GYMO ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.

Leo F. Gozalkowski, PLS
Stephen W. Yaussi, AIA
Edward G. Olley, Jr., AIA
William P. Plante, PLS
Patrick J. Scordo, PE
Thomas S.M. Compo, PE

Gregory F. Ashley, PLS

24 August 2010

Mr. Kenneth A. Mix
Planning and Community Development Coordinator
City Engineering Department
245 Washington Street
Watertown, NY 13601

Re: Zone Change Request, Site Plan Submission
Ives Hill Retirement Community-Phase III, Jewell Drive
File: 2010-077

Dear Mr. Mix:

At its August 3rd meeting, the Planning Board of the City of Watertown considered our request to amend Planned Development District #16 to allow two enriched living buildings along with five two-unit dwellings. At that same meeting, the Board considered our request for site plan approval for the construction of a 13,720 sq. ft. enriched living facility and five two-unit dwellings totaling 16,070 sq. ft. in the 1200 block of Jewell Drive, tax parcel numbers 14-49-101 and 14-49-101.005. We are submitting the following to address the planning board's comments and approval at the 20 September 2010 City Council Meeting.

- Four collated sets of full-size (24"X36") site plans;
- 11 sets of 11"X17" site plans;
- Four Engineering Reports;
- Four full size PDD Maps for zoning amendment;
- Suggested Legal Description of Assembled Parcel; and,
- Short EAF.

The following comment numbers correspond directly to your comments, contained in your correspondence dated July 28, 2010, with our responses in bold. The drawings have also been revised to reflect a change in square footage of the buildings. The Enriched Living Facility (13,913 sf), Type A dwellings (3,683 sf) and Type B dwellings (3,942 sf) have been updated to reflect a minor change in the floor plans.

Zoning Change Comments:

1) The applicant should either add a preliminary plan for the multi-family housing or show the currently approved plan for the assisted living center. Whichever plan is shown, vehicle access from Ives Street will have to be on the plan. The access has been on every plan since 1970.

There are currently no plans for the development of the area in question in the foreseeable future. The owner wishes to remove the area previously labeled as multifamily housing, and currently approved for assisted living, from the Planned Development District. The owner understands that should the area be developed in the future, a zone change request will be necessary. Refer to Site Plan Sheets C101 and C102 for the vehicle access from Ives Street that is provided pursuant to the above request. The vehicle access to Ives Street will consist of a 20-feet wide gravel emergency only access road.

2) A waterline from Ives street will also be required. The fire flows in this area are marginal. Phase II construction was only allowed because we thought the assisted living center that was approved was going to be built right after it, which would have looped the water system.

The requested eight-inch water line to Ives Street is shown on Sheet C103 and C104. The new eight-inch water line will loop from Jewell Drive to Ives Street and will provide additional hydraulic capacity for Phases I-III as well as any future development that may take place at Ives Hill Retirement Community. Refer to the engineering report for hydraulic analysis of the new system.

220 Sterling Street
Watertown, NY 13601-3313
Tel (315) 788-3900 Fax (315) 788-0668
E-mail: gymopc@gymopc.com

3) Pedestrian Paths have been lacking in all phases of this development. Phase I had minimal sidewalks. Phase III continues that trend. Consideration should be given to adding them.

As discussed at that planning board meeting and requested by the board, sidewalks have been added along the private portion of Jewell Drive, connecting the City owned sidewalk to Stone Circle.

Site Plan Approval Comments:

1) The existing property lines are not shown correctly as Parcel Number 14-49-101.005 is not shown and the plans are missing several easements. The end of the Jewell Drive right-of-way should be depicted and the utility easements within the Phase I & II development should be depicted and labeled.

Please refer to updated Survey Sheets SU101, SU102, and SU103 showing existing property lines, easements and rights-of-way.

2) The applicant must provide a Boundary and Topographic Survey Map of the involved parcels. This map must be stamped and signed with an original seal and signature on at least one copy, the rest may be copies thereof.

Please refer to updated Survey Sheets SU101, SU102, and SU103 showing existing property lines, easements and rights-of-way, as well as topographic information.

3) Two of the proposed two unit dwellings are shown being constructed across a property line. The applicant will either have to shift the buildings or combine the two parcels to rectify the issue.

The applicant is proposing to assemble Parcels 14-49-101.005, 14-49-101 and 14-49-101.001. Refer to attached Suggested Legal Description for Parcel Description.

4) The applicant must depict land use, zoning, and tax parcel numbers on the site plan.

Refer to PDD1 for Zoning and land use. Tax parcel numbers are shown on both Survey and Site Plan sheets.

5) A detail for concrete sidewalks and asphalt pavement in City R.O.W. must be provided.

A detail for concrete sidewalks (3/C501) and asphalt pavement (2/C501) have been shown

6) A detail for Curb wipedown must be provided.

There are no curbs proposed so there is no need for a curb wipedown detail.

7) The Curb Cut Fee on sheet C001 should be revised to $75.

Acknowledged. Refer to revised sheet C001.

8) The applicant should revise the line style of the parking lot for the future enriched living facility if no curbing is proposed.

Although the future building is shown for informational purposes only, refer to revised Sheet C101 for correct line style of the parking lot for the future enriched living facility.

9) An 8" main must be looped from the end of the private section of Jewell Drive at Stone Circle to the 8" main on Ives Street near the intersection with Barben Ave.

Refer to response to zone change Comment #2.

10) The applicant must provide a copy of all correspondence and submittals to NYS DOH for the Water Supply Permit and a curb stop detail must be added to the plans.

Acknowledged. The City will be copied on correspondence with NYS DOH. Refer to Detail 10, Sheet C502 for curb stop detail. Submission to the NYSDOH is anticipated once planning board approval is granted.

11) The applicant must provide a copy of all correspondence and submittals to NYS DEC for the Sanitary Sewer Permit.

Acknowledged. The City will be copied on correspondence with NYS DEC. Submission to the NYSDEC is anticipated once planning board approval is granted.

12) The applicant must provide profiles for the sanitary sewers and depict all utility crossings and add a sanitary cleanout detail to the plans.

Refer to Sheet C201 for the profiles of the sanitary sewers, which depict utility crossings. Refer to Detail 8, Sheet C501 for sanitary sewer cleanout detail.

13) A detail showing the connection to the City's sanitary sewer system must be added to the plans.

The applicant is proposing connecting at existing 8-inch sewer stub outs along Jewell Drive using a new manhole.

14) The property owner must obtain a sanitary sewer permit prior to connection to the City's sewer system.

Acknowledged. A note is included on Sheet C001 informing the contractor of the requirement.

15) A detail showing the connection to the City's storm sewer system must be added to the plans.

Refer to Detail 9 on Sheet C502.

16) The property owner must obtain a storm sewer permit prior to connection to the City's sewer system.

Acknowledged. A note is included on Sheet C001 informing the contractor of the requirement.

17) The applicant must provide pre and post drainage calculations and drainage area maps.

The Stormwater Pollution Prevention Plan (SWPPP) will contain the necessary drainage calculations and drainage area maps and will be forwarded to the City upon completion.

18) The applicant must provide final design, details and calculations for the proposed Stormwater Management Pond.

The SWPPP will contain the necessary designs, details and calculations and will be forwarded to the City upon completion.

19) The applicant must provide a stamped and signed copy of the Stormwater Pollution Prevention Plan (SWPPP).

The SWPPP will be stamped and signed by a NYS Professional Engineer and will be forwarded to the City upon completion.

20) Construction entrances shall be maintained in accordance with approved SWPPP and the contractor shall provide appropriate traffic control measures along Jewell Drive.

The SWPPP will contain information on construction entrances. Also, refer to Detail 2, Sheet C505 for typical offside sediment tracking control detail. Refer to general notes on Sheet C001 for Maintenance of Traffic notes.

21) The applicant must provide a copy of all correspondence and submittals to NYS DEC for SPDES Permit and a construction entrance detail must be provided.

The City will be copied on correspondence with the NYS DEC for stormwater discharge. Refer to Detail 2, Sheet C505 for typical offside sediment tracking control detail.

22) Additional information should be provided to show that the lighting levels around the entrance and exit areas will be adequate.

A site light has been added near the entrance to the Enriched Living Facility. Exits of the Enriched Living Facility will be lit be wallpacks installed near the exits. Refer to revised sheet C101 for photometrics.

23) Large Deciduous or coniferous trees spaced 40' on center should be provided along both sides on the enriched living facility internal drive, both sides of the internal drive that services the duplexes and along the extension of Jewell drive.

Large Deciduous or coniferous trees have been provided where feasible and no conflicts with utilities or site plan components exist. Refer to revised Sheets C101 and C102 for locations of trees and Sheet C001 for planting table.

24) A planting bed and/or landscaped berm should be considered in the area between the proposed parking lots and the street right-or-way.

Refer to revised Sheet C101 for the location of the planting bed provided along the parking lot for the enriched living facility.

25) Consideration should be given to adding sidewalks along the city street portion of Jewell Drive and the private extension of that street.

Refer to zone change Comment #3 response.

26) To meet emergency access requirements, the proposed gravel road behind the building will have to be upgraded to asphalt and the 15' gravel drive on the north side of the building will have to be widened to 20' and upgraded to asphalt.

Refer to revised Sheet C101 showing the upgraded emergency access requirements.

27) An emergency access route, which is at least 20' wide and paved, from the end of Jewell Drive to Ives Street will also have to be provided.

Pursuant to the requests of the City Fire Department at the Planning Board Meeting on August 3, 2010, a 20' wide gravel emergency access road has been provided to Ives Street. Refer to revised Sheets C101-C104.

28) The number and locations of fire hydrants will have to approved by the fire Department.

