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June 4, 2010

To: Gregg Townsend, NYSDEC, Region 7 (1 bound)
Holly Sammon, Onondaga County Public Library (1 bound)
Samuel Sage, Atlantic States Legal Foundation (1 bound)
Gina Fredericks, Liverpool Public Library (1 bound)
Mary Ann Coogan, Camillus Town Hall (1 bound)
Stephen Weiter, Moon Library (1 bound)
Cara Burton, Solvay Public Library (1 bound)
Joseph J. Heath, Esq. (1 bound)

Re: Letter of Transmittal - Onondaga Lake Document Repository

The below documents have been reviewed by the New York State Department of Environmental Conservation (NYSDEC) and are enclosed for your document holdings:

- NYSDEC Fact Sheet for Sediment Consolidation Area (SCA) Water Treatment Plant (WTP) – Draft Design Package #2
- SCA WTP – Draft Design Package #2

Sincerely,

John P. McAuliffe by CCC

John P. McAuliffe, P.E.
Program Director, Syracuse

Enc.

cc: Richard Mustico - NYSDEC

Honeywell
301 Plainfield Road
Suite 330
Syracuse, NY 13212
315-552-9700
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May 12, 2010

Mr. Richard Mustico
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D
625 Broadway
Albany, NY 12233-7013

Re: **Onondaga Lake Bottom Subsite – Onondaga County, NY**
Consent Decree 89-CV-815
SCA Water Treatment Plant

Dear Mr. Mustico:

Included in this submittal is the SCA WTP Design Package (DP) #2, which consists of Site/Civil, Process Mechanical and the Draft Wet Weather Operating Plan.

If you have any other questions, please contact Brian White at (315) 437-6100 (x2862) or me at (315) 552-9700.

Sincerely,

John P. McAuliffe by ccc

John P. McAuliffe, P.E.
Program Director, Syracuse

cc:	Mr. Robert Nunes	USEPA (4 copies)
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	Mr. Tim Larson	NYSDEC, Albany
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Mr. Christopher Calkins	O'Brien & Gere (ec or ec ltr only)
Mr. Jeffrey Rogers	O'Brien & Gere
Mr. Brian White	O'Brien & Gere

DRAFT DESIGN PACKAGE (DP) #2

Onondaga Lake Remedial Design
SCA Water Treatment Plant

Prepared for:

Honeywell

May 2010

DRAFT DESIGN PACKAGE (DP) #2

Onondaga Lake Remedial Design
SCA Water Treatment Plant

Prepared for:

Honeywell

301 Plainfield Road
Suite 330
Syracuse, New York 13212

Jeffrey S. Rogers, P.E.
Senior Vice President

May 2010

O'BRIEN & GERE

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Process Basis of Design (BOD) Memorandum

Document Review Tracking	
Representative Of:	**Reviewer's Initials and Date**
O'Brien & Gere	
Honeywell	
OCDWEP	

Wet Weather Operating Plan

The Onondaga County Department of Water Environment Protection (OCDWEP) Metropolitan Wastewater Treatment Plant (Metro) is designed to accept combined sanitary and storm water flows from the public sewer system. Metro's current SPDES permit includes a 12-month rolling average daily flow of 84.2 MGD and a maximum design flow for the secondary treatment system of 126.3 MGD. During dry weather periods the flows are typically well below the permitted average. The major treatment operations at Metro are designed to effectively treat wastewater flows well in excess of the permitted average daily flow and limited-duration high flows. This additional design capacity is used so that Metro has the capability to manage the "first flush" from storm events.

During periods of rain, snow, and/or snowmelt, the influent flows will significantly increase and may, at times, exceed the design capacities of the various treatment operations. Under these conditions, wastewater can be by-passed with varying degrees of treatment. Metro's SPDES permit requires that the OCDWEP implement Best Management Practices (BMPs), which are intended to maximize pollutant capture and minimize water quality impacts from combined sewer overflows. To this end, the OCDWEP has developed a draft Wet Weather Operating Plan (WWOP) that describes operational adjustments to be made to individual unit operations to maximize treatment during wet weather events. In addition, the OCDWEP currently implements flow restrictions on some of the permitted industrial dischargers to maximize capture during wet weather conditions.

Current Industrial Discharge Management Practices

Approximately ten percent of the incoming flow to Metro is County-permitted industrial sources. Some of the permitted industrial sources are characterized as "batch" discharges. As a condition of the Industrial Waste Discharge (IWD) permit, the OCDWEP requires some industrial users to submit a WWOP that will provide for coordination and contact information to discontinue discharges to the County sewer system during Metro WWTP by-pass events.

SCA WTP Discharge: Wet Weather Operating Strategy

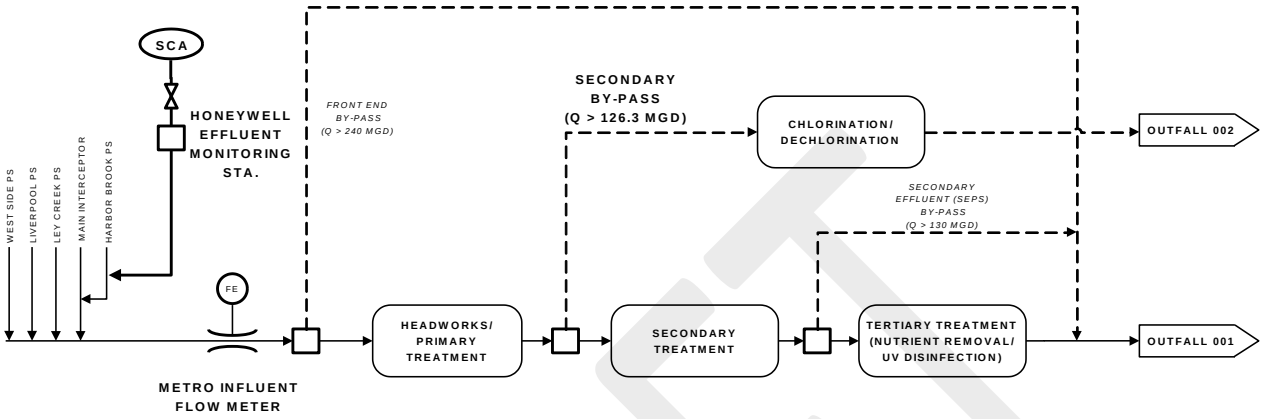
During wet weather events, the pretreated effluent from the Sediment Consolidation Area (SCA) Water Treatment Plant (WTP) will be conveyed to the public sewer system using Honeywell's existing

Wastebed Leachate Overflow pumping station and forcemain. Pretreated SCA WTP effluent can be directed to an effluent holding basin for temporary storage during periods when discharge to the County has been suspended. Upon notice from Metro to receive additional flows, the effluent holding basin will then discharge to Metro. Normally, the effluent holding basin will be bypassed. Honeywell will provide for effluent monitoring at the SCA WTP.

During the period of active dredging, the SCA WTP will be operated on a seven-day per week, 24-hour per day basis. Flow rates will vary seasonally, with the highest flows being generated during the active dredging season (i.e., April through November).

The general configuration of the pretreated SCA WTP discharge with respect to the County sewer system and Metro WWTP is presented in Figure 1-1 below.

Figure 1-1. *Pretreated SCA WTP Discharge Configuration*



Honeywell's proposed WWOP will consist of establishing progressive thresholds aimed at curtailing the pretreated SCA WTP discharge during periods when Metro is experiencing high flows that could trigger a by-pass of the Secondary Treatment System. The secondary by-pass occurs when Metro flows exceed approximately 126.3 MGD. Under these conditions, influent flows to the Secondary Treatment System in excess of 126.3 MGD spill over a weir and are disinfected (on a seasonal basis) and discharged through Metro's Outfall 002.

To provide a framework for communication, operational flexibility, and "reaction time" to implement flow control measures, Honeywell is proposing to establish multiple wet weather operating conditions that will include:

- Normal Operation
- Metro High Flow Alert
- SCA WTP Discharge Shutdown
- SCA WTP Discharge Re-Start
- SCA WTP Flow Recovery

Proposed wet weather operating guidelines for each of the pretreated SCA WTP discharge operating conditions are outlined in Table 1-1 below. These guidelines have been developed to provide a high-level outline of the WWOP.

It is understood that this is a living document, which will be modified to reflect future changes as the IWD permit is finalized and as new design and operational issues are identified. Honeywell recognizes this guidance document is intended to align expectations and promote effective communication between Honeywell and OCDWEP staff during periods of dredging operations.

Table 1-1. *SCA WTP Discharge: Wet Weather Operating Guidelines*

	OPERATION MODE	FLOW (MGD) Metro (1)	FLOW (MGD) SCA (2)	ACTIONS
1	**NORMAL OPERATION**	≤ 110	± 6.5	• Metro influent flow stable. Flow not trending upward for more than 30 minutes. • Metro operations staff monitoring local weather. No indications of pending Wet Weather event. • Pretreated SCA WTP effluent discharged in accordance with IWD permit
2	**METRO HIGH FLOW ALERT**	± 110 *(Trending Up)*	≤ 6.5	• Metro influent flow at, or about 110 MGD and trending up over a 30 minute period. • Metro operations staff monitoring local weather and comparing conditions to previous operating experience. • Metro contacts Honeywell to communicate "Alert" condition. • Honeywell mobilizes pretreatment system operations staff and implements measures to prepare for system shutdown. - *Ready for shutdown within a 1 hour period*
3	**SCA WTP SHUTDOWN**	± 125	0	• Metro influent flow at, or about 125 MGD for 30 minute period *-OR-* • Metro monitors water levels in the Secondary By-Pass overflow box. - *Target SCA WTP shutdown when water level is within XX inches of the by-pass overflow weir* • Metro operations staff monitoring local weather and comparing conditions to previous operating experience. • Metro contacts Honeywell to confirm immediate shutdown of the pretreated SCA WTP effluent (within 1 hour response time).
4	**SCA DISCHARGE RE-START**	≤ 120 *(Trending Dn)*	≤ 5.0	• Following shutdown, Metro influent flow at or below 120 MGD and trending down for 30 minute period. • Metro operations staff monitoring local weather and comparing conditions to previous operating experience. • Metro contacts Honeywell to re-start pretreated SCA WTP discharge. • Discharge is a combination of SCA WTP and the Effluent Holding Basin, not to exceed 5.0 MGD. • Honeywell ramps flow up to 5 MGD for first 2 hours, then return to Normal Operation.
5	**SCA FLOW RECOVERY**	≤ 100	±10.0	Typical guideline for post-shutdown events:

OPERATION MODE		FLOW (MGD)		ACTIONS
	(Post Shutdown)			• Metro influent flow at or below 100 MGD. • Metro operations staff monitoring local weather. No indications of pending Wet Weather event. • Honeywell requests permission to increase pretreated SCA WTP discharge to maximum level (10.0 MGD). • Discharge is a combination of SCA WTP and the Effluent Holding Basin.

NOTES:

1. Combined influent as measured by the influent flow meters (includes SCA WTP effluent discharge to Harbor Brook Interceptor).
2. SCA WTP discharge flow rate as measured at Honeywell's Effluent Monitoring station location.

Contact Information:

Honeywell

Al Labuz	Office Telephone: 315-552-9700	Cell: 315-420-9700	Email: al.labuz@honeywell.com

SCA WTP Operations (O'Brien & Gere)

TBD	Office Telephone:	Cell:	Email:

OCDWEP Operations

TBD	Office Telephone:	Cell:	Email:

TO: File

FROM: LY Duff, GB Ebersbach

RE: SCA WTP - Process Basis of Design

FILE: 1163/45613

DATE: April 29, 2010, Rev. 1.0

cc: PD Schultz
T Tong-Ngork
NT Zacharek
TR Komar

This memo documents the basis of design for each treatment process of the Sediment Consolidation Area (SCA) Water Treatment Plant (WTP).

The WTP will provide pretreatment of the SCA effluent prior to discharge to the Onondaga County Department of Water Environment Protection Metropolitan Wastewater Treatment Plant (Metro). Pretreatment of the SCA effluent will include removal of metals, solids, and volatile and semi-volatile organic compounds (VOCs and SVOCs). The pretreated water will receive enhanced ammonia removal at Metro. The WTP will include facilities for pH adjustment, chemical addition of a coagulant, clarification, multimedia filtration, carbon adsorption, and effluent monitoring. The WTP process flow diagram is attached as PFD-1, Rev. D, dated 4/9/10. The mass balances for the dredge season and winter operation are included as PFD-2, Rev. D, dated 4/9/10 and PFD-3, Rev. A, dated 4/9/10, respectively.

Procurement of the treatment system equipment may change some parameters but each unit process will need to substantially meet the requirements identified in the treatability testing.

SYSTEM CAPACITY – DREDGE SEASON

The WTP is designed to treat a maximum flow of 8.15 MGD (= 5663 gpm).

CHEMICAL BULK STORAGE

Chemical bulk storage is required for storage of chemicals used in the treatment process. Chemical dosage rates were established based on the treatability testing. Tank volumes were designed to provide approximately 5 days of chemical storage at the peak flow of 8.15 MGD.

The influent water will generally have a pH of approximately 9 to 12 s.u. As such, sulfuric acid will typically be used for pH reduction. Caustic (sodium hydroxide) feed is available for "over shoots" resulting from excessive acid feed and for the few months dredging occurs in the SMUs requiring pH adjustment to 10.5 s.u. for nickel precipitation. The caustic usage presented below is based on nickel precipitation and is a worst case scenario in terms of feed rate.

The estimated feed rates shown below correspond to dredge season operations and include the water portion of the chemical solution. Supporting calculations are included as Attachment A. The chemical usage shown on the mass balance reflects the neat chemical only and does not include the water portion. The neat chemical calculations are included as Attachment B.

20% Alum

Design Criteria Used

Dosage	20 mg/L
Estimated Feed Rate	665 gpd

Unit Details

Number of Tanks	1
Volume	6,000 gal
	9 days

50% Sodium Hydroxide

Design Criteria Used

Dosage	160 mg/L
Estimated Feed Rate	1,705 gpd

Unit Details

Number of Tanks	1
Volume	8,000 gal
	4.7 days

93% Sulfuric Acid

Design Criteria Used

Dosage	350 mg/L
Estimated Feed Rate	1,670 gpd

Unit Details

Number of Tanks	1
Volume	8,000 gal
	4.8 days

PH ADJUSTMENT

Adjustment of pH is necessary for precipitation of metals and to provide adequate and optimum conditions for downstream treatment. Two-stage chemical addition will be required to (normally) lower the pH of the SCA effluent to the required levels. Design criteria are based on the treatability testing.

1st Stage (rough):

Design Criteria Used

Hydraulic Retention Time (HRT)	10 - 15 minutes
pH adjust	12+ to 11 s.u.

Unit Details (based on Adler MX4-452 Mix Tank)

Number of units	4
Type	Frac Tank
Working volume (min, each)	16,745 gal
HRT (at max flow 5663 gpm)	11.8 min

2nd Stage (fine):

Design Criteria Used

Hydraulic Retention Time (HRT)	10 - 15 minutes
pH adjust	11 to 8.5 s.u.

Unit Details (based on Adler MX4-452 Mix Tank)

Number of Units	4
Type	Frac Tank
Working volume (min, each)	14,890 gal
HRT (at max flow 5663 gpm)	10.5 min

FLASH MIX

Rapid mixing is required to provide contact time and dispersion of the added coagulant to create insoluble metal salts for metal removal. Design criteria are based on the treatability study.

Design Criteria Used

Hydraulic Retention Time (HRT)	1 - 5 min

Unit Details (based on Adler MX4-452 Mix Tank)

Number of units	1
Type	Frac Tank
Working volume (min)	12,660 gal
HRT (at max flow 5668 gpm)	2.2 min

FLOCCULATION

Flocculation is required to form insoluble floc particles to cluster together and form larger flocs to be settled and removed from the water in the clarifiers. Design criteria are based on the treatability testing.

Design Criteria Used	
Hydraulic Retention Time (HRT)	5 - 15 min
Unit Details (based on Unipure 1000-G2 Drop-In)	
Number of units	16
Type	Integral to clarifier
Volume (each)	5,000 gal
HRT (at max flow 5668 gpm)	14 min

CLARIFIERS

The clarifiers will remove metals and solids contained in flocs created in the flash mix / floc chambers. Design criteria are based on the treatability study and literature values.

Design Criteria Used	
Surface Overflow Rate (SOR)	0.22 - 0.72 gpm/sf
Influent TSS concentration	200 mg/l
Effluent TSS concentration	10 mg/l
Unit Details ((based on Unipure 1000-G2 Drop-In)	
Number of units	16
Type	Inclined Plate
Normal Feed Rate (each)	355 gpm
Settling Area (each)	1,300 ft2
SOR (at max flow 5668 gpm, with 16 units online)	0.27 gpm/sf

FILTER FEED TANK & PUMPS

Water from the inclined plate clarifiers will flow to a filter feed tank. From the filter feed tank, water will be pumped through the multimedia filters and granular activated carbon vessels.

Unit Details (based on Adler MX4-452 Mix Tank)	
Number of tanks	1
Type	Frac Tank
Working volume (min)	17,035 gal
HRT (at max flow 4959 gpm)	3.4 min
Number of pumps	3
Type	Progressing cavity
Capacity	1,700 gpm
Drive	Variable Frequency Drive

MULTIMEDIA FILTERS

Filtration is required to remove fine particles before the carbon adsorption processes. Design criteria are based on the treatability testing.

Design Criteria Used

Filtration Rate	4 - 6 gpm/ft2
Influent TSS concentration	10 mg/l
Particle sized removed	≥ 10 µm

Unit Details (based on Siemens Multicell HPF)

Number of filter vessels	4 (3 operating, 1 spare)
Type	Horizontal
Filter area (each)	343 ft2
Filtration Rate (at max flow 4959 gpm, with 3 vessels online)	4.8 gpm/ft2

GRANULAR ACTIVATED CARBON

Granular Activated Carbon adsorption has been selected to remove remaining volatile and semi-volatile organic compounds. Design criteria are based on the treatability testing.

Design Criteria Used

Hydraulic Loading Rate (HLR)	4 - 6 gpm/ft2
Empty Bed Contact Time (EBCT)	15 min (combined for both lead/lag vessels)
Influent TSS concentration	5 mg/l

Unit Details (based on Siemens HP1220)

Number of vessels	16 (8 pairs lead/lag)
Diameter	12 ft
Filter area (each)	113 ft2
Approximate Carbon Volume (each)	728 ft3
Carbon Weight (each)	20,000 lbs
HLR (at max flow 4959 gpm)	5.5 gpm/ft2
EBCT (pair, at max flow 4959 gpm)	17.6 min

EFFLUENT MONITORING TANKS

The effluent monitoring tanks will provide a location to monitor effluent for compliance with discharge limits, before discharging to Metro. The tanks are used to provide backwash water to the multimedia filters and granular activated carbon vessels.

Unit Details (based on Adler MX4-452 Mix Tank)

Number	2
Type	Frac Tank
Working volume (min, each)	17,035 gal
HRT (combined, at max flow 4959 gpm)	6.9 min

MMF BACKWASH PUMP

The multimedia (MMF) filters will be periodically backwashed to remove accumulated solids. Each MMF is divided into 3 cells with one cell backwashed at a time. Water from the effluent monitoring tanks will be used to backwash the MMFs using the MMF backwash pump.

Design Criteria Used

Backwash Rate	15 gpm/ft2
MMF cell area	114 ft2
Duration	15 min

Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	1715 gpm
Drive	Variable Frequency Drive

GAC BACKWASH PUMP

The granular activated carbon (GAC) vessels will be periodically backwashed to remove accumulated solids. Water from the effluent monitoring tank will be used to backwash the GAC vessels using the GAC backwash pump. Since the GAC backwash pump and the MMF backwash pump are not expected to operate at the same time, the GAC backwash pump may be the same pump as the MMF backwash pump if the hydraulics for both meet the requirements.

Design Criteria Used

Backwash Rate	12.5 gpm/ft2
GAC vessel area	113 ft2
Duration	15 min

Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	1415 gpm
Drive	Variable Frequency Drive

EFFLUENT RECYCLE PUMP

Off-spec effluent will be recycled back to the SCA (from the effluent monitoring tanks) using the effluent recycle pump(s).

Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	5000 gpm
Drive	Variable Frequency Drive

POLYMER MAKEDOWN WATER PUMP

Effluent from the effluent monitoring tanks will be used as polymer makedown water at the SCA for polymer pre-conditioning of the SCA sediment prior to dewatering in the geotextile tubes. Effluent will be pumped to the SCA using the polymer makedown water pump.

Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	175 gpm

BACKWASH/SLUDGE PUMPING STATION

Spent backwash water from the GACs and MMFs and sludge from the clarifiers will be discharged to the Backwash/Sludge Pumping Station. The pumping station will also be used to collect drainage from the spent carbon trailers prior to transport off-site. The collected waters and sludge will be returned to the SCA via pumps in the pumping station.

Unit Details

Number of units	1
Type	Below grade
Working Volume	2700 gal
Number of pumps	2 operating, 1 spare
Type	Submersible, centrifugal
Capacity (ea)	1600 gpm

PIPING

In general, the following materials of construction are planned for the SCA WTP. Alternate materials, which are compatible with the fluid service and provide ease of installation or are cost-effective, may be used.

Fluid	Above Grade	Buried
Process Water (WW)	Sched. 80 PVC for 8" diameter and less. HDPE for greater than 8" diameter.	HDPE DR17. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Caustic (NaOH or Sodium Hydroxide)	Polyethylene tubing inside PVC secondary containment piping. Stainless steel at the bulk storage tank. Heat-traced and insulated outside of the building and in the unheated area of the building.	Polyethylene tubing inside PVC or HDPE secondary containment piping. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Sulfuric Acid (H2SO4 or Acid)	Teflon tubing inside PVC secondary containment piping. Stainless steel at the bulk storage tank.	Teflon tubing inside PVC or HDPE secondary containment piping.
Alum (COAG)	Polyethylene tubing inside PVC secondary containment piping. Stainless steel at the bulk storage tank. Heat-traced and insulated outside of the building and in the unheated area of the building.	Polyethylene tubing inside PVC or HDPE secondary containment piping. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Process Vent	Galvanized duct and/or PVC	Not Applicable
Sludge and Backwash Water	Sched. 80 PVC for 8" diameter and less. HDPE for greater than 8" diameter.	HDPE DR17. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Treated Water (TRWW)	Sched. 80 PVC for 8" diameter and less. HDPE for greater than 8" diameter.	HDPE DR17. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.

WINTER TREATMENT SYSTEM

Influent flow during the winter is significantly reduced from the dredge season to 500 gpm or less consisting of seepage from the geotextile tubes and precipitation. With the exception of a separate flash mix tank, the winter treatment system will use a single train of equipment from the dredge season treatment system. Refer to dredge season equipment for basis of equipment selection.

SYSTEM CAPACITY

The winter treatment system is designed to treat a maximum flow of 500 gpm.

CHEMICAL BULK STORAGE

The estimated feed rates shown below include the water portion of the chemical solution. Supporting calculations are included as Attachment C. The chemical usage shown on the mass balance reflects the neat chemical only and does not include the water portion. The neat chemical calculations are included as Attachment D.

20% Alum

Design Criteria Used	
Dosage	20 mg/L
Feed Rate	60 gpd
Unit Details	
Number of Tanks	1
Volume	6,000 gal
	100 days

50% Sodium Hydroxide

Design Criteria Used	
Dosage	160 mg/L
Feed Rate	150 gpd
Unit Details	
Number of Tanks	1
Volume	8,000 gal
	50 days

93% Sulfuric Acid

Design Criteria Used	
Dosage	350 mg/L
Feed Rate	150 gpd
Unit Details	
Number of Tanks	1
Volume (each)	8,000 gal
	50 days

PH ADJUSTMENT

1st Stage (rough):	**Design Criteria Used**	
	Hydraulic Retention Time (HRT)	10 - 15 minutes
	pH adjust	12+ to 11 s.u.

	Unit Details	
	Number of units	1
	Type	Frac Tank
	Working volume (min)	16,745 gal
	HRT (at max flow 500 gpm)	33 min
2nd Stage (fine):	**Design Criteria Used**	
	Hydraulic Retention Time (HRT)	10 - 15 minutes
	pH adjust	11 to 8.5 s.u.
	Unit Details	
	Number of Units	1
	Type	Frac Tank
	Working volume (min)	14,890 gal
	HRT (at max flow 500 gpm)	30 min

FLASH MIX

A separate flash mix tank will be provided for the winter treatment system.

Design Criteria Used	
Hydraulic Retention Time (HRT)	1 - 5 min
Unit Details (based on Design Tanks F084DT)	
Number of units	1
Type	Vertical, cylindrical
Volume (min)	4,000 gal
HRT (at max flow 500 gpm)	8 min

FLOCCULATION

Design Criteria Used	
Hydraulic Retention Time (HRT)	5 - 15 min
Unit Details	
Number of units	2
Type	Integral to clarifier
Volume (each)	5,000 gal
HRT (at max flow 500 gpm)	20 min

CLARIFIERS

Design Criteria Used	
Surface Overflow Rate (SOR)	0.22 - 0.72 gpm/sf
Influent TSS concentration	150 mg/l
Effluent TSS concentration	10 mg/l
Unit Details	
Number of units	2
Type	Inclined Plate
Normal Feed Rate (each)	250 gpm
Settling Area (each)	1,300 ft2
SOR (at max flow 500 gpm)	0.19 gpm/sf

FILTER FEED TANK & PUMPS

Unit Details	
Number of tanks	1
Type	Frac Tank
Working volume	17,035 gal
HRT (at max flow 438 gpm)	39 min
Number of pumps	TBD
Type	Progressing cavity
Capacity	438 gpm

MULTIMEDIA FILTER

Design Criteria Used	
Filtration Rate	4 - 6 gpm/ft2
Influent TSS concentration	10 mg/l
Particle sized removed	> 10 µm
Unit Details	
Number of filter vessels	1
Type	Horizontal
Filter area	343 ft2
Filtration Rate (at max flow 438 gpm)	1.3 gpm/ft2

GRANULAR ACTIVATED CARBONS

Design Criteria Used	
Hydraulic Loading Rate (HLR)	4 - 6 gpm/ft2
Empty Bed Contact Time (EBCT)	15 min (combined for both lead/lag vessels)
Influent TSS concentration	5 mg/l
Unit Details	
Number of vessels	2 (1 pair lead/lag)
Diameter	12 ft
Filter area (each)	113 ft2
Approximate Carbon Volume (each)	728 ft3
Carbon Weight (each)	20,000 lbs
HLR (at max flow 438 gpm)	3.9 gpm/ft2
EBCT at max flow (pair, at max flow 438 gpm)	25 min

EFFLUENT MONITORING TANKS

Unit Details	
Number	2
Type	Frac Tank
Working volume (min, each)	17,035 gal
HRT (combined, at max flow 438 gpm)	78 min

May 11, 2010 - 7:02pm

Note: All Equipment Shown Shaded In Yellow Will Be Installed Inside of the Heated Area of the Building and Will Be Used For Both Dredge Season and Winter Operations.

P&ID I-01 (Typ. of Tanks 1, 3, 5, 7)

Acid or Caustic

pH Adj. Tk 1

pH Adj. Tk 2

Tanks Shown With a Mixer Symbol Will Be Agitated. Actual Quantity of Mixers Per Tank TBD.

P&ID I-02 (Typ. of Tanks 2, 4, 6, 8)

Acid or Caustic

pH Adj. Tk 3

pH Adj. Tk 4

Winter Operations (and Long-Term Facility) Will Rough pH Adjust in Tank 1 and Fine pH Adjust in Tank 2.

By Others

From SCA

#11

Acid or Caustic

pH Adj. Tk 5

pH Adj. Tk 6

Acid or Caustic

pH Adj. Tk 7

pH Adj. Tk 8

P&ID I-03

Alum

Flash Mix Tank

Winter Operations (and Long-Term Facility) Will Use A Separate, Smaller Flash Mix Tank

Integral Floc. Chamber and Mixer

P&ID I-06 (Typ. of Inclined Plate Clarifiers 1 to 16)

Clarifier 1

Clarifier 2

Clarifier 3

Clarifier 4

Clarifier 5

Clarifier 6

Clarifier 7

Clarifier 8

Clarifier 9

Clarifier 10

Clarifier 11

Clarifier 12

Clarifier 13

Clarifier 14

Clarifier 15

Clarifier 16

#19

P&ID I-07

Filter Feed Tank

#20

Optional On-Line Spare Pump

P&ID I-08 (Typ. of MMFs 1, 2, 3, 4)

#21

MMF 1

MMF 2

MMF 3

MMF 4

3 On-Line, 1 Spare MMFs

P&ID I-09 (Typ. of LGACs 1A/B, 2A/B, 3A/B, 4A/B, 5A/B, 6A/B, 7A/B, 8A/B)

1A 1B

2A 2B

3A 3B

4A 4B

5A 5B

6A 6B

7A 7B

8A 8B

Lead/Lag LGACs

#23

P&ID I-10

Acid or Caustic, As Required

Effluent Monitor Tank 1

Effluent Monitor Tank 2

#7

MMF Backwash

GAC Backwash

SCA Polymer M/U

OOS to SCA or to Head of WTP

Gravity Effluent

Polymer and OOS Lines By Others

#26

By Others

Off-Line Effluent Holding Basin

Note: Gravity Effluent Routed to Existing Leachate Overflow Pumping Station. Line and Tie-In in WTP Scope

#18 #24 #25

By Others

Clarifier Sludge

MMF and GAC Backwash

LGAC Tanker Drains

Backwash/Sludge Pumping Station

Solids to SCA

P&ID I-11

Legend:
Floc. - Flocculation
LGAC – Liquid Granular Activated Carbon
MMF – Multimedia Filter
M/U – Makeup
OOS – Out of Spec

Corresponding Node Number on the (Dredge Season) Mass Balance

Note: All Equipment Shown Shaded In Yellow Will Be Installed Inside of the Heated Area of the Building and Will Be Used For Both Dredge Season and Winter Operations.

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/25/10	DP #1 FOR GAC BIDDING	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #1
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

PROCESS FLOW DIAGRAM

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.44523-PFD1
DATE FEBRUARY 2010

PFD-1

I:\Honeywell.1163\45613.Scg-Wtp-Details\Docs\DWG\DP-2\Sheets\45613-PFD1.dwg

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May 11, 2010 - 7:03pm

Honeywell SCA WTP
Mass Balance Maximum Flow - Based on Phase II Pre-Design Investigation Report - Pre Holding at Peak Flows
Review Rev. 10
3/26/2010

Draft

PARAMETER	Primary Screen Underflow		Combined Recirculation to Geotubes		Recirculation Solids Contribution to Geotubes		Non-Recirc. Liquid Stream to EQ Basin leaving Geotubes		Recirculation Liquid to EQ Basin leaving Geotubes		Total Liquid to EQ Basin		Parson Polymer Makeup		Rain Water to EQ Basin		Internal Reuse from EQ		Accumulation in EQ Basin		pH Adj Tank Influent		H2SO4 Add to pH Adj Tk		NaOH Add to pH Adj Tk		Alum Addtn to Floc	
Line Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr
GENERAL																												
Flow Rate	---	2,574,058	---	583,526	---	692	---	2,306,841	---	582,834	---	2,889,675	---	87,049	---	70,539	---	51,029	---	76,043	---	2,833,143	---	991.6	---	0.000	---	56.7
Flow Rate (GPM)	---	5,145	---	1,166	---	1.4	---	4,611	---	1,165	---	5,776.1	---	174.0	---	141.0	---	102	---	152	---	5,663	---	1.08	---	0.000	---	0.092
Flow Rate (MGD)	---	7.41	---	1.68	---	0.002	---	6.64	---	1.678	---	8.3	---	0.251	---	0.203	---	0.15	---	0.22	---	8.15	---	0.002	---	0.000	---	0.000
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.84	---	1.55	---	1.25
Design pH (S.U.)	11.5 - 12.0	---	9.0 - 10.0	---	6.5 - 7.5	---	11.5 - 12.0	---	9.0 - 10.0	---	10.0 - 11.5	---	9.0 - 10.0	---	6.5 - 7.5	---	9.0 - 10.0	---	9.0 - 10.0	---	9.0 - 10.0	---	< 1	---	> 13	---	---	---
CATIONS / ANIONS (mg/L)																												
Aluminum	---	---	8.49	4.96	3,605.8	2.50	4.900	11.312	4.222	2.462	4.763	13.77	4.217	0.367	0.0	0.0	4.650	0.24	4.650	0.35	4.774	13.54	0.0	0.0	0.0	0.0	19,930	0.9
Cadmium	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Chlorides	---	---	1,193	696.9	0.0	0.000	1,190	2,747	1,195	697	1,191	3,444	1,193	104	0.0	0.0	1,163	59.4	1,163	88.5	1,194	3,385	0.0	0.0	0.0	0.0	0.0	0.0
Chromium	---	---	0.1	0.040	53.9	0.037	0.020	0.046	0.004	0.003	0.017	0.049	0.004	0.000	0.0	0.0	0.016	0.001	0.016	0.001	0.017	0.05	0.0	0.0	0.0	0.0	0.0	0.0
Hex Chromium	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Copper	---	---	0.892	0.521	663.6	0.459	0.240	0.554	0.105	0.061	0.213	0.616	0.037	0.003	0.0	0.0	0.208	0.011	0.208	0.016	0.213	0.60	0.0	0.0	0.0	0.0	0.0	0.0
Lead	---	---	0.203	0.119	143.3	0.099	0.070	0.162	0.033	0.019	0.063	0.181	0.026	0.002	0.0	0.0	0.061	0.003	0.061	0.005	0.063	0.18	0.0	0.0	0.0	0.0	0.0	0.0
Mercury	---	---	0.005	0.024	35.1	0.024	0.011	0.025	0.000	0.000	0.009	0.026	0.000	0.000	0.0	0.0	0.009	0.000	0.009	0.001	0.009	0.03	0.0	0.0	0.0	0.0	0.0	0.0
Nickel	---	---	2.399	1.401	1941.4	1.344	0.670	1.547	0.098	0.057	0.555	1.604	0.078	0.007	0.0	0.0	0.541	0.028	0.541	0.041	0.556	1.58	0.0	0.0	0.0	0.0	0.0	0.0
Silver	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	---	---	551.1	321.9	0.0	0.00	150.0	346.3	551.8	321.9	231.0	668.2	551.1	48.01	0.0	0.0	225.5	11.52	225.5	17.16	231.6	656.6	1,674,971	903.4	0.0	0.0	70,864	3.3
Zinc	---	---	0.362	0.212	294.6	0.204	0.098	0.226	0.013	0.008	0.081	0.234	0.008	0.001	0.0	0.0	0.079	0.004	0.079	0.01	0.081	0.23	0.0	0.0	0.0	0.0	0.0	0.0
Total Tracked Cations / Anions	---	---	1,760.7	1028.2	7,699.3	5.3	1,348.7	3,113.7	1,753.6	1022.9	1,430.4	4,136.6	1,751.3	152.6	0.0	0.0	1,396.3	71.3	1,396.3	106.3	1,433.8	4,065.3	1,674,971	903.4	0.0	0.0	90,794	4.2
VOC (ug/L)																												
TIO	---	---	15.5	9.1	0.0	0.0	28.0	64.6	15.5	9.1	25.5	73.7	0.026	0.002	0.0	0.0	24.9	1.27	24.88	1.89	25.5	72.4	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL ORGANICS	---	---	15.5	9.1	0.0	0.0	28.0	64.6	15.5	9.1	25.5	73.7	0.026	0.002	0.0	0.0	24.9	1.27	24.88	1.89	25.5	72.4	0.0	0.0	0.0	0.0	0.0	0.0
OTHER																												
TBOD5 (mg/L)	---	---	334.1	195.1	142,197	98.4	170.0	392.5	165.7	96.7	169.1	489.1	131.8	11.5	0.0	0.0	165.1	8.43	165.11	12.57	169.5	480.7	0.0	0.0	0.0	0.0	0.0	0.0
TSS (mg/L)	---	---	990	578.3	666,147	461.2	200.0	461.7	200.0	116.7	200	578.4	2.0	0.2	0.0	0.0	195.2	9.97	195.23	14.86	200.5	568.4	0.0	0.0	0.0	0.0	0.0	0.0
TP (mg/L)	---	---	1.0	0.6	0.0	0.0	0.7	1.7	1.0	0.6	0.8	2.2	0.8	0.1	0.0	0.0	0.8	0.04	0.76	0.06	0.8	2.2	0.0	0.0	0.0	0.0	0.0	0.0
TKN (mg/L)	---	---	61.5	35.9	0.0	0.0	47.0	108.5	61.5	35.9	49.93	144.4	48.9	4.3	0.0	0.0	48.7	2.49	48.74	3.71	50.0	141.9	0.0	0.0	0.0	0.0	0.0	0.0

PARAMETER	Polymer Addn to Floc		Polymer Makeup Wate		I.P. Clarifier Influent		I.P. Clarifier Sludge		I.P. Clarifier Effluent		Filter Feed Tank Disch		MMF Effluent		GAC Units		GAC Effluent		Spent MMF B/Wash		Spent GAC B/Wash		Eff. Tanks Discharge		PERMIT LIMIT
Line Number	15		16		17		18		19		20		21		22		23		24		25		26		
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	
GENERAL																									
Flow Rate	---	1.42	---	1,152	---	2,835,345	---	354,418	---	2,480,927	---	2,480,927	---	2,480,927	---	---	---	2,480,927	---	83,172	---	58,887	---	2,250,667	NA
Flow Rate (GPM)	---	0.003	---	2.303	---	5,668	---	708.4	---	4,959	---	4,959	---	4,959	---	---	---	4,959	---	166.3	---	117.7	---	4,499	
Flow Rate (MGD)	---	0.000	---	0.003	---	8.16	---	1.020	---	7.14	---	7.14	---	7.14	---	---	---	7.14	---	0.239	---	0.170	---	6.5	
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	< 150
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	---	---	1.00	---	1.00	---	1.00	---	1.00	
Design pH (S.U.)	6.5 - 7.5	---	9.0 - 10.0	---	8.5-10.5	---	8.5-10.5	---	8.5	---	8.5	---	8.5	---	---	---	9.0 - 10.0	---	8.5	---	9.0 - 10.0	---	9.0 - 10.0	---	5.5-10.5
CATIONS / ANIONS (mg/L)																									
Aluminum	0.0	0.0	4.217	0.005	5.096	14.461	11.254	3.992	4.217	10.469	4.217	10.469	4.217	10.469			4.217	10.469	4.217	0.351	4.2	0.248	4.2	9.5	---
Cadmium	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	2.0
Chlorides	0.0	0.0	1,193.3	1.376	1,193.3	3,386.2	1,193.34	423.3	1,193.34	2,962.90	1,193.34	2,962.90	1,193.34	2,962.9	---	0.000	1,193.3	2962.9	1,193.3	99.33	1,193	70.3	1,193	2,688	---
Chromium	0.0	0.0	0.004	0.000	0.017	0.048	0.10	0.035	0.005	0.013	0.005	0.013	0.005	0.013	---	0.000	0.004	0.009	0.004	0.000	0.068	0.004	0.004	0.008	0.3
Hex Chromium	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	4.0
Copper	0.0	0.0	0.037	0.000	0.213	0.605	0.661	0.234	0.149	0.371	0.149	0.371	0.149	0.371	---	0.000	0.037	0.093	0.037	0.003	4.8	0.280	0.037	0.084	0.7
Lead	0.0	0.0	0.026	0.000	0.063	0.178	0.238	0.085	0.038	0.093	0.038	0.093	0.038	0.093	---	0.000	0.026	0.065	0.026	0.002	0.502	0.030	0.026	0.059	0.2
Mercury	0.0	0.0	0.000	0.000	0.009	0.025	0.069	0.024	2.651E-04	6.582E-04	2.65E-04	6.58E-04	2.65E-04	6.58E-04	---	0.00039	1.06E-04	2.63E-04	1.06E-04	8.83E-06	1.06E-04	6.25E-06	0.00011	0.00024	0.0002
Nickel	0.0	0.0	0.078	0.000	0.556	1.576	3.667	1.301	0.111	0.276	0.111	0.276	0.111	0.276	---	0.000	0.078	0.193	0.078	0.006	1.48	0.087	0.08	0.18	0.35
Silver	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	1.0
Sulfate	0.0	0.0	551.1	0.636	551.1	1563.9	551.1	195.5	551.1	1368.4	551.1	1368.4	551.1	1368.4	---	0.000	551.1	1368.4	551.1	45.9	551	32.5	551	1241	---
Zinc	0.0	0.0	0.008	0.000	0.081	0.230	0.535	0.190	0.016	0.040	0.016	0.040	0.016	0.040	---	0.000	0.008	0.020	0.008	0.001	0.349	0.021	0.008	0.018	0.4
Total Tracked Cations / Anions	0.0	0.0	1,751.3	2.0	1,753.2	4,974.9	1,763.7	625.6	1,751.7	4,349.3	1,751.7	4,349.3	1,751.7	4,349.3	---	0.000	1,751.3	4,348.2	1,751.3	145.8	1,770	104	1,751	3,945	---
VOC (ug/L)																									
TIO	0.0	0.0	0.026	0.002	25.5	72.4	25.5	9.1	25.5	63.38	25.5	63.4	25.5	63.4	---	63.3	0.026	0.063	0.026	0.002	0.026	0.002	0.026	0.057	0.1
TOTAL ORGANICS	0.0	0.0	0.026	0.002	25.5	72.4	25.5	9.1	25.5	63.38	25.5	63.4	25.5	63.4	---	63.3	0.026	0.063	0.026	0.002	0.026	0.002	0.026	0.057	---
OTHER																									
TBOD5 (mg/L)	0.0	0.0	131.8	11.5	173	492.2	416	147.7	138.8	344.5	138.8	344.5	138.8	344.5	---	0.0	131.8	327.3	131.8	11.0	424.1	25.0	132	297	NA
TSS (mg/L)	0.0	0.0	2.0	0.2	205	582.8	1571	557.3	10.3	25.5	10.3	25.5	5.0	12.4	---	0.0	2.0	5.0	159.2	13.2	128.4	7.6	2.0	4.5	NA
TP (mg/L)	0.0	0.0	0.8	0.07	0.8	2.3	0.8	0.3	0.8	2.0	0.8	2.0	0.8	2.0	---	0.0	0.8	1.9	0.76	0.06	2.4	0.1	0.76	1.7	NA
TKN (mg/L)	0.0	0.0	48.9	4.3	51.5	146.2	51.5	18.3	51.5	127.9	51.5	127.9	51.5	127.9	---	0.0	48.9	121.5	48.9	4.1	157.4	9.3	49	110	NA

Notes:
1. Cadmium, hexavalent chromium and silver were non-detect.
2. Molybdenum data and estimates are provided for informational purposes. A draft permit limit has not been established. Pre-Design Investigation (PDI) 6 will provide additional information regarding molybdenum.
3. The Geotube effluent TSS maximum anticipated value is 200 mg/l.
4. Sludge underflow from the I.P. Clarifier is 12.5% by influent volume.
5. Backwash design frequencies are: 1 time per day for each MMF unit, and 1 time per two-day period for each GAC unit.
6. Nickel removal is anticipated to occur at a pH of 10.5 S.U.
7. Parson's Mass Balance and O'Brien & Gere's Mass Balance correspond as follows: Parson's Node # 4 is equivalent to O'Brien & Gere's Node #16. Parsons Node #9 is equivalent to the sum of O'Brien & Gere Nodes # 18, 24 & 25. Parson's Node # 10 is equivalent to O'Brien & Gere's Node #9. Refer to Parsons' Mass Balance, Rev. A, 1/20/10.
8. O'Brien & Gere's in scope work for the SCA Water Treatment System begins at Node #11, the pH Adjust Tank Influent. Nodes #1 through #10 are presented for calculation purposes only, and are being addressed by Parsons.
9. Polymer is not planned to be used at the WTP. If required, usage would be as shown in Node #15.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
C	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

MASS BALANCE – DREDGE SEASON

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-PFD2
DATE FEBRUARY 2010

PFD-2

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May 11, 2010 - 7:04pm

Honeywell SCA WTP
Winter Conditions
Mass Balance Maximum Flow - Based on Phase II Pre-Design Investigation Report - Pre Holding at Peak Flows
Review Rev. 10
5/26/2010

Draft

PARAMETER	Primary Screen Underflow		Combined Recirculation to Geotubes		Recirculation Solids Contribution to Geotubes		Non-Recirc. Liquid Stream to EQ Basin leaving Geotubes		Recirculation Liquid to EQ Basin leaving Geotubes		Total Liquid to EQ Basin		Parson Polymer Makeup		Rain Water to EQ Basin		Internal Reuse from EQ		Accumulation in EQ Basin		pH Adj Tank Influent		H2SO4 Add to pH Adj Tk		*NaOH Add to pH Adj Tk*		Alum Add'n to Floc	
Line Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr
GENERAL																												
Flow Rate	---	130,604	---	49,041	---	40	---	130,573	---	49,001	---	179,574	---	0	---	70,539	---	0	---	0	---	250,113	---	87.5	---	0.000	---	5.0
Flow Rate (GPM)	---	261	---	98	---	0.1	---	261	---	98	---	358.9	---	0.0	---	141.0	---	0	---	0	---	500	---	0.10	---	0.000	---	0.008
Flow Rate (MGD)	---	0.38	---	0.14	---	0.000	---	0.38	---	0.141	---	0.5	---	0.000	---	0.203	---	0.00	---	0.00	---	0.72	---	0.000	---	0.000	---	0.000
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.84	---	1.53	---	1.23
Design pH (S.U.)	11.5 - 12.0	---	9.0 - 10.0	---	6.5 - 7.5	---	11.5 - 12.0	---	9.0 - 10.0	---	10.0 - 11.5	---	9.0 - 10.0	---	6.5 - 7.5	---	9.0 - 10.0	---	9.0 - 10.0	---	9.0 - 10.0	---	< 1	---	> 13	---	---	---
CATIONS / ANIONS (mg/L)																												
Aluminum	---	---	6.33	0.31	4,402.7	0.18	4.900	0.640	2.701	0.132	4.300	0.77	2.699	0.000	0.0	0.0	3.087	0.00	3.087	0.00	3.087	0.77	0.0	0.0	0.0	0.0	19,930	0.1
Cadmium	---	---	0.003	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Chlorides	---	---	772	37.9	0.0	0.000	1,190	156	773	38	1,076	193	772	0	0.0	0.0	773	0.0	773	0.0	773	193	0.0	0.0	0.0	0.0	0.0	0.0
Chromium	---	---	0.0	0.002	53.1	0.002	0.020	0.003	0.003	0.000	0.015	0.003	0.002	0.000	0.0	0.0	0.011	0.000	0.011	0.000	0.011	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Hex Chromium	---	---	0.005	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Copper	---	---	0.610	0.030	654.1	0.026	0.240	0.031	0.071	0.003	0.194	0.035	0.024	0.000	0.0	0.0	0.139	0.000	0.139	0.000	0.139	0.03	0.0	0.0	0.0	0.0	0.0	0.0
Lead	---	---	0.138	0.007	140.8	0.006	0.070	0.009	0.022	0.001	0.057	0.010	0.017	0.000	0.0	0.0	0.041	0.000	0.041	0.000	0.041	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Mercury	---	---	0.005	0.001	34.6	0.001	0.011	0.001	0.000	0.000	0.008	0.001	0.000	0.000	0.0	0.0	0.006	0.000	0.006	0.000	0.006	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Nickel	---	---	1.640	0.081	1911.8	0.077	0.670	0.088	0.065	0.003	0.505	0.091	0.051	0.000	0.0	0.0	0.362	0.000	0.362	0.000	0.362	0.09	0.0	0.0	0.0	0.0	0.0	0.0
Silver	---	---	0.003	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	---	---	494.9	24.3	0.0	0.00	150.0	19.6	495.3	24.3	244.2	43.9	494.9	0.00	0.0	0.0	175.4	0.00	175.4	0.00	175.4	43.9	1,674,971	79.8	0.0	0.0	70,864	0.3
Zinc	---	---	0.248	0.012	290.3	0.012	0.098	0.013	0.009	0.000	0.074	0.013	0.005	0.000	0.0	0.0	0.053	0.000	0.053	0.00	0.053	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Total Tracked Cations / Anions	---	---	1,278.8	62.8	8,428.5	0.3	1,348.7	176.2	1,272.9	62.4	1,328.0	238.7	1,271.7	0.0	0.0	0.0	953.5	0.0	953.5	0.0	953.5	238.7	1,674,971	79.8	0.0	0.0	90,794	0.4
VOC (ug/L)																												
TIO	---	---	10.7	0.5	0.0	0.0	28.0	3.7	10.7	0.5	23.3	4.2	0.017	0.000	0.0	0.0	16.7	0.00	16.71	0.00	16.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL ORGANICS	---	---	10.7	0.5	0.0	0.0	28.0	3.7	10.7	0.5	23.3	4.2	0.017	0.000	0.0	0.0	16.7	0.00	16.71	0.00	16.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0
OTHER																												
TBOD5 (mg/L)	---	---	217.0	10.7	135,406	5.5	170.0	22.2	105.5	5.2	152.4	27.4	83.1	0.0	0.0	0.0	109.4	0.00	109.42	0.00	109.4	27.4	0.0	0.0	0.0	0.0	0.0	0.0
TSS (mg/L)	---	---	750	36.8	666,147	26.9	200.0	26.1	200.0	9.8	200	35.9	2.0	0.0	0.0	0.0	143.6	0.00	143.59	0.00	143.6	35.9	0.0	0.0	0.0	0.0	0.0	0.0
TP (mg/L)	---	---	0.6	0.0	0.0	0.0	0.7	0.1	0.6	0.0	0.7	0.1	0.5	0.0	0.0	0.0	0.5	0.00	0.50	0.00	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0
TKN (mg/L)	---	---	38.7	1.9	0.0	0.0	47.0	6.1	38.7	1.9	44.74	8.0	30.5	0.0	0.0	0.0	32.1	0.00	32.12	0.00	32.1	8.0	0.0	0.0	0.0	0.0	0.0	0.0

PARAMETER	Polymer Add'n to Floc		Polymer Makeup Water		I.P. Clarifier Influent		I.P. Clarifier Sludge		I.P. Clarifier Effluent		Filter Feed Tank Disch		MMF Effluent		GAC Units		GAC Effluent		Spent MMF B/Wash		Spent GAC B/Wash		Eff. Tanks Discharge		PERMIT LIMIT
Line Number	15		16		17		18		19		20		21		22		23		24		25		26		
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	
GENERAL																									
Flow Rate	---	0.13	---	65	---	250,271	---	31,284	---	218,987	---	218,987	---	218,987	---	---	---	218,987	---	10,396	---	7,361	---	201,165	NA
Flow Rate (GPM)	---	0.000	---	0.130	---	500	---	62.5	---	438	---	438	---	438	---	---	---	438	---	20.8	---	14.7	---	402	
Flow Rate (MGD)	---	0.000	---	0.000	---	0.72	---	0.090	---	0.63	---	0.63	---	0.63	---	---	---	0.63	---	0.030	---	0.021	---	0.6	
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	< 150
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	---	---	1.00	---	1.00	---	1.00	---	1.00	
Design pH (S.U.)	6.5 - 7.5	---	9.0 - 10.0	---	8.5-10.5	---	8.5-10.5	---	8.5	---	8.5	---	8.5	---	---	---	9.0 - 10.0	---	8.5	---	9.0 - 10.0	---	9.0 - 10.0	---	5.5-10.5
CATIONS / ANIONS (mg/L)																									
Aluminum	0.0	0.0	2.699	0.000	3.410	0.854	8.388	0.263	2.699	0.591	2.699	0.591	2.699	0.591			2.699	0.591	2.699	0.028	2.7	0.020	2.7	0.5	---
Cadmium	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	2.0
Chlorides	0.0	0.0	772.4	0.050	772.4	193.5	772.41	24.2	772.41	169.28	772.41	169.28	772.41	169.3	---	0.000	772.4	169.3	772.4	8.04	772	5.7	772	156	---
Chromium	0.0	0.0	0.002	0.000	0.011	0.003	0.06	0.002	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.002	0.001	0.002	0.000	0.032	0.000	0.002	0.000	0.3
Hex Chromium	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	4.0
Copper	0.0	0.0	0.024	0.000	0.139	0.035	0.431	0.014	0.097	0.021	0.097	0.021	0.097	0.021	---	0.000	0.024	0.005	0.024	0.000	2.2	0.016	0.024	0.005	0.7
Lead	0.0	0.0	0.017	0.000	0.041	0.010	0.155	0.005	0.024	0.005	0.024	0.005	0.024	0.005	---	0.000	0.017	0.004	0.017	0.000	0.236	0.002	0.017	0.003	0.2
Mercury	0.0	0.0	0.000	0.000	0.006	0.001	0.045	0.001	1.730E-04	3.791E-05	1.73E-04	3.79E-05	1.73E-04	3.79E-05	---	0.00002	6.92E-05	1.52E-05	6.92E-05	7.20E-07	6.92E-05	5.10E-07	0.00007	0.00001	0.0002
Nickel	0.0	0.0	0.051	0.000	0.362	0.091	2.391	0.075	0.072	0.016	0.072	0.016	0.072	0.016	---	0.000	0.051	0.011	0.051	0.001	0.70	0.005	0.05	0.01	0.35
Silver	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	1.0
Sulfate	0.0	0.0	494.9	0.032	494.9	124.0	494.9	15.5	494.9	108.5	494.9	108.5	494.9	108.5	---	0.000	494.9	108.5	494.9	5.1	495	3.6	495	100	---
Zinc	0.0	0.0	0.005	0.000	0.053	0.013	0.349	0.011	0.011	0.002	0.011	0.002	0.011	0.002	---	0.000	0.005	0.001	0.005	0.000	0.162	0.001	0.005	0.001	0.4
Total Tracked Cations / Anions	0.0	0.0	1,271.7	0.1	1,273.1	318.9	1,280.9	40.1	1,272.0	278.8	1,272.0	278.8	1,272.0	278.8	---	0.000	1,271.7	278.7	1,271.7	13.2	1,280	9	1,272	256	---
VOC (ug/L)																									
TIO	0.0	0.0	0.017	0.000	16.7	4.2	16.7	0.5	16.7	3.66	16.7	3.7	16.7	3.7	---	3.7	0.017	0.004	0.017	0.000	0.017	0.000	0.017	0.003	0.1
TOTAL ORGANICS	0.0	0.0	0.017	0.000	16.7	4.2	16.7	0.5	16.7	3.66	16.7	3.7	16.7	3.7	---	3.7	0.017	0.004	0.017	0.000	0.017	0.000	0.017	0.003	---
OTHER																									
TBOD5 (mg/L)	0.0	0.0	83.1	0.0	109	27.4	262	8.2	87.5	19.2	87.5	19.2	87.5	19.2	---	0.0	83.1	18.2	83.1	0.9	213.2	1.6	83	17	NA
TSS (mg/L)	0.0	0.0	2.0	0.0	149	37.2	1136	35.6	7.4	1.6	7.4	1.6	5.0	1.1	---	0.0	2.0	0.4	53.1	0.6	91.3	0.7	2.0	0.4	NA
TP (mg/L)	0.0	0.0	0.5	0.00	0.5	0.1	0.5	0.0	0.5	0.1	0.5	0.1	0.5	0.1	---	0.0	0.5	0.1	0.47	0.00	1.2	0.0	0.47	0.1	NA
TKN (mg/L)	0.0	0.0	30.5	0.0	32.1	8.0	32.1	1.0	32.1	7.0	32.1	7.0	32.1	7.0	---	0.0	30.5	6.7	30.5	0.3	78.2	0.6	30	6	NA

Notes:
1. Cadmium, hexavalent chromium and silver were non-detect.
2. Molybdenum data and estimates are provided for informational purposes. A draft permit limit has not been established. Pre-Design Investigation (PDI) 6 will provide additional information regarding molybdenum.
3. The Geotube effluent TSS maximum anticipated value is 200 mg/L.
4. Sludge underflow from the I.P. Clarifier is 12.5% by influent volume.
5. Backwash design frequencies are: 1 time per day for each MMF unit, and 1 time per two-day period for each GAC unit.
6. Nickel removal is anticipated to occur at a pH of 10.5 SU.
7. Parson's Mass Balance and O'Brien & Gere's Mass Balance correspond as follows: Parson's Node # 4 is equivalent to O'Brien & Gere's Node #16. Parsons Node #9 is equivalent to the sum of O'Brien & Gere Nodes # 18, 24 & 25. Parson's Node # 10 is equivalent to O'Brien & Gere's Node #9. Refer to Parsons' Mass Balance, Rev. A, 1/20/10.
8. O'Brien & Gere's in scope work for the SCA Water Treatment System begins at Node #11, the pH Adjust Tank Influent. Nodes #1 through #10 are presented for calculation purposes only, and are being addressed by Parsons.
9. Polymer is not planned to be used at the WTP. If required, usage would be as shown in Node #15.

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
C	4/09/10	DP #2 ISSUED FOR HONEYWELL REVIEW	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

MASS BALANCE – WINTER SEASON

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613-PFD2
DATE FEBRUARY 2010
PFD-3

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DRAFT

Attachment A

Honeywell SCA WTP
Chemical Usage - Basis of Design Calculations
Dredge Season
April 9, 2010

Chemical Usage (lb/day) = **Conc (mg/L) * Q (gal/day) * 3.785 L/gal * 1 lb/454,000 mg**

Chemical Usage (gal/day) = $\frac{\text{Chem Usage (lb/day)}}{\text{Soln (\%) * S.G. * 8.34 lb/gal}}$

assume Q = 8.15 MGD

Chemical	Conc (mg/L)	Soln	S.G.	Chemical Usage	
				lb/day	gal/day
93% Sulfuric Acid	350	0.93	1.84	23,795	1,667
50% Sodium Hydroxide	160	0.50	1.53	10,878	1,705
20% Aluminum Sulfate	20	0.20	1.23	1,360	663

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.
2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.
3) Influent flow based on Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

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DRAFT

Attachment B

Honeywell SCA WTP
Neat Chemical Usage - Mass Balance Calculations
Dredge Season
April 9, 2010

Neat Chemical Usage (gal chem/1000 gal WW) = $\frac{\text{Conc (mg/L)}}{\text{S.G. * 1000 gal WW}}$

Neat Chemical Usage (gal/day) = **gal chem/1000 gal WW * gal WW/day / 1000 gal WW**

assume Q = 8.15 MGD

Chemical	Conc (mg/L)	S.G.	Neat Chemical Usage (gal/1000 gal WW)	Neat Chemical Usage (gal/day)	Soln	Chem Solution Usage (gal/day)
93% Sulfuric Acid	350	1.84	0.190	1,551	0.93	1,668
50% Sodium Hydroxide	160	1.53	0.105	853	0.50	1,706
20% Aluminum Sulfate	20	1.23	0.016	133	0.20	663

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.

2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.

3) Influent flow based on Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

4) Chem solution Usage = Neat Chem Usage (gal/day) / Chem soln %

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DRAFT

Attachment C

Honeywell SCA WTP
Chemical Usage - Basis of Design Calculations
Winter Operation
April 9, 2010

Chemical Usage (lb/day) = **Conc (mg/L) * Q (gal/day) * 3.785 L/gal * 1 lb/454,000 mg**

Chemical Usage (gal/day) = $\frac{\text{Chem Usage (lb/day)}}{\text{Soln (\%) * S.G. * 8.34 lb/gal}}$

assume Q = 0.72 MGD

Chemical	Conc (mg/L)	Soln	S.G.	Chemical Usage	
				lb/day	gal/day
93% Sulfuric Acid	350	0.93	1.84	2,101	147
50% Sodium Hydroxide	160	0.50	1.53	960	151
20% Aluminum Sulfate	20	0.20	1.23	120	59

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.
2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.
3) Influent flow based on Winter Conditions, Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\N-D\[Chem Usage Calcs_backup for BOD 4_9_2010.xls]Neat Chemical Usage - winter

DRAFT

Attachment D

Honeywell SCA WTP
Neat Chemical Usage - Mass Balance Calculations
Winter Operation
April 9, 2010

Neat Chemical Usage (gal chem/1000 gal WW) = $\frac{\text{Conc (mg/L)}}{\text{S.G. * 1000 gal WW}}$

Neat Chemical Usage (gal/day) = **gal chem/1000 gal WW * gal WW/day / 1000 gal WW**

assume Q = 0.72 MGD

Chemical	Conc (mg/L)	S.G.	Neat Chemical Usage (gal/1000 gal WW)	Neat Chemical Usage (gal/day)	Soln	Chem Solution Usage (gal/day)
93% Sulfuric Acid	350	1.84	0.190	137	0.93	147
50% Sodium Hydroxide	160	1.53	0.105	75	0.50	151
20% Aluminum Sulfate	20	1.23	0.016	12	0.20	59

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.

2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.

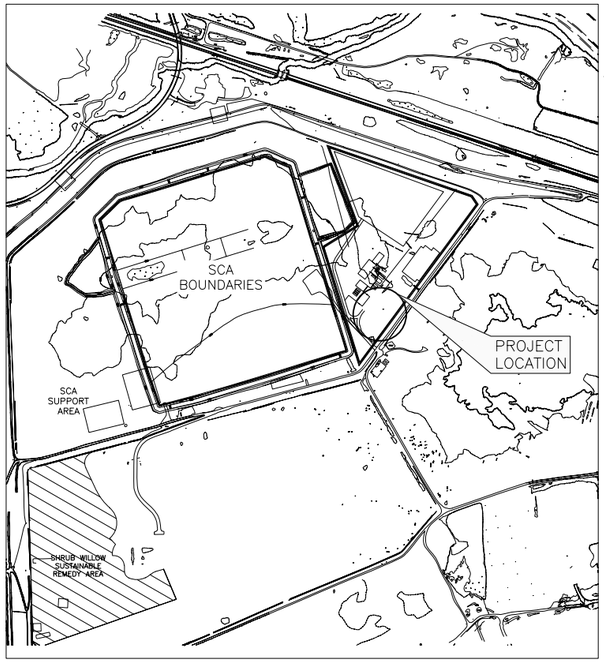
3) Influent flow based on Winter Conditions, Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

4) Chem solution Usage = Neat Chem Usage (gal/day) / Chem soln %

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\N-D\[Chem Usage Calcs_backup for BOD 4_9_2010.xls]Neat Chemical Usage - winter

Drawings

May 12, 2010 - 1:10pm



LOCATION PLAN

NOT TO SCALE

FOR NYSDEC AND COUNTY REVIEW

DESIGN PACKAGE DP #2

SCA WATER TREATMENT PLANT (WTP)

TOWN OF CAMILLUS, NEW YORK

HONEYWELL INTERNATIONAL, INC.
MORRISTOWN, NEW JERSEY

MAY 2010

O'BRIEN & GERE
ENGINEERS INC.

5000 BRITTONFIELD PKWY
EAST SYRACUSE, NY 13057
PHONE: 315-437-6100

INDEX TO DRAWINGS

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\Docs\DWG\DP-2\Sheets\44523 DP#2 T001.dwg

May 12, 2010 - 10:47am

WASTEBED 11

WASTEBEDS 9–10

BASIN 2

SEPARATED MATERIAL MANAGEMENT AREA

PROCESS AREA

BASIN 1

SCA BOUNDARIES

SCA WTP

30" HDPE BUTT FUSED DR–21

STABILIZED CONSTRUCTION ENTRANCE (TYP.)

ACCESS ROAD

TURBIDITY CURTAIN

SEE SHEET U–3

WASTEBED 12

SEE SHEET G–1 & SHEET U–1

SEE SHEET U–4

SEE SHEET U–2

RETENTION PONDS

RT. 5 BY–PASS

WASTEBED 13

SCA SUPPORT AREA

SHRUB WILLOW FULL SCALE DEMONSTRATION PROJECT AREA

ACCESS ROAD

WASTEBED 14

WASTEBED 15

PHASE 1 SHRUB WILLOW SUSTAINABLE REMEDY AREA

INLAND SALT MARSH AREA

PLAN

SCALE: 1"=400'

NOTE:

1. NEW CONSTRUCTION INCLUDES SCA WTP, SCA SUPPORT AREA AND THE EFFLUENT PIPELINE.

SURVEY NOTE:

THE BASE PLAN SURVEY CONTROL IS BASED ON THE FOLLOWING:

HORIZONTAL – NORTH AMERICAN DATUM 1983 (NAD83) PROJECTED ON NEW YORK STATE PLANE COORDINATE SYSTEM (CENTRAL ZONE)
VERTICAL – NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

LEGEND

— · · — 100 YEAR FEMA FLOOD ZONE

— · — NYS FRESHWATER WETLAND

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=400' 400 0 400 800

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PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

OVERALL SITE & KEY PLAN

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613–SP1
DATE MAY 2010

SP–1

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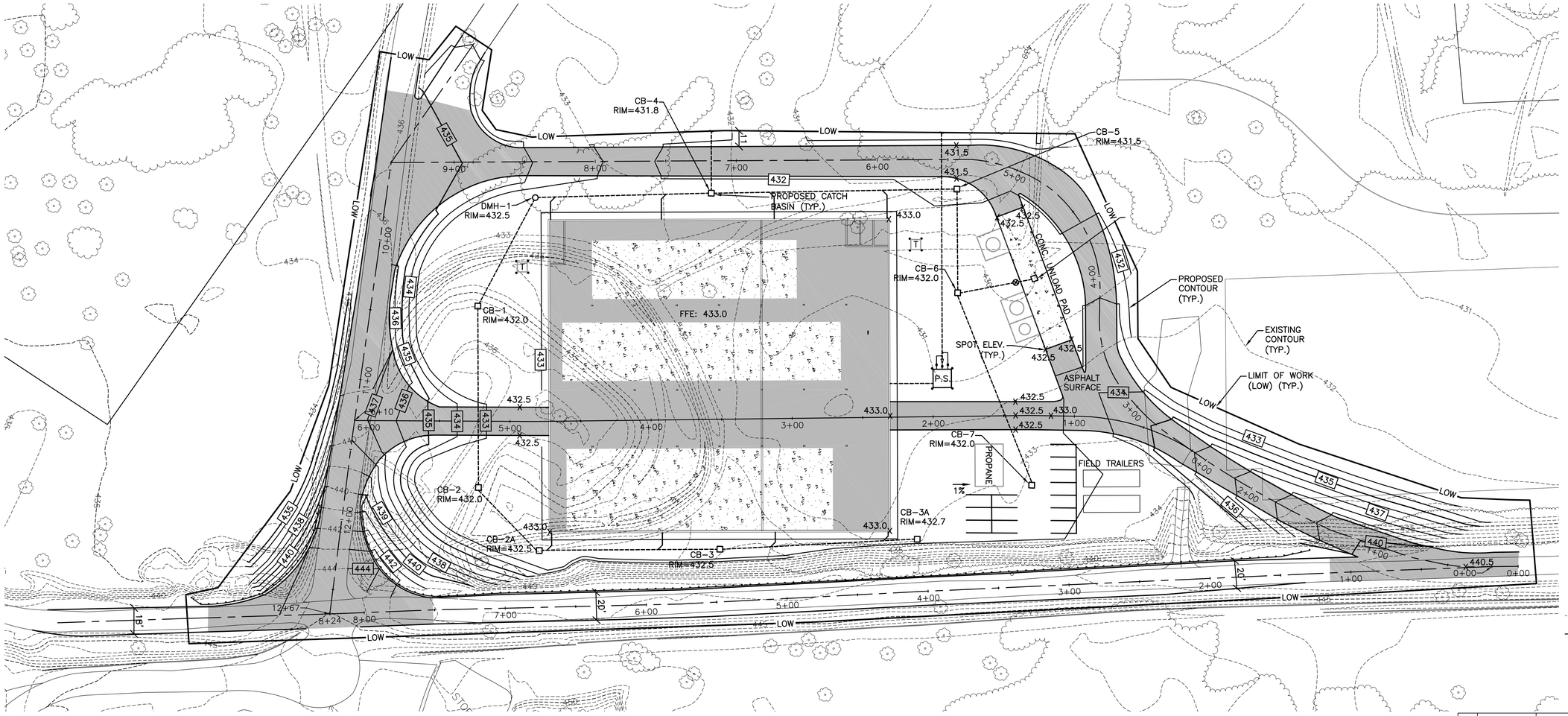

PLAN
SCALE: 1"=40'

NOTES:

1. SEE SHEET GA-1 FOR LABELING OF WATER TREATMENT PLANT EQUIPMENT.
2. CONTRACTOR TO CLEAR & GRUB AREA WITHIN THE LIMIT OF WORK LINE.

