CORNERSTONE
Environmental Group, LLC

7600 Dublin Blvd., Suite 285 • Dublin, California • 94568 • (877) 633-5820 • Fax: (925) 560-9879

September 16, 2010

Mr. Steve Richtel
Waste Management Closed Sites Group
2400 West Union Ave.
Englewood, CO 80110

Re: Olympic View Sanitary Landfill – Flare Station Modifications and Utility Flare Installation As-built Report

Dear Mr. Richtel:

Cornerstone Environmental Group, LLC (Cornerstone) provided Construction Quality Assurance (CQA) for the construction and installation of a utility flare at the Olympic View Sanitary Landfill (OVSL) in Port Orchard, Washington. The utility flare (flare) was manufactured by Landfill Gas Specialties, LLC, a division of The Shaw Group, Inc. (LFG Specialties). The flare was installed by Glacier Construction Services, Inc. (Glacier).

The following letter report documents the construction activities in conformance with the approved drawings dated March 2010 and revised June 2010. As-built drawings and photographic records are attached to this report for your records.

The OVSL flare station modifications included:

- Removal and de-energizing of the Leachate Evaporator Unit (LEU), its landfill gas (LFG) combustion and injection skid, and associated vessels and piping;
- Installation of a 75 to 750 standard cubic feet per minute (scfm) utility (open) flare skid measuring eight (8) feet wide by 28 feet long;
- Installation of the ultra-violet (UV) fire eye and erection of the flare stack;
- Connection of the 14-inch inlet header from the wellfield to the new flare skid knockout pot (KOP) inlet via 23 feet of 8-inch diameter high-density polyethylene (HDPE) standard dimension ratio (SDR) 17 piping mounted on Uni-strut pipe supports per the drawings;
- Blind flanging of the existing enclosed flare KOP inlet after disconnection from the header from the wellfield;
- Connection of a new skid-mounted five (5) horsepower (hp) reciprocating compressor to the existing inlet header sump via 33 feet of heat-traced, two (2)-inch diameter HDPE SDR-9 compressed air force main secured to the existing concrete pad;

- Installation of 40 feet of heat traced, 1-inch diameter HDPE SDR-17 common gravity drain from the compressor's oil-water separator to the existing header inlet sump;

- Connection of the KOP transfer pump discharge to the inlet header sump via 38 feet of heat-traced, 2-inch HDPE SDR-9 piping;

- Connecting the electrical main disconnect of the new flare skid to the existing main for the existing flare and LEU; and

- Connecting the auto-dialer and remote access server modem telephone line to the existing telephone connection.

Flare Station Construction Activities

Glacier mobilized to OVSL during the week of May 5, 2010 to decommission and remove the LEU, its LFG combustion and injection skid, and associated vessels and piping. Upon removal of all the LEU equipment, Glacier cut and grinded anchor bolts flush with the existing concrete. Glacier also blinded off the inlet from the LEU to the existing enclosed flare stack and the inlet from the wellfield to the LFG combustion and injection skid.

The utility flare was delivered on Monday June 21, 2010, at approximately 1:00 pm Pacific Standard Time (PST). Glacier proceeded with securing the flare skid to the existing concrete pad using 6-inch galvanized bolts and anchor plates provided by LFG Specialties. Following securing the flare skid, the Contractor proceeded with the plumbing of the two force mains and drain lines from the skid to the existing header inlet sump.

On Wednesday, June 23, 2010, Glacier's electrician (Elite Electric, Inc.) installed ¾- inch galvanized conduit and ½-inch galvanized conduit for the electrical and telephone lines, respectively, from the existing main electrical disconnect and telephone line to the flare skid main disconnect and telephone connection. Conduit and wiring was installed overhead and supported on Uni-strut between the connection points to the existing electrical and telephone terminals to the new flare control panels. One galvanized eight-foot ground rod was installed outside the southeast corner of the concrete containment for the former leachate evaporator vessels. Copper ground wire was installed via polyvinyl chloride conduit secured to the flare skid's lower I-beam and routed to the ground rod. Electrical work was completed (pre-inspection) on Wednesday afternoon.

