

PRE-FINAL CONSTRUCTION INSPECTION REPORT
Groundwater Extraction and Treatment System J
Western Groundwater Operable Unit (OU-3)

Aerojet General Corporation Superfund Site
Rancho Cordova, California

October 2011

Prepared for:



United States Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

Prepared by:



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Final

**PRE-FINAL CONSTRUCTION INSPECTION REPORT
Groundwater Extraction and Treatment System J
Western Groundwater Operable Unit (OU-3)**

**AEROJET GENERAL CORPORATION SUPERFUND SITE
RANCHO CORDOVA, CALIFORNIA**

October 2011

**Contract Number EP-R9-09-01
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Prepared for:
U.S. Environmental Protection Agency

REVIEW AND APPROVAL

Inspector:



John Warren, P.E.
Sullivan International Group, Inc.

10/28/2011

Date

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ACRONYMS/ABBREVIATIONS

Aerojet	Aerojet General Corporation
EPA	U.S. Environmental Protection Agency
GAC	Granular activated carbon
GET	Groundwater Extraction and Treatment
gpm	Gallons per minute
NDMA	n-Nitrosodimethylamine
NPL	National Priorities List
OU	Operable Unit
PCD	Partial Consent Decree
PCE	Tetrachloroethylene (perchloroethylene)
PFCI	Pre-Final Construction Inspection
P&ID	Piping and instrumentation diagram
PVC	Polyvinyl chloride
ROD	Record of Decision
SOW	Statement of Work
TCE	Trichloroethylene
UV	Ultraviolet
VOC	Volatile organic compounds

1.0 INTRODUCTION

This Pre-Final Construction Inspection (PFCI) Report is in accordance with the United States Environmental Protection Agency's (EPA) Record of Decision (ROD) and Remedial Design/Remedial Action Statement of Work (SOW) with respect to Western Groundwater Operable Unit (OU-3) at the Aerojet General Corporation Superfund Site in Rancho Cordova, California ([Figure 1](#)). The Groundwater Extraction and Treatment (GET) System J has been in operation for approximately 6 years. Although preliminary inspections have been held as each treatment system was completed, formal engineering inspections were not conducted until the entire remedial system for OU-3 had been constructed as approved in the Remedial Design.

From February through March 2011, construction inspections were conducted on behalf of EPA at OU-3 Area 2. The objective of the construction inspections was to verify that the operational status of the GET System J was in accordance with the approved Remedial Design. The construction inspections covered the GET System J groundwater extraction wells, treatment facility, and effluent discharge (outfall).

1.1 PURPOSE AND OBJECTIVE

The objectives of these construction inspections were to confirm that the GET System J components were installed and constructed in accordance with the system specifications, and that the overall GET System J was operational and functional, as described in Section IV.F.4 of the SOW (Attachment 1). Outstanding construction items discovered during the inspection have been identified and noted in this PFCI report, along with the actions required by Aerojet General Corporation (Aerojet) to resolve the items, expected completion date for the items, and an anticipated date for a Final Construction Inspection. It is expected that this PFCI Report will be submitted by EPA to Aerojet.

1.2 GENERAL HISTORY AND BACKGROUND

In 1951, Aerojet began operations in Rancho Cordova, Sacramento County, California. Aerojet and its subsidiaries manufactured liquid and solid propellants; fabricated, assembled, tested, and

rehabilitated rocket engines; and manufactured paint components, herbicides, and pharmaceutical products. Wastes from these operations were disposed of by burial, open burning, discharge into unlined evaporation ponds, and injection into wells. As a result of the disposal, volatile organic compounds (VOC), perchlorate, n-nitrosodimethylamine (NDMA), and other compounds leached into the drinking-water aquifers for various communities located in the area.

In 1983, the Aerojet Rancho Cordova facility was placed on the National Priorities List (NPL). In 2002 and as part of the Partial Consent Decree (PCD), the Site was divided into OUs. The cleanup approach for the Site under the modified PCD is to control groundwater contamination moving across the facility boundary within two OUs (OU-3 and OU-5), then remediate soil and groundwater at source areas, which consist of five OUs.

OU-3 provides for an inner groundwater boundary to prevent further contamination from flowing off-property on the western side of the Aerojet Site, an outer boundary at the toe of groundwater contamination to prevent the loss of further aquifer above the cleanup levels specified in the ROD and the eventual restoration of the drinking-water aquifer.

1.3 DESCRIPTION OF FACILITY AND COMPONENTS

As previously noted, this PFCI Report is for GET Facility J and the associated extraction-well system. GET Facility J is located at 11260 Pyrites Way in Rancho Cordova. [Figure 1](#) presents a site map that shows the location of the GET Facility J and the location of the extraction wells. The treatment facility receives groundwater from 10 extraction wells which are screened in three different water-bearing zones (see [Table 1](#)). Extracted groundwater reaches the GET System J facility via a 16-inch diameter polyvinyl chloride (PVC) pipeline. The groundwater treatment system has multiple filtration and treatment units. The major units of the treatment system are:

- Influent Bag Filters
- Ultraviolet (UV) Reactors
- Ion Exchange Vessels

- Granular Activated Carbon (GAC) Vessels
- Effluent Bag Filters
- Effluent Outfall
- Hydrogen Peroxide System
 - Stainless Steel Tank
 - Metering System
- Backwash Tanks
- Transfer and Discharge Pumps

The influent bag filters are used to reduce the amount of particulate matter in the extracted groundwater and to improve its clarity prior to treatment in the UV Reactors. The UV Reactors are used to break down NDMA, which cannot be treated effectively by the methods used for the other contaminants. After the UV Reactors, groundwater is passed through ion-exchange vessels for treatment of perchlorate. The ion-exchange vessels also provide treatment of the breakdown products from the UV Reactors. To treat VOCs (including trichloroethylene [TCE] and tetrachloroethylene [PCE]), and to provide additional confidence that the contaminant concentrations are below their associated cleanup level, the treated groundwater is then passed through GAC vessels. The last phase of the groundwater treatment process is passing the groundwater through effluent bag filters. The effluent bag filters reduce the amount of particulate matter in the groundwater to acceptable levels prior to discharge.

The groundwater collection and treatment system known as GET System J was built in six phases. A process flow diagram of the system ([Figure 2](#)) follows the site map. The process flow diagram shows extraction wells 4645, 4650, and 4655, which were installed under Construction Phase 1. Well 4635 had been installed previously by others and is also shown on [Figure 2](#), which provides the general configuration of the completed treatment system. During Construction Phase 2, wells 4640 and 4665 were installed. This construction phase included connections to existing piping systems installed prior to construction of GET System J. During Construction Phase 3, the GET J treatment system was expanded with the additional of filter

vessels and UV Reactors. During Construction Phase 4, piping connections and well installation for wells 4680, 4685, 4690, and 4695 were completed, and well 4635 was also connected to the GET System J influent piping system. During Construction Phase 5 additional UV Reactors, piping, and piping supports were added to the GET J treatment system. Finally, during Construction Phase 6 the hydrogen peroxide dosing system was added to the GET J treatment process.

TABLE 1: EXTRACTION WELL INFORMATION

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Extraction Well Number	Aquifer	Total Depth (in Feet)	Screened Interval in Feet Below Surface Grade	Maximum Extraction Rate in Gallons per Minute (gpm)
4635	C	210	105 - 185	700
4640	E	510	366 - 486	300
4645	E	503	415 - 485	500
4650	D	340	282 - 322	100
4655	C	263	160 - 250	500
4665	C	200	102 - 182	700
4680	D	290	218 - 278	450
4685	D	295	220 - 285	400
4690	C	210	134 - 194	600
4695	D	290	210 - 280	100

FIGURE 1: LOCATION MAP OU-3 AREA 2

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

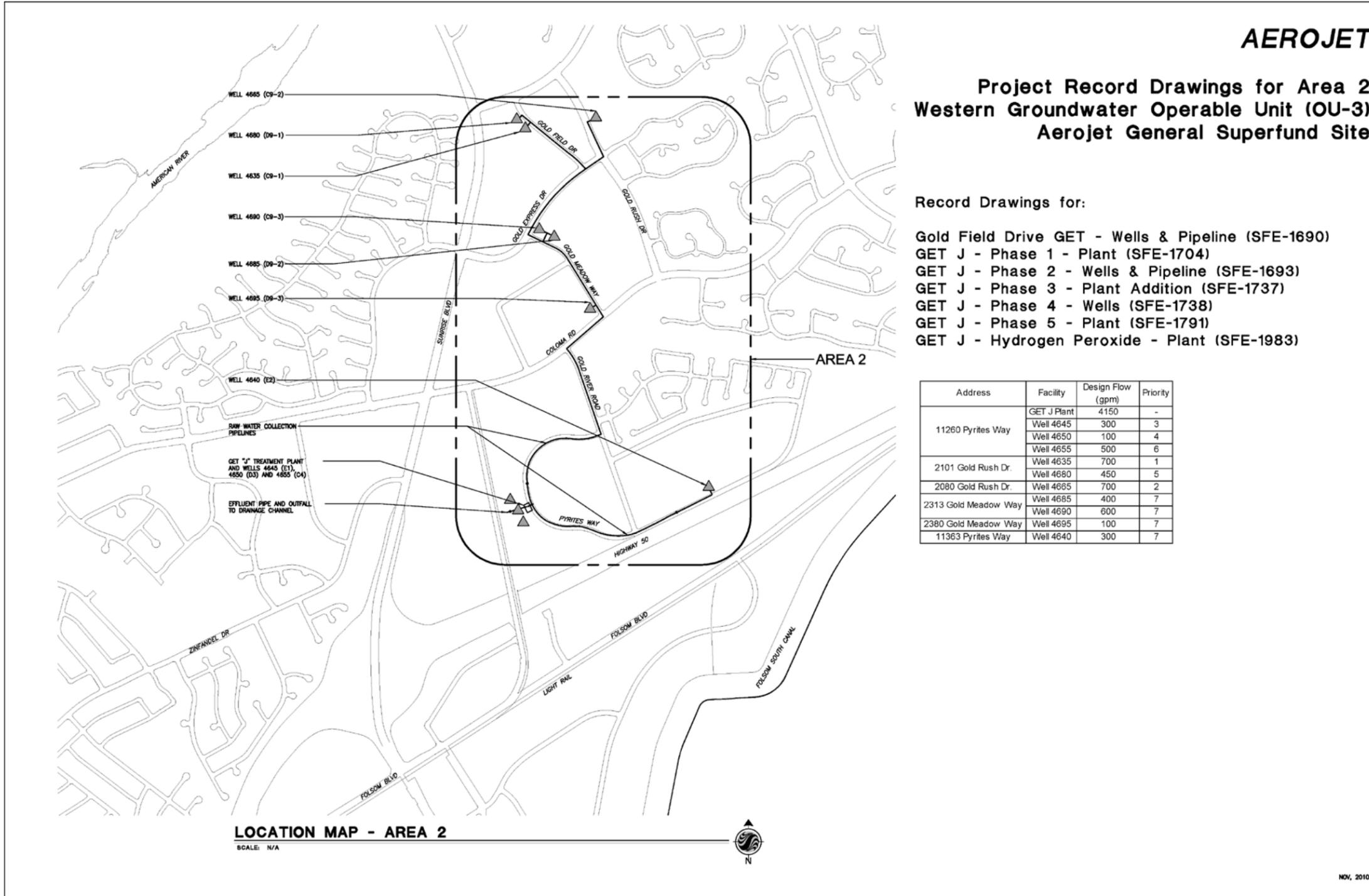
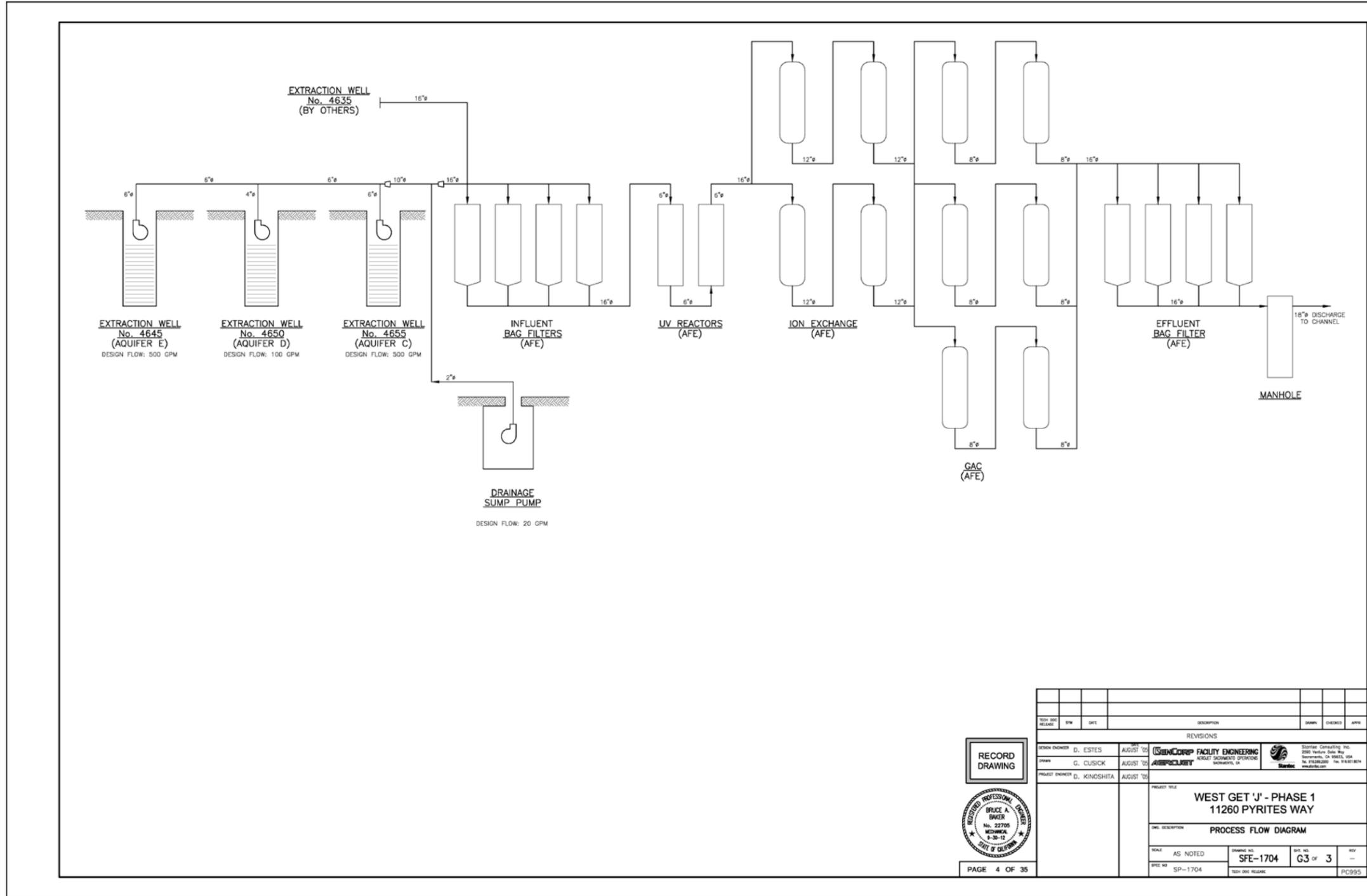