LEGEND

446	EXISTING CONTOUR
437	PROPOSED CONTOUR
x432	PROPOSED SPOT ELEVATION

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=40' 40 0 40 80

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DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

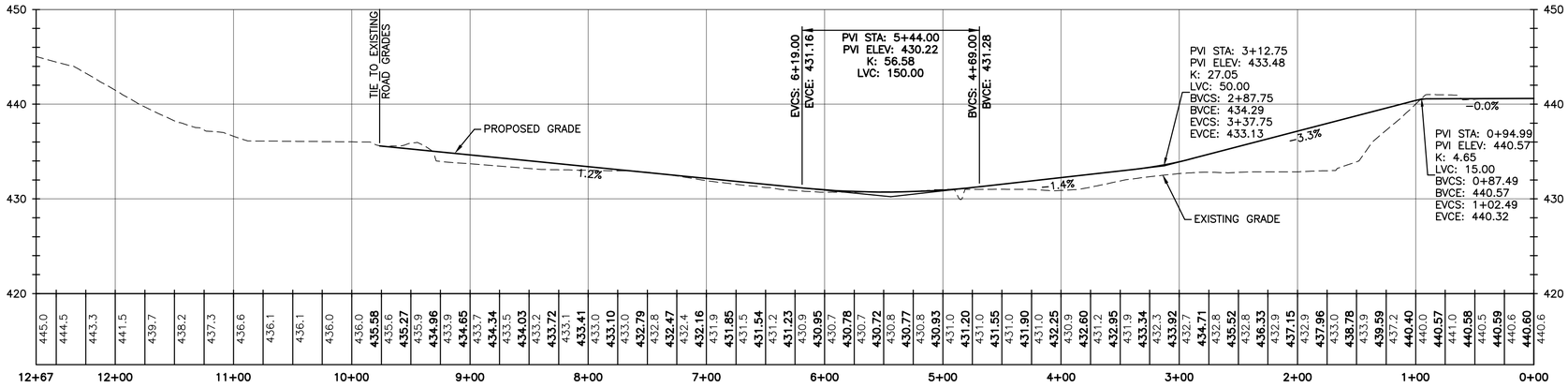
HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

GRADING PLAN

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

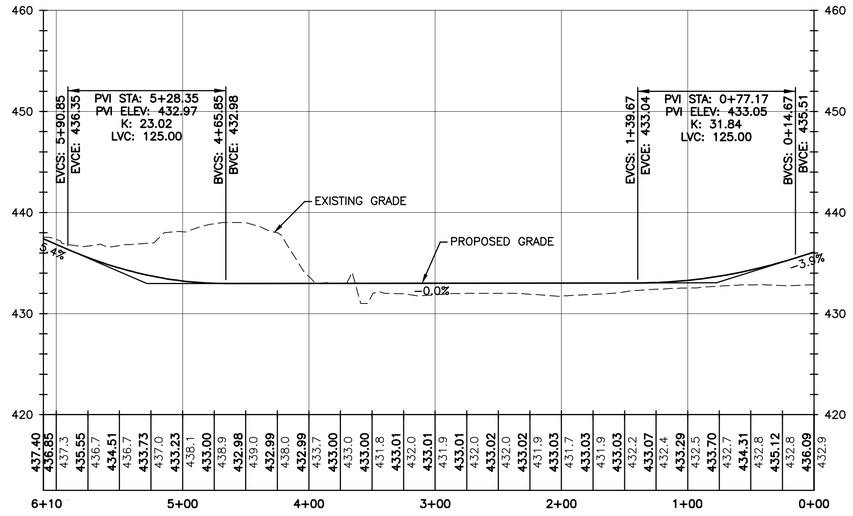
FILE NO. 1163.45613-G1
DATE MAY 2010

G-1



ROAD PROFILE

SCALE: HORIZ. 1"=60'
VERT. 1"=6'



ROAD PROFILE

SCALE: HORIZ. 1"=60'
VERT. 1"=6'

ABBREVIATIONS

BVCS	BEGIN VERTICAL CURVE STATION
BVCE	BEGIN VERTICAL CURVE ELEVATION
EVCS	END VERTICAL CURVE STATION
EVCE	END VERTICAL CURVE ELEVATION
PVI	POINT OF VERTICAL INTERSECTION
LVC	LENGTH OF VERTICAL CURVE

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=6' 6 0 6 12

1"=60' 60 0 60 120

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O'BRIEN & GERE ENGINEERS INC.

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PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

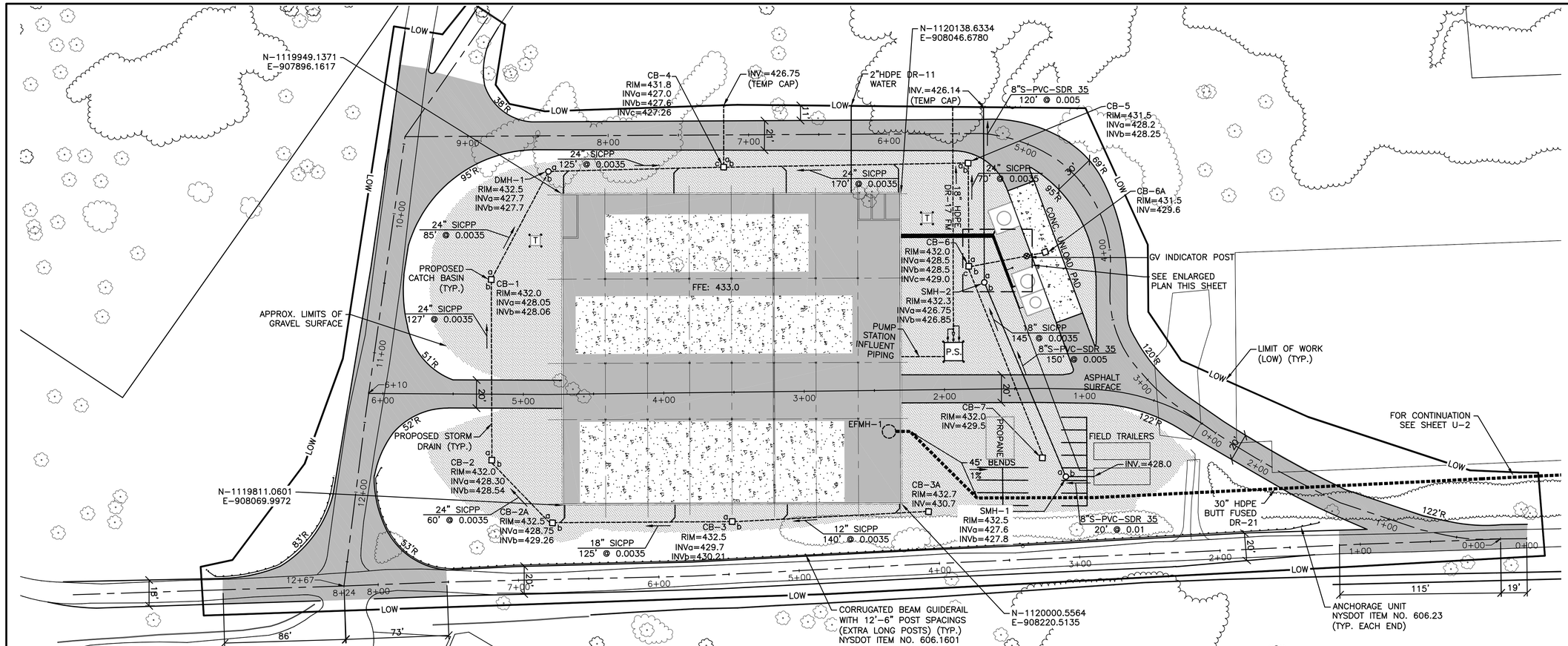
ROAD PROFILE

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-G2

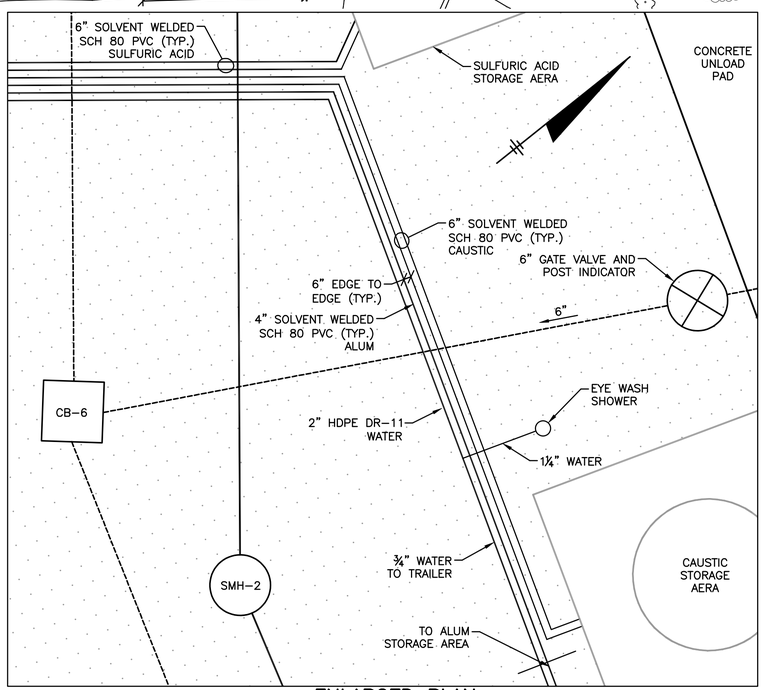
DATE MAY 2010

G-2



PLAN

SCALE: 1"=40'



ENLARGED PLAN

SCALE: 1"=10'

CURVE DATA TABLE

CURVE NUMBER	LENGTH	RADIUS	CHORD	CHORD DIRECTION	TANGENT LENGTH	DELTA ANGLE	POINT OF CURVATURE STATION	POINT OF TANGENCY STATION	MID ORDINATE	DEGREE OF CURVE
1	20.31'	132.00'	20.29'	S46°28'51"W	10.18'	8°49'00"	0+37.22	0+57.53	0.39'	43°24'14"
2	101.69'	709.30'	101.61'	S67°51'23"W	50.93'	8°12'52"	1+36.50	2+38.19	1.82'	8°04'40"
3	35.97'	129.94'	35.86'	S81°14'00"W	18.10'	15°51'39"	2+69.83	3+05.80	1.24'	44°05'42"
4	69.13'	81.77'	67.09'	N71°14'05"W	36.79'	48°26'36"	3+05.80	3+74.94	7.20'	70°04'15"
5	64.00'	90.81'	62.68'	N66°27'27"W	33.39'	40°22'50"	3+81.73	4+45.73	5.58'	63°05'38"
6	29.72'	90.44'	29.59'	S84°42'42"W	14.99'	18°49'49"	4+45.73	4+75.45	1.22'	63°21'12"
7	58.42'	110.96'	57.75'	S58°04'33"W	29.91'	30°10'01"	4+75.45	5+33.88	3.82'	51°38'09"
8	94.14'	154.52'	92.70'	S58°16'58"W	48.59'	34°54'32"	0+00	0+94.15	7.12'	37°04'44"

LEGEND

- PROPOSED CATCH BASIN
- 18" SICPP / 145' @ 0.0035 — PROPOSED STORM PIPE, SIZE, LENGTH & SLOPE
- PROPOSED DRAIN MANHOLE
- 8" SANITARY SEWER MANHOLE
- PROPOSED GUIDERAIL
- PROPOSED BITUMINOUS CONCRETE PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED GRAVEL PAVEMENT

NOTE:

1. 18" FORCEMAIN, CHEMICAL PIPELINES AND WATERLINES SHALL BE INSTALLED 5' BELOW FINISHED GRADE.

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=10' (10 0 10 20)

1"=40' (40 0 40 80)

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PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

SITE & UTILITY PLAN

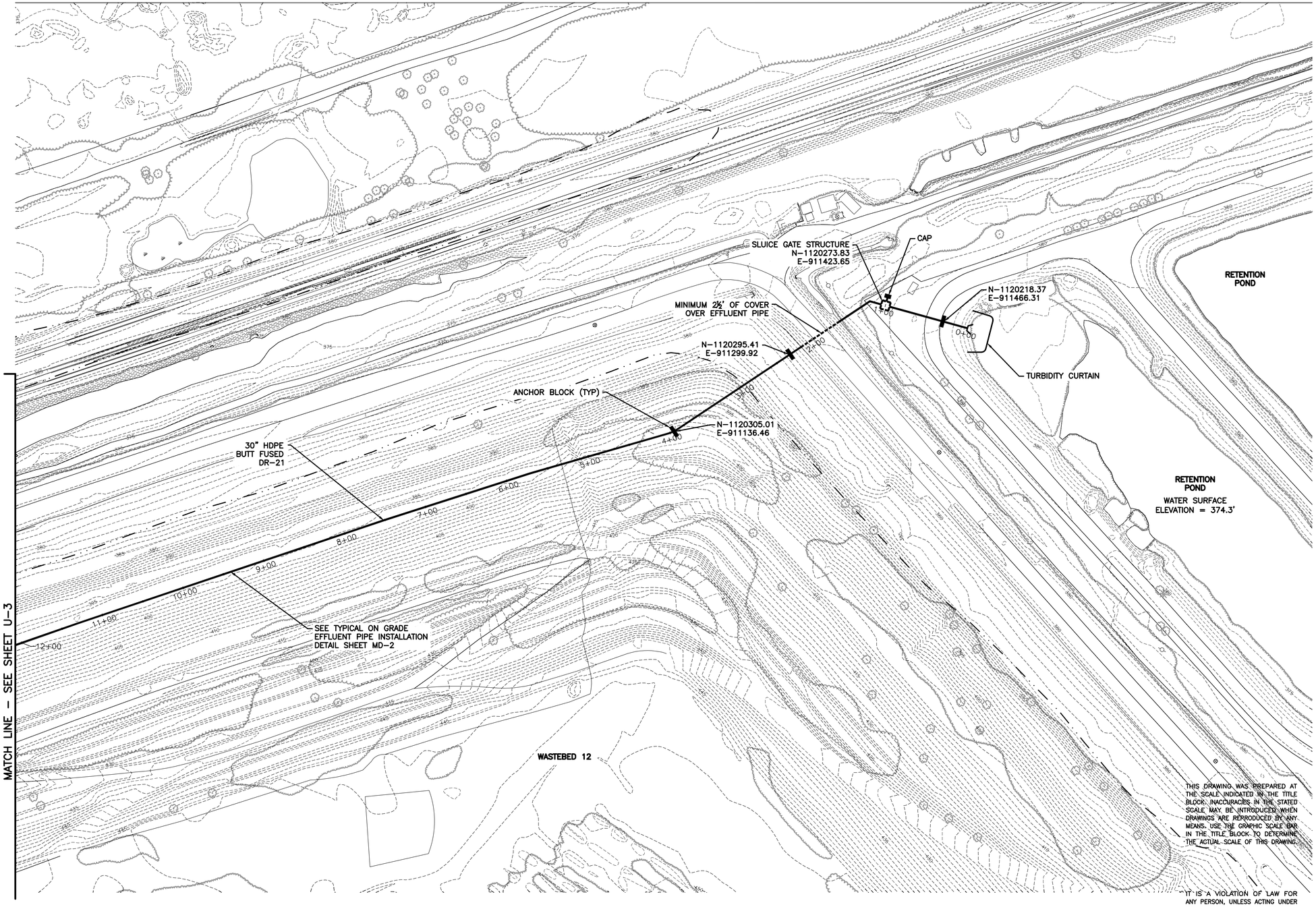
IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-U1

DATE MAY 2010

U-1

May 12, 2010 - 10:57am



PLAN
SCALE: 1"=60'

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=60' 60 0 60 120

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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

EFFLUENT PIPELINE PLAN

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-U2
DATE MAY 2010

U-2

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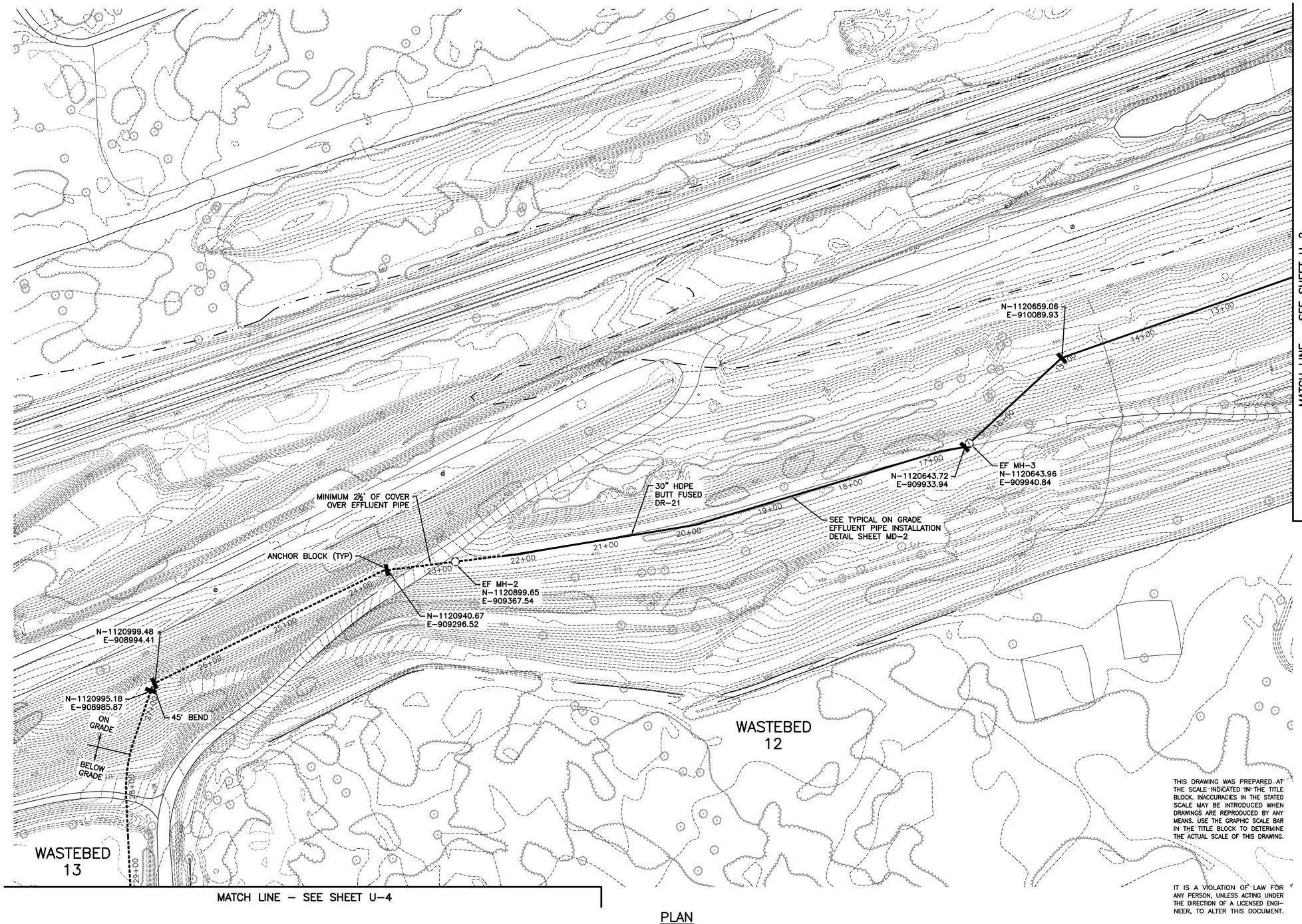

PLAN
SCALE: 1"=60'

NO.	DATE	REVISION	INIT.
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A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=60' 60 0 60 120

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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

EFFLUENT PIPELINE PLAN

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-U3
DATE MAY 2010

U-3

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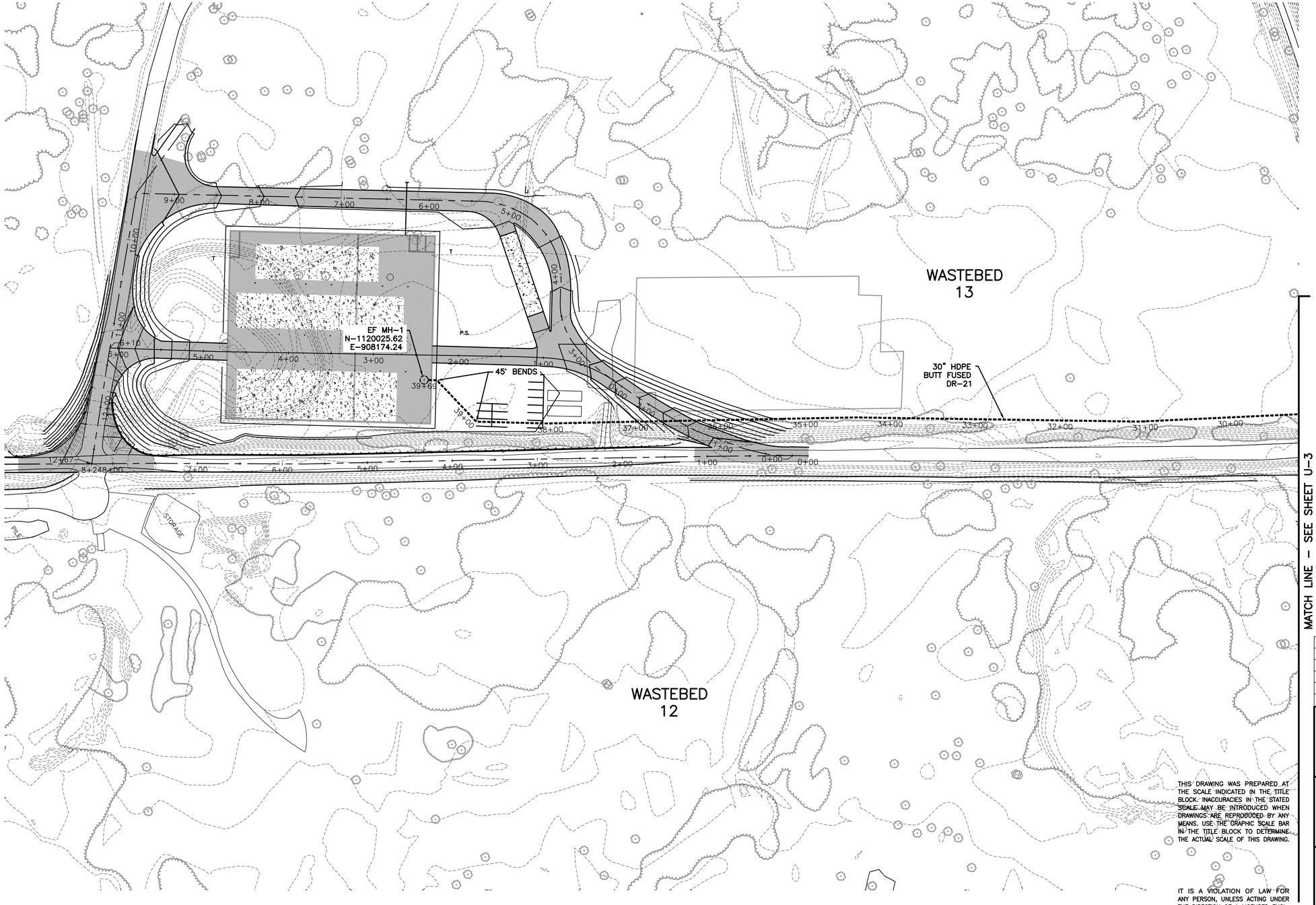

PLAN
SCALE: 1"=60'

MATCH LINE - SEE SHEET U-3

LEGEND

- PROPOSED EFFLUENT PIPELINE (EF)
- EFMH ○ PROPOSED EFFLUENT LINE MANHOLE
- PROPOSED ANCHOR BLOCK

NOTE

1. SEE SHEETS U-5 & U-6 FOR PIPELINE PROFILES.

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=60' 60 0 60 120

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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

EFFLUENT PIPELINE PLAN

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-U4
DATE MAY 2010

U-4

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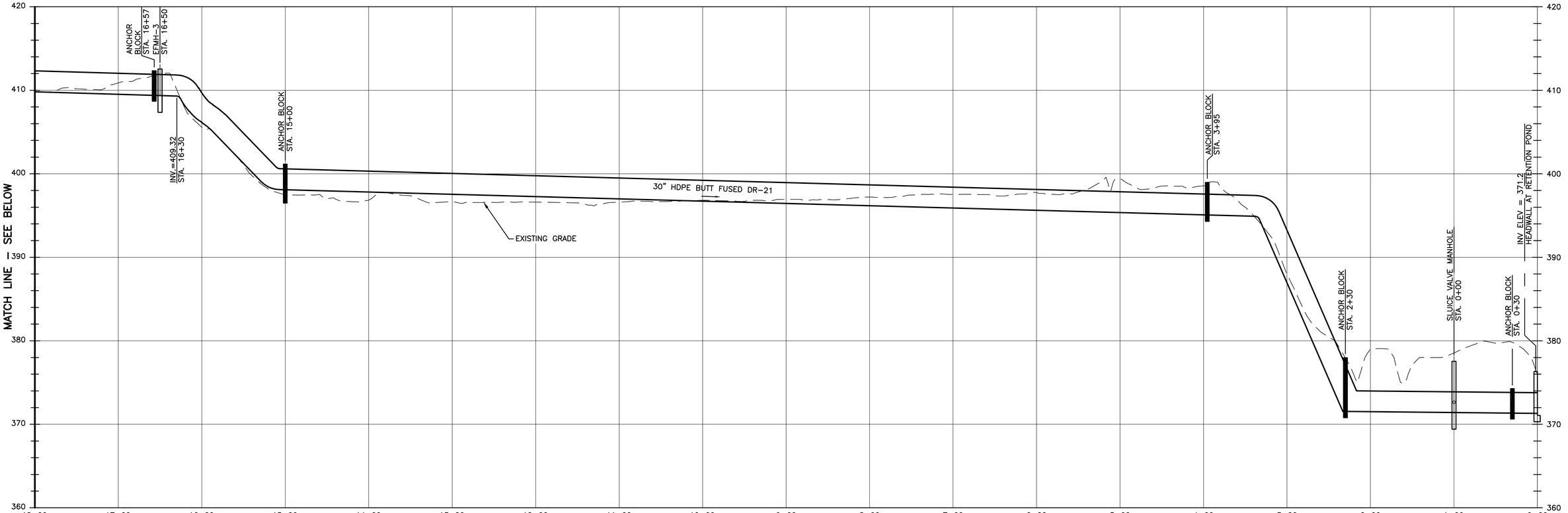
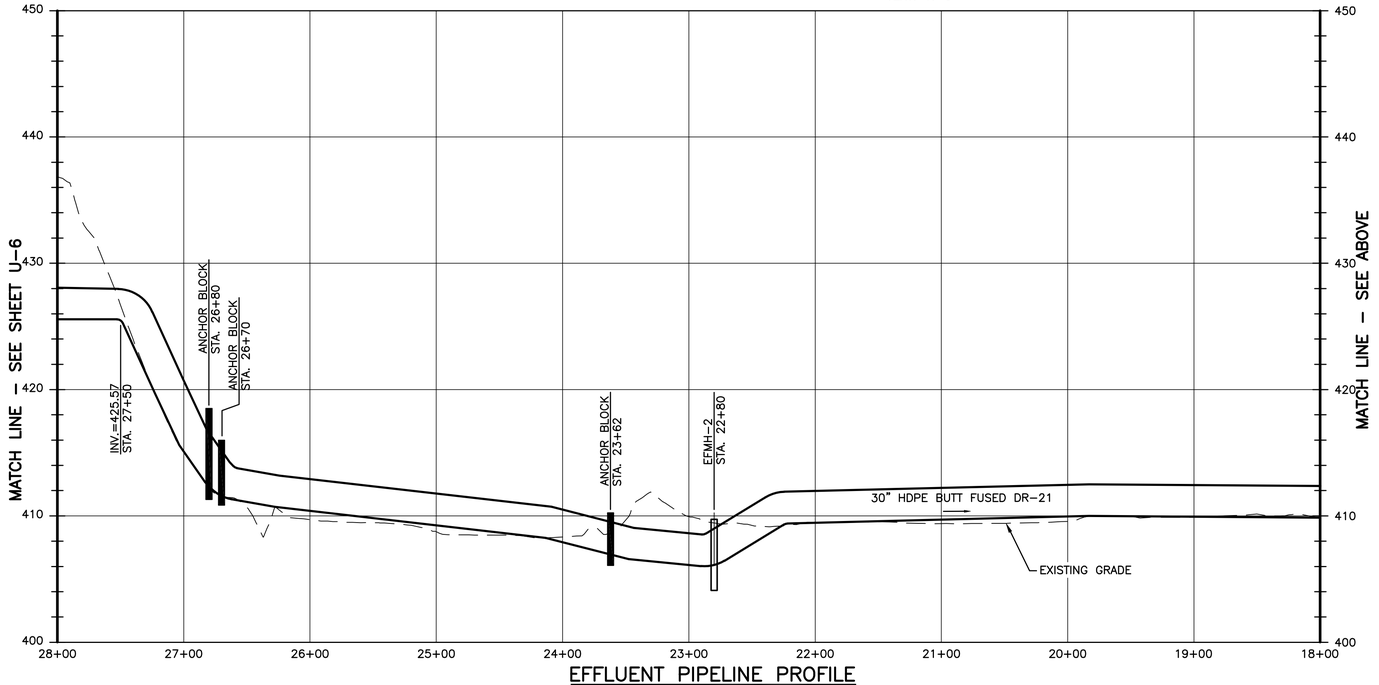


EFFLUENT PIPELINE PROFILE

SCALE: HORIZ. 1:=60'
VERT. 1:=6'



EFFLUENT PIPELINE PROFILE

SCALE: HORIZ. 1:=60'
VERT. 1:=6'

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=6' 6 0 6 12

1"=60' 60 0 60 120

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HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

EFFLUENT PIPELINE PROFILE

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-U5

DATE MAY 2010

U-5

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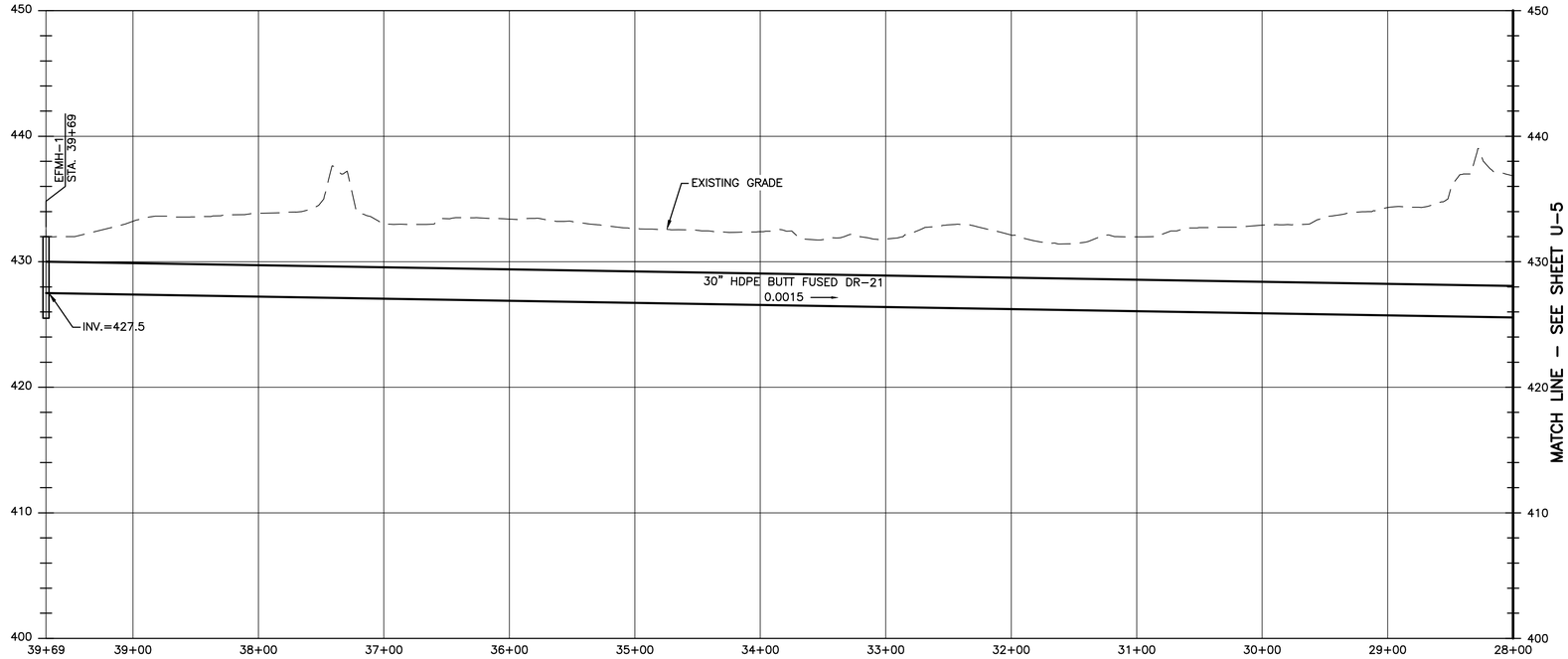

EFFLUENT PIPELINE PROFILE

SCALE: HORIZ. 1:=60'
VERT. 1:=6'

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

1"=6' 6 0 6 12

1"=60' 60 0 60 120

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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

EFFLUENT PIPELINE PROFILE

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-U6

DATE MAY 2010

U-6

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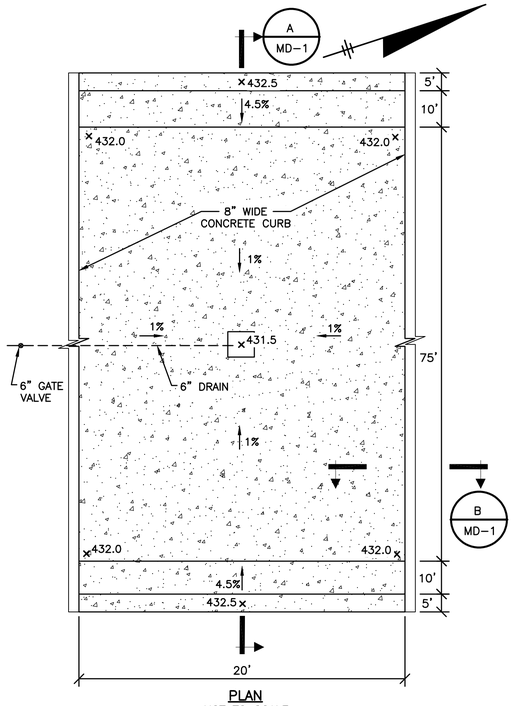
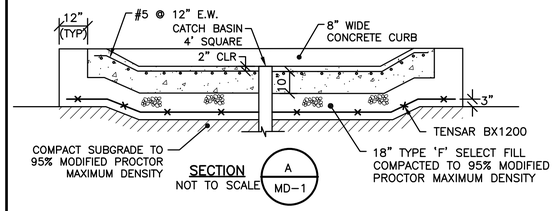
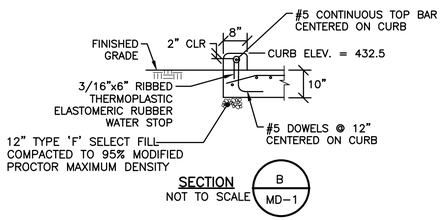


PLAN
NOT TO SCALE



SECTION A / MD-1
NOT TO SCALE



SECTION B / MD-1
NOT TO SCALE

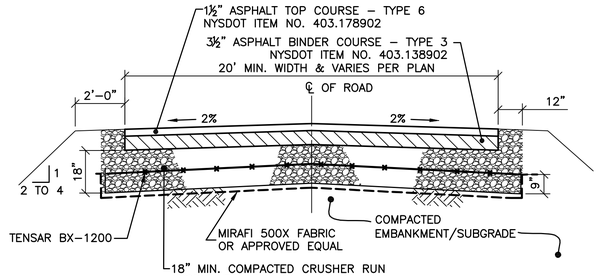
NOTES:

1. CONCRETE SHALL BE 4500 P.S.I. (MIN.) COMPRESSIVE STRENGTH, AIR ENTRAINED.
2. CONCRETE SURFACE SHALL BE TROWEL FINISHED.
3. MAX SPACING BETWEEN CONTRACTION JOINTS SHALL BE 25'. SEE STRUCTURAL DRAWINGS FOR JOINT DETAILS.
4. PROVIDE SURFACE COATING BY TNEMEC CO. INC. OR APPROVED EQUAL. COMPLY WITH MANUFACTURER'S RECOMMENDATIONS FOR SURFACE PREPARATION AND APPLICATION. APPLY COATING TO CONTAINMENT AREA INTERIOR AND INTERIOR OF CB-CA. THE TNEMEC COMPANY COATING SYSTEM FOR HORIZONTAL AND VERTICAL CONCRETE SURFACES SHALL CONSIST OF THE FOLLOWING.

A. SURFACE FILLER: TNEMEC SERIES 218 MORTAR CLAD.
B. PRIMER COAT: 4.0 TO 12.0 MILS DFT, TNEMEC SERIES 201 EPOXYLINE.
C. SECOND COAT: 6.0 TO 12.0 MILS DFT, TNEMEC SERIES 239SC CHEMTREAD.
D. THIRD COAT: 60.0 TO 80.0 MILS DFT, TNEMEC SERIES 239SC CHEMTREAD WITH EMBEDDED PART D FIBERGLASS MAT.
E. FOURTH COAT: 8.0 TO 12.0 MILS DFT, TNEMEC SERIES 282 TNEME-GLAZE WITH ROLLED ON GRIT ANTI-SKID SURFACE FINISH. ADD SELECTED GRIT TO CREATE NON-SKID SURFACE IN AREAS EXPECTED TO RECEIVE VEHICULAR OR FOOT TRAFFIC.

CHEMICAL UNLOADING AREA CONCRETE PAVEMENT DETAIL

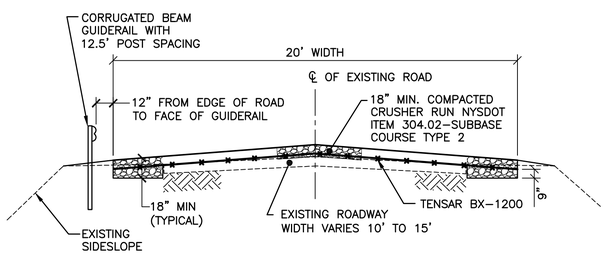
NOT TO SCALE



STA. 0+00 TO 12+67* ACCESS ROAD TYPICAL SECTION

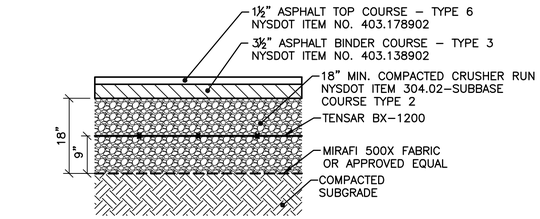
NOT TO SCALE

* INCLUDES STA. 0+00 TO 6+10 PASSING THROUGH WTP BUILDING AREA.



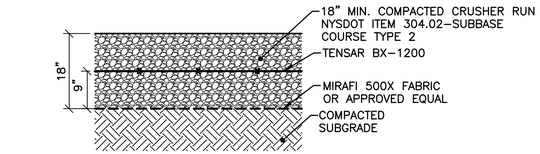
TYPICAL SECTION SITE ACCESS ROAD WIDENING

NOT TO SCALE



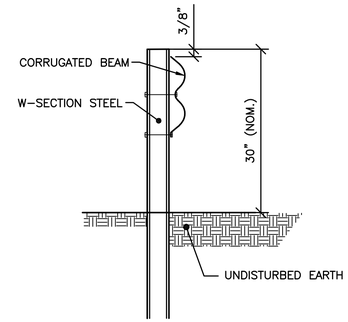
TYPICAL SECTION ASPHALT PAVEMENT IN WTP & WTP AREAS

NOT TO SCALE



TYPICAL SECTION GRAVEL PAVEMENT IN WTP AREAS

NOT TO SCALE



GUIDE RAIL DETAIL

NOT TO SCALE

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

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IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MISCELLANEOUS DETAILS

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-MD1
DATE MAY 2010

MD-1

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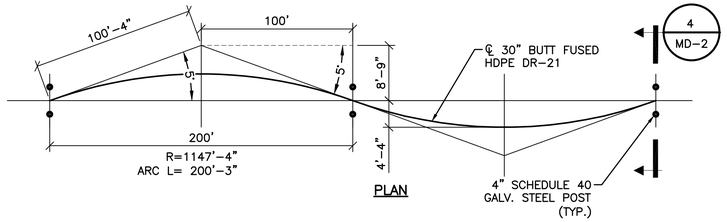
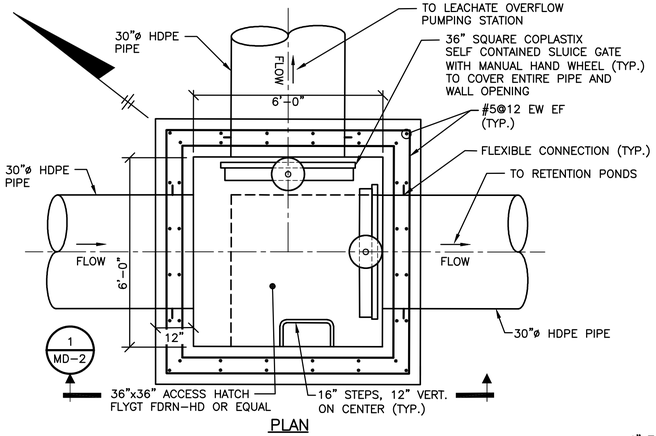


PLAN



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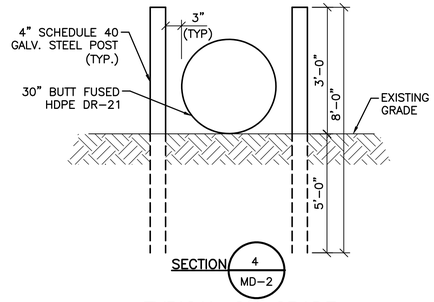
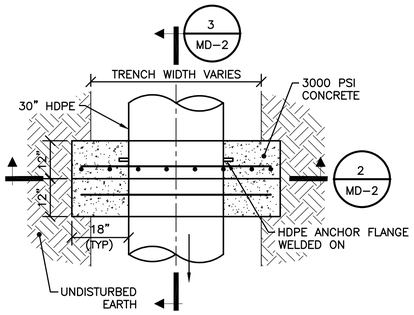
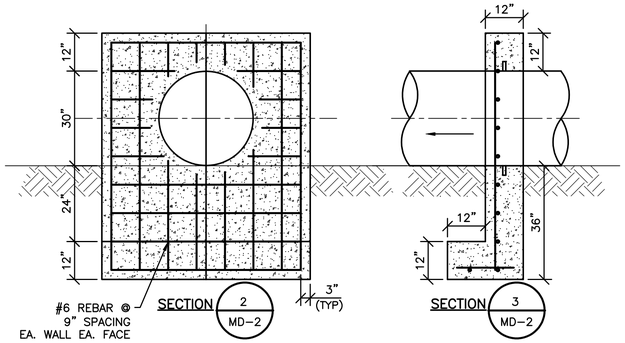


TYPICAL ON GRADE EFFLUENT PIPE INSTALLATION

NOT TO SCALE

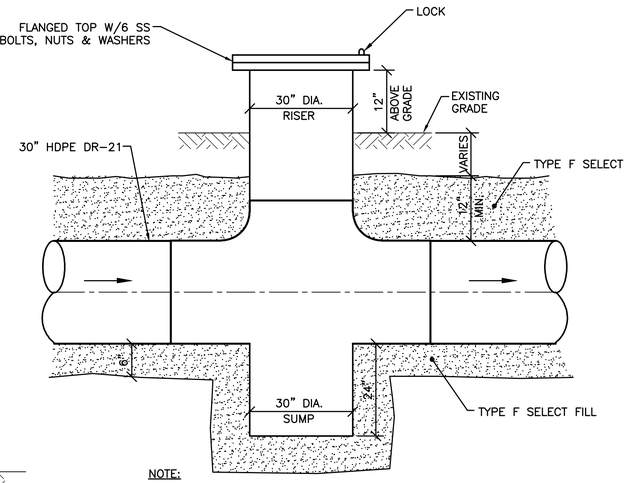


PLAN



CONCRETE ANCHOR COLLAR

NOT TO SCALE

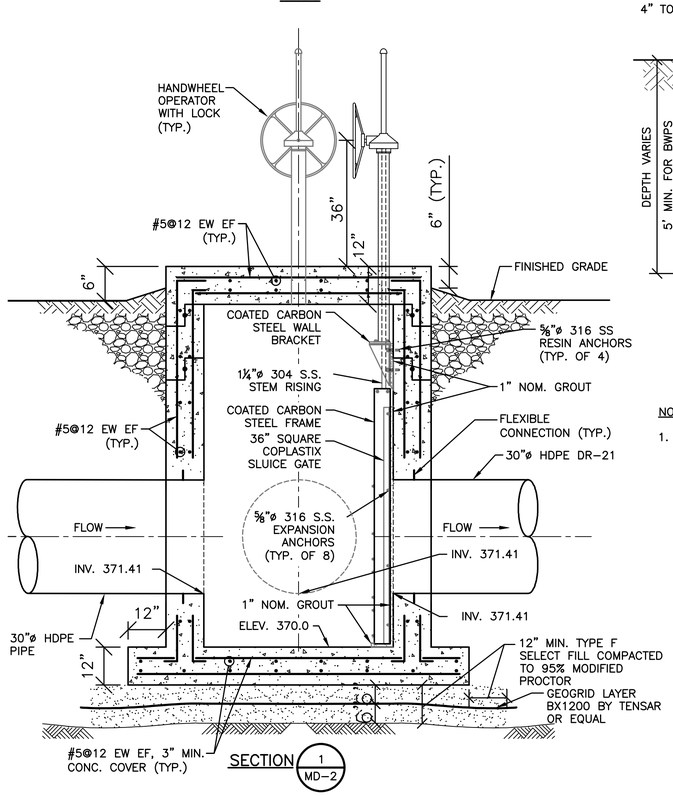


NOTE:

1. ALL COMPONENTS BUTT FUSED.

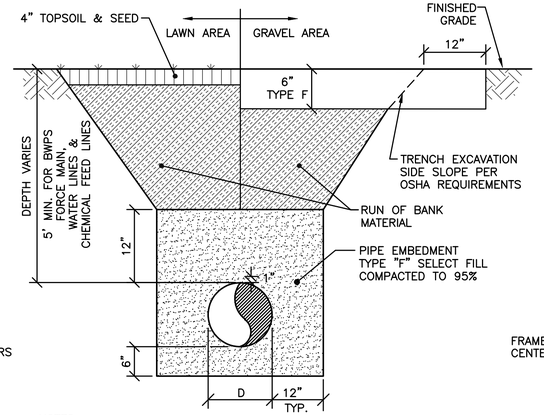
EFFLUENT PIPELINE MANHOLE DETAIL

NOT TO SCALE



SLUICE GATE STRUCTURE DETAIL

NOT TO SCALE

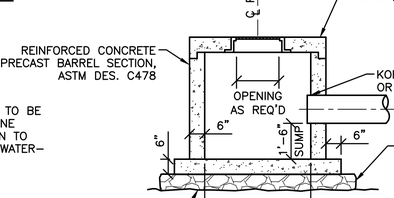


NOTES:

1. CONTRACTOR SHALL RESTORE UNIMPROVED SURFACES WITH TOPSOIL AND SEED.

TYPICAL UTILITY TRENCH DETAIL

NOT TO SCALE



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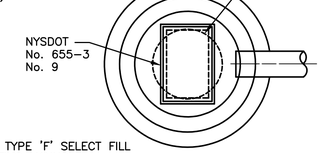
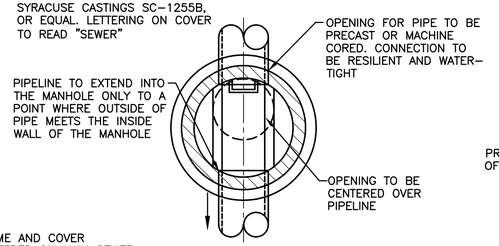


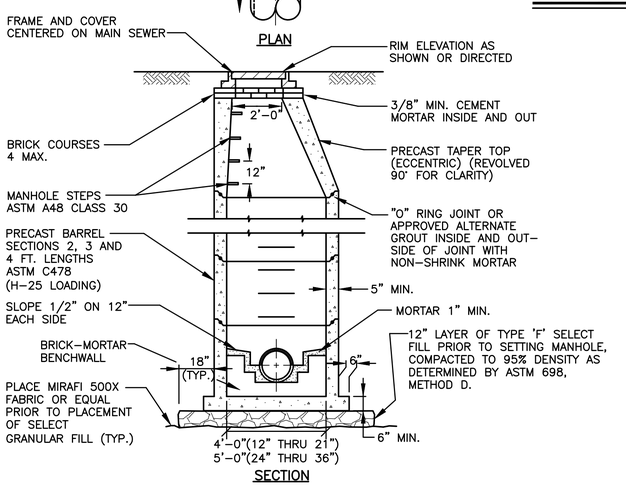
PLAN

TYPICAL CATCH BASIN DETAIL

NOT TO SCALE



PLAN



SECTION

STANDARD PRECAST CONCRETE MANHOLE

NOT TO SCALE

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC. DP #2 WATER TREATMENT PLANT TOWN OF CAMILLUS, NEW YORK

MISCELLANEOUS DETAILS

IN CHARGE OF M.E. REWKOWSKI

DESIGNED BY MER CHECKED BY RGD

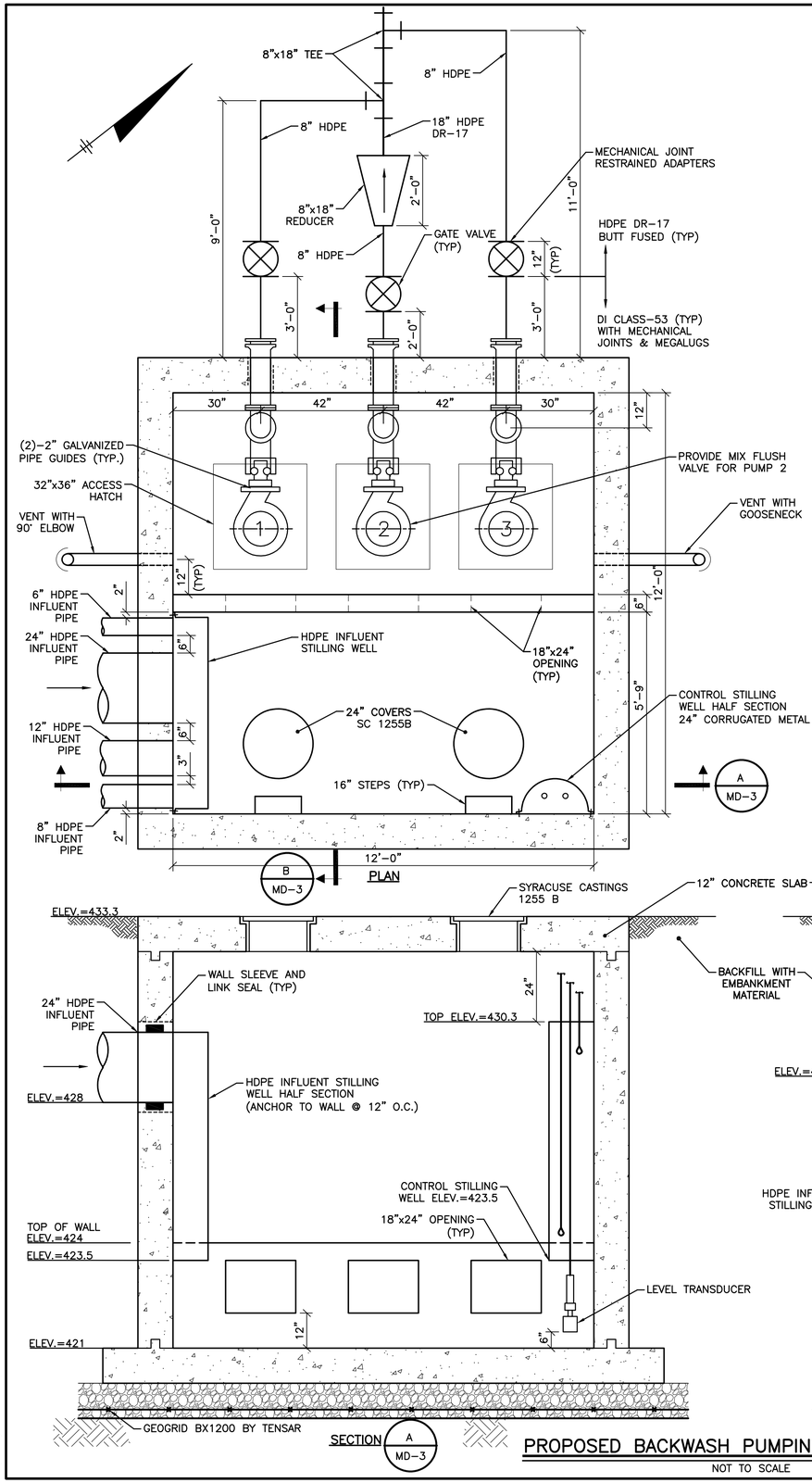
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-MD2

DATE MAY 2010

MD-2

May 12, 2010 - 11:02am



PROPOSED BACKWASH PUMPING STATION DETAIL

NOT TO SCALE

PUMP SCHEDULE

TYPE	SUBMERSIBLE BACKWASH PUMPS (3)
MFGR, MODEL	FLYGT, MODEL NP3153.181, TYPE LT
SIZE	8" DISCHARGE
IMPELLER DIA	217 MM
MOTOR HP RATING	20 HP
RATED CAPACITY/TDH	1600 GPM/30 FT
PUMP SPEED CONTROL	CONSTANT

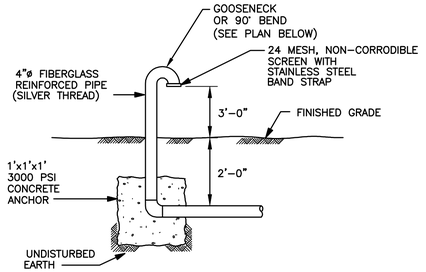
CONTROL ELEVATION SCHEDULE

	TRANSDUCER CONTROL	FLOAT CONTROL
REDUNDANT HIGH ALARM	–	428.5
HIGH LEVEL ALARM	428	–
START LAG PUMP	427	–
LEAD PUMP ON	426	–
STOP BOTH PUMPS*	423.5	–
REDUNDANT OFF AND L.L. ALARM	–	423.0

*ALTERNATE ALL THREE PUMPS

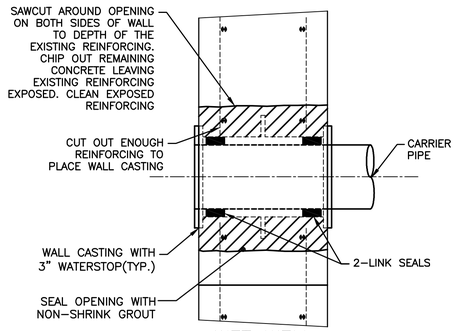
NOTES:

1. ALL PIPES AND CONDUITS ENTERING P.S. SHALL BE INSTALLED WITH CAST IRON WALL SLEEVES AND MODULAR LINK SEALS FOR WATERTIGHTNESS.
2. 4" FRP VENTS SHALL BE INSTALLED UNDERGROUND FROM PUMPING STATION TO LOCATION SHOWN ON SITE PLAN. VENT PIPE SHALL BE APPROXIMATELY 3' ABOVE FINISHED GRADE (SEE VENT DETAIL THIS SHEET).
3. ALL EXPOSED METAL ITEMS SUCH AS PIPING, SUPPORTS, VALVES AND ETC. NOT PROVIDED WITH A FACTORY COATING SHALL BE PAINTED IN THE FIELD IN ACCORDANCE WITH THE FIELD PAINTING TECHNICAL SPECIFICATION.
4. STAINLESS STEEL SHALL BE GRADE 316 MINIMUM.
5. CONTROL TRANSDUCER TO BE 6-INCHES ABOVE FINISHED FLOOR OF WET WELL.



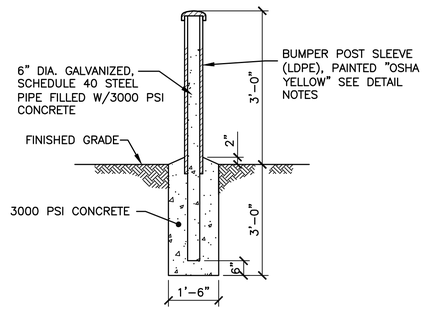
VENT DETAIL

NOT TO SCALE



WET WELL WALL PENETRATION DETAIL

NOT TO SCALE



TYPICAL 6" BOLLARD DETAIL

NOT TO SCALE

DETAIL NOTES:

1. BUMPER POST SLEEVES SHALL BE DOME TOP, MADE FROM LOW DENSITY POLYETHYLENE (LDPE), WITH ULTRA VIOLET AND ANTI-STATIC ADDITIVES. FINISH SHALL BE GLOSSY AND SMOOTH WITH NO RIDGES.
2. WALL THICKNESS OF BUMPER POST SLEEVES SHALL BE 0.25 INCHES MINIMUM.
3. BUMPER POST SLEEVE SHALL BE FASTENED TO POST WITH NEOPRENE TAPE SYSTEM.

NO.	DATE	REVISION	INIT.
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A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

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PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PUMPING STATION SECTION, PLAN AND DETAILS

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613-MD3
DATE MAY 2010

MD-3

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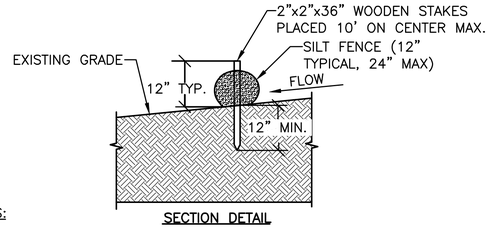


SECTION DETAIL

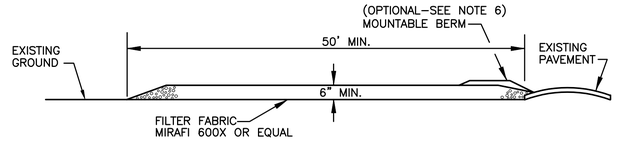
NOTES:

1. USE FILTREXX® SEDIMENT CONTROL SYSTEM BY FILTREXX® LAND IMPROVEMENT SYSTEMS OR APPROVED EQUAL. ONE SUCH APPROVED EQUAL IS MIRAFI ENVIROFENCE.
2. STAKES SHALL BE INSTALLED THROUGH THE MIDDLE OF THE SILT FENCE AT 10' INTERVALS MAXIMUM USING HARDWOOD STAKES.
3. SILT FENCE TO BE ALIGNED ALONG CONTOUR AS CLOSELY AS POSSIBLE.
4. BOTH ENDS OF EACH FENCE SECTION MUST EXTEND AT LEAST 10 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
5. SEDIMENT MUST BE REMOVED WHERE ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.
6. ANY SILT FENCE SECTION WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER
7. SILT FENCES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

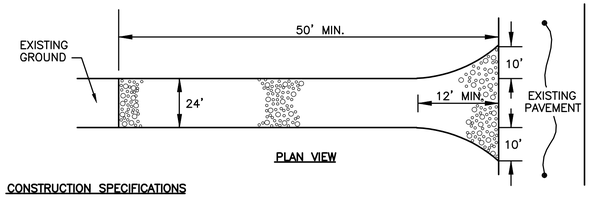
STANDARD SYMBOL —— SF ——SF

SILT FENCE

NOT TO SCALE



SECTION



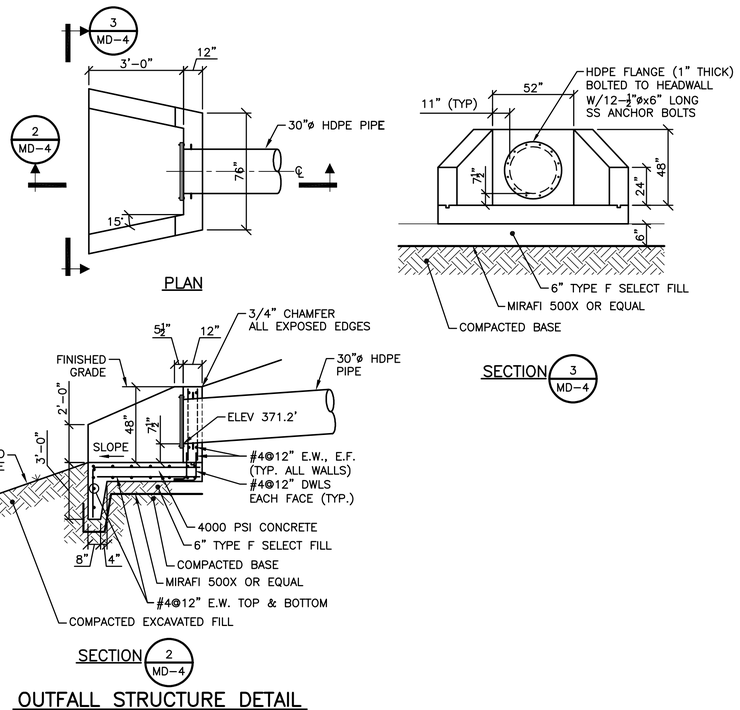
PLAN VIEW

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 50 FEET
3. THICKNESS – NOT LESS THAN SIX (6) INCHES
4. WIDTH TWENTY–FOUR (24) FEET MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE EGRESS OCCURS.
5. FILTER FABRIC (MIRAFI 600X OR EQUAL) – SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARDS CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS NOT POSSIBLE, A MOUNTABLE BERM 3' WIDE (MIN.) WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCES SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO ADJACENT SEDIMENT BASINS.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT STORM WATER POLLUTION PREVENTION PLAN.

