MSD
Metropolitan Sewer District

Louisville and Jefferson County Metropolitan Sewer District
700 West Liberty Street
Louisville Kentucky 40203-1911
502-540-6000
www.msdlouky.org

August 3, 2012

[redacted]
[redacted]West Main Street, Suite 704
Louisville, Kentucky 40202

Subject: I-64 & Grinstead Drive CSO Basin Project

Dear [redacted]

Thank you for your interest in the I-64 & Grinstead Drive CSO Basin project. Per your request, I have attached a memorandum prepared by Obrien & Gere outlining the characteristics of each facility in Detroit, Michigan, visited by MSD personnel. Please note that not all of these facilities are similar in nature to the proposed basin.

The Beuchel Basin Project is located at 3930 Produce Road; generally bounded by Poplar Level Road, East Indian Trail, and Jennings Lane. When complete, this project will retain 108 million gallons of sewage in three connected open air basins. This project is different than the I-64 & Grinstead Drive CSO Basin due to its open air concept and earthen design, but it is the most recent basin project in the MSD service area.

The first project to be constructed in Louisville that is similar in design, function, and size to the I-64 & Grinstead Drive CSO Basin will be the Logan Street CSO Basin. This project will be located east of Logan Street between East Breckenridge Street and East Kentucky Street. Construction is currently scheduled to begin in 2014. This basin will retain 16.6 million gallons of combined sewage in a covered, partially above-ground, basin that is intended to reflect the characteristics of the surrounding community.

MSD appreciates your input. If you have any further questions, please feel free to contact Christian Miller by phone at (502) 540-6626.

Sincerely,

Steve Emly
Interim Director of Engineering

SWE/cwm

Attachment: Examples of Basins in Detroit, Michigan

cc: David Schaftlein
Christian Miller

P.S.C.
Attorney at Law
A Professional Service Corporation

One Riverfront Plaza
401 West Main Street, Suite 704
Louisville, Kentucky 40202
Telephone: [redacted]
Fax: [redacted]
[redacted]

June 20, 2012

Steve Emly
Metropolitan Sewer District
700 West Liberty St.
Louisville, Kentucky 40203-1911

Dear Mr. Emly,

Thank you for meeting with me and my client on May 22, 2012. I recall your statement that a very similar CSO Basin now exists in the city of Detroit. Could you please pass along the address of that facility? My client plans to visit same. Further, you mentioned that construction either has or is soon to begin on the Buechel CSO Basin. Could I please have that address in order that we may site visit and view construction in progress?

I look forward to having a working relation with you and your staff as this project progresses. I trust you will keep us informed as we clearly need to plan for potential business interruption. An email response is acceptable if easier for you. [redacted]

My continued appreciation for you cooperation.

Re[redacted]

cc: Ben Rogers, Jr.
William Musselman
Angela Akridge, P.E.
Scott Porter
Christian W. Miller II, EIT

Colonel USAFR, Retired
Admitted to practice in Kentucky, Indiana and Washington D.C.

To: Sharlie Kahn and Steve Emly
From: O'Brien & Gere
Re: Detroit Area CSO Storage and Treatment Site Visits
File: 44109
Date: February 3, 2010

cc: Tim Kraus
Barbara Swafford
Ray Ihlenburg

On January 19 and 20, 2010 members of MSD and O'Brien & Gere visited several CSO storage and treatment facilities in the Detroit, Michigan metropolitan area. The purpose of this trip was to observe technologies and equipment that are being considered for the Louisville MDS CSO storage basins. Discussions with the owners and operators of the facilities will provide valuable insight into potential operation and maintenance issues for the different technologies.

This memorandum summarizes the components of the facilities observed, noting the type, quantity, and sizes of the equipment at each site. Additional information can be incorporated as this memorandum proceeds through review. Attachments to this memorandum contain handouts and photographs taken during the site visits.

CITY OF DEARBORN DEPARTMENT OF PUBLIC WORKS

Name of Facility: CSO Treatment Basin Tunnel Shaft

Guide:
Jim Murray, Deputy Director, Dearborn Department of Public Works. This facility was not visited, but was discussed in the Dearborn Public Works offices.

Description:
This facility utilized a concrete vertical shaft originally constructed for a large tunnel project that was canceled. A second concrete shaft was constructed adjacent to the first shaft with the connection between the two shafts at the bottom. This arrangement forms a hybrid deep shaft treatment facility. The first (original) shaft is 31-feet in diameter and the other is 51-feet in diameter. The water depth is 69-feet and the overall dimension from top slab to the bottom is 85.5-feet.

Security:
Fenced and Access Controlled.

Screening:
None

Debris removal:
Rotomix mixers are used to suspend debris at the bottom of the facility. According to Jim, the mixers need adjustment and it is difficult to determine if operating. City water is used to aid in keeping debris agitated during cleaning/pump down.

Dewatering:
Two dewatering pumps are provided to complete dewatering within 48-hrs of storm event. Only one is required. The other is back-up.

Disposal of Screenings:
Vaughan chopper pumps to DWSD.

Hypochlorite is delivered at 15/16-percent concentrations and cut to 12-percent to reduce degradation during storage.

Cleaning methods:
The design provides for empting the shaft within 48-hrs of storm event ending. A spray system is provided to wash down sides as dewatering proceeds.

Odor Control:
Odor control is being installed because it is required by their permit. Experience at other large basins indicates it will not be used

Emergency Power:
Provided

Miscellaneous Observations:
1. Allow 36-40 months to construct deep shaft.
2. Include 15% contingency to account for unknowns.
3. Sinking Caissons difficult and subject to geological unknowns. The wall segments are 8-foot thick x 10-foot lifts. Contractors should be prequalified and have experience with this type of underground construction.
4. The specifications should require bentonite slurry and include as a bid item. Shaft 7 and 8 used bentonite slurry and went down within 2-inches of the tolerance level.
5. Multiple sampling locations for chlorine sampling are recommended.
6. Dearborn intends to assign two men per site and one CSO supervisor during a rain event to collect and prepare samples and monitor operation.
7. Pump placement in the middle of the shaft could be problematic when pump removal required. As designed, a large crane will be required due to the depth of the pumps and the horizontal reach to pick the pumps up. Consideration of boom length, amount of lift distance versus depth to pump, amount of cable available, and a method to take another "purchase" on the pump lift chain as it will not reeve through the crane boom.
8. Effluent screens not installed pending completion of all piping.
9. Dewatering can be a major cost:
10. Dean likes the deep shaft concept and thinks they will reduce cleanup labor.
11. Dean disagreed with Jim's assessment of the Rotomix equipment. According to Dean, they had problems because the mixers were trying to handle solids accumulated in a sewer that was plugged for construction and then released to the facility. The main issue was large tree stumps.
12. Plans for this facility have been delivered to the OBG Louisville Office

CITY OF DETROIT WATER AND SEWER DEPARTMENT (DWSD)

Name of Facility: Conner Creek CSO Control Facility

Guides:
Mirza Rabbaig, Head Engineer of CSO Group; Terrance Moore, Head Sewage Plant Operator (CSO); and Khamis Al-Omari, Senior Associate Hazen and Sawyer.

Description:
The Conner Creek facility is a very large covered concrete basin with four (4) compartments measuring 600-ft long x 240-ft. wide A Summary of Design Criteria is provided in the attachments. There are three (3) major compartments: Screening Distribution Channel, Retention Basin Distribution Channel, and the Retention Basins.

Name of Facility: Mt. Elliot (LIEB) CSO Control Facility

Guide:
Mirza Rabbaig and Khamis Al-Omari

Description:
Mt. Elliot is a multi-level concrete structure that went in service 2001. The facility provides flow through treatment including screening (6mm) and disinfection. No storage Is provided at this facility. Dry weather flow goes through facility with no treatment. CSO is treated by four (4) Romag vertical flow and eight (8) COPA horizontal flow screens, then disinfected with sodium hypochlorite mixed by sixteen (16) Water Champ counter-current mixers prior to immediate release through the effluent channel to the Mt. Elliot sewer.

Screening:
Four (4) Romag vertical flow and eight (8) Copa horizontal flow screens. This facility was a pilot study to compare the two types of screens. According to staff, both performed the same.

Debris removal:
Cleaning is manual using fire hoses to WWTP.

Storage basin:
No storage provided.

Disposal of Screenings:
Put back into sewer.

Disinfection:
Sodium Hypochlorite mixing by sixteen (16) Water Champ counter-current mixers

Cleaning methods:
Manual with fire hoses

Odor Control:
None

Emergency Generator:
YES

Miscellaneous Observations:
1. Dry weather flow averages 4 cfs. Wet weather flow design is a maximum of 2,000 cfs
2. No pumps are at the facility other than sample pumps.
3. Hypochlorite is used for disinfection. The first flush is pre-chlorinated to account for the additional solids.
4. Only the effluent is sampled routinely for fecal and TRC. The effluent is sampled quarterly for BOD, phosphorous and ammonia.
5. The facility has horizontal flow through vertical Copa screens that seem more effective and vertical flow through horizontal Romag screens that have experienced carriage assembly breaks and breaks of the fiberglass rake teeth.

Cleaning Methods:
A network of flushing pipes and deluge nozzles is provided along the ceiling of the basin to flush accumulated solids and debris after the basin has been drained. This system was utilized due to the irregular shape of the basin. There are large troughs in the basin floor that direct the flushing water and debris towards the dewatering pump station. A stairway provides access for personnel and ramps are provided for vehicles to enter the basin to complete the cleaning process. The troughs were designed for a rubber wheeled "bomdradier" machines that is routinely used to sweep the debris toward the pump station. Dump trucks haul the large debris and maintenance personnel use fire hoses to clean the basin after every event.

Odor Control:
Two odor control measures are employed: 1. A sodium hypochlorite mist system is used to neutralize airborne odors before discharge and 2. The intermediate weir wall is flushed and cleaned after each event. It was reported that the odor control system has not been used since 1996.

Facility Control:
Three (3) computers at the facility used to monitor and control all components of the RTF. The control room also houses a database server with automated reporting capabilities. The RTF monitoring and control system is also tied to three (3) other existing CSO basins that are integrated via radio network.

Emergency Power:
Two 1,000 Kilowatt natural gas generators are sized to operate the critical facilities. They will power all of the screens, emergency bypass gates, disinfection chemical feed system, and the control system.

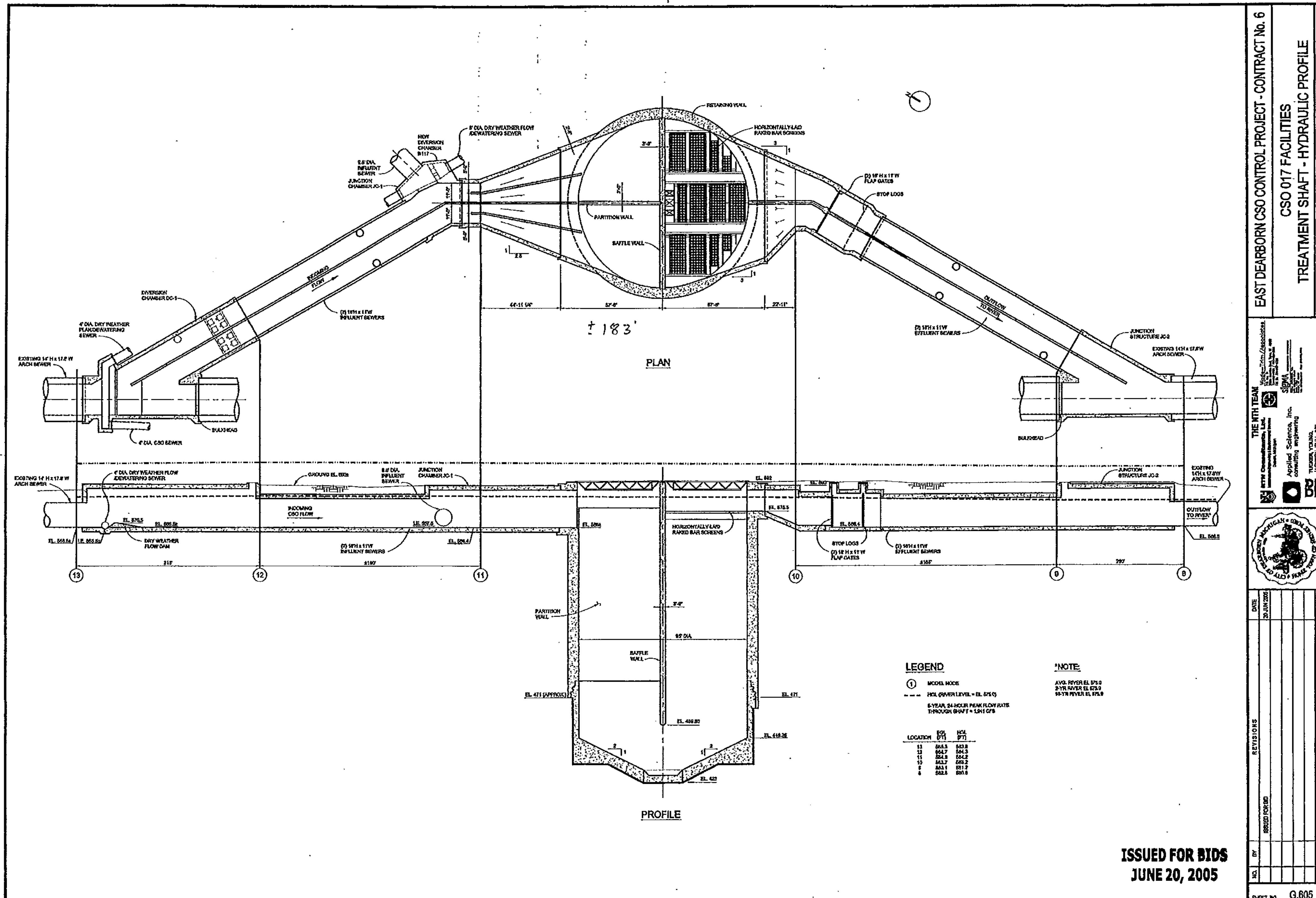
Miscellaneous:
1. Limitorque operators are preferred over Rotork
2. The mixers difficult to access and maintain.
3. The department is staffed with 11 mechanics/event operators, two supervisors, one master electrician and four SCADA technicians. They are responsible for seven pumps stations and four RTFs.
4. Three event operators are used at GWK during events to handle operation and sample preparation within 4-hrs delivery to lab.
5. The Water Champs weigh 400 pounds each and are difficult to access. Some of the pumps have experienced seal failures.
6. Confined space training and other training facility was constructed over basin.
7. They do not use pinch valves as flow control and isolation on sodium hypochlorite lines. Ball valves are used for isolation and pinch valves are used for flow control maintained in normally open position.