FIGURE 2: PROCESS FLOW DIAGRAM GET J

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)



RECORD DRAWING

BRUCE A. BAKER
No. 22795
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

DATE	BY	DESCRIPTION
AUGUST '05	D. ESTES	DESIGN ENGINEER
AUGUST '05	G. CUSICK	CHECKER
AUGUST '05	D. KINOSHITA	PROJECT ENGINEER

WEST GET 'J' - PHASE 1
11260 PYRITES WAY
PROCESS FLOW DIAGRAM

SCALE: AS NOTED
DRAWING NO: SFE-1704
SHEET NO: G3 OF 3
REV: --
DATE: SP-1704
DATE OF RELEASE: PC995

2.0 PRE-FINAL CONSTRUCTION REVIEW

This section presents the Pre-Final construction inspection and verification findings for the groundwater extraction well-heads and the treatment facility of the GET System J. Underground features of the GET System J were installed and covered prior to the PFCI. Therefore, construction inspections and verification were not conducted for buried piping and valve sizes, buried connections between pieces of equipment, or installed submersible pumps. Above-ground or accessible pumps were inspected. In addition, since GET System J has been operational for approximately 6 years, the construction inspection verified the equipment, its size, and its material to the extent feasible (equipment that could be physically reached, observed, and compared to the drawings was inspected).

2.1 GROUNDWATER EXTRACTION WELL-HEAD INSPECTIONS AND VERIFICATION

Physical inspection and verification of the 10 GET System J extraction well-heads ([Table 1](#)) was conducted in 2011 by comparing the installed equipment and material to the record drawings provided by Aerojet representing the “as constructed” state of each extraction well-head. The pump pit for each well-head was inspected from above-ground. A plan view and section view of each well-head and vault, as well as the completed PFCI checklist, are provided. The sequence of drawings is given below.

- Extraction Well 4635 ([Figures 3, 4](#) and [Table 2](#))
- Extraction Well 4640 ([Figures 5, 6](#) and [Table 3](#))
- Extraction Well 4645 ([Figures 7, 8](#) and [Table 4](#))
- Extraction Well 4650 ([Figures 7, 9](#) and [Table 6](#))
- Extraction Well 4655 ([Figures 7, 8](#) and [Table 5](#))
- Extraction Well 4665 ([Figures 11, 12](#) and [Table 8](#))
- Extraction Well 4680 ([Figures 13, 14](#) and [Table 9](#))
- Extraction Wells 4685 & 4690 ([Figures 15, 16](#) and [Table 10](#))
- Extraction Well 4695 ([Figures 17, 18](#) and [Table 11](#))

FIGURE 3: PLAN VIEW WELL 4635

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

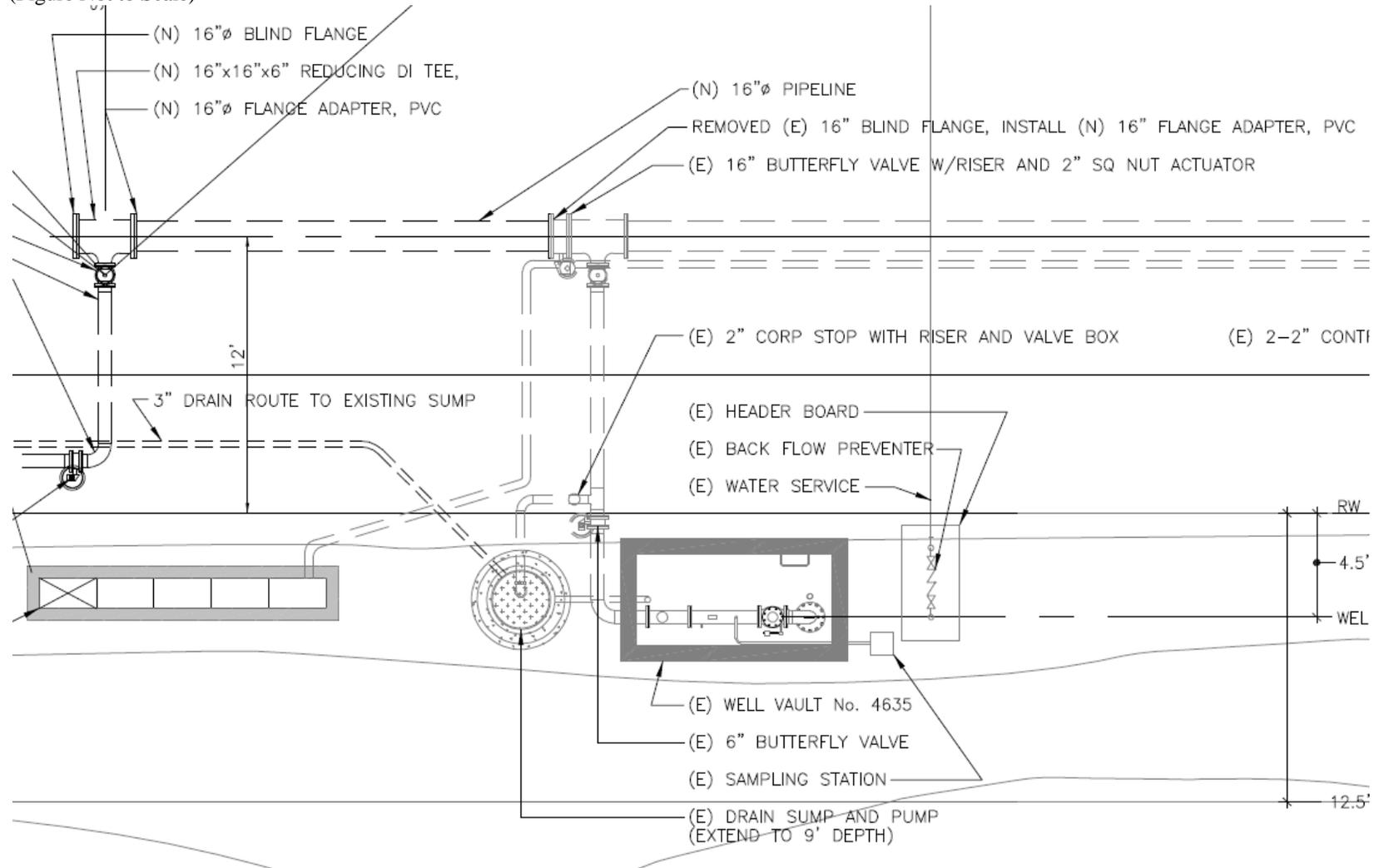


FIGURE 4: SECTION VIEW WELL 4635

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

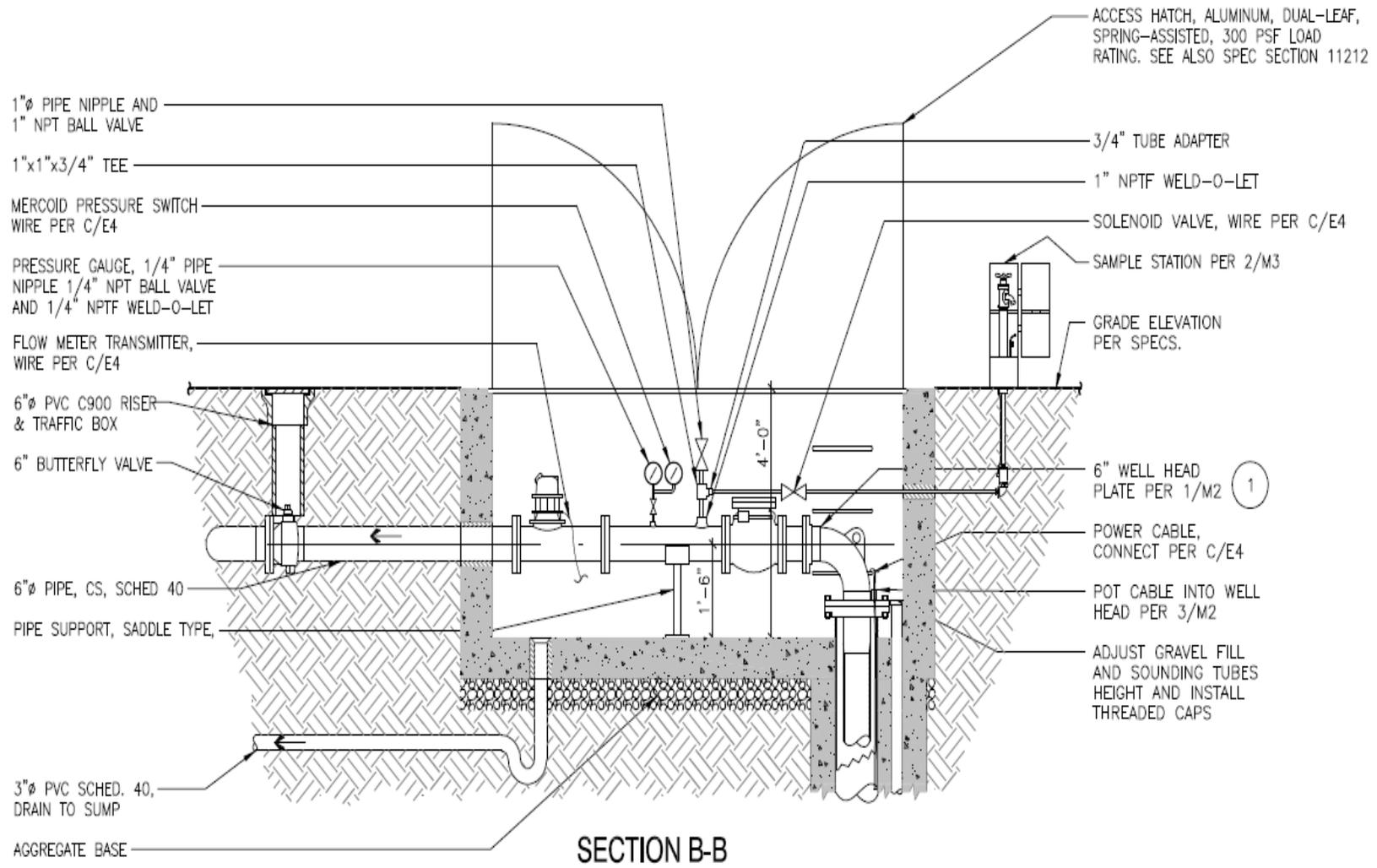


TABLE 2: CHECKLIST FOR EXTRACTION WELL C9-2 (#4635)