Acknowledged. It is anticipated that the City Fire Department will review the site and utility plans as part of the Site Plan review process.

We trust these responses address the Planning Board's concerns. If you have questions, please contact me at your earliest convenience.

Sincerely,
GYMO Architecture, Engineering & Land Surveying, P.C.

Brian J. Drake, I.E.
Project Engineer

Attachments

PC: P.J. Scordo, P.E. S. Yaussi, A.I.A.- GYMO, PC
Tina Schneider, Purcell Construction Corp. - w/encl.
Rick Gefell, Purcell Construction Corp.

X:\2010\2010-077A-IVES HILLS RETIREM\CORRESPONDENCE\ENGINEERING\CITY OF WATERTOWN\CITY RESPONSE LETTER8.24.10.DOC

PROJECT I.D. Number

Appendix C

State Environmental Quality Review

SEQR

SHORT ENVIRONMENTAL ASSESSMENT FORM

For UNLISTED ACTIONS Only

PART 1 – PROJECT INFORMATION (To be completed by Applicant or Project Sponsor)

1. APPLICANT/SPONSOR
Purcell Construction Corp.

2. PROJECT NAME
Ives Hill Phase III

3. PROJECT LOCATION:
Municipality City of Watertown County Jefferson

4. PRECISE LOCATION (Street address and road intersections, prominent landmarks, etc., or provide map)
East side of Jewell Drive across from congregate living building, Ives Hill Phase III of Planned Development District

5. IS PROPOSED ACTION:
☑ New ☐ Expansion ☐ Modification/alteration

6. DESCRIBE PROJECT BRIEFLY:
Site Plan approval for a ± 13,913 sf enriched living building, 18 units, parking, private driveway, water, sanitary sewer, storm sewer, and required appurtenances. Site Plan approval for 2 Type A Duplexes & 3 Type B Duplexes with required water/sanitary sewer/storm sewer/private driveway/ other appurtenances. PDD zone change to allow for Enriched Living Facilities.

7. AMOUNT OF LAND AFFECTED:
Initially ± 8.0 acres Ultimately ± 8.0 acres

8. WILL PROPOSED ACTION COMPLY WITH EXISTING ZONING OR OTHER EXISTING LAND USE RESTRICTIONS?
☐ Yes ☑ No If no, describe briefly PDD site plan change. Need to amend PDD to allow for Enriched Living Facility.

9. WHAT IS PRESENT LAND USE IN VICINITY OF PROJECT?
☑ Residential ☐ Industrial ☐ Commercial ☐ Agriculture ☐ Park/Forest/Open Space ☑ Other
Describe: Planned development - Multi Family Apartments and Retirement Community.

10. DOES ACTION INVOLVE A PERMIT APPROVAL, OR FUNDING, NOW OR ULTIMATELY FROM ANY OTHER GOVERNMENTAL AGENCY (FEDERAL, STATE OR LOCAL)?
☑ Yes ☐ No If yes, list agency(s) and permit/approvals NYS DOH - water
NYS DEC - sewer

11. DOES ANY ASPECT OF THE ACTION HAVE A CURRENTLY VALID PERMIT OR APPROVAL?
☐ Yes ☑ No If yes, list agency(s) and permit/approvals

12. AS A RESULT OF PROPOSED ACTION, WILL EXISTING PERMIT/APPROVAL REQUIRE MODIFICATION?
☐ Yes ☑ No

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: Purcell Construction Corp. Date: 8/24/10

Signature: for

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment

OVER

A. DOES ACTION EXCEED ANY TYPE I THRESHOLD IN 6 NYCRR, PART 617.12? If yes, coordinate the review process and use the FULL EAF.
☐ Yes ☐ No

B. WILL ACTION RECEIVE COORDINATED REVIEW AS PROVIDED FOR UNLISTED ACTIONS IN 6 NYCRR, PART 617.6? If NO, a negative declaration may be superseded by another involved agency.
☐ Yes ☐ No

C. COULD ACTION RESULT IN **ANY** ADVERSE EFFECTS ASSOCIATED WITH THE FOLLOWING: (Answers may be handwritten, if legible)

C1. Existing air quality, surface or groundwater quality or quantity, noise levels, existing traffic patterns, solid waste production or disposal, potential for erosion, drainage or flooding problems? Explain briefly:

C2. Aesthetic agricultural, archaelogical, historic, or other natural or cultural resources; or community or neighborhood character? Explain briefly:

C3. Vegetation or fauna, fish shellfish or wildlife species, significant habitats, or threatened or endangered species? Explain briefly:

C4. A community's existing plans or goals as officially adopted, or a change in use or intensity of use of land or other natural resources? Explain briefly:

C5. Growth, subsequent development, or related activities likely to be induced by the proposed action? Explain briefly.

C6. Long term, short term, cumulative, or other effects not identified in C1-C5? Explain briefly.

C7. Other impacts (including changes in use of either quantity or type of energy)? Explain briefly.

D. WILL THE PROJECT HAVE AN IMPACT ON THE ENVIRONMENTAL CHARACTERISTICS THAT CAUSED THE ESTABLISHMENT OF A CEA?
☐ Yes ☐ No

E. IS THERE, OR IS THERE LIKELY TO BE, CONTROVERSY RELATED TO POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS?
☐ Yes ☐ No If yes, explain briefly

PART III – DETERMINATION OF SIGNIFICANCE (To be completed by Agency)

INSTRUCTIONS: For each adverse effect identified above, determine whether it is substantial, large, important or otherwise significant. Each effect should be assessed in connection with its (a) setting (i.e. urban or rural); (b) probability of occurring; (c) duration; (d) irreversibility; (e) geographic scope; and (f) magnitude. If necessary, add attachments or reference supporting materials. Ensure that explanations contain sufficient detail to show that all relevant adverse impacts have been identified and adequately addressed.

☐ Check this box if you have identified one or more potentially large or significant adverse impacts which **MAY** occur. Then proceed directly to the FULL EAF and/or prepare a positive declaration.

☐ Check this box if you have determined, based on the information and analysis above and any supporting documentation, that the proposed action **WILL NOT** result in any significant adverse environmental impacts AND provide on attachments as necessary, the reasons supporting this determination:

Name of Lead Agency

Print or Type Name of Responsible Officer in Lead Agency

Title of Responsible Officer

Signature of Responsible Officer in Lead Agency

Signature of Preparer (If different from responsible officer)

Date

SUGGESTED DESCRIPTION

Ives Hill Retirement Community, Inc.
City of Watertown
Page 1 of 2

August 24, 2010
Project Number 2010-077A

ALL THAT TRACT OR PARCEL OF LAND situate in the City of Watertown, County of Jefferson, State of New York and being further described as follows:

BEGINNING at a ⅝" rebar with cap found in the northwesterly street margin of Ives Street, said rebar also being the most southeasterly corner of the parcel of land conveyed by Bankers Trust Company of California, N.A. to Khalil Kardooni and Shahandeh Haghir by deed recorded in the Jefferson County Clerk's Office in Liber 1683, at Page 01, on July 12, 1999;

THENCE S. 44°-30'-43" W., along the northwesterly street margin of Ives Street, a distance of 56.50 feet to a ½" iron pipe with cap set (2001) at the intersection of said northwesterly street margin of Ives Street with the northeasterly boundary line of the parcel of land conveyed by John B. Harris, Jr. to The Roman Catholic Diocese of Ogdensburg, New York by deed recorded in the Jefferson County Clerk's Office in Liber 696, at Page 66, on July 22, 1960;

THENCE N. 64°-57'-47" W., along the northeasterly boundary line of said Harris, Jr. to The Roman Catholic Diocese of Ogdensburg, New York conveyance, a distance of 1314.07 feet to a point;

THENCE N. 25°-02'-13" E., a distance of 205.40 feet to a point;

THENCE generally northeasterly along a curve to the right at a radius of 220.00 feet, a distance of 203.05 feet to a point, said point being situate a direct tie of N. 51°-28'-37" E., 195.92 feet from the last mentioned point;

THENCE generally northeasterly along a curve to the left at a radius of 530.00 feet, a distance of 429.86 feet to a city monument found, said monument being situate a direct tie of N. 54°-40'-56" E., 418.17 feet from the last mentioned point;

THENCE generally northeasterly along a curve to the right at a radius of 470.00 feet, a distance of 241.69 feet to a city monument found; said monument being situate a direct tie of N. 46°-10'-45" E., 239.03 feet from the last mentioned monument;

THENCE generally northeasterly along a curve to the left at a radius of 251.70 feet, a distance of 43.29 feet to a city monument found, said monument being situate a direct tie of N. 55°-59'-02" E., 43.23 feet from the last mentioned monument;

THENCE S. 64°-53'-03" E., a distance of 144.12 feet to a point, said point being situate S. 06°-55'-34" W., 0.24 feet from a ⅝" rebar with cap found;

THENCE S. 25°-06'-57" W., passing through a ⅝" rebar with cap found at 94.62 feet and continuing, a total distance of 94.83 feet to a point;

THENCE S. 64°-53'-03" E., passing through a ½" iron pipe with cap set (2001) at 203.50 feet and continuing, along the southerly terminus of Kieff Drive in part, a total distance of 253.00 feet to a point at the most southeasterly corner of the terminus of said Kieff Drive;

THENCE N. 25°-07'-00" E., along the easterly street margin of Kieff Drive, a distance of 21.64 feet to a point, said point being situate a direct tie of S. 46°-43'-03" W., 0.26 feet from a ⅝" rebar with cap found, said point also being situate a direct tie of S. 54°-05'-57" W., 0.38 feet from a ¾" iron pipe found;