Name of Facility: Park Retention Treatment Basin

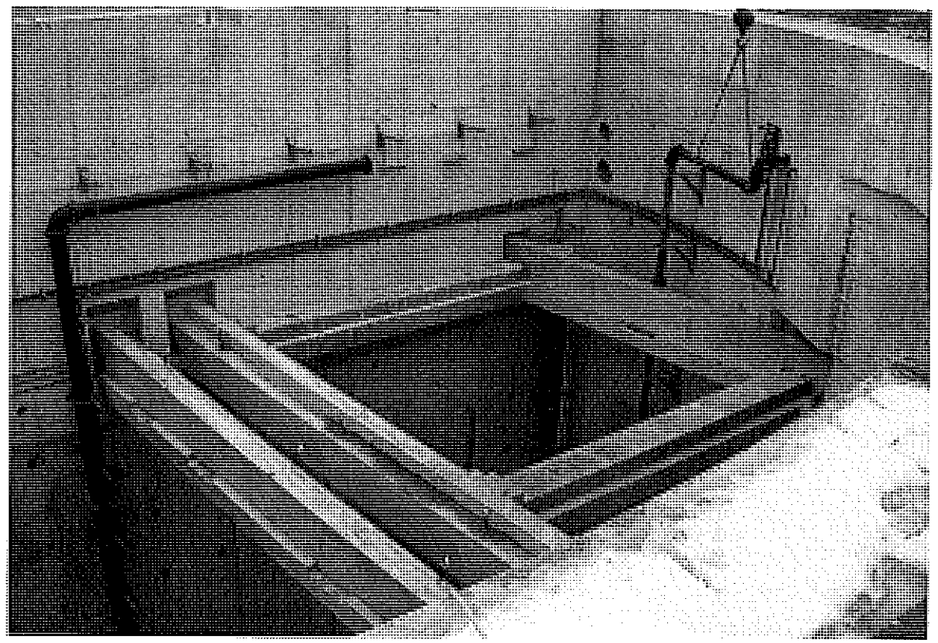
Guides:
John Stange

Description:
Underground concrete facility with 4-million gallons of storage capacity. The basin has a total foot print of 206-ft x 140-ft providing 30-minutes of detention for a 1-year, 1-hour storm or 1.0-inch of rain. The storage is provided by two (2) cells, each holding about 2-million gallons. A baffle between cell #1 and cell #2 hold debris in the first cell, away from the effluent screens.
Screening:

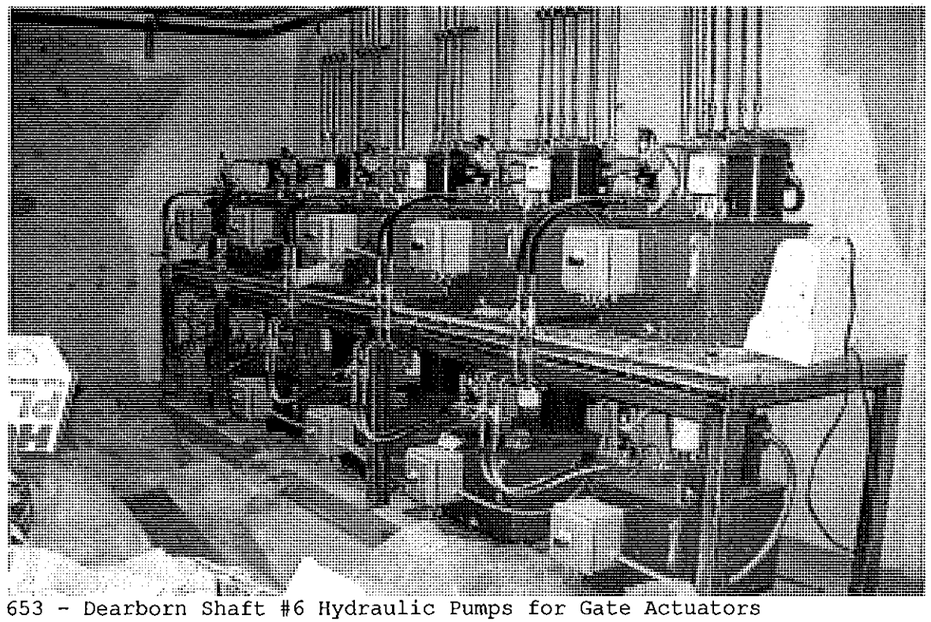
DEARBORN
CSO TREATMENT SHAFT #6


EAST DEARBORN CSO CONTROL PROJECT - CONTRACT No. 6
CSO 017 FACILITIES
TREATMENT SHAFT - HYDRAULIC PROFILE
THE NTH TEAM
PLAN
PROFILE
±183'
RETAINING WALL
HORIZONTALLY-LAID RAKED BAR SCREENS
PARTITION WALL
BAFFLE WALL
DIVERSION CHAMBER DC-1
JUNCTION CHAMBER JC-1
JUNCTION STRUCTURE JC-2
STOP LOGS
BULKHEAD
INCOMING FLOW
OUTFLOW TO RIVER
LEGEND
MODEL NODE
HGL (RIVER LEVEL = EL 575.0)
5-YEAR, 24-HOUR PEAK FLOW RATE THROUGH SHAFT = 1,941 CFS
*NOTE:
AVG. RIVER EL 575.0
2-YR RIVER EL 575.0
10-YR RIVER EL 575.9
LOCATION
EGL (FT)
HGL (FT)
ISSUED FOR BIDS
JUNE 20, 2005
SHEET NO. G.605

649 - Dearborn Shaft #6



650 - Dearborn Shaft #6 Screen Support



653 - Dearborn Shaft #6 Hydraulic Pumps for Gate Actuators

Conner Creek Pilot CSO Control Facility
Summary of Design Criteria

I. Hydraulic Characteristics

A. Peak Flow Rates

10 year, 1 hour storm (1.8 inches)	13,262 cfs
10 year, 24 hour storm (3.6 inches)	13,963 cfs

B. Detroit River Elevation

25 year flood, daily average	97.5 feet

C. Internal Basin Hydraulics (10 year, 24 hour storm)

Basin Influent Flow Rate	13,963 cfs
Detroit River at Conner Creek	97.5 feet
Conner Creek at Retention Basin	97.7 feet
Screening Distribution Channel	99.7 feet
Freud P.S. Discharge Channel	100.6 feet
Conner Creek P.S. Discharge Channel	102.5 feet
Conner Creek Sewer Forebay	103.6 feet

II. Equipment

A. Mechanically Cleaned Bar Screens

Flow Rate	13,963 cfs, maximum
Number of Units	10
Width	17 feet
Bar Spacing	1.5 inches, clear opening
Water Depth	23.7 feet
Motor	5 HP

B. Screenings Conveyors

Number of Units	2
Quantity of Screenings	888 cf/hour, maximum
Belt Width	36 inches
Motor	10 HP

D. Pumps

1. Retention Basin Dewatering Pumps

Type	Submersible, Chopper, Centrifugal
Number of Units	4
Capacity	7,600 GPM @ 12.3 feet TDH (700 rpm) 4,475 GPM @ 45.5 feet TDH (880 rpm)
Drive	Constant Speed; 700 rpm

2. Retention Basin Flushed Solids Pumps

Type	Submersible, Chopper, Centrifugal
Number of Units	2
Capacity	1,610 GPM @ 48.8 Feet TDH
Drive	Constant speed: 1,750 rpm

3. Screening/Retention Basin Distribution Channels Flushed Solids Pumps

Type	Submersible, Chopper, Centrifugal
Number of Units	2
Capacity (Screening)	680 GPM @ 41.8 feet TDH
Capacity (Basin)	740 GPM @ 37.5 feet TDH
Drive	Constant speed: 1,750 rpm

4. Influent Sampling Pumps

Type	Submersible, Chopper, Centrifugal
Number of Units	2
Capacity (Low Flow)	105 GPM @ 29.6 feet TDH
Capacity (High Flow)	263 GPM @ 18.6 feet TDH
Drive	Constant speed: 1,750 rpm

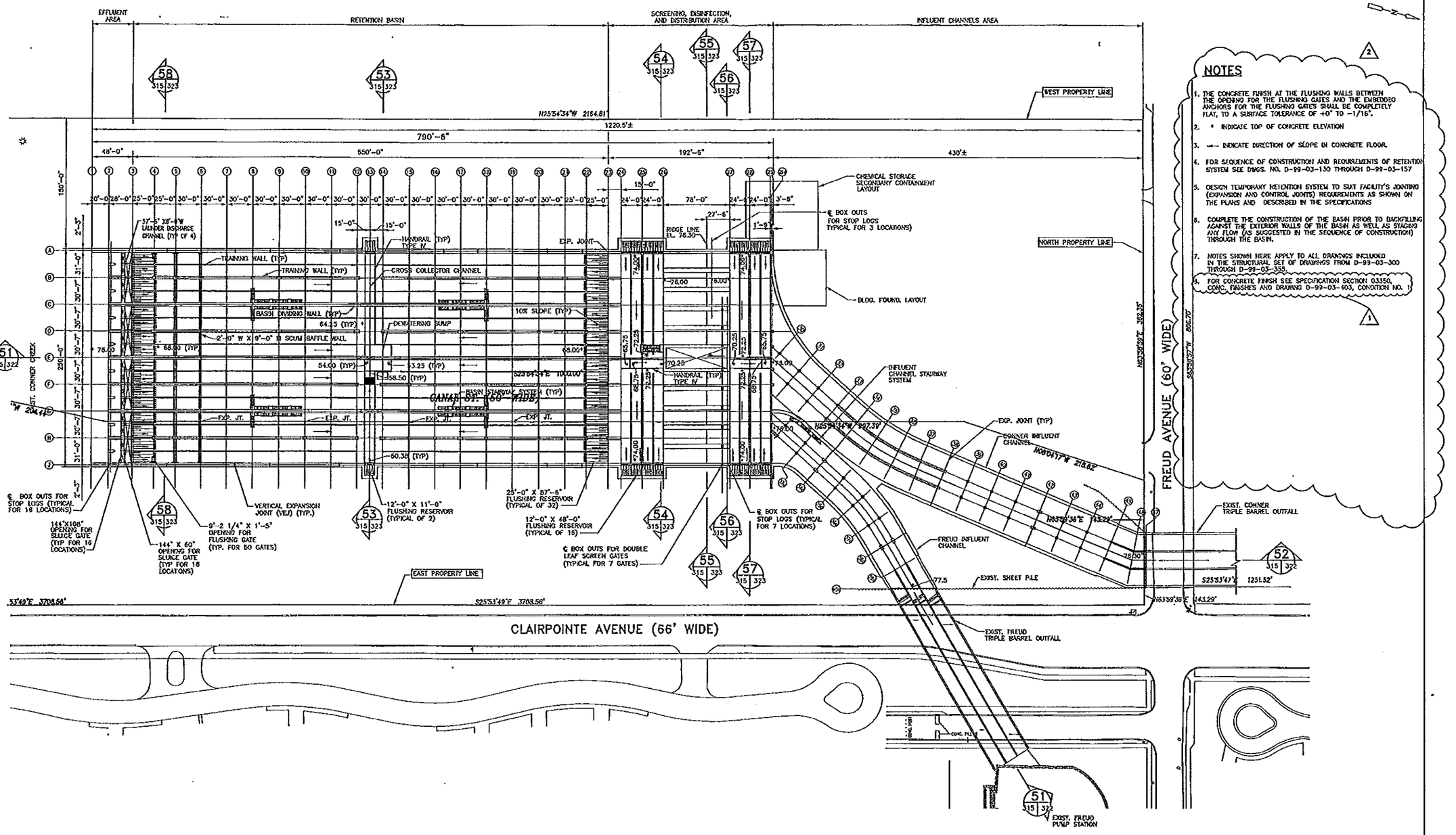
5. Effluent Sampling Pumps

Type	Submersible, Chopper, Centrifugal
Number of Units	4
Capacity	137 GPM @ 21.7 feet TDH
Drive	Constant speed: 1,750 rpm

