



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHWEST REGIONAL OFFICE

July 16, 2013

Mrs. Linda M. Johnson-Wasler, City Clerk
City of Pittsburgh
414 Grant Street
510 City County Building
Pittsburgh, PA 15219

Re: Planning Module for New Land Development
Lower Hill Development
Civic Arena Redevelopment
2104 EDUs or 841,547 GPD
DEP Code No. 02001-13-005
City of Pittsburgh
Allegheny County

Dear Mrs. Johnson-Wasler:

The Department of Environmental Protection (Department) has reviewed the proposed Official Plan revision consisting of the Lower Hill Development. The proposed development is located in the City of Pittsburgh.

The plan revision is approved with the following conditions:

1. The approved project will require a Clean Streams Law (CSL) permit for the construction and operation of the proposed sewerage facilities. The permit application must be submitted in the name of the Authority. Approval of this planning module is only approval of the preliminary concept of the proposed project and does not assure that a permit application will be acted upon favorably by the Department. Issuance of a CSL permit will be based upon a technical evaluation of the permit application and supporting information. Starting construction prior to obtaining a permit is a violation of The Clean Streams Law.
2. Instructions and applications may be obtained from the Clean Water Program at the letterhead address.

400 Waterfront Drive, Pittsburgh, PA 15222-4745

412.442.4000 FAX 412.442.5885

Printed on Recycled Paper A small logo consisting of three chasing arrows forming a triangle, representing a recycling symbol.

www.dep.state.pa.us

If you have any questions concerning this matter, please call me at 412.442.4047.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas E. Flanagan". The signature is fluid and cursive, with a long horizontal stroke at the end.

Thomas E. Flanagan
Sewage Facilities Planning Specialist
Clean Water Program

cc: Allegheny County Health Department
ALCOSAN – Michael Lichte
Pittsburgh Water and Sewer Authority – Michelle Carney
Bureau of Building Inspections
Cosmos Technologies, Inc. – John W. Spires
Sports & Exhibition Authority of City of Pittsburgh – Douglas Straley



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

TRANSMITTAL LETTER
FOR SEWAGE FACILITIES PLANNING MODULE

Table with 5 columns: DEP CODE #, APS ID #, CLIENT ID #, SITE ID #, AUTH. ID #. Header: DEP USE ONLY

TO: Approving Agency (DEP or delegated local agency) Date 03/15/2013
Mr. Thomas Flanagan
Sewage Facilities Planning Specialist
Pennsylvania Department of Environmental Protection (PA DEP)

Dear Sir:

Attached please find a completed Sewage Facilities Planning Module prepared by Cosmos Technologies, Inc.
for Lower Hill Redevelopment
a subdivision, commercial, or industrial facility located in
City of Pittsburgh, Allegheny County, PA

Check one

- (i) The Planning Module, as prepared and submitted by the applicant, is approved by the municipality as a proposed revision supplement for new land development to its "Official Sewage Facilities Plan", and is adopted for submission to the Department of Environmental Protection transmitted to the delegated local agency for approval in accordance with the requirements of Chapter 71 and the Sewage Facilities Act, OR
(ii) The Planning Module will not be approved by the municipality as a proposed revision or supplement for new land development to its "Official Sewage Facilities Plan" because the project described therein is unacceptable for the reason(s) checked below.

Check Boxes

- Additional studies are being performed by or on behalf of this municipality which may have an effect on the Planning Module as prepared and submitted by the applicant. Attached hereto is the scope of services to be performed and the time schedule for completion of said studies.
The Planning Module as submitted by the applicant fails to meet limitations imposed by other laws or ordinances, officially adopted comprehensive plans and/or environmental plans (e.g., zoning, land use, Chapter 71). Specific reference or applicable segments of such laws or plans are attached hereto.
Other (attach additional sheet giving specifics)

Municipal Secretary: Indicate below by checking appropriate boxes which components are being transmitted to the Approving Agency.

- 2. Individual Onlot Disposal
Adoption Resolution
3. Sewage Collection/Treatment
3s Small Flow Treatment Facility
4.A. Municipal Planning Agency Review
4.B. County Planning Agency Review
4.C. Health Department Review

Mary Beth Doherty (Municipal Secretary print) Mary Beth Doherty (Signature) 4-9-13 (Date)

Note: Please remove and recycle the Instructions portion of the Sewage Facilities Planning Module prior to mailing the appropriate completed components and supporting documents to the approving agency.



City of Pittsburgh
Certified Copy

510 City-County Building
414 Grant Street
Pittsburgh, PA 15219

State of Pennsylvania

Bill No: 2013-1307

I, Linda M. Johnson-Wasler, the duly appointed Clerk of Council of the City of Pittsburgh, do hereby certify that the foregoing is a true and correct copy of:

Resolution No. 219

Resolution adopting official sewage facilities plan for the Lower Hill Redevelopment, (Sports and Exhibition Authority).

WHEREAS, SECTION 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act", as amended, and the rules and regulations of the Pennsylvania Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the Pennsylvania Code, requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters of the Commonwealth and/or environmental health hazards from sewage wastes, and to revise said plan whenever it is necessary to determine whether a proposed method of sewage disposal for a new development conforms to a comprehensive program of pollution control and water quality management; and

WHEREAS, Sports and Exhibition Authority has proposed the development of a certain parcel(s) of land identified as Lower Hill Redevelopment, bounded by Crawford Street to the east, Washington Place to the west, Bedford Avenue to the north, and Centre Avenue to the south, located in the 3rd Ward of the City of Pittsburgh; and described in the attached planning modules for land development and proposes that project be served by Pittsburgh sewage systems; and

WHEREAS, the municipality has reviewed the planning module for land development for the proposed project and has determined that the proposed method of sewage disposal does conform to and is included in the approved "Official Plan" of the municipality, City of Pittsburgh; and

WHEREAS, the City of Pittsburgh finds that the project described in the attached planning module for land development conforms to applicable zoning, sub-division, other municipal ordinances and plans, and to a comprehensive program of pollution control and water quality management.

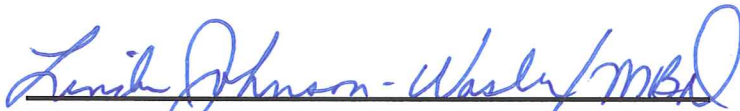
BE IT RESOLVED BY THE COUNCIL OF THE CITY OF PITTSBURGH AS FOLLOWS:

SECTION 1. The City of Pittsburgh hereby adopts and submits to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality the above-referenced planning module for land development, which is attached hereto as Exhibit A. Said modules include the proposed Lower Hill Redevelopment, bounded by Crawford Street to the east, Washington Place to the west, Bedford Avenue to the north, and Centre Avenue to the south, located in the 3rd Ward of the City of Pittsburgh.

Finally, that any Ordinance or Resolution or part thereof conflicting with the provisions of this Resolution, is hereby repealed so far as the same affects this Resolution.

Mayor's Approval Date: April 08, 2013

IN WITNESS WHEREOF, I have hereunto set my hand this 9th day of April, A.D. 2013.



Linda M. Johnson-Wasler, City Clerk

April 9, 2013

Effective Date



700 River Avenue, Suite 412
 Pittsburgh, PA 15212-5936
 Phone: (412) 321-3951
 Fax: (412) 321-3954
 E-mail: info@cosmostechnologiesinc.com
 Website: www.cosmostechnologiesinc.com

Cosmos Technologies Inc.

DATE: 03/13/2013

TO: Pittsburgh City Council District 6
 City Council Building, Ste. 510/ Floor 5
 414 Grant Street, Pittsburgh, PA 15219

ATTN: Mr. Dan Wood, R. Daniel Lavelle, Councilman, District 6

FROM: Cosmos Technologies, Inc.

SUBJECT: Lower Hill Redevelopment: Sewer Planning Module, Component 4A, Resolution, Transmittal

WE ARE SENDING:

- Shop Drawings
- Letter
- Prints
- Change Order
- Plans
- Samples
- Specifications
- Other:

SUBMITTED FOR:

- Signature
- Your Use
- As Requested
- Review and Comment

ACTION TAKEN:

- Approved as Submitted
- Approved as Noted
- Returned after Loan
- Resubmit
- Submit
- Returned
- Returned for Corrections

COMMENTS:

Please find the enclosed documents of the Sewage Facilities Planning Module for the Lower Hill Redevelopment. The component 4A, Resolution, and PA DEP Transmittal Letter need to be completed and approved by the Pittsburgh City Council. Upon approval, please return all documentation to us so it can be submitted to PA DEP for final approval.

Please contact us if you any questions or comments.

Enclosures: Sewer Planning Module, Component 4A, Resolution, Transmittal, Approved PWSA Water & Sewer Use Application

Signed: Brao Duss For

Signature of Receiver: Sridhar R. Aluguvelli, P.E., CPESC, CPSWQ

**SEWAGE FACILITIES PLANNING MODULE
FOR
LOWER HILL REDEVELOPMENT
CITY OF PITTSBURGH, ALLEGHENY COUNTY,
PENNSYLVANIA**

Presented For:



**171 10th Street, 2nd Floor
Pittsburgh, PA 15222**

Prepared By:



**700 River Ave, Suite 412
Pittsburgh, PA 15212**

February 04, 2013

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Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

APPENDICES

Appendix A

Sewage Facilities Planning Module Component 3



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

Code No.

SEWAGE FACILITIES PLANNING MODULE

Component 3. Sewage Collection and Treatment Facilities

(Return completed module package to appropriate municipality)

DEP USE ONLY				
DEP CODE #	CLIENT ID #	SITE ID #	APS ID #	AUTH ID #

This planning module component is used to fulfill the planning requirements of Act 537 for the following types of projects: (1) a subdivision to be served by sewage collection, conveyance or treatment facilities, (2) a tap-in to an existing collection system with flows on a lot of 2 EDU's or more, or (3) the construction of, or modification to, wastewater collection, conveyance or treatment facilities that will require DEP to issue or modify a Clean Streams Law permit. Planning for any project that will require DEP to issue or modify a permit cannot be processed by a delegated agency. Delegated agencies must send their projects to DEP for final planning approval.

This component, along with any other documents specified in the cover letter, must be completed and submitted to the municipality with jurisdiction over the project site for review and approval. All required documentation must be attached for the Sewage Facilities Planning Module to be complete. Refer to the instructions for help in completing this component.

REVIEW FEES: Amendments to the Sewage Facilities Act established fees to be paid by the developer for review of planning modules for land development. These fees may vary depending on the approving agency for the project (DEP or delegated local agency). Please see section R and the instructions for more information on these fees.

NOTE: All projects must complete Sections A through I, and Sections O through R. Complete Sections J, K, L, M and/or N if applicable or marked .

A. PROJECT INFORMATION (See Section A of instructions)

1. Project Name Lower Hill Redevelopment, City of Pittsburgh, Allegheny County, Pennsylvania

2. Brief Project Description The proposed development is to construct a new roadway grid including utilities and streetscape in the 30-acre project area bound by Crawford Street to the east, Washigton Place to the west, Bedford Avenue to the north, and Centre Avenue to the south in the City of Pittsburgh.

B. CLIENT (MUNICIPALITY) INFORMATION (See Section B of instructions)

Municipality Name	County	City	Boro	Twp
Pittsburgh	Allegheny	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Municipality Contact Individual - Last Name	First Name	MI	Suffix	Title
Waldorf	Don	R		Deputy Director of Engineering
Additional Individual Last Name	First Name	MI	Suffix	Title
Carney	Michelle			Engr. Technician II
Municipality Mailing Address Line 1	Mailing Address Line 2			
Penn Liberty Plaza I	1200 Penn Avenue			
Address Last Line -- City	State	ZIP+4		
Pittsburgh	PA	15222-2219		
Phone + Ext.	FAX (optional)	Email (optional)		
(412) 255-8682	(412) 393-0517	dwaldorf@pgh2o.com		

C. SITE INFORMATION (See Section C of instructions)**Site (Land Development or Project) Name**

Lower Hill Redevelopment

Site Location Line 1

66 Mario Lemieux Place

Site Location Line 2

Site Location Last Line -- City

Pittsburgh

State

PA

ZIP+4

15219

Latitude

40.441093

Longitude

-79.988708

Detailed Written Directions to Site from I-376W, Take exist 71B for 2nd Ave on I-376 W. Merge onto 2nd Ave. Turn right onto Ross St. Turn right onto 5th Ave. Take the 1st left onto 6th Ave. Take the 1st right onto Centre Ave. Turn left onto Mario Lemieux Pl. Direction to Site from I-579 S, Head southeast on I-579 S toward Bedford Ave. Turn left onto Bedford Ave. Take the 1st right onto Crawford St. Take the 1st right onto Centre Ave. Take the 1st right onto Mario Lemeiux Pl.

Description of Site The Lower Hill Redevelopment project site is located in the Lower Hill District neighborhood of the City of Pittsburgh. The site is bounded by Crawford Street to the east, Washigton Place to the west, Bedford Avenue to the north, and Centre Avenue to the south. The project site is approximately 30-acres in size. The site consists of parcel numbers 2-C-400, 2-C-300, 2-C-382, 2-C-383, and 2-B-400. Currently, these parcels are surface parking lots.

Site Contact (Developer/Owner)

Last Name

Straley

First Name

Douglas

MI

J

Suffix

Phone

412-393-0207

Ext.

Site Contact Title

Project Executive

Site Contact Firm (if none, leave blank)

Sports & Exhibition Authority (SEA)

FAX

412-393-7104

Email

dstraley@pgh-sea.com

Mailing Address Line 1

171 10th Street

Mailing Address Line 2

2nd Floor

Mailing Address Last Line -- City

Pittsburgh

State

PA

ZIP+4

15222

D. PROJECT CONSULTANT INFORMATION (See Section D of instructions)

Last Name

Spires

First Name

John

MI

W

Suffix

Title

Senior Civil Engineer - Cosmos Technologies, Inc.

Consulting Firm Name

Cosmos Technologies, Inc.

Mailing Address Line 1

700 River Ave

Mailing Address Line 2

Suite 412

Address Last Line -- City

Pittsburgh

State

PA

ZIP+4

15212

Country

Allegheny

Email

jspires@cosmostechnologiesinc.com

Phone

(412) 321-3951

Ext.

FAX

(412) 3221-3954

E. AVAILABILITY OF DRINKING WATER SUPPLY

The project will be provided with drinking water from the following source: (Check appropriate box)

- Individual wells or cisterns.
 A proposed public water supply.
 An existing public water supply.

If existing public water supply is to be used, provide the name of the water company and attach documentation from the water company stating that it will serve the project.

Name of water company: Pittsburgh Water & Sewer Authority (PWSA)

F. PROJECT NARRATIVE (See Section F of instructions)

- A narrative has been prepared as described in Section F of the instructions and is attached.

The applicant may choose to include additional information beyond that required by Section F of the instructions.

G. PROPOSED WASTEWATER DISPOSAL FACILITIES (See Section G of instructions)

Check all boxes that apply, and provide information on collection, conveyance and treatment facilities and EDU's served. This information will be used to determine consistency with Chapter 93 (relating to wastewater treatment requirements).

1. COLLECTION SYSTEM

a. Check appropriate box concerning collection system

- New collection system Pump Station Force Main
- Grinder pump(s) Extension to existing collection system Expansion of existing facility

Clean Streams Law Permit Number _____

b. Answer questions below on collection system

Number of EDU's and proposed connections to be served by collection system. EDU's 1952

Connections 3

Name of:

existing collection or conveyance system 2 connections on 5th Ave and 1 connection on 7th Ave

owner Pittsburgh Water & Sewer Authority (PWSA)

existing interceptor ALCOSAN Interceptors located along Monongahela and Allegheny Rivers

owner Allegheny County Sanitary Authority (ALCOSAN)

2. WASTEWATER TREATMENT FACILITY

Check all boxes that apply, and provide information on collection, conveyance and treatment facilities and EDU's served. This information will be used to determine consistency with Chapter(s) 91 (relating to general provisions), 92 (relating to national Pollution Discharge Elimination System permitting, monitoring and compliance) and 93 (relating to water quality standards).

a. Check appropriate box and provide requested information concerning the treatment facility

- New facility Existing facility Upgrade of existing facility Expansion of existing facility

Name of existing facility Woods Run Plant WWTP - Allegheny County Sanitary Authority (ALCOSAN)

NPDES Permit Number for existing facility PA0025984

Clean Streams Law Permit Number _____

Location of discharge point for a new facility. Latitude 40°28'34" Longitude 80°02'44"

b. The following certification statement must be completed and signed by the wastewater treatment facility permittee or their representative.

As an authorized representative of the permittee, I confirm that the Woods Run Plant WWTP (Name from above) sewage treatment facilities can accept sewage flows from this project without adversely affecting the facility's ability to achieve all applicable technology and water quality based effluent limits (see Section I) and conditions contained in the NPDES permit identified above.

Name of Permittee Agency, Authority, Municipality Allegheny County Sanitary Authority (ALCOSAN)

Name of Responsible Agent Michael D Lichte

Agent Signature [Signature] Date 3/1/2013

(Also see Section I. 4.)

G. PROPOSED WASTEWATER DISPOSAL FACILITIES (Continued)**3. PLOT PLAN**

The following information is to be submitted on a plot plan of the proposed subdivision.

- | | |
|---|--|
| a. Existing and proposed buildings. | j. Any designated recreational or open space area. |
| b. Lot lines and lot sizes. | k. Wetlands - from National Wetland Inventory Mapping and USGS Hydric Soils Mapping. |
| c. Adjacent lots. | l. Flood plains or Flood prone areas, floodways, (Federal Flood Insurance Mapping) |
| d. Remainder of tract. | m. Prime Agricultural Land. |
| e. Existing and proposed sewerage facilities. Plot location of discharge point, land application field, spray field, COLDS, or LVCOLDS if a new facility is proposed. | n. Any other facilities (pipelines, power lines, etc.) |
| f. Show tap-in or extension to the point of connection to existing collection system (if applicable). | o. Orientation to north. |
| g. Existing and proposed water supplies and surface water (wells, springs, ponds, streams, etc.) | p. Locations of all site testing activities (soil profile test pits, slope measurements, permeability test sites, background sampling, etc. (if applicable). |
| h. Existing and proposed rights-of-way. | q. Soils types and boundaries when a land based system is proposed. |
| i. Existing and proposed buildings, streets, roadways, access roads, etc. | r. Topographic lines with elevations when a land based system is proposed |

4. WETLAND PROTECTION

YES NO

- a. Are there wetlands in the project area? If yes, ensure these areas appear on the plot plan as shown in the mapping or through on-site delineation.
- b. Are there any construction activities (encroachments, or obstructions) proposed in, along, or through the wetlands? If yes, identify any proposed encroachments on wetlands and identify whether a General Permit or a full encroachment permit will be required. If a full permit is required, address time and cost impacts on the project. Note that wetland encroachments should be avoided where feasible. Also note that a feasible alternative **MUST BE SELECTED** to an identified encroachment on an exceptional value wetland as defined in Chapter 105. Identify any project impacts on streams classified as HQ or EV and address impacts of the permitting requirements of said encroachments on the project.

5. PRIME AGRICULTURAL LAND PROTECTION

YES NO

- Will the project involve the disturbance of prime agricultural lands?
If yes, coordinate with local officials to resolve any conflicts with the local prime agricultural land protection program. The project must be consistent with such municipal programs before the sewage facilities planning module package may be submitted to DEP.
If no, prime agricultural land protection is not a factor to this project.
- Have prime agricultural land protection issues been settled?

6. HISTORIC PRESERVATION ACT

YES NO

- Sufficient documentation is attached to confirm that this project is consistent with DEP Technical Guidance 012-0700-001 *Implementation of the PA State History Code* (available online at the DEP Web site at www.depweb.state.pa.us, select "subject" then select "technical guidance"). As a minimum this includes copies of the completed Cultural Resources Notice (CRN), a return receipt for its submission to the PHMC and the PHMC review letter.

7. PROTECTION OF RARE, ENDANGERED OR THREATENED SPECIES

Check one:

- The "Pennsylvania Natural Diversity Inventory (PNDI) Project Environmental Review Receipt" resulting from my search of the PNDI database and all supporting documentation from jurisdictional agencies (when necessary) is/are attached.
- A completed "Pennsylvania Natural Diversity Inventory (PNDI) Project Planning & Environmental Review Form," (PNDI Form) available at www.naturalheritage.state.pa.us, and all required supporting documentation is attached. I request DEP staff to complete the required PNDI search for my project. I realize that my planning module will be considered incomplete upon submission to the Department and that the DEP review will not begin, and that processing of my planning module will be delayed, until a "PNDI Project Environmental Review Receipt" and all supporting documentation from jurisdictional agencies (when necessary) is/are received by DEP.

Applicant or Consultant Initials _____

H. ALTERNATIVE SEWAGE FACILITIES ANALYSIS (See Section H of instructions)

- An alternative sewage facilities analysis has been prepared as described in Section H of the attached instructions and is attached to this component.
The applicant may choose to include additional information beyond that required by Section H of the attached instructions.

I. COMPLIANCE WITH WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS (See Section I of instructions) (Check and complete all that apply.)

1. **Waters designated for Special Protection**
 - The proposed project will result in a new or increased discharge into special protection waters as identified in Title 25, Pennsylvania Code, Chapter 93. The Social or Economic Justification (SEJ) required by Section 93.4c. is attached.
2. **Pennsylvania Waters Designated As Impaired**
 - The proposed project will result in a new or increased discharge of a pollutant into waters that DEP has identified as being impaired by that pollutant. A pre-planning meeting was held with the appropriate DEP regional office staff to discuss water quality based discharge limitations.
3. **Interstate and International Waters**
 - The proposed project will result in a new or increased discharge into interstate or international waters. A pre-planning meeting was held with the appropriate DEP regional office staff to discuss effluent limitations necessary to meet the requirements of the interstate or international compact.
4. **Tributaries To The Chesapeake Bay**
 - The proposed project result in a new or increased discharge of sewage into a tributary to the Chesapeake Bay. This proposal for a new sewage treatment facility or new flows to an existing facility includes total nitrogen and total phosphorus in the following amounts: _____ pounds of TN per year, and _____ pounds of TP per year. Based on the process design and effluent limits, the total nitrogen treatment capacity of the wastewater treatment facility is _____ pounds per year and the total phosphorus capacity is _____ pounds per year as determined by the wastewater treatment facility permittee. The permittee has determined that the additional TN and TP to be contributed by this project (as modified by credits and/or offsets to be provided) will not cause the discharge to exceed the annual total mass limits for these parameters. Documentation of compliance with nutrient allocations is attached.
Name of Permittee Agency, Authority, Municipality _____
Initials of Responsible Agent (See Section G 2.b) _____

See *Special Instructions* (Form 3800-FM-WSFR0353-1) for additional information on Chesapeake Bay watershed requirements.

J. CHAPTER 94 CONSISTENCY DETERMINATION (See Section J of Instructions)

Projects that propose the use of existing municipal collection, conveyance or wastewater treatment facilities, or the construction of collection and conveyance facilities to be served by existing municipal wastewater treatment facilities must be consistent with the requirements of Title 25, Chapter 94 (relating to Municipal Wasteload Management). If not previously included in Section F, include a general map showing the path of the sewage to the treatment facility. If more than one municipality or authority will be affected by the project, please obtain the information required in this section for each. Additional sheets may be attached for this purpose.

1. Project Flows 841,547 gpd
2. Total Sewage Flows to Facilities (pathway from point of origin through treatment plant)

When providing "treatment facilities" sewage flows, use Annual Average Daily Flow for "average" and Maximum Monthly Average Daily Flow for "peak" in all cases. For "peak flows" in "collection" and "conveyance" facilities, indicate whether these flows are "peak hourly flow" or "peak instantaneous flow" and how this figure was derived (i.e., metered, measured, estimated, etc.).

- a. Enter average and peak sewage flows for each proposed or existing facility as designed or permitted.
- b. Enter the average and peak sewage flows for the most restrictive sections of the existing sewage facilities.
- c. Enter the average and peak sewage flows, projected for 5 years (2 years for pump stations) through the most restrictive sections of the existing sewage facilities. Include existing, proposed (this project) and future project (other approved projects) flows.

To complete the table, refer to the Instructions, Section J.

	a. Design and/or Permitted Capacity (gpd)		b. Present Flows (gpd)		c. Projected Flows in 5 years (gpd) (2 years for P.S.)	
	Average	Peak	Average	Peak	Average	Peak
Collection	49.7 mgd	174 mgd	2.1 mgd	326.5 mgd	2.89 mgd	324.84 mgd
Conveyance		29.3 mgd	2.85 mgd	3.21 mgd	2.88 mgd	3.24 mgd
Treatment		250 mgd		250 mgd		250 mgd

* 3. Collection and Conveyance Facilities

The questions below are to be answered by the sewer authority, municipality, or agency responsible for completing the Chapter 94 report for the collection and conveyance facilities. These questions should be answered in coordination with the latest Chapter 94 annual report and the above table. The individual(s) signing below must be legally authorized to make representation for the organization.

YES NO

- a. YES NO This project proposes sewer extensions or tap-ins. Will these actions create a hydraulic overload within five years on any existing collection or conveyance facilities that are part of the system?

If yes, this sewage facilities planning module will not be accepted for review by the municipality, delegated local agency and/or DEP until all inconsistencies with Chapter 94 are resolved or unless there is an approved Corrective Action Plan (CAP) granting an allocation for this project. A letter granting allocations to this project under the CAP must be attached to the module package.

If no, a representative of the sewer authority, municipality, or agency responsible for completing the Chapter 94 report for the collection and conveyance facilities must sign below to indicate that the collection and conveyance facilities have adequate capacity and are able to provide service to the proposed development in accordance with both §71.53(d)(3) and Chapter 94 requirements and that this proposal will not affect that status.

b. Collection System

Name of Agency, Authority, Municipality Pittsburgh Water & Sewer Authority (PWSA)

Name of Responsible Agent DON R. WALDORF

Agent Signature Don R. Waldorf Date 3-5-2013

* Due to certain pipe capacities the proposed development will require new sewer construction to alleviate existing sewer surcharging. The PWSA and SEA are actively pursuing a Corrective Action Plan and funding options to construct new storm sewers to accommodate projected flows for existing and future developments in this watershed. Approved construction drawings will include this Corrective Action Plan.

S.O. No. _____

Subject: LOWER HILL REDEVELOPMENT
PLANNING MODULE Sheet No. _____ of _____

Baker

Drawing No. _____

Computed by BD Checked By SRA Date 07.27.2013

A DEVELOPMENT

A. SANITARY FLOW

New Development	841,547 GPD
- Exist Area Flow	50,000 GPD
	<hr/>
	+ 791,547 GPD

B. STORM FLOW

Exist Development	91,001,418 GPD (141 cfs)
- Proposed Development	88,545,414 GPD (137 cfs)
	<hr/>
	+ 2,456,004 GPD

C NET CHANGE

- 1,664,457 GPD
OR - 1.66 MGD

COLUMN C, SECTION J (PAGE 6 OF SEWAGE FACILITIES
PLANNING MODULE COMPONENT 3)

PEAK PROTECTED FLOWS IN 5 YEARS (MGD)

$$= 326.5 \text{ MGD} - 1.66 \text{ MGD}$$

$$= 324.84 \text{ MGD}$$

$$\text{OR } 324.84 \times 10^6 \text{ GPD}$$

$$= 324,840,000 \text{ GPD}$$

J. CHAPTER 94 CONSISTENCY DETERMINATION (Continued)

c. Conveyance System

Name of Agency, Authority, Municipality Allegheny County Sanitary Authority (ALCOSAN)

Name of Responsible Agent Michael D. Lichte

Agent Signature [Signature]

Date 3/1/2013

4. Treatment Facility

The questions below are to be answered by a representative of the facility permittee in coordination with the information in the table and the latest Chapter 94 report. The individual signing below must be legally authorized to make representation for the organization.

Yes No ALCOSAN is under a CD to address wet weather hydraulic overloads

- a. This project proposes the use of an existing wastewater treatment plant for the disposal of sewage. Will this action create a hydraulic or organic overload within 5 years at that facility?

If yes, this planning module for sewage facilities will not be reviewed by the municipality, delegated local agency and/or DEP until this inconsistency with Chapter 94 is resolved or unless there is an approved CAP granting an allocation for this project. A letter granting allocations to this project under the CAP must be attached to the planning module.

If no, the treatment facility permittee must sign below to indicate that this facility has adequate treatment capacity and is able to provide wastewater treatment services for the proposed development in accordance with both §71.53(d)(3) and Chapter 94 requirements and that this proposal will not impact that status.

b. Name of Agency, Authority, Municipality Allegheny County Sanitary Authority (ALCOSAN)

Name of Responsible Agent Michael D. Lichte

Agent Signature [Signature]

Date 3/1/2013

K. TREATMENT AND DISPOSAL OPTIONS (See Section K of instructions)

This section is for land development projects that propose construction of wastewater treatment facilities. Please note that, since these projects require permits issued by DEP, these projects may NOT receive final planning approval from a delegated local agency. Delegated local agencies must send these projects to DEP for final planning approval.

Check the appropriate box indicating the selected treatment and disposal option.

- 1. Spray irrigation (other than individual residential spray systems (IRSIS)) or other land application is proposed, and the information requested in Section K.1. of the planning module instructions are attached.
- 2. Recycle and reuse is proposed and the information requested in Section K-2 of the planning module instructions is attached.
- 3. A discharge to a dry stream channel is proposed, and the information requested in Section K.3. of the planning module instructions are attached.
- 4. A discharge to a perennial surface water body is proposed, and the information requested in Section K.4. of the planning module instructions are attached.

L. PERMEABILITY TESTING (See Section L of instructions)

- The information required in Section L of the instructions is attached.

M. PRELIMINARY HYDROGEOLOGIC STUDY (See Section M of instructions)

- The information required in Section M of the instructions is attached.

N. DETAILED HYDROGEOLOGIC STUDY (See Section N of instructions)

The detailed hydrogeologic information required in Section N. of the instructions is attached.

O. SEWAGE MANAGEMENT (See Section O of instructions)

(1-3 for completion by the developer(project sponser), 4-5 for completion by the non-municipal facility agent and 6 for completion by the municipality)

Yes No

1. Is connection to, or construction of, a DEP permitted, non-municipal sewage facility or a local agency permitted, community onlot sewage facility proposed.

If Yes, respond to the following questions, attach the supporting analysis, and an evaluation of the options available to assure long-term proper operation and maintenance of the proposed non-municipal facilities. If No, skip the remainder of Section O.

2. Project Flows _____ gpd

Yes No

3. Is the use of nutrient credits or offsets a part of this project?

If yes, attach a letter of intent to purchase the necessary credits and describe the assurance that these credits and offsets will be available for the remaining design life of the non-municipal sewage facility;

(For completion by non-municipal facility agent)

4. Collection and Conveyance Facilities

The questions below are to be answered by the organization/individual responsible for the non-municipal collection and conveyance facilities. The individual(s) signing below must be legally authorized to make representation for the organization.

Yes No

- a. If this project proposes sewer extensions or tap-ins, will these actions create a hydraulic overload on any existing collection or conveyance facilities that are part of the system?

If yes, this sewage facilities planning module will not be accepted for review by the municipality, delegated local agency and/or DEP until this issue is resolved.

If no, a representative of the organization responsible for the collection and conveyance facilities must sign below to indicate that the collection and conveyance facilities have adequate capacity and are able to provide service to the proposed development in accordance with Chapter 71 §71.53(d)(3) and that this proposal will not affect that status.

- b. Collection System

Name of Responsible Organization _____

Name of Responsible Agent _____

Agent Signature _____

Date _____

- c. Conveyance System

Name of Responsible Organization _____

Name of Responsible Agent _____

Agent Signature _____

Date _____

5. Treatment Facility

The questions below are to be answered by a representative of the facility permittee. The individual signing below must be legally authorized to make representation for the organization.

Yes No

- a. If this project proposes the use of an existing non-municipal wastewater treatment plant for the disposal of sewage, will this action create a hydraulic or organic overload at that facility?

If yes, this planning module for sewage facilities will not be reviewed by the municipality, delegated local agency and/or DEP until this issue is resolved.

If no, the treatment facility permittee must sign below to indicate that this facility has adequate treatment capacity and is able to provide wastewater treatment services for the proposed development in accordance with §71.53(d)(3) and that this proposal will not impact that status.

- b. Name of Facility _____
- Name of Responsible Agent _____
- Agent Signature _____
- Date _____

(For completion by the municipality)

- 6. The **SELECTED OPTION** necessary to assure long-term proper operation and maintenance of the proposed non-municipal facilities is clearly identified with documentation attached in the planning module package.

P. PUBLIC NOTIFICATION REQUIREMENT (See Section P of instructions)

This section must be completed to determine if the applicant will be required to publish facts about the project in a newspaper of general circulation to provide a chance for the general public to comment on proposed new land development projects. This notice may be provided by the applicant or the applicant's agent, the municipality or the local agency by publication in a newspaper of general circulation within the municipality affected. Where an applicant or an applicant's agent provides the required notice for publication, the applicant or applicant's agent shall notify the municipality or local agency and the municipality and local agency will be relieved of the obligation to publish. The required content of the publication notice is found in Section P of the instructions.

To complete this section, each of the following questions must be answered with a "yes" or "no". Newspaper publication is required if any of the following are answered "yes".

Yes No

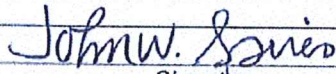
- 1. Does the project propose the construction of a sewage treatment facility ?
- 2. Will the project change the flow at an existing sewage treatment facility by more than 50,000 gallons per day?
- 3. Will the project result in a public expenditure for the sewage facilities portion of the project in excess of \$100,000?
- 4. Will the project lead to a major modification of the existing municipal administrative organizations within the municipal government?
- 5. Will the project require the establishment of *new* municipal administrative organizations within the municipal government?
- 6. Will the project result in a subdivision of 50 lots or more? (onlot sewage disposal only)

P. PUBLIC NOTIFICATION REQUIREMENT cont'd. (See Section P of Instructions)

- 7. Does the project involve a major change in established growth projections?
- 8. Does the project involve a different land use pattern than that established in the municipality's Official Sewage Plan?
- 9. Does the project involve the use of large volume onlot sewage disposal systems (Flow > 10,000 gpd)?
- 10. Does the project require resolution of a conflict between the proposed alternative and consistency requirements contained in §71.21(a)(5)(i), (ii), (iii)?
- 11. Will sewage facilities discharge into high quality or exceptional value waters?
- Attached is a copy of:
 - the public notice,
 - all comments received as a result of the notice,
 - the municipal response to these comments.
- No comments were received. A copy of the public notice is attached.

Q. FALSE SWEARING STATEMENT (See Section Q of Instructions)

I verify that the statements made in this component are true and correct to the best of my knowledge, information and belief. I understand that false statements in this component are made subject to the penalties of 18 PA C.S.A. §4904 relating to unsworn falsification to authorities.