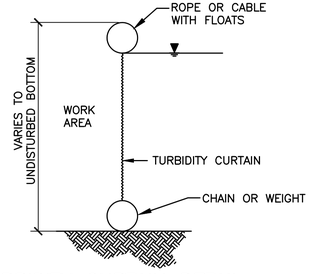
STABILIZED CONSTRUCTION ENTRANCE DETAIL

NOT TO SCALE



OUTFALL STRUCTURE DETAIL

NOT TO SCALE



TURBIDITY CURTAIN DETAIL

NOT TO SCALE

DETAIL NOTES:

1. IF A PRE–MANUFACTURED PRODUCT IS USED, THE TURBIDITY CURTAIN SHALL BE INSTALLED PER THE MANUFACTURER'S WRITTEN INSTRUCTIONS, OVERLAPPING AND SECURING SIDE AND ENDS AS REQUIRED.
2. THE HEIGHT OF THE CURTAIN SHALL BE 20% GREATER THAN THE DEPTH OF THE WATER TO ALLOW FOR WATER LEVEL FLUCTUATIONS.
3. IF WATER DEPTH AT THE DESIGN ALIGNMENT IS MINIMAL, THE TOE CAN BE ANCHORED IN PLACE BY STAKING.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

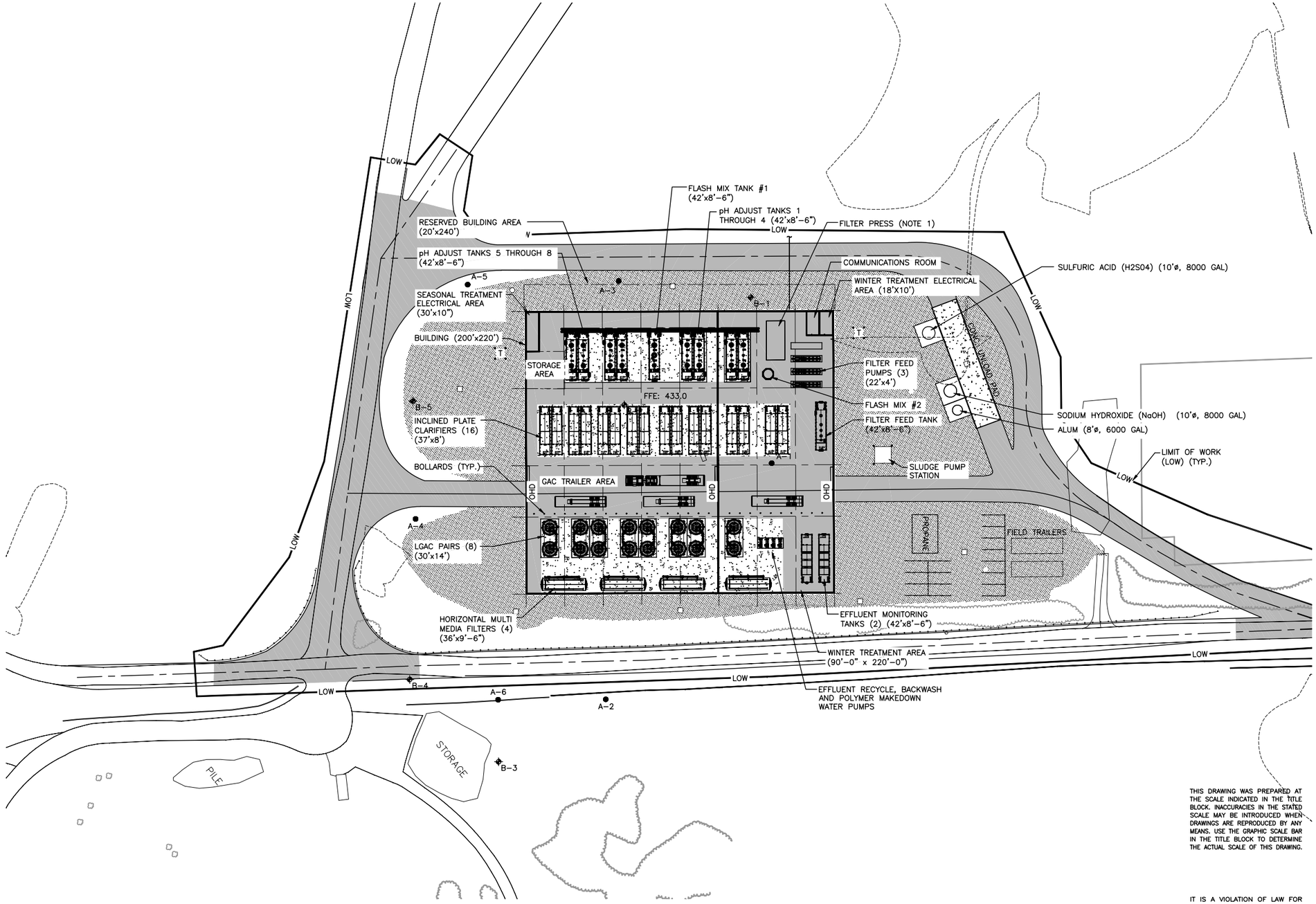
MISCELLANEOUS DETAILS

IN CHARGE OF M.E. REWKOWSKI
DESIGNED BY MER CHECKED BY RGD
DRAWN BY SLJ/DOK

FILE NO. 1163.45613–MD4
DATE MAY 2010

MD–4

May 11, 2010 - 6:51pm



SITE PLAN
SCALE: 1"=40'

1"=40' 40 0 40 80

NOTES:

1. SPACE RESERVED FOR FILTER PRESS IF REQUIRED.

NO.	DATE	REVISION	INIT.
F	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
E	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
D	3/24/10	REVISED BUILDING LAYOUT	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

GENERAL
SITE CIVIL
GENERAL ARRANGEMENT

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-GA1
DATE FEBRUARY 2010

GA-01

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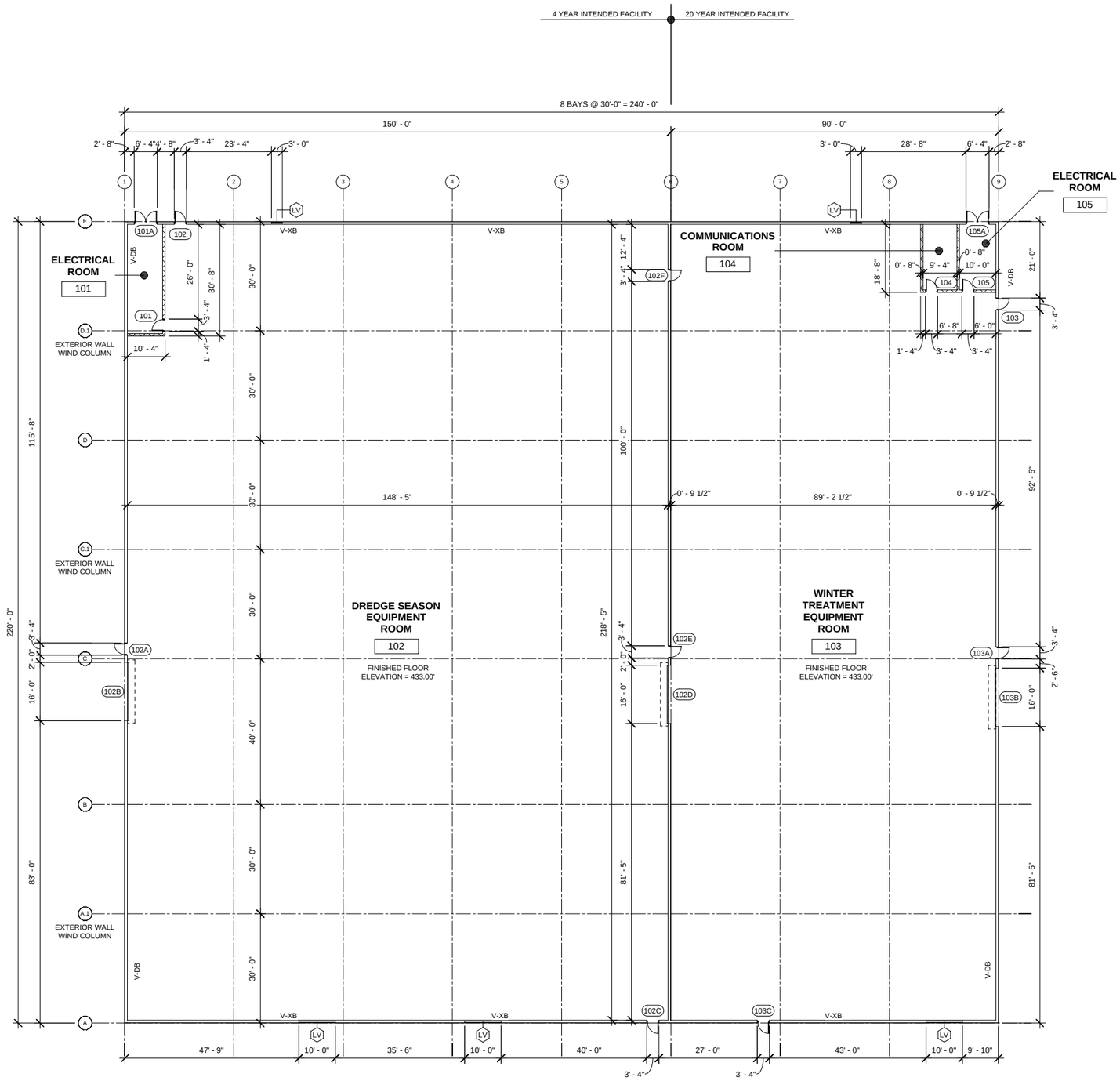

1 FLOOR PLAN
1/16" = 1'-0"

1/16"=1'-0" 16 8 0 16 32

PLAN NOTES:

1. V-XB = VERTICAL CROSS BRACING
2. V-DB = VERTICAL DIAGONAL BRACE

NO.	DATE	REVISION	INT.
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B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

HONEYWELL INTERNATIONAL INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

ARCHITECTURAL

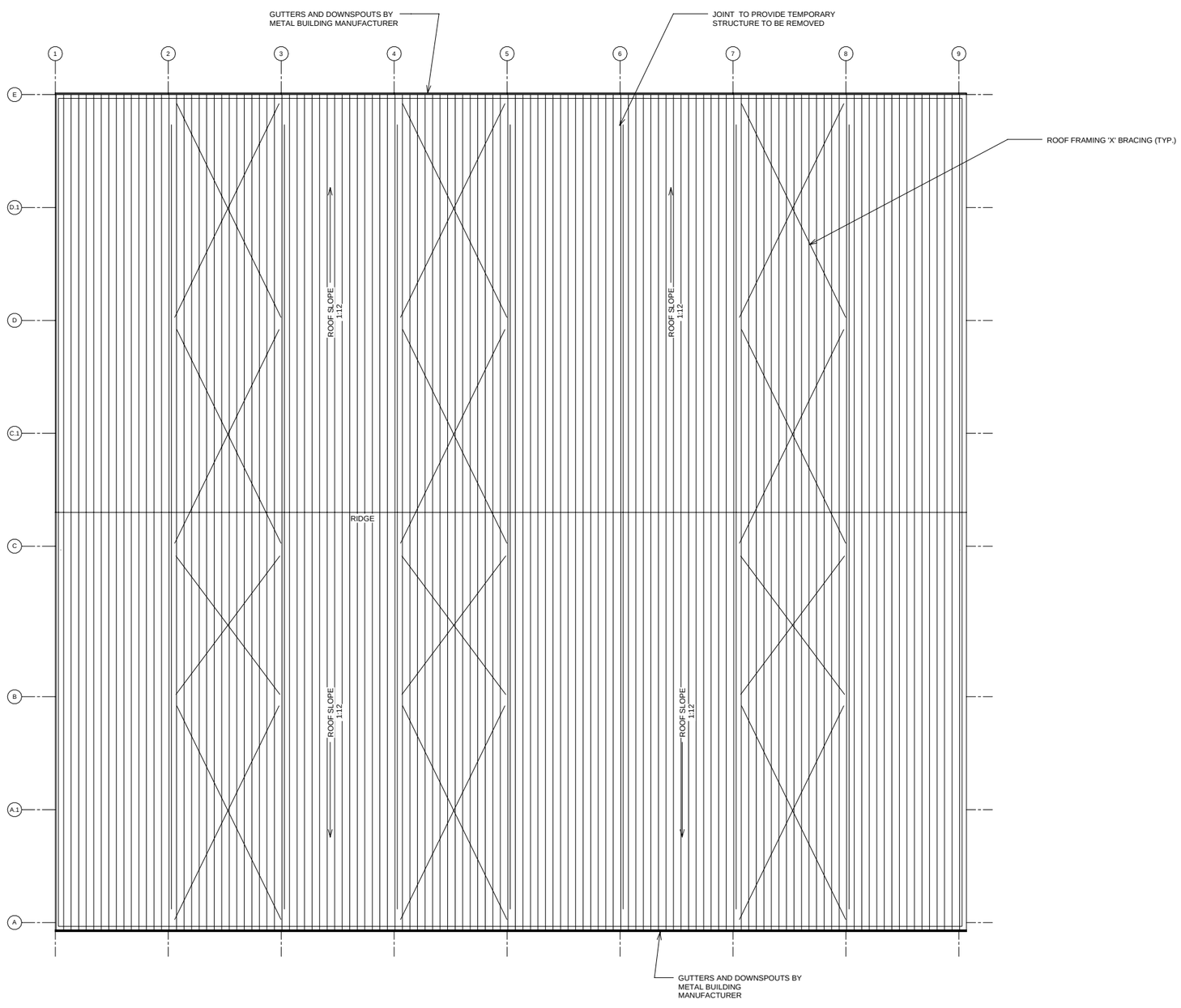
FLOOR PLAN

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: **05/12/2010**

IN CHARGE OF NJD
DESIGNED BY NJD CHECKED BY NJD
DRAWN BY KRM

FILE NO. **1163. 45613. A-1**
DATE **MAY 2010**

A-1



1 ROOF PLAN
1/16" = 1'-0"

1/16"=1'-0" 16 8 0 16 32

PRELIMINARY
NOT FOR
CONSTRUCTION

DATE: **5/12/10**

NO.	DATE	REVISION	INT.
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B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE

HONEYWELL INTERNATIONAL INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

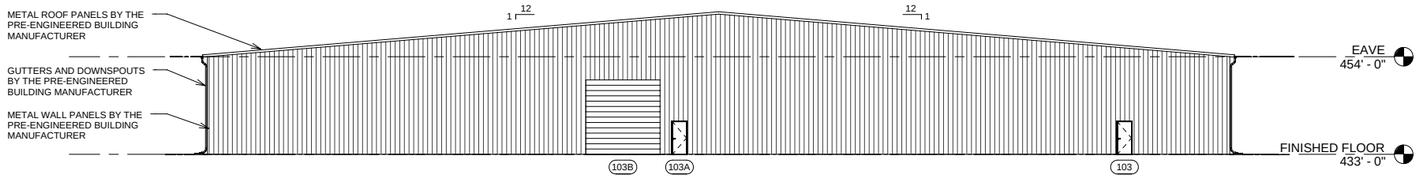
ARCHITECTURAL

ROOF PLAN

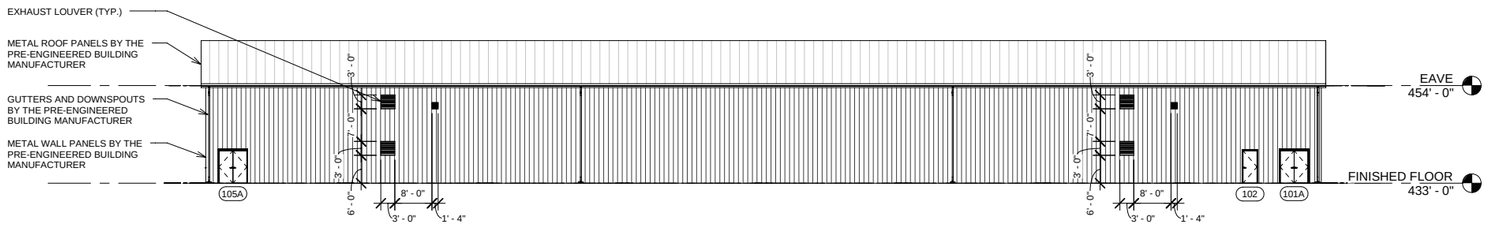
IN CHARGE OF NJD
DESIGNED BY NJD CHECKED BY NJD
DRAWN BY KRM

FILE NO. **1163. 45613. A-2**
DATE **MAY 2010**

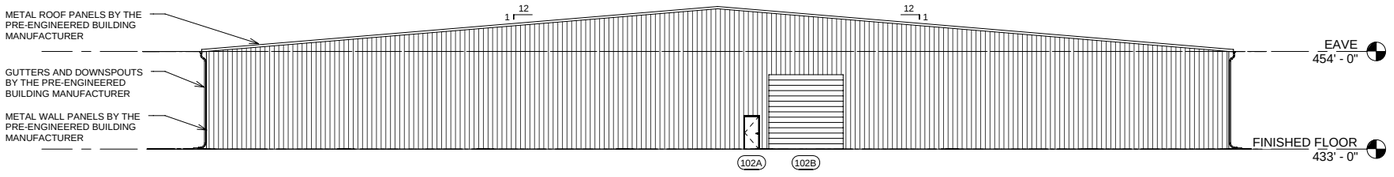
A-2



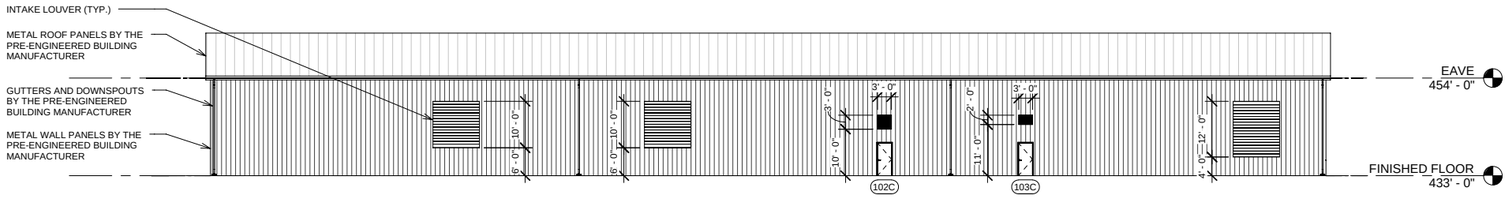
1 EAST ELEVATION
1/16" = 1'-0"



2 NORTH ELEVATION
1/16" = 1'-0"



4 WEST ELEVATION
1/16" = 1'-0"



3 SOUTH ELEVATION
1/16" = 1'-0"

1/16"=1'-0" 16 8 0 16 32

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

PRELIMINARY
NOT FOR
CONSTRUCTION

DATE: **5/12/10**

NO.	DATE	REVISION	INT.
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE

HONEYWELL INTERNATIONAL INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

ARCHITECTURAL

ELEVATIONS

IN CHARGE OF NJD
DESIGNED BY NJD CHECKED BY NJD
DRAWN BY KRM

FILE NO. **1163. 45613. A-3**
DATE **MAY 2010**

A-3

May 11, 2010 - 7:02pm

Note: All Equipment Shown Shaded In Yellow Will Be Installed Inside of the Heated Area of the Building and Will Be Used For Both Dredge Season and Winter Operations.

P&ID I-01 (Typ. of Tanks 1, 3, 5, 7)

Acid or Caustic

pH Adj. Tk 1

pH Adj. Tk 2

Tanks Shown With a Mixer Symbol Will Be Agitated. Actual Quantity of Mixers Per Tank TBD.

P&ID I-02 (Typ. of Tanks 2, 4, 6, 8)

Acid or Caustic

pH Adj. Tk 3

pH Adj. Tk 4

Winter Operations (and Long-Term Facility) Will Rough pH Adjust in Tank 1 and Fine pH Adjust in Tank 2.

By Others

From SCA

#11

Acid or Caustic

pH Adj. Tk 5

pH Adj. Tk 6

Acid or Caustic

pH Adj. Tk 7

pH Adj. Tk 8

P&ID I-03

Alum

Flash Mix Tank

Winter Operations (and Long-Term Facility) Will Use A Separate, Smaller Flash Mix Tank

Integral Floc. Chamber and Mixer

P&ID I-06 (Typ. of Inclined Plate Clarifiers 1 to 16)

Clarifier 1

Clarifier 2

Clarifier 3

Clarifier 4

Clarifier 5

Clarifier 6

Clarifier 7

Clarifier 8

Clarifier 9

Clarifier 10

Clarifier 11

Clarifier 12

Clarifier 13

Clarifier 14

Clarifier 15

Clarifier 16

#19

P&ID I-07

Filter Feed Tank

#20

Optional On-Line Spare Pump

P&ID I-08 (Typ. of MMFs 1, 2, 3, 4)

#21

MMF 1

MMF 2

MMF 3

MMF 4

3 On-Line, 1 Spare MMFs

P&ID I-09 (Typ. of LGACs 1A/B, 2A/B, 3A/B, 4A/B, 5A/B, 6A/B, 7A/B, 8A/B)

1A 1B

2A 2B

3A 3B

4A 4B

5A 5B

6A 6B

7A 7B

8A 8B

Lead/Lag LGACs

#23

P&ID I-10

Acid or Caustic, As Required

Effluent Monitor Tank 1

Effluent Monitor Tank 2

#7

MMF Backwash

GAC Backwash

SCA Polymer M/U

OOS to SCA or to Head of WTP

Gravity Effluent

Polymer and OOS Lines By Others

#26

By Others

Off-Line Effluent Holding Basin

Note: Gravity Effluent Routed to Existing Leachate Overflow Pumping Station. Line and Tie-In in WTP Scope

#18 #24 #25

By Others

Clarifier Sludge

MMF and GAC Backwash

LGAC Tanker Drains

Backwash/Sludge Pumping Station

Solids to SCA

P&ID I-11

Legend:
Floc. - Flocculation
LGAC – Liquid Granular Activated Carbon
MMF – Multimedia Filter
M/U – Makeup
OOS – Out of Spec

Corresponding Node Number on the (Dredge Season) Mass Balance

Note: All Equipment Shown Shaded In Yellow Will Be Installed Inside of the Heated Area of the Building and Will Be Used For Both Dredge Season and Winter Operations.

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/25/10	DP #1 FOR GAC BIDDING	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #1
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

PROCESS FLOW DIAGRAM

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.44523-PFD1
DATE FEBRUARY 2010

PFD-1

I:\Honeywell.1163\45613.Scg-Wtp-Details\Docs\DWG\DP-2\Sheets\45613-PFD1.dwg

I:\1163\44523\4\Detailed Design Shared PFD Mar 22 10.vsd

May 11, 2010 - 7:03pm

Honeywell SCA WTP
Mass Balance Maximum Flow - Based on Phase II Pre-Design Investigation Report - Pre Holding at Peak Flows
Review Rev. 10
3/26/2010

Draft

PARAMETER	Primary Screen Underflow		Combined Recirculation to Geotubes		Recirculation Solids Contribution to Geotubes		Non-Recirc. Liquid Stream to EQ Basin leaving Geotubes		Recirculation Liquid to EQ Basin leaving Geotubes		Total Liquid to EQ Basin		Parson Polymer Makeup		Rain Water to EQ Basin		Internal Reuse from EQ		Accumulation in EQ Basin		pH Adj Tank Influent		H2SO4 Add to pH Adj Tk		NaOH Add to pH Adj Tk		Alum Addtn to Floc	
Line Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr
GENERAL																												
Flow Rate	---	2,574,058	---	583,526	---	692	---	2,306,841	---	582,834	---	2,889,675	---	87,049	---	70,539	---	51,029	---	76,043	---	2,833,143	---	991.6	---	0.000	---	56.7
Flow Rate (GPM)	---	5,145	---	1,166	---	1.4	---	4,611	---	1,165	---	5,776.1	---	174.0	---	141.0	---	102	---	152	---	5,663	---	1.08	---	0.000	---	0.092
Flow Rate (MGD)	---	7.41	---	1.68	---	0.002	---	6.64	---	1.678	---	8.3	---	0.251	---	0.203	---	0.15	---	0.22	---	8.15	---	0.002	---	0.000	---	0.000
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.84	---	1.55	---	1.25
Design pH (S.U.)	11.5 - 12.0	---	9.0 - 10.0	---	6.5 - 7.5	---	11.5 - 12.0	---	9.0 - 10.0	---	10.0 - 11.5	---	9.0 - 10.0	---	6.5 - 7.5	---	9.0 - 10.0	---	9.0 - 10.0	---	9.0 - 10.0	---	< 1	---	> 13	---	---	---
CATIONS / ANIONS (mg/L)																												
Aluminum	---	---	8.49	4.96	3,605.8	2.50	4.900	11.312	4.222	2.462	4.763	13.77	4.217	0.367	0.0	0.0	4.650	0.24	4.650	0.35	4.774	13.54	0.0	0.0	0.0	0.0	19,930	0.9
Cadmium	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Chlorides	---	---	1,193	696.9	0.0	0.000	1,190	2,747	1,195	697	1,191	3,444	1,193	104	0.0	0.0	1,163	59.4	1,163	88.5	1,194	3,385	0.0	0.0	0.0	0.0	0.0	0.0
Chromium	---	---	0.1	0.040	53.9	0.037	0.020	0.046	0.004	0.003	0.017	0.049	0.004	0.000	0.0	0.0	0.016	0.001	0.016	0.001	0.017	0.05	0.0	0.0	0.0	0.0	0.0	0.0
Hex Chromium	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Copper	---	---	0.892	0.521	663.6	0.459	0.240	0.554	0.105	0.061	0.213	0.616	0.037	0.003	0.0	0.0	0.208	0.011	0.208	0.016	0.213	0.60	0.0	0.0	0.0	0.0	0.0	0.0
Lead	---	---	0.203	0.119	143.3	0.099	0.070	0.162	0.033	0.019	0.063	0.181	0.026	0.002	0.0	0.0	0.061	0.003	0.061	0.005	0.063	0.18	0.0	0.0	0.0	0.0	0.0	0.0
Mercury	---	---	0.005	0.024	35.1	0.024	0.011	0.025	0.000	0.000	0.009	0.026	0.000	0.000	0.0	0.0	0.009	0.000	0.009	0.001	0.009	0.03	0.0	0.0	0.0	0.0	0.0	0.0
Nickel	---	---	2.399	1.401	1941.4	1.344	0.670	1.547	0.098	0.057	0.555	1.604	0.078	0.007	0.0	0.0	0.541	0.028	0.541	0.041	0.556	1.58	0.0	0.0	0.0	0.0	0.0	0.0
Silver	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	---	---	551.1	321.9	0.0	0.00	150.0	346.3	551.8	321.9	231.0	668.2	551.1	48.01	0.0	0.0	225.5	11.52	225.5	17.16	231.6	656.6	1,674,971	903.4	0.0	0.0	70,864	3.3
Zinc	---	---	0.362	0.212	294.6	0.204	0.098	0.226	0.013	0.008	0.081	0.234	0.008	0.001	0.0	0.0	0.079	0.004	0.079	0.01	0.081	0.23	0.0	0.0	0.0	0.0	0.0	0.0
Total Tracked Cations / Anions	---	---	1,760.7	1028.2	7,699.3	5.3	1,348.7	3,113.7	1,753.6	1022.9	1,430.4	4,136.6	1,751.3	152.6	0.0	0.0	1,396.3	71.3	1,396.3	106.3	1,433.8	4,065.3	1,674,971	903.4	0.0	0.0	90,794	4.2
VOC (ug/L)																												
TIO	---	---	15.5	9.1	0.0	0.0	28.0	64.6	15.5	9.1	25.5	73.7	0.026	0.002	0.0	0.0	24.9	1.27	24.88	1.89	25.5	72.4	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL ORGANICS	---	---	15.5	9.1	0.0	0.0	28.0	64.6	15.5	9.1	25.5	73.7	0.026	0.002	0.0	0.0	24.9	1.27	24.88	1.89	25.5	72.4	0.0	0.0	0.0	0.0	0.0	0.0
OTHER																												
TBOD5 (mg/L)	---	---	334.1	195.1	142,197	98.4	170.0	392.5	165.7	96.7	169.1	489.1	131.8	11.5	0.0	0.0	165.1	8.43	165.11	12.57	169.5	480.7	0.0	0.0	0.0	0.0	0.0	0.0
TSS (mg/L)	---	---	990	578.3	666,147	461.2	200.0	461.7	200.0	116.7	200	578.4	2.0	0.2	0.0	0.0	195.2	9.97	195.23	14.86	200.5	568.4	0.0	0.0	0.0	0.0	0.0	0.0
TP (mg/L)	---	---	1.0	0.6	0.0	0.0	0.7	1.7	1.0	0.6	0.8	2.2	0.8	0.1	0.0	0.0	0.8	0.04	0.76	0.06	0.8	2.2	0.0	0.0	0.0	0.0	0.0	0.0
TKN (mg/L)	---	---	61.5	35.9	0.0	0.0	47.0	108.5	61.5	35.9	49.93	144.4	48.9	4.3	0.0	0.0	48.7	2.49	48.74	3.71	50.0	141.9	0.0	0.0	0.0	0.0	0.0	0.0

PARAMETER	Polymer Addn to Floc		Polymer Makeup Wate		I.P. Clarifier Influent		I.P. Clarifier Sludge		I.P. Clarifier Effluent		Filter Feed Tank Disch		MMF Effluent		GAC Units		GAC Effluent		Spent MMF B/Wash		Spent GAC B/Wash		Eff. Tanks Discharge		PERMIT LIMIT
Line Number	15		16		17		18		19		20		21		22		23		24		25		26		
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	
GENERAL																									
Flow Rate	---	1.42	---	1,152	---	2,835,345	---	354,418	---	2,480,927	---	2,480,927	---	2,480,927	---	---	---	2,480,927	---	83,172	---	58,887	---	2,250,667	NA
Flow Rate (GPM)	---	0.003	---	2.303	---	5,668	---	708.4	---	4,959	---	4,959	---	4,959	---	---	---	4,959	---	166.3	---	117.7	---	4,499	
Flow Rate (MGD)	---	0.000	---	0.003	---	8.16	---	1.020	---	7.14	---	7.14	---	7.14	---	---	---	7.14	---	0.239	---	0.170	---	6.5	
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	< 150
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	---	---	1.00	---	1.00	---	1.00	---	1.00	
Design pH (S.U.)	6.5 - 7.5	---	9.0 - 10.0	---	8.5-10.5	---	8.5-10.5	---	8.5	---	8.5	---	8.5	---	---	---	9.0 - 10.0	---	8.5	---	9.0 - 10.0	---	9.0 - 10.0	---	5.5-10.5
CATIONS / ANIONS (mg/L)																									
Aluminum	0.0	0.0	4.217	0.005	5.096	14.461	11.254	3.992	4.217	10.469	4.217	10.469	4.217	10.469			4.217	10.469	4.217	0.351	4.2	0.248	4.2	9.5	---
Cadmium	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	2.0
Chlorides	0.0	0.0	1,193.3	1.376	1,193.3	3,386.2	1,193.34	423.3	1,193.34	2,962.90	1,193.34	2,962.90	1,193.34	2,962.9	---	0.000	1,193.3	2962.9	1,193.3	99.33	1,193	70.3	1,193	2,688	---
Chromium	0.0	0.0	0.004	0.000	0.017	0.048	0.10	0.035	0.005	0.013	0.005	0.013	0.005	0.013	---	0.000	0.004	0.009	0.004	0.000	0.068	0.004	0.004	0.008	0.3
Hex Chromium	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	4.0
Copper	0.0	0.0	0.037	0.000	0.213	0.605	0.661	0.234	0.149	0.371	0.149	0.371	0.149	0.371	---	0.000	0.037	0.093	0.037	0.003	4.8	0.280	0.037	0.084	0.7
Lead	0.0	0.0	0.026	0.000	0.063	0.178	0.238	0.085	0.038	0.093	0.038	0.093	0.038	0.093	---	0.000	0.026	0.065	0.026	0.002	0.502	0.030	0.026	0.059	0.2
Mercury	0.0	0.0	0.000	0.000	0.009	0.025	0.069	0.024	2.651E-04	6.582E-04	2.65E-04	6.58E-04	2.65E-04	6.58E-04	---	0.00039	1.06E-04	2.63E-04	1.06E-04	8.83E-06	1.06E-04	6.25E-06	0.00011	0.00024	0.0002
Nickel	0.0	0.0	0.078	0.000	0.556	1.576	3.667	1.301	0.111	0.276	0.111	0.276	0.111	0.276	---	0.000	0.078	0.193	0.078	0.006	1.48	0.087	0.08	0.18	0.35
Silver	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	1.0
Sulfate	0.0	0.0	551.1	0.636	551.1	1563.9	551.1	195.5	551.1	1368.4	551.1	1368.4	551.1	1368.4	---	0.000	551.1	1368.4	551.1	45.9	551	32.5	551	1241	---
Zinc	0.0	0.0	0.008	0.000	0.081	0.230	0.535	0.190	0.016	0.040	0.016	0.040	0.016	0.040	---	0.000	0.008	0.020	0.008	0.001	0.349	0.021	0.008	0.018	0.4
Total Tracked Cations / Anions	0.0	0.0	1,751.3	2.0	1,753.2	4,974.9	1,763.7	625.6	1,751.7	4,349.3	1,751.7	4,349.3	1,751.7	4,349.3	---	0.000	1,751.3	4,348.2	1,751.3	145.8	1,770	104	1,751	3,945	---
VOC (ug/L)																									
TIO	0.0	0.0	0.026	0.002	25.5	72.4	25.5	9.1	25.5	63.38	25.5	63.4	25.5	63.4	---	63.3	0.026	0.063	0.026	0.002	0.026	0.002	0.026	0.057	0.1
TOTAL ORGANICS	0.0	0.0	0.026	0.002	25.5	72.4	25.5	9.1	25.5	63.38	25.5	63.4	25.5	63.4	---	63.3	0.026	0.063	0.026	0.002	0.026	0.002	0.026	0.057	---
OTHER																									
TBOD5 (mg/L)	0.0	0.0	131.8	11.5	173	492.2	416	147.7	138.8	344.5	138.8	344.5	138.8	344.5	---	0.0	131.8	327.3	131.8	11.0	424.1	25.0	132	297	NA
TSS (mg/L)	0.0	0.0	2.0	0.2	205	582.8	1571	557.3	10.3	25.5	10.3	25.5	5.0	12.4	---	0.0	2.0	5.0	159.2	13.2	128.4	7.6	2.0	4.5	NA
TP (mg/L)	0.0	0.0	0.8	0.07	0.8	2.3	0.8	0.3	0.8	2.0	0.8	2.0	0.8	2.0	---	0.0	0.8	1.9	0.76	0.06	2.4	0.1	0.76	1.7	NA
TKN (mg/L)	0.0	0.0	48.9	4.3	51.5	146.2	51.5	18.3	51.5	127.9	51.5	127.9	51.5	127.9	---	0.0	48.9	121.5	48.9	4.1	157.4	9.3	49	110	NA

Notes:
1. Cadmium, hexavalent chromium and silver were non-detect.
2. Molybdenum data and estimates are provided for informational purposes. A draft permit limit has not been established. Pre-Design Investigation (PDI) 6 will provide additional information regarding molybdenum.
3. The Geotube effluent TSS maximum anticipated value is 200 mg/l.
4. Sludge underflow from the I.P. Clarifier is 12.5% by influent volume.
5. Backwash design frequencies are: 1 time per day for each MMF unit, and 1 time per two-day period for each GAC unit.
6. Nickel removal is anticipated to occur at a pH of 10.5 S.U.
7. Parson's Mass Balance and O'Brien & Gere's Mass Balance correspond as follows: Parson's Node # 4 is equivalent to O'Brien & Gere's Node #16. Parsons Node #9 is equivalent to the sum of O'Brien & Gere Nodes # 18, 24 & 25. Parson's Node # 10 is equivalent to O'Brien & Gere's Node #9. Refer to Parsons' Mass Balance, Rev. A, 1/20/10.
8. O'Brien & Gere's in scope work for the SCA Water Treatment System begins at Node #11, the pH Adjust Tank Influent. Nodes #1 through #10 are presented for calculation purposes only, and are being addressed by Parsons.
9. Polymer is not planned to be used at the WTP. If required, usage would be as shown in Node #15.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
C	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

MASS BALANCE – DREDGE SEASON

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-PFD2
DATE FEBRUARY 2010

PFD-2

I:\Honeywell.1163\45613.Sca-Wtp-Detcile\Docs\DWG\DP-2\Sheets\45613-PFD2.dwg

May 11, 2010 - 7:04pm

Honeywell SCA WTP
Winter Conditions
Mass Balance Maximum Flow - Based on Phase II Pre-Design Investigation Report - Pre Holding at Peak Flows
Review Rev. 10
5/26/2010

Draft

PARAMETER	Primary Screen Underflow		Combined Recirculation to Geotubes		Recirculation Solids Contribution to Geotubes		Non-Recirc. Liquid Stream to EQ Basin leaving Geotubes		Recirculation Liquid to EQ Basin leaving Geotubes		Total Liquid to EQ Basin		Parson Polymer Makeup		Rain Water to EQ Basin		Internal Reuse from EQ		Accumulation in EQ Basin		pH Adj Tank Influent		H2SO4 Add to pH Adj Tk		*NaOH Add to pH Adj Tk*		Alum Add'n to Floc	
Line Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr
GENERAL																												
Flow Rate	---	130,604	---	49,041	---	40	---	130,573	---	49,001	---	179,574	---	0	---	70,539	---	0	---	0	---	250,113	---	87.5	---	0.000	---	5.0
Flow Rate (GPM)	---	261	---	98	---	0.1	---	261	---	98	---	358.9	---	0.0	---	141.0	---	0	---	0	---	500	---	0.10	---	0.000	---	0.008
Flow Rate (MGD)	---	0.38	---	0.14	---	0.000	---	0.38	---	0.141	---	0.5	---	0.000	---	0.203	---	0.00	---	0.00	---	0.72	---	0.000	---	0.000	---	0.000
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.84	---	1.53	---	1.23
Design pH (S.U.)	11.5 - 12.0	---	9.0 - 10.0	---	6.5 - 7.5	---	11.5 - 12.0	---	9.0 - 10.0	---	10.0 - 11.5	---	9.0 - 10.0	---	6.5 - 7.5	---	9.0 - 10.0	---	9.0 - 10.0	---	9.0 - 10.0	---	< 1	---	> 13	---	---	---
CATIONS / ANIONS (mg/L)																												
Aluminum	---	---	6.33	0.31	4,402.7	0.18	4.900	0.640	2.701	0.132	4.300	0.77	2.699	0.000	0.0	0.0	3.087	0.00	3.087	0.00	3.087	0.77	0.0	0.0	0.0	0.0	19,930	0.1
Cadmium	---	---	0.003	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Chlorides	---	---	772	37.9	0.0	0.000	1,190	156	773	38	1,076	193	772	0	0.0	0.0	773	0.0	773	0.0	773	193	0.0	0.0	0.0	0.0	0.0	0.0
Chromium	---	---	0.0	0.002	53.1	0.002	0.020	0.003	0.003	0.000	0.015	0.003	0.002	0.000	0.0	0.0	0.011	0.000	0.011	0.000	0.011	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Hex Chromium	---	---	0.005	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Copper	---	---	0.610	0.030	654.1	0.026	0.240	0.031	0.071	0.003	0.194	0.035	0.024	0.000	0.0	0.0	0.139	0.000	0.139	0.000	0.139	0.03	0.0	0.0	0.0	0.0	0.0	0.0
Lead	---	---	0.138	0.007	140.8	0.006	0.070	0.009	0.022	0.001	0.057	0.010	0.017	0.000	0.0	0.0	0.041	0.000	0.041	0.000	0.041	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Mercury	---	---	0.005	0.001	34.6	0.001	0.011	0.001	0.000	0.000	0.008	0.001	0.000	0.000	0.0	0.0	0.006	0.000	0.006	0.000	0.006	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Nickel	---	---	1.640	0.081	1911.8	0.077	0.670	0.088	0.065	0.003	0.505	0.091	0.051	0.000	0.0	0.0	0.362	0.000	0.362	0.000	0.362	0.09	0.0	0.0	0.0	0.0	0.0	0.0
Silver	---	---	0.003	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	---	---	494.9	24.3	0.0	0.00	150.0	19.6	495.3	24.3	244.2	43.9	494.9	0.00	0.0	0.0	175.4	0.00	175.4	0.00	175.4	43.9	1,674,971	79.8	0.0	0.0	70,864	0.3
Zinc	---	---	0.248	0.012	290.3	0.012	0.098	0.013	0.009	0.000	0.074	0.013	0.005	0.000	0.0	0.0	0.053	0.000	0.053	0.00	0.053	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Total Tracked Cations / Anions	---	---	1,278.8	62.8	8,428.5	0.3	1,348.7	176.2	1,272.9	62.4	1,328.0	238.7	1,271.7	0.0	0.0	0.0	953.5	0.0	953.5	0.0	953.5	238.7	1,674,971	79.8	0.0	0.0	90,794	0.4
VOC (ug/L)																												
TIO	---	---	10.7	0.5	0.0	0.0	28.0	3.7	10.7	0.5	23.3	4.2	0.017	0.000	0.0	0.0	16.7	0.00	16.71	0.00	16.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL ORGANICS	---	---	10.7	0.5	0.0	0.0	28.0	3.7	10.7	0.5	23.3	4.2	0.017	0.000	0.0	0.0	16.7	0.00	16.71	0.00	16.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0
OTHER																												
TBOD5 (mg/L)	---	---	217.0	10.7	135,406	5.5	170.0	22.2	105.5	5.2	152.4	27.4	83.1	0.0	0.0	0.0	109.4	0.00	109.42	0.00	109.4	27.4	0.0	0.0	0.0	0.0	0.0	0.0
TSS (mg/L)	---	---	750	36.8	666,147	26.9	200.0	26.1	200.0	9.8	200	35.9	2.0	0.0	0.0	0.0	143.6	0.00	143.59	0.00	143.6	35.9	0.0	0.0	0.0	0.0	0.0	0.0
TP (mg/L)	---	---	0.6	0.0	0.0	0.0	0.7	0.1	0.6	0.0	0.7	0.1	0.5	0.0	0.0	0.0	0.5	0.00	0.50	0.00	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0
TKN (mg/L)	---	---	38.7	1.9	0.0	0.0	47.0	6.1	38.7	1.9	44.74	8.0	30.5	0.0	0.0	0.0	32.1	0.00	32.12	0.00	32.1	8.0	0.0	0.0	0.0	0.0	0.0	0.0

PARAMETER	Polymer Add'n to Floc		Polymer Makeup Water		I.P. Clarifier Influent		I.P. Clarifier Sludge		I.P. Clarifier Effluent		Filter Feed Tank Disch		MMF Effluent		GAC Units		GAC Effluent		Spent MMF B/Wash		Spent GAC B/Wash		Eff. Tanks Discharge		PERMIT LIMIT
Line Number	15		16		17		18		19		20		21		22		23		24		25		26		
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	
GENERAL																									
Flow Rate	---	0.13	---	65	---	250,271	---	31,284	---	218,987	---	218,987	---	218,987	---	---	---	218,987	---	10,396	---	7,361	---	201,165	NA
Flow Rate (GPM)	---	0.000	---	0.130	---	500	---	62.5	---	438	---	438	---	438	---	---	---	438	---	20.8	---	14.7	---	402	
Flow Rate (MGD)	---	0.000	---	0.000	---	0.72	---	0.090	---	0.63	---	0.63	---	0.63	---	---	---	0.63	---	0.030	---	0.021	---	0.6	
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	< 150
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	---	---	1.00	---	1.00	---	1.00	---	1.00	
Design pH (S.U.)	6.5 - 7.5	---	9.0 - 10.0	---	8.5-10.5	---	8.5-10.5	---	8.5	---	8.5	---	8.5	---	---	---	9.0 - 10.0	---	8.5	---	9.0 - 10.0	---	9.0 - 10.0	---	5.5-10.5
CATIONS / ANIONS (mg/L)																									
Aluminum	0.0	0.0	2.699	0.000	3.410	0.854	8.388	0.263	2.699	0.591	2.699	0.591	2.699	0.591			2.699	0.591	2.699	0.028	2.7	0.020	2.7	0.5	---
Cadmium	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	2.0
Chlorides	0.0	0.0	772.4	0.050	772.4	193.5	772.41	24.2	772.41	169.28	772.41	169.28	772.41	169.3	---	0.000	772.4	169.3	772.4	8.04	772	5.7	772	156	---
Chromium	0.0	0.0	0.002	0.000	0.011	0.003	0.06	0.002	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.002	0.001	0.002	0.000	0.032	0.000	0.002	0.000	0.3
Hex Chromium	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	4.0
Copper	0.0	0.0	0.024	0.000	0.139	0.035	0.431	0.014	0.097	0.021	0.097	0.021	0.097	0.021	---	0.000	0.024	0.005	0.024	0.000	2.2	0.016	0.024	0.005	0.7
Lead	0.0	0.0	0.017	0.000	0.041	0.010	0.155	0.005	0.024	0.005	0.024	0.005	0.024	0.005	---	0.000	0.017	0.004	0.017	0.000	0.236	0.002	0.017	0.003	0.2
Mercury	0.0	0.0	0.000	0.000	0.006	0.001	0.045	0.001	1.730E-04	3.791E-05	1.73E-04	3.79E-05	1.73E-04	3.79E-05	---	0.00002	6.92E-05	1.52E-05	6.92E-05	7.20E-07	6.92E-05	5.10E-07	0.00007	0.00001	0.0002
Nickel	0.0	0.0	0.051	0.000	0.362	0.091	2.391	0.075	0.072	0.016	0.072	0.016	0.072	0.016	---	0.000	0.051	0.011	0.051	0.001	0.70	0.005	0.05	0.01	0.35
Silver	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	1.0
Sulfate	0.0	0.0	494.9	0.032	494.9	124.0	494.9	15.5	494.9	108.5	494.9	108.5	494.9	108.5	---	0.000	494.9	108.5	494.9	5.1	495	3.6	495	100	---
Zinc	0.0	0.0	0.005	0.000	0.053	0.013	0.349	0.011	0.011	0.002	0.011	0.002	0.011	0.002	---	0.000	0.005	0.001	0.005	0.000	0.162	0.001	0.005	0.001	0.4
Total Tracked Cations / Anions	0.0	0.0	1,271.7	0.1	1,273.1	318.9	1,280.9	40.1	1,272.0	278.8	1,272.0	278.8	1,272.0	278.8	---	0.000	1,271.7	278.7	1,271.7	13.2	1,280	9	1,272	256	---
VOC (ug/L)																									
TIO	0.0	0.0	0.017	0.000	16.7	4.2	16.7	0.5	16.7	3.66	16.7	3.7	16.7	3.7	---	3.7	0.017	0.004	0.017	0.000	0.017	0.000	0.017	0.003	0.1
TOTAL ORGANICS	0.0	0.0	0.017	0.000	16.7	4.2	16.7	0.5	16.7	3.66	16.7	3.7	16.7	3.7	---	3.7	0.017	0.004	0.017	0.000	0.017	0.000	0.017	0.003	---
OTHER																									
TBOD5 (mg/L)	0.0	0.0	83.1	0.0	109	27.4	262	8.2	87.5	19.2	87.5	19.2	87.5	19.2	---	0.0	83.1	18.2	83.1	0.9	213.2	1.6	83	17	NA
TSS (mg/L)	0.0	0.0	2.0	0.0	149	37.2	1136	35.6	7.4	1.6	7.4	1.6	5.0	1.1	---	0.0	2.0	0.4	53.1	0.6	91.3	0.7	2.0	0.4	NA
TP (mg/L)	0.0	0.0	0.5	0.00	0.5	0.1	0.5	0.0	0.5	0.1	0.5	0.1	0.5	0.1	---	0.0	0.5	0.1	0.47	0.00	1.2	0.0	0.47	0.1	NA
TKN (mg/L)	0.0	0.0	30.5	0.0	32.1	8.0	32.1	1.0	32.1	7.0	32.1	7.0	32.1	7.0	---	0.0	30.5	6.7	30.5	0.3	78.2	0.6	30	6	NA

Notes:
1. Cadmium, hexavalent chromium and silver were non-detect.
2. Molybdenum data and estimates are provided for informational purposes. A draft permit limit has not been established. Pre-Design Investigation (PDI) 6 will provide additional information regarding molybdenum.
3. The Geotube effluent TSS maximum anticipated value is 200 mg/L.
4. Sludge underflow from the I.P. Clarifier is 12.5% by influent volume.
5. Backwash design frequencies are: 1 time per day for each MMF unit, and 1 time per two-day period for each GAC unit.
6. Nickel removal is anticipated to occur at a pH of 10.5 SU.
7. Parson's Mass Balance and O'Brien & Gere's Mass Balance correspond as follows: Parson's Node # 4 is equivalent to O'Brien & Gere's Node #16. Parsons Node #9 is equivalent to the sum of O'Brien & Gere Nodes # 18, 24 & 25. Parson's Node # 10 is equivalent to O'Brien & Gere's Node #9. Refer to Parsons' Mass Balance, Rev. A, 1/20/10.
8. O'Brien & Gere's in scope work for the SCA Water Treatment System begins at Node #11, the pH Adjust Tank Influent. Nodes #1 through #10 are presented for calculation purposes only, and are being addressed by Parsons.
9. Polymer is not planned to be used at the WTP. If required, usage would be as shown in Node #15.

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
C	4/09/10	DP #2 ISSUED FOR HONEYWELL REVIEW	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

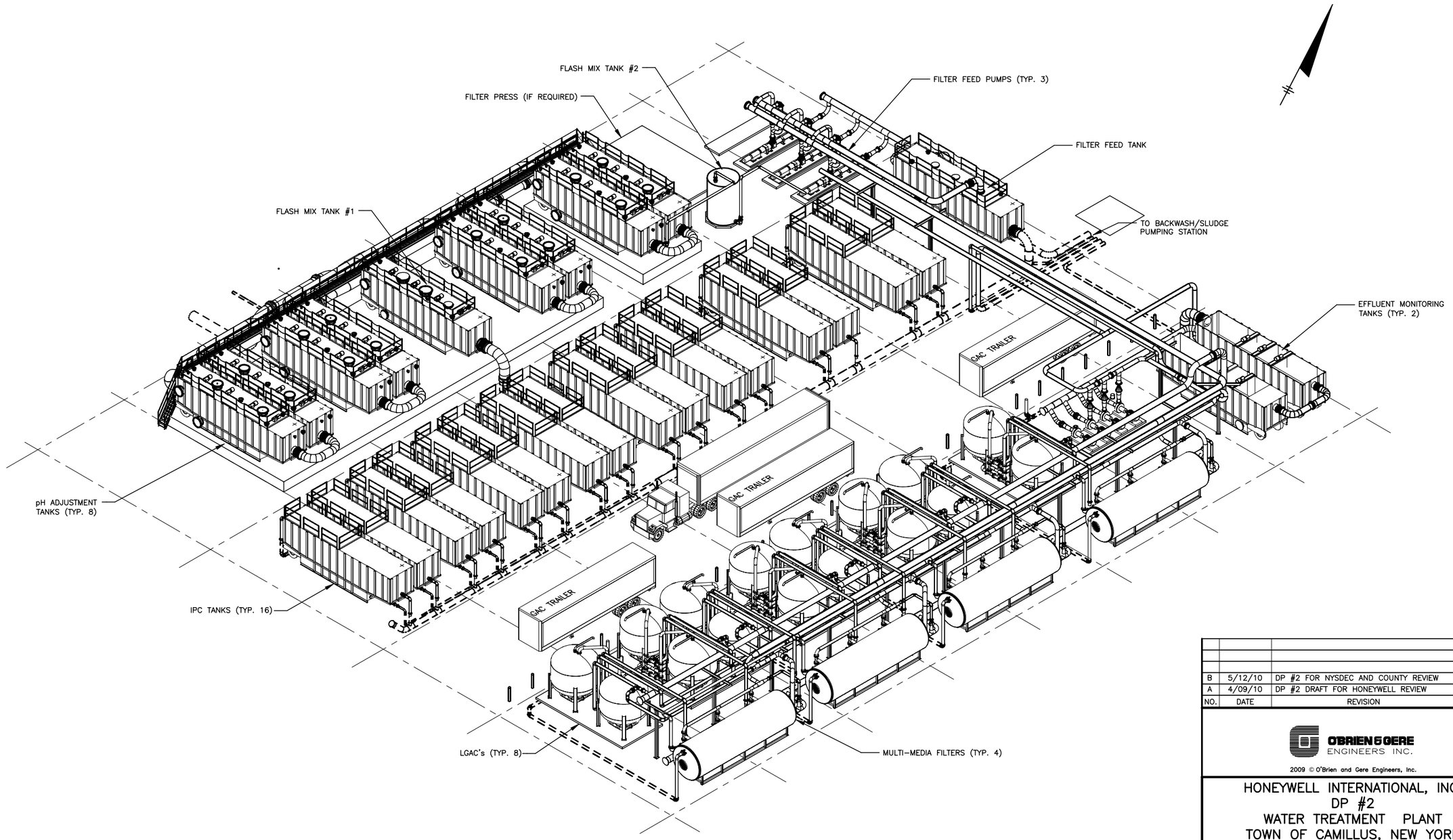
HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

MASS BALANCE – WINTER SEASON

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613-PFD2
DATE FEBRUARY 2010
PFD-3

I:\Honeywell.1163\45613.Sca-Wtp-Detail\Docs\DWG\DP-2\Sheets\45613-PFD3.dwg



ISOMETRIC

1/16"=1'-0" 16 8 0 16 32

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

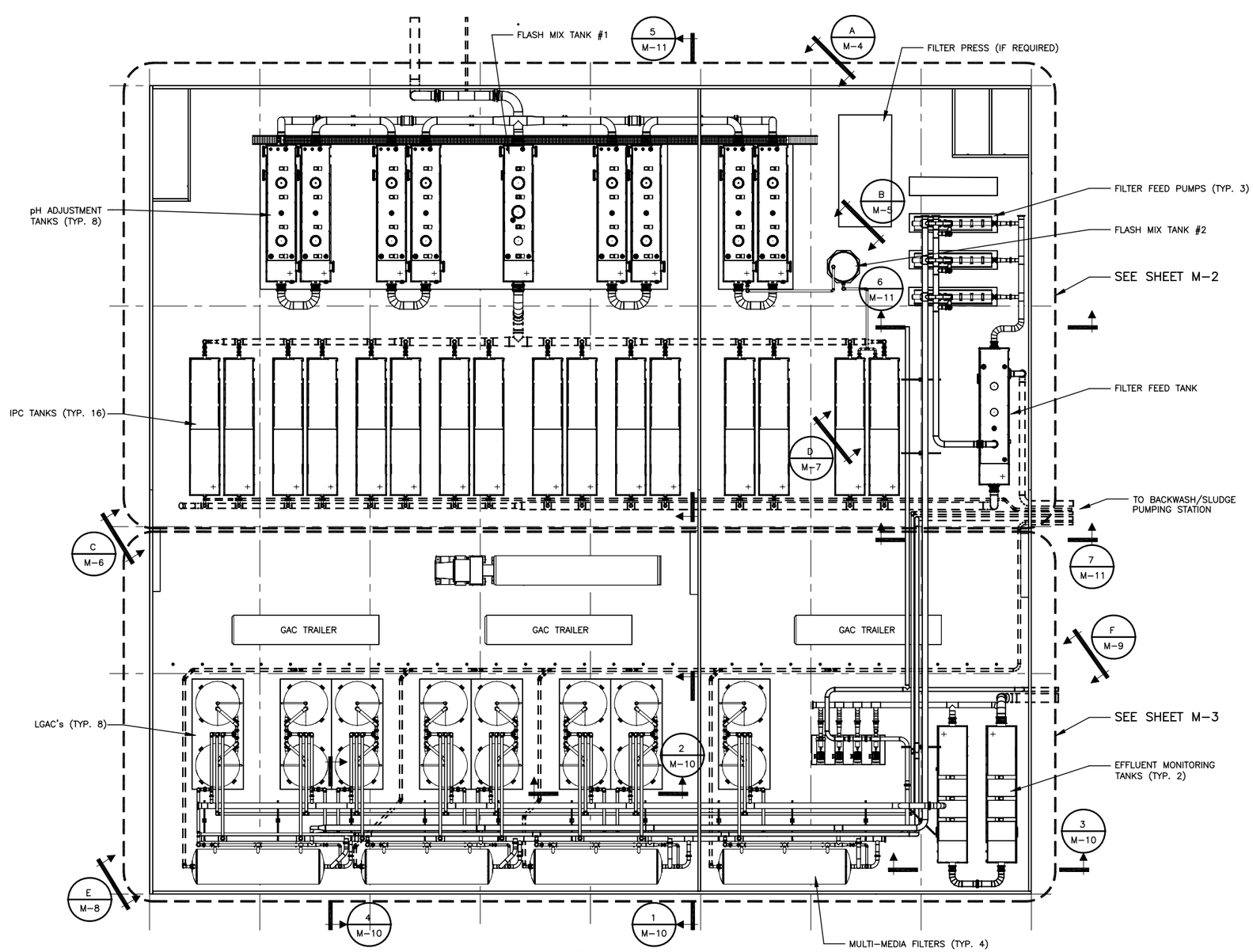
MECHANICAL

WTP ISOMETRIC

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M0
DATE APRIL 2010

M-0



PLAN

SCALE: 1/16"=1'-0"

1/16"=1'-0" 16 8 0 16 32

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PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

PLAN

IN CHARGE OF JSR

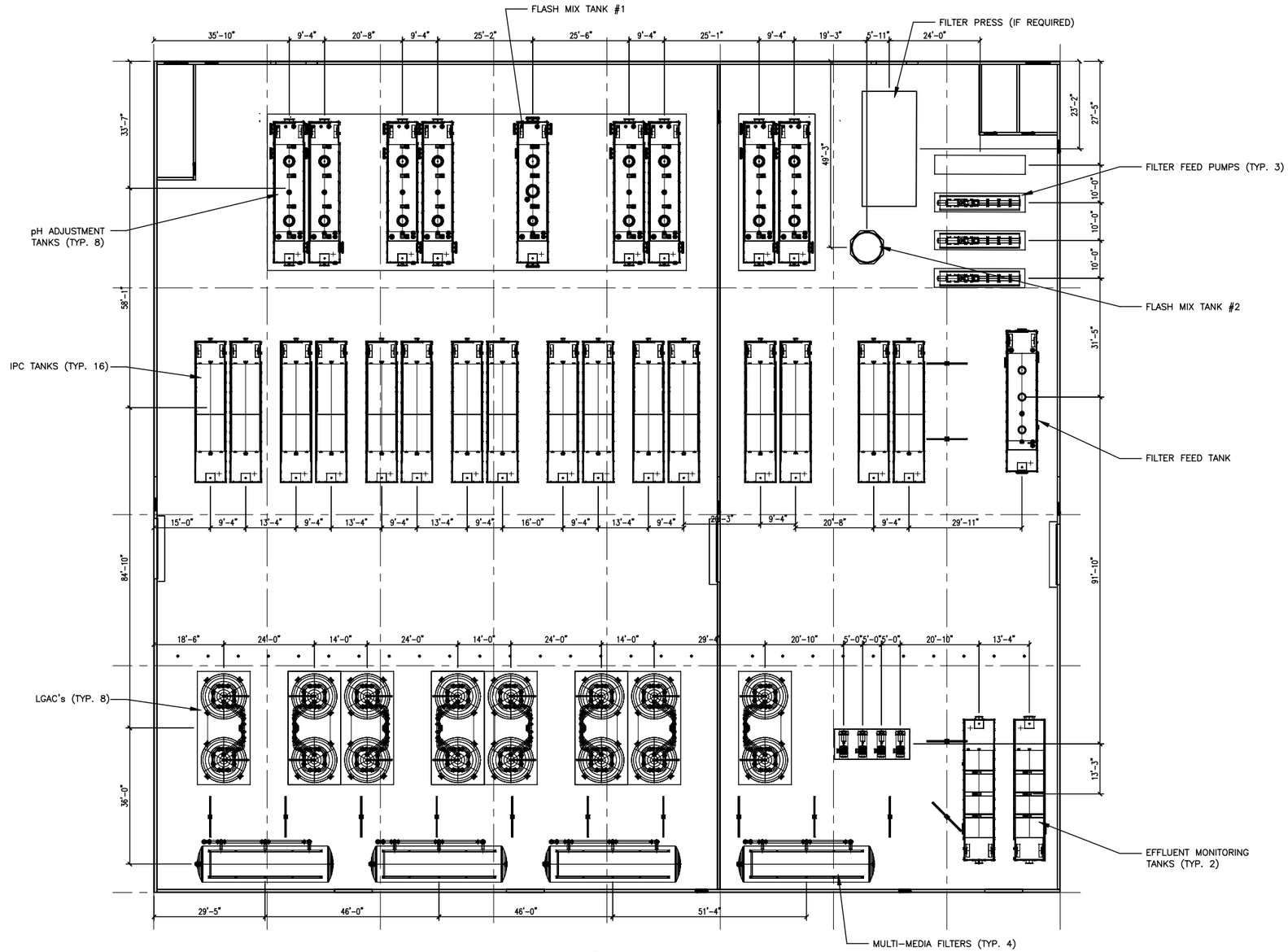
DESIGNED BY GBE CHECKED BY PDS

DRAWN BY JAS

FILE NO. 1163.45613-M1

DATE APRIL 2010

M-1



PLAN

SCALE: 1/16"=1'-0"

1/16"=1'-0" 16 8 0 16 32

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

EQUIPMENT LOCATION PLAN

IN CHARGE OF JSR

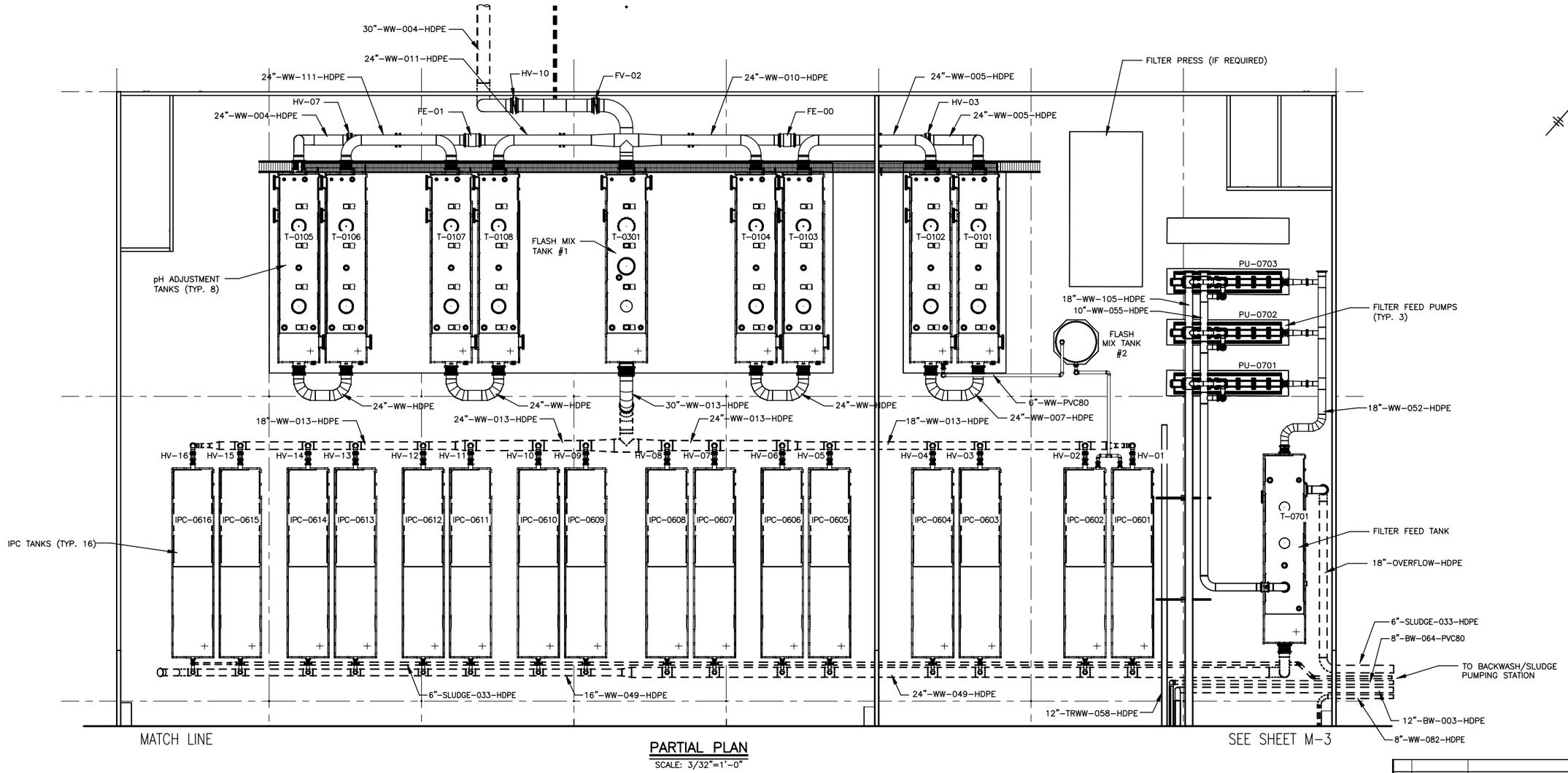
DESIGNED BY GBE CHECKED BY PDS

DRAWN BY JAS

FILE NO. 1163.45613-M1A

DATE APRIL 2010

M-1A



PARTIAL PLAN

SCALE: 3/32"=1'-0"

3/32"=1'-0" 8 0 8 16 24

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

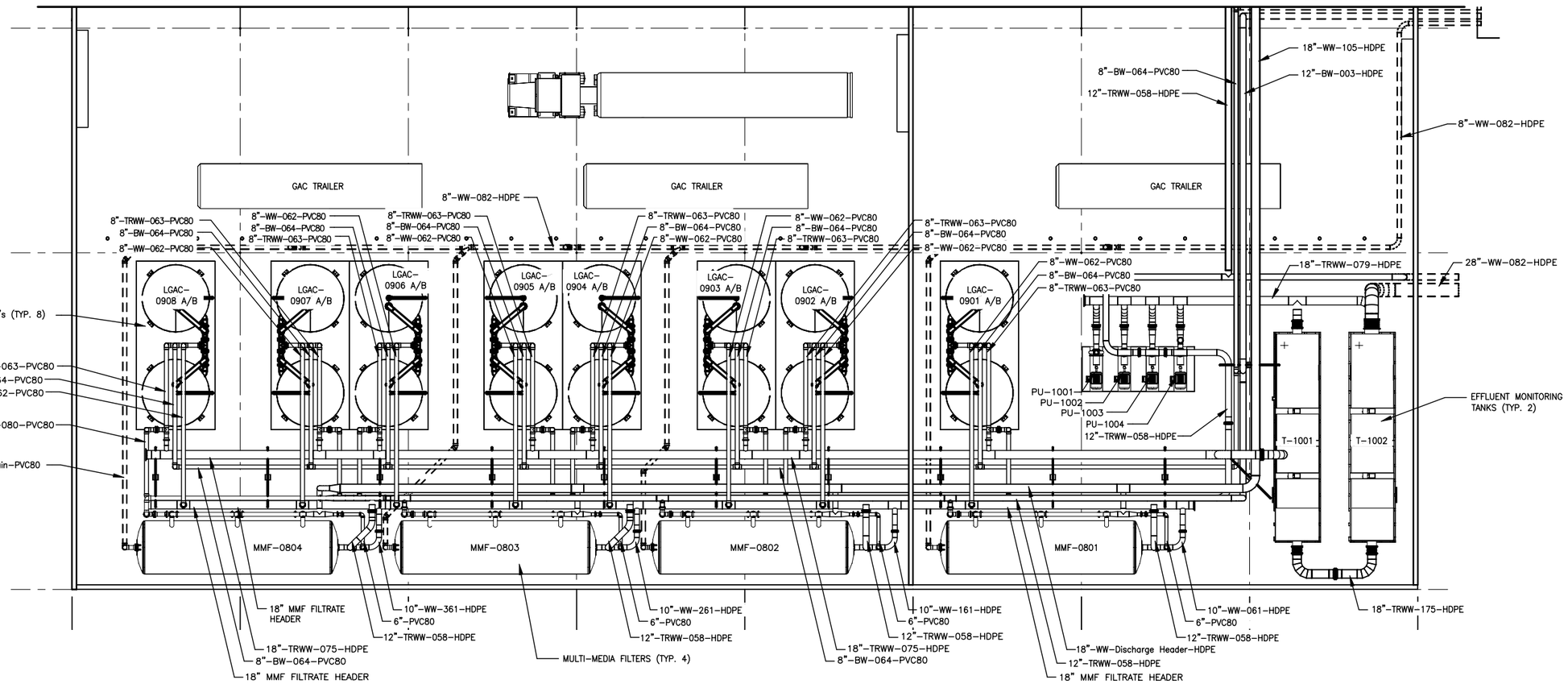
MECHANICAL

PARTIAL PLAN

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M2
DATE APRIL 2010

M-2



PARTIAL PLAN

SCALE: 3/32"=1'-0"

3/32"=1'-0" 8 0 8 16 24

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NO.	DATE	REVISION	INIT.
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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

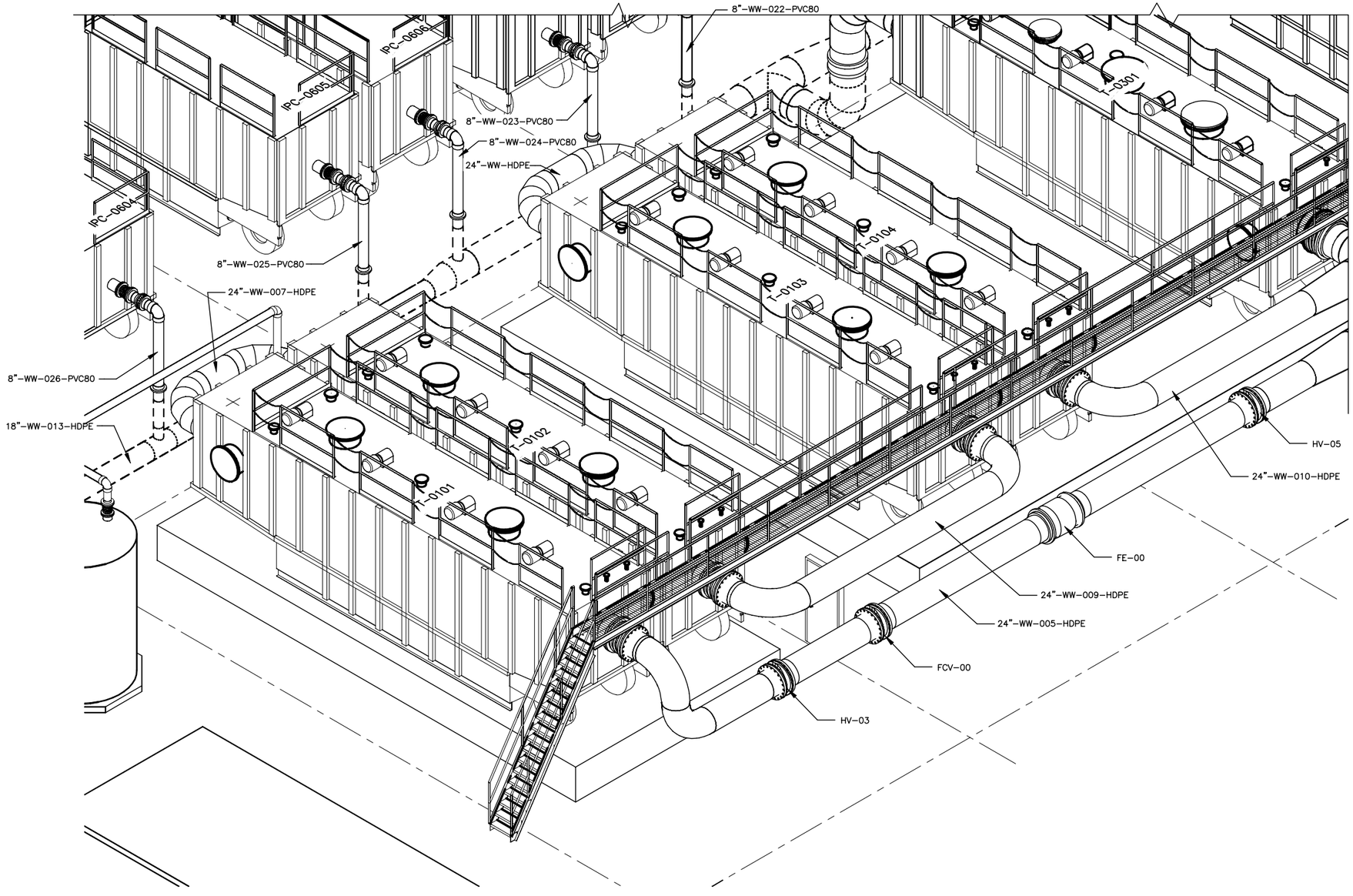
MECHANICAL

PARTIAL PLAN

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M3
DATE APRIL 2010

M-3



pH ADJUSTMENT TANKS ISOMETRIC (A / M-1)

