15466

SEBAGO TECHNICS

CIVIL ENGINEERING · SURVEYING · LANDSCAPE ARCHITECTURE

CITY OF PORTLAND DELEGATED REVIEW

Maine Department of Environmental Protection
38 M.R.S.A. §§ 481 to 490

SITE LOCATION OF DEVELOPMENT

MAINE MEDICAL CENTER
CONGRESS STREET BUILDING
22 Bramhall Street
Portland, Maine

Prepared for:

Maine Medical Center
22 Bramhall Street
Portland, Maine

Prepared by:

Sebago Technics, Inc.
75 John Roberts Road, Suite 4A
South Portland, Maine 04106

October 2018

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Department of Environmental Protection
Bureau of Land & Water Quality
17 State House Station
Augusta, Maine 04333
Telephone: 207-287-3901

FOR DEP USE **FORM A PAGE 1**
ATS # _____
L-_____
Total Fees: _____
Date: Received _____

****

SITE LOCATION OF DEVELOPMENT PERMIT APPLICATION 38 M.R.SA. §§481-490

PLEASE TYPE OR PRINT IN *INK ONLY*

This application is for: (CHECK THE ONE THAT APPLIES)	☐ 20 acre development ☐ Planning Permit ☐ Metallic Mining	☐ Marine Oil Terminal ☐ Structure ☐ Subdivision	☒ Major Amendment ☐ Minor Amendment

1. Name of Applicant:	Maine Medical Center	**6. Name of Agent (if applicable):**	William T. Conway Sebago Technics, Inc.
2. Applicant's Mailing Address:	22 Bramhall Street Portland, ME 04102	**7. Agent's Mailing Address:**	75 John Roberts Road, Suite 4A S. Portland, ME 04106
3. Applicant's Daytime Phone #:	(207) 662-3689	**8. Agent's Daytime Phone # :**	(207) 200-2055
4. Applicant's Fax # (if available):		**9. Agent's Fax # (if available):**	(207) 856-2206
5. Applicant's *e-mail address* (REQUIRED -license will be sent via: e-mail):	agreen@mmc.org	**10. Agent's *e-mail address* (REQUIRED - license will be sent via e-mail):**	wconway@sebagotechnics.com

PROJECT INFORMATION

11. Name of Development:	MMC New Congress Street Building See Deed Package, Sec. 2						
12. Map and Lot #'s:	**Map #:**	**Lot #:**	**13. Deed Reference #'s:**		**Book #:**	**Page #:**	
14. Location of Project City/Town:	Portland	**15. County:**	Cumberland	**16. UTM Northing**		**17. UTM Easting**	
18. Brief Description of Project including total parcel size:	Removal of the employee parking structure and redevelopment of the site at the corner of Congress Street and Gilman Street.						

19. Type of Direct Watershed: (Check all that apply)

☐ Lake not most at risk ☐ River, stream or brook ☐ Coastal wetland
☐ Lake most at risk ☐ Urban impaired stream ☐ Wellhead or public water
☐ Lake most at risk, severely blooming ☐ Freshwater wetland

20. Name of Waterbody Project Site drains to:

21. Amount of Developed Area:	Total acres: 9.48	Existing Developed area: 9.15 acres	New Developed area: 0.33 acres
22. Amount of Impervious Area:	Total acres: 9.48	Existing Impervious areas 9.15 acres	New Impervious area: 0.33 acres

23. Development started prior to obtaining a license?: ☐ Yes ☒ No

24. .Development or any portion of the site subject to enforcement action? ☐ Yes ☒ No — **If yes**, name of enforcement staff involved?

25. Common scheme of development?: ☐ Yes ☒ No **26. Title, Right or Interest:** ☒ own ☐ lease ☐ purchase option ☐ written agreement

27. Natural Resources Protection Act permit required?: ☐ Yes ☒ No **If yes:** ☐ PBR ☐ Tier 1 ☐ Full Permit ☐ Tier 2

28. Existing DEP Permit number (if applicable): n/a

29. Names of DEP staff person(s) present at the pre-application meeting: City of Portland Delegated Review, Barbara Barhydt

30. Does agent have an interest in project? If yes, what is the interest? ☐ Yes ☒ No

CERTIFICATIONS AND SIGNATURES LOCATED ON PAGE 2

IMPORTANT: IF THE SIGNATURE BELOW IS NOT THE APPLICANT'S SIGNATURE, ATTACH LETTER OF AGENT AUTHORIZATION SIGNED BY THE APPLICANT.

By signing below the applicant (or authorized agent), certifies that he or she has read and understood the following :

CERTIFICATIONS / SIGNATURES

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein.

Further, I hereby authorize the DEP to send me an electronically signed decision on the license I am applying for with this application by emailing the decision to the electronic address located on the front page of this application (see #5 for the applicant and #10 for the agent)"..

Signed: _____ **Title** Director of Planning **Date:** 10/31/18

Notice of Intent to Comply with Maine Construction General Permit	**With this Site Law application form and my signature, I am filing notice of my intent to carry out work which meets the requirements of the Maine Construction General Permit (MCGP). I have read and will comply with all of the MCGP standards.** **If this form is not being signed by the landowner or lessee of the property, attach documentation showing authorization to sign.** **Signed** _____ **Date:** 10/31/18

NOTE: You must file a MCGP Notice of Termination (Form K) within 20 days of completing permanent stabilization of the project site.

CERTIFICATION

The person responsible for preparing this application and/or attaching pertinent site and design information hereto, by signing below, certifies that the application for development approval is complete and accurate to the best of his/her knowledge.

Signature: _____

Name (print): William T. Conway

Date: _____

Re/Cert/Lic No.: _____

Engineer _____

Geologist _____

Soil Scientist _____

Land Surveyor _____

Site Evaluator _____

Active Member of the Maine Bar _____

Professional Landscape Architect _____

Other _____

Section 1

Development Description

Section 1: Development Description

A. Narrative

The site is located at the high point of the Portland Peninsula and includes the redevelopment of the area currently occupied by Maine Medical Center's employee garage at the corner of Congress Street and Gilman Street. The Bramhall Street Campus project site is roughly bounded by Congress Street to the northeast, Wescott Street to the northeast, Charles Street and Brackett Street to the east, Bramhall Street to the south and Gilman and Valley Streets to the west. The project location is at the corner of Congress and Gilman Streets. The MMC campus is located in a densely developed urban setting. Neighboring structures include other MMC campus buildings, office buildings, parking, public roadways and multi-family residential uses. Per the enclosed Stormwater Management Plan (Section 12), the undeveloped portion of the site is primarily grass, understory vegetation and some mature evergreens. The project area is 1.95 acres in size, will disturb 1.53 acres of which 1.19± acres is post-development impervious area. The existing visitor's garage located to the east of the project area will remain.

The proposed development proposes the removal of the employee parking garage to build a new six-story, 285,000 square foot hospital building with an approximate footprint area of 43,900 square feet. The new building complements the other campus buildings. The redevelopment of the existing parking structure site will be partially mitigated by incorporating green roof elements.

The project is subject to Portland's land use ordinance, site plan review and the technical standards applicable to a project with an existing Site Location of Development Permit to be reviewed under the City's delegated review authority that incorporates MDEP Chapter 500 Stormwater standards. Reference is made to Section 12 for the full Stormwater Management Report. A MCGP is also required as the project area exceeds one acre.

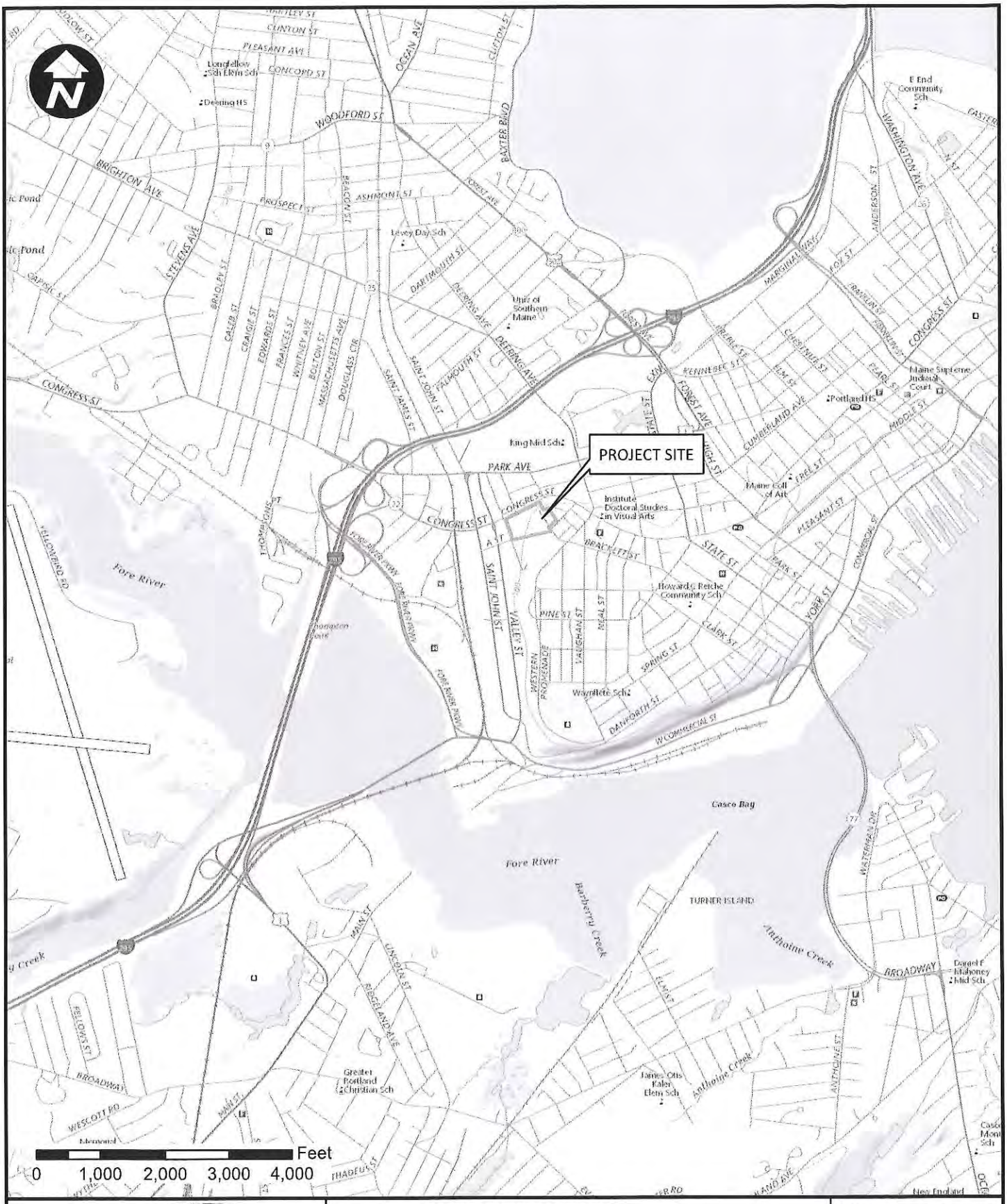
B. Topographic map

The Site Location Map is included in this section.

C. Construction Plan:

Anticipated schedule December 2019 through December 2022

Estimated Construction Time	36 Months
Erosion Controls Placed	Month 1
Construction Access	Month 1
Demolition	Months 1-6
Site Preparation	Months 6-12
Building Construction	Months 12-30
Paving/Surfaces	Months 30-36
Landscaping	Months 30-36



SEBAGO TECHNICS

WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd. - Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

TITLE FOR:	SITE LOCATION MAP MMC CONGRESS STREET PATIENT CARE BUILDING	SCALE:	1 " = 2,000 '
		DATE:	10/24/2018
LOCATION:	22 Bramhall Street Portland, ME 04102	INFORMATION:	USGS Quadrangle: Portland West

15466_LocationMap.mxd

PROJECT NUMBER: 15466

Section 2

Title, Right or Interest

Section 2: Right, Title, Interest

The record owner of the parcel(s) is Maine Medical Center. Reference is made to the deed package enclosed in this section indicating ownership by the original deed of Bailey to Maine General Hospital in 1870 and subsequent land transfers.

Know all Men by these Presents, That

I William H. Bailey of Portland in the State of Maine

in consideration of the sum of Two Hundred and fifty Dollars paid by the Maine General Hospital, a Corporation established by law at Portland

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital

heirs and assigns forever,

Bailey to Maine General Hospital

U. S. I. R. 50 Cents W. H. B. June 6. 1870.

a certain lot of land situated on the northwestern slope of Bramhalls Hill in Portland, the same being lot numbered nine, on a plan made by Howe and Osgood September 1863 recorded in the Cumberland Registry of Deeds in Plan Book number two page 56. The said plan is of a tract of land extending from the rear of the State Arsenal lot to Congress street. The lot hereby conveyed is about forty feet in breadth and about sixty feet in length on the Southwest side of an unopened street laid down on said plan. The same conveyed to me by Moody F. Walker Oct. 14 1863. Subject to the location of Ash street over any part of said lot, subject also to a mortgage for $137.50 given to Moody F. Walker which mortgage with all unpaid interest thereon, the present grantee is to assume and discharge.

To Have and to Hold the aforegranted and bargained Premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital heirs and assigns, to their use and behoof forever. And I do covenant with the said Grantee heirs and assigns, that I am lawfully seized in fee of the Premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I will and my heirs, shall and will warrant and defend the same to the said Grantee heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I the said Grantor and Elvira W. my wife of the said in testimony of her relinquishment of her right of dower in the above described premises, have hereunto set our hands and seals this sixth day of June in the year of our Lord one thousand eight hundred and seventy.

Signed, Sealed and Delivered in presence of

P. Barnes to W. H. B. — William H. Bailey Seal

Joseph S. Bailey to E. W. B. — Elvira W. Bailey. Seal

State of Maine
Cumberland, ss. June 6th 1870. Personally appeared the above named William H. Bailey and acknowledged the above instrument to be his free act and deed. Before me,

P. Barnes Justice of the Peace.

Received June 6. 1870, at 12 o'clock 54 m. P. M., and recorded according to the original.

Attest, Eben Leach Register.

Know all Men by these Presents, That

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Book 377 Page 297

I Hugh Carney of Portland in the State of Maine

in consideration of the sums of Five Hundred Dollars paid by

The Maine General Hospital, a Corporation established by law at Portland aforesaid

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said

Maine General Hospital

heirs and assigns forever, a certain parcel of land situated on the North-

U.S.I.R. 50 cents Do. do. June 6/70

western slope of Bramhall's hill in Portland, bounded on the East by the State Bremen lot and on the North by land of the City, the same conveyed to me by Moody & Walker Oct. 14. 1863, in two lots about forty feet in width by about sixty feet in length, which are numbered two and four on a plan of the same and adjoining lands made by Dana and Varney Sept. 1863, which is recorded under date of January 21. 1864 in Plan Book number two page 26 of the Cumberland Registry of Deeds. Subject to the location of Oak Street over any part of said lots.

Carney to Maine General Hospital

To Have and to Hold the aforegranted and bargained Premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital

heirs and assigns, to their use and behoof forever. And I do covenant with the said Grantee

heirs and assigns, that I am lawfully seized in fee of the Premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee

to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee

heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I the said Grantor and Bridget D my wife of the said

in testimony of her relinquishment of her right of dower in the above described premises, have hereunto set our hands and seals this sixth day of June in the year of our Lord one thousand eight hundred and seventy.

Signed, Sealed and Delivered in presence of

P. Barnes to No. 6. — Hugh his X mark Carney Seal.

Witnessed by Edward M. Bates — Bridget mark Carney Seal.

State of Maine, Cumberland, ss. June 6th 1870. Personally appeared the above-named Hugh Carney and acknowledged the above instrument to be his free act and deed. Before me,

P. Barnes Justice of the Peace.

Received June 6 1870, at 12 o'clock 54 m. P. M., and recorded according to the original.

Attest, Ebenezer Leach Register.

State of Maine Cumberland ss Portland May 19th 1870

Then personally appeared the abovenamed Sarah M. Bridges and acknowledged the foregoing instrument to be her free act and deed.

Before me, George R Davis Justice of the Peace

Received May 19 1870 at 5h 25m P M & and recorded according to the original

Attest. Ebenezer Leach Register

Agreement of Joseph S Bailey with Maine Hospital

Agreement made the 27th day of April 1870 by Joseph S Bailey of Portland for the conveyance of certain land to the Maine General Hospital

For a valuable consideration the said Bailey agrees to convey by deed of warranty to the Maine General Hospital upon the conditions hereinafter named, a certain parcel of land situated on the slope of Deerhall Hill in Portland, being the western part of a parcel of about two acres extending from the General ground to Congress street, formerly owned by Mr. F. Walker and others described, as divided into lots on a plan made by Rose and Osgood in 1863 through which two are formed a street called Park street has recently been laid out, and being all of said two acre parcel, except the ten lots nearest the General, and except the part of the street adjoining the ten lots. The conveyance hereby agreed to be made is to include the fee of the land owned by the aforesaid part of the ten lots, but subject to the location of the street.

This agreement is to be in force for the term of forty days from and after this date.

The conditions upon which the conveyance is to be made are, that the Hospital shall within the said forty days pay to the said Bailey, or to his written order, the sum of two thousand dollars, upon which payment the deed is to be made and delivered, and shall therefore make and deliver to the said Bailey or to his written appointment two several negotiable promissory notes, one for two thousand dollars payable in two years from the date of the deed, and one for one thousand dollars payable in three years from the same date, both with interest half yearly at the rate of seven and one half per annum, with liberty to pay not less than one thousand dollars on said notes at any time before maturity, together with a mortgage of the premises to secure the same, and shall assume and pay according to its tenor a mortgage now subsisting

on a part of said premises for one thousand dollars given by said Bailey in 1866 in six years, subject to which mortgage this agreement is made, interest accrued on said mortgage to the date of this conveyance to be paid by said Bailey.
In witness whereof, the said Bailey has hereunto set his hand and seal the day and year first above written.

U. S. Inter. Revenue 5 cts. J. S. B. Apl. 27. 1870.	Witness, P. Barnes Joseph S. Bailey Seal

State of Maine Cumberland ss. On this 21st day of May 1870, personally appeared Joseph S. Bailey and acknowledged the foregoing instrument by him subscribed to be his free act and deed

Before me P. Barnes Justice of the Peace

Received May 21. 1870 at 4h 10m P.M. and recorded according to the original

Attest: Eben Leach Register

U. S. I. R. $2.00 H. S. L. May 21 1870.	Know all men by these presents that S. Horatio S. Libby of Portland in the County of Cumberland and State of Maine in consideration of Six Thousand Dollars paid by John Lindsey of Standish in the County of Cumberland and State of Maine,	Libby to Lindsey

the receipt whereof is hereby acknowledged, do hereby give, grant, bargain, sell and convey unto the said John Lindsey, a certain lot of land and the buildings thereon situated on the Southwesterly side of Chestnut Street in said Portland and bounded: Beginning at the Northerly corner of land of Benjamin Sukey formerly Leonard Cross's land and running thence Northwesterly on said street thirty five feet; thence Southwesterly at right angles with said street sixty nine feet to a stake or stones; thence Southeasterly in a line parallel with said street thirty five feet to a stake or stones; thence at right angles with the last line by Mrs. A. Hay's land and said Sukey's land sixty nine feet to the bound begun at: containing about two thousand and four hundred feet, being a part of the land conveyed to me by Miriam Libby et als by deed dated January 18th 1854 and recorded in Cumberland Registry of Deeds Book 257 Page 27. Subject to a mortgage to the City of Portland on which is now due about two thousand dollars.

To have and to hold the above granted premises

Portland May 7th 1874. This mortgage having been paid and fully satisfied, is hereby cancelled and discharged.
Witness
John Lindsey

their hands and seals this twentieth day of October A.D. 1870.

Richard D. Rice {President of Maine Central Railroad Company

Countersigned by Joshua Nye, Treas. of Maine Central R.R. Co.

William L. Putnam Seal
Artemas Libbey Seal.
James J. Patten. Seal.

Cumberland ss. Oct. 20, 1870. Then personally appeared Richard D. Rice, President of the Maine Central Railroad Company and acknowledged the foregoing instrument to be the free act and deed of said Corporation, before me.

Josiah H. Drummond Justice of the Peace.

Received Nov. 2, 1870 at 2h 30m. P.M. and recorded according to the original.

Attest: Eben Leach Register

City of Portland to Me. Gen. Hospital

Whereas the City Council of the City of Portland, upon the petition of the Maine General Hospital, praying that the City would grant to the Corporation certain lands for the purpose of enlarging the building site of the Hospital, and rendering the same more commodious and useful for the objects thereof, by concurrent order of the two Branches, passed by the same respectively, on the 13d and 14th days of May 1870, and approved by the Mayor on the 31st day of the same month, ordered, that the prayer of the petition be granted, and that a deed in furtherance thereof be executed and delivered for the conveyance prayed for.

Now, know all men by these presents that the City of Portland, in pursuance of the foregoing order, and in consideration of Ten Dollars paid by the Grantee hereinafter named, the receipt whereof is hereby acknowledged, doth hereby give, grant, bargain, sell and convey to the Maine General Hospital, a Corporation established by law at Portland aforesaid, a certain parcel of land, belonging to the City, situated on the slope of Bramhall's Hill, bounded as

the Northeast by a line, as now fenced, in continuation of the Northwest side line of the Maine State Arsenal lot, and on the Southwest by lands of Joseph S. Bailey and others, and extending Westward, between those lines, from the Arsenal lot to Congress street.

Also another parcel of land belonging to the City, situated on the Southwest side of the Arsenal lot and of the lands of Bailey and others, having a front on a line in continuation of the Northwest side line of Arsenal street as far as to the Northeast side line of a contemplated street, and extending Westwardly from Arsenal street between the contemplated street on the South and the Arsenal lot and Bailey land on the North to Congress street.

The said contemplated street is laid down and designated by the name of Gilman street on a Plan made by J. P. Chappell, Engineer, May 21. 1870. to which Plan, verified as required by the Order of the City Council, by the signature of the City Treasurer, reference is made for more exact ascertainment of the position and course of said street.

This conveyance is made upon the conditions that the lands hereby granted and conveyed shall be held for the purposes of the Hospital, as a part of its building site and grounds; and that whenever the same shall cease to be so used, they shall revert to the City.

Also upon the further condition, that if the Hospital shall acquire a title to the lands of Bailey and others above mentioned, and the contemplated street shall at any time thereafter be laid out and opened across the same, as described on said Plan, no damages or compensation shall be claimed by the Hospital therefor.

To have and to hold the premises, with the privileges and appurtenances thereof, to the said Maine General Hospital, to its use and behoof forever, subject to the conditions aforesaid.

In witness whereof, these presents are executed and sealed, in behalf of the City, by Henry W. Harvey, City Treasurer, duly authorized by the Order aforesaid, this fourth day of June in the year of our Lord

one thousand eight hundred and seventy.
Signed, sealed, and delivered in presence of } Henry W. Hersey
Benj. Kingsbury Jr. } City Treasurer.

State of Maine.
Cumberland ss. On this sixth day of August 1870, personally appeared Henry W. Hersey and acknowledged the foregoing instrument by him subscribed to be the deed of the City of Portland.
Before me,
Benj. Kingsbury Jr. Justice of the Peace.

Received Nov. 14, 1870 at 1h. P.M. and recorded according to the original.
Attest: Eben Leach Register

P. & O. R. R. Co. to Davis et als

U. S. I. R. $800.00 P. & O. R. R. Co. By S. J. A. Dud Nov. 1, 1870

Discharge Book 702 Page 65

Know all men by these presents, that the Portland and Ogdensburg Railroad Company, a corporation established by the Legislature of the State of Maine, and authorized and empowered by the Legislature of New Hampshire to construct and extend its Railroad across said State of New Hampshire, subject to the laws thereof relating to Railroads, and having its principal office for the transaction of business at Portland in the County of Cumberland and State of Maine, for the purpose of effecting the several trusts and securities hereinafter set forth, created and declared, designed to enable and provide for the more speedy construction and equipment of the Railroad of said Company, and in consideration of One Dollar paid by the Grantees and trustees hereinafter named, doth hereby give, grant, bargain, sell and convey to Woodbury Davis, Samuel E. Spring, and Weston F. Milliken, all of Portland aforesaid, Gentlemen, their survivors and successors as hereinafter designated, all that part of the Railroad of said Company extending and to be extended from the terminus in Portland, in the State of Maine to Bartlett in the State of New Hampshire, located and to be located within said limits, called the Portland and Ogdensburg Railroad, including all the rights of way and lands taken and

Know all Men by these Presents, That

I Phinehas Barnes of Portland, in the County of Cumberland, State of Maine

in consideration of Four Thousand and Seventy one 37/100 Dollars paid by

The Maine General Hospital, a Corporation established by the Laws of said State

the receipt whereof I do hereby acknowledge, do hereby remise, release, bargain, sell and convey, and forever quit claim unto the said Maine General Hospital, its successors

heirs and assigns forever, all my right, title and interest in and to Twenty Several Lots of Land

Barnes to Maine G Hospital

U. S. I. R.
J. L. 50.
P. B.
July 18/71.

situated on the Northwestern slope of Bramhall's Hill in said Portland described and numbered on a plan of a tract of about two acres, extending from the Maine State Arsenal Grounds, to Congress Street which plan was made in September 1863, by Howe and Osgood, and is recorded in the Cumberland Registry of Deeds, in Plan Book, Number Two, page thirty six — the Lots hereby conveyed being numbered one, three, five, seven, eight, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, twenty one, twenty two, twenty three, and twenty four 1. 3. 5. 7. 8. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. together with all my right title, and interest in and to the lands adjoining any of said Lots, embraced within the location of Ash Street, as laid out by the City the last year: The design of this Deed being to discharge Lands mentioned in Deeds to said Barnes from Moody & Walker & wife dated 6 June 1870 recorded in said Registry, Book 371 page 382 & from Joseph S Bailey dated 6 June 1870, recorded in said Registry Book 371 page 381, the Mortgage obligations of said Barnes mentioned in said Deeds having been discharged, by said Hospital

To Have and to Hold the same, together with all the privileges and appurtenances thereunto belonging, to them the said Corporation, its successors heirs and assigns forever. And I do covenant with the said Corporation, its successors heirs and assigns, that I will warrant and forever defend the premises to them the said Corporation its successors heirs and assigns forever, against the lawful claims and demands of all persons, claiming by, through, or under me.

In Witness Whereof, I the said Phinehas Barnes, and Ann B. Barnes wife of the said Barnes, in testimony of her relinquishment of her rights of Dower in the above described Premises have hereunto set our hand and seal this Eighth day of July in the year of our Lord one thousand eight hundred and seventy one.

Signed, Sealed and Delivered in presence of
Wilfred Barnes to P. B.
Wilfred Barnes to A. B. B.

P. Barnes. Seal.
Ann B. Barnes. Seal.

State of Maine
Cumberland, ss. 8th July 1871 Personally appeared the above-named Phinehas Barnes and acknowledged the above instrument to be his free act and deed. Before me,

James T. McCobb Justice of the Peace.

Received July 11 1871, at 11 o'clock 2 m. A. M., and recorded according to the original.

Attest, Thos. Lucas Register.

with interest, and all cost and expenses, including all sums paid by said Grantee or assigns for insurance of the premises and for taxes, paying the surplus, if any, to the said Grantors, or their assigns: and such sale shall forever bar the said Grantors, and all persons claiming under them from all right and interest in the premises at law or in equity. It being mutually agreed that the said Grantee or assigns may purchase at said sale, and that no other purchaser shall be answerable for the application of the purchase money.

In witness whereof, we the said Grantors, Emily F. Bailey and Benjamin H. Bailey have hereunto set our hands and seals this thirteenth day of January in the year of our Lord eighteen hundred and seventy one.

Signed, sealed and delivered in presence of
Benj. Kingsbury Jr.

Emily F. Bailey. Seal
Benj H. Bailey. Seal

State of Maine.
Cumberland ss. Portland January 13. 1871. Then personally appeared the above named Benjamin H. Bailey and Emily F. Bailey and acknowledged the foregoing instrument to be their deed.

Before me,
Benj. Kingsbury Jr. Justice of the Peace.

Received Jan. 14. 1871 at 12 h. 29 m. P. M. and recorded according to the original.

Attest: Eben Leach Register

State of Maine
to
Maine General Hospital

State of Maine.

Resolve in favor of the Maine General Hospital.

Resolved that all the right, title and interest of this State in and to the lot of land, not including the buildings thereon, situated on Bramhall Hill in the City of Portland and County of Cumberland, being the present site of the State Arsenal, is hereby granted to the Maine General Hospital, a corporation established by acts of the Legislature, passed February twenty-fourth, one thousand eight hundred and sixty-eight, to have and to hold to

said corporation for the purpose of erecting and maintaining thereon its hospital buildings; and when said land ceases to be so used, it shall revert to the State. But this grant shall not take effect until it is shown to the satisfaction of the Governor that said Corporation has raised by responsible private subscriptions or donations the sum of Twenty Thousand Dollars; nor until the Governor has certified on a copy of this resolve certified by the Secretary of State, that the aforesaid condition precedent has been complied with; but when that is done, the grant shall take effect, and the recording of such certified copy, with the Governor's certificate thereon, in the Registry of Deeds in the County of Cumberland shall be sufficient record evidence thereof.

Resolved, That when said Corporation has raised, received into its treasury and actually expended towards the construction of its hospital buildings on said lot, the sum of Thirty thousand dollars, and this fact is shown to the satisfaction of the Governor, he may draw his warrant on the Treasurer of State for the sum of Ten thousand dollars in favor of said Corporation and payable to its Treasurer; and when said Corporation has so raised, received into its Treasury, and expended in the construction of its hospital buildings the sum of Ten thousand dollars more, or Fifty thousand dollars in all, including the Ten thousand from the State, and this fact is shown to the satisfaction of the Governor, he shall draw his warrants on the Treasurer of State for the sum of Ten thousand dollars more in favor of said Corporation and payable to its Treasurer; and the sum of Twenty thousand dollars is hereby appropriated to carry into effect the purposes of this Resolve, to be paid from any money in the Treasury not otherwise appropriated.

In the House of Representatives March 16 1870.

Read and passed finally.

Reuben Foster Speaker

In Senate March 18" 1870

Read and passed finally.

Wm. H. Bolster, President

March 19th 1870. Approved. Joshua L. Chamberlain, Governor.

State of Maine

Office of Secretary of State,

Augusta, Dec. 15. 1870

I hereby certify that the foregoing is a true copy of the original as deposited in this Office.

Franklin Mc. Odell.

Secretary of State

I, Joshua L. Chamberlain Governor of Maine in compliance with the terms of the Revolve of which the foregoing is a copy certified by the Secretary of State, hereby certify that it has been shown to my satisfaction that the Maine General Hospital the Corporation within named has raised by responsible private subscriptions and donations the sum of twenty thousand dollars.

In witness whereof I have hereunto set my hand this sixteenth day of December A. D. 1870.

In presence of
F. L. Chamberlain
Charles H. Packard

Joshua L. Chamberlain
Governor of Maine

Received Jan. 16. 1871 at 2 h. 45 m. P. M. and recorded according to the original.

Attest: Elbon Leady Register

U. S. I. R. Fifty cts. N. H. Jan. 13. 1871

Known all men by these presents, that I, Wm. H. Moreland of Stoneham, Mass. in consideration of Four Hundred Fifty Dollars to me paid by Seth Moreland of Harrison County of Cumberland State of Maine, the receipt whereof is hereby acknowledged, do hereby sell, remise, release, and forever quitclaim unto the said Seth Moreland all my right, title and interest in and to a certain farm or parcel of real estate described as follows, to wit, the same deeded to me by the said Seth Moreland by his deed, said deed dated Jany. 4th 1869, said deed recorded Book 364 Page 388. being the same farm Seth Moreland now lives on in Harrison all taxes excepted.

Wm. H. Moreland to Moreland

To have and to hold the above released premises, with all the privileges and appurtenances to the same belonging, to the said Seth, his heirs and assigns to their use and behoof forever. And I the said

Know all Men by these Presents, That

I, Bartholomew Keen of Portland in the county of Cumberland, State of Maine

in consideration of five hundred dollars paid by

The Maine General Hospital a corporation doing its business in said Portland

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital its successors & its assigns & theirs heirs and assigns forever, a certain lot of land on the easterly side of (what is or is to be) Neuse Gen Hospital

U.S.I.R.	Cathcart) Ash Street in said Portland being sixty four feet
$0.50	in length measuring back from the line of said Ash Street
B.B.	forty feet in width being the same lot indicated as number
Sept 15	twenty (20) on a certain plan of land surveyed for
1871	Moody F. Walker Sept 23. 1863 by Howe & Osgood

Civil Engineers which plan is placed on file in the office of the Registry of Deeds for Cumberland county for the purpose of reference to the details of conveyances that have been or may be made by said Moody F. Walker of the lots of land specified in said plan the same property conveyed to me by said Moody F. Walker by deed dated the 16th Oct. last 1863 recorded in said Registry Book 328 page 199

To Have and to Hold the aforegranted and bargained Premises, with all the privileges and appurtenances thereof, to the said Corporation its successors its & their heirs and assigns, to their use and behoof forever. And I do covenant with the said Corporation its successors its & their heirs and assigns, that I am lawfully seized in fee of the Premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Corporation to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee its successors its & their heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I the said Bartholomew Keen and Margaret wife of the said Bartholomew Keen in testimony of her relinquishment of her right of dower in the above described premises, have hereunto set our hands and seals this twenty eighth day of August in the year of our Lord one thousand eight hundred and seventy one

Signed Sealed and Delivered in presence of

James T. McCobb — Bartholomew Keen Seal

Witness — Margaret + Keen Seal

Michael White — her mark

Cumberland, ss. 15 September 1871 Personally appeared the above named Bartholomew Keen and acknowledged the above instrument to be his free act and deed. Before me,

James T. McCobb Justice of the Peace.

Received Sept 18 1871 at 4 o'clock 17m. P.M. and recorded according to the original:

Attest, Register.

Book 408
Page 457

Know all Men by these Presents, That

The City of Portland, a corporation in the County of Cumberland & State of Maine, in consideration of One Dollar & other considerations paid by The Maine General Hospital, a corporation in said State & County & City, the receipt whereof We do hereby acknowledge, do hereby remise, release, bargain, sell, and convey, and forever QUIT-CLAIM unto the said Maine General Hospital, its successors and assigns forever, all our right, title, and interest in and to a lot of land on Portland the slope of Bramhall Hill in said city, being the land which lies between the land owned by said Hospital & Gilman Street & Arsenal Street extended westerly & southerly bounded: Beginning at the southwest corner of a lot of land conveyed to said Hospital by said city in 1870, thence southwesterly on the northerly line of Arsenal Street produced 130 feet, more or less, to Gilman Street, thence northerly by east line of Gilman Street 653 feet, more or less, to Bailey's, so called, thence southeasterly by Bailey's land 71 feet, more or less, to land of said Hospital, thence by said Hospital land 544 feet, more or less to point of beginning: Provided, That the Powder House now on said lot be allowed to remain without expense to the city until such time as the city shall provide some other place for powder, or remove this one from the lot.

To Have and to Hold the same, together with all the privileges and appurtenances thereunto belonging, to the said Grantee, its successors & assigns, & their heirs & assigns forever. And ~~do covenant with the said heirs and assigns, that will warrant and defend the premises to the said heirs and assigns forever, against the lawful claims and demands of all persons, claiming by, through, or under.~~

In Witness Whereof, We the said Grantors, by Henry W. Heaney City Treasurer, authorized thereto by vote of the City Council of said City, approved the 2 March instant have hereunto set our hand and seal this sixth day of March in the year of our Lord one thousand eight hundred and seventy-four.

Signed, Sealed, and Delivered in presence of
1 printed word erased & 1 underlined before execution
L. B. Beckett

City of Portland
by H. W. Heaney, Treas.

State of Maine.

Cumberland, ss. March 6, 1874. Personally appeared the above-named Henry W. Heaney and acknowledged the above instrument to be his free act & deed & the free act & deed of said city.

Before me, L. B. Beckett, Justice of the Peace.

Received March 19, 1875 at 9 o'clock 25 m. A. M., and recorded according to the original.

Attest, Henry C. Houston, Register.

Know all Men by these Presents, That

Book 1250
Page 470

I, Margaret E. L. Sherman, of Norwalk, in the County of Fairfield and State of Connecticut,

in consideration of one dollar and other valuable consideration, paid by Maine General Hospital, a corporation organized and existing under the laws of the State of Maine, and located at Portland, in the County of Cumberland and State of Maine the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital, its successors and assigns forever, a certain lot or parcel of land, with the buildings thereon, situated on the northwesterly side of Arsenal Street in said Portland, bounded and described as follows; Beginning at a point on said northwesterly side of Arsenal Street where the northeasterly side line of land of said Maine General Hospital, formerly known as the Arsenal Lot, adjoins the lot hereby conveyed; thence running northeasterly by said Arsenal Street forty (40) feet to a point; and from these two points extending northwesterly, adjoining said land of Maine General Hospital and keeping a width of forty (40) feet, one hundred (100) feet more or less to Ellsworth Street.

Meaning and intending hereby to convey the same premises conveyed to William H. Bigelow by John B. Brown by deed dated March 30, 1883, recorded in Cumberland Registry of Deeds, Book 317, page 321, my title to the same having been acquired as devisee under the will of said William H. Bigelow, extract from which is recorded in said Registry of Deeds, Book 627, page 231, in which will I am designated as Margaret Eva Lena Taylor, and by deed of Joshua L. Taylor to me dated January 11, 1897, recorded in said Registry of Deeds, Book 640, page 282.

Said premises are conveyed subject to a mortgage to Portland Savings Bank upon which there is due the principal sum of $1,650, which the grantee hereby assumes and agrees to pay as a part of the consideration hereof.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital, its successors heirs and assigns, to its and their use and behoof forever. And I do covenant with the said grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; except said mortgage; that I have good right to sell and convey the same to the said grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors heirs and assigns forever, against the lawful claims and demands of all persons. except as aforesaid.

In Witness Whereof, I, the said Margaret E. L. Sherman, and I, John C. Sherman, husband of the said Margaret E. L. Sherman joining in this deed as grantor, and relinquishing and conveying my right by descent and all other rights in the above described premises,

have hereunto set our hand s and seal s this third day of Decepher in the year of our Lord one thousand nine hundred and twenty-six.

Signed, Sealed and Delivered in presence of

John F. Dana to M.E.L.S. — Margaret E. L. Sherman Seal.

Geo. Davis, C. G. Hanson } as to J.C.S. — John C. Sherman Seal.

State of Maine, CUMBERLAND, ss. December 3, 1926. Personally appeared the above named Margaret E. L. Sherman and acknowledged the above instrument to be her free act and deed.

Before me, John F. Dana, *Justice of the Peace.*

Received December 4, 1926, at 9 o'clock – m. A. M., and recorded according to the original.

Book 1282
Page 323

Know all Men by these Presents, That

I, Emma W. Hill of Portland in the county of Cumberland and State of Maine,

in consideration of one dollar and other valuable considerations, paid by Maine General Hospital, a corporation existing by law, with an established place of business in said Portland, the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital, its successors and assigns forever, a certain lot or parcel of land, with the buildings thereon, situated in said Portland, and bounded and described as follows: Beginning at the intersection of the northerly side line of Arsenal street and the westerly side line of a passageway extending from Arsenal street to Ellsworth street; thence north 20° west sixty-one and five tenths (61.5) feet by the westerly side line of said passageway to a point; thence south 70° west about thirty-four and three tenths (34.3) feet to land formerly of Nathan Moses; thence southerly by said Moses land sixty-seven (67) feet to a point on the northerly side of Arsenal street; thence north 60° 58' east by the northerly side line of Arsenal street thirty-four (34) feet, more or less, to the point of beginning.

Together with the rights of the grantor in a twelve (12) foot passageway.

Meaning and intending to hereby convey the same premises conveyed to Everett L. Hill by Milcah M. Gwynn, by deed dated February 2, 1920, recorded in Cumberland Registry of Deeds, Book 1042, page 256, and the same conveyed to this grantor by said Everett L. Hill by deed dated October 15, 1924, recorded in Cumberland Registry of Deeds, Book 1168, page 351.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital, its successors heirs and assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, the said Emma W. Hill and Everett L. Hill, husband of the said Emma W. Hill, joining in this deed as grantor, and relinquishing and conveying his rights by descent and all other rights in the above described premises have hereunto set our hand s and seale this sixteenth day of December in the year of our Lord one thousand nine hundred and twenty-seven.

Signed, Sealed and Delivered in presence of

John B. Kehoe to both

Emma W. Hill Seal.
Everett L. Hill Seal.

State of Maine, CUMBERLAND, ss. December 16, 1927. Personally appeared the above named Emma W. Hill and acknowledged the above instrument to be her free act and deed.

Before me, John B. Kehoe, *Justice of the Peace.*

Received December 16, 1927, at 11 o'clock 10 m. A. M., and recorded according to the original.

Know all Men by these Presents, That

Book 1285
Page 450

I, Harriet L. Stevens of Portland in the County of Cumberland and State of Maine,

in consideration of one ($1.00) dollar and other valuable considerations, paid by Maine General Hospital, a corporation organized and existing under the laws of said State of Maine, the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital,its successors and assigns forever, a certain lot or parcel of land, with the buildings thereon,situated in said Portland, bounded and described as follows: Beginning on the westerly side of a twelve (12) foot passageway leading from Arsenal Street to Ellsworth Street at a point sixty-one and five-tenths (61.5) feet distant from the intersection of the northerly side line of Arsenal Street with the westerly side line of said passage-way; thence south seventy (70°) degrees west,thirty-four and three-tenths (34.3) feet,more or less, to land formerly of Nathan Moses;thence northerly by said Moses land thirty-three (33) feet, more or less, to the southerly side line of Ellsworth Street;thence easterly along the southerly side line of Ellsworth Street thirty-four (34) feet, more or less, to its intersection with the westerly side line of said passageway;thence southerly along the westerly side line of said passageway thirty-eight and five-tenths (38.5) feet, more or less, to the point of beginning.

The above described premises are in the northerly portion of the premises conveyed to Shailer G. Cushing by Seth C. Gordon by his warranty deed dated September 21, 1907, and recorded in Cumberland County Registry of Deeds,Book 814,page 37.

Being the same premises conveyed to me under the name of Hattie L. Stevens by Perley W. Stevens by warranty deed dated December 24, 1912, and recorded in said Registry of Deeds, Book 906,page 161.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital,its successors heirs and assigns, to their use and behoof forever. And I do covenant with the said Grantee,its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all encumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee,its successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Wherenf,I, the said Harriet L. Stevens, and I, Perley W. Stevens,husband of the said Harriet L. Stevens,joining in this deed as Grantor, and relinquishing and conveying my right by descent and all other rights in the above described premises

have hereunto set our hand s and seals this nineteenth day of February in the year of our Lord one thousand nine hundred and twenty-eight.

Signed, Sealed and Delivered in presence of

R. E. Snow to both

Harriet L. Stevens Seal.

Perley W. Stevens Seal.

State of Maine, CUMBERLAND, ss. February 19, 1928. Personally appeared the above named Harriet L. Stevens and acknowledged the above instrument to be her free act and deed.

Before me, Reuben E. Snow, *Justice of the Peace.*

Received March 20, 1928, at 2 o'clock30 m. P. M., and recorded according to the original.

Know all Men by these Presents, That

I, Eunice M. Chase (formerly Eunice Margaret Graham) of Portland, in the County of Cumberland and State of Maine,

in consideration of One dollar ($1.00) and other valuable considerations, paid by Maine General Hospital,a corporation organized and existing under the laws of said State of Maine, and located at said Portland,
the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital,its successors and assigns forever, a certain lot or parcel of land with the buildings thereon,situated on the westerly side of a thirty foot passage way leading Northerly from Ellsworth Street,in the City of Portland, State of Maine, and now known as Charles Street,and bounded and described as follows,namely;

Beginning in the westerly side line of said Charles Street at the northeasterly corner of land now or formerly of Charles A. Donnell,thence northerly, by said Charles Street,thirty feet,thence westerly,on a line parallel with the northerly line of said Donnell's land seventy-four and two-tenths (74 2/10) feet to the Arsenal Lot,so called, now owned by said Maine General Hospital;thence southerly by said Arsenal Lot,thirty feet to said Donnell's land;thence easterly by said Donnell's land seventy-four and two tenths (74 2/10) feet to the point of beginning.

Being the same premises conveyed to me under the name of Eunice Margaret Graham Chase by William Graham by warranty deed dated July 1,1919,recorded in Cumberland Registry of Deeds,Book 1042,page 471.

Also a certain other lot or parcel of land with the buildings thereon situated in said Portland on the westerly side of Charles Street, and bounded and described as follows,to wit:

Beginning on the westerly side line of said Charles Street at a point distant seventy-three (73) feet northerly from the northeasterly corner of land now or formerly of Wiggins;thence northerly by said Charles Street forty-seven (47) feet to a stake; and from these two points extending back westerly,at right angles with said Charles Street and keeping said width of forty-seven (47) feet,about seventy-four and two-tenths (74.2) feet to the "Arsenal Lot" so called, now owned by said Maine General Hospital; and being the same premises conveyed to Mary Rich Graham,deceased,by Charles A. Donnell,by his deed dated July 1, 1895, recorded in the Cumberland Registry of Deeds,Book 604,page 124.

My title to said premises was acquired as an heir-at-law of said Mary Rich Graham, and by warranty deed from William Graham and Paul G. Graham to me under the name of Eunice Margaret Graham,dated August 2,1912,recorded in said Registry of Deeds,Book 698,page 83.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital,its successors heirs and assigns, to its and their use and behoof forever. And I do covenant with the said grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee,its successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said Eunice M. Chase,and I, Harold B. Chase,husband of the said Eunice M. Chase joining in this deed as Grantor, and relinquishing and conveying my right by descent and all other rights in the above described premises have hereunto set our hands and seals this twentieth day of April in the year of our Lord one thousand nine hundred and twenty-eight.

Signed, Sealed and Delivered in presence of

John F. Dana to both

Eunice M. Chase Seal
Harold B. Chase Seal

State of Maine, Cumberland, ss. April 20, 1928. Personally appeared the above named Eunice M. Chase and acknowledged the above instrument to be her free act and deed.

Before me, John F. Dana, *Justice of the Peace.*

Received April 20, 1928, at 10 o'clock 50 m. A. M., and recorded according to the original.

Know all Men by these Presents, That

I, Elizabeth Naylor, of Portland, in the County of Cumberland and State of Maine, in consideration of one dollar and other valuable consideration, paid by Maine General Hospital, a corporation organized and existing under the laws of said State of Maine, and located at said Portland, the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital, its successors and assigns forever, a certain lot or parcel of land, with the buildings thereon, situated in said Portland, on the northerly side of Ellsworth Street and westerly side of Charles Street, bounded and described as follows: Beginning at the corner formed by the intersection of the westerly side of Charles Street and the northerly side of Ellsworth Street, and running westerly by said Ellsworth Street to land conveyed by William R. Naylor to Samuel W. Joy by deed dated November 3, 1905, and recorded in Cumberland County Registry of Deeds, Book 776, page 200; thence northerly by said Joy land to land now or formerly of Levi J. Jones; thence easterly by said Jones land to said Charles Street; thence southerly by said Charles Street to the point of beginning.

Being the same premises conveyed to William R. Naylor by John B. Brown by deed dated February 20, 1872, recorded in Cumberland County Registry of Deeds, Book 393, page 105, excepting therefrom the portion thereof conveyed by William R. Naylor to Samuel W. Joy by deed aforesaid. My title to said premises having been acquired as devisee under the will of William R. Naylor, extract from which is recorded in said Registry of Deeds, Book 783, page 307.

Also hereby conveying any right, title and interest I may have in said Ellsworth Street.

Taxes for the year 1928 are to be prorated between the grantor and grantee.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital, its successors heirs and assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said Elizabeth Naylor, being unmarried, have hereunto set my hand and seal this 3rd day of July in the year of our Lord one thousand nine hundred and twenty-eight.

Signed, Sealed and Delivered in presence of

Nathan W. Thompson

Elizabeth Naylor Seal

State of Maine, Cumberland, ss. July 3, 1928. Personally appeared the above named Elizabeth Naylor and acknowledged the above instrument to be her free act and deed.

Before me, Nathan W. Thompson, *Justice of the Peace.*

Received July 7, 1928, at 10 o'clock 45 m. A. M., and recorded according to the original.

Know all Men by these Presents, That

I, Samuel W. Joy, of Portland, in the County of Cumberland and State of Maine,

in consideration of one dollar and other valuable considerations, paid by Maine General Hospital, a corporation organized and existing under the laws of said State of Maine, and located at said Portland, the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine General Hospital, its successors and assigns forever, a certain lot or parcel of land, with the buildings thereon, situated on the northerly side of Ellsworth Street in said Portland, being numbered forty-three (43) on said Street, and bounded and described as follows; Beginning at a point thirty-two (32) feet westerly from the intersection of the northerly side line of said Ellsworth Street with the westerly side line of Charles Street; thence westerly by said Ellsworth Street forty-four (44) feet to the Arsenal lot, so called, now owned by the Maine General Hospital; thence northerly by said Arsenal or Hospital lot eighty-seven (87) feet to land now or formerly of Levi J. Jones; thence easterly thirty (30) feet to land now or formerly of William R. Naylor; thence southerly by said Naylor land eighty-seven (87) feet more or less to the first bound.

Being the same premises conveyed to me by William R. Naylor by deed dated November 3, 1905, recorded in Cumberland County Registry of Deeds, Book 776, page 200.

Also hereby conveying any right, title and interest I may have in and to said Ellsworth Street.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital, its successors heirs and assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said Samuel W. Joy, having no wife,

have hereunto set my hand and seal this seventh day of July in the year of our Lord one thousand nine hundred and twenty-eight.

Signed, Sealed and Delivered in presence of

John F. Dana

Saml W. Joy Seal

State of Maine, Cumberland, ss. July 7, 1928. Personally appeared the above named Samuel W. Joy and acknowledged the above instrument to be his free act and deed.

Before me, John F. Dana, *Justice of the Peace.*

Received July 7, 1928, at 10 o'clock 46 m. A. M., and recorded according to the original.

IN WITNESS WHEREOF, the said Lessor has hereunto set his hand and seal on the day and year first above written.

Signed, Sealed and Delivered in Presence of

It is further understood that no liquor, beer, or cigarette advertising shall be displayed on any structure that might be erected.

JOHN DONNELLY & SONS ———

WEST SCARBORO M.E.CHURCH ———

By A. W. Hodgman, Treas.

State of Maine. County of Cumberland,ss. March 31, 1939.

Personally appeared the above named Lessor and acknowledged the above instrument to be his free act and deed.

Before me, F. H. Tewksbury Justice of the Peace

Received March 31, 1939, at 8h 40m P. M., and recorded according to the original

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Canal Nat'l.Bk. of Port. Tr. & to Maine General Hospital Deed

KNOW ALL MEN BY THESE PRESENTS, That

WHEREAS, The Canal National Bank of Portland as Trustee having filed its Bill of Complaint against Vaughan Hall, Incorporated and Harry M. Verrill, Conservator of Casco Mercantile Trust Company dated May 20, 1938, praying for foreclosure of a certain mortgage indenture on property described in said Bill of Complaint, said mortgage indenture being dated as of the fifteenth day of September, 1925, and recorded in the office of the Registry of Deeds for Cumberland County in Book 1219 at Page 41, the Supreme Judicial Court within and for the County of Cumberland in proceedings numbered 5830 on the docket of said Court entered its decree of foreclosure and order of sale therein decreeing and ordering the sale of the property described in said mortgage and hereinafter described, and

WHEREAS, it was, among other things, ordered, adjudged and decreed by said decree of foreclosure that said sale should be made by and under the direction of Raymond J. Callahan who was thereby appointed Special Master for that purpose and who was thereby directed to make and conduct said sale and to execute a deed of conveyance of the property sold to the purchaser thereof upon an order of Court confirming such sale and upon payment or settlement of the purchase price as therein provided, and that such sale be made in the County Court House in the City of Portland, Maine, on a day and at an hour as fixed by said decree of said Supreme Judicial Court and that notice of the time, place and terms of said sale describing briefly the property to be sold and referring to said decree should be published at least once a week for three successive weeks prior to said sale in a newspaper of general circulation published in Portland, Maine, and that upon confirmation of the sale by the Court and upon payment by any purchaser of the purchase price of the property purchased by him in accordance with the decrees of said Court the Special Master should execute a deed conveying, assigning and transferring to such purchaser the property sold to him, and

WHEREAS, the Supreme Judicial Court, pursuant to said decree, duly fixed the time for said sale as February 15, 1939, at ten o'clock in the forenoon and on said date the Special Master, pursuant to the provisions of said decree dated January 17, 1939, and pursuant to order of Court dated February 15, 1939, adjourned said sale from time to time in accordance with orders and decrees of said Court until March 28, 1939, at the time and place ordered by said decree of Court dated January 17, 1939, and orders and decrees subsequent thereto and said Special Master made due advertisement of said sale in the manner described in said decree dated January 17, 1939, and posted all of said notices as required by the orders of Court made subsequent thereto and the Special Master did at the time and place and in the manner and subject to the conditions of said decree and orders of Court subsequent thereto fairly strike off and sell said property to Maine General Hospital, a corporation duly organized and existing under the laws of the State of Maine and having a usual place of business at Portland, in the County of Cumberland and State of Maine, and

WHEREAS, The Canal National Bank of Portland thereafter duly presented to the Court for confirmation the bid so received by said Special Master and the said Special Master duly made a report of said sale to said Court, and a decree of confirmation and a certain decree amending said decree of foreclosure and sale were made and entered therein on the thirty-first day of March, 1939, confirming said bid, report and sale, and making said sale subject to taxes levied against said premises or any part thereof which are or may be chargeable upon said property and directing the Special Master, upon payment of the purchase price in the manner prescribed by said decree of confirmation, to execute and deliver to said purchaser a deed or other instrument conveying, assigning and transferring to said purchaser said property so sold as aforesaid, and

WHEREAS, said Supreme Judicial Court, in accordance with said decree of confirmation, by a decree made and entered herein on the thirty-first day of March, 1939, approved the form of this deed as required by said decree of confirmation dated March 31, 1939, and

WHEREAS, said sale has been conducted and made in all respects in accordance with law and with the provisions of said decrees and order of sale;

NOW, THEREFORE, I, the said Raymond J. Callahan, in my capacity as Special Master and in consideration of these presents and of one dollar and other valuable considerations paid by Maine General Hospital, receipt whereof is hereby acknowledged, do hereby remise, release, bargain, sell and convey and quitclaim unto the said Maine General Hospital, a corporation organized and existing under the laws of the State of Maine, its successors or assigns, all the right, title and interest which said Vaughan Hall, Incorporated and/or Harry M. Verrill, Conservator of Casco Mercantile Trust Company, and all persons claiming under it or him has or have in and to the following described real estate situated in Portland, in the County of Cumberland and State of Maine, and all future rents and profits thereof arising

therefrom, subject, however, to the equity of redemption as provided in the Statutes of the State of Maine and subject also to the terms and conditions set forth in the decree of the Supreme Judicial Court dated January 17, 1939, and certain decrees dated March 31, 1939, and to any other decree which may be hereafter made which relates to the property hereby conveyed, together with the rights and privileges pertaining to said property subject to the conditions described in the decrees of the Supreme Judicial Court dated January 17, 1939, and March 31, 1939, and any unpaid taxes, but subject, however, at all times to the exceptions and provisions particularly described and set forth in the various decrees of said Supreme Judicial Court heretofore made and any that may be hereafter made during the period of redemption:

A certain lot or parcel of land with the buildings thereon situated in said Portland, and bounded and described as follows:- Beginning on the westerly side of Vaughan Street at the southeasterly corner of land now or formerly of the Portland Water District; thence southerly on Vaughan Street sixty (60) feet, more or less, to land now or formerly of John W.Deering; thence westerly by said Deering land one hundred and forty (140) feet, more or less, to land now or formerly of Portland School for Medical Instruction; thence northerly by land of said Portland School for Medical Instruction sixty (60) feet, more or less, to said land of said Portland Water District; thence easterly by said land of said Portland Water District one hundred and forty (140) feet, more or less, to the point of beginning; said lot containing eighty-four hundred (8400) square feet, more or less. Being the same premises conveyed to Vaughan Hall, Incorporated, by Ralph N. Bryant by his warranty deed dated December 19, 1913, and recorded in Cumberland County Registry of Deeds, in Book 927, Page 26.

For title to the above described promises reference is also hereby made to a certain mortgage indenture dated September 15, 1925, securing the First Mortgage Sinking Fund 5 1/2% Gold Bonds of Vaughan Hall Incorporated, said mortgage indenture being by and between said Vaughan Hall, Incorporated and The Canal National Bank of Portland, said mortgage indenture being recorded in Cumberland County Registry of Deeds in Book 1219, Page 41.

TO HAVE AND TO HOLD and possess and enjoy said property and every part and parcel thereof free from all claims, rights, interests whatsoever in or to the same by or of the said Vaughan Hall, Incorporated, its successors and assigns, or of Harry M. Verrill as Conservator of Casco Mercantile Trust Company and by or of the creditors of the Receiver appointed by the Supreme Judicial Court in the equity proceedings hereinbefore referred to, or by or of the stockholders of said Vaughan Hall, Incorporated, and by or of all persons claiming by, through or under them or any of them, including the said Receiver of said Vaughan Hall, Incorporated, and by or of all the parties to said cause hereinbefore described, but subject, however, to any and all taxes levied against said premises or any part thereof which are or may be chargeable upon said property or premises or any portion thereof prior to the

U.S.I.R. $31.50 R.J.C. 5/31/39

lien of the mortgage foreclosed in said proceedings and subject to the right of redemption of said property granted by the Statutes of the State of Maine and subject to the terms and conditions of all decrees of said Supreme Judicial Court made and entered in the cause herein referred to and to any other decree which may be hereinafter entered by said Court which relates or pertains to the property herein conveyed.

IN WITNESS WHEREOF, Raymond J. Callahan, as Special Master, has hereunto set his hand and seal this thirty-first day of March, 1939.

Signed, Sealed and Delivered in Presence of

Porter Thompson — Raymond J. Callahan Seal
Special Master

State of Maine. Cumberland,ss. March 31, 1939.

Personally appeared Raymond J. Callahan and acknowledged the foregoing instrument to be his free act and deed and his free act and deed in his said capacity.

Before me, Porter Thompson Justice of the Peace

APPROVED:

Guy H. Sturgis

Justice Supreme Judicial Court

Received March 31, 1939, at 4h -m P. M., and recorded according to the original

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Casco Mer. Tr. Co., Cons. of to Maine General Hospital Deed

WHEREAS, Harry M. Verrill of Portland, in the County of Cumberland and State of Maine, was appointed Permanent Conservator of Casco Mercantile Trust Company, a banking corporation organized and existing under the laws of the State of Maine and located at said Portland, by decree of the Supreme Judicial Court in Equity in and for the County of Cumberland and State of Maine, dated April 14, 1933, in an action in equity commenced by Sanger N. Annis against Casco Mercantile Trust Company in said Court by Bill in Equity dated March 18, 1933, and

WHEREAS, upon petition of Harry M. Verrill, Conservator as aforesaid, dated March 29, 1939, a decree issued out of said Court authorizing said Conservator to sell to Maine General Hospital, a corporation organized and existing under the laws of the State of Maine and located at said Portland, all the right, title and interest of said Casco Mercantile Trust Company in and to the following described real estate, which said decree is dated March 31, 1939, and

WHEREAS, said Conservator has sold, pursuant to the terms of said decree, to said Maine General Hospital all the right, title and interest of said Casco Mercantile Trust Company in and to the real estate hereinafter described.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS, That I, the said Harry M. Verrill, by virtue of the power and authority in me vested as aforesaid, and in my capacity as Conservator of Casco Mercantile Trust Company, and in consideration of one dollar and other valuable consideration, paid by Maine General Hospital, receipt whereof is hereby acknowledged, do hereby remise, release, bargain, sell, convey and quitclaim unto the said Maine General Hospital, its successors and assigns, all the

Know all Men by these Presents, That

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I, John T. Lennon of Portland in the County of Cumberland and State of Maine

in consideration of one dollar and other valuable considerations paid by Maine Medical Center, a corporation organized and existing under the Laws of the State of Maine and located at said Portland

the receipt whereof I do hereby acknowledge, do hereby, give, grant, bargain, sell and convey unto the said Maine Medical Center, its successors and assigns forever, certain lots or parcels of land with the buildings thereon situated in said Portland and bounded and described as follows:

First:

Beginning on the northerly side of Bramhall Street at the southwesterly corner of land now or formerly of Thomas H. Pratt, running thence westerly by said Bramhall Street fifty (50) feet to land now or formerly of Sophia M. Knight, and from these two points extending northerly towards Arsenal Street, holding to said width of fifty feet, and adjoining said Pratt premises on one side and said Knight premises on the other for a distance of sixty (60) feet to land now or formerly of Edward T. Burrowes. The said lot is the southerly portion of the premises conveyed to Albert B. Cole, Frank H. Cole and Warren W. Cole by Nettie E. Pierce by deed dated September 26, 1911 and recorded in the Registry of Deeds for said County of Cumberland in Book 882, Page 188. Said premises are numbered thirty (30) on said Bramhall Street.

Second:

A certain lot of land with the buildings thereon on the southerly side of Arsenal Street in said Portland bounded and described as follows:

Commencing at a point on the Westerly line of land of Maude E. Pratt at a point sixty (60) feet northerly from the northerly side of Bramhall Street, thence westerly on a line parallel with and sixty (60) feet from said Bramhall Street, fifty (50) feet, more or less, to land of Sophia M. Knight; thence northerly from these two points keeping a width of fifty (50) feet and bounded on the West by land of said Knight and on the East by land of said Pratt and George H. Fletcher, forty-nine (49) feet, more or less, to said Arsenal Street.

Being the same property conveyed to me by Harriet B. Foster by her warranty deed dated February 24, 1945 and recorded in the Cumberland County Registy of Deeds in Book 1771 Page 131.

Also conveying all my right, title and interest in and to Arsenal Street, recently abandoned by the City of Portland.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its successors and assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors and assigns heirs and assigns forever, against the lawful claims and demands of all persons.

U.S.I.R. $16.50 J.T.L. 5/5/53

In Witness Wherent, I the said John T. Lennon and Ann C. Lennon wife of the said John T. Lennon joining in this deed as Grantor, and relinquishing and conveying my right by descent and all other rights in the above described premises,

have hereunto set our hand_ and seal_ this fifth day of May in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

John J. Devine to both

John T. Lennon Seal
Ann C. Lennon Seal

State of Maine, CUMBERLAND, ss. May 5, 1953. Personally appeared the above named John T. Lennon and acknowledged the foregoing instrument to be his free act and deed.

Before me, John J. Devine, Justice of the Peace

Received May 5, 19 53, at 2 o'clock 30 m. P. M., and recorded according to the original.

Know all Men by these Presents, That

I, Donald D. McPhee of Portland in the County of Cumberland and State of Maine,

in consideration of one dollar ($1) and other valuable considerations paid by Maine Medical Center, a corporation duly organized and existing under the laws of the State of Maine and located at Portland in said County and State
the receipt whereof I do hereby acknowledge, do hereby, give, grant, bargain, sell and convey unto the said Maine Medical Center, its successors and Assigns forever, the following described property:

A certain lot or parcel of land with the buildings thereon situated in said Portland and being the premises conveyed to me by Hope K. Fletcher by deed dated November 22, 1946 and recorded in Cumberland County Registry of Deeds in Book 1848, Page 160, in which deed said premises are described as follows:

Beginning at the Northeast corner of Sophia T. Jones lot, so-called, on Arsenal Street; thence Northeasterly on Arsenal Street fifty (50) feet to land of one Raymond; thence Southeasterly by line of Raymond forty-eight (48) feet, more or less, to land of one Haskell; thence Southwesterly along line of said Haskell land thirteen (13) feet and two (2) inches to a point; thence Northwesterly parallel to land of said Raymond three (3) feet to a point; thence Southwesterly along the line of said Haskell land thirty-six (36) feet, more or less, to land of said Jones; thence Northwesterly forty-six (46) feet, more or less to point of beginning.

Also conveying all my interest in and to said Arsenal Street, recently abandoned by the City of Portland.

U.S.I.R. $14.30 D.D.McP. 5/9/53

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its successors and Assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances: that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I the said Donald D. McPhee and I, Lorraine J. McPhee wife of the said Donald D. McPhee joining in this deed as Grantor, and relinquishing and conveying my rights by descent and all other rights in the above described premises, have hereunto set our hand s and seal s this 9th day of May in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

Edward F. Dana to both

Donald D. McPhee Seal
Lorraine J. McPhee Seal

State of Maine, Cumberland, ss. May 9, 1953. Personally appeared the above named Donald D. McPhee and acknowledged the above instrument to be his free act and deed.

Before me, Edward F. Dana, Justice of the Peace

Received May 9, 1953, at 9 o'clock 37 m. A.M., and recorded according to the original. /D

Know all Men by these Presents, That

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I, Hazel B. Therio of Portland in the County of Cumberland and State of Maine

in consideration of One Dollar and other valuable considerations paid by Maine Medical Center, a corporation duly organized and existing under the Laws of the State of Maine and located at said Portland
the receipt whereof I do hereby acknowledge, do hereby, give, grant, bargain, sell and convey unto the said Maine Medical Center, its successors and Assigns forever, the following described property:

A certain lot or parcel of land with the buildings thereon situated on the Westerly side of Bramhall Street in said Portland, being more particularly described in deed from Hazel E. Skillings to the Grantor, dated September 18, 1945 and recorded in Cumberland County Registry of Deeds in Book 1790, Page 500, in which deed said premises are described as follows:

A certain lot or parcel of land, with the buildings thereon situated in said City of Portland, on the Northwesterly side of Bramhall Street, bounded and described as follows: Beginning at the most easterly corner of land now or formerly of Sophia P. Jones; thence Northeasterly on said Bramhall Street fifty (50) feet to land now or formerly of one Raymond; thence Northwesterly by said Raymond land fifty-nine (59) feet; thence Southwesterly thirteen (13) feet two (2) inches, more or less, to a fence; thence Northwesterly by the line of the division fence three (3) feet two (2) inches; thence Southwesterly by said fence thirty-six (36) feet five (5) inches, more or less, to said Jones land; thence Southeasterly by said Jones land sixty-two (62) feet two (2) inches to the point begun at.

Also, all my right, title and interest in and to Arsenal Street recently abandoned by the City of Portland.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its successors and Assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors and Assigns heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors heirs and assigns forever, against the lawful claims and demands of all persons.

U.S.I.R.
$9.90
H.B.T.
5/16/53

In Witness Whereof, I the said Hazel B. Therio, being unmarried, have hereunto set my hand and seal this 16th day of May in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

Edward F. Dana — Hazel B. Therio — Seal

State of Maine, Cumberland, ss. May 16, 1953 Personally appeared the above named Hazel B. Therio and acknowledged the above instrument to be her free act and deed.

Before me, Edward F. Dana Justice of the Peace

Received May 16 19 53, at 10 o'clock 35 m. A. M., and recorded according to the original.

Know all Men by these Presents, That

We, Albert N. Tardif and M. Louise Tardif, both of Portland, County of Cumberland, State of Maine

in consideration of one dollar ($1.00) and other valuable considerations paid by Maine Medical Center, a Corporation established by law at said Portland

the receipt whereof we do hereby acknowledge, do hereby, give, grant, bargain, sell and convey unto the said Maine Medical Center its successors and Assigns forever, the following described property:

A certain lot or parcel of land with the buildings thereon situated on the northerly side of Bramhall Street in said Portland which was conveyed to the grantors by Wilhelmina M. Mantine, by deed dated September 16, 1935 and recorded in Cumberland County Registry of Deeds in Book 1478, Page 294 and therein described as follows: Beginning on the northerly side of Bramhall Street at the easterly corner of land formerly of James Miller; thence northeasterly by Bramhall Street twenty-one and seven twentieths (21 7/20) feet to a stake; thence northwesterly about one hundred eleven (111) feet to a point in the southerly side of Arsenal Street; thence southwesterly by Arsenal Street twenty-two and three quarters (22 3/4) feet to said Miller's land; thence southeasterly by said Miller's land one hundred eleven and four tenths (111 4/10) feet to the point of beginning.

Also all our right title and interest in and to Arsenal Street recently abandoned by the City of Portland.

U.S.I.R. $16.50 A.N.T.Et 6/11/53

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its successors and Assigns, to its and their use and behoof forever. And we do covenant with the said Grantee, its successors and Assigns,

heirs and assigns, that we are lawfully seized in fee of the premises; that they are free of all incumbrances:

that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our heirs, shall and will warrant and defend the same to the said Grantee, its successors and Assigns

heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, We the said Albert N. Tardif and M. Louise Tardif, the said Grantors, being Husband and Wife each joining in this deed as Grantors, and each relinquishing and conveying our respective rights by descent and all other rights in the above described premises,

have hereunto set our hand s and seal s this 11th day of June in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

Edward F. Dana — Albert N. Tardif — Seal

to both — M. Louise Tardif — Seal

State of Maine, CUMBERLAND, ss. June 11, 1953 Personally appeared the above named Albert N. Tardif and M. Louise Tardif and acknowledged the above instrument to be their free act and deed.

Before me, Edward F. Dana Justice of the Peace

Received June 12 1953, at 11 o'clock 5 m. A. M., and recorded according to the original.