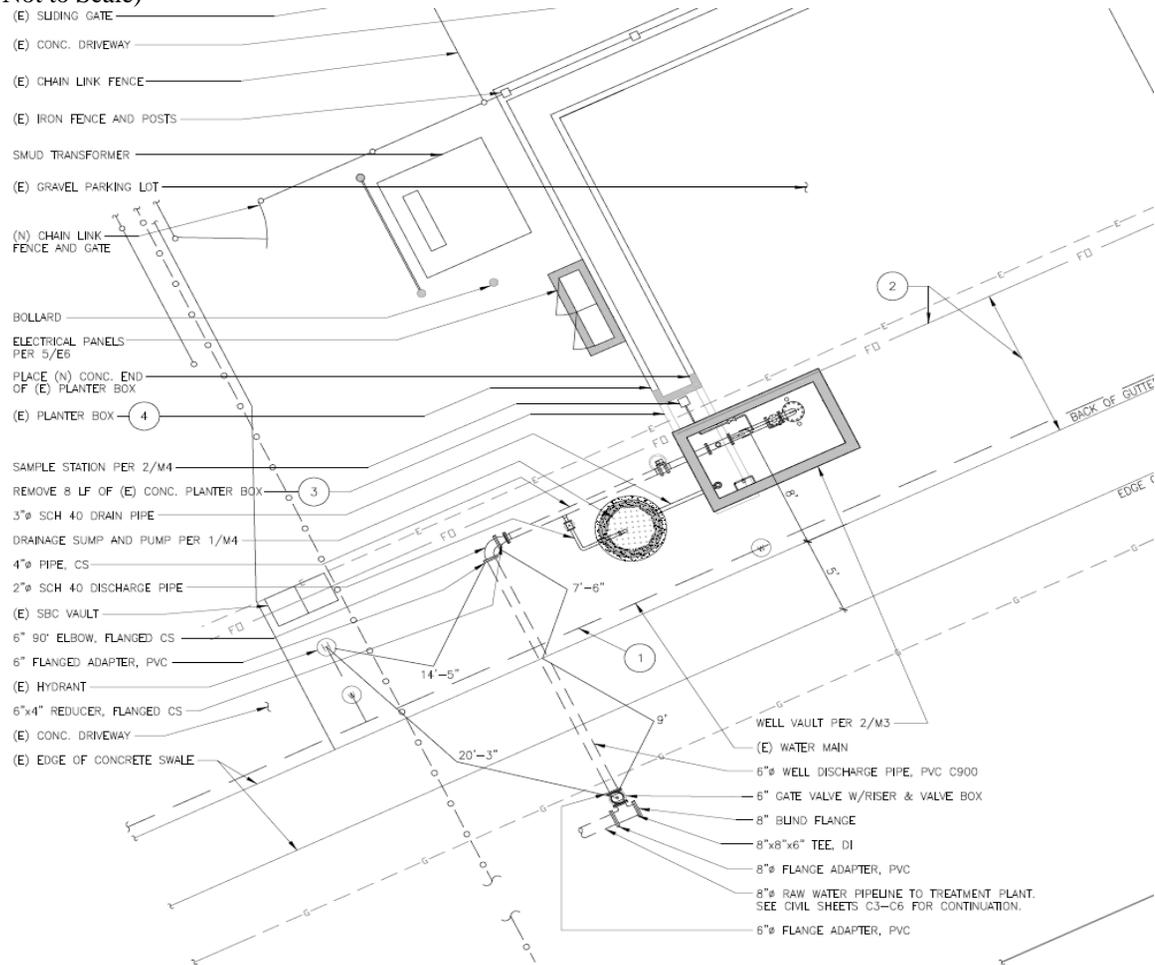
Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well C9-2 (#4635)	√	√				
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
6-Inch Check Valve	√	√				
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station	√	√				
Drain Sump	√	√				
Sump Pump	√	√				
Electric Panel	√	√				
Valve Boxes (4)	√	√				
Well Vault	√	√				

FIGURE 5: SITE PLAN WELL 4640

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

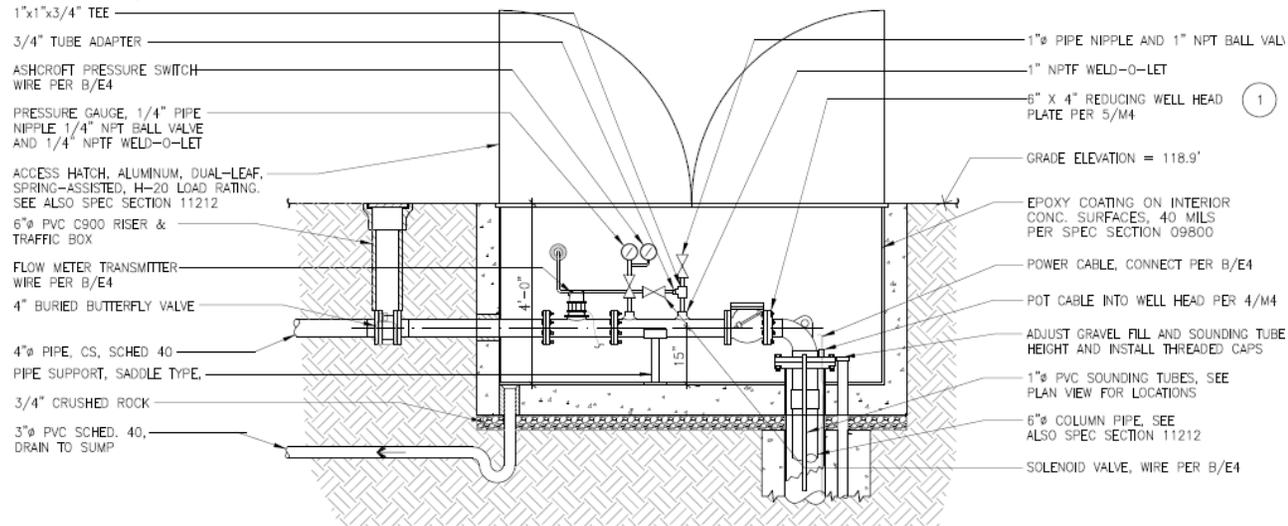


A
M2 **MECHANICAL SITE PLAN - WELL 4640**
SCALE: 1" = 6'-0"

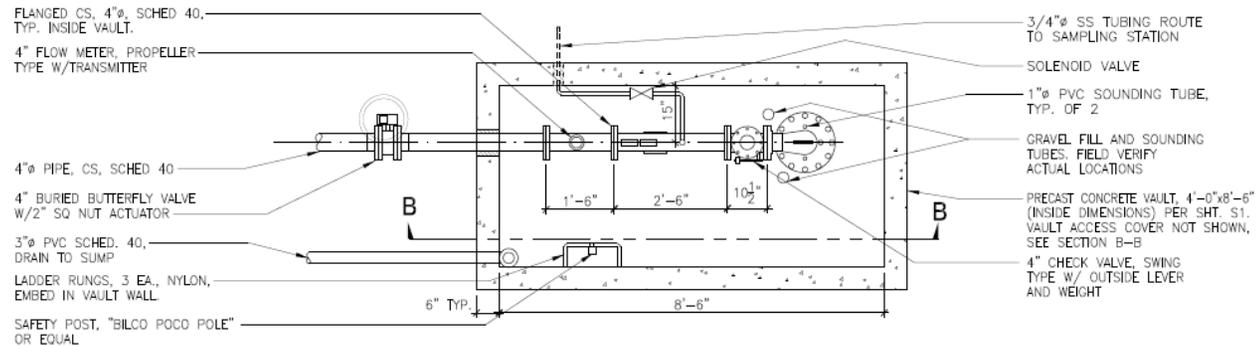
FIGURE 6: SECTION AND PLAN VIEWS, WELL 4640

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)



SECTION B-B



PLAN VIEW

2
M3

WELL VAULT - WELL 4640

SCALE: 1/2" = 1'-0"

TABLE 3: CHECKLIST FOR EXTRACTION WELL 4640

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4640						
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
6-Inch Check Valve	√	√				
4-Inch Butterfly Valve	√	√				
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station	√	√				
Valve Boxes (1 – 6-inch)	√	√				
Valve Boxes (1 – 4-inch)						