E. Disinfection System

1. Sodium Hypochlorite Storage Tanks

Type	Rubber-Lined Steel
Number	4
Capacity	95,000 gallons, each



NOTES

1. THE CONCRETE FINISH AT THE FLUSHING WALLS BETWEEN THE OPENING FOR THE FLUSHING GATES AND THE EMBEDDED ANCHORS FOR THE FLUSHING GATES SHALL BE COMPLETELY FLAT, TO A SURFACE TOLERANCE OF +0" TO -1/16".
2. * INDICATE TOP OF CONCRETE ELEVATION
3. → INDICATE DIRECTION OF SLOPE IN CONCRETE FLOOR.
4. FOR SEQUENCE OF CONSTRUCTION AND REQUIREMENTS OF RETENTION SYSTEM SEE DWGS. NO. D-99-03-130 THROUGH D-99-03-157
5. DESIGN TEMPORARY RETENTION SYSTEM TO SUIT FACILITY'S JOINTING (EXPANSION AND CONTROL JOINTS) REQUIREMENTS AS SHOWN ON THE PLANS AND DESCRIBED IN THE SPECIFICATIONS
6. COMPLETE THE CONSTRUCTION OF THE BASIN PRIOR TO BACKFILLING AGAINST THE EXTERIOR WALLS OF THE BASIN AS WELL AS STAGING ANY FLOW (AS SUGGESTED IN THE SEQUENCE OF CONSTRUCTION) THROUGH THE BASIN.
7. NOTES SHOWN HERE APPLY TO ALL DRAWINGS INCLUDED IN THE STRUCTURAL SET OF DRAWINGS FROM D-99-03-300 THROUGH D-99-03-335.
8. FOR CONCRETE FINISH SEE SPECIFICATION SECTION 03350, CONC. FINISHES AND DRAWING D-99-03-403, CONDITION NO. 1

F					DESIGN	SM
E					DRAFTING	SM
D					CHECKED	AO
C					APPROVED	AO
B	PROJECT RECORD DRAWINGS	ES	PY	4/16/04		
A	BULLETIN #4	SM	SM			
	DESCRIPTION	CHECKED	APP'D	DATE		
	REVISIONS					

PROJECT RECORD DRAWINGS

PREPARED BY WALSH CONSTRUCTION

Walsh Construction

DETROIT WATER AND SEWERAGE DEPARTMENT
WASTEWATER COLLECTION SYSTEM IMPROVEMENTS
CONNER CREEK PILOT CSO CONTROL FACILITY
GENERAL PLAN OF BASIN

SCALE: 1" = 50'

DATE: JULY, 2000

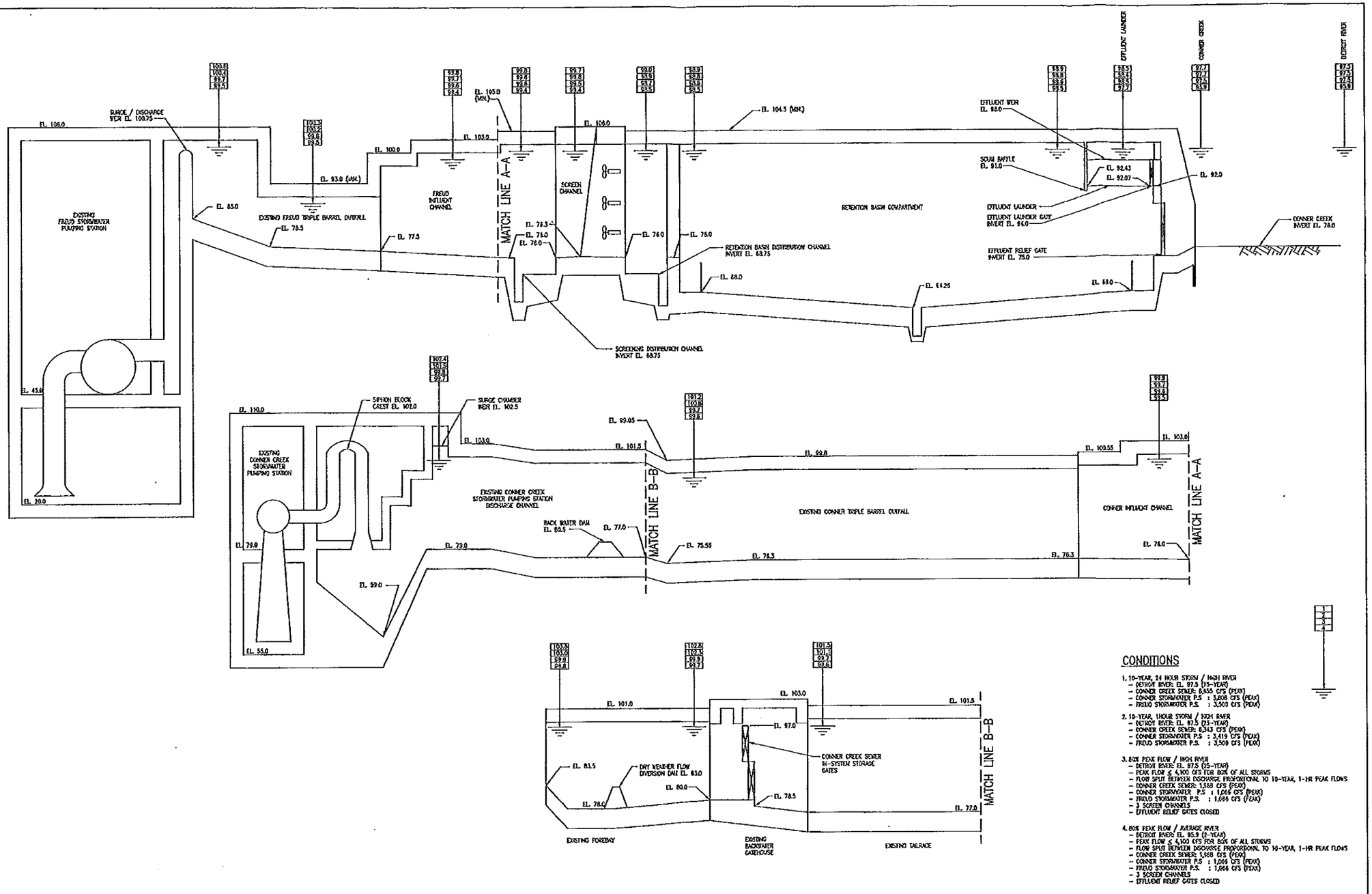
HAZEN AND SAWYER
Environmental Engineers & Scientists

SIGMA · MALCOLM PIRNIE · HEC · Hamilton Anderson Associates

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SECTION MAPS						TOWN			RANGE		
8	2	C	6	2	D	T	1	S	T	2	S	R	1	3	E

U.D.P.H./D.N.R. PERMIT NO.	SRF 5175-03
DRWG NO.	001799
CONTRACT NO.	PC-739
DWG NO.	D-99-03-315



CONDITIONS

1. 10-YEAR, 24 HOUR STORM / HIGH RIVER
   - DETROIT RIVER: EL. 97.5 (10-YEAR)
   - CONNER CREEK SEWER: 8,655 CFS (PEAK)
   - CONNER STORMWATER P.S. : 3,808 CFS (PEAK)
   - FRELIGH STORMWATER P.S. : 3,500 CFS (PEAK)
2. 10-YEAR, 1 HOUR STORM / HIGH RIVER
   - DETROIT RIVER: EL. 97.5 (10-YEAR)
   - CONNER CREEK SEWER: 8,343 CFS (PEAK)
   - CONNER STORMWATER P.S : 3,419 CFS (PEAK)
   - FRELIGH STORMWATER P.S. : 3,509 CFS (PEAK)
3. 80% PEAK FLOW / HIGH RIVER
   - DETROIT RIVER: EL. 97.5 (10-YEAR)
   - PEAK FLOW ≤ 4,100 CFS FOR 80% OF ALL STORMS
   - FLOW SPLIT BETWEEN DISCHARGE PROPORTIONAL TO 10-YEAR, 1-HR PEAK FLOWS
   - CONNER CREEK SEWER: 1,588 CFS (PEAK)
   - CONNER STORMWATER P.S : 1,066 CFS (PEAK)
   - FRELIGH STORMWATER P.S. : 1,066 CFS (PEAK)
   - 3 SCREEN CHANNELS
   - EFFLUENT RELIEF GATES CLOSED
4. 80% PEAK FLOW / AVERAGE RIVER
   - DETROIT RIVER: EL. 85.3 (2-YEAR)
   - PEAK FLOW ≤ 4,100 CFS FOR 80% OF ALL STORMS
   - FLOW SPLIT BETWEEN DISCHARGE PROPORTIONAL TO 10-YEAR, 1-HR PEAK FLOWS
   - CONNER CREEK SEWER: 1,588 CFS (PEAK)
   - CONNER STORMWATER P.S : 1,066 CFS (PEAK)
   - FRELIGH STORMWATER P.S. : 1,066 CFS (PEAK)
   - 3 SCREEN CHANNELS
   - EFFLUENT RELIEF GATES CLOSED

	DESCRIPTION / REVISIONS	CHECKED	APPVD	DATE
F				
E				
D				
C				
B				
A				

DESIGN CDC
DRAFTING GV
CHECKED CSK
APPROVED MM

PKS-005.DWG 8/26/99 GV

DETROIT WATER AND SEWERAGE DEPARTMENT
WASTEWATER COLLECTION SYSTEM IMPROVEMENTS
CONNER CREEK PILOT CSO CONTROL FACILITY

HYDRAULIC PROFILE

SCALE: NONE DATE: JULY, 2000

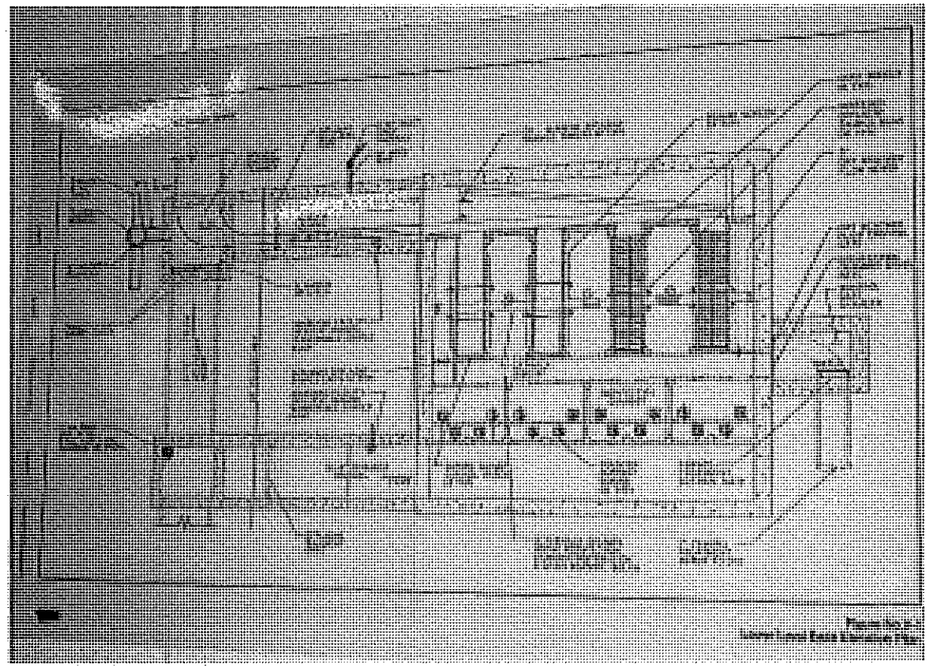
HAZEN AND SAWYER
Environmental Engineers & Scientists
SIGMA NTH MALCOLM PIRNIE MA Mueller Associates MTR HEC Hamilton Anderson Associates