Know all Men by these Presents, That

We, Fred A. Patterson and Ella H. Whidden both of Derry in the County of Rockingham and State of New Hampshire, Ruby E. McKenzie of Raymond in said County and State and Alzo F. Patterson of Portland in the County of Cumberland and State of Maine

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in consideration of One dollar ($1.00) and other valuable considerations paid by Maine Medical Center, a Corporation organized and existing under the laws of Maine and located at said Portland,

the receipt whereof we do hereby acknowledge, do hereby, give, grant, bargain, sell and convey unto the said Maine Medical Center, its Successors and Assigns forever, the following described property:

A certain lot or parcel of land with the buildings thereon, situated in said Portland on the northerly side of Bramhall Street and bounded and described as follows:

Beginning on the northerly side of Bramhall Street at the southwesterly corner of land formerly of Frederick A. Carle; thence running westerly by said Bramhall Street twenty-five (25) feet to a stake or point, and from these two points extending northerly adjoining said Carle land, keeping a width of twenty-five (25) feet, to Arsenal Street, being the premises conveyed to Daniel W. Patterson by Maria M. Jose by deed dated September 12, 1921 and recorded in Cumberland County Registry of Deeds in Book 1085, Page 228.

The said Daniel W. Patterson died intestate on September 3, 1952 leaving no widow and as his sole heirs-at-law, the Grantors herein.

The Grantee as part of the consideration hereof assumes and agrees to pay the taxes for the taxable year of 1953.

Also conveying all our right, title and interest in and to Arsenal Street recently abandoned by the City of Portland, Maine.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its Successors and Assigns to its and their use and behoof forever. And we do covenant with the said Grantee, its Successors and Assigns, heirs and assigns, that we are lawfully seized in fee of the premises; that they are free of all incumbrances; except as aforesaid.

U.S.I.R. $13.20 A.F.P.Et 5/20/53

that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our heirs, shall and will warrant and defend the same to the said Grantee, its Successors and Assigns heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, We the said Fred A.Patterson and Chrystine I.Patterson, wife of the said Fred A.Patterson; Ella H.Whidden and Charles F.Whidden, husband of the said Ella H.Whidden; Ruby E.McKenzie and Elmer W.McKenzie, husband of the said Ruby E.McKenzie, and Alzo F.Patterson and Bessie E.Patterson, wife of the said Alzo F.Patterson joining in this deed as Grantors, and relinquishing and conveying our rights by descent and all other rights in the above described premises, have hereunto set our hands and seals this twentieth day of May in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

R.E. Jensen
R.E. Jensen
Carmela Chase
Carmela Chase
Arthur K. Smith
Arthur K. Smith
P. J. Campbell
P. J. Campbell

Alzo F.Patterson Seal
Bessie E. Patterson Seal
Fred A. Patterson Seal
Chrystine I. Patterson Seal
Ella H. Whidden Seal
Charles F. Whidden Seal
Ruby E. MacKenzie Seal
Elmer MacKenzie Seal

State of Maine. CUMBERLAND, ss. May 20, 1953 Personally appeared the above named Alzo F. Patterson and acknowledged the above instrument to be his free act and deed.

Before me, Raymond E. Jensen Justice of the Peace

Received June 12 1953, at 11 o'clock 5 m. A.M., and recorded according to the original.

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Know all Men by these Presents, That

We, Leola J. Noyes and William H. Noyes, Jr., both of Portland, County of Cumberland, State of Maine,

in consideration of one dollar ($1.00) and other valuable considerations paid by Maine Medical Center, a Corporation established by law in said Portland

the receipt whereof we do hereby acknowledge, do hereby, give, grant, bargain, sell and convey unto the said Maine Medical Center, its successors and Assigns forever, the following described property:

A certain lot or parcel of land with the buildings thereon situated in said Portland between Bramhall and Arsenal Streets adjoining land formerly belonging to Sophia P. Jones and conveyed to us by Maud L. Pillsbury by deed dated October 2, 1951, recorded in Cumberland County Registry of Deeds in Book 2060, Page 419, and therein bounded and described as follows: Beginning on the northerly side of Bramhall Street at the southwesterly corner of said Jones land; thence running westerly by said Bramhall Street twenty-five (25) feet to a stake and from these two points extending northerly adjoining said Jones land keeping a width of twenty-five (25) feet, a distance of sixty-eight feet and two inches (68' 2"), which distances are marked by stakes and which stakes are twenty-six (26) feet distant from the southerly boundary line of Arsenal Street.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its successors and Assigns, to its and their use and behoof forever. And we do covenant with the said Grantee, its successors and Assigns, heirs and assigns, that we are lawfully seized in fee of the premises; that they are free of all incumbrances; that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our heirs, shall and will warrant and defend the same to the said Grantee, its successors and Assigns heirs and assigns forever, against the lawful claims and demands of all persons.

U.S.I.R. $11.00 L.J.N.Et 6/12/53

In Witness Whereof, We, the said Leola J. Noyes and William H. Noyes, Jr., the said grantors, both being unmarried

our hand s and seals this 12th day of June in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

Edward F. Dana — Leola J. Noyes — Seal

to both — William H. Noyes, Jr. — Seal

State of Maine, CUMBERLAND, ss. June 12, 1953 Personally appeared the above named Leola J. Noyes and William H. Noyes, Jr. and acknowledged the above instrument to be their free act and deed.

Before me, Edward F. Dana Justice of the Peace

Received June 12 19 53, at 1 o'clock 44 m. P. M., and recorded according to the original.

Know all Men by these Presents, That

Maine Medical Center a corporation organized and existing under the laws of the State of Maine and located at Portland in the County of Cumberland and State of Maine

in consideration of One Dollar and other valuable considerations paid by Maine General Hospital, a corporation organized and existing under the laws of the State of Maine and located at said Portland

the receipt whereof it does hereby acknowledge, does hereby, give, grant, bargain, sell and convey unto the said Maine General Hospital, its successors and assigns forever, a certain lot or parcel of land with the buildings thereon, situated in said City of Portland, between Bramhall and Arsenal Streets, adjoining land formerly owned by John W. Yeaton, and bounded and described as follows:

Beginning in the northerly line of Bramhall Street at the southeasterly corner of said Yeaton land; thence running easterly by Bramhall Street forty (40) feet and from these two points extending northerly, adjoining said Yeaton land, and keeping said width of forty (40) feet to Arsenal Street, being the same premises described in deed of J. B. Brown to Leon M. Bowdoin in 1867 by deed recorded in Cumberland County Registry of Deeds, Book 351, Page 340.

Being the same premises conveyed to this Grantor by Frederick W. McCarthy by deed dated June 30, 1953 and recorded in said Registry of Deeds in Book 2140, Page 92.

U.S.I.R. $33.55 M.M.C. 8/18/53

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine General Hospital, its successors and assigns, to its and their use and behoof forever. And the said Corporation does hereby covenant with the said Grantee, its successors and assigns, heirs and assigns, that it is lawfully seized in fee of the premises; that they are free of all incumbrances; that it has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that it and its successors heirs, shall and will warrant and defend the same to the said Grantee, its successors and assigns heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, the said Maine Medical Center has caused this instrument to be sealed with its corporate seal and signed in its corporate name by Phillips M. Payson, its President, thereunto duly authorized,

hand and seal this 18th day of August have hereunto set in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

Edward F. Dana

MAINE MEDICAL CENTER
CORPORATE SEAL
By Phillips M. Payson
President.

State of Maine, County of CUMBERLAND, ss. August 18, 1953.

Then Personally appeared the above named Phillips M. Payson, President of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed, in his said capacity, and the free act and deed of said corporation.

Before me, Edward F. Dana, Justice of the Peace.

Received August 19, 1953, at 1 o'clock 40 m. P. M., and recorded according to the original.

Know all Men by these Presents, That

I, Henry H. Grant of Portland, in the County of Cumberland and State of Maine,

in consideration of one dollar and other valuable consideration paid by Maine Medical Center, a corporation organized and existing under the laws of the State of Maine and located at said Portland,

the receipt whereof I do hereby acknowledge, do hereby, give, grant, bargain, sell and convey unto the said Maine Medical Center, its Successors and assigns forever, a certain lot or parcel of land with the buildings thereon situated between Bramhall and Arsenal Streets in said Portland, adjoining land now or formerly belonging to Sophia P. Jones, and more particularly bounded and described as follows:

Beginning on the northerly side line of said Bramhall Street, at the southwesterly corner of said Jones' land; thence westerly by said Bramhall Street, twenty-five (25) feet to a stake and from these two points extending northerly adjoining said Jones land, keeping the width of twenty-five (25) feet, to Arsenal Street.

Excepting and reserving however, a certain lot or parcel of land with the buildings thereon out of the aforesaid property, a conveyance by Westprom Realty Company to Maud L. and Janice M. Pillsbury by deed dated January 23, 1946 and recorded in Cumberland County Registry of Deeds in Book 1803, Page 444, to which reference may be had.

Meaning and intending to convey a parcel of land at the rear of 26 Bramhall Street, which parcel of land is approximately 26'x25' and contains a garage thereon.

Being the same premises conveyed to me by Westprom Realty Company by their warranty deed dated April 11, 1951 and recorded in said Registry of Deeds in Book 2040, Page 192.

U.S.I.R. $3.30 H.E.G. 9/4/53

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its Successors and assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its Successors and assigns, heirs and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its Successors and assigns heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said Henry H. Grant and I, Gladys H. Grant, wife of the said Henry H. Grant joining in this deed as Grantor, and relinquishing and conveying my right by descent and all other rights in the above described premises, have hereunto set our hands and seals this 4th day of September in the year of our Lord one thousand nine hundred and fifty-three.

Signed, Sealed and Delivered in presence of

H. Edwin Gee

Henry H. Grant Seal
Gladys H. Grant Seal

State of Maine, Cumberland, ss. September 4, 1953. Personally appeared the above named Henry H. Grant and acknowledged the above instrument to be his free act and deed.

Before me, H. Edwin Gee, Notary Public, Notarial Seal, My Commission Expires June 29, 1956

Received September 9, 1953, at 9 o'clock 50 m. A. M., and recorded according to the original. P)

Know all Men by these Presents, That

I, James S. Bell of Portland, County of Cumberland and State of Maine, Executor under the Will of Ethel B. Bell, deceased, late of Portland.

having on the 24th day of November A. D. 1953, obtained License from the Honorable Nathaniel M. Haskell Judge of Probate, within and for the County of Cumberland and State of Maine, to sell and convey at private sale the Real Estate hereinafter described of the said Ethel B. Bell for the sum of

Eleven thousand seven hundred fifty ($11750.00) dollars

the same being an advantageous offer therefor, and having agreeably to the order and decree of said Court, given due notice upon the petition for license to make such sale, and having given the bond required by law, by virtue of the power and authority with which I am as aforesaid vested, and in consideration of the aforesaid sum of Eleven thousand seven hundred fifty ($11750.00) dollars, to me paid by Maine Medical Center, a corporation duly organized and existing by law with an office and place of business at Portland, said County and State.
the receipt whereof I do hereby acknowledge, have given, granted, and sold, and by these Presents do GIVE, GRANT, SELL AND CONVEY to the said Maine Medical Center, its Successors Heirs and Assigns forever, the following described Real Estate, viz.:

A certain lot or parcel of land with the buildings thereon, situated on Arsenal and Brackett Streets in said Portland, bounded and described as follows:

Beginning at the southwesterly side of said Brackett Street at the northwesterly corner of a lot of land conveyed by Mary J. Raymond to George E. Raymond by deed dated November 3, 1897, and recorded in the Cumberland County Registry of Deeds in Book 657, Page 411; thence southwesterly by said last named lot forty seven (47) feet; thence northwesterly and at right angles with the last described course to said Arsenal Street; thence northeasterly by said Arsenal Street to said Brackett Street; thence southeasterly by said Brackett Street to the point of beginning.

Excepting and reserving from the southeasterly portion of said above described premises so much thereof, as was described and conveyed in a certain deed from Ella C. Gardner to Gemma A. Applebee et al., said deed being dated November 27, 1935 and recorded in the Cumberland County Registry of Deeds, Book 1485, Page 206, and subject also to such easements and rights as were therein granted to said Gemma A. Applebee et al; by said deed above referred to.

Being the same premises conveyed to Kathryn Ireland by deed of Mary Dyer dated August twenty eighth, A. D. 1950 recorded in said Registry of Deeds for the County of Cumberland in Book 2014, Page 62.

Being the same premises conveyed to Sarah Friedman by deed of Kathryn Ireland which deed is recorded in the Cumberland County Registry of Deeds in Book 2051, Page 193.

Being the same premises conveyed to Ethel B. Bell by Sarah Friedman which deed is recorded in said Registry of Deeds.

U.S.I.R. $13.20 E.B.B. Est. 11/25/53

To Have and to Hold the same, with all the privileges and appurtenances to the same belonging, in manner as aforesaid, to the said Maine Medical Center, its Successors ~~Heirs~~ and Assigns forever.

And I the said James S. Bell in my said capacity do COVENANT to and with the said Maine Medical Center, its Successors ~~Heirs~~ and Assigns, that I have in all things observed the rules and directions of law relative to the selling of said Estate, and have good right and lawful authority to sell and convey the same in manner aforesaid.

In Witness Whereof, I hereunto set my hand and seal in my said capacity, this 25th day of November in the year of our Lord one thousand nine hundred and fifty three

Signed, Sealed and Delivered in presence of

Morris Greenberg

Estate of Ethel B Bell
James S. Bell Seal
Executor

State of Maine, Cumberland, ss. November 25, 1953. Personally appeared the above named James S. Bell and acknowledged the foregoing ~~above~~ instrument to be his free act and deed, in said capacity.

Before me, Morris Greenberg Justice of the Peace

RECEIVED November 25 1953, at 4 o'clock 56m., P. M., and recorded according to the original.

21

(10E)

Know All Men by these Presents,

That MAINE GENERAL HOSPITAL ~~Company~~

a corporation organized and existing under the laws of the State

of Maine and located at Portland

in the County of Cumberland and State of Maine

in consideration of One Dollar ($1.00) and other valuable considerations (being less than $100)

paid by MAINE MEDICAL CENTER; a corporation organized and existing under the laws of the State of Maine and located at Portland in the County of Cumberland and State of Maine

the receipt whereof it does hereby acknowledge, does hereby give, grant, bargain, sell and convey, unto the said Maine Medical Center

its successors ~~theirs~~ and assigns forever,

a certain lot or parcel of land being a portion of Arsenal Street discontinued by the City of Portland and a small portion of land of the Grantor adjoining said discontinued land in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at a point in the center line of discontinued Arsenal Street at its easterly extremity; thence northwesterly by said easterly extremity of discontinued Arsenal Street thirty (30) feet to land of the Grantor; thence southwesterly by land of the Grantor, being the northerly sideline of the former location of Arsenal Street and at right angles to the last described course about thirty (30) feet to the easterly face of the new Maine Medical Center building; thence northwesterly at about right angles to the last described course and by the easterly face of said new building about five (5) feet to a corner of said building; thence southwesterly by the northerly face of said new building and by a line between said new building and the old building, said old building being known as the pavilion and again by the northerly face of said new building about forty-five (45) feet to a corner of said new building; thence southeasterly by the face of said new building at about right angles to the last described course about five (5) feet to the former location of the northerly sideline of said Arsenal Street; thence southwesterly by other land of the Grantor being the northerly sideline of the former location of Arsenal Street and at about right angles to the last described course and ten (10) feet to a point; thence southeasterly at right angles to the last described course thirty (30) feet to the center line of the former location of said Arsenal Street; thence northeasterly by said center line and passing through said aforementioned new building about eighty-five (85) feet to the point of beginning.

Maine General Hospital to Maine Medical Center

War

22 **To have and to hold** the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said Maine Medical Center, its successors and assigns, to its and their use and behoof forever.

And the said Grantor Corporation does hereby COVENANT with the said Grantee, its successors and assigns, that it is lawfully seized in fee of the premises, that they are free of all incumbrances;

that it has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that it and its successors, shall and will WARRANT AND DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, the said Maine General Hospital has caused this instrument to be sealed with its corporate seal and signed in its corporate name by Phillips M. Payson, its Treasurer, thereunto duly authorized, this 9th day of July in the year one thousand nine hundred and fifty-six.

Signed, Sealed and Delivered in presence of

Edmund F. Larson

MAINE GENERAL HOSPITAL

By Phillips M. Payson
Treasurer.

State of Maine.

County of Cumberland ss. July 9, 1956

Then personally appeared the above named

Phillips M. Payson, Treasurer of said Grantor 23
Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me,

Edward Hanz Justice of the Peace.

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE JUL 10 1956
Received at 1 H 5 M P M, and recorded in
BOOK 2301 PAGE 21 Robert H. Carter Register

Know All Men by These Presents,

That M. S. Hancock, Inc.

M S Hancock Inc to Gordon

a Corporation organized and existing under the laws of the State of Maine and located at Casco in the County of Cumberland and State of Maine in consideration of one dollar and other valuable consideration

War

paid by Benjamin H. Gordon of New Britain in the County of Hartford and State of Connecticut
the receipt whereof it does hereby acknowledge, does hereby give, grant, bargain, sell and convey unto the said Benjamin H. Gordon, his

heirs and assigns forever, [redacted]

Three certain lots or parcels of land situate in said Casco and on the southerly shore of Coffee Pond, so-known, the lots herein conveyed being Lot #13, Lot #14 and Lot #15 and delineated on a certain plan entitled "Coffee Pond Pines, Part II" as recorded in the Cumberland County Registry of Deeds, Plan Book 44, Page 40, together with a right of user in common with others who may have been or who may hereafter be granted a similar right in and to the road or right of way leading to said lots from Route #11, so-known, said road being delineated on said plan.

It shall be a condition of this conveyance and the Grantee, for himself and his heirs, administrators, executors or assigns, agrees that no dwelling shall be erected or constructed on any of said lots unless the same shall equal or exceed the sum of $1500.00 to build exclusive, however, of any necessary outbuildings or garages.

(2a)

Know all Men by these Presents,

161

That the CITY OF PORTLAND, a body politic and corporate, located in the County of Cumberland and State of Maine,

Portland City of

to

Maine General Hospital

Q C

in consideration of One ($1.00) Dollar and other valuable considerations, the total of which is less than One Hundred ($100.00) Dollars

paid by Maine General Hospital, a corporation organized and existing under the laws of the State of Maine and located at Portland in the County of Cumberland and State of Maine,

the receipt whereof it does hereby acknowledge, does hereby remise, release, bargain, sell and convey, and forever quit-claim unto the said

Maine General Hospital, its successors and assigns forever,

A certain lot or parcel of land situated in said Portland and bounded and described as follows:

Beginning at the point of intersection of the Northwesterly side line of Ellsworth Street extended in a Southwesterly direction and the Southwesterly side line of Charles Street; thence Southwesterly along a continuation of the Northwesterly side line of Ellsworth Street extended, a distance of thirty-eight (38) feet, more or less, to a point; thence in a Southeasterly direction parallel to and fifty (50) feet measured perpendicularly Southwesterly of the Northeasterly side line of Charles Street Extension, so-called, a distance of one hundred fifty-five (155) feet, more or less, to the Northerly terminus of Brackett Street as established and renamed by the City Council of the City of Portland; thence Northeasterly along the line terminating said Brackett Street a distance of thirty-eight (38) feet, more or less, to the point of intersection formed by the above-mentioned line and the Southwesterly side line of Charles Street Extension, so-called; thence Northerly along the Southwesterly side line of Charles Street Extension, so-called, a distance of one hundred fifty-five (155) feet, more or less, to the point of beginning.

Being the same premises conveyed to the Grantor by Warranty Deed of the Grantee dated April 9, 1954, recorded in Cumberland County Registry of Deeds in Book 2173, Page 412.

162

To have and to hold the same, together with all the privileges and appurtenances thereunto belonging, to it the said

Maine General Hospital, its successors

~~Heirs~~ and Assigns forever.

And the said Grantor Corporation does ~~covenant~~ with the said

Maine General Hospital, its successors

~~Heirs~~ and Assigns, that it will ~~Warrant and Forever Defend~~ the said premises to it the said Grantee, its successors ~~Heirs~~ and Assigns forever, against the lawful claims and demands of all persons claiming by, through, or under it.

In Witness Whereof, the said CITY OF PORTLAND

has caused this instrument to be sealed with its corporate seal and signed in its corporate name by Edwin T. Simmons, Acting City Treasurer ~~xxxxx~~ thereunto duly authorized, this Fifteenth day of August in the year one thousand nine hundred and fifty-six.

Signed, Sealed and Delivered
in presence of

M. Jane King

CITY OF PORTLAND

By Edwin T. Simmons
Acting City Treasurer

(CORPORATE SEAL)

State of Maine. } ss. August 15, 1956.
Cumberland

Personally appeared the above named Edwin T. Simmons, Acting City Treasurer of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me

Justice of the Peace

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE AUG 21 1956
Received at 1 H - M and recorded in
BOOK 2308 Page 161 Robert N. Carter Register

Doak & to Maine General Hospital -- War

Know all Men by these Presents, That

229

We, Albert E. Doak and Amelia Doak, both of Portland, County of Cumberland and State of Maine,

in consideration of one dollar and other valuable considerations paid by MAINE GENERAL HOSPITAL, a corporation organized and existing under the laws of the State of Maine, and having its principal place of business at said Portland,

the receipt whereof we do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said MAINE GENERAL HOSPITAL, its successors and assigns, forever,

A certain lot or parcel of land with the buildings thereon, situated on the westerly side of Charles Street in said Portland, bounded and described as follows: Beginning at a fence post standing on the westerly side line of Charles Street and distant northerly seventy-three and eighty-four hundredths (73.84) feet from the northwesterly corner of Ellsworth and Charles Streets; thence northerly by said Charles Street forty (40) feet to land now or formerly of Frank Abbott; thence westerly by said Abbott's land seventy-four and fifty-six hundredths (74.56) feet to land of the said grantee; thence by land of said grantee southerly forty (40) feet to land now or formerly of W. H. Naylor; thence easterly by said Naylor's land seventy-four and forty-two hundredths (74.42) feet to the point of beginning.

Being the same premises conveyed to these grantors by Henry T. Orlando by deed dated May 29, 1951, and recorded in Cumberland County Registry of Deeds in Book 2044, Page 288.

The grantee corporation herein assumes and agrees to pay the 1957 real estate taxes as part consideration for this transfer.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said MAINE GENERAL HOSPITAL, its successors

~~heirs~~ and assigns, to its and their use and behoof forever. And we do covenant with the said Grantee, its successors ~~heirs~~ and assigns, that we are lawfully seized in fee of the premises; that they are free of all incumbrances; except as aforesaid; that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our heirs and assigns shall and will warrant and defend the same to the said Grantee, its successors ~~heirs~~ and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, we, the said Albert E. Doak and Amelia Doak, husband and wife,

joining in this deed as Grantors, and relinquishing and conveying our rights by descent and all other rights in the above described premises, have hereunto set our hands and seals this third day of May in the year of our Lord one thousand nine hundred and fifty-seven.

Signed, Sealed and Delivered in presence of

Edward B. Perry
E. Bartlett

Albert E Doak
Amelia Doak

State of Maine, Cumberland ss. May 3, 1957.

Personally appeared the above named Albert E. Doak

and acknowledged the foregoing instrument to be his free act and deed.

Before me, Edward B. Perry NOTARY PUBLIC.

STATE OF MAINE, CUMBERLAND COUNTY, SS. REGISTRY OF DEEDS

Received MAY 3 1957 at 2 o'clock 35 m. P.M., and recorded in BOOK 2349 PAGE 229 Attest: Martha H. S. Bailey Register

$6.05

Book 2619
Page 499

Know All Men by These Presents,

Grant
&
to
Maine
Medical
Center
--
War

That We, Henry H. Grant and Gladys H. Grant, both of Portland in the County of Cumberland and State of Maine,

in consideration of one ($1.00) dollar and other valuable considerations

paid by Maine Medical Center, a corporation duly organized and existing under the laws of the State of Maine and located at said Portland,

the receipt whereof we do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine Medical Center, its successors and assigns forever, a certain lot or parcel of land with the buildings thereon, situated in Portland in the County of Cumberland and State of Maine, on the northwesterly side of Bramhall Street, bounded and described as follows:

Commencing at the southwesterly corner of land, now or formerly, of James Miller and Charlotte Johnson on Bramhall Street; thence northwesterly by land of said James Miller and Charlotte Johnson, sixty (60) feet to land formerly of William J. Knowlton; thence southwesterly along said Knowlton land, parallel with said street, fifty-five (55) feet to a corner of land formerly of William J. Knowlton; thence parallel with first mentioned line sixty (60) feet, more or less, to said street; thence northeasterly by said street fifty-five (55) feet to the place of beginning.

Being the same premises conveyed to us by Russell Fanning by deed recorded in Cumberland County Registry of Deeds in Book 1833, Page 415, and are conveyed subject to the conditions contained in said deed.

The Grantee herein, as part of the consideration hereof, assumes and agrees to pay taxes for the taxable year 1961.

500

To have and to hold the aforegranted and bargained premises with all the privileges and appurtenances thereof, to the said

Maine Medical Center, its successors

heirs and assigns, to its and their use and behoof forever.

And we do covenant with the said Grantee, its successors and assigns, that we are lawfully seized in fee of the premises, that they are free of all incumbrances;

that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our heirs shall and will Warrant and Defend the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, We the said Henry H. Grant

and Gladys H. Grant, being husband and

wife

joining in this deed as Grantors, and relinquishing and conveying all right by descent and all other rights in the above described premises, have hereunto set our hands and seals this thirty-first day of July in the year of our Lord one thousand nine hundred and sixty-one.

Signed, Sealed and Delivered
in presence of

Geraldine E. Wall — Henry H. Grant
R. E. Jensen — Gladys H. Grant

State of Maine. Cumberland, ss. July 31, 1961.

Personally appeared the above named Henry H. Grant

and acknowledged the foregoing instrument to be his free act and deed.

Before me,
Raymond E. Jensen
Justice of the Peace
Notary Public

AUG 4 1961
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 10 H 28 M A.M., and recorded in
BOOK 2619 PAGE 499 Lowell P. Hyson Register

Know All Men by These Presents,

369

That Sewall H. Hobson, 2nd, of Portland, County of Cumberland and State of Maine

in consideration of one dollar and other valuable consideration

paid by Maine Medical Center, a corporation duly organized and existing under the laws of the State of Maine with its principal office in said Portland

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine Medical Center, its successors and assigns forever, a certain lot or parcel of land with the buildings thereon, situated on the northwesterly side of Bramhall Street in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at the intersection of the northwesterly side line of Bramhall Street with the easterly side line of Western Promenade; thence northeasterly by Bramhall Street One Hundred Four and one-tenth (104.1) feet to the southerly corner of land conveyed by John W. Yeaton to William J. Knowlton, by deed dated April 4, 1885, and recorded in Cumberland County Registry of Deeds, in Book 517, Page 186; thence northwesterly at right angles with Bramhall Street and by said Knowlton land Sixty (60) feet to the southeasterly side line of land conveyed by John W. Yeaton to William J. Knowlton by deed dated June 6, 1882, and recorded in said Registry of Deeds, in Book 486, Page 204; thence southwesterly by said Knowlton land Forty-one and seven tenths (41.7) feet to the easterly side line of Western Promenade at a point Seventy-seven and five tenths (77.5) feet southerly thereon from the southeasterly side line of Arsenal Street; thence southerly by Western Promenade Eighty-six and seventy-eight hundredths (86.78) feet to the point of beginning.

For Grantors title reference is made to the will of Annie H. Dana, and abstract of which is recorded in said Registry of Deeds, in Book 2423, Page 273, and to a certain deed from Saint Germain Foundation et als. dated February 1, 1960, and recorded in said Registry of Deeds in Book 2526, Page 80.

To have and to hold the aforegranted and bargained premises with all the privileges and appurtenances thereof, to the said Maine Medical Center, its successors

heirs and assigns, to it and their use and behoof forever.

And I do covenant with the said Grantee, its successors heirs and assigns, that I am lawfully seized in fee of the premises, that they are free of all incumbrances;

that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and any heirs shall and will Warrant and Defend the same to the said Grantee, its successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, We the said Sewall M. Hobson, 2nd

and Anne S. Hobson

wife of the said Sewall M. Hobson, 2nd

joining in this deed as Grantor, and relinquishing and conveying her right by descent and all other rights in the above described premises, have hereunto set our hands and seals this Tenth day of July in the year of our Lord one thousand nine hundred and sixty-two.

Signed, Sealed and Delivered
in presence of

Gerald S Cope
to both

Sewall M. Hobson, 2nd
Anne S Hobson

DOCUMENTARY

State of Maine. Cumberland ss. July 10th 19 62.

Personally appeared the above named Sewall M. Hobson, 2nd

and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Gerald S Cope
Justice of the Peace
~~Notary Public~~

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at JUL 10 1962 11 H 51 M. M. and recorded in
BOOK 2685 PAGE 369 Sewall M Hobson Register

Book 2901
Page 326

326 (108)

Know all Men by these Presents,

That I, VINCENT C. NEWTON of Portland in the County of Cumberland and State of Maine

Newton

to

Maine General Hospital

War

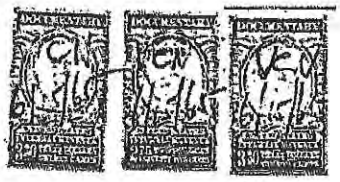
in consideration of One Dollar ($1.00) and other valuable considerations

paid by MAINE GENERAL HOSPITAL, a corporation organized and existing under the laws of Maine and located at Portland in the County of Cumberland and State of Maine,

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey, unto the said Maine General Hospital, its successors and assigns forever,

a certain lot or parcel of land with the buildings thereon situated on the westerly side of Charles Street in said Portland, bounded and described as follows:

Beginning on the westerly side line of said Charles Street at the northeasterly corner of land formerly of John M. Jones, now of Maine General Hospital; thence running northerly by said street thirty-eight (38) feet to land formerly occupied by one Graham, now owned by Maine General Hospital; and from these two points extending back westerly at right angles from said street keeping the width of thirty-eight (38) feet and bounded southerly by said Jones land and northerly by said Graham land about seventy-four and two tenths (74.2) feet to the Arsenal Lot, so-called, now of Maine General Hospital; being the same premises conveyed to me by Charles H. Abbott et al by deed dated February 10, 1944, recorded in Cumberland County Registry of Deeds in Book 1737, Page 278.



327

To Have and to Hold the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said Maine General Hospital, its successors and assigns, to its and their use and behoof forever.

And I do COVENANT with the said Grantee, its successors and assigns, that I am lawfully seized in fee of the premises that they are free of all encumbrances;

that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs shall and will WARRANT and DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I the said Vincent C. Newton, being unmarried

have hereunto set my hand and seal this 15th day of June in the year of our Lord one thousand nine hundred and sixty-five.

Signed, Sealed and Delivered
in presence of

Edward J. McGaughey

Vincent C. Newton (L.S.)

State of Maine, Cumberland, ss. June 15, 1965.

Personally appeared the above named Vincent C. Newton and acknowledged the above instrument to be his free act and deed.

Before me,
Edward J. McGaughey
Notary Public

MY COMMISSION EXPIRES OCTOBER 9, 1972

STATE OF MAINE
CUMBERLAND, ss. REGISTRY OF DEEDS
Received at 1 H. 26 M. P. M. on JUN 15 1965 and recorded in
Book 2901 Page 326 Attest
Samuel A. Nelson Register

(154)
EXECUTORS AND TRUSTEES DEED
[WHERE THE WILL AUTHORIZES A SALE.]

927

Know all Men by these Presents,

That I, HELEN M. GRIFFIN

of Portland in the county of Cumberland

sole acting executor of the last will and testament

of Mary Davis late of Portland

deceased, testate, by virtue of the authority to me given by

the said Mary Davis in her last will and

testament, in my capacity of executor as afore-

said, and in consideration of One Dollar ($1.00) and other

valuable considerations

to me paid by MAINE MEDICAL CENTER, a corporation organized under the laws of Maine and situated in Portland

the receipt whereof is hereby ac-

knowledged, do hereby sell and convey unto the said Maine Medical Center, its successors and assigns, the following described real estate, which was the property of the said Mary Davis.

A certain lot or parcel of land with the buildings thereon situated in Portland on the northerly side of Brackett Street, bounded and described as follows:

Beginning at the intersection of the northerly side of Brackett Street with the westerly side of Russell Street; thence running northeasterly by Russell Street thirty-seven (37) feet, more or less, to land formerly owned by Hobart W. Richardson; thence running northwesterly by said Richardson land seventy-four (74) feet, more or less, to land formerly owned or occupied by W. S. Dunn; thence southwesterly by the line of said Dunn's land forty-one (41) feet, more or less, to a lane; thence southeasterly by said lane forty-one (41) feet, more or less, to Brackett Street; thence easterly by Brackett Street thirty-seven (37) feet, more or less, to the point of beginning.

Being the same premises conveyed to Mary Davis by Harry E. Davis by deed dated March 18, 1915, recorded in Cumberland County Registry of Deeds in Book 945, Page 109.

Reference is made to Will of said Mary Davis, abstract of which is recorded in said Registry of Deeds in Book 3023, Page 28.

Davis Est

to

Maine Medical Center

Exec

928 **To have and to hold** the above-granted premises unto the said Maine Medical Center, its successors and assigns forever. And I the said Helen M. Griffin, in my said capacity, do hereby covenant to and with the said Maine Medical Center, its successors and assigns, that I am the lawful executor of the last will and testament of the said Mary Davis ; that I have power under said will to sell as aforesaid; and that in making this conveyance, I have in all respects, acted in pursuance of the authority granted in and by the said last will and testament.

In Witness Whereof, I the said Helen M. Griffin in my said capacity of executor as aforesaid have hereunto set my hand and seal this 31st day of March in the year of our Lord one thousand nine hundred and sixty-six.

Signed, Sealed and Delivered in presence of

Helen M. Griffin (L.S.)

State of Maine, Cumberland ss. March 31 1966.

Then personally appeared the above named Helen M. Griffin and acknowledged the above instrument to be her free act and deed in her said capacity.

Before me,

Justice of the Peace.

MAR 31 1966
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 3 H 55 M, and recorded in
BOOK 2951 PAGE 927 Register

J B Brown & Sons

to

Maine Medical Center

Q C

2081

722

Know all Men by these Presents,

That J. B. BROWN & SONS, a corporation organized and existing under the laws of the State of Maine, and located at Portland in the County of Cumberland and State of Maine

In consideration of one dollar and other valuable considerations, being less than $100.00 paid by MAINE MEDICAL CENTER, a corporation organized and existing under the laws of the State of Maine, and located at said Portland,

the receipt whereof it does hereby acknowledge, does hereby remise, release, bargain, sell and convey, and forever quit-claim unto the said MAINE MEDICAL CENTER, its successors and assigns forever,

All its right, title and interest in a strip of land, in the City of Portland, County of Cumberland and State of Maine, said strip being that portion of Charles Street lying between Brackett Street and Ellsworth Street bounded as follows: Beginning at a point on the southeasterly line of Ellsworth Street distant southwesterly One Hundred Sixty-three and seven tenths (163.7) feet from a point in said street line Fifty-seven (57) feet at right angles from a stone monument on three feet offset at the northwest corner of Ellsworth and Wescott Streets; thence running southeasterly making an included angle with the northwesterly direction of Ellsworth Street of One Hundred and One degrees and Twenty minutes (101° 20') a distance of One Hundred and Sixteen (116) feet, more or less, to the northerly line of Brackett Street near Arsenal Street. Said strip is Thirteen (13) feet wide and lies on the southerly side of the above described line.

To Have and to Hold the same, together with all the privileges and appurtenances thereunto belonging, to the said MAINE MEDICAL CENTER, its successors and assigns forever.

In Witness Whereof, the said J. B. BROWN & SONS has caused this instrument to be sealed with its corporate seal and signed in its corporate name by , its thereunto duly authorized, this 4th day of May in the year of our Lord one thousand nine hundred and sixty-six.

Signed, Sealed and Delivered in presence of

J. B. BROWN & SONS

By Lyman A. Cousens Jr. Treas.
Philip G. Clifford Director

(Corporate Seal)

May 4 1966

State of Maine, Cumberland ss. 1966.

Personally appeared the above named Lyman A. Cousens Jr. & Philip G. Clifford

of said Grantor Corporation, as aforesaid, and acknowledged the foregoing instrument to be his free act and deed, in his said capacity, and the free act and deed of said corporation.

Before me, Notary Public
Justice of the Peace

STATE OF MAINE, CUMBERLAND COUNTY, SS. REGISTRY OF DEEDS

Received MAY 4 1966 at 3 o'clock 17 m. P. M., and recorded in BOOK 2955 PAGE 722 Attest: Register.

Know all Men by these Presents, That

We, FRANK S. NEUTS and DELLA J. NEUTS, both of Portland, in the County of Cumberland and State of Maine

in consideration of one dollar and other valuable consideration s paid by JOHN P. CONSTANTINE and CHARLENE M. CONSTANTINE, both of said Portland

the receipt whereof we do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said

JOHN P. CONSTANTINE and CHARLENE M. CONSTANTINE, as joint tenants and not as tenants in common, their heirs and assigns forever.

A certain lot or parcel of land, with the buildings thereon, situated on Charles Street, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning on the westerly side of Charles Street at the northerly corner of land formerly owned by C. B. Saunders; thence westerly by said Saunders northerly line seventy-five (75) feet, more or less, to land of the Maine General Hospital; thence northerly by line of said Hospital land thirty-six (36) feet to a point; thence easterly on a line parallel with Saunders northerly line seventy-five (75) feet, more or less, to the westerly side line of Charles Street; thence southerly by said Charles Street thirty-six (36) feet to the point begun at.

Being the same premises conveyed to us by Maine General Hospital by deed dated January 30, 1962 and recorded in Cumberland County Registry of Deeds in Book 2657, Page 19.

This conveyance is made subject, however, to the common passageway established by agreement between Maine General Hospital and Clarence D. Read, et al, dated October 29, 1954 and recorded in said Registry of Deeds in Book 2203, Page 413.

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said JOHN P. CONSTANTINE and CHARLENE M. CONSTANTINE, as joint tenants and not as tenants in common, their

heirs and assigns, to them and their use and behoof forever. And we do covenant with the said Grantees, their heirs and assigns, that we are lawfully seized in fee of the premises; that they are free of all incumbrances, except as aforesaid, that we have good right to sell and convey the same to the said Grantees to hold as aforesaid; and that we and our heirs and assigns shall and will warrant and defend the same to the said Grantees, their heirs and assigns forever, against the lawful claims and demands of all persons, except as aforesaid.

In Witness Whereof, we, the said FRANK S. NEUTS and DELLA J. NEUTS, being husband and wife,

joining in this deed as Grantors, and relinquishing and conveying our respective rights by descent and all other rights in the above described premises, have hereunto set our hands and seals this second day of March in the year of our Lord one thousand nine hundred and sixty-seven.

Signed, Sealed and Delivered in presence of

Frank S. Neuts

Della J. Neuts

State of Maine, Cumberland, ss. March 2, 1967.

Personally appeared the above named Frank S. Neuts and Della J. Neuts and acknowledged the foregoing instrument to be their free act and deed.

Before me, Notary Public, Justice of the Peace.

STATE OF MAINE, CUMBERLAND COUNTY, SS. REGISTRY OF DEEDS

Received MAR 3 1967 at 11 o'clock A m. G. M., and recorded in BOOK 2988 PAGE 139 Attest Leonard R. Thayer Register.

2348

KNOW ALL MEN BY THESE PRESENTS

THAT OLD COLONY TRUST COMPANY a Corporation located in Boston, County of Suffolk and Commonwealth of Massachusetts, sole surviving Trustee under a Trust Agreement created by ALICE A. BURNITT late of Portland and dated March 30, 1961 by virtue of the authority to it given by said Trust Agreement in its capacity of Trustee as aforesaid, and in consideration of One Dollar ($1.00) and other valuable considerations to it paid by MAINE MEDICAL CENTER of Portland, Maine, the receipt whereof is hereby acknowledged, does hereby sell and convey unto the said Maine Medical Center its successors and assigns forever, the following described real estate, which was the property of Alice A. Burnitt late of Portland, situated in said Portland, Maine and bounded as follows:

a certain lot or parcel of land with the buildings thereon, situated in said Portland, bounded and described as follows: Beginning at a point on the easterly side of Western Promenade, which point is eighty-five (85) feet from the intersection of the northeasterly side line of said Promenade with the northwesterly side line of Bramhall Street; thence northerly by the line of said Promenade seventy-seven and five tenths (77.5) feet, more or less, to Arsenal Street; thence northeasterly by said Arsenal Street seventy-four and one tenths (74.1) feet, more or less, to land now or formerly of William J. Miller et al; thence southeasterly at right angles to Arsenal Street by said Miller land fifty-five and five tenths (55.5) feet, more or less, to land formerly of Hiram Knowlton; thence southwesterly parallel with said Arsenal Street one hundred and twenty-seven (127) feet, more or less, to the Western Promenade and point of beginning, containing fifty-six hundred (5600) square feet more or less.

Also another parcel of land adjoining the above described lot, and bounded and described as follows: Commencing at a point on the northwesterly side of Bramhall Street, which point is the northeasterly corner of land of Frederick C. Hussey et al, and ninety-eight and two tenths (98.2) feet, more or less, from the intersection of said northwesterly side line of Bramhall Street with the easterly side line of the Western Promenade; thence northeasterly on said Bramhall Street thirty-three and five tenths (33.5) feet to a point and land formerly of Hiram Knowlton, and from these two points extending northwesterly keeping a width of thirty-three and five

tenths (33.5) feet a distance of sixty (60) feet to the first parcel herein conveyed, containing two thousand and ten (2010) square feet.

Meaning and intending to convey and hereby conveying the real estate acquired by Alice A. Burkitt by Warranty Deed of Good Will Home Association dated December 11, 1930 recorded in the Cumberland County Registry of Deeds Book 1361, page 373; said real estate having been devised to the Grantor as Trustee by the Will of Alice A. Burkitt duly probated in the Cumberland County Probate Court.

TO HAVE AND TO HOLD the above-granted premises unto the said Maine Medical Center its successors and assigns forever. And the said Old Colony Trust Company in its said capacity does hereby covenant to and with the said Maine Medical Center its successors and assigns that it is the sole surviving Trustee under said Trust Agreement; that it has power under said Trust Agreement to sell as aforesaid; and that in making this conveyance it has in all respects acted in pursuance of the authority granted in and by said Trust Agreement.

IN WITNESS WHEREOF, the said Old Colony Trust Company in its said capacity as Trustee as aforesaid has caused this instrument to be signed in its corporate name and sealed with its corporate seal by S. Vincent its Trust Officer Vice President thereunto duly authorized this 4th day of February 1969.

Witness:

OLD COLONY TRUST COMPANY

By S. Vincent
Its Trust Officer
Vice President

COMMONWEALTH OF MASSACHUSETTS
SUFFOLK, SS.

February 4, 1969.

Then personally appeared the above-named S. Vincent who made oath that the foregoing instrument was his free act and deed and the free act and deed of the Grantor corporation in its said capacity as Trustee as aforesaid.

Before me,

Mary F. Archoska
Notary Public

Mary F. Archoska
NOTARY PUBLIC
My commission expires May 28, 1971

CERTIFICATE OF TRUSTEE

I, JAMES R. KINGSBURY of Newton, Massachusetts, Trust Officer of Old Colony Trust Company of Boston, Massachusetts, hereby certify that Old Colony Trust Company became a Co-Trustee of a certain Revocable Inter Vivos Trust created by ALICE A. BURKITT with said Old Colony Trust Company and NORMAN A. BURKITT as Co-Trustees under a Trust Agreement dated March 30, 1961;

That Norman A. Burkitt is deceased and the Old Colony Trust Company is now acting as sole surviving Trustee;

That said Trust is no longer revocable inasmuch as the Settler who reserved the power of revocation has since died;

That among the powers given to the Trustees is the following:

> "The Trustees, in addition to and not in limitation of all common law and statutory authority, shall have power, as to any real or personal property in the trust fund or any part thereof, to mortgage, to lease with or without option to purchase and although for a term extending beyond the termination of the trust, to sell in whole or in part at public or at private sale without approval of any court and without liability upon any person dealing with the Trustees to see to the application of any money or other property delivered to them; . . ."

Dated at Boston, Massachusetts, this 4TH day of February 1969.

James R. Kingsbury

COMMONWEALTH OF MASSACHUSETTS
SUFFOLK, SS.

February 4, 1969.

Personally appeared the above named James R. Kingsbury and made oath to the truth of the foregoing certificate by him subscribed.

Before me,

Mary F. Archoska
Notary Public

Mary F. Archoska
NOTARY PUBLIC
My commission expires May 28, 1971

FEB 17 1968
REGISTRY OF DEEDS, MIDDLESEX SOUTH, MASS.
Received at 11:35 A.M. and recorded in
BOOK 7673 PAGE 269 Samuel W. Flynn Registrar

No. 184

Know All Men by these Presents,

That I, CLARA G. READ, of Portland, in the County of Cumberland and State of Maine,

in consideration of one dollar and other valuable considerations

paid by MAINE MEDICAL CENTER, a Maine corporation having a place of business in said Portland, in said County and State,

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey, unto the said Maine Medical Center,

its Successors Heirs and Assigns forever,

the following described property:

A certain lot or parcel of land, with the buildings thereon, situated on the southwesterly side of Charles Street in said Portland, bounded and described as follows:

Beginning on said southwesterly side of Charles Street at a point thirty (30) feet northwesterly by said Street from the northeasterly corner of land formerly of Charles A. Donnell; thence northwesterly by said Street thirty (30) feet; thence southwesterly parallel with the line of said Donnell land seventy-four and two-tenths (74.2) feet to land formerly known as the Arsenal property; thence southeasterly by said Arsenal lot thirty (30) feet; thence northeasterly parallel with said Donnell land seventy-four and two-tenths (74.2) feet to the point of beginning.

Being the same premises conveyed to this Grantor and Clarence D. Read, as joint tenants, by Grace R. Loomis by deed dated September 1, 1948 and recorded in Cumberland County Registry of Deeds in Book 1926, Page 336. The said Clarence D. Read having deceased and his estate is of record in the Registry of Probate for Cumberland County, Maine.

The Grantor herein shall have the right to occupy the premises hereby conveyed until September 15, 1969.

STATE OF MAINE
REAL ESTATE TRANSFER TAX
***
JUL 23'69
Bureau of Taxation
$13.75

To have and to hold the aforegranted and bargained premises, with all privileges and appurtenances thereof to the said Maine Medical Center, its Successors

~~Heirs~~ and Assigns, to them and their use and behoof forever.

And I do **covenant** with the said Grantee, its/ ~~Heirs~~ Successors and Assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances;

that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my Heirs, shall and will Warrant and Defend the same to the said Grantee, its Successors

~~Heirs~~ and Assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said Clara G. Read, being a widow,

~~and~~ ~~wife of~~

~~[illegible]~~

~~[illegible]~~ have hereunto set my hand and seal this 22nd day of July in the year of our Lord one thousand nine hundred and sixty-nine.

Signed, Sealed and Delivered
in presence of

John W. Sawyer — Clara G. Read

State of Maine,
CUMBERLAND } ss. July 22, 1969.

Personally appeared the above named

CLARA G. READ

and acknowledged the above instrument to be her free act and deed.

Before me, John W. Sawyer
Justice of the Peace

JUL 23 1969
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 10 h. 58 m., and recorded in
BOOK 3095 PAGE 34 Leonard R. Flynn Register

211

47733 No. 144

Know All Men by these Presents.

That We, WILLIAM C. GOKEY and SUZANNE E. GOKEY, both of Portland in the County of Cumberland and State of Maine

in consideration of One Dollar ($1.00) and other valuable considerations

paid by MAINE MEDICAL CENTER, a corporation organized and existing under the laws of Maine and located at Portland, County of Cumberland and State of Maine

the receipt whereof we do hereby acknowledge, do hereby give, grant, bargain, sell and convey, unto the said Maine Medical Center,

its successors Heirs and Assigns forever,

the following described property:

A certain lot or parcel of land with the buildings thereon situated on the southeasterly side of Ellsworth Street in said Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at the northeasterly corner of a lot of land on Bramhall's Hill which John B. Brown sold to one Tuttle; thence northeasterly on said Ellsworth Street forty (40) feet; thence southeasterly about seventy-four (74) feet to land formerly of Davis; thence southwesterly by said Davis's land to land formerly of said Tuttle forty (40) feet; thence northwesterly to said Ellsworth Street, the bounds begun at, seventy-four (74) feet.

Being the same premises conveyed to William C. Gokey and Suzanne E. Gokey by Thelma A. Barter, by deed dated June 19, 1968, recorded in Cumberland County Registry of Deeds in Book 3045, Page 187.

This conveyance is made subject to taxes for the year 1969 which the Grantee assumes and agrees to pay.

D 2013

STATE OF MAINE
REAL ESTATE TRANSFER TAX
DEC 18 1969

To have and to hold the aforegranted and bargained premises, with all privileges and appurtenances thereof to the said Maine Medical Center, its successors

~~Heirs~~ and Assigns, to its and their use and behoof forever.

And we do ~~.~~ covenant with the said Grantee, its successors ~~Heirs~~ and Assigns, that we are lawfully seized in fee of the premises; that they are free of all incumbrances; that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our Heirs, shall and will Warrant and Defend the same to the said Grantee, its successors ~~Heirs~~ and Assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, we the said William C. Gokey and Suzanne E. Gokey, being husband and wife

~~wife of the said~~

~~joining herein and hereby releasing and conveying all~~ ~~rights by descent and all other rights in the above~~ ~~described premises~~, have hereunto set our hands and seals this 11th day of August in the year of our Lord one thousand nine hundred and sixty-nine.

Signed, Sealed and Delivered
in presence of

Edward F. Sass

William C. Gokey

Suzanne E. Gokey

State of Maine,
Cumberland } ss. August 11, 1969

Personally appeared the above named

William C. Gokey

and acknowledged the above instrument to be his free act and deed.

Before me,

Edward F. Sass
Justice of the Peace

AUG 11 1969
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 2 H 24 M, and recorded in
BOOK 3497 PAGE 244 Edward R. Welch Register

(106)

396

Know all Men by these Presents,

That JOHN P. CONSTANTINE and CHARLENE M. CONSTANTINE, both of Portland in the County of Cumberland and State of Maine

in consideration of One Dollar ($1.00) and other valuable considerations

paid by MAINE MEDICAL CENTER, a corporation organized and existing under the laws of Maine, and located at Portland, County of Cumberland and State of Maine

the receipt whereof we do hereby acknowledge, do hereby give, grant, bargain, sell and convey, unto the said Maine Medical Center, its successors ~~heirs~~ and assigns forever,

a certain lot or parcel of land, with the buildings thereon, situated on Charles Street, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning on the westerly side of Charles Street at the northerly corner of land formerly owned by C. B. Saunders; thence westerly by said Saunders northerly line seventy-five (75) feet, more or less, to land of the Maine General Hospital; thence northerly by line of said Hospital land thirty-six (36) feet to a point; thence easterly on a line parallel with Saunders northerly line seventy-five (75) feet, more or less, to the westerly side line of Charles Street; thence southerly by said Charles Street thirty-six (36) feet to the point begun at.

Being the same premises conveyed to us by Frank S. Keuts, by deed dated March 2, 1967, recorded in Cumberland County Registry of Deeds in Book 2988, Page 139.

This conveyance is made subject, however, to the common passageway established by agreement between Maine General Hospital and Clarence D. Read et al, dated October 29, 1954, recorded in said Registry of Deeds in Book 2203, Page 413.

STATE OF MAINE
REAL ESTATE TRANSFER TAX
Bureau of Taxation
$ 1.00

To have and to hold the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said Maine Medical Center, its successors and assigns, to its and their use and behoof forever.

And we do COVENANT with the said Grantee, its successors and assigns, that we are lawfully seized in fee of the premises that they are free of all encumbrances except as aforesaid; that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our heirs shall and will WARRANT and DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons, except as aforesaid.

In Witness Whereof, we the said John P. Constantine and Charlene M. Constantine, being husband and wife, and were covenants

promises have hereunto set our hands and seals this 7th day of November in the year of our Lord one thousand nine hundred and sixty-nine.

Signed, Sealed and Delivered in presence of

Edward J. Lynn

John P. Constantine

Charlene M. Constantine

State of Maine, Cumberland ss. 1969.

Personally appeared the above named John P. Constantine and acknowledged the above instrument to be his free act and deed.

Before me, Edward J. Lynn
Justice of the Peace.

NOV 7 1969

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 11 H 10 M. and recorded in
BOOK 3108 PAGE 396
Register Notary Public

No. 108

11804

Know All Men by these Presents,

That I, AGNES E. TWEEDIE, formerly AGNES E. BROWN, of Portland, County of Cumberland and State of Maine

in consideration of One Dollar ($1.00) and other valuable consideration

paid by MAINE MEDICAL CENTER, a corporation organized and existing under the laws of the State of Maine and having its principal place of business at Portland, County of Cumberland and State of Maine

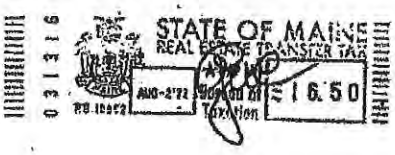
the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey, unto the said MAINE MEDICAL CENTER,

its successors and Assigns forever,

the following described property: A certain lot or parcel of land, with the buildings thereon, situated in the City of Portland, County of Cumberland and State of Maine, on the corner of Brackett and Russell Streets and bounded as follows: Southwesterly by said Brackett Street; northwesterly by said Russell Street; northeasterly by land formerly of J. K. Emery and southeasterly by land now or formerly of Annie F. Chapman; containing about twenty-one hundred and fifty-one (2151) square feet.

Being the same premises conveyed to the Grantor herein and her late husband, Kenneth C. Brown, by deed dated January 22, 1962 and recorded in the Cumberland County Registry of Deeds, Book 2655, Page 344.

This conveyance is made subject to taxes for 1971 which the Grantee assumes and agrees to pay.



To have and to hold the aforegranted and bargained premises, with all privileges and appurtenances thereof to the said

MAINE MEDICAL CENTER, its successors

Heirs and Assigns, to its and their use and behoof forever.

And I do covenant with the said Grantee, its successors Heirs and Assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; except as aforesaid that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my Heirs, shall and will Warrant and Defend the same to the said Grantee, its successors Heirs and Assigns forever, against the lawful claims and demands of all persons, except as aforesaid

In Witness Whereof, I the said

AGNES E. TWEEDIE, being a widow

and

[illegible] have hereunto set my hand and seal this day of in the year of our Lord one thousand nine hundred and seventy-one.

Signed, Sealed and Delivered in presence of

[signature] [signature] [redacted]

State of Maine,
Cumberland } ss. July 30 1971

Personally appeared the above named AGNES E. TWEEDIE

and acknowledged the above instrument to be her free act and deed.

Before me,

[signature]
Justice of the Peace

[illegible]

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE AUG 2, 1971
Received at 2 55 P.M., and recorded in
BOOK 3183 PAGE 576 [signature] Register

234 16574 Book 3187 Page 234

Know all Men by these Presents, That

I, MARGUERITE M. BROOKS of Portland, County of Cumberland and State of Maine

in consideration of one dollar and other valuable consideration paid by MAINE MEDICAL CENTER, a corporation organized under the laws of the State of Maine with a place of business at Portland, County of Cumberland and State of Maine, the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said MAINE MEDICAL CENTER, its successors and assigns forever.

A certain lot or parcel of land with the buildings thereon, situated on the southeasterly side of Ellsworth Street, in the City of Portland, County of Cumberland and State of Maine, and at present numbered forty-four (44) on said street; said lot of land being bounded and described as follows:

Beginning at the northeasterly corner of Ellsworth Street and a lane running from said Ellsworth Street to the junction of Brackett and Arsenal Streets; thence northeasterly by said Ellsworth Street, twenty-six (26) feet, more or less, to land now or formerly of Neal P. Thompson; thence southeasterly by said Thompson land, seventy-four (74) feet, more or less, to land now or formerly owned by John Russell; thence southwesterly by said Russell land, forty (40) feet, more or less, to said lane; thence northwesterly by said lane, seventy-five (75) feet, more or less, to the point begun at.

Being the same premises conveyed to me by Walter E. Mangum et al by deed dated October 15, 1957 and recorded in Cumberland County Registry of Deeds in Book 2379, Page 181.

This conveyance is made subject to taxes for 1971 which the Grantee assumes and agrees to pay.

STATE OF MAINE
REAL ESTATE TRANSFER TAX
Bureau of Taxation
$ 3.80

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said MAINE MEDICAL CENTER, its successors and assigns, to their use and behoof forever. And I do covenant with the said Grantee, its successors and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances except as aforesaid, that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs and assigns shall and will warrant and defend the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons, except as aforesaid.

In Witness Whereof, I, the said MARGUERITE M. BROOKS, being single,

~~joining herein as Grantor, and releasing and conveying all by deed and other rights in the above described premises~~, have hereunto set my hand and seal this 23rd day of August in the year of our Lord one thousand nine hundred and seventy-one.

Signed, Sealed and Delivered in presence of

Marguerite M. Brooks

State of Maine, Cumberland ss. August 23, 1971.

Personally appeared the above named MARGUERITE M. BROOKS

and acknowledged the foregoing instrument to be her free act and deed.

Before me, ~~Notary Public~~ Justice of the Peace.

STATE OF MAINE, CUMBERLAND COUNTY, SS. REGISTRY OF DEEDS

Received AUG 23 1971 at 4:40 p.m. & recorded in BOOK 3187 PAGE 234 Attest: Register.

Know all Men by these Presents, That

PORTLAND WATER DISTRICT, a quasi-municipal corporation organized and existing under the laws of the State of Maine and located at Portland in the County of Cumberland and State of Maine
in consideration of one dollar and other valuable considerations
paid by MAINE MEDICAL CENTER, a corporation organized and existing under the laws of the State of Maine and located at said Portland in said County and State

the receipt whereof it does hereby acknowledge, do es hereby remise, release, bargain, sell and convey, and forever quit-claim unto the said MAINE MEDICAL CENTER, its successors and assigns forever,

A certain lot or parcel of land situated in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at the intersection of the westerly side line of Vaughan Street with the southwesterly side line of Brackett Street; thence northwesterly by Brackett Street, two hundred forty-two and seventy-two hundredths (242.72) feet, more or less, to Bramhall Street; thence southwesterly by Bramhall Street, eighty-one and five hundredths (81.05) feet, more or less, to Chadwick Street; thence southerly by Chadwick Street, three hundred fifty-seven and forty-five hundredths (357.45) feet, more or less, to land of Chadwick Realty Corp.; thence by land of said Chadwick Realty Corp. and land of Maine General Hospital, two hundred eighty-eight and sixty-five hundredths (288.65) feet, more or less, to Vaughan Street; thence northerly by Vaughan Street, three hundred fifty-three and sixty-two hundredths (353.62) feet, more or less, to Brackett Street and the point of beginning. Containing 2.52 acres, more or less, and being known as the Bramhall Reservoir Lot.

A portion of the above-described premises, known as the J. & W. Warren Lot, was conveyed to the Portland Water Company by the following warranty deeds all dated May 1, 1869: deed of George Warren et al of a 1/3rd interest, recorded in Cumberland County Registry of Deeds, Book 368, Page 421; deed of John G. Warren of a 1/3rd interest, recorded in said Registry of Deeds, Book 368, Page 424; deed of Caroline Chadbourne et al of a 1/9th interest, recorded in said Registry of Deeds, Book 368, Page 423; and deed of Benjamin F. Chadbourne et al of a 2/9ths interest, recorded in said Registry of Deeds, Book 368, Page 425; and the remaining portion of said premises, known as the Payson Lot, was conveyed to said Portland Water Company by Henry M. Payson by warranty deed dated July 17, 1885, and recorded in said Registry of Deeds, Book 531, Page 32; all of said premises having been conveyed to said Portland Water District by Portland Water Company by quit-claim deed dated August 10, 1908, and recorded in said Registry of Deeds, Book 827, Page 147.

To Have and to Hold the same, together with all the privileges and appurtenances thereunto belonging, to the said

MAINE MEDICAL CENTER, its successors

~~heirs~~ and assigns forever. And it does covenant with the said Grantee, its successors ~~heirs and~~ assigns, that it will warrant and forever defend the premises to the said Grantee, its successors ~~heirs and~~ assigns forever, against the lawful claims and demands of all persons claiming by, through, or under it.

In Witness Whereof, the said PORTLAND WATER DISTRICT has caused this instrument to be sealed with its corporate seal and signed in its corporate name by William D. Monie, its Treasurer, thereunto duly authorized,

~~XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX~~ this first day of September in the year of our Lord one thousand nine hundred and seventy-one.

Signed, Sealed and Delivered in presence of

Robert B. Williamson (signature)

PORTLAND WATER DISTRICT

By William D. Monie (signature)
Its Treasurer

State of Maine, Cumberland ss. September 1, 1971.

Personally appeared the above named William D. Monie, Treasurer of said Grantor Corporation, as aforesaid

and acknowledged the foregoing instrument to be his free act and deed, in his said capacity, and the free act and deed of said corporation.

Before me, Robert B. Williamson (signature) ~~Notary Public.~~ Justice of the Peace.

STATE OF MAINE, CUMBERLAND COUNTY, SS. *REGISTRY OF DEEDS*

Received SEP 1 1971 at 12 o'clock 06 m. P M., and recorded in BOOK 3188 PAGE 710 Attest: Margaret [illegible] Register.

17050

Know All Men by These Presents,

That the CITY OF PORTLAND, a body politic and corporate,

~~[illegible]~~ located at Portland

in the County of Cumberland and State of Maine

in consideration of Thirteen Thousand Five Hundred ($13,500.00) Dollars

paid by the MAINE MEDICAL CENTER, a corporation organized and existing under the laws of the State of Maine and located at Portland in the County of Cumberland and State of Maine, whose address is 22 Bramhall Street, Portland, Maine

the receipt whereof it does hereby acknowledge, does hereby remise, release, bargain, sell and convey and Forever Quit-Claim unto the said

Maine Medical Center, its successors

and assigns forever,

a certain lot or parcel of land in the City of Portland, County of Cumberland and State of Maine, being bounded and described as follows:

Beginning at a point marking the intersection of the westerly terminus of the northerly side line of Bramhall Street and the Northerly terminus of the easterly side line of Western Promenade; thence on a course of South 61° 00' 30" West along a prolongation of the northerly side line of said Bramhall Street, a distance of eighty-six and eight hundredths (86.08) feet to a point; thence North 50° 49' 20" West, a distance of one hundred fifty-one and thirty-nine hundredths (151.39) feet to a point which point is on the southeasterly side line of Arsenal Street as it was formerly laid out; thence North 62° 24' 00" East fifty (50) feet to a point; thence North 27° 36' 00" West, a distance of forty (40) feet to a point on the northwesterly side line of Arsenal Street, as it was formerly laid out; thence North 62° 24' 00" East, a distance of two hundred seventy-two (272) feet, more or less, to a point which point is two hundred forty-eight (248) feet from the starting point hereof when measured on a course of North 16° 58' 00" East from said starting point; thence South 16° 58' 00" West, a distance of two hundred forty-eight (248) feet to said starting point.

Being a portion of the premises conveyed to the Grantor by deed of Sarah Little dated July 11, 1856, recorded in Cumberland County Registry of Deeds in Book 274, Page 6.

By acceptance of this deed, the Grantee covenants and agrees for itself, its successors and assigns:

(1) That the Grantee shall secure Planning Board review and approval of the site plan for its proposed development prior to beginning construction of any building and landscaping of the land herein conveyed.

(2) That the Grantee shall submit to the Planning Board for review and approval a grading plan within three months from the date hereof; that it will initiate actual grading work within six months from the date hereof; and that it will complete such grading work within three months from the date of completion of the proposed building.

(3) That the Grantee shall provide and forever maintain access for fire equipment satisfactory to the Fire Chief of the City of Portland to the proposed building and the remainder of the Medical Center Building Complex.

(4) That in the event of failure of the Grantee to complete or substantially complete the construction of the proposed building, landscaping, and grading in accordance with the approved site plan within three (3) years from the date hereof, the Grantee shall be required at the election of the Grantor, to reconvey to the Grantor all or such portion of the premises herein conveyed as the Grantor shall require for an amount which bears the same per square foot price as was paid for the premises herein conveyed.

(5) That if within a period of eight (8) years from the date hereof, the Grantee shall decide to sell any portion of the premises herein conveyed without selling all of its premises, it shall notify the Grantor in writing by registered mail directed to the City Manager of the City of Portland of its desire to sell such portion and thereupon the Grantor shall have the exclusive option for a period of sixty (60) days from the receipt of such notice to buy such portion for an amount which bears the same per square foot price as was paid for the premises herein conveyed.

(6) That the Grantee shall simultaneously with delivery of this deed to it, deliver to the Grantor at no cost to it a deed covering a parcel of land located at the intersection of the easterly side line of Gilman Street and the northwesterly side line of Arsenal Street for the purpose of providing a turn-around area serving Gilman Street.

(7) That the Grantee shall construct or cause to be constructed at no cost to the Grantor said turn-around area in accordance with specifications to be approved by the Director of Public Works of the City of Portland.

To have and to hold the same, together with all the privileges and appurtenances thereunto belonging, to it the said Maine Medical Center

its successors and Assigns forever.

And the said Grantor Corporation does covenant with the said Maine Medical Center, its successors and Assigns, that it will Warrant and Forever Defend the premises to it the said Grantee, its successors and Assigns forever, against the lawful claims and demands of all persons claiming by, through, or under it.

In Witness Whereof, the said CITY OF PORTLAND has caused this instrument to be sealed with its corporate seal and signed in its corporate name by JOHN G. DePALMA, its Director of Finance thereunto duly authorized, this 4th day of August in the year one thousand nine hundred and seventy-two.

Signed, Sealed and Delivered in presence of

Patricia E. Mealy

CITY OF PORTLAND

By John G. DePalma
Director of Finance

[CORPORATE SEAL]

State of Maine, CUMBERLAND ss. August 4 1972.

Personally appeared the above named JOHN G. DePALMA, Director of Finance of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me,

Patricia E. Mealy
Notary Public

[NOTARY PUBLIC MAINE]

Justice of the Peace

AUG 4 1972

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 3 H 05 M., and recorded in
BOOK 3278 PAGE 209 Ruth Murphy Register

23119

115

KNOW ALL MEN BY THESE PRESENTS that STATE OF MAINE, a body corporate and politic existing by law, in consideration of One Dollar ($1.00) and other valuable considerations paid by MAINE MEDICAL CENTER, a corporation organized and existing under the laws of the State of Maine with its principal place of business in the City of Portland, County of Cumberland and State of Maine, the receipt whereof it does hereby acknowledge, does hereby RELEASE, GRANT and TRANSFER unto the said MAINE MEDICAL CENTER, its successors and assigns, all and any rights and interests in the former site of the State Arsenal situated on Bramhalls Hill, so-called, in the City of Portland, County of Cumberland and State of Maine, being all and the same premises described by Chapter 180 of the Resolves of the State of Maine, 1870, and Chapter 107 of the Resolves of the State of Maine, 1951, including any right of entry, reversion or other interest of the State of Maine in said premises reserved in the State of Maine by either of said Resolves and State of Maine does hereby waive as to said Maine Medical Center its successors and assigns any such rights which may now exist or which may in the future exist in State of Maine by virtue of said Resolves.

TO HAVE AND TO HOLD the aforegranted premises, with all privileges and appurtenances thereof to the said MAINE MEDICAL CENTER, its successors and assigns, and State of Maine does hereby covenant with said Maine Medical Center, its successors and assigns that State of Maine lawfully holds rights in said premises by virtue of said Resolves; that said rights are not encumbered; that it has good right to grant the same to Maine Medical Center as aforesaid; and that State of Maine, its successors and assigns, shall and will warrant and defend the same to Maine Medical Center, its successors and assigns forever against the lawful claims and demands of all persons; provided, nevertheless, that any and all liability of State of Maine for any damage or loss to Maine Medical Center, its successors and assigns, by virtue of any breach of the foregoing covenants and warranties shall be and hereby is limited forever to the total amount of One Dollar ($1.00).

IN WITNESS WHEREOF, Kenneth M. Curtis, Governor of the State of Maine, and Edmund C. Darey, Chairman of the Executive Council of the State of Maine, acting for and with the advice and consent of the said Executive Council given this date, have caused this instrument to be executed and sealed on behalf of the State of Maine this 6th day of September, 1972.

Witness:

Peter M. Dawborn

Hiram L. Stewart

STATE OF MAINE

By Kenneth M. Curtis
Its Governor

By Edmund C. Darey
Its Chairman - Executive Council

STATE OF MAINE
KENNEBEC, ss.

September 6, 1972

Personally appeared the above-named Kenneth M. Curtis, Governor of the State of Maine, and Edmund C. Darey, Chairman of the Executive Council of the State of Maine and acknowledged the foregoing to be their free act and deed in said capacity and the free act and deed of said State of Maine.

Before me,

Peter M. Dawborn
Notary Public
Justice of the Peace

Approved as to form:

Leon V. Walkley
Assistant Attorney General

STATE OF MAINE

CUMBERLAND, ss. REGISTRY OF DEEDS

Received at 11 H. 16 M. A M. on OCT 12 1972 and recorded in Book 3310 Page 113 Attest Lotta Murphy Register

116

23120

KNOW ALL MEN BY THESE PRESENTS, that CITY OF PORTLAND, a body corporate and politic existing by law, situated at Portland, County of Cumberland and State of Maine, in consideration of One Dollar ($1.00) and other valuable considerations paid by MAINE MEDICAL CENTER, a corporation organized and existing under the laws of the State of Maine with its principal place of business in the City of Portland, County of Cumberland and State of Maine, the receipt whereof it does hereby acknowledge, does hereby RELEASE, GRANT and TRANSFER unto the said MAINE MEDICAL CENTER, its successors and assigns, all its rights and interests in the land situated on Bramhall's Hill, so-called, in the City of Portland, County of Cumberland and State of Maine which land was conveyed by City of Portland to Maine General Hospital by deed dated June 4, 1870, which deed is duly recorded in the Cumberland County Registry of Deeds, Book 381, Pages 260, 261 and 262, to which deed reference is made for a particular description of said land, including any right of entry, possibility of reverter, reversionary or other interest of the City of Portland in said land reserved to said City in said deed and City of Portland does hereby waive as to said Maine Medical Center, its successors and assigns, said right of entry and any such other rights which may now exist or which may in the future exist in the City of Portland by virtue of said deed.