NOT TO SCALE

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

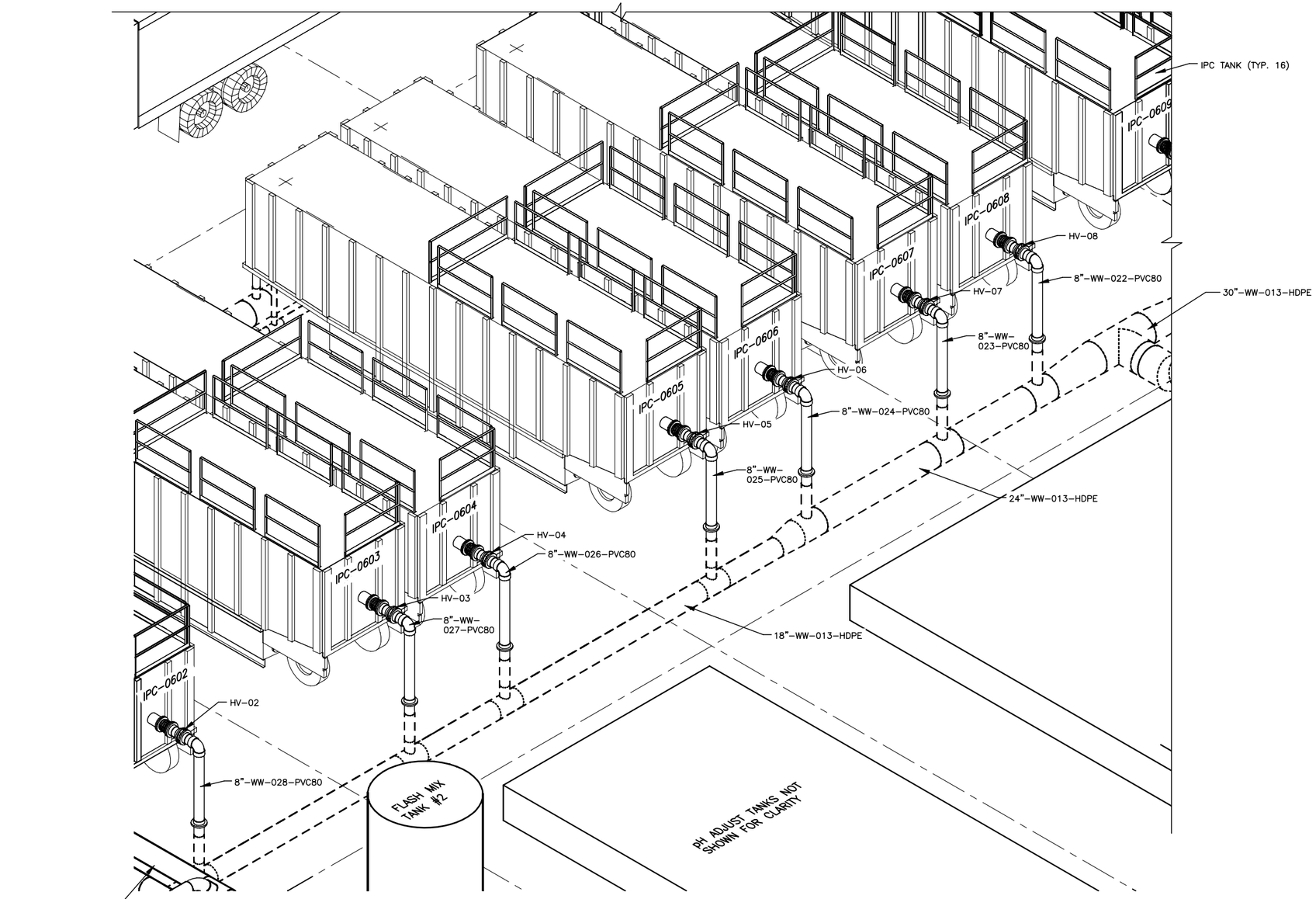
pH ADJUSTMENT TANKS ISOMETRIC

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M4
DATE APRIL 2010

M-4



IPC's ISOMETRIC (B, M-1)
NOT TO SCALE

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

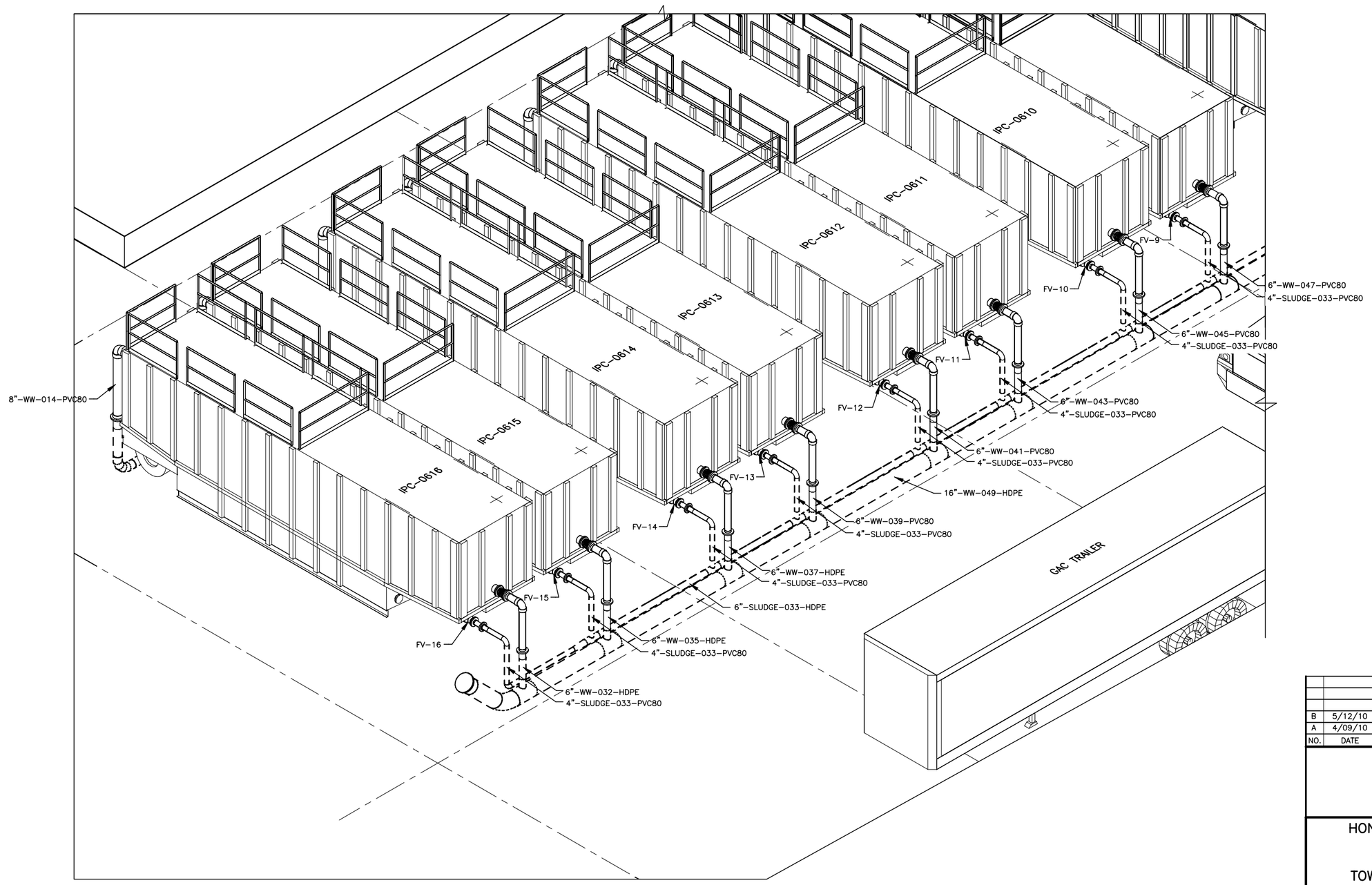
IPC's ISOMETRIC

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M5
DATE APRIL 2010

M-5



IPC's ISOMETRIC (C / M-1)
NOT TO SCALE

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

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DATE: 5/12/10

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

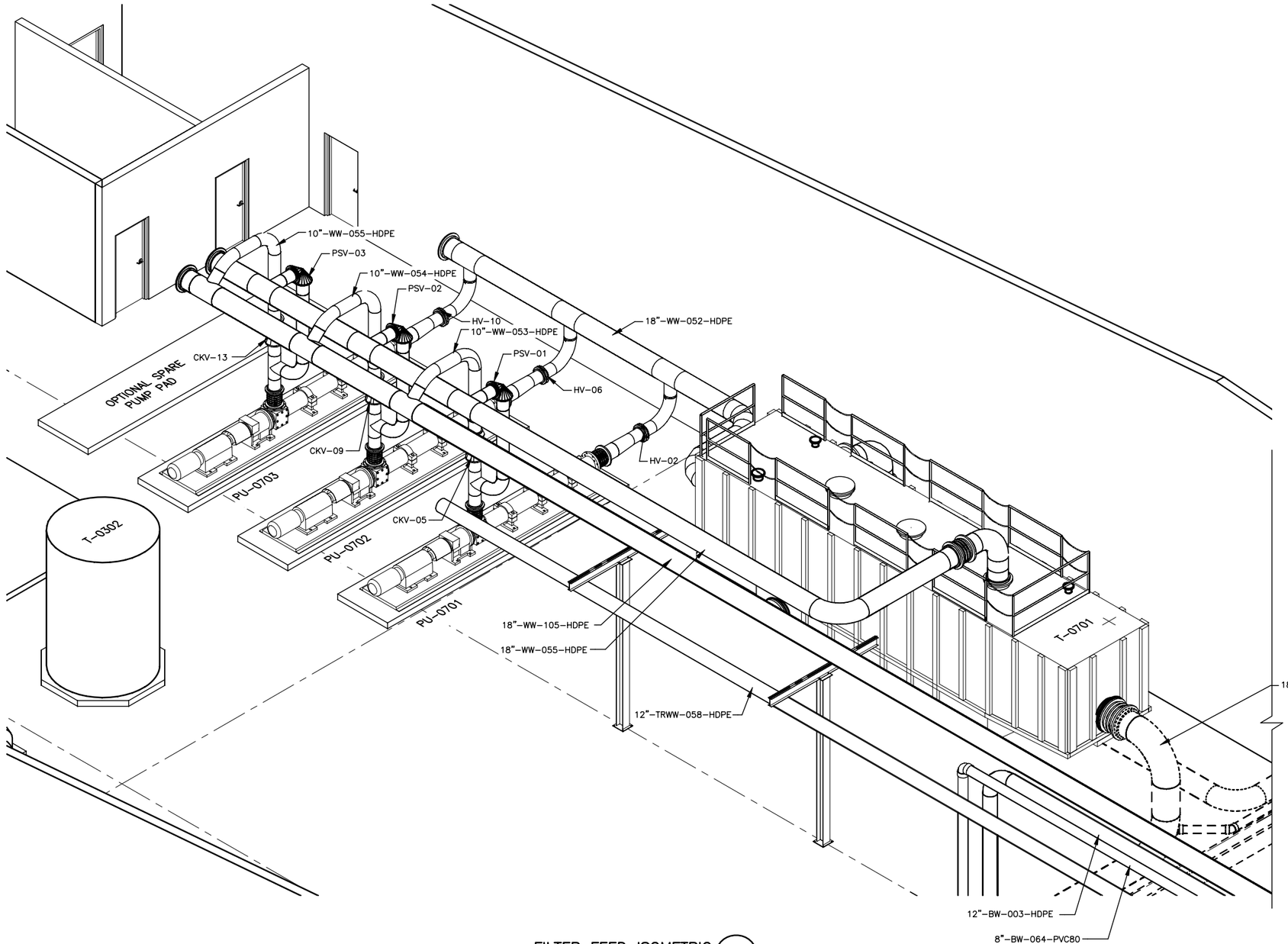
MECHANICAL

IPC's ISOMETRIC

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M6
DATE APRIL 2010

M-6



FILTER FEED ISOMETRIC (D, M-1)
NOT TO SCALE

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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

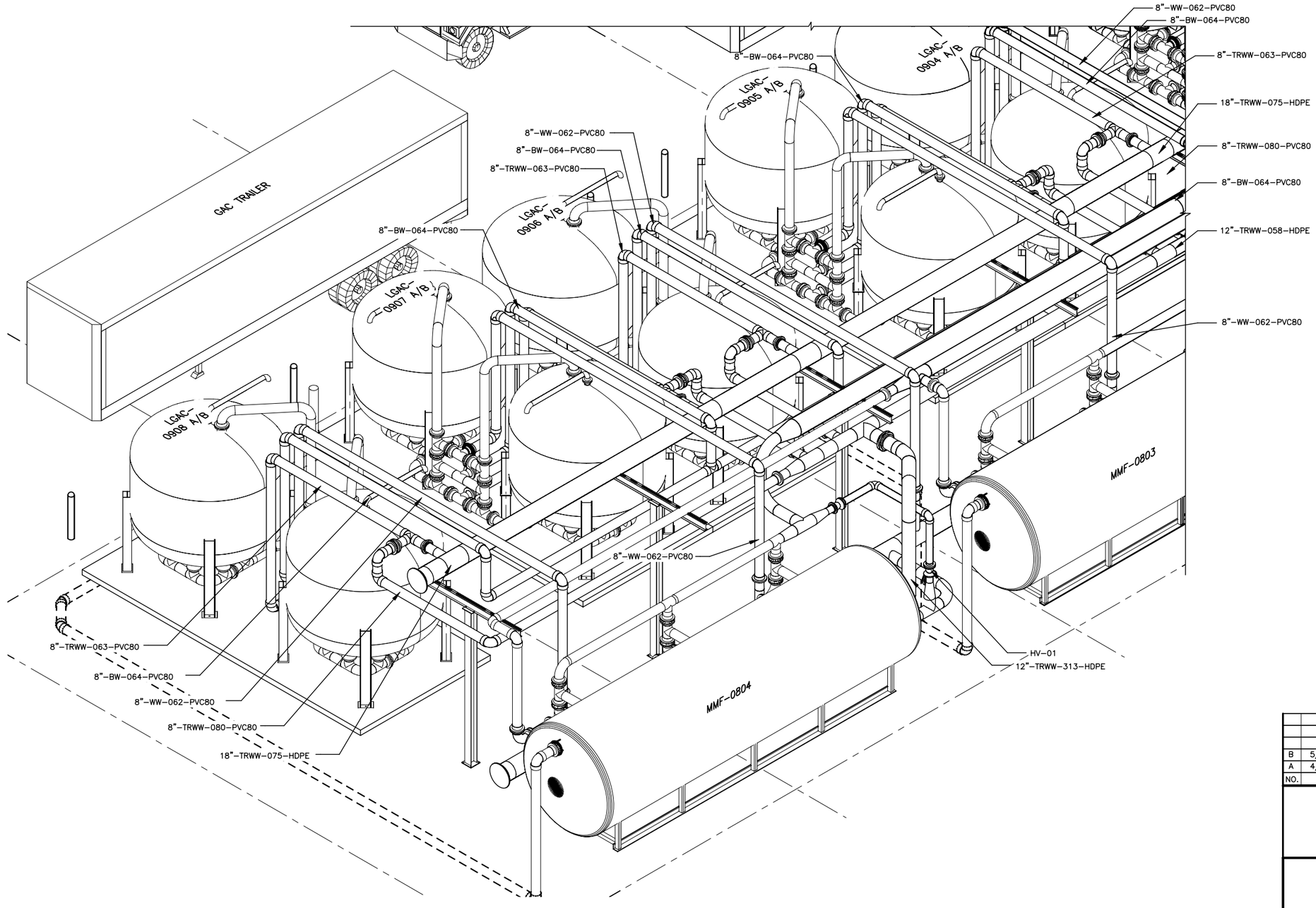
FILTER FEED ISOMETRIC

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M7
DATE APRIL 2010

M-7

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\Docs\DWG\DP-2\Sheets\45613-M7.dwg May 11, 2010 - 7:09pm



LGAC ISOMETRIC (E / M–1)
NOT TO SCALE

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

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DATE: 5/12/10

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A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

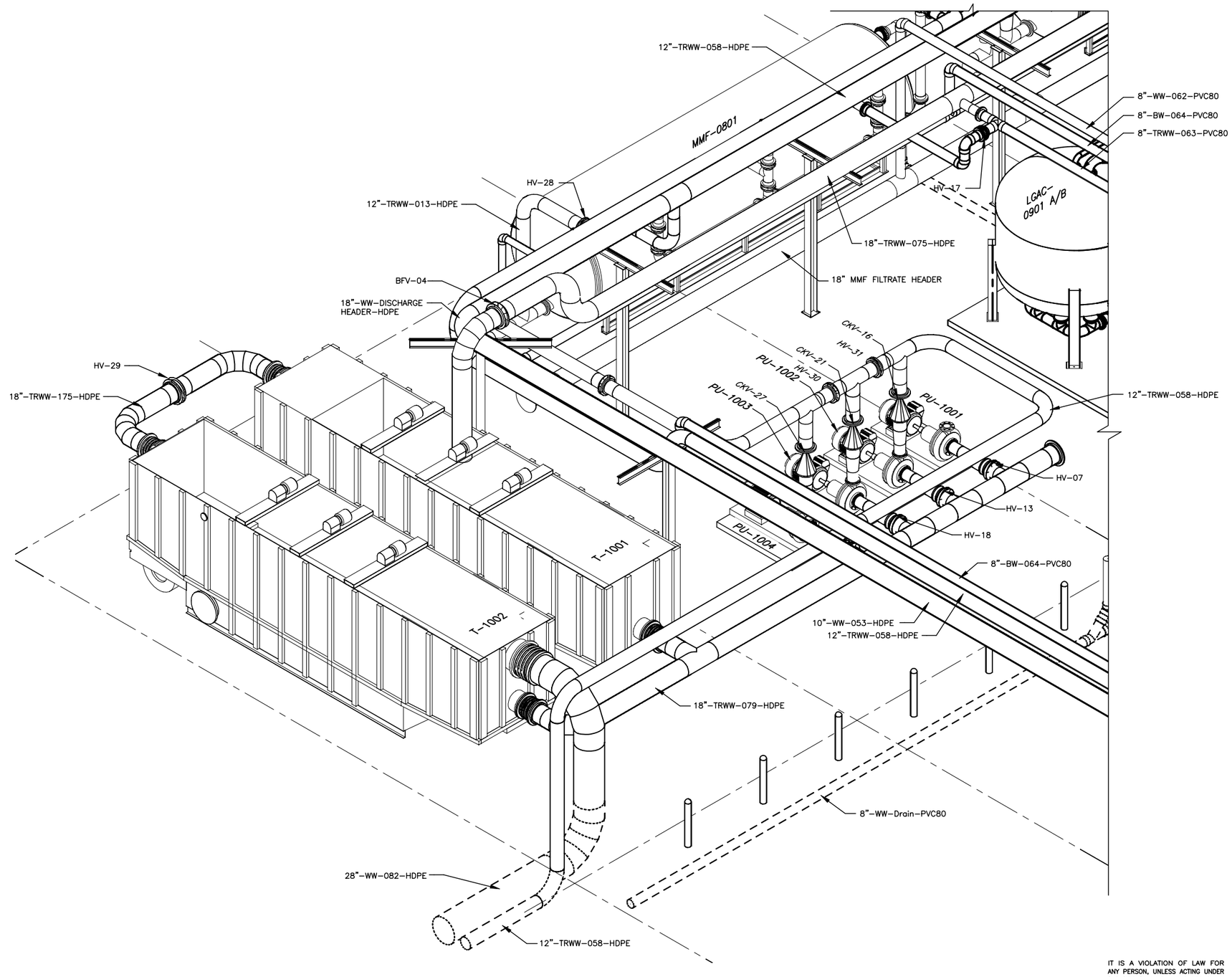
MECHANICAL

LGAC ISOMETRIC

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613–M8
DATE APRIL 2010

M–8



EFFLUENT MONITORING TANKS ISOMETRIC (F / M–1)

NOT TO SCALE

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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

EFFLUENT MONITORING TANKS ISOMETRIC

IN CHARGE OF JSR

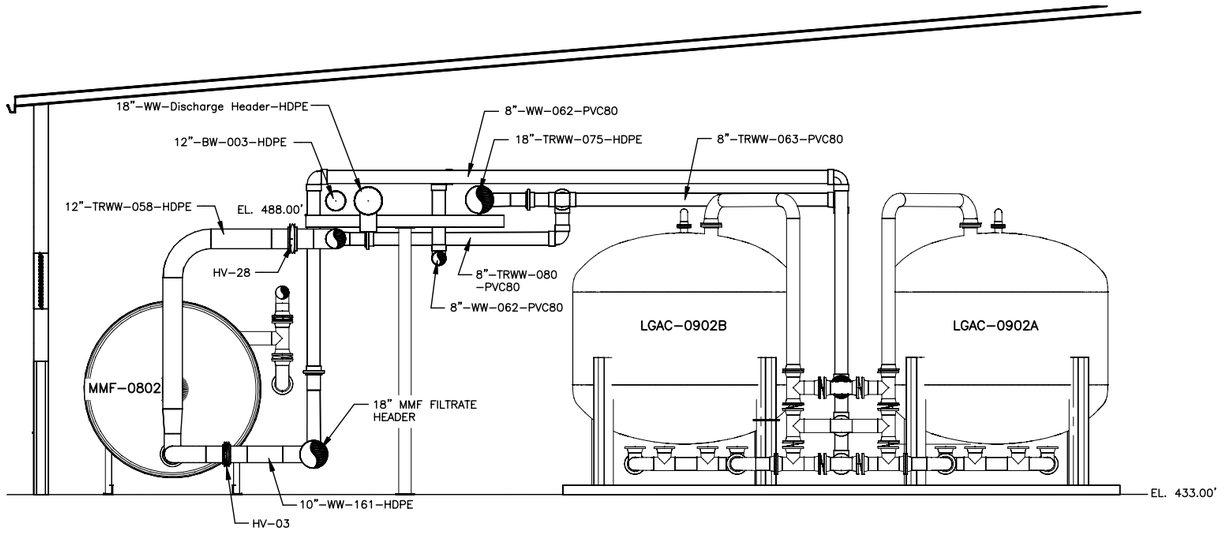
DESIGNED BY GBE CHECKED BY PDS

DRAWN BY JAS

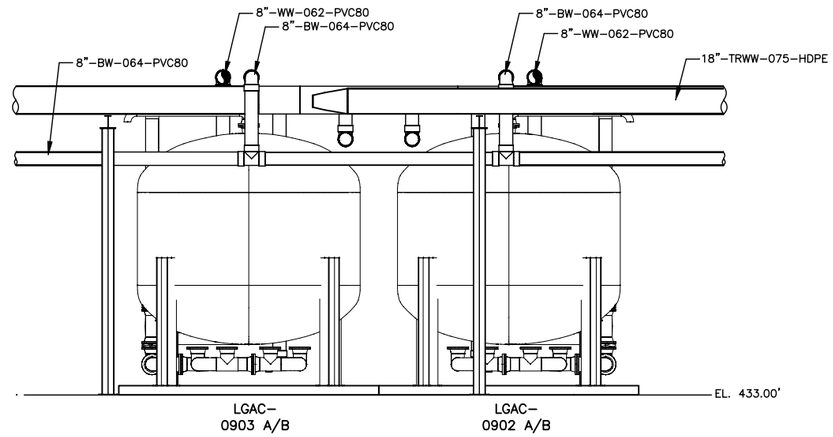
FILE NO. 1163.45613–M9

DATE APRIL 2010

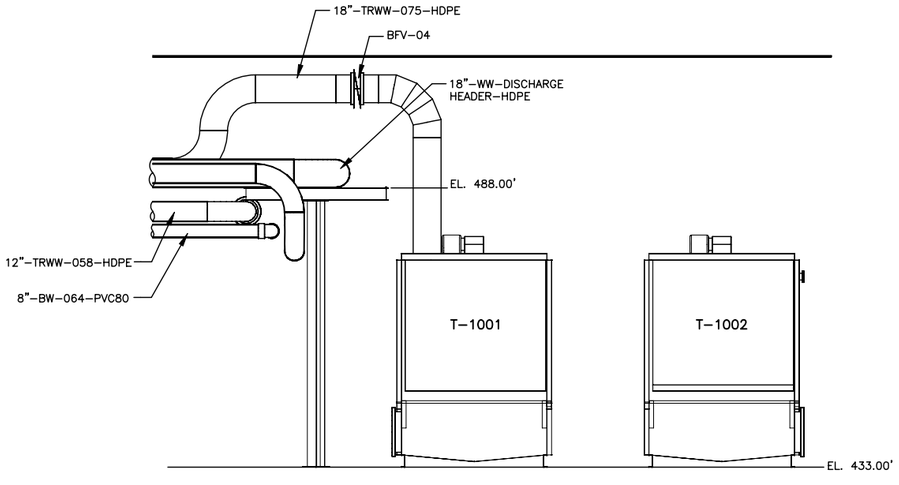
M–9



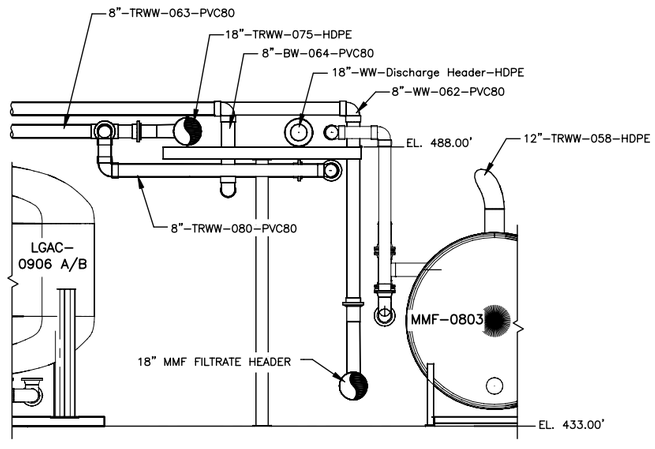
SECTION
SCALE: 1/4"–1'–0"
1 / M–1



SECTION
SCALE: 1/4"=1'–0"
2 / M–1



SECTION
SCALE: 1/4"=1'–0"
3 / M–1



SECTION
SCALE: 1/4"=1'–0"
4 / M–1

1/4"=1'–0" 2 0 2 4 6 8 10

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PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

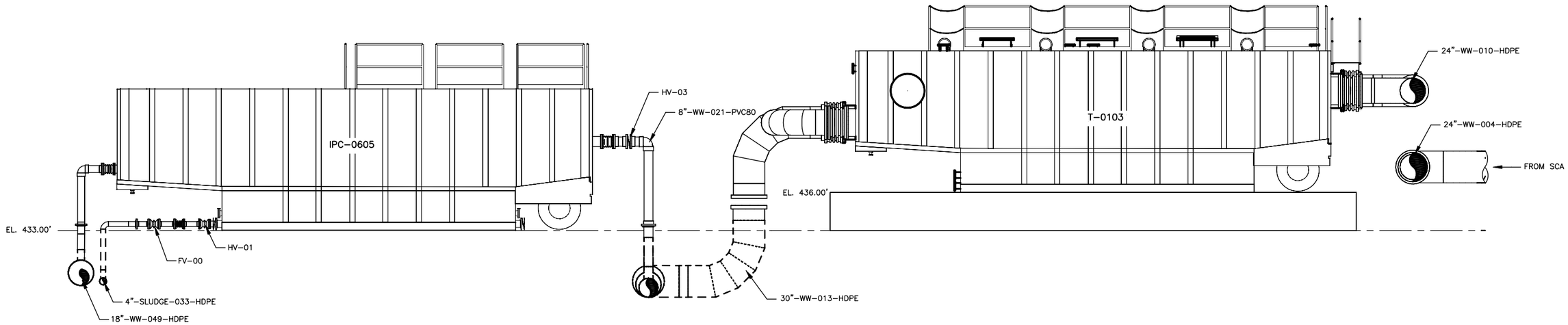
MECHANICAL

SECTIONS

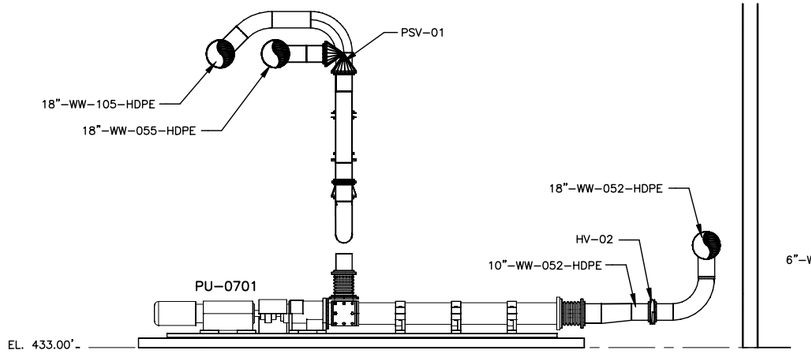
IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613–M10
DATE APRIL 2010

M–10



SECTION
SCALE: 1/4"=1'-0"
5 / M-1



SECTION
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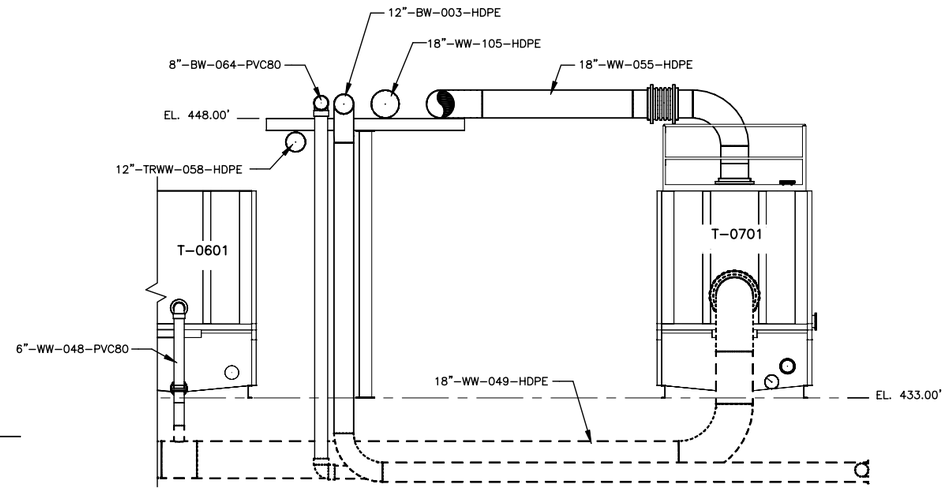
6 / M-1



SECTION
SCALE: 1/4"=1'-0"
7 / M-1

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 5/12/10

1/4"=1'-0" 2 0 2 4 6 8 10

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

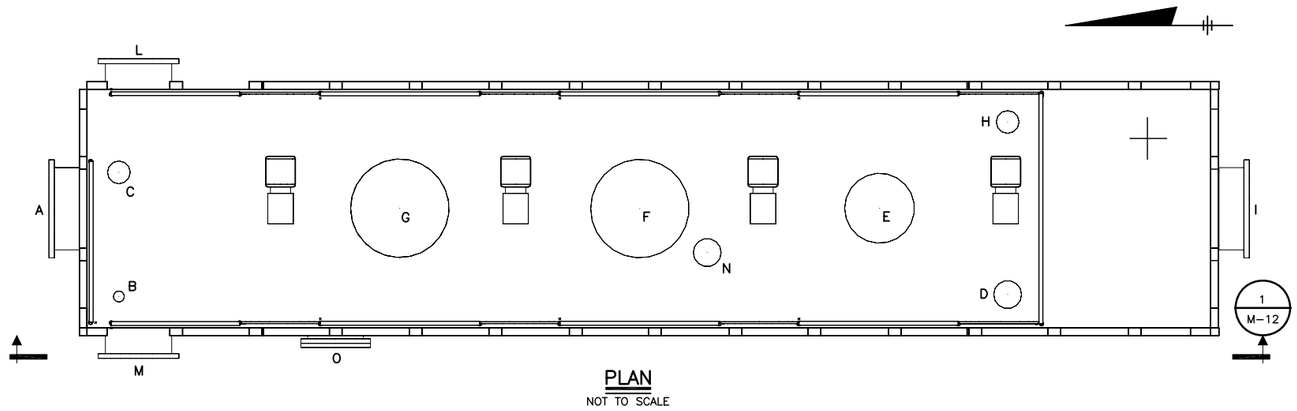
MECHANICAL

SECTIONS

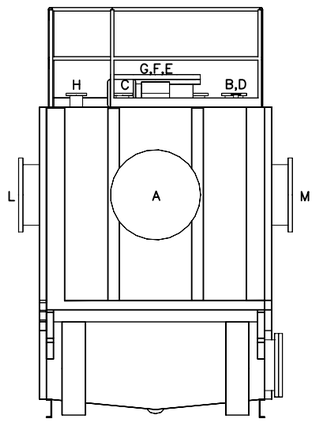
IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M10
DATE APRIL 2010

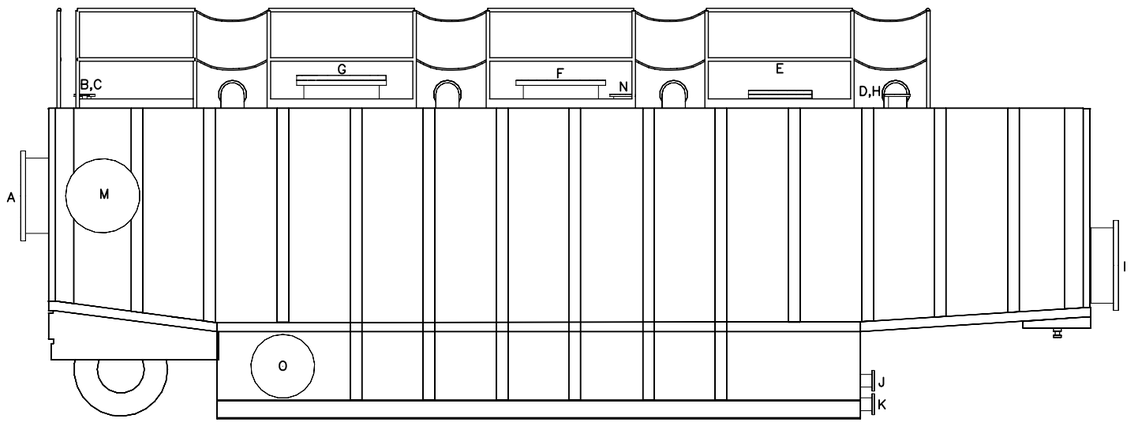
M-11



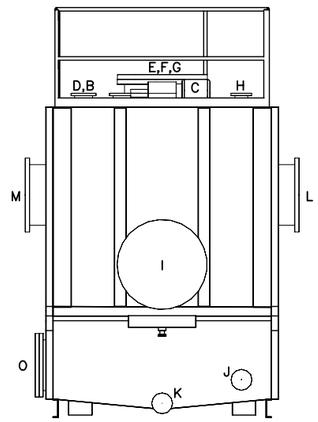
PLAN
NOT TO SCALE



NORTH END
NOT TO SCALE



SECTION
NOT TO SCALE
1
M-12



SOUTH END
NOT TO SCALE

NOTES:

1. TANK MANUFACTURER TO INSTALL NOZZLE AS LOW AS POSSIBLE ON TANK SIDEWALL LEAVING ADEQUATE CLEARANCE FOR NOZZLE FLANGE.
2. ALL NOZZLES TO EXTEND 6" FROM TANK TOP/WALL TO FACE OF FLANGE.
3. REFER TO "DOWNCOMER DETAIL" SHEET M-19.
4. DOWNCOMERS SHALL EXTEND DOWN TO 2'-0" ABOVE TANK FLOOR. TANK MANUFACTURER TO SUPPORT DOWNCOMER FROM TANK WALL AND/OR FLOOR TO ENSURE STRUCTURAL INTEGRITY OF DOWNCOMER IN AGITATED TANK.
5. NOZZLES "C","D","E", AND "G" SHALL BE PROVIDED WITH GASKETS AND BLIND FLANGES PROVIDED BY TANK MANUFACTURER.
6. ALL NOZZLE ELEVATIONS ARE FROM TANK BOTTOM TO CENTERLINE OF NOZZLE, UNLESS OTHERWISE NOTED.
7. TANK TOP HANDRAIL AND TIE-OFF POINTS NOT SHOWN FOR CLARITY.
8. BOLT HOLES FOR EACH NOZZLE FLANGE SHALL STRADDLE THE NOZZLE CENTERLINE.
9. 24" SIDE NOZZLES ARE AN OPTION (NOZZLES L & M), AND MAY OR MAY NOT BE INSTALLED. PRICING FOR NOZZLES L & M SHALL BE PROVIDED AS A SEPARATE LINE ITEM (SEE BID TABS).

NOZZLE	CONNECTION	DESCRIPTION	DOWNCOMER SEE NOTE 3	DIAMETER	ORIENTATION	CENTERLINE HIGHT	TYPE
A	30"-WW-010-HDPE	FROM pH ADJUSTMENT TANKS #4 & #8	N	30"	NORTH END	TBD	FL
B	1"-COAG-102-PE-HCET	FROM CF-1401	Y	1"	TOP	T.O.T.	FL
C	SPARE	SPARE	N	4"	TOP	T.O.T.	FL
D	SPARE	SPARE	N	6"	TOP	T.O.T	FL
E	VIEW PORT	VIEW PORT	N	20"	TOP	T.O.T.	FL
F	30"-VENT	TO VENT HEADER	N	30"	TOP	T.O.T.	FL
G	MANWAY/OVERFLOW	MANWAY	N	30"	TOP	T.O.T.	FL
H	4"-LSHH	HIGH LEVEL	N	4"	TOP	T.O.T.	FL
I	30"-WW-013-HDPE	TO DISTRIBUTION HEADER	N	30"	SOUTH END	TBD	FL
J	4"-LSLL	LOW LEVEL	N	4"	SOUTH END	TBD	FL
K	4"-DRAIN	DRAIN	N	4"	SOUTH END	NOTE 1	FL
L	24" (SEE NOTE 9)	SIDE INFLUENT (OPTION)	N	24"	EAST SIDE	TBD	FL
M	24" (SEE NOTE 9)	SIDE EFFLUENT (OPTION)	N	24"	WEST SIDE	TBD	FL
N	6"-LIT	LEVEL INDICATOR	N	6"	TOP	T.O.T.	FL
O	MANWAY	SIDE MANWAY	N	20"	SIDE	TBD	FL

TOT = TOP OF TANK
FL = EXTERIOR FLANGE PROVIDED
FLxFL = EXTERIOR FLANGE AND INTERIOR FLANGE PROVIDED

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

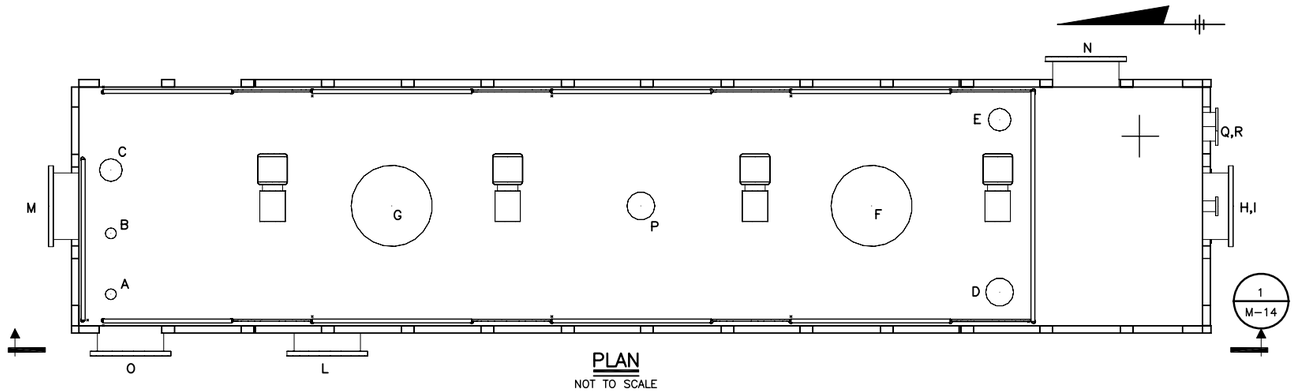
MECHANICAL

FLASH MIX TANK #1
NOZZLE SCHEDULE

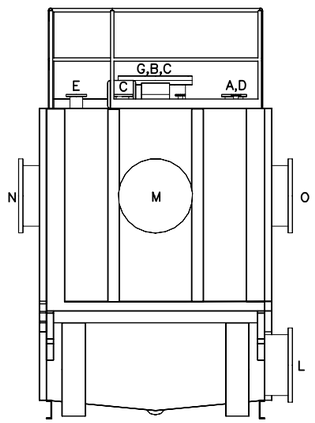
IN CHARGE OF JSR
DESIGNED BY NTZ CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M12
DATE APRIL 2010

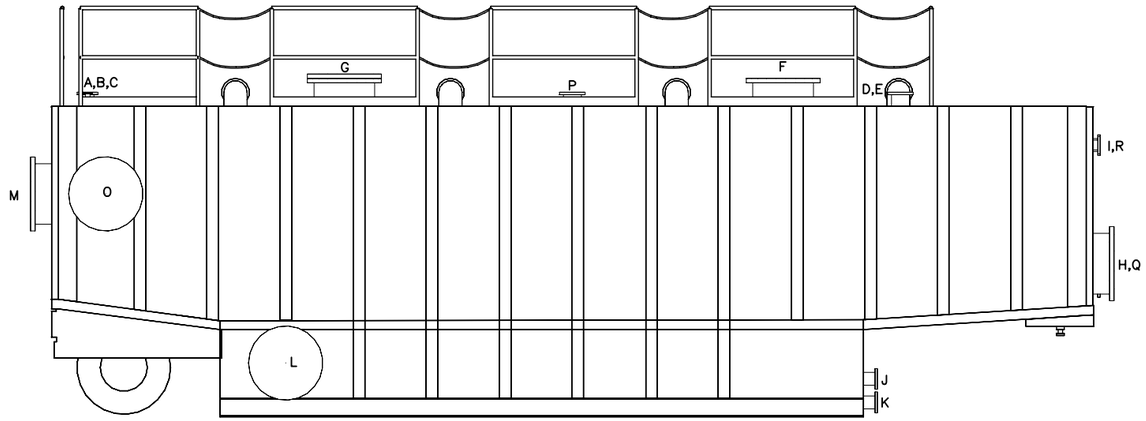
M-12



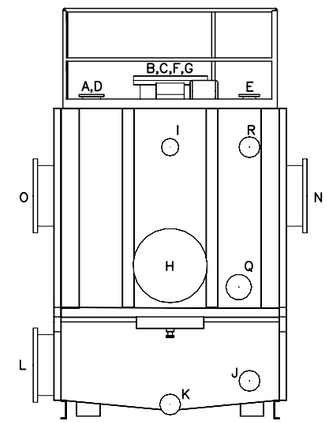
PLAN
NOT TO SCALE



NORTH END
NOT TO SCALE



SECTION (1 / M-14)
NOT TO SCALE



SOUTH END
NOT TO SCALE

NOTES:

1. TANK MANUFACTURER TO INSTALL NOZZLE AS LOW AS POSSIBLE ON TANK SIDEWALL LEAVING ADEQUATE CLEARANCE FOR NOZZLE FLANGE.
2. ALL NOZZLES TO EXTEND 6" FROM TANK TOP/WALL TO FACE OF FLANGE.
3. REFER TO "DOWNCOMER DETAIL" SHEET M-19.
4. DOWNCOMERS SHALL EXTEND DOWN TO 2'-0" ABOVE TANK FLOOR. TANK MANUFACTURER TO SUPPORT DOWNCOMER FROM TANK WALL AND/OR FLOOR TO ENSURE STRUCTURAL INTEGRITY OF DOWNCOMER IN AGITATED TANK.
5. NOZZLES "C","D","G", AND "L" SHALL BE PROVIDED WITH GASKETS AND BLIND FLANGES PROVIDED BY TANK MANUFACTURER.
6. ALL NOZZLE ELEVATIONS ARE FROM TANK BOTTOM TO CENTERLINE OF NOZZLE, UNLESS OTHERWISE NOTED.
7. TANK TOP HANDRAIL AND TIE-OFF POINTS NOT SHOWN FOR CLARITY.
8. BOLT HOLES FOR EACH NOZZLE FLANGE SHALL STRADDLE THE NOZZLE CENTERLINE.
9. 24" SIDE NOZZLES ARE AN OPTION (NOZZLES N & O), AND MAY OR MAY NOT BE INSTALLED. PRICING FOR NOZZLES N & O SHALL BE PROVIDED AS A SEPARATE LINE ITEM (SEE BID TABS).
10. NOZZLE "Q" AND "R" SHALL BE PROVIDED ON pH ADJUSTMENT TANK #2 TANK ONLY.

NOZZLE	CONNECTION	DESCRIPTION	DOWNCOMER SEE NOTE 3	DIAMETER	ORIENTATION	CENTERLINE HIGHT	TYPE
A	1"-H2SO4-002-TF	FROM CF-1301	Y	1"	TOP	T.O.T.	FL
B	1"-NaOH-001-PE-HCET	FROM CF-1201	Y	1"	TOP	T.O.T.	FL
C	SPARE	SPARE	N	4"	TOP	T.O.T.	FL
D	SPARE	SPARE	N	6"	TOP	T.O.T	FL
E	4"-LSHH	HIGH LEVEL	N	4"	TOP	T.O.T.	FL
F	24"-VENT	TO VENT HEADER	N	24"	TOP	T.O.T.	FL
G	MANWAY/OVERFLOW	MANWAY	N	24"	TOP	T.O.T.	FL
H	24"-WW-007-HDPE	TO pH ADJUST TANK #2	N	24"	SOUTH END	TBD	FL
I	3" pH METER	pH METER	N	3"	SOUTH END	TBD	FL
J	4"-LSLL	LOW LEVEL	N	4"	SOUTH END	TBD	FL
K	4"-DRAIN	DRAIN	N	4"	SOUTH END	NOTE 1	FL
L	MANWAY	MANWAY	N	20"	WEST SIDE	TBD	FL
M	24"-WW-005-HDPE	FROM SCA	N	24"	NORTH END	TBD	FL
N	24" (SEE NOTE 9)	SIDE INFLUENT (OPTION)	N	24"	EAST SIDE	TBD	FL
O	24" (SEE NOTE 9)	SIDE EFFLUENT (OPTION)	N	24"	WEST SIDE	TBD	FL
P	6"-LIT	LEVEL INDICATOR	N	6"	TOP	T.O.T.	FL
Q	6"-WW-XXX-PVC80 (NOTE 10)	TO FLASH MIX TANK #2	N	6"	SOUTH END	TBD	FL
R	4" pH METER	pH METER	N	4"	SIDE	TBD	FL

TOT = TOP OF TANK
FL = EXTERIOR FLANGE PROVIDED
FLxFL = EXTERIOR FLANGE AND INTERIOR FLANGE PROVIDED

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

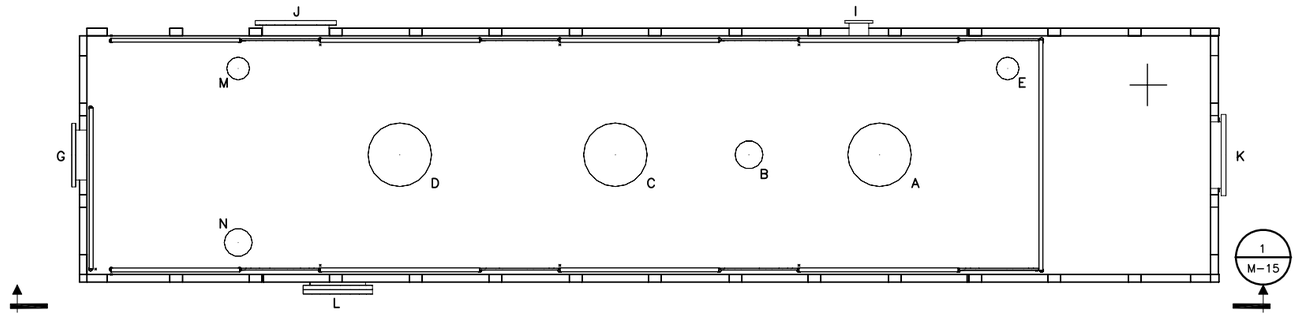
MECHANICAL

pH ADJUST TANK #1 NOZZLE SCHEDULE

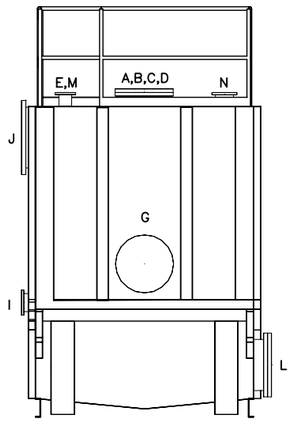
IN CHARGE OF JSR
DESIGNED BY NTZ CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M14
DATE APRIL 2010

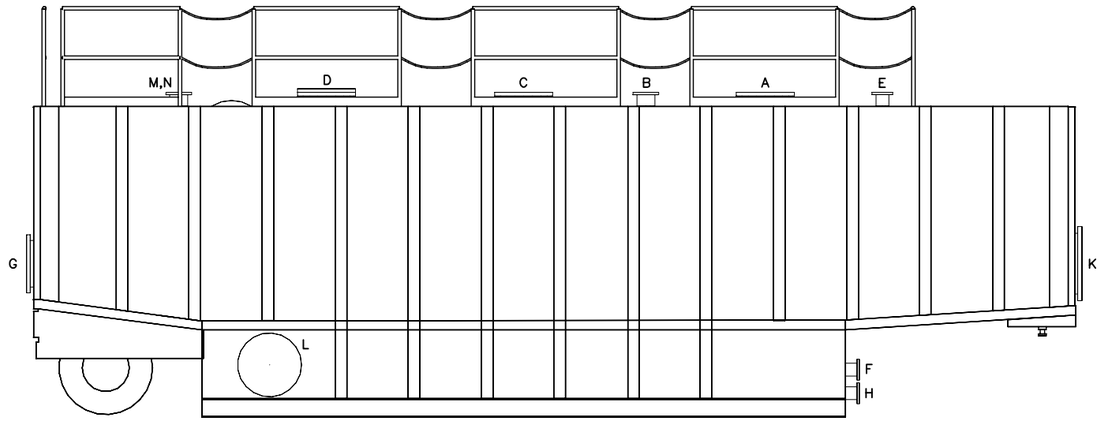
M-14



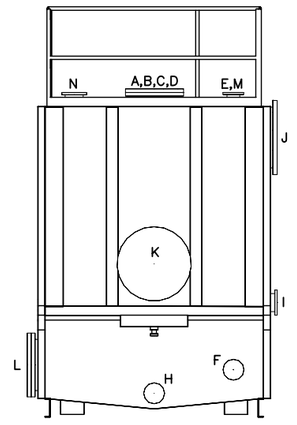
PLAN
NOT TO SCALE



NORTH END
NOT TO SCALE



SECTION
NOT TO SCALE
1
M-15



SOUTH END
NOT TO SCALE

NOTES:

1. TANK MANUFACTURER TO INSTALL NOZZLE AS LOW AS POSSIBLE ON TANK SIDEWALL LEAVING ADEQUATE CLEARANCE FOR NOZZLE FLANGE.
2. ALL NOZZLES TO EXTEND 6" FROM TANK TOP/WALL TO FACE OF FLANGE.
3. REFER TO "DOWNCOMER DETAIL" SHEET M-19.
4. DOWNCOMERS SHALL EXTEND DOWN TO 2'-0" ABOVE TANK FLOOR. TANK MANUFACTURER TO SUPPORT DOWNCOMER FROM TANK WALL AND/OR FLOOR TO ENSURE STRUCTURAL INTEGRITY OF DOWNCOMER IN AGITATED TANK.
5. NOZZLE "D" SHALL BE PROVIDED WITH GASKETS AND BLIND FLANGES PROVIDED BY TANK MANUFACTURER.
6. ALL NOZZLE ELEVATIONS ARE FROM TANK BOTTOM TO CENTERLINE OF NOZZLE, UNLESS OTHERWISE NOTED.
7. TANK TOP HANDRAIL AND TIE-OFF POINTS NOT SHOWN FOR CLARITY.
8. BOLT HOLES FOR EACH NOZZLE FLANGE SHALL STRADDLE THE NOZZLE CENTERLINE.

NOZZLE	CONNECTION	DESCRIPTION	DOWNCOMER SEE NOTE 3	DIAMETER	ORIENTATION	CENTERLINE HIGHT	TYPE
A	18"-VENT	TO VENT HEADER	N	18"	TOP	T.O.T.	FL
B	6"-LIT	LEVEL INDICATOR	N	6"	TOP	T.O.T.	FL
C	18"	FROM PSV'S	N	18"	TOP	T.O.T.	FL
D	20" MANWAY	MANWAY	N	20"	TOP	T.O.T	FL
E	4"-LSHH	HIGH LEVEL	N	4"	TOP	T.O.T.	FL
F	4"-LSLL	LOW LEVEL	N	4"	SOUTH END	TBD	FL
G	18"-WW-052-HDPE	TO MMF FEED PUMPS	N	18"	NORTH END	TBD	FL
H	4"-DRAIN	DRAIN	N	4"	SOUTH END	NOTE 1	FL
I	6"-LIT	LEVEL INDICATING TRANSMITTER	N	6"	EAST SIDE	TBD	FL
J	24"-OVERFLOW	OVERFLOW	N	24"	EAST SIDE	TBD	FL
K	24"-WW-049-HDPE	FROM IPC'S	N	24"	SOUTH END	TBD	FL
L	MANWAY	SIDE MANWAY	N	20"	SIDE	TBD	FL
M	SPARE	SPARE	N	4"	TOP	TBD	FL
N	SPARE	SPARE	N	6"	TOP	TBD	FL

TOT = TOP OF TANK
FL = EXTERIOR FLANGE PROVIDED
FLxFL = EXTERIOR FLANGE AND INTERIOR FLANGE PROVIDED

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

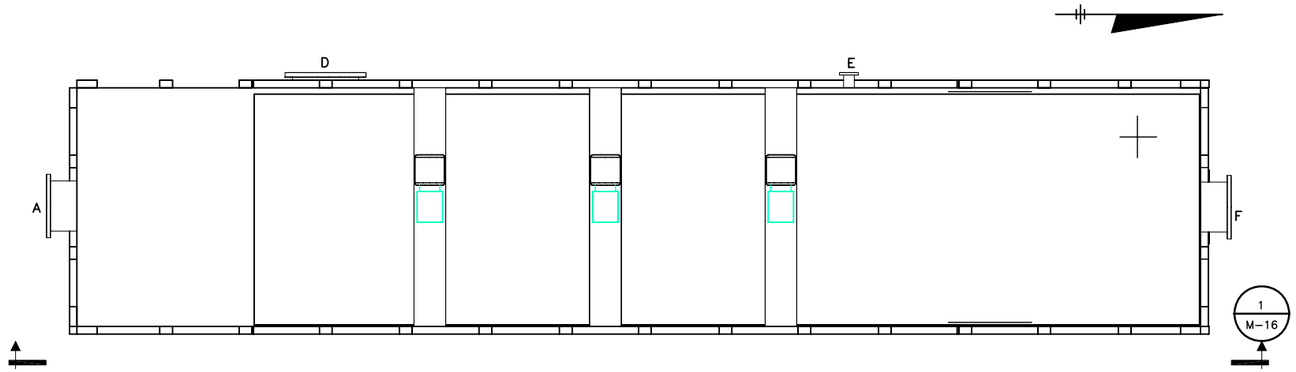
FILTER FEED TANK
NOZZLE SCHEDULE

IN CHARGE OF JSR
DESIGNED BY NTZ CHECKED BY PDS
DRAWN BY JAS

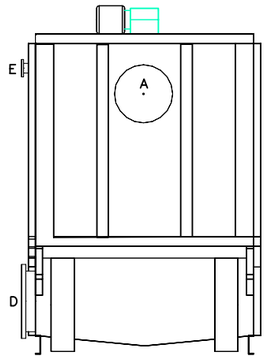
FILE NO. 1163.45613-M15
DATE APRIL 2010

M-15

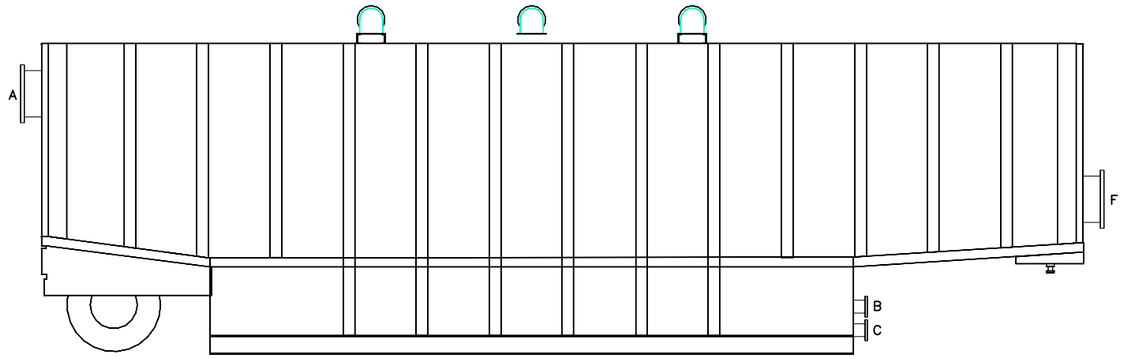
I:\Honeywell\1163\45613.Sca-Wtp-Details\Docs\DWG\DP-2\Sheets\M-15 Filter Feed Tk Nozzle Schedule.dwg May 11, 2010 - 7:12pm



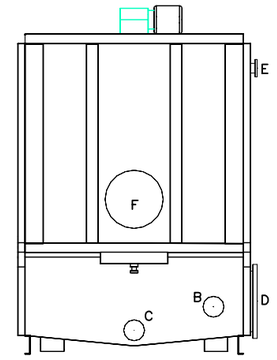
PLAN
NOT TO SCALE



SOUTH END
NOT TO SCALE



SECTION
NOT TO SCALE
1
M–16



NORTH END
NOT TO SCALE

NOTES:

1. TANK MANUFACTURER TO INSTALL NOZZLE AS LOW AS POSSIBLE ON TANK SIDEWALL LEAVING ADEQUATE CLEARANCE FOR NOZZLE FLANGE.
2. ALL NOZZLES TO EXTEND 6" FROM TANK TOP/WALL TO FACE OF FLANGE.
3. REFER TO "DOWNCOMER DETAIL" SHEET M–19.
4. DOWNCOMERS SHALL EXTEND DOWN TO 2'–0" ABOVE TANK FLOOR. TANK MANUFACTURER TO SUPPORT DOWNCOMER FROM TANK WALL AND/OR FLOOR TO ENSURE STRUCTURAL INTEGRITY OF DOWNCOMER IN AGITATED TANK.
5. NOZZLE "D" SHALL BE PROVIDED WITH GASKETS AND BLIND FLANGES PROVIDED BY TANK MANUFACTURER.
6. ALL NOZZLE ELEVATIONS ARE FROM TANK BOTTOM TO CENTERLINE OF NOZZLE, UNLESS OTHERWISE NOTED.
7. TANK TOP HANDRAIL AND TIE–OFF POINTS NOT SHOWN FOR CLARITY.
8. BOLT HOLES FOR EACH NOZZLE FLANGE SHALL STRADDLE THE NOZZLE CENTERLINE.

NOZZLE	CONNECTION	DESCRIPTION	DOWNCOMER SEE NOTE 3	DIAMETER	ORIENTATION	CENTERLINE HIGHT	TYPE
A	18"–	TO EFFLUENT MONITORING TANK #2	N	18"	SOUTH END	TBD	FL
B	4"–LSL	LOW LEVEL	N	4"	NORTH END	TBD.	FL
C	4"–DRAIN	DRAIN	N	4"	NORTH END	TBD	FL
D	20" MANWAY	MANWAY	N	20"	WEST END	TBD	FL
E	3"–AE	pH PROBE	N	3"	WEST END	TBD	FL
F	18"–	TO EFFLUENT/BACKWASH PUMPS	N	18"	NORTH END	TBD	FL

TOT = TOP OF TANK
FL = EXTERIOR FLANGE PROVIDED
FLxFL = EXTERIOR FLANGE AND INTERIOR FLANGE PROVIDED

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

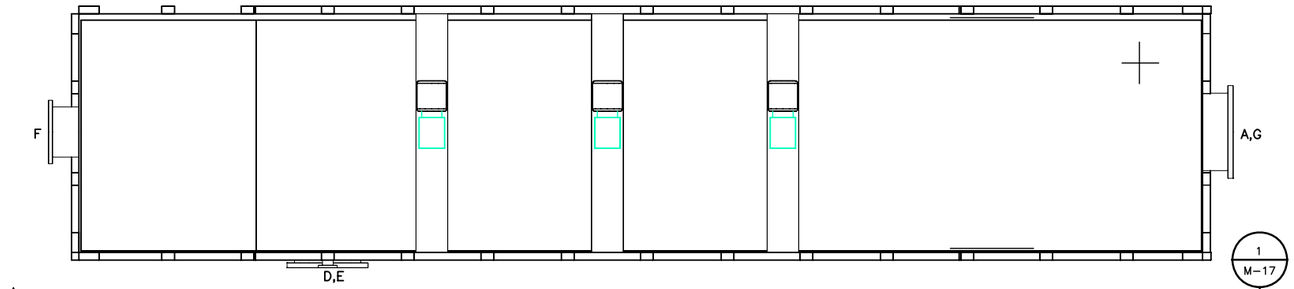
MECHANICAL

EFFLUENT MONITORING TANK #1 NOZZLE SCHEDULE

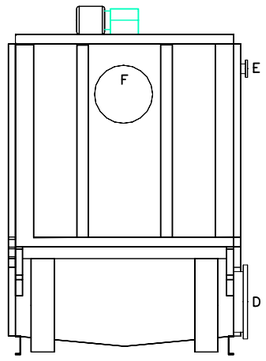
IN CHARGE OF JSR
DESIGNED BY NTZ CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613–M16
DATE APRIL 2010

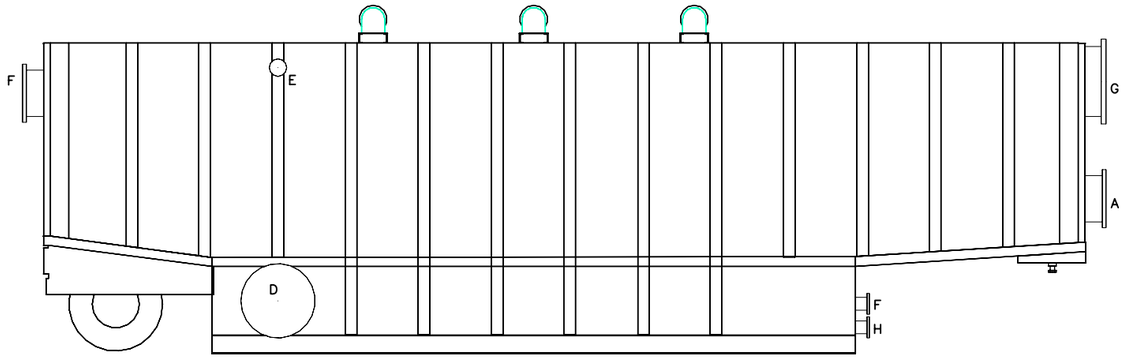
M–16



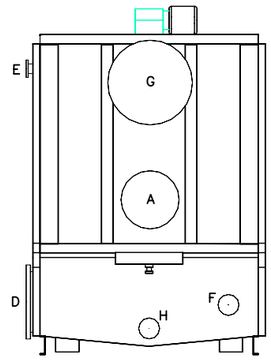
PLAN
NOT TO SCALE



NORTH END
NOT TO SCALE



SECTION
NOT TO SCALE
1
M-17



SOUTH END
NOT TO SCALE

NOTES:

1. TANK MANUFACTURER TO INSTALL NOZZLE AS LOW AS POSSIBLE ON TANK SIDEWALL LEAVING ADEQUATE CLEARANCE FOR NOZZLE FLANGE.
2. ALL NOZZLES TO EXTEND 6" FROM TANK TOP/WALL TO FACE OF FLANGE.
3. REFER TO "DOWNCOMER DETAIL" SHEET M-19.
4. DOWNCOMERS SHALL EXTEND DOWN TO 2'-0" ABOVE TANK FLOOR. TANK MANUFACTURER TO SUPPORT DOWNCOMER FROM TANK WALL AND/OR FLOOR TO ENSURE STRUCTURAL INTEGRITY OF DOWNCOMER IN AGITATED TANK.
5. NOZZLE "D" SHALL BE PROVIDED WITH GASKETS AND BLIND FLANGES PROVIDED BY TANK MANUFACTURER.
6. ALL NOZZLE ELEVATIONS ARE FROM TANK BOTTOM TO CENTERLINE OF NOZZLE, UNLESS OTHERWISE NOTED.
7. TANK TOP HANDRAIL AND TIE-OFF POINTS NOT SHOWN FOR CLARITY.
8. BOLT HOLES FOR EACH NOZZLE FLANGE SHALL STRADDLE THE NOZZLE CENTERLINE.

NOZZLE	CONNECTION	DESCRIPTION	DOWNCOMER SEE NOTE 3	DIAMETER	ORIENTATION	CENTERLINE HIGHT	TYPE
A	18"-	TO EFFLUENT/BACKWASH PUMPS	N	18"	NORTH END	TBD	FL
B	4"-LSL	LOW LEVEL	N	4"	NORTH END	TBD.	FL
C	4"-DRAIN	DRAIN	N	4"	NORTH END	TBD	FL
D	20" MANWAY	MANWAY	N	20"	EAST END	TBD	FL
E	3"-AE	pH PROBE	N	3"	EAST END	TBD	FL
F	18"-	FROM EFFLUENT MONITORING TANK #1	N	18"	SOUTH END	TBD	FL
G	28"-TRWW-078-HDPE	EFFLUENT TO METRO	N	28"	NORTH END	TBD	FL

TOT = TOP OF TANK
FL = EXTERIOR FLANGE PROVIDED
FLxFL = EXTERIOR FLANGE AND INTERIOR FLANGE PROVIDED

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
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O'BRIEN & GERE ENGINEERS INC.

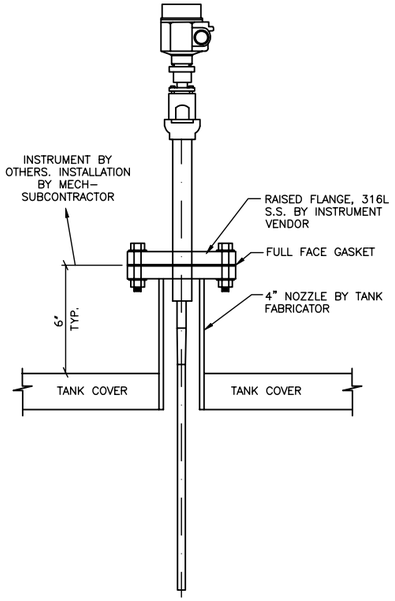
HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL
EFFLUENT MONITORING TANK #2 NOZZLE SCHEDULE

IN CHARGE OF JSR
DESIGNED BY NTZ CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M16
DATE APRIL 2010

M-17



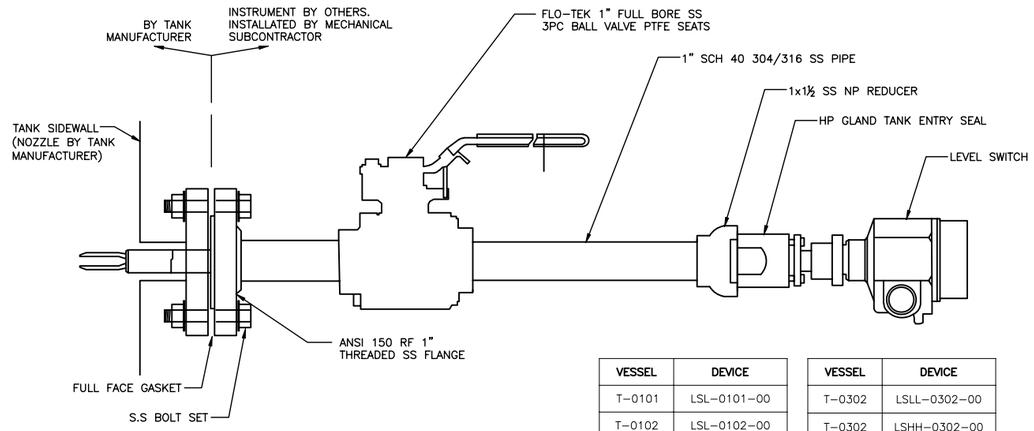
TOP–MOUNTED LEVEL SWITCH

NOT TO SCALE

NOTE:

1. DETAIL PROVIDED FOR REFERENCE ONLY. INSTALL PER MANUFACTURERS INSTRUCTIONS.

VESSEL	DEVICE
T–0101	LSH–0101–00
T–0102	LSH–0102–00
T–0103	LSH–0103–00
T–0104	LSH–0104–00
T–0105	LSH–0105–00
T–0106	LSH–0106–00
T–0107	LSH–0107–00
T–0108	LSH–0108–00
T–0301	LSH–0301–00
IPC–0601 TO IPC–0616	LSH–0601–00 TO LSH–0616–00
T–0701	LSH–0701–00
T–1001	LSHH–1001–00
T–1002	LSHH–1002–00
T–1101	LSHH–1101–00
T–1101	LSLL–1101–00
T–1301	LSHH–1301–01
T–1201	LSHH–1201–01
T–1401	LSHH–1401–02



SIDE–MOUNTED RETRACTABLE EXTENDED LEVEL SWITCH

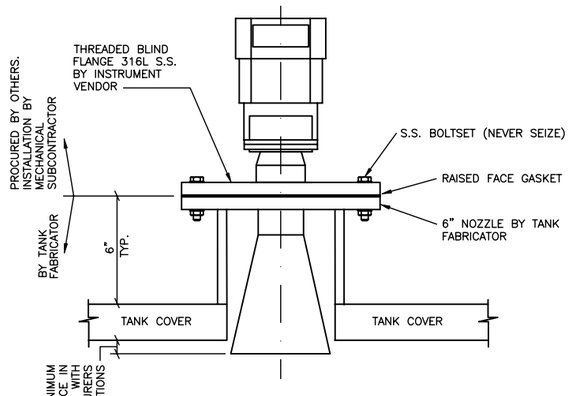
N.T.S.

NOTES:

1. REFER TO P&ID'S FOR NOZZLES WITH LEVEL SWITCHES.
2. DETAIL PROVIDED FOR REFERENCE ONLY. INSTALL PER MANUFACTURERS INSTRUCTIONS.