The electrical inspector cancelled the inspection scheduled for 3:00 pm on June 23, 2010. The inspector authorized testing the flare station prior to completion of the electrical inspection which was rescheduled for Thursday, June 24, 2010 (as detailed on Sheet 3, section labeled "Results of Electrical Inspection").

The LFG Specialties field technician inspected the skid components and connections in the control panels and junction boxes for any loose connections that may have occurred during shipping. Once electrical work was done, LFG Specialties tested the power to the new flare skid

and started the compressor unit, tested the flare ignition system, and bumped the blower motors. Two thermocouple wires were discovered to be connected to the junction box on the flare stack in reverse order. The LFG Specialties technician reversed the wiring to the correct orientation and thus corrected the issue.

On Thursday, June 24, 2010, Glacier and OVSL's GCCS operator shut the existing flare down at approximately 6:15 am PST. Glacier proceeded with disconnecting the inlet header from the existing KOP and rotated the 14-inch diameter elbow 90 degrees clockwise to align with the new 14 to 8-inch reducer and the new 8-inch HDPE SDR-17 header. Once connected, Glacier completed installation of the remaining pipe supports for the inlet header.

LFG Specialties filled the new KOP with water to test the operation of the level switches and transfer pump. All level switches and the transfer pump worked as designed.

The flare operator filled both propane canisters with propane and connected a new hose from the air supply force main from the new air compressor to the inlet header sump pump air supply regulator.

LFG Specialties completed the inspection of skid equipment and conducted a startup of the flare using LFG at approximately 10:00 am PST. LFG Specialties then continued testing flare operations and checking shutdowns and alarms.

Results of Electrical Inspection

At approximately 11:30 am PST, the electrical inspector for the State of Washington Department of Labor and Industries arrived onsite to complete the electrical inspection. The inspector inspected all cabinets, main tie-ins, motor overloads, grounds, and labeling. The electrical inspector found the following items needing correction and re-inspection:

- Two ground rods are required spaced at least six (6) feet from each other. Only one had been installed at the time of the inspection;
- The ground wire must be routed in PVC conduit instead of galvanized steel conduit unless the conduit is also grounded by a separate system;
- The flare skid transformer must be grounded to the skid; and
- Where dual voltages exist within panels, each panel must have color-coded labels indicating the presence of dual voltages and the type of voltage in each panel by color must be properly displayed/labeled.

At the end of the inspection, the inspector wrote up his report and faxed a copy to the electrical contractor's office and gave the original to Cornerstone. Cornerstone scanned in the report and emailed it to WM and Glacier personnel. The inspector indicated that flare operations and testing may continue and he would arrange to re-inspect the deficient items during the week of June 28, 2010.

The electrical contractor returned to the site on June 24, 2010 and corrected the deficiencies identified by the inspector with the exception of the labels for the control panels. LFG Specialties arranged to have the labels sent to the site for placement on the panels. On June 30, 2010, the electrical inspector returned and found all completed items acceptable and signed off on the work.

Spare Parts

Cornerstone confirmed that all spare parts ordered per the sales agreement with LFG Specialties were delivered with the flare delivery. The spare parts were turned over to the site operators for storage.

Setting Vacuum Control Set Point

On June 24, 2010, LFG Specialties set the vacuum set point on the variable frequency drive (VFD) controller. The vacuum set point was set at approximately 23 inches of water column vacuum. LFG quality was approximately 40 percent methane, 26 percent carbon dioxide, three (3) percent oxygen, and 31 percent balance gas. LFG flow was approximately 390 scfm and flare temperature was approximately 1,330 degrees Fahrenheit prior to Cornerstone leaving the site.

Final Walk-Through

Cornerstone conducted a final walk-through of work items with Patrick Madej of WM on June 24, 2010. There were no deficient items observed but the following items were noted:

- The oil-water separator is a plastic vessel and there was a concern that it may crack during freezing temperatures. However, in speaking with LFG Specialties on June 25, 2010, they indicated that there is a heater inside the unit to prevent liquid from freezing and damaging the unit.

- A 1-inch PVC ball check valve is recommended on the 1-inch gravity drain line to prevent any back flow should the inlet sump overflow. The GCCS operator offered to install this. The 1-inch PVC ball check vale will be installed the week of September 3, 2010.