FIGURE 7: SITE PLAN WELLS 4645, 4650, AND 4655

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

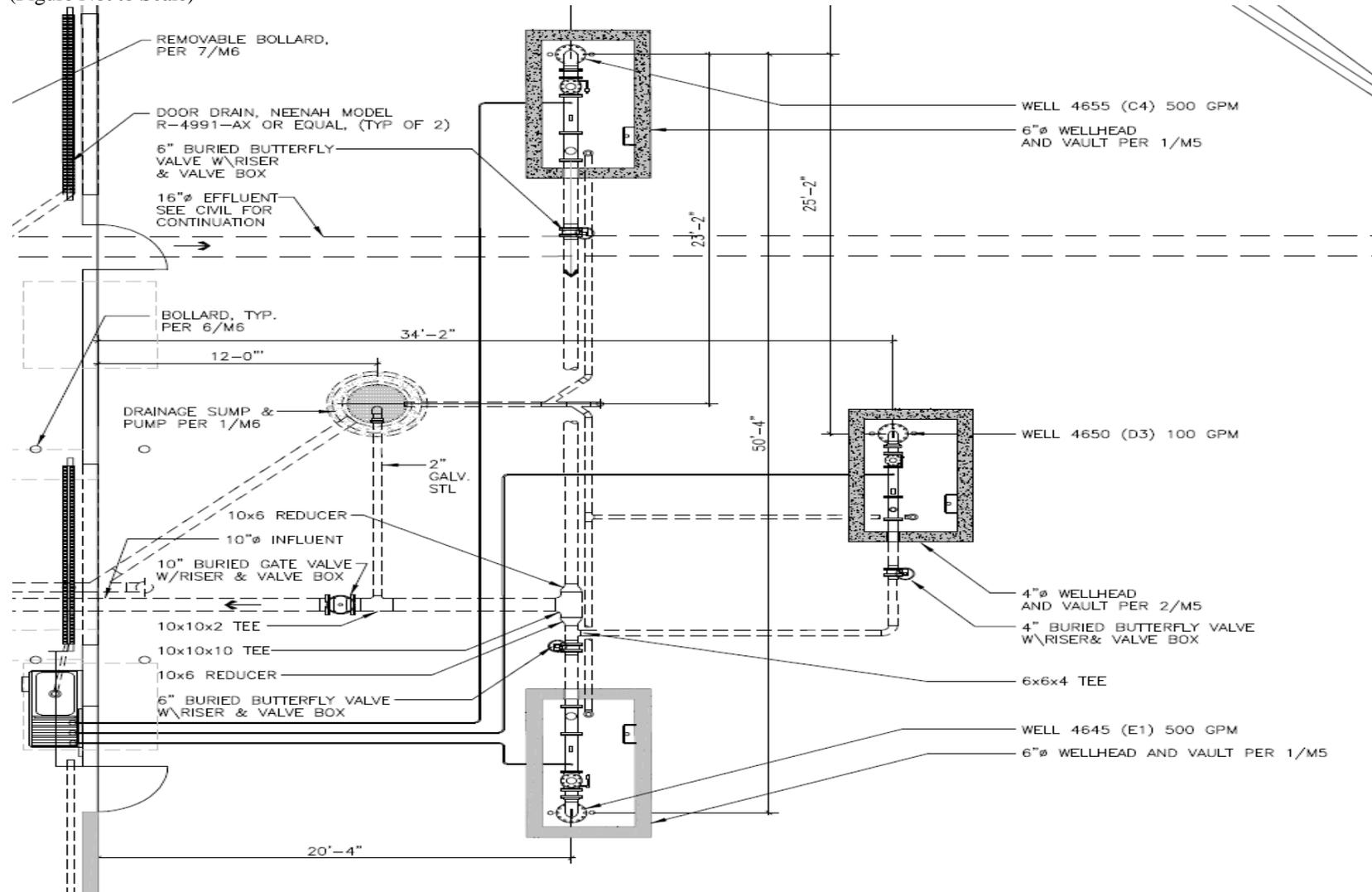
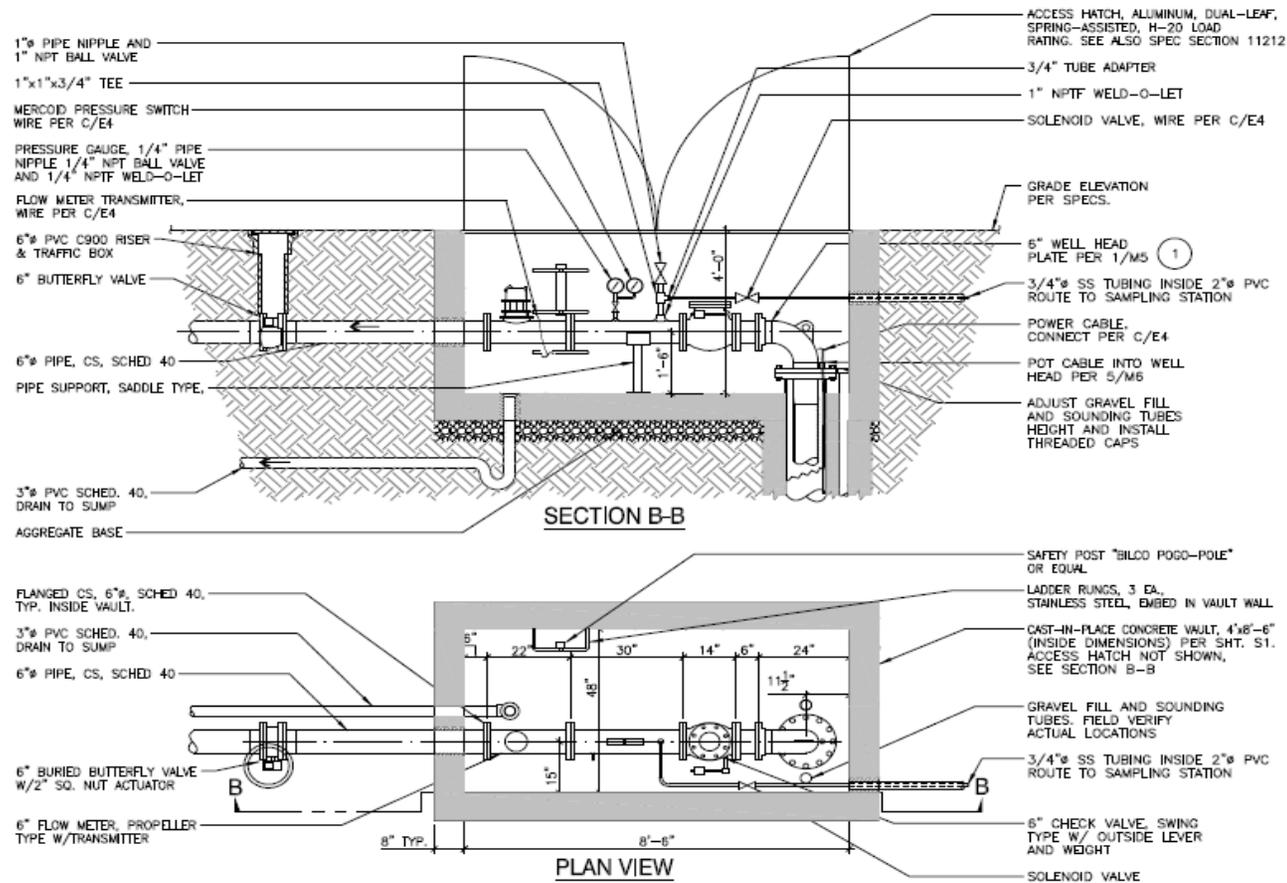


FIGURE 8: SECTION AND PLAN VIEWS, WELLS 4645 AND 4655

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)



1 WELL VAULT WITH 6" DIAMETER WELLHEAD
SCALE: 1/2" = 1'-0"

NOTES:
1 PUMP INSTALLATION UP TO AND INCLUDING WELL HEAD PLATE SHALL BE BY LAYNE CHRISTENSEN CO. (OR APPROVED EQUAL) UNDER SUBCONTRACT TO CONTRACTOR

TABLE 4: CHECKLIST FOR EXTRACTION WELL 4645

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4645						
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
6-Inch Check Valve	√	√				
6-Inch Butterfly Valve	√	√				
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station (Inside Treatment Building)	√	√				
Valve Boxes (1 – 6-inch)	√	√				

TABLE 5: CHECKLIST FOR EXTRACTION WELL 4655

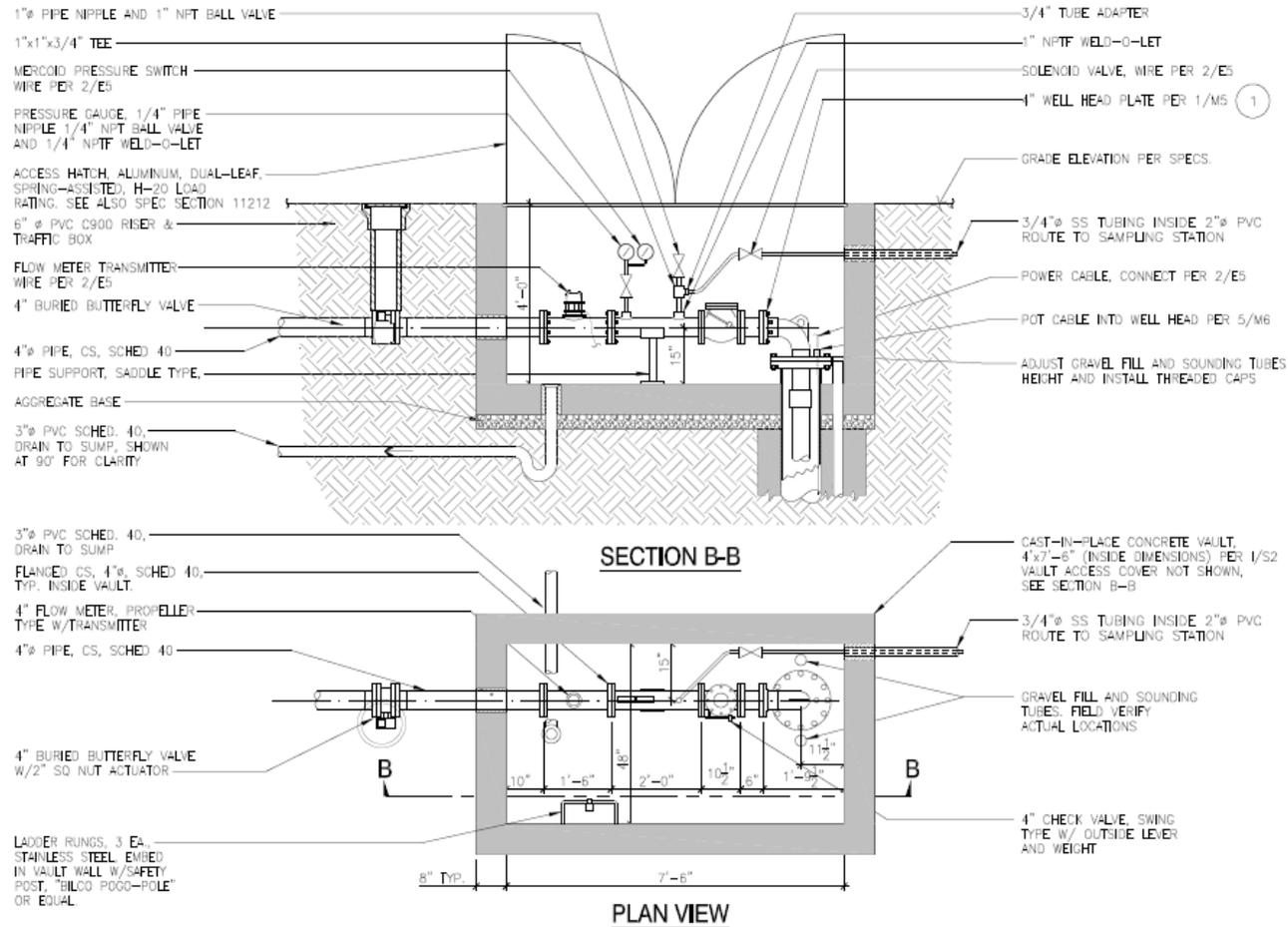
Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4655						
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
6-Inch Check Valve	√	√				
6-Inch Butterfly Valve	√	√				
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station (Inside Treatment Building)	√	√				
Valve Boxes (1 – 6-inch)	√	√				

FIGURE 9: SECTION AND PLAN VIEWS, WELL 4650

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)



2 **WELL VAULT WITH 4" DIAMETER WELLHEAD**
M5 **SCALE: 1/2" = 1'-0"**

TABLE 6: CHECKLIST FOR EXTRACTION WELL 4650

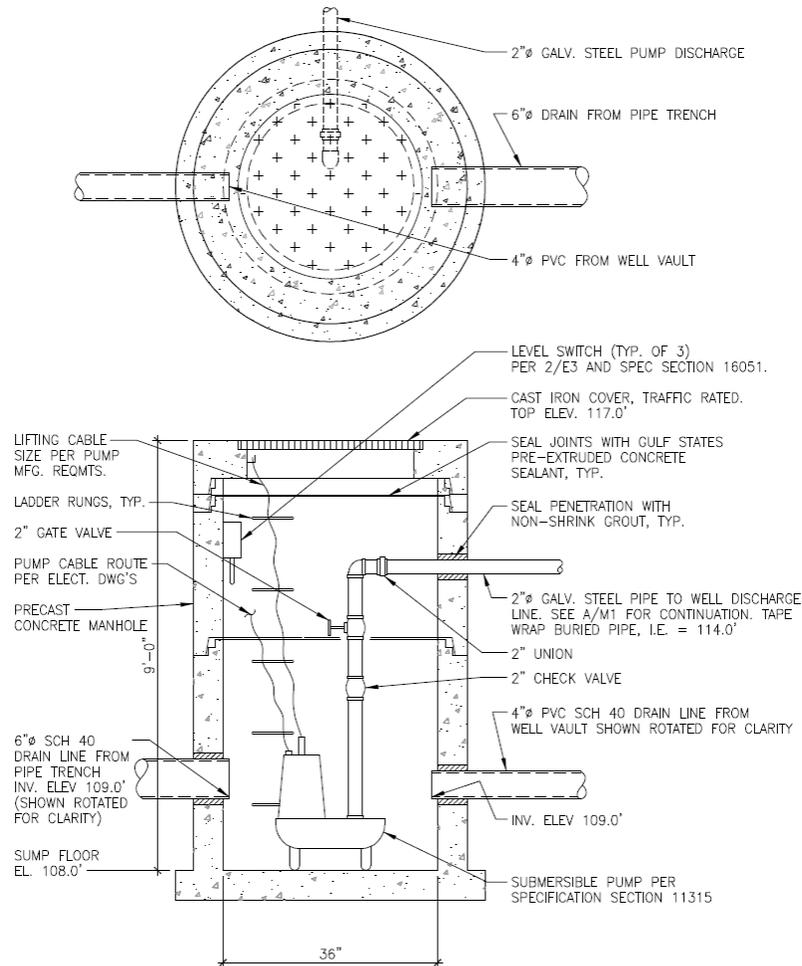
Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4650						
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
4-Inch Check Valve	√	√				
4-Inch Butterfly Valve	√	√				
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station (Inside Treatment Building)	√	√				
Valve Boxes (1 – 4-Inch)	√	√				