TO HAVE AND TO HOLD the aforegranted premises, with all privileges and appurtenances thereof to the said MAINE MEDICAL CENTER, its successors and assigns, and City of Portland does hereby covenant with said Maine Medical Center, its successors and assigns that City of Portland lawfully holds rights in said land by virtue of said deed of June 4, 1870; that said rights are not encumbered; that it has good right to grant the same to Maine Medical Center as aforesaid; that City of Portland, its successors and assigns, shall and will warrant and defend the same to Maine Medical Center, its successors and assigns forever against the lawful claims and demands of all persons; provided, nevertheless, that any and all liability of City of Portland for any damage or loss to Maine Medical Center, its successors and assigns, by virtue of any breach of the foregoing covenants and warranties shall be and hereby is limited forever to the total amount of One Dollar ($1.00).

IN WITNESS WHEREOF, City of Portland has caused this deed to be sealed and executed by John G. DePalma, its Director of Finance, hereunto duly authorized, this 14th day of September, 1972.

Witness:

CITY OF PORTLAND

By John G. DePalma
Its Director of Finance

STATE OF MAINE
CUMBERLAND, ss.

September 14, 1972

Personally appeared the above-named John G. DePalma, Director of Finance of said City of Portland and acknowledged the foregoing to be his free act and deed in said capacity and the free act and deed of said City of Portland.

Before me,

Justice of the Peace ~~Notary Public~~

OCT 12 1972
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 11 H/7 M/4M, and recorded in
BOOK 3310 PAGE 116 Register

53

No. 106
6367

Know All Men by these Presents,

That We, LEROY E. APPLEBEE and ROBERTA M. APPLEBEE, both of Portland, in the County of Cumberland and State of Maine,

in consideration of One Dollar ($1) and other valuable considerations,

paid by MAINE MEDICAL CENTER, a Maine corporation with a place of business in Portland, in the County of Cumberland and State of Maine,

the receipt whereof we do hereby acknowledge, do hereby give, grant, bargain, sell and convey, unto the said MAINE MEDICAL CENTER, its successors and Assigns forever,

~~the following described property:~~

See attached Exhibit A.

54

To have and to hold the aforegranted and bargained premises, with all privileges and appurtenances thereof to the said MAINE MEDICAL CENTER, its successors

~~Heirs~~ and Assigns, to it and their use and behoof forever.

And we do **covenant** with the said Grantee, its ~~Heirs~~ Successors and Assigns, that we are lawfully seized in fee of the premises; that they are free of all incumbrances;

that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our Heirs, shall and will **Warrant and Defend** the same to the said Grantee, its successors ~~Heirs~~ and Assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, We, the said LEROY E. APPLEBEE

and ROBERTA M. APPLEBEE, ~~wife~~ husband and wife,

joining in this deed as Grantors, and relinquishing and conveying our/ mutual rights by descent and all other rights in the above described premises, have hereunto set our hands and seals this 7th day of April in the year of our Lord one thousand nine hundred and seventy-seven.

Signed, Sealed and Delivered in presence of

LEROY E. APPLEBEE

ROBERTA M. APPLEBEE

State of Maine,
Cumberland, ss. April 7 1977

Personally appeared the above named LEORY E. APPLEBEE and ROBERTA M. APPLEBEE and acknowledged the above instrument to be their free act and deed.

Before me,

Justice of the Peace

EXHIBIT A

A certain lot or parcel of land with the buildings thereon, situated on Bramhall Street in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at a stone monument on the westerly corner of Brackett and Bramhall Streets; thence North 57° 20' West, 70.7 feet by the westerly sideline of Brackett Street; thence South 61° 07' West, 42.3 feet by the northerly sideline of a garage on the lot under description; thence South 27° 57' East, 62-1/2' feet to a point on the northerly sideline of Bramhall Street; thence North 61° 51' East, 77.5 feet by the northerly sideline of Bramhall Street to the stone monument aforesaid and point of beginning, together with the right to have the eaves of said garage which project over land of Ella C. Gardner remain as now constructed as long as said garage is maintained in its present position.

Being the same premises conveyed to Leroy E. Applebee and Roberta M. Applebee by Edna M. Sharp by deed dated September 27, 1972, and recorded in Cumberland County Registry of Deeds in Book 3303, Page 200.

APR 7 1977
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 10 H 32 M A.M., and recorded in
BOOK 3995 PAGE 53. Margaret L. Fisher Register

WARRANTY DEED

319

Know all Men by these Presents,

That JAMES H. SULLIVAN, Jr. of 26 Charles Street, Portland in the County of Cumberland and State of Maine

in consideration of One Dollar ($1.00) and other valuable considerations

paid by MAINE MEDICAL CENTER, a Maine corporation with a place of business in Portland, in the County of Cumberland and State of Maine whose mailing address is 22 Bramhall Street, Portland, Maine

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Maine Medical Center, its successors

heirs and assigns forever,

A certain lot or parcel of land, with the buildings thereon, situated on the southwesterly side of Charles Street and the southeasterly side of Congress Street, in Portland, Maine, bounded and described as follows: Beginning at a point on the southwesterly side of said Charles Street at the northerly corner of land conveyed by Edward E. Proctor to Lulu M. Stickney by warranty deed dated May 16, 1890 and recorded in the Cumberland County Registry of Deeds in Book 567, Page 348; thence running southwesterly by said Stickney land a distance of seventy-five (75) feet, more or less, to land of the Maine General Hospital; thence running northwesterly by said Hospital land to the southeasterly side of Congress Street; thence running northeasterly by the southeasterly side of Congress Street seventy-five (75) feet, more or less, to land conveyed by Henry A. Sargent to Lucinda B. Proctor by warranty deed dated August 14, 1896, and recorded in said Registry of Deeds in Book 639, Page 284; thence running southeasterly by said Proctor land and by the southwesterly side line of said Charles Street to said Stickney land and the point of beginning.

Being the same premises conveyed to James H. Sullivan, Jr. by deed dated August 23, 1976 and recorded in said Registry of Deeds in Book 3936, Page 282.

320

To have and to hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Maine Medical Center, its successors

heirs and assigns, to it and its use and behoof forever.

And I do covenant with the said Grantee, its/successors heirs and assigns, that I am lawfully seized in fee of the premises, that they are free of all encumbrances

that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs shall and will warrant and defend the same to the said Grantee, its/successors heirs and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said James H. Sullivan, Jr. being unmarried

~~husband/wife~~ joining herein and releasing and conveying all rights by descent and all other rights in the above described premises, have hereunto set my hand and seal this 25th day of the month of May, A.D. 19 83.

Signed, Sealed and Delivered in presence of

James H. Sullivan, Jr.

State of Maine, County of Cumberland ss. 25 May, 19 83.

Then personally appeared the above named James H. Sullivan, Jr.

and acknowledged the foregoing instrument to be his free act and deed.

Before me,

My commission expires Sept. 20, 1988

Notary Public
Justice of the Peace
Attorney at Law

MAY 26 1983

REGISTRY OF DEEDS CUMBERLAND COUNTY, MAINE
Received at 2:01 P.M. and recorded in
BOOK 6177 PAGE 319 James J. Walsh Register

024397 BK0309PG0005

Book 8309
Page 5

QUITCLAIM DEED
With Covenant

Know all Men by these Presents,

That we, JOHN J. HAMMETT and ELIZABETH B. HAMMETT, both of Portland, County of Cumberland, Maine

in consideration of One Dollar ($1.00) and other valuable consideration

paid by MMC REALTY CORP., a Maine corporation with a place of business at 22 Bramhall Street, in the County of Cumberland, Maine

whose mailing address is 22 Bramhall Street, Portland, Maine 04102

the receipt whereof we do hereby acknowledge, do hereby remise, release, bargain, sell and convey, and forever quitclaim unto the said MMC Realty Corp., its

successors and assigns forever,

A certain lot or parcel of land, with the buildings thereon, situated on the northwesterly corner of Bramhall and Brackett Streets, in said Portland, and bounded and described as follows:

Beginning at the northwesterly corner of Brackett and Bramhall Streets; thence westerly on Brackett Street seventy-five (75) feet ten (10) inches, more or less, to land conveyed by William H. Chapman to Charles E. Graham by deed of April 29, 1920 and recorded in the Cumberland County Registry of Deeds in Book 1050, Page 213; thence northerly by land now or formerly of said Graham sixty-one (61) feet six (6) inches, more or less, to land conveyed by Alden J. Blethen to James K. Emery by deed dated April 30, 1880 and recorded in said Registry of Deeds in Book 467, Page 152; thence easterly by land now or formerly of said Emery sixty-six (66) feet six (6) inches to Bramhall Street; thence southerly by said Bramhall Street thirty (30) feet three (3) inches, more or less, to the point of beginning.

Being the same premises conveyed to the Grantors herein by Sumner J. Goffin by deed dated February 4, 1950 and recorded in said Registry of Deeds in Book 1985, Page 483.

MAINE REAL ESTATE TRANSFER TAX PAID

BK03099PG0006

To have and to hold the same, together with all the privileges and appurtenances thereunto belonging, to the said MMC Realty Corp., its successors

heirs and assigns forever.

And we do covenant with the said Grantee, its successors and assigns, that we shall and will warrant and defend the premises to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons claiming by, through, or under us.

In Witness Whereof, we, the said John J. Hammett and Elizabeth B. Hammett

husband/wife of the said

~~husband/wife of the said~~

~~[illegible]~~ have hereunto set our hand s and seal s this 31st day of the month of May, A.D. 19 98.

Signed, Sealed and Delivered
in presence of

[redacted]

John J. Hammett

Elizabeth B. Hammett, By John J. Hammett as her Attorney in Fact pursuant to Power of Attorney dated August 16, 1994 and recorded herewith in the Cumberland County Registry of Deeds

State of Maine, County of Cumberland ss. May 31, 1998.

Then personally appeared the above named John J. Hammett

and acknowledged the foregoing instrument to be his free act and deed.

Before me,

[redacted]

Notary Public
Attorney at Law

Printed Name [redacted]

RECEIVED
RECORDED REGISTRY OF DEEDS
1998 JUN -1 AM 8:31
CUMBERLAND COUNTY
James S. Walker

BK8855PG0081

036413 WARRANTY DEED

MAINE REAL ESTATE TAX PAID

KNOW ALL MEN BY THESE PRESENTS, that GILMAN STREET LAND COMPANY, a Maine corporation, and GILMAN STREET ASSOCIATES, a Maine limited partnership, for consideration paid, grant to MMC REALTY CORP., a Maine Corporation with a principal place of business in Portland, County of Cumberland, State of Maine, whose mailing address is 22 Bramhall Street, Portland, Maine 04103, with WARRANTY COVENANTS a certain lot or parcel of land, with the improvements thereon, located at 52 Gilman Street, in the City of Portland, County of Cumberland, State of Maine, all as more particularly described in Schedule A attached hereto and incorporated herein.

IN WITNESS WHEREOF, the said GILMAN STREET LAND COMPANY has caused this instrument to be sealed with its corporate seal and signed in its corporate names by William H. Webster, its President, hereunto duly authorized, this 4th day of August, 1989, and the said GILMAN STREET ASSOCIATES has caused this instrument to be signed and sealed by William H. Webster, President of its General Partner MORSE, PAYSON & NOYES PROPERTIES, hereunto duly authorized, this 4th day of August, 1989.

WITNESS:

Robert B. Patterson, Jr.

GILMAN STREET LAND COMPANY

By: _____
William H. Webster
Its President

GILMAN STREET ASSOCIATES

By: MORSE, PAYSON & NOYES PROPERTIES,
Its General Partner

Robert B. Patterson, Jr.

By: _____
William H. Webster
Its President

STATE OF MAINE
COUNTY OF CUMBERLAND, ss.

August 4, 1989

Then personally appeared before me the above named William H. Webster, President of Gilman Street Land Company, and President of Morse, Payson & Noyes Properties, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporations and partnership.

Before me,

Robert B. Patterson Jr.
~~Notary Public~~/Attorney at Law

Robert B. Patterson, Jr.
Printed Name

~~My Commission Expires~~ _____

SCHEDULE A TO WARRANTY DEED

PARCEL ONE

A certain lot or parcel of land with the buildings thereon known as 52 Gilman Street, in Portland, County of Cumberland and State of Maine bounded and described as follows:

Beginning at a point on said street distant one hundred six and fifty-five one hundredths (106.55) feet northerly from the intersection of the westerly side of Gilman Street with the northerly side of A Street, and running thence northerly on said Gilman Street, thirty-seven and one half (37-1/2) feet to a point; thence westerly with an included angle of 91° 11' seventy and forty-two one hundredths (70.42) feet to a point; thence southerly and parallel to said Gilman Street, thirty-seven and one half (37-1/2) feet to land formerly of S. H. Jose, now of Gilman Street Land Company; thence easterly with an included angle of 91° 11' seventy and forty-two one hundredths (70.42) feet to the point of beginning.

PARCEL TWO

A certain lot or parcel of land with the buildings thereon, situated in said Portland, bounded and described as follows:

Beginning at a point in the Westerly side line of Gilman Street distant sixty-six (66) feet and one (1) inch South from the Southerly side line of Congress Street; thence running South by the side line of Gilman Street twenty-four (24) feet and eight (8) inches, more or less, to the Northerly line of land formerly of Winfield L. Smith, now of Gilman Street Land Company; thence by said line formerly of Smith and through the center of the partition wall between the house on said former Smith lot and the house on the lot herein described and by said line extended seventy and forty-two hundredths (70.42) feet and to land formerly of the City of Portland; thence North by said City of Portland land twenty-three (23) feet and eight (8) inches, more or less, to land conveyed by William B. Jordan to Willis B. Moulton et als, by deed dated May 14, 1897, and recorded in Cumberland County Registry of Deeds, Book 648, Page 450; thence in an easterly direction by said Moulton land seventy (70) feet and eight (8) inches to said Gilman Street and the point of beginning.

PARCEL THREE

A certain lot or parcel of land with the buildings thereon, situated on the westerly side of Gilman Street in said Portland and bounded as follows:

Beginning at a point on said westerly side of Gilman Street sixty-nine and five hundredths (69.05) feet northerly

from the northwesterly corner of Gilman and A Streets, and running thence northerly on Gilman Street thirty-seven and one-half (37-1/2) feet; thence westerly with an included angle of ninety-one degrees eleven minutes (91° 11') seventy and forty-two hundredths (70.42) feet to a stake; thence southerly with an included angle of eighty degrees forty-nine minutes (80° 49') thirty-seven and one half (37-1/2) feet; thence easterly with an included angle of ninety-one degrees eleven minutes (91° 11') seventy and forty-two hundredths (70.42) feet to the starting point. Being the southerly half of the lot conveyed to Samuel H. Jose by Charles F. Jose by deed dated December 6, 1886, and recorded in Cumberland County Registry of Deeds in Book 530, Page 255, to which reference is made. The premises herein conveyed are designated as No. 50 on said Gilman Street.

PARCEL FOUR

A certain lot or parcel of land with the buildings thereon situated on the westerly side of Gilman Street in Portland, County of Cumberland and State of Maine, the house being the southerly house in a block of two houses built on this and the adjoining lot, bounded and described as follows:

Beginning on the westerly sideline of Gilman Street ninety and seventy-eight hundredths (90.78) feet from the southerly line of Congress Street; thence southerly on line of Gilman Street fifty (50) feet to land formerly of Charles F. Jose, now of Gilman Street Land Company; thence westerly by said land formerly of Jose, seventy and forty-two hundredths (70.42) feet to land formerly of City of Portland; thence northerly by said City of Portland land fifty (50) feet; thence easterly seventy and forty-two hundredths (70.42) feet passing through the center of the division wall between said two houses to the point of beginning; containing 2520 square feet.

Meaning and intending to convey and hereby conveying the same premises which were conveyed to Gilman Street Land Company by John A. Godsoe, John E. Knowles, John T. Libby, Marvin C. Adams, Thomas A. Martin, Jr., and Vincent N. Oliviero, Trustees, by Trustees Deed dated December 28, 1984 and recorded in the Cumberland County Registry of Deeds in Book 6653, Page 290.

Subject to partition wall rights and obligations as set forth in deed from Virginia R. Buckley to Helen M. Sawyer dated May 4, 1948 and recorded in Cumberland County Registry of Deeds in Book 1912, Page 424 and in deed from Judith P. Johnson to Edgar J. Murphy and Louise M. Murphy dated August 31, 1948 and recorded in Cumberland County Registry of Deeds in Book 1926, Page 311.

056000

MAINE REAL ESTATE TAX PAID

KNOW ALL MEN BY THESE PRESENTS, That CASCO AERIE, NO. 565, FRATERNAL ORDER OF EAGLES, a/k/a CASCO AERIE FRATERNAL ORDER OF EAGLES #565, a/k/a FRATERNAL ORDER OF EAGLES CASCO AERIE NO. 565, a Maine corporation with a mailing address of 265 Valley Street, Portland, Maine 04112, and having a place of business at Portland, in the County of Cumberland and State of Maine, in consideration of $1.00 and other valuable consideration paid by MMC REALTY CORP., a Maine corporation, whose mailing address is 22 Bramhall Street, Portland, Maine 04102, the receipt whereof it does hereby acknowledge, does hereby give, grant, bargain, sell and convey unto the said MMC REALTY CORP., its successors and assigns forever, certain lots or parcels of land in the City of Portland, County of Cumberland, State of Maine, with any buildings thereon, bounded and described as follows:

261-269 Valley Street

A certain lot or parcel of land with the buildings thereon, situated in Portland and described as follows:

Beginning at a point on the North side of A Street, Portland, Maine, said point being the intersection of said North side line of A Street with the East side line of B Street, the name of which was changed to Valley Street in 1939; thence Northerly and making an included angle of Eighty-two (82) degrees Fifty-nine (59) minutes with the East direction of said North side line of A Street a distance of Two hundred eighty-five (285) feet, more or less, to a point in the South side line of Congress Street, said point being thirty-five (35) feet East along said South side line of Congress Street from its intersection with the East side line of Valley Street as now laid out and accepted; thence East along said South line of Congress Street and making an included angle of Ninety-four (94) degrees 49', a distance of forty-five (45) feet, more or less, to a point in the division line between the lot of land of the Grantor under description and land now or formerly of one Charles F. Jones; thence South along the said division line between land of the Grantor and land now or formerly of Charles F. Jones and land now or formerly of Charles C. Plummer, Ellsworth W. Stuart, Charles F. Jose, Maris M. and Charles F. Jose, Trustees, and Charles F. Jose a distance of 281.17 feet, more or less, to a point in the North side line of A Street; thence West and making an included angle of 89 degrees 57' and along the North side line of A Street a distance of Eighty (80) feet more or less to the point of beginning, containing 17,570 square feet, more or less.

Excepting therefrom a portion bounded and described as follows, to wit:

Beginning at a point on the East side line of said Valley Street One Hundred Fifty (150) feet South from the intersection of said East side line of Valley Street with the South side line of Congress Street, thence North by said East line of Valley Street One Hundred Fifty (150) feet to the South side line of Congress Street; thence East along said South side line of Congress Street making an included angle of 94 degrees 49', a distance of Forty-five (45) feet more or less, to a point in the division line between the lot of land under description and land now or formerly of one Charles F. Jones; thence South along the said division line between the land under description and the land of said Charles F. Jones and others One Hundred Fifty (150) feet, to a point; thence West 63.48 feet, to the point of beginning.

42 - 46 Gilman Street

A certain lot or parcel of land with the buildings thereon situated on the northwesterly corner of Gilman and A Streets in the City of Portland, County of Cumberland, State of Maine, and bounded and described as follows:

Beginning at the intersection of the westerly side of said Gilman Street with the northerly side of said A Street, and running thence northerly on said Gilman Street, sixty-nine and five one-hundredths (69.05) feet to land formerly of S.H. Jose; thence westerly by said S. H. Jose land, seventy and forty-two one-hundredths (70.42) feet to a stake; thence southerly and parallel with said Gilman Street seventy and forty-seven one-hundredths (70.47) feet to A Street; thence easterly by said A Street, seventy and forty-one one-hundredths (70.41) feet to the place of beginning.

268 - 270 Valley Street

A certain lot or parcel of land with the buildings thereon situated on the westerly side of Valley Street, formerly called B Street, in said Portland, bounded and described as follows:

Beginning at a point on said westerly side line of Valley Street at a point distance one hundred thirty six (136) feet northerly from the intersection of the westerly side of Valley Street and the northerly side of A Street; thence running southerly by said westerly side of Valley Street seventy-one (71) feet to a point; thence running westerly sixty (60) feet to land now or formerly of George W. Billings and Catherine A. Reed, at a point which is distant sixty-five (65) feet northerly from the northerly side line of A Street; thence running northerly by said Billings and Reed land sixty-four and seventy-six hundredths (64.76) feet to land formerly of William G. Davis and continuing northerly by said Davis land six and forty-three hundredths (6.43) feet; thence easterly approximately fifty-seven (57) feet to the point of beginning.

Being the same premises conveyed to the within grantors by the following deeds: Deed from Mid-Central Fish Company of Maine dated January 15, 1963 and recorded in Cumberland County Registry of Deeds in Book 2727, Page 347; Deed from Sebastiano Pennisi, et al dated June 25, 1963 and recorded in Cumberland County Registry of Deeds in Book 2759, Page 254; and Deed from Eugene S. Martin dated March 28, 1980 and recorded in Cumberland County Registry of Deeds in Book 4582, Page 291.

Subject to the following:

1. Taking of Valley Street as referenced in the deed from the City of Portland to the Unity Company dated October 20, 1937 and recorded in Cumberland County Registry of Deeds in Book 1527, Page 318 (261-269 Valley Street).

To have and to hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said MMC REALTY CORP., its successors and assigns, to them and their use and behoof forever.

AND the said Grantor Corporation does hereby covenant with the said Grantee, its sucessors and assigns, that it is lawfully seized in fee of the premises, that they are free of all encumbrances except as aforesaid, that it has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that it and its successors, shall and will warrant and defend the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS WHEREOF, the said CASCO AERIE, NO. 565, FRATERNAL ORDER OF EAGLES has caused this instrument to be sealed with its corporate seal and signed in its corporate name by Robert James, Richard Brichetto, Hilbert Welch, Reginald Conohan and Fred Darling.

its Trustees thereunto duly authorized, this 21ST day of November, A.D. 1990.

CASCO AERIE, NO. 565,
FRATERNAL ORDER OF EAGLES

Witness — By: Robert James, Its Trustee

Witness — By: Richard Brichetto, Its Trustee

Witness — By: Hilbert Welch, Its Trustee

Witness — By: Reginald Conohan, Its Trustee

Witness — By: Fred Darling, Its Trustee

STATE OF MAINE
COUNTY OF CUMBERLAND

November 21, 1990

Then personally appeared the above named Robert James, Richard Brichetto, ~~Hilbert Welch,~~ Reginald Conohan and ~~Fred Darling,~~ Trustees of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be their free act and deed in their said capacity, and the free act and deed of said Corporation.

Before me,

Attorney at Law
Notary Public
SHERRIE LYNN FONTAINE
NOTARY PUBLIC, MAINE
MY COMMISSION EXPIRES NOVEMBER 19, 1996

Printed Name

SEAL

RECEIVED
90 NOV 21 PM 3:54
CUMBERLAND COUNTY

(17527)

47527 B 9722 P 45

DEED OF SALE BY PERSONAL REPRESENTATIVE
(Testate)
Maine Statutory Short Form

Book 9722
Page 45

Know all Men by these Presents,

That Thomas F. Kane, Jr.

of Scarborough, County of Cumberland, State of Maine,

duly appointed and acting personal representative of the estate of Edna Faye Kane,

deceased (testate), as shown by the probate records of the County of Cumberland, Maine,

(and having given notice to each person succeeding to an interest in the real property described below at least ten (10) days prior to the sale) ~~(and not having given notice to each person succeeding to an interest in the real property described below at least ten (10) days prior to the sale, such notice not being required under the terms of the decedent's will)~~, by the power conferred by the Probate Code, and every other power, for consideration paid, grants to Maine Medical Center* of Portland,

*a nonprofit corporation organized and existing under the laws of the State of Maine

County of Cumberland, State of Maine,

whose mailing address is 22 Bramhall Street, Portland, ME 04102,

the real property in Portland, County of Cumberland,

State of Maine, described as follows:

A certain lot or parcel of land with the buildings thereon, situated in said Portland on the southeasterly side of Ellsworth Street, bounded and described as follows: -viz;-Beginning on the said southeasterly side of Ellsworth Street at land now or formerly of S.F. Haggett; thence southeasterly by said Haggett's land seventy-five (75) feet, more or less, to land now or formerly of J.T. Walton; thence southwesterly by said Walton's land and land now or formerly of N. Waterhouse eighty (80) feet, more or less, to land now or formerly of N.P. Thompson; thence northwesterly by said Thompson's land seventy-five (75) feet, more or less, to said Ellsworth Street; thence northeasterly by said Ellsworth Street to point begun at. Containing five thousand eight hundred forty (5,840) square feet, more or less. Said lot is numbered 34-36 and 38 as shown upon valuation plan of the City of Portland.

Being the same premises conveyed to Edna F. Kane by May Porter by her Warranty Deed, dated April 3, 1940 and recorded in Cumberland County Registry of Deeds in Book 1603, Page 134.

MAINE REAL ESTATE TAX PAID

Instr 47527 Bk 9722 Pg 46

Witness my hand and seal this 20th day of September, 19 91.

Signed, Sealed and Delivered in presence of

Samuel J. Shatz

Personal Representative of the Estate of Edna Faye Kane

Thomas F. Kane, Jr.

Samuel J. Shatz — Thomas F. Kane, Jr.

State of Maine, County of Cumberland ss. September 20, 19 91.

Then personally appeared the above named Thomas F. Kane, Jr.

in his said capacity and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Samuel J. Shatz

Samuel J. Shatz
~~Notary Public~~
Attorney at Law

Recorded
Cumberland County
Registry of Deeds
09/20/91 03:59:12PM
Robert P. Titcomb
Register

54881

WARRANTY DEED
(Maine Statutory Short Form)

KNOW ALL BY THESE PRESENTS, that I, William H. Leschey, Jr., whose mailing address is 930 Congress Street, Portland, ME 04102, for consideration paid, GRANT to MMC Realty Corp., a Maine corporation with an established place of business at and mailing address of 22 Bramhall Street, Portland, Maine 04102, with WARRANTY covenants, the land in Portland, County of Cumberland, State of Maine, which is more particularly described as follows:

A certain lot or parcel of land, with any buildings or improvements that may be thereon, situated on the southerly side of Congress Street, bounded and described as follows: BEGINNING on the southerly sideline of Congress Street at its intersection with the westerly sideline of Gilman Street; thence southerly by the westerly sideline of Gilman Street, sixty-six feet, one inch (66' 1") to the northeasterly corner of land now or formerly of Helen M. Sawyer; thence westerly by said Sawyer land seventy feet, eight inches (70' 8") to the easterly sideline of land now or formerly of Schwartz Bros. Inc.; thence northerly by said Schwartz Bros. Inc. land, sixty-two feet, one inch (62' 1") to the southerly sideline of Congress Street; thence easterly by the southerly sideline of Congress Street, seventy feet, eight inches (70' 8") to the point of beginning.

Being the same premises conveyed to the Grantor herein by deed of Edythe D. Field, dated May 11, 1987, and recorded in the Cumberland County Registry of Deeds in Book 7784, Page 182.

MAINE REAL ESTATE TAX PAID

WITNESS my hand and seal this 1st day of September, 1994.

SIGNED, SEALED AND DELIVERED
in the presence of:

William H. Leschey, Jr.

STATE OF MAINE
COUNTY OF CUMBERLAND, ss

September 1, 1994

Then personally appeared the above-named William H. Leschey, Jr. and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Notary Public/Attorney at Law
Printed Name: CHRISTOPHER J.H. CHERRYHILL

RECEIVED
RECORDED REGISTRY OF DEEDS
94 SEP -1 PM 3:05
CUMBERLAND COUNTY

BKL/4078/AAO/DR

Section 3

Financial Capacity

Section 3: Financial Capacity

A. Estimated Costs

An estimate of probable overall construction cost associated with the new MMC Congress Street Building is ±$210,000,000.00.

The following is the estimate for a selection of applicable SLODA site work:

1.	Earthwork / Soils/ ESC	$ 608,150.00
2.	Site Utilities (Water, Sewer, Storm)	$ 861,825.00
3.	Pavement/Site Walls	$ 1,140,963.00
4.	Landscape and Irrigation	$ 549,671.00
	Total	$ 3,161,609.00

B. Financing

The applicant for the development of this project is the record owner, Maine Medical Center. See enclosure, this section for demonstration of financial capacity.

C. Certificate of Good Standing

The State of Maine Department of Secretary of State indicates that Maine Medical Center is in good standing, see attached corporate name information summary.

MAINE MEDICAL CENTER LEVEL III SITE PLAN APPLICATION

CONGRESS ST PATIENT TOWER

EVIDENCE OF FINANCIAL & TECHINICAL CAPACITY

The health care landscape has been in a state of change, particularly since the signing of the Affordable Care Act (ACA). Given the recent changes in the executive and legislative branches of the federal government and continued references to "repealing" the ACA, it is nearly impossible to anticipate the scope of future changes. Maine Medical Center's strategic financial plan assumes continued market basket increases at or near 3% annually. Additionally, the strategic financial plan assumes the following:

- Little or no increase in Medicare or Medicaid payments
- Stable payer mix
- No expansion to the Medicaid program
- Achievement of operational efficiencies based on analyses of national benchmark data
- Stable utilization of hospital services
- Continuation of provider-based billing at existing locations
- Stable levels of bad debt and charity care

Minor changes in the law or regulatory environment impacting these assumptions will likely not jeopardize the overall strategic financial plan. Substantive changes, however, will need to be monitored closely to ensure support of the project.

MMC is fully licensed and accredited, and has been providing services of this scale and scope for years.

Through multiple building projects throughout the history of the organization, MMC has demonstrated its ability to develop new and renovated facilities that meet all licensure and accreditation requirements.

The proposed project's program, and design, developed by a team of health care architects and engineers, and hospital physicians and staff, are in conformance with Guidelines for Design and Construction of Health Care Facilities, 2006 Edition, Facilities Guidelines Institute, (American Institute of Architects, Washington, DC, 2006) as required by the State of Maine Department of Health and Human Services' Division of Licensing and Regulatory Services. In addition, the guidelines for Design and Construction of Health Care Facilities, 2014 Edition, Facilities Guidelines Institute, (American Institute of Architects, Washington, DC, 2014) were also used in the proposed project's design.

MAINE
Department of the Secretary of State
Bureau of Corporations, Elections and Commissions

Corporate Name Search

Information Summary

Subscriber activity report

This record contains information from the CEC database and is accurate as of: Wed Oct 24 2018 14:03:50. Please print or save for your records.

Legal Name	Charter Number	Filing Type	Status
MAINE MEDICAL CENTER	19510013ND	NONPROFIT CORPORATION (T13-B)	GOOD STANDING

Filing Date	Expiration Date	Jurisdiction
03/21/1951	N/A	MAINE

Other Names	(A=Assumed ; F=Former)
MAINEHEALTH CARE	A
THE BARBARA BUSH CHILDREN'S HOSPITAL	A
THE BARBARA BUSH CHILDREN'S HOSPITAL AT MAINE MEDICAL CENTER	A
NORTHERN NEW ENGLAND POISON CENTER - CANCELLED	A
CASCO BAY FAMILY PHYSICIANS	A
CLINICAL TRIAL CENTER	A

Clerk/Registered Agent

LUGENE INZANA
22 BRAMHALL STREET
PORTLAND, ME 04102

Section 4

Technical Ability

Section 4: Technical Ability

A. Prior experience / B. Personnel

The applicant has successfully developed and managed Maine Medical Center through an extensive series of expansions and improvements. Notably, in 2015 MMC completed construction of a new surgical center that included a new two-story operating wing encompassing 41,000 square feet with five new operating rooms and 20 pre and post-surgery recovery bays. The aforementioned surgery building and the proposed new Congress Street building was designed by the Boston-based studio of global architecture firm Perkins + Will. MMC has retained the services of Sebago Technics, Inc. for civil, landscape architecture and site permitting services.

Sebago Technics, Inc. (STI) is a multi-disciplinary engineering firm that offers a wide range of services specializing in land development, planning, permitting, and engineering design services. We maintain a staff of multi-disciplinary professionals to provide services in the areas of general civil engineering, road and utility infrastructure design, construction management, permitting, landscape architecture, soil science, wetlands science, geotechnical services, land surveying, and environmental engineering. Over the years, we have found our depth of services to be a key element in meeting the customer's needs with timely and responsive services.

Please see this Section for resumes of key personnel.

Introduction to Sebago Technics, Inc.

Year Established: 1981 (36 years in business)

About Us: Sebago Technics, Inc. (STI) is a consulting firm of more than 65 design professionals and technical staff providing services throughout New England. From the start, our business plan was simple: "to provide quality, cost-effective civil engineering services that are responsive to a customer's goals, schedule and budget." Our One Company capabilities and resources provide clients with experience and solutions to respond to their planning, permitting and design needs.

Structure: Employee-owned since 1998

Services: Civil, environmental, transportation & traffic engineering; municipal engineering; local/state/federal permitting and planning; land surveying & laser scanning; GIS; landscape architecture; environmental services; and natural resources.

Employee Disciplines:
Professional Engineers, Civil Engineers, Transportation Engineers, Landscape Architects, Professional Land Surveyors, Survey Technicians, CADD Designers, Wetland Scientist, Soil Scientist, Construction Inspectors, Environmental Scientists, GIS Professionals, Marketing, Administrative & Financial

Professional Focus: Sebago Technics provides engineering and planning services to both public and private sector clients. In the municipal and government sectors we have provided multiple discipline services through General Services Contracts (GSC) and project specific contracts. A few examples include the Portland Jetport, City of Portland Public Services, City of South Portland, City of Lewiston, City of Westbrook and several smaller communities. Our municipal sector work includes street and utility infrastructure design, municipal facility planning and specialty work such as Island marine and solid waste planning & engineering.

Location: South Portland, ME

Geographic Service Area: Maine, New Hampshire, Vermont, Massachusetts

Web Site: www.sebagotechnics.com

WILLIAM T. CONWAY, RLA, LEED-AP

Senior Vice President, Landscape Architecture

When Mr. Conway joined Sebago Technics, Inc. in 1988, he established new disciplines of master planning, land planning, and landscape architecture. His extensive experience with multi-disciplinary professional teams and sound project management for government agencies, corporate clients, and private developers resulted in substantial growth in this field. The company is now recognized as one of the leading firms in the State of Maine for Landscape Architectural services.

Mr. Conway has had significant exposure and experience in professional practice resulting from his work throughout several regions of the United States, as well as Europe and the Middle East. He has also held key positions with design firms in Atlanta, Georgia and Tucson, Arizona prior to moving to Maine. He has held professional registrations in the states of Arizona, Georgia, Connecticut, Maine, and Hew Hampshire.

Much of his work involves large-scale projects, including the L.L. Bean Freeport Retail Store and Desert Road Campus, several projects for the American Skiing Company, the UNUM Provident Headquarters in Portland (HO-III), master planning and site design for Maine Medical Center in Portland and Scarborough, Maine, and a site selection study for IDEXX Laboratories in the Greater Portland area.

EXPERIENCE

Portsmouth Public Library, Portsmouth, New Hampshire - Will worked closely with City officials in the planning and design of this building, a recipient of LEED Silver Certification. Located in the vicinity of Strawberry Banke, the site design features an outdoor reading courtyard, in part enclosed by the remains of an historic armory which once stood on the library site.

Stroudwater Landing, Westbrook, Maine - Master planning services for a 65 acre elderly housing campus planned for comprehensive housing alternatives including independent and assisted living opportunities. Avita of Westbrook, a 70 bed assisted living facility specializing in memory care services, features extensively landscaped, secure exterior courtyards. Stroudwater Landing Lodge is a 95 unit independent and assisted living community, offering residents a variety of outdoor recreational amenities. The future build out of the campus is planned to accommodate 44 independent living cottage units and medical offices.

Avita of Brunswick, Brunswick, Maine – Site planning and landscape architectural services for a 70 bed assisted living facility, located within Brunswick Landing, a former naval air station. This project includes a graceful arrival to this one story building, comprised of three resident "neighborhoods" which share common core services and administrative offices. Each neighborhood has easy access to a secure exterior courtyard. The courtyards are lush garden areas with ample seating and activities including gardening and group activities.

Southern Maine Area on Aging Day Services, Biddeford, Maine – Site planning and landscape architecture for a day services facility serving the elderly population in southern York County. Working closely with the Southern Maine Area on Aging staff, this site was designed to facilitate daily drop off and pick up activities inherent with the facility program. The 10,000 square foot, single story building is complimented with a secure exterior courtyard with extensive landscape plantings, raised benches for gardening activities, walking paths and seating facilities.

Maine Veteran's Cemetery, Augusta, Maine – Site planning and landscape architectural services for a major expansion to the cemetery located in Augusta, Maine. The project is located in the heart of the cemetery grounds, and was designed with geometry derived from Arlington National Cemetery in Washington, D.C. Design review was coordinated with and approved by the Maine Bureau of General Services, the Maine Veterans Cemetery System, and the U.S. Department of Veterans Affairs.

EDUCATION

University of Tucson, Tucson, AZ
Bachelor of Science
Landscape Architecture, 1979

REGISTRATIONS

Registered Landscape Architect:
Maine #20000108

LEED Accredited Professional
CLARB Certified

MEMBERSHIPS

American Society of Landscape Architects

Council of Landscape Architectural Registration Boards

PUBLICATIONS

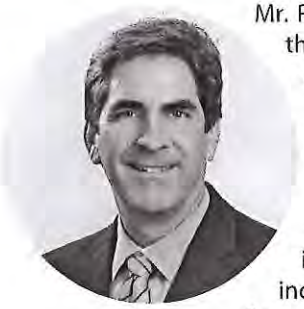
Doris Allen Twitchell Village Student Housing/ University of Maine, Orono, Maine; article in Contemporary Trends in Landscape Architecture, Van Nostrand Reinhold, 1997

SEBAGO TECHNICS

207.200.2055 WCONWAY@SEBAGOTECHNICS.COM

DANIEL L. RILEY, PE, CFM

Vice President, Engineering



Mr. Riley is a Senior Project Manager and Vice President of Engineering with over 20 years of experience in the civil engineering field on projects for the private sector, as well as federal and municipal clients. He has a diverse background in civil engineering, site design, residential and commercial development and permitting.

He is experienced and well versed in presenting complex, controversial and publicly sensitive issues to a variety of audiences. Since 2008, Mr. Riley has been the Contract Manager and lead engineer for Sebago Technics' General Engineering Services Contract with the City of South Portland. In that role, he is responsible for coordinating the firm's services and providing engineering support for City Departments including Planning and Development, Bus/Transportation and Waterfront, Public Works, and Parks and Recreation.

Prior to joining Sebago Technics, Mr. Riley worked as a professional engineer in Colorado specializing in water resources engineering. In that role, he managed projects for federal and municipal clients, including stormwater master planning studies and floodplain analysis and delineation projects. He has also assisted communities with the implementation of Stormwater Management Utilities.

EXPERIENCE

Maine Medical Center Bramhall Campus Expansion
Site and utility design for a comprehensive facilities construction project on the hospital's downtown Portland campus. The scope of the project includes a 4-story birthing center, 512 car parking garage, central utility plant and helicopter pad. The project includes the vacation and realignment of two public streets and the development of a steep, challenging site.

Central Maine Medical Center Emergency Department Expansion
Site and utility design for a 46,500 sf expansion of the hospital's emergency department providing 52,000 annual emergency room patient visits. Site improvements included the reconfiguration of patient parking areas, ambulance access from Main Street, pedestrian improvements lighting and landscaping. New traffic calming measures were constructed along Main Street in Lewiston to better define ambulance access and enhance the safety of pedestrian crossings.

Jordan's Meats Redevelopment - Portland, ME
Mr. Riley managed the site design and permitting of the Westin Hotel and Residences, a 480,000 square feet mixed use development. The site is located on a full city block adjacent to Portland's developing waterfront. The project approvals, including major utility relocations and City Council approval of a contract zone to allow 30 feet of additional building height, were approved in less than 8 months.

After securing entitlements the property was sold. Mr. Riley was the engineer of record for the current owner, responsible for the site design and utility construction for first phase development of the Hampton Inn that occupies the site today.

City of South Portland Maine Engineering Services
Mr. Riley has been the Contract Manager and lead engineer for Sebago Technics' General Engineering Services Contract with the City of South Portland. In that role, he is responsible for coordinating the firm's services and providing engineering support for City Departments including Planning and Development, Bus/Transportation and Waterfront, Public Works, and Parks and Recreation.

EDUCATION

Villanova University, Villanova, PA
Bachelor of Science, Civil Engineering
1991

REGISTRATIONS

Professional Engineer:
Maine #9967
Colorado: #32176

Certified Floodplain Manager
#32249

MEMBERSHIPS

Chi Epsilon, National Civil Engineering Honor Society

American Society of Civil Engineers

SEBAGO TECHNICS

207.200.2080 DRILEY@SEBAGOTECHNICS.COM

Section 5

Noise

05: Noise

A. Developments producing a minor noise impact

Per item (3) Schools and hospitals, the new patient care building is redevelopment at an existing hospital and is considered to be a development producing minor noise impact.

B. Developments potentially producing a major noise impact.
Not applicable.

Section 6

Visual Quality and Scenic Character

06: Visual Quality and Scenic Character

The proposed new property services facility will not negatively impact the visual quality of the surrounding landscape, nor will it significantly affect the scenic character of the Congress Street, Portland location. The project is located within a dense urban setting consisting of hospital, office buildings, parking and multi-family residential housing. The proposed site improvements have been designed to be consistent with the MMC campus and to complement surrounding properties. This project includes the removal of the Gilman Street staff parking garage for the building expansion into the space and reorienting the campus toward Congress Street. The proposed site improvements are part of a revitalization to one of the City gateways. We have included an existing conditions photo of MMC taken from I-295 and a photo simulation of the completed project.

The development does not impact areas of significant scenic character, therefore a Visual Impact Analysis has not been prepared. The site meets the standard for no unreasonable impact on scenic resources, and the proposed site activity will not be visible from scenic resources as defined by Chapter 315 of the relevant Maine DEP regulations.

Existing Northeasterly View to MMC from Interstate-295

Photo Simulation of Completed Project

Section 7

Wildlife & Fisheries

Section 7: Wildlife & Fisheries

Sebago Technics has recently solicited an updated site review by the Maine Department of Inland Fisheries and Wildlife (MDIFW) for the presence of essential habitats that will be affected by the project. Significant impacts are not anticipated as the site is mostly developed and occurs in a dense urban setting. Enclosed in this section is a copy of the letter sent to MDIFW all future correspondence and the determination letter will be forwarded to the City upon receipt.

SEBAGO
TECHNICS

October 24, 2018
15466

Mr. John Perry
Environmental Coordinator
Maine Department of Inland Fisheries
41 State House Station
Augusta, Maine 04333
John.Perry@Maine.gov

Re: Maine Medical Center
New Congress Street Patient Care Building
22 Bramhall Street, Portland

Dear John:

Sebago Technics is in the process of updating resource letters as part of the required permit applications for proposed site improvements associated with the redevelopment of a portion of the Maine Medical Center Campus. This project includes the demolition and removal of the existing employee garage on the Bramhall Campus. In its place, MMC will build a new six-story medical building. The proposed new building will provide patient and procedure rooms and will include a new arrival/departure plaza and main entrance to the hospital on Congress Street.

We respectfully request that you review your resources for any lands that support rare, threatened and endangered species, designated essential and significant wildlife habitats, and fisheries habitat. For your reference, I have attached a site location map for your reference and record. If you have any questions on this project, please do not hesitate to contact me at snichols@sebagotechnics.com or on my direct line at (207) 200-2120. I look forward to hearing from you.

Sincerely,

SEBAGO TECHNICS, INC.

Stefanie Nichols

Stefanie Nichols
Permitting Specialist/Project Coordinator

enc.

Section 8

Historic Sites

Section 8: Historic Sites

Sebago Technics recently solicited an updated review from the Maine Historic Preservation Commission (MHPC) for the presence of archaeological features or historic properties of concern within the vicinity of the site redevelopment project. Historic impacts are not anticipated as part of the project as the project includes removal of an existing parking structure and replacement with a new patient care building and other associated site improvements. A copy of the letter to MHPC is included in this section and future correspondence and the determination letter will be forwarded to the City upon receipt.

SEBAGO
TECHNICS

October 24, 2018
15466

Mr. Kirk Mohney
Maine Historic Preservation Commission
55 Capitol Street
65 State House Station
Augusta, ME 04039-0065

Re: Maine Medical Center
New Congress Street Patient Care Building
22 Bramhall Street, Portland

Dear Mr. Mohney

Sebago Technics is in the process of updating resource letters as part of the required permit applications for proposed site improvements associated with the redevelopment of a portion of the Maine Medical Center Campus. This project includes the demolition and removal of the existing employee garage on the Bramhall Campus. In its place, MMC will build a new six-story medical building. The new building will provide new patient and procedure rooms and will include a new arrival/departure plaza and main entrance to the hospital on Congress Street.

Sebago Technics intends to file an amended Site Location of Development Act application for delegated review by the City. We have reviewed City resources and determined that the Bramhall MMC Campus is not located within a designated Historic District. We respectfully request a review by the Maine Historic Preservation Commission for any Archaeological or Historic Sites within or adjacent to the redevelopment area in accordance with the provisions of 36 CFR, Part 800, Section 106.

The 22 Bramhall Street Maine Medical Center Campus is located at a high point in the west end and The Campus is located in a densely developed urban setting consisting of the hospital, office buildings with their associated parking, public roadways and multi-family residential housing. The proposed project redevelopment location is bounded by Congress and Gilman Streets, the existing Central Heating Plant/Bean Building/Emergency entrance and the Visitor Parking Garage.

We have enclosed a site location map and a selection of keyed photographs for your use. At your earliest convenience, please review and forward your findings. If you have any questions

or need further information please do not hesitate to contact me at snichols@sebagotechnics.com.

Sincerely,

SEBAGO TECHNICS, INC.

Stefanie Nichols
Permitting Specialist/Project Coordinator

enc.

Section 9

Unusual Natural Areas

Section 9: Unusual Natural Areas

Sebago Technics recently requested an updated site review from the State of Maine Department of Agriculture, Conservation and Forestry Natural Areas Program (MNAP) for the presence of known mapped significant natural features within and adjacent to the project site. Due to the dense urban nature of the site we do not anticipate unusual natural areas to affect the proposed project. A copy of the letter to MNAP is enclosed in this section. The determination letter will be forwarded to the City upon receipt.

SEBAGO
TECHNICS

October 24, 2018
15466

Ms. Lisa St.Hilaire
Maine Natural Areas Program
93 State House Station
Augusta, ME 04333-0093

Re: Maine Medical Center
New Congress Street Patient Care Building
22 Bramhall Street, Portland

Dear Lisa:

Sebago Technics is in the process of updating resource letters as part of the required permit applications for proposed site improvements associated with the redevelopment of a portion of the Maine Medical Center Campus. This project includes the demolition and removal of the existing employee garage on the Bramhall Campus. In its place, MMC will build a new six-story medical building. The new building will provide new patient and procedure rooms and will include a new arrival/departure plaza and main entrance to the hospital on Congress Street.

As part of the applications, a review of by Maine Natural Areas Program for any lands that support rare and endangered plants, rare natural communities and ecosystems, and other natural communities and ecosystems in the vicinity of the proposed project area is requested.

For your reference, I have enclosed a USGS Site Location Map with the proposed project location identified. If you have any questions on this project, please do not hesitate to contact me at snichols@sebagotechnics.com or on my direct line at (207) 200-2120. I look forward to hearing from you.

Sincerely,

SEBAGO TECHNICS, INC.

Stefanie Nichols

Stefanie Nichols
Permitting Specialist/Project Coordinator

Section 10

Buffers

Section 10: Buffers

None of the proposed work area is located in a previously designated buffer area and no new dedicated buffering is proposed as part of this site development project.

Section 11

Soils

Section 11: Soils

A. Soil survey map and report

The project site is a redevelopment that includes razing and existing parking garage and redevelopment by constructing a new patient services building. A soil survey was not performed for the project. Soils classifications within the project area are referenced from the Cumberland County Medium-Intensity Soil Survey. The site is primarily comprised of Hinckley gravelly sand loam.

C. Geotechnical investigation

A geotechnical investigation was performed for the redevelopment site and the narrative is included in this section. The geotechnical evaluation indicates significant depths of granular fill overlaying glacial till.

D. Hydric soils mapping

Not applicable

REPORT DRAFT

February 21, 2017
16-1136 S

EXPLORATIONS AND GEOTECHNICAL ENGINEERING SERVICES
Proposed Congress Street Medical Office Building
Maine Medical Center Facility
Portland, Maine

SUBMITTED TO:
Maine Medical Center
Attention: Dennis Morelli, AIA
Director of Facilities Development
22 Bramhall Street
Portland, ME 04102

PREPARED BY:
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S.W.COLE ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing and Special Inspections*
- *GeoEnvironmental Services*
- *Test Boring Explorations*

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LIST OF ATTACHMENTS

16-1136

February 20, 2017

Maine Medical Center
Attention: Dennis Morelli, AIA – Director of Facilities Development
22 Bramhall Street
Portland, ME 04102

Subject: Explorations and Geotechnical Engineering Services
Proposed Congress Street Medical Office Building
Maine Medical Center Facility
Portland, Maine

Dear Dennis:

In accordance with our Proposal, dated May 10, 2016, we have performed subsurface explorations for the subject project. We understand two projects are proposed; the Gilman Street Parking Garage and the Congress Street Medical Office Building. This report focuses on the proposed Medical Office Building and summarizes our findings and geotechnical recommendations. The contents of this report are subject to the limitations set forth in Attachment A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at certain areas of the site in order to provide geotechnical recommendations relative to foundations, earthwork and pavement associated with the proposed construction. Our scope of services included a review of prior subsurface explorations made at the nearby New Parking Garage (circa 2002), an exploration program consisting of test borings, soils laboratory testing, and a preliminary geotechnical analysis of the subsurface findings and preparation of this preliminary report.

1.2 Site and Proposed Construction

Based on information provided by Simpson Gumpertz & Heger (SGH - project structural engineer), we understand an 8-level medical office building is proposed on the Maine Medical Center (MMC) campus on the southerly side of Congress Street and westerly side of Gilman Street in Portland, Maine. The site of the proposed medical office building is situated in an area occupied by an existing circa 1970's parking garage and landscaped areas. We understand the existing 9-level parking garage will be demolished in favor of the proposed construction.

Based on the information provided, we understand the proposed 8-level, trapezoidal-shaped medical office building will be on the order of 295 by by 120 feet in plan dimensions. We understand the lowest floor level (level 5) will be at about elevation 38 feet (project datum). The highest floor level (Ground level) will be at about elevation 145 feet. The southerly wall line of the proposed building will be near and parallel to the existing southerly retaining wall of the existing parking garage. The northerly, westerly and easterly wall lines will be parallel to Congress Street, Gilman Street and the existing 2002 parking garage, respectively.

Although existing floor grade information for the existing parking garage is not available at this time, based on the exterior topographic information shown on Sheet 1 and visual observations at the site during drilling, it appears the on-grade slab of the parking garage slopes upward from about elevation 52 feet at the Gilman Street entrance to about elevation 65 feet at the easterly end of the garage. An interior ramp exists along a portion of the southerly wall line that slopes upward to the west to access the next level of parking. The ground surface on the northerly side of the existing parking garage (grassed and landscaped area) varies from about 43 feet at the intersection of Gilman and Congress Streets up to about 64 feet near the easterly end of the garage; roughly following the slope of Congress Street. Based on a proposed floor elevation of 38 feet for the lowest floor level (level 5) and the approximate existing grades, cuts on the order of 5 feet will be needed near the Gilman/Congress Street intersection; cuts on the order of 15 feet at the Gilman Street garage entrance and cuts on the order of 27 feet at the easterly end of the garage to achieve floor grade. Deeper cuts will be needed in the area of the existing interior ground floor ramp along the southerly parking garage wall line.

Based on concept drawings provided by SGH, we understand the southerly wall line of the proposed medical office building will utilize the existing parking garage wall as a new foundation wall from about elevation 65 feet (between floor levels 3 and 4) up to about level 1 floor grade (104 feet). Based on the topographic information shown on Sheet 1, the exterior grade along the southerly wall line of the garage (Crescent Street and landscaped areas) varies from about elevation 75 to 115 feet (west to east). Thus, the proposed floor grade (level 5) will be about 37 to 77 feet below existing grades on the southerly side of the garage.

Additionally, we understand the existing southerly parking garage wall will be left in place, underpinned, reinforced and supported using tie-backs for the new structure. Further, a new tie-back wall system is planned to support the excavation below the existing garage wall. The underpinning, tiebacks and wall system will be evaluated and designed by others.

Existing site features are shown on the "Exploration Location Plan" attached as Sheet 1. Proposed building location, site grading and structural loading information is not available at this time.

2.0 EXPLORATION AND TESTING

2.1 Explorations

2.1.1 Recent Explorations

Nine test borings (B-16-1 through B-16-9) were made from November 21 through December 9, 2016 by S. W. Cole Explorations, Inc., a subsidiary of S. W. Cole Engineering, Inc. (S.W.COLE) for the proposed Parking Garage and Congress Street Building. Borings B-16-5 through B-16-9 were made for the proposed Medical Office Building. The borings were made outside the footprint of the existing garage area. Due to the low head room in the garage, no borings were made within the garage footprint.

The approximate locations of the test borings made are shown on the "Exploration Location Plan" attached as Sheet 1. Generalized subsurface profiles for both the proposed Gilman Parking Garage and the proposed Congress Street Medical Office Building sites are attached as Sheets 1.1 and 1.4.

Logs of the test borings made for both the Proposed Parking Garage and the Proposed Medical Office Building sites are attached as Sheets 2 through 19. The elevations shown on the logs were estimated based on topographic information shown on Sheet 1. A key to the notes and symbols used on the boring logs is attached as Sheet 20.

2.1.2 Previous Explorations

Several test borings were made for the existing newer parking garage (circa 2002). Two borings (B-96-15 and B-96-16) were made near the easterly side of the proposed Medical Office Building site. The approximate locations of these two test borings are shown on Sheet 1. Additionally, the approximate location of Boring B-02-1, made in the northwest corner of the existing Central Utility Plant, is shown on Sheet 1. The logs for these three borings are attached in Appendix A. Logs of other borings and test pits made for nearby sites can be found in the previous geotechnical reports.

2.2 Testing

The recent test borings were drilled using a combination of hollow stem auger and cased wash-boring techniques. The soils were sampled at 2 to 10 foot intervals using a split spoon sampler and Standard Penetration Testing (SPT) methods. SPT blow counts are noted on the logs. Pocket penetrometer testing (PPT) was performed on stiffer cohesive soil samples. Shelby Tube sampling and in-situ vane shear testing (VST) were performed in softer cohesive soils. SPT blow counts, PPT and VST results are shown on the logs.

Soil samples obtained during drilling were returned to our laboratory for classification and testing. The results of soil moisture content and Atterberg limit testing are noted on the logs. Results of soil gradation tests and a one-dimensional laboratory consolidation tests performed on a Shelby Tube sample from Boring B-16-3 are attached in Appendix B.

A soil sample from boring B-16-8 2D (2.3'-4.3') was submitted to Katahdin Analytical Services for determination of pH (SW846 9045D), water soluble chloride content (EPA 325.2) and water soluble sulfate content (EPA 375.4). Results are included in Appendix C.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Surficial

The site of the proposed Medical Office Building is located at the site of an existing parking garage (circa 1970's) on the southeasterly side of the intersection of Congress and Gilman Streets. The existing 9-level garage occupies a majority of the southerly portion of the site and is on the order of 340 by 120 feet in plan dimensions. The sloped on-grade garage floor varies from about elevation 52 feet on the west side (Gilman Street entrance) to about elevation 65 feet on the east side. The remainder of the site is landscaped and varies from about elevation 43 feet at the intersection of Congress and Gilman Streets to about 64 feet on the east end of the site. A newer parking garage (circa 2002) exists on the easterly side of the site. The Central Utility Plant exists at the southwesterly corner of the site. Crescent Street and landscaped areas exist on the southerly side of the site varying from about elevation 75 to 115 feet (west to east).

Existing site features are shown on the "Exploration Location Plan" attached as Sheet 1.

3.2 General Geological Conditions

Overburden mapping by the Maine Geological Survey (MGS) describes the unconsolidated overburden as Urban Fill overlying marine clay and glacial till. This is consistent with boring logs for the area, describing variable sand, silt, and gravel material locally with debris. Bedrock depths were generally about 65 to 73 feet below ground surface (bgs) where encountered. The bedrock geology has been described by the MGS, (Hussey, 2003) as stratified meta-sedimentary rock of Silurian-Ordovician age (Eliot Formation), descried as quartz-plagioclase-biotite phyllite. Linear features trending approximately north-south and north 35° to 55° east.

3.3 Soil and Bedrock

Below the existing concrete pavement and topsoil, the explorations encountered a soil profile generally consisting of granular and clayey fill overlying glaciomarine clay overlying sandy soils overlying glacial till and probable bedrock with depth. The principal strata encountered in the explorations are summarized below; refer to the attached logs for detailed subsurface information. Not all the strata were encountered at each of the explorations.

Topsoil: Borings B-16-6 through B-16-8 encountered about 12 to 18 inches of topsoil and/or bark mulch at the surface.

Pavement: Borings B-16-5 and B-16-9 encountered about 6 inches of concrete pavement at the surface.

Uncontrolled Fill: Borings B-16-5 through B-16-9 encountered generally loose to medium dense uncontrolled fill varying from about 3 to 13 feet in thickness. The uncontrolled fill generally consists of sand with varying amounts of silt and gravel, as well as sandy, clayey silt. Boring B-16-6 encountered what may be the concrete foundation for the existing parking garage at a depth of about 4 feet. Thus, the boring was shifted about 4 feet north. This area may have been developed prior to the construction of the parking garage. Thus, miscellaneous uncontrolled fill, existing and relic foundations and subsurface utilities should be expected.

Glaciomarine Clay: Below the fill, Borings B-16-5 through B-16-7 encountered a glaciomarine deposit of stiff brown silty clay to depths varying from about 10.5 to 19.5 feet. Gray silty clay of medium consistency was encountered below the brown silty clay at Borings B-16-5 and below the fill at B-16-8. The gray silty clay deposit is about 5 feet thick at these two locations. The glaciomarine deposit was not observed at B-16-9.

Based on the laboratory consolidation testing of a Shelby Tube sample at Boring B-16-3, the gray silty clay in this area appears to be over-consolidated by about 1,500 psf. In-situ vane shear test results performed in the gray silty clay at nearby B-16-1 and B-16-3 were about 850 to 1,000 psf virgin strength and 130 to 220 psf remolded strengths.

Outwash Sands: Below the glaciomarine clay deposit or fill, the borings encountered a deposit of loose to medium dense outwash sand with zones of clay and silt layers. In general, the sand thickness ranged from about 4 to 21 feet at borings B-16-5 through B-16-9.

Glacial Till: Medium dense to very dense glacial till generally consisting of sand and silt with varying amounts of gravel with zones having a trace to some clay was encountered below the outwash sands at depths varying from about 15 to 38 feet below the ground surface at borings B-16-5 through B-16-9.

The depth to glacial till was shallowest at boring B-16-9. Cobbles were encountered occasionally during drilling. The glacial till may also contain some boulders. Borings B-16-7 through B-16-9 were terminated in very dense glacial till at depths of 79.5 to 81.5 feet below the existing ground surface.

Refusal Surfaces: Probable bedrock was encountered at depths of about 73 and 68 feet below the existing ground surface at Borings B-16-5 and B-16-6, respectively. A roller cone was advanced about 2 feet into the probable bedrock surface at these two borings.

3.4 Groundwater

The soils were generally moist from the ground surface. The borings were started with hollow-stem augers and then switched to cased wash-borings at depth, upon which water was introduced obscuring groundwater observations during drilling. In general, it appears perched water exists within the fills at depths of about 5 to 10 feet. Groundwater piezometers were installed at borings B-16-8 and B-16-9. Water levels in the piezometers were measured to be about 14 and 31 feet below the ground surface at these two boring locations, respectively, on January 4, 2017. Based on the moisture content test results, the softer gray silty clay and underlying glacial till are at or near saturation.

Long-term groundwater levels were not determined. It should be anticipated that groundwater will be perched atop silty and clayey soils as well as the underlying glacial till. Groundwater levels should be expected to fluctuate, particularly in response to periods of snowmelt and precipitation, as well as changes in site use.

3.5 Frost and Seismic

The 100-year Air Freezing Index for the Portland, Maine area is about 1,407-Farenheit degree-days, which corresponds to a frost penetration depth on the order of 4.5 feet. Based on the subsurface findings, we interpret the site soils to correspond to Seismic Soil Site Class D according to IBC 2009/ASCE 7-05. We offer the following seismic design parameters for consideration:

RECOMMENDED SEISMIC DESIGN PARAMETERS (2,500-year Design Earthquake)		
Peak Ground Acceleration (PGA)	0.2-second Spectral Acceleration (S_s)	1-second Spectral Acceleration (S_1)
0.17 g	0.242 g	0.078 g

NOTE: Seismic design parameters from USGS.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. The principle geotechnical considerations include:

- Due to the presence of uncontrolled fills, variable thickness of soft to medium compressible glaciomarine clays and loose to medium dense sands with silt and clay layers, beneath the westerly portion of the site, anticipated heavy column loads as well as anticipated differential settlement between foundations supported on the medium dense glacial till (easterly side) and variable glaciomarine clays and outwash sands (westerly side), we recommend the proposed medical office building structure be supported on a deep foundation consisting of driven piles bearing in the very dense glacial till or on bedrock. Alternatively, a specialty ground improvement contractor can be consulted to assess the suitability of using ground improvement techniques such as rammed aggregate piers (RAPs) or geo-concrete columns (GCCs) to improve the soils sufficiently for potential spread footings.

- Based on the information at the boring locations, it appears cuts varying from about 5 to 27 feet, or greater, will be needed to achieve floor grade for level 5 (lowest floor elevation). Based on the findings at borings B-16-5 through B-16-9, it appears that in general, the subgrade for the proposed first level slab-on-grade floor will consist of existing loose to medium dense fill, stiff brown silty clay, softer gray silty clay and medium dense sands with varying amounts of silt and clay layers in the westerly portion of the proposed building footprint and medium dense glacial till in the easterly portion.

- It is our opinion that the floor slab can be supported on properly prepared soil subgrades. Existing foundations, fill and soft, disturbed soils will need to be removed prior to placing new fills. We recommend on-grade slabs be underlain

with at least 12 inches of compacted Crushed Stone overlying a non-woven geotextile fabric to provide a drainage layer and passive radon venting if deemed necessary by the project structural engineer. The Crushed Stone should be positively connected to foundation and sub-slab underdrains drains.

- The site is developed with many years of various development likely including previous structures and foundations, uncontrolled fills and subsurface utilities. Thus, uncontrolled fills, relic foundations and other manmade structures and utilities should be expected during excavation including the foundation system for the existing garage.

- Conventional asphalt pavements appear suitable for proposed parking areas, entrances and sidewalks. The pavement gravels should be positively connected to foundation drains. Existing granular fills should be densified by proof-rolling and soft areas removed and replaced with additional pavement sub-base aggregate.

- Based on the subsurface findings and our understanding of the proposed construction, the proposed 5 to 22 foot cuts along Congress and Gilman Streets appears feasible from a geotechnical standpoint. Braced shoring will be needed to support surrounding grades, structures and utilities during construction. Perched groundwater should be expected in the soils. We understand evaluation and design of excavations, water control, bracing and shoring, underpinning, reinforcing and tie-back anchorage will be by others.

- Structural Fill, Crushed Stone, and pavement base and sub-base gravels will be required for construction. Existing soils are unsuitable for reuse.

4.2 Settlement Analysis

We have made an estimate of post-construction settlement of the underlying medium dense glacial till (east side) and variable glaciomarine clays and outwash sands (westerly side). Our estimate is been based on:

1. A proposed finished floor elevation of 38 feet;
2. Subsurface information found at borings B-16-7 and B-16-9,
3. An assumed column load of 400 kips and soil contact pressure of 4 ksf.

Our field and laboratory testing from boring B-16-4 indicates that the gray silty clay soils beneath the site are over-consolidated by about 1.5 ksf.

We estimate that settlement of the glaciomarine clays and outwash sands (westerly side) beneath an individual square footing with a contact pressure of 4 ksf could result in several inches of total post-construction settlement. We estimate that post-construction settlement of the existing medium dense glacial till (easterly side) could be on the order of 1 inch. The estimated post-construction settlement on the westerly side and the anticipated differential settlement between glacial till supported foundations and foundations supported on the glaciomarine clays and outwash sands on the easterly side are not considered within tolerable limits for the proposed structure, if supported on shallow spread footings. Thus, we recommend the structure be supported on driven piles. Alternatively, consideration can be given to ground improvement using rammed aggregate piers (RAPs) or Geo-Concrete Columns (GCCs) to improve ground conditions for spread footing foundation support.

4.3 Pile Foundations

Considering the subsurface findings, steel H-piles and steel pipe piles driven to end-bearing in the glacial till stratum or on bedrock appear well-suited for foundation support of the proposed structure. We understand that the pile type, size, driving criteria and allowable loads will be provided by a design-build contractor using design loading information provided by SGH (project structural engineer). We offer the following common pile types and estimated capacities for preliminary design:

Estimated Pile Capacities		
Pile Type	Section	Estimated Allowable Axial Compressive Capacity (kips)
Concrete Filled Steel Pipe Pile, 46-ksi steel, driven to practical refusal. 0.25" min wall thickness, Closed End, flat plate at tip	10 ¾" diameter 12 ¾" diameter	180 220
Steel H-Pile with cast driving tips, 50-ksi steel, driven to practical refusal. Assumes 1/16" corrosion	HP 12 x 53	190
	HP 12 x 74	290
	HP 14 x 89	340
	HP 14 x 117	500

All grade beams, pile caps and foundations exposed to freezing temperatures should extend at least 4.5 feet below finished grade. Piles should be spaced a minimum center- to-center distance of at least 3 pile diameters, but no less than 30 inches. Piles in groups should be driven from the interior working outward to preclude densification and excessively hard driving conditions on the interior. We recommend that a working mat of at least 8 inches of Crushed Stone be provided below all pile caps and grade beams.

Passive soil lateral resistance acting on grade beams and pile caps backfilled with compacted Select Fill should consider a total unit weight of compacted granular backfill (γ_t) of 125 pcf, an angle of internal friction of 32 degrees and a passive lateral earth pressure coefficient (K_p) of 3.3. Several inches of lateral deflection may be required to fully mobilize passive lateral earth pressures. We recommend that the surficial 3 feet of soil around the structure not be included in passive soil lateral resistance. Additional resistance to lateral loads can be mobilized along the pile shafts. S.W.COLE can assist with evaluation of lateral pile capacity, if requested. Battered piles can be considered to help resist lateral loads.

Considering the depths to glacial till and probable bedrock encountered at test borings B-16-5 and B-16-6 and a first level floor slab elevation 38 feet (project datum), we estimate pile lengths may range from about 55 to 75 feet. Because subsurface conditions vary across the site, the actual tip elevations and lengths of driven piling will vary. To assess this variability and to better refine estimates for pile lengths, we recommend that several test piles be driven at different locations across the site before production piles are driven.

The IBC International Building Code (2009) requires that pile load tests be performed on piles with design capacities over 40 tons (80 kips). We recommend monitoring the test piles with a Pile Driving Analyzer (PDA) to assess pile capacity and to define the "set" or stop driving criteria. In any case, the pile driving contractor should submit information relative to pile driving equipment and a WEAP analysis for geotechnical review prior to beginning driving. S.W.COLE should be retained to review the pile submittal and to observe the test pile program and driving of production piles.

We recommend pre-construction surveys of adjacent structures be completed prior to pile driving and that construction vibrations be monitored. S.W.COLE can assist with pre-construction surveys of adjacent structures and vibration monitoring during construction.

4.4 Spread Footing Foundations

As mentioned above, a specialty ground improvement contractor can be consulted to assess the suitability of the underlying soils for potential ground improvement techniques to support potential spread footings. Footings should be underlain with at least 12 inches of Crushed Stone wrapped in non-woven geotextile filter fabric, such as Mirafi 180N, bearing on properly prepared subgrades as designed by a specialty ground improvement contractor. For foundations bearing on properly prepared subgrades, we offer the following preliminary geotechnical parameters for design consideration following successful ground improvement program:

Geotechnical Parameters for Spread Footings and Foundation Walls	
Design Frost Depth	4.5 feet
Net Allowable Soil Bearing Pressure (Improved Ground)	Estimate 4.0 ksf to be determined by Specialty Contractor
Base Friction Factor	0.35
Total Unit Weight of Backfill (compacted Structural Fill)	130 pcf
Internal Friction Angle of Backfill (compacted Structural Fill)	30°
At-Rest Lateral Earth Pressure Coefficient	0.5
Total Post-Construction Settlement	Determined by Specialty Contractor
Differential Post-Construction Settlement	Determined by Specialty Contractor

We anticipate the RAPs or GCCs would need to extend through existing fills and glaciomarine clays and sands to transfer loads to the underlying stable glacial till soils. If ground improvement is selected, we recommend the contract documents require an engineered submittal for the ground improvement technique to improve ground conditions to meet or exceed the geotechnical parameters for bearing capacity and settlement requirements selected by the structural engineer. The submittal must include QC and modulus testing procedures. We recommend load tests be completed prior to installing production ground improvement elements. The submittal must be

prepared and sealed by a Professional Engineer licensed in the State of Maine and endorsed by the Installer.