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

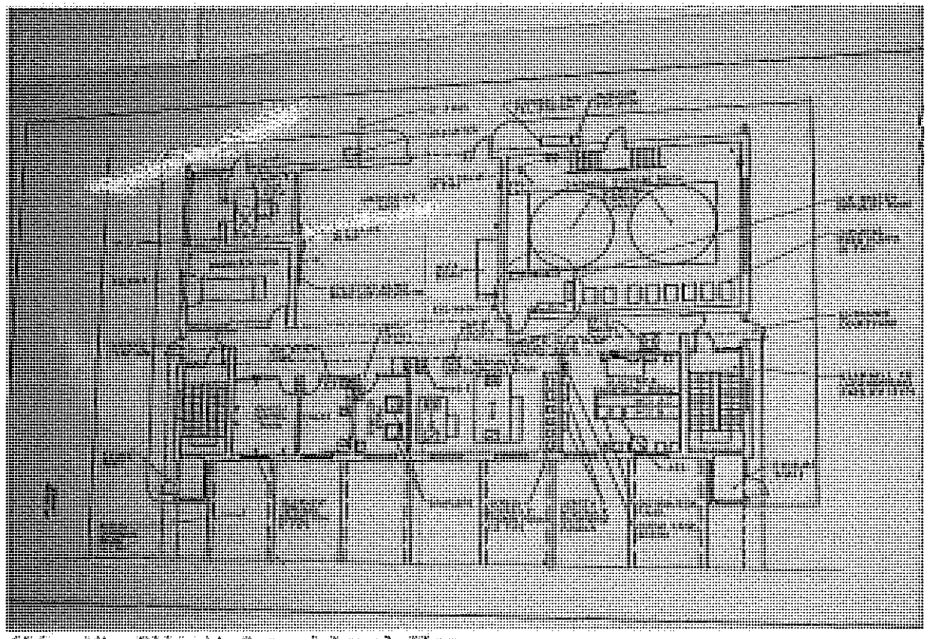
SECTION MAPS	TOWN	RANGE
6 2 C 6 2 D	T 1 S T 2 S	R 1 3 E

M.D.P.H./D.N.R. PERMIT NO. SRF 5175-03
DRWG NO. 001799
CONTRACT NO. PC-739
DWG NO. D-99-03-403

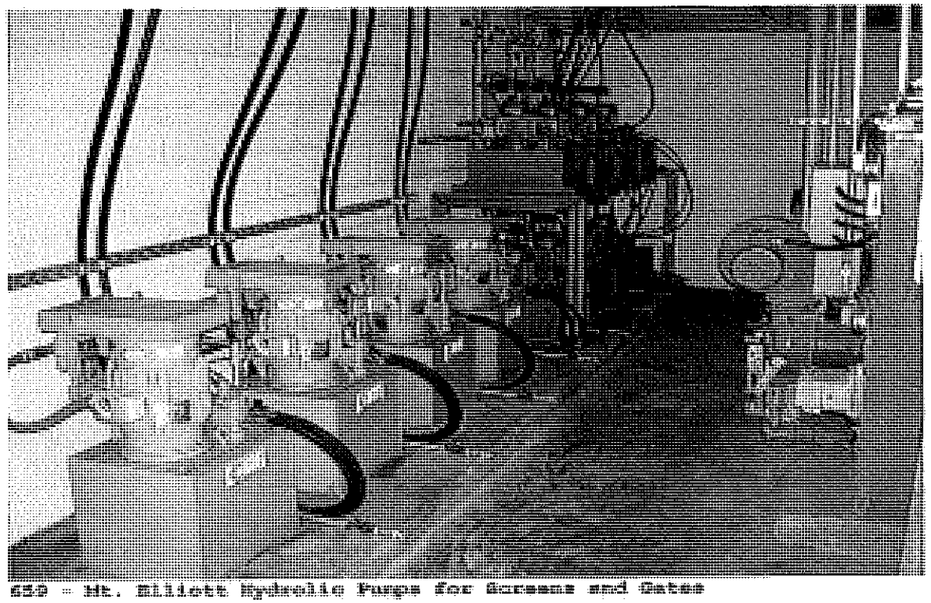
DETROIT
MT. ELLIOT
CSO CONTROL FACILITY



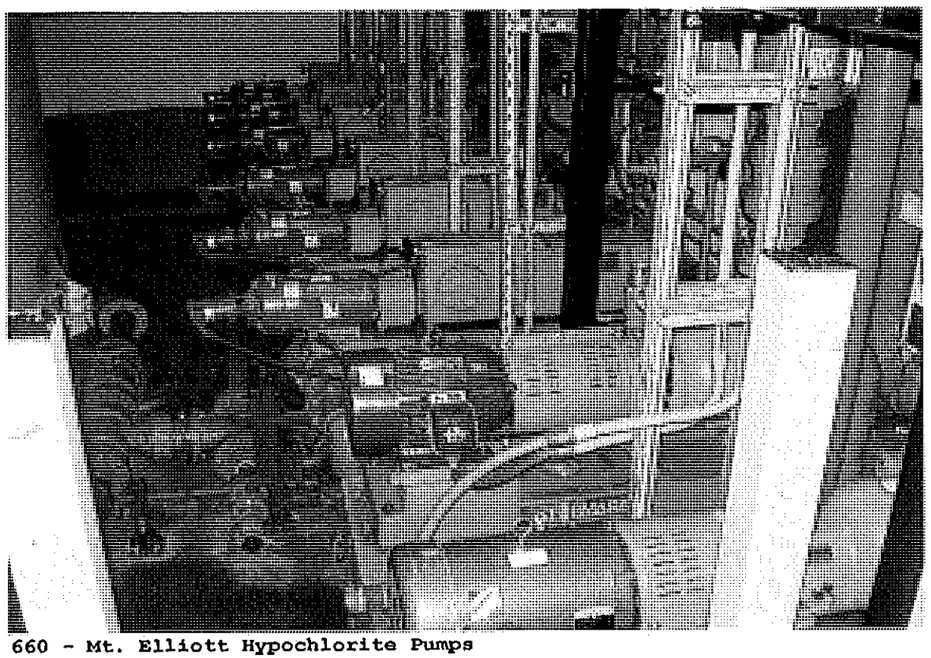
655 - Mt. Elliott Lower Level Plan



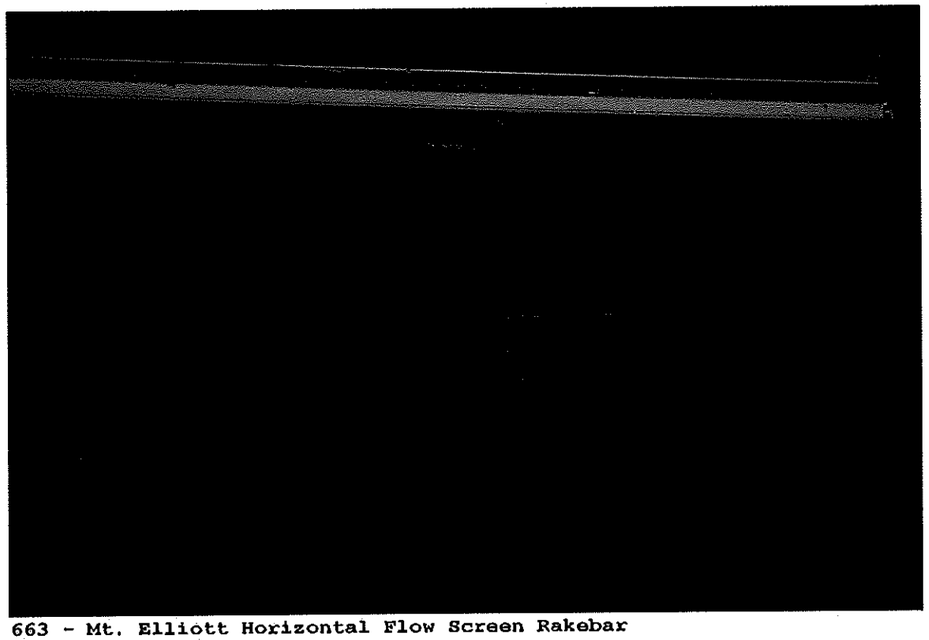
656 - Mt. Elliott Ground Level Plan



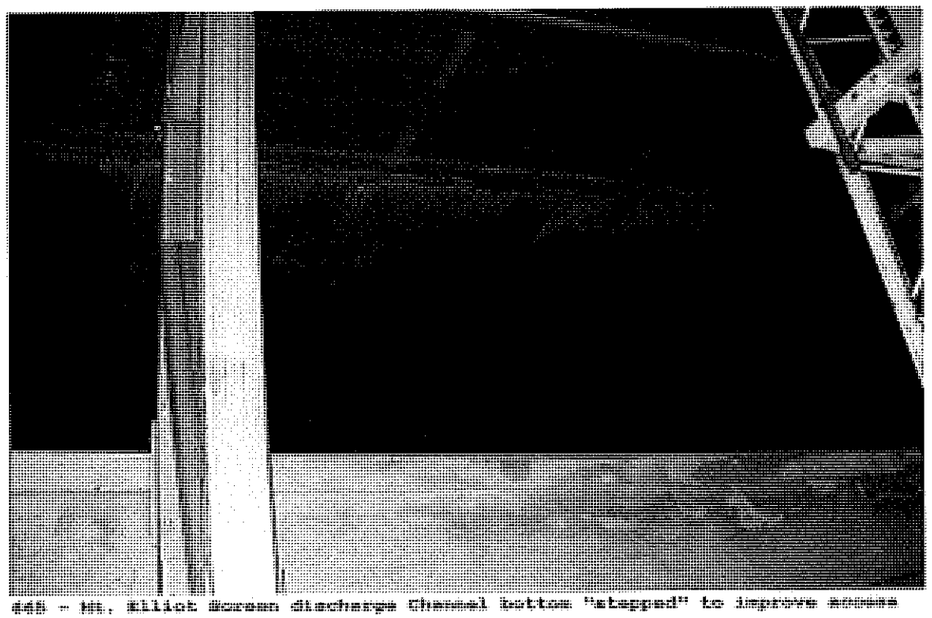
659 - Mt. Elliott Hydrolic Pumps for Screens and Gates



660 - Mt. Elliott Hypochlorite Pumps



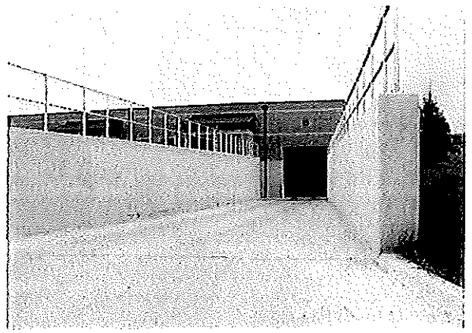
663 - Mt. Elliott Horizontal Flow Screen Rakebar



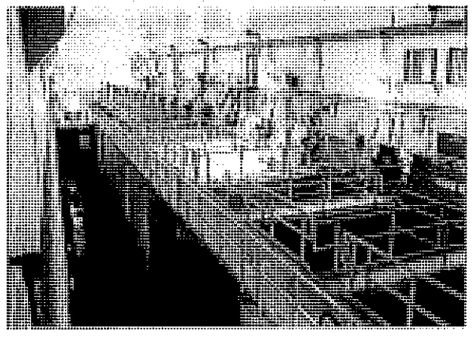
668 - Mt. Elliot Screen discharge channel bottom "stepped" to improve access

OAKLAND COUNTY
GWK
RETENTION TREATMENT FACILITY

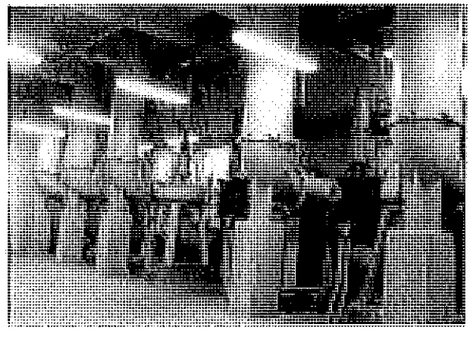
RETENTION TREATMENT FACILITY (RTF) The expansion of the former Twelve Towns Retention Treatment Basin was completed in 2006 to meet MDEQ permit requirements for the treatment of combined sewer overflows (CSOs). This was necessary to protect the Red Run Drain and the Clinton River. The original 1972 facility provided 62 million gallons (mg) of basin storage, and an additional 32 mg of in-system (upstream pipe) storage. The new RTF adds more than 30 mg of basin storage, for a total storage volume of 124 mg. In addition, any overflow from the facility receives both fine screening and disinfection prior to release. When capacity becomes available, retained flows are returned to the collection system for processing at the Detroit Wastewater Treatment Plant.



UNDERGROUND STORAGE BASIN The underground concrete basin provides more than 30 million gallons of storage capacity to reduce the volume and frequency of overflows to the Red Run Drain. A new 2,000-foot-long intermediate weir (retaining wall) located downstream of the screen room contains smaller storms, and provides hydraulic control of larger storms. A network of flushing pipes and nozzles is provided along the ceiling of the basin to flush accumulated solids and debris after the basin has been drained. Troughs are provided in the floor to direct flushing water and debris toward the dewatering pump station. An access ramp is provided to allow vehicles and maintenance staff to enter the basin to complete the cleaning process. Staff members use fire hoses to thoroughly clean the basin after an event and dump trucks haul out large debris.