John W. Spires, P.E.	
Name (Print)	Signature
Senior Civil Engineer	2-04-2013
Title	Date
Cosmos Technologies, Inc. 700 River Ave, Suite 412, Pittsburgh, PA 15212	412-321-3951
Address	Telephone Number

R. REVIEW FEE (See Section R of Instructions)

The Sewage Facilities Act establishes a fee for the DEP planning module review. DEP will calculate the review fee for the project and invoice the project sponsor **OR** the project sponsor may attach a self-calculated fee payment to the planning module prior to submission of the planning package to DEP. (Since the fee and fee collection procedures may vary if a "delegated local agency" is conducting the review, the project sponsor should contact the "delegated local agency" to determine these details.) Check the appropriate box.

- I request DEP calculate the review fee for my project and send me an invoice for the correct amount. I understand DEP's review of my project will not begin until DEP receives the correct review fee from me for the project.
- I have calculated the review fee for my project using the formula found below and the review fee guidance in the instructions. I have attached a check or money order in the amount of \$94,500 payable to "Commonwealth of PA, DEP". Include DEP code number on check. I understand DEP will not begin review of my project unless it receives the fee and determines the fee is correct. If the fee is incorrect, DEP will return my check or money order, send me an invoice for the correct amount. I understand DEP review will NOT begin until I have submitted the correct fee.
- I request to be exempt from the DEP planning module review fee because this planning module creates **only** one new lot and is the **only** lot subdivided from a parcel of land as that land existed on December 14, 1995. I realize that subdivision of a second lot from this parcel of land shall disqualify me from this review fee exemption. I am furnishing the following deed reference information in support of my fee exemption.

County Recorder of Deeds for _____ County, Pennsylvania

Deed Volume _____ Book Number _____

Page Number _____ Date Recorded _____

R. REVIEW FEE (continued)

Formula:

1. For a new collection system (with or without a Clean Streams Law Permit), a collection system extension, or individual tap-ins to an existing collection system use this formula.

$$\#2,104 \text{ Lots (or EDUs)} \times \$50.00 = \$105,200$$

The fee is based upon:

- The number of lots created or number of EDUs whichever is higher.
 - For community sewer system projects, one EDU is equal to a sewage flow of 400 gallons per day.
2. For a surface or subsurface discharge system, use the appropriate one of these formulae.

- A. A new surface discharge greater than 2000 gpd will use a flat fee:

\$ 1,500 per submittal (non-municipal)
\$ 500 per submittal (municipal)

- B. An increase in an existing surface discharge will use:

$$\# \text{ } \text{ Lots (or EDUs)} \times \$35.00 = \$ \text{ }$$

to a maximum of \$ 1,500 per submittal (non-municipal) or \$ 500 per submittal (municipal)

The fee is based upon:

- The number of lots created or number of EDUs whichever is higher.
 - For community sewage system projects one EDU is equal to a sewage flow of 400 gallons per day.
 - For non-single family residential projects, EDUs are calculated using projected population figures
- C. A sub-surface discharge system that requires a permit under The Clean Streams Law will use a flat fee:

\$ 1,500 per submittal (non-municipal)
\$ 500 per submittal (municipal)

Appendix B

Sewage Facilities Planning Module Component 4A


SEWAGE FACILITIES PLANNING MODULE
COMPONENT 4A - MUNICIPAL PLANNING AGENCY REVIEW

Note to Project Sponsor: To expedite the review of your proposal, one copy of your completed planning module package and one copy of this *Planning Agency Review Component* should be sent to the existing local municipal planning agency for their comments.

SECTION A. PROJECT NAME (See Section A of instructions)

Project Name

Lower Hill Redevelopment
SECTION B. REVIEW SCHEDULE (See Section B of instructions)

1. Date plan received by municipal planning agency. 8 February 2013
 2. Date review completed by agency. 8 March 2013

SECTION C. AGENCY REVIEW (See Section C of instructions)

- | Yes | No | |
|-------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 1. Is there a municipal comprehensive plan adopted under the Municipalities Planning Code (53 P.S. 10101, <i>et seq.</i>)? |
| <input type="checkbox"/> | <input type="checkbox"/> | 2. Is this proposal consistent with the comprehensive plan for land use?
If no, describe the inconsistencies _____ |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. Is this proposal consistent with the use, development, and protection of water resources?
If no, describe the inconsistencies _____ |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Is this proposal consistent with municipal land use planning relative to Prime Agricultural Land Preservation? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. Does this project propose encroachments, obstructions, or dams that will affect wetlands?
If yes, describe impacts _____ |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 6. Will any known historical or archaeological resources be impacted by this project?
If yes, describe impacts _____ |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 7. Will any known endangered or threatened species of plant or animal be impacted by this project?
If yes, describe impacts _____ |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 8. Is there a municipal zoning ordinance? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 9. Is this proposal consistent with the ordinance?
If no, describe the inconsistencies _____ |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 10. Does the proposal require a change or variance to an existing comprehensive plan or zoning ordinance? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 11. Have all applicable zoning approvals been obtained? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 12. Is there a municipal subdivision and land development ordinance? |

SECTION C. AGENCY REVIEW (continued)

Yes No

13. Is this proposal consistent with the ordinance?
If no, describe the inconsistencies _____

14. Is this plan consistent with the municipal Act 537 Official Sewage Facilities Plan?
If no, describe the inconsistencies _____

15. Are there any wastewater disposal needs in the area adjacent to this proposal that should be considered by the municipality?
If yes, describe _____

16. Has a waiver of the sewage facilities planning requirements been requested for the residual tract of this subdivision?

If yes, is the proposed waiver consistent with applicable ordinances?

17. Name, title and signature of planning agency staff member completing this section:

Name: Susan Tynaczko

Title: Zoning Administrator

Signature: Susan Tynaczko

Date: 8 March 2013

Name of Municipal Planning Agency: City of Pittsburgh - Department of City Planning

Address 200 Ross Street (Fourth Floor) Pittsburgh, PA 15219

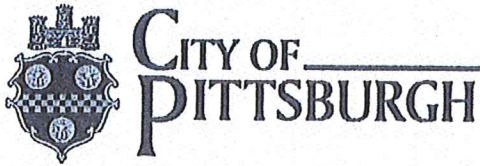
Telephone Number: 412 255-2971

SECTION D. ADDITIONAL COMMENTS (See Section D of instructions)

This Component does not limit municipal planning agencies from making additional comments concerning the relevancy of the proposed plan to other plans or ordinances. If additional comments are desired, attach additional sheets.

The planning agency must complete this Component within 60 days.

This component and any additional comments are to be returned to the project sponsor.



Department of City Planning

Luke Ravenstahl
Mayor

Noor Ismail, AICP
Director

8 March 2013

Mr. Sridhar Aluguvelli
Cosmos Technologies
700 River Avenue (Suite 412)
Pittsburgh, PA 15212

Dear Mr. Aluguvelli:

The purpose of this letter is to inform any person, group or entity that the Stormwater Management Report prepared for the Lower Hill Redevelopment meets City of Pittsburgh Stormwater Management regulatory requirements. The report was prepared for the Sports and Exhibition Authority, is dated 30 January 2013, and is titled Preliminary Drainage Design Report. It addresses, among other things, the requirement that any project receiving more than \$1,000,000 of funds through the City of Pittsburgh retains the 95th percentile precipitation event on site.

It identifies the quantity of stormwater that must be retained for each project development block (A-G) and ten roadway segments. As development blocks are developed specific designs will be identified to address the volumes identified in the report. The precipitation on the roads will be addressed through roadway basins and tree planters that will direct flows to those basins. Areas of the proposed basins and number of tree planters required are specified. Three of the ten roadway segments have slopes greater than 5%. Should it prove infeasible to direct runoff from these streets into the planters the retention volumes required for these streets will be addressed in one or both of the project open space areas.

Should there be any questions please contact me at 412 255-2233 or dan.sentz@pittsburghpa.gov.

Sincerely,

Daniel T. Sentz
Environmental Planner

Appendix C

Sewage Facilities Planning Module Component 4C



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

DEP Code #

SEWAGE FACILITIES PLANNING MODULE
COMPONENT 4C - COUNTY OR JOINT HEALTH DEPARTMENT REVIEW

Note to Project Sponsor: To expedite the review of your proposal, one copy of your completed planning module package and one copy of this *Planning Agency Review Component* should be sent to the county or joint county health department for their comments.

SECTION A. PROJECT NAME (See Section A of instructions)

Project Name

Lower Hill Redevelopment

SECTION B. REVIEW SCHEDULE (See Section B of instructions)

1. Date plan received by county or joint-county health department. March 8, 2013

Agency name Allegheny County Health Department (ACHD)

2. Date review completed by agency March 11, 2013

SECTION C. AGENCY REVIEW (See Section C of instructions)

Yes No

1. Is the proposed plan consistent with the municipality's Official Sewage Facilities Plan?
If no, what are the inconsistencies? _____
2. Are there any waste water disposal needs in the area adjacent to the new land development that should be considered by the municipality?
If yes, describe _____
3. Is there any known groundwater degradation in the area of the proposed subdivision?
If yes, describe _____
4. The county or joint county health department recommendation concerning this proposed plan is as follows: ACHD recommends approval. See attached letter.
5. Name, title and signature of person completing this section:
Name: Deborah Williamson, P.E.
Title: Environmental Health Engineer
Signature:
Date: March 11, 2013
Name of County Health Department: ACHD
Address: 3901 Penn Avenue, Building #5, Pittsburgh PA 15224-1318
Telephone Number: 412.578.8040

SECTION D. ADDITIONAL COMMENTS (See Section D of instructions)

This Component does not limit county planning agencies from making additional comments concerning the relevancy of the proposed plan to other plans or ordinances. If additional comments are needed, attach additional sheets.

The county planning agency must complete this Component within 60 days.

This Component and any additional comments are to be returned to the applicant.

COUNTY OF



ALLEGHENY

RICH FITZGERALD
COUNTY EXECUTIVE

March 11, 2013

Mr. John Spires, P.E.
Cosmos Technologies, Inc.
700 River Avenue, Suite 412
Pittsburgh, PA 15212

**RE: SEWAGE FACILITIES PLANNING MODULE
LOWER HILL REDEVELOPMENT
CITY OF PITTSBURGH**

Dear Mr. Spires:

Enclosed is a signed copy of Component 4C, County or Joint County Health Department Review, for the above-referenced development. This Planning Module Component was received on March 8, 2013. The project proposes the following:

Project Description:	Multi-residential, commercial and mixed use development on the former Civic Arena site
Sewage Flow:	756,547 GPD Net
Conveyance:	PWSA combined sewer to POC M-05 and the Monongahela River Interceptor and to POC A-12 and the Allegheny River Interceptor
Sewer's Owner:	PWSA and ALCOSAN
Name of Sewage Treatment Plant:	ALCOSAN

Please be advised that a permit must be obtained from the Allegheny County Health Department's (ACHD) Plumbing Section prior to commencing any plumbing work for the proposed project. Plumbing work for which an ACHD Plumbing Permit must be obtained includes any plumbing work done on the site and any sewers, which will not be owned and operated by a municipality or a sewer authority. In addition, it should be noted that the approval of this sewage facilities planning module does not include approval of pipe size and/or type. Approval for pipe size and/or type must be obtained by filing a specific plumbing plan with the ACHD's Plumbing Section. If you should have any questions relative to ACHD's plumbing requirements, please contact Flawzel A. Hall, Plumbing Inspector Supervisor, at 412-578-8393.

The ACHD has no objection to the approval of this project. If you have any questions, please call me at 412-578-8040.

Sincerely,

Deborah Williamson, P.E.
Environmental Health Engineer
Public Drinking Water & Waste Management
Allegheny County Health Department
3901 Penn Avenue, Building #5
Pittsburgh, Pennsylvania 15224-1318
Phone: 412-578-8040
FAX: 412-578-8053

lo

Enclosure

cc: Thomas Flanagan, PA Department of Environmental Protection w/attachment
Flawzel A. Hall, Plumbing Inspector Supervisor, ACHD w/attachment

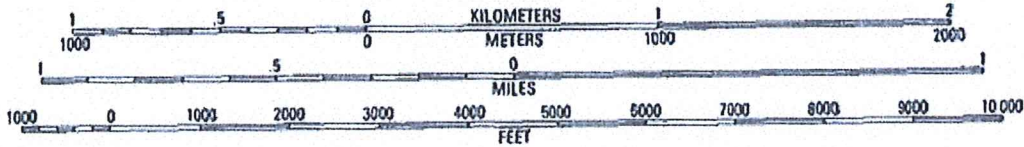
RONALD E. VOORHEES, MD, MPH, ACTING DIRECTOR
ALLEGHENY COUNTY HEALTH DEPARTMENT
3333 FORBES AVENUE • PITTSBURGH, PA 15213
PHONE (412) 687-ACHD (2243) • FAX (412) 578-8325 • WWW.ACHD.NET

Appendix D

Site Location U.S.G.S. 7.5 Minute Topographic Maps



SCALE 1:24 000



REFERENCE: USGS 7.5 Minute Series (Topographic), Pittsburgh East Quadrangle, 1997



700 River Avenue, Suite 112
 Pittsburgh, PA 15212-5936
 Phone: (412) 311-3951
 Fax: (412) 321-3954
 E-mail: info@cosmostechnologiesinc.com
 Website: www.cosmostechnologiesinc.com

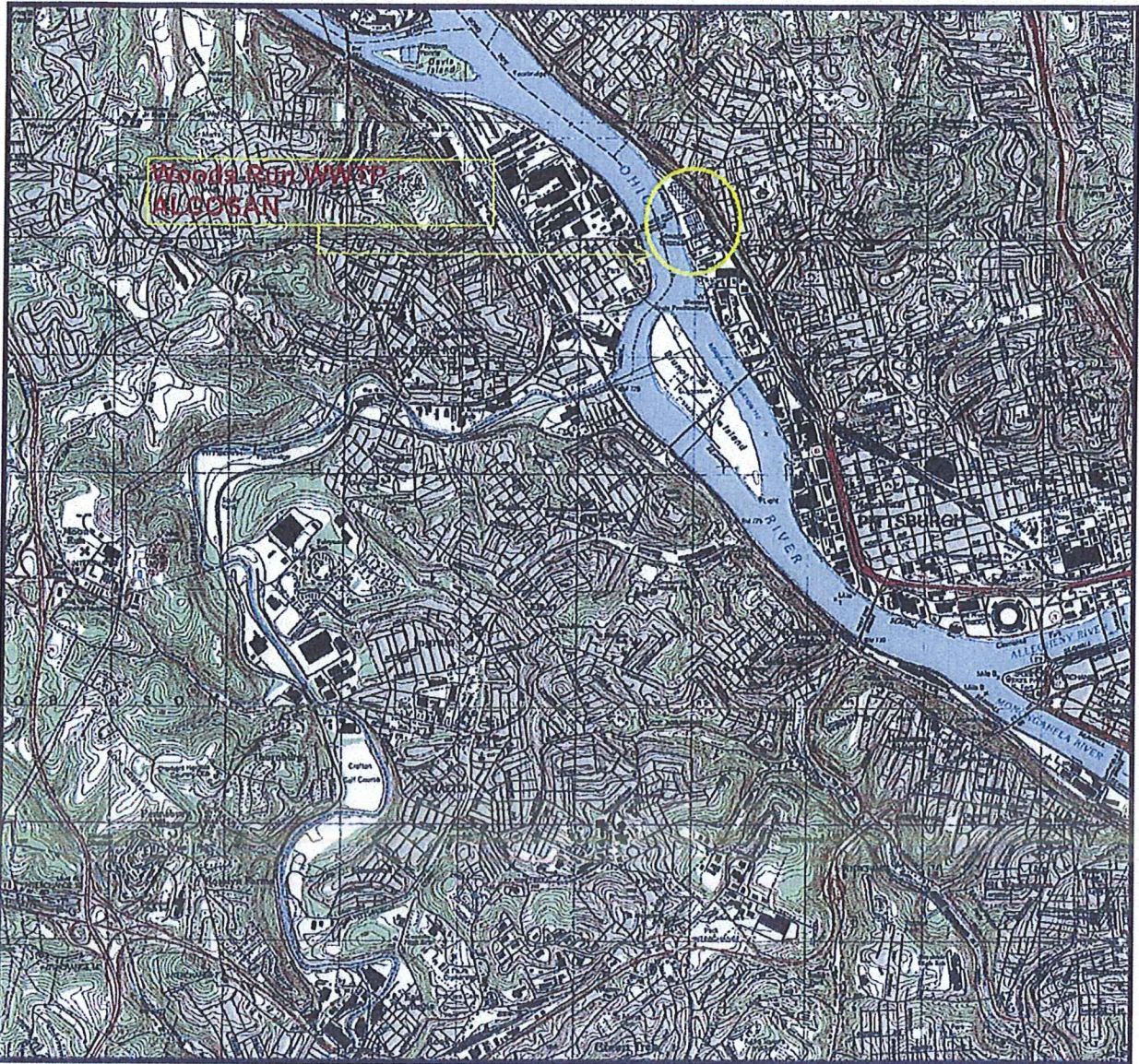
Cosmos Technologies Inc.

**Site Location U.S.G.S. 7.5 Minute
 Topographic Map
 Lower Hill Redevelopment
 City of Pittsburgh
 Allegheny County, Pennsylvania 15219**

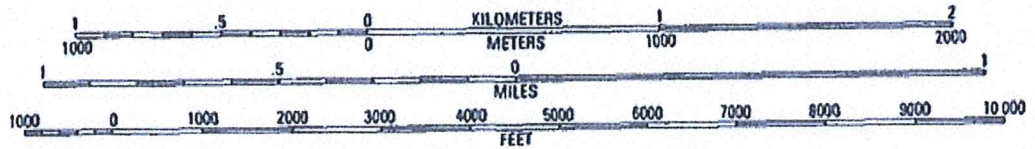
DRAWN BY: Sehul Patel

DATE: 11/07/2012

FIGURE 1



SCALE 1:24 000



REFERENCE: USGS 7.5 Minute Series (Topographic), Pittsburgh West Quadrangle, 1997



700 River Avenue, Suite 412
 Pittsburgh, PA 15212-5936
 Phone: (412) 321-3951
 Fax: (412) 321-3951
 E-mail: info@cosmostechnologiesinc.com
 Website: www.cosmostechnologiesinc.com

Cosmos Technologies Inc.

**Site Location U.S.G.S. 7.5 Minute
 Topographic Map
 Lower Hill Redevelopment
 City of Pittsburgh
 Allegheny County, Pennsylvania 15219**

DRAWN BY: Sehul Patel

DATE: 11/08/2012

FIGURE 2

Appendix E

Project Narrative

SEWAGE FACILITIES PLANNING MODULE
COMPONENT 3 – SEWAGE COLLECTION AND TREATMENT FACILITIES
SECTION F – PROJECT NARRATIVE
LOWER HILL REDEVELOPMENT SITE
CITY OF PITTSBURGH, ALLEGHENY COUNTY, PENNSYLVANIA

On behalf of the Sports & Exhibition Authority (SEA), Cosmos Technologies, Inc. (Cosmos) presents this Project Narrative (Section F of Component 3) to accompany the Sewage Facilities Planning Module for the Lower Hill Redevelopment Site Infrastructure project for a proposed multi-residential, commercial and mixed use development. The site is located in the Lower Hill District neighborhood of the City of Pittsburgh, Allegheny County, Pennsylvania. The site is bounded by Crawford Street to the east, Washington Place to the west, Bedford Avenue to the north, and Centre Avenue to the south. The boundaries of the project site are shown on Site Location U.S.G.S. 7.5 Minute Topographic Map (Figure 1 of Appendix D) and Plot Plan (Appendix F).

The project site is approximately thirty (30) acres in size. The site consists of the following parcels: 2-C-400, 2-C-300, 2-C-382, 2-C-383, and 2-B-400. Currently, these parcels are occupied by surface parking lots. The proposed development on this site includes residential, retail/ commercial, office, hotel, structured parking, parks space, and other open space.

The parcel #2-C-400 consisted of former civic arena, and surface parking lots. Recently, the civic arena has been demolished and is now replaced by more surface parking lots. The parcel numbers, 2-C-300, 2-C-382, 2-C-383, and 2-B-400 are surface parking lots.

The proposed development will generate approximately 841,547 gpd or 2,104 EDUs. The sanitary flow and water usage calculations include use for townhomes, apartments, restaurants (conventional and short-order), bar, retail stores, cineplex, hotel, office, parks, HVAC condensate and irrigation flows. Approximately 85,000 gpd will be considered replacement flows based upon calculations submitted to and approved by the Pittsburgh Water and Sewer Authority (PWSA) for the demolished former Civic Arena at the site. Therefore, the actual increase in flows from this project has been calculated to be 756,547 gpd or 1,891 EDUs (Appendix J – Total Sewage Flows to Facilities Table), based upon the inclusion of the replacement sanitary flow data.

All proposed sanitary and storm sewers have been designed as separate sewer systems within the project boundaries. Once connected to the public sewer system, the sewage flows from the site will flow by gravity to the existing combined sewer system located along Centre Avenue.

Video inspections of PWSA-owned sewers in the immediate vicinity have been completed as part of the Civic Arena demolition project, which has been evaluated and coordinated with the PWSA.

The proposed sanitary flows from the site will tie into the two (2) existing combined sewer systems, one along Centre Avenue, which eventually flows by gravity downstream via Fifth Avenue to the ALCOSAN Interceptor Line located at the Monongahela River, and the other along Bedford Ave and Washington Place which flows by gravity downstream via seventh Street to the ALCOSAN Interceptor line located at the Allegheny River.. The sewage treatment will be provided via the Woods Run Wastewater Treatment Plant operated by the Allegheny County Sanitary Authority (ALCOSAN) (Appendix D – Site Location Map).



Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

Breakdown of Peak Sanitary Flows for the Proposed Development Blocks

A detailed breakdown of the peak daily sanitary flows for the proposed developments blocks are shown on pages 5 and 6 of Attachment 6 of this submission (“Appendix J” of the previously submitted Sewage Facilities Planning Module packet). The flow estimates are based on the Illustrative Master Plan, Section 9 of Preliminary Land development Plan (PLDP), which includes a breakdown of the overall PLDP program on a block by block basis.

Notes:

1. For the project site, the **Total Water Consumption** of 996,424 gpd is equal to the sum of daily water usage (937,845 gpd) and average daily cooling tower make-up water usage (58,579 gpd) for the Max Development Program.
2. The **Total Sanitary Flows** of 841,547 gpd is equal to the sum estimated peak sanitary flow (827,125 gpd) and average daily condensate discharge (14,422 gpd) for the Max Development Program.

Breakdown of Peak Storm Flows for the Proposed Development Blocks

The proposed storm flow computations for the development blocks have been previously included in “Appendix C” of the preliminary drainage report (“Appendix L” of the previously submitted Sewage Facilities Planning Module packet). Please refer to the table below which reflects an estimation of storm flows generated by the building structures from various development blocks. The percentage of buildings is estimated from the Illustrative Master Plan, Section 9 of Preliminary Land development Plan (PLDP).

Storm Flows for Proposed Development Blocks

BLOCK ID	AREA (acres) A	TOTAL RUNOFF Q _{10-yr} (cfs)	TOTAL RUNOFF Q _{25-yr} (cfs)	PERCENT BUILDINGS (%)	BUILDING RUNOFF Q _{10-yr} (cfs)	BUILDING RUNOFF Q _{25-yr} (cfs)
Block-A	3.38	16.5	18.9	75.0	12.4	14.2
Block-B	2.80	12.1	13.9	60.0	7.3	8.4
Block-C	4.78	23.3	26.8	75.0	17.5	20.1
Block-D	2.27	11.1	12.7	75.0	8.3	9.5
Block-E	2.60	12.7	14.6	75.0	9.5	10.9
Block-F	1.84	8.0	9.1	60.0	4.8	5.5
Block-G	3.11	15.2	17.4	75.0	11.4	13.1
Block-H	2.86	8.9	10.3	25.0	2.2	2.6

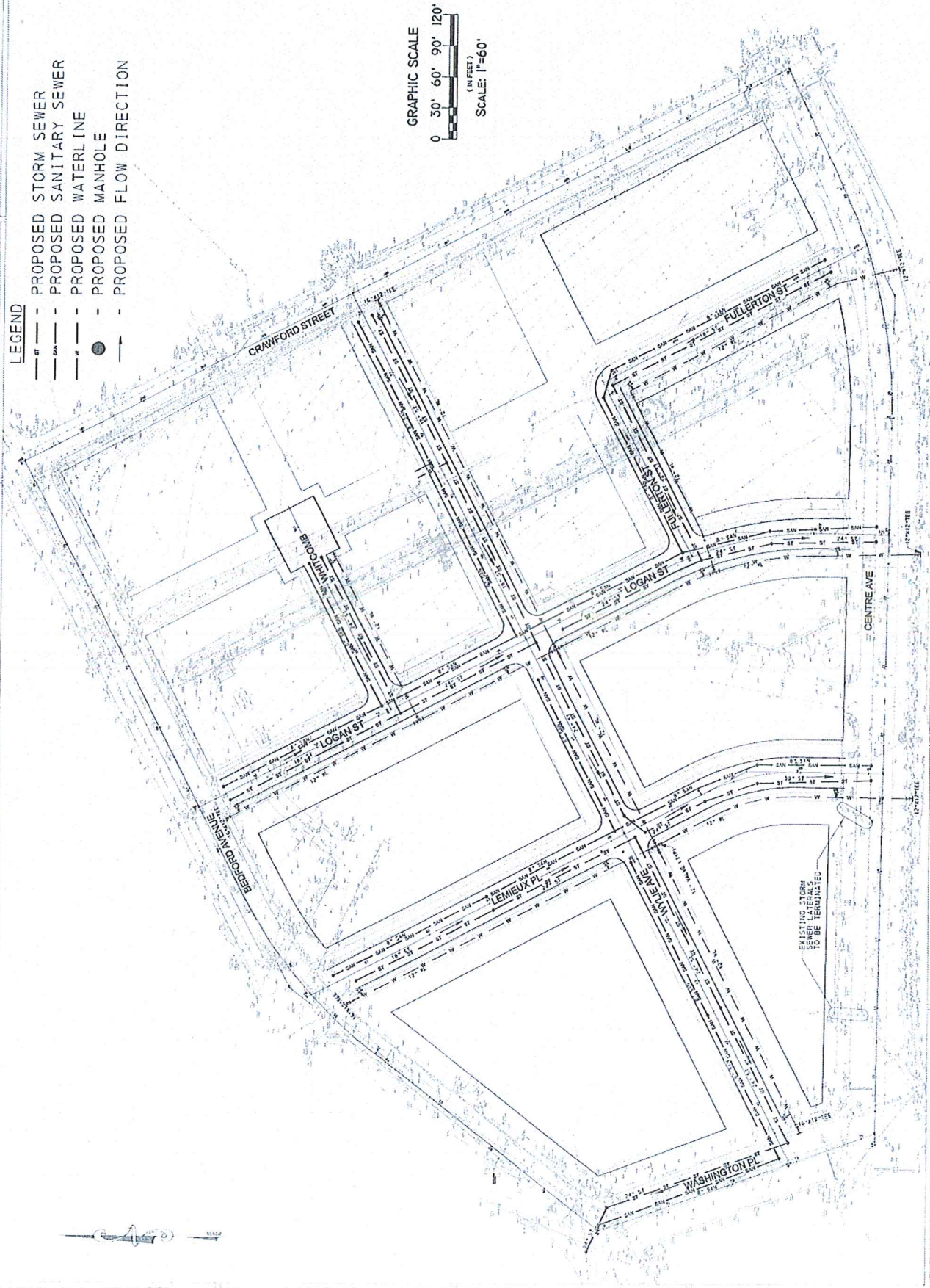
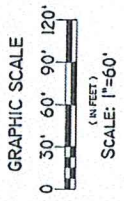


Appendix F

Plot Plan

NOT FOR CONSTRUCTION / FOR INFORMATION ONLY

- LEGEND**
- PROPOSED STORM SEWER
 - PROPOSED SANITARY SEWER
 - PROPOSED WATERLINE
 - PROPOSED MANHOLE
 - PROPOSED FLOW DIRECTION



Appendix G

Pennsylvania Historical & Museum Commission Application and Letter

SEWAGE FACILITIES PLANNING MODULE
COMPONENT 3 – SEWAGE COLLECTION AND TREATMENT FACILITIES
SECTION G.6 – HISTORIC PRESERVATION ACT
LOWER HILL REDEVELOPMENT SITE
CITY OF PITTSBURGH, ALLEGHENY COUNTY, PENNSYLVANIA

Cosmos Technologies, Inc. (Cosmos) will submit copies of the completed Cultural Resources Notice (CRN), a return receipt for its submission to the (PHMC) and the PHMC review letter when they become available.



Cosmos Technologies Inc.

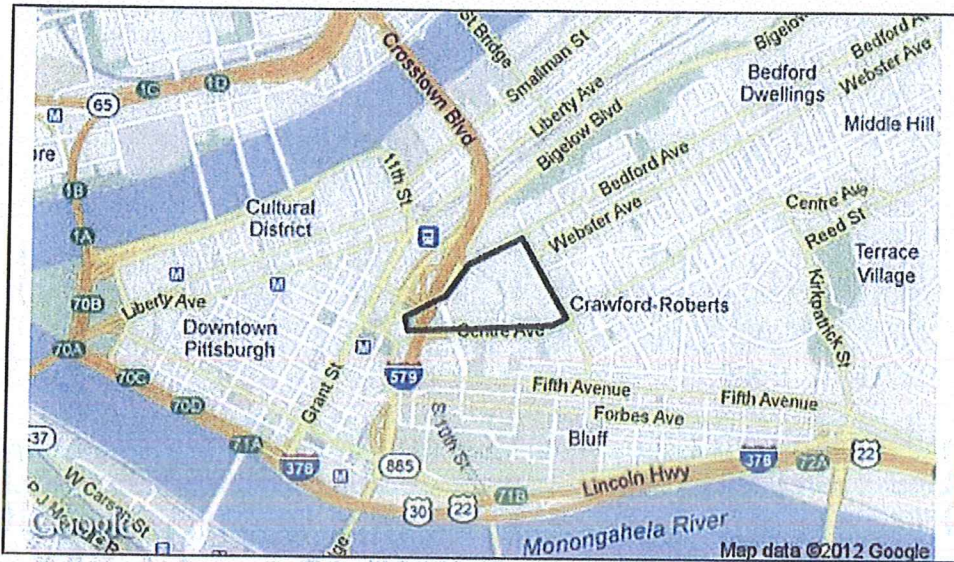
INNOVATION FOR THE FUTURE

Appendix H

PNDI Project Environmental Review Receipt

1. PROJECT INFORMATION

Project Name: **Lower Hill Redevelopment**
 Date of review: **11/7/2012 1:45:18 PM**
 Project Category: **Development, Other**
 Project Area: **32.5 acres**
 County: **Allegheny** Township/Municipality: **Pittsburgh**
 Quadrangle Name: **PITTSBURGH EAST** ~ ZIP Code: **15219**
 Decimal Degrees: **40.441264 N, -79.989480 W**
 Degrees Minutes Seconds: **40° 26' 28.6" N, -79° 59' 22.1" W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are valid for two years (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

PGC Species: (Note: The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)

Scientific Name: Falco peregrinus

Common Name: Peregrine Falcon

Current Status: Endangered

Proposed Status: Endangered

PA Department of Conservation and Natural Resources

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: No impacts to federally listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.

** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, send the following information to the agency(s) seeking this information (see AGENCY CONTACT INFORMATION).

Check-list of *Minimum Materials to be submitted:*

- SIGNED** copy of this Project Environmental Review Receipt
- Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
- Project location information (name of USGS Quadrangle, Township/Municipality, and County)
- USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the map

The inclusion of the following information may expedite the review process.

- A basic site plan (particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
- Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
- Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at <http://www.naturalheritage.state.pa.us>.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA.
17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service
Endangered Species Section
315 South Allen Street, Suite 322, State College, PA.
16801-4851
NO Faxes Please.

PA Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

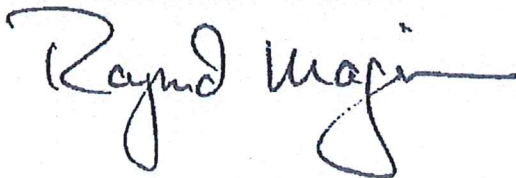
Name: Raymond Maginness
Company/Business Name: Michael Baker Jr., Inc.
Address: 100 Airside Drive
City, State, Zip: Moon, PA 15108
Phone: (412) 269-2749
Email: rmaginness@mbakercorp.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

date



November 07, 2012

Appendix I

Alternative Analysis Narrative

**SEWAGE FACILITIES PLANNING MODULE
 COMPONENT 3 – SEWAGE COLLECTION AND TREATMENT FACILITIES
 SECTION I – ALTERNATIVE ANALYSIS NARRATIVE
 LOWER HILL REDEVELOPMENT SITE
 CITY OF PITTSBURGH, ALLEGHENY COUNTY, PENNSYLVANIA**

On behalf of the Sports & Exhibition Authority (SEA), Cosmos Technologies, Inc. (Cosmos) presents this Alternative Analysis Narrative (Section H of Component 3) to accompany the Sewage Facilities Planning Module for the Lower Hill Redevelopment Site Infrastructure project for a proposed multi-residential and commercial development. The site is located in the Lower Hill District neighborhood of the City of Pittsburgh, Allegheny County, Pennsylvania. The site is bounded by Crawford Street to the east, Washington Place to the west, Bedford Avenue to the north, and Centre Avenue to the south. The boundaries of the project site are shown on Site Location U.S.G.S. 7.5 Minute Topographic Map (Figure 1 of Appendix D) and Plot Plan (Appendix F).

Please find following information for Sewage Facilities Analysis:

1. Proposed Disposal Method:

The proposed sanitary flows will be conveyed to the Woods Run Wastewater Treatment Plant (operated by Allegheny County Sanitary Authority) via Monongahela River deep tunnel interceptor and Allegheny River deep tunnel interceptor systems which discharge into the Main Pumping Station from where it is lifted to flow by gravity through the treatment process. The Woods Run WWTP is located along the Ohio River on the North Side neighborhood of the City of Pittsburgh, Pennsylvania. The wastewater at the Woods Run WWTP is treated by following processes: Mechanical Bar Screens (6 units), Aerated Grit Collecting Tanks (6 units), Primary Sedimentation Tanks (9 units), 4-pass Aeration Basins (8 units), Secondary Sedimentation Tanks (16 units), Chlorine Contact Tanks (2 units), and Effluent Post Aeration system.