FIGURE 10: SECTION AND PLAN VIEW, DRAINAGE SUMP

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)



1
M6

DRAINAGE SUMP AND PUMP

SCALE: 3/4" = 1'-0"

TABLE 7: CHECKLIST FOR DRAINAGE SUMP FOR EXTRACTION WELLS 4645, 4650, AND 4655

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
GET J – Wells (4645, 4650, 4655)						
Drainage Sump	√	√				
Sump Pump	√	√				
10-inch Gate Valve	√	√				
16-inch Effluent Discharge	√	√				
Discharge Manhole	√	√				
Outfall	√	√				

FIGURE 11: SITE PLAN WELL 4665

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

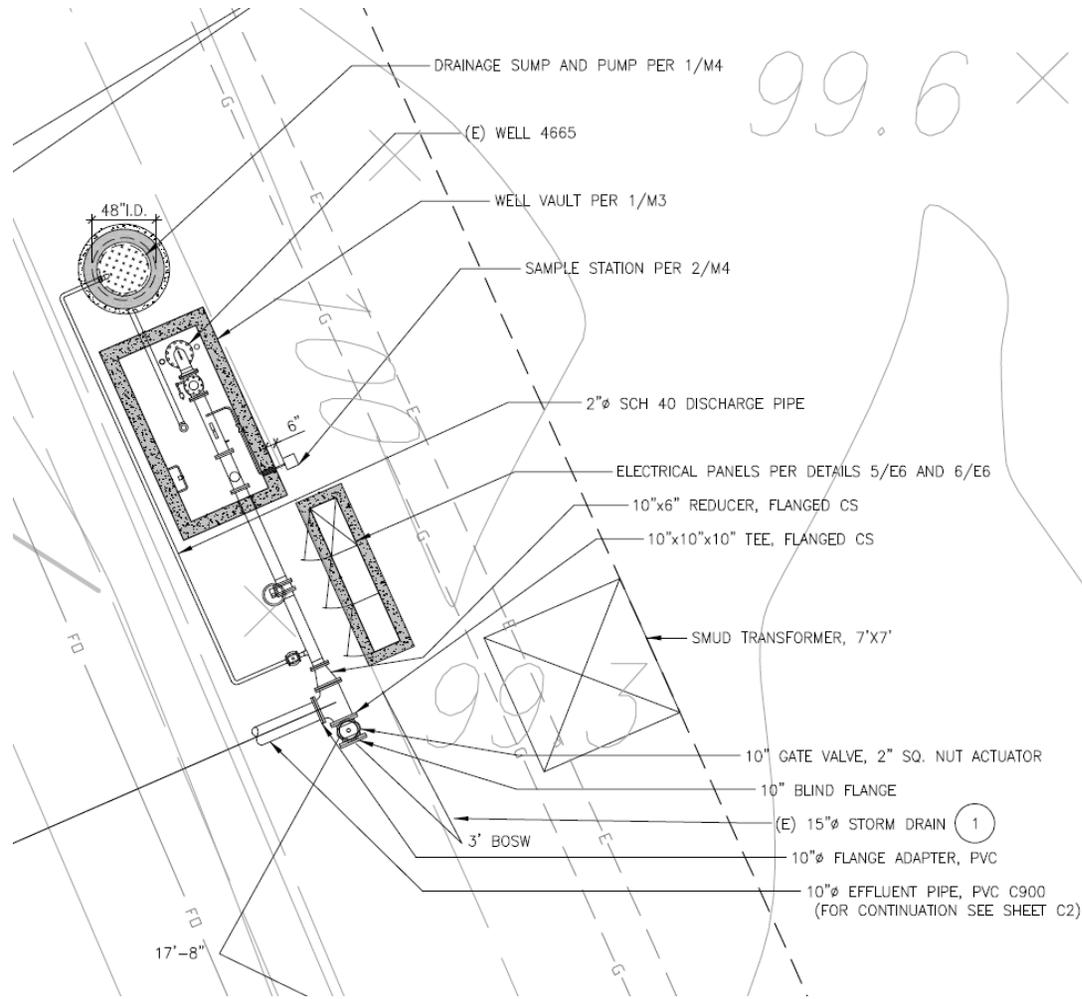
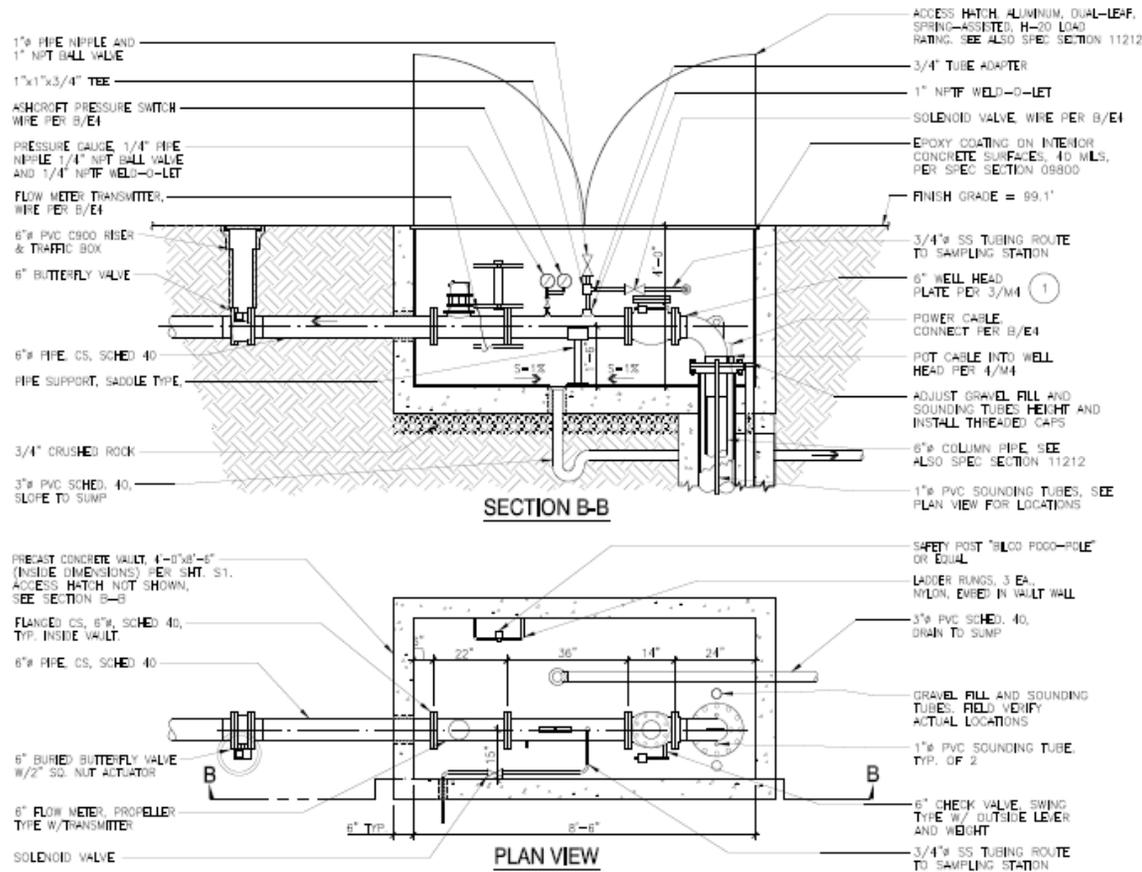


FIGURE 12: SECTION AND PLAN VIEWS, WELL 4665

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)



1 WELL VAULT - WELL 4665
SCALE: 1/2" = 1'-0"

TABLE 8: CHECKLIST FOR EXTRACTION WELL 4665

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
 Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4665						
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
6-Inch Check Valve	√	√				
6-Inch Butterfly Valve	√	√				
10-Inch Gate Valve	√	√				
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station	√	√				
Valve Boxes (1 – 6-inch, 1 – 10-inch)	√	√				