4.4 Foundation Walls

Based on the proposed on-grade slab elevation, it appears a deep cut will be needed along Congress and Gilman Streets. We offer the following geotechnical soil parameters for foundation wall design consideration:

Geotechnical Parameters for Foundation Walls	
Design Frost Depth	4.5 feet
Base Friction Factor (concrete on Crushed Stone)	0.35
Subgrade Reaction Modulus, k_s	120 pci
Total Unit Weight of Backfill (compacted Structural Fill)	130 pcf
Internal Friction Angle of Backfill (compacted structural fill)	32°
At-Rest Lateral Earth Pressure Coefficient (K_o)	0.5
At-Rest Lateral Earth Pressure (equivalent fluid)	65 pcf
Surcharge Lateral Area Load Coefficient	0.5

Note: The above parameters do not apply to proposed retaining walls or the existing parking garage wall.

4.5 Slab-On-Grade

We recommend all slab-on-grade areas be over-excavated to allow for at least 12 inches of compacted Crushed Stone overlying a non-woven geotextile fabric such as Mirafi 180N. The on-grade floor slab may be designed using a subgrade reaction modulus of 120 pci (pounds per cubic inch) provided the slab is underlain by at least 12 inches of compacted Crushed Stone overlying a non-woven geotextile fabric and properly prepared subgrades. The structural engineer or concrete consultant must design steel reinforcing and joint spacing appropriate to slab thickness and function.

We recommend a sub-slab vapor retarder particularly in areas of the building where the concrete slab will be covered with an impermeable surface treatment or floor covering that may be sensitive to moisture vapors. The vapor retarder must have a permeance that is less than the floor covering or surface treatment that is applied to the slab. The vapor retarder must have sufficient durability to withstand direct contact with the sub-slab base material and construction activity. The vapor retarder material shall be placed according to the manufacturer's recommended method, including the taping and lapping

of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

Floor slabs should be appropriately cured using moisture retention methods after casting. Typical floor slab curing methods should be used for at least 7 days. The architect or flooring consultant should assign curing methods consistent with current applicable American Concrete Institute (ACI) procedures with consideration of curing method compatibility to proposed surface treatments, flooring and adhesive materials.

4.6 Foundation Drainage

We recommend that an exterior perimeter foundation drainage system be provided near pile cap/foundation subgrade (4.5 feet minimum depth). We also recommend sub-slab underdrains be provided within the Crushed Stone at a spacing of about 15 to 20 feet on center. The underdrain pipe should consist of rigid, 4-inch diameter perforated SDR-35 foundation drain pipe with perforations of ¼ to ½ inch enveloped in 12 inches of MaineDOT 703.22 Underdrain Backfill Type C Crushed Stone bedding wrapped in a non-woven geotextile filter fabric such as Mirafi 180N. The underdrain must have a positive gravity outlet protected from freezing, clogging and backflow. Exterior foundation backfill should be sealed with a surficial layer of clayey or loamy soil in areas that are not to be paved or occupied by entrance slabs in order to reduce surface water infiltration into the foundation backfill. Surface grades should be sloped away from the building for positive surface water drainage. Details of the recommended foundation drainage system are presented on the attached Sheet 21.

4.7 Entrances, Sidewalks and Exterior Slabs

Entrance approaches, sidewalks and exterior slabs should be designed to reduce the effects of differential frost action between doorways and entrances. We recommend that excavations beneath the entire width and length of entrances, sidewalks, and exterior slabs, continue to at least 4.5 feet below finish grade. These areas should be backfilled with compacted non-frost susceptible granular fill meeting the Structural Fill gradation to limit abrupt heave or differential movement. The zone of Structural Fill adjacent to exterior foundations and below entrance slabs and sidewalks should transition up to the bottom of adjacent sidewalk or pavement subbase gravel at a 3H:1V or flatter slope (see details on Sheet 21).

4.8 Excavation, Grading and Dewatering

An erosion control system should be instituted prior to any construction activity at the site to help protect adjacent drainage ways. As much vegetation and existing pavement should remain in-place over areas of inactive construction to lessen the potential for erosion. Excavation work will encounter uncontrolled fills generally consisting of silty sand and gravel, relic foundations and utilities. Below the fills, excavation will encounter stiff brown silty clay and softer gray silty clay. The subgrades will be sensitive to disturbance from construction activity. Construction equipment should not operate directly on wet to saturated subgrades nor on the native silts and clays. Pre-excavating or pre-augering at proposed pile or ground improvement element locations may be needed in some areas. Over-excavated areas should be replaced with compacted Structural Fill or Pavement Subbase, as appropriate. A woven geotextile fabric may be needed below the compacted fill if the subgrade is wet, soft or unstable. The on-site soils are unsuitable for reuse in construction.

Based on the findings at the explorations during drilling, groundwater and wet soil conditions will likely be encountered in foundation excavations deeper than about 10 feet below existing grades. In our opinion, ditching with sump and pump dewatering techniques at a minimum should be anticipated to control groundwater in shallow footing excavations. It may be necessary to place a layer of geotextile filter fabric and crushed stone to act as a drainage media from which to sump and pump. Deeper excavations, will likely require braced sheet pile shoring for groundwater cutoff and excavation stability. In any case, excavations must be properly shored and/or sloped in accordance with OSHA Regulations to prevent sloughing and caving of the excavation.

4.9 Backfill and Compaction

Based on the subsurface findings, the existing site soils are unsuitable for reuse as fill and backfill in building areas but may be reused in landscape areas. We recommend the following fill and backfill materials:

Geotextile Fabrics: Non-woven geotextile fabric (such as Mirafi 180N) for use as a filter media fully wrapping the Crushed Stone surrounding the underdrain piping. Woven geotextile fabric (such as Mirafi 600X) for use in areas requiring over-excavation and for silty clay subgrades beneath floor slab areas. Geotextile fabric is not recommended at proposed pile locations.

Structural Fill: Backfill below floor slabs, entrance slabs, exterior slabs, in depressions left from removal of existing foundations and adjacent to new foundations should consist of clean, non-frost susceptible sand and gravel meeting the following gradation requirements.

Structural Fill	
Sieve Size	**Percent Finer by Weight**
4 inch	100
3 inch	90 to 100
¼ inch	25 to 90
#40	0 to 30
#200	0 to 5

Crushed Stone: Crushed Stone used around underdrains and as the working mat at all pile cap and grade beam locations should consist of crushed rock meeting the gradation requirements of MaineDOT Standard Specifications 703.22 "Underdrain Backfill Type C".

MaineDOT 703.22 Underdrain Backfill Type C – Crushed Stone	
Sieve Size	**Percent Finer by Weight**
1 inch	100
¾ inch	90-100
⅜ inch	0-75
#4	0-25
#10	0-5

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose lift thicknesses for grading, fill and backfill activities should not exceed 12 inches. We recommend that fill and backfill in building areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Crushed Stone should be compacted in loose lifts not exceeding 12 inches with a vibratory plate compactor with a static weight of at least 500 pounds. Soft or yielding areas should be over excavated and replaced with the woven geotextile fabric and additional sub base aggregates.

4.10 Pavement

We anticipate that asphalt pavement is proposed in entrance drives and some sidewalk areas. We also anticipate pavement will be primarily subjected to passenger vehicle and light delivery truck traffic. Considering the site soils and proposed usage, we offer the following pavement section for consideration. Materials are based on 2014 Maine Department of Transportation (MaineDOT) Standard Specifications.

Pavement Layer	Standard Duty
MaineDOT 9.5 mm Hot Mix Asphalt (50 Gyration Design)	1¼ inches
MaineDOT 19.0 mm Hot Mix Asphalt (50 Gyration Design)	2¼ inches
MaineDOT 703.06 Aggregate Base Type A	3 inches
MaineDOT 703.06 Aggregate Sub base Type D	15 inches

We recommend placing woven geotextile fabric such as Mirafi 600X on silty or clayey subgrades prior to placing subbase material. Soft or yielding areas should be over excavated and replaced with additional subbase aggregate underlain by woven geotextile fabric, as needed.

The base and subbase materials should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D-1557. The surface and binder layers of hot mix asphalt should ideally be placed during the same construction season. We recommend that bituminous pavements be compacted to 92 to 97 percent of their theoretical maximum densities as determined by ASTM D-2041. A tack coat should be used between successive lifts of bituminous pavement.

It should be understood that frost penetration can be on the order of 4.5 feet in this area. In the absence of full depth excavation of frost susceptible soils below paved areas and subsequent replacement with non-frost susceptible compacted fill, frost penetration into the subgrade will occur and some heaving and distress of pavement must be anticipated. We recommend consideration be given to providing perimeter drainage swales and underdrains beneath paved areas to help drain pavement gravels.

4.11 Weather Considerations

Subgrades, foundations and floor slabs must be protected from freezing conditions. Fill soils and concrete must not be placed on frozen soil and once placed, the soil beneath the structure must be protected from freezing. Further, the uncontrolled fills and native site soils are moisture sensitive and as such subgrades will be susceptible to disturbance during wet and freeze-thaw conditions. Consequently, site work and construction activities should take appropriate measures to protect exposed subgrades, particularly during wet and freezing conditions. This may require the use of temporary haul roads and staging areas to preclude subgrade damage due to construction traffic. Geotextile fabric may also be needed below haul roads, staging and proposed slabs to help stabilize subgrades.

4.12 Design Review and Construction Testing

S.W.COLE should be retained to review the construction documents before bidding to determine that our earthwork, foundation and pavement recommendations have been properly interpreted and implemented.

S.W.COLE should be retained to provide geotechnical observation and testing services for the piling, excavation and foundation phases of construction. This is to observe compliance with the design recommendations, drawings and specifications and to allow design changes in the event that subsurface conditions are found to differ from those anticipated prior to the start of construction.

A Special Inspections program including observation of pile installation, reinforced concrete, structural masonry and structural steel should also be implemented during construction to observe compliance with the construction documents. S.W.COLE is available to provide Special Inspections and testing services for piling, soils, concrete, steel, spray-applied fireproofing and asphalt construction materials.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you as the design progresses and during the construction.

Sincerely,

S. W. Cole Engineering, Inc.

Paul F. Kohler, P.E.
Senior Geotechnical Engineer

PFK:tjb-mas/jlm

Attachment A
Limitations

This report has been prepared for the exclusive use of Maine Medical Center for specific application to the proposed Medical Office Building project located on the southeasterly side of the intersection of Gilman and Congress Streets in Portland, Maine. Information provided in this report from the nearby proposed Gilman Street Parking Garage site or other past projects is included for informational purposes. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

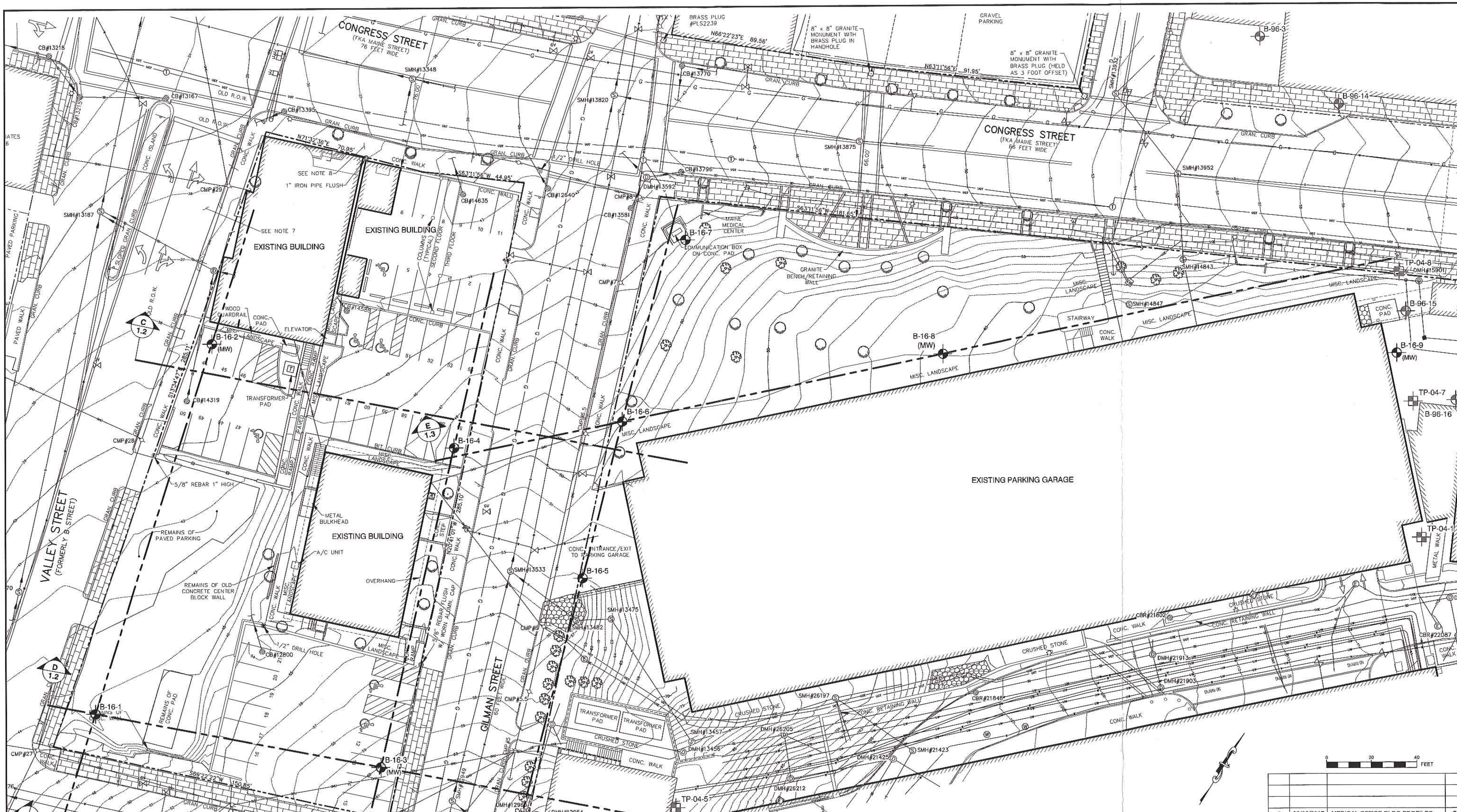
The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.



LEGEND:

- APPROXIMATE BORING LOCATION
- (MW) APPROXIMATE BORING LOCATION WITH PIEZOMETER INSTALLED
- APPROXIMATE HISTORIC BORING LOCATION
- APPROXIMATE HISTORIC TEST PIT LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A 1"=20' SCALE PLAN OF THE SITE ENTITLED "EXISTING CONDITIONS SURVEY," PREPARED BY SEBAGO TECHNICS, DATED 10/23/2009, REVISED 12/23/2009.
2. THE BORINGS WERE LOCATED IN THE FIELD BY TAPED MEASUREMENTS FROM EXISTING SITE FEATURES.
3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE APPROXIMATE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

NO.	DATE	DESCRIPTION	BY
2	02/20/2017	MEDICAL OFFICE BLDG PROFILES	CEM
1	01/12/2017	ADD GEOLOGIC PROFILE LINES	CEM
0	01/06/2017	PRELIMINARY FINDINGS SUBMISSION	CEM

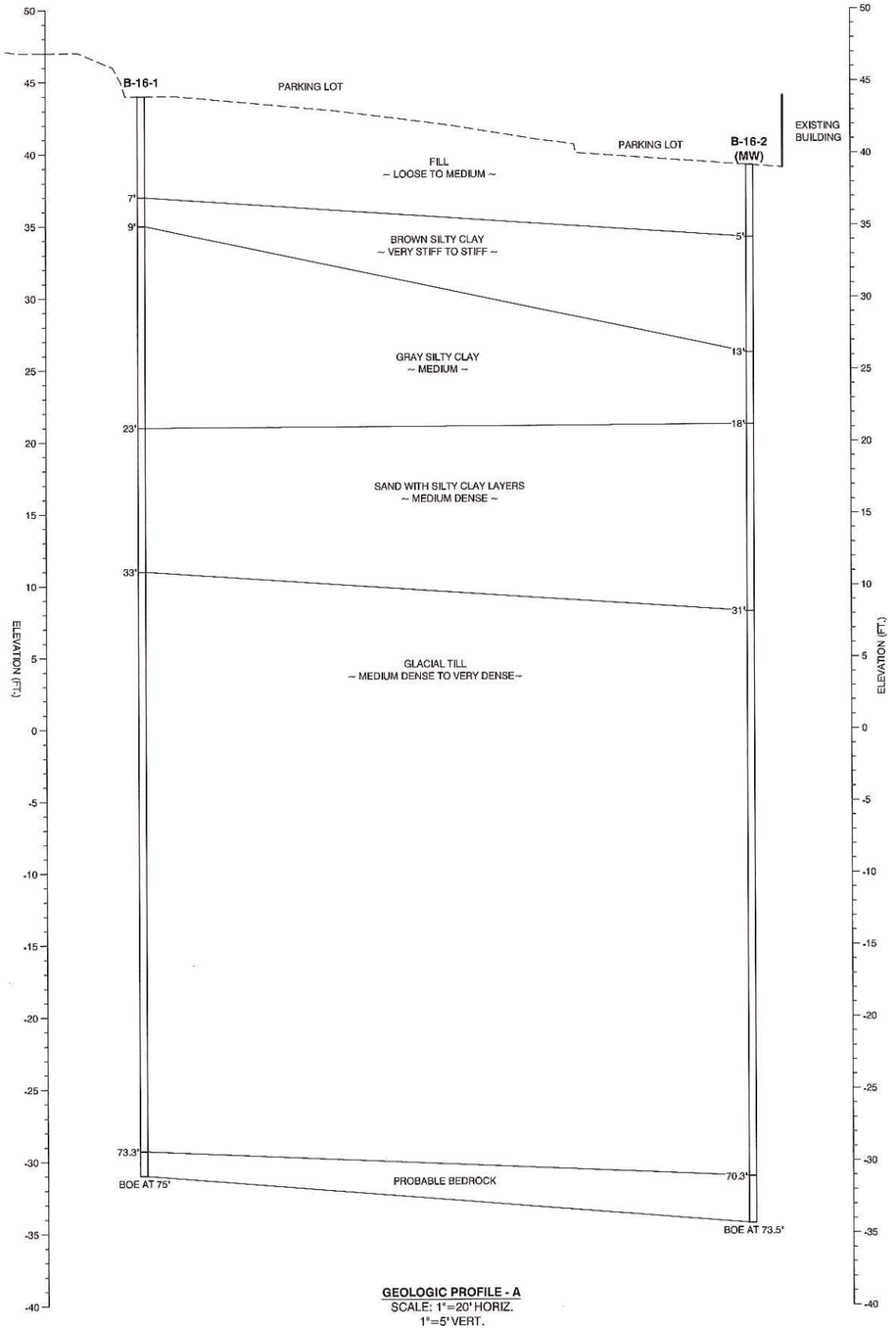
S.W.COLE ENGINEERING, INC.

MAINE MEDICAL CENTER

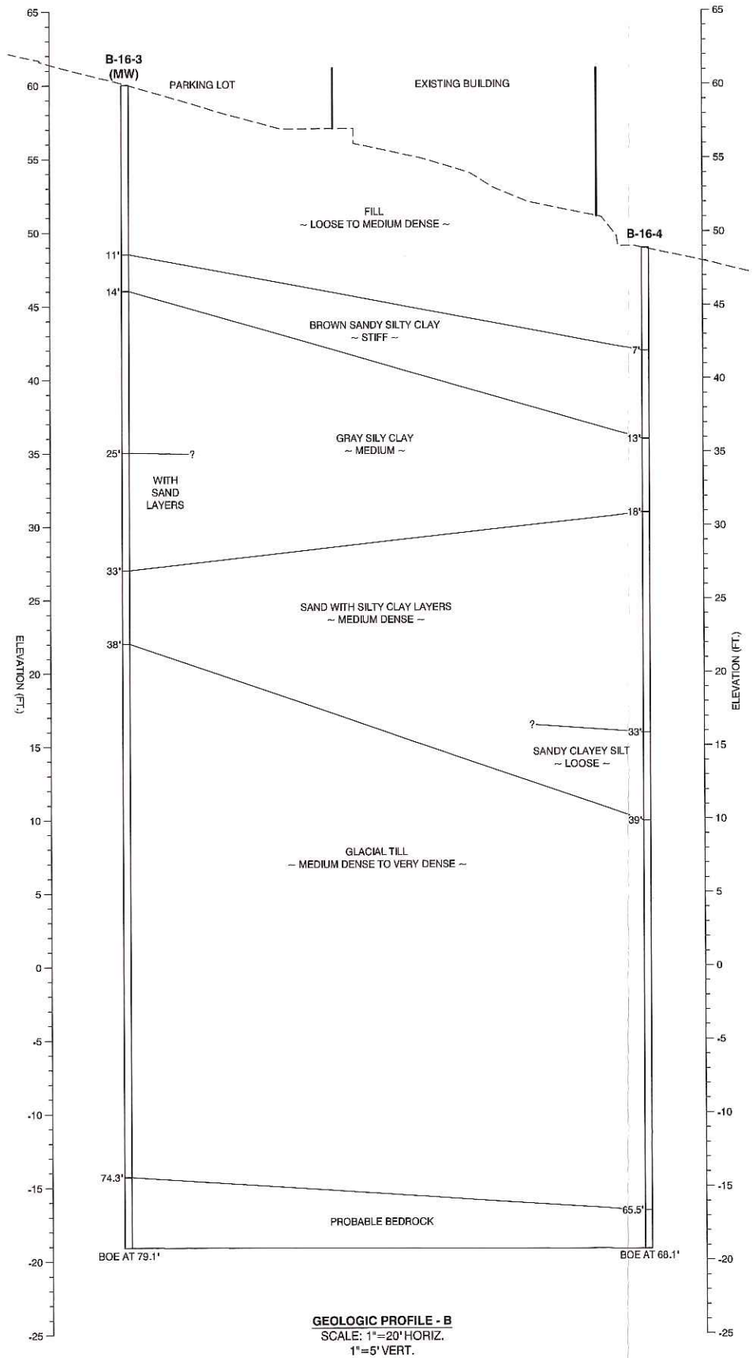
EXPLORATION LOCATION PLAN

PROPOSED PARKING GARAGE AND
CONGRESS STREET BUILDING
GILMAN AND CONGRESS STREETS
PORTLAND, MAINE

Job No.:	16-1136	Scale:	1" = 20'
Date :	01/06/2017	Sheet:	1



GEOLOGIC PROFILE - A
SCALE: 1"=20' HORIZ.
1"=5' VERT.



GEOLOGIC PROFILE - B
SCALE: 1"=20' HORIZ.
1"=5' VERT.

LEGEND

B-16-4 (MW)	BORING NUMBER PIEZOMETER INSTALLED
	APPROXIMATE EXISTING GROUND SURFACE
7'	STRATA CHANGE
SILT	STRATA DEFINITION
BOE	BOTTOM OF EXPLORATION

NOTES:

1. THE DEPTH AND THICKNESS OF THE SUBSURFACE STRATA INDICATED ON THE SECTION WERE GENERALIZED FROM AND INTERPOLATED BETWEEN EXPLORATION LOCATIONS. THE TRANSITION BETWEEN MATERIALS MAY BE MORE OR LESS GRADUAL THAN INDICATED. INFORMATION ON ACTUAL SUBSURFACE CONDITIONS EXISTS ONLY AT THE SPECIFIC LOCATIONS INDICATED AND AT THE TIME OF EXPLORATION. SEE BORING LOGS FOR MORE DETAILED INFORMATION.

NO.	DATE	DESCRIPTION	BY
0	01/12/2017	PRELIMINARY FINDINGS SUBMISSION	CEM

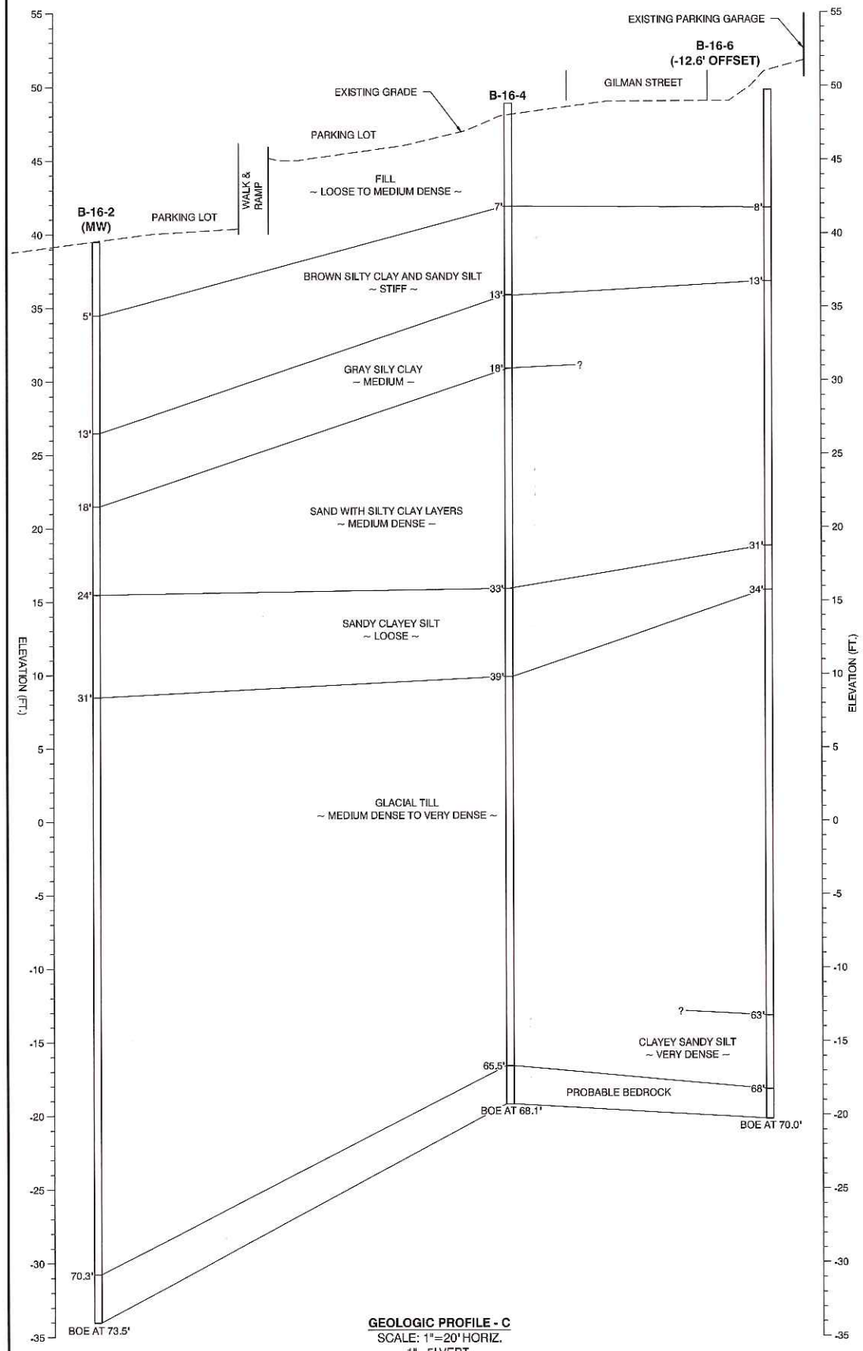
S.W. COLE ENGINEERING, INC.

MAINE MEDICAL CENTER

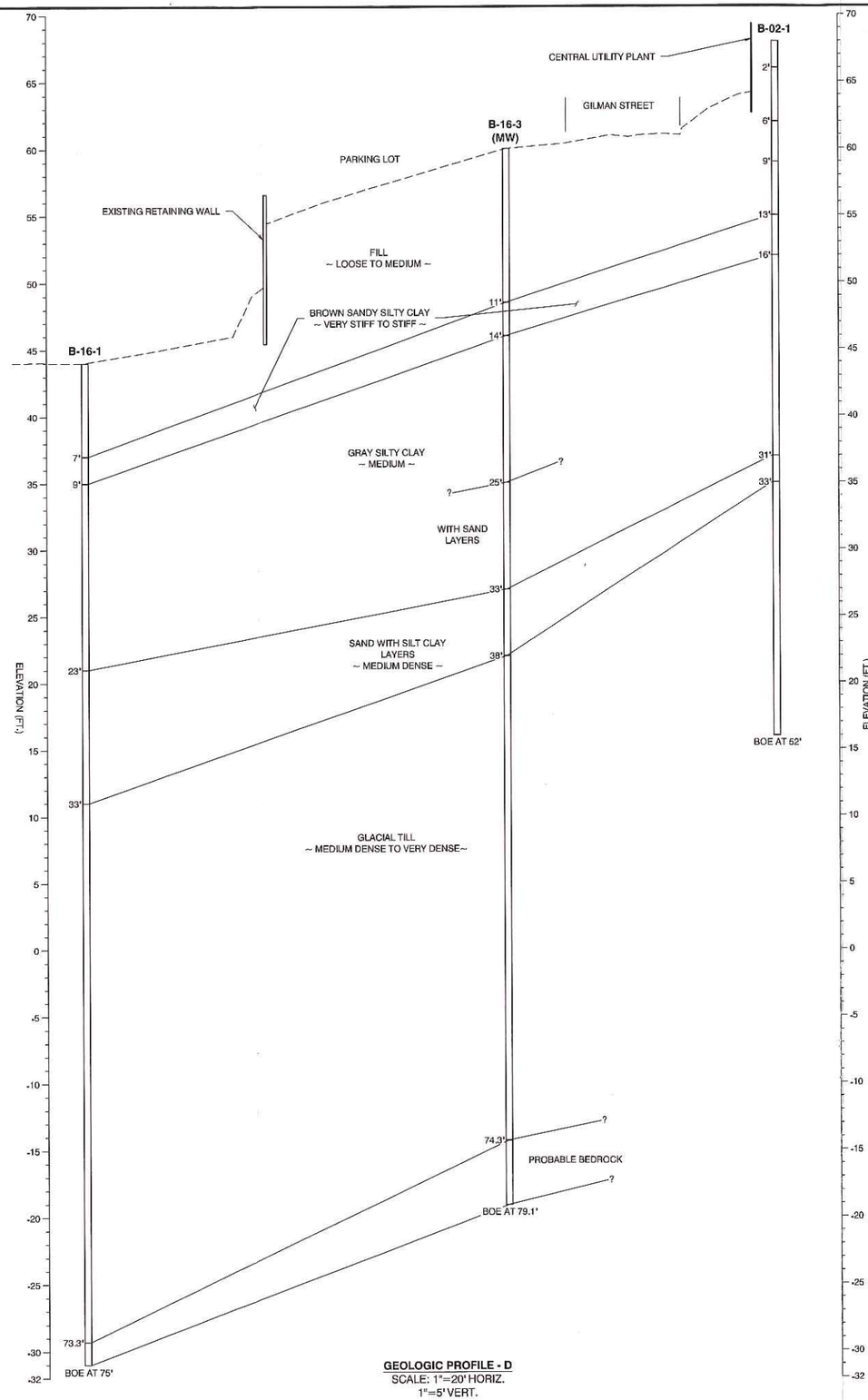
GEOLOGIC PROFILES A & B

PROPOSED PARKING GARAGE AND
CONGRESS STREET BUILDING
GILMAN AND CONGRESS STREETS
PORTLAND, MAINE

Job No.: 16-1136 Scale: 1" = 20'
Date : 01/12/2017 Sheet: 1.1



GEOLOGIC PROFILE - C
SCALE: 1"=20' HORIZ.
1"=5' VERT.



GEOLOGIC PROFILE - D
SCALE: 1"=20' HORIZ.
1"=5' VERT.

LEGEND

B-16-4 (MW)	BORING NUMBER PIEZOMETER INSTALLED
7'	APPROXIMATE EXISTING GROUND SURFACE STRATA CHANGE
SILT	STRATA DEFINITION
BOE	BOTTOM OF EXPLORATION

NOTES:

1. THE DEPTH AND THICKNESS OF THE SUBSURFACE STRATA INDICATED ON THE SECTION WERE GENERALIZED FROM AND INTERPOLATED BETWEEN EXPLORATION LOCATIONS. THE TRANSITION BETWEEN MATERIALS MAY BE MORE OR LESS GRADUAL THAN INDICATED. INFORMATION ON ACTUAL SUBSURFACE CONDITIONS EXISTS ONLY AT THE SPECIFIC LOCATIONS INDICATED AND AT THE TIME OF EXPLORATION. SEE BORING LOGS FOR MORE DETAILED INFORMATION.

NO.	DATE	DESCRIPTION	BY
0	01/12/2017	PRELIMINARY FINDINGS SUBMISSION	CEM

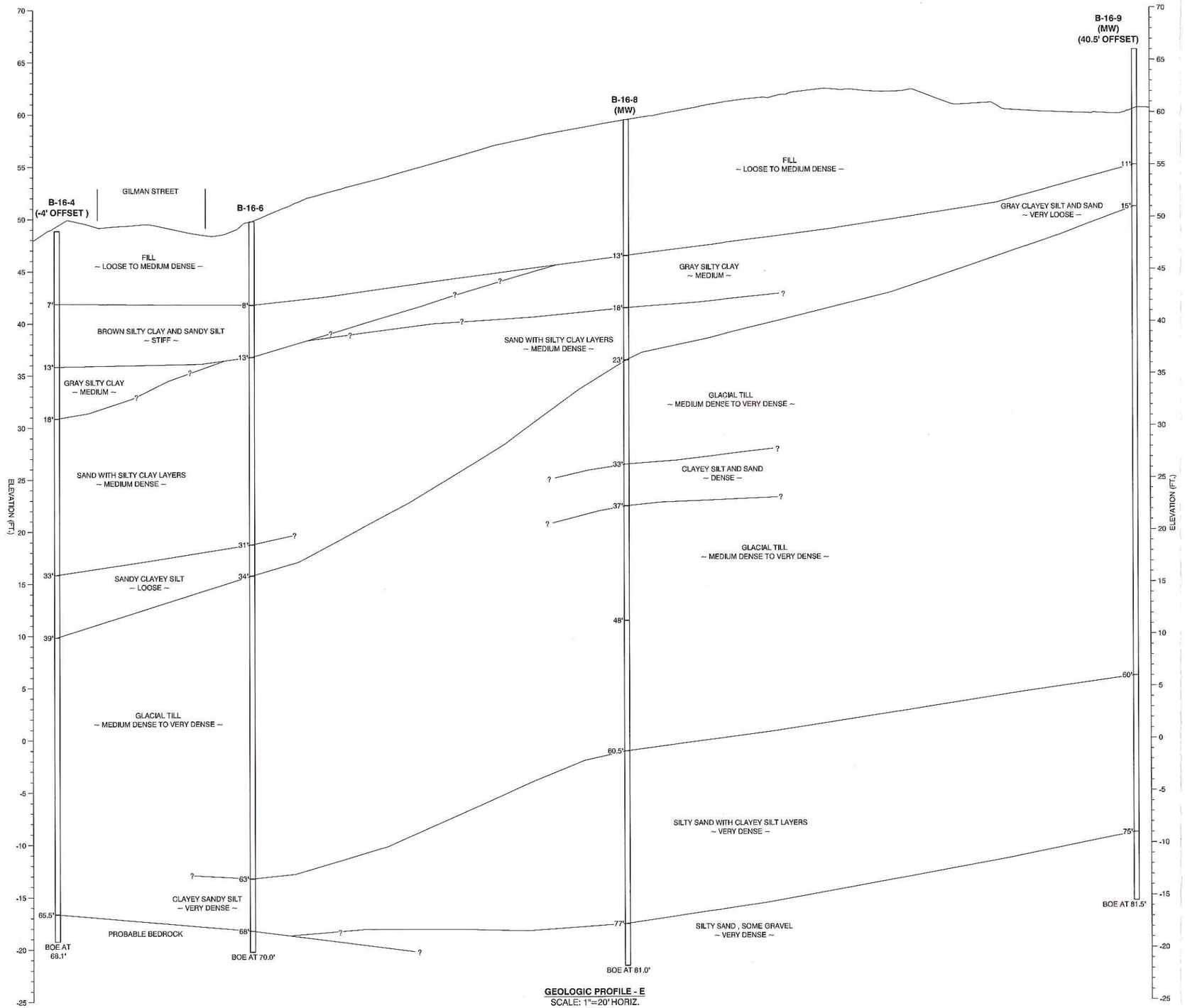
S.W. COLE ENGINEERING, INC.

MAINE MEDICAL CENTER

GEOLOGIC PROFILES C & D

PROPOSED PARKING GARAGE AND
CONGRESS STREET BUILDING
GILMAN AND CONGRESS STREETS
PORTLAND, MAINE

Job No.: 16-1136 Scale: 1" = 20'
Date: 01/12/2017 Sheet: 1.2



GEOLOGIC PROFILE - E
SCALE: 1"=20' HORIZ.
1"=5' VERT.

LEGEND

B-16-4 (MW)	BORING NUMBER PIEZOMETER INSTALLED
	APPROXIMATE EXISTING GROUND SURFACE
7'	STRATA CHANGE
SILT	STRATA DEFINITION
BOE	BOTTOM OF EXPLORATION

NOTES:

1. THE DEPTH AND THICKNESS OF THE SUBSURFACE STRATA INDICATED ON THE SECTION WERE GENERALIZED FROM AND INTERPOLATED BETWEEN EXPLORATION LOCATIONS. THE TRANSITION BETWEEN MATERIALS MAY BE MORE OR LESS GRADUAL THAN INDICATED. INFORMATION ON ACTUAL SUBSURFACE CONDITIONS EXISTS ONLY AT THE SPECIFIC LOCATIONS INDICATED AND AT THE TIME OF EXPLORATION. SEE BORING LOGS FOR MORE DETAILED INFORMATION.

NO.	DATE	DESCRIPTION	BY
0	02/20/2017	PRELIMINARY FINDINGS SUBMISSION	CEM

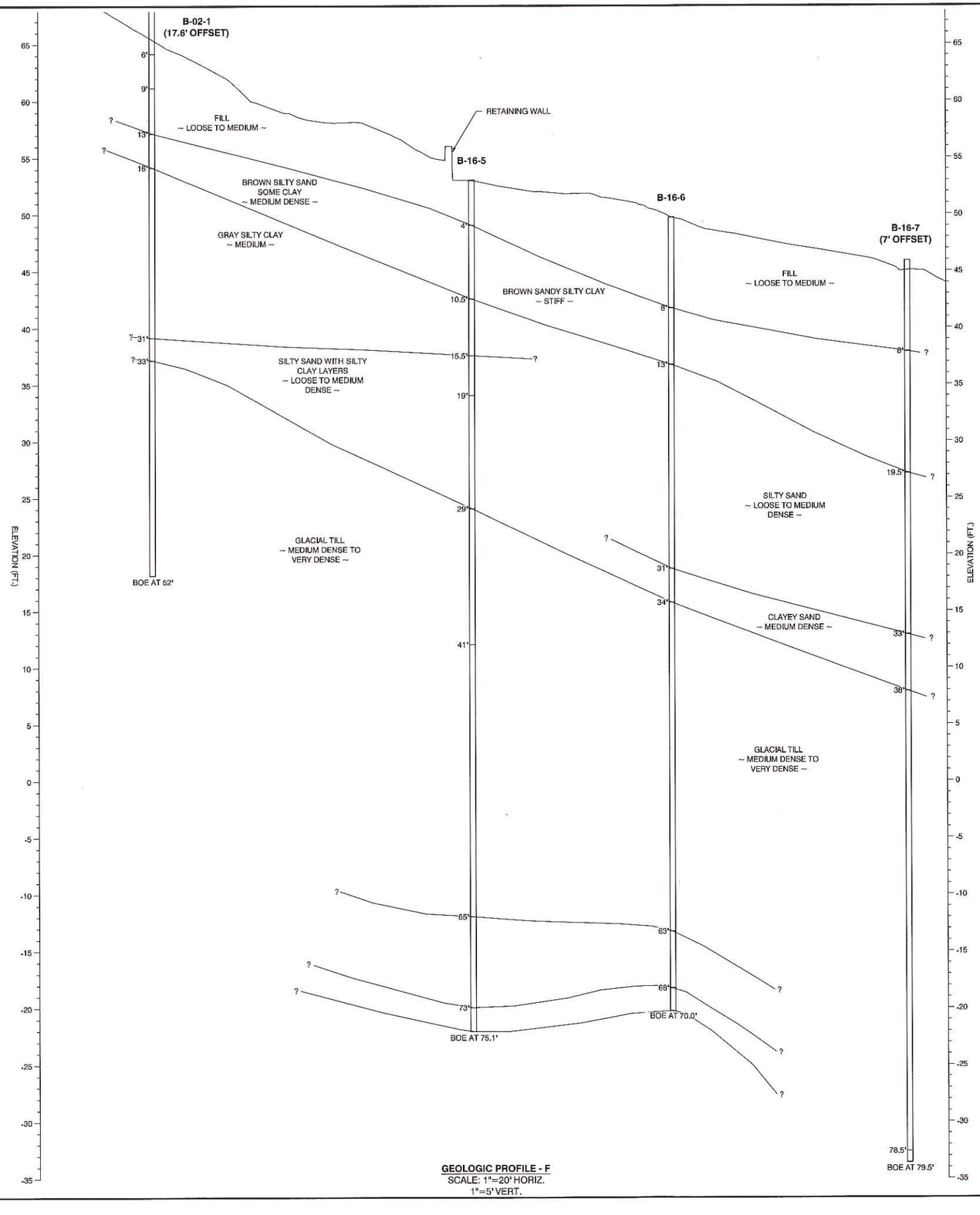
S.W.COLE ENGINEERING, INC.

MAINE MEDICAL CENTER

GEOLOGIC PROFILE E

PROPOSED PARKING GARAGE AND
CONGRESS STREET BUILDING
GILMAN AND CONGRESS STREETS
PORTLAND, MAINE

Job No.: 16-1136 Scale: 1" = 20'
Date : 02/20/2017 Sheet: 1.3



GEOLOGIC PROFILE - F
SCALE: 1"=20' HORIZ.
1"=5' VERT.

LEGEND

B-16-4 (MW)	BORING NUMBER PIEZOMETER INSTALLED
~ ~	APPROXIMATE EXISTING GROUND SURFACE
7'	STRATA CHANGE
SILT	STRATA DEFINITION
BOE	BOTTOM OF EXPLORATION

NOTES:

1. THE DEPTH AND THICKNESS OF THE SUBSURFACE STRATA INDICATED ON THE SECTION WERE GENERALIZED FROM AND INTERPOLATED BETWEEN EXPLORATION LOCATIONS. THE TRANSITION BETWEEN MATERIALS MAY BE MORE OR LESS GRADUAL THAN INDICATED. INFORMATION ON ACTUAL SUBSURFACE CONDITIONS EXISTS ONLY AT THE SPECIFIC LOCATIONS INDICATED AND AT THE TIME OF EXPLORATION. SEE BORING LOGS FOR MORE DETAILED INFORMATION.

NO.	DATE	DESCRIPTION	BY
0	02/20/2017	PRELIMINARY FINDINGS SUBMISSION	CEM

S.W. COLE ENGINEERING, INC.

MAINE MEDICAL CENTER

GEOLOGIC PROFILE F

PROPOSED PARKING GARAGE AND
CONGRESS STREET BUILDING
GILMAN AND CONGRESS STREETS
PORTLAND, MAINE

Job No.: 16-1136 Scale: 1" = 20'
Date: 02/20/2017 Sheet: 1.4

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-1**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 11/21/2016
DATE FINISH: 11/21/2016
ELEVATION: 44' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: KEVIN HANSCOM

	TYPE	SIZE O.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 10'
FREE WATER AT 4.3' PRIOR TO CASING

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
SSA									0.5'	LAWN AREA / DARK BROWN SANDY SILT (FILL) ~LOOSE~
	1D	24"	13"	2.0'	4	11	9	10		~MEDIUM DENSE~ GRAY-BROWN-BLACK GRAVELLY SILTY SAND WITH CONCRETE PIECES, BRICK, WIRE (FILL)
									4.0'	
	2D	24"	12"	7.0'	8	20	10	4	7.0'	CONCRETE / PROBABLE RELIC BUILDING FOUNDATION / SLAB (FILL) ~MEDIUM DENSE~
									9.0'	GRAY-BROWN SILTY CLAY
4" HW										~MEDIUM~ GRAY SILTY CLAY
	3D	24"	22"	12.0'	1	1	1	1		w= 39.7% q_p = < 0.5 ksf
OPEN										
HOLE	1S	24"	24"	17.0'	3" SHELBY TUBE					w= 28.2% W_L = 42 W_P = 20
	1V			18.0'	3 5/8" X 6" VANE					S_v = 0.85 ksf / 0.22 ksf
	1V'			18.7'	3 5/8" X 6" VANE					S_v = 0.98 ksf / 0.15 ksf
									23.0'	
	4D	24"	17"	27.0'	9	12	13	15		GRAY-BROWN SAND, SOME SILT ~MEDIUM DENSE~
	5D	24"	14"	32.0'	10	9	6	5	31.7'	w = 22.7%
									33.0'	GRAY SILTY SAND WITH CLAY LAYERS
	6D	24"	14"	37.0'	6	5	7	8		DARK GRAY SILTY SAND, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES ~MEDIUM DENSE BECOMING...

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-1**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-1**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 11/21/2016
DATE FINISH: 11/21/2016
ELEVATION: 44' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: KEVIN HANSCOM

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 10'
FREE WATER AT 4.3' PRIOR TO CASING

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										GRAY GRAVELLY SAND AND SILT (GLACIAL TILL)
	7D	24"	17"	42.0'	9	16	28	25		w = 10.7%
										...DENSE~
	8D	24"	8"	47.0'	16	18	19	36		
	9D	24"	14"	52.0'	14	24	29	33		~VERY DENSE~
	10D	17"	12"	56.4'	23	46	52/5"			
										GRAY GRAVELLY SAND AND SILT (GLACIAL TILL)
	11D	24"	20"	61.9'	37	44	52	51/5"		w = 7.3%
	12D	15"	12"	66.2'	24	47	50/3"			
	13D	22"	20"	71.8'	26	28	34	52/4"		GRAY SILT AND SAND, TRACE GRAVEL (GLACIAL TILL)
										w = 15.9%
									73.3'	
									75.0'	ADVANCED BY ROLLER CONE (PROBABLE BEDROCK)
										BOTTOM OF EXPLORATION AT 75.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-1**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-2**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 11/22/2016
DATE FINISH: 11/23/2016
ELEVATION: 39' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: KEVIN HANSCOM

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 22.5' IN PIEZO ON 12/11/2016
WATER AT 22.3' IN PIEZO ON 1/4/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
SSA										2 ¾" ASPHALT / PARKING LOT
									1.5'	BROWN GRAVELY SAND, SOME SILT (FILL) ~MEDIUM DENSE~
	1D	24"	15"	2.6'	8	7	3	2		~LOOSE~
									4.0'	GRAY SILTY SAND (FILL) PETROLEUM ODOR / PID = 3,050 PPM
	2D	24"	20"	4.6'	4	4	4	4	5.0'	GRAY-BROWN CLAYEY SANDY SILT (REWORKED / FILL) ~LOOSE~
										~VERY STIFF~
	3D	24"	22"	7.0'	6	5	8	9		BROWN SILTY CLAY q_p = 6.5 to 8 ksf
										w = 26.8%
4" HW										~STIFF~
	4D	24"	22"	12.0'	2	3	4	3		WITH OCCASIONAL SAND SEAMS, q_p = 3 to 4 ksf
									13.0'	
OPEN										~MEDIUM~
HOLE	5D	24"	14"	17.0'	W O H	1	2	3		GRAY SILTY CLAY
TO 40'										w = 36.6% q_p = < 0.5 ksf
THEN									18.0'	
4" HW										
TO 30'										~MEDIUM DENSE~
	6D	24"	14"	22.0'	6	5	8	9		BROWN SILTY SAND
									24.0'	
	7D	24"	17"	27.0'	3	8	11	10		~MEDIUM DENSE~
										RUST BROWN - BROWN SILTY SAND
										WITH GRAY SILTY CLAY LAYERS
									31.0'	
	8D	24"	20"	32.0'	1	9	8	9		~MEDIUM DENSE~
OPEN										
HOLE										DARK GRAY SILT AND SAND, SOME GRAVEL (GLACIAL TILL)
										OCCASIONAL COBBLES
	9D	24"	18"	37.0'	7	10	13	18		

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 22.6'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-2**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-2**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 11/22/2016
DATE FINISH: 11/23/2016
ELEVATION: 39' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: KEVIN HANSCOM

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 22.5' IN PIEZO ON 12/11 AND 1/4/2016
WATER AT 22.3' IN PIEZO ON 1/4/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										~DENSE~
	10D	24"	18"	42.0'	7	11	21	27		DARK GRAY SAND AND SILT, SOME GRAVEL, TRACE CLAY (GLACIAL TILL) w = 10.9%
	11D	24"	1"	47.0'	7	8	9	6		~MEDIUM DENSE~
	12D	24"	22"	52.0'	7	9	11	24		~MORE SILTY AND CLAYEY~
	13D	11"	11"	55.9'	41	74/5"				~VERY DENSE~
									57.0'	
	14D	11"	11"	60.9'	28	60/5"				~VERY DENSE~ GRAY SILT AND SAND, SOME CLAY, TRACE GRAVEL (GLACIAL TILL) w = 39.6%
	15D	5"	5"	65.4'	50/5"					~MORE SAND~
									68.0'	
	16D	4"	4"	70.3'	50/4"				70.3'	~VERY DENSE~ GRAY GRAVELLY SAND AND SILT, SOME CLAY (GLACIAL TILL)
									73.5'	ADVANCED BY ROLLER CONE (PROBABLE BEDROCK)
										BOTTOM OF EXPLORATION AT 73.5'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 22.6'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-2**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-3**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 11/30/2016
DATE FINISH: 11/30/2016
ELEVATION: 60' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 10'±
WATER AT 35.3' IN PIEZO ON 12/11 AND 1/5/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										3" ASPHALT / PARKING LOT
									2.0'	DARK BROWN SILTY SAND, SOME GRAVEL (FILL) ~MEDIUM DENSE~
	1D	24"	14"	2.3'	4	4	7	5		~LOOSE~
										LIGHT BROWN GRAVELLY SAND, SOME SILT (FILL)
	2D	24"	10"	4.3'	4	5	3	4	5.0'	
										~MEDIUM DENSE~
	3D	24"	20"	6.3'	3	4	6	4		BROWN CLAYEY SILTY FINE SAND, SOME GRAVEL (PROBABLE FILL)
										w = 29.2%
	4D	24"	18"	12.0'	2	6	4	2	11.5'	
										BROWN SANDY SILTY CLAY
									14.0'	~MEDIUM TO STIFF~
	5D	24"	24"	16.0'	W O R / 24"					GRAY SILTY CLAY q_p = ≤ 0.5 ksf
										~MEDIUM~
										w = 40.6%
	1S	24"	24"	21.0'	3" SHELBY TUBE					W_L = 48
										W_P = 20
	1V			22.7'	3 5/8" X 6" VANE					S_v = 1.00 ksf / 0.13 ksf
	1V'			23.4'	3 5/8" X 6" VANE					S_v = 0.99 ksf / 0.16 ksf
	6D	24"	24"	26.0'	W O H / 18"			2	25.5'	w = 36.9%
										PROBABLE GRAY SILTY CLAY WITH SAND LAYERS
	2V			29.7'	3 5/8" X 6" VANE					S_v = ≥ 1.00 ksf
										(NO ROTATION)
									33.0'	
										~MEDIUM DENSE~
	7D	24"	15"	36.0'	8	11	14	19		LIGHT BROWN SAND, SOME SILT
									38.0'	
										GRAY SAND AND SILT, SOME CLAY, TRACE GRAVEL (GLACIAL TILL)
										OCCASIONAL COBBLES

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 36.7'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-3**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-3**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 11/30/2016
DATE FINISH: 11/30/2016
ELEVATION: 60' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 10'±
WATER AT 35.3' IN PIEZO ON 12/11 AND 1/5/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	8D	24"	16"	41.0'	9	12	12	12		~MEDIUM DENSE~
	9D	24"	21"	46.0'	5	12	8	9		GRAY SAND AND SILT, SOME CLAY, SOME GRAVEL (GLACIAL TILL) w = 12.1%
	10D	24"	22"	51.0'	12	14	11	13		
	11D	24"	16"	56.0'	11	13	19	26		
	12D	24"	10"	61.0'	45	19	49	50/5"		~VERY DENSE~ ...MORE GRAVEL...
	13D	23"	15"	65.9'	24	35	46	50/5"		
	14D	11"	8"	69.9'	43	50/5"			71.0'	
	15D	3"	3"	74.3'	50/3"				74.3'	~VERY DENSE~ PROBABLE GLACIAL TILL AND WEATHERED ROCK
										ADVANCED BY ROLLER CONE (PROBABLE BEDROCK)
	16D	1"	0"	79.1'	50/1"				79.1'	BOTTOM OF EXPLORATION AT 79.1'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 36.7'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-3**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-4**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 11/30/2016
DATE FINISH: 12/1/2016
ELEVATION: 49' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET AT 4.5' ±
FREE WATER AT 20' ± ON 12/2/16

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
H S A										3"± ASPHALT / PARKING LOT
									1.0'	BROWN GRAVELLY SAND, SOME SILT (FILL) ~LOOSE~
	1D	24"	15"	2.4'	6	4	3	2	2.1'	BROWN SAND, SOME SILT (FILL) ~LOOSE~
									4.5'	DARK BROWN SAND AND SILT (FILL) ~LOOSE~
	2D	24"	4"	4.4'	3	3	3	2		
									5.5'	BROWN SAND, SOME SILT (FILL) ~LOOSE TO MEDIUM DENSE~
	3D	24"	18"	6.4'	4	6	7	5		~MEDIUM DENSE~
									7.0'	BROWN SANDY CLAYEY SILT, TRACE GRAVEL (FILL)
										~STIFF~
										BROWN SILTY CLAY
4" HW	4D	24"	20"	11.0'	3	4	5	5		WITH FREQUENT SAND SEAMS q_p = 4 to 5 ksf
									13.0'	
										~MEDIUM~
										GRAY-BROWN SILTY CLAY
OPEN	5D	24"	22"	16.0'	2	2	2	3		WITH OCCASIONAL SAND SEAMS q_p = 1 to 2 ksf
HOLE										
TO 50'									18.0'	
THEN										
4" HW										~MEDIUM DENSE~
TO 44'	6D	24"	12"	21.0'	12	7	12	13		
										BROWN SAND, SOME SILT
										WITH OCCASIONAL GRAY CLAYEY SILT SEAMS
										SOME GRAVEL BELOW 25'
	7D	24"	12"	26.0'	6	12	11	9		
									29.0'	
										~MEDIUM DENSE~
	8D	24"	10"	31.0'	7	5	6	14		RUST BROWN-BROWN SAND WITH
										GRAY CLAYEY SILT LAYERS
									33.0'	
										~LOOSE~
	9D	24"	2"	36.0'	2	2	5	5		GRAY-BROWN SANDY CLAYEY SILT
									39.0'	
										DARK GRAY SILT AND SAND, TRACE GRAVEL (GLACIAL TILL)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-4**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-4**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 11/30/2016
DATE FINISH: 12/1/2016
ELEVATION: 49' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET AT 4.5' ±
FREE WATER AT 20' ± ON 12/2/16

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24
	10D	24"	18"	41.0'	4	5	6	9
	11D	24"	16"	47.0'	12	12	19	18
	12D	17"	17"	51.4'	46	45	50/5"	
	13D	18"	18"	56.5'	25	34	50	
	14D	22"	20"	61.8'	17	22	38	50/4"
	15D	2"	2"	65.2'	50/2"			
	16D	1"	1"	68.1'	50/1"			

DEPTH	STRATA & TEST DATA
	~MEDIUM DENSE~ GRAY SILT AND SAND, SOME CLAY, TRACE GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES ~DENSE~ ...MORE GRAVEL... ~VERY DENSE~
65.5'	
	ADVANCED BY ROLLER CONE (PROBABLE BEDROCK)
68.1'	
	BOTTOM OF EXPLORATION AT 68.1'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-4**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-5**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 12/1/2016
DATE FINISH: 12/2/2016
ELEVATION: 53' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
FREE WATER AT 4.5' DURING DRILLING

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
SSA									0.5'	6"± CONCRETE
	1D	24"	12"	2.5'	4	6	5	5	4.0'	~MEDIUM DENSE~ BROWN GRAVELLY SAND, SOME SILT (FILL)
	2D	24"	22"	7.0'	3	3	3	5	10.5'	~STIFF~ BROWN SILTY CLAY WITH FREQUENT FINE SAND SEAMS q_p = 3 to 4 ksf ~MEDIUM~ q_p = 1.5 ksf
	3D	24"	22"	12.0'	2	1	2	3	15.5'	~MEDIUM~ q_p = < 0.5 ksf GRAY SILTY CLAY WITH FREQUENT SAND SEAMS / LAYERS
4" HW										
	4D	24"	23"	17.0'	2	3	6	6	19.0'	~LOOSE~ BROWN SILTY SAND WITH GRAY CLAYEY SILT LAYERS
	5D	24"	12"	22.0'	12	11	10	14	25.0'	~MEDIUM DENSE~ RUST BROWN-BROWN FINE SAND, WITH CLAYEY SILT LAYERS
	6D	24"	11"	27.0'	12	14	16	18	29.0'	~MEDIUM DENSE~ w = 13.6% LIGHT BROWN SAND, SOME SILT
	7D	24"	16"	32.0'	10	8	7	9		~MEDIUM DENSE~ GRAY CLAYEY SILTY SAND, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES
	8D	24"	1"	37.0'	13	14	20	22		~DENSE~

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-5**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-5**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 12/1/2016
DATE FINISH: 12/2/2016
ELEVATION: 53' +/-
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
FREE WATER AT 4.5' DURING DRILLING

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									41.0'	
	9D	24"	14"	42.0'	13	12	56	35		~VERY DENSE~
	10D	8"	6"	45.6'	33	50/2"				DARK GRAY SAND AND SILT, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES w = 9.9%
	11D	24"	24"	52.0'	21	27	35	48		
	12D	24"	22"	57.0'	23	38	38	55		~VERY DENSE~
	13D	18"	17"	61.5'	36	33	50			w = 8.6%
									65.0'	
	14D	24"	20"	67.0'	26	30	23	63		~VERY DENSE~ w = 28.4% DARK GRAY CLAYEY SILT, SOME SAND
	15D	2"	2"	70.1'	50/2"				73.0'	
									75.1'	ADVANCED BY ROLLER CONE (PROBABLE BEDROCK)
										BOTTOM OF EXPLORATION AT 75.1'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-5**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-6**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 12/5/2016
DATE FINISH: 12/5/2016
ELEVATION: 50' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 30'±
FREE WATER AT 18' WHEN CASING PULLED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
H S A									1.0'	BARK MULCH AND TOPSOIL
	1D	24"	20"	2.0'	1	12	12	9		~MEDIUM DENSE~ BROWN SILTY SAND WITH SOME GRAVEL (FILL) NOTE: HIT PROBABLE CONCRETE AT 4', MOVED BORING 5' WEST
									5.0'	
	2D	24"	24"	7.0'	2	3	4	4		~STIFF TO ~VERY STIFF~ q_p = 4 to 6 ksf BROWN SILTY CLAY (DISTURBED/FILL)
									8.0'	
4" HW										~STIFF~ BROWN SILTY CLAY WITH SAND LAYERS w = 34.1%
	3D	24"	24"	12.0'	3	3	3	5	13.0'	
	4D	24"	16"	17.0'	6	9	9	12		~MEDIUM DENSE~ LIGHT BROWN SAND, TRACE SILT w = 6.2%
									18.0'	
	5D	24"	12"	22.0'	13	12	14	15		~MEDIUM DENSE~ BROWN SILTY SAND WITH GRAY CLAYEY SILT LAYERS
	6D	24"	15"	27.0'	5	9	10	7		
									31.0'	
	7D	24"	24"	32.0'	2	1	1	4		~VERY LOOSE~ GRAY CLAYEY SILTY SAND
									34.0'	
OPEN HOLE	8D	24"	14"	37.0'	8	12	10	14		~MEDIUM DENSE~ DARK GRAY SAND AND SILT, SOME CLAY, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES w = 13.3%

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-6**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-6**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 12/5/2016
DATE FINISH: 12/5/2016
ELEVATION: 50' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 30'±
FREE WATER AT 18' WHEN CASING PULLED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	9D	24"	24"	42.0'	15	17	45	50/5"		~VERY DENSE~
	10D	15"	12"	46.2'	22	43	50/3"			
	11D	23"	20"	51.9'	18	33	33	50/5"		w = 10.3% GRAY SAND AND SILT, TRACE GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES
	12D	5"	5"	55.4'	50/5"					
	13D	10"	6"	60.8'	53	50/4"			63.0'	... MORE SANDY...
	14D	22"	20"	66.8'	25	23	25	50/4"	68.0'	~VERY DENSE~ DARK GRAY SANDY CLAYEY SILT
	15D	0"	0"	70.0'	25/0"				70.0'	ADVANCED BY ROLLER CONE (PROBABLE BEDROCK)
										BOTTOM OF EXPLORATION AT 70.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-6**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-7**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 12/7/2016
DATE FINISH: 12/8/2016
ELEVATION: 46' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 34.5'± DURING DRILLING

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
H S A										DARK BROWN SILTY SAND, SOME GRAVEL, ORGANICS (FILL)
	1D	24"	10"	2.0'	2	4	5	5		~LOOSE~
									3.0'	
										~MEDIUM DENSE~
										BROWN SILTY SAND (FILL)
	2D	24"	16"	7.0'	11	10	13	19		
									8.0'	
										~STIFF~
4" HW	3D	24"	22"	10.5'	3	4	4	4		BROWN SILTY CLAY q_p = 2 ksf
	4D	24"	24"	15.5'	2	3	4	5		...FREQUENT SAND SEAMS...
									19.5'	
	5D	24"	24"	20.5'	3	4	5	6		~LOOSE BECOMING...
										RUST BROWN SAND, SOME SILT
	6D	24"	18"	25.5'	10	11	13	13		...MEDIUM DENSE~
	7D	24"	20"	31.5'	13	13	17	20	33.0'	
										~MEDIUM DENSE~
										GRAY-BROWN CLAYEY SAND
	8D	24"	22"	36.5'	3	7	5	4		WITH CLAYEY SILT LAYERS
									38.0'	
										BROWN SAND AND SILT, SOME GRAVEL (GLACIAL TILL)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-7**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-7**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 12/7/2016
DATE FINISH: 12/8/2016
ELEVATION: 46' +/-
SWC REP.: PFK / TSD

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED BELOW 38.5'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	9D	18"	12"	40.5'	20	33	50/6"			BROWN SAND AND SILT, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES
	10D	11"	4"	44.4'	37	50/5"				~VERY DENSE~
	11D	23"	18"	50.4'	40	43	42	50/5"		
	12D	12"	12"	54.5'	39	50				
	13D	10"	8"	59.4'	42	50/4"				
	14D	5"	4"	68.9'	50/5"					~VERY DENSE~ GRAY-BROWN SILTY SAND, TRACE GRAVEL (GLACIAL TILL)
									78.5'	
									79.5'	DARK GRAY SILT AND SAND, TRACE GRAVEL (GLACIAL TILL) ~VERY DENSE~
	15D	12"	8"	79.5'	37	50/6"				BOTTOM OF EXPLORATION AT 79.5'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-7**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-8**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 12/6/2016
DATE FINISH: 12/6/2016
ELEVATION: 59' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 20.7' IN PIEZO ON 12/11/2016
WATER AT 14' IN PIEZO ON 1/4/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
H S A										BARK MULCH AND TOPSOIL (FILL)
	1D	24"	8"	2.0'	4	4	7	8	1.5'	
	2D	24"	15"	7.0'	3	3	4	5		BROWN-GRAY CLAYEY SILT AND SANDY SILTY CLAY (MIXED FILL) ~LOOSE~
4" HW	3D	24"	14"	11.0'	3	2	3	3	13.0'	
	4D	24"	24"	16.0'	W O H / 12"		1	1	18.0'	~MEDIUM~ GRAY SILTY CLAY WITH SAND SEAMS w = 39.7%
	5D	24"	16"	21.0'	5	7	9	8	23.0'	~MEDIUM DENSE~ RUST BROWN-BROWN SILTY SAND WITH CLAYEY SILT LAYERS w = 23.8%
OPEN HOLE	6D	24"	10"	26.0'	8	6	5	7		~MEDIUM DENSE~ GRAY SAND AND SILT, SOME CLAY (GLACIAL TILL) OCCASIONAL COBBLES w = 13.4%
	7D	24"	22"	31.0'	10	13	13	18	33.0'	
	8D	24"	13"	36.0'	17	16	21	24	37.0'	~DENSE~ BROWN CLAYEY SILT AND SAND
										BROWN SAND AND SILT, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 38'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-8**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-8**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 12/6/2016
DATE FINISH: 12/6/2016
ELEVATION: 59' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	H S A	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 20.7' IN PIEZO ON 12/11/2016
WATER AT 14' IN PIEZO ON 1/4/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	9D	24"	16"	41.0'	20	16	15	24		~DENSE~ BROWN SAND AND SILT, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES w = 13.3%
	10D	24"	14"	46.0'	11	12	12	9	48.0'	
	11D	17"	16"	51.0'	28	37	50/5"			~VERY DENSE~ GRAY SAND AND SILT, SOME CLAY, SOME GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES
	12D	11"	8"	54.9'	54	50/5"				w = 8.5%
	13D	22"	18"	60.8'	17	27	31	50/4"	60.5'	
	14D	10"	9"	64.8'	32	50/4"				~VERY DENSE~ BROWN-GRAY SILTY SAND WITH CLAYEY SILT LAYERS
	15D	16"	12"	70.3'	47	58	50/4"			...SOME GRAVEL...
									77.0'	
										~VERY DENSE~ GRAY SILTY SAND, SOME GRAVEL
	16D	6"	6"	79.5'	77				81.0'	BOTTOM OF EXPLORATION AT 81'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 38'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-8**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-9**
SHEET: 1 OF 2
PROJECT NO.: 16-1136
DATE START: 12/9/2016
DATE FINISH: 12/9/2016
ELEVATION: 66' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 35.1' IN PIEZO ON 12/11/2016
WATER AT 30.9' IN PIEZO ON 1/4/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
4" HW									0.5'	6" CONCRETE
	1D	24"	14"	2.5'	9	7	5	5		~MEDIUM DENSE~ BROWN SAND, SOME GRAVEL, SOME SILT (FILL)
	2D	24"	24"	7.0'	7	6	6	7		
	3D	24"	8"	9.0'	5	3	2	2		~LOOSE~
OPEN									11.0'	
HOLE	4D	24"	10"	11.5'	1	1	2	3		~VERY LOOSE~ DARK GRAY CLAYEY SAND AND SILT
									15.0'	
	5D	24"	14"	16.5'	8	12	25	24		~DENSE~ DARK GRAY SAND AND SILT, SOME GRAVEL, TRACE CLAY (GLACIAL TILL) OCCASIONAL COBBLES
	6D	24"	16"	21.5'	8	12	25	24		w = 9.1%
	7D	24"	20"	26.5'	12	14	19	19		
									30.0'	
	8D	24"	10"	31.5'	9	12	14	20		~MEDIUM DENSE~ GRAY SAND AND SILT, SOME CLAY, TRACE GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES
	9D	24"	24"	36.5'	15	12	10	15		

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 39'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-9**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-16-9**
SHEET: 2 OF 2
PROJECT NO.: 16-1136
DATE START: 12/9/2016
DATE FINISH: 12/9/2016
ELEVATION: 66' +/-
SWC REP.: PFK

PROJECT / CLIENT: PROPOSED GILMAN ST. GARAGE & CONGRESS ST. BUILDING / MAINE MEDICAL CENTER
LOCATION: PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC DRILLER: SCOTT HOLLABOUGH

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 35.1' IN PIEZO ON 12/11/2016
WATER AT 30.9' IN PIEZO ON 1/4/2016

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	10D	24"	18"	41.5'	10	14	12	24		GRAY SAND AND SILT, SOME CLAY, TRACE GRAVEL (GLACIAL TILL) OCCASIONAL COBBLES
	11D	24"	10"	46.5'	12	17	22	26		~DENSE~ ...MORE GRAVEL...
	12D	21"	20"	51.2'	10	21	30	50/3"		~VERY DENSE~ ...SOME SAND LAYERING...
	13D	10"	8"	55.3'	54	50/4"				GRAY SILTY SAND, SOME GRAVEL (GLACIAL TILL)
									60.0'	
	14D	10"	6"	60.3'	50	50/4"				~VERY DENSE~ GRAY-BROWN SILTY SAND WITH CLAYEY SILT LAYERS
	15D	10"	8"	70.3'	60	50/4"				...SOME GRAVEL...
									75.0'	
										DARK GRAY SAND AND SILT, SOME GRAVEL, TRACE CLAY WITH PIECES OF WEATHERED ROCK (GLACIAL TILL) ~VERY DENSE~
	16D	12"	12"	80.5'	22	54			81.5'	BOTTOM OF EXPLORATION AT 81.5'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: BOTTOM OF PIEZO AT 39'± WITH 5' SCREEN

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-16-9**

KEY TO THE NOTES & SYMBOLS
Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - based on laboratory unconfined compressive test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. based on pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass. RQD is computed from recovered core samples.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight

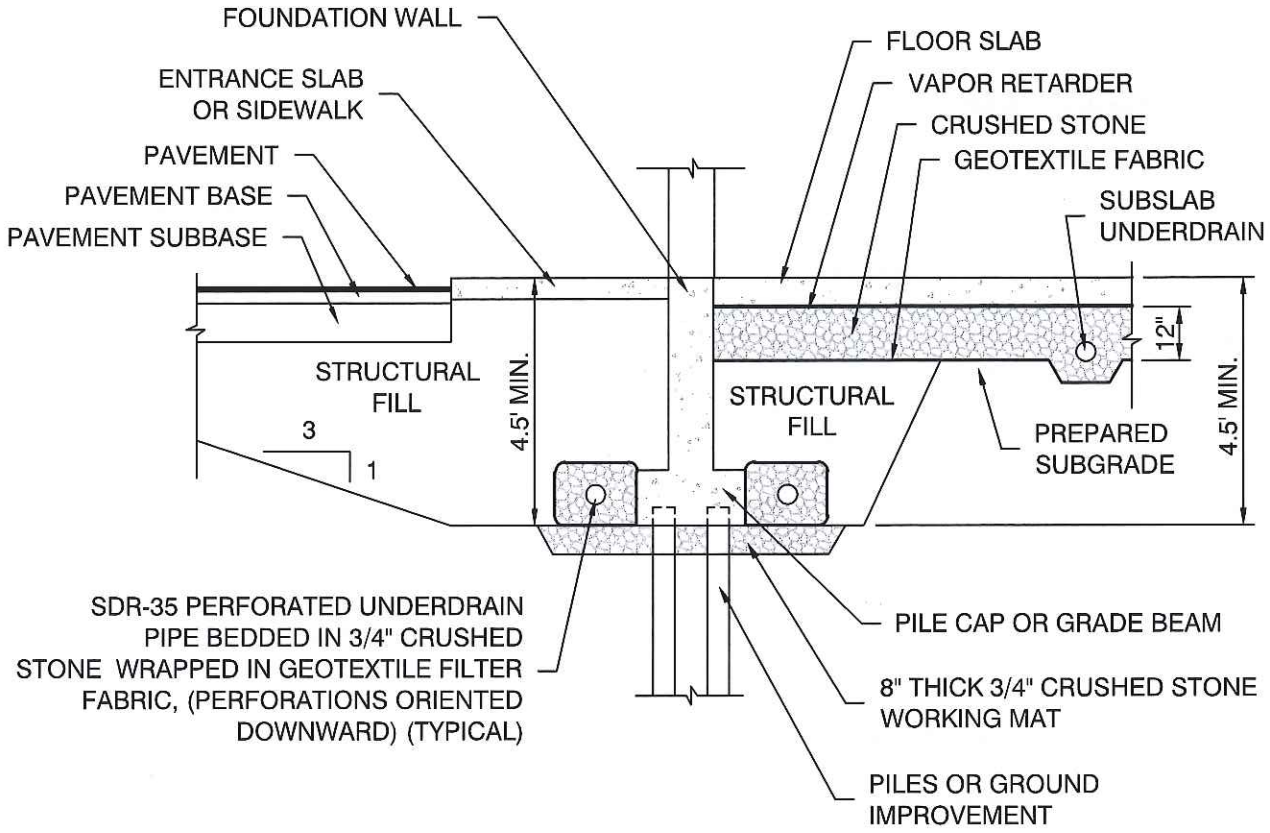
Description of Proportions:

0 to 5% TRACE
5 to 12% SOME
12 to 35% "Y"
35+% AND

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.