SCREENING The number and size of screens at the RTF make it one of the largest screening facilities in North America. Sixteen fine screens (one-half-inch openings) are used under normal conditions; four emergency screens (two-inch openings) are used if upstream flow levels reach critical depths. All flow that enters the Red Run Drain receives screening. Debris that is collected on the screens is discharged to a sluicing trough that flushes to the Detroit collection system for treatment. Two auxiliary screens protect the pumps by removing large objects from the sluicing trough. These large objects are dried on-site and disposed of in a landfill. A 10-ton overhead crane is provided to lift the screens out for maintenance.

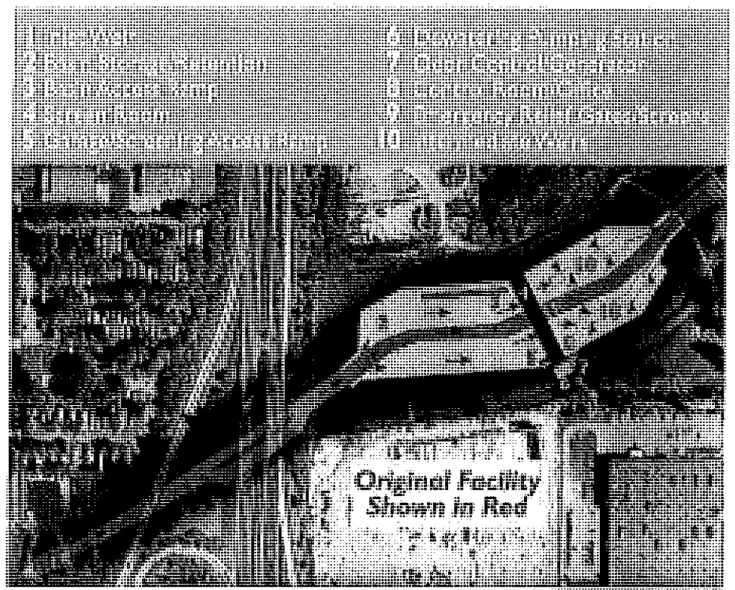


PUMPING STATION The pumping station contains six vertical dry-pit solids handling pumps with a capacity of 20 cubic feet per second (cfs) each, providing a firm capacity of 100 cfs, with the largest pump out of service. The pumps are located 47 feet below the motors, and are connected through extended drive shafts. The motors are equipped to allow variable flow rates to match available capacity in the Twelve Mile Interceptor. The pumps drain the stored flow from the RTF when capacity is available. The pumps are controlled along with those at the Dequindre Road station to maintain the contracted outlet capacity with Detroit.

Improving and Protecting the

FACILITY LAYOUT

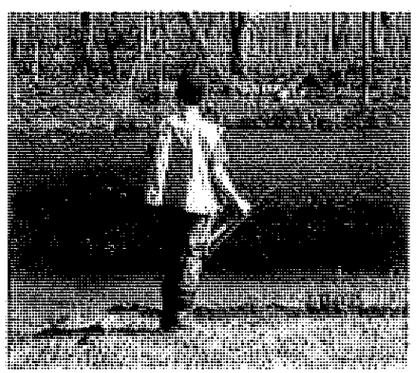
Extensive planning and design efforts were undertaken to attach the new, fully automated RTF to the original facility, shown in red. The new RTF consists of two chambers located on both sides of the original RTF, between I-75 and John R, north of Twelve Mile Road.

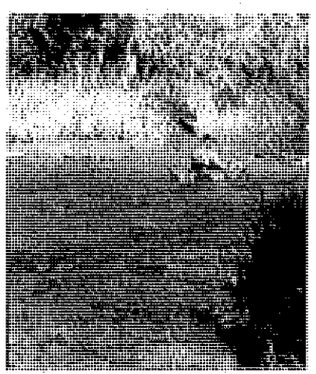


THE CLINTON RIVER

The GWK Drainage District has historically discharged an average of 25 combined sewer overflows (CSOs) per year to the Red Run Drain, a tributary of the Clinton River. Efforts to protect the receiving waters began more than half a century ago with the construction of relief drains and the original RTF. The new RTF will reduce the volume and frequency of combined sewer overflows to an average of four per year. All discharge will now be screened, settled, and disinfected to reduce pollutants prior to release.

To learn more about what you can do to improve the water quality of the Clinton River, visit www.crwc.org.





HIGHLIGHTS

The new RTF will reduce overflow volume by an average of 875 million gallons per year. It will also prevent release of untreated combined sewage by rerouting two combined sewers into the RTF which would have otherwise entered the basin downstream of the new screens and disinfection facilities.

Existing storm sewers discharging into the basin were removed and rerouted, providing more volume to control combined sewer flows. System storage was increased to 124 million gallons.

Redundant fiber optics were used for flushing valve communication and control over the entire two mile length of the project.

Operators can control any part of the facility from any one of the eight Wonderware Intouch human machine interface workstations.

The new basin structures were connected to the existing facility's tunnel with a hinge to accommodate initial and long-term settlement.

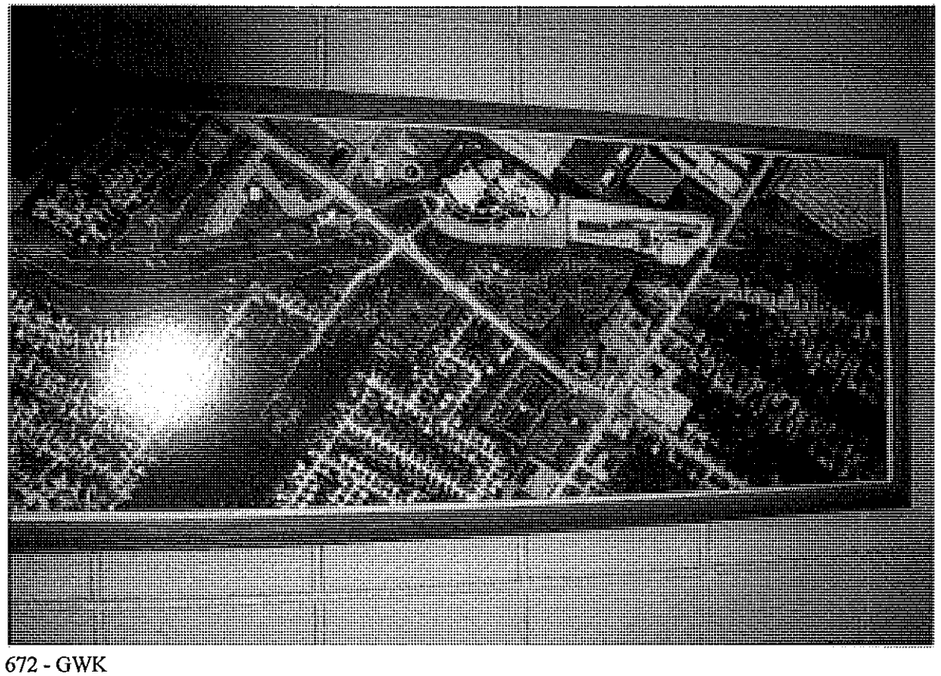
Excavation had to proceed equally on both sides of the existing reinforced concrete double box sewer to avoid damage from differential earth pressure. Special attention was also given to monitoring worker safety concerns during excavation. No accidents occurred during construction.

Construction required careful staging and coordination to continuously maintain flows through the facility and to lessen the impact on traffic in the I-75 corridor. Consideration was also needed to protect the existing foundation of the I-75 bridge and adjacent overhead power line towers.

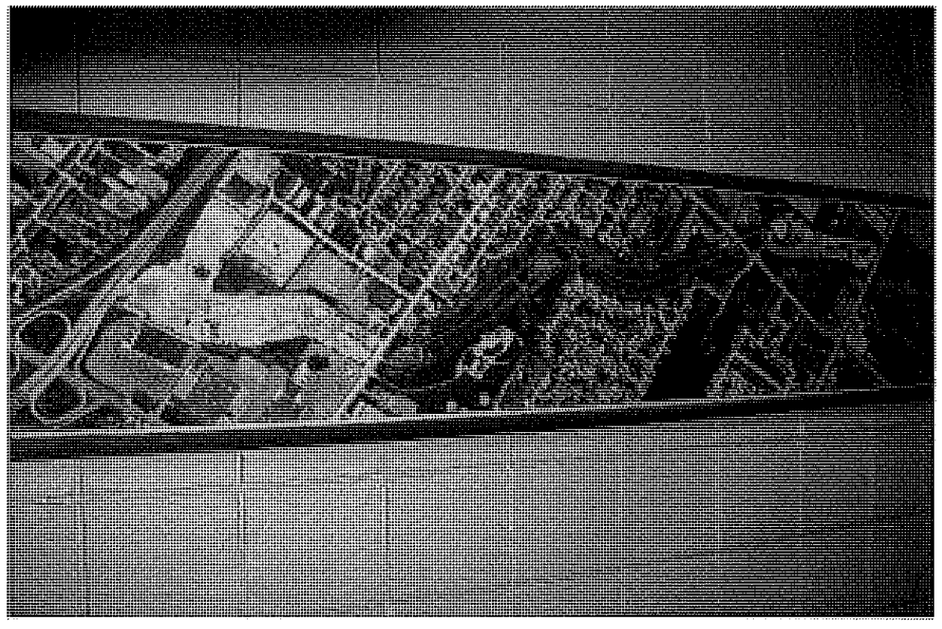
The new RTF required 106,000 cubic yards of concrete, and 14,000 tons of reinforcing steel.

An abrasion and corrosion resistant polyurea lining was used to protect the concrete screening troughs. All screens were constructed of stainless steel for longevity and corrosion resistance.

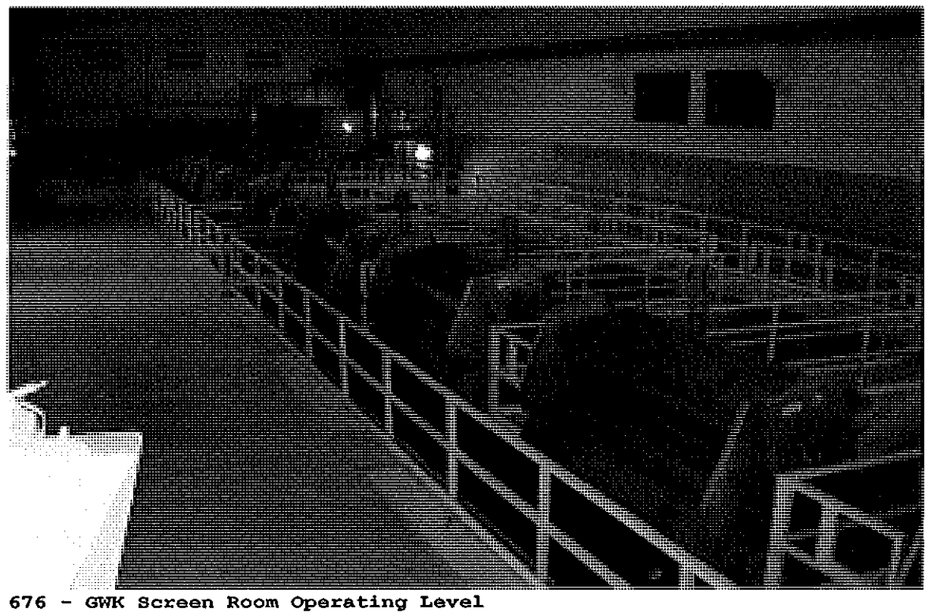
The University of Michigan created a physical model to confirm the hydraulic losses of the new and modified weirs. A high-flow relief gate system was included to assist in reducing hydraulic losses during extreme flow conditions.