THENCE S. 64°-53'-00" E., a distance of 149.98 feet to a ½" iron pipe with cap set (2001) in the westerly boundary line of the parcel of land conveyed by T. Urling Walker (a/k/a Thomas U. Walker) and Mabel B. Walker to T. Urling Walker (a/k/a Thomas U. Walker) and Mabel B. Walker by deed recorded in the Jefferson County Clerk's Office as File Number 2006-18054 on October 25, 2006, said iron pipe being situate a direct tie of N. 65°-25'-15" W., 1.66 feet from a ¾" iron pipe found;

THENCE S. 25°-07'-00" W., along the westerly boundary line of the aforementioned Walker to Walker conveyance in part, and along the westerly boundary line of the following conveyances:

Cathleen M. Arthur to Ronald L. Netto, Sr. and Addie M. Netto by deed recorded in the Jefferson County Clerk's Office in Liber 1645, at Page 299, on October 28, 1998;

Bruce W. Goodnough and Lorraine M. Goodnough to Lorraine M. Goodnough by deed recorded in the Jefferson County Clerk's Office as File Number 2010-0762 on January 20, 2010;

F. Joseph Fusco and Ann M. Fusco to Carleton H. Lamica and Beverly J. Lamica by deed recorded in the Jefferson County Clerk's Office in Liber 925, at Page 747 on September 10, 1982;

and Bankers Trust Company of California, N.A. to Khalil Kardooni and Shahandeh Haghir by deed recorded in the Jefferson County Clerk's Office in Liber 1683, at Page 01, on July 12, 1999;

passing through a ½" iron pipe found at 475.80 feet, a ½" iron pipe found at 476.54 feet and a ⅝" rebar with cap found at 676.54 feet respectively and continuing, a total distance of 876.54 feet to a ⅝" rebar with cap found at the most southwesterly corner of the aforementioned Bankers Trust Company of California, N.A. to Kardooni and Haghir conveyance;

THENCE S. 64°-53'-00" E., along the southerly boundary line of said Bankers Trust Company of California, N.A. to Kardooni and Haghir conveyance, a distance of 384.60 feet to the POINT OF BEGINNING.

CONTAINING 17.554 acres of land more or less.

SUBJECT to any rights or restrictions of record.

IT BEING the intent to describe the parcels of land conveyed by Community A.L. Corporation to Ives Hills Retirement Community, Inc. by deed recorded in the Jefferson County Clerk's Office as File Number 2006-18059 on October 25, 2006 and the parcel of land conveyed by Revision Development, LLC to Ives Hill Retirement Community, Inc. by deed recorded in the Jefferson County Clerk's Office as File Number 2006-18060 on October 25, 2006, as shown on a map titled "Survey + Topographic Map of the Land of Ives Hill Retirement Community, Inc., Jewell Drive, City of Watertown, New York", dated August 24, 2010, prepared by GYMO, Architecture, Engineering & Land Surveying, P.C., Watertown, New York.

Gregory F. Ashley
P.L.S. #50257

2010-077E

ENGINEERING REPORT

IVES HILL – PHASE III
PURCELL CONSTRUCTION CORP.

CITY OF WATERTOWN
JEFFERSON COUNTY, NEW YORK

GYMO PC
ARCHITECTURE, ENGINEERING & LAND SURVEYING
220 Sterling Street, Watertown, New York 13601
tel.315.788.3900 fax.315.788.0668 e-mail. gymopc@gymopc.com

ENGINEERING REPORT

IVES HILL PHASE III

JEWELL DRIVE
CITY OF WATERTOWN
JEFFERSON COUNTY
STATE OF NEW YORK

PURCELL CONSTRUCTION CORP.

566 COFFEEN STREET
WATERTOWN, NY 13601
CONTACT PERSON:
MS. CHRISTINA SCHNEIDER
CHIEF FINANCIAL OFFICER (315) 782-1050

PROJECT # 2010-077E
20 JULY 2010
REVISED 24 AUGUST 2010
24 AUGUST 2010 REVISIONS ARE IN BOLD ITALICS

PATRICK J. SCORDO, P.E.
DIRECTOR OF ENGINEERING

The above Engineer states that to the best of his knowledge, information and belief, the plans and specifications are in accordance with the applicable requirements of New York State. It is a violation of New York State Law for any person, unless acting under the direction of a licensed professional engineer to alter this document in any way. If altered, such licensee shall affix his or her seal and the notation "altered by" followed by his or her signature, date, and a specific description of alteration.

GYMO ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.
220 STERLING STREET-WATERTOWN, NY-TELE: (315)788-3900 FAX: (315)788-0668

TABLE OF CONTENTS

1.0 SITE AND PROJECT DESCRIPTIONS

1.1 Location

The site is located on the southeastern side of Jewell Drive in the City of Watertown and is Phase III of the Ives Hill Planned Development District. The proposed driveway to the Enriched Living Facility is located on Jewell Drive approximately 700 feet from the intersection of Jewell Drive and Weldon Drive. The site is located on City of Watertown tax parcels 14-49-101.000, 14-49-101.101, and 14-49-101.005. The proposed disturbed area for the development is 5.5 acres.

1.2 Project Description

The proposed project involves the development of Phase III of the Ives Hill Planned Development District. A ***13,913*** sf Enriched Living Facility (ELF) will be constructed along with (2) Type A (***3,683*** sf) Duplexes and (3) Type B (***3,492*** sf) Duplexes. Phase I included the development of a 47,400 square feet (sf) Congregate Building, four (4) 2,920 sf Duplex Buildings, and two (2) 3,370 sf Duplex Buildings.

Phase II of the project involved the development of seven (7) 2,920 sf Duplex Buildings and five (5) 3,370 sf duplex buildings. Phase III also includes an additional ***13,913*** sf Enriched Living Facility, for which site plan approval is not sought at this time.

City of Watertown Site Plan Approval is anticipated for ***the multifamily buildings and the Enriched Living Facility*** and where the remaining building involved in Phase III is discussed, it is for informational purposes of future development only. No site plan approval is sought for the remaining building of Phase III.

The access roads, water, sanitary sewer, storm sewers, site lighting, landscaping and parking areas necessary for Phase III will be constructed as the initial part of Phase III. This infrastructure is being designed with the future building in mind. Sanitary sewer, and water systems will be discussed in more detail in other sections of this report. Storm sewer will be discussed in detail in the Storm Water Pollution Prevention Plan (SWPPP) report.

1.3 Zoning/Parking/Employees

Zoning of the project area is currently Planned Development District (PDD), which allows for multifamily housing. An amendment to the current PDD will be necessary for this project and will be submitted under separate cover to the City of Watertown to allow for Enriched Living Facilities. Parking for this project was analyzed for the ELF, which is to be constructed. The multifamily Duplexes will each have private driveways for parking.

As the residents of the ELF will not have cars onsite, it is proposed that only parking for the ELF employees ***and visitors*** is constructed. Zoning for Nursing Home classification requires one parking space per three beds plus one space per ten beds for guest (18 units* 1/3 + 18/10). This equates to 8 spaces.

Employees for the ELF are scheduled as follows:

7 Employees – Day shift 7 a.m. 3 p.m.
3 Employees Evening Shift – 3 to 11
2 Employees Night Shift – 11 to 1
One LPN will be on staff day and evening shift.

As it is possible to have up to 11 employees overlapping, ***16*** parking spaces are proposed, with two of the spaces handicapped reserved. This is in excess of the zoning requirements. ***Multifamily buildings will have individual garages, with additional private driveways available for guest parking.***

1.4 Site Topography

The highest point within the disturbed area is at the southeastern most portion of the project, at an elevation of ***510***. The ***majority of the*** site slopes downward predominantly in a northerly direction to approximate elevation 473 at Jewell Drive. ***A portion of the proposed emergency access road drains in a southerly direction toward catch basins on Ives St.*** The eastern area drains to a City of Watertown catch basin on Jewell Drive at the northeast corner of the project. The City of Watertown storm sewer flows via stormwater piping northeast along Jewell Drive to Weldon Drive. From there, the storm sewer is piped north to a detention basin constructed during Phase I. The western portion of the project flows to a low point on the south side of Jewell Drive, where is it then piped under Jewell Drive and flows through Phase II via piping to a storm water detention area that was constructed during Phase II.

1.5 Soil Classification

According to the United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS), working from the western end of the site to the eastern end of the site, you will find: NIC-Nellis Loam (61.5% of area of interest), CnC-Collamer Silt Loam – 3 to 8% slopes (20.4%), and CnB-Collamer Silt Loam – 8 to 15% slopes (12.2%). Trace amounts of NoA – Niagara Silt Loam (0.3%) are expected. Near the entrance of Ives St. GIA – Galway Silt Loam (5.9%) will be encountered.

According to the Jefferson County Soil Survey, CnB, and CnC are class C soils. NIC and GIA are classified as class B soil. This amounts to the majority of the project soils being classified as hydrologic class B soils (94.1%). See the attached USDA/NRCS Jefferson County Soil Survey descriptions for more information on the specific soil type properties in Appendix #1.

The soil has been disturbed by human activities. The site is currently undeveloped, and groundcover is mainly overgrown grassland, and brush with some small saplings.