2. Type of Land uses Adjacent to the Project Area: The project area is located in a dense and urban setting. The current land use of adjacent properties is as follows:

Table 1 – Summary of Current and Past Uses of Adjoining Properties

Direction	Street Name	Current Use	Zoning Designation	Sewage Disposal Method
East	Crawford Street	Two-Story Town Homes and Multi-Story Apartment Complex	RP/ Residential Planned	Centralized Treatment by ALCOSAN
West	Washington Place	Surface Parking Lot	GT-E/ Golden Triangle Subdistrict E	Centralized Treatment by ALCOSAN
North	Bedford Avenue	School & Boy Scouts of America	GT-E/ Golden Triangle Subdistrict E	Centralized Treatment by ALCOSAN
South	Centre Avenue	Stadium, Multi-Story Apartment Complex, Church and Hotel	GT-E/ Golden Triangle Subdistrict E	Centralized Treatment by ALCOSAN



Cosmos Technologies Inc.

3. The public sewer system is described as the sewage collection, conveyance and disposal method for proposed development in the Lower Hill District area as per City of Pittsburgh's Official Sewage Plan.
4. There are not any potential alternative sewage disposal methods available for the project except public sewer system because of the site being located in a dense, urban setting and does not lend itself to an onlot treatment.
5. The site is served by the Pittsburgh Water & Sewer Authority (PWSA) as the collection facility, while the Allegheny County Sanitary Authority (ALCOSAN) as the conveyance and treatment facility.
6. The above-mentioned facilities will be used for the Lower Hill Redevelopment site because of these facilities are readily accessible.



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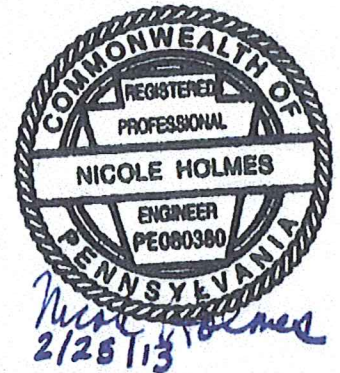
Appendix J

Total Sewage Flows to Facilities Table

MEMORANDUM

TO: Rich Hixon, Executive Director of Strategic Planning
 Pittsburgh Penguins
FROM: Nicole Holmes, PE
DATE: February 25, 2013 (Final)
RE: Lower Hill Redevelopment Plan
 Peak Sanitary Flow and Water Usage
 Calculations

Nitsch Project #8959.1



The attached preliminary peak daily sanitary flow and water usage estimates are based on the following program for Preliminary Land Development Plan Program (PLDP) and the Max Development Program for the Lower Hill Redevelopment:

PLDP and Max Development Program Summary							
Use	PLDP Program	Units	Factor	Max Development Program	Units	Area Conversion	Area
Townhouse	44	units	10%	48	units	1,400 sf	67,760
Apartments	1,143	units	10%	1,257	units	1,200 sf	1,508,760
Community	8,800	sf	10%	9,680	sf	1 sf	9,680
Retail	198,850	sf	10%	218,735	sf	1 sf	218,735
Cineplex	2,310	seats	5%	2,426	seats	22 sf/seat	53,361
Hotel	150	rooms	10%	165	rooms	1,000 sf/room	165,000
Office	631,962	sf	20%	758,354	sf	1 sf	758,354
Total Area (sf)	2,473,632					Total Area (sf)	2,781,650

The PLDP's Section 9: Illustrative Plan (dated October 10, 2012) includes a breakdown of the overall PLDP Program on a block by block basis – these values were used to perform the sanitary flow and water usage calculations on a block by block basis. The percent increase factor between the PLDP Program to the Max Development Program provided in the table above was applied to the block-by-block PLDP Program uses to estimate the Max Development program by block.

The peak daily flow rates were obtained from the Pittsburgh Water and Sewer Authority (PWSA) Procedures Manual for Developers, Table 1. The following referenced values are applicable to the proposed program:

Peak Daily Sanitary Flow Assumptions	
PWSA Procedures Manual for Developers	
Table 1 Sanitary Sewage Flow Estimates	
Referenced from PA Code Title 25 Chapter 73	
Type of Establishment	Projected Sewage Flow (gpd/unit)
Multi-family dwellings (per unit)	400
Apartments: 2 Bedroom (per unit)	300
Apartments: Larger than 2BR (per unit)	400
Hotels (per unit)	100
Offices (per employee)	10
Restaurants, toilet and kitchen wastes (per patron)	10
(Additional for bars and cocktail lounges)	2
Stores (per public toilet)	400
Stores (per public urinal)	200
Stores (per public sink)	200
Theaters (not including food, per seat)	5
Fairgrounds and parks, picnic (toilet wastes only, per person)	5
HVAC condensate from commercial, industrial & institutional facilities	Applicant must estimate flow

In order to apply the peak daily flow values, Nitsch Engineering made several assumptions to estimate the number of bedrooms, employees, patrons, etc. The assumptions were based upon typical building code requirements, design standards, rule-of-thumb values, and our experience on other large mixed-use projects.

A summary of assumptions follows:

- The total number of multi-family apartment units are assumed to be 60% 2-bedroom units and 40% 3-bedroom units;
- The total square footage of retail space per block is assumed to be a mix of 40% restaurant, 20% fast-food restaurant, 20% bar/lounge, and 20% retail stores;
- To calculate the number of patrons for restaurants, the total number of seats was estimated based on rule-of-thumb design standards. Assuming seating is available for 2/3 of the total space (leaving 1/3 for kitchen/prep space), one (1) seat per 15 square feet was used to determine the number of seats. Four (4) seatings per day is assumed to calculate the number of daily patrons;
- To calculate the number of patrons for bars, the total number of seats was estimated based on rule-of-thumb design standards. Assuming seating is available for 2/3 of the total space, one (1) seat per 10 square feet was calculated to determine the number of seats. Two (2) seatings per day is assumed to calculate the number of daily patrons;
- For retail store space, the total number of customers is assumed to be one (1) customer per 200 square feet. One (1) restroom (including one [1] toilet and one [1] sink) is assumed per 50 occupants, with each restroom having one (1) toilet and one (1) sink;

- For the park toilet wastes, the estimated number of visitors is estimated as five (5) visitors per 1,000 square feet;
- For each park, a pavilion café/coffee shop is assumed as 500 customers per day; and
- For office space, the number of employees is estimated to be 3.3 employees per 1,000 square feet.

Peak daily water usage is estimated by applying a factor of 1.1 to the sanitary flow values.

Water usage was assumed for irrigation of landscaping on the development blocks including the parks. Irrigation is estimated using an industry rule-of-thumb application rate of 1 inch per week. The amount of space requiring irrigation at the parks and community space is estimated as 60% of the total park development area. No water usage is assumed for the street trees or the green roofs that may be incorporated in the building designs. Although rainwater harvesting is being considered to offset potable water usage, the associated reduced water demands were conservatively not included in this analysis.

The peak flow and water usage calculations are presented in Attachment 1: Peak Daily Sanitary Flow and Water Usage Analysis. Based on the program and assumptions summarized in this memorandum:

- The estimated peak daily sanitary flow for the PLDP and Max Development Programs is **752,831 gallons per day** and **827,125 gallons per day**, respectively.
- The estimated daily water usage for the PLDP and Max Development Programs is **856,121 gallons per day** and **937,845 gallons per day**, respectively. The water usage calculations include approximately 25,215 gallons per day attributed to irrigation, which would only occur during the growing season.

Additionally, water usage and sanitary flow estimates for cooling tower/HVAC condensate have been calculated by CJL Engineering. These calculations are presented in the attached letter and calculations dated February 25th, 2012 from CJL Engineering. Based on the program and assumptions referenced in the calculations:

- The estimated average daily condensate discharge (sanitary flow) for the PLDP and Max Development Programs is **9,312 gallons per day** and **10,541 gallons per day**, respectively.
- The estimated average daily cooling tower make-up water usage for the PLDP and Max Development Program is **48,274 gallons per day** and **54,698 gallons per day**, respectively.

These total peak sanitary flow and daily water usage estimates for the development area have been prepared based on the development program identified in the Lower Hill Preliminary Land Development Plan, Section 9: Illustrative Master Plan dated October 10, 2012.

NH/mmn

Lower Hill Redevelopment Plan
 Attachment 1: Peak Daily Sanitary Flow and Water Usage Analysis
 Tuesday, January 22, 2013
 NRech#9959.1

Lower Hill Redevelopment Plan: Peak Daily Sanitary Flow and Water Usage Estimates										
Block	Program	Development Scenario per Illustrative Master Plan Program					Development Scenario per Maximum Development Statistics			
		Total	Units	Assumptions for Peak Calculation**	Calculated Peak Sanitary Flow (gpd)	Calculated Peak Water Use (gpd)	Total Units**	Assumptions for Peak Calculation**	Calculated Peak Sanitary Flow (gpd)	Calculated Peak Water Use (gpd)
A	Attached Houses	15	Units	None - Per unit	8,000		17	None - Per unit	6,600	
	Multi-family Apartments	329	Units	60% of units 2BR, 40% of units 3BR	111,860		362	60% of units 2BR, 40% of units 3BR	123,046	
	Total Residential	344			119,860		379		129,646	142,611
	Restaurants - Conventional (40% of Total)	5,358	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	9,560		5,662	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	10,480	
	Restaurants - Short Order (20% of Total)	2,678	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	4,800		2,616	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	5,240	
	Bar (20% of Total)	2,678	Square Feet	1 customer/105SF, with seating at 2/3 of the space; 2 seatings/seat/day	4,206		2,946	1 customer/105SF, with seating at 2/3 of the space; 2 seatings/seat/day	4,728	
	Retail Stores (20% of Total)	2,078	Square Feet	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		2,048	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600	
	Total Retail (SF)	13,300			19,256		14,720		21,048	23,153
	Parking (SF)	365	Square Feet	No substantial flow			365	No substantial flow		
	Block Landscaping	35,234	Square Feet	1 inch/week			3,137	1 inch/week		3,137
BLOCK TOTAL				137,116	193,969			150,694	168,901	
B	Multi-family Apartments	223	Units	60% of units 2BR, 40% of units 3BR	75,820		245	60% of units 2BR, 40% of units 3BR	83,402	
	Total Residential	223			75,820		245		83,402	91,742
	Restaurants - Conventional (40% of Total)	4,364	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	7,760		4,800	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	8,560	
	Restaurants - Short Order (20% of Total)	2,182	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	3,860		2,400	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	4,260	
	Bar (20% of Total)	2,182	Square Feet	1 customer/105SF, with seating at 2/3 of the space; 2 seatings/seat/day	3,604		2,400	1 customer/105SF, with seating at 2/3 of the space; 2 seatings/seat/day	3,664	
	Retail Stores (20% of Total)	2,182	Square Feet	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		2,400	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600	
	Total Retail	10,910			15,744		12,001		17,304	16,034
	Parking	247	Square Feet	No substantial flow			247	No substantial flow		
	Community Space	8,600	Square Feet	No substantial flow			9,680	No substantial flow		
	Park	43,560	Square Feet	5 Park visitors/1,000 SF 500 customers/day for coffee shop in park 1 inch/week, 60% of the space requires irrigation	1,090 5,000	1,109 5,500	43,560	5 Park visitors/1,000 SF 500 customers/day for coffee shop in park 1 inch/week; 60% of the space requires irrigation	1,090 5,000	1,109 5,500
Total Park				6,090	6,609			6,090	6,609	
Block Landscaping	63,543	Square Feet	1 inch/week		4,768	63,543	1 inch/week		4,768	
BLOCK TOTAL				97,854	114,516			108,738	124,571	
C	Attached Houses	29	Units	None - Per unit	11,600		32	None - Per unit	12,760	
	Multi-family Apartments	326	Units	60% of units 2BR, 40% of units 3BR	110,840		359	60% of units 2BR, 40% of units 3BR	121,924	
	Total Residential	355			122,440		391		134,684	148,152
	Parking	390	Square Feet	No substantial flow			360	No substantial flow		
	Block Landscaping	69,354	Square Feet	1 inch/week		5,820	65,354	1 inch/week		5,820
BLOCK TOTAL				122,440	140,604			134,684	153,972	
D	Multi-family Apartments	141	Units	60% of units 2BR, 40% of units 3BR	47,940		155	60% of units 2BR, 40% of units 3BR	52,734	
	Total Residential	141			47,940		155		52,734	58,007
	Restaurants - Conventional (40% of Total)	16,880	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	30,040		18,669	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	33,040	
	Restaurants - Short Order (20% of Total)	8,440	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	15,040		9,284	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	16,520	
	Bar (20% of Total)	8,440	Square Feet	1 customer/105SF, with seating at 2/3 of the space; 2 seatings/seat/day	13,512		9,284	1 customer/105SF, with seating at 2/3 of the space; 2 seatings/seat/day	14,666	
	Retail Stores (20% of Total)	8,440	Square Feet	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		9,284	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600	
	Total Retail	42,200			59,152	65,111	45,420		65,010	71,518
	Office	116,000	Square Feet	3.3 employees/1,000 SF	3,328	4,211	139,200	3.3 employees/1,000 SF	4,594	5,053
	Parking	305	Square Feet	No substantial flow			305	No substantial flow		
	Block Landscaping	23,510	Square Feet	1 inch/week		2,094	23,510	1 inch/week		2,094
BLOCK TOTAL				116,660	124,160			122,344	136,672	
E	Multi-family Apartments	124	Units	60% of units 2BR, 40% of units 3BR	42,160		136	60% of units 2BR, 40% of units 3BR	46,376	
	Total Residential	124			42,160		136		46,376	51,014
	Restaurants - Conventional (40% of Total)	5,766	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	10,280		6,343	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	11,263	
	Restaurants - Short Order (20% of Total)	2,893	Square Feet	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	5,160		3,171	1 patron/155SF, with seating at 2/3 of the space; 4 seatings/seat/day	5,640	

Block	Program	Development Scenario per Illustrative Master Plan Program					Development Scenario per Maximum Development Statistics				
		Total	Units	Assumptions for Peak Calculation***	Calculated Peak Sanitary Flow (gpd)	Calculated Peak Water Use (gpd)	Total Units **	Assumptions for Peak Calculation***	Calculated Peak Sanitary Flow (gpd)	Calculated Peak Water Use (gpd)	
	Bar (20% of Total)	2,653	Square Foot	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	4,632		3,171	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	5,009		
	Retail Stores (20% of Total)	2,653	Square Foot	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		3,171	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		
	Total Retail	14,415			20,672		15,857		22,608	24,609	
	Office	103,370	Square Foot	3.3 employees/1,000 SF	3,576	3,934	130,044	3.3 employees/1,000 SF	4,201	4,721	
	Parking	481	Square Foot	No substantial flow			481	No substantial flow			
	Block Landscaping	22,119	Square Foot	1 inch/week			22,119	1 inch/week			
BLOCK TOTAL				69,408	75,010			73,275	82,573		
F	Restaurants - Conventional (40% of Total)	9,240	Square Foot	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	16,440		10,164	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	18,080		
	Restaurants - Short Order (20% of Total)	4,620	Square Foot	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	8,240		5,082	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	9,040		
	Bar (20% of Total)	4,620	Square Foot	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	7,302		5,082	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	8,136		
	Retail Stores (20% of Total)	4,620	Square Foot	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		5,082	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		
	Total Retail	23,099			32,672	35,039	25,409		35,659	39,432	
	Cineplex	2,310	Seats	Per seat, assuming no fast food service	11,550	12,705	2,426	Per seat, assuming no fast food service	12,128	13,340	
				5 Park visitors/1,000 SF	1,090	1,199		5 Park visitors/1,000 SF	1,090	1,159	
	Park	52,272	Square Foot	500 customers/day for coffee shop in park; 1 inch/week; 60% of the space requires irrigation	5,000	5,500	52,272	500 customers/day for coffee shop in park; 1 inch/week; 60% of the space requires irrigation	5,000	5,500	
	Total Park				6,090	6,699			6,090	6,659	
	Block Landscaping	35,247	Square Foot	1 inch/week			35,247	1 inch/week			
BLOCK TOTAL				59,312	64,275			54,074	63,412		
G	Restaurants - Conventional (40% of Total)	35,934	Square Foot	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	69,920		39,628	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	70,280		
	Restaurants - Short Order (20% of Total)	17,967	Square Foot	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	31,960		19,704	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	35,160		
	Bar (20% of Total)	17,967	Square Foot	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	29,762		19,704	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	31,632		
	Retail Stores (20% of Total)	17,967	Square Foot	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	1,200		19,704	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	1,200		
	Total Retail	89,835			125,832	138,415	69,820		138,272	152,059	
	Office	407,592	Square Foot	3.3 employees/1,000 SF	13,451	14,766	489,110	3.3 employees/1,000 SF	16,141	17,753	
	Hotel	150	Rooms	None - Per unit	15,000	16,500	165	None - Per unit	16,500	18,150	
	Parking	700	Square Foot	No substantial flow			700	No substantial flow			
	Block Landscaping	6,335	Square Foot	1 inch/week			6,335	1 inch/week			
	BLOCK TOTAL				154,283	170,275			170,913	189,568	
H	Restaurants - Conventional (40% of Total)	2,600	Square Foot	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	3,560		2,200	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	3,920		
	Restaurants - Short Order (20% of Total)	1,000	Square Foot	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	1,800		1,100	1 patron/15SF, with seating at 2/3 of the space; 4 seatings/seat/day	1,560		
	Bar (20% of Total)	1,000	Square Foot	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	1,600		1,100	1 customer/10SF, with seating at 2/3 of the space; 2 seatings/seat/day	1,770		
	Retail Stores (20% of Total)	1,000	Square Foot	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		1,100	1 occupant per 200 SF, assume 1 water closet and 1 sink per 50 occupants	600		
	Total Retail	5,000			7,560	8,326	5,500		8,256	9,082	
				5 Park visitors/1,000 SF	1,000	1,100		5 Park visitors/1,000 SF	1,000	1,100	
	Park	20,130	Square Foot	500 customers/day for coffee shop in park; 1 inch/week; 60% of the space requires irrigation	5,000	5,500	20,130	500 customers/day for coffee shop in park; 1 inch/week; 60% of the space requires irrigation	5,000	5,500	
Total Park				6,000	6,600			6,000	6,600		
BLOCK TOTAL				13,660	16,426			14,346	17,177		
TOTAL DAILY FLOW (GPD) - ALL BLOCKS****				752,831	856,121			827,125	937,845		

*Source: 10/17/14_CPCorpus_MatualPlan.pdf (04/3/10 03:02) retrieved from L'Orchard Bond Association on October 11, 2012
 **Source: Lower Hill development program for flow analysis 11/4/2012 retrieved from Durham eGroup LLC on November 4, 2012 (except number of total floors per area from Craig Durham dated November 7, 2012)
 ***Restaurants Short Order Assumption - Source: 2000 International Building Code, Table 1004.1.1 Maximum Floor Area Allowances Per Occupant, Restaurant/Bar Seating Assumptions - Not Seated
 ****Estimate do not include HVAC cooling tower for condensate. Water use estimate also does not include irrigation for green roofs or street trees, nor does it account for water use savings from rainwater harvesting.

Attachment #2

Development Scenario per Illustrative Master Plan Program

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)	
A	Townhouses	15	1,400	550	2.5	38.2	15	0.07	2.67	
	Apartments	329	1,200	400	3.0	987.0	15	0.07	69.09	
	Restaurant-(Conventional)	1	5,356	145	36.9	36.9	20	0.10	3.69	
	Restaurant-(Short Order)	1	2,678	170	15.8	15.8	20	0.10	1.58	
	Bar	1	2,678	170	15.8	15.8	20	0.10	1.58	
	Retail Stores	1	2,678	225	11.9	11.9	20	0.10	1.19	
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down	
Apartments Cooling Tower	2	987.0	*	1,315	5	1,776.6	444.2	2630		
Block Totals					Block Total AC Tons		1105.5	Block Total Disch. GPH		523.95
								Block Total Disch. GPD (12 hr day)		6,287.37

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)	
B	Apartments	223	1,200	400	3.0	669.0	15	0.07	46.83	
	Restaurant-(Conventional)	1	4,364	145	30.1	30.1	20	0.10	3.01	
	Restaurant-(Short Order)	1	2,182	170	12.8	12.8	20	0.10	1.28	
	Bar	1	2,182	170	12.8	12.8	20	0.10	1.28	
	Retail Stores	1	2,678	225	11.9	11.9	20	0.10	1.19	
	Community Space	1	8,800	400	22.0	22.0	20	0.10	2.20	
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down	
Apartments Cooling Tower	1	669.0	*	2,020	5	1,204.2	301.1	2020		
Block Totals					Block Total AC Tons		758.7	Block Total Disch. GPH		356.85
								Block Total Disch. GPD (12 hr day)		4282.16

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)	
C	Townhouses	29	1,400	550	2.5	73.8	15	0.07	5.17	
	Apartments	326	1,200	400	3.0	978.0	15	0.07	68.46	
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down	
Apartments Cooling Tower	2	978.0	*	1,315	5	1,760.4	440.1	2630		
Block Totals					Block Total AC Tons		1,051.8	Block Total Disch. GPH		513.73
								Block Total Disch. GPD (12 hr day)		6,164.73

Attachment #2

Development Scenario per Illustrative Master Plan Program

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
D	Apartments	141	1,200	400	3.0	423.0	15	0.07	29.61
	Restaurant-(Conventional)	1	16,880	145	116.4	116.4	20	0.10	11.64
	Restaurant-(Short Order)	1	8,440	170	49.6	49.6	20	0.10	4.96
	Bar	1	8,440	170	49.6	49.6	20	0.10	4.96
	Retail Stores	1	8,440	225	37.5	37.5	20	0.10	3.75
	Office	1	116,000	350	331.4	331.4	20	0.10	33.14
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Office/Retail/ Apart. Cooling Tower	2	791.9	*	1,270	5	1,425.5	356.4	2540
Block Totals					Block Total AC Tons	1,007.6		Block Total Disch. GPH	456.09
								Block Total Disch. GPD (12 hr day)	5,473.07

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
E	Apartments	124	1,200	400	3.0	372.0	15	0.07	26.04
	Restaurant-(Conventional)	1	5,766	145	39.8	39.8	20	0.10	3.98
	Restaurant-(Short Order)	1	2,883	170	17.0	17.0	20	0.10	1.70
	Bar	1	2,883	170	17.0	17.0	20	0.10	1.70
	Retail Stores	1	2,883	225	12.8	12.8	20	0.10	1.28
	Office	1	108,370	350	309.6	309.6	20	0.10	30.96
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Office/Retail/ Apart. Cooling Tower	1	694.4	*	2,020	5	1,250.0	312.5	2,020
Block Totals					Block Total AC Tons	768.1		Block Total Disch. GPH	378.15
								Block Total Disch. GPD (12 hr day)	4,537.82

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
F	Restaurant-(Conventional)	1	9,240	145	63.7	63.7	20	0.10	6.37
	Restaurant-(Short Order)	1	4,620	170	27.2	27.2	20	0.10	2.72
	Bar	1	4,620	170	27.2	27.2	20	0.10	2.72
	Retail Stores	1	4,620	225	20.5	20.5	20	0.10	2.05
	Program	Units	Seats	Tons/Seat					
	Cineplex	1	2,310	0.06	138.6	138.6	30	0.15	20.79
Block Totals					Block Total AC Tons	138.6		Block Total Disch. GPH	34.65
								Block Total Disch. GPD (12 hr day)	415.81

**Attachment #2
Development Scenario per Illustrative Master Plan Program**

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
G	Restaurant-(Conventional)	1	35,934	145	247.8	247.8	20	0.10	24.78
	Restaurant-(Short Order)	1	17,967	170	105.7	105.7	20	0.10	10.57
	Bar	1	17,967	170	105.7	105.7	20	0.10	10.57
	Retail Stores	1	17,967	225	79.9	79.9	20	0.10	7.99
	Office	1	407,592	350	1,164.5	1,164.5	20	0.10	116.45
	Hotel	150	1,000	450	2.2	333.3	15	0.07	23.33
	Hotel Concourse (sqft estimated)	1	20,000	225	88.9	88.9	15	0.07	6.22
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Hotel Boiler	3	*	6,000	100	*	*	*	300
	Hotel Cooling Tower	2	422.2	*	750	5	760.0	190.0	1,500
	Office/Retail Cooling Tower	2	1,244.4	*	1,800	5	2,239.9	560.0	3,600
	Block Totals					Block Total AC Tons	2,125.8		Block Total Disch. GPH
								Block Total Disch. GPD (12 hr day)	11,398.76

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
H	Restaurant-(Conventional)	1	2,000	145	13.8	13.8	20	0.10	1.38
	Restaurant-(Short Order)	1	1,000	170	5.9	5.9	20	0.10	0.59
	Bar	1	1,000	170	5.9	5.9	20	0.10	0.59
	Retail Stores	1	1,000	225	4.4	4.4	20	0.10	0.44
Block Totals					Block Total AC Tons	30.00		Block Total Disch. GPH	3.00
								Block Total Disch. GPD (12 hr day)	36.00

All Blocks Totals	Total AC Tons	6,986.2		All Blocks Total Disch. Gallons Per Hour	3,216.31
				All Blocks Total Disch. Gallons Per Day(12 Hrs)	38,595.71
				Est'd Total Gallons For (1) Drain Down/ Per Year of all Towers & Boilers	17,240.00

Attachment #2

Development Scenario per Illustrative Master Plan Program

Summary of Development Scenario per Illustrative Master Plan Program Totals

Discharge To Sanitary Totals				
Cooling Days/Season (Peak day) outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total GPD Condensate Discharge For All Blocks (12 hr day)	Est'd Total Gallons For (1) Drain Down/Per Year of all Towers & Boilers	Estimated Total Gallons of Condensate Discharge Per Cooling Season	Estimated Average GPD / Year
120	38,595.71	17,240.00	4,631,485.66	12,736.23

Tower Make-up Water Volume Usage Totals							
Block	Total Tower Evaporation (GPH)	Total Tower Blowdown (GPH)	Total Tower Drift (GPH)	Total Tower Make-up Volume (GPH)	Total Tower Make-up Volume (GPD) (12 hr day)	Total Tower Make-up Volume (GPD/season) (120 days/season)	Total Tower Make-up Volume (Avg. GPD/Yr)
A	1,776.6	444.2	14.2	2,235.0	26,819.6	3,218,346.4	8,817.4
B	1,204.2	301.1	9.6	1,514.9	18,178.6	2,181,432.4	5,976.5
C	1,760.4	440.1	14.1	2,214.6	26,575.0	3,188,999.8	8,737.0
D	1,425.5	356.4	11.4	1,793.3	21,519.2	2,582,306.2	7,074.8
E	1,250.0	312.5	10.0	1,572.5	18,869.9	2,264,391.7	6,203.8
G	2,999.9	750.0	24.0	3,773.9	45,286.8	5,434,421.3	14,888.8
Total All Blocks	10,416.6	2,604.2	83.3	13,104.1	157,249.1	18,869,897.9	51,698.4

Assumptions:

- Cooling towers, hot water boilers, chillers, are assumed to be the primary heating and cooling systems for the larger main building.
- Gas fired, DX cooling type equipment are assumed to be the primary heating and cooling systems for the smaller & unitary buildings and spaces.
- Primary cooling day is 12 hours long.

Formulas used:

Evaporation Volume (GPH) = 1.8 GPH / 1 ton cooling

Blowdown Volume (GPH) = Evaporation Volume / (Cycles-1)

Tot. GPD (all Blocks) x Clg Days (per season) = Est. Tot. Gal. Disch. Per Season

(Est. Tot. Gal. Disch. Per Season + Tot Gal Tower & Boiler Drain Down) / 365 days/yr = Avg. GPD/yr

Make-up Water Volume (GPH) = Evap. GPH + Blowdn. GPH + Drift GPH

Drift (GPH) = 0.0144 Gal/hr x Tot. Tower Clg. Tons

Attachment #3

Development Scenario per Maximum Development Statistics

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
A	Townhouses	17	1,400	550	2.5	43.3	15	0.07	3.03
	Apartments	362	1,200	400	3.0	1,086.0	15	0.07	76.02
	Restaurant-(Conventional)	1	5,892	145	40.6	40.6	20	0.10	4.06
	Restaurant-(Short Order)	1	2,946	170	17.3	17.3	20	0.10	1.73
	Bar	1	2,946	170	17.3	17.3	20	0.10	1.73
	Retail Stores	1	2,946	225	13.1	13.1	20	0.10	1.31
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
Apartments Cooling Tower	2	1,086.0	*	1,445	5	1,954.8	488.7	2890	
Block Totals					Block Total AC Tons	1217.7		Block Total Disch. GPH	576.59
								Block Total Disch. GPD (12 hr day)	6,919.05

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
B	Apartments	245	1,200	400	3.0	735.0	15	0.07	51.45
	Restaurant-(Conventional)	1	4,800	145	33.1	33.1	20	0.10	3.31
	Restaurant-(Short Order)	1	2,400	170	14.1	14.1	20	0.10	1.41
	Bar	1	2,400	170	14.1	14.1	20	0.10	1.41
	Retail Stores	1	2,400	225	10.7	10.7	20	0.10	1.07
	Community Space	1	9,680	400	24.2	24.2	20	0.10	2.42
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
Apartments Cooling Tower	2	735.0	*	984	5	1,323.0	330.8	1968	
Block Totals					Block Total AC Tons	831.2		Block Total Disch. GPH	391.82
								Block Total Disch. GPD (12 hr day)	4701.85

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
C	Townhouses	32	1,400	550	2.5	81.5	15	0.07	5.70
	Apartments	359	1,200	400	3.0	1,077.0	15	0.07	75.39
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
Apartments Cooling Tower	2	1,077.0	*	1,445	5	1,938.6	484.7	2890	
Block Totals					Block Total AC Tons	1,158.5		Block Total Disch. GPH	565.74
								Block Total Disch. GPD (12 hr day)	6,783.90

Attachment #3

Development Scenario per Maximum Development Statistics

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
D	Apartments	155	1,200	400	3.0	465.0	15	0.07	32.55
	Restaurant-(Conventional)	1	18,568	145	128.1	128.1	20	0.10	12.81
	Restaurant-(Short Order)	1	9,284	170	54.6	54.6	20	0.10	5.46
	Bar	1	9,284	170	54.6	54.6	20	0.10	5.46
	Retail Stores	1	9,284	225	41.3	41.3	20	0.10	4.13
	Office	1	139,200	350	397.7	397.7	20	0.10	39.77
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Office/Retail/ Apart. Cooling Tower	2	904.0	*	1,315	5	1,627.2	406.8	2,630
Block Totals					Block Total AC Tons	1,141.3		Block Total Disch. GPH	519.77
								Block Total Disch. GPD (12 hr day)	6,237.25

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
E	Apartments	136	1,200	400	3.0	408.0	15	0.07	28.56
	Restaurant-(Conventional)	1	6,343	145	43.7	43.7	20	0.10	4.37
	Restaurant-(Short Order)	1	3,171	170	18.7	18.7	20	0.10	1.87
	Bar	1	3,171	170	18.7	18.7	20	0.10	1.87
	Retail Stores	1	3,171	225	14.1	14.1	20	0.10	1.41
	Office	1	130,044	350	371.6	371.6	20	0.10	37.16
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Office/Retail Cooling Tower	2	793.6	*	1,270	5	1,428.6	357.1	2,540
Block Totals					Block Total AC Tons	874.7		Block Total Disch. GPH	432.37
								Block Total Disch. GPD (12 hr day)	5,188.46

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
F	Restaurant-(Conventional)	1	10,440	145	72.0	72.0	20	0.10	7.20
	Restaurant-(Short Order)	1	5,082	170	29.9	29.9	20	0.10	2.99
	Bar	1	5,082	170	29.9	29.9	20	0.10	2.99
	Retail Stores	1	5,082	225	22.6	22.6	20	0.10	2.26
	Program	Units	Seats	Tons/Seat					
	Cineplex	1	2,426	0.05	145.6	145.6	30	0.15	21.83
Block Totals					Block Total AC Tons	154.4		Block Total Disch. GPH	37.27
								Block Total Disch. GPD (12 hr day)	447.26

Attachment #3
Development Scenario per Maximum Development Statistics

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
G	Restaurant-(Conventional)	1	39,528	145	272.6	272.6	20	0.10	27.26
	Restaurant-(Short Order)	1	19,764	170	116.3	116.3	20	0.10	11.63
	Bar	1	19,764	170	116.3	116.3	20	0.10	11.63
	Retail Stores	1	19,764	225	87.8	87.8	20	0.10	8.78
	Office	1	489,110	350	1,397.5	1,397.5	20	0.10	139.75
	Hotel	165	1,000	450	2.2	366.7	15	0.07	25.67
	Hotel Concourse (sqft estimated)	1	25,000	225	111.1	111.1	15	0.07	7.78
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Hotel Boiler	3	*	6,000	100	*	*	*	300
	Hotel Cooling Tower	2	477.8	*	880	5	860.0	215.0	1,760
	Office/Retail Cooling Tower	2	1,485.3	*	1,850	5	2,673.5	668.4	3,700
Block Totals					Block Total AC Tons	2,468.2		Block Total Disch. GPH	1,115.87
								Block Total Disch. GPD (12 hr day)	13,390.44

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
H	Restaurant-(Conventional)	1	2,200	145	15.2	15.2	20	0.10	1.52
	Restaurant-(Short Order)	1	1,100	170	6.5	6.5	20	0.10	0.65
	Bar	1	1,100	170	6.5	6.5	20	0.10	0.65
	Retail Stores	1	1,100	225	4.9	4.9	20	0.10	0.49
Block Totals					Block Total AC Tons	33.00		Block Total Disch. GPH	3.30
								Block Total Disch. GPD (12 hr day)	39.60

All Blocks Totals	Total AC Tons	7,878.8		All Blocks Total Disch. Gallons Per Hour	3,642.73
				All Blocks Total Disch. Gallons Per Day(12 Hrs)	43,712.81
				Est'd Total Gallons For (1) Drain Down/ Per Year of all Towers & Boilers	18,678.00

Attachment #3

Development Scenario per Maximum Development Statistics

Summary of Development Scenario per Maximum Development Statistics Totals

Discharge To Sanitary Totals				
Cooling Days/Season (Peak day) outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total GPD Condensate Discharge For All Blocks (12 hr day)	Est'd Total Gallons For (1) Drain Down/ pre year of all Towers & Boilers	Estimated Total Gallons of Condensate Discharge Per Cooling Season	Estimated Average GPD / Year
120	43,712.81	18,678.00	5,245,536.83	14,422.51

Tower Make-up Water Volume Usage Totals							
Block	Total Tower Evaporation (GPH)	Total Tower Blowdown (GPH)	Total Tower Drift (GPH)	Total Tower Make-up Volume (GPH)	Total Tower Make-up Volume (GPD) (12 hr day)	Total Tower Make-up Volume (GPD/season) (120 days/season)	Total Tower Make-up Volume (Avg. GPD/Yr)
A	1,954.8	488.7	12.4	2,455.9	29,470.6	3,536,467.8	9,689.0
B	1,323.0	330.8	10.6	1,664.3	19,972.0	2,396,641.0	6,566.1
C	1,938.6	484.7	15.5	2,438.8	29,265.1	3,511,812.7	9,621.4
D	1,627.2	406.8	13.0	2,047.0	24,563.6	2,947,628.7	8,075.7
E	1,428.6	357.1	11.4	1,797.1	21,565.6	2,587,875.4	7,090.1
G	3,533.5	883.4	28.3	4,445.2	53,342.2	6,401,069.1	17,537.2
Total All Blocks	11,805.7	2,951.4	91.2	14,848.3	178,179.1	21,381,494.6	58,579.4

Assumptions

- Cooling towers, hot water boilers, chillers, are assumed to be the primary heating and cooling systems for the larger main building.
- Gas fired, DX cooling type equipment are assumed to be the primary heating and cooling systems for the smaller & unitary buildings and spaces.
- Primary cooling day is 12 hours long.