- The surface of the window on the main control panel is not clear. The glass is etched or oxidized. The window pane needs to be replaced. LFG Specialties is aware and is sending a replacement window to the site. The GCCS operator offered to replace the window upon receipt. The glass was received early July and installed.

- A LFG leak was observed at the connection of the gear-operated 8-inch valve to the new KOP. Upon tightening of the bolts, the leak was fixed. The LFG Specialties field technician used a PID to check for leaks around the entire skid and none were found.

- O&M Manuals from LFG Specialties were to be sent to OVSL during the week of July 12, 2010.

Flare Operations and Maintenance Training

Flare operations and maintenance training was conducted by the LFG Specialties technician on Friday, June 25, 2010, for WM and their GCCS operator personnel. Cornerstone was not required to be present for this training as agreed upon by WM personnel.

Based on Cornerstone's final walk through meeting with Mr. Madej, Cornerstone assumes that OVSL accepts this project as substantially complete in accordance with the descriptions and date of this letter. If you have any questions or comments, please contact me at 760-977-8106 or Paul Stout at 630-633-5822. Thank you for your continued consideration and use of our services.

Sincerely,

Cornerstone Environmental Group, LLC.

Darrell Thompson
Project Manager

Paul Stout, P.E.
Senior Manager

PAUL JAMES STOUT
STATE OF WASHINGTON
45766
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 10/16/11

9/16/10

Attachments:
Record Drawings
Photographs

cc: Dave Wilson, OVSL
Charles Luckie, OVSL
Patrick Madej, WMCSG
Dave Beardon, WMI

RECORD DRAWINGS

PLANS FOR THE

2010 FLARE STATION MODIFICATIONS

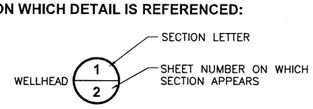
PREPARED FOR OLYMPIC VIEW SANITARY LANDFILL

PORT ORCHARD, WASHINGTON

SEPTEMBER 2010

DETAIL INDICATOR:

SHEET ON WHICH DETAIL IS REFERENCED:



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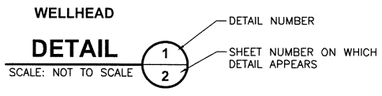
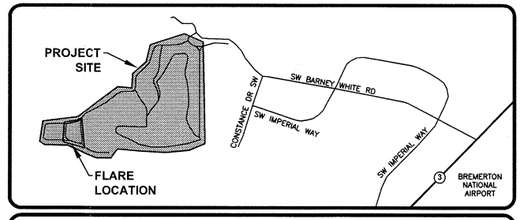