NOTE:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.

2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.

S.W.COLE ENGINEERING, INC.

MAINE MEDICAL CENTER

UNDERDRAIN DETAIL

PROPOSED CONGRESS STREET MEDICAL OFFICE BUILDING
CONGRESS STREET
PORTLAND, MAINE

Job No.:	16-1136	Scale:	Not to Scale
Date :	02/20/2017	Sheet:	21

APPENDIX A

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-1
SHEET: 1 OF 2
PROJECT NO.: 02-0763 S
DATE START: 9/3/2002
DATE FINISH: 9/3/2002
ELEVATION: 68+/-
SWC REP.: KGB

PROJECT / CLIENT: PROPOSED CENTRAL UTILITIES PLANT / MAINE MEDICAL CENTER
LOCATION: GILMAN STREET PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORINGS DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/2"		
SAMPLER:	SS	1 3/8"	140 LB	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO GROUNDWATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	S-1	24"	19"	2.0'	3	5	10	11	2.0'+/-	BROWN SILTY SAND, SOME GRAVEL, SOME ORGANICS (FILL) ~ MEDIUM DENSE ~
									6.0'	BROWN SILTY SAND, SOME FINE GRAVEL (FILL) ~ MEDIUM DENSE ~
	S-2	24"	20"	7.0'	7	14	16	18	9.0'	BROWN SILTY SAND, TRACE OF FINE GRAVEL (FILL) ~ MEDIUM DENSE TO DENSE ~
19										
28	S-3	24"	20"	12.0'	8	7	7	10	13.0'	LIGHT BROWN MEDIUM SAND, SOME FINE GRAVEL, TRACE OF SILT (PROBABLE FILL) ~ MEDIUM DENSE ~
48										
45									16.0'	BROWN SILTY SAND, SOME GRAVEL, TRACE OF CLAY ~ MEDIUM DENSE ~
	S-4	24"	24"	17.0'	3	1	1	1		~ MEDIUM ~ GRAY SILTY CLAY WITH SOME SAND LAYERS
	1U	24"	24"	19.0'	HYDRAULIC PUSH					qu = 1.24 ksf W = 40.4% qp = 0.5 ksf Wl = 38 Wp = 18
	S-5	24"	24"	22.0'	WOH/24"					
	3.5" X 6" VANE			25.6'						Sv = 1.3/0.21 ksf
	3.5" X 6" VANE			26.5'						Sv = NO ROTATION
	2U	12"	10"	31.0'	HYDRAULIC PUSH				31.0'	W = 31.0% Wl = 28 qu = 2.9 ksf Wp = 17
	S-6	24"	17"	33.0'	12	8	7	16	33.0'	LIGHT BROWN FINE SAND WITH FREQUENT IRON STAINING, TRACE OF SILT AND SEAMS OF SILTY SAND, TRACE OF CLAY ~ MEDIUM DENSE ~
	S-7	24"	24"	37.0'	1	3	4	7		GRAY SILT AND SAND, SOME GRAVEL AND TRACE OF CLAY (TILL) ~ MEDIUM DENSE ~

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[X] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

2

BORING NO.: B-1

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-1
SHEET: 2 OF 2
PROJECT NO.: 02-0763 S
DATE START: 9/3/2002
DATE FINISH: 9/3/2002
ELEVATION: 68+/-
SWC REP.: KGB

PROJECT / CLIENT: PROPOSED CENTRAL UTILITIES PLANT / MAINE MEDICAL CENTER
LOCATION: GILMAN STREET PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORINGS DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/2"		
SAMPLER:	SS	1 3/8"	140 LB	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO GROUNDWATER OBSERVED

SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	BLOWS/6" 0-6	6-12	12-18	18-24	ELEV.	STRATA & TEST DATA
S-8	24"	14"	42.0'	5	4	8	11		- MEDIUM DENSE BECOMING . . .
S-9	24"	14"	47.0'	5	7	8	10		GRAY SILT AND SAND, SOME GRAVEL AND TRACE OF CLAY (TILL)
S-10	24"	21"	52.0'	7	13	15	23	52.0'	. . . DENSE -
									BOTTOM OF EXPLORATION AT 52.0' NOT REFUSAL
									NOTE : BORING MADE APROXIMATELY 15' SOUTH OF EXISTING STORM DRAIN

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[X] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-1

B-96-15

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-15
SHEET: 1 OF 1
PROJECT NO.: 96-0043 S
DATE START: 1/6/1997
DATE FINISH: 1/6/1997
ELEVATION: 65.0'+/-
SWC REP.: RRJ

PROJECT / CLIENT: MEDICAL OFFICE AND PARKING GARAGE / MAINE MEDICAL CENTER
LOCATION: CONGRESS STREET PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORINGS, INC. DRILLER: DAVE DIONNE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	4 1/4"		
SAMPLER:	SS	1 3/8"	140 LB	30"
CORE BARREL:				

WATER LEVEL INFORMATION
OPEN HOLE TO 21.0'
WATER AT 10.3' AFTER 24 HOURS

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	DARK BROWN LOAMY SANDY SILT WITH ORGANICS (TOPSOIL)
	S-1	24"	6"	2.0'	3	4	5	8	2.0'	BROWN SILTY SAND WITH SOME GRAVEL (FILL) ~ MEDIUM DENSE ~
	S-2	24"	10"	7.0'	9	16	23	25		~ DENSE ~
	S-3	24"	18"	12.0'	20	22	25	35		GRAY GRAVELLY SILTY SAND (TILL) W = 8.5%
	S-4	24"	18"	17.0'	5	8	9	15		~ MEDIUM DENSE ~
	S-5	24"	20"	22.0'	8	8	10	13		~ DENSE ~
	S-6	24"	12"	27.0'	7	11	28	25	27.0'	
										BOTTOM OF EXPLORATION AT 27.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-15

B-96-16

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-16
SHEET: 1 OF 2
PROJECT NO.: 96-0043 S
DATE START: 1/8/1997
DATE FINISH: 1/8/1997
ELEVATION: 66.5'+/-
SWC REP.: RRJ

PROJECT / CLIENT: MEDICAL OFFICE AND PARKING GARAGE / MAINE MEDICAL CENTER
LOCATION: CONGRESS STREET PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORINGS, INC. DRILLER: DAVE DIONNE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	4 1/4"		
SAMPLER:	SS	1 3/8"	140 LB	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS APPEARED SATURATED AT 10'+/-

CASING BLOWS PER FOOT	SAMPLE NO.	PEN	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT PAVEMENT
	S-1	18"	8"	1.7'	15	9	23		2.0'	DARK BROWN GRAVELLY SAND WITH SOME SILT (FILL)
	S-2	24"	20"	7.0'	16	75	21	17		GRAY CLAYEY SAND WITH SOME SILT AND TRACE OF GRAVEL (TILL) ~ DENSE TO VERY DENSE ~
	S-3	24"	18"	12.0'	6	17	16	35		
	S-4	24"	0	17.0'	39	43	50	61		
	S-5	24"	24"	22.0'	6	16	25	27	23.0'	
									24.5'	BOULDER
	S-6	24"	10"	26.5'	11	20	33	48		GRAY SAND AND SILT WITH SOME GRAVEL (TILL) ~ VERY DENSE ~
	S-7	24"	24"	32.0'	41	33	20	32		
	S-8	24"	12"	37.0'	10	12	38	42		

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-16

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-16
SHEET: 2 OF 2
PROJECT NO.: 96-0043 S
DATE START: 1/6/1997
DATE FINISH: 1/6/1997
ELEVATION: 66.5'+/-
SWC REP.: RRJ

PROJECT / CLIENT: MEDICAL OFFICE AND PARKING GARAGE / MAINE MEDICAL CENTER
LOCATION: CONGRESS STREET PORTLAND, MAINE
DRILLING FIRM: GREAT WORKS TEST BORINGS, INC. DRILLER: DAVE DIONNE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	4 1/4"		
SAMPLER:	SS	1 3/8"	140 LB	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS APPEARED SATURATED AT 10'+/-

CASING BLOWS PER FOOT	SAMPLE NO	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										GRAY SAND AND SILT WITH SOME GRAVEL (TILL)
	S-9	24"	24"	42.0'	12	16	22	31	42.0'	~ VERY DENSE ~
										BOTTOM OF EXPLORATION AT 42.0'

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-16

APPENDIX B

S.W.COLE ENGINEERING, INC.

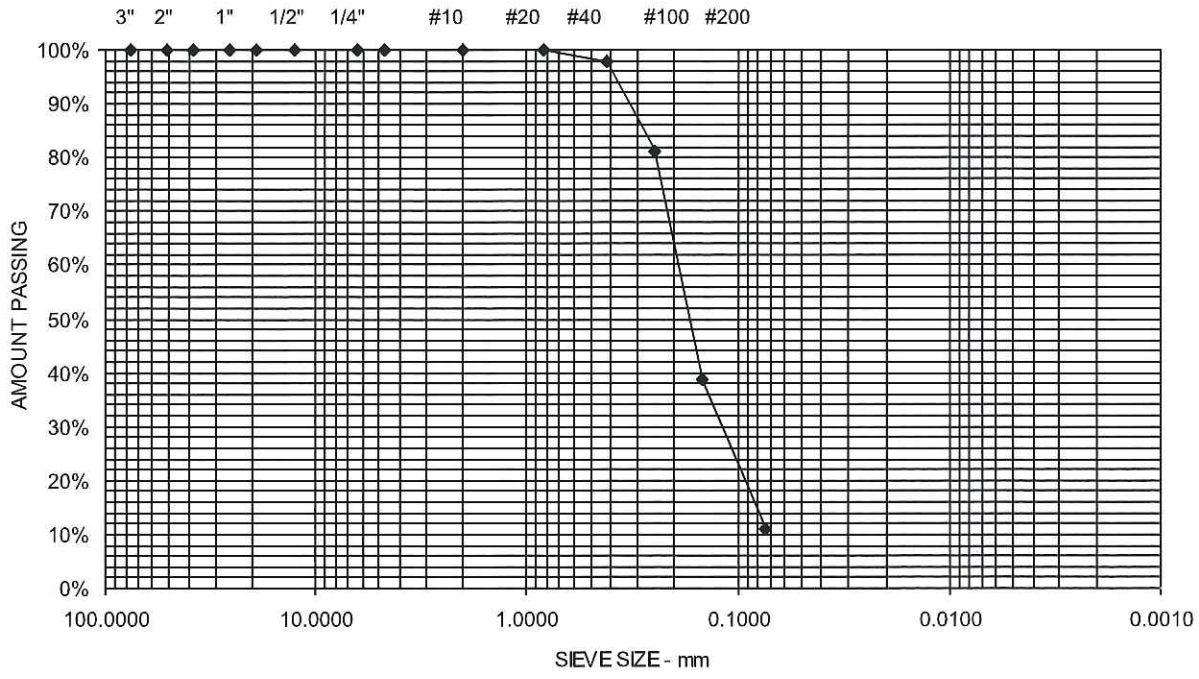
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21874G
		Date Received	11/30/2016
		Date Completed	12/5/2016
Material Source	**B-16-1 5D 30-32'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**100**	0% Gravel
2.00 mm	**No. 10**	**100**	
850 um	**No. 20**	**100**	
425 um	**No. 40**	**98**	89% Sand
250 um	**No. 60**	**81**	
150 um	**No. 100**	**39**	
75 um	**No. 200**	**11.0**	11% Fines

SAND, SOME SILT



Comments: w = 22.7%

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S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name: PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING

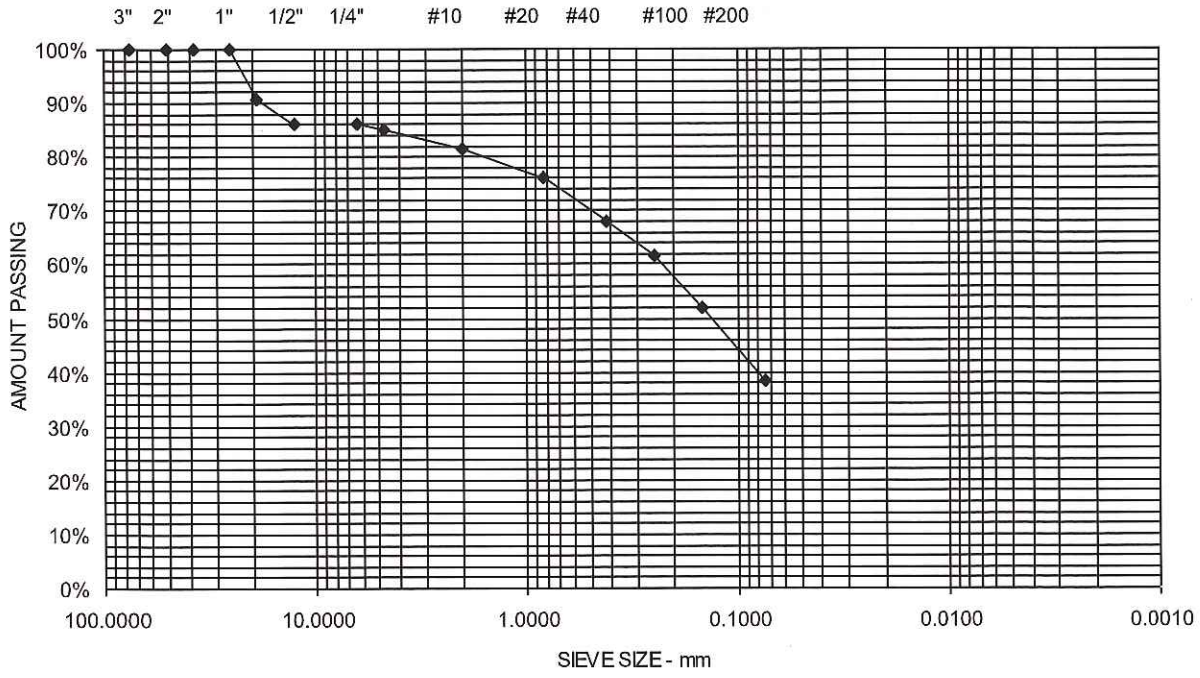
Client: MAINE MEDICAL CENTER

Material Source: **B-16-1 9D 40-42'**

Project Number: 16-1136
Lab ID: 21875G
Date Received: 11/30/2016
Date Completed: 12/5/2016
Tested By: JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**91**	
12.5 mm	**1/2"**	**86**	
6.3 mm	**1/4"**	**86**	
4.75 mm	**No. 4**	**85**	14.8% Gravel
2.00 mm	**No. 10**	**82**	
850 um	**No. 20**	**76**	
425 um	**No. 40**	**68**	46.7% Sand
250 um	**No. 60**	**62**	
150 um	**No. 100**	**52**	
75 um	**No. 200**	**38.5**	38.5% Fines

GRAVELLY SAND AND SILT



Comments: w = 10.7%

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S.W.COLE ENGINEERING, INC.

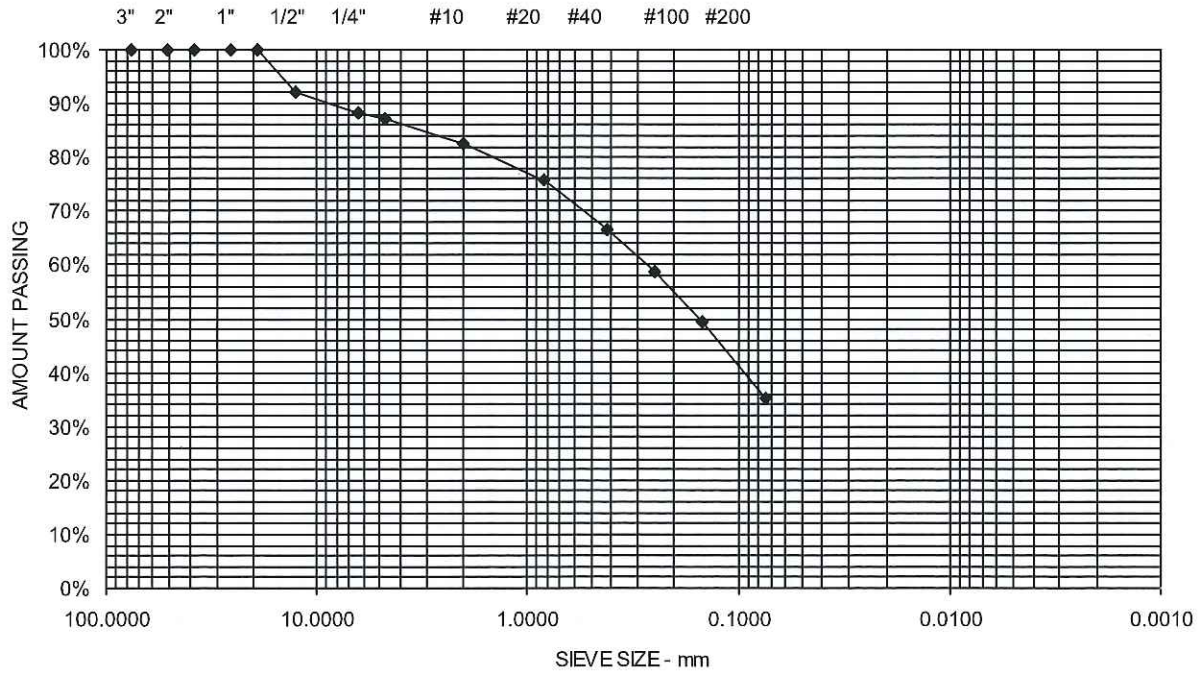
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21876G
		Date Received	11/30/2016
		Date Completed	12/7/2016
Material Source	**B-16-1 11D 60-61.9'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**92**	
6.3 mm	**1/4"**	**88**	
4.75 mm	**No. 4**	**87**	12.9% Gravel
2.00 mm	**No. 10**	**82**	
850 um	**No. 20**	**76**	
425 um	**No. 40**	**67**	51.7% Sand
250 um	**No. 60**	**59**	
150 um	**No. 100**	**49**	
75 um	**No. 200**	**35.4**	35.4% Fines

GRAVELLY SAND AND SILT



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S.W.COLE ENGINEERING, INC.

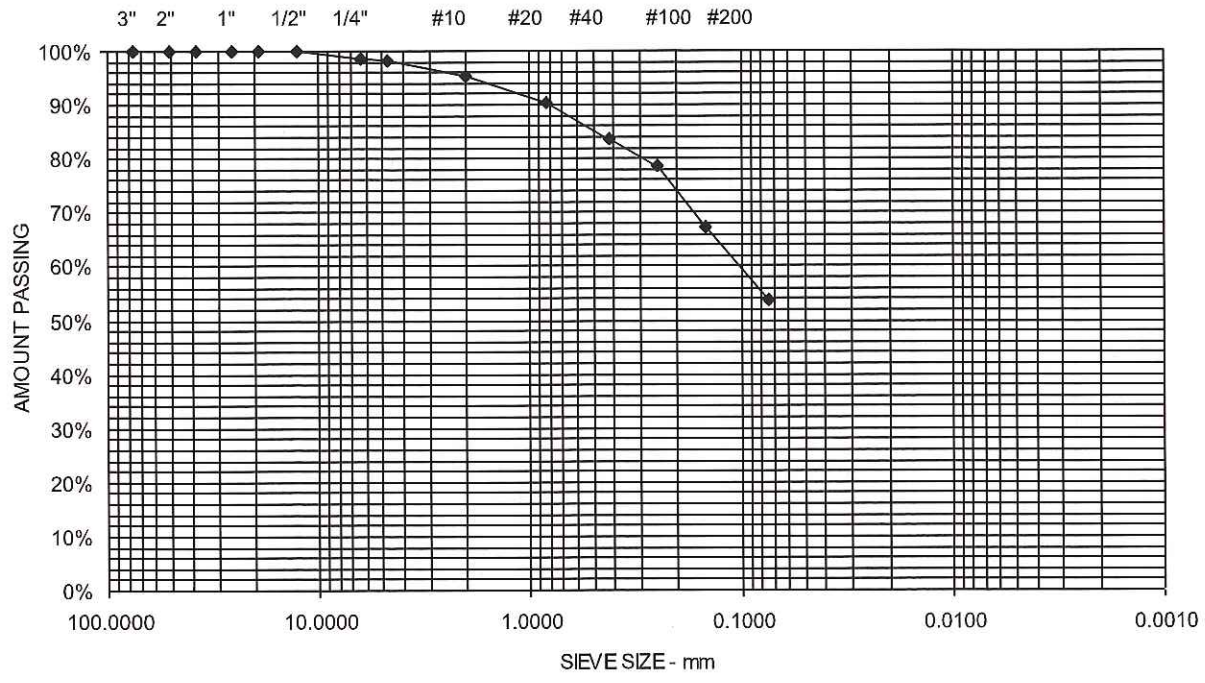
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21877G
		Date Received	11/30/2016
		Date Completed	12/7/2016
Material Source	**B-16-1 13D 70-71.8'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**99**	
4.75 mm	**No. 4**	**98**	1.8% Gravel
2.00 mm	**No. 10**	**95**	
850 um	**No. 20**	**90**	
425 um	**No. 40**	**84**	44.3% Sand
250 um	**No. 60**	**79**	
150 um	**No. 100**	**67**	
75 um	**No. 200**	**53.9**	53.9% Fines

SILT AND SAND, TRACE GRAVEL



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S.W.COLE ENGINEERING, INC.

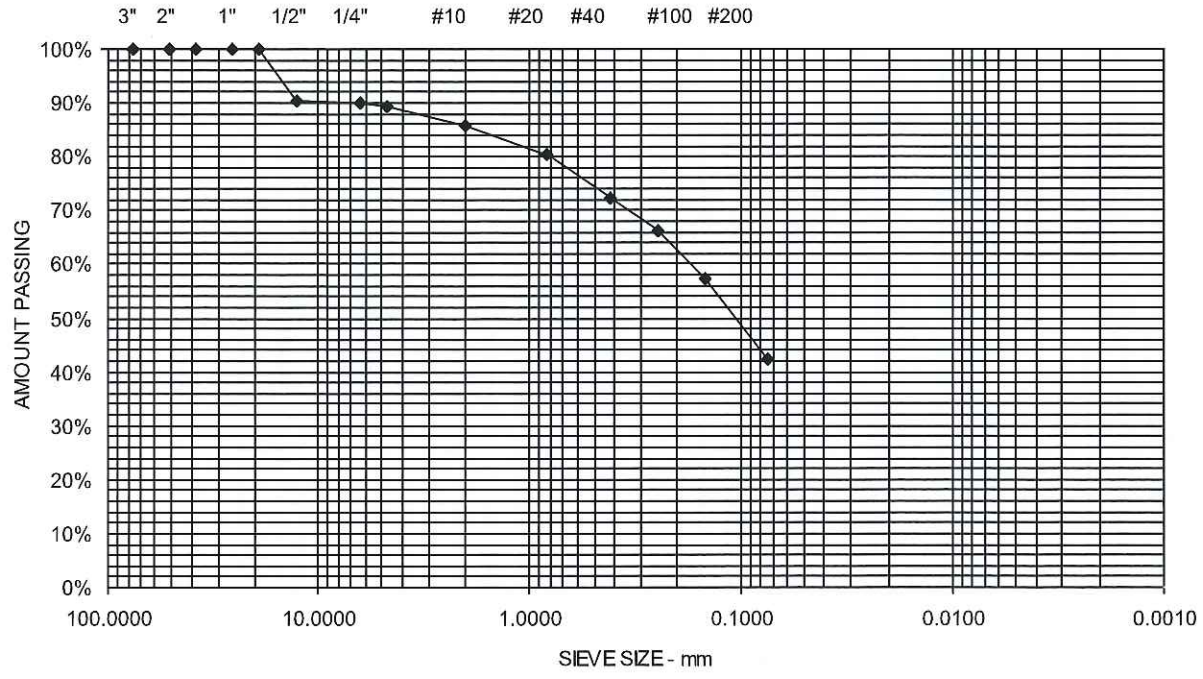
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21880G
		Date Received	11/30/2016
		Date Completed	12/7/2016
Material Source	**B-16-2 10D 40-42'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**90**	
6.3 mm	**1/4"**	**90**	
4.75 mm	**No. 4**	**89**	10.8% Gravel
2.00 mm	**No. 10**	**86**	
850 um	**No. 20**	**80**	
425 um	**No. 40**	**72**	47% Sand
250 um	**No. 60**	**66**	
150 um	**No. 100**	**57**	
75 um	**No. 200**	**42.2**	42.2% Fines

SAND AND SILT, SOME GRAVEL, TRACE CLAY



Comments: w = 10.9%

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S.W.COLE ENGINEERING, INC.

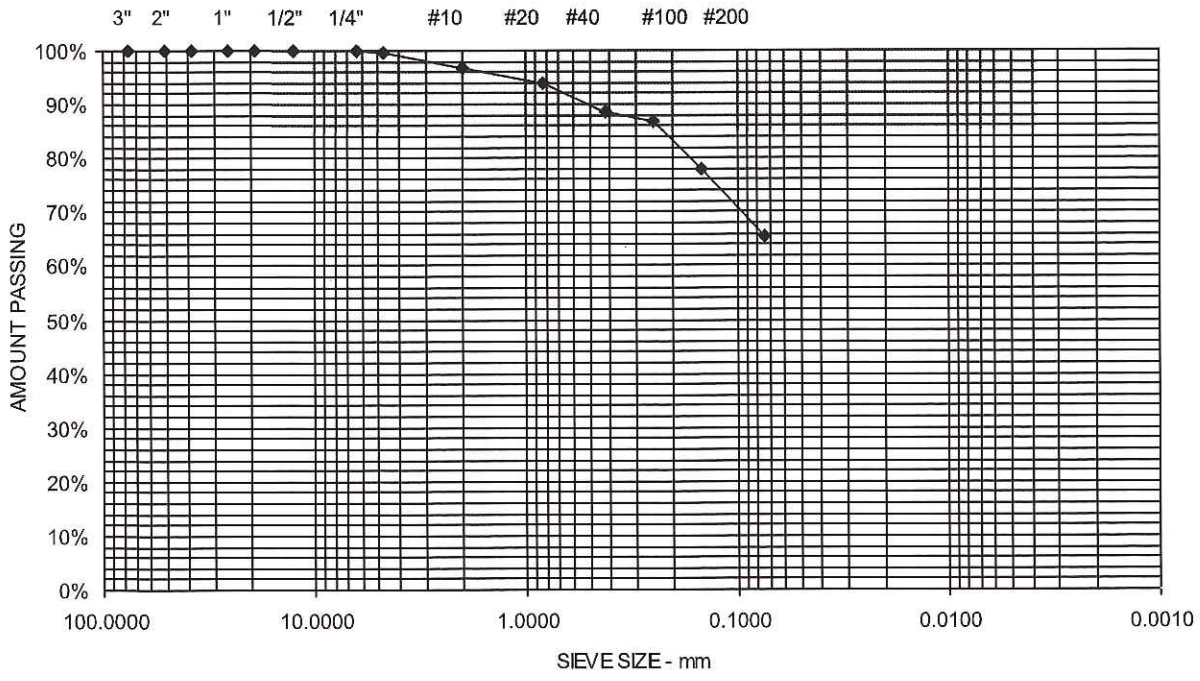
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21881G
		Date Received	11/30/2016
		Date Completed	12/7/2016
Material Source	**B-16-2 14D 60-60.9'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**100**	0.4% Gravel
2.00 mm	**No. 10**	**97**	
850 um	**No. 20**	**94**	
425 um	**No. 40**	**89**	34.3% Sand
250 um	**No. 60**	**87**	
150 um	**No. 100**	**78**	
75 um	**No. 200**	**65.3**	65.3% Fines

SILT AND SAND, SOME CLAY, TRACE GRAVEL



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S.W.COLE ENGINEERING, INC.

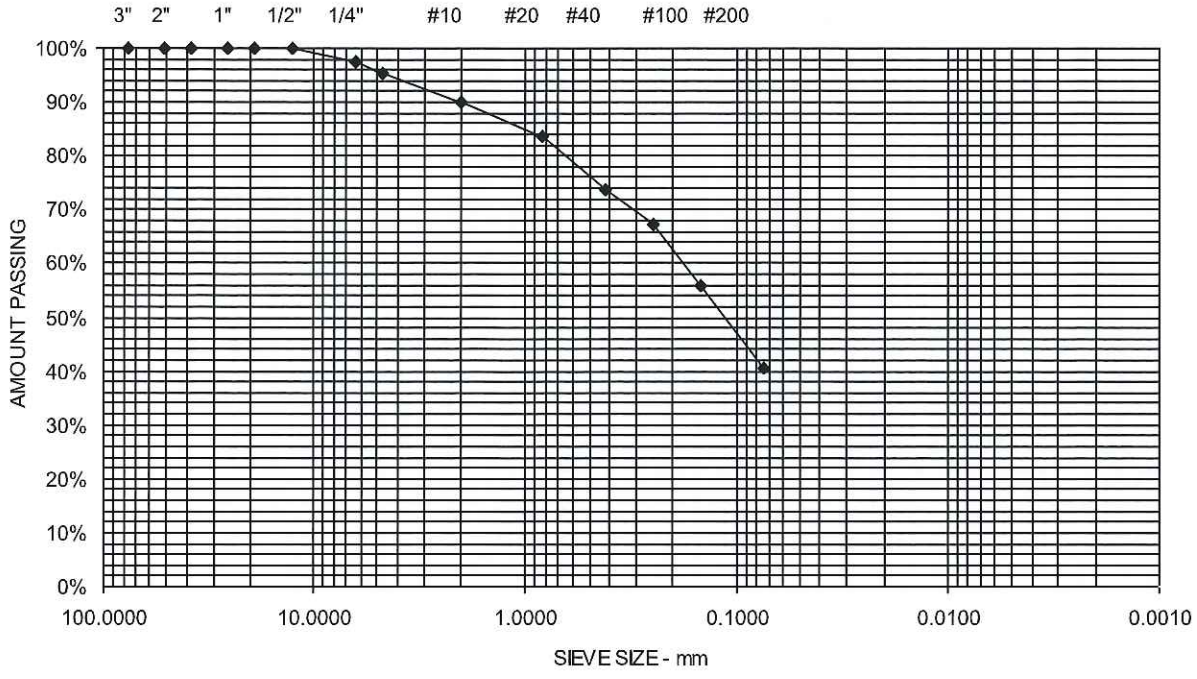
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21884G
		Date Received	11/30/2016
		Date Completed	12/7/2016
Material Source	**B-16-3 10D 49-51'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**98**	
4.75 mm	**No. 4**	**95**	4.6% Gravel
2.00 mm	**No. 10**	**90**	
850 um	**No. 20**	**83**	
425 um	**No. 40**	**74**	54.8% Sand
250 um	**No. 60**	**67**	
150 um	**No. 100**	**56**	
75 um	**No. 200**	**40.6**	40.6% Fines

SAND AND SILT, SOME CLAY, TRACE GRAVEL



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S.W.COLE ENGINEERING, INC.

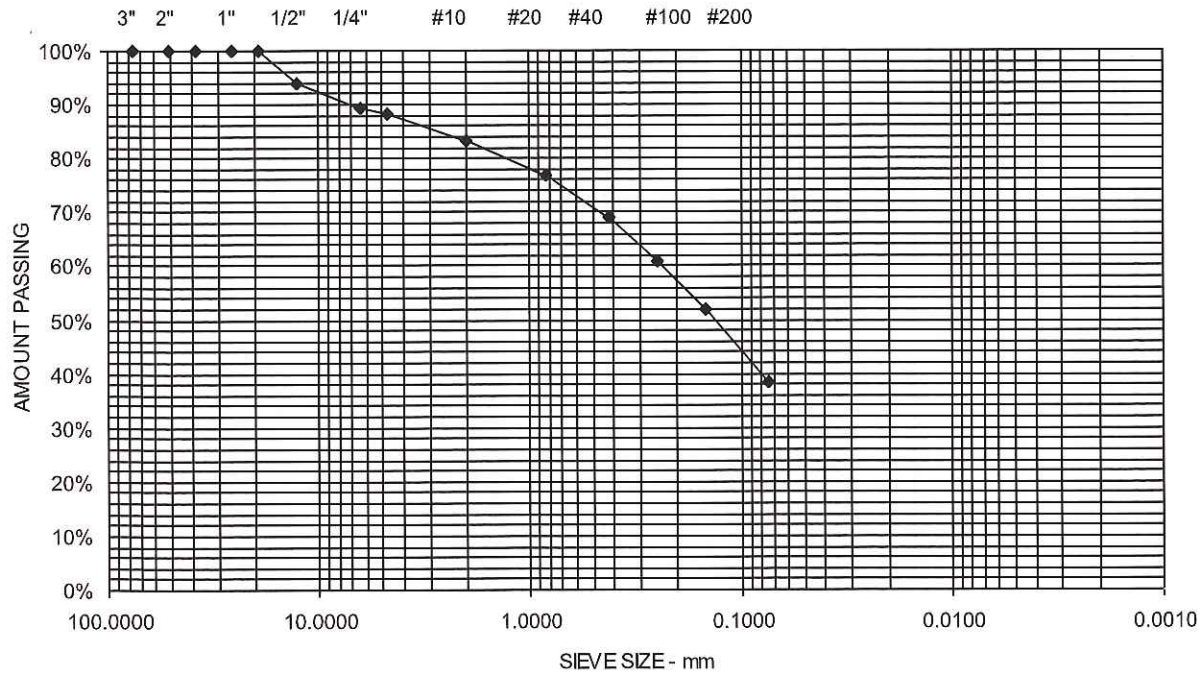
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21900G
		Date Received	12/7/2016
		Date Completed	12/14/2016
Material Source	**B-16-5 10D 45-47'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**94**	
6.3 mm	**1/4"**	**89**	
4.75 mm	**No. 4**	**88**	11.6% Gravel
2.00 mm	**No. 10**	**83**	
850 um	**No. 20**	**77**	
425 um	**No. 40**	**69**	50% Sand
250 um	**No. 60**	**61**	
150 um	**No. 100**	**52**	
75 um	**No. 200**	**38.4**	38.4% Fines

SAND AND SILT, SOME GRAVEL



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S.W.COLE ENGINEERING, INC.

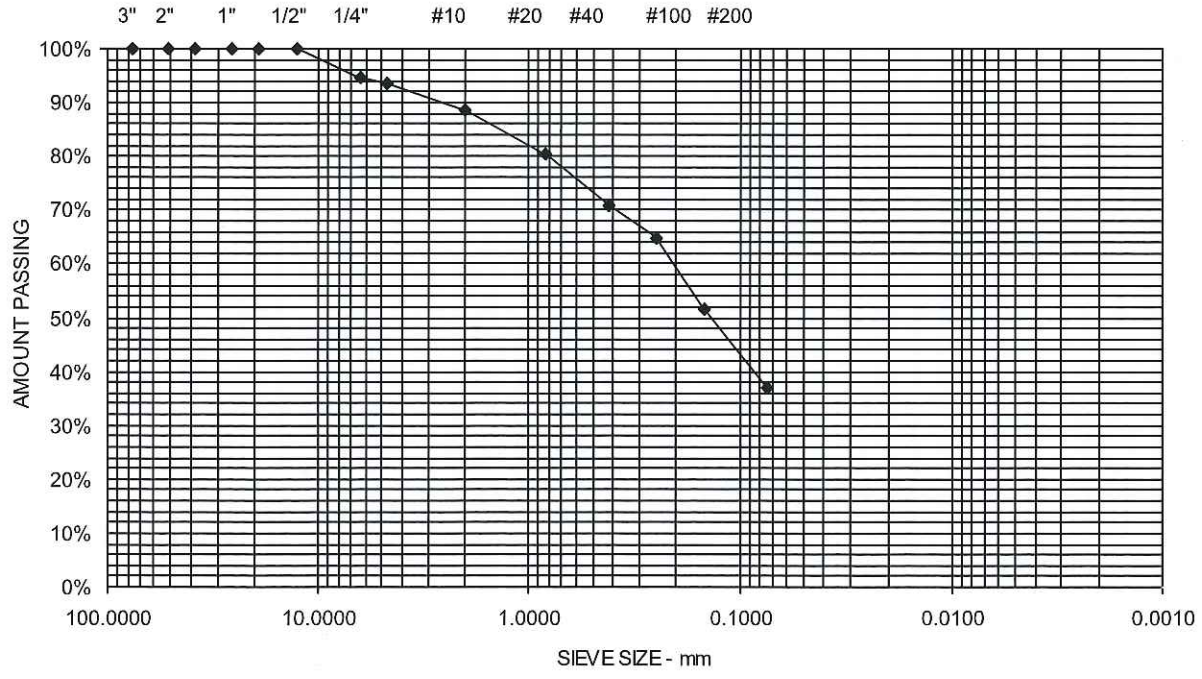
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21901G
		Date Received	12/7/2016
		Date Completed	12/14/2016
Material Source	**B-16-5 13D 60-61'**	Tested By	PAUL SHAFFER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**95**	
4.75 mm	**No. 4**	**94**	6.4% Gravel
2.00 mm	**No. 10**	**89**	
850 um	**No. 20**	**81**	
425 um	**No. 40**	**71**	56.7% Sand
250 um	**No. 60**	**65**	
150 um	**No. 100**	**52**	
75 um	**No. 200**	**36.9**	36.9% Fines

SAND AND SILT, SOME GRAVEL



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S.W.COLE ENGINEERING, INC.

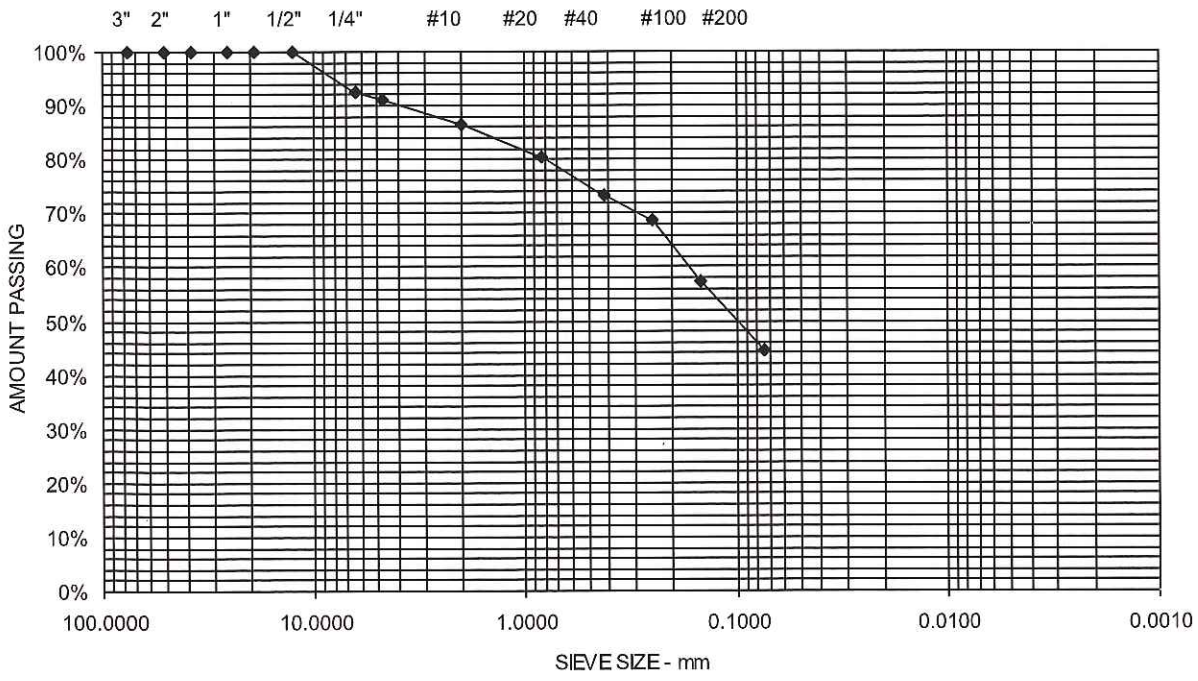
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21905G
		Date Received	12/7/2016
		Date Completed	12/14/2016
Material Source	**B-16-6 8D 35-37'**	Tested By	PAUL SHAFFER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**92**	
4.75 mm	**No. 4**	**91**	9% Gravel
2.00 mm	**No. 10**	**86**	
850 um	**No. 20**	**80**	
425 um	**No. 40**	**73**	46.5% Sand
250 um	**No. 60**	**69**	
150 um	**No. 100**	**57**	
75 um	**No. 200**	**44.6**	44.6% Fines

SAND AND SILT, SOME CLAY, SOME GRAVEL



Comments: w = 13.3%

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S.W.COLE ENGINEERING, INC.

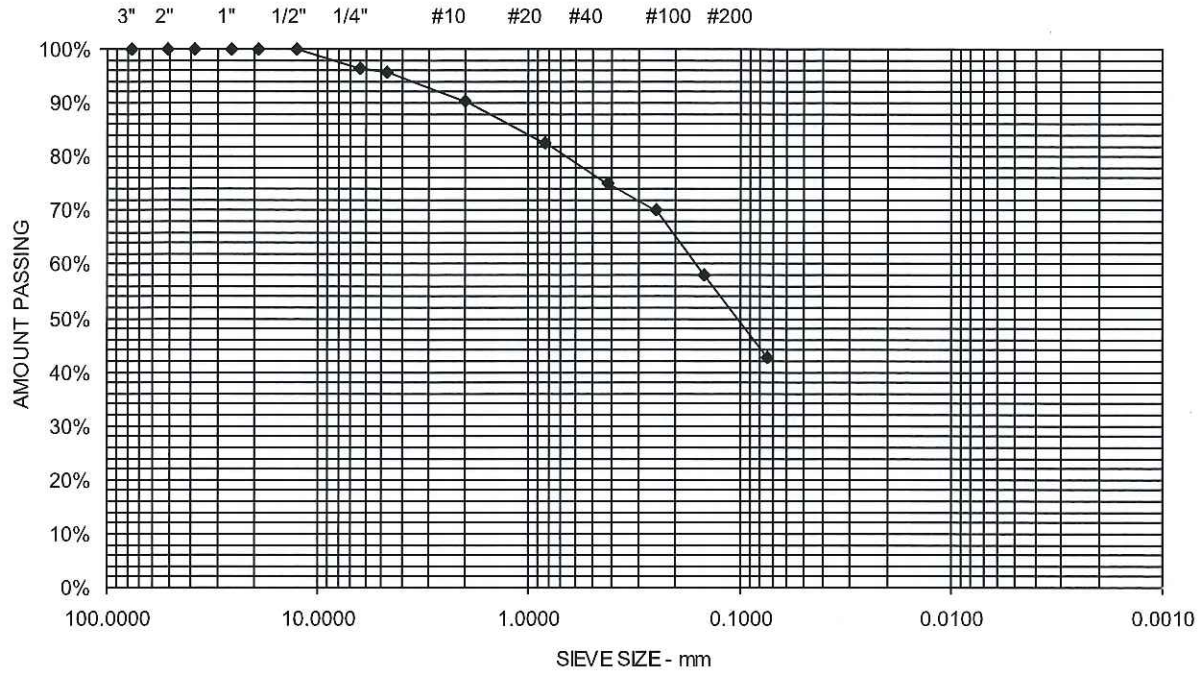
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21906G
		Date Received	12/7/2016
		Date Completed	12/15/2016
Material Source	**B-16-6 11D 50-52'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**96**	
4.75 mm	**No. 4**	**96**	4.3% Gravel
2.00 mm	**No. 10**	**90**	
850 um	**No. 20**	**83**	
425 um	**No. 40**	**75**	53.1% Sand
250 um	**No. 60**	**70**	
150 um	**No. 100**	**58**	
75 um	**No. 200**	**42.6**	42.6% Fines

SAND AND SILT, TRACE GRAVEL



Comments: w = 10.3%

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S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name: PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING

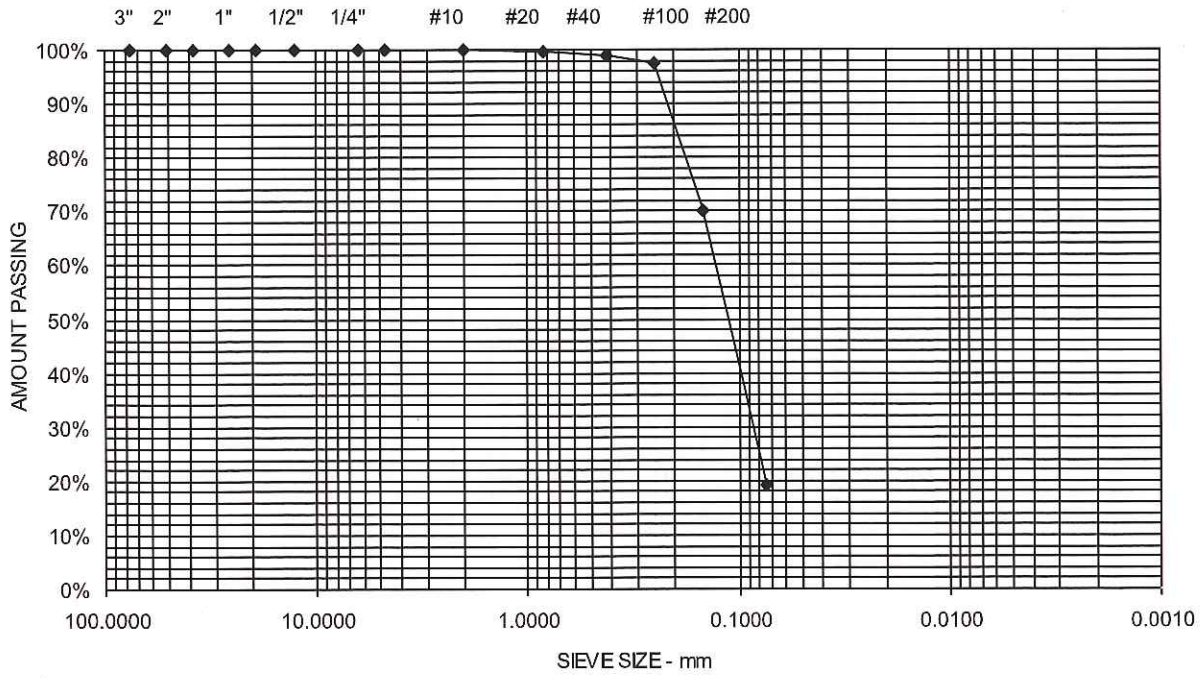
Client: MAINE MEDICAL CENTER

Material Source: **B-16-8 5D 19-21'**

Project Number: 16-1136
Lab ID: 21908G
Date Received: 12/7/2016
Date Completed: 12/15/2016
Tested By: PAUL SHAFFER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**100**	0% Gravel
2.00 mm	**No. 10**	**100**	
850 um	**No. 20**	**100**	
425 um	**No. 40**	**99**	80.8% Sand
250 um	**No. 60**	**97**	
150 um	**No. 100**	**70**	
75 um	**No. 200**	**19.2**	19.2% Fines

SILTY SAND



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Sheet

S.W.COLE ENGINEERING, INC.

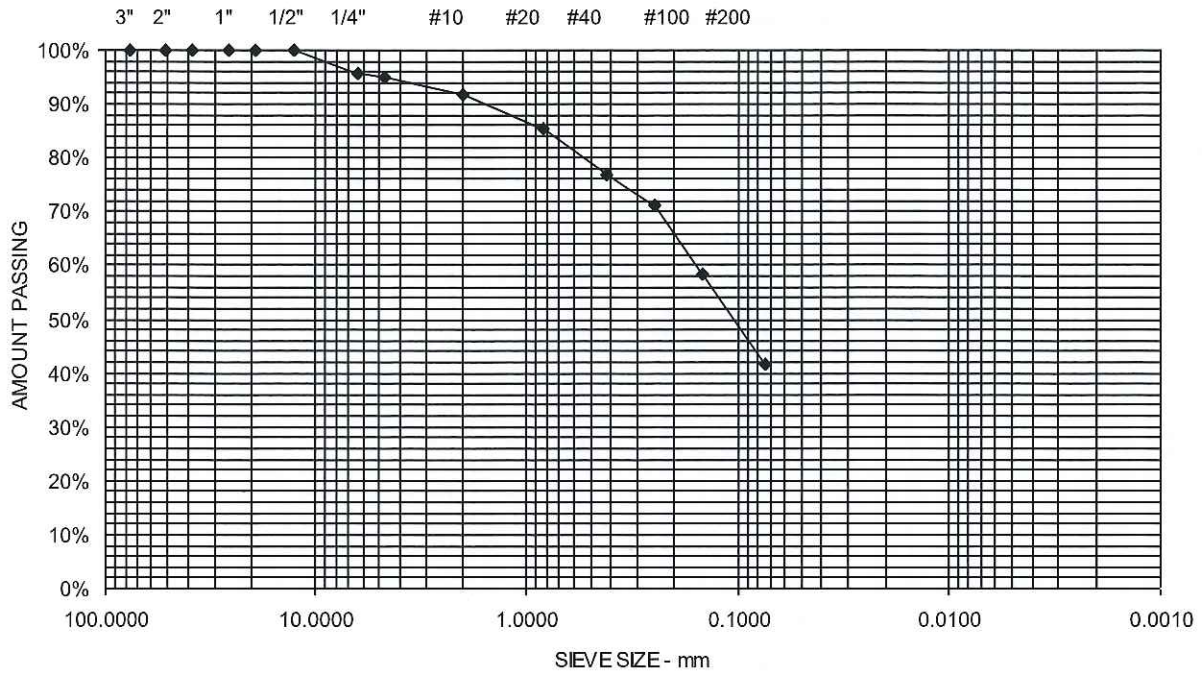
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21909G
		Date Received	12/7/2016
		Date Completed	12/15/2016
Material Source	**B-16-8 6D 24-26'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**96**	
4.75 mm	**No. 4**	**95**	4.9% Gravel
2.00 mm	**No. 10**	**92**	
850 um	**No. 20**	**85**	
425 um	**No. 40**	**77**	53.3% Sand
250 um	**No. 60**	**71**	
150 um	**No. 100**	**58**	
75 um	**No. 200**	**41.8**	41.8% Fines

SAND AND SILT, SOME CLAY, TRACE GRAVEL



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S.W.COLE ENGINEERING, INC.

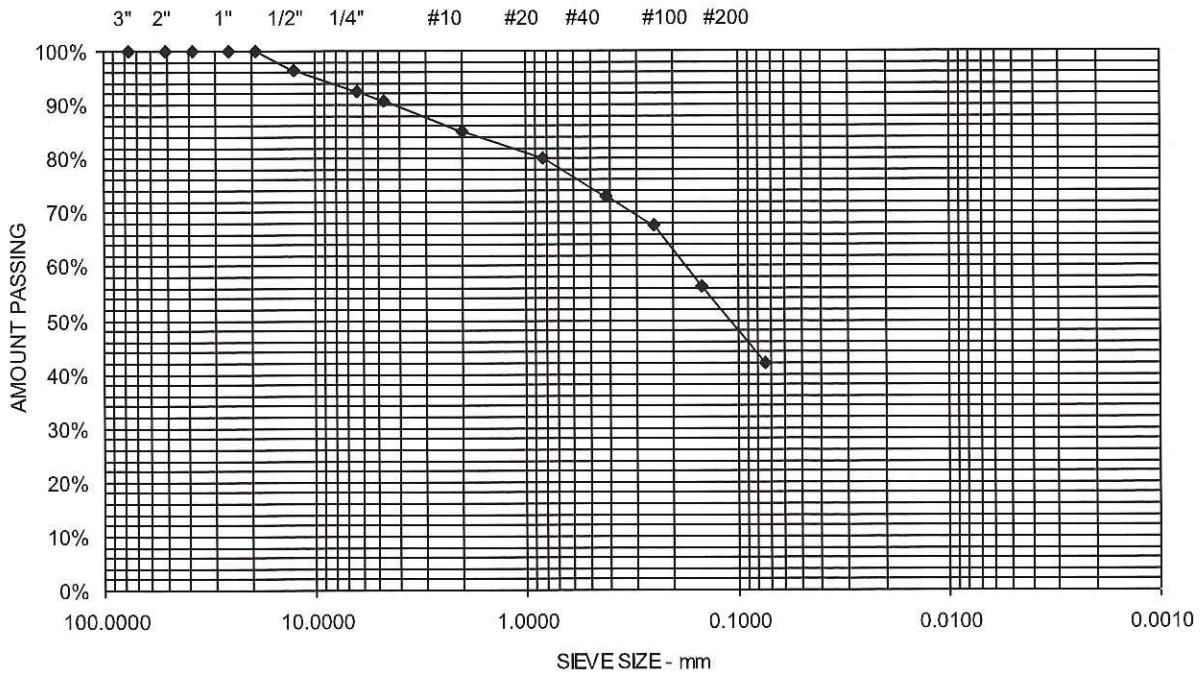
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21911G
		Date Received	12/7/2016
		Date Completed	12/15/2016
Material Source	**B-16-8 12D 54-56'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**96**	
6.3 mm	**1/4"**	**92**	
4.75 mm	**No. 4**	**91**	9.4% Gravel
2.00 mm	**No. 10**	**85**	
850 um	**No. 20**	**80**	
425 um	**No. 40**	**73**	48.6% Sand
250 um	**No. 60**	**67**	
150 um	**No. 100**	**56**	
75 um	**No. 200**	**42.1**	42.1% Fines

SAND AND SILT, SOME CLAY, SOME GRAVEL



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S.W.COLE ENGINEERING, INC.

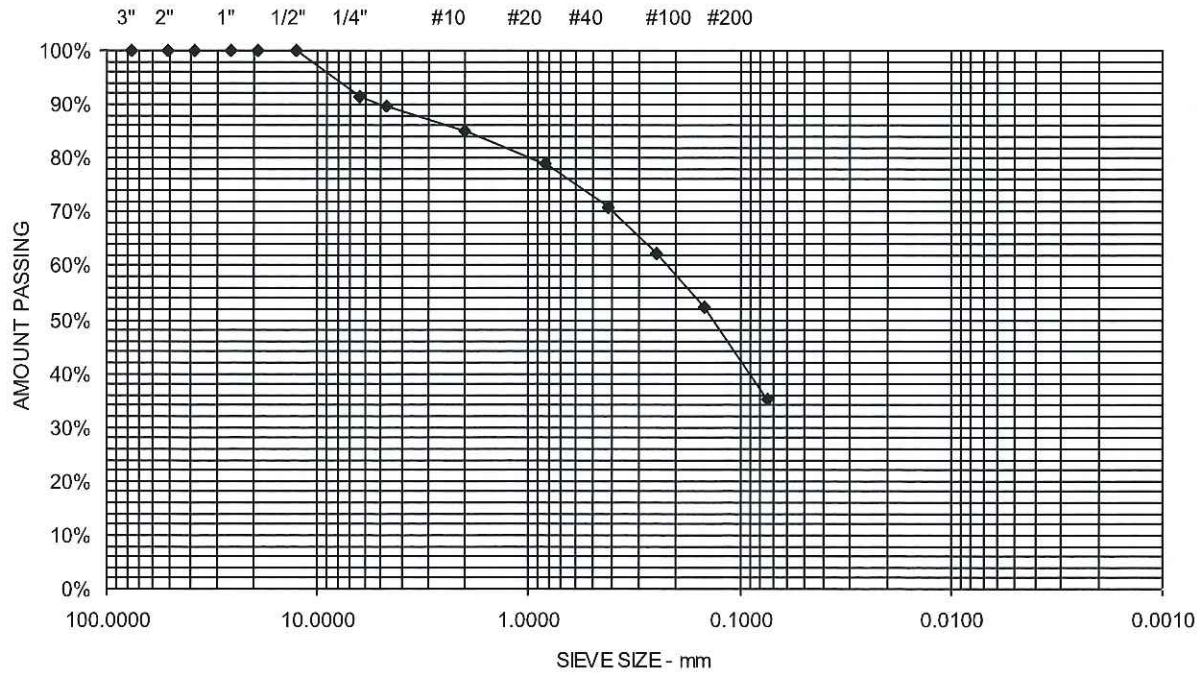
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21928G
		Date Received	12/15/2016
		Date Completed	12/19/2016
Material Source	**B-16-9 19.5-21.5'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**92**	
4.75 mm	**No. 4**	**90**	10.4% Gravel
2.00 mm	**No. 10**	**85**	
850 um	**No. 20**	**79**	
425 um	**No. 40**	**71**	54.4% Sand
250 um	**No. 60**	**62**	
150 um	**No. 100**	**52**	
75 um	**No. 200**	**35.2**	35.2% Fines

SAND AND SILT, SOME GRAVEL



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S.W.COLE ENGINEERING, INC.

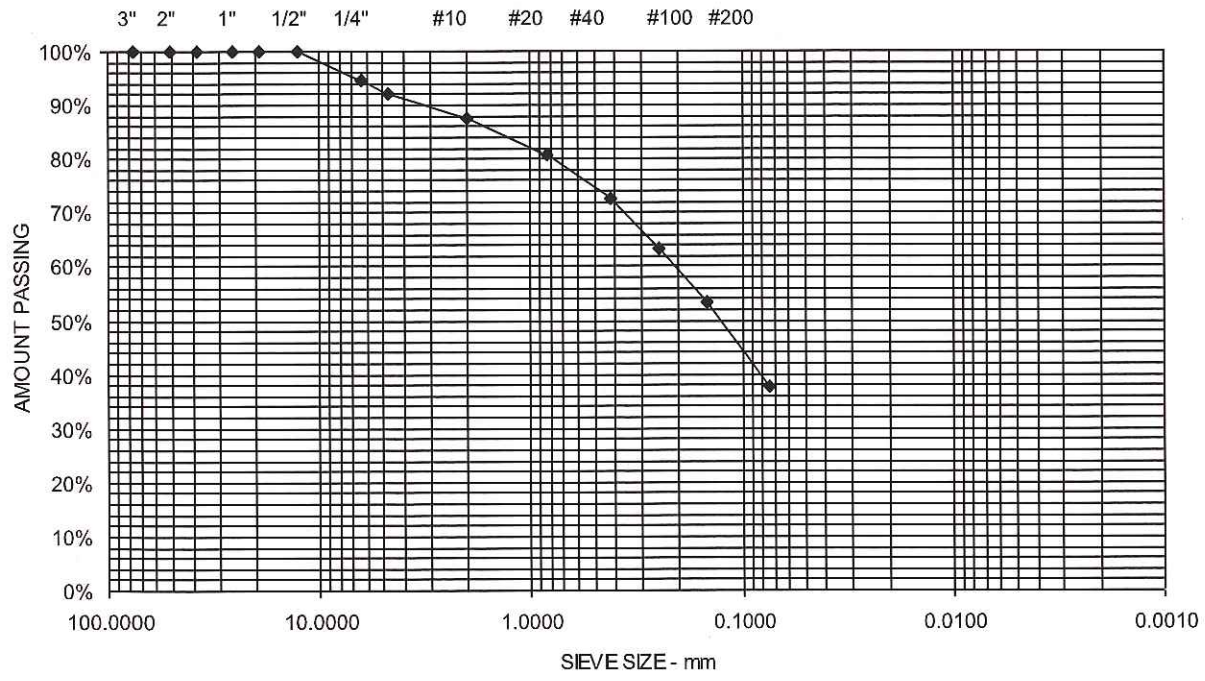
Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED GILMAN STREET GARAGE AND CONGRESS STREET BUILDING - GEOTECHNICAL ENGINEERING	Project Number	16-1136
Client	MAINE MEDICAL CENTER	Lab ID	21929G
		Date Received	12/15/2016
		Date Completed	12/19/2016
Material Source	**B-16-9 34.5-36.5'**	Tested By	JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
6.3 mm	**1/4"**	**95**	
4.75 mm	**No. 4**	**92**	7.8% Gravel
2.00 mm	**No. 10**	**88**	
850 um	**No. 20**	**81**	
425 um	**No. 40**	**72**	54.6% Sand
250 um	**No. 60**	**63**	
150 um	**No. 100**	**53**	
75 um	**No. 200**	**37.6**	37.6% Fines

SAND AND SILT, SOME GRAVEL



Comments: w = 11.8%

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S.W.COLE ENGINEERING, INC.

Consolidation Test

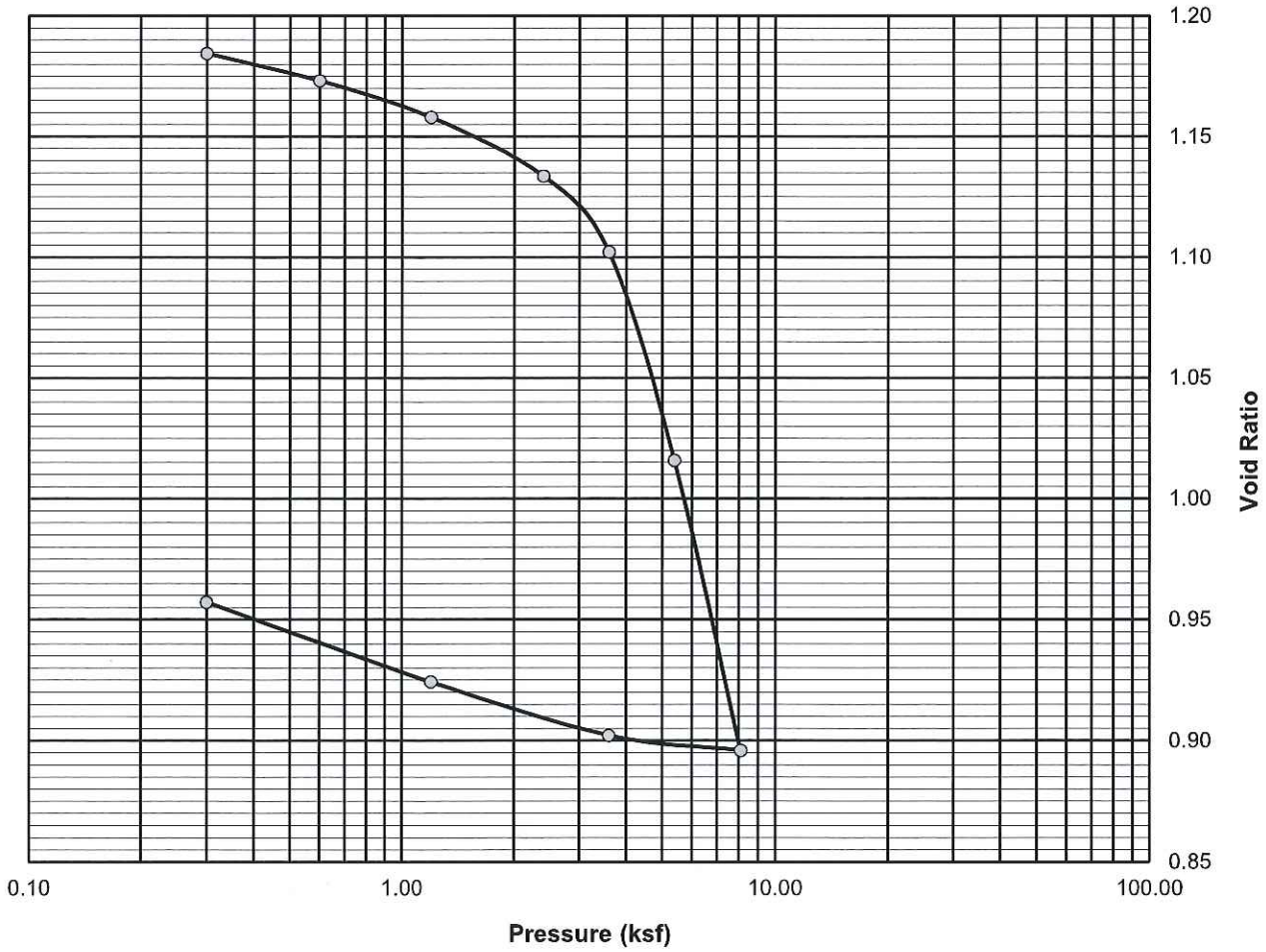
ASTM D-4767

Project Name: Proposed Gilman St. Garage & Congress St. Building
Client: Maine Medical Center

Project Number: 16-1136
Lab ID: 20156B
Date: 12/6/2016

Boring: B-3
Sample: 1S
Depth: 19-21'

P_C =	3.8 ksf
C_C =	0.66
C_R =	0.04
w =	40.1%
W_L =	48
W_P =	20



Comments:

EMW
Reviewed By

APPENDIX C

Report of Analytical Results

Client: Paul Kohler
S. W. Cole Engineering, Inc.
286 Portland Road
Gray,ME 04039

Lab Sample ID: TJ0628-2
Report Date: 28-DEC-16
Client PO:
Project: 16-1136
SDG: TJ0628

Sample Description	Matrix	Date Sampled	Date Received
B-16-8 2D 5-7'	SL	14-DEC-16 00:00:00	15-DEC-16

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Chloride	200 mg/Kgdrywt	20	9.9	EPA 325.2	WG197220	21-DEC-16 15:36:00	EPA 300.0	15-DEC-16	SC		
Sulfate-Turbidimetric	300 mg/Kgdrywt	19.	3.8	EPA 375.4	WG197331	23-DEC-16 15:50:24	EPA 300.0	15-DEC-16	SC		
Total Solids	92. %	1		SM2540G	WG196836	19-DEC-16 12:23:19	SM2540G	16-DEC-16	AP		
pH(Soil)	7.2 pH	0.10	0.10	SW846 9045D	WG196958	15-DEC-16 16:23:51	SW846 9045C	15-DEC-16	AP		

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P.O. Box 540, Scarborough, ME 04070

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Section 12

Stormwater Management

SEBAGO
TECHNICS

CIVIL ENGINEERING • SURVEYING • LANDSCAPE ARCHITECTURE

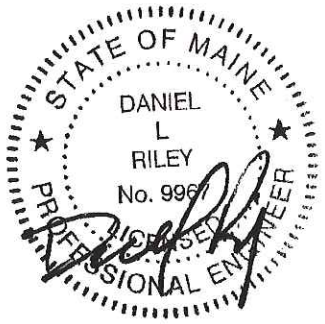
STORMWATER MANAGEMENT PLAN

Maine Medical Center
Congress Street Building
Portland, Maine

Prepared for

Maine Medical Center
22 Bramhall Street
Portland, ME 04102

September 25, 2018



09/25/2018

STORMWATER MANAGEMENT PLAN

Maine Medical Center Congress Street Building
Portland, ME

Introduction

This Stormwater Management Plan has been prepared to address the potential impacts on stormwater runoff associated with the construction of a new hospital building on Maine Medical Center's Bramhall Campus.

The Congress Street Building project will consist of a new 6 story, 264,300 square foot hospital building with an approximately 43,900 sf footprint area. The proposed building replaces the existing employee-parking garage located at the corner of Congress Street and Gilman Street and includes redevelopment of the site along Congress Street. The total area of the campus affected by the work, as shown on the exhibits attached to this report is approximately 1.95 acres.

As discussed in this report, the Stormwater analysis and treatment/detention system has been designed to detain and treat rooftop runoff from the existing Visitors Parking Garage adjacent to the new building. Providing treatment from an additional 26,400 sf of parking deck that currently drains un-detained into the combined sewer system in Congress Street.

The impact of the new building is mitigated in part by redeveloping an existing parking structure with the new building whose rooftop includes green roof components.

Development on the Maine Medical Center Bramhall Campus is subject to the Maine Department of Environmental Protection (MDEP) Site location of Development Act and Chapter 500 Stormwater standards, reviewed by the City of Portland under its delegated review authority from MDEP. Based on the proposed development, the project is subject to the MDEP Chapter 500 Basic, General, and Flooding standards, including the redevelopment standards for a Site Law project, as incorporated into the City of Portland Land Use Ordinance and Site Plan review regulations.

The site is located in an area served by a combined sewer system where the City of Portland seeks to mitigate and reduce combined sewer overflow (CSO) events. The design storm events for CSO evaluation is a 1" rainfall, 24-hour design storm (CSO Storm).