Formulas used:

Evaporation Volume (GPH) = 1.8 GPH / 1 ton cooling

Blowdown Volume (GPH) = Evaporation Volume / (Cycles-1)

Tot. GPD (all Blocks) X Clg Days (per season) = Est. Tot. Gal. Disch. Per Season

(Est. Tot. Gal. Disch. Per Season + Tot Gal Tower & Boiler Drain Down) / 365 days/yr = Avg. GPD/yr

Make-up Water Volume (GPH) = Evap. GPH + Blowdn. GPH + Drift GPH

Drift (GPH) = 0.0144 Gal/hr x Tot. Tower Clg. Tons



February 25, 2013

Rich Hixon
Executive Director of Strategic Planning
Pittsburgh Penguins
Consol Energy Center
1001 Fifth Avenue
Pittsburgh, PA 15219

Re: Lower Hill Redevelopment Plan
Estimated Air Conditioning Condensate and Make-Up Water Loads
CJL Reference #P13-0216

Dear Mr. Hixon:

The calculations for estimating the air conditioning condensate load have been completed and are attached. They include calculations for both Attachment #1, "Development Scenario per Illustrative Master Plan Program," and Attachment #2, "Development Scenario per Maximum Development Statistics." In coordination with sanitary calculations that have been completed by other parties, the air conditioning condensate load calculations can be inserted at desired locations with the other calculations.

Each of the attachments contains three sections with resultant data. They are:

1. Estimated air conditioning condensate loads.
2. Estimated sanitary loads related to air conditioning systems.
3. Estimated cooling tower make-up water volume.

We are available to discuss the estimated loads. Please feel free to call at any time.

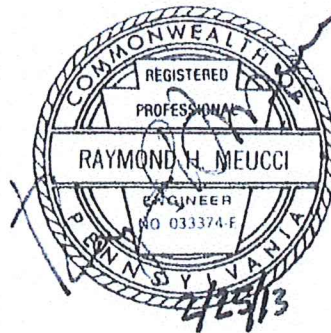
Sincerely,

Raymond H. Meucci, P.E.
CJL Engineering, Partner

RHM/jwl

Cc: Alan Traugott
Chris Carroll

Enclosures



Pittsburgh 1555 Coraopolis Heights Road, Suite 4200, Moon Township, PA 15108 P: 412.262.1220 F: 412.262.2972
Johnstown 232 Horner Street, Johnstown, PA 15902 P: 814.536.1651 F: 814.536.5732
Youngstown 1044 N. Meridian Road, Suite B, Youngstown, OH 44509 P: 330.746.1360 F: 330.746.7000

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #1

Development Scenario per Illustrative Master Plan Program

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
A	Townhouses	15	1,400	550	2.5	38.2	15	0.07	2.67
	Apartments	329	1,200	400	3.0	987.0	15	0.07	69.09
	Restaurant-(Conventional)	1	5,356	145	36.9	36.9	20	0.10	3.69
	Restaurant-(Short Order)	1	2,678	170	15.8	15.8	20	0.10	1.58
	Bar	1	2,678	170	15.8	15.8	20	0.10	1.58
	Retail Stores	1	2,678	225	11.9	11.9	20	0.10	1.19
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Apartments Cooling Tower	2	987.0	*	1,315	7	1,776.6	296.1	2630
Block Totals					Block Total AC Tons	1105.5		Block Total Disch. GPH	375.90
								Block Total Disch. GPD (12 hr day)	4,510.77

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB Inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
B	Apartments	223	1,200	400	3.0	669.0	15	0.07	46.83
	Restaurant-(Conventional)	1	4,364	145	30.1	30.1	20	0.10	3.01
	Restaurant-(Short Order)	1	2,182	170	12.8	12.8	20	0.10	1.28
	Bar	1	2,182	170	12.8	12.8	20	0.10	1.28
	Retail Stores	1	2,678	225	11.9	11.9	20	0.10	1.19
	Community Space	1	8,800	400	22.0	22.0	20	0.10	2.20
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Apartments Cooling Tower	1	669.0	*	2,020	7	1,204.2	200.7	2020
Block Totals					Block Total AC Tons	758.7		Block Total Disch. GPH	256.50
								Block Total Disch. GPD (12 hr day)	3077.96

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB Inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
C	Townhouses	29	1,400	550	2.5	73.8	15	0.07	5.17
	Apartments	326	1,200	400	3.0	978.0	15	0.07	68.46
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Apartments Cooling Tower	2	978.0	*	1,315	7	1,760.4	293.4	2630
Block Totals					Block Total AC Tons	1,051.8		Block Total Disch. GPH	367.03
								Block Total Disch. GPD (12 hr day)	4,404.33

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #1

Development Scenario per Illustrative Master Plan Program

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
D	Apartments	141	1,200	400	3.0	423.0	15	0.07	29.61
	Restaurant-(Conventional)	1	16,880	145	116.4	116.4	20	0.10	11.64
	Restaurant-(Short Order)	1	8,440	170	49.6	49.6	20	0.10	4.96
	Bar	1	8,440	170	49.6	49.6	20	0.10	4.96
	Retail Stores	1	8,440	225	37.5	37.5	20	0.10	3.75
	Office	1	116,000	350	331.4	331.4	20	0.10	33.14
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
Office/Retail/Apart. Cooling Tower	2	791.9	*	1,270	7	1,425.5	237.6	2540	
Block Totals					Block Total AC Tons	1,007.6		Block Total Disch. GPH	337.30
								Block Total Disch. GPD (12 hr day)	4,047.58

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
E	Apartments	124	1,200	400	3.0	372.0	15	0.07	26.04
	Restaurant-(Conventional)	1	5,766	145	39.8	39.8	20	0.10	3.98
	Restaurant-(Short Order)	1	2,883	170	17.0	17.0	20	0.10	1.70
	Bar	1	2,883	170	17.0	17.0	20	0.10	1.70
	Retail Stores	1	2,883	225	12.8	12.8	20	0.10	1.28
	Office	1	108,370	350	309.6	309.6	20	0.10	30.96
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
Office/Retail/Apart. Cooling Tower	1	694.4	*	2,020	7	1,250.0	208.3	2,020	
Block Totals					Block Total AC Tons	768.1		Block Total Disch. GPH	273.99
								Block Total Disch. GPD (12 hr day)	3,287.82

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
F	Restaurant-(Conventional)	1	9,240	145	63.7	63.7	20	0.10	6.37
	Restaurant-(Short Order)	1	4,620	170	27.2	27.2	20	0.10	2.72
	Bar	1	4,620	170	27.2	27.2	20	0.10	2.72
	Retail Stores	1	4,620	225	20.5	20.5	20	0.10	2.05
	Program	Units	Seats	Tons/Seat					
Cineplex	1	2,310	0.06	138.6	138.6	30	0.15	20.79	
Block Totals					Block Total AC Tons	138.6		Block Total Disch. GPH	34.65
								Block Total Disch. GPD (12 hr day)	415.81

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #1

Development Scenario per Illustrative Master Plan Program

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
G	Restaurant-(Conventional)	1	35,934	145	247.8	247.8	20	0.10	24.78
	Restaurant-(Short Order)	1	17,967	170	105.7	105.7	20	0.10	10.57
	Bar	1	17,967	170	105.7	105.7	20	0.10	10.57
	Retail Stores	1	17,967	225	79.9	79.9	20	0.10	7.99
	Office	1	407,592	350	1,164.5	1,164.5	20	0.10	116.45
	Hotel	150	1,000	450	2.2	333.3	15	0.07	23.33
	Hotel Concourse (sqft estimated)	1	20,000	225	88.9	88.9	15	0.07	6.22
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Hotel Boiler	3	*	6,000	100	*	*	*	300
	Hotel Cooling Tower	2	422.2	*	750	7	760.0	126.7	1,500
	Office/Retail Cooling Tower	2	1,244.4	*	1,800	7	2,239.9	373.3	3,600
	Block Totals					Block Total AC Tons	2,125.8		Block Total Disch. GPH
								Block Total Disch. GPD (12 hr day)	8,398.83

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
H	Restaurant-(Conventional)	1	2,000	145	13.8	13.8	20	0.10	1.38
	Restaurant-(Short Order)	1	1,000	170	5.9	5.9	20	0.10	0.59
	Bar	1	1,000	170	5.9	5.9	20	0.10	0.59
	Retail Stores	1	1,000	225	4.4	4.4	20	0.10	0.44
Block Totals					Block Total AC Tons	30.00		Block Total Disch. GPH	3.00
								Block Total Disch. GPD (12 hr day)	36.00

Total Discharge for All Blocks					Total AC Tons	6,986.2		All Blocks Total Disch. Gallons Per Hour	2,348.26
								All Blocks Total Disch. Gallons Per Day (12 Hrs)	28,179.10
								Est'd Total Gallons For (1) Drain Down/ Per Year of all Towers & Bollers	17,240.00

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #1

Development Scenario per Illustrative Master Plan Program

Summary of Development Scenario per Illustrative Master Plan Program Estimated Totals

Estimated air conditioning Condensate Discharge To Sanitary Totals				
Cooling Days/Season (Peak day) outside=91 DB/75 WB inside=75 F/50% RH	Estimated Total GPD Condensate Discharge For All Blocks (12 hr day)	Est'd Total Gallons For (1) Drain Down/Per Year of all Towers & Boilers	Estimated Total Gallons of Condensate Discharge Per Cooling Season	Estimated Average GPD / Year
120	28,179.10	17,240.00	3,381,492.42	9,311.60

Estimate Tower Make-up Water Volume Usage Totals							
Block	Total Tower Evaporation (GPH)	Total Tower Blowdown (GPH)	Total Tower Drift (GPH)	Total Tower Make-up Volume (GPH)	Total Tower Make-up Volume (GPD) (12 hr day)	Total Tower Make-up Volume (GPD/season) (120 days/season)	Total Tower Make-up Volume (Avg. GPD/Yr)
A	1,776.6	296.1	14.2	2,086.9	25,043.0	3,005,154.4	8,233.3
B	1,204.2	200.7	9.6	1,414.5	16,974.4	2,036,928.4	5,580.6
C	1,760.4	293.4	14.1	2,067.9	24,814.6	2,977,751.8	8,158.2
D	1,425.5	237.6	11.4	1,674.5	20,093.7	2,411,247.3	6,606.2
E	1,250.0	208.3	10.0	1,468.3	17,619.9	2,114,392.3	5,792.9
G	2,999.9	500.0	24.0	3,523.9	42,286.9	5,074,430.5	13,902.5
Total All Blocks	10,416.6	1,736.1	83.3	12,236.0	146,832.5	17,619,904.6	48,273.7

Assumptions:

1. Cooling towers, hot water boilers, chillers, are assumed to be the primary heating and cooling systems for the larger main building.
2. Gas fired, DX cooling type equipment are assumed to be the primary heating and cooling systems for the smaller & unitary buildings and spaces.
3. Primary cooling day is 12 hours long.

Formulas used:

Evaporation Volume (GPH) = 1.8 GPH / 1 ton cooling

Cooling Tower Blowdown Volume (GPH) = Evaporation Volume / (Cycles-1)

Tot. GPD (all Blocks) x Clg Days (per season) = Est. Tot. Gal. Disch. Per Season

(Est. Tot. Gal. Disch. Per Season + Tot Gal Tower & Boiler Drain Down) / 365 days/yr = Avg. GPD/yr

Make-up Water Volume (GPH) = Evap. GPH + Blowdn. GPH + Drift GPH

Drift (GPH) = 0.0144 Gal/hr x Tot. Tower Clg. Tons

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #2

Development Scenario per Maximum Development Statistics

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
A	Townhouses	17	1,400	550	2.5	43.3	15	0.07	3.03
	Apartments	362	1,200	400	3.0	1,086.0	15	0.07	76.02
	Restaurant-(Conventional)	1	5,892	145	40.6	40.6	20	0.10	4.06
	Restaurant-(Short Order)	1	2,946	170	17.3	17.3	20	0.10	1.73
	Bar	1	2,946	170	17.3	17.3	20	0.10	1.73
	Retail Stores	1	2,946	225	13.1	13.1	20	0.10	1.31
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Apartments Cooling Tower	2	1,086.0	*	1,445	7	1,954.8	325.8	2890
Block Totals					Block Total AC Tons	1217.7		Block Total Disch. GPH	413.69
								Block Total Disch. GPD (12 hr day)	4,964.25

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
B	Apartments	245	1,200	400	3.0	735.0	15	0.07	51.45
	Restaurant-(Conventional)	1	4,800	145	33.1	33.1	20	0.10	3.31
	Restaurant-(Short Order)	1	2,400	170	14.1	14.1	20	0.10	1.41
	Bar	1	2,400	170	14.1	14.1	20	0.10	1.41
	Retail Stores	1	2,400	225	10.7	10.7	20	0.10	1.07
	Community Space	1	9,680	400	24.2	24.2	20	0.10	2.42
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Apartments Cooling Tower	2	735.0	*	984	7	1,323.0	220.5	1968
Block Totals					Block Total AC Tons	831.2		Block Total Disch. GPH	281.57
								Block Total Disch. GPD (12 hr day)	3378.85

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
C	Townhouses	32	1,400	550	2.5	81.5	15	0.07	5.70
	Apartments	359	1,200	400	3.0	1,077.0	15	0.07	75.39
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Apartments Cooling Tower	2	1,077.0	*	1,445	7	1,938.6	323.1	2890
Block Totals					Block Total AC Tons	1,158.5		Block Total Disch. GPH	404.19
								Block Total Disch. GPD (12 hr day)	4,850.30

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #2

Development Scenario per Maximum Development Statistics

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB Inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
D	Apartments	155	1,200	400	3.0	465.0	15	0.07	32.55
	Restaurant-(Conventional)	1	18,568	145	128.1	128.1	20	0.10	12.81
	Restaurant-(Short Order)	1	9,284	170	54.6	54.6	20	0.10	5.46
	Bar	1	9,284	170	54.6	54.6	20	0.10	5.46
	Retail Stores	1	9,284	225	41.3	41.3	20	0.10	4.13
	Office	1	139,200	350	397.7	397.7	20	0.10	39.77
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
Office/Retail/Apart. Cooling Tower	2	904.0	*	1,315	7	1,627.2	271.2	2,630	
Block Totals					Block Total AC Tons	1,141.3		Block Total Disch. GPH	384.17
								Block Total Disch. GPD (12 hr day)	4,610.09

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB Inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
E	Apartments	136	1,200	400	3.0	408.0	15	0.07	28.56
	Restaurant-(Conventional)	1	6,343	145	43.7	43.7	20	0.10	4.37
	Restaurant-(Short Order)	1	3,171	170	18.7	18.7	20	0.10	1.87
	Bar	1	3,171	170	18.7	18.7	20	0.10	1.87
	Retail Stores	1	3,171	225	14.1	14.1	20	0.10	1.41
	Office	1	130,044	350	371.6	371.6	20	0.10	37.16
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
Office/Retail Cooling Tower	2	793.6	*	1,270	7	1,428.6	238.1	2,540	
Block Totals					Block Total AC Tons	874.7		Block Total Disch. GPH	313.32
								Block Total Disch. GPD (12 hr day)	3,759.89

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB Inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
F	Restaurant-(Conventional)	1	10,440	145	72.0	72.0	20	0.10	7.20
	Restaurant-(Short Order)	1	5,082	170	29.9	29.9	20	0.10	2.99
	Bar	1	5,082	170	29.9	29.9	20	0.10	2.99
	Retail Stores	1	5,082	225	22.6	22.6	20	0.10	2.26
	Program	Units	Seats	Tons/Seat					
	Cineplex	1	2,426	0.06	145.6	145.6	30	0.15	21.83
Block Totals					Block Total AC Tons	154.4		Block Total Disch. GPH	37.27
								Block Total Disch. GPD (12 hr day)	447.26

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #2

Development Scenario per Maximum Development Statistics

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
G	Restaurant-(Conventional)	1	39,528	145	272.6	272.6	20	0.10	27.26
	Restaurant-(Short Order)	1	19,764	170	116.3	116.3	20	0.10	11.63
	Bar	1	19,764	170	116.3	116.3	20	0.10	11.63
	Retail Stores	1	19,764	225	87.8	87.8	20	0.10	8.78
	Office	1	489,110	350	1,397.5	1,397.5	20	0.10	139.75
	Hotel	165	1,000	450	2.2	366.7	15	0.07	25.67
	Hotel Concourse (sqft estimated)	1	25,000	225	111.1	111.1	15	0.07	7.78
	Program	Units	Total Cooling Tons	Htg Load (MBH)	Gals Wtr/ Unit	Assumed Tower cycles (ratio)	Evaporation GPH/Total clg tons	Total Blowdown GPH	Est'd Total Gal's For (1) Unit Drain Down
	Hotel Boiler	3	*	6,000	100	*	*	*	300
	Hotel Cooling Tower	2	477.8	*	880	7	860.0	143.3	1,760
	Office/Retail Cooling Tower	2	1,485.3	*	1,850	7	2,673.5	445.6	3,700
Block Totals					Block Total AC Tons	2,468.2		Block Total Disch. GPH	821.41
								Block Total Disch. GPD (12 hr day)	9,856.91

Block	Program	Units	Sqft/unit	Sqft/ton	Estimated Tons/unit	Estimated Total AC Tons	Outdoor Air %	Estimated Condensate Discharge (gal/hr)/1 ton outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total Condensate Discharge (gal/hr)
H	Restaurant-(Conventional)	1	2,200	145	15.2	15.2	20	0.10	1.52
	Restaurant-(Short Order)	1	1,100	170	6.5	6.5	20	0.10	0.65
	Bar	1	1,100	170	6.5	6.5	20	0.10	0.65
	Retail Stores	1	1,100	225	4.9	4.9	20	0.10	0.49
Block Totals					Block Total AC Tons	33.00		Block Total Disch. GPH	3.30
								Block Total Disch. GPD (12 hr day)	39.60

Total Discharge For All Blocks	Total AC Tons	7,878.8	All Blocks Total Disch. Gallons Per Hour	2,658.93
			All Blocks Total Disch. Gallons Per Day(12 Hrs)	31,907.15
			Est'd Total Gallons For (1) Drain Down/ Per Year of all Towers & Bolders	18,678.00

ESTIMATED AIR CONDITIONING CONDENSATE AND MAKEUP WATER VOLUME LOADS

Attachment #2

Development Scenario per Maximum Development Statistics

Summary of Development Scenario per Maximum Development Statistics Estimated Totals

Estimated Air Conditioning Condensate Discharge To Sanitary Totals				
Cooling Days/Season (Peak day) outside=91 DB/75 WB inside=75 F/ 50% RH	Estimated Total GPD Condensate Discharge For All Blocks (12 hr day)	Est'd Total Gallons For (1) Drain Down/ pre year of all Towers & Boilers	Estimated Total Gallons of Condensate Discharge Per Cooling Season	Estimated Average GPD / Year
120	31,907.15	18,678.00	3,828,857.83	10,541.19

Estimated Tower Make-up Water Volume Usage Totals							
Block	Total Tower Evaporation (GPH)	Total Tower Blowdown (GPH)	Total Tower Drift (GPH)	Total Tower Make-up Volume (GPH)	Total Tower Make-up Volume (GPD) (12 hr day)	Total Tower Make-up Volume (GPD/season) (120 days/season)	Total Tower Make-up Volume (Avg. GPD/Yr)
A	1,954.8	325.8	12.4	2,293.0	27,515.8	3,301,891.8	9,046.3
B	1,323.0	220.5	10.6	1,554.1	18,649.0	2,237,881.0	6,131.2
C	1,938.6	323.1	15.5	2,277.2	27,326.5	3,279,180.7	8,984.1
D	1,627.2	271.2	13.0	1,911.4	22,936.4	2,752,369.8	7,540.7
E	1,428.6	238.1	11.4	1,678.1	20,137.1	2,416,447.5	6,620.4
G	3,533.5	588.9	28.3	4,150.7	49,808.7	5,977,044.9	16,375.5
Total All Blocks	11,805.7	1,967.6	91.2	13,864.5	166,373.5	19,964,815.6	54,698.1

Assumptions

1. Cooling towers, hot water boilers, chillers, are assumed to be the primary heating and cooling systems for the larger main building.
2. Gas fired, DX cooling type equipment are assumed to be the primary heating and cooling systems for the smaller & unitary buildings and spaces.
3. Primary cooling day is 12 hours long.

Formulas used:

Evaporation Volume (GPH) = 1.8 GPH / 1 ton cooling

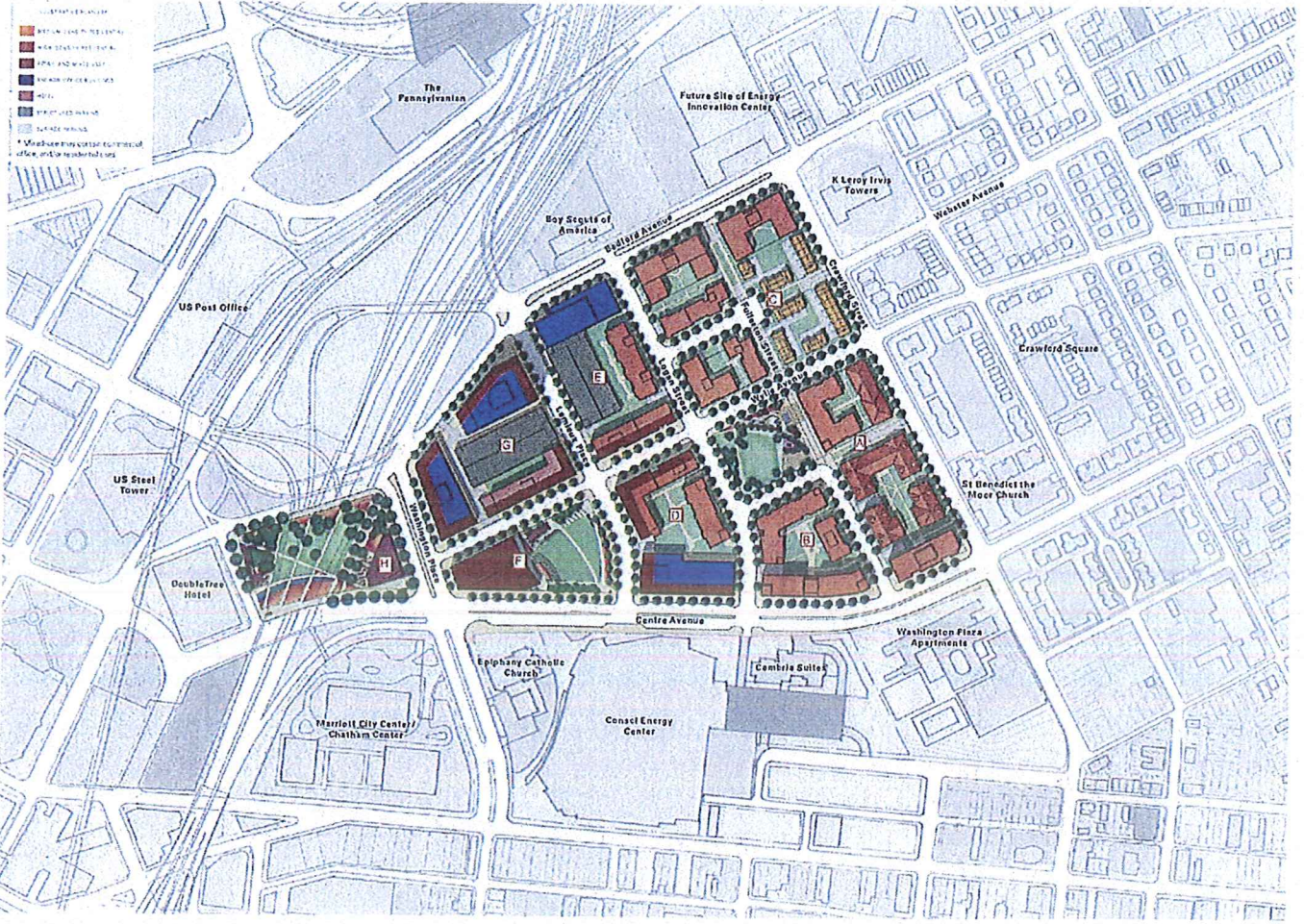
Cooling Tower Blowdown Volume (GPH) = Evaporation Volume / (Cycles-1)

Tot. GPD (all Blocks) X Clg Days (per season) = Est. Tot. Gal. Disch. Per Season

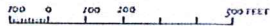
(Est. Tot. Gal. Disch. Per Season + Tot Gal Tower & Boiler Drain Down) / 365 days/yr = Avg. GPD/yr

Make-up Water Volume (GPH) = Evap. GPH + Blowdn. GPH + Drift GPH

Drift (GPH) = 0.0144 Gal/hr x Tot. Tower Clg. Tons



URBAN DESIGN ASSOCIATES
 OCTOBER 2012



Conceptual Redevelopment Plan
 Lower Hill Site Redevelopment | Pittsburgh, Pennsylvania

EXISTING/REPLACEMENT SEWAGE FLOW CALCULATIONS FOR THE FORMER CIVIC ARENA

Total Replacement Sewage Flows for the Former Civic Arena			
Type of Establishment	Sewage Flow	No. of Seats	Sewage Flow
Stadium (per seat)	2.94 gals/ seat	17,000	*50,000 gpd
Total Replacement Sewage Flows			*50,000 gpd
Total Replacement Sewage Flows (1 EDU = 400 gpd)			125 EDUs
Lower Hill Redevelopment Proposed Sewage Flows			
Total Calculated Sewage Flows for Lower Hill Redevelopment			841,547 gpd
Total Calculated Sewage Flows (1 EDU = 400 gpd)			2,104 EDUs
Additional Sewage Flows from Lower Hill Redevelopment			
Additional Sewage Flows from Lower Hill Redevelopment			*841,547 gpd
Additional Sewage Flows from Lower Hill Redevelopment (1 EDU = 400 gpd)			*2,104 EDUs

*** Notes:**

PWSA, based upon the review of previous water consumption records, reported the existing sewage flow of 1.5 MG/Month for the former Civic Arena, which is equal to 50,000 GPD (assuming 30 days in a month). Cosmos initially reported the total existing sewage flow of the Civic Arena as 85,000 gpd, assuming 5 gals/seat for a total of 17,000 seats. However, as per the direction from PWSA, the existing sewage flow shown above is not included in the total additional sewage flows from the Lower Hill Site. The total sanitary flows, including the total number of EDU's are adjusted accordingly.

Appendix K

Proof of Public Notification

Appendix L

Preliminary Drainage Report

PRELIMINARY DRAINAGE DESIGN REPORT

for

LOWER HILL INFRASTRUCTURE REDEVELOPMENT

CITY OF PITTSBURGH, ALLEGHENY
COUNTY, PENNSYLVANIA

JANUARY 30, 2013

PREPARED FOR:



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Technologies Inc.

IN ASSOCIATION WITH **Baker**

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Cosmos Technologies Inc.

LOWER HILL INFRASTRUCTURE REDEVELOPMENT

EXHIBIT 1 – DRAINAGE AREA DELINEATION MAP FOR PRE-CONSTRUCTION CONDITIONS

EXHIBIT 2 – DRAINAGE AREA DELINEATION MAP FOR POST-CONSTRUCTION CONDITIONS

EXHIBIT 3 – OVERALL UTILITY SITE PLAN

ATTACHMENTS

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ATTACHMENT 2– RAINFALL INTENSITY DURATION (IDF) CURVES

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Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

PRELIMINARY DRAINAGE REPORT

LOWER HILL INFRASTRUCTURE REDEVELOPMENT

I. INTRODUCTION

The report provides a basis for the design of stormwater conveyance systems within the Redevelopment of the Lower Hill Site, which is also the former Pittsburgh Penguin's Civic Arena Site (herein called the Site). The objective of this report is to analyze the hydrologic characteristics associated with the pre-construction (existing) and post-construction (proposed) conditions.

This report includes an overall drainage & utility layout along with all the necessary supporting documents i.e. appendices, exhibits, and attachments, including hydrologic & hydraulic computations for the design of stormsewer network within the subject property.

II. PROJECT DESCRIPTION

The subject property, which is approximately 28.0 acres, is located in the Lower Hill District neighborhood of the City of Pittsburgh, Allegheny County, Pennsylvania. The Sports & Exhibition Authority (SEA) of Pittsburgh and Allegheny County is proposing the redevelopment of this site which includes mixed-use, residential, retail/ commercial, office, hotel, structured parking, and open spaces.

The Lower Hill Site Redevelopment, as the Specific Planning (SP) District Planning and Design goals state, seeks to be a sustainable new development in an urban context. The goal is to create a new mixed-use, sustainable development that will create a new connection between Downtown Pittsburgh and the Hill District. The project seeks to establish a new standard for large-scale sustainable development which will be a central tenet in design, construction; including a broad & dynamic use of land-scaping to address stormwater concerns.

III. EXISTING DRAINAGE CONDITIONS

The site consists of various parcels, including 2-C-400, 2-C-300, 2-C-382, and 2-C-383. Currently, these parcels are occupied by surface parking lots. The parcel # 2-C-400 consisted of former Civic Arena, and surface parking lots. Recently, the Civic Arena has been demolished and has been replaced by more surface parking lots. The parcel numbers, 2-C-300, 2-C-382, and 2-C-383 are occupied by surface parking lots which have been in existence before the demolition of the Civic Arena. Refer to **Attachment 4** of this report for the parcels map.

The Site has a moderate sloped terrain that runs east to west. The existing stormwater runoff from the site is conveyed offsite via inlets & existing storm/combined sewer systems that ultimately outlet to the Monongahela River and The Lower Allegheny River, both located within the Ohio Basin. Currently, approximately, seventy percent (70%) of the total site flows to the existing combined storm sewer system on Centre Ave & Washington Pl intersection, which ultimately outlets to the Monongahela River via Try Street Truck Sewer system. Approximately, the other thirty percent (30%) of the site flows to the existing combined storm sewer system on Bedford Ave & Washington Pl intersection, which ultimately outlets to The Lower Allegheny River via Garrison Place and 11th Street Truck Sewer system.

Drainage Sub-basins & Flow Rates (Existing Conditions):

Based upon the site topography, the total site is delineated into five (5) sub-drainage areas as shown in **Exhibit 1**. The sub-drainage areas DA-1, DA-2 & DA-3, which contribute to nearly seventy percent (70%) of the total site area drains towards the existing combined storm sewer system along Center St & Washington PI intersection. The total flow contributed from these three sub-drainage areas is approximately 98 cfs for a 10-year rainfall event. The sub-drainage areas DA-4A and DA-4B, which contribute to nearly thirty percent (30%) of the total site area flows towards the existing combined storm sewer system along Bedford Ave & Washington PI intersection. The total flow contributed from these two sub-drainage areas is approximately 43 cfs for a 10-year rainfall event. The net flow generated by all five sub-basins from the 28 acre site in the existing conditions is approximately 141 cfs. Refer to **Appendix A** for the hydrologic/ flow computations of the basins for various rainfall events in the existing conditions.

III. PROPOSED DRAINAGE CONDITIONS

The Sports & Exhibition Authority (SEA) is proposing the redevelopment of the 28 acre site using sustainable community requirements in accordance with LEED for neighborhood development (LEED-ND) and establish a sustainable stormwater management. The goal of sustainability is to reduce pollution, conserve energy & resources, and enhance natural systems. The development shall consist of mixed-use, residential, retail/ commercial, office, hotel, structured parking, and open spaces. Refer to **Attachment-1**, which illustrates the overall master plan for the Lower Hill Redevelopment. The master plan consists of several development blocks comprising of residential, office, retail, hotel & entertainment, food & beverage; commercial & residential landscape, open spaces & courtyards; sustainable streets with varying Right-of-Way's (ROW) and connections.

The total site has been delineated into three (3) sub-drainage areas in the fully-developed/ proposed conditions, as shown in **Exhibit 2**. In the proposed conditions, the drainage areas are delineated to mimic the existing drainage patterns, so that nearly seventy percent (70%) of the total site drains to Washington PI & Centre Ave intersection and the remaining thirty percent (30%) of the site drains towards Bedford Ave & Washington PI intersection. The sub-basins DA-1 & DA-2 flow to the Washington PI & Centre Ave intersection, whereas DA-3 flows to Bedford Ave & Washington PI intersection.

Drainage Sub-basins & Flow Rates (Proposed Conditions):

The sub-basin DA-1, which comprises of Blocks A & B, half of Block D, Fullerton St and half of Logan St, outlets at proposed Logan & Centre Ave intersection. The net flow generated by drainage area DA-1 for a 10-year rainfall event is approximately 43 cfs. The sub-basin DA-2, which comprises of Block C, half of Blocks D & E, approximately two-thirds of Wylie Ave & half of Lemieux outlets at proposed Lemieux PI & Centre Ave intersection. The net flow generated by drainage area DA-2 for a 10-year rainfall event is approximately 43 cfs. The sub-basin DA-3, which includes Blocks G & F, half of Block E, one-third of Wylie, half of Lemieux PI, outlets at Bedford Ave & Washington PI intersection. The net flow generated by drainage area DA-3 for a 10-year rainfall event is approximately 39 cfs. Refer to **Appendix B** for the hydrologic/ flow computations of the basins for various rainfall events in the proposed conditions. The total net flow generated from the entire site in the fully-developed conditions is approximately 137 cfs, which is approximately 4 cfs less than the existing conditions. Refer to **Appendix B** for the hydrologic/ flow computations

The flow computations for the drainage areas in the post-construction conditions were also computed for comparison purposes using the average twenty five year (25-year) rainfall intensity of 5.8 inch/hour, as stated in the Pittsburgh Water and Sewer Authority procedures manual for developers. Refer to **Appendix c** for the corresponding hydrologic/ flow computations of the drainage areas. It is noted that the total net flow generated from the entire site for the fully-developed conditions using PWSA's average rainfall intensity is approximately 131 cfs, which is approximately 6 cfs less when compared to the total flows computed from earlier.