WASTE MANAGEMENT

CORNERSTONE
Environmental Group, LLC

7600 DUBLIN BLVD. SUITE 200
DUBLIN, CALIFORNIA 94568
Tel. (877) 633-5520



LOCATION MAP

Taken from 2009 Google Imagery

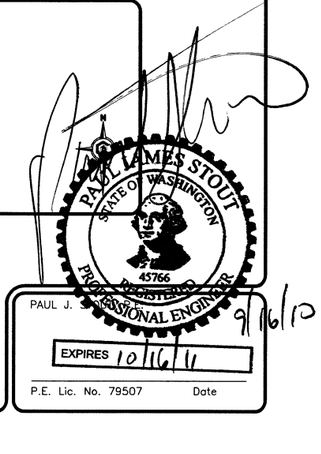
KITSAP COUNTY, WA

N473004-W1224702

2009

SHEET INDEX

RECORD DRAWING



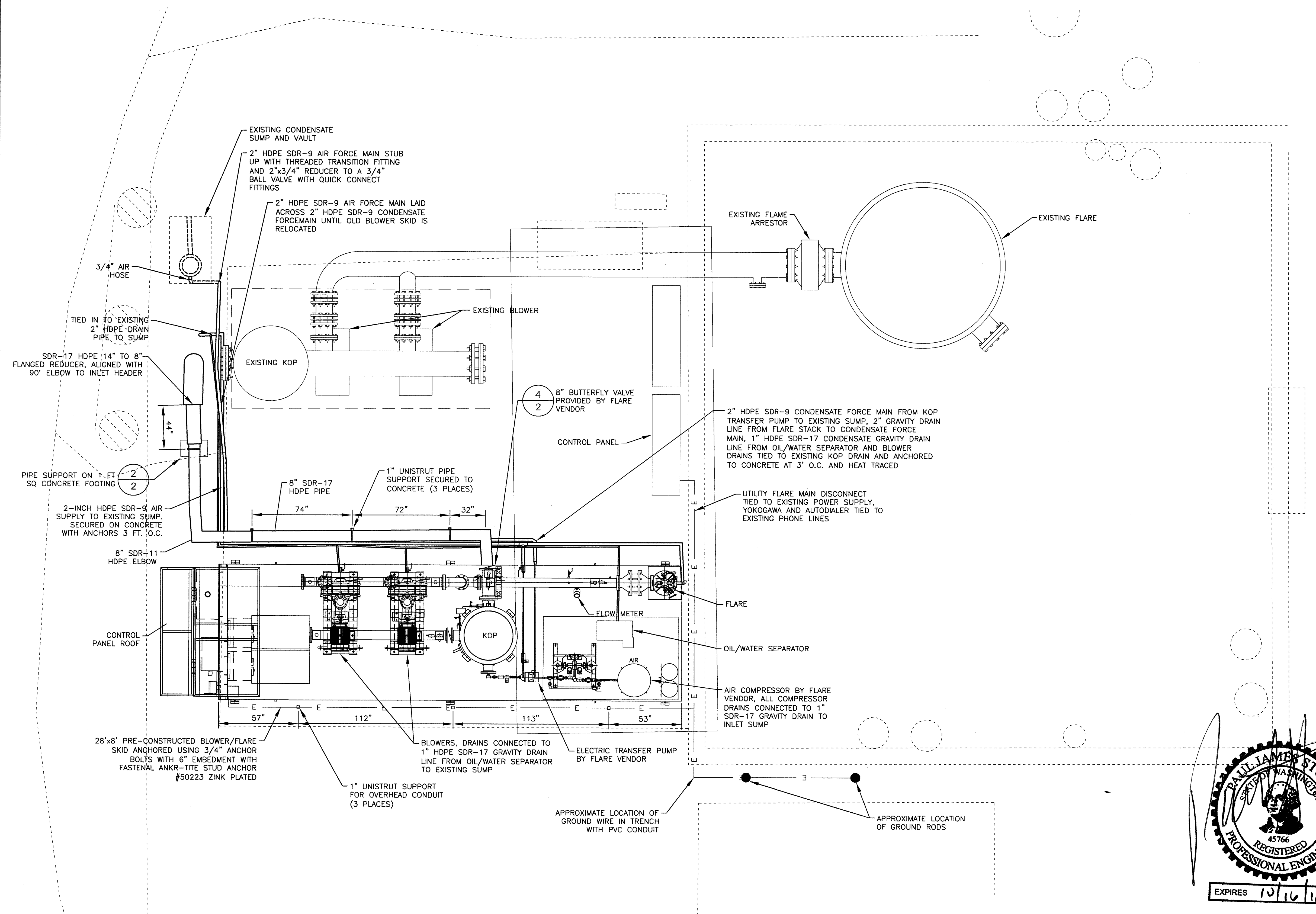
PAUL J. STOUT

EXPIRES 10/16/11

P.E. Lic. No. 79507 Date

1" 1/2" 0" 1"

File: X:\PROJECTS\OVSL - 2009 - FLARE STATION - 090408_PROJECT DRAWINGS\OVSLSITE-01_IMPROVEMENTS.dwg Layout: TITLE User: michael.fritz Sep 16, 2010 - 3:08pm