2.0 WATER FACILITIES

2.1 Existing Water Facilities

An eight-inch ductile iron pipe (DIP) travels along Jewell Drive north of the site within the City of Watertown Right-of-Way. In addition, an eight-inch DIP travels along the gravel road to the east of the site within a 20-foot City of Watertown easement. The eight inch main to the east of the project tees into the eight-inch main along Jewell Drive, and ultimately ends up looping Kieff Drive to the south, Jewell Drive and Weldon Drive to the east. The main along Jewell Drive continues west before looping Phase II. ***An eight-inch main travels along the southern side of Ives St. This eight-inch main tees off to two eight-inch mains with one south of Barben Ave. and one east on Ives St.***

There are hydrants along Jewell Drive. In addition to these hydrants, there are hydrants along the Phase II loop. Also, there is a hydrant on Kieff Drive, approximately 260 feet

southeast of the southeast corner of the project. ***A hydrant is also located at the corner of Barben Ave. and Ives St.***

2.2 Proposed Water Facilities (Enriched Living Facility)

Both the eight-inch main on Jewell Drive and the eight-inch main to the east of the site will be utilized for connection of the proposed water supply. The project sponsor proposes ±574-feet of eight-inch DIP water main with two six-inch laterals for the ELF portion of the project. One six-inch lateral will serve the ELF and the remaining six-inch lateral will serve a future Phase III building. The eight-inch DI will loop around the ELF as shown on the civil plans in Appendix #2. As the entire proposed ELF is within 300 feet of an existing hydrant, no new hydrants are proposed at this time for the ELF portion of the project.

The eight-inch water main and six-inch laterals are proposed to be owned, operated, and maintained by the owner. The water lines will remain as private lines, will be the property owner's responsibility and will be installed to City of Watertown Specifications. GYMO, P.C. will explain to the developer that project inspection will be required for Engineers Certification of installed facilities.

2.3 Proposed Water Facilities (Multifamily)

The eight-inch main along Jewell Drive will be extended along the Jewell Drive Extension. From there, a new eight-inch Ductile Iron main will loop the proposed Multifamily road and connect back into the eight-inch main along Jewell Drive. Two new hydrants will be installed – one near the current end of Jewell Drive, and one near the midpoint of the proposed multifamily road. The duplex units will each be served by one-inch copper lines. Approximately 773 LF of eight-inch Ductile Iron main, and 546 LF of one-inch copper services will be constructed. ***In addition to the aforementioned utilities, the eight-inch main along Jewell Drive will be extended along the western property line southeast to Ives St. Approximately 1100 ft of eight-inch DI pipe and three hydrants will be installed to Ives St., where it will connect to an existing eight-inch main on south side of Ives St.***

The eight-inch water main and one-inch laterals are proposed to be owned, operated, and maintained by the owner. The water lines will remain as private lines, will be the property owner's responsibility and will be installed to City of Watertown Specifications. GYMO, P.C. will explain to the developer that project inspection will be required for Engineers Certification of installed facilities.

2.4 Water Demand

For design purposes, water demands are assumed to be equivalent to average daily sewage flows generated.

2.4.1 NYS Department of Environmental Conservation (DEC)

Water demands can be determined utilizing NYS DEC guidelines. According to NYS DEC a one bedroom unit would generate 150 gpd and two bedroom unit would generate 300 gpd. These requirements can be reduced by twenty percent if new fixtures are being used.

2.4.2 City of Watertown

The City of Watertown has indicated that their meter readings and calculations of similar City projects (Maple Courts, Fairway West, and Ives Hill Manor) result in water usage of 85 gpd for a one bedroom unit and 125 gpd from a two bedroom unit.

BUILDING	APPLICATION RATE	FACTOR	FLOW [gpd]
ELF Building	85 GPD/UNIT	18 UNITS	1,530
Future ELF BLDG	85 GPD/UNIT	18 UNITS	1,530
Duplexes	125 GPD/UNIT	10 UNITS	1.250
TOTAL			**4,310**

The average flow equates to 2.99 GPM. Using a peaking factor of 4, the peak demand is calculated to be 11.97 GPM. Calculations are shown below.

4,310 GPD/1440 min/day = 2.99 GPM (average)

4 = peaking factor

2.99 GPM * 4 = 11.97 GPM (peak)

2.5 Hydraulic Analysis

A hydrant flow test was conducted by GYMO, P.C. on 14 July, 2010 with the hydrant near the proposed driveway connection to Jewell Drive on the eight-inch main acting as the monitored hydrant and the hydrant approximately 293 feet east on the eight-inch water main serving as the flowed hydrant. The flowed hydrant, at an approximate elevation of 475.5 ft, was flowed at a value of 1,120 gpm, while the pressure dropped from 69 to 53 pounds per square inch (psi). The projected available fire flow at the flowed hydrant was 2,050 GPM at 20 psi. This hydrant flow test data was utilized in a hydraulic WaterCAD model. The additional 18 unit future building (similar to the ELF facility) demands were considered for this analysis.

An additional hydrant flow test was conducted by GYMO, P.C. on August 9, 2010, with the hydrant at the intersection of Barben Ave. and Ives St. serving as the flowed hydrant (Elev. = 490). This hydrant was flowed at 1075gpm, while the pressure dropped from 65 psi to 50 psi. Projected available fire flow at the flowed hydrant was 1946gpm at 20 psi. Both flow tests were utilized in the model.

The water model shows that with domestic demands, 2,470gpm is available at 20 psi at the Enriched Living Facility that can be dedicated to the fire protection in the building.

3.0 SANITARY SEWER FACILITIES

3.1 Existing Sanitary Sewer Facilities

An eight-inch gravity sanitary sewer main and manhole exists at the location of the proposed entrance to the ELF on Jewell Drive. The eight-inch gravity flows east along Jewell Drive to a pumping station designed during Phase I.

The Phase I pump station was designed for Phase I (5,720gpd), Phase II (3,000gpd), and future Phase III (10,720 gpd) as well as ten-unit, two-bedroom Priests apartment complex (3000gpd) located adjacent to Immaculate Heart Central High School. Phase III was anticipated to be 32 one-bedroom and 64 two bedroom units.

There is an eight-inch PVC stub-out on the south side of Jewell Drive, ***near ELF entrance***. This eight-inch sanitary sewer flows via gravity to the Phase I pump station, where it is pumped to the aforementioned manhole located on Jewell Drive near the proposed entrance to the ELF. The Phase II pump station was designed to handle Phase II plus a portion of Phase III (20 duplexes or 5000 gpd) plus the Priest's apartment complex. ***There is also an eight-inch PVC stub-out on the south side of Jewell Drive near the proposed detention pond, which flows to the Phase II pump station.***

3.2 Proposed Sanitary Sewer Facilities (ELF)

The Enriched Living Facility sanitary sewers are proposed to be constructed with a series of eight-inch SDR-35 PVC gravity sewers and precast manholes throughout the site which lead to the aforementioned manhole on Jewell Drive and eventually to the Phase I pump station. The approximately 200 linear foot proposed gravity sewer running south to north through the project will serve the ELF. This section of gravity sanitary sewer and the pump station has been designed to accommodate an additional building similar to the ELF building, if necessary.

As mentioned in the previous section, the pump station was designed to handle the flows from the ELF. It is anticipated that the pump floats will be adjusted to meet project requirements. Additional details of the pump station design can be reviewed in the attached calculations (Appendix #4) and site plans.

3.3 Proposed Sanitary Sewer Facilities (Multifamily)

The multifamily sanitary sewers are proposed to be constructed with a series of eight-inch SDR-35 PVC gravity sewers and precast manholes throughout the site which lead to a new manhole at the existing eight-inch PVC stub south of Jewell Drive and eventually to the Phase II pump station. The approximately 628 linear foot proposed gravity sewer running along the center of the proposed private street will serve the multifamily housing. Four-inch PVC laterals will connect into the main to service the buildings.

As mentioned in the previous sections, the Phase I and Phase II pump stations were designed to handle the flows from the multifamily housing. It is anticipated that the pump floats will be adjusted to meet project requirements. Additional details of the pump station designs can be reviewed in the attached calculations (Appendix #4).

4.0 HYDROLOGIC AND HYDRAULIC ANALYSES

4.1 Existing Drainage

As described briefly in the beginning of the report, Phase I and Phase II have been constructed. Phase I of the project drains by a series of catch basins and storm lines that discharge to an existing detention basin on the north side of the site. Phase II is drained by a series of catch basins and storm lines that discharge to an existing detention basin on the west corner of the site.

The existing drainage for the ELF site sheet flows from south to north to catch basins along Jewell Drive, where it then travels via stormwater piping east toward Weldon Drive and eventually is discharged to the Phase I detention basin.

There is a low lying area west of the site that collects runoff from the western portion of Phase III and discharges under Jewell Drive before eventually discharging to the Phase II detention pond.

The 55-foot portion of the property that extends east to Ives Street sheet flows south toward Immaculate Heart Central's (IHC) parking lot.

4.2 Proposed Drainage

The proposed drainage analysis will be performed as part of the Stormwater Pollution Prevention Plan (SWPPP) report. The aforementioned low area to the west will be utilized for a stormwater treatment area, and the required stormwater quality and quantity treatment. The increase in peak flow will be attenuated in accordance with the NYS State Pollutant Discharge Elimination System (SPDES) requirements of no increase of the peak runoff from existing to proposed conditions of the 100 year - 24 hour storm event. The SWPPP will be prepared to include the total projected Phase III build out including the second ELF building. The stormwater treatment area will designed for the Phase III build out as well.

4.3 Proposed Storm Sewer Piping

The storm drainage piping will be designed to carry, at a minimum, the peak runoff of the 10 year - 24 hour storm event. Critical piping such as any roof drain leaders will carry the peak runoff of the 100 year - 1 hour storm event in accordance with building permit requirements. In addition, a 100-year overland flood route will be designed to avoid flooding of the building.