Storm Sewer & Sanitary Sewer Design:

The hydraulic analysis of the proposed storm & sanitary sewer network was performed using Hydraflow storm sewer computer program by Autodesk Civil 3D. See **Appendices F & G** for the Hydraflow output results, which contain the schematic plan of the storm & sanitary sewer layout, plans & profiles, velocities within the pipe systems, Hydraulic gradient lines (HGL). Refer to **Exhibit-3** of the report for the overall utility layout. The 10-year return frequency storm was used as the basis of the stormsewer analysis.

To be on the conservative side, the stormwater attenuation resulting from Retention or Detention was not accounted in the analysis of the proposed stormsewer systems.

IV. Methodology

The *Rational Formula method* was used for determining the peak flow rates of the drainage areas. The time of concentration (T_c) for the drainage areas were calculated based on sheet flow, shallow concentrated flow and open channel flow regimes using *TR-55 guidelines*. The *Manning's Kinematic Equation* as specified in TR-55 was used for estimating the overland (sheet) flow travel time. Refer to **Appendices D & E** for the time of concentration computations for the pre-construction & post-construction conditions. When estimating the time of concentration for overland flow, the *Average Velocity Chart adapted from National Engineering Handbook, Volume 4 (NEH4)* is used. Refer to **Attachment 4** for the average velocity chart.

The Rainfall Duration Intensity (IDF) values for various rainfall events were taken from *Chapter 7, Appendix A of PennDOT Design Manual*. Refer to **Attachment 3** for the IDF curves.

The weighted runoff coefficients that were used in the Rational Formula method for both existing & proposed conditions were determined by weighting the coefficients of open spaces, roads & streets, gravel areas, and impervious areas which include paved parking lots, roofs, and driveways.

VI. Assumptions

The following assumptions were used in various design computations:

1. The stormwater attenuation resulting from Retention or Detention was not accounted in the analysis of the proposed stormsewer systems.
2. A porosity of 20% for soil, 30% for sand, 40% for rock are assumed in tree planter volume computations based upon Reference Page 64 of City of *Philadelphia SWM Guidance Manual*.
3. The stormwater recapture computations for tree planters may be applicable only for sustainable streets where the roadway grades are less than or equal to 5%.
4. The drainage area delineations for the basins were determined and adjusted based upon site reconnaissance & the information obtained from survey drawings.
5. A minimum time of concentration (T_c) of 5 minutes was assumed for determining rainfall intensities for all the sub-areas if the computed T_c is less than 5 minutes, per PennDOT Drainage Manual, Chapter 7, Page # 7-30.
6. The percent pervious & impervious areas for the existing conditions were estimated based on the information obtained from Google Earth and site reconnaissance.
7. The percent pervious & impervious areas for the proposed conditions were estimated based on the information furnished in the illustrative master plan.

VII. CONCLUSION

The analysis performed for this report demonstrates that the proposed system of storm sewer systems can safely convey the 10-year storm runoff from the onsite drainage basins contributing to the Lower Hill Redevelopment. It is recommended that the proposed storm drain systems undergo

regular maintenance activities. This should include removing debris from inlets, as well as sediment buildup within the pipe system. The future development contributing flows should be analyzed in greater detail at the time of development to ensure that the runoff is within the constraints of the design.

The analysis performed for this report also demonstrates that the computed storm runoff in the post-construction conditions is less than the pre-construction conditions.

It should be also noted that the stormwater runoff volume can be significantly reduced with the incorporation of retention and detention systems using the Low Impact Development (LID) Sustainable Design techniques as proposed in the Preliminary Land Development Plan (PLDP).

APPENDICES



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APPENDIX A

HYDROLOGIC/ FLOW COMPUTATIONS FOR PRE-CONSTRUCTION CONDITIONS



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SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA

Drainage Analysis Summary - Pre-Construction Conditions (Existing Conditions)

Drainage Basin ID	Area (sq ft)	Area (acres)	Time of Conc. (min)	Rainfall Intensity (in/hr)	Rainfall Intensity (in/hr)	Rainfall Intensity (in/hr)	Rainfall Intensity (in/hr)	Rainfall Intensity (in/hr)	Weighted Runoff Coefficient	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)
	A	A	T _c	I _{5-yr}	I _{15-yr}	I _{5-yr}	I _{15-yr}	I _{100-yr}	C _w	Q _{5-yr}	Q _{15-yr}	Q _{5-yr}	Q _{100-yr}
Drainage Area-1	427,226	9.8	7.0	4.1	5.5	6.4	6.8	7.4	0.89	35.8	42.8	55.9	64.6
Drainage Area-2	224,146	5.1	7.0	4.1	5.5	6.4	6.8	7.4	0.89	18.8	22.4	29.3	33.9
Drainage Area-3	199,374	4.6	5.0	4.6	5.5	6.1	7.0	7.8	0.89	18.7	22.4	28.5	34.6
Drainage Area-4A	241,948	5.6	5.0	4.6	5.5	6.1	7.0	7.8	0.89	22.7	27.2	34.6	42.0
Drainage Area-4B	108,125	2.5	5.0	4.6	5.5	6.1	7.0	7.8	0.83	9.5	11.3	14.4	17.5
Total Area		27.6							Total Flow	105.5	126.1	162.71	192.64

Weighted Runoff Coefficient Computations

Impervious areas include pavement & roofs; Pervious areas to include green areas such as grass & lawns

Basin ID	% Impervious	% Pervious	C _{impervious}	C _{pervious}	C _{weighted}
Drainage Area-1	90	10	0.95	0.35	0.89
Drainage Area-2	90	10	0.95	0.35	0.89
Drainage Area-3	90	10	0.95	0.35	0.89
Drainage Area-4A	90	10	0.95	0.35	0.89
Drainage Area-4B	80	20	0.95	0.35	0.83

Summary of Discharge Points & Outfall Locations

ANALYSIS POINT ID	DISCHARGE Q ₁₀ (cfs)	ULTIMATE DISCHARGE/ OUTFALL LOCATION
AP-1	48.0	CENTRE AVE
AP-2	25.2	CENTRE AVE
AP-3	24.8	CENTRE AVE
AP-4A	30.2	BEDFORD AVE
AP-4B	12.6	BEDFORD AVE
Net Flow	140.8	

Q_{CENTRE AVE} = AP-1+AP-2+AP-3
 Q_{BEDFORD AVE} = AP-4A+AP-4B

STREET NAME	NET FLOW Q ₁₀ (cfs)	PERCENT TOTAL
CENTRE AVE	98	70%
BEDFORD AVE	43	30%
Net Flow	140.8	

Assumptions:

1. Rational Formula method is used for computing flowrates of the drainage basins.
2. The values of runoff coefficients used to determine the weighted runoff coefficient were taken from figure 7.7 of chapter 7 of PennDOT manual.
3. The Manning's Kinematic Equation as specified in TR-55 was used for estimating the overland (sheet) flow travel time.
4. The Rainfall intensity values for various rainfall events were taken from Chapter 7, Appendix A of PennDOT Design Manual.
5. The drainage area delineations of various Blocks & Roadway basins were determined and adjusted based upon the information provided by the surveyor, Baker Engineering & the Revised PLDP Draft, dated 09.25.2012 of Lower Hill Redevelopment Plan.
6. The ROW widths for various streets were taken from Streetscape types of Revised PLDP of Lower Hill Redevelopment Plan.
7. A minimum time of concentration (T_c) of 5 minutes is assumed for determining rainfall intensities for those basins when the computed T_c is less than 10 minutes.
8. The percent pervious & impervious areas were calculated based on the information provided in the tables of Water Reuse Analysis - By Block



APPENDIX B
HYDROLOGIC/ FLOW COMPUTATIONS FOR
POST-CONSTRUCTION CONDITIONS



SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA

Drainage Analysis Summary for Post-Construction Conditions (Fully Developed Conditions)

(Revised 11.01.2012)

DRAINAGE BASIN ID	AREA (acres)	AREA (sq ft)	TIME OF CONC. (min)	RAINFALL INTENSITY (in/hr)	RAINFALL INTENSITY (in/hr)	RAINFALL INTENSITY (in/hr)	RAINFALL INTENSITY (in/hr)	RAINFALL INTENSITY (in/hr)	RAINFALL INTENSITY (in/hr)	WEIGHTED RUNOFF COEFFICIENT	DISCHARGE (cfs)		DISCHARGE (cfs)	
											Q _{dry}	Q _{wet}	Q _{dry}	Q _{wet}
Block-A	145.055	3,38	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.80	12.4	14.9	16.5	18.9
Block-B	117.812	2,70	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.71	9.2	10.9	12.1	13.9
Block-C	201.083	4,63	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.80	17.6	21.0	23.3	26.8
Block-D	97.199	2,23	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.80	8.4	10.0	11.1	12.7
Block-E	108.900	2,50	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.80	9.6	11.5	12.7	14.6
Block-F	75.794	1,74	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.71	6.0	7.2	8.0	9.1
Block-G	128.502	2,95	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.80	11.5	13.7	15.2	17.4
Block-H	35.719	0.82	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.51	1.9	2.3	2.6	2.9
Block-I	54.889	1,26	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	4.8	5.8	6.1	7.1
Roadway-Fullerton St (South)	26,736	0.61	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	2.6	3.1	3.4	4.0
Roadway-Fullerton St (West)	14,064	0.32	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	1.4	1.6	1.8	2.1
Roadway-Logan St (North)	33,064	0.75	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	3.2	3.8	4.3	4.9
Roadway-Logan St (South)	31,914	0.73	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	3.1	3.7	4.1	4.7
Roadway-Lemieux Pl (North)	34,760	0.80	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	3.4	4.0	4.5	5.1
Roadway-Lemieux Pl (South)	26,544	0.61	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	2.6	3.1	3.4	3.9
Roadway-Wylie Ave (East)	41,884	0.96	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	4.1	4.9	5.4	6.2
Roadway-Wylie Ave (Middle)	27,552	0.63	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	2.7	3.2	3.5	4.1
Roadway-Wylie Ave (West)	39,351	0.90	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	3.8	4.6	5.1	5.9
Whitcomb Way (Cul-de-sac)	24,888	0.57	5.0	4.6	5.5	6.1	7.0	7.8	8.5	0.82	2.4	2.9	3.2	3.7
Total Area	29.1	25.9									110.4	132.0	146.4	167.99

Total Flow

Total Area

Note: Blocks H & I have been combined to Block H

Weighted Runoff Coefficient Computations

Impervious areas include pavement & roofs; Pervious areas to include green areas such as: grass & lawns

Basin ID	% Impervious	% Pervious	Area	C _{impervious}	C _{pervious}	C _{combined}
Block-A	75	25	3.38	0.95	0.35	0.80
Block-B	60	40	2.80	0.95	0.35	0.71
Block-C	75	25	4.78	0.95	0.35	0.80
Block-D	75	25	2.27	0.95	0.35	0.80
Block-E	75	25	2.60	0.95	0.35	0.80
Block-F	60	40	1.84	0.95	0.35	0.71
Block-G	75	25	3.11	0.95	0.35	0.80
Block-H	27	73	1.26	0.82	0.35	0.51
Block-I	75	25	1.26	0.95	0.35	0.80
Roadway-Fullerton St (South)	95	5	0.61	0.95	0.35	0.90
Roadway-Fullerton St (West)	95	5	0.32	0.95	0.35	0.92
Roadway-Logan St (North)	95	5	0.75	0.95	0.35	0.92
Roadway-Logan St (South)	95	5	0.73	0.95	0.35	0.92
Roadway-Lemieux Pl (North)	95	5	0.80	0.95	0.35	0.92
Roadway-Lemieux Pl (South)	95	5	0.61	0.95	0.35	0.92
Roadway-Wylie Ave (East)	95	5	0.96	0.95	0.35	0.92
Roadway-Wylie Ave (Middle)	95	5	0.63	0.95	0.35	0.92
Roadway-Wylie Ave (West)	95	5	0.90	0.95	0.35	0.92
Whitcomb Way (Cul-de-sac)	95	5	0.57	0.95	0.35	0.92

Assumptions:

- Rational Formula method is used for computing flowrates of the drainage basins.
- The values of runoff coefficients used to determine the weighted runoff coefficient were taken from figure 7.7 of chapter 7 of PennDOT manual.
- The Manning's Kinematic Equation as specified in TR-55 was used for estimating the overland (sheet) flow travel time.
- The rainfall intensity values for various rainfall events were taken from Chapter 7, Appendix A of PennDOT Design Manual.
- The rainfall intensity values for various rainfall events were taken from Chapter 7, Appendix A of PennDOT Design Manual.
- The ROW widths for various streets were taken from Streetscape types of Revised PUDP of Lower Hill Redevelopment Plan.
- A minimum time of concentration of 5 minutes is assumed for determining rainfall intensities for all the basins in the proposed conditions since the computed T_c is less than 5 minutes.
- The percent pervious & impervious areas were calculated based on the information provided in the tables of Water Release Analysis - By Block

Summary of Discharge/Analysis Points

ANALYSIS POINT ID	DISCHARGE (cfs)	INTERSECTION LOCATION
AP-1	43.0	Wylie & Logan
AP-2	55.0	Wylie & Lemieux
AP-3	39.0	Bedford & Washington
AP-4	8.7	Chatham & Center
AP-5	137.0	Bedford & Washington

Note: * AP-5 is the total discharge from the 28 ac. site (AP-5 = AP-1+AP-2+AP-3)

ANALYSIS POINT ID	CONTRIBUTING BASINS
AP-1	Block A, Block B, Half of Block D, Fullerton (S), Fullerton (W), Logan (S)
AP-2	Wylie (East), Lemieux (S)
AP-3	Block G, Block F, Wylie (West), Lemieux (N), Half of Block E

Unaccounted ROW Areas

Location	Length (L) (ft)	Avg Width (W) (ft)	AREA (sq ft)	AREA (acres)
Crawford St.	1158	4	4,356	0.10
Bedford Ave.	1364	10	13,504	0.31
Washington Pl.	371	14	5,227	0.12
Center Ave.	1463	4	5,227	0.12
Total				0.65

Proposed Roadway Basins

Basin ID	Length (L) (ft)	ROW (W) (ft)	AREA (sq ft)	AREA (acres)
Fullerton St (South)	418	64	26,736	0.61
Fullerton St (West)	220	64	14,064	0.32
Logan St (North)	460	72	33,064	0.76
Logan St (South)	443	72	31,914	0.73
Lemieux Pl (North)	435	80	34,760	0.80
Lemieux Pl (South)	316	84	26,544	0.61
Wylie Ave (East)	566	74	41,884	0.96
Wylie Ave (Middle)	268	64	17,152	0.63
Wylie Ave (West)	505	78	39,351	0.90
Whitcomb Way	303	82	24,988	0.57
Total Area			300,677	6.97



APPENDIX C

HYDROLOGIC/ FLOW COMPUTATIONS FOR POST-CONSTRUCTION CONDITIONS USING PWSA'S RAINFALL INTENSITY



Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA

Drainage Analysis Summary for Post-Construction Conditions (Fully Developed Conditions) using PWSA's 25-yr Rainfall Intensity

(Revised 11/01/2012)

DRAINAGE BASIN ID	AREA (sq ft)	AREA (acres)	AREA (Adjusted)	TIME OF CONC. (min)	RAINFALL INTENSITY (in/hr)		RAINFALL INTENSITY (in/hr)		RAINFALL INTENSITY (in/hr)		WEIGHTED RUNOFF COEFFICIENT	DISCHARGE (cfs)		DISCHARGE (cfs)		INTERSECTION LOCATION
					Tc	1-hr	3-hr	1-hr	3-hr	Q _{25-yr}		Q _{100-yr}	Q _{25-yr}	Q _{100-yr}		
Block-A	145,055	3.33	3.33	9.0	4.6	5.5	6.1	5.8	7.8	0.80	12.4	14.9	15.7	21.1	23.0	Wylie & Lemieux
Block-B	117,912	2.70	2.60	9.0	4.6	5.5	6.1	5.8	7.8	0.71	9.2	11.5	11.5	15.5	16.9	Bedford & Washington
Block-C	201,883	4.63	4.73	9.0	4.6	5.5	6.1	5.8	7.8	0.80	17.6	21.0	22.2	29.8	32.5	Chatham & Center
Block-D	87,189	2.03	2.27	9.0	4.6	5.5	6.1	5.8	7.8	0.80	8.4	10.0	10.5	14.2	15.4	Bedford & Washington
Block-E	198,900	4.56	4.6	9.0	4.6	5.5	6.1	5.8	7.8	0.80	9.6	11.5	12.7	16.2	17.7	
Block-F	75,194	1.74	1.84	9.0	4.6	5.5	6.1	5.8	7.8	0.71	6.0	7.2	8.0	10.2	11.1	
Block-G	128,502	2.95	3.11	9.0	4.6	5.5	6.1	5.8	7.8	0.80	11.5	13.7	14.4	19.4	21.2	
Block-H	35,719	0.82	0.82	9.0	4.6	5.5	6.1	5.8	7.8	0.80	1.9	2.3	2.4	3.3	3.6	
Block-I	54,888	1.26	1.26	9.0	4.6	5.5	6.1	5.8	7.8	0.80	4.6	5.5	5.8	7.9	8.6	
Roadway-Fullerton St (South)	26,236	0.61	0.61	9.0	4.6	5.5	6.1	5.8	7.8	0.80	2.6	3.1	3.4	4.4	4.8	
Roadway-Fullerton St (West)	14,064	0.32	0.32	9.0	4.6	5.5	6.1	5.8	7.8	0.82	1.4	1.6	1.7	2.3	2.5	
Roadway-Logan St (North)	33,084	0.76	0.73	9.0	4.6	5.5	6.1	5.8	7.8	0.82	3.2	3.8	4.1	5.5	5.9	
Roadway-Logan St (South)	31,914	0.73	0.73	9.0	4.6	5.5	6.1	5.8	7.8	0.82	3.1	3.7	4.1	5.3	5.7	
Roadway-Lemieux Pl (North)	34,760	0.80	0.80	9.0	4.6	5.5	6.1	5.8	7.8	0.82	3.1	3.7	4.1	5.3	5.7	
Roadway-Lemieux Pl (South)	26,844	0.61	0.61	9.0	4.6	5.5	6.1	5.8	7.8	0.82	2.6	3.1	3.4	4.4	4.8	
Roadway-Wylie Ave (East)	41,884	0.96	0.96	9.0	4.6	5.5	6.1	5.8	7.8	0.82	4.1	4.9	5.4	6.9	7.5	
Roadway-Wylie Ave (Middle)	27,552	0.63	0.63	9.0	4.6	5.5	6.1	5.8	7.8	0.82	2.7	3.2	3.5	4.4	4.9	
Roadway-Wylie Ave (West)	39,351	0.90	0.90	9.0	4.6	5.5	6.1	5.8	7.8	0.82	3.8	4.6	5.1	6.5	7.1	
Whitcomb Way (Out-of-lot)	24,988	0.57	0.57	9.0	4.6	5.5	6.1	5.8	7.8	0.82	2.4	2.9	3.2	4.1	4.5	
Total Area	29.1	29.8								Total Flow	110.4	132.0	146.4	187.19	203.99	

Total Average of the project site (not including blocks F & I) 27.7

Net flow from this site using PWSA's 25-yr event intensity 131

Note: Blocks H & I have been combined to Block H

Weighted Runoff Coefficient Computations

Impervious areas include pavement & roofs; Pervious areas to include green areas such as: grass & lawns

Basin ID	% Impervious	% Pervious	Area	Compositeness	C _{adj}
Block-A	75	25	3.38	0.95	0.80
Block-B	60	40	2.80	0.95	0.71
Block-C	75	25	4.73	0.95	0.80
Block-D	75	25	2.27	0.95	0.80
Block-E	75	25	2.60	0.95	0.80
Block-F	60	40	1.84	0.95	0.71
Block-G	75	25	3.11	0.95	0.80
Block-H	27	73	0.82	0.95	0.51
Block-I	75	25	1.26	0.95	0.80
Roadway-Fullerton St (South)	95	5	0.61	0.95	0.92
Roadway-Fullerton St (West)	95	5	0.32	0.95	0.92
Roadway-Logan St (North)	95	5	0.76	0.95	0.92
Roadway-Logan St (South)	95	5	0.73	0.95	0.92
Roadway-Lemieux Pl (North)	95	5	0.80	0.95	0.92
Roadway-Lemieux Pl (South)	95	5	0.61	0.95	0.92
Roadway-Wylie Ave (East)	95	5	0.96	0.95	0.92
Roadway-Wylie Ave (Middle)	95	5	0.63	0.95	0.92
Roadway-Wylie Ave (West)	95	5	0.90	0.95	0.92
Whitcomb Way (Out-of-lot)	95	5	0.57	0.95	0.92

14.8

- Assumptions:
- Rational formula is used for computing flowrates of the drainage basins.
 - The values of runoff coefficients used to determine the weighted runoff coefficient were taken from figure 7.7 of chapter 7 of PennDOT manual.
 - The Manning's Kinematic Equation as specified in TR-55 was used for estimating the overland (sheet) flow travel time.
 - The Rational Formula was used to estimate the flow from the basins to the storm sewer system from Chapter 7, Appendix A of PennDOT Design Manual.
 - The drainage area delineations of various Blocks & Roads were taken from the information provided by the surveyor, Baker Engineering & the Revised PLDP Draft, dated 09.23.2012 of Lower Hill Redevelopment Plan.
 - The ROW widths for various streets were taken from Streetscape Types of Revised PLDP of Lower Hill Redevelopment Plan.
 - A minimum time of concentration of 5 minutes is assumed for determining rainfall intensities for all the basins in the proposed conditions since the computed T_c is less than 5 minutes.
 - The percent pervious & impervious areas were calculated based on the information provided in the tables of Water Reuse Analysis - By Block

Summary of Discharge/Analysis Points

ANALYSIS POINT ID	DISCHARGE (cfs) Q _{25-yr} (PWSA)	DISCHARGE (cfs) Q _{100-yr}	INTERSECTION LOCATION
AP-1	41	52	Wylie & Lemieux
AP-2	37	46	Bedford & Washington
AP-3	8.3	10.3	Chatham & Center
AP-4	190.2	222.2	Bedford & Washington

Note: * AP-5 is the total discharge from the 28 ac. site (AP-5 = AP-1+AP-2+AP-3)

CONTRIBUTING BASINS

ANALYSIS POINT ID	CONTRIBUTING BASINS
AP-1	Block A, Block B, Hall of Block D, Fullerton (S), Fullerton (W), Logan (S)
AP-2	Wylie (East), Lemieux (S)
AP-3	Block G, Block F, Wylie (West), Lemieux (N), Hall of Block E

Unaccounted ROW Areas

Location	Length (L) (ft)	Avg Width (W) (ft)	AREA (sq ft)	AREA (acres)
Crawford St	1158	4	4,356	0.10
Bedford Ave	1364	10	13,640	0.31
Washington Pl	371	14	5,227	0.12
Center Ave	1463	4	5,852	0.13
Total			29,075	0.65

Proposed Roadway Basins

Basin ID	Length (L) (ft)	ROW (W) (ft)	AREA (sq ft)	AREA (acres)
Fullerton St (South)	418	64	26,736	0.61
Fullerton St (West)	250	64	14,064	0.32
Logan St (North)	460	72	33,084	0.76
Logan St (South)	443	72	31,914	0.73
Lemieux Pl (North)	435	80	34,760	0.80
Lemieux Pl (South)	316	84	26,544	0.61
Wylie Ave (East)	566	74	41,884	0.96
Wylie Ave (Middle)	328	84	27,552	0.63
Wylie Ave (West)	505	78	39,351	0.90
Whitcomb Way	303	82	24,988	0.57
Total Area			309,877	6.97

Net flow at Lemieux & Centre outfall = 109.9



APPENDIX D

TIME OF CONCENTRATION (T_c) COMPUTATIONS FOR PRE-CONSTRUCTION CONDITIONS



SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations for Pre-construction Conditions

Drainage Basin - DA-1

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Paved	
Mannings n	0.015	
Hydraulic Length (ft)	150	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.15	
T_t (hr)	0.02	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Paved	
Hydraulic Length (ft)	180	
Avg. Slope (ft/ft)	0.14	
Avg. Velocity (ft/sec)	7.5	
T _(hr)	0.01	
T_t (hr)	0.01	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	1039
Avg. Slope (ft/ft)	0.03
Avg. Velocity (ft/sec)	3.5
T_t (hr)	0.08

Time of Concentration (hrs)	0.11
Time of Concentration (mins)	6

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.15	15.3	150	951	928
Shallow1	0.14	13.9	180	928	903
Channel/Pipe	0.03	3.5	1039	903	867

Note: A T_c of 5 minutes is used for flow computations if the computed T_c is less than 5 minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations for Pre-construction Conditions
Drainage Basin - DA-2

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Paved	
Mannings n	0.015	
Hydraulic Length (ft)	150	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.13	
T_t (hr)	0.02	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Paved	
Hydraulic Length (ft)	180	
Avg. Slope (ft/ft)	0.05	
Avg. Velocity (ft/sec)	4.0	
T (hr)	0.01	
T_t (hr)	0.01	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	1039
Avg. Slope (ft/ft)	0.01
Avg. Velocity (ft/sec)	3.5
T_t (hr)	0.08

Time of Concentration (hrs) 0.11
Time of Concentration (mins) 7

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.13	12.7	150	886	867
Shallow1	0.05	5.0	180	867	858
Channel/Pipe	0.01	1.4	1039	858	843

Note: A T_c of 5 minutes is used for flow computations if the computed T_c is less than 5 minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations for Pre-construction Conditions
Drainage Basin - DA-3

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Paved	
Mannings n	0.015	
Hydraulic Length (ft)	150	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.07	
T_t (hr)	0.03	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Paved	
Hydraulic Length (ft)	595	
Avg. Slope (ft/ft)	0.05	
Avg. Velocity (ft/sec)	4.5	
T _t (hr)	0.04	
T_t (hr)	0.04	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	50
Avg. Slope (ft/ft)	0.04
Avg. Velocity (ft/sec)	4
T_t (hr)	0.003

Time of Concentration (hrs) 0.07
Time of Concentration (mins) 4.0

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.07	6.7	150	865	855
Shallow1	0.05	5.0	595	855	825
Channel/Pipe	0.04	4.0	50	822	820

Note: A T_c of 5 minutes is used for flow computations if the computed T_c is less than 5 minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations for Pre-construction Conditions
Drainage Basin - DA-4A

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Paved	
Mannings n	0.015	
Hydraulic Length (ft)	150	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.07	
T_t (hr)	0.03	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Paved	
Hydraulic Length (ft)	665	
Avg. Slope (ft/ft)	0.06	
Avg. Velocity (ft/sec)	5.0	
T _(hr)	0.04	
T_t (hr)	0.04	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	50
Avg. Slope (ft/ft)	0.02
Avg. Velocity (ft/sec)	2.9
T_t (hr)	0.005

Time of Concentration (hrs)	0.07
Time of Concentration (mins)	4

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.07	6.7	150	865	855
Shallow1	0.06	6.0	665	855	815
Channel/Pipe	0.02	2.0	50	811	810

Note: A T_c of 5 minutes is used for flow computations if the computed T_c is less than 5 minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations for Pre-construction Conditions
Drainage Basin - DA-4B

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Unpaved	
Mannings n	0.03	
Hydraulic Length (ft)	150	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.25	
T_t(hr)	0.03	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Unpaved	Paved
Hydraulic Length (ft)	250	420
Avg. Slope (ft/ft)	0.04	0.09
Avg. Velocity (ft/sec)	5.0	4.0
T (hr)	0.01	0.03
T_t(hr)	0.04	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	100
Avg. Slope (ft/ft)	0.13
Avg. Velocity (ft/sec)	6
T_t(hr)	0.005

Time of Concentration (hrs)	0.07
Time of Concentration (mins)	4

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.25	25.3	150	908	870
Shallow1	0.04	4.0	250	870	860
Shallow2	0.09	8.8	420	860	823
Channel/Pipe	0.13	13.0	100	823	810

Note: A T_c of 5 minutes is used for flow computations if the computed T_c is less than 5 minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30

APPENDIX E

TIME OF CONCENTRATION (TC) COMPUTATIONS FOR POST- CONSTRUCTION CONDITIONS



Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations - Post Construction Conditions

Drainage Basin - DA-1

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Paved	
Mannings n	0.015	
Hydraulic Length (ft)	50	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.10	
T_t(hr)	0.01	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Paved	
Hydraulic Length (ft)	200	
Avg. Slope (ft/ft)	0.08	
Avg. Velocity (ft/sec)	5.5	
T _(hr)	0.01	
T_t(hr)	0.01	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	900
Avg. Slope (ft/ft)	0.03
Avg. Velocity (ft/sec)	4
T_t(hr)	0.06

Time of Concentration (hrs)	0.08
Time of Concentration (mins)	5

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.10	10.0	50	900	895
Shallow1	0.08	7.5	200	895	880
Channel/Pipe	0.03	3.3	900	880	850

Notes:

1. A T_c of 5 minutes is used for flow computations if the computed T_c is less than five (5) minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30
2. The above computed T_c also includes the time of the storm runoff to the outfall location

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations - Post Construction Conditions

Drainage Basin - DA-2

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Paved	
Mannings n	0.015	
Hydraulic Length (ft)	25	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.08	
T_t (hr)	0.01	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Paved	
Hydraulic Length (ft)	25	
Avg. Slope (ft/ft)	0.04	
Avg. Velocity (ft/sec)	4	
T _(hr)	0.002	
T_t (hr)	0.00	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	1200
Avg. Slope (ft/ft)	0.07
Avg. Velocity (ft/sec)	5.2
T_t (hr)	0.06

Time of Concentration (hrs)	0.07
Time of Concentration (mins)	4

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.08	8.0	25	918	916
Shallow1	0.04	4.0	25	916	915
Channel/Pipe	0.07	6.8	1200	915	834

Notes:

1. A T_c of 5 minutes is used for flow computations if the computed T_c is less than five (5) minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30
2. The above computed T_c also includes the time of the storm runoff to the outfall location

SEA Lower Hill Infrastructure Redevelopment, Pittsburgh, PA
Time of Concentration Calculations - Post Construction Conditions

Drainage Basin - DA-3

SHEET FLOW (Kinematic Wave Equation)

Segment ID	1	2
Surface Description	Paved	
Mannings n	0.015	
Hydraulic Length (ft)	25	
P (2yr-24hr) inches	2.34	
Avg. Slope (ft/ft)	0.12	
T_t (hr)	0.005	

SHALLOW CONCENTRATED FLOW

Segment ID	1	2
Surface Description	Paved	
Hydraulic Length (ft)	25	
Avg. Slope (ft/ft)	0.08	
Avg. Velocity (ft/sec)	5.5	
T _(hr)	0.001	
T_t (hr)	0.00	

CHANNEL FLOW (MANNING'S Avg. Velocity)

Surface Description	Paved
Hydraulic Length (ft)	1200
Avg. Slope (ft/ft)	0.03
Avg. Velocity (ft/sec)	3.5
T_t (hr)	0.10

Time of Concentration (hrs)	0.10
Time of Concentration (mins)	6

Flow Type	Avg. Slope (ft/ft)	Avg. Slope (%)	Length (ft)	Elev. U/S	Elev. D/S
Sheet	0.12	12.0	25	855	852
Shallow1	0.08	8.0	25	852	850
Channel/Pipe	0.03	3.4	1200	850	809

Notes:

1. A T_c of 5 minutes is used for flow computations if the computed T_c is less than five (5) minutes per PennDOT Drainage Manual, Chapter 7, Page # 7-30
2. The above computed T_c also includes the time of the storm runoff to the outfall location

APPENDIX F

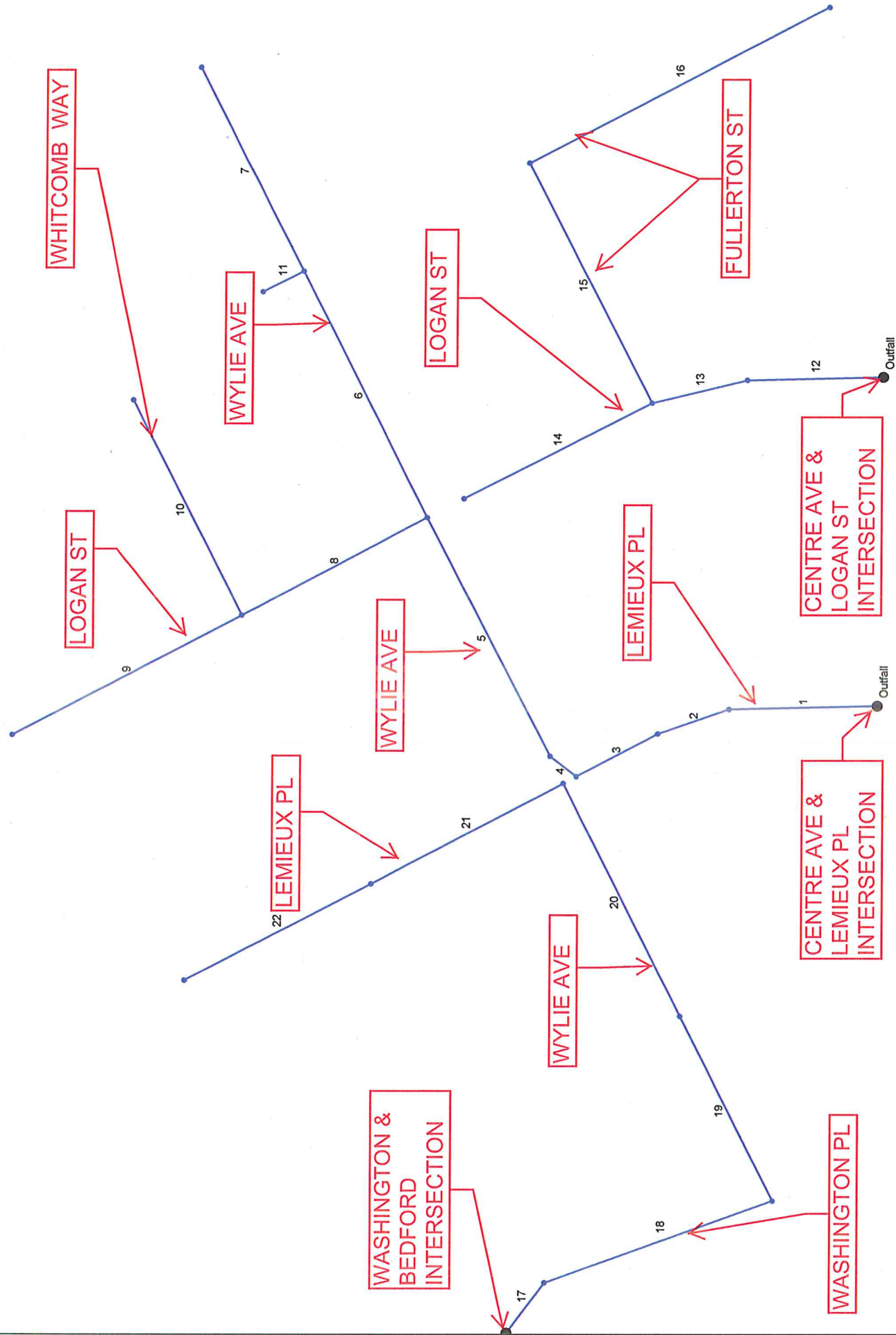
STORM SEWER ANALYSIS USING HYDRAFLOW COMPUTER PROGRAM



Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

HydroFlow Storm Sewers Extension for AutoCAD® Civil 3D® 2013 Plan



Project File: Overall-Option A.stm

Number of lines: 22

Date: 1/28/2013

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		57.20	30	Cir	159.697	818.00	825.98	4.997	820.50	828.35	0.77	828.35	End	Manhole
2		52.70	24	Cir	81.430	826.50	831.39	6.005	828.35	833.37	n/a	834.16	1	Manhole
3		48.20	24	Cir	99.069	832.00	836.95	4.997	834.89	838.93	n/a	838.93	2	Manhole
4		48.20	24	Cir	35.800	837.50	839.29	5.000	838.96	841.27	n/a	841.27	3	Manhole
5		48.20	24	Cir	287.447	840.00	851.50	4.001	841.61	853.48	n/a	857.15	4	Manhole
6		11.20	18	Cir	295.968	853.00	876.68	8.001	860.20	877.96	n/a	877.96 j	5	Manhole
7		2.70	18	Cir	244.916	880.00	902.04	8.999	880.29	902.66	n/a	902.66	6	Manhole
8		33.50	24	Cir	225.454	852.00	856.51	2.000	859.06*	863.27*	1.77	865.04	5	Manhole
9		14.30	18	Cir	278.111	858.00	877.47	7.001	865.79	878.86	n/a	878.86 j	8	Manhole
10		26.80	24	Cir	258.209	857.00	872.49	5.999	865.68	874.29	n/a	874.29 j	8	Manhole
11		5.80	18	Cir	49.361	873.00	876.95	8.002	878.55*	878.68*	0.17	878.84	6	Manhole
12		43.40	24	Cir	146.442	837.50	838.96	0.997	839.46*	843.85*	0.74	844.60	End	Manhole
13		41.00	24	Cir	106.210	839.50	841.09	1.497	844.91*	847.89*	2.57	850.46	12	Manhole
14		4.80	18	Cir	226.571	841.50	848.30	3.001	852.99*	853.40*	0.11	853.51	13	Manhole
15		33.80	24	Cir	289.258	845.00	862.36	6.002	851.31	864.27	n/a	864.27 j	13	Manhole
16		17.70	18	Cir	363.246	863.00	872.08	2.500	864.57	873.53	n/a	873.53 j	15	Manhole
17		39.20	24	Cir	67.000	785.00	787.01	3.000	787.00	788.96	n/a	788.96 j	End	Manhole
18		39.20	24	Cir	261.586	787.50	797.96	3.999	788.99	799.91	2.46	799.91	17	Manhole
19		39.20	24	Cir	221.590	798.50	816.23	8.001	799.94	818.18	0.37	818.55	18	Manhole
20		32.60	24	Cir	279.429	816.50	831.87	5.501	819.33	833.77	n/a	833.77 j	19	Manhole
21		26.10	24	Cir	232.940	832.00	836.66	2.001	834.44	838.45	n/a	838.45 j	20	Manhole
22		16.20	18	Cir	225.712	837.00	846.03	4.001	838.45	847.46	n/a	847.46 j	21	Manhole