Based on discussions with the City staff, the stormwater analysis and the proposed detention/treatment system has been designed to reduce the rate of runoff from the project site including both the new Congress Street Building and the existing Visitor Garage, to the greatest extent possible during this 1" CSO Storm event.

The proposed erosion controls, inspection and maintenance criteria, and the stormwater management systems have been designed to meet MDEP and City of Portland requirements. The proposed design includes a subsurface sand filter Best Management Practice (BMP) which has been designed to meet

the system sizing and treatment requirements for the new building's and redevelopment project standard. The system has been expanded to the extent practicable and to provide treatment for runoff from the adjacent parking garage.

The proposed design meets the applicable standards for system volume, but due to the limited site area, incorporating the runoff from the Visitor Garage will require waiver of the system surface area design criteria. The waiver is simply a trade-off to allow detention of existing runoff volume to address the CSO flows reduction desired by the City.

Permitting and Analysis History

A comprehensive stormwater analysis of the Maine Medical Center Bramhall Campus was completed in January 2004 as part of the Site Location of Development review, by the City of Portland, of the Bramhall Campus Expansion project. This project constructed from 2004-2007 was significant redevelopment of the campus including the construction of the Visitors Garage, Central Utility Plant and East Tower and renovations of the Emergency Department. The 2004 project also included the reconstruction and re-alignment of Crescent Street and separation of storm drainage in Gilman Street.

The redevelopment project fully separated stormwater runoff from the combined sewers within hospital property the campus and the immediately adjacent streets. The separated runoff re-enters the City's combined system at 7 locations abutting the site to facilitate future separation projects that may be undertaken by the City as part if its CSO program.

The 2004 redevelopment project included the installation of two hydrodynamic separator treatment units and separated runoff from approximately 6.3 acres of the campus and Gilman Street (uphill of A Street) the municipal separated storm drain in A Street, fully utilizing the design capacity of the A Street Storm drain.

The 2004 analysis is presented in a Stormwater Management Report dated January 2004 attached to the Maine Medical Center's January 2004 Site Location of Development Application on file in the City of Portland Planning office.

The 2004 post-development analysis subdivided the campus and tributary offsite areas into 20 onsite and offsite sub catchment areas. These sub catchment areas are the basis of the current study's pre-development analysis. The full campus watershed plan is attached for reference, identifying the sub catchments affected by the currently proposed redevelopment.

The discussion of our current analysis focuses on those sub catchments and study points affected by the proposed project, the analysis of off site areas of the campus remains unchanged from the 2004 analysis with exception of the design rainfall events which have been updated in accordance with the design rainfall adopted by the MDEP Chapter 500 regulations in August of 2015.

Site Existing Conditions

The project site includes the area occupied by the hospital's existing employee garage at the corner of Congress Street and Gilman Street. The runoff evaluation area includes portions of Congress Street to the north and east, Gilman Street to the west and the access road between the existing garage and the LL Bean Wing of the hospital to the south.

The campus located in a densely developed urban setting consisting of hospital and office buildings with their associated parking and landscaped areas, public roadways, and multi-family residential housing. The undeveloped areas of the site consist of steeply sloped land abutting Congress Street and Gilman Street. Ground cover in this area consists primarily of grass, brush and evergreen tree growth.

The subject site is located at a high point in the west end of the Portland Peninsula. Runoff from the project site is collected through a series of roof drains and catch basins and conveyed to the combined sanitary/stormwater sewers located within public streets abutting the site. There are currently two Downstream Defender units, installed in 2005, which provide stormwater quality treatment to runoff from the site. One Downstream Defender unit is located in the Visitor Garage on Congress Street, tributary to the municipal combined sewer system that runs down Forest Street to Park Avenue. The outfall of the Visitor Garage's downstream defender will be redirected to a proposed detention and treatment system associated with new Congress Street building to provide peak flow mitigation during the CSO design storm.

The second Downstream Defender unit is located along Gilman Street, in front of the Central Utility Plant, treating stormwater before it enters the municipal separated storm drain in A Street.

Soils

Soil classifications within the project area were referenced from the Cumberland County Medium Intensity Soil Survey. The site is primarily comprised of Hinckley gravelly sand loam. The project geotechnical evaluation report indicates significant depths of granular fill overlaying glacial till. For modeling purposes of this report the soils were considered hydraulic soil groups A consistent with the Cumberland County soil survey.

Proposed Development

Maine Medical Center proposes to construct a new 6 story, 264,300 square foot hospital building with an approximately 43,900 sf footprint area. The new building incorporates green roof elements and replaces the impervious surfaces associated with the existing employee-parking garage.

The Visitors Garage east of the site will remain. The drainage system from the Visitors Garage will be modified for redirect runoff to the proposed building's stormwater treatment system. The stormwater analysis was developed to consider treatment for both the proposed hospital expansion and the existing parking garage.

The site is subject to the Chapter 500 redevelopment standards as a Site Law, although the proposed development will result in the following:

Total Developed Area Subject to Treatment Standards	= 1.53 acres
Total Post Development Impervious area	= 1.19 acres
Redevelopment Impact Rating	= (- 0.5)
Redeveloped Area Requiring Treatment (50%)	= 0.77 acres
Redeveloped Area Receiving Treatment	= 1.95 acres

Regulatory Requirements

City of Portland:

The project is subject to the City of Portland's land use ordinance and Technical Standards applicable to a project with an existing Site Location of Development Permit and reviewed under the City's delegated review authority. The City's standards incorporate the MDEP Chapter 500 standards as follows.

Maine Department of Environmental Protection (MDEP)

MDEP Rule Chapters 500 and 502 describe stormwater management requirements for new development projects. These rules describe performance standards divided into five major categories: Basic Standard, General Standard, Phosphorous Standard, Urban Impaired Stream Standard, and Flooding Standard. The following sections describe how this project will address these stormwater management performance standards.

Basic Standard: A project must meet basic standards if it disturbs an area greater than one (1) acre. As this development will disturb approximately 1.53 acres, it must meet the basic standard. The standard includes various erosion and sedimentation controls, inspection and maintenance procedures, and general housekeeping requirements.

General Standard: A project is subject to the general standard if it results in the creation of one (1) or more acres of impervious area or developed areas greater than five (5) acres. As this project will include approximately 1.19 acres of impervious area, it must meet the general standard, including provisions in the General Standards for Redevelopment projects.

The redevelopment standard applicable to this project is outlined in the Chapter 500.4.C(2)(d). This standard establishes treatment requirements based on a pre and post development pollutant impact rating which establishes a sliding scale of the percentage of Developed Area which must be treated. For Site Law projects, the scale ranges from a minimum of 50% of the developed area to a maximum treatment equal to a new development.

The redevelopment calculations for the current project indicates that a minimum of 50% of the site's redevelopment must be treated. The treatment system proposed exceeds the minimum requirement

as a stand alone project including the Congress Street building and significantly exceeds the minimum standards by providing treatment for the Visitor Garage runoff.

Standard BMPs have been defined by the MDEP and are described thoroughly in their publication Stormwater Management for Maine: Best Management Practices manual, as revised March 2016.

Phosphorous Standard: A project must meet the phosphorous standards if located within a lake watershed. As this project is not tributary to a lake watershed, it is not subject to the phosphorus standard.

Urban Impaired Stream Standard: A project must meet the urban impaired stream standards if located within an urban impaired stream watershed. As this project is not tributary to an Urban Impaired Stream as defined by MDEP Chapter 502, this project is not subject to the urban impaired stream standard.

Flooding Standard: A project must meet to the flooding standards if it creates impervious areas greater than three (3) acres, or developed areas greater than twenty (20) acres. This project includes approximately 1.19 acres of impervious area; however, the City of Portland Technical Manual Section II-C states that all Level III site plans are required to meet the Maine DEP Chapter 500 flooding standard.

City of Portland Combined Sewers

In addition to the Stormwater Management provisions of the Land Use Ordinance and Technical Standards, the project is located in an area served by a combined sewer system where the City seeks to mitigate the rate of flow in the system that contribute to Combined Sewer Overflow (CSO) events. Discussions with the City Public works department in July 2018 have defined the CSO storm event to be a 1" rainfall event modeled using a 24-hour duration Type III storm distribution. The City has requested that the proposed treatment system be designed to mitigate to the extent practicable the rate of runoff from the site during this storm event, and to detain if practicable the runoff from the existing parking garage.

Quality Treatment

To meet the stormwater quality treatment requirements for the site, a subsurface sand filter BMP and a vegetated roof BMP are proposed to treat runoff from proposed development.

A subsurface sand filter utilizing a Cultec pretreatment row and ACF R-Tank detention modules is proposed to treat and store runoff generated from the roof surface of the proposed Congress Street building. Runoff from the roof will be collected in the building's roof drainage system and directed to the subsurface sand filter installed beneath the paved area of the proposed main entrance. The treated stormwater will discharge to the existing combined sewer at a new Manhole in Congress Street, tributary to Study Point C2.

The proposed subsurface sand filter has been sized based on chapter 7.3 of the Maine Department of Environmental Protection (MDEP) BMP Manual: Subsurface Sand Filters, to provide adequate treatment for the water quality volume, pretreatment of the one-year storm using an inlet control structure and isolator row, and detention for larger storm events.

Redevelopment standards apply because the proposed building will replace existing buildings and pavement areas. After completing the calculations outlined in §4.C(2)(d) of Chapter 500, the ranked impact change due to redevelopment is calculated to be -0.5. Because the project is subject to an existing Site Law Permit the minimum level of treatment required 50% of the redeveloped area.

The redevelopment impact ratings are included in Attachment A to this report.

Also included in Attachment A are tables summarizing the impervious and developed areas for the proposed development and the BMP measures treating these areas. The conclusion is a tabulation of the effective treatment percentages for the proposed development. The results of this tabulation indicate the following:

- The post-development area subject to treatment standards includes 1.53 acres of developed area on the Congress Street building site. This area is comprised of approximately 1.19 acres of impervious area (rooftop, driveway and sidewalk areas) and 0.34 acres of landscaped areas.

- The redevelopment standard requires treatment for 50% of this developed areas for a minimum of 0.77 acres.

- The total area receiving treatment is approximately 1.95 acres of developed area including the new Congress Street Building roof and entrance driveway area (1.34 acres) and the Visitor Garage (0.61 acres).

The redevelopment standard requires treatment for 50% of the new developed areas. As such, the site is required to provide treatment for a minimum of 0.77 acres. The total area receiving treatment is approximately 1.95 acres or 128% of the required area.

Stormwater Treatment System

A subsurface soil filter system is proposed below the Congress Street building's entrance plaza at Congress Street is proposed to provide Stormwater Quality and Quantity Treatment. The system presented on the plans is based on R-Tank chambers with Cultec chamber isolator rows for pre treatment

The system sizing criteria is provided in Attachment A to this report and summarized as follows:

Storage Volume Required	= 5,279 cf
Storage Volume Provided	= 5,385 cf
Surface Area Required (Congress Building only)	= 2,564 sf
Surface Area Required (Congress Building and Visitor Garage)	= 3,883 sf
Surface Area Provided	= 3,082 sf

Methodology:

In order to evaluate drainage characteristics as a result of the proposed development activities, a quantitative analysis was performed to determine peak runoff rates in the pre-development and post-development conditions. The evaluation was performed using the methodology outlined in the USDA Soil Conservation Service's "Urban Hydrology for Small Watersheds - Technical Release #55 (TR-55)". HydroCAD computer software was utilized to perform the calculations.

The peak runoff rates were calculated using a 24-hour duration storm event with a Type III rainfall distribution. The rainfall amounts for Cumberland County have recently been updated and the following 24-hour duration rainfall amounts were used for this report:

Storm Frequency	24-hr Duration Rainfall (in.)
CSO Storm	1.0
2-yr	3.1
10-yr	4.6
25-yr	5.8

Twenty sub catchments were analyzed in the pre-development condition, and twenty-two watersheds in the post-development condition. The pre development sub catchment delineations are based the 2004 study post-development watersheds modified to reflect site improvements constructed as part of the 2004-2007 Bramhall Campus Expansion project construction along with record drawings, and field surveys of the drainage infrastructure.

Sub catchment delineations along the hospital building rooftops are based on visible roof drain locations and record design drawings. Due to the age of a number of buildings, records indicating the locations of roof drain connections to the surrounding sewer system are not available. In these cases, the assumed watershed delineations were made based observations of the rooflines and the surrounding topography and sewer infrastructure.

Five Study Points, identified on the attached watershed plans and hydrologic model output as points SP-C1 through SP-C5 have historically been used to evaluate pre and post-developed runoff conditions from the campus. The Study Points represent locations where stormwater runoff, from the project site, enters the public drainage infrastructure system. In most cases, the capacity of the existing combined sewers is small relative the area draining to them under existing conditions. In these cases,

the study points represent the total stormwater discharge at the study point including both gutter flow and flow into the sewer.

Of these study points only two SP-C2 and SP-C3 are affected by the proposed redevelopment.

Study Point SP-C1 represents the point where stormwater runoff from the site enters a combined sewer at the intersection of Wescott Street and Crescent Street. The study point represents runoff at a manhole identified as DMH-25868 on the project plans. The sewer outlet from this manhole is a 12" cement line that drains in a westerly direction along Crescent Street, eventually draining to Park Avenue via sewers in Ellsworth Street, Congress Street and Weymouth Street.

Study Point SP-C2 represents the point where runoff from the existing Maine Medical Center parking garage, enters a combined sewer at the intersection of Congress Street and Forest Street. The study point represents runoff at a manhole SMH-13952 on the project plans. The sewer outlet from this manhole is an 18" reinforced concrete pipe that drains in a northerly direction along Forest Street to Park Avenue.

Study Point SP-C3 represents the point where runoff from areas of the project site east of the existing visitor garage enters the combined sewer system at the intersection of Gilman Street and Congress Street. At this point runoff within the sewer system discharges in a northerly direction along Gilman Street to Park Avenue. Runoff in the roadway that bypasses the catch basins at the intersection discharges in a westerly direction along Congress Street to St. John Street.

Study Point SP-C4 represents at the intersection of Gilman Street and A Street where runoff from areas of the site including the existing emergency room parking area, L.L. Bean wing, and service areas abutting the central utility plant is directed to the A Street storm drain. A Downstream Defender stormwater treatment system was installed in 2005.

Study Point SP-C5 represents runoff at the intersection of Ellsworth Street and Wescott Street. Runoff currently enters the combined sewer system via manholes in Ellsworth Street and drains in an easterly direction along Ellsworth Street towards its intersection with Congress Street.

The areas and times of concentration of the post-development watersheds vary from the existing conditions based on the proposed site development. Due to the highly-developed nature of the site, the time of concentration in some watersheds is less than six minutes. A minimum time of concentration of six minutes was used in these cases.

Table 1 summarizes the results of the hydrologic analysis of the project under pre-development and post-development conditions.

Table 1 Stormwater Peak Discharge Summary Table									
Study Point	2-Year Storm			10-Year Storm			25-Year Storm		
	Pre (cfs)	Post (cfs)	Diff. (cfs)	Pre (cfs)	Post (cfs)	Diff. (cfs)	Pre (cfs)	Post (cfs)	Diff. (cfs)
SP-C1	1.28	1.28	0.00	2.39	2.39	0.00	3.31	3.31	0.00
SP-C2	6.45	3.78	-2.67	9.14	6.88	-2.26	11.23	11.15	-0.08
SP-C3	1.72	1.53	-0.19	4.28	4.05	-0.23	5.76	5.21	-0.55
SP-C4	14.04	13.78	-0.26	25.22	24.94	-0.28	34.61	34.33	-0.28
SP-C5	1.60	1.60	0.00	3.01	3.01	0.00	4.07	4.07	0.00

The results of the stormwater modeling at Study Point SP-C1 to SP-C5 indicate that the peak rates of runoff in the post-development condition will be less than the pre-developed condition for the 2-year, 10-year, and 25-year storm events.

Study points SP-C2 and SP-C3 were further evaluated to determine the impact on peak flow rate and runoff duration from the project site during the 1" CSO Storm event. The proposed subsurface sand filter has been expanded in size to allow for the detention of runoff from the Congress building and the Parking Garage. The system outlets have been designed to maximize the detention of runoff generated from a 1" rainfall to reduce the peak rate of runoff during this storm and to extend the duration of that runoff as long as practicable to mitigate and reduce the site's contribution to offsite CSO events. The results during this event are summarized in Table 2 below.

The modeling node used to evaluate the connection point to the City system is node SMH-1 representing ESMH-13952.

Table 2 CSO Event Summary Table			
Study Point	1"- 24 Hour Type III Storm		
	Peak Runoff		
	Pre (cfs)	Post (cfs)	Diff. (cfs)
ESMH-13952	1.34	0.28	-1.06 (80%)

The results of the analysis indicates that the proposed system reduces the rate of runoff at the connection to the City's combined sewer by approximately 80%.

To further evaluate the attenuation of flow from the project site during smaller storm events, Table 3 below summarized the performance of the proposed subsurface sand filter detention system identified as Node 1P+G(R-Tank System with Garage) in the model. The table below evaluates the inflow

hydrograph into the system and the outflow hydrograph to the City system during a 1" storm event. This summary most closely represents the contribution of the project site runoff, without the influence of offsite runoff.

The proposed design will reduce the peak rate of runoff from a 1" storm event by 97% compared to the un detained discharge

Table 3 CSO Event Summary Table			
Study Point	1"- 24 Hour Type III Storm		
	Peak Runoff		
	Pre (cfs)	Post (cfs)	Diff. (cfs)
R-Tank System	1.48	0.04	-1.44 (97%)

Conclusion

Erosion and sedimentation controls, inspection and maintenance procedures and general housekeeping requirements have been outlined to prevent unreasonable impacts on the site and to the surrounding environment.

By utilizing Best Management practices, stormwater quality treatment has been provided for at least 50% of the total impervious area and at least 50% of the total developed area. Based on the modeling data, the post-development peak rates of runoff for the 2-year, 10-year, and 25-year storm events demonstrate decreases in the peak rates of runoff when compared to the pre-development peak rates of runoff.

The proposed detention and treatment system meets all of the applicable sizing criteria for minimum surface area, channel protection volume, sediment pretreatment volume to address the requirements for the Congress Street Building project. At the City's request, the system has been expanded to accept runoff from the adjacent Visitor Garage for the purpose of detaining runoff from the existing development during a CSO event storm.

With the addition of this area, the system continues to meet the applicable sizing criteria with the exception of the minimum surface area criteria. The proposed system provides approximately 120% of the required area for the Congress Street Building alone. The proposed system provides 80% of the required area for the combined Congress Building and parking garage footprint. Meeting the full area requirement would require an additional 800 sf of system area which is not available on this site.

With the incorporation of the above referenced erosion control, treatment and detention measures, the project has been designed in conformance with the Maine Department of Environmental Protection Chapter 500 Stormwater Law and City of Portland Stormwater Management Standards.

Accordingly, it is anticipated that stormwater runoff from the proposed development will not cause a significant adverse effect to off-site receiving channels or downstream properties.

Prepared by,

SEBAGO TECHNICS, INC.

Daniel L. Riley, P.E.
Vice President, Engineering

09/25/2018

September 25, 2018

Appendix A

STORWATER QUALITY CALCULATIONS

Table 3: MDEP GENERAL STANDARD CALCULATIONS: MMC Congress Street Building, Portland, Maine

AREA ID	WATERSHED SIZE (S.F.)	EXISTING IMPERVIOUS AREA (To Remain) (S.F.)	NEW IMPERVIOUS AREA (S.F.)	EXISTING LANDSCAPED AREA (To Remain) (S.F.)	NEW LANDSCAPED AREA (S.F.)	NEW DEVELOPED AREA (S.F.)	UNDEVELOPED AREAS (S.F.)	TREATMENT PROVIDED?	NEW IMPERVIOUS AREA TREATED* (S.F.)	NEW LANDSCAPED AREA TREATED* (S.F.)	NEW DEVELOPED AREA TREATED* (S.F.)	TREATMENT BMP
3.1	10,051	8,335	0	1,716	0	0	0	NO	0	0	0	NONE
3.2	4,089	4,089	0	0	0	0	0	NO	0	0	0	NONE
14.1	22,477	14,929	5,018	0	2,530	7,548	0	NO	0	0	0	NONE
15.1	18,644	10,163	443	8,038	0	443	0	NO	0	0	0	NONE
17.1A	43,616	0	43,616	0	0	43,616	0	YES	43,616	0	43,616	SSSF
17.1B	14,879	0	2,836	0	12,043	14,879	0	YES	2,836	12,043	14,879	Green Roof
18	26,386	26,386	0	0	0	0	0	YES	26,386	0	26,386	SSSF
SUM	140,142	63,902	51,913	9,754	14,573	66,486	0	-	72,838	12,043	84,881	-

Designations: SSSF=Subsurface Sand Filter

TOTAL NEW IMPERVIOUS AREA (S.F.)	51,913	TOTAL NEW DEVELOPED AREA (S.F.)	66,486
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (S.F.)	72,838	TOTAL DEV. AREA RECEIVING TREATMENT (S.F.)	84,881
% OF IMPERVIOUS AREA RECEIVING TREATMENT	140.3%	% OF DEV. AREA RECEIVING TREATMENT	127.7%

Table 4: MDEP REDEVELOPMENT STANDARD CALCULATIONS: MMC Congress Street Building, Portland, Maine

Existing Areas by Pollutant Ranking (S.F.)							Proposed Areas by Pollutant Ranking (S.F.)						
0	1	2	3	4	5	SUM	0	1	2	3	4	5	SUM
0	6,538	17,424	1,739	43,699	0	69,400	0	328	22,153	46,919	0	0	69,400

Existing Areas by Pollutant Ranking (acres)							Proposed Areas by Pollutant Ranking (acres)						
0	1	2	3	4	5	SUM	0	1	2	3	4	5	SUM
0.000	0.150	0.400	0.040	1.003	0.000	1.593	0.000	0.008	0.509	1.077	0.000	0.000	1.593

Existing Weighted Average (Item C)	Proposed Weighted Average (Item D)
5.083	4.256

Total Development Area (acres)	Total Redevelopment Area (acres)
1.593	1.593

Ranked Impact Change Due to Redevelopment (Item E)
-0.5

Percent Increase in Developed Area
0.00%

Treatment Levels for Redevelopment Projects	
Ranked Impact Change Due to Redevelopment (Item E)	**Percentage of Developed Area that Must be Treated**
0.0 or less	0% (Stormwater projects) 50% (Site projects)
≤ 0.0 to ≥ 1.0	60%
> 1.0 to ≥ 2.0	70%
> 2.0 to ≥ 3.0	80%
> 3.0	Same treatment level as for new development

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JOB	15466 - Congress Street Building		
SHEET NO.	1	OF	3
CALCULATED BY	DLR	DATE	7/18/2018
FILE NAME	15466 - Stormwater calcs Congre:	PRNT DATE	9/24/2018

UNDERDRAINED SUBSURFACE SAND FILTER

Task: Calculate water quality volume per MDEP chapter 500 regulations

References
1. Maine DEP Chapter 500, Section 4.B.(2)(b)
   a. "must detain a runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped area"

Proposed Congress Building

Tributary to Subsurface Sand Filter #1

Landscaped Area	12,043	SF	
Impervious Area	46,452	SF	

Minimum Surface Area for sand filter and chamber system

Required (2% X Landscaped + 5% X Impervious)

Total Landscaped Area	12,043	SF	Area	240.9	SF	
Total Impervious Area	46,452	SF	Area	2,322.6	SF	
Required Minimum Surface Area				2,563.5	SF	
Provided Surface Area				3,082.0	SF	

Channel Protection Volume (CPV)

Required (0.4" X Landscaped + 1.0" X Impervious)

Landscaped Area	12,043	SF	Volume	401.4				
Impervious Area	46,452	SF	Volume	3,871.0				
CPV Required				4,272.4	CF	0.098	AF	
Provided CPV				6,800.0	CF	4,790 cf@ Elev 52.75		

Sediment Pre-Treatment

Per Reference 2.c above

One year flow rate out put from Hydrocad:		3.32	cfs		
Iso Row sizing for:	902HD	**0.2**	cfs		
Total number of Isolator Row Chambers required:		17		25	Provided

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JOB	15466 - Congress Street Building		
SHEET NO.	2	OF	3
CALCULATED BY	DLR	DATE	7/18/2018
FILE NAME	15466 - Stormwater calcs Congre	PRNT DATE	9/24/2018

UNDERDRAINED SUBSURFACE SAND FILTER

Task: Calculate water quality volume per MDEP chapter 500 regulations

References
1. Maine DEP Chapter 500, Section 4.B.(2)(b)
   a. "must detain a runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped area"

Existing Visitor Garage

Tributary to Subsurface Sand Filter #1

Landscaped Area	0	SF					
Impervious Area	26,386	SF					

Minimum Surface Area for sand filter and chamber system

Required (2% X Landscaped + 5% X Impervious)

Total Landscaped Area	0	SF	Area	0.0	SF		
Total Impervious Area	26,386	SF	Area	1,319.3	SF		
Required Minimum Surface Area				1,319.3	SF		
Provided Surface Area				*	SF		

Channel Protection Volume (CPV)

Required (0.4" X Landscaped + 1.0" X Impervious)

Landscaped Area	0	SF	Volume	0.0					
Impervious Area	26,386	SF	Volume	2,198.8					
Pre Treatment Credit (%)	25%								
CPV Required				1,649.1	CF	0.038	AF		
Provided CPV				*	CF				

Sediment Pre-Treatment

Per Reference 2.c above

One year flow rate out put from Hydrocad:		1.53	cfs
Iso Row sizing for:	902HD	**0.2**	cfs
Total number of Isolator Row Chambers required:		8	

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JOB	15466 - Congress Street Building		
SHEET NO.	3	OF	3
CALCULATED BY	DLR	DATE	7/18/2018
FILE NAME	15466 - Stormwater calcs Congre	PRNT DATE	9/24/2018

UNDERDRAINED SUBSURFACE SAND FILTER

Task: Calculate water quality volume per MDEP chapter 500 regulations

References
1. Maine DEP Chapter 500, Section 4.B.(2)(b)
   a. "must detain a runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped area"

Congress Building and Visitor Garage

Tributary to Subsurface Sand Filter #1

Landscaped Area	12,073	SF				
Impervious Area	72,838	SF				

Minimum Surface Area for sand filter and chamber system

Required (2% X Landscaped + 5% X Impervious)

Total Landscaped Area	12,073	SF	Area	241	SF	
Total Impervious Area	72,838	SF	Area	3,642	SF	
Required Minimum Surface Area				3,883	SF	
Provided Surface Area				3,082	SF	

Channel Protection Volume (CPV)

Required (0.4" X Landscaped + 1.0" X Impervious)

Landscaped Area	12,073	SF	Volume	402				
Impervious Area (Bldg)	43,558	SF	Volume	3,630				
Site Pavement	2,894							
Impervious Area (Garage)	26,386			2,199				
Pretreatment Credit (Garage, 25%)		-25%		-550		(ASSUMES 25% Pretreament Credit for HIL Unit)		
CPV Required				5,279	CF	0.121	AF	
Provided CPV				5,385	CF	@ Elev 51.2		

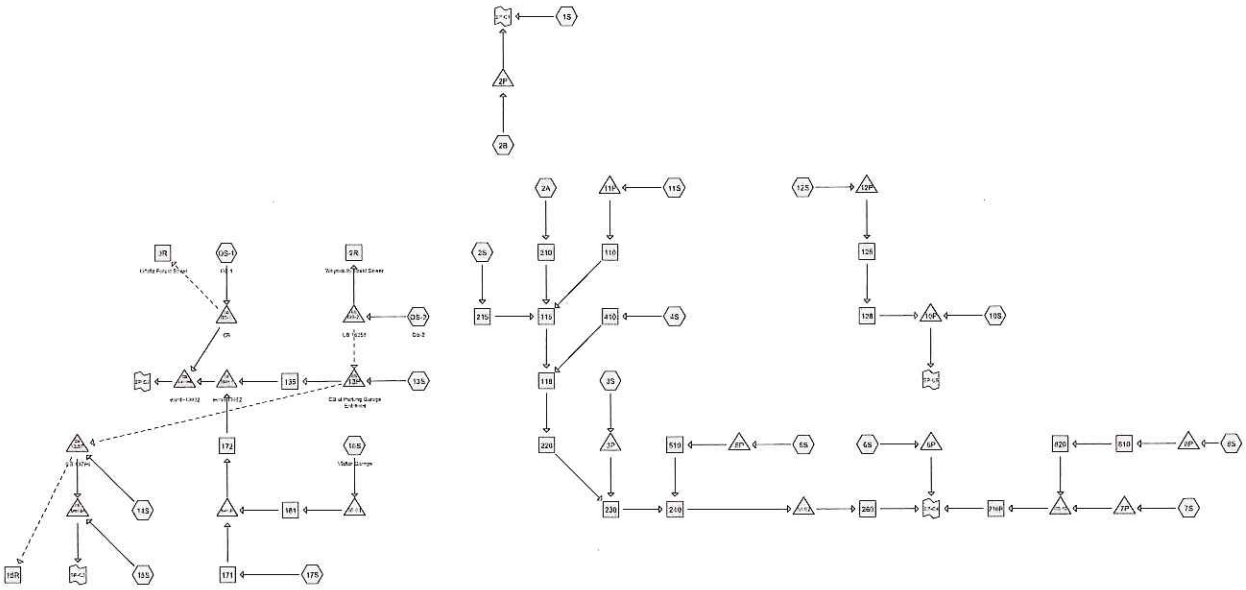
Sediment Pre-Treatment

Per Reference 2.c above

One year flow rate out put from Hydrocad:		4.50	cfs
Iso Row sizing for:	902HD	**0.2**	cfs
Total number of Isolator Row Chambers required:		23	25

Appendix B

HYDROCAD OUTPUT



Subcat Reach Pond Link

Routing Diagram for 15466 - Congress CD PRE
Prepared by Sebago Technics, Inc., Printed 9/24/2018

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.354	39	>75% Grass cover, Good, HSG A (1S, 2B, 3S, 5S, 6S, 8S, 10S, 14S, 15S)
7.080	98	Paved parking (1S, 2A, 2B, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 12S, 13S, 14S, 15S, 17S)
2.834	98	Roofs (5S, 6S, 8S, 10S, 18S)
1.998	89	Urban commercial, 85% imp, HSG A (13S, OS-1, OS-2)
1.517	43	Woods/grass comb., Fair, HSG A (7S, 8S, 13S)
15.783	**83**	**TOTAL AREA**

Summary for Subcatchment 1S:

Runoff = 0.03 cfs @ 12.16 hrs, Volume= 0.004 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	14,272	98	Paved parking
	5,174	39	>75% Grass cover, Good, HSG A
	19,446	82	Weighted Average
	5,174		26.61% Pervious Area
	14,272		73.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	40	0.0500	0.20		**Sheet Flow, SHEET A TO B** Grass: Short n= 0.150 P2= 3.00"
0.2	33	0.0500	3.35		**Shallow Concentrated Flow, SHALLOW B TO C** Grassed Waterway Kv= 15.0 fps
0.3	82	0.0420	4.16		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
0.1	74	0.0500	10.99	8.63	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
2.0					**Direct Entry, DIRECT**
6.0	229	Total			

Summary for Subcatchment 2A:

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.038 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	25,217	98	Paved parking
	25,217		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	30	0.0050	0.60		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
1.3	112	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
3.9					**Direct Entry, DIRECT**
6.0	142	Total			

Summary for Subcatchment 2B:

Runoff = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	10,133	98	Paved parking
	3,735	39	>75% Grass cover, Good, HSG A
	13,868	82	Weighted Average
	3,735		26.93% Pervious Area
	10,133		73.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0100	0.79		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.5	123	0.0380	3.96		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
2.0	131	0.0005	1.10	0.86	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
2.9					**Direct Entry, DIRECT**
6.0	284	Total			

Summary for Subcatchment 2S:

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	16,157	98	Paved parking
	16,157		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0180	1.00		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	78	0.0370	3.90		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.4	136	0.0107	5.08	3.99	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
4.8					**Direct Entry, DIRECT**
6.0	244	Total			

Summary for Subcatchment 3S:

Runoff = 0.06 cfs @ 12.11 hrs, Volume= 0.006 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	3,076	39	>75% Grass cover, Good, HSG A
*	11,898	98	Paved parking
	14,974	86	Weighted Average
	3,076		20.54% Pervious Area
	11,898		79.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0250	1.14		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	106	0.0810	5.78		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.2	222	0.0530	14.83	26.20	**Pipe Channel, PIPE C TO D** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
5.1					**Direct Entry, DIRECT**
6.0	358	Total			

Summary for Subcatchment 4S:

Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	23,249	98	Paved parking
	23,249		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	50	0.0050	0.67		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
1.3	110	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
3.4					**Direct Entry, DIRECT**
6.0	160	Total			

Summary for Subcatchment 5S:

Runoff = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	25,085	98	Paved parking
	26,415	39	>75% Grass cover, Good, HSG A
*	73,528	98	Roofs
	125,028	86	Weighted Average
	26,415		21.13% Pervious Area
	98,613		78.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	35	0.0050	0.62		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
2.2	355	0.0050	2.65	0.93	**Pipe Channel, PIPE B TO C** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
0.1	35	0.0300	8.51	6.69	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.2	85	0.0160	6.22	4.88	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
2.6					**Direct Entry, DIRECT**
6.0	510	Total			

Summary for Subcatchment 6S:

Runoff = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	2,282	39	>75% Grass cover, Good, HSG A
*	501	98	Paved parking
*	8,302	98	Roofs
	11,085	86	Weighted Average
	2,282		20.59% Pervious Area
	8,803		79.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0100	0.79		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	64	0.0100	3.75	1.31	**Pipe Channel, PIPE B TO C (ROOF DRAIN)** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
0.0	27	0.0740	10.20	3.56	**Pipe Channel, PIPE C TO D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
5.1					**Direct Entry, DIRECT**
6.0	121	Total			

Summary for Subcatchment 7S:

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	56,212	43	Woods/grass comb., Fair, HSG A
*	36,084	98	Paved parking
	92,296	65	Weighted Average
	56,212		60.90% Pervious Area
	36,084		39.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	75	0.0400	1.66		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.5	78	0.0180	2.72		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.7	219	0.0590	4.93		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
0.2	72	0.0970	6.32		**Shallow Concentrated Flow, SHALLOW D TO E** Paved Kv= 20.3 fps
0.2	190	0.1020	15.70	12.33	**Pipe Channel, PIPE E TO F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
3.6					**Direct Entry, DIRECT**
6.0	634	Total			

Summary for Subcatchment 8S:

Runoff = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	16,895	98	Paved parking
	7,542	43	Woods/grass comb., Fair, HSG A
	8,958	39	>75% Grass cover, Good, HSG A
*	12,138	98	Roofs
	45,533	77	Weighted Average
	16,500		36.24% Pervious Area
	29,033		63.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	40	0.0050	0.64		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	93	0.0100	4.91	3.86	**Pipe Channel, PIPE B TO C** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.5	135	0.0100	4.91	3.86	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	131	0.0100	4.91	3.86	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
3.8					**Direct Entry, DIRECT**
6.0	399	Total			

Summary for Subcatchment 10S:

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	25,937	39	>75% Grass cover, Good, HSG A
*	9,276	98	Paved parking
*	2,034	98	Roofs
	37,247	57	Weighted Average
	25,937		69.64% Pervious Area
	11,310		30.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0400	1.38		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.1	37	0.0540	4.72		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.4	75	0.0200	2.87		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
0.3	113	0.0210	7.12	5.59	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	71	0.0050	3.47	2.73	**Pipe Channel, PIPE E TO F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
4.5					**Direct Entry, DIRECT**
6.0	326	Total			

Summary for Subcatchment 11S:

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	11,050	98	Paved parking
	11,050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	30	0.0050	0.60		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.7	60	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
4.5					**Direct Entry, DIRECT**
6.0	90	Total			

Summary for Subcatchment 12S:

Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	23,268	98	Paved parking
	23,268		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	30	0.0050	0.60		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.9	80	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.4	90	0.0100	3.75	1.31	**Pipe Channel, PIPE C TO D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
3.9					**Direct Entry, DIRECT**
6.0	200	Total			

Summary for Subcatchment 13S:

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	14,571	98	Paved parking
	2,309	43	Woods/grass comb., Fair, HSG A
	19,134	89	Urban commercial, 85% imp, HSG A
	36,014	90	Weighted Average
	5,179		14.38% Pervious Area
	30,835		85.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	40	0.1000	0.12		**Sheet Flow, SHEET A TO B** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	51	0.6400	4.00		**Shallow Concentrated Flow, SHALLOW B TO C** Woodland Kv= 5.0 fps
0.4	105	0.0420	4.16		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
6.2	196	Total			

Summary for Subcatchment 14S:

Runoff = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	14,684	98	Paved parking
	15,059	39	>75% Grass cover, Good, HSG A
	29,743	68	Weighted Average
	15,059		50.63% Pervious Area
	14,684		49.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	45	0.0680	0.23		**Sheet Flow, SHEET A TO B** Grass: Short n= 0.150 P2= 3.00"
1.0	217	0.0320	3.63		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
1.7					**Direct Entry, DIRECT**
6.0	262	Total			

Summary for Subcatchment 15S:

Runoff = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	11,909	39	>75% Grass cover, Good, HSG A
*	15,681	98	Paved parking
	27,590	73	Weighted Average
	11,909		43.16% Pervious Area
	15,681		56.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	18	0.2770	0.33		**Sheet Flow, SHEET A TO B** Grass: Short n= 0.150 P2= 3.00"
0.5	190	0.1920	6.57		**Shallow Concentrated Flow, SHALLOW B TO C** Grassed Waterway Kv= 15.0 fps
0.5	176	0.0760	5.60		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
4.1					**Direct Entry, DIRECT**
6.0	384	Total			

Summary for Subcatchment 17S:

Runoff = 0.81 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	40,392	98	Paved parking
	40,392		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	40	0.0100	0.84		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.1	14	0.0100	2.03		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.1	134	0.1600	15.00	5.24	**Pipe Channel, PIPE C TO D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
5.0					**Direct Entry, DIRECT**
6.0	188	Total			

Summary for Subcatchment 18S: Visitor Garage

Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	27,443	98	Roofs
	27,443		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	40	0.0100	0.84		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	141	0.2000	9.08		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.4	135	0.0110	5.15	4.05	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
4.5					**Direct Entry, DIRECT**
6.0	316	Total			

Summary for Subcatchment OS-1: OS-1

Runoff = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
17,031	89	Urban commercial, 85% imp, HSG A
2,555		15.00% Pervious Area
14,476		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	60	0.0400	0.20		**Sheet Flow, Sheet flow A-B** Grass: Short n= 0.150 P2= 3.00"
0.9	180	0.0250	3.21		**Shallow Concentrated Flow, Gutter Flow B-C (Russell Street)** Paved Kv= 20.3 fps
0.7	80	0.0100	2.03		**Shallow Concentrated Flow, Gutter Flow C-D (Hill Street)** Paved Kv= 20.3 fps
1.1	375	0.0800	5.74		**Shallow Concentrated Flow, Gutter Flow D-E (Ellsworth Street)** Paved Kv= 20.3 fps
2.2	605	0.0500	4.54		**Shallow Concentrated Flow, Gutter Flow E-F (Congress Street)** Paved Kv= 20.3 fps
10.0	1,300	Total			

Summary for Subcatchment OS-2: OS-2

Runoff = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
50,885	89	Urban commercial, 85% imp, HSG A
7,633		15.00% Pervious Area
43,252		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	60	0.0400	0.20		**Sheet Flow, Sheet flow A-B** Grass: Short n= 0.150 P2= 3.00"
0.9	180	0.0250	3.21		**Shallow Concentrated Flow, Gutter Flow B-C (Russell Street)** Paved Kv= 20.3 fps
0.7	80	0.0100	2.03		**Shallow Concentrated Flow, Gutter Flow C-D (Hill Street)** Paved Kv= 20.3 fps
1.1	375	0.0800	5.74		**Shallow Concentrated Flow, Gutter Flow D-E (Ellsworth Street)** Paved Kv= 20.3 fps
2.2	605	0.0500	4.54		**Shallow Concentrated Flow, Gutter Flow E-F (Congress Street)** Paved Kv= 20.3 fps
10.0	1,300	Total			

Summary for Reach 2R: Weymouth Street Sewer

Inflow Area = 1.168 ac, 85.00% Impervious, Inflow Depth = 0.28" for 1-Inch event
Inflow = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af
Outflow = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 3R: Offsite Forest Street

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 15R:

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 110:

Inflow Area = 0.254 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.22 cfs @ 12.10 hrs, Volume= 0.017 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.79 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 0.9 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.31 cfs

8.0" Round Pipe
n= 0.012
Length= 51.0' Slope= 0.0100 '/'
Inlet Invert= 110.51', Outlet Invert= 110.00'

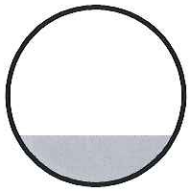
Summary for Reach 115:

Inflow Area = 1.203 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 1.04 cfs @ 12.10 hrs, Volume= 0.079 af
Outflow = 1.02 cfs @ 12.10 hrs, Volume= 0.079 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.73 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 0.9 min

Peak Storage= 19 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.17 cfs

15.0" Round Pipe
n= 0.012
Length= 67.0' Slope= 0.0078 '/'
Inlet Invert= 110.11', Outlet Invert= 109.59'



Summary for Reach 118:

Inflow Area = 1.737 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 1.48 cfs @ 12.10 hrs, Volume= 0.114 af
Outflow = 1.47 cfs @ 12.11 hrs, Volume= 0.114 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.86 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.26 fps, Avg. Travel Time= 0.7 min

Peak Storage= 19 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 20.98 cfs

18.0" Round Pipe
n= 0.012
Length= 90.0' Slope= 0.0340 '/'
Inlet Invert= 109.44', Outlet Invert= 106.38'

Summary for Reach 125:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.46 cfs @ 12.10 hrs, Volume= 0.035 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 1.0 min

Peak Storage= 9 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.21 cfs

12.0" Round Pipe
n= 0.012
Length= 79.0' Slope= 0.0182 '/'
Inlet Invert= 131.87', Outlet Invert= 130.43'

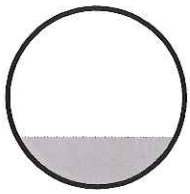
Summary for Reach 128:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.10 hrs, Volume= 0.035 af
Outflow = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.54 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 1.4 min

Peak Storage= 13 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.67 cfs

12.0" Round Pipe
n= 0.012
Length= 71.0' Slope= 0.0048 '/'
Inlet Invert= 130.40', Outlet Invert= 130.06'



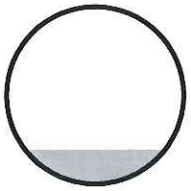
Summary for Reach 135:

Inflow Area = 0.827 ac, 85.62% Impervious, Inflow Depth = 0.32" for 1-Inch event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af
Outflow = 0.28 cfs @ 12.12 hrs, Volume= 0.022 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.13 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.40 fps, Avg. Travel Time= 1.6 min

Peak Storage= 11 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 3.58 cfs

8.0" Round Pipe
n= 0.012
Length= 225.0' Slope= 0.0747 '/'
Inlet Invert= 62.69', Outlet Invert= 45.89'



Summary for Reach 171:

Inflow Area = 0.927 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.81 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.81 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.40 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.51 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 29.32 cfs

15.0" Round Pipe
n= 0.012
Length= 31.0' Slope= 0.1755 '/'
Inlet Invert= 57.44', Outlet Invert= 52.00'

Summary for Reach 172:

Inflow Area = 1.557 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 1.35 cfs @ 12.09 hrs, Volume= 0.103 af
Outflow = 1.34 cfs @ 12.09 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.82 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 27.27 cfs

15.0" Round Pipe
n= 0.012
Length= 38.0' Slope= 0.1518 '/'
Inlet Invert= 51.66', Outlet Invert= 45.89'

Summary for Reach 181:

Inflow Area = 0.630 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 0.042 af
Outflow = 0.54 cfs @ 12.10 hrs, Volume= 0.042 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.91 fps, Avg. Travel Time= 0.9 min

Peak Storage= 10 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 7.96 cfs

12.0" Round Pipe
n= 0.012
Length= 104.0' Slope= 0.0425 '/'
Inlet Invert= 56.28', Outlet Invert= 51.86'

Summary for Reach 210:

Inflow Area = 0.579 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.038 af
Outflow = 0.50 cfs @ 12.10 hrs, Volume= 0.038 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.34 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.43 fps, Avg. Travel Time= 0.8 min

Peak Storage= 8 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.46 cfs

12.0" Round Pipe
n= 0.012
Length= 66.0' Slope= 0.0200 '/'
Inlet Invert= 122.35', Outlet Invert= 121.03'

Summary for Reach 215:

Inflow Area = 0.371 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.32 cfs @ 12.10 hrs, Volume= 0.024 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.47 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 1.1 min

Peak Storage= 7 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.96 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 52.0' Slope= 0.0069 '/'
Inlet Invert= 121.67', Outlet Invert= 121.31'

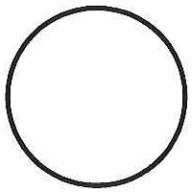
Summary for Reach 216R:

Inflow Area = 3.164 ac, 47.24% Impervious, Inflow Depth = 0.02" for 1-Inch event
Inflow = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.27 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 16.96 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 12.0' Slope= 0.2267 '/'
Inlet Invert= 60.11', Outlet Invert= 57.39'



Summary for Reach 220:

Inflow Area = 1.737 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 1.47 cfs @ 12.11 hrs, Volume= 0.114 af
Outflow = 1.42 cfs @ 12.12 hrs, Volume= 0.114 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.18 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.05 fps, Avg. Travel Time= 1.8 min

Peak Storage= 51 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.30 cfs

18.0" Round Pipe
n= 0.012
Length= 218.0' Slope= 0.0259 '/'
Inlet Invert= 105.99', Outlet Invert= 100.35'

Summary for Reach 230:

Inflow Area = 2.081 ac, 96.61% Impervious, Inflow Depth = 0.69" for 1-Inch event
Inflow = 1.48 cfs @ 12.12 hrs, Volume= 0.120 af
Outflow = 1.47 cfs @ 12.13 hrs, Volume= 0.120 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.41 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.27 fps, Avg. Travel Time= 0.3 min

Peak Storage= 10 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 49.39 cfs

18.0" Round Pipe
n= 0.012
Length= 87.0' Slope= 0.1884 '/'
Inlet Invert= 100.16', Outlet Invert= 83.77'

Summary for Reach 240:

Inflow Area = 4.951 ac, 86.33% Impervious, Inflow Depth = 0.41" for 1-Inch event
Inflow = 2.00 cfs @ 12.12 hrs, Volume= 0.167 af
Outflow = 1.97 cfs @ 12.13 hrs, Volume= 0.167 af, Atten= 2%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.83 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.43 fps, Avg. Travel Time= 0.4 min

Peak Storage= 15 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 45.69 cfs

18.0" Round Pipe
n= 0.012
Length= 100.0' Slope= 0.1612 '/'
Inlet Invert= 67.96', Outlet Invert= 51.84'

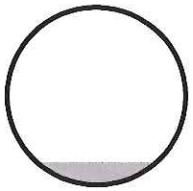
Summary for Reach 260:

Inflow Area = 4.951 ac, 86.33% Impervious, Inflow Depth = 0.41" for 1-Inch event
Inflow = 1.97 cfs @ 12.13 hrs, Volume= 0.167 af
Outflow = 1.96 cfs @ 12.13 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.28 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.87 fps, Avg. Travel Time= 0.3 min

Peak Storage= 11 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 55.59 cfs

24.0" Round Pipe
n= 0.012
Length= 48.0' Slope= 0.0515 '/'
Inlet Invert= 51.84', Outlet Invert= 49.37'



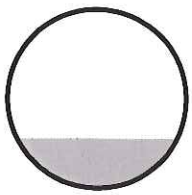
Summary for Reach 410:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.62 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.77 cfs

12.0" Round Pipe
n= 0.012
Length= 35.0' Slope= 0.0051 '/'
Inlet Invert= 110.68', Outlet Invert= 110.50'



Summary for Reach 510:

Inflow Area = 2.870 ac, 78.87% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af
Outflow = 0.52 cfs @ 12.11 hrs, Volume= 0.047 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.95 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.94 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 47.85 cfs

18.0" Round Pipe
n= 0.012
Length= 62.0' Slope= 0.1768 '/'
Inlet Invert= 95.90', Outlet Invert= 84.94'

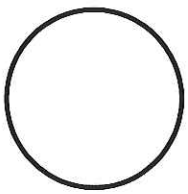
Summary for Reach 810:

Inflow Area = 1.045 ac, 63.76% Impervious, Inflow Depth = 0.05" for 1-Inch event
Inflow = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.47 hrs, Volume= 0.004 af, Atten= 1%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 17.81 cfs

12.0" Round Pipe
n= 0.012
Length= 210.0' Slope= 0.2129 '/'
Inlet Invert= 120.21', Outlet Invert= 75.50'



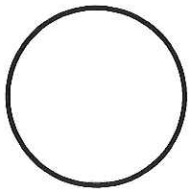
Summary for Reach 820:

Inflow Area = 1.045 ac, 63.76% Impervious, Inflow Depth = 0.05" for 1-Inch event
Inflow = 0.01 cfs @ 12.47 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.50 hrs, Volume= 0.004 af, Atten= 2%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.55 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.32 cfs

12.0" Round Pipe
n= 0.012
Length= 164.0' Slope= 0.1020 '/'
Inlet Invert= 75.58', Outlet Invert= 58.86'



Summary for Pond 2P:

Inflow Area = 0.318 ac, 73.07% Impervious, Inflow Depth = 0.11" for 1-Inch event
Inflow = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af
Outflow = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.2 min
Primary = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 107.03' @ 12.16 hrs Surf.Area= 13 sf Storage= 0 cf

Plug-Flow detention time= 0.3 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (928.3 - 928.0)

Volume	Invert	Avail.Storage	Storage Description
#1	107.00'	169 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
107.00	13	0	0
120.00	13	169	169

Device	Routing	Invert	Outlet Devices
#1	Primary	107.00'	**18.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 107.00' / 106.50' S= 0.0100 '/' Cc= 0.900
n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.16 hrs HW=107.03' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.00 cfs @ 0.81 fps)

Summary for Pond 3P:

Inflow Area = 0.344 ac, 79.46% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.06 cfs @ 12.11 hrs, Volume= 0.006 af
Primary = 0.06 cfs @ 12.11 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 5P:

Inflow Area = 2.870 ac, 78.87% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af
Primary = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 6P:

Inflow Area = 0.254 ac, 79.41% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af
Primary = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 7P:

Inflow Area = 2.119 ac, 39.10% Impervious, Inflow Depth = 0.00" for 1-Inch event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 8P:

Inflow Area = 1.045 ac, 63.76% Impervious, Inflow Depth = 0.05" for 1-Inch event
Inflow = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 10P:

Inflow Area = 1.389 ac, 57.14% Impervious, Inflow Depth = 0.30" for 1-Inch event
Inflow = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af
Primary = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 11P:

Inflow Area = 0.254 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
Primary = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 12P:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Primary = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 13.5P: CB 13796

Inflow Area = 0.683 ac, 49.37% Impervious, Inflow Depth = 0.00" for 1-Inch event
Inflow = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 23.95 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 42.50' @ 23.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.86'	**10.0" Round 12" SD** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 38.86' / 37.64' S= 0.0813 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#2	Device 1	42.50'	**2.0' long Curb Inlet** 2 End Contraction(s)
#3	Secondary	43.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 23.95 hrs HW=42.50' (Free Discharge)
└**1=12" SD** (Passes 0.00 cfs of 4.72 cfs potential flow)
└**2=Curb Inlet** (Weir Controls 0.00 cfs @ 0.06 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=38.86' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 13P: CB at Parking Garage Entrance

Inflow Area = 0.827 ac, 85.62% Impervious, Inflow Depth = 0.32" for 1-Inch event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af
Outflow = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 66.03' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**1.0" x 3.0" Horiz. Grate X 24.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	66.20'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.28 cfs @ 12.10 hrs HW=66.03' (Free Discharge)
└**1=Grate** (Weir Controls 0.28 cfs @ 0.58 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond CB-63:

Inflow Area = 3.164 ac, 47.24% Impervious, Inflow Depth = 0.02" for 1-Inch event
Inflow = 0.01 cfs @ 12.50 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.8 min
Primary = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 59.84' @ 12.52 hrs Surf.Area= 13 sf Storage= 1 cf

Plug-Flow detention time= 0.8 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (1,000.9 - 1,000.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.80'	81 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.80	13	0	0
66.00	13	81	81

Device	Routing	Invert	Outlet Devices
#1	Primary	59.80'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 59.80' / 58.46' S= 0.1340 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.01 cfs @ 12.52 hrs HW=59.84' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.01 cfs @ 0.71 fps)

Summary for Pond DMH 20:

Inflow Area = 1.316 ac, 52.96% Impervious, Inflow Depth = 0.01" for 1-Inch event
Inflow = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 37.61' @ 15.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.59'	**12.0" Round 12" SD** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 37.59' / 35.00' S= 0.1295 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 15.12 hrs HW=37.61' (Free Discharge)
↑—**1=12" SD** (Inlet Controls 0.00 cfs @ 0.45 fps)

Summary for Pond hil-01:

Inflow Area = 0.630 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 0.042 af
Primary = 0.55 cfs @ 12.09 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond hil-02:

Inflow Area = 4.951 ac, 86.33% Impervious, Inflow Depth = 0.41" for 1-Inch event
Inflow = 1.97 cfs @ 12.13 hrs, Volume= 0.167 af
Primary = 1.97 cfs @ 12.13 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond OS-1.: CB

Inflow Area = 0.391 ac, 85.00% Impervious, Inflow Depth = 0.28" for 1-Inch event
Inflow = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af
Outflow = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Primary = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 55.05' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	45.00'	**8.0" Round Stormdrain** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.00' / 44.44' S= 0.0373 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	55.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	55.20'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.07 cfs @ 12.16 hrs HW=55.05' (Free Discharge)
↑**1=Stormdrain** (Passes 0.07 cfs of 5.24 cfs potential flow)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.73 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=45.00' (Free Discharge)
↑**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond OS-2.: CB 16258

Inflow Area = 1.168 ac, 85.00% Impervious, Inflow Depth = 0.28" for 1-Inch event
Inflow = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af
Outflow = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 83.13' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	79.02'	**8.0" Round Stormdrain** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.02' / 78.25' S= 0.0220 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	83.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	83.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.30 cfs @ 12.16 hrs HW=83.13' (Free Discharge)
└**1=Stormdrain** (Passes 0.30 cfs of 3.12 cfs potential flow)
└**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 1.18 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.02' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SMH 1: esmh-13952

Inflow Area = 2.384 ac, 95.01% Impervious, Inflow Depth = 0.63" for 1-Inch event
Inflow = 1.61 cfs @ 12.10 hrs, Volume= 0.125 af
Outflow = 1.61 cfs @ 12.10 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 12.10 hrs, Volume= 0.125 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 45.19' @ 12.10 hrs
Flood Elev= 52.64'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.61'	**18.0" Round Sewer** L= 45.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.61' / 41.64' S= 0.0660 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=1.60 cfs @ 12.10 hrs HW=45.18' (Free Discharge)
└**1=Sewer** (Inlet Controls 1.60 cfs @ 2.58 fps)

Summary for Pond SMH-13932: esmh-13932

Inflow Area = 2.775 ac, 93.60% Impervious, Inflow Depth = 0.58" for 1-Inch event
Inflow = 1.70 cfs @ 12.10 hrs, Volume= 0.134 af
Outflow = 1.70 cfs @ 12.10 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
Primary = 1.70 cfs @ 12.10 hrs, Volume= 0.134 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 41.23' @ 12.10 hrs
Flood Elev= 52.64'

Device	Routing	Invert	Outlet Devices
#1	Primary	40.64'	**18.0" Round Sewer** L= 45.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.64' / 38.00' S= 0.0587 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=1.70 cfs @ 12.10 hrs HW=41.23' (Free Discharge)
└**1=Sewer** (Inlet Controls 1.70 cfs @ 2.62 fps)

Summary for Pond SMH-20:

Inflow Area = 1.557 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 1.35 cfs @ 12.09 hrs, Volume= 0.103 af
Primary = 1.35 cfs @ 12.09 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C1:

Inflow Area = 0.765 ac, 73.26% Impervious, Inflow Depth = 0.11" for 1-Inch event
Inflow = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af
Primary = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C2:

Inflow Area = 2.775 ac, 93.60% Impervious, Inflow Depth = 0.58" for 1-Inch event
Inflow = 1.70 cfs @ 12.10 hrs, Volume= 0.134 af
Primary = 1.70 cfs @ 12.10 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C3:

Inflow Area = 1.316 ac, 52.96% Impervious, Inflow Depth = 0.01" for 1-Inch event
Inflow = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C4:

Inflow Area = 8.370 ac, 71.34% Impervious, Inflow Depth = 0.25" for 1-Inch event
Inflow = 2.00 cfs @ 12.13 hrs, Volume= 0.176 af
Primary = 2.00 cfs @ 12.13 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C5:

Inflow Area = 1.389 ac, 57.14% Impervious, Inflow Depth = 0.30" for 1-Inch event
Inflow = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af
Primary = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=19,446 sf 73.39% Impervious Runoff Depth=1.46"
Flow Length=229' Tc=6.0 min CN=82 Runoff=0.75 cfs 0.054 af

Subcatchment2A: Runoff Area=25,217 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=142' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.70 cfs 0.138 af

Subcatchment2B: Runoff Area=13,868 sf 73.07% Impervious Runoff Depth=1.46"
Flow Length=284' Tc=6.0 min CN=82 Runoff=0.53 cfs 0.039 af

Subcatchment2S: Runoff Area=16,157 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=244' Tc=6.0 min CN=98 Runoff=1.09 cfs 0.089 af

Subcatchment3S: Runoff Area=14,974 sf 79.46% Impervious Runoff Depth=1.75"
Flow Length=358' Tc=6.0 min CN=86 Runoff=0.69 cfs 0.050 af

Subcatchment4S: Runoff Area=23,249 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=160' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.57 cfs 0.128 af

Subcatchment5S: Runoff Area=125,028 sf 78.87% Impervious Runoff Depth=1.75"
Flow Length=510' Tc=6.0 min CN=86 Runoff=5.77 cfs 0.418 af

Subcatchment6S: Runoff Area=11,085 sf 79.41% Impervious Runoff Depth=1.75"
Flow Length=121' Tc=6.0 min CN=86 Runoff=0.51 cfs 0.037 af

Subcatchment7S: Runoff Area=92,296 sf 39.10% Impervious Runoff Depth=0.55"
Flow Length=634' Tc=6.0 min CN=65 Runoff=1.03 cfs 0.098 af

Subcatchment8S: Runoff Area=45,533 sf 63.76% Impervious Runoff Depth=1.14"
Flow Length=399' Tc=6.0 min CN=77 Runoff=1.33 cfs 0.099 af

Subcatchment10S: Runoff Area=37,247 sf 30.36% Impervious Runoff Depth=0.28"
Flow Length=326' Tc=6.0 min CN=57 Runoff=0.11 cfs 0.020 af

Subcatchment11S: Runoff Area=11,050 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=90' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=0.74 cfs 0.061 af

Subcatchment12S: Runoff Area=23,268 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=200' Tc=6.0 min CN=98 Runoff=1.57 cfs 0.128 af

Subcatchment13S: Runoff Area=36,014 sf 85.62% Impervious Runoff Depth=2.08"
Flow Length=196' Tc=6.2 min CN=90 Runoff=1.94 cfs 0.143 af

Subcatchment14S: Runoff Area=29,743 sf 49.37% Impervious Runoff Depth=0.68"
Flow Length=262' Tc=6.0 min CN=68 Runoff=0.45 cfs 0.039 af

Subcatchment15S: Runoff Area=27,590 sf 56.84% Impervious Runoff Depth=0.92"
Flow Length=384' Tc=6.0 min CN=73 Runoff=0.62 cfs 0.049 af

Subcatchment 17S: Runoff Area=40,392 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=188' Tc=6.0 min CN=98 Runoff=2.72 cfs 0.222 af

Subcatchment 18S: Visitor Garage Runoff Area=27,443 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=316' Tc=6.0 min CN=98 Runoff=1.85 cfs 0.151 af

Subcatchment OS-1: OS-1 Runoff Area=17,031 sf 85.00% Impervious Runoff Depth=1.99"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=0.78 cfs 0.065 af

Subcatchment OS-2: OS-2 Runoff Area=50,885 sf 85.00% Impervious Runoff Depth=1.99"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=2.34 cfs 0.194 af

Reach 2R: Weymouth Street Sewer Inflow=2.28 cfs 0.194 af
Outflow=2.28 cfs 0.194 af

Reach 3R: Offsite Forest Street Inflow=0.13 cfs 0.001 af
Outflow=0.13 cfs 0.001 af

Reach 15R: Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 110: Avg. Flow Depth=0.36' Max Vel=3.87 fps Inflow=0.74 cfs 0.061 af
8.0" Round Pipe n=0.012 L=51.0' S=0.0100 '/' Capacity=1.31 cfs Outflow=0.74 cfs 0.061 af

Reach 115: Avg. Flow Depth=0.68' Max Vel=5.19 fps Inflow=3.51 cfs 0.288 af
15.0" Round Pipe n=0.012 L=67.0' S=0.0078 '/' Capacity=6.17 cfs Outflow=3.48 cfs 0.288 af

Reach 118: Avg. Flow Depth=0.50' Max Vel=9.76 fps Inflow=5.04 cfs 0.415 af
18.0" Round Pipe n=0.012 L=90.0' S=0.0340 '/' Capacity=20.98 cfs Outflow=5.01 cfs 0.415 af

Reach 125: Avg. Flow Depth=0.38' Max Vel=5.80 fps Inflow=1.57 cfs 0.128 af
12.0" Round Pipe n=0.012 L=79.0' S=0.0182 '/' Capacity=5.21 cfs Outflow=1.56 cfs 0.128 af

Reach 128: Avg. Flow Depth=0.55' Max Vel=3.53 fps Inflow=1.56 cfs 0.128 af
12.0" Round Pipe n=0.012 L=71.0' S=0.0048 '/' Capacity=2.67 cfs Outflow=1.54 cfs 0.128 af

Reach 135: Avg. Flow Depth=0.28' Max Vel=9.40 fps Inflow=1.29 cfs 0.136 af
8.0" Round Pipe n=0.012 L=225.0' S=0.0747 '/' Capacity=3.58 cfs Outflow=1.28 cfs 0.136 af

Reach 171: Avg. Flow Depth=0.26' Max Vel=14.91 fps Inflow=2.72 cfs 0.222 af
15.0" Round Pipe n=0.012 L=31.0' S=0.1755 '/' Capacity=29.32 cfs Outflow=2.72 cfs 0.222 af

Reach 172: Avg. Flow Depth=0.35' Max Vel=16.46 fps Inflow=4.56 cfs 0.372 af
15.0" Round Pipe n=0.012 L=38.0' S=0.1518 '/' Capacity=27.27 cfs Outflow=4.55 cfs 0.372 af

Reach 181: Avg. Flow Depth=0.33' Max Vel=8.24 fps Inflow=1.85 cfs 0.151 af
12.0" Round Pipe n=0.012 L=104.0' S=0.0425 '/' Capacity=7.96 cfs Outflow=1.84 cfs 0.151 af

Reach 210: Avg. Flow Depth=0.38' Max Vel=6.13 fps Inflow=1.70 cfs 0.138 af
12.0" Round Pipe n=0.012 L=66.0' S=0.0200 '/' Capacity=5.46 cfs Outflow=1.69 cfs 0.138 af

Reach 215: Avg. Flow Depth=0.42' Max Vel=3.48 fps Inflow=1.09 cfs 0.089 af
12.0" Round Pipe n=0.013 L=52.0' S=0.0069 '/' Capacity=2.96 cfs Outflow=1.08 cfs 0.089 af

Reach 216R: Avg. Flow Depth=0.25' Max Vel=15.09 fps Inflow=2.33 cfs 0.197 af
12.0" Round Pipe n=0.013 L=12.0' S=0.2267 '/' Capacity=16.96 cfs Outflow=2.33 cfs 0.197 af

Reach 220: Avg. Flow Depth=0.54' Max Vel=8.82 fps Inflow=5.01 cfs 0.415 af
18.0" Round Pipe n=0.012 L=218.0' S=0.0259 '/' Capacity=18.30 cfs Outflow=4.91 cfs 0.415 af

Reach 230: Avg. Flow Depth=0.34' Max Vel=18.51 fps Inflow=5.59 cfs 0.465 af
18.0" Round Pipe n=0.012 L=87.0' S=0.1884 '/' Capacity=49.39 cfs Outflow=5.57 cfs 0.465 af

Reach 240: Avg. Flow Depth=0.51' Max Vel=21.42 fps Inflow=11.29 cfs 0.883 af
18.0" Round Pipe n=0.012 L=100.0' S=0.1612 '/' Capacity=45.69 cfs Outflow=11.25 cfs 0.883 af

Reach 260: Avg. Flow Depth=0.61' Max Vel=13.86 fps Inflow=11.25 cfs 0.883 af
24.0" Round Pipe n=0.012 L=48.0' S=0.0515 '/' Capacity=55.59 cfs Outflow=11.22 cfs 0.883 af

Reach 410: Avg. Flow Depth=0.54' Max Vel=3.63 fps Inflow=1.57 cfs 0.128 af
12.0" Round Pipe n=0.012 L=35.0' S=0.0051 '/' Capacity=2.77 cfs Outflow=1.56 cfs 0.128 af

Reach 510: Avg. Flow Depth=0.35' Max Vel=18.27 fps Inflow=5.77 cfs 0.418 af
18.0" Round Pipe n=0.012 L=62.0' S=0.1768 '/' Capacity=47.85 cfs Outflow=5.76 cfs 0.418 af

Reach 810: Avg. Flow Depth=0.19' Max Vel=13.33 fps Inflow=1.33 cfs 0.099 af
12.0" Round Pipe n=0.012 L=210.0' S=0.2129 '/' Capacity=17.81 cfs Outflow=1.32 cfs 0.099 af

Reach 820: Avg. Flow Depth=0.22' Max Vel=10.22 fps Inflow=1.32 cfs 0.099 af
12.0" Round Pipe n=0.012 L=164.0' S=0.1020 '/' Capacity=12.32 cfs Outflow=1.30 cfs 0.099 af

Pond 2P: Peak Elev=107.31' Storage=4 cf Inflow=0.53 cfs 0.039 af
18.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=0.53 cfs 0.039 af

Pond 3P: Inflow=0.69 cfs 0.050 af
Primary=0.69 cfs 0.050 af

Pond 5P: Inflow=5.77 cfs 0.418 af
Primary=5.77 cfs 0.418 af

Pond 6P: Inflow=0.51 cfs 0.037 af
Primary=0.51 cfs 0.037 af

Pond 7P: Inflow=1.03 cfs 0.098 af
Primary=1.03 cfs 0.098 af

Pond 8P: Inflow=1.33 cfs 0.099 af
Primary=1.33 cfs 0.099 af

Pond 10P: Inflow=1.60 cfs 0.147 af
Primary=1.60 cfs 0.147 af

Pond 11P: Inflow=0.74 cfs 0.061 af
Primary=0.74 cfs 0.061 af

Pond 12P: Inflow=1.57 cfs 0.128 af
Primary=1.57 cfs 0.128 af

Pond 13.5P: CB 13796 Peak Elev=42.81' Inflow=1.10 cfs 0.045 af
Primary=1.10 cfs 0.045 af Secondary=0.00 cfs 0.000 af Outflow=1.10 cfs 0.045 af

Pond 13P: CB at Parking Garage Entrance Peak Elev=66.29' Inflow=1.94 cfs 0.143 af
Primary=1.29 cfs 0.136 af Secondary=0.65 cfs 0.007 af Outflow=1.94 cfs 0.143 af

Pond CB-63: Peak Elev=60.68' Storage=11 cf Inflow=2.33 cfs 0.197 af
12.0" Round Culvert n=0.012 L=10.0' S=0.1340 '/' Outflow=2.33 cfs 0.197 af

Pond DMH 20: Peak Elev=38.30' Inflow=1.72 cfs 0.094 af
12.0" Round Culvert n=0.010 L=20.0' S=0.1295 '/' Outflow=1.72 cfs 0.094 af

Pond hil-01: Inflow=1.85 cfs 0.151 af
Primary=1.85 cfs 0.151 af

Pond hil-02: Inflow=11.25 cfs 0.883 af
Primary=11.25 cfs 0.883 af

Pond OS-1.: CB Peak Elev=55.22' Inflow=0.78 cfs 0.065 af
Primary=0.65 cfs 0.064 af Secondary=0.13 cfs 0.001 af Outflow=0.78 cfs 0.065 af

Pond OS-2.: CB 16258 Peak Elev=83.51' Inflow=2.34 cfs 0.194 af
Primary=2.28 cfs 0.194 af Secondary=0.06 cfs 0.000 af Outflow=2.34 cfs 0.194 af

Pond SMH 1: esmh-13952 Peak Elev=45.84' Inflow=5.83 cfs 0.509 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0660 '/' Outflow=5.83 cfs 0.509 af

Pond SMH-13932: esmh-13932 Peak Elev=41.96' Inflow=6.45 cfs 0.572 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0587 '/' Outflow=6.45 cfs 0.572 af

Pond SMH-20: Inflow=4.56 cfs 0.372 af
Primary=4.56 cfs 0.372 af

Link SP-C1: Inflow=1.28 cfs 0.093 af
Primary=1.28 cfs 0.093 af

Link SP-C2: Inflow=6.45 cfs 0.572 af
Primary=6.45 cfs 0.572 af

Link SP-C3: Inflow=1.72 cfs 0.094 af
Primary=1.72 cfs 0.094 af

Link SP-C4: Inflow=14.04 cfs 1.117 af
Primary=14.04 cfs 1.117 af

Link SP-C5:

Inflow=1.60 cfs 0.147 af
Primary=1.60 cfs 0.147 af

Total Runoff Area = 15.783 ac Runoff Volume = 2.219 af Average Runoff Depth = 1.69"
26.42% Pervious = 4.170 ac 73.58% Impervious = 11.613 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=19,446 sf 73.39% Impervious Runoff Depth=2.72"
Flow Length=229' Tc=6.0 min CN=82 Runoff=1.40 cfs 0.101 af

Subcatchment2A: Runoff Area=25,217 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=142' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=2.54 cfs 0.211 af

Subcatchment2B: Runoff Area=13,868 sf 73.07% Impervious Runoff Depth=2.72"
Flow Length=284' Tc=6.0 min CN=82 Runoff=1.00 cfs 0.072 af

Subcatchment2S: Runoff Area=16,157 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=244' Tc=6.0 min CN=98 Runoff=1.63 cfs 0.135 af

Subcatchment3S: Runoff Area=14,974 sf 79.46% Impervious Runoff Depth=3.10"
Flow Length=358' Tc=6.0 min CN=86 Runoff=1.21 cfs 0.089 af

Subcatchment4S: Runoff Area=23,249 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=160' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=2.34 cfs 0.194 af

Subcatchment5S: Runoff Area=125,028 sf 78.87% Impervious Runoff Depth=3.10"
Flow Length=510' Tc=6.0 min CN=86 Runoff=10.09 cfs 0.740 af

Subcatchment6S: Runoff Area=11,085 sf 79.41% Impervious Runoff Depth=3.10"
Flow Length=121' Tc=6.0 min CN=86 Runoff=0.89 cfs 0.066 af

Subcatchment7S: Runoff Area=92,296 sf 39.10% Impervious Runoff Depth=1.39"
Flow Length=634' Tc=6.0 min CN=65 Runoff=3.18 cfs 0.246 af

Subcatchment8S: Runoff Area=45,533 sf 63.76% Impervious Runoff Depth=2.29"
Flow Length=399' Tc=6.0 min CN=77 Runoff=2.75 cfs 0.200 af

Subcatchment10S: Runoff Area=37,247 sf 30.36% Impervious Runoff Depth=0.90"
Flow Length=326' Tc=6.0 min CN=57 Runoff=0.71 cfs 0.064 af

Subcatchment11S: Runoff Area=11,050 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=90' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.11 cfs 0.092 af

Subcatchment12S: Runoff Area=23,268 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=200' Tc=6.0 min CN=98 Runoff=2.34 cfs 0.194 af

Subcatchment13S: Runoff Area=36,014 sf 85.62% Impervious Runoff Depth=3.49"
Flow Length=196' Tc=6.2 min CN=90 Runoff=3.19 cfs 0.241 af

Subcatchment14S: Runoff Area=29,743 sf 49.37% Impervious Runoff Depth=1.60"
Flow Length=262' Tc=6.0 min CN=68 Runoff=1.21 cfs 0.091 af

Subcatchment15S: Runoff Area=27,590 sf 56.84% Impervious Runoff Depth=1.97"
Flow Length=384' Tc=6.0 min CN=73 Runoff=1.42 cfs 0.104 af

Subcatchment 17S: Runoff Area=40,392 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=188' Tc=6.0 min CN=98 Runoff=4.07 cfs 0.337 af

Subcatchment 18S: Visitor Garage Runoff Area=27,443 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=316' Tc=6.0 min CN=98 Runoff=2.77 cfs 0.229 af

Subcatchment OS-1: OS-1 Runoff Area=17,031 sf 85.00% Impervious Runoff Depth=3.39"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=1.31 cfs 0.110 af

Subcatchment OS-2: OS-2 Runoff Area=50,885 sf 85.00% Impervious Runoff Depth=3.39"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=3.92 cfs 0.330 af

Reach 2R: Weymouth Street Sewer Inflow=2.95 cfs 0.318 af
Outflow=2.95 cfs 0.318 af

Reach 3R: Offsite Forest Street Inflow=0.46 cfs 0.008 af
Outflow=0.46 cfs 0.008 af

Reach 15R: Inflow=0.81 cfs 0.006 af
Outflow=0.81 cfs 0.006 af

Reach 110: Avg. Flow Depth=0.47' Max Vel=4.21 fps Inflow=1.11 cfs 0.092 af
8.0" Round Pipe n=0.012 L=51.0' S=0.0100 '/' Capacity=1.31 cfs Outflow=1.11 cfs 0.092 af

Reach 115: Avg. Flow Depth=0.89' Max Vel=5.64 fps Inflow=5.25 cfs 0.438 af
15.0" Round Pipe n=0.012 L=67.0' S=0.0078 '/' Capacity=6.17 cfs Outflow=5.21 cfs 0.438 af

Reach 118: Avg. Flow Depth=0.62' Max Vel=10.90 fps Inflow=7.54 cfs 0.632 af
18.0" Round Pipe n=0.012 L=90.0' S=0.0340 '/' Capacity=20.98 cfs Outflow=7.50 cfs 0.632 af

Reach 125: Avg. Flow Depth=0.47' Max Vel=6.45 fps Inflow=2.34 cfs 0.194 af
12.0" Round Pipe n=0.012 L=79.0' S=0.0182 '/' Capacity=5.21 cfs Outflow=2.33 cfs 0.194 af

Reach 128: Avg. Flow Depth=0.72' Max Vel=3.83 fps Inflow=2.33 cfs 0.194 af
12.0" Round Pipe n=0.012 L=71.0' S=0.0048 '/' Capacity=2.67 cfs Outflow=2.30 cfs 0.194 af

Reach 135: Avg. Flow Depth=0.31' Max Vel=9.87 fps Inflow=1.55 cfs 0.215 af
8.0" Round Pipe n=0.012 L=225.0' S=0.0747 '/' Capacity=3.58 cfs Outflow=1.54 cfs 0.215 af

Reach 171: Avg. Flow Depth=0.31' Max Vel=16.76 fps Inflow=4.07 cfs 0.337 af
15.0" Round Pipe n=0.012 L=31.0' S=0.1755 '/' Capacity=29.32 cfs Outflow=4.07 cfs 0.337 af

Reach 172: Avg. Flow Depth=0.43' Max Vel=18.44 fps Inflow=6.81 cfs 0.566 af
15.0" Round Pipe n=0.012 L=38.0' S=0.1518 '/' Capacity=27.27 cfs Outflow=6.81 cfs 0.566 af

Reach 181: Avg. Flow Depth=0.41' Max Vel=9.21 fps Inflow=2.77 cfs 0.229 af
12.0" Round Pipe n=0.012 L=104.0' S=0.0425 '/' Capacity=7.96 cfs Outflow=2.75 cfs 0.229 af

Reach 210: Avg. Flow Depth=0.48' Max Vel=6.82 fps Inflow=2.54 cfs 0.211 af
12.0" Round Pipe n=0.012 L=66.0' S=0.0200 '/' Capacity=5.46 cfs Outflow=2.53 cfs 0.211 af

Reach 215: Avg. Flow Depth=0.53' Max Vel=3.86 fps Inflow=1.63 cfs 0.135 af
12.0" Round Pipe n=0.013 L=52.0' S=0.0069 '/' Capacity=2.96 cfs Outflow=1.62 cfs 0.135 af

Reach 216R: Avg. Flow Depth=0.41' Max Vel=19.62 fps Inflow=5.88 cfs 0.446 af
12.0" Round Pipe n=0.013 L=12.0' S=0.2267 '/' Capacity=16.96 cfs Outflow=5.87 cfs 0.446 af

Reach 220: Avg. Flow Depth=0.67' Max Vel=9.84 fps Inflow=7.50 cfs 0.632 af
18.0" Round Pipe n=0.012 L=218.0' S=0.0259 '/' Capacity=18.30 cfs Outflow=7.37 cfs 0.632 af

Reach 230: Avg. Flow Depth=0.42' Max Vel=20.94 fps Inflow=8.56 cfs 0.720 af
18.0" Round Pipe n=0.012 L=87.0' S=0.1884 '/' Capacity=49.39 cfs Outflow=8.53 cfs 0.720 af

Reach 240: Avg. Flow Depth=0.67' Max Vel=24.51 fps Inflow=18.55 cfs 1.461 af
18.0" Round Pipe n=0.012 L=100.0' S=0.1612 '/' Capacity=45.69 cfs Outflow=18.50 cfs 1.461 af

Reach 260: Avg. Flow Depth=0.79' Max Vel=15.91 fps Inflow=18.50 cfs 1.461 af
24.0" Round Pipe n=0.012 L=48.0' S=0.0515 '/' Capacity=55.59 cfs Outflow=18.46 cfs 1.461 af

Reach 410: Avg. Flow Depth=0.71' Max Vel=3.95 fps Inflow=2.34 cfs 0.194 af
12.0" Round Pipe n=0.012 L=35.0' S=0.0051 '/' Capacity=2.77 cfs Outflow=2.33 cfs 0.194 af

Reach 510: Avg. Flow Depth=0.47' Max Vel=21.44 fps Inflow=10.09 cfs 0.740 af
18.0" Round Pipe n=0.012 L=62.0' S=0.1768 '/' Capacity=47.85 cfs Outflow=10.08 cfs 0.740 af

Reach 810: Avg. Flow Depth=0.27' Max Vel=16.46 fps Inflow=2.75 cfs 0.200 af
12.0" Round Pipe n=0.012 L=210.0' S=0.2129 '/' Capacity=17.81 cfs Outflow=2.73 cfs 0.200 af

Reach 820: Avg. Flow Depth=0.32' Max Vel=12.61 fps Inflow=2.73 cfs 0.200 af
12.0" Round Pipe n=0.012 L=164.0' S=0.1020 '/' Capacity=12.32 cfs Outflow=2.70 cfs 0.200 af

Pond 2P: Peak Elev=107.44' Storage=6 cf Inflow=1.00 cfs 0.072 af
18.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=1.00 cfs 0.072 af

Pond 3P: Inflow=1.21 cfs 0.089 af
Primary=1.21 cfs 0.089 af

Pond 5P: Inflow=10.09 cfs 0.740 af
Primary=10.09 cfs 0.740 af

Pond 6P: Inflow=0.89 cfs 0.066 af
Primary=0.89 cfs 0.066 af

Pond 7P: Inflow=3.18 cfs 0.246 af
Primary=3.18 cfs 0.246 af

Pond 8P: Inflow=2.75 cfs 0.200 af
Primary=2.75 cfs 0.200 af

Pond 10P: Inflow=3.01 cfs 0.258 af
Primary=3.01 cfs 0.258 af

Pond 11P: Inflow=1.11 cfs 0.092 af
Primary=1.11 cfs 0.092 af

Pond 12P: Inflow=2.34 cfs 0.194 af
Primary=2.34 cfs 0.194 af

Pond 13.5P: CB 13796 Peak Elev=43.10' Inflow=3.67 cfs 0.129 af
Primary=2.86 cfs 0.123 af Secondary=0.81 cfs 0.006 af Outflow=3.67 cfs 0.129 af

Pond 13P: CB at Parking Garage Entrance Peak Elev=66.41' Inflow=4.01 cfs 0.253 af
Primary=1.55 cfs 0.215 af Secondary=2.47 cfs 0.038 af Outflow=4.01 cfs 0.253 af

Pond CB-63: Peak Elev=62.71' Storage=38 cf Inflow=5.88 cfs 0.446 af
12.0" Round Culvert n=0.012 L=10.0' S=0.1340 '/' Outflow=5.88 cfs 0.446 af

Pond DMH 20: Peak Elev=39.37' Inflow=4.28 cfs 0.227 af
12.0" Round Culvert n=0.010 L=20.0' S=0.1295 '/' Outflow=4.28 cfs 0.227 af

Pond hil-01: Inflow=2.77 cfs 0.229 af
Primary=2.77 cfs 0.229 af

Pond hil-02: Inflow=18.50 cfs 1.461 af
Primary=18.50 cfs 1.461 af

Pond OS-1.: CB Peak Elev=55.26' Inflow=1.31 cfs 0.110 af
Primary=0.85 cfs 0.102 af Secondary=0.46 cfs 0.008 af Outflow=1.31 cfs 0.110 af

Pond OS-2.: CB 16258 Peak Elev=83.61' Inflow=3.92 cfs 0.330 af
Primary=2.95 cfs 0.318 af Secondary=0.97 cfs 0.013 af Outflow=3.92 cfs 0.330 af

Pond SMH 1: esmh-13952 Peak Elev=46.32' Inflow=8.33 cfs 0.781 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0660 '/' Outflow=8.33 cfs 0.781 af

Pond SMH-13932: esmh-13932 Peak Elev=42.54' Inflow=9.14 cfs 0.884 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0587 '/' Outflow=9.14 cfs 0.884 af

Pond SMH-20: Inflow=6.81 cfs 0.566 af
Primary=6.81 cfs 0.566 af

Link SP-C1: Inflow=2.39 cfs 0.174 af
Primary=2.39 cfs 0.174 af

Link SP-C2: Inflow=9.14 cfs 0.884 af
Primary=9.14 cfs 0.884 af

Link SP-C3: Inflow=4.28 cfs 0.227 af
Primary=4.28 cfs 0.227 af

Link SP-C4: Inflow=25.22 cfs 1.972 af
Primary=25.22 cfs 1.972 af

Link SP-C5:

Inflow=3.01 cfs 0.258 af
Primary=3.01 cfs 0.258 af

Total Runoff Area = 15.783 ac Runoff Volume = 3.847 af Average Runoff Depth = 2.92"
26.42% Pervious = 4.170 ac 73.58% Impervious = 11.613 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=19,446 sf 73.39% Impervious Runoff Depth=3.80"
Flow Length=229' Tc=6.0 min CN=82 Runoff=1.93 cfs 0.141 af

Subcatchment2A: Runoff Area=25,217 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=142' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=3.21 cfs 0.268 af

Subcatchment2B: Runoff Area=13,868 sf 73.07% Impervious Runoff Depth=3.80"
Flow Length=284' Tc=6.0 min CN=82 Runoff=1.38 cfs 0.101 af

Subcatchment2S: Runoff Area=16,157 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=244' Tc=6.0 min CN=98 Runoff=2.06 cfs 0.172 af

Subcatchment3S: Runoff Area=14,974 sf 79.46% Impervious Runoff Depth=4.22"
Flow Length=358' Tc=6.0 min CN=86 Runoff=1.63 cfs 0.121 af

Subcatchment4S: Runoff Area=23,249 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=160' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=2.96 cfs 0.247 af

Subcatchment5S: Runoff Area=125,028 sf 78.87% Impervious Runoff Depth=4.22"
Flow Length=510' Tc=6.0 min CN=86 Runoff=13.59 cfs 1.009 af

Subcatchment6S: Runoff Area=11,085 sf 79.41% Impervious Runoff Depth=4.22"
Flow Length=121' Tc=6.0 min CN=86 Runoff=1.20 cfs 0.089 af

Subcatchment7S: Runoff Area=92,296 sf 39.10% Impervious Runoff Depth=2.21"
Flow Length=634' Tc=6.0 min CN=65 Runoff=5.25 cfs 0.390 af

Subcatchment8S: Runoff Area=45,533 sf 63.76% Impervious Runoff Depth=3.31"
Flow Length=399' Tc=6.0 min CN=77 Runoff=3.97 cfs 0.288 af

Subcatchment10S: Runoff Area=37,247 sf 30.36% Impervious Runoff Depth=1.56"
Flow Length=326' Tc=6.0 min CN=57 Runoff=1.39 cfs 0.111 af

Subcatchment11S: Runoff Area=11,050 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=90' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.41 cfs 0.118 af

Subcatchment12S: Runoff Area=23,268 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=200' Tc=6.0 min CN=98 Runoff=2.96 cfs 0.248 af

Subcatchment13S: Runoff Area=36,014 sf 85.62% Impervious Runoff Depth=4.65"
Flow Length=196' Tc=6.2 min CN=90 Runoff=4.19 cfs 0.320 af

Subcatchment14S: Runoff Area=29,743 sf 49.37% Impervious Runoff Depth=2.47"
Flow Length=262' Tc=6.0 min CN=68 Runoff=1.92 cfs 0.140 af

Subcatchment15S: Runoff Area=27,590 sf 56.84% Impervious Runoff Depth=2.92"
Flow Length=384' Tc=6.0 min CN=73 Runoff=2.13 cfs 0.154 af

Subcatchment 17S: Runoff Area=40,392 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=188' Tc=6.0 min CN=98 Runoff=5.15 cfs 0.430 af

Subcatchment 18S: Visitor Garage Runoff Area=27,443 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=316' Tc=6.0 min CN=98 Runoff=3.50 cfs 0.292 af

Subcatchment OS-1: OS-1 Runoff Area=17,031 sf 85.00% Impervious Runoff Depth=4.54"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=1.73 cfs 0.148 af

Subcatchment OS-2: OS-2 Runoff Area=50,885 sf 85.00% Impervious Runoff Depth=4.54"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=5.17 cfs 0.442 af

Reach 2R: Weymouth Street Sewer Inflow=3.31 cfs 0.412 af
Outflow=3.31 cfs 0.412 af

Reach 3R: Offsite Forest Street Inflow=0.73 cfs 0.016 af
Outflow=0.73 cfs 0.016 af

Reach 15R: Inflow=2.41 cfs 0.027 af
Outflow=2.41 cfs 0.027 af

Reach 110: Avg. Flow Depth=0.61' Max Vel=4.27 fps Inflow=1.41 cfs 0.118 af
8.0" Round Pipe n=0.012 L=51.0' S=0.0100 '/' Capacity=1.31 cfs Outflow=1.39 cfs 0.118 af

Reach 115: Avg. Flow Depth=1.15' Max Vel=5.72 fps Inflow=6.64 cfs 0.558 af
15.0" Round Pipe n=0.012 L=67.0' S=0.0078 '/' Capacity=6.17 cfs Outflow=6.57 cfs 0.558 af

Reach 118: Avg. Flow Depth=0.71' Max Vel=11.58 fps Inflow=9.50 cfs 0.805 af
18.0" Round Pipe n=0.012 L=90.0' S=0.0340 '/' Capacity=20.98 cfs Outflow=9.46 cfs 0.805 af

Reach 125: Avg. Flow Depth=0.54' Max Vel=6.84 fps Inflow=2.96 cfs 0.248 af
12.0" Round Pipe n=0.012 L=79.0' S=0.0182 '/' Capacity=5.21 cfs Outflow=2.95 cfs 0.248 af

Reach 128: Avg. Flow Depth=1.00' Max Vel=3.87 fps Inflow=2.95 cfs 0.248 af
12.0" Round Pipe n=0.012 L=71.0' S=0.0048 '/' Capacity=2.67 cfs Outflow=2.79 cfs 0.248 af

Reach 135: Avg. Flow Depth=0.32' Max Vel=10.11 fps Inflow=1.70 cfs 0.273 af
8.0" Round Pipe n=0.012 L=225.0' S=0.0747 '/' Capacity=3.58 cfs Outflow=1.69 cfs 0.273 af

Reach 171: Avg. Flow Depth=0.35' Max Vel=17.93 fps Inflow=5.15 cfs 0.430 af
15.0" Round Pipe n=0.012 L=31.0' S=0.1755 '/' Capacity=29.32 cfs Outflow=5.14 cfs 0.430 af

Reach 172: Avg. Flow Depth=0.48' Max Vel=19.67 fps Inflow=8.62 cfs 0.722 af
15.0" Round Pipe n=0.012 L=38.0' S=0.1518 '/' Capacity=27.27 cfs Outflow=8.61 cfs 0.722 af

Reach 181: Avg. Flow Depth=0.46' Max Vel=9.79 fps Inflow=3.50 cfs 0.292 af
12.0" Round Pipe n=0.012 L=104.0' S=0.0425 '/' Capacity=7.96 cfs Outflow=3.48 cfs 0.292 af

Reach 210: Avg. Flow Depth=0.55' Max Vel=7.22 fps Inflow=3.21 cfs 0.268 af
12.0" Round Pipe n=0.012 L=66.0' S=0.0200 '/' Capacity=5.46 cfs Outflow=3.20 cfs 0.268 af

Reach 215: Avg. Flow Depth=0.61' Max Vel=4.07 fps Inflow=2.06 cfs 0.172 af
12.0" Round Pipe n=0.013 L=52.0' S=0.0069 '/' Capacity=2.96 cfs Outflow=2.04 cfs 0.172 af

Reach 216R: Avg. Flow Depth=0.52' Max Vel=22.00 fps Inflow=9.15 cfs 0.678 af
12.0" Round Pipe n=0.013 L=12.0' S=0.2267 '/' Capacity=16.96 cfs Outflow=9.15 cfs 0.678 af

Reach 220: Avg. Flow Depth=0.76' Max Vel=10.44 fps Inflow=9.46 cfs 0.805 af
18.0" Round Pipe n=0.012 L=218.0' S=0.0259 '/' Capacity=18.30 cfs Outflow=9.32 cfs 0.805 af

Reach 230: Avg. Flow Depth=0.48' Max Vel=22.44 fps Inflow=10.92 cfs 0.926 af
18.0" Round Pipe n=0.012 L=87.0' S=0.1884 '/' Capacity=49.39 cfs Outflow=10.89 cfs 0.926 af

Reach 240: Avg. Flow Depth=0.78' Max Vel=26.27 fps Inflow=24.37 cfs 1.935 af
18.0" Round Pipe n=0.012 L=100.0' S=0.1612 '/' Capacity=45.69 cfs Outflow=24.31 cfs 1.935 af

Reach 260: Avg. Flow Depth=0.93' Max Vel=17.11 fps Inflow=24.31 cfs 1.935 af
24.0" Round Pipe n=0.012 L=48.0' S=0.0515 '/' Capacity=55.59 cfs Outflow=24.27 cfs 1.935 af

Reach 410: Avg. Flow Depth=0.90' Max Vel=4.02 fps Inflow=2.96 cfs 0.247 af
12.0" Round Pipe n=0.012 L=35.0' S=0.0051 '/' Capacity=2.77 cfs Outflow=2.94 cfs 0.247 af

Reach 510: Avg. Flow Depth=0.55' Max Vel=23.28 fps Inflow=13.59 cfs 1.009 af
18.0" Round Pipe n=0.012 L=62.0' S=0.1768 '/' Capacity=47.85 cfs Outflow=13.57 cfs 1.009 af

Reach 810: Avg. Flow Depth=0.32' Max Vel=18.26 fps Inflow=3.97 cfs 0.288 af
12.0" Round Pipe n=0.012 L=210.0' S=0.2129 '/' Capacity=17.81 cfs Outflow=3.94 cfs 0.288 af

Reach 820: Avg. Flow Depth=0.39' Max Vel=13.96 fps Inflow=3.94 cfs 0.288 af
12.0" Round Pipe n=0.012 L=164.0' S=0.1020 '/' Capacity=12.32 cfs Outflow=3.91 cfs 0.288 af

Pond 2P: Peak Elev=107.53' Storage=7 cf Inflow=1.38 cfs 0.101 af
18.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=1.38 cfs 0.101 af

Pond 3P: Inflow=1.63 cfs 0.121 af
Primary=1.63 cfs 0.121 af

Pond 5P: Inflow=13.59 cfs 1.009 af
Primary=13.59 cfs 1.009 af

Pond 6P: Inflow=1.20 cfs 0.089 af
Primary=1.20 cfs 0.089 af

Pond 7P: Inflow=5.25 cfs 0.390 af
Primary=5.25 cfs 0.390 af

Pond 8P: Inflow=3.97 cfs 0.288 af
Primary=3.97 cfs 0.288 af

Pond 10P: Inflow=4.07 cfs 0.358 af
Primary=4.07 cfs 0.358 af

Pond 11P: Inflow=1.41 cfs 0.118 af
Primary=1.41 cfs 0.118 af

Pond 12P: Inflow=2.96 cfs 0.248 af
Primary=2.96 cfs 0.248 af

Pond 13.5P: CB 13796 Peak Elev=43.21' Inflow=6.05 cfs 0.218 af
Primary=3.64 cfs 0.190 af Secondary=2.41 cfs 0.027 af Outflow=6.05 cfs 0.218 af

Pond 13P: CB at Parking Garage Entrance Peak Elev=66.50' Inflow=5.84 cfs 0.351 af
Primary=1.70 cfs 0.273 af Secondary=4.14 cfs 0.077 af Outflow=5.84 cfs 0.351 af

Pond CB-63: Peak Elev=66.15' Storage=81 cf Inflow=9.16 cfs 0.678 af
12.0" Round Culvert n=0.012 L=10.0' S=0.1340 '/' Outflow=9.15 cfs 0.678 af

Pond DMH 20: Peak Elev=40.41' Inflow=5.76 cfs 0.345 af
12.0" Round Culvert n=0.010 L=20.0' S=0.1295 '/' Outflow=5.76 cfs 0.345 af

Pond hil-01: Inflow=3.50 cfs 0.292 af
Primary=3.50 cfs 0.292 af

Pond hil-02: Inflow=24.31 cfs 1.935 af
Primary=24.31 cfs 1.935 af

Pond OS-1.: CB Peak Elev=55.29' Inflow=1.73 cfs 0.148 af
Primary=1.00 cfs 0.132 af Secondary=0.73 cfs 0.016 af Outflow=1.73 cfs 0.148 af

Pond OS-2.: CB 16258 Peak Elev=83.68' Inflow=5.17 cfs 0.442 af
Primary=3.31 cfs 0.412 af Secondary=1.86 cfs 0.030 af Outflow=5.17 cfs 0.442 af

Pond SMH 1: esmh-13952 Peak Elev=46.82' Inflow=10.28 cfs 0.995 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0660 '/' Outflow=10.28 cfs 0.995 af

Pond SMH-13932: esmh-13932 Peak Elev=43.13' Inflow=11.23 cfs 1.128 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0587 '/' Outflow=11.23 cfs 1.128 af

Pond SMH-20: Inflow=8.62 cfs 0.722 af
Primary=8.62 cfs 0.722 af

Link SP-C1: Inflow=3.31 cfs 0.242 af
Primary=3.31 cfs 0.242 af

Link SP-C2: Inflow=11.23 cfs 1.128 af
Primary=11.23 cfs 1.128 af

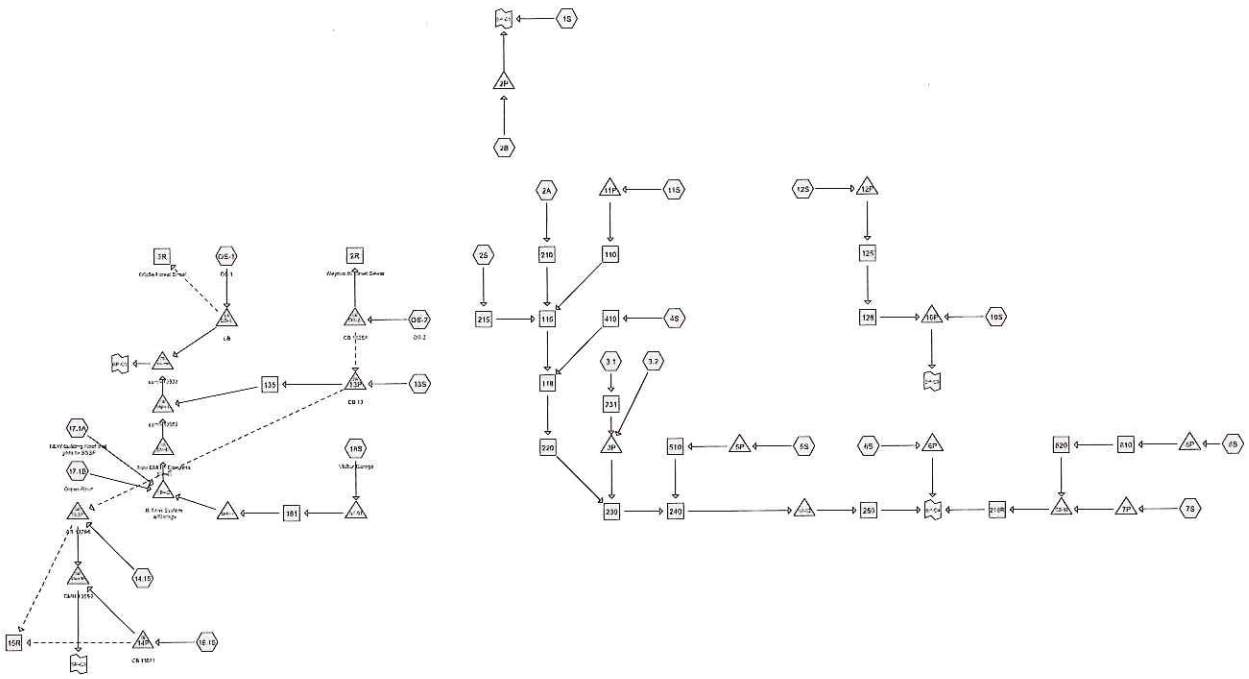
Link SP-C3: Inflow=5.76 cfs 0.345 af
Primary=5.76 cfs 0.345 af

Link SP-C4: Inflow=34.61 cfs 2.702 af
Primary=34.61 cfs 2.702 af

Link SP-C5:

Inflow=4.07 cfs 0.358 af
Primary=4.07 cfs 0.358 af

Total Runoff Area = 15.783 ac Runoff Volume = 5.230 af Average Runoff Depth = 3.98"
26.42% Pervious = 4.170 ac 73.58% Impervious = 11.613 ac



Subcat Reach Pond Link

Routing Diagram for 15466 - Congress CD Post Dev 20180207
Prepared by Sebago Technics, Inc., Printed 9/24/2018

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.026	39	>75% Grass cover, Good, HSG A (1S, 2B, 2S, 3.1, 3.2, 5S, 6S, 8S, 10S, 14.1S, 15.1S)
0.276	86	Green roof (no Walkways) (17.1B)
6.639	98	Paved parking (1S, 2A, 2B, 2S, 3.1, 3.2, 4S, 5S, 6S, 7S, 8S, 10S, 11S, 12S, 13S, 14.1S, 15.1S, 18S)
0.028	98	Paved parking & roofs (17.1A)
3.260	98	Roofs (2S, 5S, 6S, 8S, 10S, 17.1A, 17.1B)
1.998	89	Urban commercial, 85% imp, HSG A (13S, OS-1, OS-2)
0.039	98	Walkways (17.1B)
1.517	43	Woods/grass comb., Fair, HSG A (7S, 8S, 13S)
15.783	**84**	**TOTAL AREA**

Summary for Subcatchment 1S:

Runoff = 0.03 cfs @ 12.16 hrs, Volume= 0.004 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	14,272	98	Paved parking
	5,174	39	>75% Grass cover, Good, HSG A
	19,446	82	Weighted Average
	5,174		26.61% Pervious Area
	14,272		73.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	40	0.0500	0.20		**Sheet Flow, SHEET A TO B** Grass: Short n= 0.150 P2= 3.00"
0.2	33	0.0500	3.35		**Shallow Concentrated Flow, SHALLOW B TO C** Grassed Waterway Kv= 15.0 fps
0.3	82	0.0420	4.16		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
0.1	74	0.0500	10.99	8.63	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
2.0					**Direct Entry, DIRECT**
6.0	229	Total			

Summary for Subcatchment 2A:

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.038 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	25,217	98	Paved parking
	25,217		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	30	0.0050	0.60		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
1.3	112	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
3.9					**Direct Entry, DIRECT**
6.0	142	Total			

Summary for Subcatchment 2B:

Runoff = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	10,133	98	Paved parking
	3,735	39	>75% Grass cover, Good, HSG A
	13,868	82	Weighted Average
	3,735		26.93% Pervious Area
	10,133		73.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0100	0.79		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.5	123	0.0380	3.96		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
2.0	131	0.0005	1.10	0.86	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
2.9					**Direct Entry, DIRECT**
6.0	284	Total			

Summary for Subcatchment 2S:

Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	11,481	98	Paved parking
	2,220	39	>75% Grass cover, Good, HSG A
*	2,456	98	Roofs
	16,157	90	Weighted Average
	2,220		13.74% Pervious Area
	13,937		86.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0180	1.00		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	78	0.0370	3.90		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.4	136	0.0107	5.08	3.99	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
4.8					**Direct Entry, DIRECT**
6.0	244	Total			

Summary for Subcatchment 3.1:

Runoff = 0.06 cfs @ 12.10 hrs, Volume= 0.005 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	1,661	39	>75% Grass cover, Good, HSG A
*	8,390	98	Paved parking
	10,051	88	Weighted Average
	1,661		16.53% Pervious Area
	8,390		83.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0250	1.14		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.6	220	0.0810	5.78		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
5.0					**Direct Entry, DIRECT**
6.0	250	Total			

Summary for Subcatchment 3.2:

Runoff = 0.00 cfs @ 12.36 hrs, Volume= 0.001 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	2,788	98	Paved parking
	1,301	39	>75% Grass cover, Good, HSG A
	4,089	79	Weighted Average
	1,301		31.82% Pervious Area
	2,788		68.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	66	0.0250	1.34		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
5.2					**Direct Entry, DIRECT**
6.0	66	Total			

Summary for Subcatchment 4S:

Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	23,249	98	Paved parking
	23,249		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	50	0.0050	0.67		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
1.3	110	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
3.4					**Direct Entry, DIRECT**
6.0	160	Total			

Summary for Subcatchment 5S:

Runoff = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	25,085	98	Paved parking
	26,415	39	>75% Grass cover, Good, HSG A
*	73,528	98	Roofs
	125,028	86	Weighted Average
	26,415		21.13% Pervious Area
	98,613		78.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	35	0.0050	0.62		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
2.2	355	0.0050	2.65	0.93	**Pipe Channel, PIPE B TO C** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
0.1	35	0.0300	8.51	6.69	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.2	85	0.0160	6.22	4.88	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
2.6					**Direct Entry, DIRECT**
6.0	510	Total			

Summary for Subcatchment 6S:

Runoff = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	2,282	39	>75% Grass cover, Good, HSG A
*	501	98	Paved parking
*	8,302	98	Roofs
	11,085	86	Weighted Average
	2,282		20.59% Pervious Area
	8,803		79.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	30	0.0100	0.79		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	64	0.0100	3.75	1.31	**Pipe Channel, PIPE B TO C (ROOF DRAIN)** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
0.0	27	0.0740	10.20	3.56	**Pipe Channel, PIPE C TO D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
5.1					**Direct Entry, DIRECT**
6.0	121	Total			

Summary for Subcatchment 7S:

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	36,084	98	Paved parking
	56,212	43	Woods/grass comb., Fair, HSG A
	92,296	65	Weighted Average
	56,212		60.90% Pervious Area
	36,084		39.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	75	0.0400	1.66		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.5	78	0.0180	2.72		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.7	219	0.0590	4.93		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
0.2	72	0.0970	6.32		**Shallow Concentrated Flow, SHALLOW D TO E** Paved Kv= 20.3 fps
0.2	190	0.1020	15.70	12.33	**Pipe Channel, PIPE E TO F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
3.6					**Direct Entry, DIRECT**
6.0	634	Total			

Summary for Subcatchment 8S:

Runoff = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	16,895	98	Paved parking
	7,542	43	Woods/grass comb., Fair, HSG A
	8,958	39	>75% Grass cover, Good, HSG A
*	12,138	98	Roofs
	45,533	77	Weighted Average
	16,500		36.24% Pervious Area
	29,033		63.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	40	0.0050	0.64		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	93	0.0100	4.91	3.86	**Pipe Channel, PIPE B TO C** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.5	135	0.0100	4.91	3.86	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.4	131	0.0100	4.91	3.86	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
3.8					**Direct Entry, DIRECT**
6.0	399	Total			

Summary for Subcatchment 10S:

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	25,937	39	>75% Grass cover, Good, HSG A
*	9,276	98	Paved parking
*	2,034	98	Roofs
	37,247	57	Weighted Average
	25,937		69.64% Pervious Area
	11,310		30.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0400	1.38		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.1	37	0.0540	4.72		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.4	75	0.0200	2.87		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
0.3	113	0.0210	7.12	5.59	**Pipe Channel, PIPE D TO E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	71	0.0050	3.47	2.73	**Pipe Channel, PIPE E TO F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
4.5					**Direct Entry, DIRECT**
6.0	326	Total			

Summary for Subcatchment 11S:

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	11,050	98	Paved parking
	11,050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	30	0.0050	0.60		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.7	60	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
4.5					**Direct Entry, DIRECT**
6.0	90	Total			

Summary for Subcatchment 12S:

Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	23,268	98	Paved parking
	23,268		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	30	0.0050	0.60		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.9	80	0.0050	1.44		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.4	90	0.0100	3.75	1.31	**Pipe Channel, PIPE C TO D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
3.9					**Direct Entry, DIRECT**
6.0	200	Total			

Summary for Subcatchment 13S:

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	14,571	98	Paved parking
	2,309	43	Woods/grass comb., Fair, HSG A
	19,134	89	Urban commercial, 85% imp, HSG A
	36,014	90	Weighted Average
	5,179		14.38% Pervious Area
	30,835		85.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	40	0.1000	0.12		**Sheet Flow, SHEET A TO B** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	51	0.6400	4.00		**Shallow Concentrated Flow, SHALLOW B TO C** Woodland Kv= 5.0 fps
0.4	105	0.0420	4.16		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
6.2	196	Total			

Summary for Subcatchment 14.1S:

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	19,947	98	Paved parking
	2,530	39	>75% Grass cover, Good, HSG A
	22,477	91	Weighted Average
	2,530		11.26% Pervious Area
	19,947		88.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0500	1.51		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
1.4	295	0.0320	3.63		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
4.3					**Direct Entry, DIRECT ENTRY**
6.0	325	Total			

Summary for Subcatchment 15.1S:

Runoff = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
	8,038	39	>75% Grass cover, Good, HSG A
*	10,606	98	Paved parking
	18,644	73	Weighted Average
	8,038		43.11% Pervious Area
	10,606		56.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	18	0.2770	0.33		**Sheet Flow, SHEET A TO B** Grass: Short n= 0.150 P2= 3.00"
0.4	170	0.1920	6.57		**Shallow Concentrated Flow, SHALLOW B TO C** Grassed Waterway Kv= 15.0 fps
0.6	195	0.0760	5.60		**Shallow Concentrated Flow, SHALLOW C TO D** Paved Kv= 20.3 fps
4.1					**Direct Entry, DIRECT**
6.0	383	Total			

Summary for Subcatchment 17.1A: NEW Building Roof that goes to SSSF

Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.066 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	1,202	98	Paved parking & roofs
*	42,414	98	Roofs
	43,616	98	Weighted Average
	43,616		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 17.1B: Green Roof

Runoff = 0.09 cfs @ 12.10 hrs, Volume= 0.007 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	12,043	86	Green roof (no Walkways)
*	1,692	98	Walkways
*	1,144	98	Roofs
	14,879	88	Weighted Average
	12,043		80.94% Pervious Area
	2,836		19.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	40	0.0100	0.84		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.1	14	0.0100	2.03		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.1	134	0.1600	15.00	5.24	**Pipe Channel, PIPE C TO D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
5.0					**Direct Entry, DIRECT**
6.0	188	Total			

Summary for Subcatchment 18S: Visitor Garage

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	26,386	98	Paved parking
	26,386		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	40	0.0100	0.84		**Sheet Flow, SHEET A TO B** Smooth surfaces n= 0.011 P2= 3.00"
0.3	141	0.2000	9.08		**Shallow Concentrated Flow, SHALLOW B TO C** Paved Kv= 20.3 fps
0.3	83	0.0110	5.15	4.05	**Pipe Channel, PIPE C TO D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
4.6					**Direct Entry, DIRECT**
6.0	264	Total			

Summary for Subcatchment OS-1: OS-1

Runoff = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
17,031	89	Urban commercial, 85% imp, HSG A
2,555		15.00% Pervious Area
14,476		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	60	0.0400	0.20		**Sheet Flow, Sheet flow A-B** Grass: Short n= 0.150 P2= 3.00"
0.9	180	0.0250	3.21		**Shallow Concentrated Flow, Gutter Flow B-C (Russell Street)** Paved Kv= 20.3 fps
0.7	80	0.0100	2.03		**Shallow Concentrated Flow, Gutter Flow C-D (Hill Street)** Paved Kv= 20.3 fps
1.1	375	0.0800	5.74		**Shallow Concentrated Flow, Gutter Flow D-E (Ellsworth Street** Paved Kv= 20.3 fps
2.2	605	0.0500	4.54		**Shallow Concentrated Flow, Gutter Flow E-F (Congress Street)** Paved Kv= 20.3 fps
10.0	1,300	Total			

Summary for Subcatchment OS-2: OS-2

Runoff = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (sf)	CN	Description
50,885	89	Urban commercial, 85% imp, HSG A
7,633		15.00% Pervious Area
43,252		85.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	60	0.0400	0.20		**Sheet Flow, Sheet flow A-B** Grass: Short n= 0.150 P2= 3.00"
0.9	180	0.0250	3.21		**Shallow Concentrated Flow, Gutter Flow B-C (Russell Street)** Paved Kv= 20.3 fps
0.7	80	0.0100	2.03		**Shallow Concentrated Flow, Gutter Flow C-D (Hill Street)** Paved Kv= 20.3 fps
1.1	375	0.0800	5.74		**Shallow Concentrated Flow, Gutter Flow D-E (Ellsworth Street)** Paved Kv= 20.3 fps
2.2	605	0.0500	4.54		**Shallow Concentrated Flow, Gutter Flow E-F (Congress Street** Paved Kv= 20.3 fps
10.0	1,300	Total			

Summary for Reach 2R: Weymouth Street Sewer

Inflow Area = 1.168 ac, 85.00% Impervious, Inflow Depth = 0.28" for 1-Inch event
Inflow = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af
Outflow = 0.31 cfs @ 12.16 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 3R: Offsite Forest Street

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 15R:

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

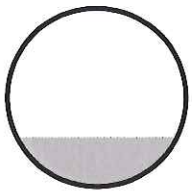
Summary for Reach 110:

Inflow Area = 0.254 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.22 cfs @ 12.10 hrs, Volume= 0.017 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.79 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 0.9 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.31 cfs

8.0" Round Pipe
n= 0.012
Length= 51.0' Slope= 0.0100 '/'
Inlet Invert= 110.51', Outlet Invert= 110.00'



Summary for Reach 115:

Inflow Area = 1.203 ac, 95.77% Impervious, Inflow Depth = 0.65" for 1-Inch event
Inflow = 0.84 cfs @ 12.10 hrs, Volume= 0.065 af
Outflow = 0.83 cfs @ 12.11 hrs, Volume= 0.065 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.52 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 1.0 min

Peak Storage= 16 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.17 cfs

15.0" Round Pipe
n= 0.012
Length= 67.0' Slope= 0.0078 '/'
Inlet Invert= 110.11', Outlet Invert= 109.59'

Summary for Reach 118:

Inflow Area = 1.737 ac, 97.07% Impervious, Inflow Depth = 0.69" for 1-Inch event
Inflow = 1.29 cfs @ 12.10 hrs, Volume= 0.100 af
Outflow = 1.28 cfs @ 12.11 hrs, Volume= 0.100 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.58 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.18 fps, Avg. Travel Time= 0.7 min

Peak Storage= 18 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 20.98 cfs

18.0" Round Pipe
n= 0.012
Length= 90.0' Slope= 0.0340 '/'
Inlet Invert= 109.44', Outlet Invert= 106.38'

Summary for Reach 125:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.46 cfs @ 12.10 hrs, Volume= 0.035 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 1.0 min

Peak Storage= 9 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.21 cfs

12.0" Round Pipe
n= 0.012
Length= 79.0' Slope= 0.0182 '/'
Inlet Invert= 131.87', Outlet Invert= 130.43'

Summary for Reach 128:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.10 hrs, Volume= 0.035 af
Outflow = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.54 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 1.4 min

Peak Storage= 13 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.67 cfs

12.0" Round Pipe
n= 0.012
Length= 71.0' Slope= 0.0048 '/'
Inlet Invert= 130.40', Outlet Invert= 130.06'

Summary for Reach 135:

Inflow Area = 0.827 ac, 85.62% Impervious, Inflow Depth = 0.32" for 1-Inch event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af
Outflow = 0.28 cfs @ 12.12 hrs, Volume= 0.022 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.13 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.40 fps, Avg. Travel Time= 1.6 min

Peak Storage= 11 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 3.58 cfs

8.0" Round Pipe
n= 0.012
Length= 225.0' Slope= 0.0747 '/'
Inlet Invert= 62.69', Outlet Invert= 45.89'

Summary for Reach 181:

Inflow Area = 0.606 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.52 cfs @ 12.10 hrs, Volume= 0.040 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.69 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 1.1 min

Peak Storage= 12 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.73 cfs

12.0" Round Pipe
n= 0.012
Length= 60.0' Slope= 0.0050 '/'
Inlet Invert= 54.46', Outlet Invert= 54.16'

Summary for Reach 210:

Inflow Area = 0.579 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.038 af
Outflow = 0.50 cfs @ 12.10 hrs, Volume= 0.038 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.34 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.43 fps, Avg. Travel Time= 0.8 min

Peak Storage= 8 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.46 cfs

12.0" Round Pipe
n= 0.012
Length= 66.0' Slope= 0.0200 '/'
Inlet Invert= 122.35', Outlet Invert= 121.03'

Summary for Reach 215:

Inflow Area = 0.371 ac, 86.26% Impervious, Inflow Depth = 0.32" for 1-Inch event
Inflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af
Outflow = 0.13 cfs @ 12.11 hrs, Volume= 0.010 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.89 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 1.2 min

Peak Storage= 4 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.96 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 52.0' Slope= 0.0069 '/'
Inlet Invert= 121.67', Outlet Invert= 121.31'

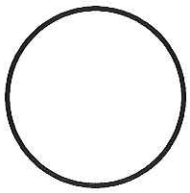
Summary for Reach 216R:

Inflow Area = 3.164 ac, 47.24% Impervious, Inflow Depth = 0.02" for 1-Inch event
Inflow = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.27 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 16.96 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 12.0' Slope= 0.2267 '/'
Inlet Invert= 60.11', Outlet Invert= 57.39'



Summary for Reach 220:

Inflow Area = 1.737 ac, 97.07% Impervious, Inflow Depth = 0.69" for 1-Inch event
Inflow = 1.28 cfs @ 12.11 hrs, Volume= 0.100 af
Outflow = 1.23 cfs @ 12.13 hrs, Volume= 0.100 af, Atten= 4%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.93 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 1.8 min

Peak Storage= 47 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.30 cfs

18.0" Round Pipe
n= 0.012
Length= 218.0' Slope= 0.0259 '/'
Inlet Invert= 105.99', Outlet Invert= 100.35'

Summary for Reach 230:

Inflow Area = 2.062 ac, 94.23% Impervious, Inflow Depth = 0.61" for 1-Inch event
Inflow = 1.29 cfs @ 12.12 hrs, Volume= 0.105 af
Outflow = 1.28 cfs @ 12.13 hrs, Volume= 0.105 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.91 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.13 fps, Avg. Travel Time= 0.4 min

Peak Storage= 9 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 49.39 cfs

18.0" Round Pipe
n= 0.012
Length= 87.0' Slope= 0.1884 '/'
Inlet Invert= 100.16', Outlet Invert= 83.77'

Summary for Reach 231:

Inflow Area = 0.231 ac, 83.47% Impervious, Inflow Depth = 0.25" for 1-Inch event
Inflow = 0.06 cfs @ 12.10 hrs, Volume= 0.005 af
Outflow = 0.06 cfs @ 12.10 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Reach 240:

Inflow Area = 4.932 ac, 85.29% Impervious, Inflow Depth = 0.37" for 1-Inch event
Inflow = 1.80 cfs @ 12.12 hrs, Volume= 0.153 af
Outflow = 1.78 cfs @ 12.13 hrs, Volume= 0.153 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.45 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.31 fps, Avg. Travel Time= 0.4 min

Peak Storage= 14 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 45.69 cfs

18.0" Round Pipe
n= 0.012
Length= 100.0' Slope= 0.1612 '/'
Inlet Invert= 67.96', Outlet Invert= 51.84'

Summary for Reach 260:

Inflow Area = 4.932 ac, 85.29% Impervious, Inflow Depth = 0.37" for 1-Inch event
Inflow = 1.78 cfs @ 12.13 hrs, Volume= 0.153 af
Outflow = 1.77 cfs @ 12.13 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.04 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.79 fps, Avg. Travel Time= 0.3 min

Peak Storage= 11 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 55.59 cfs

24.0" Round Pipe
n= 0.012
Length= 48.0' Slope= 0.0515 '/'
Inlet Invert= 51.84', Outlet Invert= 49.37'

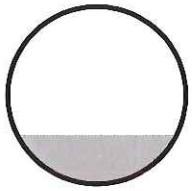
Summary for Reach 410:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.62 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.77 cfs

12.0" Round Pipe
n= 0.012
Length= 35.0' Slope= 0.0051 '/'
Inlet Invert= 110.68', Outlet Invert= 110.50'



Summary for Reach 510:

Inflow Area = 2.870 ac, 78.87% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af
Outflow = 0.52 cfs @ 12.11 hrs, Volume= 0.047 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.95 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.94 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 47.85 cfs

18.0" Round Pipe
n= 0.012
Length= 62.0' Slope= 0.1768 '/'
Inlet Invert= 95.90', Outlet Invert= 84.94'

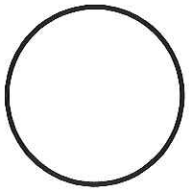
Summary for Reach 810:

Inflow Area = 1.045 ac, 63.76% Impervious, Inflow Depth = 0.05" for 1-Inch event
Inflow = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.47 hrs, Volume= 0.004 af, Atten= 1%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 17.81 cfs

12.0" Round Pipe
n= 0.012
Length= 210.0' Slope= 0.2129 '/'
Inlet Invert= 120.21', Outlet Invert= 75.50'



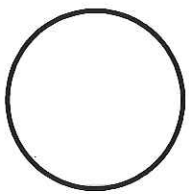
Summary for Reach 820:

Inflow Area = 1.045 ac, 63.76% Impervious, Inflow Depth = 0.05" for 1-Inch event
Inflow = 0.01 cfs @ 12.47 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.50 hrs, Volume= 0.004 af, Atten= 2%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.55 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.32 cfs

12.0" Round Pipe
n= 0.012
Length= 164.0' Slope= 0.1020 '/'
Inlet Invert= 75.58', Outlet Invert= 58.86'



Summary for Pond 1P+G: R-Tank System w/Garage

Inflow Area = 1.949 ac, 85.81% Impervious, Inflow Depth = 0.70" for 1-Inch event
Inflow = 1.48 cfs @ 12.09 hrs, Volume= 0.113 af
Outflow = 0.04 cfs @ 14.20 hrs, Volume= 0.030 af, Atten= 98%, Lag= 126.4 min
Primary = 0.04 cfs @ 14.20 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 50.69' @ 17.15 hrs Surf.Area= 2,963 sf Storage= 3,942 cf

Plug-Flow detention time= 504.5 min calculated for 0.030 af (26% of inflow)
Center-of-Mass det. time= 345.5 min (1,139.4 - 794.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.58'	973 cf	**8.50'W x 76.37'L x 5.75'H Field A** 3,732 cf Overall - 1,300 cf Embedded = 2,432 cf x 40.0% Voids
#2A	51.33'	1,300 cf	**Cultec R-902HD** x 20 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap Cap Storage= +2.8 cf x 2 x 1 rows = 5.5 cf
#3B	48.37'	3,596 cf	**10.56'W x 179.94'L x 8.96'H Field B** 17,019 cf Overall - 8,029 cf Embedded = 8,989 cf x 40.0% Voids
#4B	48.37'	7,628 cf	**ACF R-Tank HD 5.0** x 375 Inside #3 Inside= 15.7"W x 83.5"H => 8.67 sf x 2.35'L = 20.3 cf Outside= 15.7"W x 83.5"H => 9.13 sf x 2.35'L = 21.4 cf 5 Rows of 75 Chambers
#5C	50.83'	286 cf	**8.50'W x 21.37'L x 5.75'H Field C** 1,044 cf Overall - 329 cf Embedded = 715 cf x 40.0% Voids
#6C	51.58'	329 cf	**Cultec R-902HD** x 5 Inside #5 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap Cap Storage= +2.8 cf x 2 x 1 rows = 5.5 cf
#7D	48.37'	675 cf	**10.56'W x 39.19'L x 7.96'H Field D** 3,293 cf Overall - 1,606 cf Embedded = 1,687 cf x 40.0% Voids
#8D	48.37'	1,526 cf	**ACF R-Tank HD 5.0** x 75 Inside #7 Inside= 15.7"W x 83.5"H => 8.67 sf x 2.35'L = 20.3 cf Outside= 15.7"W x 83.5"H => 9.13 sf x 2.35'L = 21.4 cf 5 Rows of 15 Chambers
		16,312 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard
Storage Group C created with Chamber Wizard
Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	45.94'	**12.0" Round Stromdrain** L= 37.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.94' / 45.76' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	46.04'	**1.5" Vert. Orifice/Grate** C= 0.600
#3	Device 2	48.37'	**2.410 in/hr Filtration over Surface area above 48.37'** Excluded Surface area = 2,314 sf
#4	Device 1	51.20'	**6.0" Vert. Orifice** C= 0.600
#5	Primary	52.20'	**0.4' long x 2.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)
#6	Device 1	53.95'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.04 cfs @ 14.20 hrs HW=50.58' (Free Discharge)
- **1=Stromdrain** (Passes 0.04 cfs of 7.55 cfs potential flow)
  - **2=Orifice/Grate** (Passes 0.04 cfs of 0.13 cfs potential flow)
    - **3=Filtration** (Exfiltration Controls 0.04 cfs)
  - **4=Orifice** (Controls 0.00 cfs)
  - **6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- **5=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 2P:

Inflow Area = 0.318 ac, 73.07% Impervious, Inflow Depth = 0.11" for 1-Inch event
Inflow = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af
Outflow = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.2 min
Primary = 0.02 cfs @ 12.16 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 107.03' @ 12.16 hrs Surf.Area= 13 sf Storage= 0 cf

Plug-Flow detention time= 0.3 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (928.3 - 928.0)

Volume	Invert	Avail.Storage	Storage Description
#1	107.00'	169 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
107.00	13	0	0
120.00	13	169	169

Device	Routing	Invert	Outlet Devices
#1	Primary	107.00'	**18.0" Round Culvert** L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 107.00' / 106.50' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.16 hrs HW=107.03' (Free Discharge)
- **1=Culvert** (Barrel Controls 0.00 cfs @ 0.81 fps)

Summary for Pond 3P:

Inflow Area = 0.325 ac, 79.05% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.06 cfs @ 12.11 hrs, Volume= 0.005 af
Primary = 0.06 cfs @ 12.11 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 5P:

Inflow Area = 2.870 ac, 78.87% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af
Primary = 0.53 cfs @ 12.11 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 6P:

Inflow Area = 0.254 ac, 79.41% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af
Primary = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 7P:

Inflow Area = 2.119 ac, 39.10% Impervious, Inflow Depth = 0.00" for 1-Inch event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 8P:

Inflow Area = 1.045 ac, 63.76% Impervious, Inflow Depth = 0.05" for 1-Inch event
Inflow = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 12.44 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 10P:

Inflow Area = 1.389 ac, 57.14% Impervious, Inflow Depth = 0.30" for 1-Inch event
Inflow = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af
Primary = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 11P:

Inflow Area = 0.254 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
Primary = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 12P:

Inflow Area = 0.534 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Primary = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 13.5P: CB 13796

Inflow Area = 0.516 ac, 88.74% Impervious, Inflow Depth = 0.36" for 1-Inch event
Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af
Outflow = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 42.60' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.86'	**10.0" Round 12" SD** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 38.86' / 37.64' S= 0.0813 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#2	Device 1	42.50'	**2.0' long Curb Inlet** 2 End Contraction(s)
#3	Secondary	43.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.20 cfs @ 12.10 hrs HW=42.60' (Free Discharge)
↑**1=12" SD** (Passes 0.20 cfs of 4.79 cfs potential flow)
↑**2=Curb Inlet** (Weir Controls 0.20 cfs @ 1.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=38.86' (Free Discharge)
↑**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 13P: CB 13

Inflow Area = 0.827 ac, 85.62% Impervious, Inflow Depth = 0.32" for 1-Inch event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af
Outflow = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 66.03' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**1.0" x 3.0" Horiz. Grate X 24.00** C= 0.600 Limited to weir flow at low heads

#2	Secondary	66.20'	**5.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.28 cfs @ 12.10 hrs HW=66.03' (Free Discharge)
└**1=Grate** (Weir Controls 0.28 cfs @ 0.58 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 14P: CB 13581

Inflow Area = 0.428 ac, 56.89% Impervious, Inflow Depth = 0.02" for 1-Inch event
Inflow = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 15.12 hrs, Volume= 0.001 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 42.50' @ 15.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.62'	**8.0" Round 12" SD** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.62' / 39.00' S= 0.1080 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	42.50'	**2.0' long Curb Inlet** 2 End Contraction(s)
#3	Secondary	43.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 15.12 hrs HW=42.50' (Free Discharge)
└**1=12" SD** (Passes 0.00 cfs of 2.09 cfs potential flow)
└**2=Curb Inlet** (Weir Controls 0.00 cfs @ 0.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=40.62' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond CB-63:

Inflow Area = 3.164 ac, 47.24% Impervious, Inflow Depth = 0.02" for 1-Inch event
Inflow = 0.01 cfs @ 12.50 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.8 min
Primary = 0.01 cfs @ 12.52 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 59.84' @ 12.52 hrs Surf.Area= 13 sf Storage= 1 cf

Plug-Flow detention time= 0.8 min calculated for 0.004 af (100% of inflow)

Center-of-Mass det. time= 0.8 min (1,000.9 - 1,000.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.80'	81 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.80	13	0	0
66.00	13	81	81

Device	Routing	Invert	Outlet Devices
#1	Primary	59.80'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 59.80' / 58.46' S= 0.1340 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.01 cfs @ 12.52 hrs HW=59.84' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.01 cfs @ 0.71 fps)

Summary for Pond DMH 20: DMH 13592

Inflow Area = 0.944 ac, 74.30% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af
Outflow = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 37.81' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.59'	**12.0" Round 12" SD** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 37.59' / 35.00' S= 0.1295 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 12.10 hrs HW=37.81' (Free Discharge)
↑**1=12" SD** (Inlet Controls 0.21 cfs @ 1.60 fps)

Summary for Pond DMH-7:

Inflow Area = 0.606 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.52 cfs @ 12.10 hrs, Volume= 0.040 af
Primary = 0.52 cfs @ 12.10 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DMH1: New DMH-1 Congress Street

Inflow Area = 1.949 ac, 85.81% Impervious, Inflow Depth = 0.18" for 1-Inch event
Inflow = 0.04 cfs @ 14.20 hrs, Volume= 0.030 af
Outflow = 0.04 cfs @ 14.20 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 14.20 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 45.77' @ 14.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	45.66'	**15.0" Round Stormdrain** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.66' / 45.64' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.04 cfs @ 14.20 hrs HW=45.77' (Free Discharge)
└**1=Stormdrain** (Barrel Controls 0.04 cfs @ 1.09 fps)

Summary for Pond hil-01:

Inflow Area = 0.606 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.040 af
Primary = 0.53 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond hil-02:

Inflow Area = 4.932 ac, 85.29% Impervious, Inflow Depth = 0.37" for 1-Inch event
Inflow = 1.78 cfs @ 12.13 hrs, Volume= 0.153 af
Primary = 1.78 cfs @ 12.13 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond OS-1.: CB

Inflow Area = 0.391 ac, 85.00% Impervious, Inflow Depth = 0.28" for 1-Inch event
Inflow = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af
Outflow = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Primary = 0.10 cfs @ 12.16 hrs, Volume= 0.009 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 55.05' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	45.00'	**8.0" Round Stormdrain** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.00' / 44.44' S= 0.0373 '/' Cc= 0.900

n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

#2	Device 1	55.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	55.20'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.07 cfs @ 12.16 hrs HW=55.05' (Free Discharge)
↑—**1=Stormdrain** (Passes 0.07 cfs of 5.24 cfs potential flow)
↑—**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.73 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=45.00' (Free Discharge)
↑—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond OS-2.: CB 16258

Inflow Area =	1.168 ac, 85.00% Impervious, Inflow Depth =	0.28"	for 1-Inch event	
Inflow =	0.31 cfs @	12.16 hrs, Volume=	0.028 af	
Outflow =	0.31 cfs @	12.16 hrs, Volume=	0.028 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.31 cfs @	12.16 hrs, Volume=	0.028 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 83.13' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	79.02'	**8.0" Round Stormdrain** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.02' / 78.25' S= 0.0220 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	83.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Secondary	83.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.30 cfs @ 12.16 hrs HW=83.13' (Free Discharge)
↑—**1=Stormdrain** (Passes 0.30 cfs of 3.12 cfs potential flow)
↑—**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 1.18 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=79.02' (Free Discharge)
↑—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SMH-1: esmh-13952

Inflow Area =	2.775 ac, 85.75% Impervious, Inflow Depth =	0.22"	for 1-Inch event	
Inflow =	0.28 cfs @	12.12 hrs, Volume=	0.052 af	
Outflow =	0.28 cfs @	12.12 hrs, Volume=	0.052 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.28 cfs @	12.12 hrs, Volume=	0.052 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 44.84' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	44.61'	**18.0" Round Culvert** L= 41.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.61' / 41.64' S= 0.0724 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.27 cfs @ 12.12 hrs HW=44.84' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.27 cfs @ 1.62 fps)

Summary for Pond SMH-13932: esmh-13932

Inflow Area = 3.166 ac, 85.66% Impervious, Inflow Depth = 0.23" for 1-Inch event
Inflow = 0.37 cfs @ 12.13 hrs, Volume= 0.061 af
Outflow = 0.37 cfs @ 12.13 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 12.13 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 40.90' @ 12.13 hrs
Flood Elev= 52.64'

Device	Routing	Invert	Outlet Devices
#1	Primary	40.64'	**18.0" Round Sewer** L= 45.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.64' / 38.00' S= 0.0587 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=0.36 cfs @ 12.13 hrs HW=40.90' (Free Discharge)
↑**1=Sewer** (Inlet Controls 0.36 cfs @ 1.74 fps)

Summary for Link SP-C1:

Inflow Area = 0.765 ac, 73.26% Impervious, Inflow Depth = 0.11" for 1-Inch event
Inflow = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af
Primary = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C2:

Inflow Area = 3.166 ac, 85.66% Impervious, Inflow Depth = 0.23" for 1-Inch event
Inflow = 0.37 cfs @ 12.13 hrs, Volume= 0.061 af
Primary = 0.37 cfs @ 12.13 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C3:

Inflow Area = 0.944 ac, 74.30% Impervious, Inflow Depth = 0.20" for 1-Inch event
Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af
Primary = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C4:

Inflow Area = 8.351 ac, 70.70% Impervious, Inflow Depth = 0.23" for 1-Inch event
Inflow = 1.82 cfs @ 12.13 hrs, Volume= 0.161 af
Primary = 1.82 cfs @ 12.13 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP-C5:

Inflow Area = 1.389 ac, 57.14% Impervious, Inflow Depth = 0.30" for 1-Inch event
Inflow = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af
Primary = 0.45 cfs @ 12.11 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=19,446 sf 73.39% Impervious Runoff Depth=1.46"
Flow Length=229' Tc=6.0 min CN=82 Runoff=0.75 cfs 0.054 af

Subcatchment2A: Runoff Area=25,217 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=142' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.70 cfs 0.138 af

Subcatchment2B: Runoff Area=13,868 sf 73.07% Impervious Runoff Depth=1.46"
Flow Length=284' Tc=6.0 min CN=82 Runoff=0.53 cfs 0.039 af

Subcatchment2S: Runoff Area=16,157 sf 86.26% Impervious Runoff Depth=2.08"
Flow Length=244' Tc=6.0 min CN=90 Runoff=0.88 cfs 0.064 af

Subcatchment3.1: Runoff Area=10,051 sf 83.47% Impervious Runoff Depth=1.91"
Flow Length=250' Tc=6.0 min CN=88 Runoff=0.50 cfs 0.037 af

Subcatchment3.2: Runoff Area=4,089 sf 68.18% Impervious Runoff Depth=1.26"
Flow Length=66' Slope=0.0250 '/' Tc=6.0 min CN=79 Runoff=0.13 cfs 0.010 af

Subcatchment4S: Runoff Area=23,249 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=160' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.57 cfs 0.128 af

Subcatchment5S: Runoff Area=125,028 sf 78.87% Impervious Runoff Depth=1.75"
Flow Length=510' Tc=6.0 min CN=86 Runoff=5.77 cfs 0.418 af

Subcatchment6S: Runoff Area=11,085 sf 79.41% Impervious Runoff Depth=1.75"
Flow Length=121' Tc=6.0 min CN=86 Runoff=0.51 cfs 0.037 af

Subcatchment7S: Runoff Area=92,296 sf 39.10% Impervious Runoff Depth=0.55"
Flow Length=634' Tc=6.0 min CN=65 Runoff=1.03 cfs 0.098 af

Subcatchment8S: Runoff Area=45,533 sf 63.76% Impervious Runoff Depth=1.14"
Flow Length=399' Tc=6.0 min CN=77 Runoff=1.33 cfs 0.099 af

Subcatchment10S: Runoff Area=37,247 sf 30.36% Impervious Runoff Depth=0.28"
Flow Length=326' Tc=6.0 min CN=57 Runoff=0.11 cfs 0.020 af

Subcatchment11S: Runoff Area=11,050 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=90' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=0.74 cfs 0.061 af

Subcatchment12S: Runoff Area=23,268 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=200' Tc=6.0 min CN=98 Runoff=1.57 cfs 0.128 af

Subcatchment13S: Runoff Area=36,014 sf 85.62% Impervious Runoff Depth=2.08"
Flow Length=196' Tc=6.2 min CN=90 Runoff=1.94 cfs 0.143 af

Subcatchment14.1S: Runoff Area=22,477 sf 88.74% Impervious Runoff Depth=2.16"
Flow Length=325' Tc=6.0 min CN=91 Runoff=1.26 cfs 0.093 af

Subcatchment 15.1S: Runoff Area=18,644 sf 56.89% Impervious Runoff Depth=0.92"
Flow Length=383' Tc=6.0 min CN=73 Runoff=0.42 cfs 0.033 af

Subcatchment 17.1A: NEW Building Roof Runoff Area=43,616 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=2.94 cfs 0.239 af

Subcatchment 17.1B: Green Roof Runoff Area=14,879 sf 19.06% Impervious Runoff Depth=1.91"
Flow Length=188' Tc=6.0 min CN=88 Runoff=0.75 cfs 0.054 af

Subcatchment 18S: Visitor Garage Runoff Area=26,386 sf 100.00% Impervious Runoff Depth=2.87"
Flow Length=264' Tc=6.0 min CN=98 Runoff=1.78 cfs 0.145 af

Subcatchment OS-1: OS-1 Runoff Area=17,031 sf 85.00% Impervious Runoff Depth=1.99"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=0.78 cfs 0.065 af

Subcatchment OS-2: OS-2 Runoff Area=50,885 sf 85.00% Impervious Runoff Depth=1.99"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=2.34 cfs 0.194 af

Reach 2R: Weymouth Street Sewer Inflow=2.28 cfs 0.194 af
Outflow=2.28 cfs 0.194 af

Reach 3R: Offsite Forest Street Inflow=0.13 cfs 0.001 af
Outflow=0.13 cfs 0.001 af

Reach 15R: Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 110: Avg. Flow Depth=0.36' Max Vel=3.87 fps Inflow=0.74 cfs 0.061 af
8.0" Round Pipe n=0.012 L=51.0' S=0.0100 '/' Capacity=1.31 cfs Outflow=0.74 cfs 0.061 af

Reach 115: Avg. Flow Depth=0.65' Max Vel=5.11 fps Inflow=3.30 cfs 0.263 af
15.0" Round Pipe n=0.012 L=67.0' S=0.0078 '/' Capacity=6.17 cfs Outflow=3.27 cfs 0.263 af

Reach 118: Avg. Flow Depth=0.49' Max Vel=9.65 fps Inflow=4.83 cfs 0.391 af
18.0" Round Pipe n=0.012 L=90.0' S=0.0340 '/' Capacity=20.98 cfs Outflow=4.80 cfs 0.391 af

Reach 125: Avg. Flow Depth=0.38' Max Vel=5.80 fps Inflow=1.57 cfs 0.128 af
12.0" Round Pipe n=0.012 L=79.0' S=0.0182 '/' Capacity=5.21 cfs Outflow=1.56 cfs 0.128 af

Reach 128: Avg. Flow Depth=0.55' Max Vel=3.53 fps Inflow=1.56 cfs 0.128 af
12.0" Round Pipe n=0.012 L=71.0' S=0.0048 '/' Capacity=2.67 cfs Outflow=1.54 cfs 0.128 af

Reach 135: Avg. Flow Depth=0.29' Max Vel=9.56 fps Inflow=1.37 cfs 0.137 af
8.0" Round Pipe n=0.012 L=225.0' S=0.0747 '/' Capacity=3.58 cfs Outflow=1.36 cfs 0.137 af

Reach 181: Avg. Flow Depth=0.59' Max Vel=3.70 fps Inflow=1.78 cfs 0.145 af
12.0" Round Pipe n=0.012 L=60.0' S=0.0050 '/' Capacity=2.73 cfs Outflow=1.76 cfs 0.145 af

Reach 210: Avg. Flow Depth=0.38' Max Vel=6.13 fps Inflow=1.70 cfs 0.138 af
12.0" Round Pipe n=0.012 L=66.0' S=0.0200 '/' Capacity=5.46 cfs Outflow=1.69 cfs 0.138 af

Reach 215: Avg. Flow Depth=0.37' Max Vel=3.29 fps Inflow=0.88 cfs 0.064 af
12.0" Round Pipe n=0.013 L=52.0' S=0.0069 '/' Capacity=2.96 cfs Outflow=0.87 cfs 0.064 af

Reach 216R: Avg. Flow Depth=0.25' Max Vel=15.09 fps Inflow=2.33 cfs 0.197 af
12.0" Round Pipe n=0.013 L=12.0' S=0.2267 '/' Capacity=16.96 cfs Outflow=2.33 cfs 0.197 af