4.4 Proposed Storm Water Management

A control structure will be designed as part of the stormwater treatment area to comply with NYS SPDES guidelines for discharges from construction projects. The SWM pond will provide quantity control of the peak runoff from a 100 year - 24 hour storm event, and provide quality treatment of the first 0.9-inch of runoff from all new impervious surfaces, through the use of 24 hour extended detention. ***A portion of the gravel Emergency Access road (0.38 acres) will drain via roadside swales to the City of Watertown's storm sewer system along Ives St.***

5.0 TRAFFIC ANALYSIS

5.1 Estimated Additional Daily Traffic

By using the Trip Generation, 8th Edition by the Institute of Transportation Engineers, the amount of additional traffic that would be generated by an assisted living building is 48 Average Daily Trip ends, with four PM peak hour trip ends on adjacent street. The multifamily housing would generate an additional 74 average daily trip ends, with five PM peak hour trip ends on adjacent street. See Appendix #5 for calculations.

6.0 LIGHTING

6.1 Site Lighting

The site will generally be lit by 350 Watt pulse start metal halide lights installed 30' above finished grade. ***The entrance to the ELF will be lit by one 150-watt metal halide light***

installed 15 feet above finished grade. Light spillage over the property line has been kept under 0.5 footcandles as required. Refer to Sheet C101 of the site plans in Appendix #1.

7.0 LANDSCAPING

7.1 Existing Landscaping

There is no desirable landscaping on the project site. The site is currently undeveloped, and groundcover is mainly overgrown grassland, and brush with some small saplings.

7.2 Proposed Landscaping

Landscaping will be provided to comply with City of Watertown requirements. Landscaping will be chosen that is native to the area, grows well in the soil conditions of the project and fits in with the overall theme of the area.

8.0 SUMMARY

The Ives Hill Phase III will continue to build on the success that Phase I and Phase II has had in the City of Watertown. Phase III will not cause the City of Watertown's infrastructure to be exceeded, provided the improvements discussed in this report are performed. Additionally, we believe this project, as is Phase I and Phase II, to be of great value to the City of Watertown.

Patrick J. Scordo, P.E.
Director of Engineering

Brian J. Drake, I.E.
Project Engineer

APPENDIX #1

USDA/NRCS SOILS INFORMATION

other urban uses. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIw.

CmB—Claverack loamy fine sand, 3 to 8 percent slopes. This is a gently sloping, very deep, moderately well drained soil mainly in short, concave, sloping areas on the sides of ridges, knolls, and benches. Areas range from 10 to 50 acres.

Typically, the surface layer is very dark grayish brown loamy fine sand about 8 inches thick. The subsoil is mottled and about 32 inches thick. It is pale brown and brown loamy sand in the upper part and dark grayish brown silty clay in the lower part. The substratum is dark grayish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping, where the soil deposits are loamy rather than sandy, are small areas of moderately well drained Galen and Elmridge soils. Also included, in areas that do not have a sandy mantle, are somewhat poorly drained Rhinebeck soils and moderately well drained Hudson soils. Also included are small clay spots.

The seasonal high water table in this Claverack soil is commonly within 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is rapid in the upper part of the subsoil and slow or very slow in the lower part of the subsoil and the substratum. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is low or moderate. The surface layer is strongly acid to neutral.

Many areas of this prime farmland soil have been cleared and are used for cultivated crops. Some previously cleared areas have been planted to conifers. Some areas are used as pasture or woodland. A few areas are idle.

This soil is well suited to cultivated crops. The seasonal high water table somewhat delays planting and harvesting crops. In cultivated areas drainage is commonly needed for wet spots. Erosion is a moderate hazard if slopes are bare of vegetation. Conservation tillage, contour farming, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve water needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet or too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are no major management concerns for woodland uses.

The seasonal high water table, seepage, the clayey texture, and rate of water movement through the lower part of the subsoil and the substratum are limitations to use of this soil as sites for sanitary facilities. Also, the seasonal high water table and poor stability are limitations for shallow excavations and buildings with basements. The seasonal high water table, potential frost action, and droughty conditions are limitations to other urban uses. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIw.

CnB—Collamer silt loam, 3 to 8 percent slopes. This is a gently sloping, very deep, moderately well drained soil mainly in convex, sloping areas on plains. Areas range from 2 to 60 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is yellowish brown silt loam about 6 inches thick. The subsoil is mottled and about 18 inches thick. It is light brownish gray to brown silt loam and silty clay loam. The substratum is mottled, grayish brown, stratified silt, fine sand, and clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Niagara soils and poorly drained and very poorly drained Canandaigua soils in flat areas and in depressions. Also included, where bedrock is within 40 to 72 inches of the surface, are small areas of Collamer soils. Also included are small areas that have a clayey surface texture. Also included are small sandy areas.

The seasonal high water table of this Collamer soil is commonly within 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is moderate in the surface and the subsurface layers and slow or moderately slow in the subsoil and the substratum. Runoff is medium. The capacity for the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops for dairy farming. Some areas are highly productive, farm woodlots. Some areas are in urban use. A few areas are in pasture.

This soil is well suited to cultivated crops. If it is properly managed, row crops can be grown intensively. Erosion is a severe hazard if slopes are bare of vegetation. The seasonal high water table somewhat delays planting and harvesting crops. Random drainage is commonly needed in areas used for cultivated crops. Conservation tillage, till and plant on the contour for short slopes, and strip cropping on the contour for longer slopes are suitable management practices. Crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to control soil erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing

when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are no management concerns for woodland uses.

The seasonal high water table, rate of water movement through the subsoil and the substratum, and potential frost action are limitations to use of this soil for most urban uses. Erosion is a severe hazard on building sites. Low soil strength is also a limitation for some urban uses. There are few limitations on sites for sewage lagoons and area landfills and for lawns and landscaping. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIe.

CnC—Collamer silt loam, 8 to 15 percent slopes. This is a sloping, very deep, moderately well drained soil mainly on the shoulders of short and narrow, convex ridges, knolls, and benches on lowland plains. Areas range from 8 to 100 acres.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is yellowish brown silt loam about 6 inches thick. The subsoil is mottled and about 18 inches thick. It is light grayish brown to brown silt loam to silty clay loam. The substratum is mottled, grayish brown, stratified silt, fine sand, and clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Niagara soils and poorly drained and very poorly drained Canandaigua soils in low, flat areas and in depressions. Also included, where bedrock is within 40 to 72 inches of the surface, are small areas of Collamer soils. Also included are small areas of soils that have a clay surface layer. Also included are small sandy areas.

The seasonal high water table of this Collamer soil is commonly within 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is moderate in the surface and subsurface layers and slow or moderately slow in the subsoil and the substratum. Runoff is medium or rapid. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops for dairy farming. Some areas are in urban use or are highly productive, farm woodlots. A few areas are used as pasture or woodland.

This soil is moderately suited to cultivated crops, but requires careful management to control erosion. Erosion is a severe hazard if slopes are bare of vegetation. The seasonal high water table somewhat delays planting and harvesting crops. Conservation tillage, till and plant on the contour on the short slopes, and stripcropping on the contour on the longer slopes are suitable management practices. Crop rotation with long periods of hay, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. Erosion is a moderate hazard. During logging operations careful management is required to control erosion.

The seasonal high water table, slope, rate of water movement through the subsoil and the substratum, and potential frost action are limitations to use of this soil for most urban uses. Erosion is a severe hazard on building sites. Low soil strength is also a limitation for some urban uses. There are few limitations on sites for area landfills and shallow excavations and for lawns and landscaping. Potential for habitat for both openland and woodland wildlife is good.

The capability subclass is IIIe.

CnC3—Collamer silt loam, 8 to 15 percent slopes, severely eroded. This is a sloping, very deep, moderately well drained, severely eroded soil mainly on the shoulders of short and narrow, convex ridges, knolls, and benches on lowland plains. The surface layer commonly incorporates the upper part of the subsoil. Areas range from 10 to 150 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. It is not as dark as that of the uneroded Collamer soils, and is as little as 2 inches thick. The subsoil is mottled and extends to a depth of 32 inches. It is light grayish brown to brown silt loam and silty clay loam. The substratum is mottled, stratified silt, fine sand, and clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat poorly drained Niagara soils on foot slopes and small areas of Collamer soils that have bedrock within 40 to 72 inches of the surface. Also included are small areas of soils where the surface layer is not severely eroded.

The seasonal high water table in this Collamer soil is commonly within a depth of 1 1/2 to 2 feet of the surface from March through May. The rate of water movement through the soil is moderate in the surface and subsurface layers, and slow or moderately slow in the subsoil and the substratum. Runoff is rapid. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil are in pasture, have been replanted to conifers, or are idle. Some areas are used for cultivated crops.