Project File: Overall-Option A.stm

Number of lines: 22

Run Date: 1/28/2013

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station Line	To Line	Len (ft)	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
			Incr	Total		Incr	Total	Inlet (min)	Syst (min)					Slope (%)	Size (in)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	159.697	0.00	0.00	0.00	0.00	0.00	0.0	4.0	0.0	57.20	99.32	11.77	30	5.00	818.00	825.98	820.50	828.35	834.50	842.00	
2	1	81.430	0.00	0.00	0.00	0.00	0.00	0.0	3.9	0.0	52.70	60.04	17.07	24	6.01	826.50	831.39	828.35	833.37	842.00	846.20	
3	2	99.069	0.00	0.00	0.00	0.00	0.00	0.0	3.8	0.0	48.20	54.77	15.36	24	5.00	832.00	836.95	834.89	838.93	846.20	849.75	
4	3	35.800	0.00	0.00	0.00	0.00	0.00	0.0	3.8	0.0	48.20	54.79	17.53	24	5.00	837.50	839.29	838.96	841.27	849.75	850.50	
5	4	287.447	0.00	0.00	0.00	0.00	0.00	0.0	3.4	0.0	48.20	49.01	16.58	24	4.00	840.00	851.50	841.61	853.48	850.50	861.75	
6	5	295.968	0.00	0.00	0.00	0.00	0.00	0.0	2.7	0.0	11.20	32.18	6.66	18	8.00	853.00	876.68	860.20	877.96	861.75	886.70	
7	6	244.916	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	2.70	34.13	7.70	18	9.00	880.00	902.04	880.29	902.66	886.70	917.75	
8	5	225.454	0.00	0.00	0.00	0.00	0.00	0.0	0.6	0.0	33.50	34.66	10.66	24	2.00	852.00	856.51	859.06	863.27	861.75	870.00	
9	8	278.111	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	14.30	30.10	8.23	18	7.00	858.00	877.47	865.79	878.86	870.00	889.00	
10	8	258.209	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	26.80	60.01	8.76	24	6.00	857.00	872.49	865.68	874.29	870.00	881.75	
11	6	49.361	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	5.80	32.18	3.28	18	8.00	873.00	876.95	878.55	878.68	886.70	886.50	
12	End	146.442	0.00	0.00	0.00	0.00	0.00	0.0	1.5	0.0	43.40	24.47	13.84	24	1.00	837.50	838.96	839.46	843.85	849.25	852.00	
13	12	106.210	0.00	0.00	0.00	0.00	0.00	0.0	1.4	0.0	41.00	29.98	13.05	24	1.50	839.50	841.09	844.91	847.89	852.00	856.25	
14	13	226.571	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	4.80	19.71	2.72	18	3.00	841.50	848.30	852.99	853.40	856.25	861.25	
15	13	289.258	0.00	0.00	0.00	0.00	0.00	0.0	0.6	0.0	33.80	60.03	10.85	24	6.00	845.00	862.36	851.31	864.27	856.25	876.00	
16	15	363.246	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	17.70	17.99	10.07	18	2.50	863.00	872.08	864.57	873.53	876.00	879.00	
17	End	67.000	0.00	0.00	0.00	0.00	0.00	0.0	2.0	0.0	39.20	42.44	12.52	24	3.00	785.00	787.01	787.00	788.96	809.17	809.00	
18	17	261.586	0.00	0.00	0.00	0.00	0.00	0.0	1.6	0.0	39.20	49.00	14.08	24	4.00	787.50	797.96	788.99	799.91	809.00	808.50	
19	18	221.590	0.00	0.00	0.00	0.00	0.00	0.0	1.3	0.0	39.20	69.31	14.37	24	8.00	798.50	816.23	799.94	818.18	808.50	824.75	
20	19	279.429	0.00	0.00	0.00	0.00	0.00	0.0	0.9	0.0	32.60	57.47	10.48	24	5.50	816.50	831.87	819.33	833.77	824.75	850.00	
21	20	232.940	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	26.10	34.66	8.56	24	2.00	832.00	836.66	834.44	838.45	850.00	845.00	
22	21	225.712	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	16.20	22.75	9.30	18	4.00	837.00	846.03	838.45	847.46	845.00	852.00	

Project File: Overall-Option A.stm
 Number of lines: 22
 Run Date: 1/28/2013

NOTES: Intensity = 50.75 / (Inlet time + 9.80) ^ 0.79 ; Return period = Yrs. 10 ; c = cir e = ellip b = box

FL-DCT Report

Line No	To Line	Type of struc	n - Value	Len (ft)	Drainage Area			Time of conc (min)	Time of Flow in sect (min)	Inten (l) (in/hr)	Total CA	Add Q (cfs)	Inlet elev (ft)	Elev of HGL			Rise	HGL	ADD		Date: 1/28/2013									
					C1 = 0.2	C2 = 0.5	C3 = 0.9							Inlet elev (ft)	Up (ft)	Down (ft)			Fall (ft)	Span		Pipe	Full Flow							
																								Incr- ment (ac)	Sub- Total (ac)	Sum CA	Size (in)	Slope (%)	Vel (ft/s)	Cap (cfs)
1	End	MH	0.012	159.697	0.00	0.00	0.00	0.23	0.00	0.00	57.20	842.00	828.35	820.50	7.85	30	4.92	11.77	57.20	1/28/2013										
					0.00	0.00	0.00				57.20		828.48	820.50		30	5.00	20.23	99.32											
					0.00	0.00	0.00						825.98	818.00	7.98	Cir				Proj: Overall-Option A.stm										
2	1	MH	0.012	81.430	0.00	0.00	0.00	0.08	0.00	0.00	52.70	846.20	833.37	828.35	5.02	24	6.17	17.07	52.70											
					0.00	0.00	0.00				52.70		833.39	828.50		24	6.01	19.11	60.04											
					0.00	0.00	0.00						831.39	826.50	4.89	Cir														
3	2	MH	0.012	99.069	0.00	0.00	0.00	0.11	0.00	0.00	48.20	849.75	838.93	834.89	4.04	24	4.08	15.36	48.20											
					0.00	0.00	0.00				48.20		838.95	834.00		24	5.00	17.43	54.77											
					0.00	0.00	0.00						836.95	832.00	4.95	Cir														
4	3	MH	0.012	35.800	0.00	0.00	0.00	0.04	0.00	0.00	48.20	850.50	841.27	838.96	2.31	24	6.46	17.53	48.20											
					0.00	0.00	0.00				48.20		841.29	839.50		24	5.00	17.44	54.79											
					0.00	0.00	0.00						839.29	837.50	1.79	Cir														
5	4	MH	0.012	287.447	0.00	0.00	0.00	0.31	0.00	0.00	48.20	861.75	853.48	841.61	11.87	24	4.13	16.58	48.20											
					0.00	0.00	0.00				48.20		853.50	842.00		24	4.00	15.60	49.01											
					0.00	0.00	0.00						851.50	840.00	11.50	Cir														
6	5	MH	0.012	295.968	0.00	0.00	0.00	0.78	0.00	0.00	11.20	886.70	877.96	860.20	17.76	18	6.00	6.66	11.20											
					0.00	0.00	0.00				11.20		878.18	854.50		18	8.00	18.21	32.18											
					0.00	0.00	0.00						876.68	853.00	23.68	Cir														
7	6	MH	0.012	244.916	0.00	0.00	0.00	2.67	0.00	0.00	2.70	917.75	902.66	880.29	22.38	18	9.14	7.70	2.70											
					0.00	0.00	0.00				2.70		903.54	881.50		18	9.00	19.31	34.13											
					0.00	0.00	0.00						902.04	880.00	22.04	Cir														
8	5	MH	0.012	225.454	0.00	0.00	0.00	0.35	0.00	0.00	33.50	870.00	863.27	859.06	4.22	24	1.87	10.66	33.50											
					0.00	0.00	0.00				33.50		858.51	854.00		24	2.00	11.03	34.66											
					0.00	0.00	0.00						856.51	852.00	4.51	Cir														
9	8	MH	0.012	278.111	0.00	0.00	0.00	0.57	0.00	0.00	14.30	889.00	878.86	865.79	13.07	18	4.70	8.23	14.30											
					0.00	0.00	0.00				14.30		878.97	859.50		18	7.00	17.03	30.10											
					0.00	0.00	0.00						877.47	858.00	19.47	Cir														
10	8	MH	0.012	258.209	0.00	0.00	0.00	0.50	0.00	0.00	26.80	881.75	874.29	865.68	8.61	24	3.34	8.76	26.80											
					0.00	0.00	0.00				26.80		874.49	859.00		24	6.00	19.10	60.01											
					0.00	0.00	0.00						872.49	857.00	15.49	Cir														

NOTES: Intensity = 50.75 / (Inlet time + 9.80) ^ 0.79 (in/hr) ; Time of flow in section is based on full flow.

Project File: Overall-Option A.stm

FL-DCT Report

Line No	To Line	Type of struc	n - Value	Len (ft)	Drainage Area			Time of conc (min)	Time of Flow in sect (min)	Inten (l) (in/hr)	Total CA	Add Q Total Flow (cfs)	Inlet elev (ft)	Elev of HGL			Rise Span	HGL Pipe	ADD		Date: 1/28/2013					
					Incr- ment (ac)	Sub- Total (ac)	Sum CA							Up (ft)	Down (ft)	Fall (ft)			Size (in)	Slope (%)		Vel (ft/s)	Cap (cfs)			
																								C1 = 0.2	C2 = 0.5	C3 = 0.9
11	6	MH	0.012	49.361	0.00	0.00	0.00	0.25	0.00	0.00	5.80	886.50	878.68	878.55	0.13	18	0.26	3.28	5.80	1/28/2013						
					0.00	0.00	0.00				5.80		878.45	874.50	18	8.00	18.21	32.18								
					0.00	0.00	0.00						876.95	873.00	Cir					Proj: Overall-Option A.stm						
12	End	MH	0.012	146.442	0.00	0.00	1.53	0.18	0.00	0.00	43.40	852.00	843.85	839.46	4.39	24	3.00	13.84	43.40							
					0.00	0.00	0.00				43.40		840.96	839.50	24	1.00	7.79	24.47								
					0.00	0.00	0.00						838.96	837.50	Cir											
13	12	MH	0.012	106.210	0.00	0.00	1.39	0.14	0.00	0.00	41.00	856.25	847.89	844.91	2.98	24	2.80	13.05	41.00							
					0.00	0.00	0.00				41.00		843.09	841.50	24	1.50	9.54	29.98								
					0.00	0.00	0.00						841.09	839.50	Cir											
14	13	MH	0.012	226.571	0.00	0.00	0.00	1.39	0.00	0.00	4.80	861.25	853.40	852.99	0.40	18	0.18	2.72	4.80							
					0.00	0.00	0.00				4.80		849.80	843.00	18	3.00	11.15	19.71								
					0.00	0.00	0.00						848.30	841.50	Cir											
15	13	MH	0.012	289.258	0.00	0.00	0.60	0.45	0.00	0.00	33.80	876.00	864.27	851.31	12.96	24	4.48	10.85	33.80							
					0.00	0.00	0.00				33.80		864.36	847.00	24	6.00	19.11	60.03								
					0.00	0.00	0.00						862.36	845.00	Cir											
16	15	MH	0.012	363.246	0.00	0.00	0.00	0.60	0.00	0.00	17.70	879.00	873.53	864.57	8.96	18	2.47	10.07	17.70							
					0.00	0.00	0.00				17.70		873.58	864.50	18	2.50	10.18	17.99								
					0.00	0.00	0.00						872.08	863.00	Cir											
17	End	MH	0.012	67.000	0.00	0.00	1.97	0.09	0.00	0.00	39.20	809.00	788.96	787.00	1.96	24	2.92	12.52	39.20							
					0.00	0.00	0.00				39.20		789.01	787.00	24	3.00	13.51	42.44								
					0.00	0.00	0.00						787.01	785.00	Cir											
18	17	MH	0.012	261.586	0.00	0.00	1.62	0.35	0.00	0.00	39.20	808.50	799.91	788.99	10.92	24	4.17	14.08	39.20							
					0.00	0.00	0.00				39.20		799.96	789.50	24	4.00	15.60	49.00								
					0.00	0.00	0.00						797.96	787.50	Cir											
19	18	MH	0.012	221.590	0.00	0.00	1.33	0.30	0.00	0.00	39.20	824.75	818.18	799.94	18.24	24	8.23	14.37	39.20							
					0.00	0.00	0.00				39.20		818.23	800.50	24	8.00	22.06	69.31								
					0.00	0.00	0.00						816.23	798.50	Cir											
20	19	MH	0.012	279.429	0.00	0.00	0.88	0.45	0.00	0.00	32.60	850.00	833.77	819.33	14.44	24	5.17	10.48	32.60							
					0.00	0.00	0.00				32.60		833.87	818.50	24	5.50	18.29	57.47								
					0.00	0.00	0.00						831.87	816.50	Cir											

NOTES: Intensity = 50.75 / (Inlet time + 9.80) ^ 0.79 (in/hr) ; Time of flow in section is based on full flow.

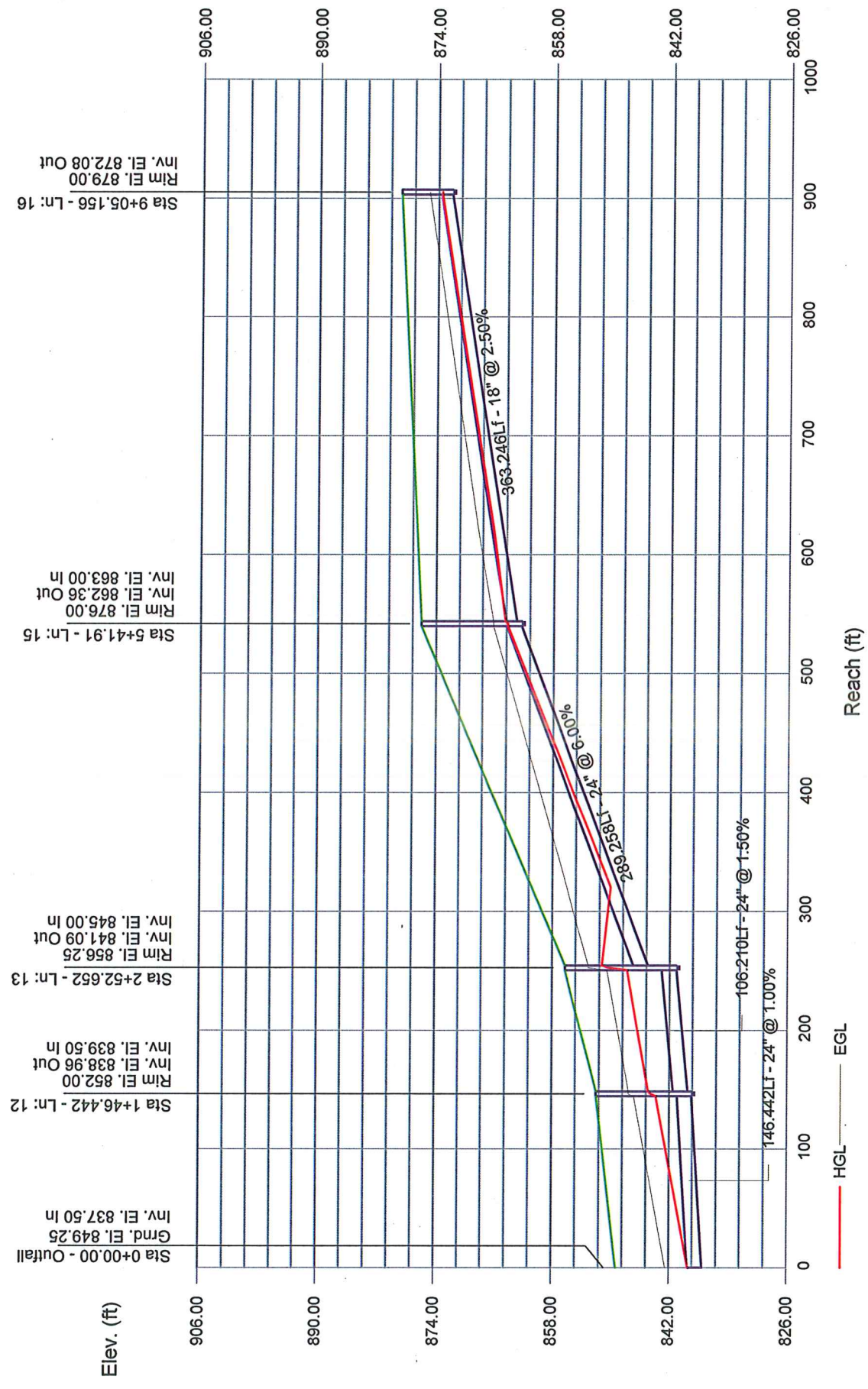
Project File: Overall-Option A.stm

FL-DCT Report

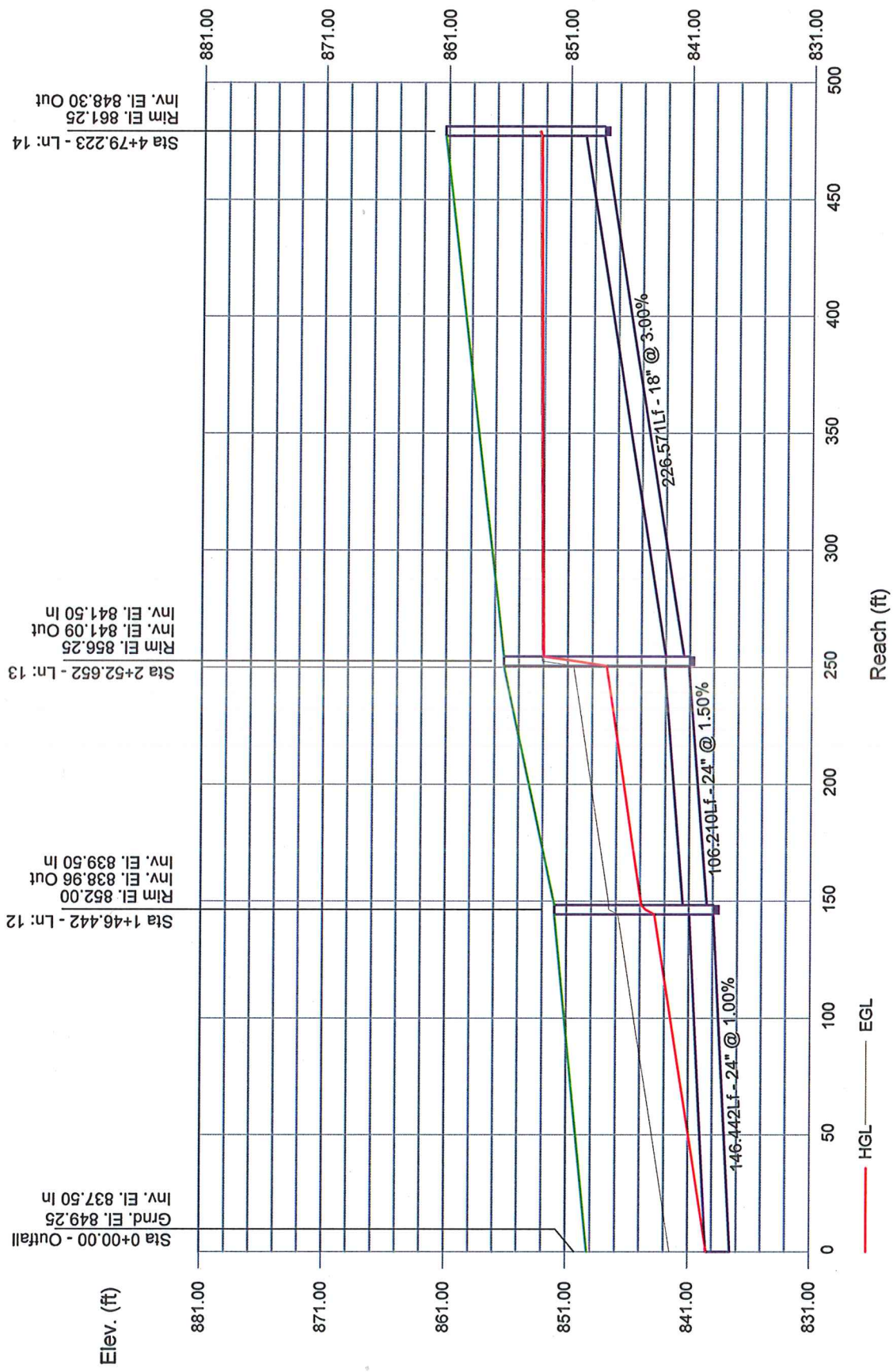
Line No	To Line	Type of struc	n - Value	Len (ft)	Drainage Area			Time of conc (min)	Time of Flow in sect (min)	Inten (I) (in/hr)	Total CA	Add Q Total Flow (cfs)	Inlet elev (ft)	Elev of HGL			Rise Span	HGL Pipe	ADD		Date: 1/28/2013	Proj: Overall-Option A.stm					
					C1 = 0.2	C2 = 0.5	C3 = 0.9							Up (ft)	Down (ft)	Fall (ft)			Size (in)	Slope (%)			Vel (ft/s)	Cap (cfs)			
																									Increment (ac)	Sub-Total (ac)	Sum CA
21	20	MH	0.012	232.940	0.00	0.00	0.00	0.41	0.47	0.00	0.00	845.00	838.45	834.44	4.01	24	1.72	8.56	26.10	Date: 1/28/2013	Proj: Overall-Option A.stm						
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	838.66	834.00	4.66	24	2.00			11.03	34.66				
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	836.66	832.00	0.00	Cir	4.00			12.88	22.75				
22	21	MH	0.012	225.712	0.00	0.00	0.00	0.00	0.41	0.00	0.00	852.00	847.46	838.45	9.01	18	3.99	9.30	16.20	Date: 1/28/2013	Proj: Overall-Option A.stm						
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	847.53	838.50	9.03	18	4.00			12.88	22.75				
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	846.03	837.00	0.00	Cir	4.00			12.88	22.75				

NOTES: Intensity = 50.75 / (Inlet time + 9.80) ^ 0.79 (in/hr) ; Time of flow in section is based on full flow.

