pilot hole to the desired diameter for pipeline installation, also called reaming. During this time the new pipe must be fused together (if utilizing fusible polyethylene Chloride pipe [PVC] or high density polyethylene pipe [HDPE]) and strung out adjacent to the receiving side of the bore. The fused pipe is pulled back into the enlarged hole. Finally, connection pits are dug to connect the new HDD construction to the existing pipeline.

Drilling fluid consisting of bentonite slurry is used to retrieve the excavated material from the boring. Additional work space is required for storage, retrieval and treatment of used drilling fluid and to string out the new pipe prior to installation. If drilling fluid is captured with the intent for reuse it would require treatment through a soils clarifier. Alternatively, the drilling fluid could be used once before being transported offsite. Space limitations will be clearly shown on final design plans. Treatment and reuse of drilling fluid or one time use of drilling fluid will be per the Contractor's means and methods. The drilling fluid is under pressure. Depending on actual field conditions, it is possible for the fluid to escape to the surface (i.e. frac-out). However, with adequate depth of profile under the creek and proper operation of the HDD equipment, the risk of frac-out is minimal. The contractor will be required to create and implement a contingency plan to manage potential frac-outs. A conservative planning level alignment is shown in Figure 2. The planning level design is based on the following parameters:

- a conservative, planning level drilling geometry of a maximum 10 degree entry and exit point angles and a minimum radius of 500,
- entry and exit points are located so as not to interfere with existing Omni La Costa Spa and Resort structures in the work yard,
- the connection point between the new creek crossing and the existing recycled water line is between the recently installed isolation valve and the creek, and
- with the above requirements in place the apparent maximum depth beneath the creek that the new pipeline may achieve is approximately 13 feet.

The entire 382 feet of pipeline would need to be fused before pull-back could begin, reducing the risk of separation of fused joints due to inadequate cooling. The 382 feet of pipeline would be laid out behind the receiving pit and could impact golf course operations. To minimize impact it is possible for the pipe to be fused elsewhere, possibly along a golf cart path, and moved into place just prior to pullback operations. With the use of specialized equipment impact to golf course in non-excavation work areas and turf and subsequent turf restoration could be minimized. However, the retrieval point and the western connection pit would both directly impact an existing tee-box. The turf repair for this location would be substantial.

Groundwater would need to be controlled in the shared connection pit(s) with a sump pump. This is discussed further in the section of this technical memorandum below entitled Geotechnical Investigation and Dewatering Activities.

The estimated cost for HDD utilizing a surface launched horizontal drilling machine for 382 linear feet of pipeline and replacement of the recycled water line isolation valve at the Gafner Treatment Plant is \$173,880 and would require approximately 20 working days to construct.

JACK AND BORE

Jack and bore is a trenchless construction method consisting of a boring auger that bores a full diameter hole and a steel casing that is jacked into place which both stabilizes the boring and provides protection for the carrier pipe installed within. Jack and bore does not allow for curves; therefore, a 29 foot deep bore pit and 22 foot deep receiving pit are necessary to be constructed to maintain minimum 12 feet of cover between the existing creek bed and the top of the jacked casing. A minimum of a 24" diameter welded steel casing would be necessary to install the 12" PVC line with restrained fittings. The PVC pipe would need to be installed with casing spacers to prevent the restraint fittings from being in contact with the steel casing. To avoid the use of buried metallic fittings, IEC recommends the use of Certa-Lok PVC pipe that utilizes PVC restraint fittings. Alternatively, the carrier pipe may be installed utilizing fusible PVC or HDPE. The total length of trenchless construction would be approximately 130 linear feet for jack and bore.

The bore pits will require shoring and dewatering. Ground water is present approximately 12 feet below the surface. With groundwater expected to be present, the contractor will need to bore from the lower bore pit to allow for the water to drain from the tunnel. The bottom of the bore pit can be over excavated and have gravel installed to allow for a good working platform and allow groundwater to be drained to a temporary sump. The water can be pumped out of the pit utilizing a dewatering pump.

The estimated cost for jack and bore construction and replacement of the recycled water line isolation valve at the Gafner Treatment Plant is \$267,000 and would require approximately 40 working days to construct.

ADDITIONAL CONSIDERATIONS

ABOVEGROUND CROSSING

IEC discussed the potential to cross San Marcos Creek with a new bridge crossing on the existing bridge just south of the existing creek crossing or with an aboveground pipeline crossing on piers. Neither of these crossing methods are recommended for installation due to the following concerns:

- pursuing a new alignment would require the negotiation of a new easement,
- there is concern over the structural integrity of the existing bridge to withstand forces due to seismic or high water events, and,
- there is a concern over the potential for high water events or vandalism to damage an aboveground crossing on piers.