Reach 220: Avg. Flow Depth=0.52' Max Vel=8.72 fps Inflow=4.80 cfs 0.391 af
18.0" Round Pipe n=0.012 L=218.0' S=0.0259 '/' Capacity=18.30 cfs Outflow=4.70 cfs 0.391 af

Reach 230: Avg. Flow Depth=0.33' Max Vel=18.24 fps Inflow=5.32 cfs 0.437 af
18.0" Round Pipe n=0.012 L=87.0' S=0.1884 '/' Capacity=49.39 cfs Outflow=5.30 cfs 0.437 af

Reach 231: Inflow=0.50 cfs 0.037 af
Outflow=0.50 cfs 0.037 af

Reach 240: Avg. Flow Depth=0.50' Max Vel=21.28 fps Inflow=11.02 cfs 0.855 af
18.0" Round Pipe n=0.012 L=100.0' S=0.1612 '/' Capacity=45.69 cfs Outflow=10.98 cfs 0.855 af

Reach 260: Avg. Flow Depth=0.60' Max Vel=13.77 fps Inflow=10.98 cfs 0.855 af
24.0" Round Pipe n=0.012 L=48.0' S=0.0515 '/' Capacity=55.59 cfs Outflow=10.95 cfs 0.855 af

Reach 410: Avg. Flow Depth=0.54' Max Vel=3.63 fps Inflow=1.57 cfs 0.128 af
12.0" Round Pipe n=0.012 L=35.0' S=0.0051 '/' Capacity=2.77 cfs Outflow=1.56 cfs 0.128 af

Reach 510: Avg. Flow Depth=0.35' Max Vel=18.27 fps Inflow=5.77 cfs 0.418 af
18.0" Round Pipe n=0.012 L=62.0' S=0.1768 '/' Capacity=47.85 cfs Outflow=5.76 cfs 0.418 af

Reach 810: Avg. Flow Depth=0.19' Max Vel=13.33 fps Inflow=1.33 cfs 0.099 af
12.0" Round Pipe n=0.012 L=210.0' S=0.2129 '/' Capacity=17.81 cfs Outflow=1.32 cfs 0.099 af

Reach 820: Avg. Flow Depth=0.22' Max Vel=10.22 fps Inflow=1.32 cfs 0.099 af
12.0" Round Pipe n=0.012 L=164.0' S=0.1020 '/' Capacity=12.32 cfs Outflow=1.30 cfs 0.099 af

Pond 1P+G: R-Tank System w/Garage Peak Elev=53.01' Storage=9,113 cf Inflow=5.45 cfs 0.438 af
Outflow=2.18 cfs 0.355 af

Pond 2P: Peak Elev=107.31' Storage=4 cf Inflow=0.53 cfs 0.039 af
18.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=0.53 cfs 0.039 af

Pond 3P: Inflow=0.64 cfs 0.047 af
Primary=0.64 cfs 0.047 af

Pond 5P: Inflow=5.77 cfs 0.418 af
Primary=5.77 cfs 0.418 af

Pond 6P: Inflow=0.51 cfs 0.037 af
Primary=0.51 cfs 0.037 af

Pond 7P: Inflow=1.03 cfs 0.098 af
Primary=1.03 cfs 0.098 af

Pond 8P: Inflow=1.33 cfs 0.099 af
Primary=1.33 cfs 0.099 af

Pond 10P: Inflow=1.60 cfs 0.147 af
Primary=1.60 cfs 0.147 af

Pond 11P: Inflow=0.74 cfs 0.061 af
Primary=0.74 cfs 0.061 af

Pond 12P: Inflow=1.57 cfs 0.128 af
Primary=1.57 cfs 0.128 af

Pond 13.5P: CB 13796 Peak Elev=42.94' Inflow=1.83 cfs 0.099 af
Primary=1.83 cfs 0.099 af Secondary=0.00 cfs 0.000 af Outflow=1.83 cfs 0.099 af

Pond 13P: CB 13 Peak Elev=66.33' Inflow=1.94 cfs 0.143 af
Primary=1.37 cfs 0.137 af Secondary=0.56 cfs 0.006 af Outflow=1.94 cfs 0.143 af

Pond 14P: CB 13581 Peak Elev=42.66' Inflow=0.42 cfs 0.033 af
Primary=0.42 cfs 0.033 af Secondary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.033 af

Pond CB-63: Peak Elev=60.68' Storage=11 cf Inflow=2.33 cfs 0.197 af
12.0" Round Culvert n=0.012 L=10.0' S=0.1340 '/' Outflow=2.33 cfs 0.197 af

Pond DMH 20: DMH 13592 Peak Elev=38.44' Inflow=2.25 cfs 0.132 af
12.0" Round Culvert n=0.010 L=20.0' S=0.1295 '/' Outflow=2.25 cfs 0.132 af

Pond DMH-7: Inflow=1.76 cfs 0.145 af
Primary=1.76 cfs 0.145 af

Pond DMH1: New DMH-1 Congress Street Peak Elev=46.57' Inflow=2.18 cfs 0.355 af
15.0" Round Culvert n=0.013 L=4.0' S=0.0050 '/' Outflow=2.18 cfs 0.355 af

Pond hil-01: Inflow=1.78 cfs 0.145 af
Primary=1.78 cfs 0.145 af

Pond hil-02: Inflow=10.98 cfs 0.855 af
Primary=10.98 cfs 0.855 af

Pond OS-1.: CB Peak Elev=55.22' Inflow=0.78 cfs 0.065 af
Primary=0.65 cfs 0.064 af Secondary=0.13 cfs 0.001 af Outflow=0.78 cfs 0.065 af

Pond OS-2.: CB 16258 Peak Elev=83.51' Inflow=2.34 cfs 0.194 af
Primary=2.28 cfs 0.194 af Secondary=0.06 cfs 0.000 af Outflow=2.34 cfs 0.194 af

Pond SMH-1: esmh-13952 Peak Elev=45.45' Inflow=3.17 cfs 0.493 af
18.0" Round Culvert n=0.012 L=41.0' S=0.0724 '/' Outflow=3.17 cfs 0.493 af

Pond SMH-13932: esmh-13932 Peak Elev=41.57' Inflow=3.78 cfs 0.556 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0587 '/' Outflow=3.78 cfs 0.556 af

Link SP-C1: Inflow=1.28 cfs 0.093 af
Primary=1.28 cfs 0.093 af

Link SP-C2: Inflow=3.78 cfs 0.556 af
Primary=3.78 cfs 0.556 af

Link SP-C3: Inflow=2.25 cfs 0.132 af
Primary=2.25 cfs 0.132 af

Link SP-C4: Inflow=13.78 cfs 1.089 af
Primary=13.78 cfs 1.089 af

Link SP-C5: Inflow=1.60 cfs 0.147 af
Primary=1.60 cfs 0.147 af

Total Runoff Area = 15.783 ac Runoff Volume = 2.296 af Average Runoff Depth = 1.75"
26.10% Pervious = 4.119 ac 73.90% Impervious = 11.664 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=19,446 sf 73.39% Impervious Runoff Depth=2.72"
Flow Length=229' Tc=6.0 min CN=82 Runoff=1.40 cfs 0.101 af

Subcatchment2A: Runoff Area=25,217 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=142' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=2.54 cfs 0.211 af

Subcatchment2B: Runoff Area=13,868 sf 73.07% Impervious Runoff Depth=2.72"
Flow Length=284' Tc=6.0 min CN=82 Runoff=1.00 cfs 0.072 af

Subcatchment2S: Runoff Area=16,157 sf 86.26% Impervious Runoff Depth=3.49"
Flow Length=244' Tc=6.0 min CN=90 Runoff=1.44 cfs 0.108 af

Subcatchment3.1: Runoff Area=10,051 sf 83.47% Impervious Runoff Depth=3.29"
Flow Length=250' Tc=6.0 min CN=88 Runoff=0.85 cfs 0.063 af

Subcatchment3.2: Runoff Area=4,089 sf 68.18% Impervious Runoff Depth=2.46"
Flow Length=66' Slope=0.0250 '/' Tc=6.0 min CN=79 Runoff=0.27 cfs 0.019 af

Subcatchment4S: Runoff Area=23,249 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=160' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=2.34 cfs 0.194 af

Subcatchment5S: Runoff Area=125,028 sf 78.87% Impervious Runoff Depth=3.10"
Flow Length=510' Tc=6.0 min CN=86 Runoff=10.09 cfs 0.740 af

Subcatchment6S: Runoff Area=11,085 sf 79.41% Impervious Runoff Depth=3.10"
Flow Length=121' Tc=6.0 min CN=86 Runoff=0.89 cfs 0.066 af

Subcatchment7S: Runoff Area=92,296 sf 39.10% Impervious Runoff Depth=1.39"
Flow Length=634' Tc=6.0 min CN=65 Runoff=3.18 cfs 0.246 af

Subcatchment8S: Runoff Area=45,533 sf 63.76% Impervious Runoff Depth=2.29"
Flow Length=399' Tc=6.0 min CN=77 Runoff=2.75 cfs 0.200 af

Subcatchment10S: Runoff Area=37,247 sf 30.36% Impervious Runoff Depth=0.90"
Flow Length=326' Tc=6.0 min CN=57 Runoff=0.71 cfs 0.064 af

Subcatchment11S: Runoff Area=11,050 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=90' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.11 cfs 0.092 af

Subcatchment12S: Runoff Area=23,268 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=200' Tc=6.0 min CN=98 Runoff=2.34 cfs 0.194 af

Subcatchment13S: Runoff Area=36,014 sf 85.62% Impervious Runoff Depth=3.49"
Flow Length=196' Tc=6.2 min CN=90 Runoff=3.19 cfs 0.241 af

Subcatchment14.1S: Runoff Area=22,477 sf 88.74% Impervious Runoff Depth=3.59"
Flow Length=325' Tc=6.0 min CN=91 Runoff=2.05 cfs 0.155 af

Subcatchment 15.1S: Runoff Area=18,644 sf 56.89% Impervious Runoff Depth=1.97"
Flow Length=383' Tc=6.0 min CN=73 Runoff=0.96 cfs 0.070 af

Subcatchment 17.1A: NEW Building Roof Runoff Area=43,616 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=4.40 cfs 0.364 af

Subcatchment 17.1B: Green Roof Runoff Area=14,879 sf 19.06% Impervious Runoff Depth=3.29"
Flow Length=188' Tc=6.0 min CN=88 Runoff=1.26 cfs 0.094 af

Subcatchment 18S: Visitor Garage Runoff Area=26,386 sf 100.00% Impervious Runoff Depth=4.36"
Flow Length=264' Tc=6.0 min CN=98 Runoff=2.66 cfs 0.220 af

Subcatchment OS-1: OS-1 Runoff Area=17,031 sf 85.00% Impervious Runoff Depth=3.39"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=1.31 cfs 0.110 af

Subcatchment OS-2: OS-2 Runoff Area=50,885 sf 85.00% Impervious Runoff Depth=3.39"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=3.92 cfs 0.330 af

Reach 2R: Weymouth Street Sewer Inflow=2.95 cfs 0.318 af
Outflow=2.95 cfs 0.318 af

Reach 3R: Offsite Forest Street Inflow=0.46 cfs 0.008 af
Outflow=0.46 cfs 0.008 af

Reach 15R: Inflow=1.22 cfs 0.011 af
Outflow=1.22 cfs 0.011 af

Reach 110: Avg. Flow Depth=0.47' Max Vel=4.21 fps Inflow=1.11 cfs 0.092 af
8.0" Round Pipe n=0.012 L=51.0' S=0.0100 '/' Capacity=1.31 cfs Outflow=1.11 cfs 0.092 af

Reach 115: Avg. Flow Depth=0.86' Max Vel=5.61 fps Inflow=5.06 cfs 0.411 af
15.0" Round Pipe n=0.012 L=67.0' S=0.0078 '/' Capacity=6.17 cfs Outflow=5.03 cfs 0.411 af

Reach 118: Avg. Flow Depth=0.61' Max Vel=10.83 fps Inflow=7.35 cfs 0.605 af
18.0" Round Pipe n=0.012 L=90.0' S=0.0340 '/' Capacity=20.98 cfs Outflow=7.31 cfs 0.605 af

Reach 125: Avg. Flow Depth=0.47' Max Vel=6.45 fps Inflow=2.34 cfs 0.194 af
12.0" Round Pipe n=0.012 L=79.0' S=0.0182 '/' Capacity=5.21 cfs Outflow=2.33 cfs 0.194 af

Reach 128: Avg. Flow Depth=0.72' Max Vel=3.83 fps Inflow=2.33 cfs 0.194 af
12.0" Round Pipe n=0.012 L=71.0' S=0.0048 '/' Capacity=2.67 cfs Outflow=2.30 cfs 0.194 af

Reach 135: Avg. Flow Depth=0.33' Max Vel=10.15 fps Inflow=1.73 cfs 0.219 af
8.0" Round Pipe n=0.012 L=225.0' S=0.0747 '/' Capacity=3.58 cfs Outflow=1.72 cfs 0.219 af

Reach 181: Avg. Flow Depth=0.80' Max Vel=3.96 fps Inflow=2.66 cfs 0.220 af
12.0" Round Pipe n=0.012 L=60.0' S=0.0050 '/' Capacity=2.73 cfs Outflow=2.64 cfs 0.220 af

Reach 210: Avg. Flow Depth=0.48' Max Vel=6.82 fps Inflow=2.54 cfs 0.211 af
12.0" Round Pipe n=0.012 L=66.0' S=0.0200 '/' Capacity=5.46 cfs Outflow=2.53 cfs 0.211 af

Reach 215: Avg. Flow Depth=0.49' Max Vel=3.75 fps Inflow=1.44 cfs 0.108 af
12.0" Round Pipe n=0.013 L=52.0' S=0.0069 '/' Capacity=2.96 cfs Outflow=1.43 cfs 0.108 af

Reach 216R: Avg. Flow Depth=0.41' Max Vel=19.62 fps Inflow=5.88 cfs 0.446 af
12.0" Round Pipe n=0.013 L=12.0' S=0.2267 '/' Capacity=16.96 cfs Outflow=5.87 cfs 0.446 af

Reach 220: Avg. Flow Depth=0.66' Max Vel=9.78 fps Inflow=7.31 cfs 0.605 af
18.0" Round Pipe n=0.012 L=218.0' S=0.0259 '/' Capacity=18.30 cfs Outflow=7.19 cfs 0.605 af

Reach 230: Avg. Flow Depth=0.42' Max Vel=20.75 fps Inflow=8.29 cfs 0.687 af
18.0" Round Pipe n=0.012 L=87.0' S=0.1884 '/' Capacity=49.39 cfs Outflow=8.26 cfs 0.687 af

Reach 231: Inflow=0.85 cfs 0.063 af
Outflow=0.85 cfs 0.063 af

Reach 240: Avg. Flow Depth=0.66' Max Vel=24.42 fps Inflow=18.27 cfs 1.428 af
18.0" Round Pipe n=0.012 L=100.0' S=0.1612 '/' Capacity=45.69 cfs Outflow=18.22 cfs 1.428 af

Reach 260: Avg. Flow Depth=0.79' Max Vel=15.85 fps Inflow=18.22 cfs 1.428 af
24.0" Round Pipe n=0.012 L=48.0' S=0.0515 '/' Capacity=55.59 cfs Outflow=18.19 cfs 1.428 af

Reach 410: Avg. Flow Depth=0.71' Max Vel=3.95 fps Inflow=2.34 cfs 0.194 af
12.0" Round Pipe n=0.012 L=35.0' S=0.0051 '/' Capacity=2.77 cfs Outflow=2.33 cfs 0.194 af

Reach 510: Avg. Flow Depth=0.47' Max Vel=21.44 fps Inflow=10.09 cfs 0.740 af
18.0" Round Pipe n=0.012 L=62.0' S=0.1768 '/' Capacity=47.85 cfs Outflow=10.08 cfs 0.740 af

Reach 810: Avg. Flow Depth=0.27' Max Vel=16.46 fps Inflow=2.75 cfs 0.200 af
12.0" Round Pipe n=0.012 L=210.0' S=0.2129 '/' Capacity=17.81 cfs Outflow=2.73 cfs 0.200 af

Reach 820: Avg. Flow Depth=0.32' Max Vel=12.61 fps Inflow=2.73 cfs 0.200 af
12.0" Round Pipe n=0.012 L=164.0' S=0.1020 '/' Capacity=12.32 cfs Outflow=2.70 cfs 0.200 af

Pond 1P+G: R-Tank System w/Garage Peak Elev=53.95' Storage=11,275 cf Inflow=8.29 cfs 0.678 af
Outflow=4.58 cfs 0.595 af

Pond 2P: Peak Elev=107.44' Storage=6 cf Inflow=1.00 cfs 0.072 af
18.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=1.00 cfs 0.072 af

Pond 3P: Inflow=1.12 cfs 0.083 af
Primary=1.12 cfs 0.083 af

Pond 5P: Inflow=10.09 cfs 0.740 af
Primary=10.09 cfs 0.740 af

Pond 6P: Inflow=0.89 cfs 0.066 af
Primary=0.89 cfs 0.066 af

Pond 7P: Inflow=3.18 cfs 0.246 af
Primary=3.18 cfs 0.246 af

Pond 8P: Inflow=2.75 cfs 0.200 af
Primary=2.75 cfs 0.200 af

Pond 10P: Inflow=3.01 cfs 0.258 af
Primary=3.01 cfs 0.258 af

Pond 11P: Inflow=1.11 cfs 0.092 af
Primary=1.11 cfs 0.092 af

Pond 12P: Inflow=2.34 cfs 0.194 af
Primary=2.34 cfs 0.194 af

Pond 13.5P: CB 13796 Peak Elev=43.13' Inflow=4.31 cfs 0.189 af
Primary=3.09 cfs 0.178 af Secondary=1.22 cfs 0.011 af Outflow=4.31 cfs 0.189 af

Pond 13P: CB 13 Peak Elev=66.52' Inflow=4.01 cfs 0.253 af
Primary=1.73 cfs 0.219 af Secondary=2.29 cfs 0.034 af Outflow=4.01 cfs 0.253 af

Pond 14P: CB 13581 Peak Elev=42.78' Inflow=0.96 cfs 0.070 af
Primary=0.96 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.070 af

Pond CB-63: Peak Elev=62.71' Storage=38 cf Inflow=5.88 cfs 0.446 af
12.0" Round Culvert n=0.012 L=10.0' S=0.1340 '/' Outflow=5.88 cfs 0.446 af

Pond DMH 20: DMH 13592 Peak Elev=39.23' Inflow=4.05 cfs 0.249 af
12.0" Round Culvert n=0.010 L=20.0' S=0.1295 '/' Outflow=4.05 cfs 0.249 af

Pond DMH-7: Inflow=2.64 cfs 0.220 af
Primary=2.64 cfs 0.220 af

Pond DMH1: New DMH-1 Congress Street Peak Elev=47.13' Inflow=4.58 cfs 0.595 af
15.0" Round Culvert n=0.013 L=4.0' S=0.0050 '/' Outflow=4.58 cfs 0.595 af

Pond hil-01: Inflow=2.66 cfs 0.220 af
Primary=2.66 cfs 0.220 af

Pond hil-02: Inflow=18.22 cfs 1.428 af
Primary=18.22 cfs 1.428 af

Pond OS-1.: CB Peak Elev=55.26' Inflow=1.31 cfs 0.110 af
Primary=0.85 cfs 0.102 af Secondary=0.46 cfs 0.008 af Outflow=1.31 cfs 0.110 af

Pond OS-2.: CB 16258 Peak Elev=83.61' Inflow=3.92 cfs 0.330 af
Primary=2.95 cfs 0.318 af Secondary=0.97 cfs 0.013 af Outflow=3.92 cfs 0.330 af

Pond SMH-1: esmh-13952 Peak Elev=45.88' Inflow=6.09 cfs 0.813 af
18.0" Round Culvert n=0.012 L=41.0' S=0.0724 '/' Outflow=6.09 cfs 0.813 af

Pond SMH-13932: esmh-13932 Peak Elev=42.04' Inflow=6.88 cfs 0.916 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0587 '/' Outflow=6.88 cfs 0.916 af

Link SP-C1: Inflow=2.39 cfs 0.174 af
Primary=2.39 cfs 0.174 af

Link SP-C2: Inflow=6.88 cfs 0.916 af
Primary=6.88 cfs 0.916 af

Link SP-C3: Inflow=4.05 cfs 0.249 af
Primary=4.05 cfs 0.249 af

Link SP-C4: Inflow=24.94 cfs 1.939 af
Primary=24.94 cfs 1.939 af

Link SP-C5: Inflow=3.01 cfs 0.258 af
Primary=3.01 cfs 0.258 af

Total Runoff Area = 15.783 ac Runoff Volume = 3.955 af Average Runoff Depth = 3.01"
26.10% Pervious = 4.119 ac 73.90% Impervious = 11.664 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=19,446 sf 73.39% Impervious Runoff Depth=3.80"
Flow Length=229' Tc=6.0 min CN=82 Runoff=1.93 cfs 0.141 af

Subcatchment2A: Runoff Area=25,217 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=142' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=3.21 cfs 0.268 af

Subcatchment2B: Runoff Area=13,868 sf 73.07% Impervious Runoff Depth=3.80"
Flow Length=284' Tc=6.0 min CN=82 Runoff=1.38 cfs 0.101 af

Subcatchment2S: Runoff Area=16,157 sf 86.26% Impervious Runoff Depth=4.65"
Flow Length=244' Tc=6.0 min CN=90 Runoff=1.89 cfs 0.144 af

Subcatchment3.1: Runoff Area=10,051 sf 83.47% Impervious Runoff Depth=4.43"
Flow Length=250' Tc=6.0 min CN=88 Runoff=1.14 cfs 0.085 af

Subcatchment3.2: Runoff Area=4,089 sf 68.18% Impervious Runoff Depth=3.50"
Flow Length=66' Slope=0.0250 '/' Tc=6.0 min CN=79 Runoff=0.38 cfs 0.027 af

Subcatchment4S: Runoff Area=23,249 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=160' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=2.96 cfs 0.247 af

Subcatchment5S: Runoff Area=125,028 sf 78.87% Impervious Runoff Depth=4.22"
Flow Length=510' Tc=6.0 min CN=86 Runoff=13.59 cfs 1.009 af

Subcatchment6S: Runoff Area=11,085 sf 79.41% Impervious Runoff Depth=4.22"
Flow Length=121' Tc=6.0 min CN=86 Runoff=1.20 cfs 0.089 af

Subcatchment7S: Runoff Area=92,296 sf 39.10% Impervious Runoff Depth=2.21"
Flow Length=634' Tc=6.0 min CN=65 Runoff=5.25 cfs 0.390 af

Subcatchment8S: Runoff Area=45,533 sf 63.76% Impervious Runoff Depth=3.31"
Flow Length=399' Tc=6.0 min CN=77 Runoff=3.97 cfs 0.288 af

Subcatchment10S: Runoff Area=37,247 sf 30.36% Impervious Runoff Depth=1.56"
Flow Length=326' Tc=6.0 min CN=57 Runoff=1.39 cfs 0.111 af

Subcatchment11S: Runoff Area=11,050 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=90' Slope=0.0050 '/' Tc=6.0 min CN=98 Runoff=1.41 cfs 0.118 af

Subcatchment12S: Runoff Area=23,268 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=200' Tc=6.0 min CN=98 Runoff=2.96 cfs 0.248 af

Subcatchment13S: Runoff Area=36,014 sf 85.62% Impervious Runoff Depth=4.65"
Flow Length=196' Tc=6.2 min CN=90 Runoff=4.19 cfs 0.320 af

Subcatchment14.1S: Runoff Area=22,477 sf 88.74% Impervious Runoff Depth=4.76"
Flow Length=325' Tc=6.0 min CN=91 Runoff=2.67 cfs 0.205 af

Subcatchment 15.1S: Runoff Area=18,644 sf 56.89% Impervious Runoff Depth=2.92"
Flow Length=383' Tc=6.0 min CN=73 Runoff=1.44 cfs 0.104 af

Subcatchment 17.1A: NEW Building Roof Runoff Area=43,616 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=5.56 cfs 0.464 af

Subcatchment 17.1B: Green Roof Runoff Area=14,879 sf 19.06% Impervious Runoff Depth=4.43"
Flow Length=188' Tc=6.0 min CN=88 Runoff=1.68 cfs 0.126 af

Subcatchment 18S: Visitor Garage Runoff Area=26,386 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=264' Tc=6.0 min CN=98 Runoff=3.36 cfs 0.281 af

Subcatchment OS-1: OS-1 Runoff Area=17,031 sf 85.00% Impervious Runoff Depth=4.54"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=1.73 cfs 0.148 af

Subcatchment OS-2: OS-2 Runoff Area=50,885 sf 85.00% Impervious Runoff Depth=4.54"
Flow Length=1,300' Tc=10.0 min CN=89 Runoff=5.17 cfs 0.442 af

Reach 2R: Weymouth Street Sewer Inflow=3.31 cfs 0.412 af
Outflow=3.31 cfs 0.412 af

Reach 3R: Offsite Forest Street Inflow=0.73 cfs 0.016 af
Outflow=0.73 cfs 0.016 af

Reach 15R: Inflow=2.76 cfs 0.033 af
Outflow=2.76 cfs 0.033 af

Reach 110: Avg. Flow Depth=0.61' Max Vel=4.27 fps Inflow=1.41 cfs 0.118 af
8.0" Round Pipe n=0.012 L=51.0' S=0.0100 '/' Capacity=1.31 cfs Outflow=1.39 cfs 0.118 af

Reach 115: Avg. Flow Depth=1.09' Max Vel=5.70 fps Inflow=6.47 cfs 0.530 af
15.0" Round Pipe n=0.012 L=67.0' S=0.0078 '/' Capacity=6.17 cfs Outflow=6.41 cfs 0.530 af

Reach 118: Avg. Flow Depth=0.70' Max Vel=11.53 fps Inflow=9.35 cfs 0.777 af
18.0" Round Pipe n=0.012 L=90.0' S=0.0340 '/' Capacity=20.98 cfs Outflow=9.30 cfs 0.777 af

Reach 125: Avg. Flow Depth=0.54' Max Vel=6.84 fps Inflow=2.96 cfs 0.248 af
12.0" Round Pipe n=0.012 L=79.0' S=0.0182 '/' Capacity=5.21 cfs Outflow=2.95 cfs 0.248 af

Reach 128: Avg. Flow Depth=1.00' Max Vel=3.87 fps Inflow=2.95 cfs 0.248 af
12.0" Round Pipe n=0.012 L=71.0' S=0.0048 '/' Capacity=2.67 cfs Outflow=2.79 cfs 0.248 af

Reach 135: Avg. Flow Depth=0.35' Max Vel=10.44 fps Inflow=1.94 cfs 0.280 af
8.0" Round Pipe n=0.012 L=225.0' S=0.0747 '/' Capacity=3.58 cfs Outflow=1.93 cfs 0.280 af

Reach 181: Avg. Flow Depth=1.00' Max Vel=3.94 fps Inflow=3.36 cfs 0.281 af
12.0" Round Pipe n=0.012 L=60.0' S=0.0050 '/' Capacity=2.73 cfs Outflow=2.94 cfs 0.281 af

Reach 210: Avg. Flow Depth=0.55' Max Vel=7.22 fps Inflow=3.21 cfs 0.268 af
12.0" Round Pipe n=0.012 L=66.0' S=0.0200 '/' Capacity=5.46 cfs Outflow=3.20 cfs 0.268 af

Reach 215: Avg. Flow Depth=0.58' Max Vel=4.00 fps Inflow=1.89 cfs 0.144 af
12.0" Round Pipe n=0.013 L=52.0' S=0.0069 '/' Capacity=2.96 cfs Outflow=1.88 cfs 0.144 af

Reach 216R: Avg. Flow Depth=0.52' Max Vel=22.00 fps Inflow=9.15 cfs 0.678 af
12.0" Round Pipe n=0.013 L=12.0' S=0.2267 '/' Capacity=16.96 cfs Outflow=9.15 cfs 0.678 af

Reach 220: Avg. Flow Depth=0.76' Max Vel=10.40 fps Inflow=9.30 cfs 0.777 af
18.0" Round Pipe n=0.012 L=218.0' S=0.0259 '/' Capacity=18.30 cfs Outflow=9.15 cfs 0.777 af

Reach 230: Avg. Flow Depth=0.47' Max Vel=22.28 fps Inflow=10.64 cfs 0.890 af
18.0" Round Pipe n=0.012 L=87.0' S=0.1884 '/' Capacity=49.39 cfs Outflow=10.61 cfs 0.890 af

Reach 231: Inflow=1.14 cfs 0.085 af
Outflow=1.14 cfs 0.085 af

Reach 240: Avg. Flow Depth=0.77' Max Vel=26.20 fps Inflow=24.09 cfs 1.899 af
18.0" Round Pipe n=0.012 L=100.0' S=0.1612 '/' Capacity=45.69 cfs Outflow=24.04 cfs 1.899 af

Reach 260: Avg. Flow Depth=0.92' Max Vel=17.05 fps Inflow=24.04 cfs 1.899 af
24.0" Round Pipe n=0.012 L=48.0' S=0.0515 '/' Capacity=55.59 cfs Outflow=23.99 cfs 1.899 af

Reach 410: Avg. Flow Depth=0.90' Max Vel=4.02 fps Inflow=2.96 cfs 0.247 af
12.0" Round Pipe n=0.012 L=35.0' S=0.0051 '/' Capacity=2.77 cfs Outflow=2.94 cfs 0.247 af

Reach 510: Avg. Flow Depth=0.55' Max Vel=23.28 fps Inflow=13.59 cfs 1.009 af
18.0" Round Pipe n=0.012 L=62.0' S=0.1768 '/' Capacity=47.85 cfs Outflow=13.57 cfs 1.009 af

Reach 810: Avg. Flow Depth=0.32' Max Vel=18.26 fps Inflow=3.97 cfs 0.288 af
12.0" Round Pipe n=0.012 L=210.0' S=0.2129 '/' Capacity=17.81 cfs Outflow=3.94 cfs 0.288 af

Reach 820: Avg. Flow Depth=0.39' Max Vel=13.96 fps Inflow=3.94 cfs 0.288 af
12.0" Round Pipe n=0.012 L=164.0' S=0.1020 '/' Capacity=12.32 cfs Outflow=3.91 cfs 0.288 af

Pond 1P+G: R-Tank System w/Garage Peak Elev=54.27' Storage=11,982 cf Inflow=9.96 cfs 0.871 af
Outflow=8.32 cfs 0.788 af

Pond 2P: Peak Elev=107.53' Storage=7 cf Inflow=1.38 cfs 0.101 af
18.0" Round Culvert n=0.011 L=50.0' S=0.0100 '/' Outflow=1.38 cfs 0.101 af

Pond 3P: Inflow=1.51 cfs 0.113 af
Primary=1.51 cfs 0.113 af

Pond 5P: Inflow=13.59 cfs 1.009 af
Primary=13.59 cfs 1.009 af

Pond 6P: Inflow=1.20 cfs 0.089 af
Primary=1.20 cfs 0.089 af

Pond 7P: Inflow=5.25 cfs 0.390 af
Primary=5.25 cfs 0.390 af

Pond 8P: Inflow=3.97 cfs 0.288 af
Primary=3.97 cfs 0.288 af

Pond 10P: Inflow=4.07 cfs 0.358 af
Primary=4.07 cfs 0.358 af

Pond 11P: Inflow=1.41 cfs 0.118 af
Primary=1.41 cfs 0.118 af

Pond 12P: Inflow=2.96 cfs 0.248 af
Primary=2.96 cfs 0.248 af

Pond 13.5P: CB 13796 Peak Elev=43.23' Inflow=6.54 cfs 0.276 af
Primary=3.78 cfs 0.243 af Secondary=2.76 cfs 0.033 af Outflow=6.54 cfs 0.276 af

Pond 13P: CB 13 Peak Elev=66.65' Inflow=5.84 cfs 0.351 af
Primary=1.94 cfs 0.280 af Secondary=3.91 cfs 0.071 af Outflow=5.84 cfs 0.351 af

Pond 14P: CB 13581 Peak Elev=42.87' Inflow=1.44 cfs 0.104 af
Primary=1.44 cfs 0.104 af Secondary=0.00 cfs 0.000 af Outflow=1.44 cfs 0.104 af

Pond CB-63: Peak Elev=66.15' Storage=81 cf Inflow=9.16 cfs 0.678 af
12.0" Round Culvert n=0.012 L=10.0' S=0.1340 '/' Outflow=9.15 cfs 0.678 af

Pond DMH 20: DMH 13592 Peak Elev=39.99' Inflow=5.21 cfs 0.347 af
12.0" Round Culvert n=0.010 L=20.0' S=0.1295 '/' Outflow=5.21 cfs 0.347 af

Pond DMH-7: Inflow=2.94 cfs 0.281 af
Primary=2.94 cfs 0.281 af

Pond DMH1: New DMH-1 Congress Street Peak Elev=48.22' Inflow=8.32 cfs 0.788 af
15.0" Round Culvert n=0.013 L=4.0' S=0.0050 '/' Outflow=8.32 cfs 0.788 af

Pond hil-01: Inflow=3.36 cfs 0.281 af
Primary=3.36 cfs 0.281 af

Pond hil-02: Inflow=24.04 cfs 1.899 af
Primary=24.04 cfs 1.899 af

Pond OS-1.: CB Peak Elev=55.29' Inflow=1.73 cfs 0.148 af
Primary=1.00 cfs 0.132 af Secondary=0.73 cfs 0.016 af Outflow=1.73 cfs 0.148 af

Pond OS-2.: CB 16258 Peak Elev=83.68' Inflow=5.17 cfs 0.442 af
Primary=3.31 cfs 0.412 af Secondary=1.86 cfs 0.030 af Outflow=5.17 cfs 0.442 af

Pond SMH-1: esmh-13952 Peak Elev=46.78' Inflow=10.17 cfs 1.067 af
18.0" Round Culvert n=0.012 L=41.0' S=0.0724 '/' Outflow=10.17 cfs 1.067 af

Pond SMH-13932: esmh-13932 Peak Elev=43.10' Inflow=11.15 cfs 1.200 af
18.0" Round Culvert n=0.025 L=45.0' S=0.0587 '/' Outflow=11.15 cfs 1.200 af

Link SP-C1:
Inflow=3.31 cfs 0.242 af
Primary=3.31 cfs 0.242 af

Link SP-C2:
Inflow=11.15 cfs 1.200 af
Primary=11.15 cfs 1.200 af

Link SP-C3:
Inflow=5.21 cfs 0.347 af
Primary=5.21 cfs 0.347 af

Link SP-C4:
Inflow=34.33 cfs 2.666 af
Primary=34.33 cfs 2.666 af

Link SP-C5:
Inflow=4.07 cfs 0.358 af
Primary=4.07 cfs 0.358 af

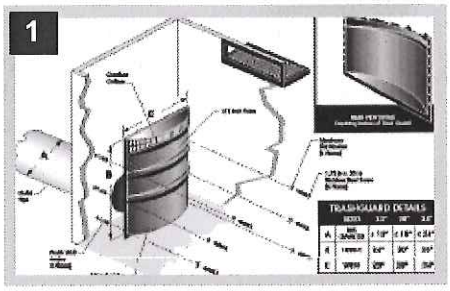
Total Runoff Area = 15.783 ac Runoff Volume = 5.358 af Average Runoff Depth = 4.07"
26.10% Pervious = 4.119 ac 73.90% Impervious = 11.664 ac

R TANK

R-TANK MAINTENANCE

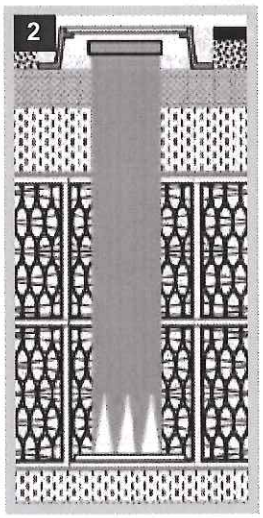
With adequate pre-treatment of stormwater before it enters the ACF R-Tank, heavy sediments, trash, and other debris will not enter the system. Systems like the TrashGuard (see image 1) are simple and inexpensive, but also highly effective. Therefore, most maintenance efforts should be directed at the pre-treatment structures to ensure they are functioning properly.

To monitor the accumulation of fine sediments that may enter the detention/ retention area, ACF R-Tank systems should include maintanance ports.



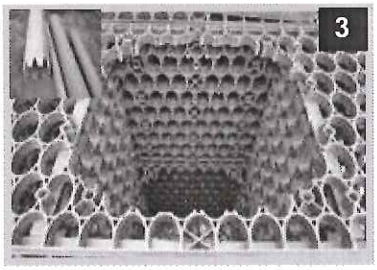
Maintenance

Running from the bottom of the ACF R-Tank up to ground level, Maintenance Ports are made from solid PVC Pipe with notches cut into the bottom. As water is pumped into the port the notches will direct water throughout the bottom of the system to create turbulence, thereby re-suspending accumulated sediments.



After pumping water into the tanks, flushing is completed by vacuuming sediment laden water out of the system either through the outlet structure or through the flush port.

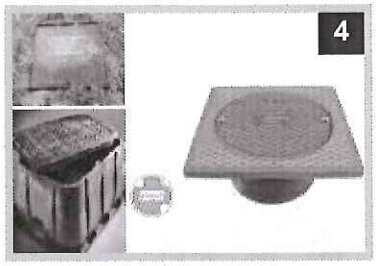
The diameter of the flush port is determined by a number of factors including the rate at which water will be pumped into the system, the number of flush ports incorporated, and the possible requirement of vacuuming through the port. Experience has shown that a 12" port is more than adequate for virtually any required use, with 6" ports more common when vacuuming will be performed at the outlet structure.



Installing the Maintenance System

To install the PCV Pipe, remove the center small plate and cut the top large plate between the remaining interior small plates. Before inserting the port into the Tank, install an anti-scour plate in the bottom of the Tank to prevent disturbance of the base materials.

Maintenance ports should be capped at the surface. In landscaped areas, this may be accomplished with a simple pipe cap or plastic valve box (see image 4 lower inset). In paved areas, metal lids are more appropriate (see image 4).



R-TANK MAINTENANCE

Maintenance Intervals

Maintenance Schedules for the ACF R-Tank System are a function of the contributing area and the type of pre-treatment specified. A standard maintenance schedule may include quarterly inspections through the first year of use, with yearly inspections thereafter. Flushing should be performed if sediment should the lesser of 6" or 15% of the system height.

Availability

All system components, including caps, lids, anti-scour plates, frames and covers are available from ACF. In fact, we've created Maintenance Port Kids (see image 5) that include everything needed except for the pipe itself. Contact your local sales representative or our Sales Office at 800-448-3636 for assistance.

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R TANK

R-TANK OPERATION, INSPECTION & MAINTENANCE

Operation

Your ACF R-Tank System has been designed to function in conjunction with the engineered drainage system on your site, the existing municipal infrastructure, and/or the existing soils and geography of the receiving watershed. Unless your site included certain unique and rare features, the operation of your R-Tank System will be driven by naturally occurring systems and will function autonomously. However, upholding a proper schedule of Inspection & Maintenance is critical to ensuring continued functionality and optimum performance of the system.

Inspection

Both the R-Tank and all stormwater pre-treatment features incorporated into your site must be inspected regularly. Inspection frequency for your system must be determined based on the contributing drainage area, but should never exceed one year between inspections (six months during the first year of operation).

Inspections may be required more frequently for pre-treatment systems. You should refer to the manufacturer requirements for the proper inspection schedule.

With the right equipment your inspection and measurements can be accomplished from the surface without physically entering any confined spaces. If your inspection does require confined space entry, you MUST follow all local/regional requirements as well as OSHA standards.

R-Tank Systems may incorporate Inspection Ports, Maintenance Ports, and/or adjoining manholes. Each of these features are easily accessed by removing the lid at the surface. With the cover removed, a visual inspection can be performed to identify sediment deposits within the structure. Using a flashlight, ALL access points should be examined to complete a thorough inspection.

Inspection Ports

Usually located centrally in the R-Tank System, these perforated columns are designed to give the user a base-line sediment depth across the system floor.

Maintenance Ports

Usually located near the inlet and outlet connections, you'll likely find deeper deposits of heavier sediments when compared to the Inspection Ports.

Manholes

Most systems will include at least two manholes - one at the inlet and another at the outlet. There may be more than one location where stormwater enters the system, which would result in additional manholes to inspect.

Bear in mind that these manholes often include a sump below the invert of the pipe connecting to the R-Tank. These sumps are designed to capture sediment before it reaches the R-Tank, and they should be kept clean to ensure they function properly. However, existence of sediment in the sump does NOT necessarily mean sediment has accumulated in the R-Tank.

After inspecting the bottom of the structure, use a mirror on a pole (or some other device) to check for sediment or debris in the pipe connecting to the R-Tank.

R-TANK OPERATION INSPECTION & MAINTENANCE

If sediment or debris is observed in any of these structures, you should determine the depth of the material. This is typically accomplished with a stadia rod, but you should determine the best way to obtain the measurement.

All observations and measurements should be recorded on an Inspection Log kept on file. We've included a form you can use at the end of this guideline.

Maintenance

The R-Tank System should be back-flushed once sediment accumulation has reached 6" or 15% of the total system height. Use the chart below as a guideline to determine the point at which maintenance is required on your system.

R-Tank Unit	Height	Max Sediment Dept
Mini	9.5"	1.5"
Single	17"	3"
Double	34"	5"
Triple	50"	6"
Quad	67"	6"
Pent	84"	6"

Before any maintenance is performed on your system, be sure to plug the outlet pipe to prevent contamination of the adjacent systems.

To back-flush the R-Tank, water is pumped into the system through the Maintenance Ports as rapidly as possible. Water should be pumped into ALL Maintenance Ports. The turbulent action of the water moving through the R-Tank will suspend sediments which may then be pumped out.

If your system includes an Outlet Structure, this will be the ideal location to pump contaminated water out of the system. However, removal of back-flush water may be accomplished through the Maintenance Ports, as well.

For systems with large footprints that would require extensive volumes of water to properly flush the system, you should consider performing your maintenance within 24 hours of a rain event. Stormwater entering the system will aid in the suspension of sediments and reduce the volume of water required to properly flush the system.

Once removed, sediment-laden water may be captured for disposal or pumped through a Dirtbag™ (if permitted by the locality).

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Step-By-Step Inspection & Maintenance Routine

1) **Inspection**
    a. Inspection Port
        i. Remove Cap
        ii. Use flashlight to detect sediment deposits
        iii. If present, measure sediment depth with stadia rod
        iv. Record results on Maintenance Log
        v. Replace Cap
    b. Maintenance Port/s
        i. Remove Cap
        ii. Use flashlight to detect sediment deposits
        iii. If present, measure sediment depth with stadia rod
        iv. Record results on Maintenance Log
        v. Replace Cap
        vi. Repeat for ALL Maintenance Ports
    c. Adjacent Manholes
        i. Remove Cover
        ii. Use flashlight to detect sediment deposits
        iii. If present, measure sediment depth with stadia rod, accounting for depth of sump (if present)
        iv. Inspect pipes connecting to R-Tank
        v. Record results on Maintenance Log
        vi. Replace Cover
        vii. Repeat for ALL Manholes that connect to the R-Tank

2) **Maintenance**
    a. Plug system outlet to prevent discharge of back-flush water
    b. Determine best location to pump out back-flush water
    c. Remove Cap from Maintenance Port
    d. Pump water as rapidly as possible (without over-topping port) into system until at least 1"
    of water covers system bottom
    e. Replace Cap
    f. Repeat at ALL Maintenance Ports
    g. Pump out back-flush water to complete back-flushing
    h. Vacuum all adjacent structures and any other structures or stormwater pre-treatment systems that require attention
    i. Sediment-laden water may be captured for disposal or pumped through a Dirtbag™.
    j. Replace any remaining Caps or Covers
    k. Record the back-flushing event in your Maintenance Log with any relevant specifics

R-Tank Maintenance Log

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Site Name:______________________________

Location:______________________________

System Owner:______________________________

Company Responsible for Maintenance:______________________________

Contact:______________________________

Phone Numer:______________________________

Date	Location	Depth to Bottom	Depth to Sediment	Sediment Depth	Observations/Notes	Initials

Contactor® & Recharger®
Stormwater Chambers

Operation and Maintenance Guidelines
for CULTEC Stormwater Management Systems

The Founder of Plastic Chamber Technology

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May 2017

These instructions are for single-layer traffic applications only. For multi-layer applications, contact CULTEC.
All illustrations and photos shown herein are examples of typical situations. Be sure to follow the engineer's drawings. Actual designs may vary.

This manual contains guidelines recommended by CULTEC, Inc. and may be used in conjunction with, but not to supersede, local regulations or regulatory authorities. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Introduction

The CULTEC Subsurface Stormwater Management System is a high-density polyethylene (HDPE) chamber system arranged in parallel rows surrounded by washed stone. The CULTEC chambers create arch-shaped voids within the washed stone to provide stormwater detention, retention, infiltration, and reclamation. Filter fabric is placed between the native soil and stone interface to prevent the intrusion of fines into the system. In order to minimize the amount of sediment which may enter the CULTEC system, a sediment collection device (stormwater pretreatment device) is recommended upstream from the CULTEC chamber system. Examples of pretreatment devices include, but are not limited to, an appropriately sized catch basin with sump, pretreatment catchment device, oil grit separator, or baffled distribution box. Manufactured pretreatment devices may also be used in accordance with CULTEC chambers. Installation, operation, and maintenance of these devices shall be in accordance with manufacturer's recommendations. Almost all of the sediment entering the stormwater management system will be collected within the pretreatment device.

Best Management Practices allow for the maintenance of the preliminary collection systems prior to feeding the CULTEC chambers. The pretreatment structures shall be inspected for any debris that will restrict inlet flow rates. Outfall structures, if any, such as outlet control must also be inspected for any obstructions that would restrict outlet flow rates. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Operation and Maintenance Requirements

I. Operation

CULTEC stormwater management systems shall be operated to receive only stormwater run-off in accordance with applicable local regulations. CULTEC subsurface stormwater management chambers operate at peak performance when installed in series with pretreatment. Pretreatment of suspended solids is superior to treatment of solids once they have been introduced into the system. The use of pretreatment is adequate as long as the structure is maintained and the site remains stable with finished impervious surfaces such as parking lots, walkways, and pervious areas are properly maintained. If there is to be an unstable condition, such as improvements to buildings or parking areas, all proper silt control measures shall be implemented according to local regulations.

II. Inspection and Maintenance Options

A. The CULTEC system may be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pretreatment device). CCTV inspection of this row can be deployed through this access port to deter mine if any sediment has accumulated in the inlet row.

B. If the CULTEC bed is not equipped with an inspection port, then access to the inlet row will be through an upstream manhole or the CULTEC StormFilter.

1. Manhole Access
This inspection should only be carried out by persons trained in confined space entry and sewer inspection services. After the manhole cover has been removed a gas detector must be lowered into the manhole to ensure that there are not high concentrations of toxic gases present. The inspector should be lowered into the manhole with the proper safety equipment as per OSHA requirements. The inspector may be able to observe sediment from this location. If this is not possible, the inspector will need to deploy a CCTV robot to permit viewing of the sediment.

2. **StormFilter Access**
Remove the manhole cover to allow access to the unit. Typically a 30-inch (750 mm) pipe is used as a riser from the StormFilter to the surface. As in the case with manhole access, this access point requires a technician trained in confined space entry with proper gas detection equipment. This individual must be equipped with the proper safety equipment for entry into the StormFilter. The technician will be lowered onto the StormFilter unit. The hatch on the unit must be removed. Inside the unit are two filters which may be removed according to StormFilter maintenance guidelines. Once these filters are removed the inspector can enter the StormFilter unit to launch the CCTV camera robot.

C. The inlet row of the CULTEC system is placed on a polyethylene liner to prevent scouring of the washed stone beneath this row. This also facilitates the flushing of this row with high pressure water through a culvert cleaning nozzle. The nozzle is deployed through a manhole or the StormFilter and extended to the end of the row. The water is turned on and the inlet row is back-flushed into the manhole or StormFilter. This water is to be removed from the manhole or StormFilter using a vacuum truck.

III. Maintenance Guidelines

The following guidelines shall be adhered to for the operation and maintenance of the CULTEC stormwater management system:

A. The owner shall keep a maintenance log which shall include details of any events which would have an effect on the system's operational capacity.

B. The operation and maintenance procedure shall be reviewed periodically and changed to meet site conditions.

C. Maintenance of the stormwater management system shall be performed by qualified workers and shall follow applicable occupational health and safety requirements.

D. Debris removed from the stormwater management system shall be disposed of in accordance with applicable laws and regulations.

IV. Suggested Maintenance Schedules

A. Minor Maintenance
The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris, as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris, as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris, as required.

B. Major Maintenance
The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers. (See table on next page)

	Frequency	Action
Inlets and Outlets	Every 3 years	• Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
	Spring and Fall	• Check inlet and outlets for clogging and remove any debris as required.
CULTEC Stormwater Chambers	2 years after commissioning	• Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
	9 years after commissioning every 9 years following	• Clean stormwater management chambers and feed connectors of any debris. • Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
	45 years after commissioning	• Clean stormwater management chambers and feed connectors of any debris. • Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. • Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. • Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. • Attain the appropriate approvals as required. • Establish a new operation and maintenance schedule.
Surrounding Site	Monthly in 1st year	• Check for depressions in areas over and surrounding the stormwater management system.
	Spring and Fall	• Check for depressions in areas over and surrounding the stormwater management system.
	Yearly	• Confirm that no unauthorized modifications have been performed to the site.

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.

WQMP
Operation & Maintenance (O&M) Plan

Project Name:_____

Prepared for:

Project Name: _____

Address:_____

City, State Zip:_____

Prepared on:

Date:_____

This O&M Plan describes the designated responsible party for implementation of this WQMP, including: operation and maintenance of all the structural BMP(s), conducting the training/educational program and duties, and any other necessary activities. The O&M Plan includes detailed inspection and maintenance requirements for all structural BMPs, including copies of any maintenance contract agreements, manufacturer's maintenance requirements, permits, etc.

8.1.1 Project Information

Project name	
Address	
City, State Zip	
Site size	
List of structural BMPs, number of each	
Other notes	

8.1.2 Responsible Party

The responsible party for implementation of this WQMP is:

Name of Person or HOA Property Manager	
Address	
City, State Zip	
Phone number	
24-Hour Emergency Contact number	
Email	

8.1.3 Record Keeping

Parties responsible for the O&M plan shall retain records for at least 5 years.

All training and educational activities and BMP operation and maintenance shall be documented to verify compliance with this O&M Plan. A sample Training Log and Inspection and Maintenance Log are included in this document.

8.1.4 Electronic Data Submittal

This document along with the Site Plan and Attachments shall be provided in PDF format. AutoCAD files and/or GIS coordinates of BMPs shall also be submitted to the City.

Appendix ____

BMP SITE PLAN

Site plan is preferred on minimum 11" by 17" colored sheets, as long as legible.

BMP OPERATION & MAINTENANCE LOG

Project Name: _____

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

Minor Maintenance

Frequency		Action
Monthly in first year		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Month 1	Date:	
□ Month 2	Date:	
□ Month 3	Date:	
□ Month 4	Date	
□ Month 5	Date:	
□ Month 6	Date:	
□ Month 7	Date:	
□ Month 8	Date:	
□ Month 9	Date:	
□ Month 10	Date:	
□ Month 11	Date:	
□ Month 12	Date:	
Spring and Fall		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
One year after commissioning and every third year following		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Year 1	Date:	
□ Year 4	Date:	
□ Year 7	Date:	
□ Year 10	Date:	
□ Year 13	Date:	
□ Year 16	Date:	
□ Year 19	Date:	
□ Year 22	Date:	

Major Maintenance

	Frequency		Action
Inlets and Outlets	**Every 3 years**		Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
			Notes
	□ Year 1	Date:	
	□ Year 4	Date:	
	□ Year 7	Date:	
	□ Year 10	Date:	
	□ Year 13	Date:	
	□ Year 16	Date:	
	□ Year 19	Date:	
	□ Year 22	Date:	
	Spring and Fall		Check inlet and outlets for clogging and remove any debris, as required.
			Notes
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
CULTEC Stormwater Chambers	**2 years after commissioning**		□ Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. □ Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
			Notes
	□ Year 2	Date:	

Major Maintenance

	Frequency		Action
CULTEC Stormwater Chambers	**9 years after commissioning every 9 years following**		□ Clean stormwater management chambers and feed connectors of any debris. □ Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. □ Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
			Notes
	□ Year 9	Date:	
	□ Year 18	Date:	
	□ Year 27	Date:	
	□ Year 36	Date:	
	45 years after commissioning		□ Clean stormwater management chambers and feed connectors of any debris. □ Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. □ Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. □ Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. □ Attain the appropriate approvals as required. □ Establish a new operation and maintenance schedule.
			Notes
	□ Year 45	Date:	

Major Maintenance

	Frequency		Action
Surrounding Site	**Monthly in 1st year**		□ Check for depressions in areas over and surrounding the stormwater management system.
			Notes
	□ Month 1	Date:	
	□ Month 2	Date:	
	□ Month 3	Date:	
	□ Month 4	Date:	
	□ Month 5	Date:	
	□ Month 6	Date:	
	□ Month 7	Date:	
	□ Month 8	Date:	
	□ Month 9	Date:	
	□ Month 10	Date:	
	□ Month 11	Date:	
	□ Month 12	Date:	
	Spring and Fall		□ Check for depressions in areas over and surrounding the stormwater management system.
			Notes
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	Yearly		□ Confirm that no unauthorized modifications have been performed to the site.
			Notes
	□ Year 1	Date:	
	□ Year 2	Date:	
	□ Year 3	Date:	
	□ Year 4	Date:	
	□ Year 5	Date:	
	□ Year 6	Date:	
	□ Year 7	Date:	

Section 13

Urban Impaired Stream Submissions

Section 13: Urban Impaired Streams

A project must meet the urban impaired stream standards if located within an urban impaired stream watershed As this project is not tributary to an Urban Impaired Stream as defined by Maine DEP Chapter 502, this project is not subject to the urban impaired stream standard.

Section 14

Basic Standards

Section 14: Basic Standards

A. Narrative

Site specific Erosion and Sedimentation Control (ESC) measures have been designed for the site. All ESC and stabilization measures have been prepared to address the requirements of the basic stabilization standards as defined by Maine DEP Chapter 500, Stormwater Management regulations. Maintenance, inspections and Housekeeping is addressed in the Stormwater Management Plan, Section 12.

B. Implementation schedule

Final stabilization removals are anticipated during late 2022. Reference is made to Section 1 for the construction schedule timing.

C./D./E. ESC Plan, Details and Work Limits

The proposed measures include the drainage and erosion control elements, their locations and the work/disturbance limits, as required.

F. Design Drawings

The design drawings include ESC measures designed in accordance with the *Erosion and Sediment Control Handbook for Construction: Best Management Practices*, latest edition.

G. ESC Calculations for sizing, spacing or stabilizing ESC measures.

Reference is made to Section 12-Stormwater for calculations related to sizing and spacing of ESC measures, as applicable.

Section 15

Groundwater

Section 15: Groundwater

A. Narrative and Report

The proposed property maintenance facility with not draw from, or eject to aquifers. No groundwater degradation is anticipated as a result of the site development.

(1) Location and Maps
The site has been previously reviewed under the provisions of Site Law that included significant sand and gravel aquifers, surficial geology, and bedrock maps. Copies of the maps are not included in this submittal.

(2) Quantity
Not applicable.

(3) Sources

Solid waste:

Construction period solid waste removal will be facilitated by the Construction Manager by contract with a licensed waste facility.

Post construction solid waste will be collected internal to the building and placed in external dumpsters that are emptied on a regular schedule and disposed of off-site as part as part of an existing solid waste removal contract between MMC and Troiano Waste Services.

Hazardous materials will be handled and disposed of by existing MMC protocol. No changes to existing procedures are proposed or anticipated as part of the site redevelopment.

(4) Measures to prevent degradation.
The Construction Manager will carefully monitor construction activity and MMC will be responsible for post-construction monitoring.

B. Groundwater Protection Plan
Not applicable

Section 16

Water Supply

Section 16: Water Supply

The MEANS division of the Portland Water District (PWD) has been contacted regarding the proposed redevelopment. Please refer to the enclosed 9/24/18 email from Sebago Technics to PWD is enclosed for reference. A copy of the determination letter from PWD will be forwarded to the City upon receipt.

Will Conway

From: Dylan Stuart
Sent: Monday, September 24, 2018 11:22 AM
To: rbartels@pwd.org
Cc: Will Conway; 15466
Subject: Maine Medical Center Ability to Serve Request
Attachments: 15466U2-U-CONGRESS.pdf

Robert,

I am writing to request an ability to serve letter for the Maine Medical Center Expansion project following our meeting from last week. We have updated the locations for the domestic and fire services coming from Gilman and Congress Street. Please see the attached Utility plan as well as the most updated Peak Flow Based on Fixture Count form that was filled out by our MEP engineer.
Please let me know if you have any questions or require any additional information.

Thank you,

Dylan Stuart *Civil Engineer*
Office: 207.200.2100 | Direct: 207.200.2093
75 John Roberts Rd., Suite 4A, South Portland, ME 04106
dstuart@sebagotechnics.com | www.sebagotechnics.com
An Employee-Owned Company

SEBAGO
TECHNICS

Peak Flow Based on Fixture Count

Customer	Maine Medical Center
Street Address	22 Bramhall Street
City	Portland

Fixture	Fixture Value 60 psi		No. of Fixtures		Fixture Value
Bathtub	8	x	0	=	0
Bedpan Washers	10	x	5	=	50
Bidet	2	x	0	=	0
Dental Unit	2	x	0	=	0
Drinking Fountain - Public	2	x	0	=	0
Kitchen Sink	2.2	x	95	=	209
Lavatory	1.5	x	141	=	211.5
Showerhead (Shower Only)	2.5	x	100	=	250
Service Sink	4	x	10	=	40
Toilet -Flush Valve	35	x	142	=	4970
-Tank Type	4	x	0	=	0
Urinal -Pedestal Flush Valve	35	x	0	=	0
-Wall Flush Valve	16	x	17	=	272
Wash Sink (Each Set of Faucets)	4	x	8	=	32
Dishwasher	2	x	0	=	0
Washing Machine	6	x	0	=	0
Hose (50 ft. Wash Down) -1/2 in.	5	x	0	=	0
-5/8 in.	9	x	0	=	0
-3/4 in.	12	x	0	=	0
Combined Fixture Value Total					6034.5

Customer Peak Demand From Fig. 4-2 or 4-3	175
Pressure Factor From Table 4-1	1.17

No. of Irrigation Sections (Areas of 100 sq. ft.)	0
Irrigation Factor (1.16-Spray Systems, 0.40-Rotary Systems)	

Hose Bibs for Irrigation:

Size	Fixture Value	No. of Fixtures
1/2"		
5/8"		
3/4"		

Total Fixed Demand (Peak Flow) 204.75 gpm

Table 4-1 Pressure Adjustment Factors

Working Pressure at Meter Discharge (psi)	Pressure Adjustment Factor
35	0.74
40	0.80
50	0.90
60	1.00
70	1.09
80	1.17
90	1.25
100	1.34

Adapted from AWWA Manual M22 table 4-1

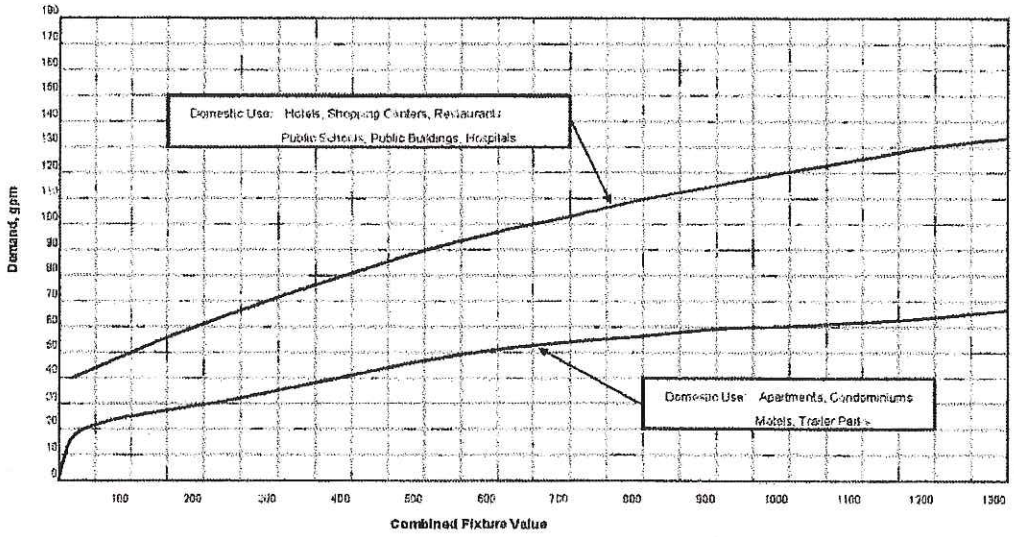


Figure 4-2 Water flow demand per fixture value - low range

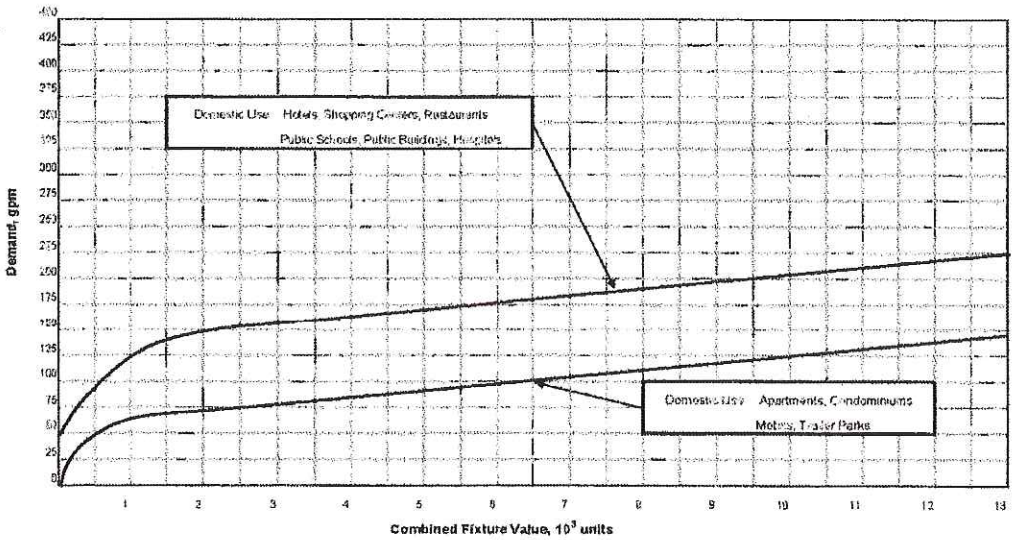


Figure 4-3 Water flow demand per fixture value - High range

Section 17

Wastewater Disposal

Section 17: Wastewater Disposal

A municipal facility with provide sewage disposal. A City of Portland Wastewater Capacity Application will be reviewed by Water Resources as part of the Site Plan Review.

Section 18

Solid Waste

Section 18: Solid Waste

Construction period solid waste removal will be managed by the construction manager. Demolition debris will be recycled to the greatest extent possible and will be disposed of at a licensed facility.

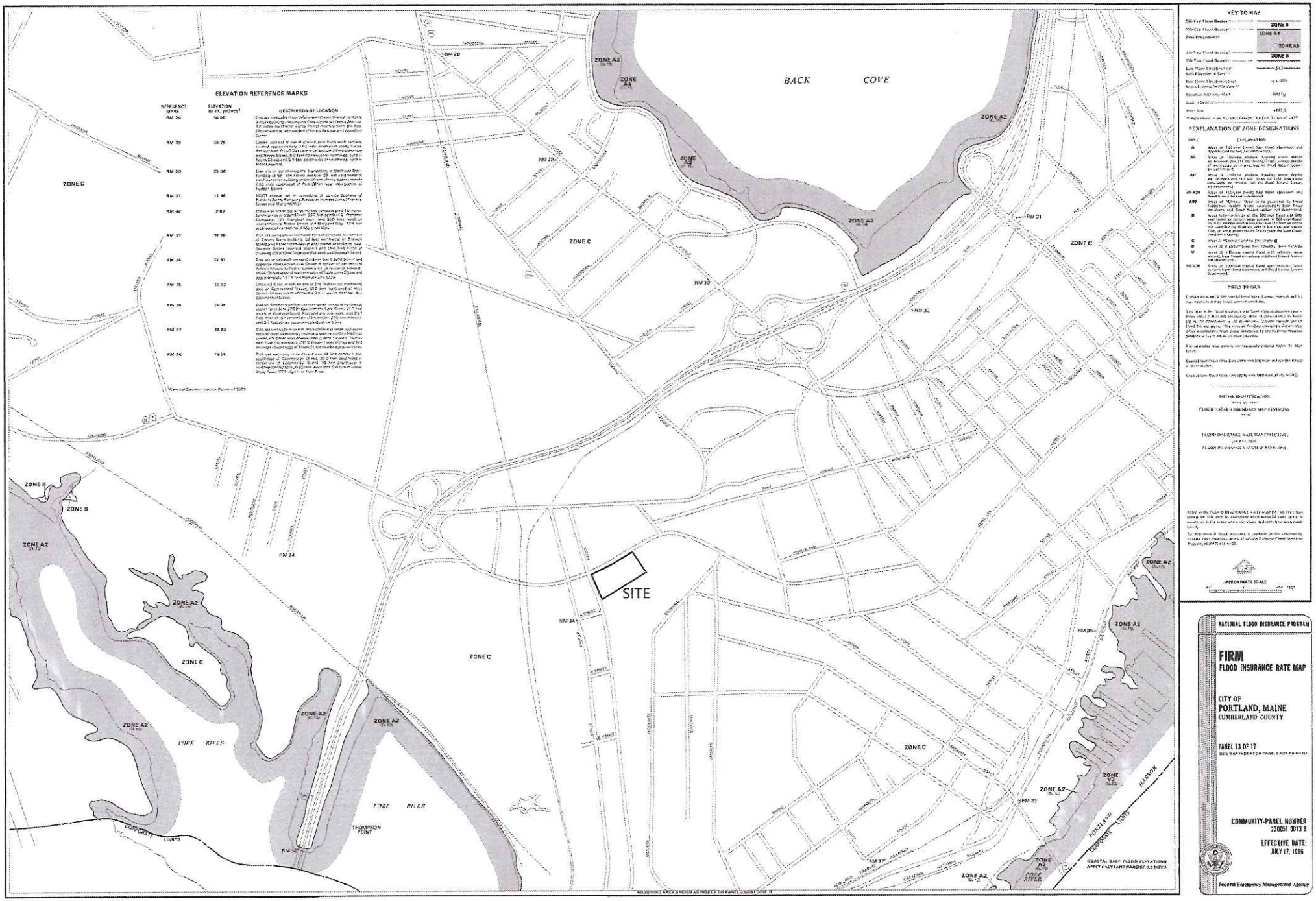
Post construction solid waste will be handled under the provisions of an existing waste disposal contracts in place between Troiano Waste Management and MMC.

Section 19

Flooding

Section 19: Flooding

The project site is not located in a flood plain and will not cause an unreasonable flood hazard to any structure. A copy of the FEMA Flood Insurance Rate Map (FIRM) is enclosed in this section.


ELEVATION REFERENCE MARKS
REFERENCE MARK
ELEVATION (IN FT. (NGVD))*
DESCRIPTION OF LOCATION
RM 20
RM 29
RM 30
RM 31
RM 32
RM 33
RM 34
RM 35
RM 36
RM 37
RM 38
ZONE C
ZONE A2
ZONE A4
ZONE AE
ZONE B
BACK COVE
FORE RIVER
THOMPSON POINT
PORTLAND HARBOR
SITE
COMMUNITY LIMITS
KEY TO MAP
EXPLANATION OF ZONE DESIGNATIONS
ZONE
EXPLANATION
INITIAL IDENTIFICATION
FLOOD HAZARD BOUNDARY MAP REVISIONS
FLOOD INSURANCE RATE MAP EFFECTIVE
FLOOD INSURANCE RATE MAP REVISIONS
APPROXIMATE SCALE
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
CITY OF
PORTLAND, MAINE
CUMBERLAND COUNTY
PANEL 13 OF 17
COMMUNITY-PANEL NUMBER
230051 0013 B
EFFECTIVE DATE:
JULY 17, 1986
Federal Emergency Management Agency

Section 20

Blasting

Section 20: Blasting

Given the nature of the site and the proposed project scope it is anticipated that no blasting will be required. Should ledge be encountered during construction, a blasting plan will be submitted.

Sections 21, 22, 23 and 24

Air Emissions
Odors
Water Vapor
Sunlight

SECTION 21: Air Emissions

No unreasonable adverse environmental effect on air quality is anticipated as part of the proposed site development activities. Vehicular traffic will be limited to existing adjacent parking facilities associated with MMC. Heating and ventilation sources for the proposed building expansion will be comparable with other existing commercial units found throughout the MMC campus. The majority of the units associated with the new building will be placed within the basement level of the new building, however, there will be limited HVAC units on the roof of the tall section of the building. This building expansion project does not require an Air Emission License.

SECTION 22: Odors

The proposed site improvements represent a reorganization and expansion to existing uses and will not result in the creation of any significant odors during or after construction.

SECTION 23: Water Vapor

No large-scale water vapor emissions are proposed as part of the removal of the Gilman Street garage and proposed building expansion, therefore, no adverse effect or unreasonable alteration of climate is associated with this project.

SECTION 24: Sunlight

The proposed new building conforms to the massing of the campus. The taller section of the new Congress Street Patient Care Building abuts the tall elevator/stair tower portion of their visitor garage, while the remainder of the building steps down at the edge of the campus. The new building is of a scale that is compatible with other MMC structures and has a vertical presence that is similar to the existing staff garage that it is replacing. The proposed new building will not block access to direct sunlight by neighboring structures that utilize solar energy through active or passive systems.