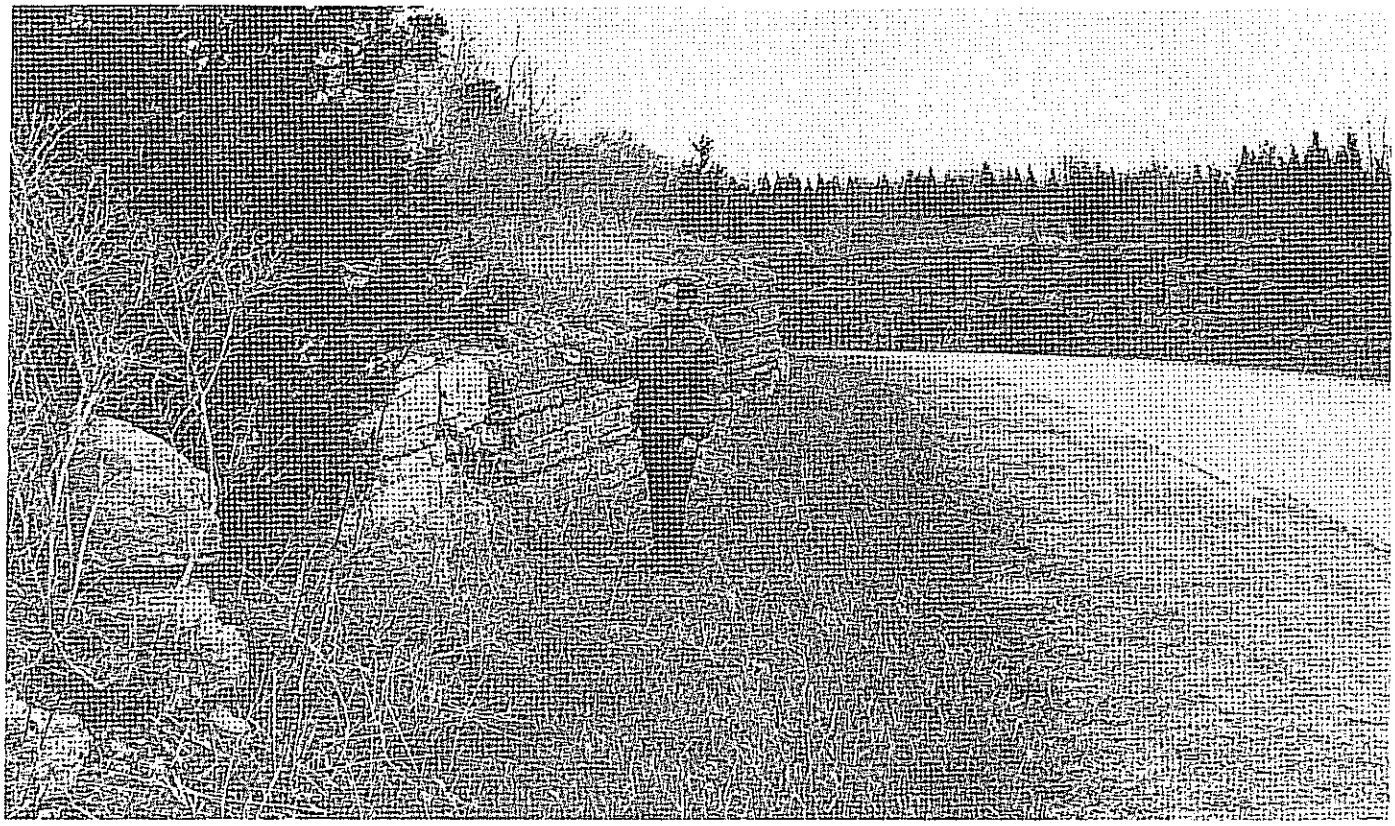


Figure 7.—Exposed ledges of hard limestone bedrock are common in areas of Galoo-Rock outcrop complex, 0 to 8 percent slopes. The bedrock is a limitation to most urban uses, such as roads, that require subsurface excavations.

inches. Bedrock of dolomitic sandstone and Theresa sandstone is at a depth of 7 inches. Typically, it is buff colored and the grains are cemented by carbonates.

Included with this unit in mapping are small areas of shallow, well drained and somewhat excessively drained Hollis soils, shallow, poorly drained and very poorly drained Ruse soils, and moderately deep, well drained and somewhat excessively drained Chatfield soils on ridges. Also included are small areas of moderately deep, somewhat poorly drained Chaumont soils between bedrock ridges and poorly drained and very poorly drained Guffin soils in depressions. Also included are small areas where stones and boulders are on the surface.

Bedrock in the Galoo, acid, soil is at a depth of less than 10 inches. The rate of water movement through the soil is moderate. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is very low. The surface layer is very strongly acid or strongly acid.

Most areas of the Galoo, acid, soil are in pasture, are reverting to brush, or are poor quality woodland.

The Galoo, acid, soil is not suited to cultivated crops because of very shallow depth to bedrock, rock outcrops, and droughtiness.

The Galoo, acid, soil is poorly suited to pasture. If used for pasture, it requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, restricted grazing during dry periods, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of the Galoo, acid, soil for red maple is moderate. Depth to bedrock, rock outcrops, and droughtiness cause high seedling mortality, and restricted rooting depth results in uprooting of trees during windy periods.

Depth to bedrock and rock outcrops are limitations of this soil as sites for sanitary facilities and for other urban uses. Potential for habitat for wildlife is poor.

The capability subclass is VIIs.

GIA—Galway silt loam, 0 to 3 percent slopes. This is a nearly level, moderately deep, well drained and

moderately well drained soil mainly in smooth, oblong, flat areas on uplands. Bedrock is at a depth of 20 to 40 inches. Areas range from 10 to 80 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 14 inches thick. It is yellowish brown gravelly silt loam in the upper part, and mottled, dark grayish brown to brown gravelly loam in the lower part. The substratum is brown to grayish brown very gravelly loam to a depth of 36 inches. Gray limestone bedrock is at a depth of 36 inches.

Included with this soil in mapping are small areas of shallow, well drained and somewhat excessively drained Farmington soils and moderately deep, somewhat poorly drained and poorly drained Newstead soils. Also included are small areas of very deep, well drained Nellis soils and very deep, moderately well drained Amenia soils. Also included are areas of Galway soils that have a channery or very channery surface layer. Also included are small areas of rock outcrops, bedrock escarpments, stony areas, and wet areas.

The seasonal high water table in this Galway soil is commonly within 1 1/2 to 3 feet of the surface in March and April. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate. Runoff is slow. The capacity of the soil to store water available for plant growth is low or moderate. The surface layer is moderately acid to neutral.

Most areas of this prime farmland soil have been cleared and are used for cultivated crops in dairy farming. A few areas are used as pasture or woodland. A few areas are in urban use.

This soil is well suited to cultivated crops. It is somewhat droughty during the drier summer months. Row crops can be grown intensively. Conservation tillage, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to maintain soil tilth and the content of organic matter and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are few or no major management concerns for woodland use.

Depth to bedrock is a limitation to use of this soil as sites for sanitary facilities, shallow excavations, and dwellings with basements. Depth to bedrock is a limitation of this soil for local roads and streets. The thin layer of soil over bedrock is a limitation for lawns and landscaping. Potential for habitat for openland and woodland wildlife is good.

The capability subclass is IIs.

GIB—Galway silt loam, 3 to 8 percent slopes. This is a gently sloping, moderately deep, well drained and moderately well drained soil mainly in convex, sloping areas on uplands. Bedrock is at a depth of 20 to 40 inches. Areas range from 10 to 80 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 14 inches thick. It is yellowish brown gravelly silt loam in the upper part and mottled, dark grayish brown and brown gravelly loam in the lower part. The substratum is brown and grayish brown very gravelly loam to a depth of 26 inches. Gray limestone bedrock is at a depth of 26 inches.

Included with this soil in mapping are small areas of shallow, well drained and somewhat excessively drained Farmington soils on knolls and moderately deep, somewhat poorly drained and poorly drained Newstead soils in low, flat areas. Also included are small areas of very deep, well drained Nellis soils and moderately well drained Amenia soils. Also included are Galway soils that have a channery and very channery surface layer. Also included are small areas of rock outcrops, bedrock escarpments, stony areas, and wet spots.

The seasonal high water table in this Galway soil is commonly within 1 1/2 to 3 feet of the surface layer in March and April. Bedrock is at a depth of 20 to 40 inches. The rate of water movement through the soil is moderate. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is low or moderate. The surface layer is moderately acid to neutral.

Most areas of this prime farmland soil have been cleared and are used for cultivated crops in dairy farming. A few areas are used for pasture or woodland. A few areas are in urban use.

This soil is well suited to cultivated crops. It is somewhat droughty during the drier summer months. Row crops can be grown intensively, but erosion is a moderate hazard if slopes are bare of vegetation. Conservation tillage, contour farming with strip crops on the contour on the longer slopes, crop rotation, using winter cover crops, and returning crop residue and adding manure to the soil help to maintain soil tilth and the content of organic matter and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. There are few or no major management limitations for woodland use.

Depth to bedrock is a limitation to use of this soil as sites for sanitary facilities, shallow excavations, and dwellings with basements. Depth to bedrock is a limitation of the soil for most other urban uses. Potential

NIC—Nellis loam, 8 to 15 percent slopes. This is a sloping, very deep, well drained soil mainly in long, narrow, convex areas on flanks of hilltops and ridges on uplands. Areas range from 8 to 45 acres.

Typically, the surface layer is dark brown loam about 9 inches thick. The subsoil is dark yellowish brown loam about 12 inches thick. The substratum is brown to light brownish gray gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Amenia soils on somewhat wetter parts of the landscape and, where the soils have a silty mantle, well drained Lowville soils. Also included are small areas of moderately deep, well drained and moderately well drained Galway soils. Also included are small areas where cobbly or flaggy rock fragments are in the surface layer and areas of rock outcrops.

The rate of water movement through this Nellis soil is moderate in the subsoil and moderately slow or moderate in the substratum. Runoff is medium or rapid. The capacity of the soil to store water available for plant growth is high. The surface layer is moderately acid to neutral.

Most areas of this soil are used for cultivated row crops in dairy farming. Some areas are highly productive woodlots or are sugarbushes. Some areas are in urban use.

This soil is moderately suited to cultivated crops. Erosion is a moderate hazard if slopes are bare of vegetation. Field strips or stripcropping help to control erosion. Crop rotation with long-term hay crops or sod, using winter cover crops, and returning crop residue and adding manure to the soil help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet or too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of this soil for sugar maple is moderate. There are few or no major management concerns for woodland use.

Rate of water movement through the substratum is a limitation to use of this soil as sites for septic tank absorption fields. Slope is a limitation for sewage lagoons and for both trench and area sanitary landfills. Slope and potential frost action are limitations for other urban uses. Potential for habitat is good for woodland wildlife.

The capability subclass is IIIe.