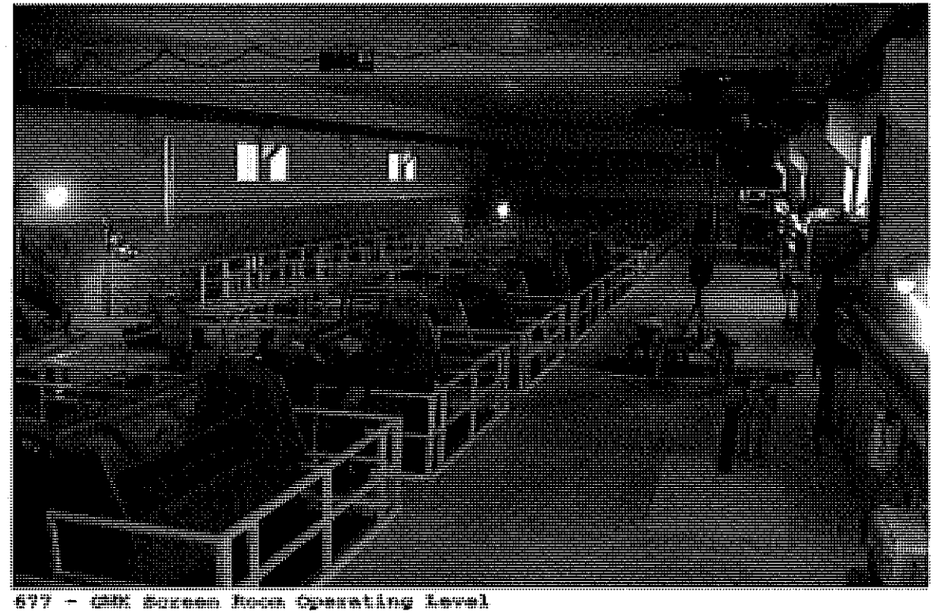
672 - GWK



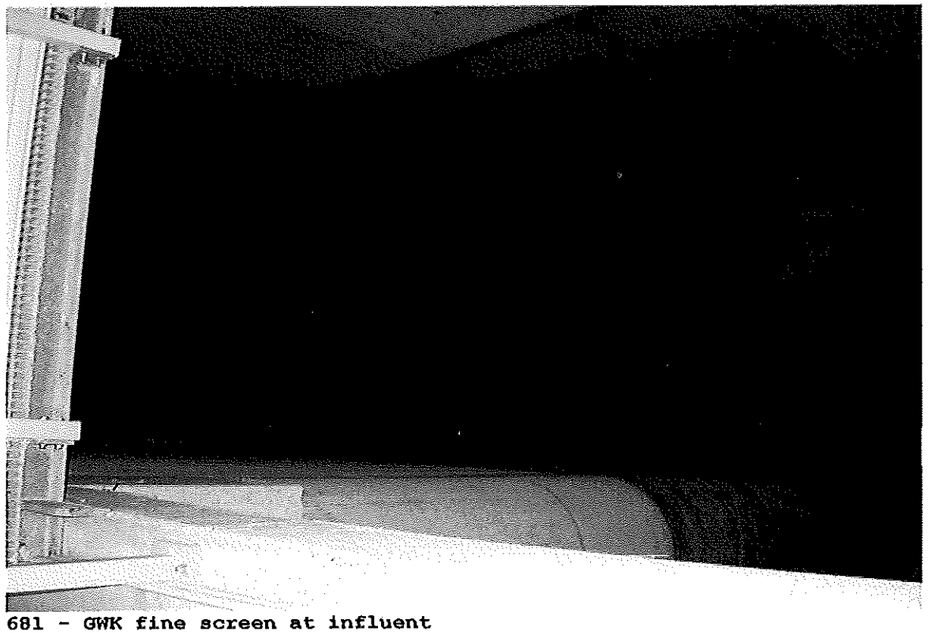
673 - GWK



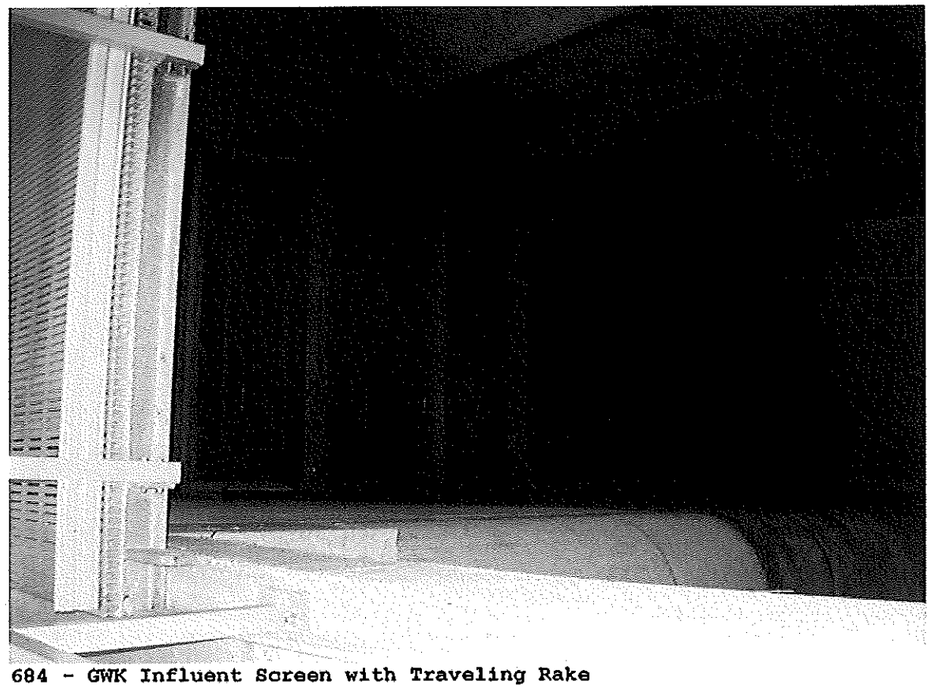
676 - GWK Screen Room Operating Level



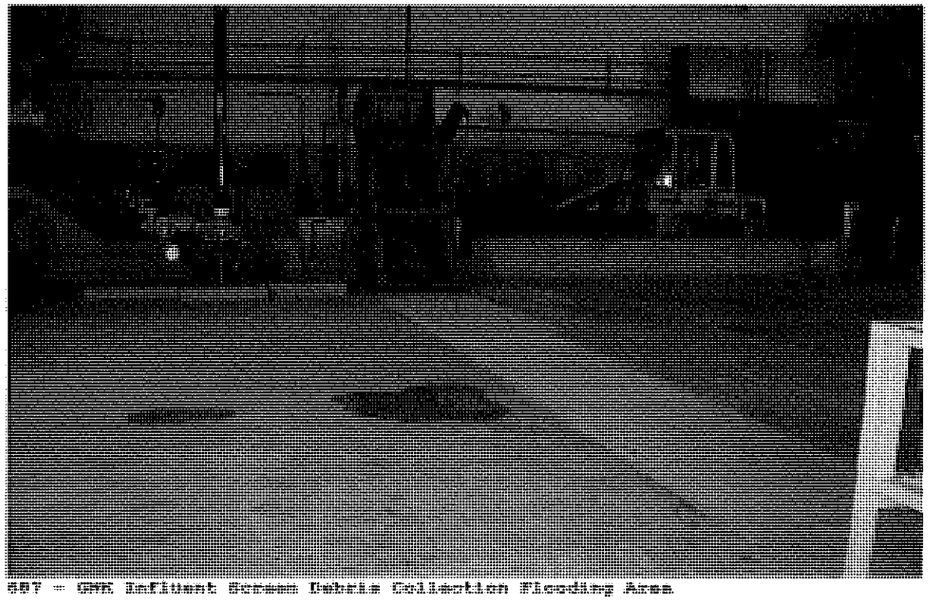
677 - GWK Screen Room Operating Level



681 - GWK fine screen at influent

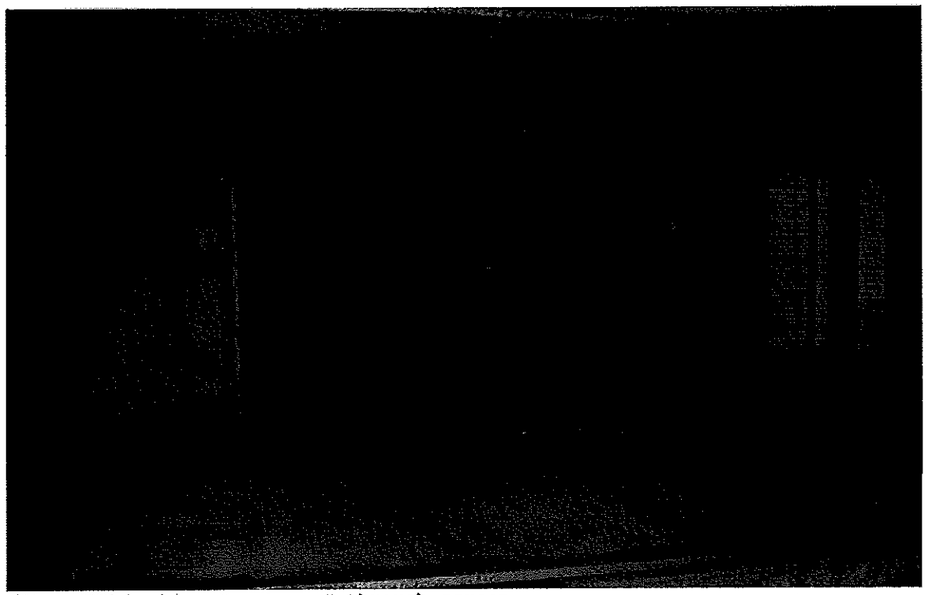


684 - GWK Influent Screen with Traveling Rake

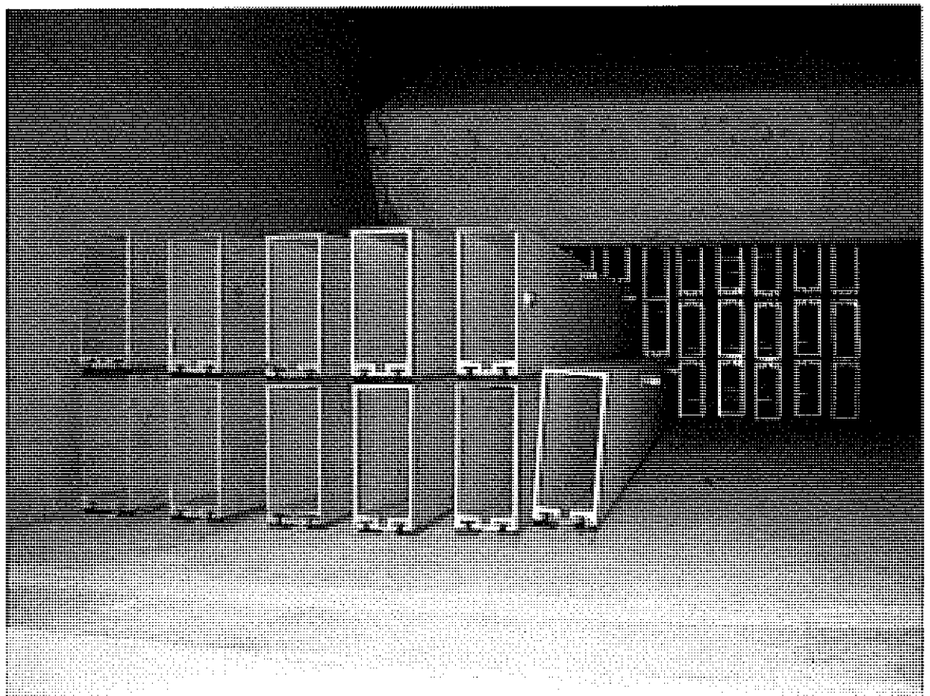


687 - GWK Influent Screen Debris Collection Flooding Area

688 - GWK effluent Weir Baffle

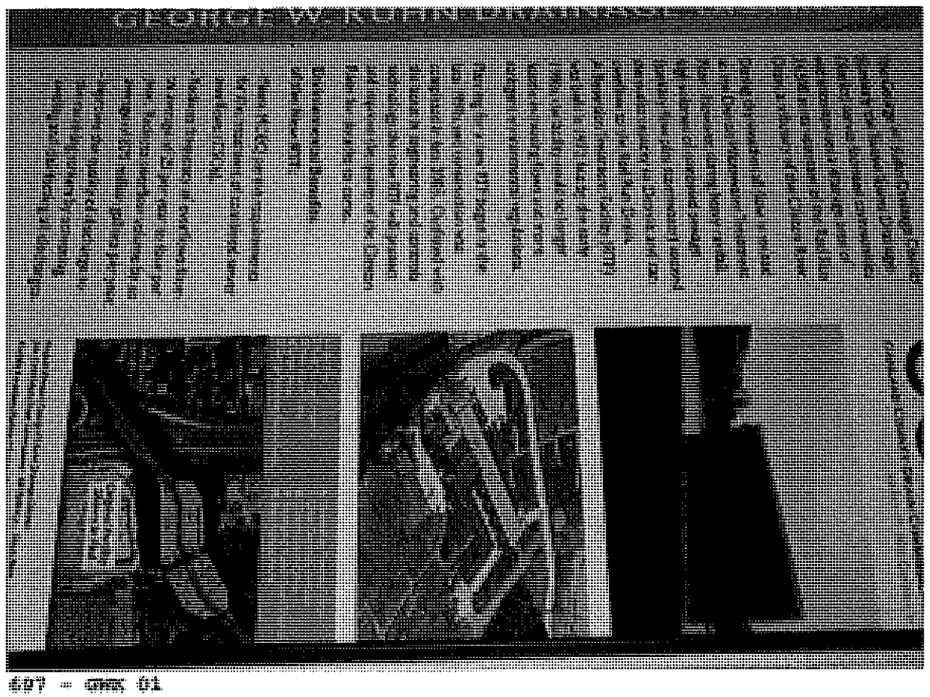


691 - GWK looking "upstream" through screen

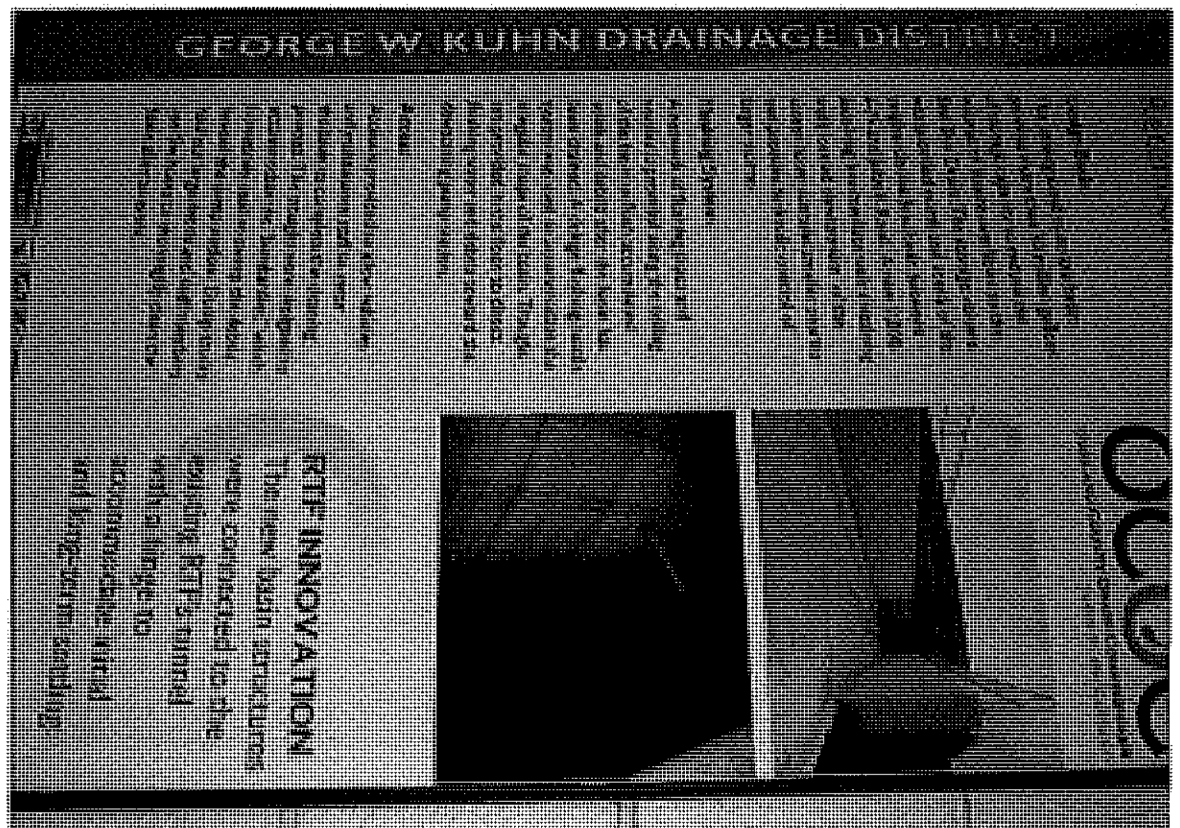


693 - Aluminum Stop Logs stored until needed to isolate influent screen

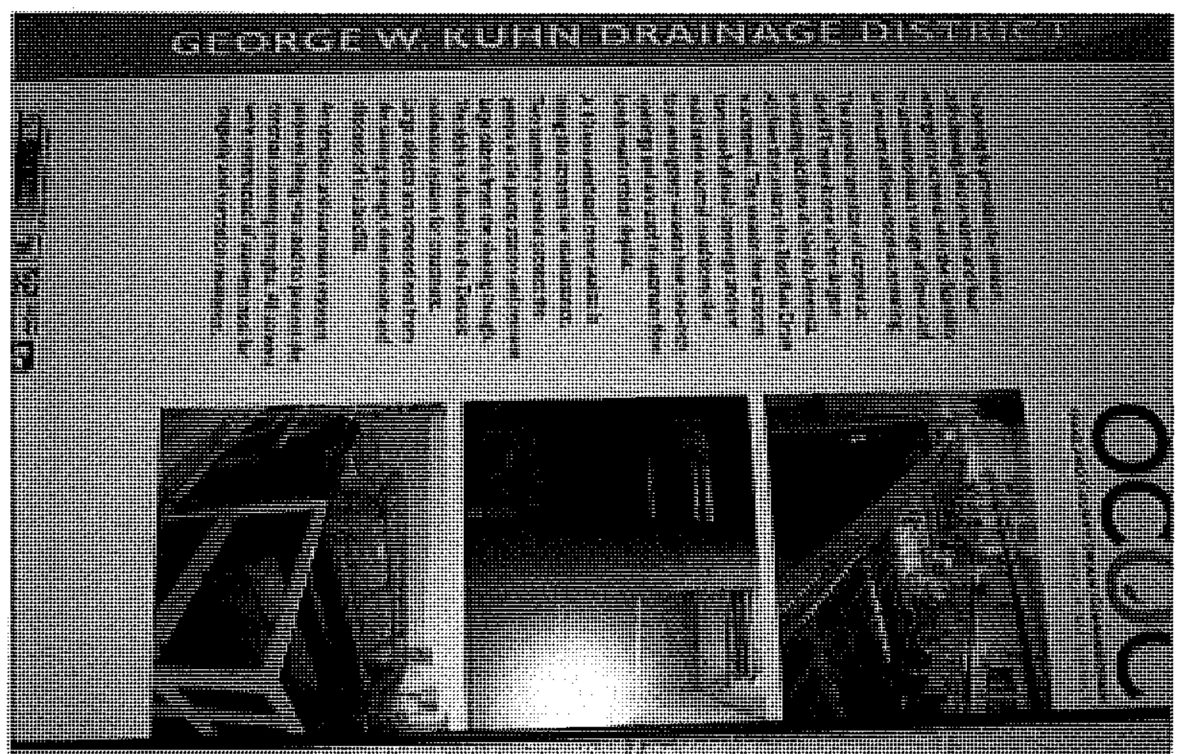
606 - GWK observation windows protected with dropdown panels



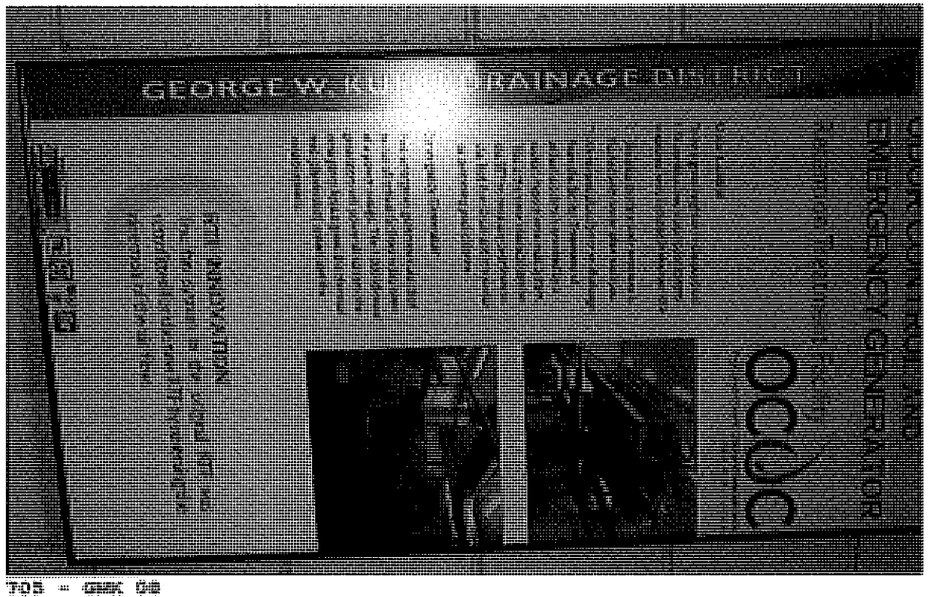
607 - GWK 01



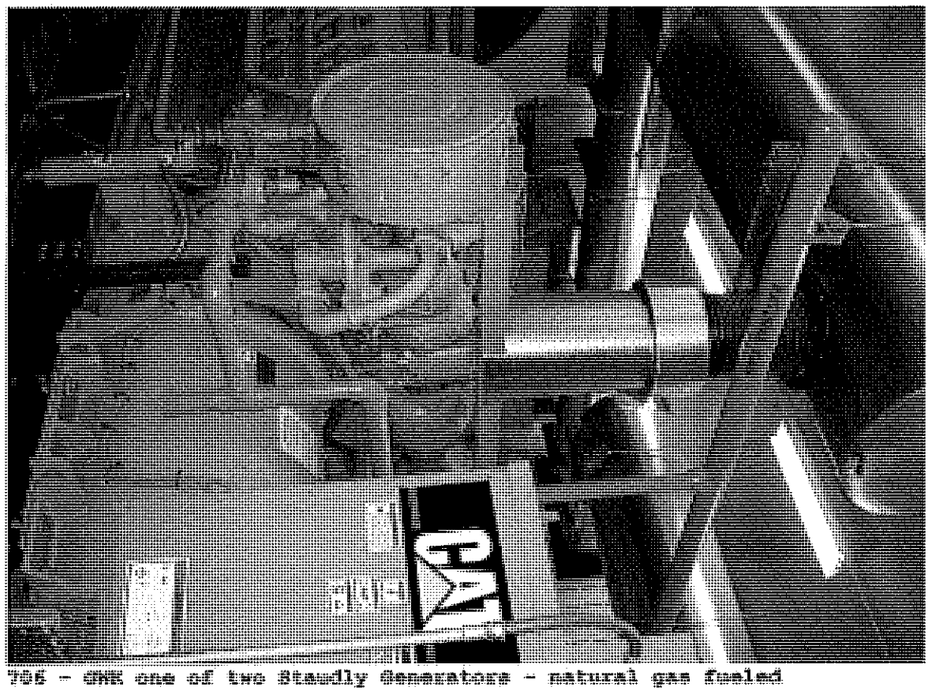
700 - GWK 04



701 - GWK 06



TOS - GWK 08



TOS - GWK one of two Staudly Generators - natural gas fueled

Acacia Park

RETENTION TREATMENT BASIN

Beverly Hills, MI

Project Cost
[illegible]