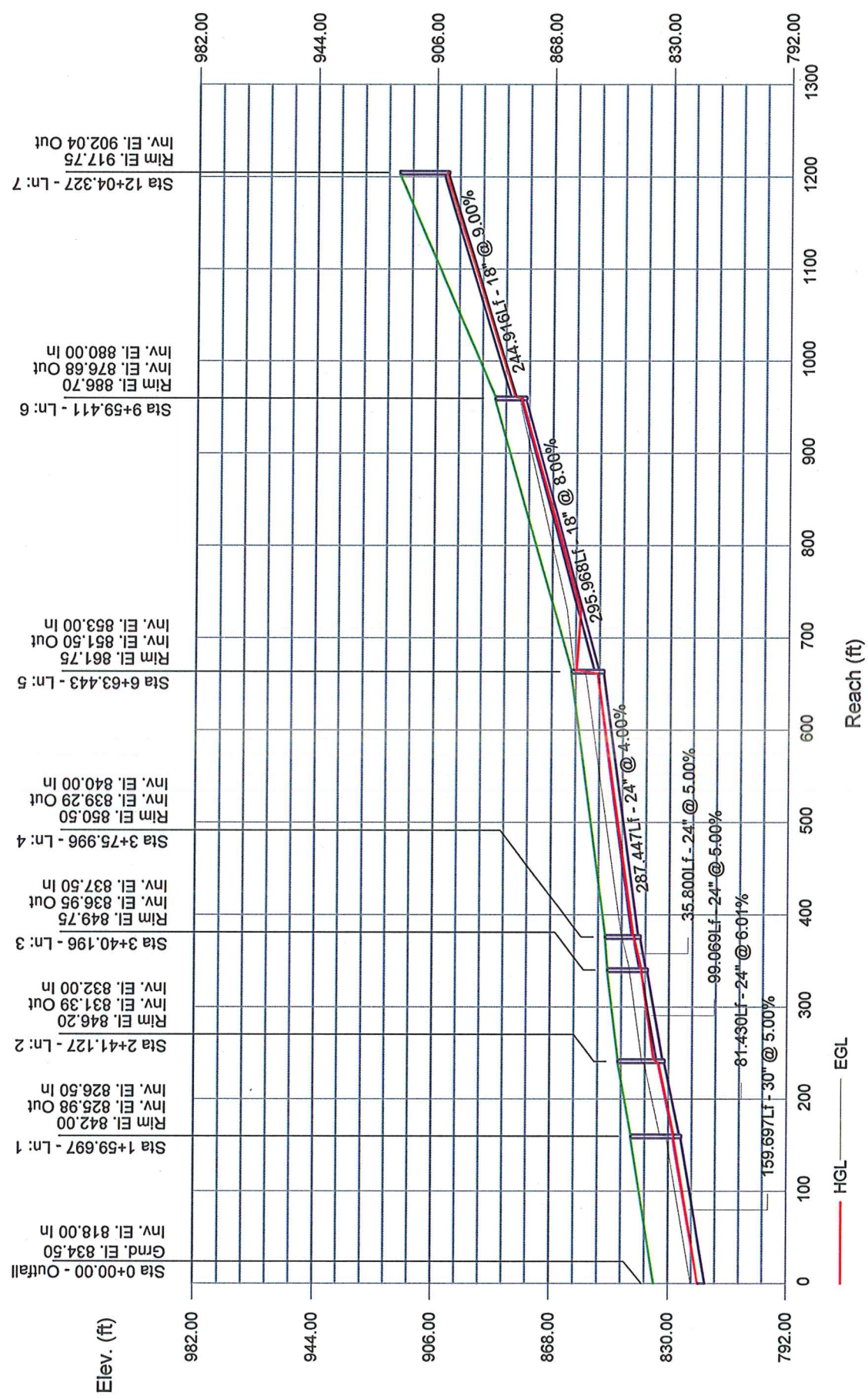
Storm Sewer Profile



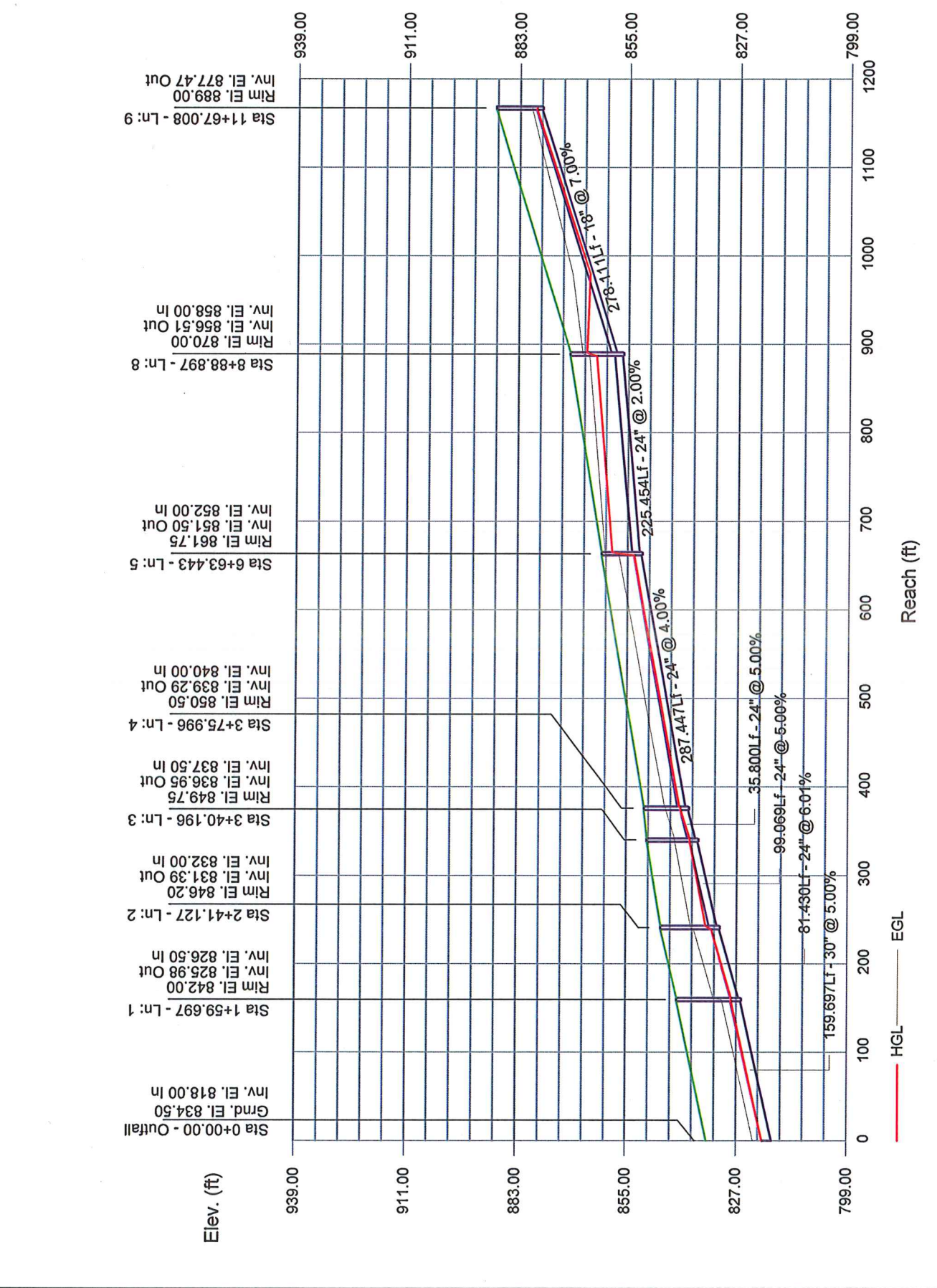
Storm Sewer Profile



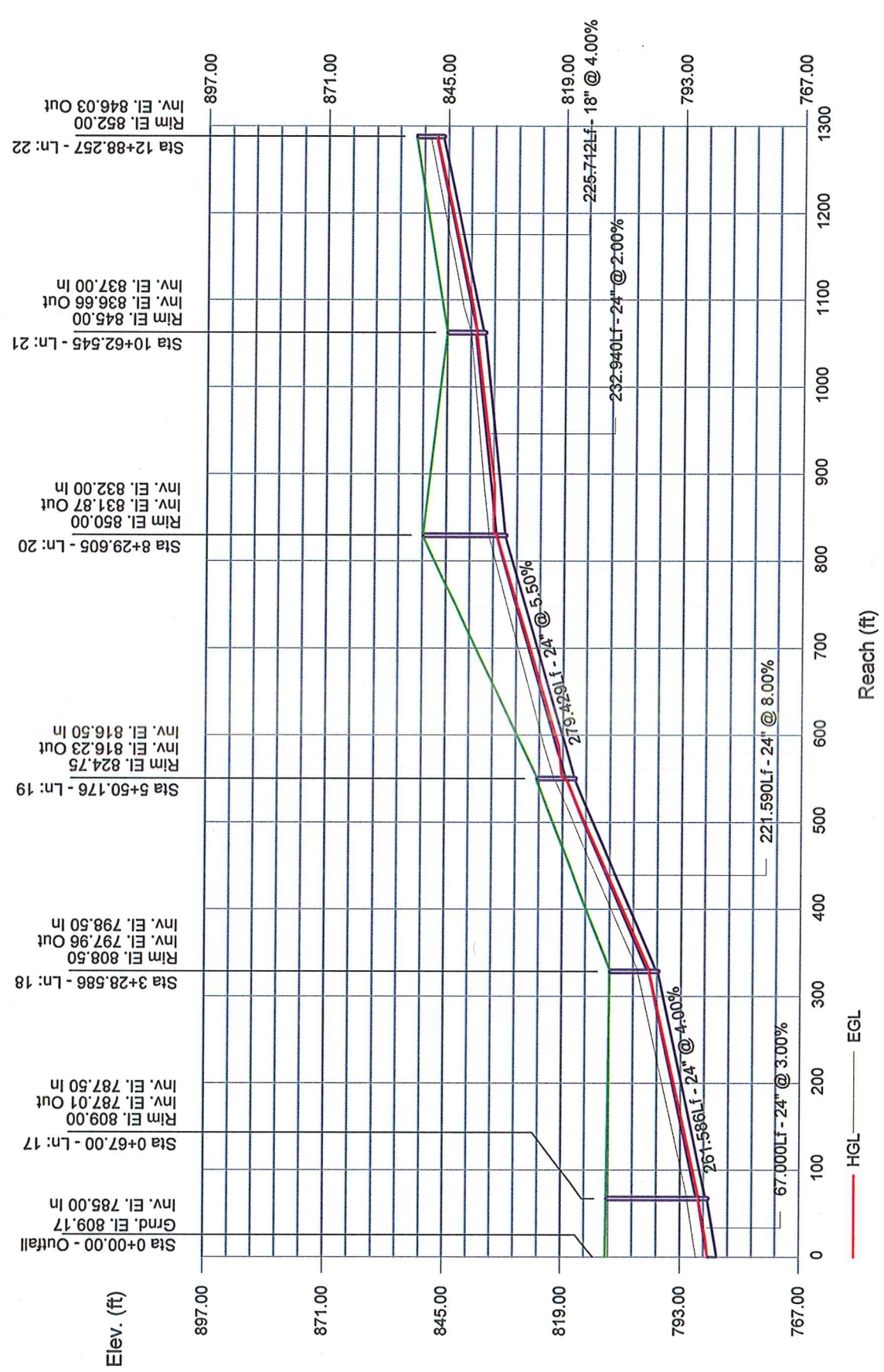
Storm Sewer Profile



Storm Sewer Profile



Storm Sewer Profile



APPENDIX G

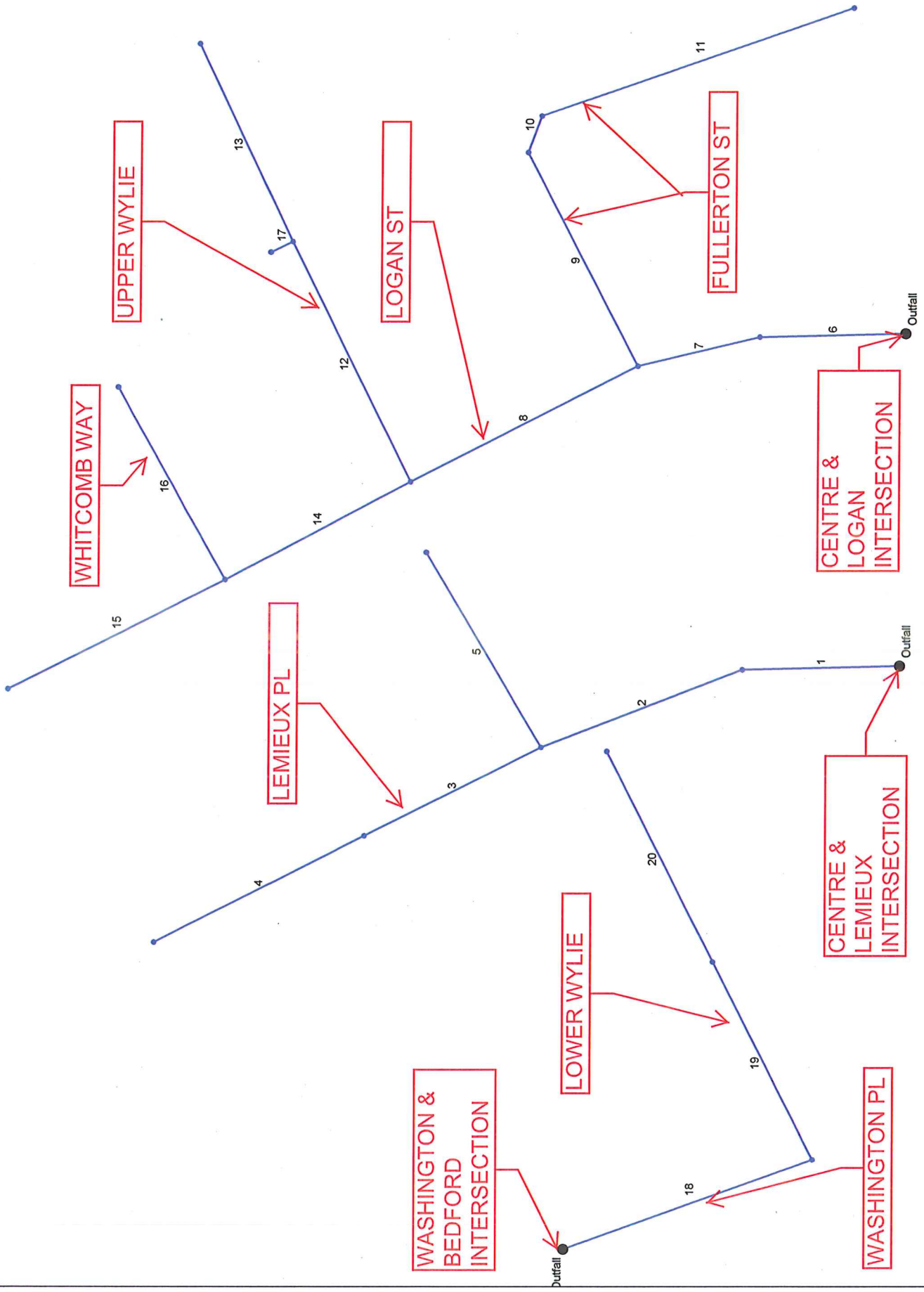
SANITARY SEWER ANALYSIS USING HYDRAFLOW COMPUTER PROGRAM



Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

Hydrus Storm Sewers Extension for AutoCAD® Civil 3D® 2013 Plan



Project File: Entire Network-02.01.2013.stm

Number of lines: 20

Date: 2/1/2013

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		0.45	8	Cir	168,000	818.00	824.72	4.000	818.67	825.03	n/a	825.03 j	End	Manhole
2		0.45	8	Cir	230,000	825.00	834.20	4.000	825.19	834.51	n/a	834.51	1	Manhole
3		0.45	8	Cir	210,000	835.00	837.10	1.000	835.27	837.41	n/a	837.41	2	Manhole
4		0.45	8	Cir	251,000	837.25	839.76	1.000	837.52	840.07	n/a	840.07	3	Manhole
5		0.45	8	Cir	240,000	834.20	846.20	5.000	834.61	846.51	n/a	846.51 j	2	Manhole
6		0.90	8	Cir	156,000	837.00	840.12	2.000	837.67	840.57	n/a	840.57 j	End	Manhole
7		0.90	8	Cir	134,000	841.00	843.68	2.000	841.33	844.13	n/a	844.13	6	Manhole
8		0.32	8	Cir	271,000	844.00	849.42	2.000	844.32	849.68	n/a	849.68 j	7	Manhole
9		0.40	8	Cir	255,000	845.00	860.30	6.000	845.16	860.59	n/a	860.59	7	Manhole
10		0.40	8	Cir	41,000	861.00	863.05	5.000	861.17	863.34	n/a	863.34	9	Manhole
11		0.40	8	Cir	352,000	863.50	870.54	2.000	863.71	870.83	n/a	870.83	10	Manhole
12		0.21	8	Cir	284,000	850.00	875.56	9.000	850.10	875.77	0.08	875.77	8	Manhole
13		0.21	8	Cir	232,000	877.00	897.88	9.000	877.10	898.09	0.08	898.09	12	Manhole
14		0.32	8	Cir	223,000	850.00	861.15	5.000	850.15	861.41	0.10	861.41	8	Manhole
15		0.32	8	Cir	258,000	862.00	880.06	7.000	862.14	880.32	0.10	880.32	14	Manhole
16		0.21	8	Cir	234,000	862.00	873.70	5.000	862.12	873.91	0.08	873.91	14	Manhole
17		0.21	8	Cir	26,000	876.00	877.30	5.000	876.12	877.51	0.08	877.51	12	Manhole
18		0.45	8	Cir	282,000	787.50	797.96	3.709	788.17	798.27	n/a	798.27 j	End	Manhole
19		0.45	8	Cir	235,000	798.50	816.23	7.545	798.66	816.54	n/a	816.54	18	Manhole
20		0.48	8	Cir	250,000	816.50	831.87	6.148	816.67	832.19	0.13	832.19	19	Manhole

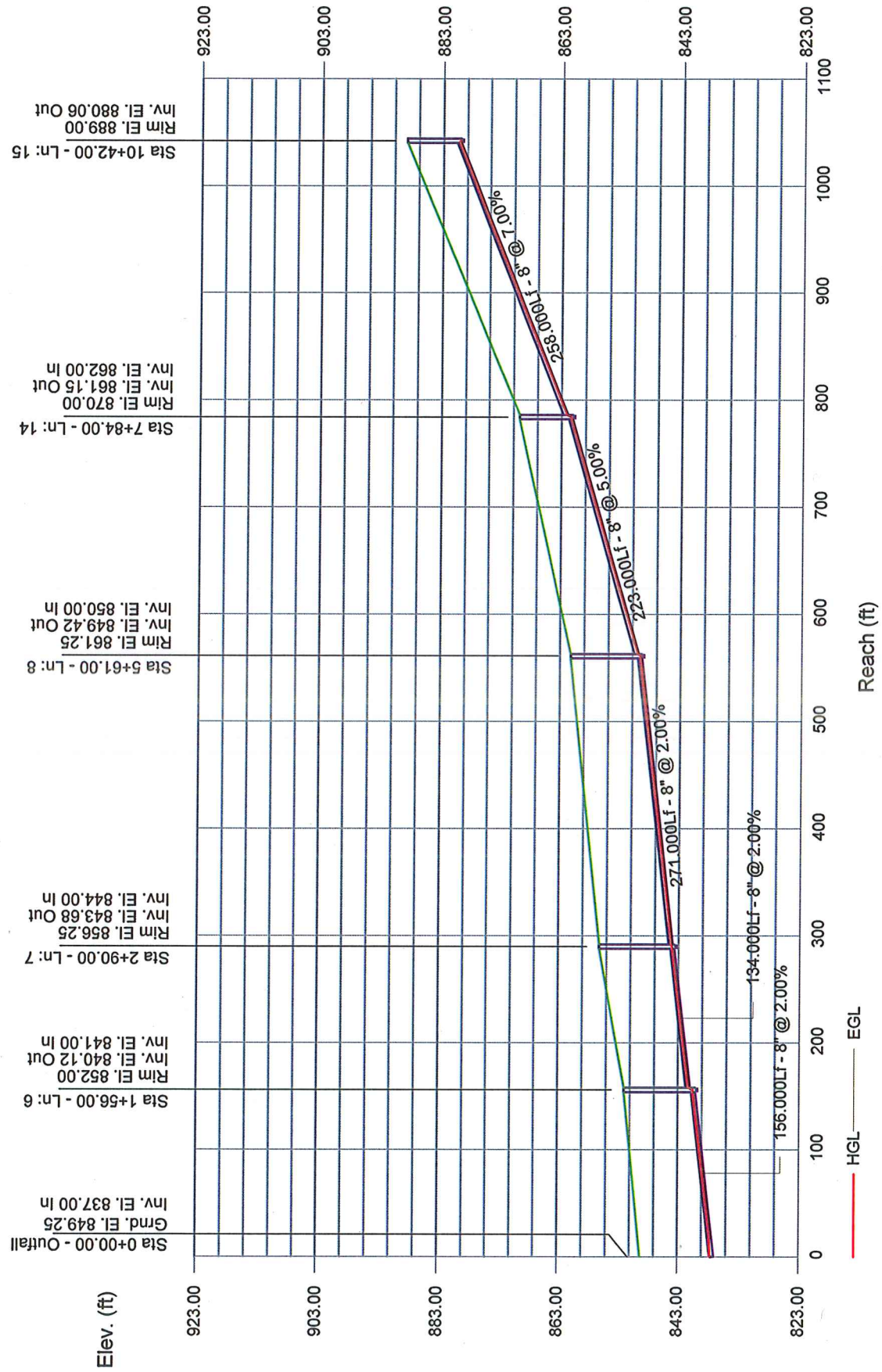
Project File: Entire Network-02.01.2013.stm

Number of lines: 20

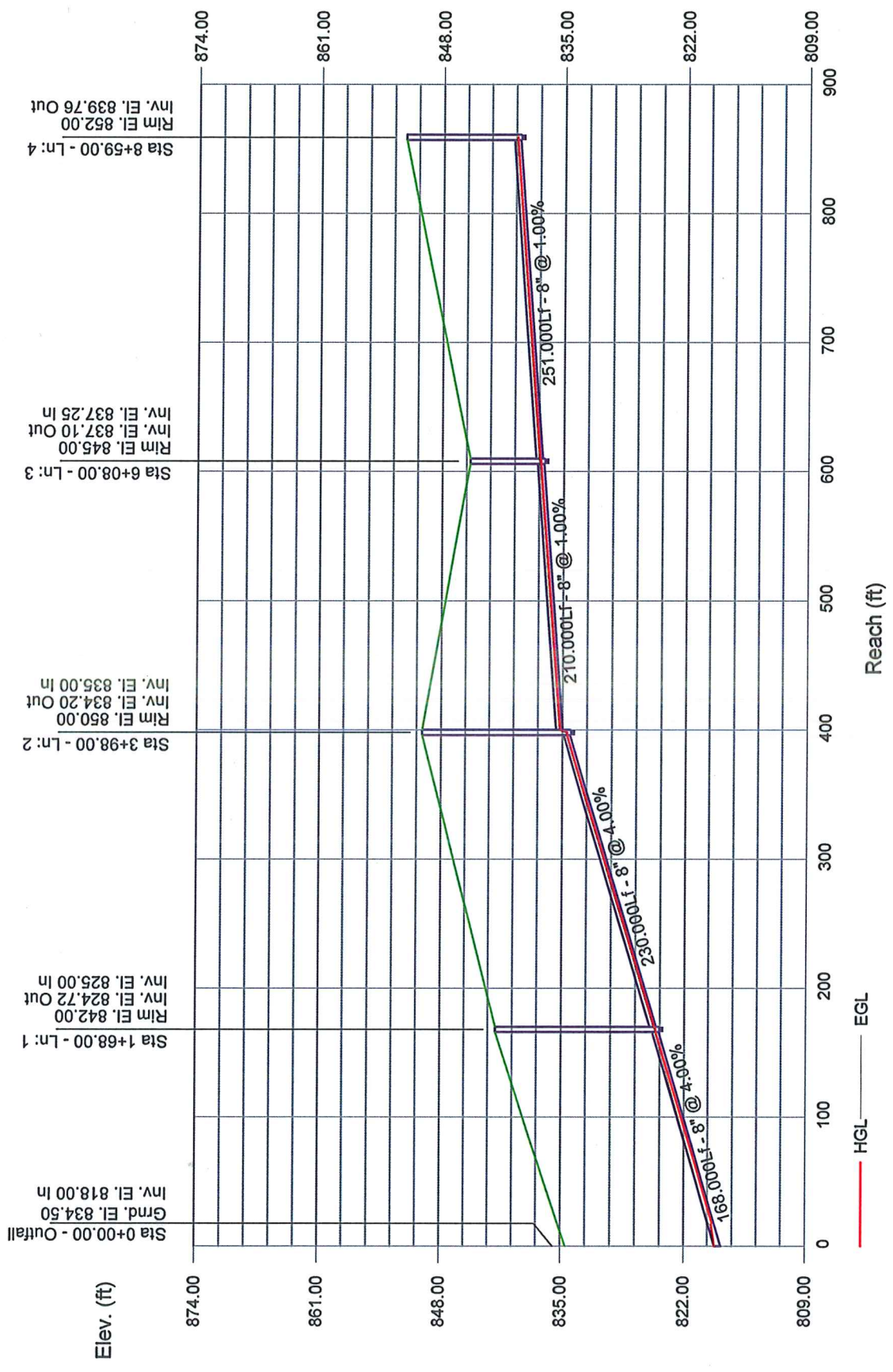
Run Date: 2/1/2013

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

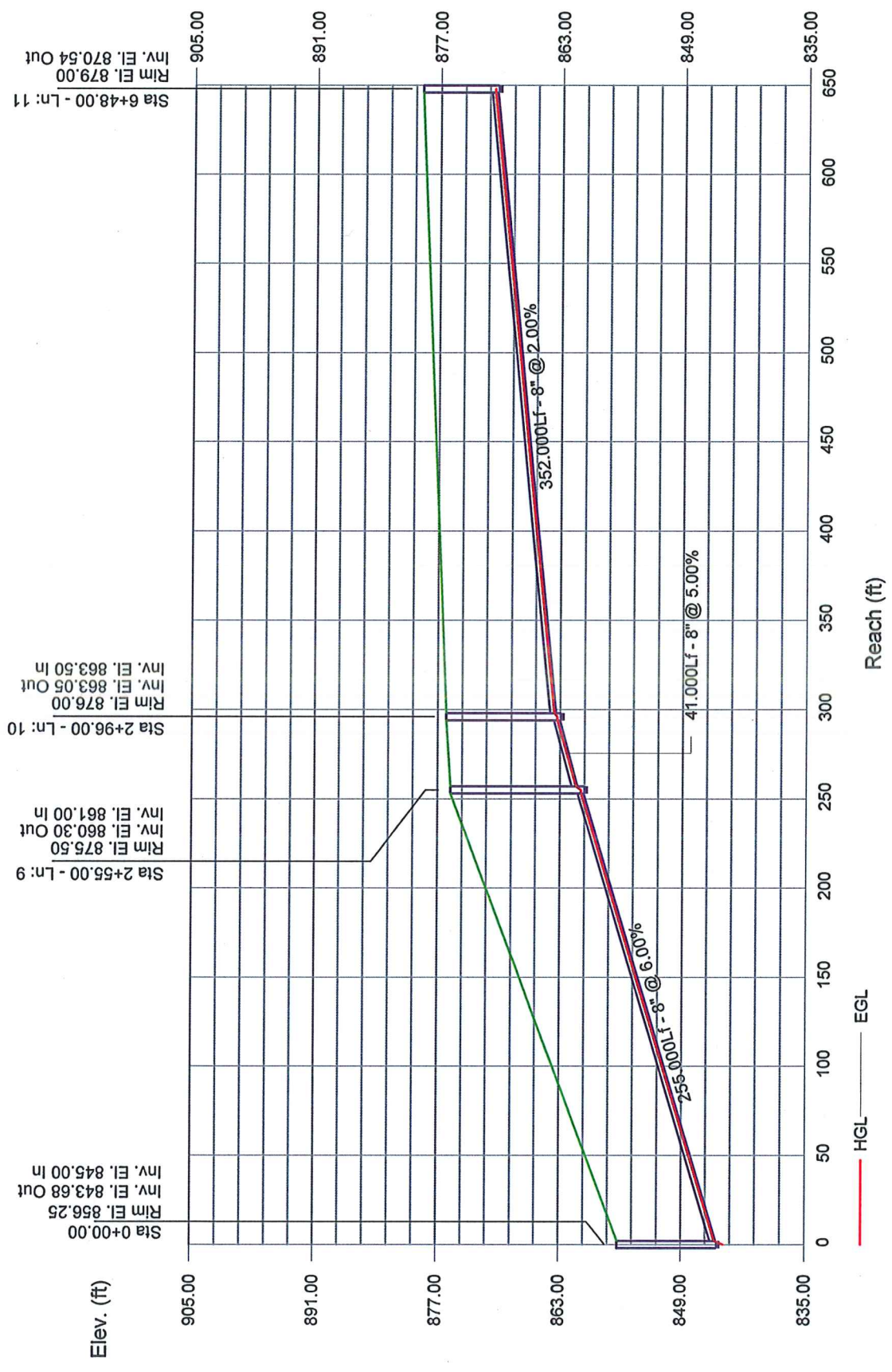
Storm Sewer Profile



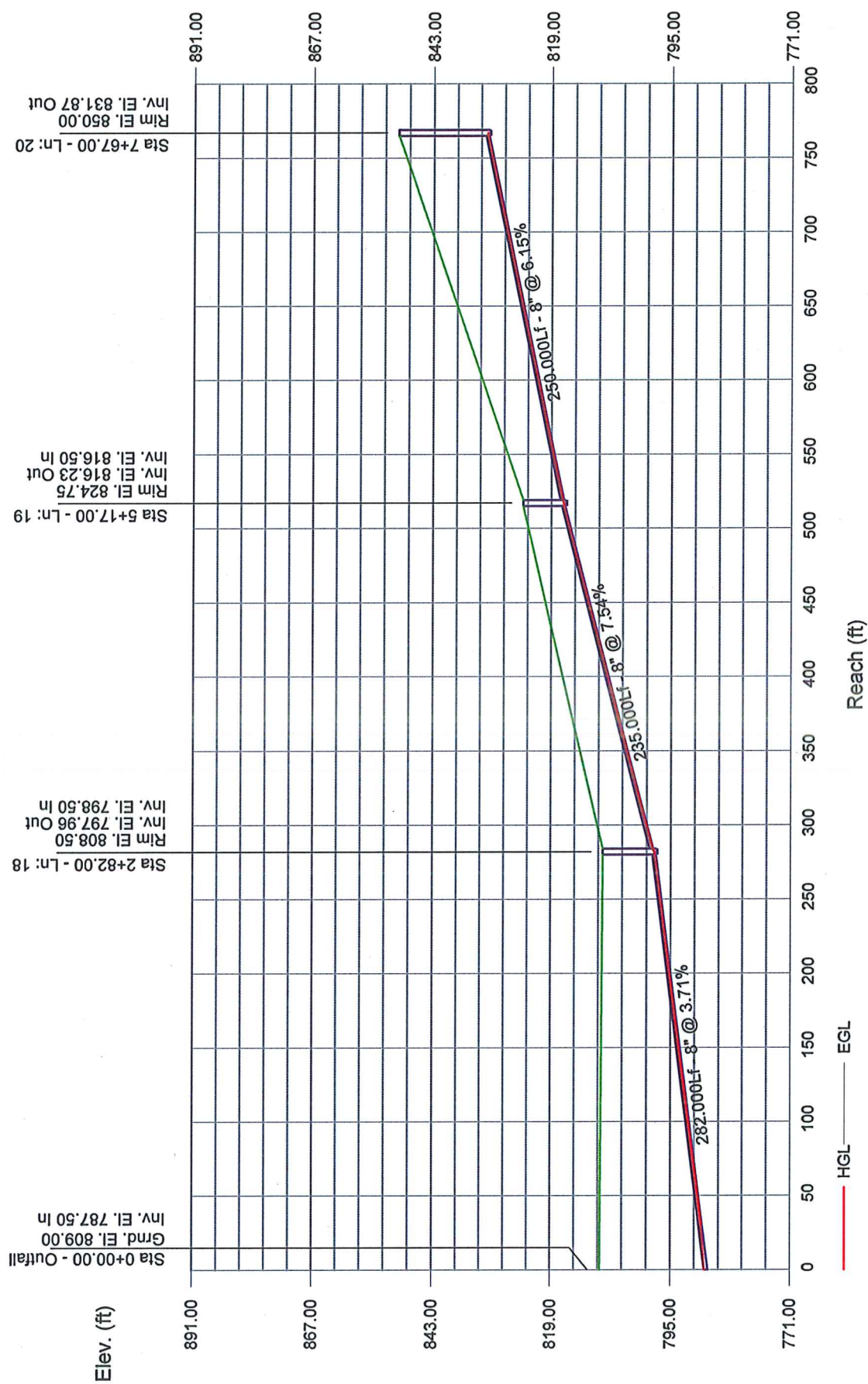
Storm Sewer Profile



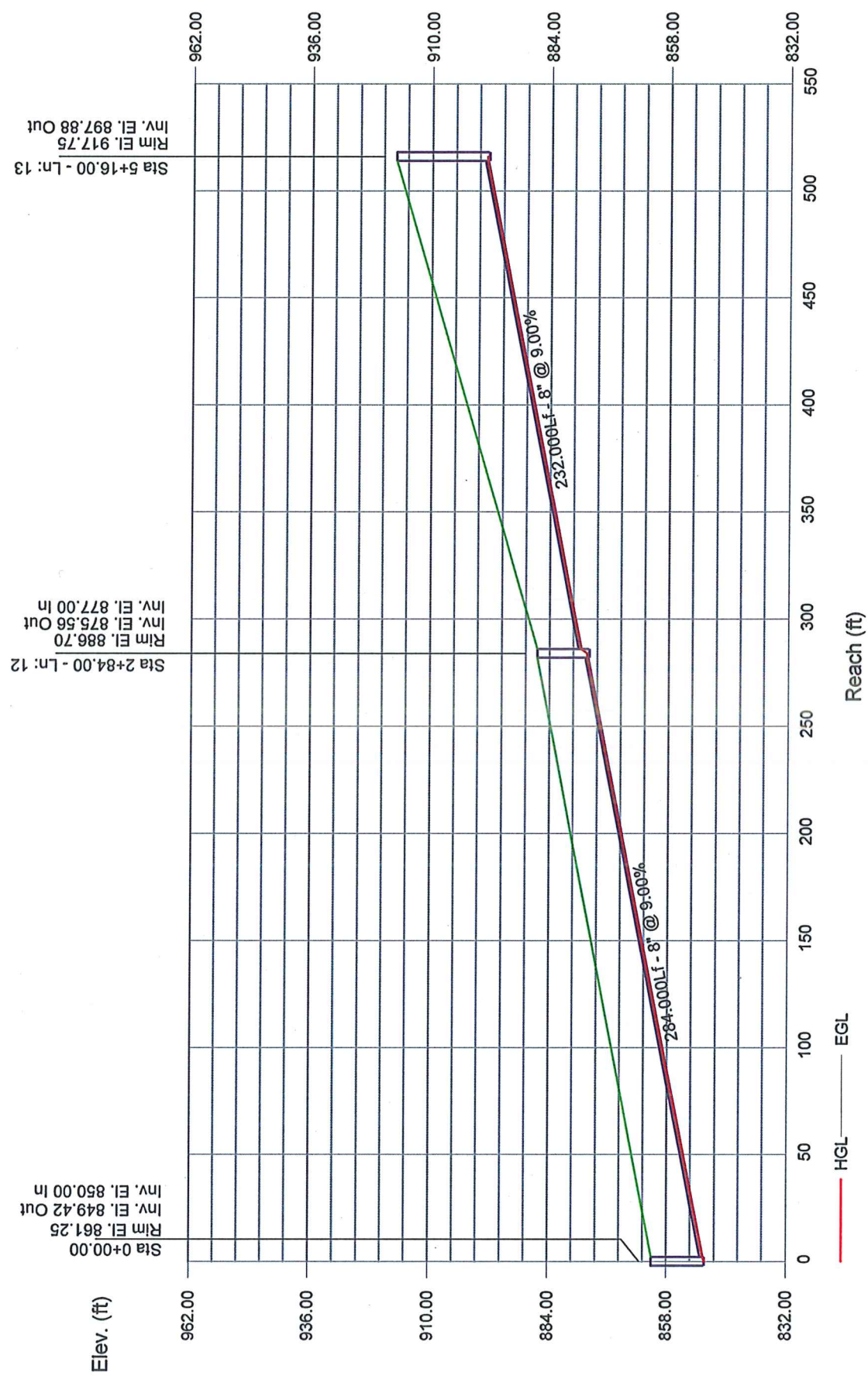
Storm Sewer Profile



Storm Sewer Profile



Storm Sewer Profile



EXHIBITS



Cosmos Technologies Inc.

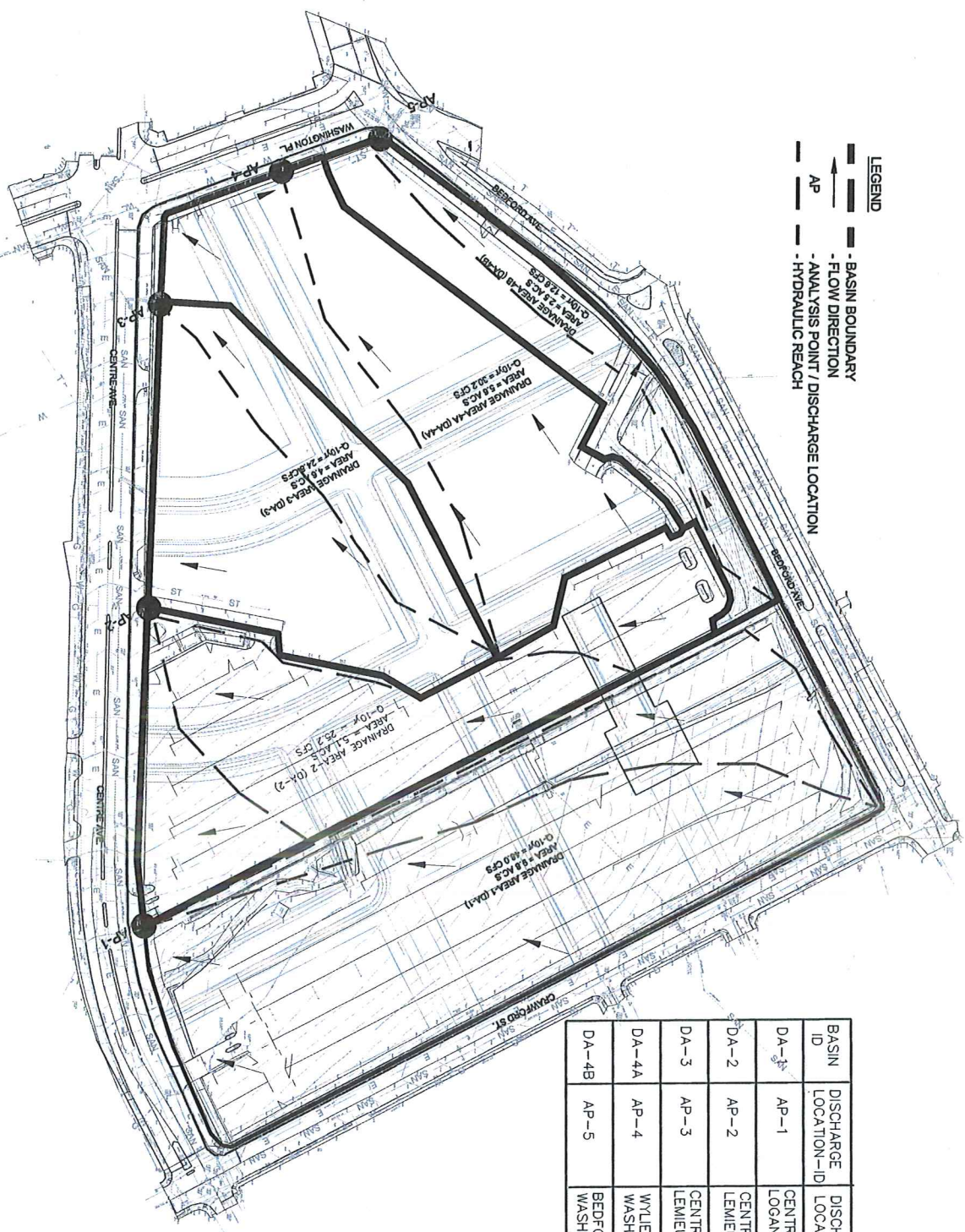
INNOVATION FOR THE FUTURE

EXHIBIT 1
DRAINAGE AREA DELINEATION MAP FOR
PRE-CONSTRUCTION CONDITIONS





- LEGEND**
- BASIN BOUNDARY
 - FLOW DIRECTION
 - ANALYSIS POINT / DISCHARGE LOCATION
 - HYDRAULIC REACH



BASIN ID	DISCHARGE LOCATION-ID	DISCHARGE LOCATION	AREA (ac.s)	Tc (min.s)	0-10yr (cfs)	0-25yr (cfs)
DA-1	AP-1	CENTRE & LOGAN	9.8	7	48.0	56.0
DA-2	AP-2	CENTRE & LEMIEUX	5.1	7	25.0	29.0
DA-3	AP-3	CENTRE & LEMIEUX	4.6	5	25.0	28.0
DA-4A	AP-4	WYLE & WASHINGTON	5.6	5	30.0	35.0
DA-4B	AP-5	BEDFORD & WASHINGTON	2.5	5	13.0	14.0



NOT FOR CONSTRUCTION / FOR INFORMATION ONLY

REVISIONS	JANUARY 24, 2013
DRAINAGE AREA MAP	
EXISTING CONDITIONS	

LOWER HILL REDEVELOPMENT
PITTSBURGH ALLEGHENY COUNTY PENNSYLVANIA

700 River Avenue, Suite 412
Pittsburgh, PA 15212-5936
Phone: (412) 321-3951
Fax: (412) 321-3954
E-mail: info@cosmostechnologiesinc.com
Website: www.cosmostechnologiesinc.com

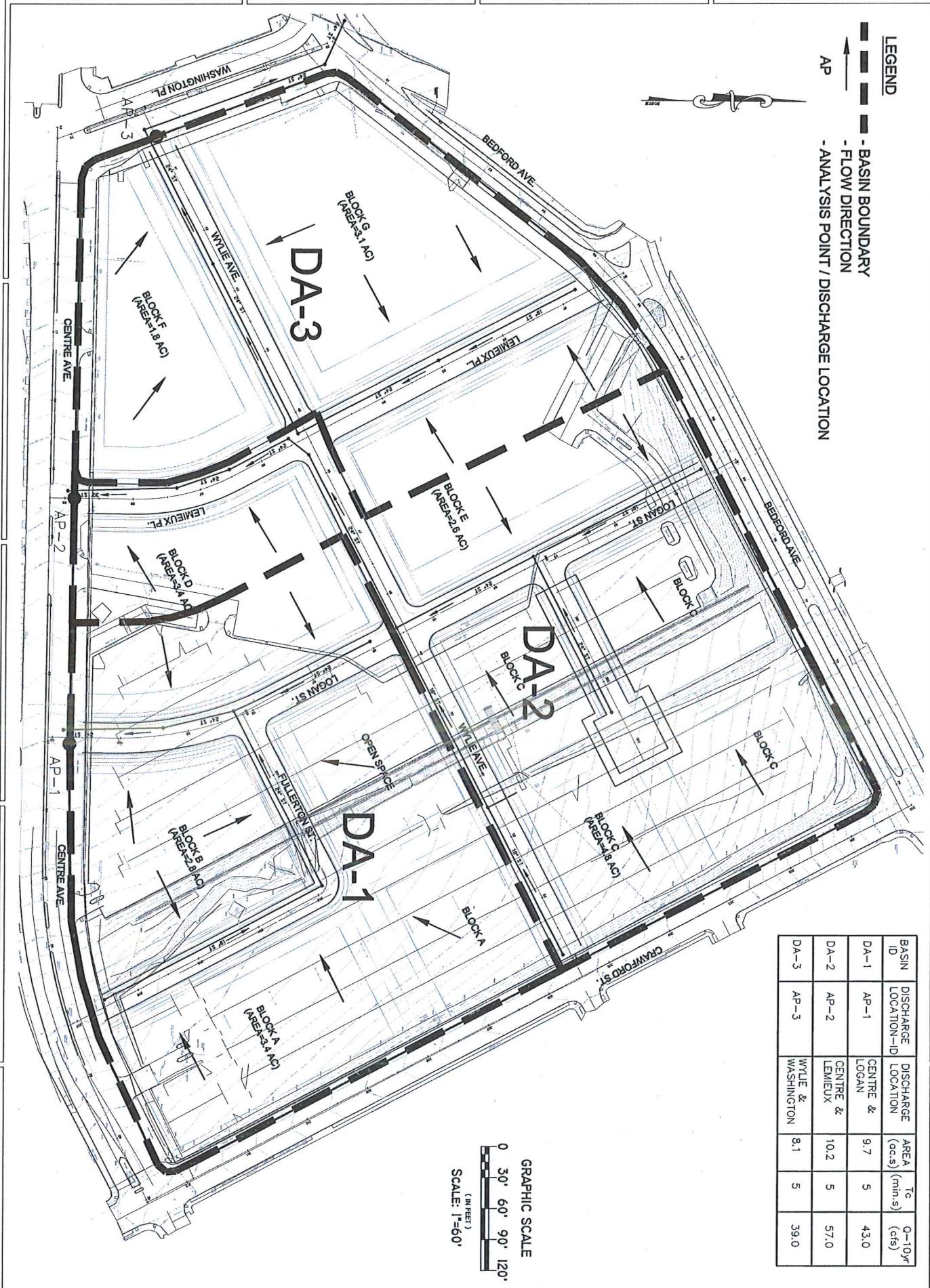
EXHIBIT 2
DRAINAGE AREA DELINEATION MAP FOR
POST-CONSTRUCTION CONDITIONS



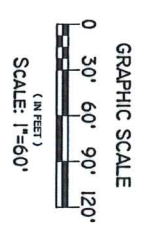
Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

- LEGEND**
- BASIN BOUNDARY
 - FLOW DIRECTION
 - ANALYSIS POINT / DISCHARGE LOCATION



BASIN ID	DISCHARGE LOCATION-ID	DISCHARGE LOCATION	AREA (ac.s)	T _c (min.s)	Q-10 _y (cfs)
DA-1	AP-1	CENTRE & LOGAN	9.7	5	43.0
DA-2	AP-2	CENTRE & LEMIEUX	10.2	5	57.0
DA-3	AP-3	WYLLIE & WASHINGTON	8.1	5	39.0



NOT FOR CONSTRUCTION / FOR INFORMATION ONLY

REVISIONS

DATE: JANUARY 24, 2013

DESCRIPTION: DRAINAGE MAP

PROJECT: DRAINAGE AREA MAP PROPOSED CONDITIONS

LOWER HILL REDEVELOPMENT

PITTSBURGH ALLEGHENY COUNTY PENNSYLVANIA

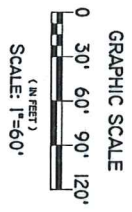
700 River Avenue, Suite 412
Pittsburgh, PA 15212-5936
Phone: (412) 321-3934
Fax: (412) 321-3934
E-mail: info@cosmostechnologiesinc.com
Website: www.cosmostechnologiesinc.com

EXHIBIT 3
OVERALL UTILITY SITE PLAN





- LEGEND**
- PROPOSED STORM SEWER
 - PROPOSED SANITARY SEWER
 - PROPOSED WATERLINE
 - PROPOSED MANHOLE
 - PROPOSED FLOW DIRECTION



NOT FOR CONSTRUCTION / FOR INFORMATION ONLY

**UTILITY
SITE PLAN**

PA PER SERVICE
FACILITY PLANNING
MODULE SITE PLAN

REVISIONS
JANUARY 16, 2013

SITE PLAN
DECEMBER 14, 2012

LOWER HILL REDEVELOPMENT

PITTSBURGH ALLEGHENY COUNTY PENNSYLVANIA



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Cosmos Technologies Inc.