NID—Nellis loam, 15 to 25 percent slopes. This is a moderately steep, very deep, well drained soil mainly in long, narrow areas on the sides of ridges and hills on uplands. Areas range from 8 to 30 acres.

Typically, the surface layer is brown loam about 9 inches thick. The subsoil is dark yellowish brown loam about 12 inches thick. The substratum is brown to light brownish gray gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are a few small areas of well drained Lowville soils that have a silty mantle. Also included are small very severely eroded areas. Also included are small areas of rock outcrops and small areas where large stones are on the surface.

The rate of water movement through this Nellis soil is moderate in the subsoil and moderately slow or moderate in the substratum. Runoff is medium or rapid. The capacity of the soil to store water available for plant growth is high. The surface layer is moderately acid to neutral.

Most areas of this soil are used for pasture. Some areas are used for crops or are small woodlots. Some areas are in urban use.

This soil is poorly suited to cultivated crops because of slope. Erosion is a serious hazard if slopes are bare of vegetation. Conservation tillage, crop rotation with long-term hay crops or sod, using cover crops, returning crop residue to the soil, and installing diversions help to control erosion, to maintain soil tilth and the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet or too dry. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of this soil for sugar maple is moderate. The main management concerns are the moderate erosion hazard and the equipment limitation, both because of slope. Careful management helps to control erosion during logging operations.

Slope is a limitation of this soil for most urban uses. Potential for habitat is good for woodland wildlife.

The capability subclass is IVe.

NmE—Nellis and Madrid soils, steep. This map unit consists of steep, very deep, well drained Nellis and Madrid soils mainly on the sides of hills and ridges on uplands. Areas range from 20 to 100 acres. Some areas are mostly Nellis soils, some are mostly Madrid soils, and some consist of both. Slope ranges from 25 to 50 percent.

The total acreage of the map unit is about 60 percent Nellis soils, 30 percent Madrid soils, and 10 percent other soils. These soils were mapped together because they are similar in use and management.

Typically, the surface layer of the Nellis soil is dark brown loam about 9 inches thick. The subsoil is dark yellowish brown loam to a depth of about 21 inches. The

substratum is brown to light brownish gray gravelly fine sandy loam to a depth of 60 inches or more.

Typically, the surface layer of the Madrid soil is grayish brown sandy loam about 8 inches thick. In the upper part the subsoil is brown sandy loam to dark brown fine sandy loam about 11 inches thick. In the lower part it is dark brown fine sandy loam about 6 inches thick. The substratum is dark brown, firm gravelly fine sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Lowville soils. Also included are small severely eroded areas. Also included are areas where few stones or boulders are on the surface and areas of rock outcrops.

The rate of water movement through the Nellis soil is moderate in the subsoil and moderately slow or slow in the substratum, and through the Madrid soil is moderate in the surface layer and the upper part of the subsoil, moderately slow or moderate in the lower part of the subsoil, and moderately slow in the substratum. Runoff is rapid. The capacity of these soils to store water available for plant growth is high. The surface layer is moderately acid to neutral in the Nellis soils and strongly acid to neutral in the Madrid soils.

Most areas of these soils are woodland or are reverting to brush. Some areas are in permanent pasture or are idle.

These soils are not suited to cultivated crops because of slope.

If used for pasture, these soils require a management program that minimizes overgrazing and restricts grazing when the soils are too dry or too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of these soils for sugar maple is moderate. The main management concerns are the moderate erosion hazard and the moderate equipment limitation, both because of slope. Careful management is needed to control erosion during logging operations.

Slope is a limitation of these soils for urban use. Potential for habitat is good for woodland wildlife.

The capability subclass is VIIe.

Nn—Newstead silt loam. This is a nearly level, moderately deep, somewhat poorly drained and poorly drained soil in long, narrow or large, irregularly shaped areas on uplands. Slope ranges from 0 to 3 percent, but is dominantly less than 2 percent. Areas range from 10 to 100 acres.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil is mottled and about 14 inches thick. It is grayish brown silt loam in the upper part and grayish brown gravelly loam in the lower part. The substratum is mottled, grayish brown gravelly sandy loam to a depth of 30 inches. Gray limestone bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of very deep, somewhat poorly drained and poorly drained Massena soils and very poorly drained and poorly drained Sun soils. Also included are small areas of somewhat excessively drained and excessively drained Benson soils and well drained and moderately well drained Galway soils on the drier parts of the landscape. Also included are small stony areas.

The seasonal high water table in this Newstead soil is commonly within 1/2 to 1 foot of the surface from December through May. The rate of water movement through the soil is moderate in the surface layer, the subsoil, and the substratum. Runoff is slow. The capacity of the soil to store water available for plant growth is moderate. The surface layer ranges from moderately acid to mildly alkaline.

Most areas of this soil are used for hay crops or pasture. Some areas are forest or are reverting to brush. This is a prime farmland soil, where drained.

This soil is moderately suited to cultivated crops. The seasonal high water table is the main limitation. Drainage is needed if the soil is used for cultivated crops. Using cover crops and returning crop residue and applying manure to the soil help to improve soil tilth in the surface layer and to maintain the content of organic matter.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for red maple is moderate. The seasonal high water table limits equipment use, causes high seedling mortality, and restricts rooting depth, resulting in uprooting of trees during windy periods.

The prolonged seasonal high water table, depth to bedrock, and potential frost action are limitations of this soil for urban uses. Potential for habitat is fair for wetland wildlife.

The capability subclass is IIIw.

NoA—Niagara silt loam, 0 to 3 percent slopes. This is a nearly level, very deep, somewhat poorly drained soil in smooth, broad, irregularly shaped areas on lowland plains. Areas range from 10 to 40 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is mottled, dark grayish brown silt loam about 4 inches thick. The subsoil is mottled and about 22 inches thick. It is brown to dark brown silt loam in the upper part and dark grayish brown silt loam in the lower part. The substratum is mottled, dark grayish brown to dark brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Collamer soils, poorly drained and very poorly drained Canandaigua soils, and, where bedrock is at a depth of 40 to 72 inches, Niagara soils.

Also included are small areas of moderately deep, poorly drained and very poorly drained Guffin soils in depressions.

The seasonal high water table in this Niagara soil is commonly within 1/2 to 1 1/2 feet of the surface from December through May. The rate of water movement through the soil is moderate in the surface layer and moderately slow in the subsoil and the substratum. Runoff is slow. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops. This is a prime farmland soil, where drained. Some areas are used as pasture or forest.

This soil is moderately suited to crops. The main limitation is the seasonal high water table. If the soil is properly managed, row crops can be grown intensively. Drainage is needed if the soil is used for cultivated crops. Conservation tillage, crop rotation, using winter cover crops, and returning crop residue and applying manure to the soil help to improve soil tilth, to maintain the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers.

Potential productivity of this soil for sugar maple is moderate. The seasonal high water table somewhat limits equipment use, causes moderate seedling mortality, and somewhat restricts rooting depth, resulting in uprooting of trees during windy periods.

The seasonal high water table, rate of water movement through the soil, and potential frost action are limitations of this soil for urban uses. Potential for habitat is good for openland and woodland wildlife.

The capability subclass is IIIw.

NoB—Niagara silt loam, 3 to 8 percent slopes. This is a gently sloping, very deep, somewhat poorly drained soil in concave, oblong areas on lowland plains. Areas range from 10 to 40 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is mottled, dark grayish brown silt loam about 4 inches thick. The subsoil is mottled and about 22 inches thick. It is brown to dark brown silt loam in the upper part and dark grayish brown silt loam in the lower part. The substratum is mottled, dark grayish brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Collamer soils, poorly drained and very poorly drained Canandaigua soils, and Niagara soils where bedrock is at a depth of 40 to 72 inches. Also included are small areas of moderately deep, poorly drained and very poorly drained Guffin soils in depressions.

The seasonal high water table in this Niagara soil is commonly within 1/2 to 1 1/2 feet of the surface from December through May. The rate of water movement through the soil is moderate in the surface layer and moderately slow in the subsoil and the substratum. Runoff is slow or medium. The capacity of the soil to store water available for plant growth is high. The surface layer is strongly acid to neutral.

Most areas of this soil have been cleared and are used for cultivated crops. This is a prime farmland soil, if drained. Some areas are used as pasture or forest.

This soil is moderately suited to cultivated crops. The main limitation is the seasonal high water table. If the soil is properly managed, row crops can be grown intensively. Drainage is needed if the soil is used for cultivated crops. Erosion is a moderate hazard if slopes are bare of vegetation. Conservation tillage, contour farming, crop rotation, using winter cover crops, and returning crop residue and applying manure to the soil help to control erosion, to improve soil tilth, to maintain the content of organic matter, and to conserve moisture needed for plant growth.

If used for pasture, this soil requires a management program that minimizes overgrazing and restricts grazing when the soil is too wet. Suitable management practices are proper stocking rates, pasture renovation, pasture reseeding, and application of lime and fertilizers. These practices help to control erosion.

Potential productivity of this soil for sugar maple is moderate. The seasonal high water table somewhat limits equipment use, causes moderate seedling mortality, and somewhat restricts rooting depth, resulting in uprooting of trees during windy periods.

The seasonal high water table, rate of water movement through the soil, and potential frost action are limitations of this soil for urban use. Potential for habitat is good for openland and woodland wildlife.

The capability subclass is IIIw.

NpB—Niagara silt loam, bedrock substratum, 2 to 6 percent slopes. This is a gently sloping, very deep, somewhat poorly drained soil in concave or undulating areas on lake plains. Areas range from 10 to 20 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is mottled, dark grayish brown silt loam about 4 inches thick. The subsoil is mottled and about 16 inches thick. It is brown to dark brown silt loam in the upper part and dark grayish brown silt loam in the lower part. The substratum is mottled, dark grayish brown silt loam to a depth of 48 inches. Bedrock is at a depth of 48 inches.