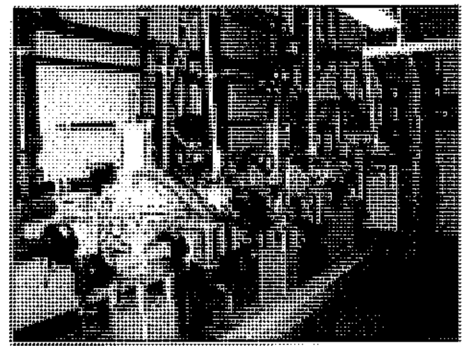
Commencement
[illegible]

Completion
February 1997

Notable Features
- Control Building architecture is similar to a stable.
- Re-establishment of a "Relic Prairie" meadow and mitigation of 0.7 acres of wetland.
- TRC minimization improvements completed in December [illegible]

Drainage District Communities
Village of Beverly Hills

WRC



The Acacia Park Retention Treatment Basin (RTB) was constructed as part of an $82 million national demonstration project. The demonstration project was a three-phase project aimed at eliminating combined sewage overflows (CSO) in the Rouge River watershed. The RTB is operated and maintained by the Office of the Oakland County Water Resources Commissioner (WRC), as a Chapter 20 Drain.

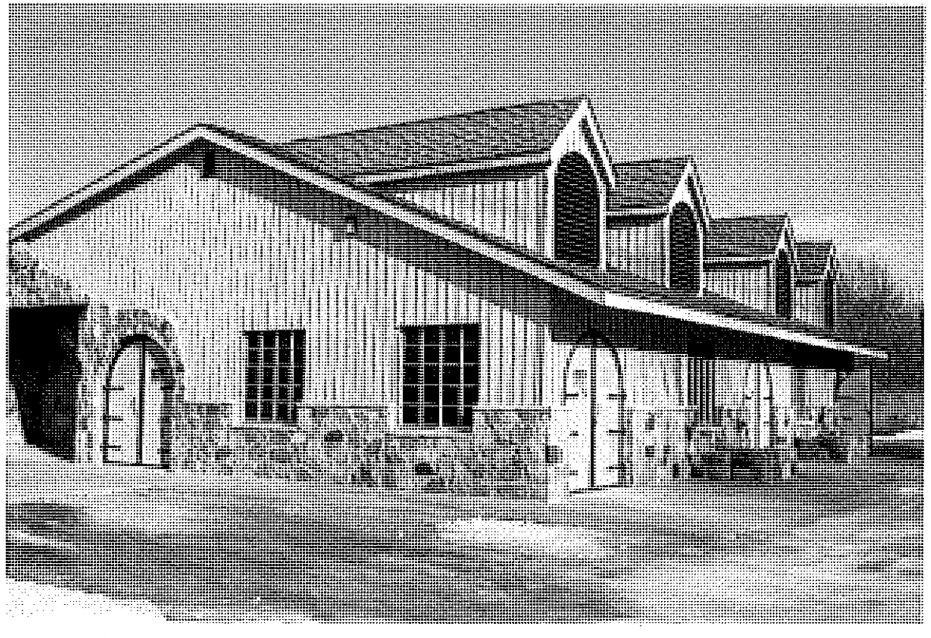
The Acacia Park RTB services as an 816-acre watershed, treating approximately 70 million gallons of CSO annually, of which 19 million gallons are discharged to the Rouge River. The RTB has a capacity of 4 million gallons and is 206' x 140' x 20'. The facility is designed to provide 30 minutes detention time for a 1-year, 1-hour storm (1.0").