FIGURE 13: SITE PLAN WELL 4680

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

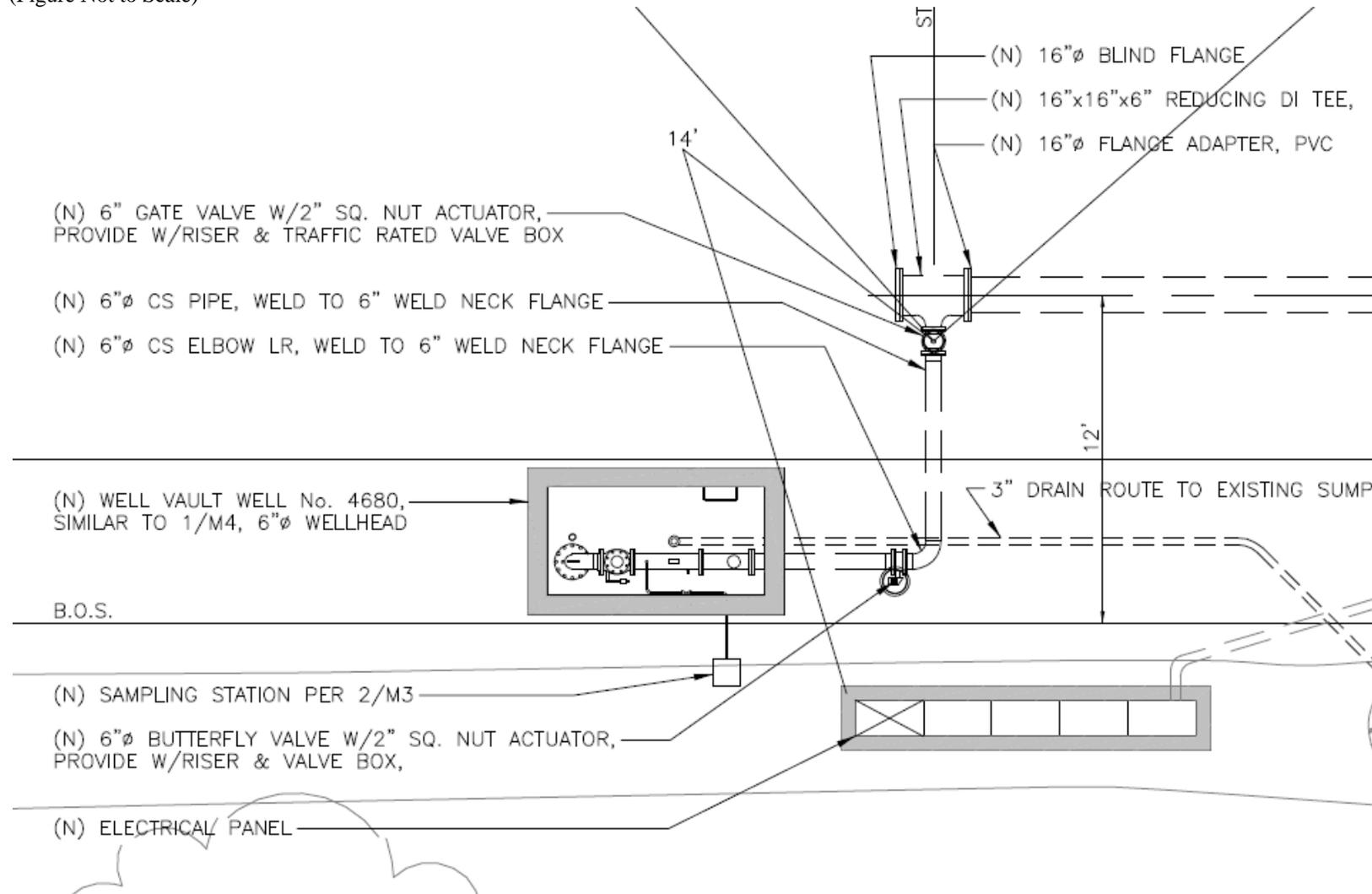


FIGURE 14: SECTION AND PLAN VIEWS, WELL 4680

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

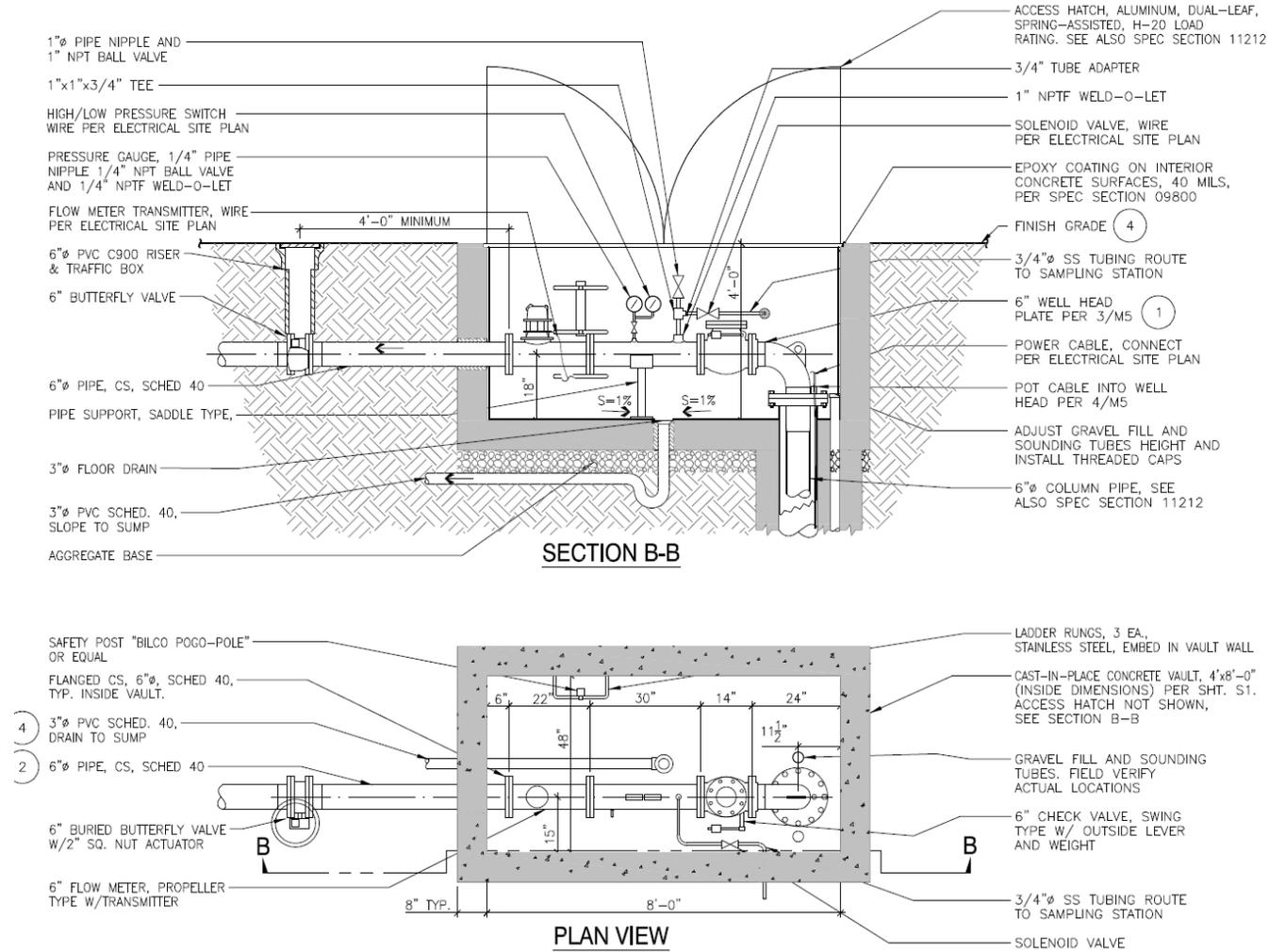


TABLE 9: CHECKLIST FOR EXTRACTION WELL 4680

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4680						
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
6-Inch Check Valve	√	√				
6-Inch Butterfly Valve	√	√				
6-Inch Gate Valve	√	√				
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station	√	√				
Valve Boxes (2 – 6-inch)	√	√				

FIGURE 15: SITE PLAN WELLS 4685 AND 4690

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

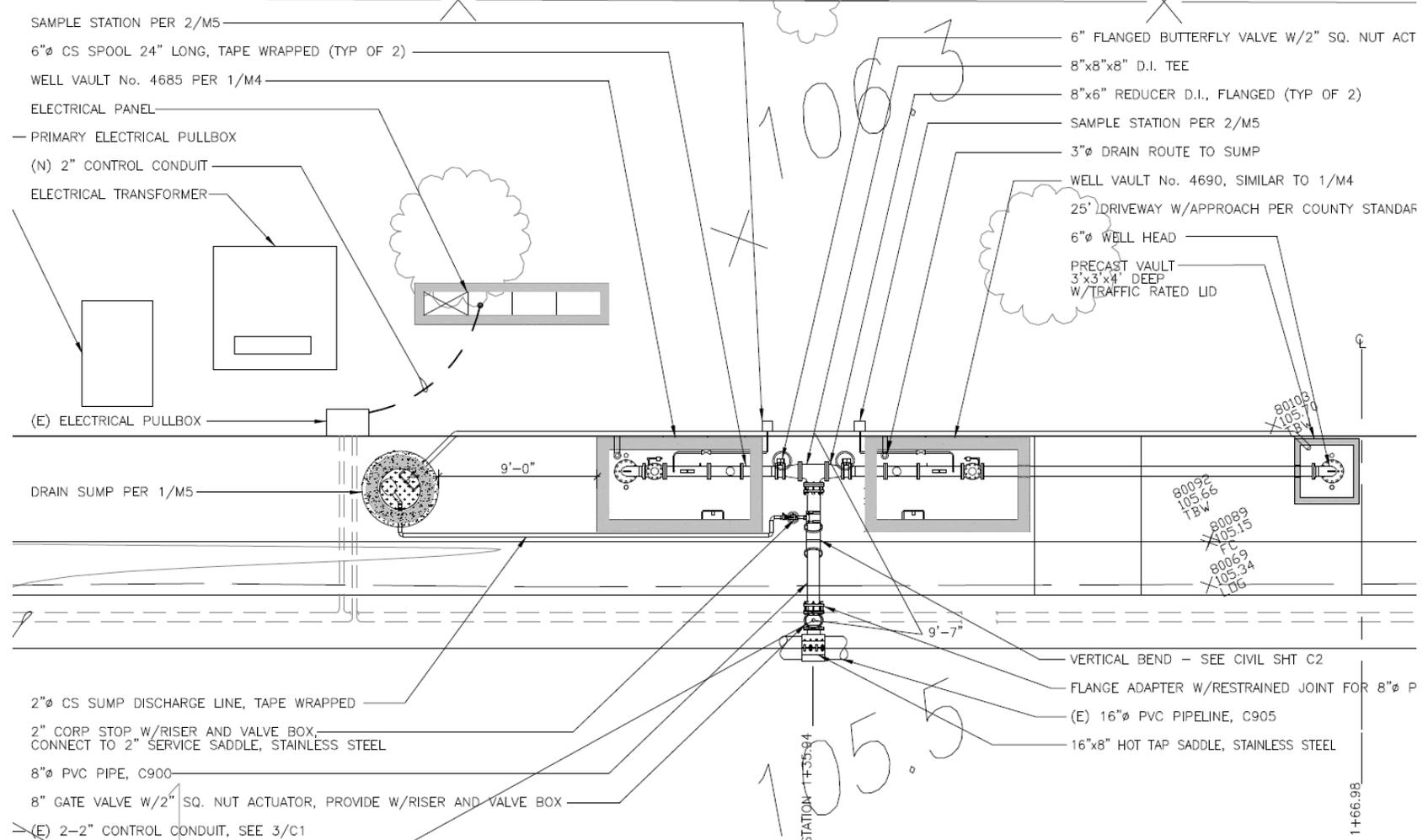


FIGURE 16: SECTION AND PLAN VIEWS, WELLS 4685 AND 4690
 Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
 Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

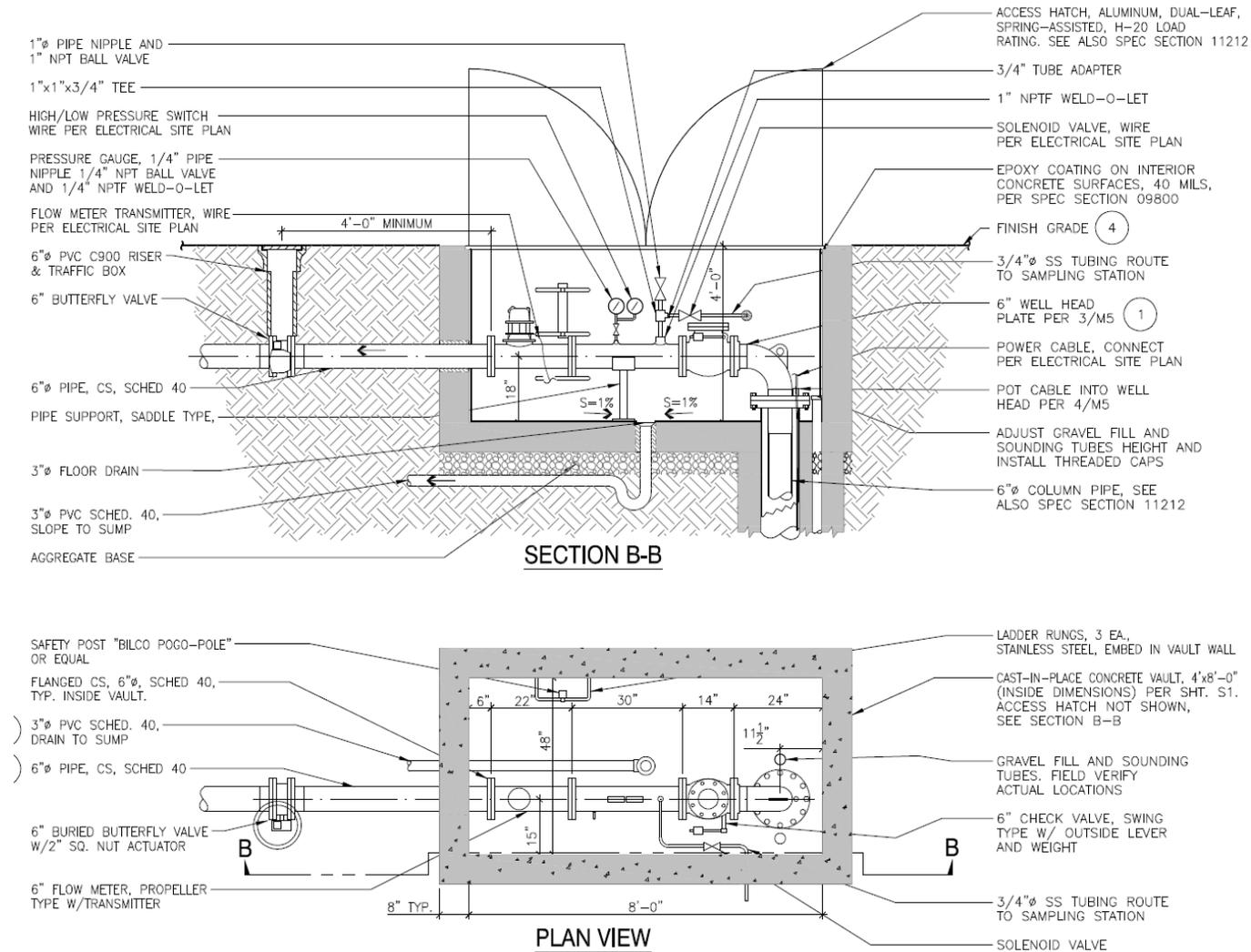


TABLE 10: CHECKLIST FOR EXTRACTION WELLS 4685 AND 4690

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4685 & 4690						
Well Vault	√	√				
Access Hatch (1 per)	√	√				
Ladder Rungs (1 per)	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
6-Inch Check Valve (2)	√	√				
6-Inch Butterfly Valve (2)	√	√				
6-Inch Gate Valve (2)	√	√				
Flow Meter (2)	√	√				
Pressure Switches	√	√				
Pressure Gauges	√	√				
Solenoid Valves	√	√				
Ball Valves	√	√				
Sample Station (2)	√	√				
Valve Boxes (2 – 6-inch and 1– 8-inch)	√	√				