EXISTING CONDENSATE SUMP AND VAULT
2" HDPE SDR-9 AIR FORCE MAIN STUB UP WITH THREADED TRANSITION FITTING AND 2"x3/4" REDUCER TO A 3/4" BALL VALVE WITH QUICK CONNECT FITTINGS
2" HDPE SDR-9 AIR FORCE MAIN LAID ACROSS 2" HDPE SDR-9 CONDENSATE FORCEMAIN UNTIL OLD BLOWER SKID IS RELOCATED
3/4" AIR HOSE
TIED IN TO EXISTING 2" HDPE DRAIN PIPE TO SUMP
SDR-17 HDPE 14" TO 8" FLANGED REDUCER, ALIGNED WITH 90° ELBOW TO INLET HEADER
44"
PIPE SUPPORT ON 1 FT SQ CONCRETE FOOTING
2
2
2-INCH HDPE SDR-9 AIR SUPPLY TO EXISTING SUMP. SECURED ON CONCRETE WITH ANCHORS 3 FT. O.C.
8" SDR-11 HDPE ELBOW
CONTROL PANEL ROOF
28'x8' PRE-CONSTRUCTED BLOWER/FLARE SKID ANCHORED USING 3/4" ANCHOR BOLTS WITH 6" EMBEDMENT WITH FASTENAL ANKR-TITE STUD ANCHOR #50223 ZINK PLATED
1" UNISTRUT SUPPORT FOR OVERHEAD CONDUIT (3 PLACES)
EXISTING BLOWER
EXISTING KOP
4
2
8" BUTTERFLY VALVE PROVIDED BY FLARE VENDOR
CONTROL PANEL
8" SDR-17 HDPE PIPE
1" UNISTRUT PIPE SUPPORT SECURED TO CONCRETE (3 PLACES)
74"
72"
32"
KOP
FLOW METER
AIR
57"
112"
113"
53"
BLOWERS, DRAINS CONNECTED TO 1" HDPE SDR-17 GRAVITY DRAIN LINE FROM OIL/WATER SEPARATOR TO EXISTING SUMP
ELECTRIC TRANSFER PUMP BY FLARE VENDOR
EXISTING FLAME ARRESTOR
EXISTING FLARE
2" HDPE SDR-9 CONDENSATE FORCE MAIN FROM KOP TRANSFER PUMP TO EXISTING SUMP, 2" GRAVITY DRAIN LINE FROM FLARE STACK TO CONDENSATE FORCE MAIN, 1" HDPE SDR-17 CONDENSATE GRAVITY DRAIN LINE FROM OIL/WATER SEPARATOR AND BLOWER DRAINS TIED TO EXISTING KOP DRAIN AND ANCHORED TO CONCRETE AT 3' O.C. AND HEAT TRACED
UTILITY FLARE MAIN DISCONNECT TIED TO EXISTING POWER SUPPLY, YOKOGAWA AND AUTODIALER TIED TO EXISTING PHONE LINES
FLARE
OIL/WATER SEPARATOR
AIR COMPRESSOR BY FLARE VENDOR, ALL COMPRESSOR DRAINS CONNECTED TO 1" SDR-17 GRAVITY DRAIN TO INLET SUMP
APPROXIMATE LOCATION OF GROUND WIRE IN TRENCH WITH PVC CONDUIT
APPROXIMATE LOCATION OF GROUND RODS

LEGEND

— — —	EXISTING CONCRETE
———	EXISTING STRUCTURES (AS NOTED)
━━━	PROPOSED STRUCTURES TO BE INSTALLED (AS NOTED)
—A—A—	2" HDPE SDR-9 COMPRESSED AIR FORCE MAIN
—E—	ELECTRICAL CONDUIT

NOTES:
1. PROTECT IN PLACE ALL ITEMS NOT TO BE REMOVED.
2. EXISTING FLARE TO REMAIN IN FULL OPERATION DURING PROPOSED FLARE INSTALLATION.
3. AFTER EQUIPMENT REMOVAL, ALL VERTICAL SURFACE PENETRATIONS TO BE CUT FLUSH TO GRADE TO LEAVE THE AREA FREE OF TRIP HAZARDS. FILL OPEN CONDUIT WITH SEALANT.
4. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS IN WORKING WITH PIPING CONTAINING LANDFILL GAS.

