

INFORMATION HANDOUT

1. Geotechnical Design Recommendations for Retaining Wall
2. Route 105 Dewatering System Transition Plan
Garfield Treatment Facility

FOR CONTRACT NO. 07-4S8404
PROJECT NO. 0700001000

INFORMATION HANDOUT

Geotechnical Design Recommendations for Retaining Wall

ROUTE: 07-LA-105 R14.3

Memorandum

*Flex your power!
Be energy efficient!*

To: Shafiqul Islam
District 7 Maintenance

Date: May 13, 2010

Attn.: Cynthia Chang/ Dana Hendrix

File: 07-LA-105 PM 14.3
EA 4S8401
I-105 Groundwater Treatment
System Modification

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES
OFFICE OF GEOTECHNICAL DESIGN – SOUTH 1

Subject: Geotechnical Design Recommendations for Retaining Wall

Introduction

This memorandum presents the geotechnical design recommendations for the proposed retaining wall between Vessel E-2 and Vessel E-3 at the East Water Treatment Plan at above-mentioned location.

The recommendations provided herein are based on:

- Site visit on March 29, 2010
- Discussion with the District Maintenance Engineers
- Review of Foundation Recommendations and Log of Test Boring (LOTB) by Caltrans for the Garfield Pumping Plant project
- Review of available part of CCO #7 As-Built Plan for EA 07-195004 provided by the District Maintenance
- Review of proposed site plan provided by the District Maintenance

No additional subsurface exploration has been conducted at the site for the proposed retaining wall.

Project Description

According to the proposed site plan, the proposed retaining wall would be approximately 55 feet long with height of approximately 14 feet, and the angle of the slope behind the proposed wall would be approximately 20 degrees.

The existing material at the proposed retaining wall is fill material, considering two buried pipes (10-inch and 14-inch) exist at the area of the proposed retaining wall. However, there is no record available to confirm that it is structural back fill.

According to the District Maintenance, the existing retaining wall for Vessel E-03 thru E-06 at East Water Treatment System is Caltrans Standard Type 1 retaining wall.

Geotechnical Recommendations

Based on the observations during site visits and the information provide by the District, the geotechnical recommendations are made as follows:

- Caltrans Standard Type 1 Retaining Wall with Spread Footing can be used under the following conditions:
 - Caltrans Standard Plans (May 2006) shall be used.
 - The spread footing shall be horizontal.
 - 3 feet over-excavation below the bottom of spread footing is required, and the over-excavation backfill shall be structure fill compacted to a relative compaction of 95 percent according to Standard Specifications (May 2006)
 - A minimum cover of 1.5 feet of fill is required over the top of footing.

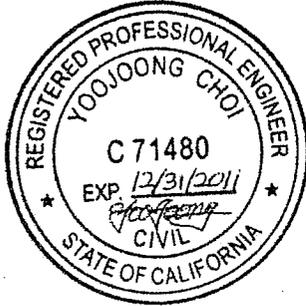
- Due to lack of corrosion tests on the project site materials, the project site should be conservatively considered as corrosive, and the thickness of the concrete cover should be increased accordingly.

Construction Considerations

- Temporary shoring system should be used during construction of the proposed retaining wall.
- The Log of Test Boring (LOTB) by Caltrans for the Garfield Pumping Plant indicates that groundwater was encountered at elevation of 39.2 feet at the time of boring (July 7, 1987). Based on this information, groundwater should not be a major concern during the construction. However, it should be noted that groundwater can fluctuate due to seasonal and climate variations.
- We assume that the existence of two buried pipes (10-inch and 14-inch) will not affect construction of the proposed retaining wall.

If you have any questions, please contact me at 916-227-5241 or Thang Le at 916-227-5390.