VESSEL	DEVICE
T–0101	LSL–0101–00
T–0102	LSL–0102–00
T–0103	LSL–0103–00
T–0104	LSL–0104–00
T–0105	LSL–0105–00
T–0106	LSL–0106–00
T–0107	LSL–0107–00
T–0108	LSL–0108–00
T–0301	LSL–0301–00

VESSEL	DEVICE
T–0302	LSLL–0302–00
T–0302	LSHH–0302–00
IPC–0601 TO IPC–0616	LSL–0601–00 TO LSL–0616–00
T–0701	LSLL–0701–00
T–1001	LSLL–1001–00
T–1002	LSLL–1002–00
T–1301	LSLL–1301–01
T–1201	LSLL–1201.01
T–1401	LSLL–1401–02



RADAR LEVEL TRANSMITTER

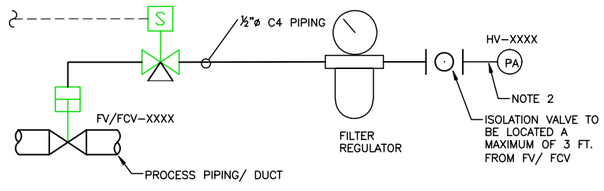
NOT TO SCALE

VESSEL	DEVICE
T–0302	LIT–0302–00
T–0701	LIT–0701–00
T–1002	LIT–1002–00
T–1101	LIT–1101–00

VESSEL	DEVICE
T–1301	LIT–1301–01
T–1201	LIT–1201–01
T–1401	LIT–1401–02

NOTE:

1. DETAIL PROVIDED FOR REFERENCE ONLY. INSTALL PER MANUFACTURERS INSTRUCTIONS.



PLANT AIR DETAIL FOR PNEUMATICALLY ACTUATED FV/FCV

NOT TO SCALE

NOTES:

1. APPLY THIS DETAIL TO EACH PNEUMATICALLY OPERATED FV AND FCV IN THE CONTRACT.
2. PROVIDE ½"ø BLOW–OFF VALVES AT ALL COMPRESSED AIR LOW POINTS.
3. DETAIL PROVIDED FOR REFERENCE ONLY. INSTALL PER MANUFACTURERS INSTRUCTIONS.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

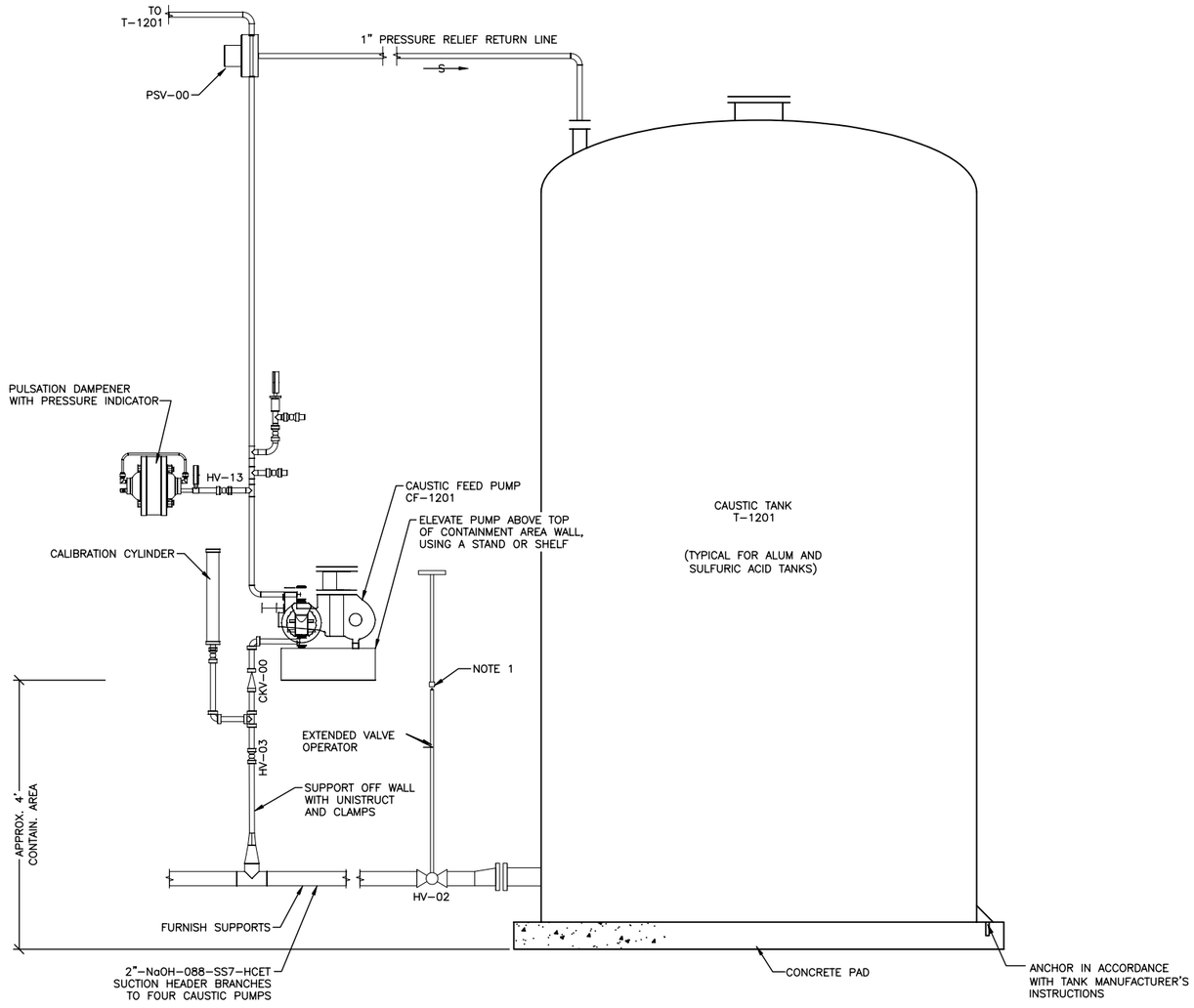
MECHANICAL

DETAILS

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613–M18
DATE MAY 2010

M–18

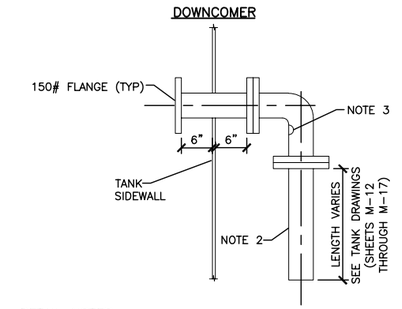


BULK CHEMICAL STORAGE

NOT TO SCALE

NOTES:

1. MANUAL VALVE OPERATOR THAT CONNECTS TO KEY. IN THE EVENT OF A SPILL, OPERATOR TO BE CAPABLE OF OPENING/CLOSING VALVE WITHOUT ENTERING CONTAINMENT.

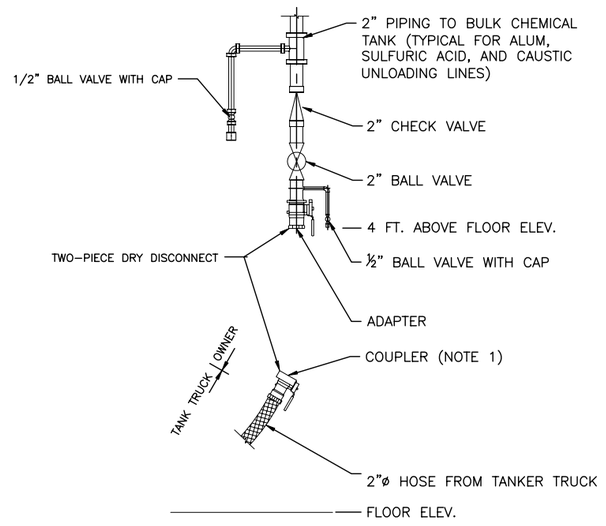


DETAIL NOTES:

1. SEE NOZZLE SCHEDULES FOR LENGTHS OF DOWNCOMERS AND STILLING WELLS.
2. FOR DOWNCOMERS PIPES:
   a. FOR TANK INFLUENT PIPES THAT ARE LESS THAN OR EQUAL TO 2", DOWNCOMER PIPES ARE TO BE 2" DIAMETER.
   b. FOR TANK INFLUENT PIPES THAT ARE GREATER THAN 2", DOWNCOMER PIPES ARE TO MATCH THE INFLUENT PIPES DIAMETERS.
3. ALL DOWNCOMER PIPES TO HAVE 1/2" DIAMETER HOLE AT HIGH POINT INSIDE THE TANK.
4. MATCH DOWNCOMER PIPES MATERIALS OF CONSTRUCTION WITH TANKS MATERIAL OF CONSTRUCTION.

DOWNCOMER DETAIL

NOT TO SCALE



BULK UNLOADING PIPING CONNECTION DETAIL

NOT TO SCALE

NOTES:

1. OPERATING PROCEDURE WILL REQUIRE MANUAL THREADING OF COUPLER TO 2"ø HOSE FROM TANKER TRUCK.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
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O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

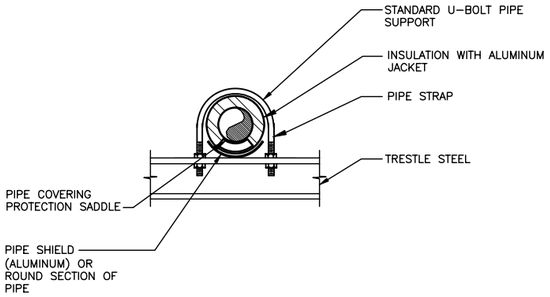
DETAILS

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M19

DATE MAY 2010

M-19

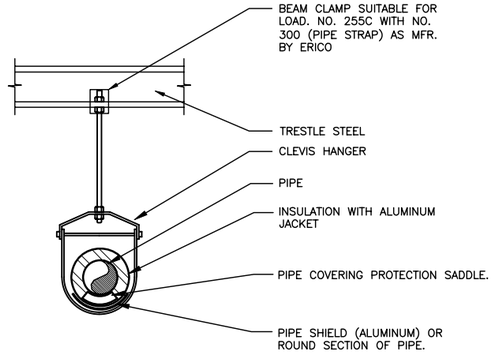


SUPPORT DETAIL 1

SCALE: NTS

NOTES:

1. TYPICAL SUPPORT DETAIL FOR INSULATED OUTDOOR PIPING.
2. FOR NON-METALLIC PIPING COORDINATE INSTALLATION AND SUPPORTS WITH MANUFACTURER'S INSTRUCTIONS.

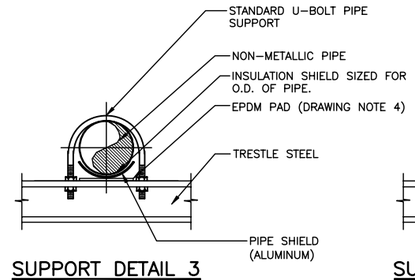


SUPPORT DETAIL 2

SCALE: NTS

NOTES:

1. TYPICAL SUPPORT DETAIL FOR OUTDOOR PIPING SUPPORTED BELOW TRESTLE STEEL.
2. FOR NON-METALLIC PIPING COORDINATE INSTALLATION AND SUPPORTS WITH MANUFACTURER'S INSTRUCTIONS.

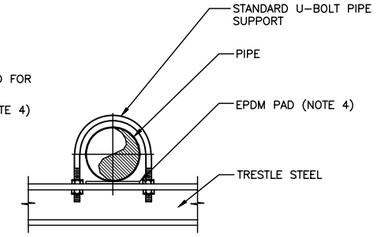


SUPPORT DETAIL 3

SCALE: NTS

NOTES:

1. TYPICAL SUPPORT DETAIL FOR INDOOR NON-METALLIC PIPING SUPPORTED ABOVE TRESTLE STEEL



SUPPORT DETAIL 4

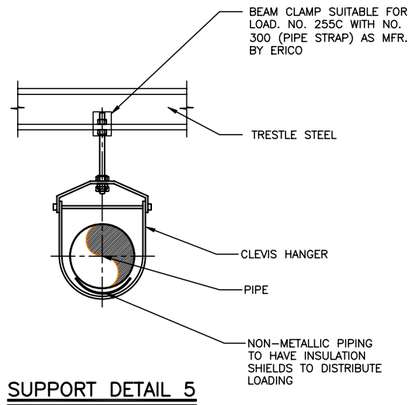
SCALE: NTS

NOTES:

1. TYPICAL SUPPORT DETAIL FOR INDOOR PIPING (EXCEPT NON-METALLIC) ABOVE TRESTLE STEEL

NOTES:

1. HANGERS AND SUPPORTS SHALL BE SPACED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND AS SHOWN ON THE CONTRACT DRAWINGS AND IN THE SPECIFICATIONS.
2. PROVIDE MANUAL AIR RELIEF AT ALL HIGH POINTS.
3. PROVIDE MANUAL DRAIN AT ALL LOW POINTS.
4. PROVIDE 1/8"x4"x6" EPDM PADS BETWEEN SUPPORTS FOR FRP AND STEEL AND BETWEEN DISSIMILAR METALS.
5. U-BOLTS SHALL BE 1/4" FOR 4"ø PIPING AND LESS.
6. U-BOLTS SHALL BE 1/2" FOR PIPING AND DUCT GREATER THAN 4"ø.
7. PROVIDE INSULATION SHIELDS FOR FRP AND PLASTIC PIPES AT EACH SUPPORT POINT.
8. ALTERNATIVE METHODS OF SUPPORTING THE PIPE AND DUCT SHALL BE REVIEWED AND APPROVED BY ENGINEER PRIOR TO FABRICATION OR PURCHASE OF SUPPORTS.
9. PROTECTION SADDLE TO BE USED TO SUPPORT FRP PIPING AND SHALL HAVE A FULL CONTACT ANGLE WITH THE PIPE AS RECOMMENDED IN THE FRP MANUFACTURER DESIGN GUIDES.

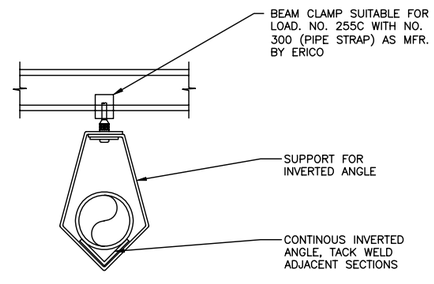


SUPPORT DETAIL 5

SCALE: NTS

NOTES:

1. TYPICAL SUPPORT DETAIL FOR INDOOR PIPING SUPPORTED BELOW TRESTLE STEEL.

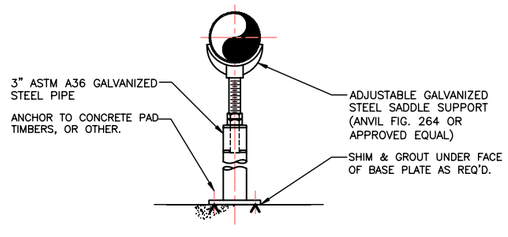


SUPPORT DETAIL 6

SCALE: NTS

NOTES:

1. TYPICAL FOR INDOOR CONTINUOUS SUPPORT. MODEL NO. 104V AS MANUFACTURED BY ERICO (OR EQUAL). ANGLE TO BE SIZED APPROPRIATELY FOR SUPPORT SPACING AND PIPE WEIGHTS.



FLOOR SUPPORT DETAIL

SCALE: NTS

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

DETAILS

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-M20
DATE MAY 2010

M-20

PIPING SYMBOLS

PIPE LINES

- NEW PIPING
- EXISTING PIPING
- SECONDARY HOSE
- FLUID DESTINATION / CONN. P&ID NO. — OFF–DRAWING PIPING CONNECTOR (COIL., ROW ON CONN. P&ID)
- FL CODE / P&ID — OFF–DRAWING UTILITY CONNECTOR
- TIE–IN POINT
- PIPING AND/OR EQUIPMENT TO BE REMOVED
- M.S. — INDICATES SCOPE BREAK FOR MECHANICAL SUB–CONTRACTOR
- FL CODE / P&ID — OFF–DRAWING DRAIN CONNECTOR

VALVES

- GATE VALVE
- EXTENDED BODY GATE VALVE
- VENT/DRAIN GATE VALVE
- BLANK GATE VALVE
- BUTTERFLY VALVE
- KNIFE GATE VALVE
- SLIDE VALVE
- 3–WAY SLIDE VALVE
- GLOBE VALVE
- ANGLE GLOBE VALVE
- Y GLOBE VALVE
- 3–WAY GLOBE VALVE
- NEEDLE VALVE
- HOSE VALVE
- ANGLE HOSE VALVE
- BALL VALVE
- 3–WAY BALL VALVE
- ANGLE BLOWDOWN VALVE
- Y BLOWDOWN VALVE
- TANK DRAIN VALVE
- PLUG VALVE
- 3–WAY PLUG VALVE
- 4–WAY PLUG VALVE
- DIAPHRAGM VALVE
- PINCH VALVE
- CHECK VALVE
- WAFER CHECK VALVE
- ANGLE CHECK VALVE
- STOP CHECK VALVE
- ANGLE STOP CHECK VALVE
- Y STOP CHECK VALVE
- BACKFLOW PREVENTER
- AUTOMATIC RECIRCULATION VALVE
- MULTIVANE DAMPER OR LOUVER VALVE
- SINGLE DAMPER OR LOUVER VALVE
- ANGLE VALVE
- 3–WAY VALVE
- 4–WAY VALVE
- EXCESS FLOW VALVE
- PULSATION DAMPENERS
- FE — BALANCING VALVE
- LC — FLOAT VALVE
- CSV — CSV CONSERVATION BREATHER VENT
- FLAPPER VALVE
- DIAPHRAGM AIR RELEASE VALVE
- BLAST GATE
- AUTOMATIC AIR & VACUUM RELIEF VALVE

PIPING SEGMENT LABELS

2–XXX–0000–XXX–XX–XX

- HEAT TRACING
- INSULATION PURPOSE
- MATERIAL SPECIFICATION
- LINE NUMBER
- FLUID CODE
- LINE SIZE (IN INCHES)

BOUNDARY LINES

- PACKAGE
- SYSTEM BOUNDARY
- VENDOR

PIPING

MATERIAL	DESIGNATION	PRESSURE RANGE
ALLOY	AL6XN	TBD
COPPER TUBING (TYPE K)	C4	420# AT 250°F
CAST IRON	CI	ATMOS AT AMB
CS	CS1	150# ANSI B16.5
CS	CS2	125# ANSI B16.1
CS	CS3	300# AT 550°F
CS	CS4	AT 350°F
CS	CS5	300# AT 550°F
CS	CS6	SCHED 20
CS	CS7	SCHED 10
SCH80 CPVC	CPVC	100# AT 100°F
DUCTILE IRON	DI	ATMOS AT 75°F
FRP PIPE	FRP	150# AT 100°F
FRP DUCT W/ LINER	FRP2	±" TBD WC
GALVANIZED STEEL	GS	
POLYETHYLENE TUBING	PE	90# AT 73°F
PTFE LINED	PTFE	TBD
SCH80 PVC	PVC	100# AT 100°F
304L S/S TUBING	SS2	1000# AT 150°F
304 S/S	SS1	150# AT 300°F
304 S/S	SS3	150# ANSI B16.5 AT –320°F THRU 120°F
316L S/S TUBING	SS4	125# AT 250°F
316L S/S TUBING	SS5	150# AT 350°F
316L S/S	SS6	150# AT (–)100°F
316 S/S	SS7	150# ANSI B16.5 AT –20°F THRU 100°F
316L S/S CORE W/VAC INSULATION & 304 SS JACKET	SS8	150# AT (–)300°F
316 S/S CS	SS9	SHEETMETAL DUCTING
TEFLON TUBING	TF	75# AT 73°F
SCHED 80 PVC	PVC80	
HDPE DR 32.5	HDPE	

INSULATION PURPOSE DESIGNATIONS

- IC – COLD CONSERVATION/ANTISWEAT
- HC – HEAT CONSERVATION
- IP – PERSONAL PROTECTION

PIPELINE TRACING DESIGNATIONS

- ST – STEAM TRACING
- ET – ELECTRIC TRACING
- CT – COLD FLUID TRACING
- JK – JACKETED PIPE

PIPING FLUID CODE DESIGNATIONS

AIR	–	ATMOSPHERIC AIR
AF	–	ANTIFOAM
BA	–	AERATION AIR
BW	–	BACKWASH WASTE
C125	–	CONDENSATE, 125 PSIG
C50	–	CONDENSATE, 50 PSIG
CH4	–	NATURAL GAS
CHS,–R	–	HVAC CHILLED WATER SUPPLY, RETURN, 42"F
CNTC	–	CONTAMINATED CONDENSATE
COAG	–	COAGULANT
CS	–	CLEAN STEAM
DE	–	DIATOMACEOUS EARTH
DIW	–	DEIONIZED WATER
DNAPL	–	DENSE NON–AQUEOUS PHASE LIQUID
DR	–	DRAIN
FA	–	FERMENTATION AIR
FILTR	–	BFP FILTRATE/FLOOR SUMP
FW	–	FIRE WATER
GW	–	GROUND WATER
H2O2	–	HYDROGEN PEROXIDE
H2SO4	–	SULFURIC ACID
HYD	–	HYDRAULIC FLUID
IA	–	INSTRUMENT AIR
LNAPL	–	LIGHT NON–AQUEOUS PHASE LIQUID
MACT	–	MACT REGULATED WW
MICRO	–	MICRONUTRIENT
N2G,–L	–	NITROGEN GAS, LIQUID
NaOCL	–	SODIUM HYPOCHLORITE
NAOH	–	SODIUM HYDROXIDE SOL'N
P	–	PROCESS
PA	–	PLANT AIR
PC	–	PROCESS CHEMICAL
PHOS	–	PHOSPHORIC ACID
POLY	–	POLYMER
POLY A	–	POLYMER (ANIONIC)
POLY C	–	POLYMER (CATIONIC)
PS	–	PROCESS SEWER
PV	–	PROCESS VACUUM
PW	–	PLANT WATER
RF	–	REFRIGERENT
S125	–	STEAM, 125 PSIG
S40	–	STEAM, 40 PSIG
SA	–	STERILE AIR
SAN	–	SANITARY SEWER
SEQ	–	SEQUESTERING AGENT
SF	–	SEAL FLUID
SL	–	SCRUBBER LIQUOR
SLUDGE	–	SLUDGE
SOL	–	SOLVENT
SW	–	STORM WATER
THIO	–	SODIUM THIOSULFATE
TRWW	–	TREATED WASTEWATER
TWS,–R	–	TOWER WATER SUPPLY,–RETURN
UR	–	UREA
VOC	–	VAPOR ORGANIC COMPOUNDS
VT	–	VENT
WAS	–	WASTE ACTIVATED SLUDGE DOMESTIC WATER
WD,–CW–	–	SUPPLY,–RETURN
WDH	–	HOT DOMESTIC WATER
WFI	–	WATER FOR INJECTION
WFIS	–	PURE STEAM
WP	–	PROCESS WATER
WPH	–	HOT PROCESS WATER
WPUR	–	PURIFIED WATER
WW	–	WASTE WATER

FITTINGS

- FLANGE
- ORIFICE FLANGE
- FIX UNION
- BLIND FLANGE
- OPEN SPECTACLE BLANK
- CLOSE SPECTACLE BLANK
- SPACER
- PADDLE BLANK
- PLUG
- CAP
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER (FLAT ON TOP)
- HOSE CONNECTION
- TRICLAMP STERILE CONNECTION
- INGOLD CONNECTION W/TRICLAMP
- SLIP ON HOSE CONNECTION
- BAYONET CONNECTION FOR TUBING
- FLEX CONNECTOR
- QUICK CONNECTION
- CLEANOUT
- HARNESSED COUPLING

SPECIALITY

- WEATHER CAP
- EXPANSION JOINT
- Y STRAINER
- T — STEAM TRAP
- PULSATION DAMPENER
- CALIBRATION TUBE
- SNUBBER
- FILTER
- FILTER/REGULATOR/GAUGE
- EJECTOR
- CHEMICAL SEAL
- DRAIN
- MUFFLER

PUMP SEAL TYPES

SEAL TYPE 1	SINGLE MECHANICAL SEAL, NO FLUID FLUSH
SEAL TYPE 2	SINGLE SEAL OR PACKING, FLUSH LIQUID FROM PUMP DISCHARGE
SEAL TYPE 3	SINGLE SEAL OR PACKING, EXTERNAL FLUSH LIQUID
SEAL TYPE 4	DOUBLE MECHANICAL SEAL, FLUSH EXTERNAL FLUSH LIQUID
SEAL TYPE 5	DOUBLE MECHANICAL SEAL, FLUSH LIQUID FROM PUMP DISCHARGE
SEAL TYPE 6	SEAL–LESS PUMP
SEAL TYPE 7	DOUBLE SEAL, FLUSH LIQUID FROM LOCAL CONTAINER
SEAL TYPE 8	DOUBLE SEAL FOR AGITATOR WITH PRESSURE CONVECTION COOLER
SEAL TYPE 9	DRY SEAL

EQUIPMENT SYMBOL

- CENTRIFUGAL FAN
- M — CENTRIFUGAL PUMP
- DIAPHRAGM OR TUBULAR METERING PUMP
- M — MIXER OR FLOCCULATOR WITH ELECTRIC MOTOR

EQUIPMENT SYMBOL

- PROCESS VESSEL (NON–PRESSURIZED)
- PROCESS VESSEL (PRESSURIZED)
- AIR OPERATED DIAPHRAM (AOD) PUMP
- ROTARY LOBE PUMP
- ROTARY POSITIVE DISPLACEMENT BLOWER
- EJECTOR/EDUCTOR
- PERISTALTIC PUMP
- SPILL TRAY

SIGNAL LINES

- CONNECTION TO PROCESS LINE
- CAPILLARY TUBE
- ELECTRIC
- PNEUMATIC
- HYDRAULIC
- SOFTWARE OR DATA LINK
- MECHANICAL LINK

CONTROL VALVES AND REGULATORS

- SELF CONTAINED PRESSURE REDUCING REGULATOR
- PRESSURE REDUCING REGULATOR WITH EXTERNAL TAP
- PRESSURE REDUCING REGULATOR WITH INTEGRAL OUTLET PRESSURE RELIEF VALVE
- SELF CONTAINED BACKPRESSURE REGULATOR
- BACKPRESSURE REGULATOR WITH EXTERNAL TAP
- DIFFERENTIAL PRESSURE REDUCING REGULATOR WITH INTERNAL AND EXTERNAL TAPS
- FILLED SYSTEM TEMPERATURE REGULATOR
- LEVEL REGULATOR WITH MECHANICAL LINKAGE
- INSTRUMENT AIR SUPPLY WITH REGULATOR
- ON/OFF FLOW CONTROL VALVE (PNEUMATIC ACT. W/ SPRING RETURN)
- E — ON/OFF FLOW CONTROL VALVE (ELECTRIC ACT. W/ SPRING RETURN)

RELIEF DEVICES

- ANGLE PRESSURE RELIEF VALVE
- STRAIGHT–THRU PRESSURE RELIEF VALVE OR CONSERVATION VENT
- VACUUM RELIEF VALVE OR CONSERVATION VENT
- PRESSURE AND VACUUM RELIEF VALVE
- PRESSURE AND VACUUM RELIEF MANHOLE COVER
- PRESSURE RELIEF RUPTURE DISK
- VACUUM RELIEF RUPTURE DISK
- TEMPERATURE FUSIBLE PLUG OR DISK

PIPING SEGMENT LABELS

- FLAME ARRESTOR
- DETONATION FLAME ARRESTOR
- HAMMER ARRESTOR
- EXHAUST HEAD
- BREATHER CAP
- WEATHER CAP
- WEATHER CAP
- MIXING TEE
- SPRAY NOZZLE
- RS — REMOVABLE SPOOL
- SWING ELBOW
- EXPANSION JOINT
- MOTOR
- DRESSER COUPLING
- FLEXIBLE HOSE
- SAMPLE COOLER
- CARTRIDGE FILTER
- TWIN BASKET STRAINER
- T STRAINER
- Y STRAINER
- BASKET STRAINER
- CONE STRAINER
- FLAT PLATE STRAINER
- SUMP STRAINER
- FILTER
- STILLING WELL WITH PROBE INSERT
- VB — VACUUM BREAKER
- T — STEAM TRAP
- IBT — INVERTED BUCKET STEAM TRAP
- TST — THERMOSTATIC STEAM TRAP
- TDT — THERMODYNAMIC STEAM TRAP
- IT — IMPULSE STEAM TRAP
- GENERIC COMPONENT
- T1 — STEAM TRAP ASSEMBLY INCLUDING STRAINER, BLOCK VALVES AND BYPASS WITH VALVE CARBON STEEL
- T2 — STEAM TRAP ASSEMBLY STAINLESS STEEL
- S — SAMPLE PROBE
- SECONDARY CONTAINMENT
- HT — INSULATED, HEAT TRACED
- INSULATED
- STATIC MIXER

LETTER DESIGNATION OF EQUIPMENT

AG	–	AGITATOR
BL	–	BLOWER / FAN
CE	–	CENTRIFUGE
CF	–	CHEMICAL FEED UNIT
CMP	–	COMPRESSOR
CV	–	CHEMICAL VESSEL
D	–	SCRUBBER
DE	–	DECANTER
FP	–	FILTER PRESS
GAC	–	GRANULAR ACTIVATED CARBON VESSEL
GR	–	GRINDER
HP	–	HYDRAULIC PUMP
IE	–	ION EXCHANGE
IPC	–	INCLINED PLATE CLARIFIER
LGAC	–	LIQ. PHASE GRANULAR ACTIVATED CARBON UNITS
MH	–	MAINTENANCE SHOP HAND HOIST
MIX	–	MIXER
MMF	–	MULTIMEDIA FILTER VESSEL
PB	–	POLYMER BLENDING
PLF	–	PRESSURE LEAF FILTER
PM	–	PIPING MANIFOLD
PU	–	PUMP
R	–	REACTOR
RTO	–	REGENERATIVE THERMAL OXIDIZER
SK	–	SPRAY COOLER
SI	–	SILENCER
SM	–	STATIC MIXER
SP	–	COMPOSITE SAMPLER
ST	–	AIR STRIPPER
STI	–	STEAM INJECTOR
T	–	TANK
TB	–	TOTE
TD	–	ELECTRIC HOIST
TK	–	PROCESS VESSEL
TZ	–	DIESEL GENERATOR
VGAC	–	VAPOR PHASE CARBON UNIT
W	–	ROLLOFF WINCH
X	–	FUME HOOD
ZZ	–	LAB INSTRUMENTS

LETTER DESIGNATION OF VALVES

- ARV – AUTOMATIC AIR RELIEF VALVE
- A/VRV – AUTOMATIC AIR/VACUUM RELIEF VALVE
- BPV – BACK PRESSURE VALVE
- CKV – CHECK VALVE
- HV – HAND VALVE
- FCV – FLOW CONTROL VALVE
- FV – FLOW VALVE
- LCV – LEVEL CONTROL VALVE
- PRV – PRESSURE REDUCING VALVE
- PSV – PRESSURE RELIEF VALVE
- TCV – TEMPERATURE CONTROL VALVE
- VRV – VACUUM RELIEF VALVE

EQUIPMENT NUMBER IDENTIFICATION

Equipment Tag Numbering:
***-XXYYA, where:

***	Letter designation of equipment, may be fewer or more than 3 letters (e.g., T indicates tank). Refer to the Lead Sheets for list of letter designations for equipment.
XX	Subsystem number, two digits (e.g., 03 indicates Flash Mixing). Refer to the Lead Sheets for list of numerical designations for subsystems.
YY	Sequential numbering for identical equipment items, two digits (e.g., 01 indicates the equipment or tank is the first of one or more identical units).
A, B, C, or D, etc.	Additional categorization, where required, for duplicate items (e.g., MIX–0301C would indicate the mixer is the third identical unit within the first Flash Mixing Tank). This letter will be left blank if there is only one mixer in the tank.

Subsystem Number	Subsystem
01	pH Adjustment (Rough)
02	pH Adjustment (Fine)
03	Flash Mix
04	Flocculation
05	Distribution Box
06	Clarification
07	Filter Feed
08	Multimedia Filtration
09	GAC Adsorption
10	Effluent Monitoring
11	Sludge Holding and Transfer
12	Sodium Hydroxide (Caustic)
13	Sulfuric Acid and Bulk Unloading
14	Aluminum Sulfate (Alum)
15	Plant Water
16	Compressed Air
17	Miscellaneous

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

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PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION

LEGEND & SYMBOLS

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613–IA
DATE APRIL 2010

I–A

May 11, 2010 – 7:12pm

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SYMBOLS

IN-LINE INSTRUMENTS

- ORIFICE PLATE
- ORIFICE PLATE IN QUICK CHANGE FITTING
- FLOW NOZZLE
- VENTURI TUBE
- SINGLE PORT PITOT TUBE
- PITOT-VENTURI TUBE
- AVERAGING PITOT TUBE
- VALVE WITH RESTRICTION ORIFICE

IN-LINE INSTRUMENTS

- ROTAMETER WITHOUT ADJUSTABLE VALVE
- ROTAMETER WITH ADJUSTABLE VALVE
- FLOW GAUGE
- POSITIVE DISPLACEMENT FLOW SENSOR
- TARGET FLOW SENSOR
- TURBINE OR PROPELLER FLOW SENSOR
- VORTEX FLOW SENSOR
- ULTRASONIC FLOW SENSOR
- MASS FLOW SENSOR
- MAGNETIC FLOW TUBE
- FLUME
- WEIR
- SEGMENTAL WEDGE
- FLOW STRAIGHTENING VANE
- ORIFICE PLATE WITH FLANGES
- CALIBRATION CYLINDER
- SIGHT FLOW INDICATOR
- PULSATION DAMPENER
- ORIFICE PLATE W/FLANGES

INSTRUMENT COMPONENT LABELS

- BALLOON WITH TAG NUMBER
- EXISTING
- TOP MOUNTED ACCESSORY
- SIDE MOUNTED ACCESSORY
- DIAPHRAGM ACTUATOR
- PRESSURE-BALANCED DIAPHRAGM ACTUATOR
- 2-WAY SOLENOID VALVE
- ANGLE SOLENOID VALVE
- 3-WAY SOLENOID VALVE
- POSITIONER ACCESSORY
- INTERLOCK WITH IDENTIFICATION NUMBER
- CAPACITANCE SENSOR ACCESSORY
- BALL FLOAT ACCESSORY
- DISPLACEMENT FLOAT ACCESSORY
- DUAL-FLOAT ACCESSORY
- DIAPHRAGM SEAL ACCESSORY
- PADDLE WHEEL ACTUATOR
- SHEET NUMBER
- I-XX / TAG# — SIGNAL CONTINUATION
- CORESPONDING INSTRUMENT
- OPERATOR STATION INDICATOR/CONTROL
- AI — PLC ANALOG INPUT
- DI — PLC DIGITAL INPUT
- AO — PLC ANALOG OUTPUT
- DO — PLC DIGITAL OUTPUT

INSTRUMENT COMPONENT LABELS

- I/P — CONVERTS ELECTRICAL INPUT TO PNEUMATIC
- LEVEL SWITCH (FLOAT TYPE)
- ZS — POSITION SWITCH
- ZSC — POSITION SWITCH CLOSED
- ZSO — POSITION SWITCH OPEN
- ZI — POSITION INDICATOR

ELECTRIC SWITCH DESIGNATION

- HS – HAND SWITCH
- HPS – HAND PNEUMATIC SWITCH
- HOA – HAND OFF AUTOMATIC SWITCH
- PB – PUSH BUTTON
- PBL – PUSH BUTTON W/LIGHT
- PB2 – TWO PUSH BUTTONS
- PB2L – TWO PUSH BUTTONS W/LIGHT
- SS – SELECTOR SWITCH
- OCA – OPEN CLOSED AUTO

OFF-LINE INSTRUMENTS

- FIELD MOUNTED INSTRUMENT
- DISCRETE INSTRUMENT PRIMARY LOCATION ACCESSIBLE TO OPERATOR
- DISCRETE INSTRUMENT AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR
- SINGLE FUNCTION INSTRUMENT LOCATED IN LOCAL CONTROL ROOM OR BACKUP PANEL (NOT NORMALLY ACCESSABLE) REAR OF PANEL
- SHARED DISPLAY/CONTROL FUNCTION, PRIMARY LOCATION ACCESSIBLE TO OPERATOR
- SHARED DISPLAY/CONTROL FUNCTION, AUXILIARY LOCATION ACCESSIBLE TO OPERATOR
- PROGRAMMABLE LOGIC CONTROL FUNCTION, PRIMARY LOCATION ACCESSIBLE TO OPERATOR
- PROGRAMMABLE LOGIC CONTROL FUNCTION, AUXILIARY LOCATION ACCESSIBLE TO OPERATOR
- PROGRAMMABLE LOGIC CONTROL FUNCTION, FIELD MOUNTED
- FIELD INDICATION LIGHT
- PANEL MOUNTED INDICATION LIGHT

INSTRUMENT IDENTIFICATION

PIC – XXX YY A

- A — SUFFIX IF REQUIRED
- YY — SEQUENTIAL No. ON P&ID
- XXX — No. OF P&ID ON WHICH INSTRUMENT APPEARS
- PIC — MEASURED VARIABLE AND INSTRUMENT FUNCTION

PANEL IDENTIFICATION

XXX A B

- B — ALPHA SUFFIX
- A — ASSOCIATED LOCAL CONTROL ROOM
- XXX — PANEL TYPE

PANEL TYPES :

- MBP – MANUAL BACKUP PANEL (HPS & HIC)
- DIP – DIGITAL INDICATOR PANEL (LCD'S)
- CVIB – CONTROL VALVE INTERFACE BOX (EV'S & I/P)
- MP – MARSHALLING PANEL
- TTP – TEMPERATURE TRANSMITTER PANEL

LETTER IDENTIFICATION OF INSTRUMENTS

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

NO.	DATE	REVISION	INIT.
D	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
C	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
B	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

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WATER TREATMENT PLANT
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PROCESS AND INSTRUMENTATION

LEGEND & SYMBOLS

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

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DATE FEBRUARY 2010

I-B

Honeywell
SCA WTP
Draft Interlock List
10-May-10

Interlock No.	P&ID(s)	Description
1	I-01	At a high-high-high (HHH) influent turbidity, as indicated by AE/AIT-00 for one minute or more, WTP influent valve FV-02 will automatically close. Coordinate with the SCA project, to determine if a valve position signal can be used to shut down the SCA d
2	I-01, I-14, I-15	At a low (L) liquid level in pH Adjust Tank #1 (T-0101), as indicated by LSL/LAL-0101-00, Mixers MIX-0101A, 0101B, 0101C, and 0101D will automatically shut down. Stop the addition of sodium hydroxide or sulfuric acid by shutting down CF-1201 and CF-1301,
3	I-01, I-14, I-15	At a high (H) liquid level in pH Adjust Tank #1 (T-0101), as indicated by LSH/LAH-0101-00, tank influent valve FCV-00 will automatically close. Stop the addition of sodium hydroxide or sulfuric acid by shutting down CF-1201 and CF-1301, respectively. Co
4	NA (Pertains to pH Adjust Tank #5), I-14, I-15	At a low (L) liquid level in pH Adjust Tank #5 (T-0105), as indicated by LSL/LAL-0105-00, Mixers MIX-0105A, 0105B, 0105C, and 0105D will automatically shut down. Stop the addition of sodium hydroxide or sulfuric acid by shutting down CF-1203 and CF-1303,
5	NA (Pertains to pH Adjust Tank #5), I-01, I-14, I-15	At a high (H) liquid level in pH Adjust Tank #5 (T-0105), as indicated by LSH/LAH-0105-00, tank influent valve FCV-01 will automatically close. Stop the addition of sodium hydroxide or sulfuric acid by shutting down CF-1203 and CF-1303, respectively. Co
6	I-01, I-02	At a low (L) liquid level in pH Adjust Tank #2 (T-0102), as indicated by LSL/LAL-0102-00, Mixers MIX-0102A, 0102B, 0102C, and 0102D will automatically shut down. Also shut FCV-00 on I-01 to prevent additional leakage.
7	NA (Pertains to pH Adjust Tank #3), I-14, I-15	At a low (L) liquid level in pH Adjust Tank #3 (T-0103), as indicated by LSL/LAL-0103-00, Mixers MIX-0103A, 0103B, 0103C, and 0103D will automatically shut down. Stop the addition of sodium hydroxide or sulfuric acid by shutting down CF-1202 and CF-1302,
8	NA (Pertains to pH Adjust Tank #4)	At a low (L) liquid level in pH Adjust Tank #4 (T-0104), as indicated by LSL/LAL-0104-00, Mixers MIX-0104A, 0104B, 0104C, and 0104D will automatically shut down.
9	NA (Pertains to pH Adjust Tank #6)	At a low (L) liquid level in pH Adjust Tank #6 (T-0106), as indicated by LSL/LAL-0106-00, Mixers MIX-0106A, 0106B, 0106C, and 0106D will automatically shut down.
10	NA (Pertains to pH Adjust Tank #7), I-14, I-15	At a low (L) liquid level in pH Adjust Tank #7 (T-0107), as indicated by LSL/LAL-0107-00, Mixers MIX-0107A, 0107B, 0107C, and 0107D will automatically shut down. Stop the addition of sodium hydroxide or sulfuric acid by shutting down CF-1204 and CF-1304,
11	NA (Pertains to pH Adjust Tank #8)	At a low (L) liquid level in pH Adjust Tank #8 (T-0108), as indicated by LSL/LAL-0108-00, Mixers MIX-0108A, 0108B, 0108C, and 0108D will automatically shut down.
12	I-01, and NA (Pertains to pH Adjust Tank #4)	At a high-high (HH) or low-low (LL) pH in pH Adjust Tank #4 (T-0104), as indicated by AE/AIT/AIC-0104-00, pH Adjust Tank #1 influent valve FCV-00 will close
13	I-01, and NA (Pertains to pH Adjust Tank #8)	At a high-high (HH) or low-low (LL) pH in pH Adjust Tank #8 (T-0108), as indicated by AE/AIT/AIC-0108-00, pH Adjust Tank #5 influent valve FCV-01 will close
14	I-01, I-16	At a low alum flow from CF-1401, as indicated by FSL/FAL-00, WTP influent valve FV-02 will close
15		Deleted
16	I-01, I-06	At a low liquid level in Inclined Plate Clarifier #1, as indicated by LSL/LAL-0601-00, Clarifier Sludge Valve #1 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
17	NA (Pertains to Inclined Plate Clarifier #2)	At a low liquid level in Inclined Plate Clarifier #2, as indicated by LSL/LAL-0602-00, Clarifier Sludge Valve #2 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
18	NA (Pertains to Inclined Plate Clarifier #3)	At a low liquid level in Inclined Plate Clarifier #3, as indicated by LSL/LAL-0603-00, Clarifier Sludge Valve #3 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
19	NA (Pertains to Inclined Plate Clarifier #4)	At a low liquid level in Inclined Plate Clarifier #4, as indicated by LSL/LAL-0604-00, Clarifier Sludge Valve #4 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
20	NA (Pertains to Inclined Plate Clarifier #5)	At a low liquid level in Inclined Plate Clarifier #5, as indicated by LSL/LAL-0605-00, Clarifier Sludge Valve #5 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
21	NA (Pertains to Inclined Plate Clarifier #6)	At a low liquid level in Inclined Plate Clarifier #6, as indicated by LSL/LAL-0606-00, Clarifier Sludge Valve #6 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
22	NA (Pertains to Inclined Plate Clarifier #7)	At a low liquid level in Inclined Plate Clarifier #7, as indicated by LSL/LAL-0607-00, Clarifier Sludge Valve #7 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
23	NA (Pertains to Inclined Plate Clarifier #8)	At a low liquid level in Inclined Plate Clarifier #8, as indicated by LSL/LAL-0608-00, Clarifier Sludge Valve #8 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
24	NA (Pertains to Inclined Plate Clarifier #9)	At a low liquid level in Inclined Plate Clarifier #9, as indicated by LSL/LAL-0609-00, Clarifier Sludge Valve #9 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
25	NA (Pertains to Inclined Plate Clarifier #10)	At a low liquid level in Inclined Plate Clarifier #10, as indicated by LSL/LAL-0610-00, Clarifier Sludge Valve #10 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
26	NA (Pertains to Inclined Plate Clarifier #11)	At a low liquid level in Inclined Plate Clarifier #11, as indicated by LSL/LAL-0611-00, Clarifier Sludge Valve #11 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
27	NA (Pertains to Inclined Plate Clarifier #12)	At a low liquid level in Inclined Plate Clarifier #12, as indicated by LSL/LAL-0612-00, Clarifier Sludge Valve #12 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
28	NA (Pertains to Inclined Plate Clarifier #13)	At a low liquid level in Inclined Plate Clarifier #13, as indicated by LSL/LAL-0613-00, Clarifier Sludge Valve #13 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
29	NA (Pertains to Inclined Plate Clarifier #14)	At a low liquid level in Inclined Plate Clarifier #14, as indicated by LSL/LAL-0614-00, Clarifier Sludge Valve #14 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
30	NA (Pertains to Inclined Plate Clarifier #15)	At a low liquid level in Inclined Plate Clarifier #15, as indicated by LSL/LAL-0615-00, Clarifier Sludge Valve #15 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
31	NA (Pertains to Inclined Plate Clarifier #16)	At a low liquid level in Inclined Plate Clarifier #16, as indicated by LSL/LAL-0616-00, Clarifier Sludge Valve #16 (FV) will close. Close FV-02 on I-01. Shut off Floc Mixer.
32		Deleted
33	I-01, I-06	At a high (H) level in any two Inclined Plate Clarifiers simultaneously, influent valve FV-02 (on I-01) will close. Typical of the other Clarifiers. Provide interlock numbers for each Clarifier.
34	I-07	A low-low (LL) liquid level in the Filter Feed Tank, as indicated by LIT-0701-00, LIT-0701-01, or LSLL 0701-00, will shut down Multimedia Feed Pumps PU-0701, PU-0702, PU-0703, and PU-0704.
35	I-07	A low flow rate, as indicated by FSL/FAL-01, will shut down Multimedia Feed Pump #1 (PU-0701)
36	I-07	A low flow rate, as indicated by FSL/FAL-02, will shut down Multimedia Feed Pump #2 (PU-0702)
37	I-07	A low flow rate, as indicated by FSL/FAL-03, will shut down Multimedia Feed Pump #3 (PU-0703)
38	I-07	A low flow rate, as indicated by FSL/FAL-04, will shut down Multimedia Feed Pump #4 (PU-0704)
39	I-08	A high-high (HH) differential pressure across Multimedia Filter #1 (MMF-0801), as indicated by PDIT-0801-00, will start the idled spare Multimedia Filter and corresponding Multimedia Feed Pump, and shut the valve(s) feeding Multimedia Filter #1.
40	NA (Pertains to Multimedia Filter #2)	A high-high (HH) differential pressure across Multimedia Filter #2 (MMF-0802), as indicated by PDIT-0802-00, will start the idled spare Multimedia Filter and corresponding Multimedia Feed Pump, and shut the valve(s) feeding Multimedia Filter #2.
41	NA (Pertains to Multimedia Filter #3)	A high-high (HH) differential pressure across Multimedia Filter #3 (MMF-0803), as indicated by PDIT-0803-00, will start the idled spare Multimedia Filter and corresponding Multimedia Feed Pump, and shut the valve(s) feeding Multimedia Filter #3.
42	NA (Pertains to Multimedia Filter #4)	A high-high (HH) differential pressure across Multimedia Filter #4 (MMF-0804), as indicated by PDIT-0804-00, will start the idled spare Multimedia Filter and corresponding Multimedia Feed Pump, and shut the valve(s) feeding Multimedia Filter #4.
43	I-01, I-08	A high-high (HH) turbidity at the combined Multimedia Filter outlet, as indicated by AE/AIT-0801-00, will shut the influent feed valve FV-02.
44	I-08, I-09	A high-high differential pressure across LGAC-0901A/B, as indicated by PDIT-0901-00, will shut down the corresponding LGAC feed valve (FCV-0901-00 on P&ID I-08). Provide interlock numbers for each LGAC pair.
45	I-10, I-15	At a low liquid level in Effluent Monitoring Tank #1 or #2 (T-1001 or T-1002), as indicated by LSL/LAL-00 or LIT-00, Mixers MIX-1001A, MIX-1001B, and MIX-1001C (and the corresponding mixers in Tank #2) will shut down. Also shut down pumps PU-1001, PU-100
46	I-01, I-10	A high-high (HH) or low-low (LL) pH in Effluent Monitoring Tank #1 or #2 or the discharge line, as indicated by AE/AIC-1001-00, AE/AIC-1002-00 or AE/AIT-1001-01 will close effluent discharge valve FV-1001-00, and shut down pumps PU-1001, PU-1002, PU-1003,
47	I-10	Coordinate signal(s) back from SCA, including HH level in the destination basin/tank, to shut off the Effluent Recycle Pump(s) (PU-1003).
48	I-10	Coordinate signal(s) back from SCA, including "fault" or similar at the Polymer System, to shut off the Polymer Makedown Pump (PU-1001).
49	I-10	Coordinate signal(s) from the existing Leachate Overflow P.S. to shut the gravity effluent FV-1001-00. And/or would the WTP get a verbal notice from that facility.
50	I-11	A low-low (LL) liquid level in the Backwash/Sludge Pumping Station (T-1101), as indicated by LIT-1101-00 or LSLL/LALL-1101-00, will shut down Sludge Return Pumps PU-1101, PU-1102, and PU-1103.
51	I-11	Coordinate signal(s) from SCA, including HH level in the destination basin/tank, to shut off the Sludge Return Pumps PU-1101, PU-1102, and PU-1103.
52	I-6, I-10, I-11, I-103, I-107	A high-high liquid level in the Backwash/Sludge Pumping Station (T-1101), as indicated by LIT-1101-00 or LSHH/LAHH-1101-00, will shut the Inclined Plate Clarifier Sludge Valves (1 through 16), the MMF Backwash Pump (PU-1004), and the GAC Backwash Pump (PU
53		Deleted
54	I-08	Shut GAC-0901A/B feed valve FCV-00 (on I-08) at high-high flow (as indicated by FE/FIQT/FIC-00 on I-08) to prevent inadequate contact time in GACs.
55	I-01, I-10	Shut influent feed valve FV-02 (on I-01) at a high-high liquid level in Effluent Monitoring Tank T-1001, as indicated by LIC-1001-00 or LSHH-1001-00.
56		Deleted
57	I-01, I-03	At low-low (LL) liquid level in Flash Mix Tank, shut down Mixers. Also shut influent valve FV-02 on I-01.
58	I-01, I-14, I-15	At a no (i.e., low-low (LL)) flow to pH Adjustment Train 1 (as indicated by FE/FIC-00 on I-01), shut off sulfuric acid pumps CF-1201 and CF-1202 and caustic feed pumps CF-1301 and CF-1302.
59	I-01, I-14, I-15	At a no (i.e., low-low (LL)) flow to pH Adjustment Train 2 (as indicated by FE/FIC-01 on I-01), shut off sulfuric acid pumps CF-1203 and CF-1204 and caustic feed pumps CF-1303 and CF-1304.
60	I-12, I-15	At a low-low (LL) level in H2SO4 Storage Tank T-1301, shut down Acid Feed Pumps CF-1301 through CF-1305.
61	I-13, I-14	At a low-low (LL) level in NaOH Storage Tank T-1201, shut down NaOH Feed Pumps CF-1201 through CF-1204.
62	I-13, I-16	At a low-low (LL) level in Alum Storage Tank T-1401, shut down Alum Feed Pump CF-1401 .
63	I-14, I-15	Only acid or caustic can be fed to any one tank at any time. CF-1201 cannot run at the same time as CF-1301
64	I-14, I-15	Only acid or caustic can be fed to any one tank at any time. CF-1202 cannot run at the same time as CF-1302
65	I-14, I-15	Only acid or caustic can be fed to any one tank at any time. CF-1203 cannot run at the same time as CF-1303
66	I-14, I-15	Only acid or caustic can be fed to any one tank at any time. CF-1204 cannot run at the same time as CF-1304

NO.	DATE	REVISION	INIT.
C	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
B	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
A	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	

NOT TO SCALE

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

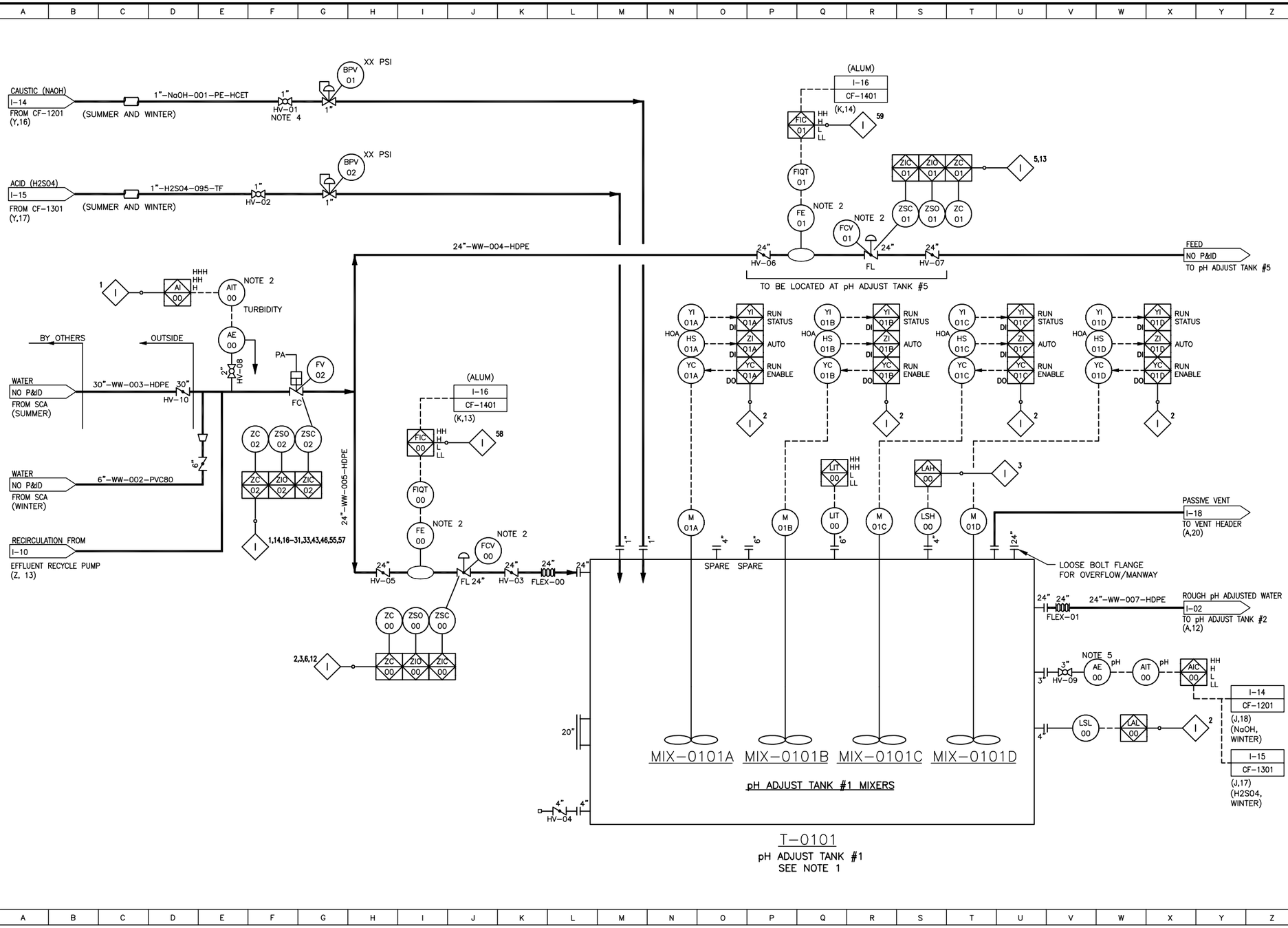
MECHANICAL

INTERLOCKS

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-IC
DATE FEBRUARY 2010

I-C



NOTES:

1. REFER TO THE PROCESS FLOW DIAGRAM (PFD). THIS P&ID IS TYPICAL FOR:
   A. pH ADJUSTMENT TANK #1 (FILLED FROM SCA, DISCHARGING TO pH ADJUSTMENT TANK #2),
   B. pH ADJUSTMENT TANK #3 (FILLED FROM pH ADJUSTMENT TANK #2, DISCHARGING TO pH ADJUSTMENT TANK #4),
   C. pH ADJUSTMENT TANK #5 (FILLED FROM SCA, DISCHARGING TO pH ADJUSTMENT TANK #6),
   D. pH ADJUSTMENT TANK #7 (FILLED FROM pH ADJUSTMENT TANK #6, DISCHARGING TO pH ADJUSTMENT TANK #8).
2. FLOW METER AND FLOW CONTROL VALVES TYPICAL FOR pH ADJUST TANKS #1 AND #5 ONLY. TURBIDITY METER ON WTP INFLUENT LINE ONLY.
3. REFER TO THE PROJECT EQUIPMENT LIST FOR TANK, PUMP, MIXER, AND EQUIPMENT TAG NUMBERS OF IDENTICAL SYSTEMS.
4. LOCATE CHEMICAL FEED ISOLATION VALVES AND BPVS AT TOP OF TANK.
5. DURING DREDGE/SUMMER SEASON THIS pH DEVICE IS FOR MONITORING ONLY, NO CONTROL. DURING WINTER SEASON THIS DEVICE WILL CONTROL THE ADDITION OF H2SO4 OR NaOH.

INTERLOCKS:

REFER TO SHEET I–C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
pH ADJUSTMENT TANK #1
P&ID

T–0101
pH ADJUSTMENT TANK #1
SIZE: APPROX. 46'L x 8.5'W x 10'H
VOLUME: MINIMUM 18,275 GAL.
MOC: EPOXY COATED STEEL
DESIGN: PRE FABRICATED, TRAILER TANK W/ROOF

MIX–0101A
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX–0101B
pH ADJUSTMENT TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX–0101C
pH ADJUSTMENT TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX–0101D
pH ADJUSTMENT TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613–I01
DATE FEBRUARY 2010

I–01

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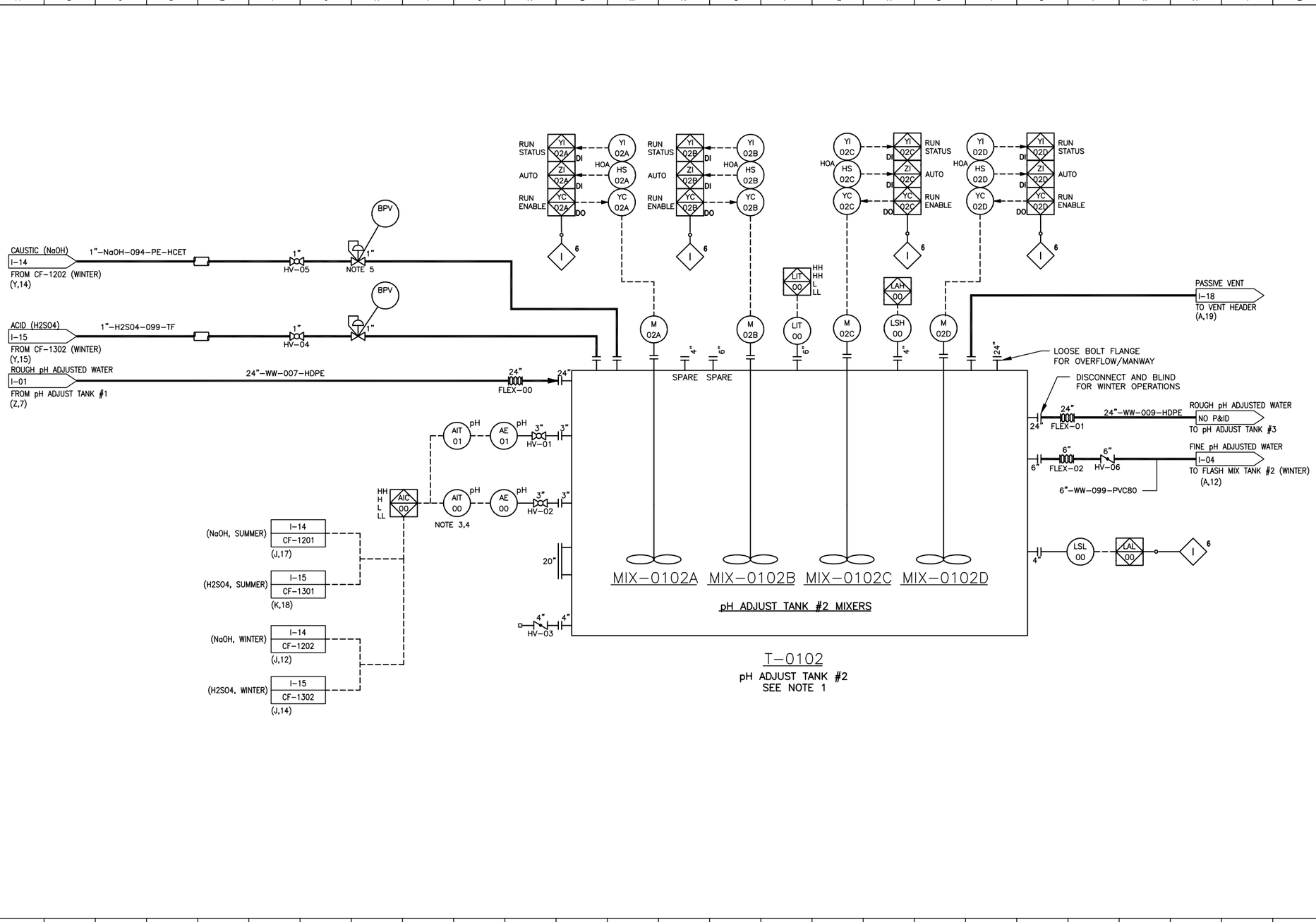


NOTES:

1. REFER TO THE PROCESS FLOW DIAGRAM (PFD). THIS P&ID IS TYPICAL FOR:
   A. pH ADJUSTMENT TANK #2 (FILLED FROM pH ADJUSTMENT TANK #1, DISCHARGING TO pH ADJUSTMENT TANK #3),
   B. pH ADJUSTMENT TANK #4 (FILLED FROM pH ADJUSTMENT TANK #3, DISCHARGING TO FLASH MIX TANK),
   C. pH ADJUSTMENT TANK #6 (FILLED FROM pH ADJUSTMENT TANK #5, DISCHARGING TO pH ADJUSTMENT TANK #7),
   D. pH ADJUSTMENT TANK #8 (FILLED FROM pH ADJUSTMENT TANK #7, DISCHARGING TO FLASH MIX TANK).
2. REFER TO THE PROJECT EQUIPMENT LIST FOR TANK, PUMP, MIXER, AND EQUIPMENT TAG NUMBERS OF IDENTICAL SYSTEMS.
3. pH ADJUSTMENT TANKS #2, #4 AND #8 TO HAVE REDUNDANT pH PROBES (I.E., 2 PER TANK). OPERATOR TO SELECT THE DEVICE CONTROLLING THE CHEMICAL FEED PUMPS. PROVIDE DEVIATION ALARMS COMPARING THE READINGS OF THE REDUNDANT DEVICES.
4. DURING THE DREDGE/SUMMER SEASON THIS pH DEVICE WILL CONTROL THE ADDITION OF H2SO4 OR NaOH TO pH ADJUST TANK #1. DURING WINTER THIS pH DEVICE WILL CONTROL THE ADDITION OF H2SO4 OR NaOH TO pH ADJUST TANK #2.
5. LOCATE CHEMICAL FEED ISOLATION VALVES AND BPVS AT THE TOP OF TANK.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
pH ADJUSTMENT TANK #2
P&ID

T-0102
pH ADJUSTMENT TANK #2
SIZE: APPROX. 46'L x 8.5'W x 10'H
VOLUME: MINIMUM 18,275 GAL
MOC: EPOXY COATED STEEL
DESIGN: PRE FABRICATED, TRAILER TANK W/ROOF

MIX-0102A
pH ADJUSTMENT TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-0102B
pH ADJUSTMENT TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-0102C
pH ADJUSTMENT TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

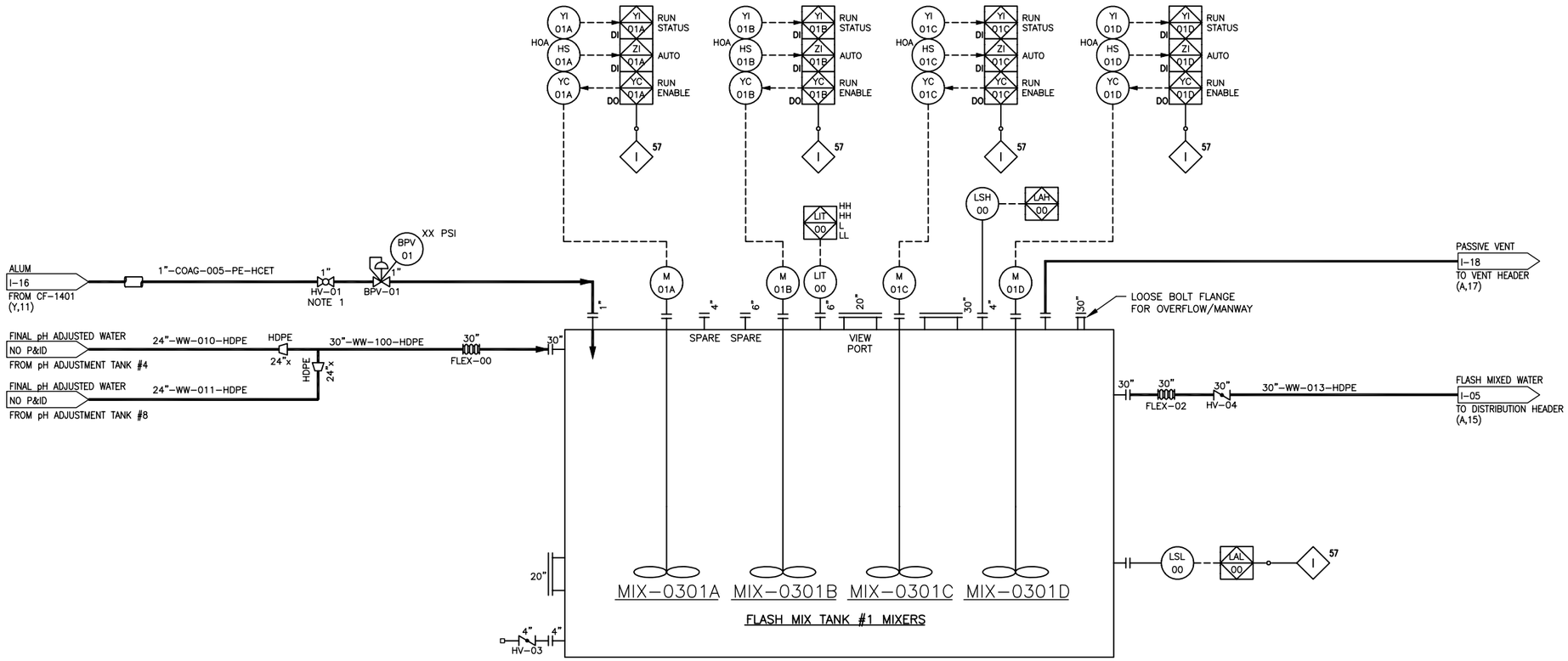
MIX-0102D
pH ADJUSTMENT TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-I02
DATE FEBRUARY 2010

I-02



NOTES:

1. LOCATE CHEMICAL FEED ISOLATION VALVE AND BPV AT TOP OF TANK.
2. THIS TANK TO BE DRAINED AND NOT USED DURING WINTER OPERATIONS.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION

FLASH MIX TANK #1 P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-I03
DATE FEBRUARY 2010

I-03

T-0301
FLASH MIX TANK #1
SIZE: APPROX. 46'L x 8.5'W x 10'H
VOLUME: MINIMUM 18,275 GAL
MOC: EPOXY COATED STEEL
DESIGN: PRE FABRICATED, TRAILER TANK W/ROOF

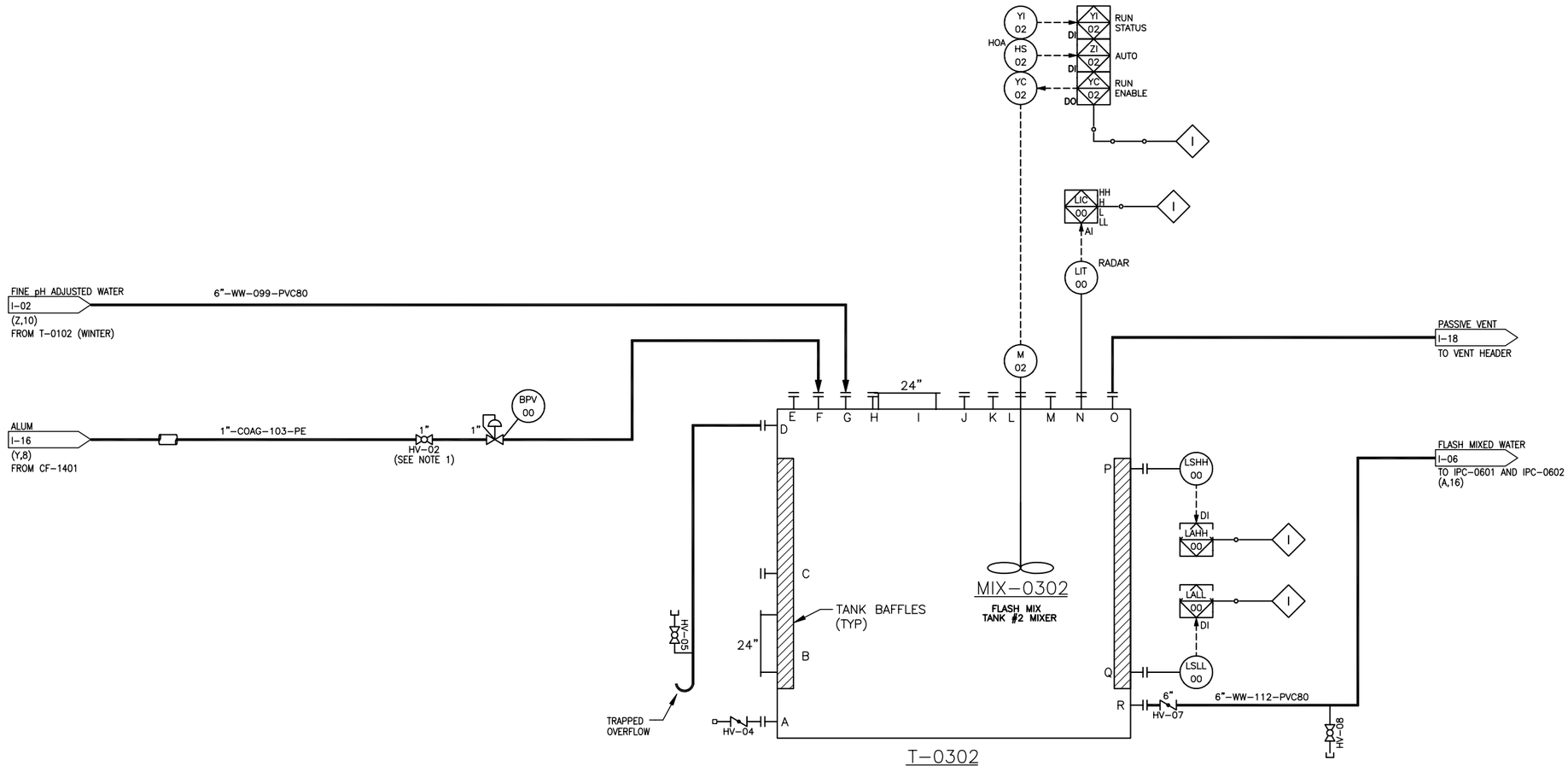
MIX-0301A
FLASH MIX TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-0301B
FLASH MIX TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-0301C
FLASH MIX TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-0301D
FLASH MIX TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: 10HP / 480V / 3PH
AGITATOR RPM: TBD
IMPELLER: TBD

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10



T–0302
FLASH MIX TANK #2

NOTES:

1. LOCATE CHEMICAL FEED ISOLATION VALVES AND BPV AT TOP OF TANK.
2. THIS TANK TO BE DRAINED AND NOT USED DURING SUMMER/DREDGE OPERATIONS.