PAUL JAMES STOUT
STATE OF WASHINGTON
45766
REGISTERED
PROFESSIONAL ENGINEER
7/16/10
EXPIRES 10/16/11

0 3 6
SCALE IN FEET

RECORD DRAWING

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

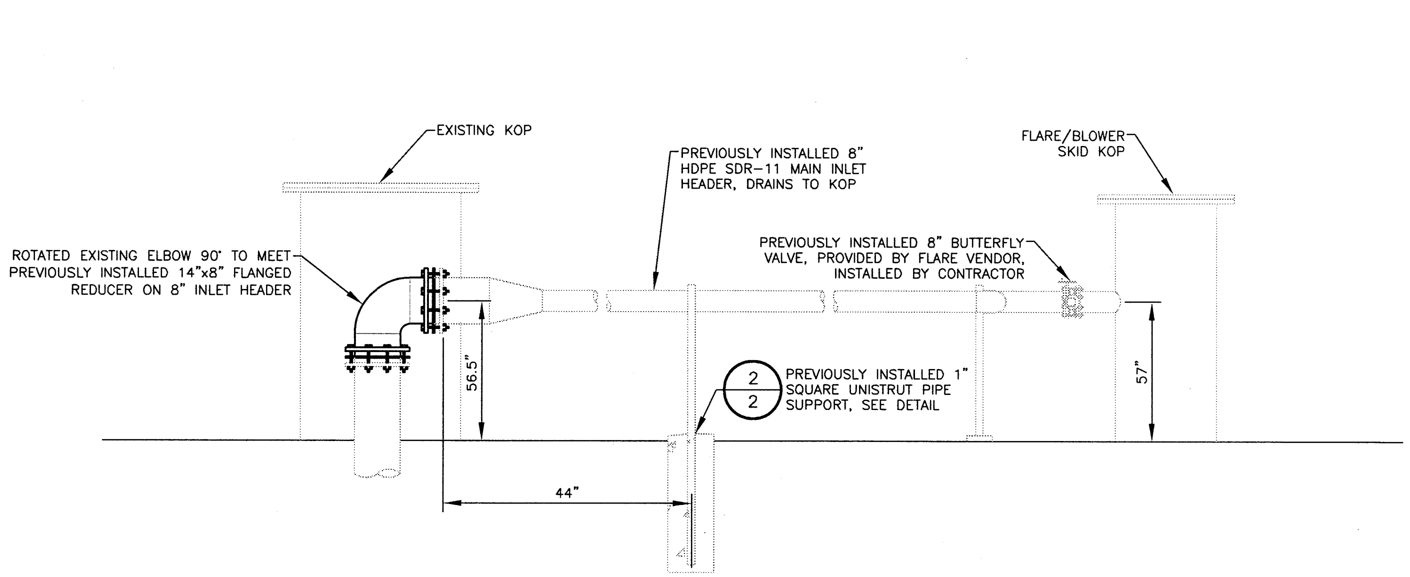
DATE OF ISSUE 8/06/2010
DRAWN BY MRF
DESIGNED BY JBS
CHECKED BY DHT
APPROVED BY PJS

CORNERSTONE Environmental Group, LLC

OLYMPIC VIEW SANITARY LANDFILL
PORT ORCHARD, WASHINGTON

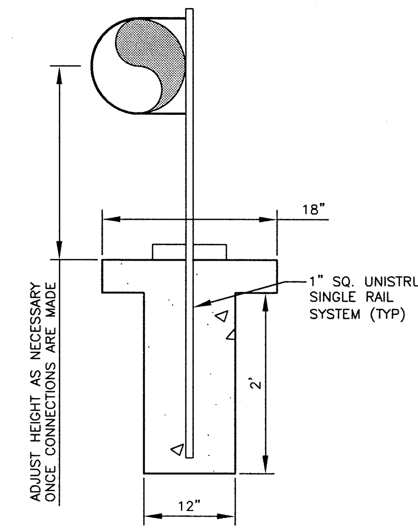
FLARE STATION IMPROVEMENTS
AS-BUILT FLARE STATION SITE PLAN

SHEET NO. 1
PROJECT NO. 90408.2



NEW FLARE HEADER TIE-IN

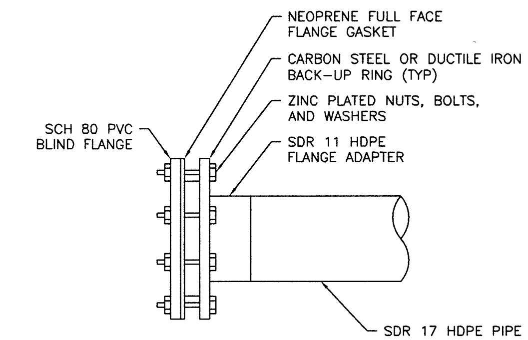
DETAIL 1/2
SCALE: NTS



NOTES:
1. PIPE SUPPORTS SHALL BE PLACED, PER PLAN, ALONG LENGTH OF PIPE.
2. CONCRETE FOOTING SHALL BE ASTW C 150, TYPE 1, 3,000 PSI AT 28 DAYS.
3. UNISTRUT SECURED DIRECTLY TO EXISTING CONCRETE WHERE POSSIBLE.