ATTACHMENTS



Cosmos Technologies Inc.

ATTACHMENT 1

**ILLUSTRATIVE MASTER PLAN FOR LOWER HILL PRELIMINARY
LAND DEVELOPMENT PLAN**



Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

Sec. 9.1 Introduction

Fifty years ago, a vibrant city neighborhood was torn down to build an arena. The Lower Hill Preliminary Land Development Plan proposes to build back a vibrant mixed-use neighborhood.

The plan to the right is a conceptual plan illustrating potential development on the site. A street grid, reflecting some of the historic streets provides a new network. New attached houses and low-rise apartments are intended to line Crawford Street reinforcing the successful Crawford Square development across the street. On the blocks closer to Downtown, office buildings and mid-rise apartments are intended to be built with ground floor shops and restaurants. An entertainment retail environment is envisioned for the core of the site surrounding a signature community park. A second park further east in the plan will cater to residents.

TABLE 9.1 Concept Development Program

Residential	1,188 units
Retail/Commercial	200,100 SF
Office	632,000 SF
Hotel	150 rooms
Structured Parking	2,457 cars
Parks Space	2.8 acres
Other Open Space	3.1 acres

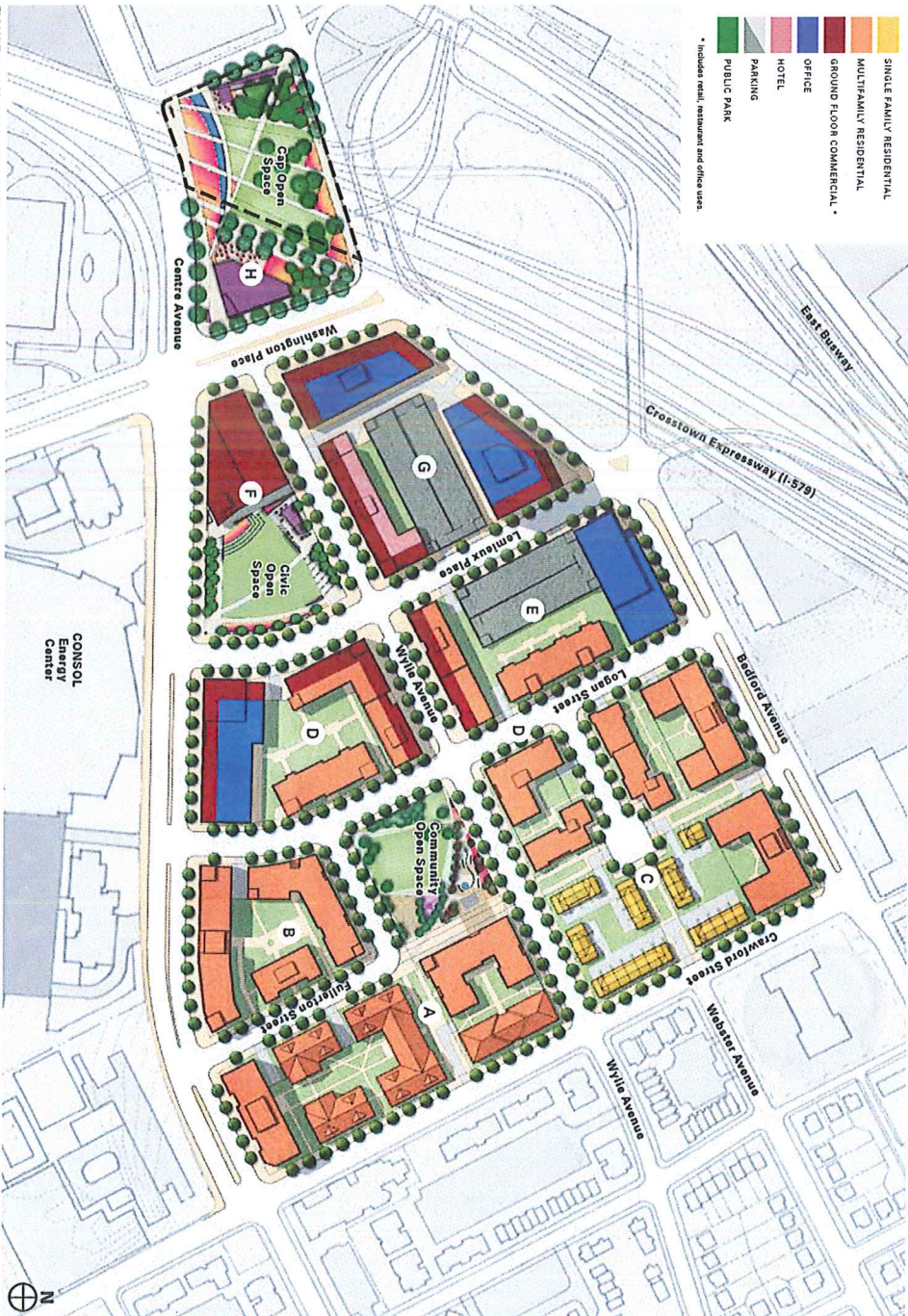


FIGURE 9.11 Illustrative Master Plan

ATTACHMENT 2
RAINFALL INTENSITY DURATION (IDF) CURVES



Figure 7A.12(a) Rainfall Intensity for 1- through 100-year Storms for Region 3 (U.S. Customary).

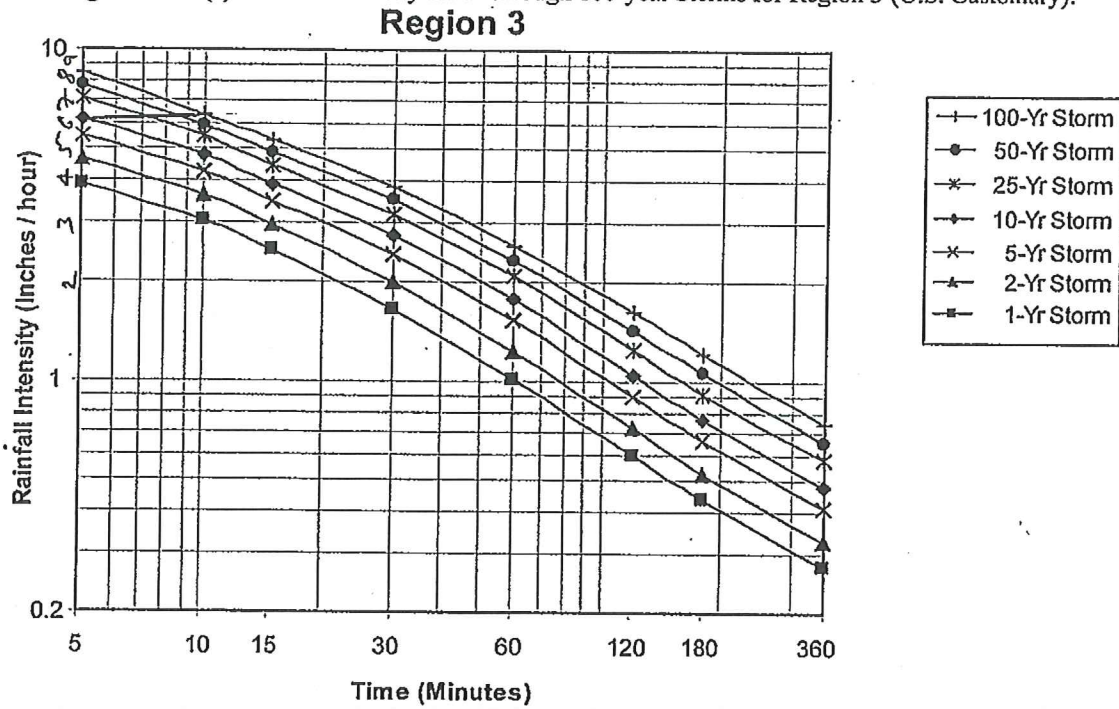
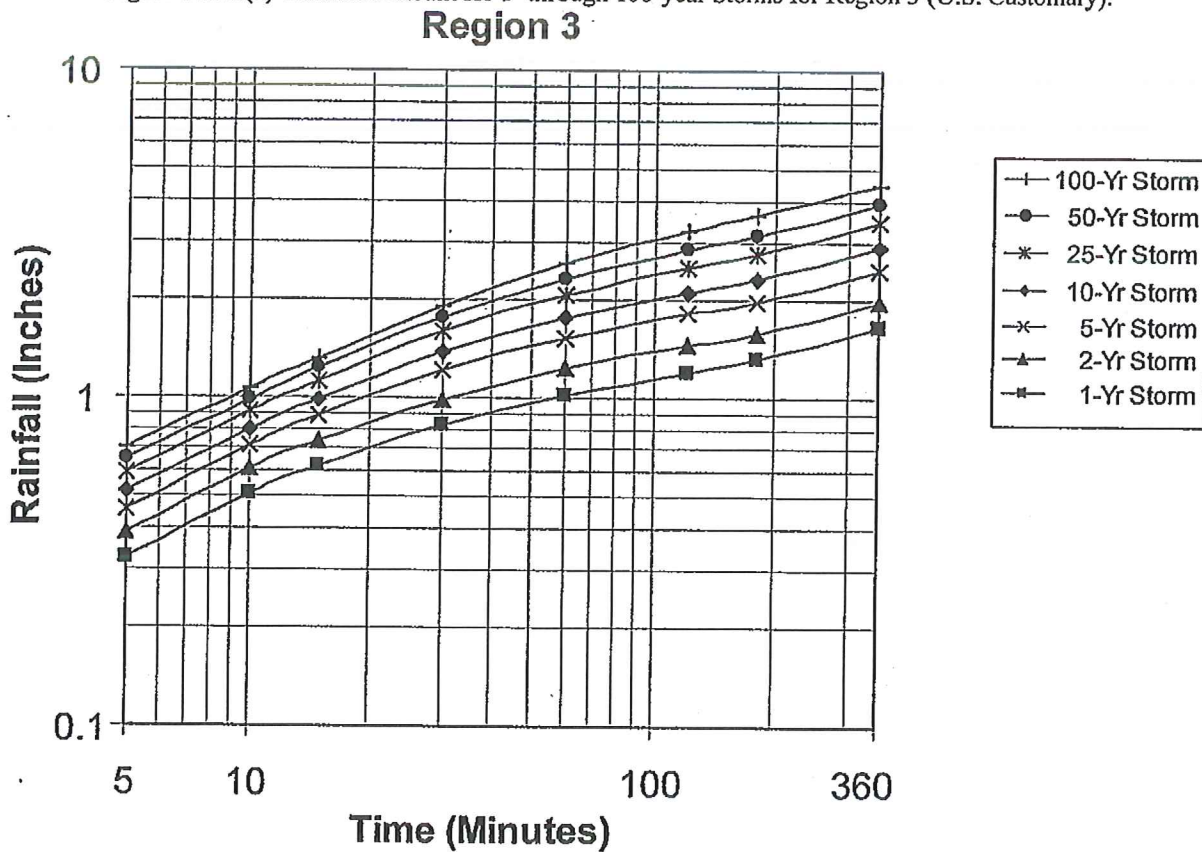


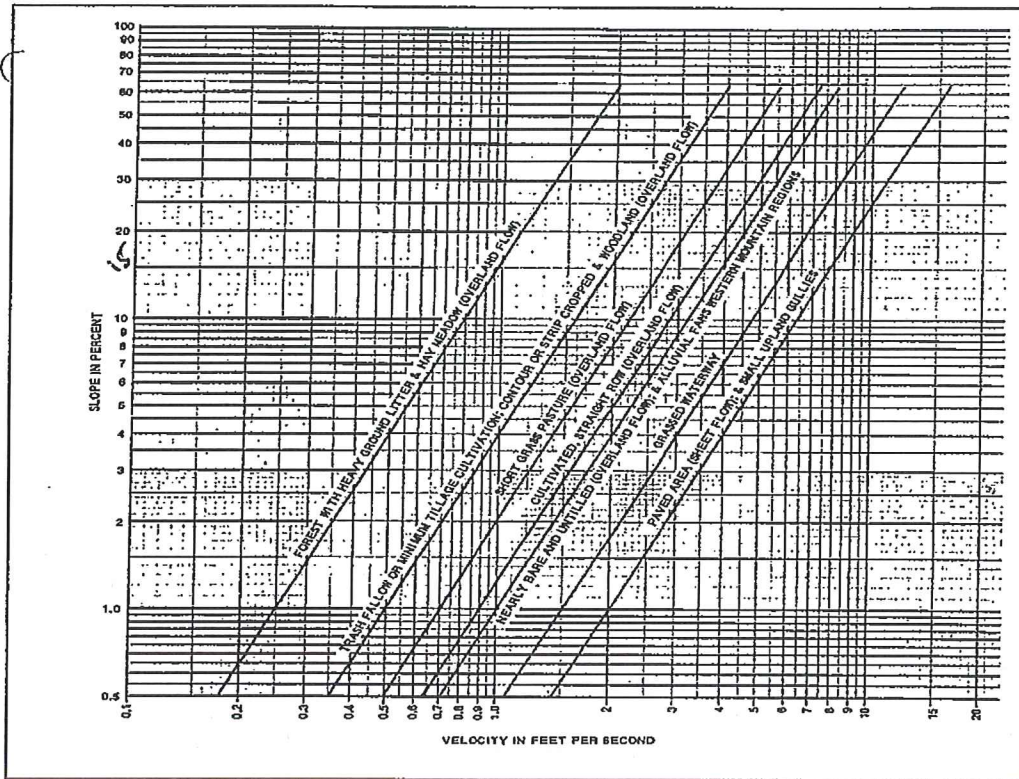
Figure 7A.12(b) Rainfall Amount for 1- through 100-year Storms for Region 3 (U.S. Customary).





ATTACHMENT 3
AVERAGE VELOCITY CHART FOR OVERLAND FLOW FOR
ESTIMATING TIME OF CONCENTRATION

Figure 7.4 Velocities for Upland Method of Estimating Time of Concentration, t_c
(Adapted from National Engineering Handbook, Volume 4 (NEH4), Figure 15.2)



C. Segmental Method.

1. Sheet-flow travel time is a shallow mass of runoff on a plane surface with the depth uniform across the sloping surface. Such flow occurs over relatively short distances, rarely more than ~46 meters (150 feet) (FHWA, 2002). Sheet flow rates are commonly estimated using a version of the kinematic wave equation.

(Equation 7.3)

$$t_i = \frac{K}{i^{0.4}} \left(\frac{nL}{\sqrt{s}} \right)^{0.6}$$

- where: t_i = sheet flow travel time, min
 K = 6.92 for Metric units or 0.933 for U.S. Customary Units
 i = rainfall intensity, mm/hr (in/hr)
 s = surface slope of the flow path, m/m, (ft/ft)
 n = Manning's n-value (see Table 7.5 for example Manning's n-values)
 L = longest hydraulic length, m (ft)

Since i depends on T_c and T_c is not initially know, the computation of T_c is an iterative process. An initial estimate of T_c is assumed and used to obtain i from the PDT-IDF curve for the site. The T_c is then computed from Equation 7.3 and used to check the initial value of T_c . If they are not the same, the process is repeated until two successive T_c estimates are the same.

Sheet flow can also be determined using Manning's kinematic solution specified in TR-55.

2. The velocity method can be used to estimate travel times for sheet flow, pipe flow, or channel flow. It is based on the travel time for a flow segment as a function of the length and the velocity.

ATTACHMENT 4
PARCELS MAP OF THE LOWER HILL REDEVELOPMENT PLAN

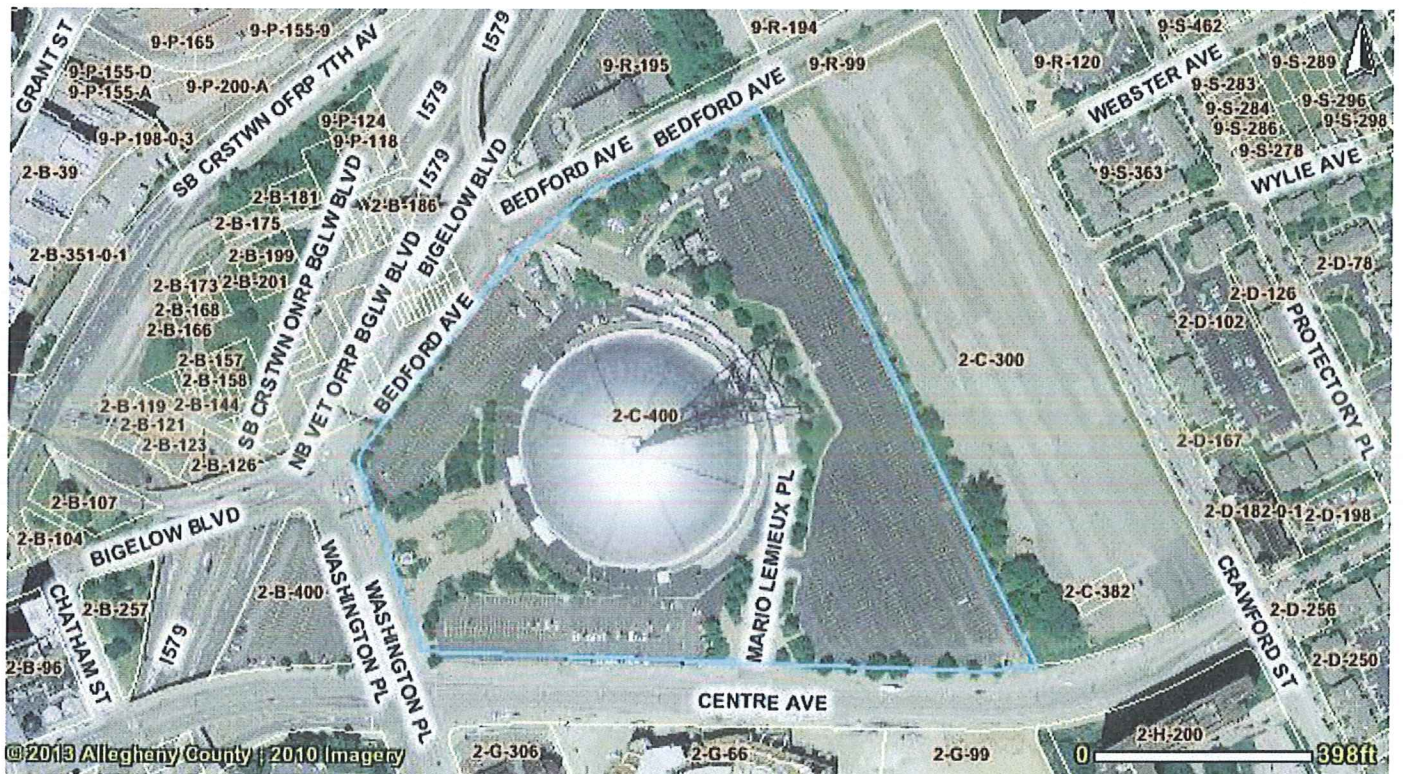


Cosmos Technologies Inc.

INNOVATION FOR THE FUTURE

PARCELS MAP

LOWER HILL REDEVELOPMENT PLAN



DEP Code No.

RESOLUTION FOR PLAN REVISION FOR NEW LAND DEVELOPMENT

RESOLUTION OF THE (SUPERVISORS) (COMMISSIONERS) (COUNCILMEN) of _____
(TOWNSHIP) (BOROUGH) (CITY), _____ COUNTY, PENNSYLVANIA (hereinafter "the municipality").

WHEREAS Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act", as Amended, and the rules and Regulations of the Pennsylvania Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the Pennsylvania Code, require the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters of the Commonwealth and/or environmental health hazards from sewage wastes, and to revise said plan whenever it is necessary to determine whether a proposed method of sewage disposal for a new land development conforms to a comprehensive program of pollution control and water quality management, and

WHEREAS _____ has proposed the development of a parcel of land identified as
land developer
_____, and described in the attached Sewage Facilities Planning Module, and
name of subdivision
proposes that such subdivision be served by: (check all that apply), sewer tap-ins, sewer extension, new treatment facility, individual onlot systems, community onlot systems, spray irrigation, retaining tanks, other, (please specify). _____

WHEREAS, _____ finds that the subdivision described in the attached
municipality
Sewage Facilities Planning Module conforms to applicable sewage related zoning and other sewage related municipal ordinances and plans, and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the (Supervisors) (Commissioners) (Councilmen) of the (Township) (Borough) (City) of _____ hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Sewage Facilities Plan" of the municipality the above referenced Sewage Facilities Planning Module which is attached hereto.

I _____, Secretary, _____
(Signature)

Township Board of Supervisors (Borough Council) (City Councilmen), hereby certify that the foregoing is a true copy of the Township (Borough) (City) Resolution # _____, adopted, _____, 20____.

Municipal Address:

Telephone _____

Seal of
Governing Body



COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 BUREAU OF WATER STANDARDS AND FACILITY REGULATION

**TRANSMITTAL LETTER
 FOR SEWAGE FACILITIES PLANNING MODULE**

DEP USE ONLY				
DEP CODE #	APS ID #	CLIENT ID #	SITE ID #	AUTH. ID #

TO: Approving Agency (DEP or delegated local agency) _____ Date _____

Dear Sir:

Attached please find a completed Sewage Facilities Planning Module prepared by _____ (Name)
 _____ (Title) for _____ (Name)
 a subdivision, commercial, or industrial facility located in _____
 _____ County.
 _____ (City, Borough, Township)

Check one

- (i) The Planning Module, as prepared and submitted by the applicant, is approved by the municipality as a proposed revision supplement for new land development to its "Official Sewage Facilities Plan", and is adopted for submission to the Department of Environmental Protection transmitted to the delegated local agency for approval in accordance with the requirements of Chapter 71 and the Sewage Facilities Act, OR
- (ii) The Planning Module will not be approved by the municipality as a proposed revision or supplement for new land development to its "Official Sewage Facilities Plan" because the project described therein is unacceptable for the reason(s) checked below.

Check Boxes

- Additional studies are being performed by or on behalf of this municipality which may have an effect on the Planning Module as prepared and submitted by the applicant. Attached hereto is the scope of services to be performed and the time schedule for completion of said studies.
- The Planning Module as submitted by the applicant fails to meet limitations imposed by other laws or ordinances, officially adopted comprehensive plans and/or environmental plans (e.g., zoning, land use, Chapter 71). Specific reference or applicable segments of such laws or plans are attached hereto.
- Other (attach additional sheet giving specifics)

Municipal Secretary: Indicate below by checking appropriate boxes which components are being transmitted to the Approving Agency.

- 2. Individual Onlot Disposal
- Adoption Resolution
- 3. Sewage Collection/Treatment
- 3s Small Flow Treatment Facility
- 4.A. Municipal Planning Agency Review
- 4.B. County Planning Agency Review
- 4.C. Health Department Review

 Municipal Secretary (print) Signature Date

Note: Please remove and recycle the Instructions portion of the Sewage Facilities Planning Module prior to mailing the appropriate completed components and supporting documents to the approving agency.

THE PITTSBURGH WATER AND SEWER AUTHORITY

James L. Good
Interim Executive Director

Penn Liberty Plaza I
1200 Penn Avenue
Pittsburgh, PA 15222
(412) 255-8800
Fax: (412) 393-0522

March 11, 2013

Mr. Sridhar Aluguvelli, P.E.
Cosmos Technologies, Inc.
700 River Avenue, Suite 412
Pittsburgh, PA 15212-5936

RE: Lower Hill Redevelopment (30 Acre Site)
Bounded by Crawford St, Washington Pl, Bedford Ave and Centre Ave
PA DEP Sewage Facilities Planning Module

Dear Mr. Aluguvelli:

The Pittsburgh Water and Sewer Authority (PWSA) is in receipt of the PA DEP Sewage Facilities Planning Module Component 3.

PWSA has signed in the correct location and forwarding back to you for processing to the DEP. You must include all documentation including the required approved City of Pittsburgh Council Resolution and any review fees. Contact Jason Zollett at the City of Pittsburgh Law Department at (412-255-2008) to prepare the required City Resolution that Council will need to approve for this project.

Once PWSA receives a copy of the approved Sewage Facilities Planning Module from DEP, PWSA will process the tap in plan. PWSA is not permitted to issue final approval or a PWSA Permit for connection to the water or sewer mains until approval from DEP is granted.

If you have any questions, feel free to contact PWSA or any questions regarding the Planning Module you must contact the DEP.

Sincerely,



Michelle E. Carney
Engineering Technician II

MEC

Attachment

cc: Tom Flanagan – DEP
Tom Ryser – Sports & Exhibition Authority
Jason Zollett – City of Pittsburgh Law Department
Larry Odille - PWSA
PWSA File

Project No. 13103.08

(PWSA USE ONLY)

**THE PITTSBURGH WATER AND SEWER AUTHORITY
ENGINEERING AND CONSTRUCTION DIVISION**

WATER AND SEWER USE APPLICATION

(Return completed submittal package to The Pittsburgh Water and Sewer Authority (PWSA), Engineering and Construction Division)

This application is used for commercial or residential projects that propose connecting to the PWSA water or sewer system or propose changing the amount of PWSA water consumed and/or flows discharged to the PWSA sewer system.

A. GENERAL INFORMATION

1. Name of Land Development Project: Lower Hill Redevelopment, City of Pittsburgh, Allegheny County, Pennsylvania
Location of land development project. Use landmark or address, if available (e.g., north side of Liberty Ave 75 ft. east of intersection of Liberty Ave and 6th St.) Old Civic Arena (Penguins Arena) Site; 66 Mario Lemieux Place, Pittsburgh, PA 15219; site area bounded by Bedford Avenue, Crawford Street, Centre Avenue and Washington Place
2. Nature of Development. Check appropriate box and provide total flows.
- | | Total Water Consumption (gpd) | Total Sanitary Flows (gpd) | Total Storm Flows (cfs) |
|---|-------------------------------|-----------------------------|-------------------------|
| <input checked="" type="checkbox"/> Residential | <u>538,069</u> | <u>454,436</u> | <u>82</u> |
| <input checked="" type="checkbox"/> Commercial | <u>458,355</u>
(996,424) | <u>387,111</u>
(841,547) | <u>55</u>
(137 cfs) |
3. Acreage of development 30 acres
4. Allegheny County Block & Lot Nos. Parcel #2-C-400, #2-C-300, #2-C-382, #2-C-383, and #2-B-400
5. Ownership of Land Development
- | Name | Address |
|---|---|
| Sports and Exhibition Authority (Parcel #2-C-400) | 66 Mario Lemieux Pl, Pittsburgh, PA 15219 |
| Urban Redevelopment Authority (Parcel #2-C-300) | Centre Ave (Old Epiphany St), Pittsburgh, PA 15219 |
| Urban Redevelopment Authority (Parcel #2-C-382) | Centre Ave (Old Fullerton St), Pittsburgh, PA 15219 |
| Urban Redevelopment Authority (Parcel #2-C-383) | Centre Ave (Old Fullerton St), Pittsburgh, PA 15219 |
| Sports and Exhibition Authority (Parcel #2-B-400) | Washington Place, Pittsburgh, PA 15219 |
6. Applicant (Subdivider, Developer, or Responsible Project Agent)
Name Mr. Douglas Straley - Sports & Exhibition Authority (SEA)
Address 171 10th Street, 2nd Floor, Pittsburgh, PA 15222
Telephone (412) 393-0200

B. WASTEWATER AND STORMWATER FACILITIES

Provide information on collection and treatment facilities.

1. **COLLECTION SYSTEM**
- Number of proposed connections (sanitary and/or storm) 3 sanitary & 3 storm
 - Name of existing collection or conveyance system Fifth Avenue and Seventh Street
 - Name of interceptor ALCOSAN Interceptors located along Monongahela & Allegheny Rivers
 - Name of treatment facility Allegheny County Sanitary Authority (ALCOSAN)
2. **SITE PLAN (24" x 36" maximum size accepted)**
The following information is to be submitted on a site plan of the proposed subdivision.
- Existing building.
 - Lot lines and lot sizes.
 - Remainder of tract.
 - Orientation to North.
 - Show proposed sewer line to the point of connection to existing collection system. Including all components (collection & conveyance lines, pumps, etc.)
 - Existing and proposed right(s)-of-way.
 - Existing and proposed street, roadway, etc.
 - Water bodies and wetland areas.


Applicant Signature

2-26-13
Date

C. FALSE SWEARING STATEMENT (To be completed by individual completing the form)

I verify that the statements made in the Component are true and correct to the best of my knowledge, information, and belief. I understand that false statements in this Component are made subject to the penalties of 18 PA C.S.A. § 4904 relating to unsworn falsification to authorities.

Lower Hill Redevelopment, City of Pittsburgh, Allegheny County, Pennsylvania

Name of Land Development Project (Same as on Page 1, Section A.1)

John W. Spires, P.E.
Name (Print) John W. Spires
Signature
(412) 321-3951
Telephone Number

Senior Civil Engineer
Title
700 River Avenue, Suite 412, Pittsburgh, PA 15212
Address
2-04-2013
Date

D. CHAPTER 94 CONSISTENCY (See PA Department of Environmental Protection Current Regulations)

The following certification is to be completed by the Pittsburgh Water and Sewer Authority agent and agency responsible for completing the (DEP) Chapter 94 report for the collection, conveyance, and treatment facilities.

I/we certify that the sewerage facilities proposed to serve the new land development described in this Planning Module are in compliance with the provisions of DEP Chapter 94, Municipal Wasteload Management and have adequate capacity to serve the sewage flows to be generated by this development, without creation of an overload or projected overload.

Collection System

Conveyance and Treatment

Michelle E. Canney 2/27/2013
Signature of Responsible Agent Date Pittsburgh
Water and Sewer Authority

ALCOSAN [Signature]
Signature of Responsible Agent Date

E. PLANNING AGENCY REVIEW

3/1/2013

City of Pittsburgh Municipal Planning Agency

This development/project has been reviewed and:

- is consistent
- is not consistent (objections attached)

with programs of planning for the area of the proposed development administered by this planning agency under the municipalities Planning Code (53 P.S. § 10101-11202).

City of Pitt Department of Planning [Signature] Zoning Administrator Date

Stormwater Management

This development/project has been reviewed and:

- is consistent
- is not consistent (objections attached)

With programs of planning for the area of the proposed development administered by this planning agency under the current City of Pittsburgh stormwater management regulations.

City of Pittsburgh Department of City Planning [Signature] Environmental Planner Date 3/8/2013

County or Joint County Health Department COMMENT: cosmos plan 30 january 2013

This development/project has been reviewed and:

- approval is recommended
- approval is not recommended

Allegheny County Health Department [Signature] Signature of Responsible Date 3/12/2013