Prepared by Date: 5/13/2010



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 District Materials Engineer

FOR CONTRACT NO. 07-4S8404
PROJECT NO. 0700001000

INFORMATION HANDOUT

Route 105 Dewatering System Transition Plan
Garfield Treatment Facility

ROUTE: 07-LA-105 R14.3

**ROUTE 105
DEWATERING SYSTEM
TRANSITION PLAN
GARFIELD TREATMENT FACILITY**

Contract Number 43A0236, Task Order No. 11



Prepared for:
**California Department of Transportation
Division of Engineering Services**

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1.0 INTRODUCTION

Planned modifications to the I-105 Garfield Pumphouse groundwater dewatering and treatment systems have been prepared by AMEC Geomatrix, Inc. (AMEC) on behalf of the California Department of Transportation (Caltrans). Groundwater is continually pumped from below the I-105 Freeway using thirteen groundwater dewatering wells to depress the groundwater table and prevent water from collecting on the surface of the highway. The existing treatment system treats the extracted groundwater using granular activated carbon (GAC) prior to discharge to the Los Angeles River. Design elements for the system modification include process flow piping modifications; new bag filter units; new concrete pad and retaining wall. Because these modifications may result in a temporary shutdown of the treatment system(s), it is necessary to phase the work to minimize shutdown periods and prevent groundwater from surfacing on the I-105 Freeway. Currently the dewatering wells are operated to maintain the groundwater 3.5 feet below profile grade of the freeway. The Contractor will be required to maintain the groundwater below this elevation during the construction process. This document describes one potential solution for sequencing work that limits the need for temporary treatment systems and maintain water levels at the required elevations below the freeway. Contractors are not required to follow this example, but are responsible for completing the modifications in a way that maintains groundwater levels at the required elevations below the surface of I-105. Details of the proposed system modifications can be found in the project construction plans and specifications.

2.0 BACKGROUND

A dewatering system is maintained along a low-lying section of the I-105 Freeway to maintain groundwater levels below the surface of the road. There are thirteen dewatering wells (1-D1 through 1-D13) associated with the Garfield Pumphouse groundwater extraction and treatment systems, ten of which are currently active (ID-3 through ID-12). Initially thirteen wells were installed in 1998; but since that time, three wells have been abandoned. The wells are located immediately adjacent to the Route 105 Freeway between Garfield Avenue and Paramount Blvd.

The shallow aquifer in the area of the dewatering wells is impacted by volatile organic compounds (VOCs) from upgradient sources. The primary VOCs impacting groundwater include trichloroethene (TCE); dichloroethene (DCE); and tetrachloroethene (PCE). Other organic compounds have been detected at various times over the past 10 years including trichloroethane (TCA); 1,4-dioxane; and 1,2,3-trichloropropane (TCP). Formaldehyde and elevated levels of manganese were also present during a 2005 study of the groundwater. Thus, operation of the dewatering systems typically requires treatment of the water prior to discharge under a state National Pollutant Discharge Elimination System (NPDES) Permit. Extracted groundwater is treated using liquid-phase GAC. The Garfield Pumphouse treatment system consists of two separate treatment systems, designated as the West System and the East System. The West System includes eight vessels (W01 thru W08), each containing 5,000 lbs of GAC. This system services extracted groundwater from wells ID-3 and ID-4. The West System vessels are arranged as four sets of two vessels each, with each set of two in a lead/lag configuration. The four sets of vessels are piped in parallel, giving operators the capability of directing flow simultaneously to each set via a manifold header.

The East System consists of six treatment vessels (E01 through E06), each containing 20,000 lbs of GAC. The East System provides treatment for groundwater extracted from wells ID-5 through ID-12. These six vessels are operated in parallel, with flow directed to any number of



individual vessels simultaneously based on operator discretion. These vessels are not in lead-lag configuration.

Submersible pumps (20 - 25 HP) in each well are rated at approximately 500 gallons per minute (gpm) at 80 feet of head. Each pump motor is controlled with a variable frequency drive (VFD) that allows the operator to select a desired flow rate. Table 1 provides a summary of the facility equipment that is currently operational.