FIGURE 17: SITE PLAN WELL 4695

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J, Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

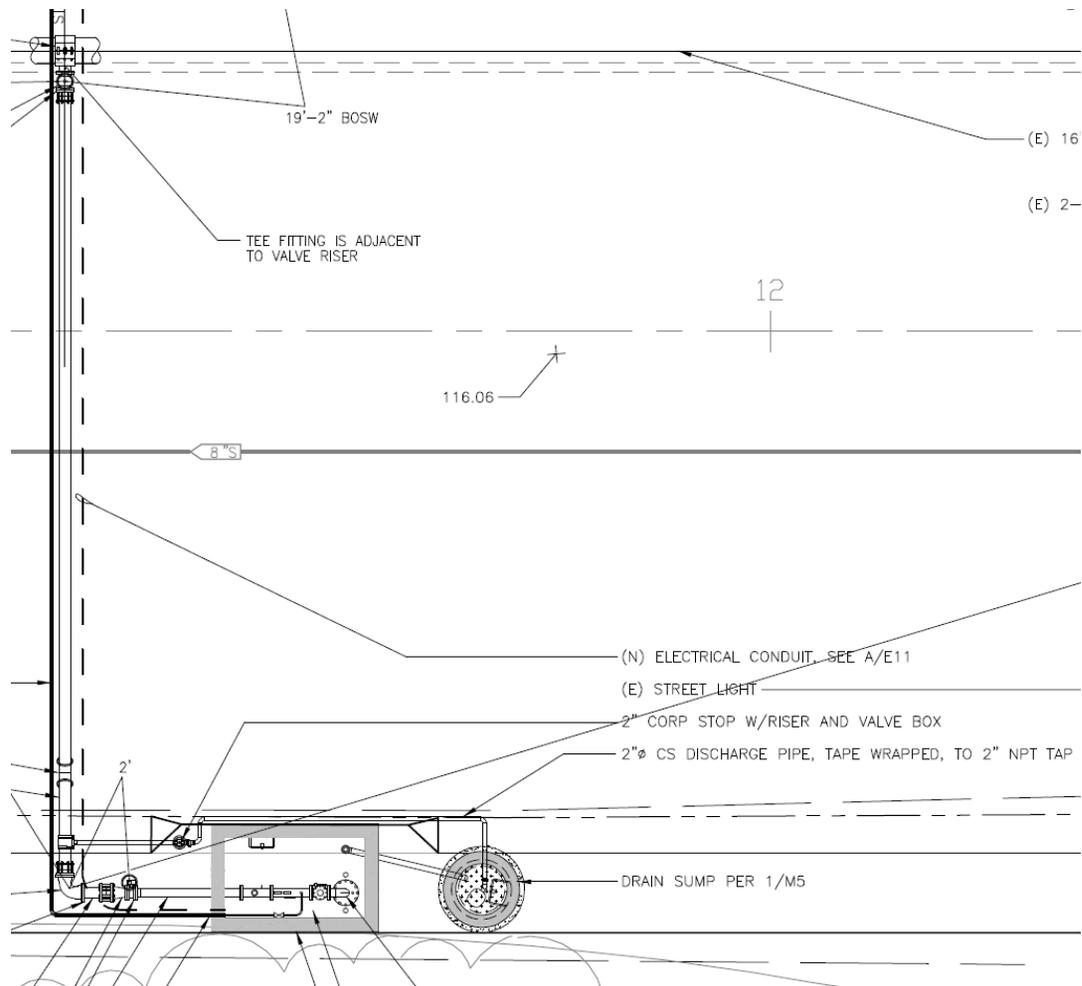
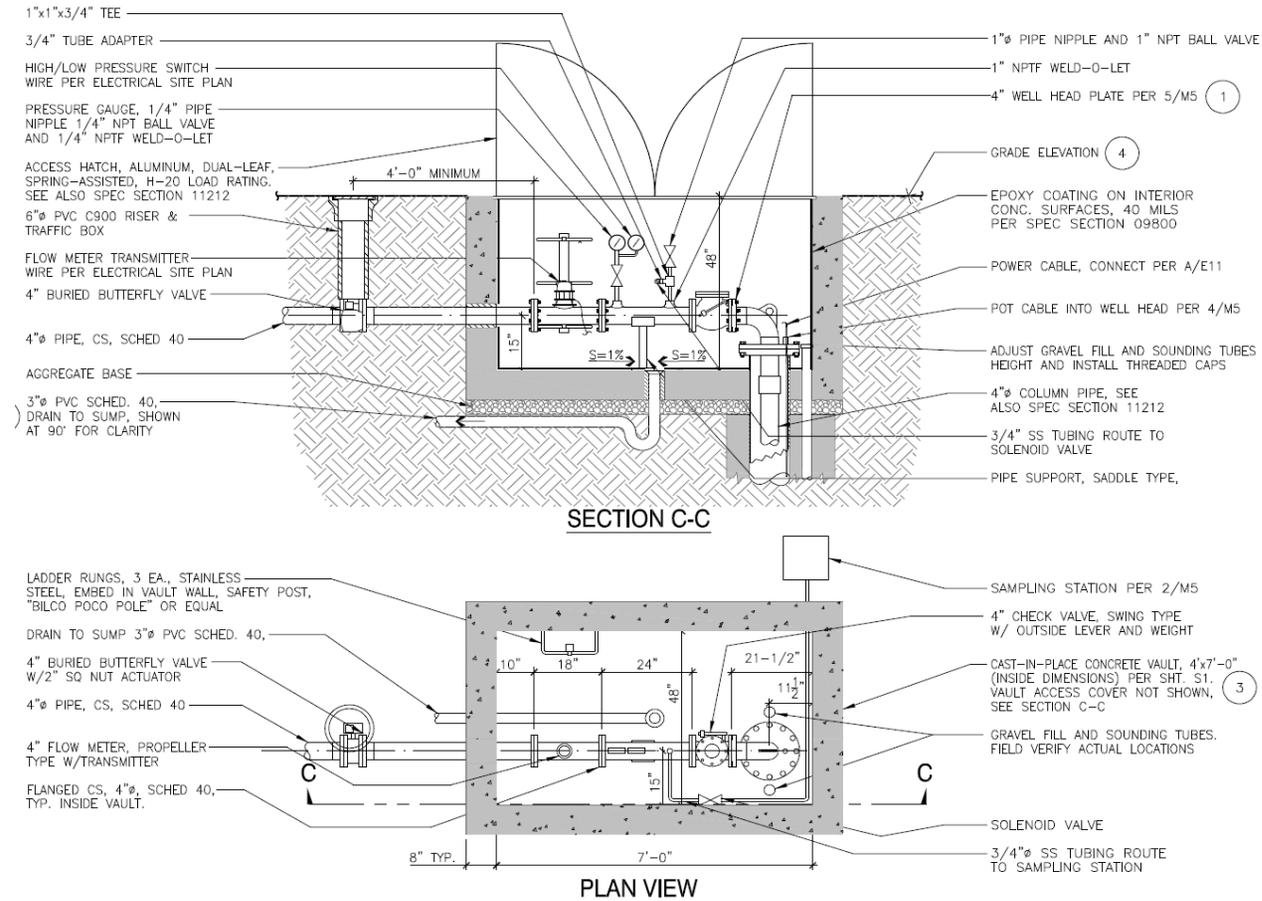


FIGURE 18: SECTION AND PLAN VIEWS, WELL 4695

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)



2 **4" WELL VAULT - WELL 4695**
M4 SCALE: 1/2" = 1'-0"

TABLE 11: CHECKLIST FOR EXTRACTION WELL 4695

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
Extraction Well 4695						
Well Vault	√	√				
Access Hatch	√	√				
Ladder Rungs	√	√				
Drain	√	√				
Well	√	√				
Pump	√	√				
Sounding Tube	√	√				
4-Inch Check Valve	√	√				
4-Inch Butterfly Valve	√	√				
6-Inch Gate Valve						
Flow Meter	√	√				
Pressure Switch	√	√				
Pressure Gauge	√	√				
Solenoid Valve	√	√				
Ball Valve	√	√				
Sample Station (Inside Treatment Building)	√	√				
Valve Boxes (1 – 4-inch, 1 – 2-inch & 1 – 6-inch)	√	√				

2.2 TREATMENT FACILITY CONSTRUCTION INSPECTION AND VERIFICATION

Physical inspection and verification of the GET System J treatment facility ([Section 1.3](#)) was conducted in early 2011 by comparing the installed equipment and material to the record drawings provided by Aerojet representing the “as constructed” state of the treatment system equipment. A plan view of the installed treatment equipment ([Figure 19](#)) and the completed PFCI checklist ([Table 12](#)) are provided.

FIGURE 19: PLAN VIEW GET J TREATMENT FACILITY

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

(Figure Not to Scale)