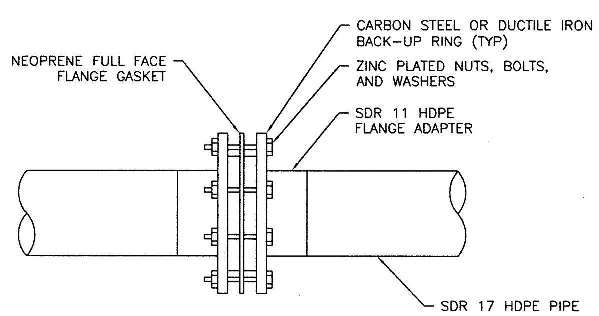
UNISTRUT PIPE SUPPORT

DETAIL 2/2
SCALE: NOT TO SCALE



BLIND FLANGE ASSEMBLY

DETAIL 3/2
SCALE: NOT TO SCALE

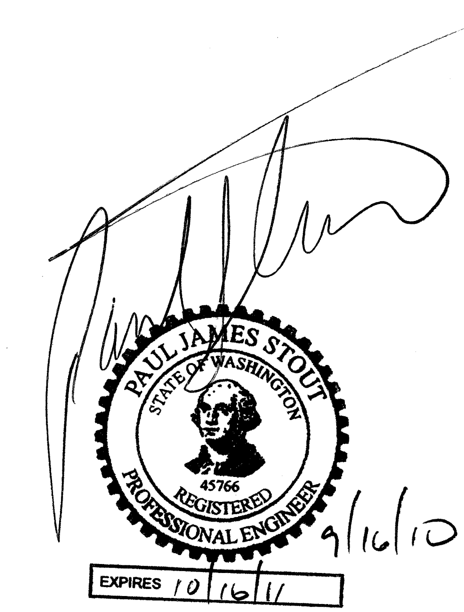


NOTES:

1. TAPE 5 MIL PLASTIC AROUND ALL FLANGE CONNECTIONS
2. LOCATE VALVE BETWEEN FLANGES WITH APPROPRIATE SPACERS AS REQUIRED.
3. IF USING VALVE, INSTALL EVERY OTHER BOLT THROUGH BOTH FLANGES, AND EVERY OTHER BOLT THROUGH FLANGE ON HEADER SIDE THROUGH VALVE ONLY. VALVE SHALL BE ASAHI TYPE 75 BUTTERFLY VALVE OR APPROVED EQUAL. GEAR OPERATED, PVC BODY PPDISK, NITRILE OR VITON SEATS AND SEALS.
4. VALVE SHALL INCLUDE HDPE FLANGE ADAPTER, D.I. BACKUP RING, AND GALVANIZED OR ZINC PLATED NUTS, BOLTS AND WASHERS, HDPE VALVE SPACER OR ROUTER FLANGE ADAPTER TO ALLOW VALVE TO FULLY OPEN.

FLANGE ASSEMBLY

DETAIL 4/2
SCALE: NOT TO SCALE



RECORD DRAWING

WASTE MANAGEMENT

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 8/06/2010 — DRAWN BY MRF — DESIGNED BY JBS — CHECKED BY DHT — APPROVED BY PJS

CORNERSTONE Environmental Group, LLC

OLYMPIC VIEW SANITARY LANDFILL
PORT ORCHARD, WASHINGTON

FLARE STATION IMPROVEMENTS
DETAILS

SHEET NO. 2
PROJECT NO. 90408.2

PHOTOGRAPHIC RECORD

Photographic Record

Olympic View Sanitary Landfill – Flare Station Modifications and Utility Flare Installation

Date:

May 5, 2010

Description:

Removed leachate evaporator unit, skid, and associated vessels and anchors.

Date:

May 5, 2010

Description:

Removed leachate evaporator unit and associated vessels and anchors.