GEOTECHNICAL INVESTIGATION AND DEWATERING ACTIVITIES

IEC retained Southern California Soil & Testing, Inc. for the geotechnical investigation. In their report SCS&T No. 131167, Report No. 1, dated November 11, 2013, they analyzed two exploratory test borings to depths of 25 feet below the existing ground surface, located on either side of San Marcos Creek in the vicinity of the proposed pipeline crossing. The soil expected to be encountered is a fill consisting of loose clayey sand of approximately three feet, underlaid by an alluvium consisting of very soft to soft sandy clay and clay with sand. The alluvium encountered is conducive to both HDD and jack and bore.

Dewatering activities will be required in order to connect to the existing pipeline. More substantive dewatering activities would be required for replacement of the crossing by the jack and bore method. Over-excavation of the bottom of the bore or connection pits where groundwater is present may be necessary in order to place gravel to allow for proper drainage. Ground water was present approximately 12 feet below the ground surface in the geotechnical boring. This was confirmed in the recent installation of an isolation valve on the Eastern side of San Marcos Creek. However, groundwater can fluctuate both seasonally and following periods of precipitation. The Contractor may be able to discharge the groundwater into a nearby sewer with an EWA (Encina Wastewater Authority) permit or into the Creek with a NPDES (National Pollution Discharge Elimination System) permit. It is anticipated that dewatering will most likely be to the sewer system with an EWA permit. The pipeline depth on the East side is approximately 13 feet. A connection pit on the East side will require dewatering activities. The connection depth on the West side is unknown. The Contractor will be required to pothole the connection point ahead of construction to determine if groundwater will be present and if so, to take samples to be tested as required in order to obtain a discharge permit for dewatering activities.

RECYCLED WATER PIPELINE MATERIALS

At a review meeting for the second draft of the recycled water line preliminary design technical memorandum held at the District's offices on March 13, 2014, the District and IEC discussed possible pipeline materials. The District concurred with IEC's recommendation to use Fusible PVC to perform the installation by horizontal directional drilling for the following reasons:

- Fusible PVC is well suited to installation by horizontal directional drilling.
- Fusible PVC may be repaired utilizing standard repair couplings or fittings for AWWA C900 PVC pipe.
- Fusible PVC provides a similar inside diameter to the existing inside diameter (existing Asbestos Cement Pipe, ACP) without increasing the outer diameter and subsequent bore hole size as would be necessary if HDPE were used.

GOLF COURSE RESTORATION

Two bore pits or two piping connection pits and adjacent work areas depending on the installation method chosen are required for this project will require surface restoration following installation of the new creek crossing. The District intends to explore the possibility of contracting directly with Omni Spa and Resort to perform the site restoration during final design. Alternatively, the Contractor would be required to replace turf in like and kind. In the event that HDD is utilized as the preferred construction method, contract documents would require the use of low impact turf pads to minimize golf course turf restoration requirements. The area of work will be clearly delineated in the final design contract documents. If the District elects to pay Omni Spa and Resort to perform their own restoration of the damaged area the Contractor will be provided with a square footage cost that must be paid by the contractor to the District in the event that areas outside of those designated as work areas are damaged during construction and need additional site restoration.

RECYCLED WATER ISOLATION VALVES AND NEW BLOWOFF CONNECTION

In November 2013 Piperin Corporation in association with Koppl Pipeline Services, Inc. installed an isolation valve between the recycled water pond and the creek crossing. This valve is now operational and will allow the District to isolate the recycled water line creek crossing from the recycled water pond. It is recommended that this valve remain in the closed position when the pipeline is not in operation or when a storm is forecast.

A second isolation valve is located on the District's Gafner Treatment Plant site. The District has indicated that this valve is leaking. Replacement of this valve is included in this project. Excavation, replacement and surface restoration following replacement of this valve is estimated at approximately \$25,000.

At a review meeting for the second draft of the recycled water line preliminary design technical memorandum held at the District's offices on March 13, 2014, the District requested IEC also include installation of a new blow off connection at the District's Gafner Plant site. This was tentatively discussed to be possibly installed inside the existing meter vault. The location and type of connection will be finalized during the final design phase.

CONCLUSION

IEC recommends replacing the recycled water pipeline creek crossing with a new horizontal directional drill crossing. The estimated cost for the new recycled water pipeline creek crossing, new isolation valve and blow off connection at the Gafner site is \$173,880.

ATTACHMENTS

- Figure 1 – Site Location Map – Jack and Bore
- Figure 2 – Site Location Map – Horizontal Directional Drilling (HDD)
- Geotechnical Report - SCS&T No. 131167, Report No. 1, dated November 11, 2013
- Cost Estimate