INTERLOCKS:

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
FLASH MIX TANK #2
P&ID

T–0302
FLASH MIX TANK #2
SIZE: TBD
VOLUME: APPROXIMATELY 4,000 GALLONS
MOC: FRP
DESIGN: ATMOSPHERIC
TYPE: VERTICAL CYLINDRICAL

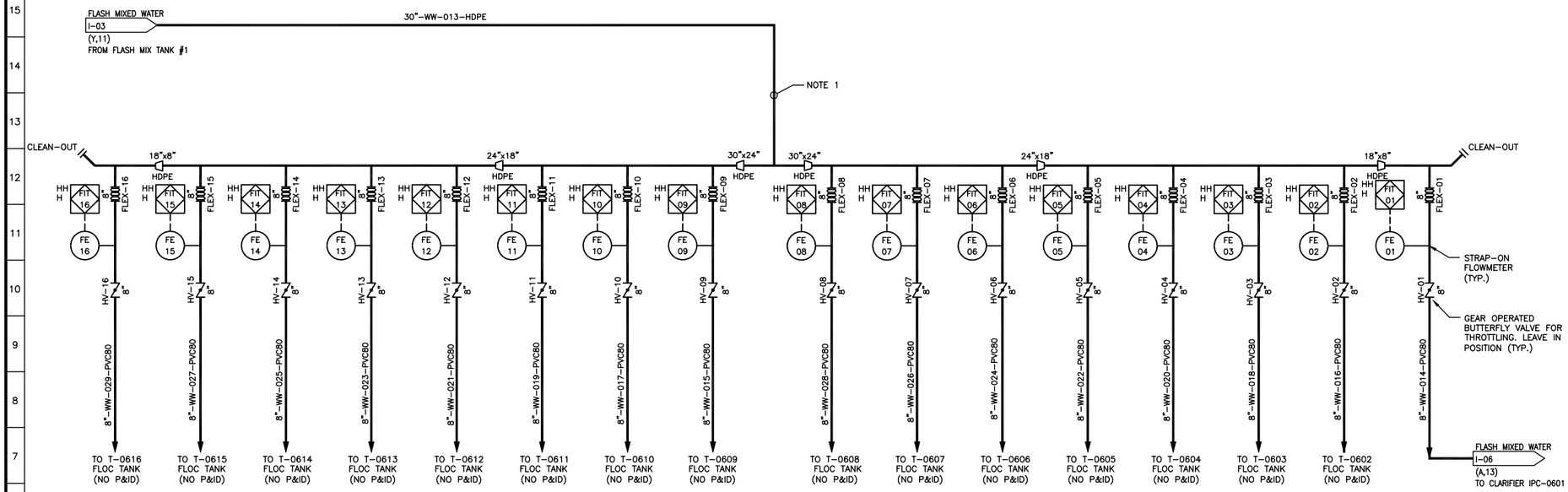
MIX–0302
FLASH MIX TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR HP: 480V / 3HP
AGITATOR RPM: TBD
IMPELLER: TBD

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613–I04
DATE FEBRUARY 2010

I–04



NOTES:

1. THIS HEADER SYSTEM TO BE DRAINED AND NOT USED DURING WINTER OPERATIONS.

INTERLOCKS:

REFER TO SHEET I–C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
DISTRIBUTION HEADER
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613–I05
DATE FEBRUARY 2010

I–05

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DATE: 5/12/10

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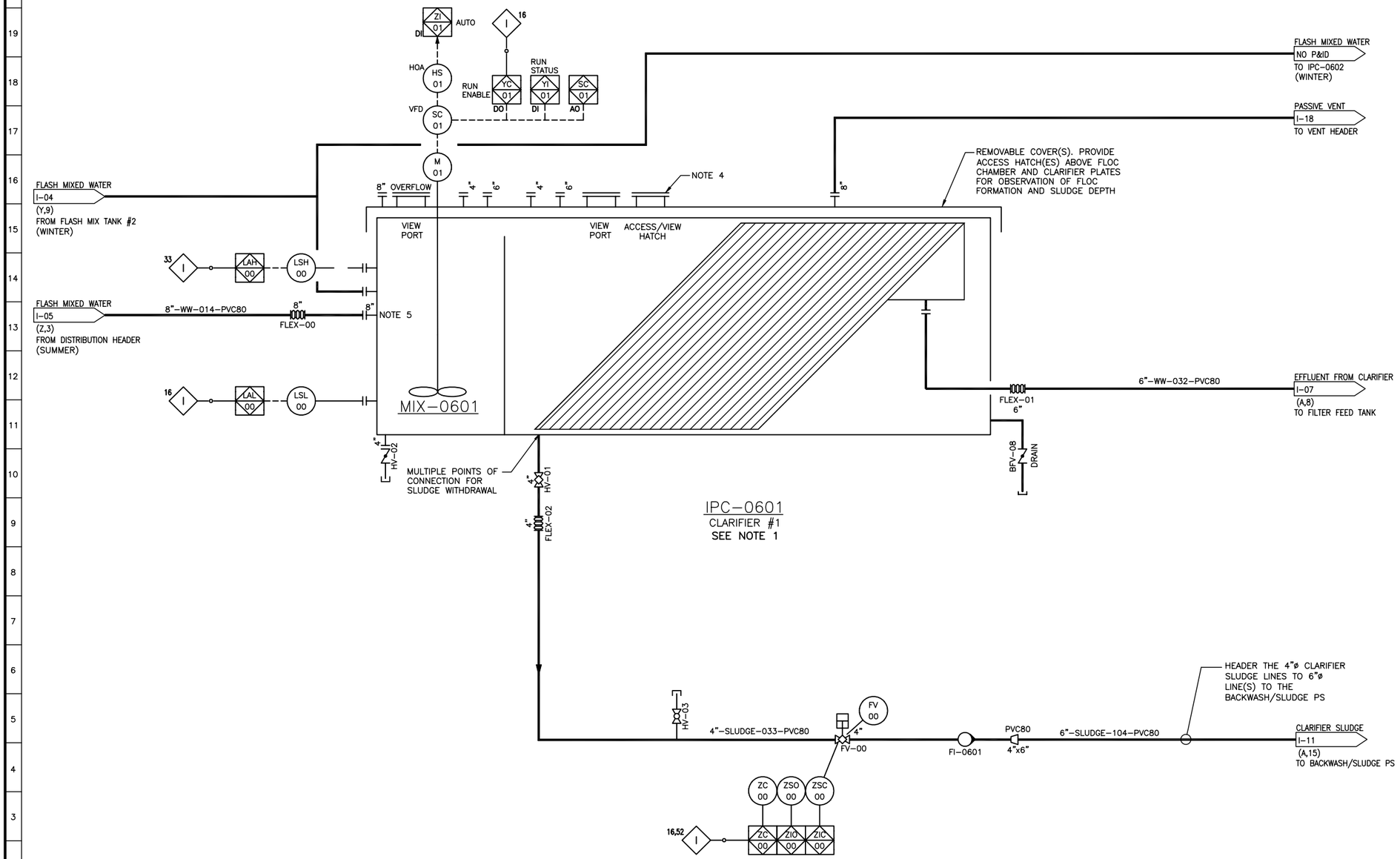


NOTES:

1. REFER TO THE PROCESS FLOW DIAGRAM (PFD). THIS P&ID IS TYPICAL FOR 16 CLARIFIER SYSTEMS.
2. VENDOR SUPPLIED CLARIFIER SYSTEM TO BE INSTALLED PER VENDORS APPROVED SHOP DRAWINGS AND INSTRUCTIONS.
3. REFER TO THE PROJECT EQUIPMENT LIST FOR TANK, PUMP, MIXER, AND EQUIPMENT TAG NUMBERS OF IDENTICAL SYSTEMS.
4. PROVIDE MEANS FOR LNAPL REMOVAL (FLOATING BOOMS OR EQUIVALENT).
5. DISCONNECT AND INSTALL BLIND AS REQUIRED FOR WINTER OPERATION.
6. IPC–0601 AND IPC–0602 TO BE IN HEATED PORTION OF BUILDING FOR SUMMER AND WINTER OPERATION.

INTERLOCKS:

REFER TO SHEET I–C

MIX–0601

CLARIFIER #1 FLOCCULATION MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR: TBD / VAR. SPEED
AGITATOR RPM: TBD
IMPELLER: TBD

IPC–0601

CLARIFIER #1
SIZE: 40'L x 8'6"W x 11'2"H TANK
MOC: EPOXY LINED STEEL WITH FRP PLATES
ACCESSORIES: TBD
DESIGN FLOW (SUMMER): 370 GPM AVERAGE
DESIGN FLOW (WINTER): 250 GPM AVERAGE

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

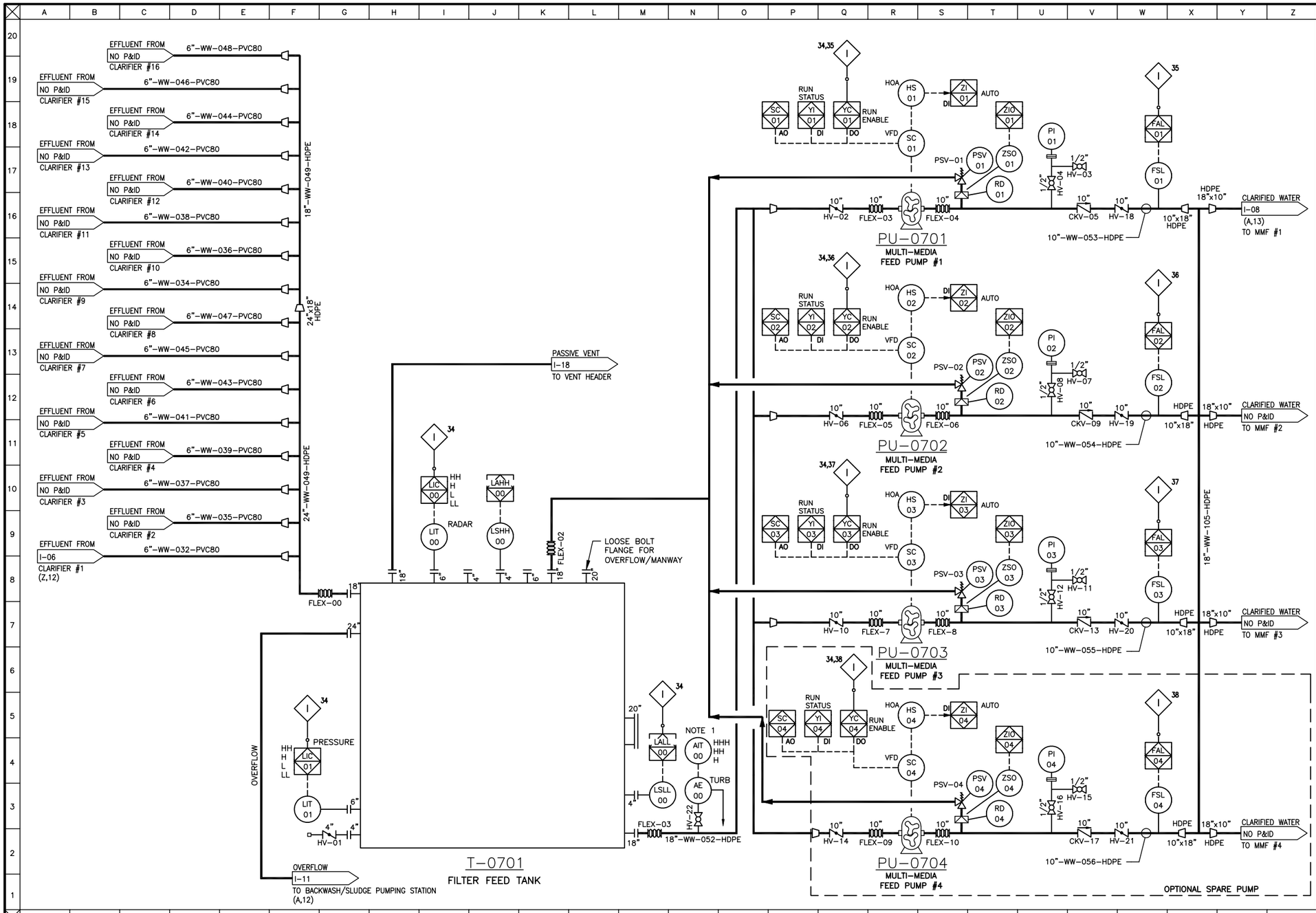
NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
INCLINED PLATE CLARIFIER
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613–I06
DATE FEBRUARY 2010
I–06



NOTES:

1. PROVIDE SAMPLING TUBING AND MANUAL VALVES TO ASSESS PERFORMANCE OF INDIVIDUAL CLARIFIERS.
2. FILTER FEED TANK AND PUMPS TO BE IN HEATED PORTION OF BUILDING FOR SUMMER AND WINTER OPERATION.

INTERLOCKS:

REFER TO SHEET I-C

T-0701
FILTER FEED TANK
SIZE: 46'lL x 8.5'W x 10'H
VOLUME: MINIMUM 18,275 GAL.
MOC: EPOXY COATED STEEL
DESIGN: PRE FABRICATED, TRAILER TANK W/ROOF

PU-0701
MULTIMEDIA FEED PUMP
TYPE: PROGRESSING CAVITY
CAPACITY: 1655 GPM
HP: APROX. 150
MOC: CI, ALLOY STEEL

PU-0702
MULTIMEDIA FEED PUMP
TYPE: PROGRESSING CAVITY
CAPACITY: 1655 GPM
HP: APROX. 150
MOC: CI, ALLOY STEEL

PU-0703
MULTIMEDIA FEED PUMP
TYPE: PROGRESSING CAVITY
CAPACITY: 1655 GPM
HP: APROX. 150
MOC: CI, ALLOY STEEL

PU-0704
MULTIMEDIA FEED PUMP
TYPE: PROGRESSING CAVITY
CAPACITY: 1655 GPM
HP: APROX. 150
MOC: CI, ALLOY STEEL
OPTIONAL SPARE PUMP

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

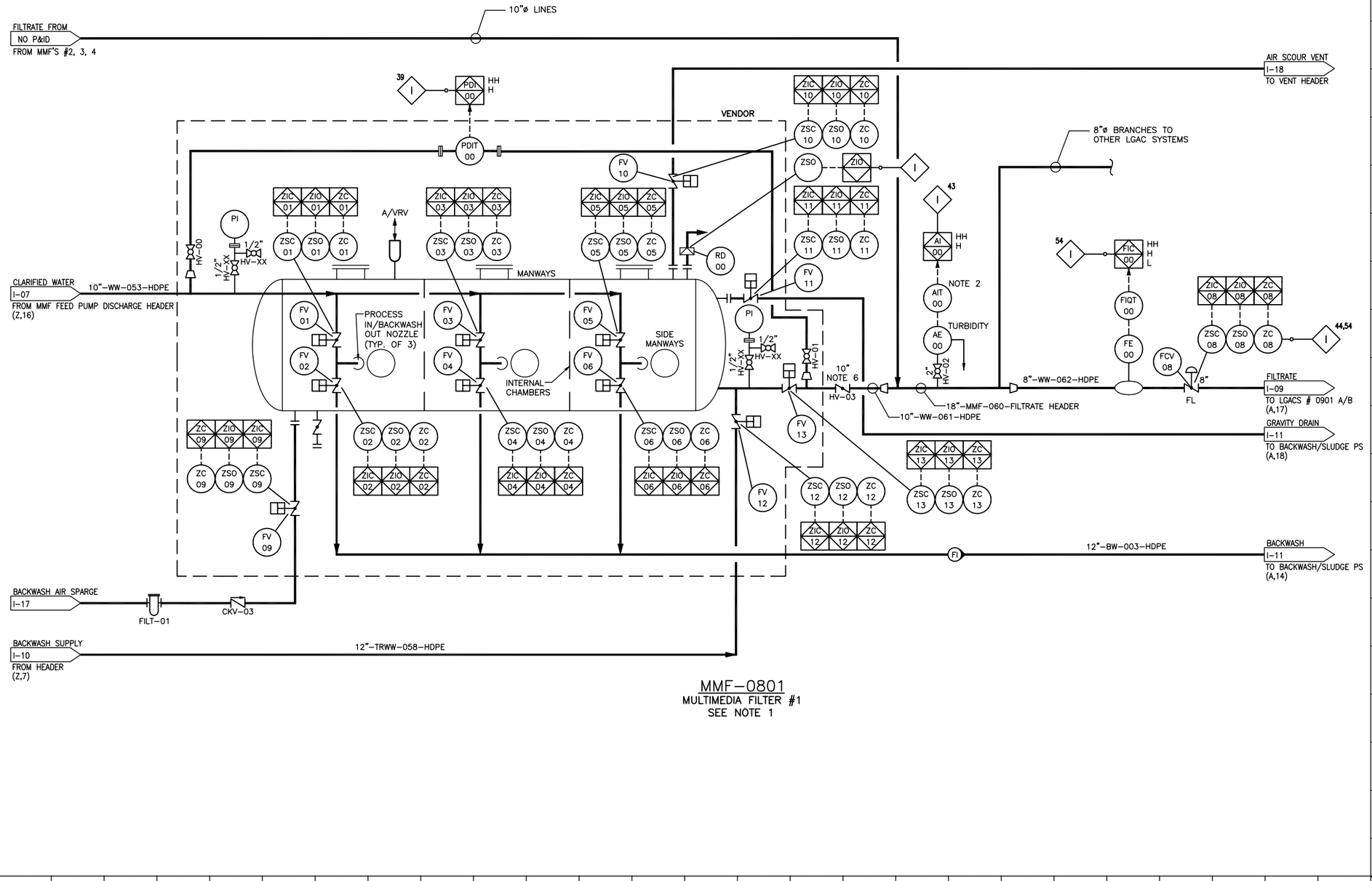
HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
FILTER FEED TANK
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-I07
DATE FEBRUARY 2010

I-07



MMF-0801
MULTIMEDIA FILTER #1
SEE NOTE 1

NOTES:

1. REFER TO THE PROCESS FLOW DIAGRAM (PFD). THIS P&ID IS TYPICAL FOR FOUR MULTIMEDIA FILTER SYSTEMS.
2. ONE TURBIDITY METER ON THE MMF EFFLUENT HEADER TO THE LGAC'S. PROVIDE SAMPLING TUBING AND MANUAL VALVES TO ASSESS PERFORMANCE OF INDIVIDUAL CLARIFIERS.
3. VENDOR SUPPLIED MULTIMEDIA FILTER SYSTEM TO BE INSTALLED PER VENDOR'S APPROVAL SHOP DRAWINGS AND INSTRUCTIONS.
4. REFER TO THE PROJECT EQUIPMENT LIST FOR TANK, PUMP, MIXER, AND EQUIPMENT TAG NUMBERS OF IDENTICAL SYSTEMS.
5. FLEXIBLE CONNECTORS TO BE PROVIDED AT CONNECTIONS TO EQUIPMENT AND AT MANIFOLD PIPING WHERE REQUIRED.
6. INSTALL PORTABLE STRAP-ON FLOW METERS AT DISCHARGE FROM EACH MMF. MODULATE THE INDIVIDUAL MANUAL GEAR OPERATED BUTTERFLY VALVES AND LEAVE AT MAXIMUM ALLOWABLE FLOW WITH CLEAN BEDS.
7. MMF-0801 TO BE IN HEATED PORTION OF BUILDING FOR SUMMER AND WINTER OPERATION.

INTERLOCKS:

REFER TO SHEET I-C

MMF-0801
MULTIMEDIA FILTER
QTY: 1
SIZE: APPROX. 36'L x 10' DIA. x 11'4"H
MOC: COATED CARBON STEEL
TYPE: HORIZONTAL, MULTIPLE CHAMBERS
DESIGN FLOW (SUMMER): 1715 GPM
DESIGN FLOW (WINTER): 500 GPM
BACKWASH: 1715 GPM (ONE CHAMBER)

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
MULTIMEDIA FILTER
P&ID

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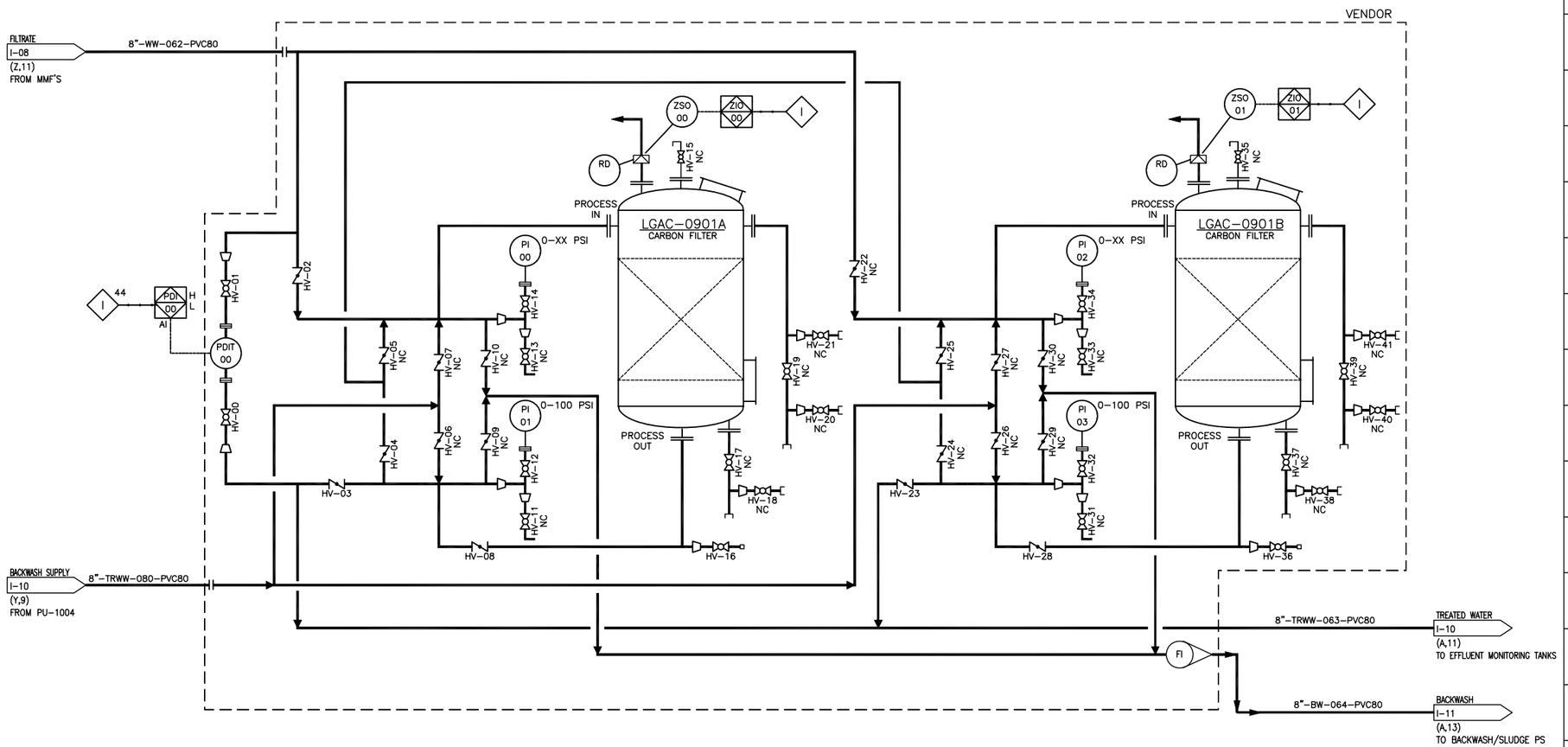
FILE NO. 1163.45613-I08
DATE FEBRUARY 2010
I-08



LGAC's-0901 A/B
CARBON FILTERS
SEE NOTE 1

LGAC-0901A, 0901B
CARBON FILTERS
DESIGN FLOW (SUMMER): APPROX. 640 GPM AVERAGE
DESIGN FLOW (WINTER): 500 GPM AVERAGE
BACKWASH FLOW: APPROX. 1700 GPM
P/T RATING: 125 PSI @ 150 DEG. F
VESSEL DIMENSIONS: 12' DIA. x 15'4"H
MOC: LINED STEEL
MASS OF CARBON: 20,000 LBS PER VESSEL

NOTES:

1. REFER TO THE PROCESS FLOW DIAGRAM (PFD). THIS P&ID IS TYPICAL FOR EIGHT LGAC PAIRS.
2. NORMAL VALVE POSITIONS ARE SHOWN ASSUMING LGAC-0901A IS THE LEAD VESSEL.
3. VENDOR SUPPLIED GAC SYSTEM TO BE INSTALLED PER VENDOR'S APPROVED SHOP DRAWINGS AND INSTRUCTIONS.
4. ONE LGAC PAIR (LGAC-0901 A/B) WILL BE LOCATED IN HEATED PORTION OF BUILDING FOR SUMMER (DREDGE SEASON) AND WINTER OPERATIONS.
5. REFER TO THE PROJECT EQUIPMENT LIST FOR TANK, PUMP, MIXER, AND EQUIPMENT TAG NUMBERS OF IDENTICAL SYSTEMS.
6. FLEXIBLE CONNECTORS TO BE PROVIDED AT CONNECTIONS TO EQUIPMENT AND AT MANIFOLD PIPING WHERE REQUIRED.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
F	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
E	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
D	3/25/10	DP #1 FOR GAC BIDDING	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
CARBON FILTERS
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-I09
DATE FEBRUARY 2010

I-09

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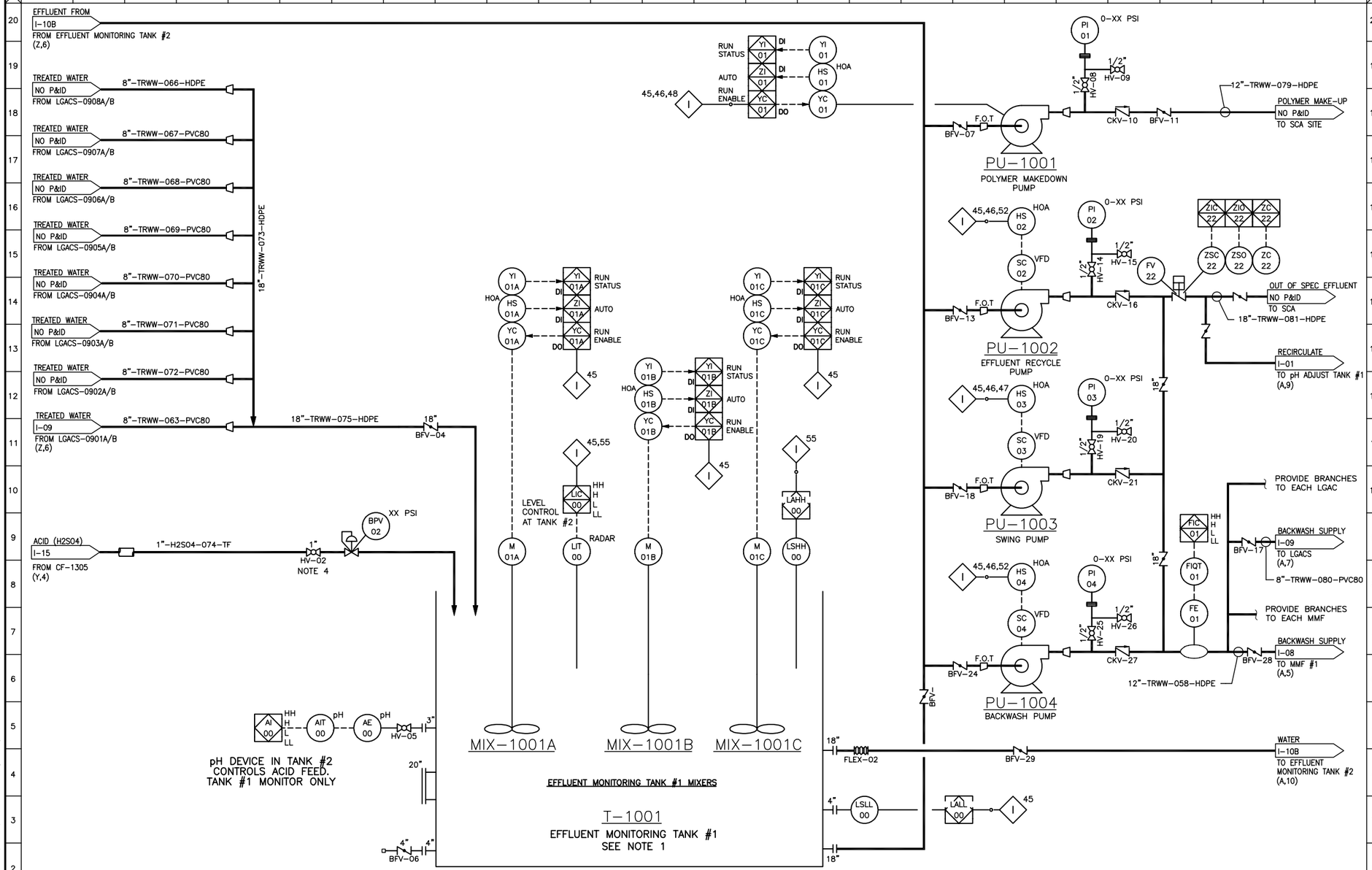

NOTES:

1. REFER TO THE PROCESS FLOW DIAGRAM (PFD). THIS P&ID IS TYPICAL FOR TWO EFFLUENT MONITORING TANKS. HOWEVER, PUMPS PU-1001 THROUGH PU-1004 ARE SHARED BY THE PAIR OF TANKS.
2. REFER TO THE PROJECT EQUIPMENT LIST FOR TANK, PUMP, MIXER, AND EQUIPMENT TAG NUMBERS OF IDENTICAL SYSTEMS.
3. EFFLUENT MONITORING TANKS AND ASSOCIATED PUMPS TO BE IN HEATED PORTION OF BUILDING FOR SUMMER AND WINTER OPERATION.
4. LOCATE CHEMICAL FEED ISOLATION VALVE AND BPV ON TOP OF TANK.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
EFFLUENT MONITORING TANK #1
P&ID

T-1001
EFFLUENT MONITORING TANK #1
SIZE: APPROX. 46'L x 8.5'W x 10'H
VOLUME: MINIMUM 18,275 GAL
MOC: COATED STEEL
DESIGN: PRE FABRICATED, OPEN TOP TRAILER TANK

MIX-1001A
EFFLUENT MONITORING TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR HP: 10 HP
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-1001B
EFFLUENT MONITORING TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR HP: 10 HP
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-1001C
EFFLUENT MONITORING TANK #1 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR HP: 10 HP
AGITATOR RPM: TBD
IMPELLER: TBD

PU-1001
POLYMER MAKEDOWN PUMP
TYPE: HORZ. CENTRIFUGAL
CAPACITY: 600 GPM
HP: 20
MOC: 316SS

PU-1002
EFFLUENT RECYCLE PUMP
TYPE: HORZ. CENTRIFUGAL
CAPACITY: 2500 GPM
HP: 75
MOC: 316SS

PU-1003
SWING PUMP
TYPE: HORZ. CENTRIFUGAL
CAPACITY: 2500 GPM
HP: 75
MOC: 316SS

PU-1004
BACKWASH PUMP
TYPE: HORZ. CENTRIFUGAL
CAPACITY: 1700 GPM
HP: 75
MOC: 316SS

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
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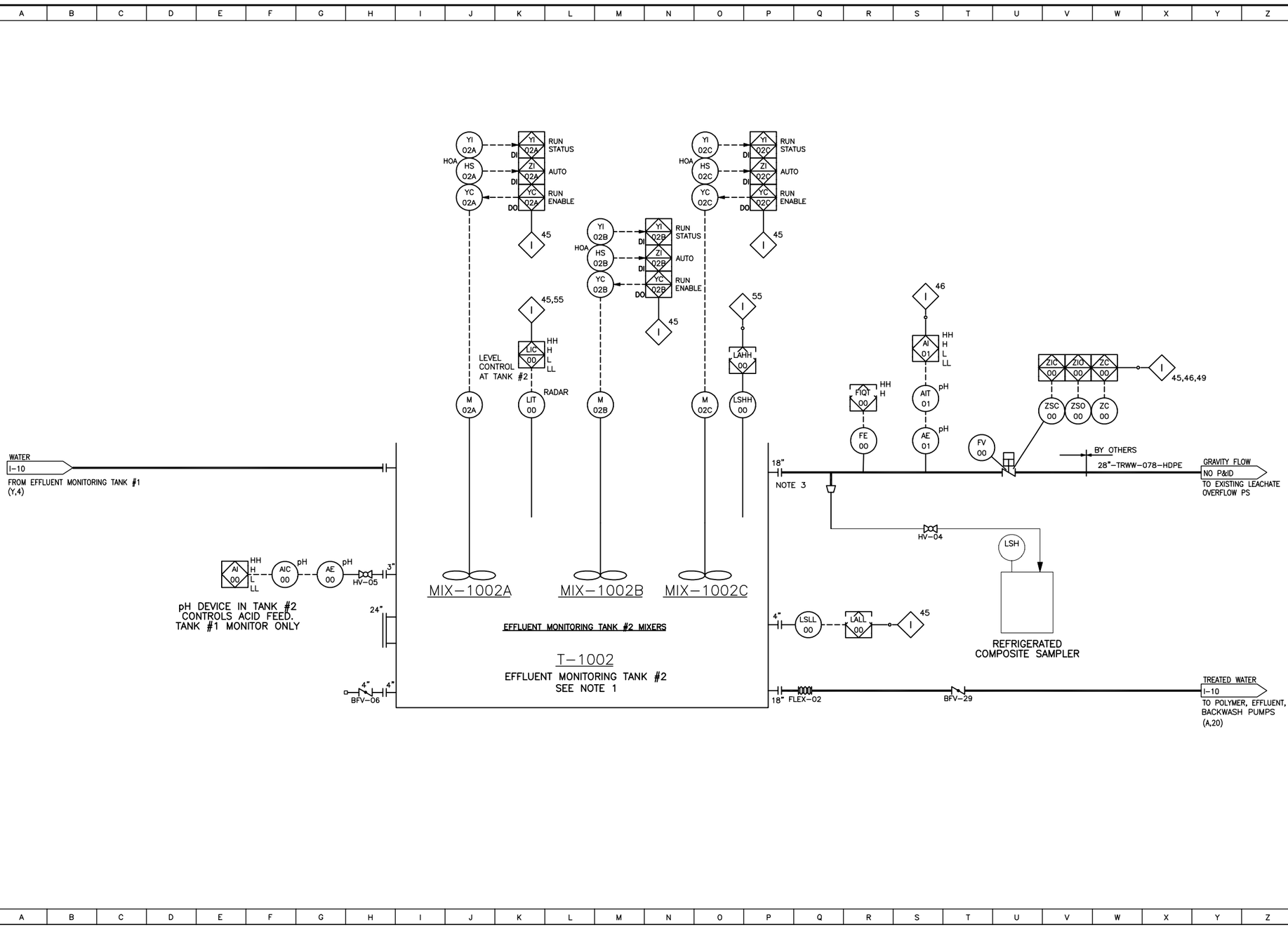
FILE NO. 1163.45613-I10
DATE FEBRUARY 2010

I-10



NOTES:

1. REFER TO THE PROCESS FLOW DIAGRAM (PFD).
2. REFER TO THE PROJECT EQUIPMENT LIST FOR TANK, PUMP, MIXER, AND EQUIPMENT TAG NUMBERS OF IDENTICAL SYSTEMS.
3. DISCHARGE FROM HIGH ON EFFLUENT MONITORING TANK #2 SIDEWALL.

INTERLOCKS:

REFER TO SHEET I-C

T-1002
EFFLUENT MONITORING TANK #2
SIZE: APPROX. 46'L x 8.5'W x 10'H
VOLUME: MINIMUM 18,275 GAL
MOC: COATED STEEL
DESIGN: PRE FABRICATED, OPEN TOP TRAILER TANK

MIX-1002A
EFFLUENT MONITORING TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR HP: 10 HP
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-1002B
EFFLUENT MONITORING TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR HP: 10 HP
AGITATOR RPM: TBD
IMPELLER: TBD

MIX-1002C
EFFLUENT MONITORING TANK #2 MIXER
TYPE: TOP ENTRY
MOC: 316SS
MOTOR HP: 10 HP
AGITATOR RPM: TBD
IMPELLER: TBD

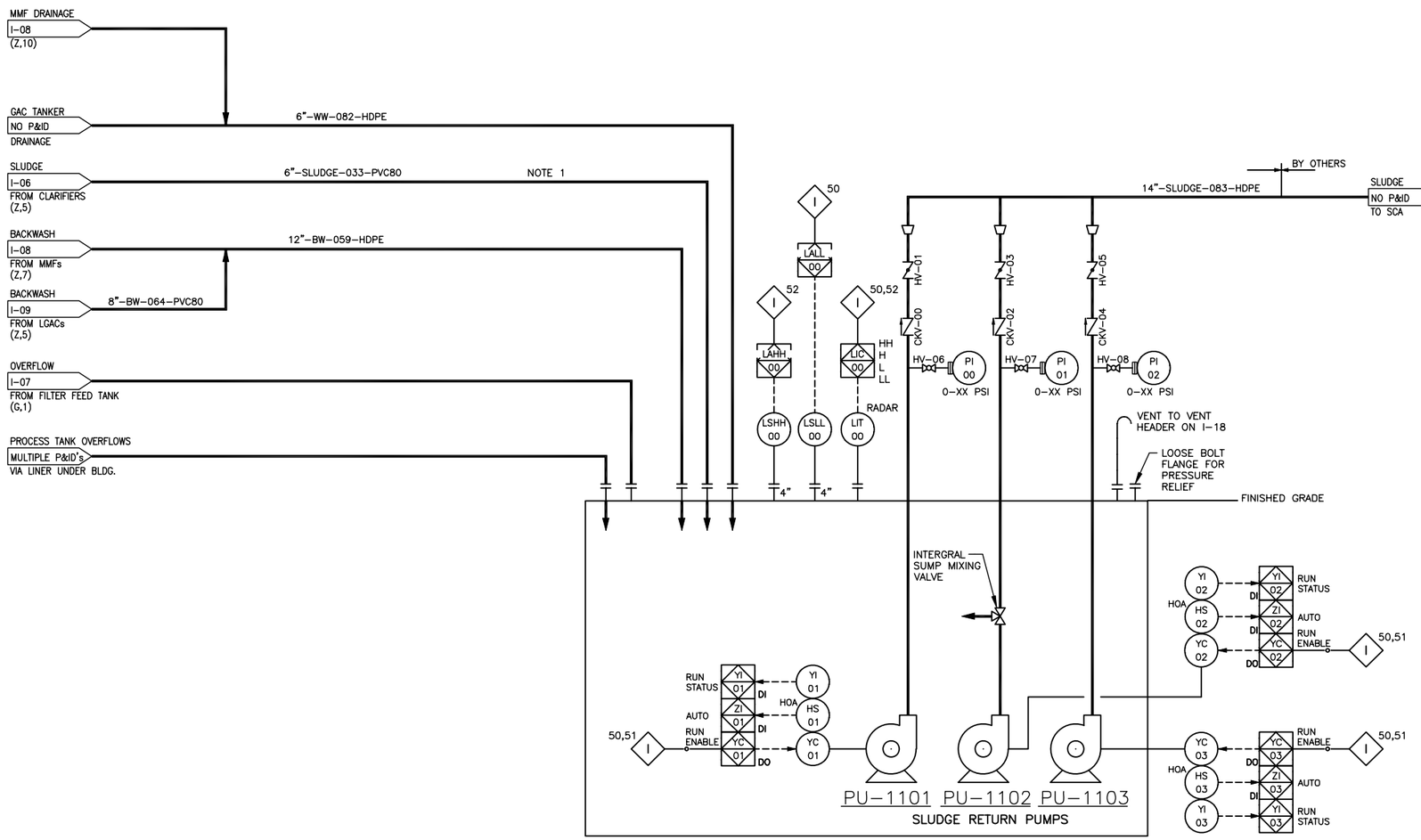
PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
EFFLUENT MONITORING TANK #2 P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613-I10
DATE FEBRUARY 2010
I-10B



T-1101
BACKWASH/SLUDGE PUMPING STATION

NOTES:

1. HEADER TOGETHER SLUDGE DISCHARGE LINES (4"ø) FROM INCLINED PLATE CLARIFIERS TO A 6"ø LINE TO THE SLUDGE PUMPING STATION.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
BACKWASH/SLUDGE PUMPING STATION
P&ID

T-1101
BACKWASH/SLUDGE PUMPING STATION
SIZE: APPROX. 12' x 12' x 12'
VOLUME: TBD GAL.
MOC: CONCRETE
DESIGN: IN-GROUND

PU-1101
SLUDGE RETURN PUMP
TYPE: SUBMERSIBLE
CAPACITY: 1600 GPM
HP: APPROX. 20
MOC: CAST IRON, VITON

PU-1102
SLUDGE RETURN PUMP
TYPE: SUBMERSIBLE
CAPACITY: 1600 GPM
HP: APPROX. 20
MOC: CAST IRON, VITON

PU-1103
SLUDGE RETURN PUMP
TYPE: SUBMERSIBLE
CAPACITY: 1600 GPM
HP: APPROX. 20
MOC: CAST IRON, VITON

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613-I11
DATE FEBRUARY 2010

I-11

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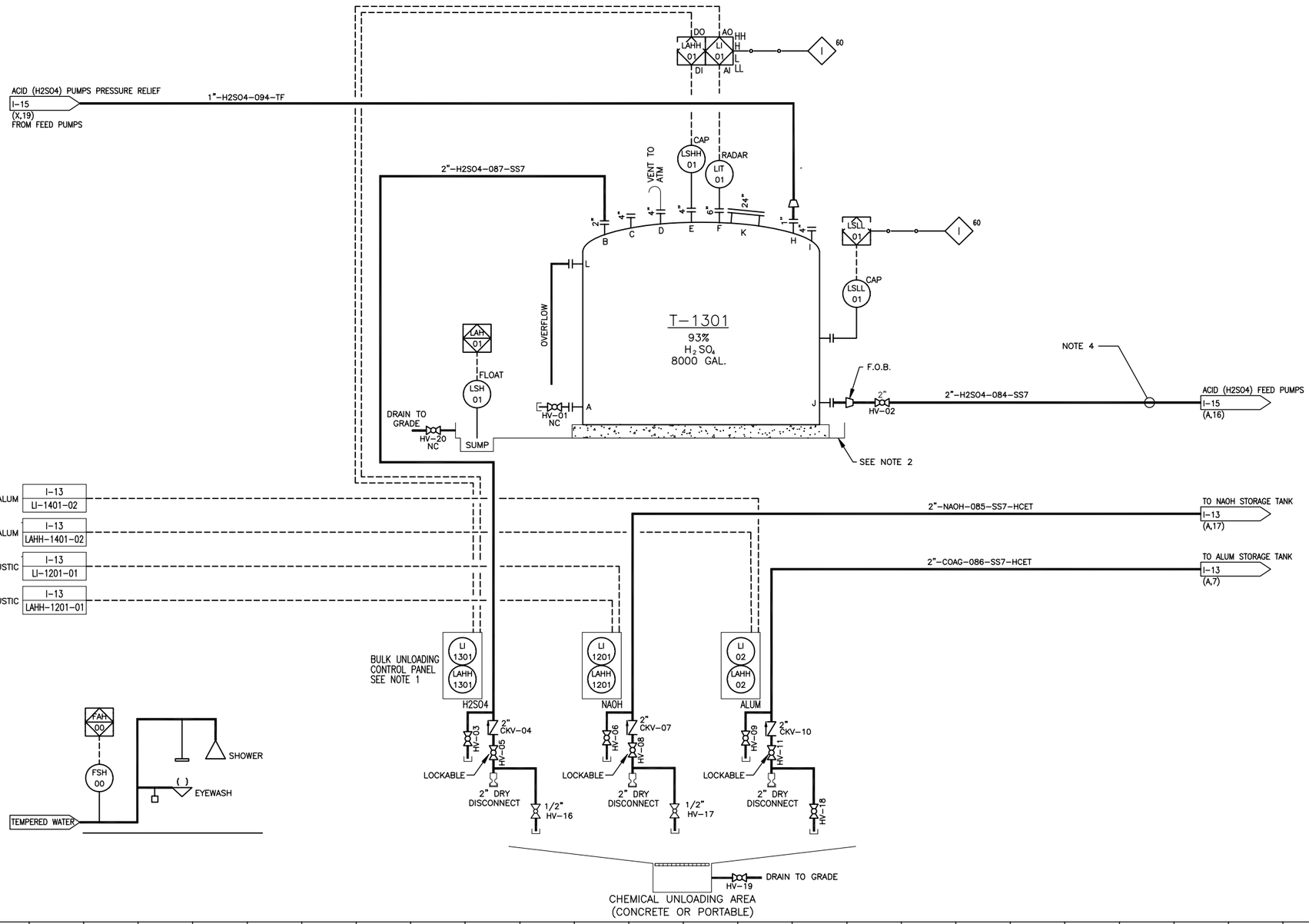

NOTES:

1. AWNING OVER UNLOADING PANEL.
2. SAWCUT/GROOVE CONCRETE PAD TO SHOW LEAKAGE AT TANK BOTTOM.
3. 93% SULFURIC ACID PROPOSED FOR FREEZE PREVENTION. ALTERNATE CONCENTRATIONS MAY REQUIRE HEAT-TRACING AND INSULATION.
4. PROVIDE FLANGE GUARDS ON ALL SULFURIC ACID AND SODIUM HYDROXIDE PIPELINES.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
CHEMICAL STORAGE - H2SO4/UNLOADING
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-I12
DATE FEBRUARY 2010

I-12

T-1301

H2SO4 STORAGE TANK
SIZE: 10' DIA. x 14'-10" H
VOLUME: 8000 GAL
MOC: TBD
DESIGN: VERTICAL, CYLINDRICAL

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

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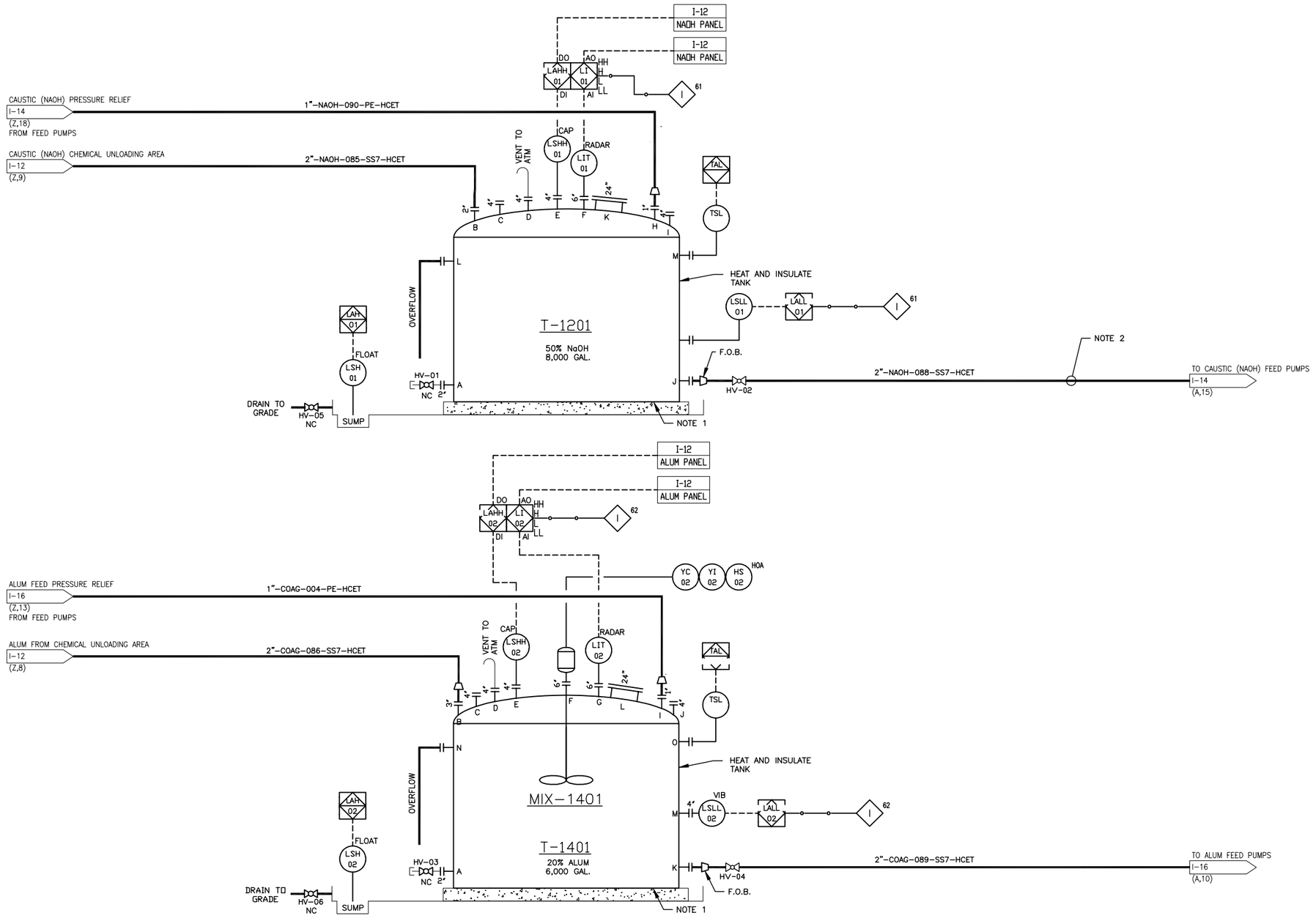

NOTES:

1. SAWCUT/GROOVE CONCRETE PADS TO SHOW LEAKAGE AT TANK BOTTOM.
2. PROVIDE FLANGE GUARDS ON ALL SULFURIC ACID AND SODIUM HYDROXIDE PIPELINES.

INTERLOCKS:

REFER TO SHEET I-C

T-1201
NaOH STORAGE TANK
SIZE: APPROX. 10' DIA. x 14'-10" H
VOLUME: 8000 GAL.
MOC: FRP
DESIGN: VERTICAL CYLINDRICAL

T-1401
ALUM STORAGE TANK
SIZE: APPROX. 8' DIA. x 16'-11" H
VOLUME: 6000 GAL.
MOC: FRP
DESIGN: VERTICAL, CYLINDRICAL

MIX-0401
ALUM STORAGE TANK MIXER
MIXER TYPE: TOP ENTRY
MOC: 316SS
MOTOR: TBD
AGITATOR RPM: TBD
IMPELLER: TBD

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
CHEMICAL STORAGE – NAOH/ALUM
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613-I13
DATE FEBRUARY 2010

I-13

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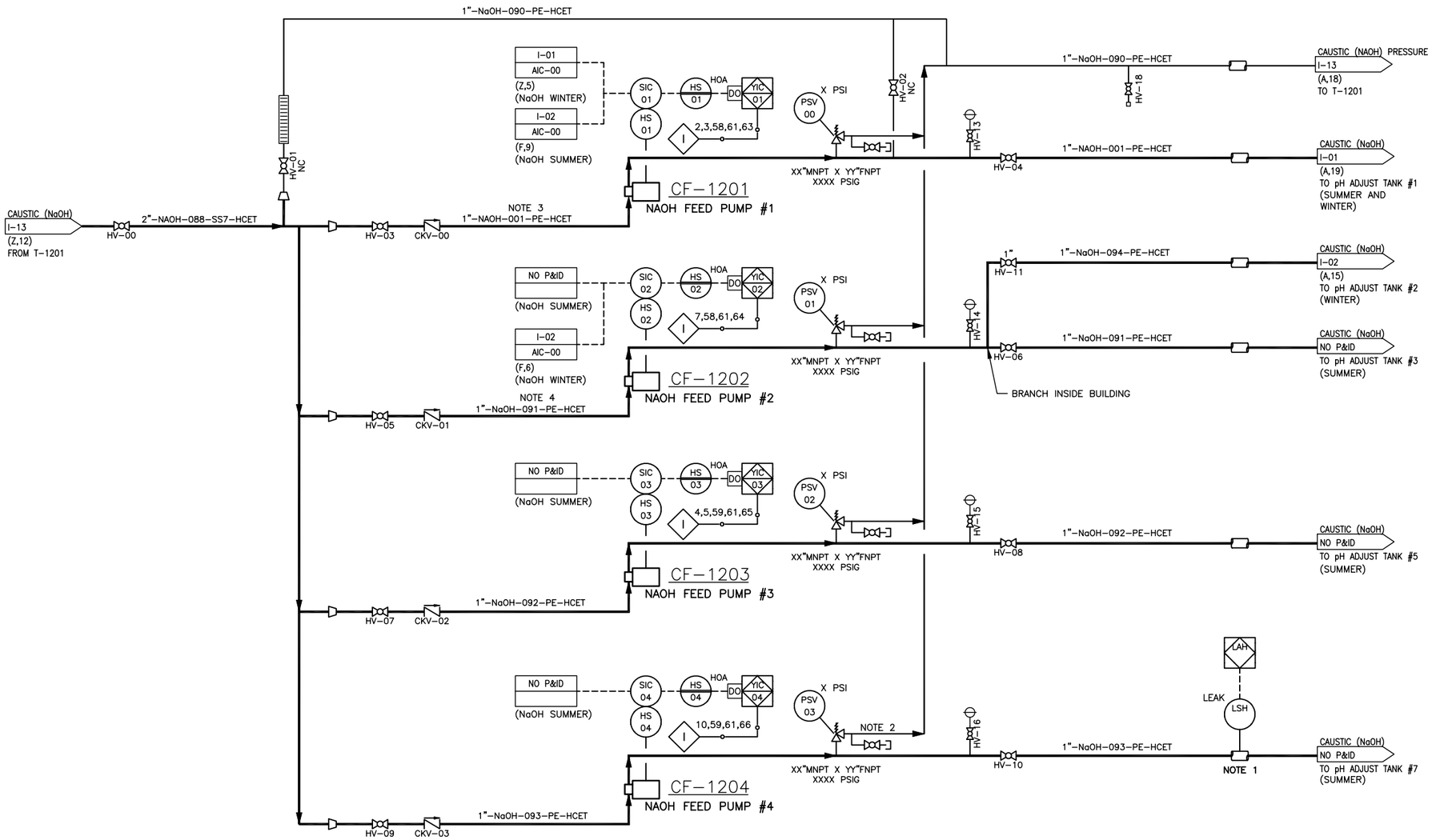


NOTES:

1. INSTALL NaOH DISCHARGE LINE WITHIN BURIED COMMON SECONDARY PIPE(S) BETWEEN THE BULK CHEMICAL AREA AND TREATMENT BUILDING. PROVIDE LEAK DETECTION INSIDE EACH SECONDARY CONTAINMENT PIPE.
2. PROVIDE DRAIN VALVE AND CAP/PLUG AT EACH PSV OUTLET. DRAIN VALVES NOT REQUIRED IF THE DISCHARGES FROM THE PSVs CAN BE CONTINUOUSLY SLOPED TO DRAIN TO THE NaOH TANK.
3. DURING SUMMER/DREDGE SEASON OPERATIONS AIC-0102-00 AT pH ADJUST TANK #2 WILL CONTROL CF-1201 OPERATION. DURING WINTER/OFF-SEASON OPERATIONS, AIC-0101-00 AT pH ADJUST TANK #1 WILL CONTROL CF-1201 OPERATION.
4. DURING SUMMER/DREDGE SEASON OPERATIONS FEED CAUSTIC TO pH ADJUST TANK #3 VIA THE OPENING OF HV-06. CONTROL OF CF-1202 WILL BE BY pH CONTROLLER IN pH ADJUST TANK #4. DURING WINTER/OFF-SEASON OPERATIONS, FEED CAUSTIC TO pH ADJUST TANK #2 VIA THE OPENING OF HV-11. CONTROL OF CF-1202 WILL BE BY pH CONTROLLER IN pH ADJUST TANK #2.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION

CHEMICAL FEED SYSTEMS – NAOH
P&ID

CF-1201
NAOH FEED PUMP #1
TYPE: METERING PUMP
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

CF-1202
NAOH FEED PUMP #2
TYPE: METERING PUMP
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

CF-1203
NAOH FEED PUMP #3
TYPE: METERING PUMP
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

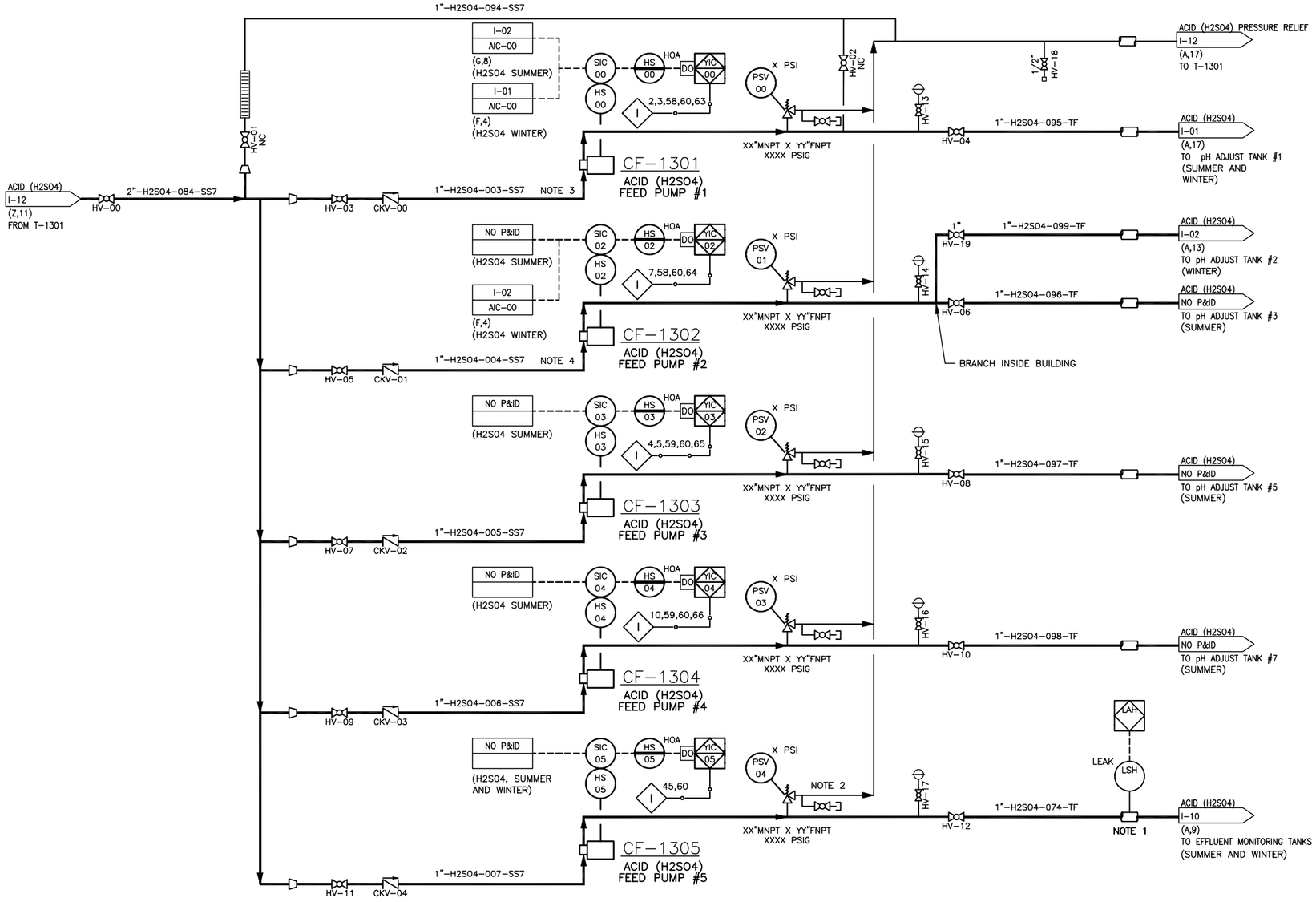
CF-1204
NAOH FEED PUMP #4
TYPE: METERING PUMP
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-I14
DATE APRIL 2010

I-14



NOTES:

1. INSTALL H2S04 DISCHARGE LINE WITHIN BURIED COMMON SECONDARY PIPE(S) BETWEEN THE BULK CHEMICAL AREA AND TREATMENT BUILDING. PROVIDE LEAK DETECTION INSIDE EACH SECONDARY CONTAINMENT PIPE.
2. PROVIDE DRAIN VALVE AND CAP/PLUG AT EACH PSV OUTLET. DRAIN VALVES NOT REQUIRED IF THE DISCHARGES FROM THE PSVs CAN BE CONTINUOUSLY SLOPED TO DRAIN TO THE H2S04 TANK.
3. DURING SUMMER/DREDGE SEASON OPERATIONS AIC-0102-00 AT pH ADJUST TANK #2 WILL CONTROL CF-1301 OPERATION. DURING WINTER/OFF-SEASON OPERATIONS, AIC-0101-00 AT pH ADJUST TANK #1 WILL CONTROL CF-1301 OPERATION.
4. DURING SUMMER/DREDGE SEASON OPERATIONS FEED H2S04 TO pH ADJUST TANK #3 VIA THE OPENING OF HV-06. CONTROL OF CF-1302 WILL BE BY pH CONTROLLER IN pH ADJUST TANK #4. DURING WINTER/OFF-SEASON OPERATIONS, FEED H2S04 TO pH ADJUST TANK #2 VIA THE OPENING OF HV-11. CONTROL OF CF-1302 WILL BE BY pH CONTROLLER IN pH ADJUST TANK #2.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION

CHEMICAL FEED SYSTEMS – H2S04
P&ID

CF-1301
ACID FEED PUMP #1
TYPE: 93% SULFURIC ACID
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

CF-1302
ACID FEED PUMP #2
TYPE: 93% SULFURIC ACID
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

CF-1303
ACID FEED PUMP #3
TYPE: 93% SULFURIC ACID
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

CF-1304
ACID FEED PUMP #4
TYPE: 93% SULFURIC ACID
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

CF-1305
ACID FEED PUMP #5
TYPE: 93% SULFURIC ACID
CAPACITY: 5 TO 50 GPH
HP: 0.5 HP
MOC: TBD

PRELIMINARY NOT FOR CONSTRUCTION
5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-I15
DATE FEBRUARY 2010

I-15

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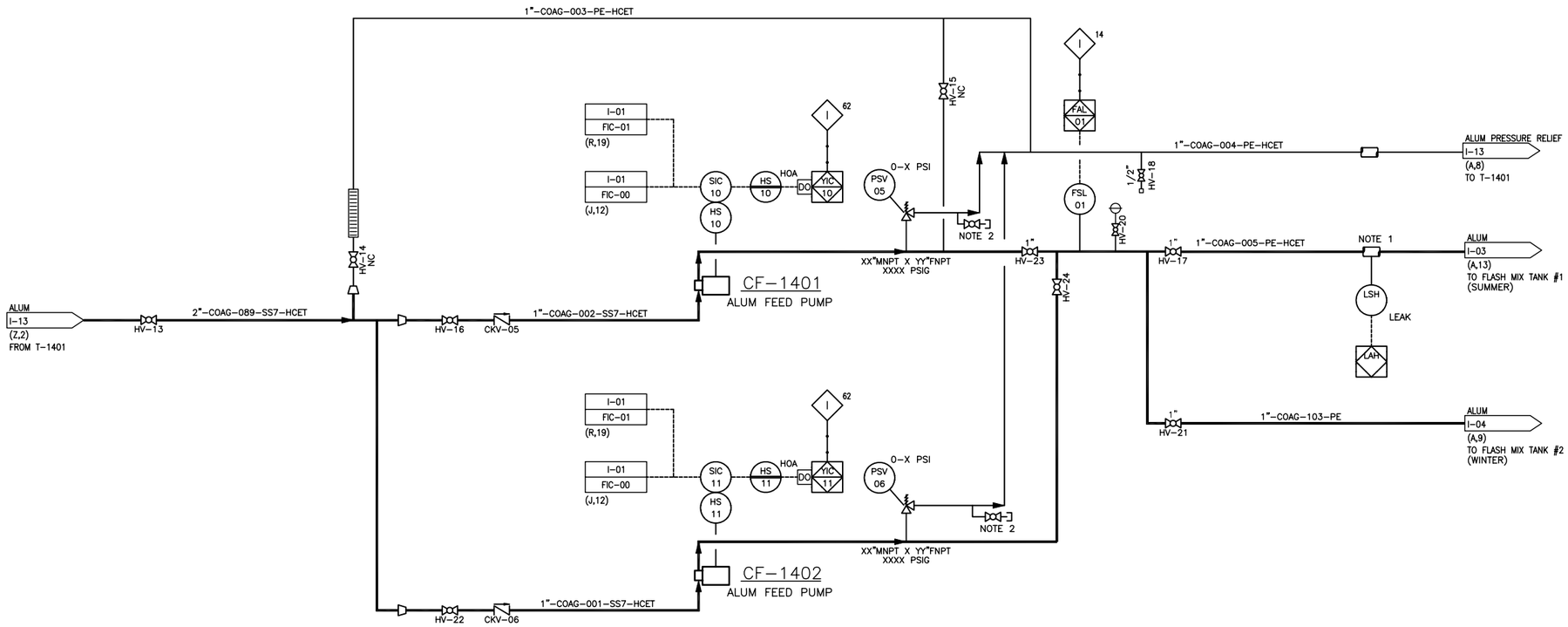


NOTES:

1. INSTALL ALUM DISCHARGE LINE(S) WITHIN BURIED COMMON SECONDARY CONTAINMENT PIPE BETWEEN THE BULK CHEMICAL AREA AND TREATMENT BUILDING. PROVIDE LEAK DETECTION INSIDE SECONDARY CONTAINMENT PIPE.
2. PROVIDE DRAIN VALVE WITH CAP/PLUG AT PSV OUTLET. DRAIN VALVE NOT REQUIRED IF THE DISCHARGE FROM PSV CAN BE CONTINUOUSLY SLOPED TO DRAIN TO THE ALUM TANK.
3. ONE PUMP WILL OPERATE WITH OTHER BEING INSTALLED SPARE.

INTERLOCKS:

REFER TO SHEET I-C

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/10/10	DP #1 FOR NYSDEC AND COUNTY REVIEW	
B	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	
A	2/4/10	DP #1 INTERNAL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
CHEMICAL FEED – ALUM
P&ID

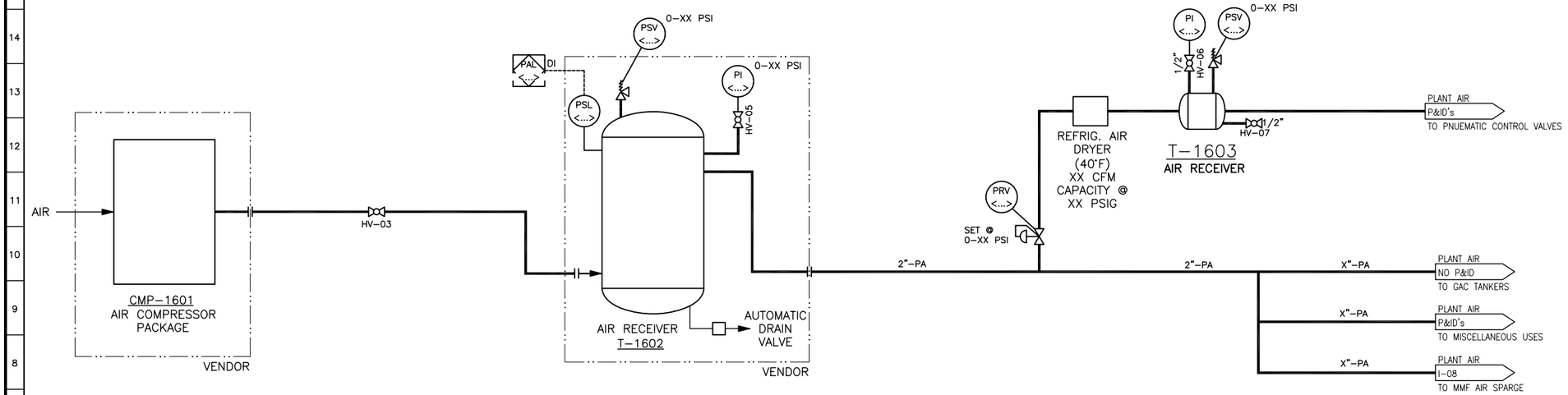
CF-1401
ALUM FEED PUMP
TYPE: 20% ALUM
CAPACITY: 0-72 GPH
HP: 0.5 HP
MOC: TBD

CF-1402
ALUM FEED PUMP
TYPE: 20% ALUM
CAPACITY: 0-72 GPH
HP: 0.5 HP
MOC: TBD

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613-I16
DATE FEBRUARY 2010

I-16



NOTES:

1.