Date:
May 5, 2010

Description:

Blind flange installed on inlet to flare from former leachate evaporator unit.

Date:

May 5, 2010

Description:

Blind flange installed on inlet to old enclosed flare.

Date:

June 23, 2010

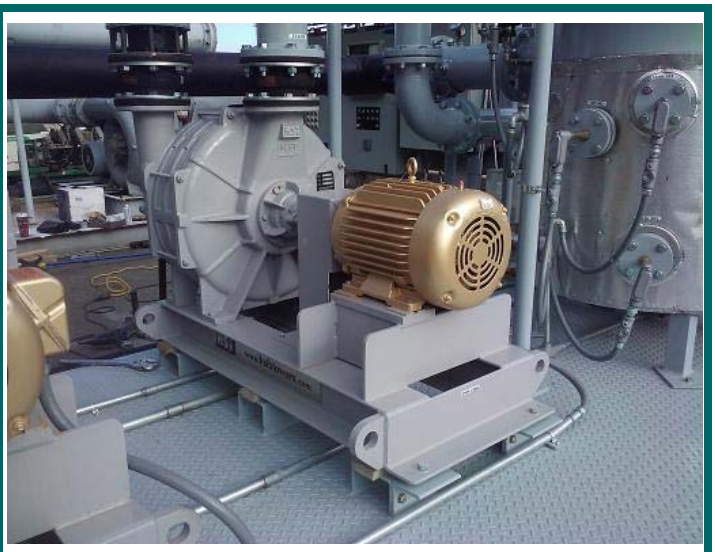
Description:

Utility flare skid.

Date:

June 23, 2010

Description:
Utility flare skid knockout pot (KOP).

Date: June 23, 2010 **Description:** Blower and motor.	
Date: June 23, 2010 **Description:** Installation of pipe supports.	

Date: June 23, 2010 **Description:** Condensate force main and air supply piping anchored to concrete pad.	
Date: June 23, 2010 **Description:** Air compressor.	

Date:

June 23, 2010

Description:

Flare stack hinge point with gasket and union for electrical.

Date:

June 23, 2010

Description:
KOP transfer pump.

Date:

June 23, 2010

Description:
Pneumatic fail close valve.

Date:

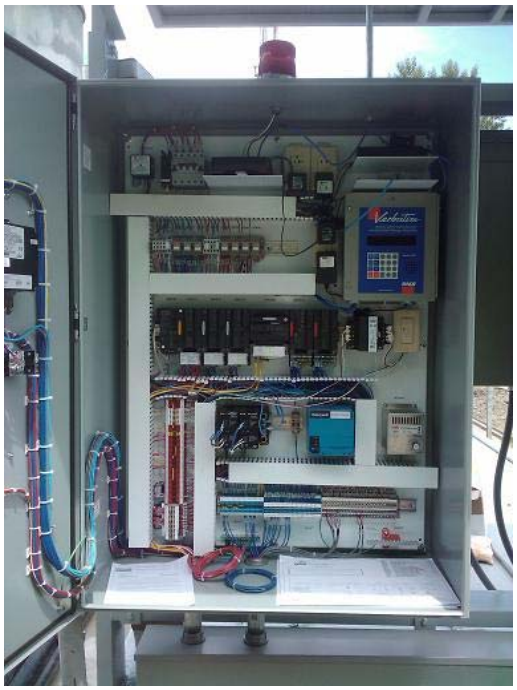
June 23, 2010

Description:
Pipe fusion.

Date:

June 23, 2010

Description:
Interior of main control panel.



Date:

June 23, 2010

Description:

Ground rod and ground wire installed.

Date:

June 24, 2010

Description:

Completed connection to field header.

Date:

June 24, 2010

Description:

GE touch screen / PLC interface.

Date:

June 24, 2010

Description:

New air supply stub and hose to inlet header sump.

Date:

June 24, 2010

Description:

Testing of heat trace auto-on.

Date:

June 24, 2010

Description:

Heat trace on prove light.

Date:

June 24, 2010

Description:
Completed inlet header and pipe supports to new KOP.

Date:

June 24, 2010

Description:
Completed utility flare skid showing electrical and telephone conduits run overhead on pipe supports.