As shown in the flow diagram on the reverse side, flow is normally regulated to 4 cfs by a tipping plate regulator. Flow exceeding 4 cfs is diverted to a 10' diameter influent tunnel, providing approximately 400,000 gallons of storage. Two separate cells are sequentially filled, as the facility provides disinfection, settling and skimming. Treated flow exceeding the storage capacity of the two cells is screened through 3/4" x 3-3/4" openings and overflows via weir troughs to an effluent channel that discharges to the Rouge River. Discharge water quality has consistently exceeded water quality from separated storm sewers upstream and downstream from the RTB. Retained flow in the RTB is pumped back into the Evergreen Interceptor for treatment at the Detroit Publicly Owned Treatment Works (POTW). After the basin is dewatered, a pivoting trough flushing system is used to flush any remaining sediment from the tank bottom to the interceptor sewer.

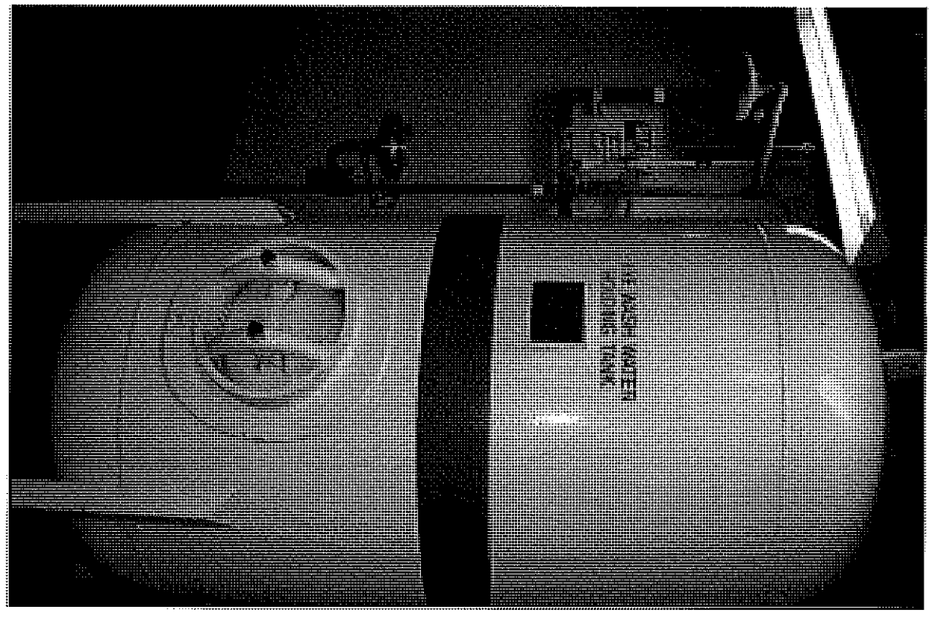
Construction of the RTB was completed in February 1997. Located within the Village of Beverly Hills Nature Preserve, construction of the RTB included the re-establishment of a "Relic Prairie" meadow and mitigation of 0.7 acres of wetland. The sitting of the facility allowed for several unique design characteristics. An example of this is the control building architecture that resembles a stable, thereby blending with the aesthetics of the site.

The Acacia Park instrumentation and controls are relayed to WRC's Supervisory Control and Data Acquisition (SCADA) system, allowing WRC to monitor the facility from a remote location and optimally operate the facility.

Improving and Protecting the Quality of the Rouge River

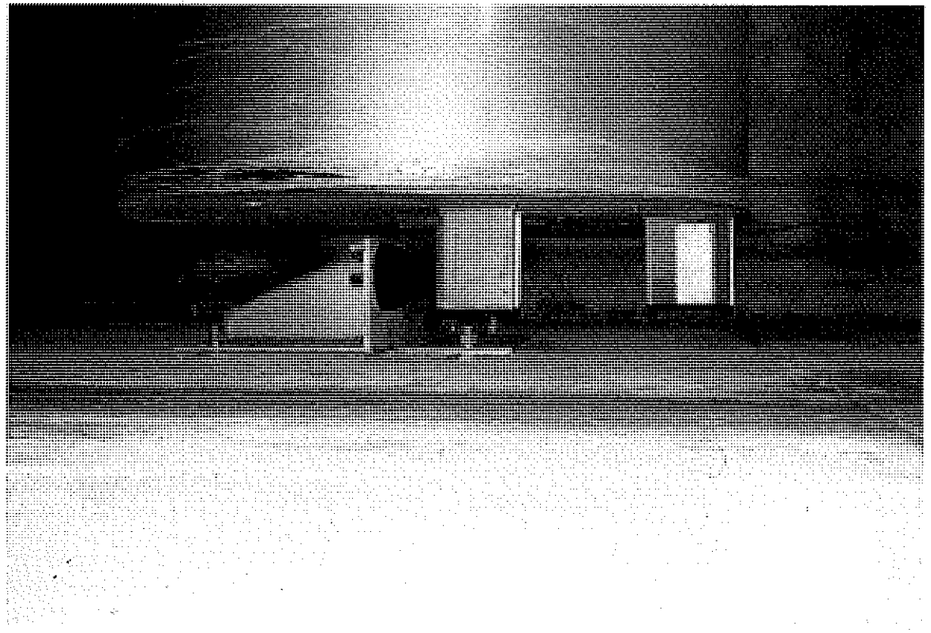


707 - Acacia CSO control building

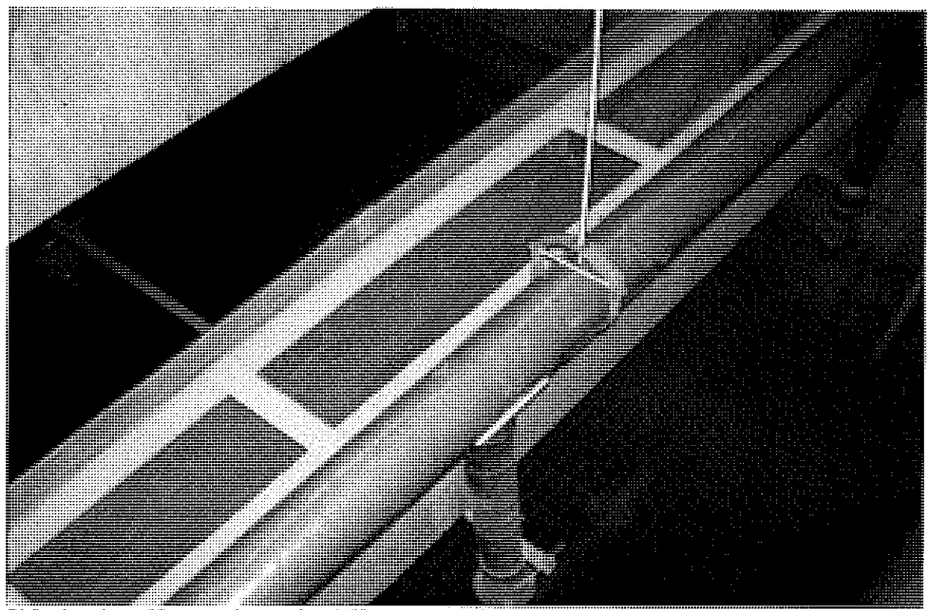


708 - Acacia CSO - Eye wash water stored at room temperature

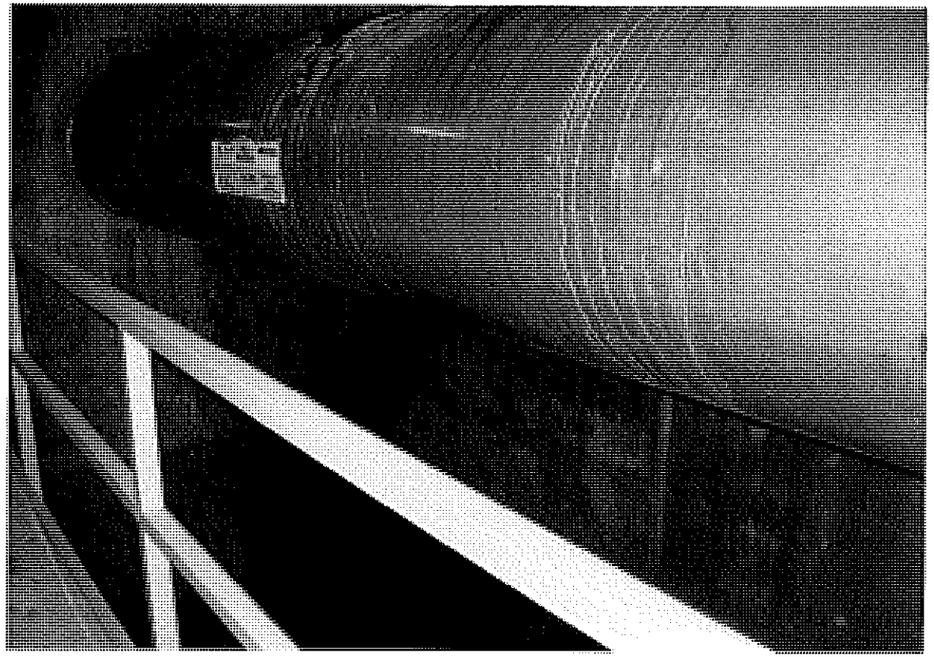
711 - Acacia - Tipping Bucket



712 -Acacia CSO - tipping bucket shaft



715 - Acacia - effluent weir troughs. Effluent screens below



716 - Acacia - tipping bucket

Annual Service Contract Evaluation Form
Contract Name: Grass Mowing Nine (9) Separate Contracts
Group 9- Detention Basin
Supplier Name: MLS II
Date Sent: 8/3/2012
Date Return: 8/10/2012

1. In conformance to the specifications, how would you rate the continued service throughout the contract term? Was cutting cycle complete within 15 consecutive days for drainage channels and 25 consecutive days for drainage/detention basin mowing work? Was MLS II mowing staff cooperative and responsive? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

2. Please rate the quality of the service as defined in the specifications. Vegetation shall be cut to a height of not less than 2 to 3 inches, exclusive of any unmowable trees. What is the satisfaction level of service? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

3. Are MLS II standard administrative practices in compliance with MSD administrative needs? Is paperwork timely, properly completed and processed? Are receiving processes and/or billing practices adequate for you to adhere to your responsibilities? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

4. In general, without making application to the referenced specs, what is the satisfaction level of MLS II? Are they meeting your individual expectation? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

5. Do you want to renew the contract with MLS II? (*Yes or No*)

   Answer _____

6. Please make any general comments.

_____

_____

_____

Completed by: _____ **Title:** _____

Date: _____

Annual Service Contract Evaluation Form
Contract Name: Grass Mowing Nine (9) Separate Contracts
Group 1-PRP District, Group 7- Valley Station Area, Group 7- Physical Assets
Supplier Name: Mattingly Brothers, Inc.
Date Sent: 8/3/2012
Date Return: 8/10/2012

1. In conformance to the specifications, how would you rate the continued service throughout the contract term? Was cutting cycle complete within 15 consecutive days for drainage channels and 25 consecutive days for drainage/detention basin mowing work? Was Mattingly Brothers mowing staff cooperative and responsive? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

2. Please rate the quality of the service as defined in the specifications. Vegetation shall be cut to a height of not less than 2 to 3 inches, exclusive of any unmowable trees. What is the satisfaction level of service? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

3. Are Mattingly Brothers 'standard administrative practices in compliance with MSD administrative needs? Is paperwork timely, properly completed and processed? Are receiving processes and/or billing practices adequate for you to adhere to your responsibilities? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

4. In general, without making application to the referenced specs, what is the satisfaction level of Mattingly Brothers? Are they meeting your individual expectation? *(5 being the highest)*

   Rate: 1, 2, 3, 4 or 5 _____

5. Do you want to renew the contract with Mattingly Brothers, Inc.? (*Yes or No*)

   Answer _____

6. Please make any general comments.

_____

_____

_____

Completed by: _____ **Title:** _____

Date: _____

Revised 9/13/2010