INTERLOCKS:

PENDING

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/9/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP#2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
AIR COMPRESSOR
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613–I17
DATE APRIL 2010

I–17

CMP–1601
AIR COMPRESSOR
TYPE: ROTARY SCREW
CAPACITY: 305 CFM
138 PSIG
HP: APPROX. 75
ACCESSORIES: AFTERCOOLER
DIM: APPROX. 40"L x 22"W x 35"H

T–1602
AIR RECEIVER
CAPACITY: 400 GAL.
TYPE: VERTICAL
SIZE: 3' DIA. x 7'–10"H
MOC: CARBON STEEL
ACCESSORIES: SAFETY RELIEF VALVE
PRESSURE GAUGE
ELECTRONIC DRAIN VALVE
PRESSURE RATING: 165 PSIG

T–1603
AIR RECEIVER
CAPACITY: 52 GAL.
TYPE: HORIZONTAL
SIZE: APPROX. 17"DIA. x 53"L
MOC: CARBON STEEL
ACCESSORIES: SAFETY RELIEF VALVE
ELECTRONIC DRAIN VALVE
PRESSURE RATING: 160 PSIG

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

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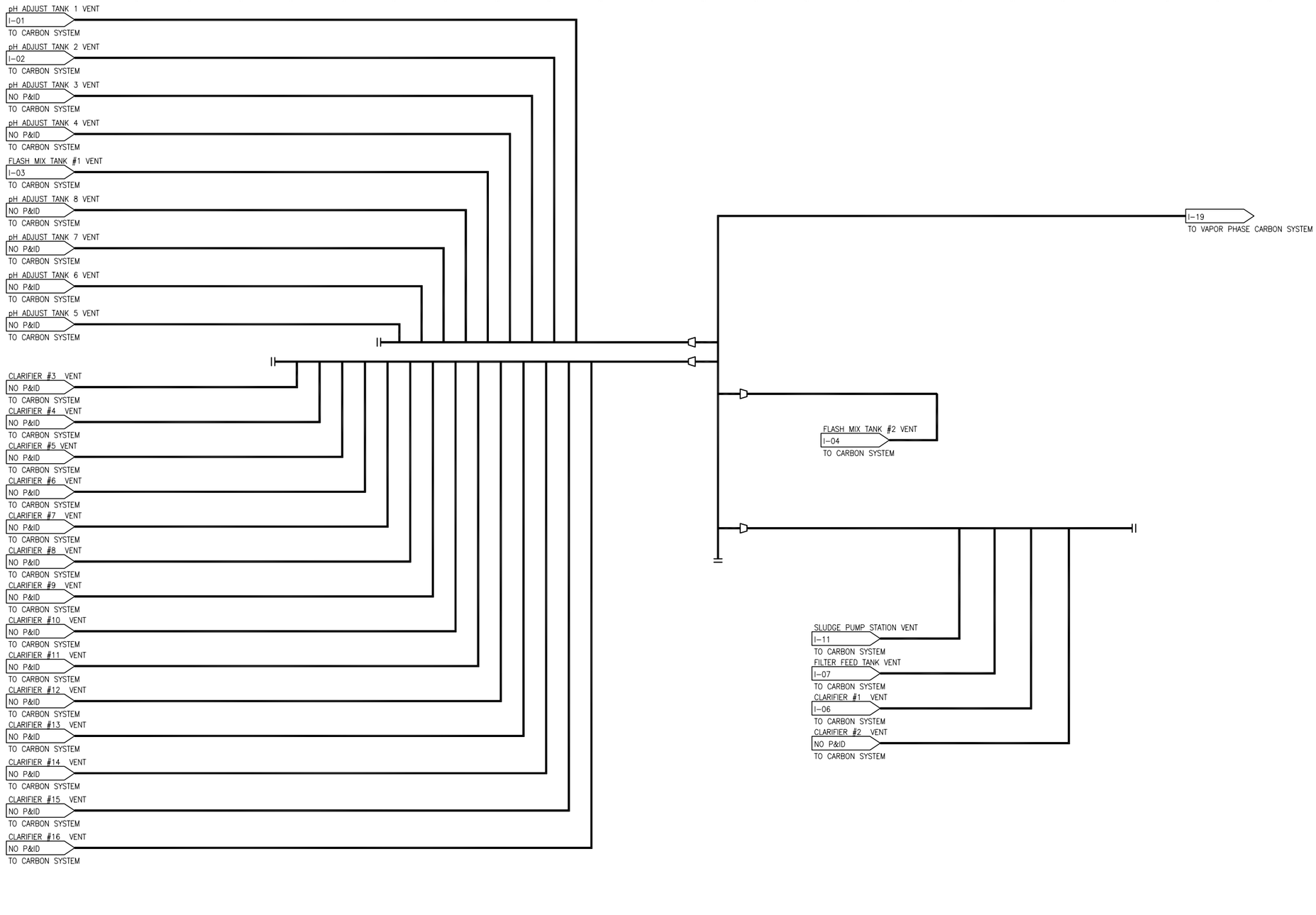

NOTES:

1.

INTERLOCKS:

PENDING

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP#2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION

VENT HEADER
P&ID

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY JAS

FILE NO. 1163.45613-I17
DATE MAY 2010

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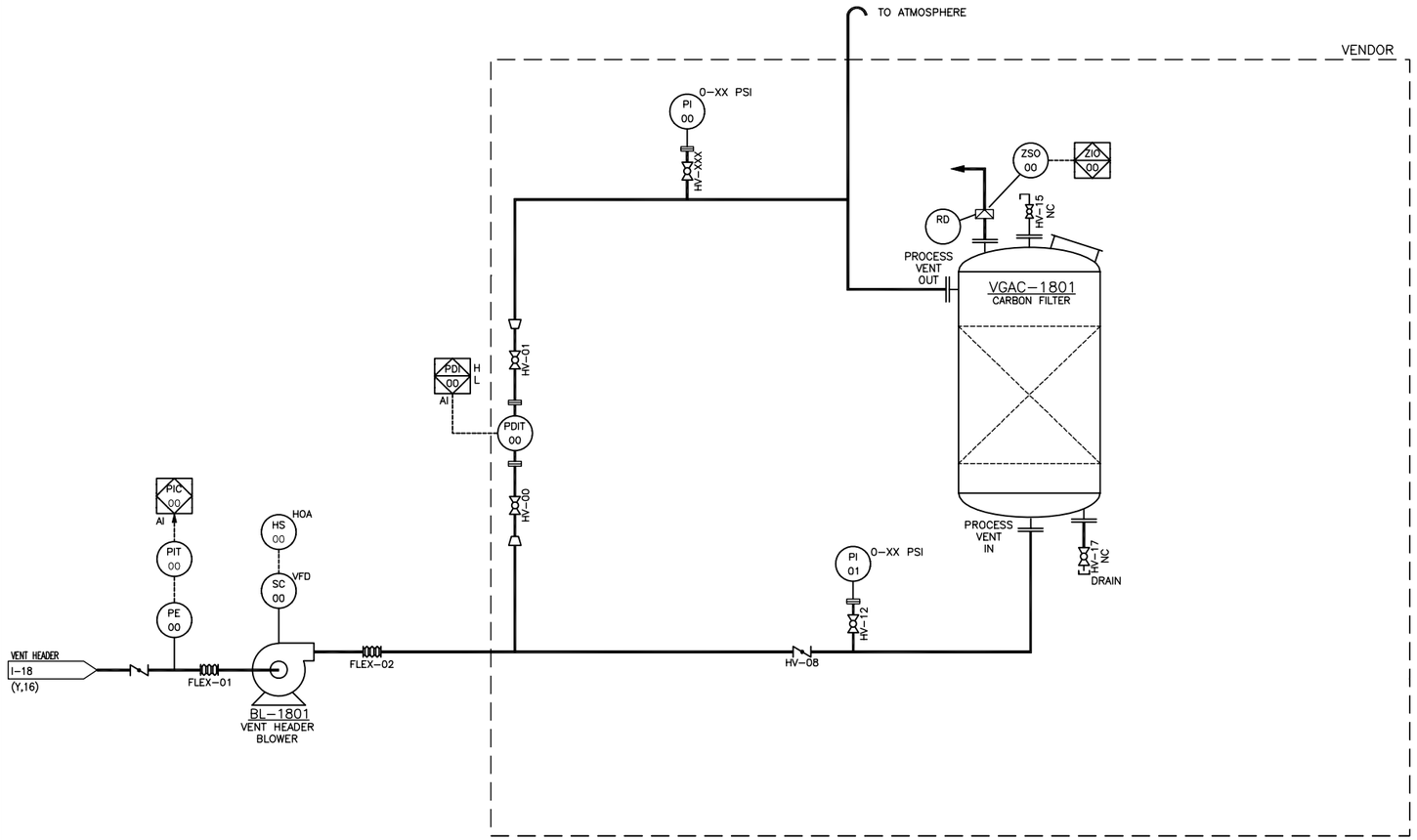


VGAC–1801
VAPOR PHASE CARBON FILTER

NOTES:

1. VENDOR SUPPLIED VAPOR PHASE GAC SYSTEM TO BE INSTALLED PER VENDOR'S APPROVED SHOP DRAWINGS AND INSTRUCTIONS.

INTERLOCKS:

REFER TO SHEET I–C

BL–1801
VENT HEADER BLOWER
TYPE: INDUCED DRAFT RADIAL
DESIGN FLOW: TBD CFM
DESIGN PRESSURE: TBD
MOC: TBD
HP: TBD

VGAC–1801
VAPOR PHASE CARBON FILTER
DESIGN FLOW (SUMMER): TBD CFM
DESIGN FLOW (WINTER): TBD CFM
P/T RATING: 15 PSI @ 180 DEG. F
VESSEL DIMENSIONS: APPROX. 46" DIA. x 89"H
MOC: LINED STEEL
MASS OF CARBON: 1,000 LBS

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
A	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	

O'BRIEN & GERE ENGINEERS INC.

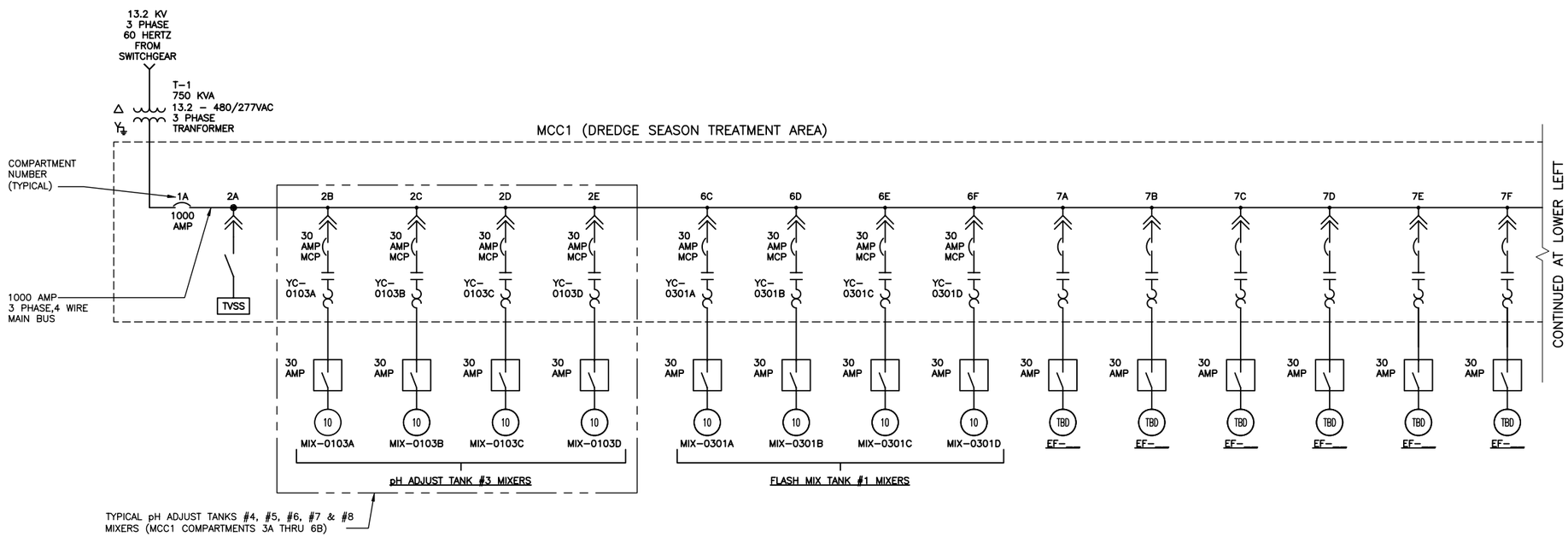
HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

PROCESS AND INSTRUMENTATION
VAPOR PHASE CARBON FILTER
P&ID

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613–I19
DATE FEBRUARY 2010

I–19

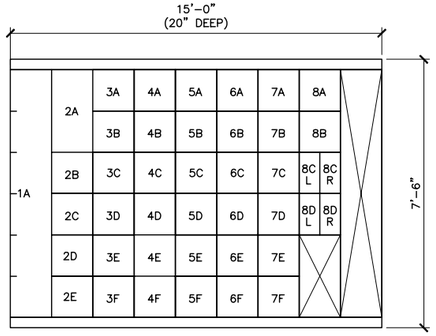


MCC1 ONE-LINE

NOT TO SCALE

NOTES:

1. THE FOLLOWING EQUIPMENT SHALL BE POWERED FROM POWER PANELS PP1A AND PP1B:
   - -CLARIFIER FLOCCULATION MIXERS
   - -MOTOR OPERATED VALVES
   - -OVERHEAD DOOR OPERATORS
   - -WELDED RECEPTACLES



MCC1 ELEVATION

NOT TO SCALE

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
B	5/12/10	DP#2 FOR NYSDEC AND COUNTY REVIEW	
A	4/9/10	DP#2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MCC ONE-LINE

IN CHARGE OF _____

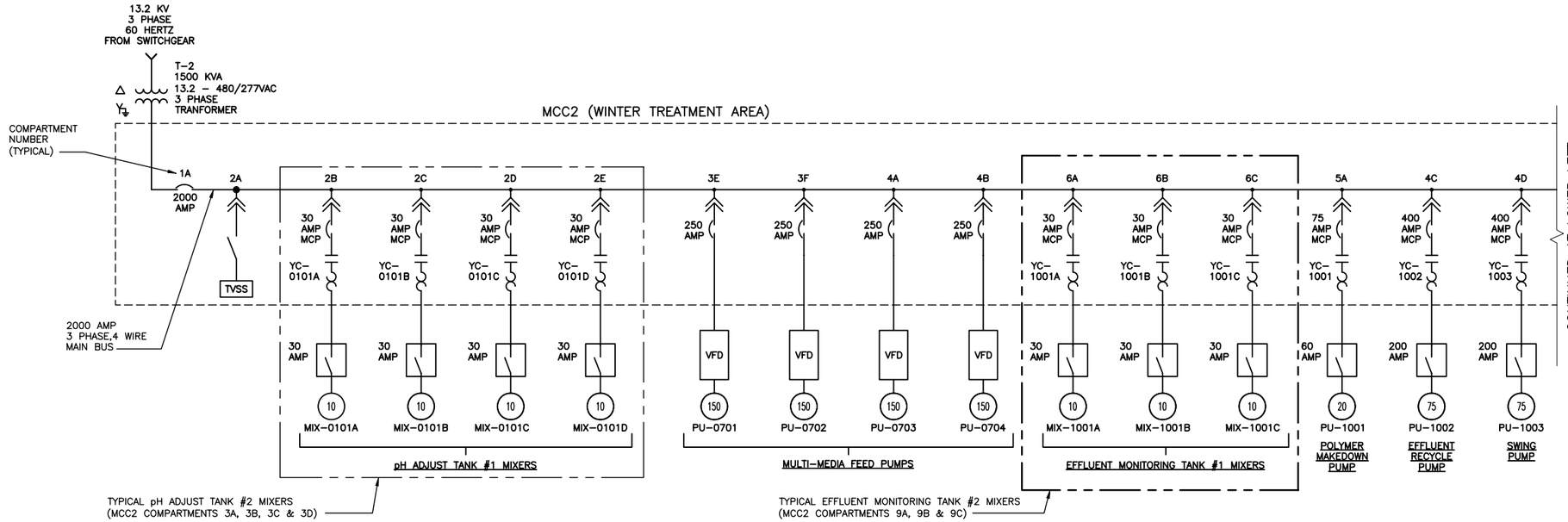
DESIGNED BY _____ CHECKED BY _____

DRAWN BY _____

FILE NO. 1163.45613-E1

DATE APRIL 2010

E-1



MCC2 ONE-LINE

NOT TO SCALE

NOTES:

1. THE FOLLOWING EQUIPMENT SHALL BE POWERED FROM POWER PANELS PP2A AND PP2B:
   - -CLARIFIER FLOCCULATION MIXERS
   - -CHEMICAL FEED PUMPS
   - -MOTOR OPERATED VALVES
   - -DOOR OPERATORS
   - -WATER HEATERS
   - -WELDED RECEPTACLES

2. THE FOLLOWING EQUIPMENT SHALL BE POWERED FROM POWER PANELS PP2C AND LIGHTING PANEL LP2C:
   - -CHEMICAL TANK HEATERS
   - -SELECTED HVAC EQUIPMENT IN THE WINTER TREATMENT AREA
   - -SELECTED INTERIOR LIGHTING

NO.	DATE	REVISION	INIT.
B	5/12/10	DP#2 FOR NYSDEC AND COUNTY REVIEW	
A	4/9/10	DP#2 DRAFT FOR HONEYWELL REVIEW	

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MCC ONE-LINE

IN CHARGE OF _____

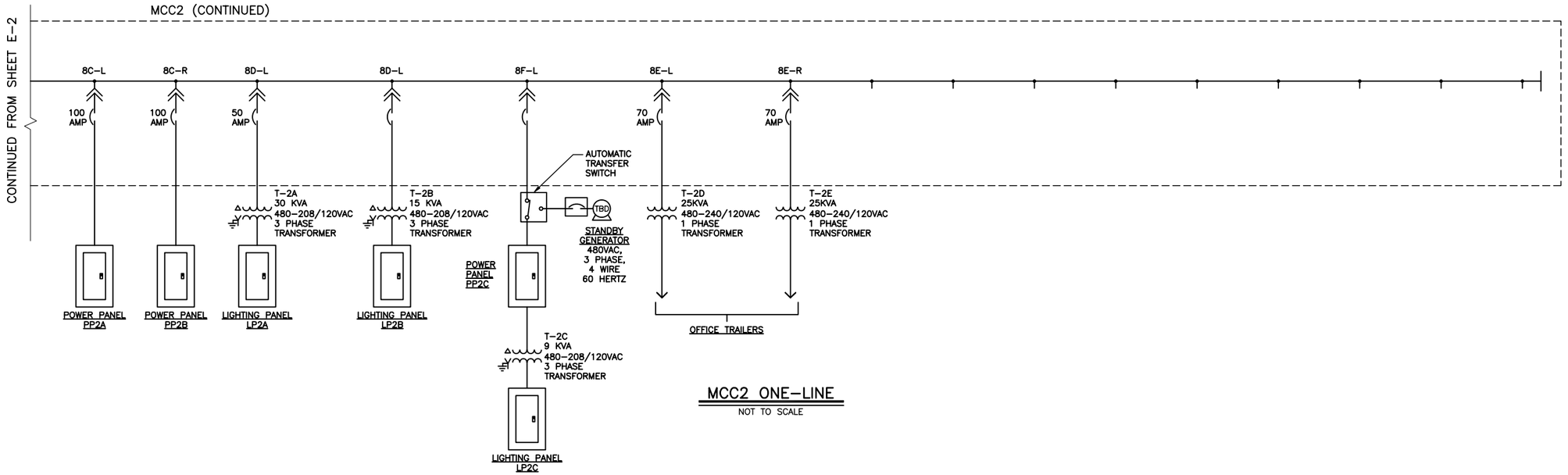
DESIGNED BY _____ CHECKED BY _____

DRAWN BY _____

FILE NO. 1163.45613-E2

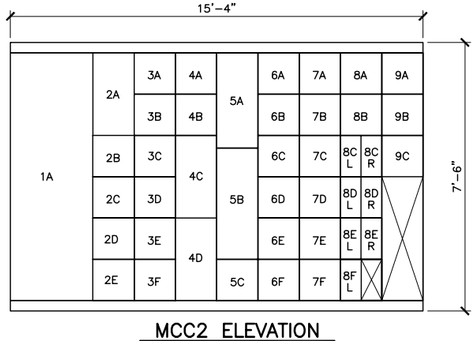
DATE APRIL 2010

E-2



MCC2 ONE-LINE

NOT TO SCALE



MCC2 ELEVATION

NOT TO SCALE

PRELIMINARY NOT FOR CONSTRUCTION

DATE: 5/12/10

NO.	DATE	REVISION	INIT.
B	5/12/10	DP#2 FOR NYSDEC AND COUNTY REVIEW	
A	4/9/10	DP#2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

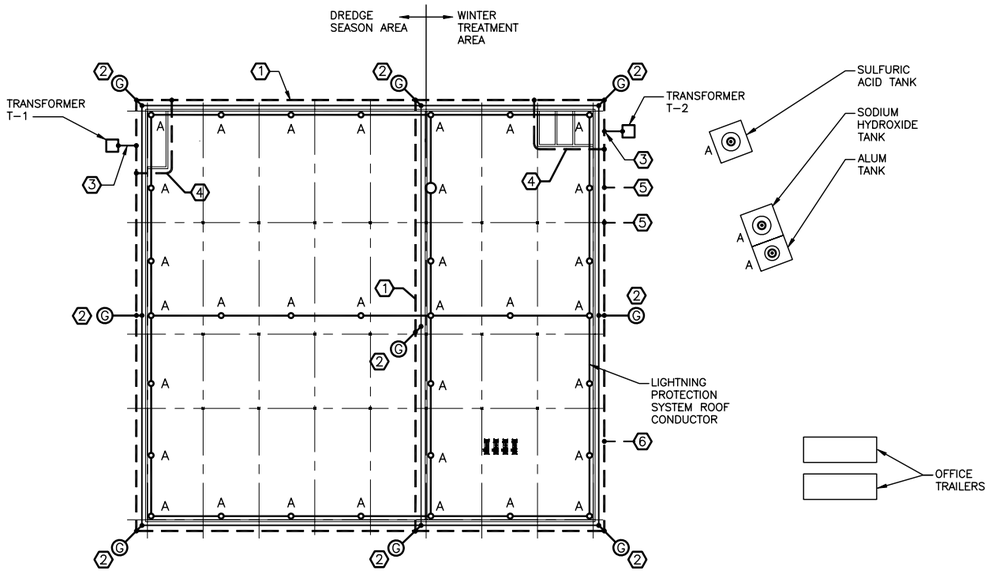
MCC ONE-LINE

IN CHARGE OF _____
DESIGNED BY _____ CHECKED BY _____
DRAWN BY _____

FILE NO. 1163.45613-E3

DATE APRIL 2010

E-3



SCA WATER TREATMENT PLANT
SITE PLAN
SCALE: 1"= 40'

DRAWING NOTES:

1. IN ADDITION TO THE GROUNDING SYSTEM CONNECTIONS SHOWN, PROVIDE A 4/0 BARE COPPER GROUND CONDUCTOR FROM THE FOLLOWING TO THE NEAREST BUILDING STRUCTURAL STEEL:
   - –UNDERGROUND METALLIC PIPING ENTERING/EXITING THE TREATMENT BUILDING.
   - –FRAMES OF MOTORS 10HP AND LARGER
   - –LGAC UNIT FRAMES
   - –POWER PANELS, LIGHTING PANELS AND TRANSFORMERS LOCATED REMOTE FROM ELECTRICAL AREAS

   GROUND CONDUCTORS SHALL BE ROUTED UNDERGROUND TO THE EXTENT PRACTICAL. PROVIDE COMPRESSION CONNECTORS ON PIPING/EQUIPMENT AND ON BUILDING STRUCTURAL STEEL.

2. PROVIDE GROUNDING REELS (FOR GROUNDING GAC SLURRY TRUCKS) LOCATED ON TREATMENT BUILDING COLUMNS B3, E3 AND G3. GROUNDING REELS SHALL HAVE 50' NYLON COVERED CABLE WITH GROUND CLAMP, AUTOMATIC REWINDING, LOCK ON/LOCK OFF SWITCH AND STEEL HOUSING. STEEL HOUSING SHALL PROVIDE A MECHANICAL GROUNDING CONNECTION TO THE STRUCTURAL STEEL COLUMNS. MANUFACTURER SHALL BE CROUSE–HINDS CATALOG NO. SDR–50N OR EQUAL. MOUNT GROUNDING REELS 3'–0" ABOVE FLOOR.

SYMBOLS

- SURFACE MOUNTED CONDUCTOR
- CONCEALED CONDUCTOR
- (G) GROUND ROD
- A LIGHTNING PROTECTION SYSTEM AIR TERMINAL

KEY NOTES:

1. 4/0 BARE COPPER GROUND GRID, INSTALL 36" FROM FOOTINGS, 36" BELOW GRADE.
2. GROUND RODS SHALL BE 5/8" DIAMETER, 10'–0" LONG, COPPER CLAD STEEL. PROVIDE EXOTHERMIC WELD CONNECTION TO GROUND GRID. PROVIDE 4/0 BARE COPPER GROUND CONDUCTOR FROM GROUND ROD TO BUILDING STRUCTURAL COLUMN WITH EXOTHERMIC WELD CONNECTION ON GROUND ROD AND COMPRESSION CONNECTOR ON COLUMN.
3. 4/0 BARE COPPER GROUND CONDUCTOR FROM GROUND GRID TO PAD MOUNTED TRANSFORMER WITH EXOTHERMIC WELD CONNECTION TO GROUND GRID AND COMPRESSION CONNECTOR ON TRANSFORMER.
4. 4/0 BARE COPPER GROUND CONDUCTOR FROM GROUND GRID TO ELECTRICAL AREA WITH EXOTHERMIC WELD CONNECTIONS TO GROUND GRID. PROVIDE CONNECTION FROM GROUND CONDUCTOR TO ELECTRICAL EQUIPMENT (MOTOR CONTROL CENTERS, DRY TYPE TRANSFORMERS, POWER PANELS AND LIGHTING PANELS) IN THE ELECTRICAL AREA. PROVIDE EXOTHERMIC WELD CONNECTIONS TO GROUND GRID AND COMPRESSION CONNECTORS ON ELECTRICAL EQUIPMENT.
5. 4/0 BARE COPPER GROUND CONDUCTOR FROM GROUND GRID TO CHEMICAL TANK LIGHTNING PROTECTION SYSTEM GROUND RODS. PROVIDE EXOTHERMIC WELD CONNECTION ON GROUND GRID AND GROUND RODS.
6. 4/0 BARE COPPER GROUND CONDUCTOR FROM GROUND GRID TO OFFICE TRAILER SERVICE DISCONECTS. PROVIDE EXOTHERMIC WELD CONNECTION ON GROUND GRID AND COMPRESSION CONNECTORS ON DISCONNECTS.

LIGHTNING PROTECTION SYSTEM NOTES:

1. PROVIDE A LIGHTNING PROTECTION SYSTEM ON THE (SCA WATER TREATMENT PLANT) AND CHEMICAL TANKS. SYSTEM SHALL BE IN ACCORDANCE WITH LIGHTNING PROTECTION INSTITUTE (L.P.I.) CODE 175 WITH REGARD TO DESIGN, MATERIALS AND INSTALLATION. INSTALLATION SHALL BE MADE BY OR UNDER THE SUPERVISION OF AN L.P.I. CERTIFIED MASTER INSTALLER. COMPLETED INSTALLATION SHALL RECEIVE SYSTEM CERTIFICATION INCLUDING A U.L. MASTER LABEL AND SUBMITTAL OF FORM LPI–1–R91. SYSTEM SHALL BE BY THOMPSON LIGHTNING PROTECTION INC.
2. LIGHTNING PROTECTION SYSTEM FEATURES SHOWN ARE MINIMUM. PROVIDE AIR TERMINALS, AIR TERMINAL SPACINGS AND LIGHTNING PROTECTION SYSTEM CONNECTIONS TO ROOF MOUNTED FEATURES IN ACCORDANCE WITH L.P.I. REQUIREMENTS.
3. PROVIDE LIGHTNING PROTECTION SYSTEM DOWN CONDUCTORS IN ACCORDANCE WITH L.P.I. REQUIREMENTS INCLUDING DEDICATED GROUND RODS AT EACH DOWN CONDUCTOR. PROVIDE CONNECTION OF GROUND RODS TO THE BUILDING GROUND GRID.
4. MATERIAL SIZES, MATERIALS OF CONSTRUCTION AND INSTALLATION DETAILS OF LIGHTNING PROTECTION SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH L.P.I. REQUIREMENTS.
5. THE LIGHTNING PROTECTION SYSTEM SHALL BE DESIGNED AND INSTALLED TO ALLOW FUTURE REMOVAL OF THE DREDGE SEASON AREA PORTION OF THE (SCA WATER TREATMENT PLANT). PROVIDE AIR TERMINALS, DOWN CONDUCTORS AND OTHER FEATURES AS NECESSARY TO MAINTAIN SYSTEM CERTIFICATION OF THE REMAINING WINTER TREATMENT AREA AFTER DREDGE SEASON AREA REMOVAL.

NO.	DATE	REVISION	INIT.
B	5/12/10	DP#2 FOR NYSDEC AND COUNTY REVIEW	
A	4/9/10	DP#2 DRAFT FOR HONEYWELL REVIEW	

1"=40' 40 0 40

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

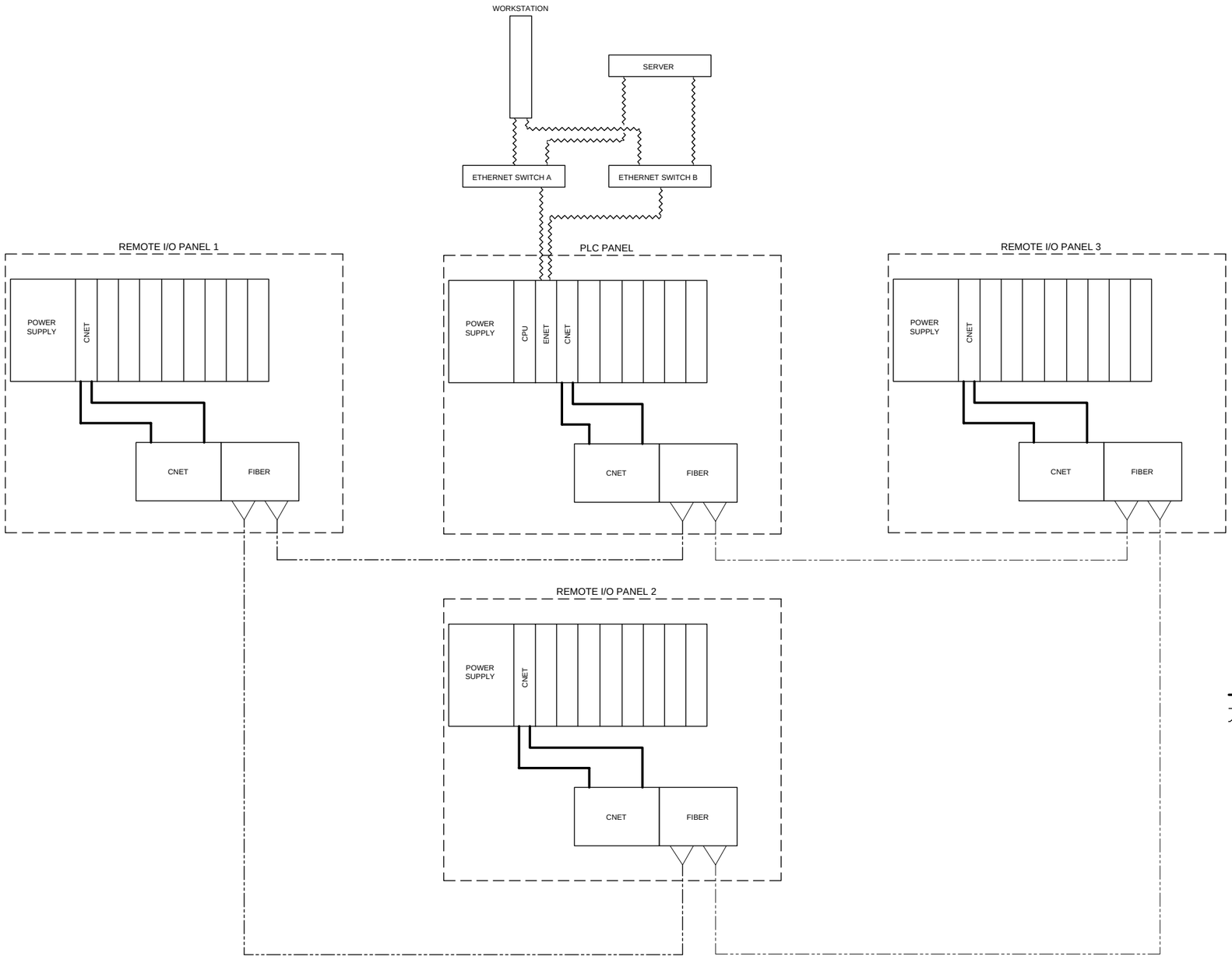
GROUNDING PLAN

IN CHARGE OF _____
DESIGNED BY _____ CHECKED BY _____
DRAWN BY _____

FILE NO. 1163.45613–E4
DATE APRIL 2010

E–4

NOTES:



LEGEND:

- CONTROLNET
- FIBER
- ETHERNET CAT 5

NO.	DATE	REVISION	INIT.
B	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
A	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	

O'BRIEN & GERE ENGINEERS INC.

HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

ELECTRICAL

CONTROL SYSTEM OVERVIEW

PRELIMINARY
NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF _____
DESIGNED BY _____ CHECKED BY _____
DRAWN BY _____

FILE NO. 1163.45613-CS1
DATE APRIL 2010

CS-1

Technical Specifications – Major Equipment

SECTION 44 42 23.07

INCLINED PLATE CLARIFIERS - PRE-PURCHASE SPECIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the covered flash mix tanks, flocculation tanks and inclined plate clarifier (IPC) system, including mixers and associated control panels as shown on the Contract Drawings. Refer to the attached Process and Instrumentation Drawing (P&ID) for an example schematic of the system. The space allocated for the system is as shown on the enclosed General Arrangement Plan. The general scope of the work is to furnish, deliver, and provide start-up assistance for the IPC system, so that a complete system successfully performs as designed

B. The information provided is based upon sixteen frac tank clarifier units. The type, size and quantity of these IPC units are what were used to develop the design basis for this project. However, the intent is to specify performance-based equipment. Quantities, sizes and types are all subject to change based upon the equipment manufacturer's compliance to the performance criteria described herein. Manufacturers shall consider alternate equipment, as needed, to optimize the design to propose more cost effective alternatives. As such, traditional IPC units, or other differences will be acceptable and will be considered. The IPC units shall be kept to Manufacturer's standard offerings, as much as possible. Any requests in this RFP which, in the Vendor's opinion, impart unnecessary costs or unnecessarily differ from Manufacturer's standard offerings shall be clearly identified in Bidder's proposal

C. The IPC system shall be designed to precipitate dissolved metals and remove total suspended solids (TSS). A 20 percent solution of aluminum sulfate (alum) will be added to the flash mix tank to attain the desired solution concentration with the IPC feed water. Chemical storage and feed equipment are provided by others.

D. The system is planned to be installed (by others) inside a structure at the Owner's facility and operated approximately seven months out of each year (April 15th through November 15th) for four years beginning in the year 2012. In addition to the short-term (4-year) treatment trains, a long-term treatment train (which includes an IPC component) will also be operated at the same Owner's facility. This long-term treatment train will be designed to treat a much lower flow rate. The long-term IPC unit will treat the same water (contains the same constituents at the same concentrations as shown on Table 2) but at a maximum flow rate of 500 gpm, and for an expected operational lifespan of 20 years. The long-term unit(s) shall be within a heated building. The Manufacturer shall select equipment such that an appropriately-sized IPC unit(s) is shared between the "short-term" and the "long-term" treatment trains (i.e. serving as a part of the short-term IPC system during the seven months of "summer" operation and then used as part of the lower-flow, long-term system during the winter months for the first four years and year-round after year 4).

Even though the short-term equipment will be located inside a structure, the structure is not heated and therefore the units are subject to freezing during the non-operational

winter months (but after they have been drained). Manufacturer shall identify required means, methods and procedures, if any, needed to prepare units for storage over the winter months.

E. Start-up services shall be provided. Provide a factory representative for up to 40 hours of field start-up assistance at the Owner's facility.

F. The equipment shall fit within the footprint allocated as shown on the General Arrangement Drawing GA-01 provided herein. The clarifier system shall be serviceable, including removal of plates and mixers, within the building's clear height. There is no lifting mechanism proposed above the IPC. Manufacturer shall identify any operational or maintenance clearances required with the Bid. The equipment will need to fit through the building's overhead door which has dimensions of 14 feet x 18 feet. The building will be new construction. Manufacturer shall advise if a larger overhead door opening is required. Manufacturer is to confirm that the equipment can enter the building via the overhead door and be moved to the positions shown on drawing GA-01. The clear height at the building eave is estimated at 18'-0". At the planned location of the north end of the IPC's, the clear height is approximately 20'-6". Additional clear height is available between roof support members.

1.2 REFERENCES

A. Comply with the latest revision of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society of Mechanical Engineers (ASME)

2. American Society for Testing and Materials (ASTM)

3. American National Standards Institute (ANSI)

4. NACE International

5. National Electric Code (NEC)

1.3 COORDINATION REQUIREMENTS

A. Coordinate delivery with project schedule as maintained by Construction Supervisor.

B. Coordinate with Engineer and Control System Integrator for controls integration.

C. Bid Review Meeting: Following the Engineer's review of the proposal, a bid review meeting will be held in Syracuse, NY.

D. Scheduling: The IPC system must be operational before April 2012. Refer to RFP Section IV "Information" Schedule Milestones for schedule dates.

1.4 SUBMITTALS

A. Prepare and provide drawings and submittals specific to this system in accordance with the requirements shown on Table 1 (provided as Appendix A to this specification).

B. Product Data Submittals: "Catalog cuts" and spec sheets included as submittals shall be marked to specifically indicate the equipment and materials proposed for this project. Indicate selections with arrows, and cross out irrelevant data.

C. Submittal data for motors shall be in accordance with the attached Specification 26 05 13 "Electric Motors."

D. Operation and Maintenance Data

1. Presentation of Submittals

a. Operational and Maintenance Manuals (3 hard copies each in a 3-ring binder and 1 electronic copy). Owner's name, address, equipment serial numbers, and model numbers shall be clearly identified on the cover. Include Manufacturer and local service representative contact information, including phone numbers and e-mail addresses, on the cover.

b. Each manual shall include a table of contents, an index, and sequential section dividers separating equipment information into subsections. Each manual shall incorporate, at a minimum, the following: field installation instructions, written operation description of the equipment and corresponding components, starting and stopping procedures, routine maintenance procedures, procedures for protecting the equipment during short-term and long-term downtime, schedules, parts lists, troubleshooting topics, illustrations and diagrams and safety instructions for operating personnel.

c. Each manual shall include any other information that is required by maintenance personnel for proper operation and maintenance.

d. Electronic files of the complete operation and maintenance manual are to be provided on CD.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer to provide description of relevant past experience providing IPC systems. Especially of interest is past experience with projects where IPC units were used to clarify water from dredging operations or surface water clean-up projects. Manufacturer shall provide a list of references and contact information.

2. Seismic Design Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing structural and seismic engineering services, including the design of seismic restraints.

3. Owner or Owner's Representative will be conducting scheduled visits to Manufacturer's facilities during fabrication and/or Manufacturer's shop testing procedures.

1.6 DELIVERY, STORAGE AND HANDLING

A. As required, disassemble and deliver IPC system in the minimum number of pieces.

B. Site access is via a one-way access road, parts of which are steeply graded. Equipment Manufacturer to ensure adequate means of delivery is provided to enable delivery to the site. A site visit prior to delivery is recommended.

C. Materials and equipment shall be boxed, crated or otherwise completely protected during shipment, delivery, storage and handling. Such boxes, crates or protection shall be clearly labeled with the Manufacturer's and Owner's name, site address, project equipment tag numbers, brand or model.

D. Ship, deliver, store and handle to prevent damage and in accordance with Manufacturer's written instructions. Provide factory-installed lifting provisions.

E. The IPC system shall be delivered freight on board (FOB) to the project site.

F. Manufacturer's storage requirements shall be provided. Units will be stored outside and unprotected from weather events for a prolonged period of time prior to installation. Manufacturer shall provide adequate packaging and protection so as to prevent damage under these conditions.

G. Off-loading of equipment delivered to the site is by Others.

1.7 WARRANTY

A. Provide parts and labor warranty in accordance with the Purchase Order General Terms and Conditions, and the Supplemental Terms and Conditions.

B. The standard warranty duration shall be from delivery date of units to one year after start-up. Start-up is defined as the initiation of operational commissioning (assume start-up to begin on April 30, 2012). Provide with the Bid the cost adder to extend the warranty to 42 months after start-up, as described in the Bid Tab document. The standard warranty shall include parts and labor for all supplied items, including but not limited to, equipment, controls, and coating system.

1.8 PERFORMANCE GUARANTEE

A. Performance shall be warrantied and proven. Performance shall be demonstrated continuously for four weeks after start-up under full operating conditions. Performance testing is by others. IPC Manufacturer's Representative shall be present at the site to witness a portion of the performance testing, per Section 3.5.B.2, and provide input as requested. The IPC system shall be designed to achieve effluent concentrations, given the maximum influent concentrations provided on Table 2. Performance shall be warrantied over the entire range of flow rates. Anticipated maximum influent and required effluent concentrations, and minimum and maximum flow rates for the system are provided in Table 2. If the equipment fails to continuously meet this effluent quality, the Manufacturer shall, at no additional cost to the Owner or Buyer, provide and install replacement equipment, parts, and labor (including cost of return trips to the site as

needed), to correct demonstrated performance deficiencies as needed to achieve the required performance.

B. Process: the provided system shall achieve an effluent TSS concentration of 10 mg/L or less. The design value for TSS concentration of the influent water is as shown on Table 2. If the influent TSS concentration exceeds the design value, than 95% removal is required. If the equipment fails to continuously meet this effluent quality, the Manufacturer shall, at no additional cost to the Owner or Buyer, provide and install additional or replacement equipment, parts and labor to correct demonstrated performance deficiencies as needed to achieve the required performance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following Manufacturers are named to establish a standard of quality necessary for the Project:

1. Unipure
2. Graver
3. Parkson
4. Siemens
5. WesTech
6. Or approved equal

2.2 PERFORMANCE REQUIREMENTS

A. The influent water characteristics shall be as shown in Table 2 (see Appendix B to this specification).

B. The flash mix tank criteria shall be as follows:

Application	Chemical addition
Number of Flash Mix Tanks	Manufacturer to identify
Alum Dosage (Note 1)	20 mg/L
Flash Mix Tank Residence Time, Minimum	1 – 5 minutes, Manufacturer to confirm
Flash Mix Tank Mixer, Motor (Note 1)	Manufacturer to provide HP
Flash Mix Tank Mixer, Type	Flange mounted, constant speed (Note 1).

Note 1: Motors shall be in accordance with requirements provided in Appendices.

C. The flocculation tank criteria shall be as follows:

Application	Chemical precipitation and solids coagulation
Number of Flocculation Tanks	Manufacturer to identify
Flocculation Tank Residence Time, Minimum	5 - 15 minutes, Manufacturer to confirm
Flocculation Tank Mixer, Motor (Note 1)	Manufacturer to provide HP

Flocculation Tank Mixer, Type	Flange mounted, variable speed (Note 1). VFD by Others.

Note 1: Motors shall be in accordance with requirements provided in Appendices. Mixer VFD's to be provided by Others.

D. The IPC criteria shall be as follows:

Application	Gravity settling of suspended solids
Number of IPC units	Manufacturer to identify
Material of Construction, Tank	Coated carbon steel, FRP or approved alternate MOC, as recommended by the Manufacturer.
Material of Construction, Plates	Manufacturer to provide
Projected Sludge Generation Rate (at Maximum Influent Flow of 5,668 gpm)	708 gpm
Projected Sludge Solids Concentration (as determined during jar testing)	0.85%
Sludge Withdrawal	Intermittent
Hopper Volume, Minimum	Manufacturer to provide
Effective Settling Area per IPC unit, Minimum	Manufacturer to provide
Surface Overflow Rate Range (based on treatability testing)	0.22 to 0.72 gpm/sf
Plate, Angle	Manufacturer to provide
Plate, Size	Manufacturer to provide
Plate Thickness, Minimum	Manufacturer to provide
Plate Perpendicular Spacing, Minimum	Manufacturer to provide
Number of Plates, Minimum	Manufacturer to provide
Weir Type	Flat plate, with gasket
Influent Nozzle Diameter	Manufacturer to provide
Effluent Nozzle Diameter	Manufacturer to provide
Drain/Sludge Hopper Nozzle Diameter	Manufacturer to provide
Hopper Sample Port Nozzle Diameter	¾" diameter
Hopper Sample Port Nozzles, Quantity	Manufacturer to provide

E. The inclined plate clarifier system shall be designed for an effluent TSS concentration of 10 mg/L or less. The design value for TSS concentration of the influent water is as shown on Table 2. If the influent TSS concentration exceeds the design value, than 95% removal is required.

F. The IPC system will receive water from dredged locations with different water makeup and varying settling properties. As such, treatability testing performed showed a range in the acceptable surface overflow rate of 0.22 to 0.72 gpm/sf (refer to attached Treatability Testing Report). However, Manufacturer shall select equipment and revise surface overflow rate as needed. Manufacturer shall size and propose equipment based on achieving the desired effluent TSS concentration, while optimizing equipment sizing to fit in allotted space, and minimizing operational and equipment cost. An important factor in the consideration of the award of the purchase contract for the IPC system will be Manufacturer's design and/or operational strategies, equipment sizing, and other ideas and concepts which place a high importance on maximizing treatment while minimizing

capital and operation/maintenance costs. Vendor shall present any original design alternatives with the Bid.

G. Although maximum concentrations and flow rates have been identified, actual flow rates and concentrations may be less than what is expected. The first year of operation will establish typical flow rates and concentrations and will be used to fine-tune equipment requirements and operational plans for future years of operation. As such, Vendor shall propose ways to optimize the design of the IPC system. Strategies such as the purchase of a core number of units during year one supplemented by lease of additional units as needed will be entertained. If actual conditions warrant the eventual purchase of these leased units, the accrued lease costs would then be applied towards the purchase of these units. Other strategies, as proposed by the Vendor with the Bid, are encouraged and will be evaluated.

H. The influent chamber of the inclined plate clarifier shall be designed to ensure even distribution of the influent.

I. The flash mix compartment shall be separated from the flocculation compartment by a baffle, separate structure, or other acceptable means.

J. The inclined plate clarifier system shall be designed to operate with the flow in an upward direction. The horizontal spacing of the plates shall be such that the maximum vertical velocity of the flow is at the maximum loading.

K. The inclined plates shall be removed as a unit or individually for cleaning and/or replacement. Manufacturer to identify weights, clearances required, recommended means of removal, and what additional lifting equipment is required.

L. The effluent shall be collected by an overflow box or trough with an adjustable weir. The weir shall be leveled to provide an even overflow across each weir plate and shall be positively assured by visual inspection. Design of weir adjustment must be adequate to compensate for differential settlement of the equipment as described herein.

M. The sludge collection area shall be sufficiently sized to collect sludge generated within the system. A nozzle(s) shall be provided at the bottom of the sludge collection area. A sludge auger is to be provided, if required. The nozzle shall be a connection point to remove sludge under tank hydraulic head from the sludge collection area and designed such that the sludge flows freely to the discharge point without buildup or short-circuiting. Vendor to recommend means and methods of sludge removal and sludge removal rate.

N. Each of the vessels (flash mix, flocculation, and clarifier) shall be provided with separate, removable, gasketed covers for containment of headspace vapors. Each cover will be provided with pick points for lifting, and will be designed to support live loads of 60 lbs per square foot and super-imposed equipment dead loads of 10 lbs per square foot, plus all mixer loads (i.e. vertical downward load, bending moment, static moment, torque, etc.). OSHA-approved 5,000 lb. tie-off points for personnel shall be included. Each of the covers shall be provided with load-rated viewports as follows:

1. One viewport for Flash Mix
2. One viewport for Flocculation chamber
3. Two viewports for clarifier section; one at each end

Inspection ports shall be equipped with manual quick release latches.

O. The covered headspaces above the flash mix tank, flocculation tank, and the clarifier shall be vented to atmosphere via adequately sized vent nozzles. The tanks shall be designed for atmospheric service (no pressure) under maximum inflow and outflow conditions.

P. Electrical classification in the headspace of the tanks and outside of the tanks is designated as ordinary.

Q. An elevated access platform (constructed with OSHA-compliant materials of construction) shall be provided, as necessary, to enable routine maintenance and cleaning at the top of the covers. Handrails and guardrails shall comply with the attached Specification 05 52 13 – Pipe and Tube Railings. Manufacturer shall provide in the base bid pricing, the cost for a platform and access to that platform at the top of each IPC unit. If possible, (and as shown on the General Arrangement Drawing,) it would be preferred to share platforms between pairs of IPC units such that the quantity of access ladders and platforming is kept to a minimum. For example, in the General Arrangement Drawing equipment shown, eight access ladders would be required in the base bid. Each pair of IPC units could have one (combined) ladder for access to the top of the units and one handrail/guardrail system around the perimeter of both units together.

In addition, provide pricing for staircases in lieu of ladders in the Base Bid. Manufacturer is to indicate (and include pricing for) the recommended platform arrangement being proposed.

Manufacturer shall also provide optional separate pricing to provide gangplank type platforms between the IPC units such that personnel would be able to access all the IPC covers via one platform without the need to climb up and down ladders/stairs for each unit. Gangplanks shall be used in lieu of fixed platforms to be able to absorb lateral and vertical movement between the units. Manufacturer shall consider the most cost efficient way to allow access to the units while allowing for lateral and vertical movement and taking into account ease of operator access. For the optional gangplank type platform, Manufacturer shall adjust the number of access ladders/stairs to three (one on each end of platform and one in central location).

Locations of top nozzles, manways, and equipment or instrumentation located on the tops of tanks shall be grouped together as much as possible, and located outside of main access paths to avoid trip hazards for personnel walking on the access platforms.

R. The interiors of the clarifier vessels, equipment, piping, coating system, and all wetted ancillaries shall be selected by the Manufacturer to be compatible with constituents found in the water up to the combined maximum concentrations identified in Table 2 (see Appendix B). Note the water exhibits chlorides and organic compound solvent concentrations. When selecting materials of construction, the Manufacturer shall also consider the expected project lifespan of 4 years, and potential buy-back option after completion of the anticipated 4-year term, and select materials of construction accordingly, except for the single “shared” system that is expected to remain operational for the long-term project life and as addressed by the alternative materials of construction described in the Bid Tab Items.

S. All tanks, equipment items, valves, and instruments shall be provided with stainless steel tags. Tags shall be permanently affixed or chained to the item, and will indicate the tag number and description of the item as shown on the P&ID (e.g., IPC-0601 Inclined Plate Clarifier). Lettering on the tag shall be etched or struck, with a minimum letter height of 0.5 inches.

T. All units and equipment shall be designed to resist the design loads per the Building Code of New York State (BCNYS) 2007 edition, including sloshing effects resulting from a hydrodynamic and/or seismic analysis. Vessel/equipment support layout details, including locations of anchor bolt holes, anchor bolt size and type, and embedment length shall be provided. Maximum Reaction Forces and moments at each anchor point shall be provided. The structural design criteria provided below for this site are preliminary, based on initial information available for the site, and are subject to change upon completion of a site geotechnical evaluation. Finalized structural design criteria will be provided prior to award of purchase order. Once finalized design criteria is provided, Manufacturer to certify that equipment design and anchoring is in compliance with the finalized structural design criteria. Draft structural design criteria are as follows:

SEISMIC DESIGN CRITERIA:

Seismic Importance Factor, I_E	1.25
Seismic Use Group	II
Mapped Spectral Response Acceleration, S_S	0.192 g
Mapped Spectral Response Acceleration, S_1	0.078 g
5% Damped Spectral Response Acceleration at Short Periods, S_{DS}	0.32 g
5% Damped Spectral Response Acceleration at 1 sec Periods, S_{D1}	0.182 g
Seismic Design Category, SDC	C

U. The IPC units will be placed on a former wastebed. As such, the soils are limited in the amount of weight they can support. Units must be designed to limit loading to less than 1,500 pounds per square foot at floor contact points when full of water. Skid mounting of equipment may be necessary to achieve this acceptable loading. Manufacturer shall advise in Bid. IPC units are to be installed on either timber mats or concrete pads. Manufacturer to identify any concerns with planned support arrangement (i.e. embedment into timber mats, etc.). Because of the properties of the soil, it is expected that potentially uneven settlement will occur. Assume the maximum acceptable settlement is as follows: less than 3/4" differential settlement across each unit and less than 1.5" of total overall settlement. Equipment Manufacturer shall identify the maximum acceptable differential settlement their unit can encounter without affecting the equipment or its operation. Means to relevel shall be provided.

V. Manufacturer shall identify minimum flow rate into the individual IPC's that will still allow for proper treatment and operational performance. Manufacturer shall identify minimum and maximum acceptable hydraulic flow for each unit (flash tank, flocculation tank, and clarifier) and provide this information with the Bid.

W. Each unit shall be equipped with a minimum of four lifting lugs to facilitate lifting/rigging.

X. The attached P&ID's show IPC system arrangement utilizing frac tank vessels. The P&ID's are to be used only as examples of the functionality of an IPC system. Alternate

types of systems, such as traditional IPC clarifiers with integral Flash Mix (adder) and Flocculation tanks will be considered.

Y. Controls, alarms, and sludge pumps or sludge discharge valves (if hydraulic head discharge of sludge is used) are by others. Manufacturer shall recommend alarm conditions and setpoints (for example "Mixer Off" setpoint, etc.), as appropriate.

Z. Instruments to be provided by the Manufacturer, as indicated herein, shall comply with the attached Specification 16900, Instrumentation and Controls Requirements. Controls and alarms associated with the IPC system are to be integrated into a Distributed Control System (DCS). Programming and hardware associated with the DCS is by others. The Manufacturer shall provide supporting documents as specified in Specification 16900, "Instrumentation and Controls Requirements," as required.

AA. Manufacturer shall provide one spare for each different instrument provided. In addition, one spare mixer of each different type provided by Manufacturer shall be provided.

BB. The Manufacturer shall conduct shop testing to satisfy hydraulic conditions of each component. The IPC systems shall be hydrostatically leak tested by filling units at the Manufacturer's shop prior to delivery to the site. Certified test reports for each unit shall be provided prior to delivery.

CC. All tank nozzles shall be provided with flanges designed in accordance with ASME B16.5, 150# flanges. Nozzle projections shall be of sufficient lengths to allow access to flange bolts and nuts.

DD. Any stainless steel bolts shall be applied with anti-seize thread lubricant.

2.3 COMPONENTS

A. Flash Mix Tank and Mixer(s) (submitted as adders)

1. The flash mix tank shall provide the necessary mixing energy and detention time to completely mix and provide contact between the coagulant and the influent solids.

2. The flash mix tank mixers shall be constant speed. Motors shall be TENV or TEFC, 480 volt, three phase, 60 Hertz, with anticondensation heaters in accordance with Specification 26 05 13, "Electric Motors."

3. The tank shall be equipped with a removable cover. A cover gasket, or some other acceptable means to reduce potential emissions from the removable cover, shall be provided. The cover shall also contain a viewport to allow visual inspection of floc formation.

4. A 30-inch diameter manway with a loose-bolted blind flange shall be provided on the top of the vessel to be used as a tank overflow. Materials of construction of the overflow manway flange shall be selected, and the overflow shall be designed, such that the flange would lift off to allow water to overflow. .

5. High and low level switches shall be provided. Level switches shall comply with attached Specification 16900, "Instrumentation and Controls Requirements."

6. The flash mix tank shall be provided with the following nozzles:

   a. 30-inch diameter influent nozzle.
   b. 4-inch diameter drain.
   c. 1-inch diameter alum inlet.
   d. Mixer flanges, as necessary.
   e. 4-inch diameter high level switch nozzle.
   f. 4-inch diameter low level switch nozzle.
   g. 30-inch diameter outlet.
   h. 30-inch diameter manway with loose-bolted blind flange (overflow).
   i. 4-inch diameter spare nozzle.
   j. 6-inch diameter spare nozzle.
   k. 30-inch diameter vent.

   Note: sizes of nozzles are based on equipment selected during preliminary design (one 18,000 gallon [nominal] flash mix tank) and may change based upon Manufacturer's equipment selection. Nozzle sizes/locations will be finalized after selecting equipment Manufacturer.

B. Flocculation Tank and Mixer(s)

1. The flocculation tank shall provide the necessary blending energy and detention time to facilitate the formation of large flocs.

2. The flocculation tank mixer(s) shall be variable speed and sufficient horsepower to provide adequate mixing. Motors shall be TENV or TEFC, 480 volt, three phase, 60 Hertz, inverter duty type (60 NEMA MG1, Part 31 compliant) with anticondensation heaters in accordance with attached Specification 26 05 13, "Electric Motors." The mixers shall be equipped with locally mounted variable speed controllers provided by Others. The controllers may be mounted to the inclined plate clarifier system in a position that will be accessible to operating personnel. Manufacturer to identify mixer speed ranges

3. The tank shall be equipped with a removal cover. A cover gasket, or some other acceptable means to reduce potential emissions from the removable cover, shall be provided. The cover shall also contain a viewport to allow visual inspection of floc formation and depth.

4. An 8-inch diameter nozzle with a loose-bolted blind flange shall be provided on the top of the vessel to be used as a tank overflow. Materials of construction of the overflow blind flange shall be selected, and the overflow shall be designed, such that the flange would lift off to allow water to overflow.

5. High and low level switches shall be provided. Level switches shall comply with attached Specification 16900, Instrumentation and Controls Requirements.

6. The flocculation tank shall be provided with the following nozzles:
   a. 8-inch diameter influent nozzle.

b. 4-inch diameter drain.
c. 8-inch diameter nozzle with loose-bolted blind flange (overflow).
d. Mixer flange(s), as necessary.
e. 4-inch diameter high level switch nozzle.
f. 4-inch diameter low level switch nozzle.
g. Overflow baffle (or other outlet, if not combined with IPC unit).
h. 4-inch diameter spare nozzle.
i. 6-inch diameter spare nozzle.

If Flocculation Tank and clarifier are not housed within the same tank with a shared headspace, then Flocculation Tank shall also be provided with an independent, appropriately sized outlet nozzle and vent.

Note: sizes of nozzles are based on equipment selected during preliminary design (representing one of sixteen flocculation tanks) and may change based upon Manufacturer's equipment selection. Nozzle sizes/locations will be finalized after selecting equipment Manufacturer.

C. Mixers General

1. The motors shall be designed in accordance with the requirements provided in the appendices herein.

2. The mixer Manufacturer shall be Lightnin, Chemineer, or approved equal.

3. The mixers shall be equipped with 316 stainless steel shafts and impellers, or approved alternate, as recommended by the Manufacturer (refer to Table 2).

4. Mixer blades shall be attached to shaft by keyways. Blades attached by set screws only are not acceptable.

D. Inclined Plate Clarifier System

1. The IPC shall be equipped with a removable cover. A cover gasket, or some other acceptable means to reduce potential emissions from the removable cover, shall be provided. Cover shall be removable to allow access and/or removal of the inclined plates for periodic cleaning. The cover shall contain two viewports, one of which will be an access/view hatch to allow visual inspection of a LNAPL (floating oil) removal device (e.g., floating boom, by others). Additionally, the Vendor shall provide a means of LNAPL collection by use of an underflow baffle or some other design feature in place to allow capture of floating LNAPL. Vendor shall identify means of LNAPL capture with the Bid.

2. The IPC tank shall be provided with the following nozzles:

a. 4-inch diameter drain.
b. 6-inch diameter treated water outlet
c. 4-inch diameter sludge outlet.
d. Sludge sampling ports, as necessary.
e. 8-inch vent.
f. 4-inch diameter spare nozzle.

g. 6-inch diameter spare nozzle.

If Flocculation Tank and clarifier are not housed within the same tank with a shared headspace, then clarifier shall also be provided with an independent, appropriately sized overflow with loose-bolted flange.

Note: sizes of nozzles are based on equipment selected during preliminary design (representing one of sixteen clarifier tanks) and may change based upon Manufacturer's equipment selection. Nozzle sizes/locations will be finalized after selecting equipment Manufacturer.

3. Inclined Plates

a. The plates shall be constructed of materials of construction, as recommended by the Manufacturer, to be suitable for the water chemistry (refer to Table 2).

4. Weir Plate

a. The weir plates shall be adjustable and unaffected by the chemicals identified in Table 2.
b. A gasket shall be installed between the weir plates and effluent trough. The gasket materials of construction shall be compatible with the water chemistry data (see attached Table 2).

5. Sludge Hopper

a. Sample ports shall be provided at varying elevations (in 6-inch increments) on the sludge hopper for sludge sampling.

2.4 SOURCE QUALITY CONTROL

A. Factory Assembly

1. Owner or Owner's Representative reserves the right to visit Manufacturer's factory during fabrication to witness progress and fabrication.

B. Factory Test

1. Each IPC system shall be factory tested as follows:

a. Manufacturer's standard inspections and tests
b. Hydrostatically tested by the Manufacturer at the shop prior to delivery to the site. Notice shall be given to the Engineer at least two weeks prior to hydrostatically testing the equipment, so that arrangements can be made for Engineer and/or other Owner's Representative to witness the testing at the Manufacturer's facility.

2. Submit factory test reports for approval prior to shipment.

2.5 SHOP FINISHES

A. All surfaces to be coated shall be prepared in accordance with PIP VESV1003HA and Honeywell's associated overlay document associated with the PIP specification. Surface preparation prior to coating application shall be in accordance with the NACE standard SP0178 and NACE SP0178 Appendix C NACE Weld Preparation Designation C, and coating Manufacturer's instructions, whichever is more stringent.

B. The Manufacturer shall provide a shop applied protective coating system for all interior metal surfaces of the IPC package in accordance with coating system manufacturer recommendations. The interior linings of the units shall be compatible with the influent parameters and concentrations presented in this specification (refer to Table 2) and shall be abrasion resistant for this intended use. Coal tar epoxy is not an acceptable interior lining. Proposed coating and lining systems and dry film thickness (DFT) of each coat and of the overall coating system proposed shall be provided with the Bid. Stainless steel does not require coating. Cathodic protection may be used for supplemental corrosion resistance, as recommended by the Manufacturer and at no additional cost.

C. The Manufacturer shall provide a shop-applied protective coating system (primer and suitable top coat(s)) for all exterior metal surfaces of the IPC system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. As part of on-site start-up services, Manufacturer's representative shall examine areas and conditions for compliance with Manufacturer's installation recommendations and requirements.

B. Proceed with start-up only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Installation is by others. Installation shall be per Manufacturer's instructions.

3.3 FIELD QUALITY CONTROL

A. The Manufacturer shall furnish the services of a Manufacturer's representative to inspect the installation (by others) and to provide start-up services for the units.

3.4 MANUFACTURER'S FIELD SERVICES

A. The on-site services of the Manufacturer's field representative shall be provided during the start-up and adjustment in accordance with this specification and as identified in the Bid Documents.

B. The services of the Manufacturer's field representative shall be provided during installation. The Manufacturer's field representative is not required to be on-site during installation efforts, but will be conferred if problems or questions occur during installation.

C. A factory-authorized service representative will perform the following inspections, checks, start-up, and supervision of testing per Section 3.5.B.1:

1. Inspect field-assembled components, equipment installation, and electrical connections for compliance with the Manufacturer's installation recommendations and requirements.

2. Set field-adjustable settings to the values recommended by the equipment Manufacturer.

3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and components.

4. Witness and provide input as requested during on-site performance tests (testing to be performed by others)

5. Perform or supervise start-up services

6. Prepare written report to record the following:

a. Inspections and checks carried out on-site.
b. Optimization of chemical dosages.

3.5 DEMONSTRATION AND TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the equipment.

1. Review data in Operation and Maintenance manuals.

2. Schedule training with Owner or Engineer, with at least two weeks advance notice.

B. The services of the Manufacturer's representative shall be provided as separate visits, if required, for the minimum hours as listed below for each IPC system:

1. Twenty-eight hours for installation assistance, inspection, certification of installation and start-up.

2. Eight hours for performance testing.

3. Four hours for the owner's personnel training.

Manufacturer shall advise if the amount of hours specified are reasonable or provide the number of hours recommended if different than what is allotted above.

PART 4 - APPENDICES

A. Table 1 – IPC Submittal Schedule

B. Table 2 – Constituent Concentrations

C. Process Flow Diagram – PFD-1

D. P&ID's

1. Lead Sheets
2. I-03 Flash Mix Tank
3. I-06 Inclined Plate Clarifier

E. General Arrangement Plan – GA-01

F. Treatability Test Results

G. Specification 16900 - Instrumentation and Controls Requirements

H. Specification 26 05 13 – Electric Motors

I. Honeywell overlay document
1. Process Industry Practices (PIP) Standard VESV1003
2. Honeywell Specification MSL-2002 HW ***(not applicable for this contract)***

J NACE SPO178-2007 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service

K. NACE SPO188-2006 - Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

L. Specification 05 52 13 – Pipe and Tube Railings

END OF SECTION

SECTION 44 43 13.26

MULTIMEDIA FILTRATION PRE-PURCHASE SPECIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the equipment and associated controls associated with the skid-mounted Multimedia Filter (MMF) system as shown on the Contract Drawings. Refer to the attached Process and Instrumentation Drawing (P&ID) for an example schematic of the system. The space allocated for the system is as shown on the General Arrangement Plan (attached as Appendix E to this specification). The general scope of the work is to furnish, deliver, and provide start-up assistance for the MMF system, so that a complete system successfully performs as designed.

1. The equipment shall include filter vessels, filter media support, filter media, underdrain, inlet distributor, backwash system, electrical and instrumentation termination panels, air scour system, valve manifold with control and manual valves, and all required accessories for a completely assembled, ready to install system.

2. The filtration system will be one component of a water treatment train, designed to remove solids, metals, and organic compounds. The filtration component will be designed to remove residual suspended solids from a clarifier effluent stream.

3. The filtration system shall be delivered FOB project site to 522 Gere Lock Road, Syracuse, NY 13209.

B. The information provided is based upon four horizontal type Multimedia Filters. The type, size and quantity of these MMF units are what were used to develop the design basis for this project. However, the intent is to specify performance-based equipment. Quantities, sizes and types are all subject to change based upon the equipment manufacturer's compliance to the performance criteria described herein. Manufacturers shall consider alternate equipment, as needed, to optimize the design to propose more cost effective alternatives. As such, vertical MMF units, or other differences will be acceptable and will be considered. Any requests in this RFP which, in the Vendor's opinion, impart unnecessary costs or unnecessarily differ from Manufacturer's standard offerings should be clearly identified in Bidder's proposal.

C. The system is planned to be installed (by others) inside a structure at the Owner's facility and operated approximately seven months out of each year (April 15th through November 15th) for four years beginning in the year 2012. In addition to the short-term (4-year) treatment trains, a long-term treatment train (which includes a MMF component) will also be operated at the same Owner's facility. This long-term treatment train will be designed to treat a much lower flow rate. The long-term MMF unit will treat the same water (contains the same constituents at the same concentrations as shown on Table 2 provided in Appendix B to this specification) but at a maximum flow rate of 500 gpm,

and for an expected operational lifespan of 20 years. The Manufacturer shall select equipment such that appropriately-sized MMF unit(s) is shared between the "short-term" and the "long-term" treatment trains (i.e. serving as a part of the short-term MMF system during the seven months of "summer" operation and then used as part of the lower-flow, long-term system during the winter months for the first four years and year-round after year 4). The long-term system will be in a heated space.