TABLE 1. SUMMARY OF EQUIPMENT AND CAPACITIES

Area	No. Wells and Well ID	Maximum Flow per Well	Combined Maximum Flow	No. Carbon Vessels	Carbon Vessel Configuration	Treatment Capacity per Vessel	Total Treatment Capacity ⁽¹⁾
West	2 Wells ID-3 & ID-4	500 gpm	1,000 gpm	8	4 sets of 2 in parallel lead/lag	250 gpm	1,000 gpm
East	8 Wells ID-5 – ID-12	500 gpm	4,000 gpm	6	Parallel	750 gpm	4,500 gpm

1. The West system total capacity would be 2,000 gpm if all 8 vessels were operated in parallel.

The West and East Treatment Systems each have a separate effluent pipe that directs flow to a rectangular, below-grade, concrete wet well located at the Garfield Pumphouse. A culvert leading from the wet well drains accumulated water via gravity to a county storm water channel that discharges to the Los Angeles River. It should be noted that the Garfield Pumphouse also collects storm water from a section of the I-105 Freeway underdrain system through a separate system and pumps it into the wet well; thus the wet well also serves the Garfield Pumphouse discharge. This stormwater system only operates during precipitation events.

3.0 CURRENT PUMPING STRATEGY

The system is manually operated with an operator selecting the active pumping wells and flow rates each month based on the observed depth to water in each well. Based on discussions with the operator, even-numbered wells are generally pumped during even-numbered months (e.g. February, April, June, etc.) and odd-numbered wells are generally pumped during odd-numbered months (e.g. January, March, May, etc.), with the exception of well ID-4. Well ID-4 is pumped continuously throughout the year to maintain the groundwater level at least 3.5 feet below profile grade of the freeway. During maintenance activities on the well, well ID-4 can typically be shut down for up to two or three days before water levels approach the maximum allowable level (i.e. 3.5 foot depth below profile grade of the freeway) and pumping of ID-4 must resume. Based on operations data (flow rates and water levels) recorded in 2009 and 2010, it appears that the remainder of the wells can be shut down for several weeks or more before water levels reach their maximum allowable levels. The operations data also indicates that well ID-3 is rarely operated and Wells I-D5, I-D9, ID-11, and I-D12 have consistently low water levels in them with only periodic pumping. Furthermore, wells I-D6, I-D7, and I-D8 appear to be operated only periodically during the winter months to maintain adequate water levels. Only wells I-D4 and I-D10 require consistent operation to maintain acceptable water levels.

Based on flow data available from 2009 and 2010, the maximum flow rate for the West Treatment System was observed in January of both years at 137 gallons per minute (gpm) and 80 gpm, respectively. The maximum flow rate for the East Treatment System was observed in January 2009 at 435 gpm and in March 2010 at 550 gpm. This indicates that the treatment systems are operating at a fraction of their maximum flow capacity.



4.0 CONSTRUCTION SEQUENCING

Based on the above information, in order to construct the planned modifications without affecting the I-105 Freeway, AMEC proposes sequencing construction events in a manner that requires limited treatment system operations throughout most of the construction duration. The following phases are proposed as an example of how construction may be sequenced to maintain required groundwater levels. The conceptual components of each phase are shown in Figure 1. Figure 1 is a conceptual drawing; the Project Plans and Specifications issued by Caltrans are the definitive design documents and take precedence over this Transition Plan when identifying design components and placement. Consideration should be given to performing the work during the dry summer months when pumping rates are minimized.

Phase 0:

- Pump all operational wells for 2 to 4 weeks prior to construction in order to draw down water levels.

Phase 1 (approximately two day duration):

- Shutdown wells ID-3 and ID-4 and the West Treatment System; continually monitor the depth to water to confirm that a minimum of 3.5 feet below profile grade of the freeway is maintained.
- Demolish and replace West Treatment System pipe header in accordance with the Project Plans.
- Install a tee and gate valve behind Garfield Pumphouse (see Figure 1) and install a temporary blind flange on eastern opening of tee.
- Once all connections are completed, return the West Treatment System to service and turn wells ID-3 and ID-4 on.