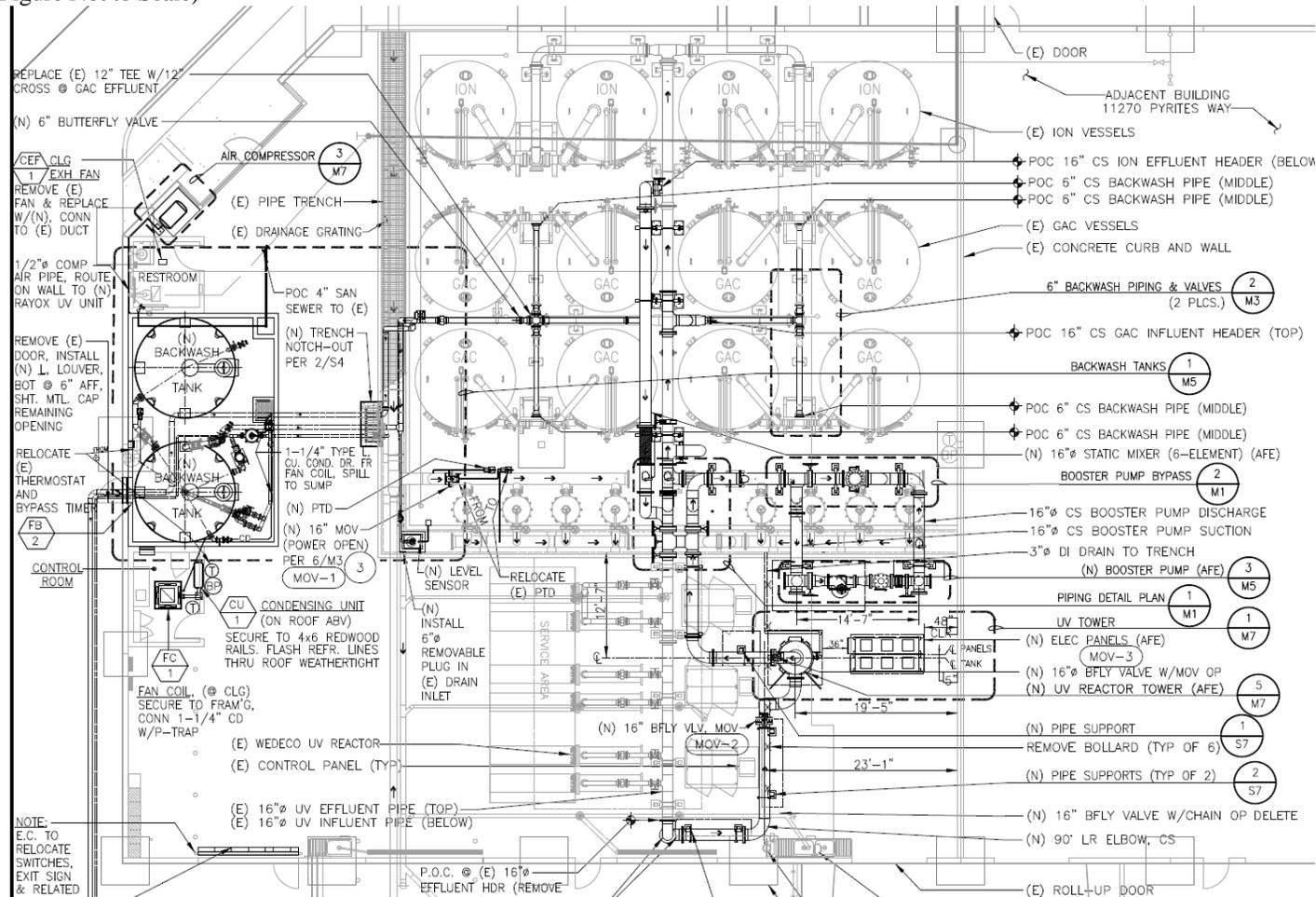


TABLE 12: CHECKLIST FOR GET J TREATMENT FACILITY

Pre-Final Construction Inspection Report, Groundwater Extraction & Treatment System J,
Aerojet General Corporation Superfund Site, Rancho Cordova, California

Well Installation – Phase 1 Wells						
	Installed	Meets Plans & Specs	Not Compliant	Item to Correct	Estimated Time for Correction	Completed
GET J Treatment Facility						
Influent Bag Filters (4)	√	√				
UV Reactor (2)	√	√				
Influent GAC Units (4)	√	√				
Ion Exchange Units (4)	√	√				
Effluent GAC Units (4)	√	√				
Effluent Bag Filters (4)	√	√				
Backwash Tanks (2)	√	√				
Peroxide Storage Tank	√	√				
Metering Pump Skid	√	√				

3.0 CONCLUSIONS

As stated previously, the objectives of the construction inspections were to verify that construction was complete and that the GET System J is operational and functional in accordance with specification.

Construction: No outstanding construction items were discovered during the inspection and, therefore, no final construction inspection will be required

Operation: Operational efficiency of the treatment system is monitored through the results of samples collected from the treated effluent and sent to the EPA, Regional Water Quality Control Board, and Department of Toxic Substance Control for review.

APPENDIX A
SITE PHOTOGRAPHS



Photograph 1: Well 4650. Typical wellhead vault.



Photograph 2: Influent bag filters with granular activated carbon (GAC) units in background, GET System J.



Photograph 3: Original Ultraviolet (UV) Reactor, GET System J.



Photograph 4: UV Reactor, GET System J.



Photograph 5: Effluent bag filters, GET System J.



Photograph 6: Recirculation pump, GET System J.

ATTACHMENT 1
OU-3 STATEMENT OF WORK PAGES 17 TO 20

Major Deliverables and Other Tasks) of this SOW. The Prefinal Design shall fully address all Agencies' comments provided by the EPA on the Conceptual/Preliminary Design Report, and if not previously addressed, be accompanied by a memorandum indicating how the comments were incorporated into the Prefinal Design. The Prefinal Design documents shall be certified by a Professional Engineer registered in the State of California.

The Prefinal Remedial Design shall serve as the Final Remedial Design if the Agencies have no further comments and EPA provides its approval. The Prefinal Remedial Design submittals shall include a capital and operation and maintenance cost estimate; reproducible drawings and specifications; and a complete set of construction drawings in full and one-half size reduction. The Final Remedial Design should also include a schedule for completion of construction including inspection certifications to establish Construction Criteria of this SOW are met.

3. GET E/F Modification

Respondents is proceeding to modify the existing GET E/F Facility to achieve on-property groundwater boundary containment needed for the OU-3 remedy under the existing Partial Consent Decree in Civil Action No. CIVS-86-0063-EJG and CIVS-86-0064-EJG consolidated. If the GET E/F modifications have been completed prior to entry of this Administrative Order and meet the provisions of this SOW, Respondents shall only be obligated to provide each of the Agencies with a set of reproduceable as-built drawings, a hard copy of the as-built drawing signed and stamped by a Professional Engineer, and an electronic PDF file of the Final Design documents for the GET E/F facility modification. Any completed GET E/F modifications which do not meet the Performance Standards of this SOW shall be modified as needed to meet the Performance Standards.

F. Remedial Action

Respondents shall implement the Remedial Action. During the design period, in preparation for implementation of the Remedial Action and in accordance with Section IV(M) (Supporting Plans) and Section V (Schedule for Major Deliverables and Other Tasks) of this SOW, Respondents shall submit to the Agencies for review a Construction SAP with Field Sampling Plan and QAPP; Construction Quality Assurance Program Plan; Construction Health and Safety Plan; Construction Contingency Plan; and any needed updates to the RD/RA Work Plan.

Unless otherwise approved by the EPA, Respondents shall not begin any phase of the construction until after the EPA has approved its Final Remedial Design, Construction Contingency Plan, and Construction SAP. Field changes to the Remedial Action, as set forth in the RD/RA Work Plan and Final Design, shall not be undertaken without review by the Agencies and the EPA's approval. All Work on the Remedial Action shall be documented in enough detail to produce as-built construction drawings after the Remedial Action is complete. Review by the Agencies and/or EPA's approval of submittals does not guarantee

that the Remedial Action, when constructed, will meet the Performance Standards of this SOW.

1. Remedial Action Work Plan

Respondents shall not be required to submit a separate Remedial Action Work Plan. Instead, Respondents shall provide supplemental information as necessary to update the RD/RA Work Plan.

2. Pre-Construction Meeting

A pre-construction meeting shall be held after selection of the construction contractor but before initiation of construction in accordance with the schedule contained in Section V (Schedule of Major Deliverables and Other Tasks) of this SOW. The meeting shall include Respondents's representatives and interested federal, state and local regulatory agency personnel. At the meeting, Respondents shall describe the roles, relationships, and responsibilities of all parties; review the work area security and safety protocols; review any access issues; review the construction schedule; and review the construction quality assurance procedures.

Respondents shall document the meeting results in a Pre-Construction Meeting Report and submit the report in accordance with the schedule contained in Section V (Schedule of Major Deliverables and Other Tasks) of this SOW. Respondents shall submit the report to all parties in attendance, and shall include the names of people in attendance, issues discussed, clarifications made, and action items and due dates.

Respondents shall provide the Agencies with a Start of Construction Notice in accordance with the schedule contained in Section V (Schedule of Major Deliverables and Other Tasks) of this SOW.

3. Remedial Action Construction

Respondents shall implement the Remedial Action as detailed in the approved RD/RA Work Plan (as updated) and approved Final Design.

4. Prefinal Construction Inspection

A Prefinal Construction Inspection shall be scheduled in accordance with the schedule contained in Section V (Schedule of Major Deliverables and Other Tasks) of this SOW after Respondents determine that construction is complete and the Remedial Action, or a discrete portion of the Remedial Action, is operational and functional meeting the Performance Standards of Section III (Performance Standards) of this SOW. Respondents shall notify the Agencies so that a prefinal inspection can be conducted and attended by the Agencies, Respondents, and other participants including the Project Coordinators and other federal, state, and local regulatory Agencies with a jurisdictional

interest. If a Prefinal Construction Inspection is held for a portion of the Remedial Action, one or more additional inspections shall be conducted so that the entire Remedial Action shall have been inspected.

The objective of the inspection/s is to determine whether construction is complete and the Remedial Action (or the inspected portion) is operational and functional. Any outstanding construction items discovered during the inspection shall be identified and noted on a bullet list. Respondents shall certify that the equipment is effectively meeting the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. A Prefinal Construction Inspection Report shall be submitted by Respondents which outlines the outstanding construction items, actions required to resolve the items, completion date for the items, and an anticipated date for a Final Inspection. The Prefinal Inspection Report can be in the form of a bullet list or letter.

5. Final Construction Inspection

If required by the EPA, a Final Construction Inspection shall be conducted after completion of any work identified in the prefinal inspection report in accordance with the schedule contained in Section V (Schedule of Major Deliverables and Other Tasks) of this SOW. Respondents shall notify the Agencies and coordinate the schedule for any final inspection. The final inspection shall consist of a walk-through inspection by the Agencies and Respondents. The prefinal inspection report shall be used as a checklist, with the final inspection focusing on the outstanding construction items identified in the prefinal inspection. Confirmation shall be made that outstanding items have been resolved for all items, including any items which may have been found after the checklist has been developed.

Any outstanding construction items discovered by Respondents or the Agencies during the inspection, whether or not identified on the prefinal inspection, to still require correction shall be identified and noted on a punch list. If any items are still unresolved, the inspection shall be considered to be a Prefinal Construction Inspection requiring another Prefinal Construction Inspection Report and subsequent Final Construction Inspection. After all items are resolved, Respondents shall issue a Final Construction Inspection Report in accordance with the schedule contained in Section V (Schedule of Major Deliverables and Other Tasks) of this SOW.

6. Remedial Action Construction Complete Report

As specified in the approved schedule included in Section V (Schedule for Major Deliverables and Other Tasks) of this SOW, after construction is completed on the entire Remedial Action and the systems are operational and functional as intended and Contaminated Groundwater is contained in all layers of the aquifer, Respondents shall submit a Remedial Action Construction Complete Report. In the Report, a registered Professional Engineer and Respondents' Project Coordinator shall state that the construction of the Remedial Action has been completed in accordance with the RD/RA

Work Plan submitted under this SOW. The written Report shall provide a synopsis of the Work defined in this SOW, describe deviations from the RD/RA Work Plan, include reproduceable and PDF electronic file version of as-built drawings signed and stamped by a Professional Engineer, provide actual costs of the Remedial Action, O&M to date, and a summary of the results of operational and performance monitoring completed to date. The Report shall contain the following statement, signed by a responsible corporate official of Respondents or Respondents' Project Coordinator:

“To the best of our knowledge, after thorough investigation, we certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

7. Remedial Action Report

As specified in the approved schedule included in Section V (Schedule for Major Deliverables and Other Tasks) of this SOW, after Respondents has determined that the Performance Standards of the Remedial Action are being met and all phases of the work including Operation and Maintenance (O&M), Respondents shall submit an Remedial Action Report. In the Report, a registered Professional Engineer and Respondents' Project Coordinator shall certify that the Remedial Action is operating and functioning as intended and that Performance Standards listed in Section III (Performance Standards) of this SOW are being met. The written Report shall provide a summary of the results of operational and performance monitoring completed to date and shall provide documentation to substantiate Respondents' certification in full compliance with Sections IV(K) (Performance Evaluation Reports) and IV(L) (Quarterly Compliance Monitoring Reports) of this SOW. The Remedial Action Report shall contain the following statement, signed by a responsible corporate official of Respondents or Respondents' Project Coordinator:

“To the best of our knowledge, after thorough investigation, we certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

G. Operation and Maintenance

O&M shall be performed in accordance with the approved O&M Manual.

1. Operation and Maintenance Plan

An Operation and Maintenance (O&M) Plan is not required. O&M-related information shall be provided by Respondents in Section IV(G)(2) (Operations and Maintenance Manual) of this SOW.

2. Operation and Maintenance Manual