Even though the short-term equipment will be located inside a structure, the structure is not heated and therefore the units are subject to freezing during the non-operational winter months. Manufacturer shall identify required means, methods and procedures needed to prepare units for storage over the winter months.

D. Start-up services shall be provided. Provide a factory representative for up to 40 hours of field start-up assistance at the Owner's facility.

E. The equipment shall fit within the footprint allocated as shown on the General Arrangement Drawing GA-01 provided herein. Manufacturer shall identify any operational or maintenance clearances required with the Bid. The equipment will need to fit through the building's overhead door which has dimensions of 14 feet x 18 feet. The building will be new construction. Manufacturer shall advise if a larger overhead door opening is required. Manufacturer is to confirm that the equipment can enter the building via the overhead door and be moved to the positions shown on drawing GA-01. The clear height at the building eave is estimated at 18'-0". Additional clear height is available between roof support members.

1.2 REFERENCES

A. Comply with the latest revision of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)
2. American National Standards Institute (ANSI)
3. American Society of Mechanical Engineers (ASME)
4. NACE International
5. National Electric Code (NEC)

1.3 COORDINATION REQUIREMENTS

A. Coordinate delivery with project schedule as maintained by Construction Supervisor.

B. Coordinate with Engineer and Control System Integrator for controls integration.

C. Bid Review Meeting: Following the Engineer's review of the proposal, a bid review meeting will be held in Syracuse, NY.

D. Scheduling: The MMF system must be operational before April 2012. Refer to RFP Section IV "Information" Schedule Milestones Table for schedule dates.

1.4 SUBMITTALS

A. Prepare and provide drawings and submittals specific to this system in accordance with the requirements shown on Table 1 (provided as Appendix A to this specification).

B. Product Data Submittals: "Catalog cuts" and spec sheets included as submittals shall be marked to specifically indicate the equipment and materials proposed for this project. Indicate selections with arrows, and cross out irrelevant data.

C. Operation and Maintenance Data

1. Presentation of Submittals

a. Operational and Maintenance Manuals (3 hard copies each in a 3-ring binder and 1 electronic copy). Owner's name, address, equipment serial numbers, and model numbers shall be clearly identified on the cover. Include Manufacturer and local service representative contact information, including phone numbers and e-mail addresses, on the cover.
b. Each manual shall include a table of contents, an index, and sequential section dividers separating equipment information into subsections. Each manual shall incorporate, at a minimum, the following: field installation instructions, operation description including each mode of operation (i.e. normal flow-through, backwash and air scour modes), written description of the equipment and corresponding components, starting and stopping procedures, routine maintenance procedures, procedures for protecting the equipment during short-term and long-term downtime, schedules, parts lists, troubleshooting topics, illustrations and diagrams and safety instructions for operating personnel.
c. Each manual shall include any other information that is required by maintenance personnel for proper operation and maintenance.
d. Electronic files of the complete operation and maintenance manual are to be provided on CD.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer to provide description of relevant past experience providing MMF systems. Especially of interest is past experience with projects where MMF units were used to clarify water from dredging operations or surface water clean-up projects. Manufacturer shall provide a list of references and contact information.

2. Seismic Design Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is

experienced in providing structural and seismic engineering services, including the design of seismic restraints.

3. Owner or Owner's Representative will be conducting scheduled visits to Manufacturer's facilities during fabrication and/or Manufacturer's shop testing procedures.

1.6 DELIVERY, STORAGE AND HANDLING

A. As required, disassemble and deliver MMF system in the minimum number of pieces.

B. Site access is via a one-way access road, parts of which are steeply graded. Equipment vendor to ensure adequate means of delivery are provided to enable delivery to the site. A site visit prior to delivery is recommended.

C. Materials and equipment shall be boxed, crated or otherwise completely protected during shipment, delivery, storage and handling. Such boxes, crates or protection shall be clearly labeled with the Manufacturer's and Owner's name, site address, project equipment tag numbers, brand or model.

D. Ship, deliver, store and handle to prevent damage and in accordance with Manufacturer's written instructions. Provide factory-installed lifting provisions.

E. The MMF system shall be delivered freight on board (FOB) to the project site.

F. Media shall not be delivered or installed until approximately three weeks prior to the initiation of operational commissioning at the site (assume operational commission begins April 30, 2012).

G. Manufacturer's storage requirements shall be provided. Units will be stored outside and unprotected from weather events for a prolonged period of time prior to installation. Manufacturer shall provide adequate packaging and protection so as to prevent damage under these conditions.

H. Off-loading of equipment delivered to the site is by Others.

1.7 WARRANTY

A. Provide parts and labor warranty in accordance with the Purchase Order General Terms and Conditions, and the Supplemental Terms and Conditions.

B. The standard warranty duration shall be from delivery date of units to one year after start-up. Start-up is defined as the initiation of operational commissioning (assume start-up to begin on April 30, 2012). Provide with the Bid the cost adder to extend the warranty for 42 months after start-up, as described in the Bid Tab document. The standard warranty shall include parts and labor for all supplied items, including but not limited to, equipment, controls, and coating system.

1.8 PERFORMANCE GUARANTEE

A. Performance shall be warrantied and proven. Performance shall be demonstrated continuously for four weeks after start-up under full operating conditions. Performance testing is by others. MMF Manufacturer's Representative shall be present at the site to witness a portion of the performance testing, per Section 3.5.B.2, and provide input as requested. The MMF system shall be designed to achieve effluent concentrations, given the maximum influent concentrations provided on Table 2. Performance shall be warrantied over the entire range of flow rates. Anticipated maximum influent and required effluent concentrations, and minimum and maximum flow rates for the system are provided in Table 2. If the equipment fails to continuously meet this effluent quality, the Manufacturer shall, at no additional cost to the Owner or Buyer, provide and install additional or replacement equipment, parts, and labor (including cost of return trips to the site as needed) to correct demonstrated performance deficiencies as needed to achieve the required performance.

B. Process: the provided system shall achieve an effluent TSS concentration of 5 mg/L or less. The design value for TSS concentration of the influent water is as shown on Table 2. If the influent TSS concentration exceeds the design value, than 90% removal is required. If the equipment fails to continuously meet this effluent quality, the Manufacturer shall, at no additional cost to the Owner or Buyer, provide and install additional or replacement equipment, parts and labor to correct demonstrated performance deficiencies as needed to achieve the required performance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers are named to establish a standard quality necessary for the Project:

1. General Electric
2. Siemens
3. Graver
4. Yardney
5. WesTech
6. TIGG
7. Or approved equal

2.2 PERFORMANCE REQUIREMENTS

A. The MMF system shall be suitable for filtration of suspended solids from the water under the design influent specified herein to the effluent concentrations specified herein. The MMF vessels shall be backwashable, capable of automatic or hand operation.

B. The MMF system criteria shall be as follows:

Application	Filtration of suspended solids
Materials of construction, tanks	Manufacturer to provide
Filter Media	Sand, anthracite and gamet (or alternate, as recommended by the Manufacturer)
Acceptable surface loading rate	4-6 gpm/sf @ maximum gpm is what was used for design basis. However, Manufacturer shall make recommendation.

C. Water influent and acceptable effluent constituents and their respective concentrations are provided in the attached Table 2. Manufacturer shall size filters to handle the peak flow rate as provided in Table 2 and to reach effluent TSS limits. Manufacturer shall identify proposed surface loading rate at maximum flow rate. Sizing and design of filters shall be based on normal operation with Vendor to select number of MMF units based on maximum full flow with a redundant on-line spare MMF unit also being provided. The design intent is that the on-line spare will be in "standby" mode until one of the operating units initiates a backwash. At that point, the vessel to be backwashed will be taken off-line to be backwashed while the forward flow is redirected to the redundant unit. Once the backwash is complete, that unit would be kept in "standby" mode until another unit requires backwashing. At that time, the "standby" vessel will again be put back into service accepting forward flow.

D. The MMF's shall be designed to remove total suspended solids (TSS) from the influent. Removal of TSS shall be as follows:

1. Influent TSS of >5 mg/L to 50 mg/L requires TSS removal to 5 mg/L or less in MMF effluent.
2. Influent TSS >50 mg/L requires 90% TSS removal in MMF effluent.

E. Materials of construction for the interiors of the MMF vessels, equipment, piping, and all wetted ancillaries shall be selected by the Vendor to be compatible with constituents found in the water at the combined maximum concentrations identified herein (see Table 2). Note the water exhibits chlorides and organic compound solvent concentrations. When selecting materials of construction, the Vendor shall also consider the expected project lifespan of 4 years and potential buy-back option after completion of the anticipated 4-year term, and select materials of construction accordingly, except for the "shared" unit(s) that is expected to remain operational for the long-term project life and as addressed by the alternative materials of construction described in the Bid Tab Items.

F. All units and equipment shall be designed to resist the design loads per the Building Code of New York State (BCNYS) 2007 edition, including sloshing effects resulting from a hydrodynamic and/or seismic analysis. Vessel/equipment support layout details, including locations of anchor bolt holes, anchor bolt size and type, and embedment length shall be provided. Maximum Reaction Forces and moments at each anchor point shall be provided. The structural design criteria provided below for this site are preliminary, based on initial information available for the site, and are subject to change upon completion of a site geotechnical evaluation. Finalized structural design criteria will be provided prior to award of purchase order. Once finalized design criteria is provided,

Vendor to certify that equipment design and anchoring is in compliance with the finalized structural design criteria. Draft structural design criteria are as follows:

SEISMIC DESIGN CRITERIA:	
Seismic Importance Factor, I_E	1.25
Seismic Use Group	II
Mapped Spectral Response Acceleration, S_S	0.192 g
Mapped Spectral Response Acceleration, S_1	0.078 g
5% Damped Spectral Response Acceleration at Short Periods, S_{DS}	0.32 g
5% Damped Spectral Response Acceleration at 1 sec Periods, S_{D1}	0.182 g
Seismic Design Category, SDC	C

G. The MMF units will be placed on a former wastebed. As such, the soils are limited in the amount of weight they can support. Units must be designed to limit loading to less than 1,500 pounds per square foot at floor contact points when full of media and water, or just water, whichever is heaviest. Skid mounting of the equipment may be necessary to achieve this acceptable loading. Manufacturer shall advise in Bid. MMF skids are to be installed on either timber mats or concrete pads. Vendor to identify any concerns with planned support arrangement (i.e. embedment into timber mats, etc.). Because of the properties of the soil, it is expected that potentially uneven settlement will occur. Assume the maximum acceptable settlement is as follows: less than 3/4" differential settlement across each unit and less than 1.5" of total overall settlement. Equipment Manufacturer shall identify the maximum acceptable differential settlement their unit can encounter without affecting the equipment or its operation. Means to relevel shall be provided.

H. The vessels shall be designed for a pressure of 100 psig or 1.3 times the peak pressure during the backwash cycle, whichever is greater. The vessels shall be designed and fabricated in accordance with the ASME boiler and unfired pressure vessel code. ASME code stamp is required.

I. Manufacturer shall identify minimum flow rate into the individual MMF's that will still allow for proper treatment and operational performance. Manufacturer shall identify minimum and maximum acceptable hydraulic flow for each unit and provide this information with the Bid.

J. Instrumentation and components shall be sized per Manufacturer's recommendations and shall comply with Specification 16900 – Instrumentation and Controls Requirements. Each filter tank shall be equipped with the following features:

1. Automatic air release/vacuum valve – valve shall be sized to automatically relieve air as vessel is filling with water and introduce air as vessel is draining.

2. Inlet and outlet pressure gauges with diaphragm seals.

3. Differential pressure indicating transmitter – Differential pressure will be continuously monitored across each MMF. Transmitter shall have diaphragm seals on each leg. An operator-adjustable set point will indicate when initiation of a backwash is warranted. High differential pressure across an MMF vessel

shall automatically close an electrically-operated flow valve on the influent of the MMF and open a valve on the idle MMF unit to redirect flow to the stand-by MMF. Control of this function is via Owner-provided Distributed Control System (DCS).

4. Inlet and outlet sample taps.

5. Top and side manways – a minimum 14" x 18", easy-open type manway suitable for maintenance access on the top of each vessel and a second manway on the sidewall with a minimum opening dimension of not less than 20" diameter shall be provided. Manways must be suitably sized to allow entry for inspection and repair of coatings and interior components. Manways shall comply with ASME boiler and unfired pressure vessel code. Manways shall be flanged. Side manways shall be equipped with a davit hinge.

6. Rupture disk (or other Engineer-approved device) – over pressurization protection shall consist of a standard rupture disk designed for bursting pressure of 95% (+/- 5%) of the design pressure rating of the vessel. The rupture disk shall be equipped with a tell-tale device which alerts the Operator (via an alarm to the DCS) that the disk has ruptured. The rupture disk will be interlocked to shut the feed valve (valve by MMF vendor) to the MMF system upon rupturing. The rupture disk shall be in compliance with ASME code requirements. Three spare rupture disks shall be provided for the complete MMF system.

7. Sight flow indicator tube – A sight flow indicator shall be provided on the backwash waste line of each MMF. The sight tube shall consist of a 2 foot long (minimum) section of transparent rigid pipe or other Engineer-approved design. Manufacturer shall confirm feasibility of using transparent rigid pipe with air scouring.

8. Vent – An adequately-sized vent with an automatic electrically-actuated flow valve shall be provided to permit exhaust of air when unit is in air scour mode.

9. Air scour feature – MMF vessels shall be required to undergo automatic air scour step with each backwash. Compressed air is available and will be provided by others. MMF Manufacturer shall identify compressed air requirements including required quality of air, flow rate, pressure, pressure drop (through Vendor-provided system), connection(s) sizes and types, duration of air scour step, and volume of air required. A description of operation of the MMF, including the air scour step, shall be provided. MMF Vendor to advise of benefits to air scour.

10. Drain with isolation valve – As part of the air scour feature, it is anticipated that a gravity drain down will be required prior to initiation of air scouring. An adequately-sized drain with an automatic electrically-actuated flow valve shall be provided by the Vendor to permit the vessel to automatically gravity drain. Drain down valve shall include an open and closed limit switch to shut drain down valve upon high level in the receiving sump or tank. In addition, MMF's shall be equipped with a manual drain with isolation valve to enable manual draining of each MMF for maintenance purposes.

K. The vessel internal filter inlet and outlet distribution configurations shall be designed to provide uniform distribution of flow at any flow range between the minimum and maximum flow rates specified herein.

L. The underdrain system shall be capable of supporting the media when the vessel is filled with water and media and pressured to the system design pressure.

M. Each unit shall be equipped with lifting lugs to facilitate lifting/rigging.

N. Each filter shall be equipped with media loading and clean-out ports.

O. The filter tanks shall be fitted with electrically actuated control valves to accomplish backwash and to isolate the operating filters during backwash of the redundant unit. Valves shall be Manufacturer's standard if they are suitable for expected concentrations of constituents found in the water. Valves 8 inches and larger shall be equipped with a gear operator. Each valve shall be provided with two limit switches (open and closed). Any manually operated valves located higher than 6 feet shall be equipped with a chain operator.

P. MMF vessels shall have provisions for a fully automatic water backwash of each individual MMF vessel. The source of backwash water shall be from an external treated water source (by others) unless it is possible to use forward flow from other MMF's (or other chambers of same MMF, if feasible) as the source of backwash water. It is preferred to use the treated water from MMF's as the backwash water source. Manufacturer shall identify requirements (i.e. acceptable water source and water properties, volume, required pressure, duration, flow rate, pressure drop, connection sizes/locations/types, etc.) Manufacturer shall minimize the amount of backwash water required. A complete and detailed description of the backwash/air scour process shall be provided with the Bid that provides a step-by-step, sequential description of the process. Instrumentation and actuated valves provided shall comply with Specification 16900 Instrument and Controls Requirements. Control valves shall be electrically actuated. Backwash may be automatically initiated upon:

1. High differential pressure, or

2. Timer, or

3. High discharge turbidity, or

4. Manually, at the Operator Interface Terminal (OIT)

A pressure differential transmitter shall be provided to allow initiation of backwash of a MMF upon exceedance of a pre-set, operator-adjustable pressure differential. A turbidimeter on the effluent piping from the filters will be provided by Others, with filter backwash possibly initiated at a pre-set turbidity value (operator-adjustable set point). A time clock controller shall be provided at DCS (by others) which is capable of being set to backwash each filter at a pre-set time each day, or any selection of days in a 14 day

cycle, or to skip a day or several days. A manual override to permit manual initiation of backwashing shall also be provided.

Q. The Manufacturer shall provide MMF media that meets the design requirements. The type, properties and depth of media shall be identified by the Manufacturer with the Bid. Information provided shall include media material identification, gradation and sizing.

R. The attached P&ID I-08 is for a typical horizontal, pressure-type MMF system. The P&ID is to be used only as an example of filtration functionality. Alternate filtration systems may be considered.

S. The automatic controls and alarms associated with the MMF system are to be integrated into a DCS. Programming and hardware associated with the DCS is by others. The Manufacturer is required to provide a detailed control description along with other supporting documents as specified in Section 16900 "Instrumentation and Controls Requirements." All instruments shall be installed and wired back to electrical and instrumentation terminal strip boxes (NEMA 4) by the Manufacturer. One terminal box strip shall be provided for each MMF. All instrumentation and controls shall be as specified in Section 16900 "Instrumentation and Controls Requirements" (no exceptions).

T. Manufacturer shall recommend alarm and shutdown conditions, as appropriate. Alarms shall have a sufficient programmable time delay to minimize nuisance alarms and system shutdowns. Interlocks will be incorporated in the DCS to prevent:

1. Initiation of backwash while any other MMF vessel is backwashing

2. Initiation of backwash on high water level in the collection vessel accepting spent backwash water

3. Initiation of backwash on a low water level in the backwash water source tank (if applicable)

U. Electrical area hazard classification (interior and exterior of the MMF's) is designated as ordinary.

V. All tanks, equipment items, valves, and instruments shall be provided with stainless steel tags. Tags shall be permanently affixed or chained to the item, and will indicate the tag number and description of the item as shown on the P&ID (e.g., MMF-0801 – Multimedia Filter # 1). Lettering on the tag shall be etched or struck, with a minimum letter height of 0.5 inches.

W. Vendor shall identify any issues that may result from a prolonged shutdown and what time interval it would be expected that the issues may occur at.

X. All interconnecting piping between the individual MMF vessels of the MMF system shall be provided by others. The piping from each vessel to its associated valve manifold is by MMF Vendor, as shown on P&ID's (see Appendix D to this specification).

Y. All MMF system nozzles shall be provided with flanges designed in accordance with ASME B16.5, 150# flanges. Nozzle projections shall be of sufficient lengths to allow access to flange bolts and nuts.

Z. Although polymer is not envisioned to be added, the potential exists that it may be used in the future. If polymer builds up on the filtration media, a mechanism must be provided to remove polymer (e.g., chemical cleaning). Manufacturer is to advise suitability of acid cleaning and/or identify other acceptable or recommended means for polymer removal.

AA. Calcium scale is experienced at the site. Manufacturer is to advise suitability of acid cleaning and/or identify other acceptable or recommended means for scale removal.

BB. Any stainless steel bolts shall be applied with anti-seize thread lubricant.

2.3 SHOP FINISHES

A. All surfaces to be coated shall be prepared in accordance with PIP VESV1003HA and Honeywell's associated overlay document associated with the PIP specification. Surface preparation prior to coating application shall be in accordance with the NACE standard SP0178 and NACE SP0178 Appendix C NACE Weld Preparation Designation C, and coating Manufacturer's instructions, whichever is more stringent.

B. The Manufacturer shall provide a shop applied protective coating system for all wetted metal surfaces of the MMF vessel package. The interior linings of the vessels shall be compatible with the influent parameters and concentrations presented in this specification as well as potential cleaning chemicals (to remove polymer and scale build-up) and shall be abrasion resistant for this intended use. Coal tar epoxy is not an acceptable interior lining. Proposed coating and lining systems and dry film thickness (DFT) of each coat and of the overall coating system proposed shall be provided. Stainless steel does not require coating. Cathodic protection may be used for supplemental corrosion resistance, as recommended by the Manufacturer and at no additional cost.

C. The Manufacturer shall provide a shop-applied protective coating system (primer and suitable top coat(s)) for all non-wetted metal surfaces of the MMF system.

2.4 SOURCE QUALITY CONTROL

A. Factory Assembly

1. Owner or Owner's Representative reserves the right to visit Manufacturer's factory during fabrication to witness progress and fabrication.

B. Factory Test

1. Each MMF unit shall be factory tested as follows:
   a. Manufacturer's standard inspections and tests

b. Hydrostatically tested by the Manufacturer at the shop prior to delivery to the site. Notice shall be given to the Engineer at least two weeks prior to hydrostatically testing of fully assembled equipment, so that arrangements can be made for Engineer or other Owner's Representative to witness the testing at the Manufacturer's facility.
c. Testing of interior coating systems per NACE standards SP0188 and SP0178.

2. Submit factory test report for approval prior to shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. As part of on-site start-up services, Manufacturer's representative shall examine areas and conditions for compliance with Manufacturer's installation recommendations and requirements.

B. Proceed with start-up only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Installation is by others. Installation shall be per Manufacturer's instructions.

B. The MMF system shall fit and be serviceable in the allocated space as shown on the General Arrangement Plan (Drawing GA-01). If an alternate system can be proposed that would require less space, it will be considered an advantage. Dimensions of building access doors and overhead clearances were provided previously herein.

3.3 FIELD QUALITY CONTROL

A. The Manufacturer shall furnish the services of a Manufacturer's representative to inspect the installation (by others) and to provide start-up services for the units.

3.4 MANUFACTURER'S FIELD SERVICES

A. The on-site services of the Manufacturer's field representative shall be provided during the start-up and adjustment in accordance with this specification and as identified in the Bid Documents.

B. The services of the Manufacturer's field representative shall be provided during installation. The Manufacturer's field representative is not required to be on-site during installation efforts, but will be conferred if problems or questions occur during installation.

C. A factory-authorized service representative shall perform the following inspections and checks:

1. Inspect field-assembled components, equipment installation, and electrical connections for compliance with the Manufacturer's installation recommendations and requirements.

2. Set field-adjustable settings to the values provided by the equipment Manufacturer.

3. Test and adjust Vendor-provided controls and safety devices. Replace damaged and malfunctioning instrumentation and components.

4. Witness and provide input as requested during on-site performance tests (testing to be performed by others).

5. Perform or supervise start-up services.

6. Prepare written report to record the following:

   a. Inspections and checks carried out on site
   b. Test procedures used to test controls and instrumentation
   c. Test results that comply with requirements for controls and instrumentation
   d. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements for controls and instrumentation.

3.5 DEMONSTRATION AND TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the equipment.

1. Review data in Operation and Maintenance manuals.

2. Schedule training with Owner or Engineer, with at least two weeks advance notice.

B. The services of the Manufacturer's representative shall be provided as separate visits, if required, for the minimum hours as listed below for the MMF system:

1. Twenty-Eight hours for inspection, certification of installation and start-up.

2. Eight hours of site presence during performance testing.

3. Four hours on-site for the owner's personnel training.

Vendor shall advise if the amount of hours specified are reasonable or provide the number of hours recommended if different than what is allotted above.

PART 4 - APPENDICES

A. Table 1 – MMF Submittal Schedule

B. Table 2 – Constituent Concentrations

C. Process Flow Diagram – PFD-1

D. P&ID Lead Sheets and I-08 Multimedia Filter

E. General Arrangement Plan – GA-01

F. Treatability Test Results

G. Specification 16900 - Instrumentation and Controls Requirements

H. Honeywell overlay document

1. Process Industry Practices (PIP) Standard VESV1003

2. Honeywell Specification MSL-2002 HW ***(not applicable for this contract)***

I. NACE SPO178-2007 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service

J. NACE SPO188-2006 - Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

END OF SECTION

SECTION 44 43 13.29

GRANULAR ACTIVATED CARBON SYSTEM PRE-PURCHASE SPECIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes work consisting of furnishing, delivering and providing start-up and operational change-out services for a liquid-phase granular activated carbon (GAC) system as shown on the Site Plan and Process and Instrumentation (P&ID) drawings.

1. The equipment shall include skid-mounted, backwashable GAC vessels, carbon, interconnecting piping, manual valves, distribution and collection laterals, and accessories and controls for a completely assembled, ready to install and operate system.

2. The GAC system will be one component of a water treatment system designed to remove metals, and organic compounds. The GAC system will be designed to remove volatile and semi-volatile organic compounds from an effluent stream of a polishing filter system.

3. The GAC system shall be delivered FOB project site to 522 Gere Lock Road, Syracuse, NY 13209.

B. The system is planned to be installed (by others) inside a structure at the Owner's facility and operated approximately seven months out of each year (April 15th through November 15th) for four years beginning in the year 2012. In addition to the short-term (4-year) treatment trains, a long-term treatment train (which includes a GAC component) will also be operated at the same Owner's facility. This long-term treatment train will be designed to treat a much lower flow rate. The long-term GAC unit will treat the same water (contains the same constituents at the same concentrations as shown on Table 2) but at a maximum flow rate of 500 gpm, and for an expected operational lifespan of 20 years. The Manufacturer shall select equipment such that one appropriately-sized GAC lead/lag unit is shared between the "short-term" and the "long-term" treatment trains (i.e. serving as a part of the short-term GAC system during the seven months of "summer" operation and then used as part of the lower-flow, long-term system during the winter months for the first four years and year-round after year 4). The long-term system will be in a heated space.

Even though the short-term equipment will be located inside a structure, the structure is not heated and therefore the short-term units are subject to freezing during winter months. Vendor shall identify required means, methods and procedures needed to prepare units for storage over the winter months. As part of the Service Contract described in the Bid Tab Items, Vendor will be responsible for filling units, and bringing system on-line and fully operational each year prior to April 15th, and emptying/removal of carbon (if required) and rendering system safe for winter downtime/storage immediately after the November 15th yearly shutdown.

C. Start-up services shall be provided. Provide a factory representative for up to 40 hours of field start-up assistance at the Owner's facility.

D. Provide a maintenance/service contract for operational change-out services on an annual basis. Treatability testing conducted on the water estimates that lead GAC units will need to be changed out approximately once every month. Due to the quantity of GAC units required to treat the volume of water, and in order to maintain design flow rate requirements, GAC change-outs will need to be staggered such that only one pair can be off-line at a given time. However, it is up to the Manufacturer to appropriately size the equipment hydraulically and estimate change-out frequency based upon criteria (maximum influent and effluent concentrations) presented herein. It is assumed that spent carbon would need to be classified as Hazardous.

E. The equipment shall fit within the footprint allocated as shown on the General Arrangement Drawing GA-01 provided herein. The equipment will need to fit through the building's overhead door which has minimum dimensions of 16 feet x 16 feet. The building will be new construction. Vendor shall advise if a larger overhead door opening is required. The clear height at the building eave is estimated at 18'-0". At the planned location of the GAC's, the clear height is approximately 20'-6". Additional clear height is available between roof support members.

1.2 REFERENCES

A. Comply with the latest revision of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society of Mechanical Engineers (ASME)

2. American Society for Testing and Materials (ASTM)

3. American National Standards Institute (ANSI)

4. NACE International

5. National Electric Code

1.3 COORDINATION REQUIREMENTS

A. Coordinate delivery with project schedule as maintained by Construction Supervisor.

B. Coordinate with Engineer and Control System Integrator for controls integration.

C. Bid Review Meeting: Following the Engineer's review of the proposal, a bid review meeting will be held in Syracuse, NY.

D. Scheduling: The GAC system must be operational before April 2012. To allow adequate time for installation (by others), the equipment must arrive on-site no later than April 20, 2011.

1.4 SUBMITTALS

A. Prepare and provide drawings and submittals specific to this system in accordance with the requirements shown on Table 1 herein.

B. Product Data Submittals: "Catalog cuts" and spec sheets included as submittals shall be marked to specifically indicate the equipment and materials proposed for this project. Indicate selections with arrows, and cross out irrelevant data.

C. Presentation of Submittals

1. Operation and Maintenance Data

a. Operational and Maintenance Manuals (3 hard copies each in a 3-ring binder and 1 electronic copy). Owner's name, address, equipment serial numbers, and model numbers shall be clearly identified on the cover. Include Manufacturer and local service representative contact information, including phone numbers and e-mail addresses, on the cover.
b. Each manual shall include a table of contents, an index, and sequential section dividers separating equipment information into subsections. Each manual shall incorporate, at a minimum, the following: field installation instructions, brief written description of the equipment and corresponding components, change-out procedures, starting and stopping procedures, routine maintenance procedures, procedures for protecting the equipment during short-term and long-term downtime, schedules, parts lists, troubleshooting topics, illustrations and diagrams and safety instructions for operating personnel.
c. Each manual shall include any other information that is required by maintenance personnel for proper operation and maintenance.
d. Electronic files of the complete operation and maintenance manual are to be provided on CD.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer's Factory Qualifications: Manufacturing facilities shall have accreditation to ISO 9000:2000 or an equivalent quality management system acceptable to the Engineer.

2. Seismic Design Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing structural and seismic engineering services, including the design of seismic restraints.

3. Owner or Owner's Representative will be conducting scheduled visits to Manufacturer's manufacturing facilities during fabrication and/or Manufacturer's shop testing procedures.

1.6 DELIVERY, STORAGE AND HANDLING

A. As required, disassemble and deliver GAC system in the minimum number of pieces.

B. Site access is via a one-way access road, parts of which are steeply graded. Equipment vendor to ensure adequate means of delivery are provided to enable delivery to the site. A site visit prior to delivery is recommended.

C. Materials and equipment shall be boxed, crated or otherwise completely enclosed and protected during delivery, storage and handling. Such boxes, crates or protection shall be clearly labeled with the Manufacturer's and Owner's name, site address, project equipment tag numbers, brand or model.

D. Deliver, store and handle to prevent damage and in accordance with Manufacturer's written instructions. Provide factory-installed lifting provisions.

E. The GAC system shall be delivered freight on board (FOB) to the project site.

F. Carbon shall not be delivered or installed until approximately two weeks prior to the initiation of operational commissioning at the site (assume date of April 30, 2012).

G. Manufacturer's storage requirements shall be provided. Units will be stored outside and unprotected from weather events for a prolonged period of time. Manufacturer shall provide adequate storage so as to prevent damage under these conditions.

1.7 WARRANTY

A. Provide parts and labor warranty in accordance with the Subcontractor Agreement For Services.

B. The standard warranty duration shall be from delivery date of units to one year after start-up. Start-up is defined as the initiation of operational commissioning (assume start-up to begin on April 30, 2012). Provide with the Bid the cost adder to extend the warranty for 42 months, as described in the Bid Tab document. The standard warranty shall include parts and labor for all supplied items, including but not limited to, equipment, controls, and coating system.

1.8 PERFORMANCE GUARANTEE

A. Performance shall be warrantied and proven. Performance shall be demonstrated continuously for four weeks after start-up under full operating conditions. Performance testing is by others. GAC Vendor shall be present at the site (assume 8 hours) to witness performance testing and provide input as requested. The provided GAC system shall be designed to achieve effluent concentrations, given the maximum influent concentrations provided on Table 2. Performance shall be warrantied over the entire range of flow rates. Anticipated maximum influent concentrations, required effluent concentrations, and minimum and maximum flow rates for the system are provided in Table 2. If the equipment fails to continuously meet this effluent quality during the warranty period, the

Manufacturer shall, at no additional cost to the Owner or Buyer, provide and install replacement equipment, parts, and labor to correct demonstrated performance deficiencies as needed to achieve the required performance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following Manufacturers are named to establish a standard of quality necessary for the Project:

1. Calgon Carbon
2. Siemens Water Technology
3. Carbonair Environmental
4. Carbtrol Corporation
5. TIGG Corporation
6. Envirogen
7. Or approved equal

2.2 PERFORMANCE REQUIREMENTS

A. The GAC vessels shall be suitable for contact removal of VOCs and SVOCs from the water stream with the design influent characteristics to the effluent concentrations as specified in Table 2 herein. The GAC vessels shall also be backwashable.

B. Water constituents and concentrations are provided in Table 2 herein.

C. Emphasis will be placed on the following criteria and objectives to evaluate Bids for the GAC system. The GAC system criteria shall be as follows:

1. Application – Adsorption of VOCs/SVOCs

2. Minimum Empty Bed Contact Time (EBCT) – The GAC system shall be sized to achieve a minimum EBCT of 15 minutes (lead and lag vessels combined). During times when a GAC unit is taken offline for backwashing or change-out, the system shall be sized such that the remaining GAC vessels shall be capable of accepting and treating the full flow with a reduced EBCT of 14 minutes, minimum.

3. Vendor to optimize design such that operational downtime is minimized. System shall be designed so that no vessels are off-line for more than four hours for normal maintenance, backwashing or carbon change-out events. An important factor in the consideration of the award of the purchase contract for the GAC system will be Vendor’s design and/or operational strategies, equipment sizing, and other ideas and concepts which place a high importance on maximizing system uptime. Vendor shall present any original alternatives which maximize uptime with the Bid.

4. Vendor design and operational strategy shall minimize, to the extent possible, the amount of spent backwash water generated and also minimize the amount of solids in the spent backwash water. Any means of lessening the volume and/or amount of solids in the spent backwash water shall be specifically identified by the Vendor with the Bid as this is an important factor in the consideration of the award of the contract.

5. Since maximizing system uptime is a main concern, it is important to minimize the time required to perform routine change-out events. Good operational start-up practice for bringing new carbon on-line should include sufficient time to wet the carbon and allow for degassing, stratification, and removal of fines and alkalinity. However, this wetting period should not take away from system uptime. Therefore, Vendor should provide with the Bid their plan for managing change-out events to minimize downtime, operating and capital costs. Vendor shall provide with the Bid the estimated time required to perform a carbon change-out event.

6. Upon notification from site Operators that a vessel change-out is required, Vendor shall be capable of arriving at the site within a reasonable amount of time with the appropriate materials required to perform a vessel change-out so that system is not required to be shut down on contaminant breakthrough through the lag vessel. Vendor to provide with the Bid the number of hours required from when the call for a change-out is received, until arrival on-site to begin the change-out, including if notification occurs on a weekend or holiday, if different than at other times.

7. Although maximum concentrations and flow rates have been identified, actual flow rates and concentrations may be less than what is expected. The first year of operation will establish typical flow rates and concentrations and will be used to fine-tune equipment requirements and operational plans for future years of operation. As such, Vendor shall propose ways to optimize the design of the GAC system. Strategies such as the purchase of a core number of vessels during year one supplemented by lease of additional units as needed will be entertained. If actual conditions warrant the eventual purchase of these leased units, the accrued lease costs would then be applied towards the purchase of these units. Other strategies, as proposed by the Vendor with the Bid, are encouraged and will be evaluated.

8. Materials of Construction, Vessels – Vessel materials of construction should be selected by the Vendor to be compatible with constituents found in the water at the concentrations identified herein (see Table 2). When selecting materials of construction, the Vendor shall also consider the expected project lifespan of 4 years and select materials of construction accordingly, except for the single lead/lag system that is expected to remain operational for the long-term project life and as addressed by the alternative materials of construction described in Bid Item No. 2.

D. All vessels and equipment shall be designed to resist the design loads per the Building Code of New York State (BCNYS) 2007 edition, including sloshing effects resulting from a hydrodynamic and/or seismic analysis. Vessel/equipment support layout details, including locations of anchor bolt holes, anchor bolt size and type, and embedment length

shall be provided. Maximum Reaction Forces and moments at each anchor point shall be provided. The structural design criteria provided below for this site are preliminary, based on initial information available for the site, and are subject to change upon completion of a site geotechnical evaluation. Finalized structural design criteria will be provided prior to award of the Contract. Once finalized design criteria is provided, Vendor to certify that equipment design and anchoring is in compliance with the finalized structural design criteria. Draft structural design criteria are as follows:

LIVE LOAD:	
Roof Live Load	20 psf
Floor Live Load	250 psf or 3 kips
SEISMIC DESIGN CRITERIA:	
Seismic Importance Factor, I_E	1.25
Seismic Use Group	II
Mapped Spectral Response Acceleration, S_S	0.192 g
Mapped Spectral Response Acceleration, S_1	0.078 g
5% Damped Spectral Response Acceleration at Short Periods, S_{DS}	0.32 g
5% Damped Spectral Response Acceleration at 1 sec Periods, S_{D1}	0.182 g
Seismic Design Category, SDC	C

E. GAC system shall be designed for lead/lag operation. Manually operated valves and manifold piping shall be provided such that either unit may operate in the lead position. Operator should be able to select (by manual manipulation of valve operators) which of the vessels is to serve as the lead vessel. Also, design of the entire system shall allow the isolation of any unit (1 pair of vessels) for backwash or carbon change-out while maintaining full flow through the other units. A valve sequencing chart and valve labels shall be provided by the Vendor for this purpose and to minimize potential Operator mistakes.

F. The design of the valve manifold skid shall be sized to include extra space to allow a change to automated (electrically-actuated) valves in the future. Shop drawings shall show (in dashed lines) the outline of potential future valve actuators, drawn to scale. Proposed actuator make and model shall be identified by the Vendor with shop drawings provided to indicate how, if required in the future, they may be fitted up to the valves. Vendor shall verify that the proposed valve is able to be mated with the proposed actuator.

G. The GAC units will be placed on a former wastebed. As such, the soils are limited in the amount of weight they can support. Units must be designed to limit loading to less than 1,500 pounds per square foot when full of carbon and water, or just water. Therefore, GAC units are required to be skid-mounted with skids to comply with the 1,500 psf loading criteria. Skids are to be installed on either timber mats or concrete pads. Vendor to identify any concerns with planned support arrangement. Because of the properties of the soil, it is expected that potentially uneven settlement will occur. Assume the maximum acceptable settlement is as follows: less than 3/4" differential settlement across each unit and less than 1.5" of total overall settlement. Equipment Manufacturer shall identify the maximum acceptable differential settlement their unit can encounter without affecting the equipment or its operation.

H. The vessels shall be designed for a pressure of 125 psig or 1.3 times the peak pressure during the backwash cycle, whichever is greater. The vessels shall be designed and fabricated in accordance with ASME boiler and unfired pressure vessel code. ASME code stamp is required.

I. Manufacturer shall identify minimum flow rate into the GACs that will still allow for proper operational performance.

J. Each GAC vessel shall be equipped with a vent connection with a manual valve for air/vacuum relief. Additionally, over-pressurization protection, differential pressure indicating transmitter, and inlet and outlet pressure gauges shall be provided as shown on the P&ID. The pressure differential transmitter shall be provided to alarm to the Distributed Control System (DCS) upon exceedance of a pre-set, operator-adjustable pressure differential. Each vessel shall be provided with influent and effluent sample cocks. Instrumentation and control components shall be sized per Manufacturer's recommendations and shall comply with the "Instrumentation and Controls Requirements" document attached herein. Over-pressurization protection shall consist of a standard rupture disk designed for bursting pressure of 95% (+/-5%) of the working design pressure or other Engineer-approved device. The rupture disk shall be equipped with a tell-tale device which alerts the Operator (via an alarm to the DCS) that the disk has ruptured. The rupture disk will be interlocked to shut a feed valve to the GAC system upon rupturing. The rupture disk shall be in compliance with ASME code requirements.

K. A sight flow indicator tube shall be provided on the backwash waste line of each adsorber. The sight tube shall consist of a 2 foot long (minimum) section of transparent rigid pipe or other Engineer-approved design.

L. The GAC vessels shall contain a minimum 14" x 18", easy-open type manway suitable for maintenance access on the top dish of each unit and a second manway on the straight sidewall with a minimum opening dimension of not less than 20" diameter. Alternative dimensions will be considered. Manways must be suitably sized to allow entry for inspection and repair of coatings and interior components. Manways shall comply with ASME boiler and unfired pressure vessel code. Manways shall be flanged. Side manways shall be equipped with a davit hinge.

M. The inlet and outlet distribution laterals shall be designed to provide uniform distribution of flow at any flow rate range between the minimum and maximum flow rates specified herein. Inlet and outlet distribution laterals shall be separated from the carbon.

N. The underdrain system shall be capable of supporting the carbon when the vessel is filled with water and pressured to the system design pressure.

O. Each unit shall be equipped with a minimum of three lifting lugs to facilitate lifting/rigging.

P. Each GAC vessel shall be equipped with carbon loading and clean-out ports. The setup shall allow the removal and addition of carbon in a fluidized form. Manufacturer shall provide manual air/vacuum relief, as required, to promote GAC filling and clean-out activities. Adsorber design shall incorporate the feature to remove carbon without

requiring the adsorber to be opened and cleaned or hosed. Carbon loading and drain line shall be fitted with quick disconnect adapters. A mating tank truck adapter shall be provided for each type and size of quick disconnect fitting provided.

Q. The Manufacturer shall provide face (manifold) piping between the lead and lag carbon vessels. Manifold piping shall be pre-assembled and skid-mounted by the Manufacturer and shall require only the connection of the influent, effluent and backwash influent and effluent piping in the field. Valves shall be Manufacturer's standard if they are suitable for expected concentrations of constituents found in the water. Valves located higher than 6 feet shall be equipped with a chain operator. Valves 8 inches and larger shall be equipped with a gear operator.

R. Treatability testing indicates the build-up of gas bubbles which form within the carbon vessel occupying the voids between the carbon media. The treatability testing results are provided as an Appendix herein. It is not apparent if the bubbles are a result of bioactivity, a by-product of a chemical reaction taking place, or as a result of another phenomenon. The presence of these gas bubbles may act to reduce the surface area of available carbon media, thereby reducing treatability. Therefore, GAC vessels shall be capable of being backwashed with water. The source of backwash water shall be from an external treated water source (by others). Manufacturer to identify size and location of connection(s) provided for the backwash piping. Manufacturer to design and size system such that only a single vessel can be backwashed at any one time. Manufacturer to identify backwash pumping flow and head (at the vessel) requirements and durations with the Bid.

S. The Subcontractor shall provide GAC media that meets the design requirements. The depth of media shall be provided by the Manufacturer. Coal-based carbon shall be used. A cost comparison will be performed to evaluate the use of virgin carbon vs. reactivated carbon (as shown in the Bid Items). If reactivated carbon is used, the initial carbon fill would be with virgin carbon. Thereafter, the same carbon would be reactivated and returned to the site. This reactivated carbon would be dedicated solely to this Honeywell project. Additional carbon used to supplement the reactivated carbon, as needed, would be virgin type carbon. All virgin carbon (including carbon used to supplement after reactivation) shall meet the following criteria:

Iodine Number, mg/g (min)	1000
Moisture, weight % (max)	2
Abrasion Number (min)	75
Effective Size (mm)	0.55-0.75
Uniformity Coefficient (max)	1.9
Ash, weight % (max)	9
Apparent Density, g/cc (min)	0.44
Screen Size, US Sieve Series, weight %	
Larger than No. 12 (max)	5
Smaller than No. 40 (max)	4

All reactivated carbon shall meet the following criteria:

Iodine Number, mg/g (min)	900
Moisture, weight % (max)	2
Abrasion Number (min)	75
Effective Size (mm)	0.55-0.75

Uniformity Coefficient (max)	1.9
Ash, weight % (max)	9
Apparent Density, g/cc (min)	0.44
Screen Size, US Sieve Series, weight %	
Larger than No. 12 (max)	5
Smaller than No. 40 (max)	4

T. The attached P&ID I-09 shows a typical downflow, pressure-type GAC vessel system. The P&ID is to be used only as an example of the functionality of a GAC system. Alternate types of systems may be considered.

U. Controls and alarms associated with the GAC system are to be integrated into a DCS. Programming and hardware associated with the DCS is by others. The Manufacturer shall provide supporting documents as specified in the "Instrumentation and Controls Requirements" appendix for Vendor provided instruments. All instruments will be installed and wired back to common electrical and instrumentation terminal boxes by the Manufacturer. One terminal box shall be provided for each lead/lag unit. Terminal boxes shall be NEMA 4X enclosures for operation in an indoor, unheated temporary structure.

V. Manufacturer shall recommend alarm conditions and setpoints, as appropriate. Manufacturer shall identify recommended time delay to minimize nuisance alarms.

W. Electrical classification is ordinary.

X. The Manufacturer shall conduct shop testing to satisfy hydraulic conditions and pressure ratings of each tank. The GAC vessels shall be hydrostatically pressure tested by the Manufacturer at the shop prior to delivery to the site. Certified test reports for each unit shall be provided prior to delivery.

Y. The interiors of the GAC vessels, equipment, piping, and all wetted ancillaries are to be constructed of materials that are compatible with the water characteristics provided in Table 2. Note the water exhibits chlorides and organic compound solvent concentrations.

Z. All tanks, equipment items, valves, and instruments shall be provided with stainless steel tags. Tags shall be permanently affixed or chained to the item, and will indicate the tag number and description of the item as shown on the P&IDs. Lettering on the tag shall be etched or struck, with a minimum letter height of 0.5 inches.

AA. Vendor shall identify any issues that may result from a prolonged shutdown and what time interval it would be expected that the issues may occur at.

2.3 SHOP FINISHES

A. All surfaces to be coated shall be prepared in accordance with PIP VESV1003HA and Honeywell's associated overlay document associated with the PIP specification. Surface preparation prior to coating application shall be in accordance with the NACE standard

SP0178 and NACE SP0178 Appendix C NACE Weld Preparation Designation C, and coating Manufacturer's instructions, whichever is more stringent.

B. The Manufacturer shall provide a shop applied protective coating system for all wetted metal surfaces of the GAC vessel package. The interior linings of the vessels shall be compatible with the influent parameters and concentrations presented in this specification and shall be abrasion resistant for this intended use. Coal tar epoxy is not an acceptable interior lining. Proposed coating and lining systems and DFT proposed shall be provided. Stainless steel does not require coating. Cathodic protection may be used for supplemental corrosion resistance, as recommended by the Manufacturer.

C. The Manufacturer shall provide a shop-applied protective coating system for all non-wetted metal surfaces of the GAC system.

2.4 SOURCE QUALITY CONTROL

A. Factory Quality Certification

1. Provide written documentation of Manufacturer's Factory Quality Management system to satisfy Quality Assurance requirements as specified in Section 1.5.

B. Factory Assembly

1. GAC systems shall be manufactured in accordance with the Factory Quality Management system's certification document.

C. Factory Test

1. Each GAC system shall be factory tested as follows:

   a. Manufacturer's standard inspections and tests
   b. Hydrostatically tested by the Manufacturer at the shop prior to delivery to the site. Notice shall be given to the Engineer at least two weeks prior to hydrostatically testing the equipment, so that arrangements can be made for Engineer or other Owner's Representative to witness the testing at the Manufacturer's facility.
   c. Testing of interior coating systems per NACE standards SP0188 and SP0178.

2. Submit factory test reports for approval prior to shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. As part of on-site start-up services, Manufacturer's representative shall examine areas and conditions for compliance with Manufacturer's installation recommendations and requirements.

B. Proceed with start-up only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Installation is by others. Installation shall be per Manufacturer's instructions.

B. The GAC system shall fit and be serviceable in the allocated space as shown on the Site Plan (Drawing GA-01). Dimensions of building access doors and overhead clearances were provided previously herein.

3.3 FIELD QUALITY CONTROL

A. The Manufacturer shall furnish the services of a Manufacturer's representative to inspect the installation (by others) and to provide start-up services for the units.

3.4 MANUFACTURER'S FIELD SERVICES

A. The on-site services of the Manufacturer's field representative shall be provided during the start-up and adjustment in accordance with this specification and as identified in the Bid Documents.

B. The services of the Manufacturer's field representative shall be provided during installation. The Manufacturer's field representative is not required to be on-site during installation efforts, but will be conferred if problems or questions occur during installation.

C. A factory-authorized service representative shall perform the following inspections and checks:

1. Inspect field-assembled components, equipment installation, and electrical connections for compliance with the Manufacturer's installation recommendations and requirements.

2. Set field-adjustable settings to the values recommended by the equipment Manufacturer.

3. Witness and provide input as requested during on-site performance tests (testing to be performed by others).

4. Perform or supervise start-up services.

5. Prepare written report to record the following:

a. Inspections and checks carried out on site

3.5 DEMONSTRATION AND TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the equipment.

1. Review data in Operation and Maintenance manuals.

2. Schedule training with Owner /Engineer, with at least two weeks advance notice.

B. The on-site services of the Manufacturer's representative shall be provided as separate visits, if required, for the minimum hours as listed below for the GAC system:

1. Twenty-Eight hours for inspection, certification of installation and start-up.

2. Eight hours of site presence during performance testing.

3. Four hours on-site for the owner's personnel training.

Vendor shall advise if the amount of hours specified are reasonable or provide the number of hours recommended if different than what is allotted above.

3.6 MAINTENANCE/SERVICE CONTRACT

A. Refer to Bid Tab Item 7.

PART 4 - APPENDICES

A. Table 1 – GAC Submittal Schedule

B. Table 2 – Constituent Concentrations

C. Process Flow Diagram – PFD-1

D. P&ID I-09 Carbon Filters

E. General Arrangement Plan – GA-01

F. Treatability Testing Results

G. Section 16900 - Instrumentation and Controls Requirements

H. Honeywell overlay document

1. Process Industry Practices (PIP) Standard VESV1003
2. Honeywell Specification MSL-2002 HW ***(not applicable for this contract)***

I. NACE SPO178-2007 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service

J. NACE SPO188-2006 - Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

END OF SECTION

SECTION 44 42 73

FRAC TANKS PRE-PURCHASE SPECIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes work consisting of furnishing and delivering Frac Tanks as shown on the Process and Instrumentation (P&ID) drawings and General Arrangement Plan (attached as Appendices D and E, respectively). Refer to the attached P&ID drawings for example schematics of the systems. The space allocated for the tanks are as shown on the General Arrangement Plan.

1. Twelve Frac Tanks are required. The equipment shall include tanks and accessories for a completely assembled, ready to install and operate system.

2. The Frac Tanks shall be delivered FOB project site to 522 Gere Lock Road, Syracuse, NY 13209.

B. The system is planned to be installed (by others) inside a structure at the Owner's facility and operated approximately seven months out of each year (April 15th through November 15th) for four years beginning in the year 2012. In addition to the short-term (4-year) treatment trains, a long-term treatment train (which includes a total of five Frac Tanks) will also be operated at the same Owner's facility. The long-term tanks will treat the same water (contains the same constituents at the same concentrations as shown on Table 2 provided in Appendix B to this specification) but for an expected operational lifespan of 20 years. The long-term system will be in a heated space.

Even though the short-term tanks will be located inside a structure, the structure is not heated and therefore the short-term tanks are subject to freezing during non-operational winter months (but after they have been drained). Vendor shall identify required means, methods and procedures, if any, needed to prepare units for storage over the winter months.

C. The equipment shall fit within the footprint allocated as shown on the General Arrangement Drawing GA-01 provided herein. Manufacturer shall identify any operational or maintenance clearances required with the Bid. The equipment will need to fit through the building's overhead door which has dimensions of 14 feet width x 18 feet height. The building will be new construction. Vendor shall advise if a larger overhead door opening is required. Manufacturer is to confirm that the equipment can enter the building via the overhead door and be moved to the positions shown on drawing GA-01. The clear height at the building eave is estimated at 18'-0". Additional clear height is available between roof support members.

D. The Frac Tanks shall be kept to Manufacturer's standard offerings, as much as possible. New, used or refurbished tanks are acceptable if they meet the design intent and warranty requirements. Any requests in this RFP which, in the Vendor's opinion, impart

unnecessary costs or unnecessarily differ from Manufacturer's standard offerings shall be clearly identified in Bidder's proposal.

1.2 REFERENCES

A. Comply with the latest revision of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society of Mechanical Engineers (ASME)

2. American Society for Testing and Materials (ASTM)

3. American National Standards Institute (ANSI)

4. NACE International

5. National Electric Code

1.3 COORDINATION REQUIREMENTS

A. Coordinate delivery with project schedule as maintained by Construction Supervisor.

B. Bid Review Meeting: Following the Engineer's review of the proposal, a bid review meeting will be held in Syracuse, NY.

C. Scheduling: The Frac Tanks must be operational before April 2012. Refer to RFP Section IV "Information" Schedule Milestones Table for schedule dates.

1.4 SUBMITTALS

A. Prepare and provide drawings and submittals specific to this system in accordance with the requirements shown on Table 1 (provided as Appendix A to this specification).

B. Product Data Submittals: "Catalog cuts" and spec sheets included as submittals shall be marked to specifically indicate the equipment and materials proposed for this project. Indicate selections with arrows, and cross out irrelevant data.

C. Submittal data for motors shall be in accordance with the attached Specification 26 05 13 "Electric Motors."

D. Operation and Maintenance Data

1. Presentation of Submittals

a. Operational and Maintenance Manuals (3 hard copies each in a 3-ring binder and 1 electronic copy). Owner's name, address, equipment serial numbers, and model numbers shall be clearly identified on the cover. Include

Manufacturer and local service representative contact information, including phone numbers and e-mail addresses, on the cover.

b. Each manual shall include a table of contents, an index, and sequential section dividers separating equipment information into subsections. Each manual shall incorporate, at a minimum, the following: field installation instructions, brief written description of the equipment and corresponding components, routine maintenance procedures, procedures for protecting the equipment during short-term and long-term downtime, schedules, parts lists, troubleshooting topics, illustrations and diagrams and safety instructions for operating personnel.

c. Each manual shall include any other information that is required by maintenance personnel for proper operation and maintenance.

d. Electronic files of the complete operation and maintenance manual are to be provided on CD.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer shall provide a list of references and contact information.

2. Seismic Design Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing structural and seismic engineering services, including the design of seismic restraints.

3. Owner or Owner's Representative reserves the right to conduct scheduled visits to Manufacturer's facilities during fabrication to witness progress and fabrication and/or during Manufacturer's shop testing procedures.

1.6 DELIVERY, STORAGE AND HANDLING

A. As required, disassemble and deliver Frac Tanks and ancillary equipment in the minimum number of pieces.

B. Site access is via a one-way access road, parts of which are steeply graded. Equipment Vendor to ensure adequate means of delivery is provided to enable delivery to the site. A site visit prior to delivery is recommended.

C. Materials and equipment shall be boxed, crated or otherwise completely protected during shipment, delivery, storage and handling. Such boxes, crates or protection shall be clearly labeled with the Manufacturer's and Owner's name, site address, project equipment tag numbers, brand or model.

D. Ship, deliver, store and handle to prevent damage and in accordance with Manufacturer's written instructions. Provide factory-installed lifting provisions.

E. Manufacturer's storage requirements shall be provided. Units will be stored outside and unprotected from weather events for a prolonged period of time prior to installation.

Manufacturer shall provide adequate packaging and protection to prevent damage under these conditions.

F. Off-loading of equipment delivered to the site is by Others.

1.7 WARRANTY

A. Provide parts and labor warranty in accordance with the Purchase Order General Terms and Conditions, and the Supplemental Terms and Conditions.

B. The standard warranty duration shall be from delivery date of units to one year after start-up. Start-up is defined as the initiation of operational commissioning (assume start-up to begin on April 30, 2012). Provide with the Bid the cost adder to extend the warranty for 42 months after start-up, as described in the Bid Tab document. The standard warranty shall include parts and labor for all supplied items, including but not limited to, equipment, controls, and coating system. Any defects in equipment shall be corrected by Manufacturer, at no additional cost to the Owner or Buyer. Manufacturer shall provide and install additional or replacement equipment, parts, and labor (including cost of return trips to the site as needed), to correct deficiencies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following Manufacturers are named to establish a standard of quality necessary for the Project:

1. Baker Corp
2. Adler Tank
3. Rain For Rent
4. Del Tanks
5. Or approved equal

2.2 PERFORMANCE REQUIREMENTS

A. The Frac Tank criteria shall be as follows:

pH ADJUST TANKS	
Number of pH Adjust Tanks	8
Capacity	18,000 gallons, nominal (or greater)
Mixers required/application?	Yes/chemical addition and neutral-ization
Covered?	Yes
FLASH MIX TANK	
Number of Flash Mix Tanks	1
Capacity	18,000 gallons, nominal (or greater)

Mixers required/application?	Yes/chemical addition
Covered?	Yes
FILTER FEED TANK	
Number of Flash Mix Tanks	1
Capacity	18,000 gallons, nominal (or greater)
Mixers required/application?	No
Covered?	Yes
EFFLUENT MONITORING TANKS	
Number of Flash Mix Tanks	2
Capacity	18,000 gallons, nominal (or greater)
Mixers required/application?	Yes/chemical addition and neutral-ization
Covered?	No

Note 1: Motors shall be in accordance with requirements provided in Appendices.

B. Emphasis will be placed on the following criteria and objectives to evaluate Bids for the Frac Tanks:

1. With the short-term and long-term components to this project, and with the seven-month operational up-time per year for the short-term tanks, this project lends itself to some unique opportunities for purchasing/rental options. Vendor shall propose cost effective ways to optimize the Frac Tank purchasing strategy. Strategies such as the purchase of the Frac Tanks coupled with Vendor buy-back after project completion (estimated to be 4 years), or rental of tanks with decreased rental pricing for off-line months, etc. will be entertained. If actual conditions warrant the eventual purchase of these rented units, the accrued rental costs would then be applied towards the purchase of these units. Other strategies, as proposed by the Vendor with the Bid, are encouraged and will be evaluated.

C. Water constituents and concentrations are provided in Table 2 (provided as Appendix B to this specification).

D. Materials of Construction, Vessels – The material of construction for the interior of the tanks or coating system and any potentially wetted parts shall be selected by the Vendor to be compatible with constituents found in the water up to the combined maximum concentrations identified in Table 2 (see Appendix B to this specification). Note the water exhibits chlorides and organic compound solvent concentrations. When selecting materials of construction, the Vendor shall also consider the expected project lifespan of 4 years and select materials of construction accordingly, except for the Frac Tanks to be used in the long-term, heated building which are expected to remain operational for the long-term project life and as addressed by the alternative materials of construction described in Bid Item No. 2.

E. All vessels and equipment shall be designed to resist the design loads per the Building Code of New York State (BCNYS) 2007 edition, including sloshing effects resulting from a hydrodynamic and/or seismic analysis. Vessel/equipment support layout details,

including locations of anchor bolt holes, anchor bolt size and type, and embedment length shall be provided. Maximum Reaction Forces and moments at each anchor point shall be provided. The structural design criteria provided below for this site are preliminary, based on initial information available for the site, and are subject to change upon completion of a site geotechnical evaluation. Finalized structural design criteria will be provided prior to award of the Contract. Once finalized design criteria is provided, Vendor to certify that equipment design and anchoring is in compliance with the finalized structural design criteria. Draft structural design criteria are as follows:

SEISMIC DESIGN CRITERIA:	
Seismic Importance Factor, I_E	1.25
Seismic Use Group	II
Mapped Spectral Response Acceleration, S_S	0.192 g
Mapped Spectral Response Acceleration, S_1	0.078 g
5% Damped Spectral Response Acceleration at Short Periods, S_{DS}	0.32 g
5% Damped Spectral Response Acceleration at 1 sec Periods, S_{D1}	0.182 g
Seismic Design Category, SDC	C

F. The Frac Tanks will be placed on a former wastebed. As such, the soils are limited in the amount of weight they can support. The support structure (by Others) for the tanks will be designed to limit loading at floor contact points when full of water. Frac Tanks are to be installed on concrete pads or elevated cribbing. Vendor shall identify if continuous support is required beneath tanks, or if tanks can span between support locations (if timbers or concrete cribbing is used). Vendor to identify any concerns with planned support arrangement. Because of the properties of the soil, it is expected that potentially uneven settlement will occur. Assume the maximum acceptable settlement is as follows: less than 3/4" differential settlement across each tank and less than 1.5" of total overall settlement. Equipment Manufacturer shall identify the maximum acceptable differential settlement their unit can encounter without affecting the equipment or its operation.

G. The vessels shall be designed for atmospheric service (no pressure).

H. The Frac Tanks shall be equipped with nozzles, manways, downcomers, and all accessories as described herein and on the attached Nozzle Schedule drawings (see Appendix F to this specification). Manways shall be minimum 20" diameter, easy-open type, suitable for maintenance access on the top cover of each tank and a second manway on the sidewall with a minimum opening dimension of not less than 20" diameter. Alternative dimensions will be considered. Manways must be suitably sized to allow entry for inspection and repair of coatings and interior components. Manways shall be gasketed and flanged. Side manways shall be equipped with a davit hinge.

I. Access to the tops of the tanks and walkable tank covers shall be provided, as necessary, to enable routine maintenance and cleaning at the top of the covers. Handrails and guardrails shall comply with the attached Specification 05 52 13 – Pipe and Tube Railings. Manufacturer shall provide in the base bid pricing, the cost for top of tank access for each Frac Tank. If possible, (and as shown on the General Arrangement Drawing,) it would be preferred to share access between pairs of Frac Tanks grouped together (such as the pH Adjustment Tanks) such that the quantity of access ladders and handrailing is kept to a minimum. For example, in the General Arrangement Drawing equipment shown, each pair of pH Adjustment Tanks could have one (combined) ladder

for access to the top of the units and one handrail/guardrail system around the perimeter of both units together.

In addition, provide pricing for staircases in lieu of ladders as identified in the Bid Tab Items. Manufacturer is to indicate (and include pricing for) the recommended arrangement being proposed and clearly identify the number, size and location of handrails, walkable (portions of) tank covers, ladders or stairways, etc. Manufacturer shall propose a cost-effective means of providing necessary access without imposing unnecessary custom design components, if possible.

Locations of top nozzles, manways, and equipment or instrumentation located on the tops of tanks shall be grouped together as much as possible, and located outside of main walkable paths to avoid trip hazards for personnel walking on the tank covers.

J. Each Frac Tank shall be equipped with a minimum of four lifting lugs to facilitate lifting/rigging.

K. Nozzle sizes, locations and information are presented on the Tank Nozzle Schedule drawings (included in Appendix F to this specification.) Tanks which are covered will be designed to support live loads of 60 lbs per square foot and super-imposed equipment dead loads of 10 lbs per square foot, plus all mixer loads (i.e. vertical downward load, bending moment, static moment, torque, etc.). OSHA-approved 5,000 lb. tie-off points for personnel shall be included. Each of the covers shall be provided with load-rated manways.

L. For those tanks with mixers, tank manufacturer shall coordinate with engineer and/or mixer manufacturer to ensure that the tanks are designed to handle the loads imposed by the mixers. This coordination between the mixer manufacturer and the tank manufacturer is required regardless of whether the mixers are included in the scope of the tank manufacturer or not.

M. Mixers shall be constant speed. Motors shall be TENV or TEFC, 480 volt, three phase, 60 Hertz, with anticondensation heaters in accordance with Specification 26 05 13, “Electric Motors” (attached as Appendix G to this specification.)

N. Mixers General

1. The motors shall be designed in accordance with the requirements provided in the appendices herein.

2. The mixer Manufacturer shall be Lightnin, Chemineer, or approved equal.

3. The mixers shall be equipped with 316 stainless steel shafts and impellers, or approved alternate, as recommended by the Manufacturer.

4. Mixer blades shall be attached to shaft by keyways. Blades attached by set screws only are not acceptable.

O. The attached P&ID's show typical Frac Tank arrangements for each of the 4 types of tanks needed (pH Adjust Tanks, Flash Mix Tank, Filter Feed Tank, and Effluent Monitoring Tanks).

P. Electrical area hazard classification (interior and exterior of the Frac Tanks) is designated as ordinary.

Q. The Manufacturer shall conduct shop testing to satisfy hydraulic conditions of each tank. The Frac Tanks shall be hydrostatically leak tested by filling units at the Manufacturer's shop prior to delivery to the site. Certified test reports for each Frac Tank shall be provided prior to delivery.

R. The interiors of the Frac Tanks, equipment, piping, and all wetted ancillaries are to be constructed of materials that are compatible with the water characteristics provided in Table 2. Note the water exhibits chlorides and organic compound solvent concentrations.

S. All tanks, equipment items, valves, and instruments shall be provided with stainless steel tags. Tags shall be permanently affixed or chained to the item, and will indicate the tag number and description of the item as shown on the P&IDs. Lettering on the tag shall be etched or struck, with a minimum letter height of 0.5 inches.

T. Vendor shall identify any issues that may result from a prolonged shutdown and what time interval it would be expected that the issues may occur at.

U. All tank nozzles shall be provided with flanges designed in accordance with ASME B16.5, 150# flanges. Nozzle projections shall be of sufficient lengths to allow access to flange bolts and nuts

V. Manufacturer shall provide pricing for one spare for each different type of mixer provided.

W. Any stainless steel bolts shall be applied with anti-seize thread lubricant.

2.3 SHOP FINISHES

A. All surfaces to be coated shall be prepared in accordance with PIP VESV1003HA and Honeywell's associated overlay document associated with the PIP specification. Surface preparation prior to coating application shall be in accordance with the NACE standard SP0178 and NACE SP0178 Appendix C NACE Weld Preparation Designation C, and coating Manufacturer's instructions, whichever is more stringent.

B. The Manufacturer shall provide a shop applied protective coating system for all interior metal surfaces of the Frac Tanks system in accordance with coating system manufacturer recommendations. The interior linings of the Frac Tanks shall be compatible with the influent parameters and concentrations presented in this specification. Coal tar epoxy is not an acceptable interior lining. Proposed coating and lining systems and dry film

thickness (DFT) of each coat and of the overall coating system proposed shall be provided with the Bid. Stainless steel does not require coating. Cathodic protection may be used for supplemental corrosion resistance, if recommended by the Manufacturer.

C. The Manufacturer shall provide a shop-applied protective coating system (primer and suitable top coat(s)) for all exterior metal surfaces.

2.4 SOURCE QUALITY CONTROL

A. Factory Test

1. Each Frac Tank shall be factory tested as follows:

a. Manufacturer's standard inspections and tests
b. Hydrostatically tested by the Manufacturer at the shop prior to delivery to the site. Notice shall be given to the Engineer at least two weeks prior to hydrostatically testing the equipment, so that arrangements can be made for Engineer and/or other Owner's Representative(s) to witness the testing at the Manufacturer's facility.
c. Testing of interior coating systems per NACE standards SP0188 and SP0178.

2. Submit factory test reports for approval prior to shipment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation is by others. Installation shall be per Manufacturer's instructions.

3.2 MANUFACTURER'S SERVICES

A. If mixers are provided by the Frac Tank Successful Bidder, the on-site services of the Manufacturer's field representative shall be provided during the start-up and adjustment in accordance with this specification and as identified in the Bid Documents.

B. The services of the Manufacturer's representative shall be provided during installation. The Manufacturer's representative is not required to be on-site during installation efforts, but will be conferred if problems or questions occur during installation. Assume 4 hours for mixer installation assistance and 2 hours for Frac Tanks installation assistance.

C. A factory-authorized service representative will perform the following inspections, checks, and start-up assistance per Section 3.3.B:

1. Inspect field-assembled components, equipment installation, and electrical connections for compliance with the Manufacturer's installation recommendations and requirements.

2. Set field-adjustable settings to the values recommended by the equipment Manufacturer.

3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and components.

4. Perform or supervise start-up services.

5. Prepare written report to record the following:

   a. Inspections and checks carried out on-site.

3.3 DEMONSTRATION AND TRAINING

A. If mixers are provided by the Frac Tank Successful Bidder, engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the equipment.

1. Review data in Operation and Maintenance manuals.

2. Schedule training with Owner or Engineer, with at least two weeks advance notice.

B. If mixers are provided by the Frac Tank Successful Bidder, the services of the Manufacturer’s representative shall be provided within one site visit for the minimum hours as listed below:

1. Thirty-Six hours for inspection, certification of installation and start-up assistance.

2. Four hours for training Owner’s personnel.

Manufacturer shall advise if the amount of hours specified are reasonable or provide the number of hours recommended if different than what is allotted above

PART 4 - APPENDICES

A. Table 1 – Frac Tank Submittal Schedule

B. Table 2 – Constituent Concentrations

C. Tank Data Sheets

D. P&ID’s

1. Lead Sheets
2. I-01 pH Adjustment Tank #1
3. I-02 pH Adjustment Tank #2
4. I-03 Flash Mix Tank #1
5. I-07 Filter Feed Tank

6. I-10 Effluent Monitoring Tank #1

E. General Arrangement Plan – GA-01

F. Nozzle Schedule Drawings

1. M-12 Flash Mix Tank #1 Nozzle Schedule
2. M-14 pH Adjust Tank #1 Nozzle Schedule
3. M-15 Filter Feed Tank Nozzle Schedule
4. M-16 Effluent Monitoring Tank #1 Nozzle Schedule
5. M-17 Effluent Monitoring Tank #2 Nozzle Schedule

G. Specification 26 05 13, "Electric Motors"

H. Specification 05 52 13 – "Pipe and Tube Railings"

I. Honeywell overlay document

1. Process Industry Practices (PIP) Standard VESV1003
2. Honeywell Specification MSL-2002 HW ***(not applicable for this contract)***

J. NACE SPO178-2007 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service

K. NACE SPO188-2006 - Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

END OF SECTION