Phase 2:

- Shutdown wells ID-5 through ID-13.
- Take GAC Units E-01 through E-06 off-line.
- Demolish existing piping related to E-01 and E-02 and install new piping associated with these GAC units.
- Install discharge line from E-01 and E-02 to the Garfield Pumphouse (see Figure 1). A temporary fitting will be required at the 90 degree bend to the Garfield Pumphouse until the remaining subsurface piping is installed.
- Demolish remaining piping connected to E03 through E06.
- Connect temporary flexible piping/hose from existing influent pipe from ID-5 though ID-13 to the newly installed E-01 and E-02 manifold (see Figure 1).



Phase 3:

- Return ID-5 through ID-13 to service and operate through E-01 and E-02 as needed to maintain water levels.
- Excavate and construct retaining wall and remaining civil work, including the concrete pad, the drains and sumps, and the fencing and gates.
- Install remaining subsurface piping north of retaining wall, except for final connections.
- Install Bag Filters.
- Install piping to E-03 through E-06 and Bag Filters.
- Install electrical and controls.
- Shut down all wells and perform final connections. Remove temporary flexible piping/hose.

Phase 4:

- Return all wells to service. Take West Treatment vessels out of service.
- Commission East Treatment System.

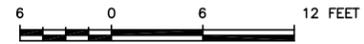
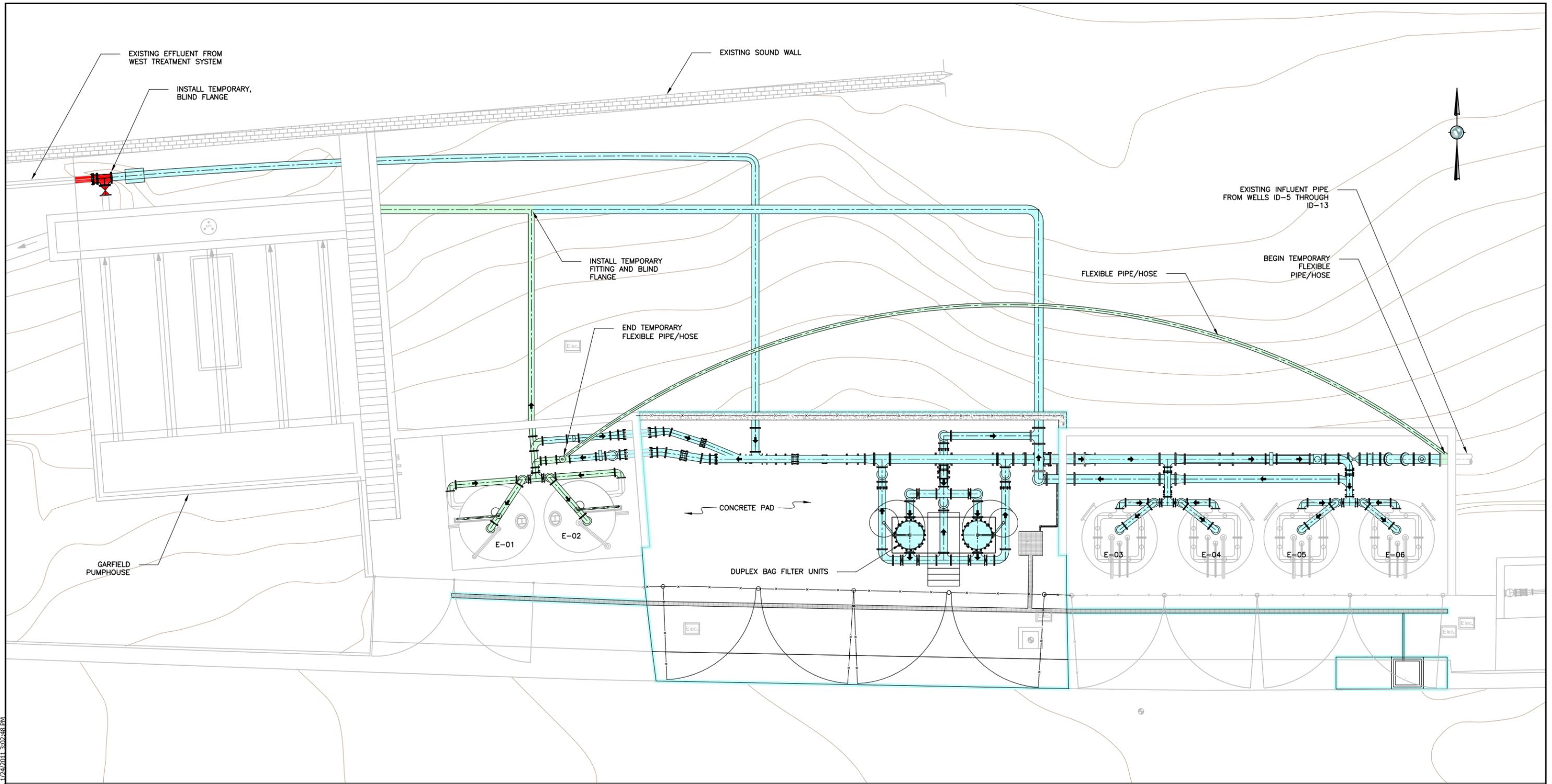
In general, these phases allow for the continued operation of the West Treatment System, with the exception of a two-day shutdown for modifications. This shutdown duration is not expected to have adverse effects on water levels, though additional testing is recommended prior to construction as discussed above. Furthermore, two 20,000-pound GAC units (E-01 and E-02) will be operational in the East Treatment System for the majority of the construction. These two units will provide up to 1,500 gpm of treatment capacity, well below the maximum flow rate observed at the East Treatment System in 2009 and 2010 (550 gpm).

5.0 PUMP AND WATER LEVEL TESTING

The Contractor should perform a pumping and water level study prior to enacting any transition plan in order to ensure the pumping frequencies, flow rates, and groundwater recovery rates discussed above are accurate. This process may include the following steps:

- Shut down wells ID-3 and ID-4 and measure water levels in all wells daily to assess how long the West Treatment System can be turned off.
- Turn ID-3 and ID-4 back on. Turn off all remaining wells and repeat the monitoring of water levels.

This process will give an indication of the amount of time the wells can remain off for construction purposes without groundwater levels affecting the freeway.



PROPOSED CONSTRUCTION PHASING

- PHASE 1: WEST SYSTEM
- PHASE 2: E-01/E-02 AND TEMPORARY FLEXIBLE PIPE/HOSE
- PHASE 3: CIVIL WORK, BAG FILTERS, E-03 THROUGH E-06, ELECTRICAL AND CONTROLS

- NOTES:
1. THIS DRAWING IS FOR PHASING ILLUSTRATION PURPOSES ONLY. CONTRACTOR TO REFER TO DESIGN DRAWINGS AND SPECIFICATIONS FOR CONSTRUCTION DETAILS.
 2. CONNECTION POINTS FOR TEMPORARY FLEXIBLE PIPE/HOSE TO BE DETERMINED BY CONTRACTOR.
 3. WEST SYSTEM MODIFICATIONS NOT ALL SHOWN ON THIS FIGURE. SEE DESIGN DRAWINGS FOR WEST MODIFICATIONS DETAILS.

**I-105 GROUNDWATER TREATMENT SYSTEM
TRANSITION PLAN**

EXAMPLE TREATMENT SYSTEM PHASING PLAN

By: JKM Date: 01/24/11 Project No. 0144430110



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