Included with this soil in mapping are small areas of moderately well drained Collamer soils and, where bedrock is at a depth of 40 to 72 inches, poorly drained and very poorly drained Canandaigua and Niagara soils.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
DcB, DcC, DcD----- Danley	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	High-----	High-----	Low.
DdA, DdB, DdC----- Darien	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Low.
DeB---------- Deerfield	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low------	High.
Dp*. Dumps												
ElA, ElB---------- Elmridge	C	None--------	---	---	1.5-3.0	Perched	Nov-May	>60	---	High-----	Moderate	Moderate.
Em---------- Ensley	B/D	None--------	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
En---------- Ensley	B/D	None--------	---	---	+1-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
FaB---------- Farmington	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	Moderate.
Fu*: Fluvaquents. Udifluvents.												
GaA, GaB---------- Galen	B	None--------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	Moderate	Moderate	Low.
GbB*: Galoo---------- Rock outcrop.	C/D	None--------	---	---	>6.0	---	---	2-10	Hard	Moderate	Low------	Low.
GcB*: Galoo---------- Rock outcrop.	C/D	None--------	---	---	>6.0	---	---	2-10	Hard	Moderate	Moderate	High.
GlA, GlB, GlC, GmC---------- Galway	B	None--------	---	---	1.5-3.0	Perched	Mar-Apr	20-40	Hard	Moderate	Low------	Low.
Gr---------- Granby	A/D	None--------	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	Moderate	High-----	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
NbF*:												
Nassau	C	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Manlius	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
NlA, NlB, NlC, NlD---------- Nellis	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Low.
NmE*:												
Nellis	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Low.
Madrid	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
Nn---------- Newstead	C	None	---	---	0.5-1.0	Perched	Dec-May	20-40	Hard	High	High	Low.
NoA, NoB---------- Niagara	C	None	---	---	0.5-1.5	Apparent	Dec-May	>60	---	High	High	Low.
NpB---------- Niagara	C	None	---	---	0.5-1.5	Apparent	Dec-May	40-60	Hard	High	High	Low.
Pa---------- Palms	A/D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Moderate.
PhA, PhB---------- Phelps	B	None	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High	Moderate	Low.
PkB*:												
Pinckney	C	None	---	---	1.5-2.0	Perched	Feb-May	>60	---	Moderate	Low	Moderate.
Ensley	B/D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	High	High	Low.
Pm*, Pn*. Pits												
PoB, PoC---------- Plainfield	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
PpD*:												
Plainfield	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Windsor	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Ps---------- Pootatuck	B	Frequent	Brief	Nov-Apr	1.5-2.5	Apparent	Nov-Apr	>60	---	Moderate	Moderate	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
BmC*, BmD*: Bice	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Pinckney	C	None	---	---	1.5-2.0	---	Feb-May	>60	---	Moderate	Low	Moderate.
BnA, BnB, BnC Blasdell	A	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
BoA, BoB Bombay	B	None	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
BpB, BpC Bonaparte	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Moderate.
Bt Boots	A/D	Occasional	Long	Nov-May	+1-1.0	Apparent	Nov-Aug	>60	---	High	Moderate	Low.
Ca, Cb Canandaigua	D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Low.
Cc Carbondale	A/D	None	---	---	+1-1.0	Apparent	Sep-May	>60	---	High	High	Moderate.
Cd Carlisle	A/D	None	---	---	+.5-1.0	Apparent	Sep-Jun	>60	---	High	High	Low.
ChB Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
CkC*, CkE*: Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Rock outcrop.												
ClA, ClB Chaumont	D	None	---	---	0.5-1.5	Perched	Dec-May	20-40	Hard	High	High	Low.
CmA, CmB Claverack	C	None	---	---	1.5-2.0	Perched	Nov-May	>60	---	Moderate	Low	Moderate.
CnB, CnC, CnC3 Collamer	C	None	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High	Moderate	Low.
CoB Collamer	C	None	---	---	1.5-2.0	Apparent	Mar-May	40-60	Hard	High	Moderate	Low.
Cp Covington	D	None	---	---	0.5-1.0	Apparent	Oct-May	>60	---	Moderate	High	Moderate.

See footnote at end of table.

Soil Map—Jefferson County, New York
(IVES HILL RETIREMENT - PHASE III)

USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:2,940 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson County, New York
Survey Area Data: Version 7, Feb 5, 2010

Date(s) aerial images were photographed: 7/30/2006

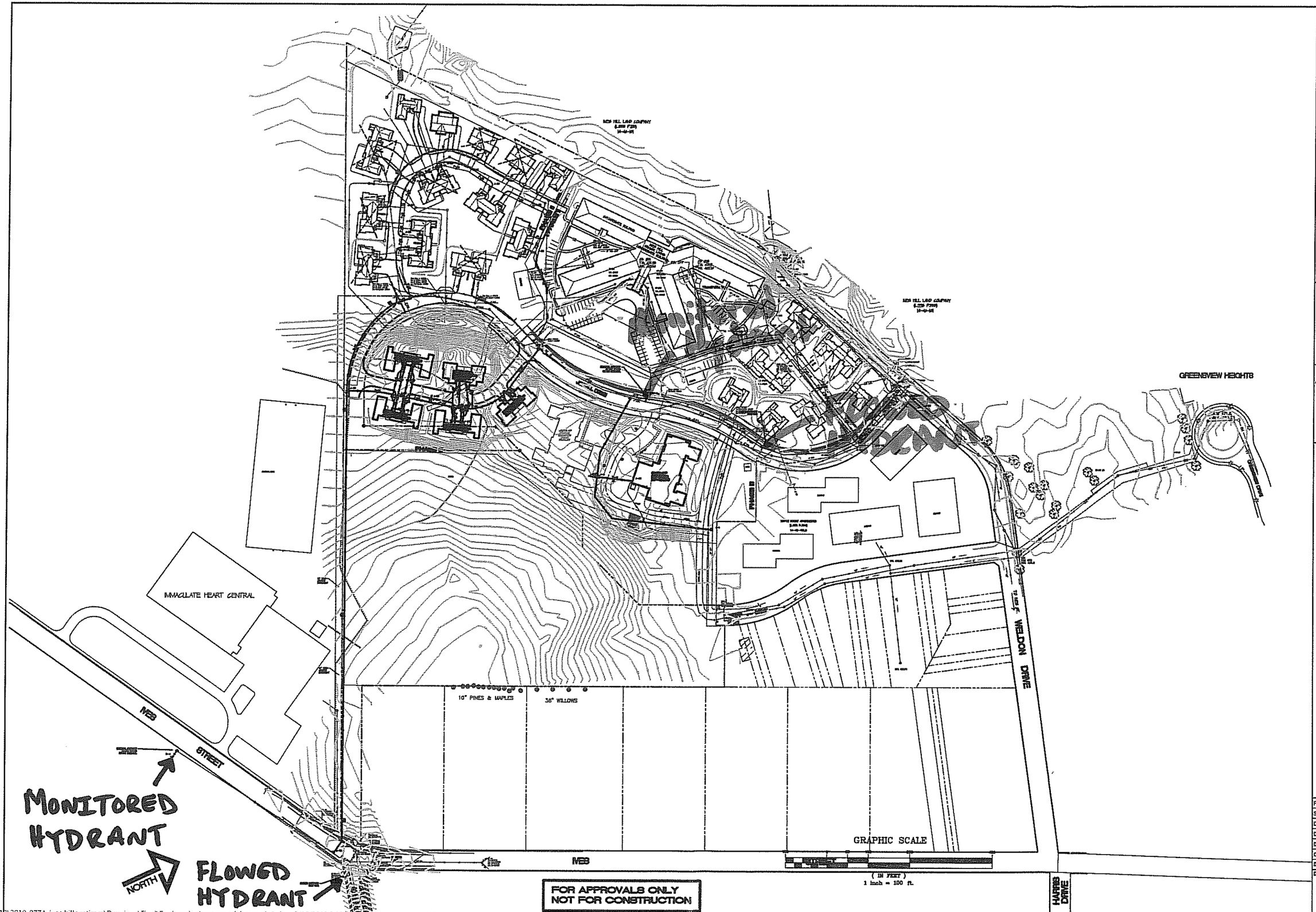
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Jefferson County, New York (NY045)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CnB	Collamer silt loam, 3 to 8 percent slopes	0.8	12.2%
CnC	Collamer silt loam, 8 to 15 percent slopes	1.4	20.4%
GlA	Galway silt loam, 0 to 3 percent slopes	0.4	5.9%
NlC	Nellis loam, 8 to 15 percent slopes	4.2	61.5%
NoA	Niagara silt loam, 0 to 3 percent slopes	0.0	0.0%
Totals for Area of Interest		**6.8**	**100.0%**

APPENDIX #2

CIVIL PLANS



ARCHITECTURE, ENGINEERING & LAND SURVEYING P.C.
GYMO
520 STERLING STREET
WATERTOWN, NEW YORK, 13601
TEL (315) 788-8500
FAX (315) 788-0668
www.gymopc.com

HYDRAULIC ANALYSIS

IVES HILL-PHASE III
IVES HILL - JEWELL DRIVE
CITY OF WATERTOWN, NY

Project No:	2010-077
Scale:	As Noted
Date:	8/18/10
Drawn By:	BJD
Designed By:	BJD
Checked By:	
Date Issued:	8/23/10
Drwg. No.	A

APPENDIX #3

FLOW TEST DATA
HYDRAULIC CALCULATIONS

IVES HILL ENRICHED LIVING FACILITY 7/14/10 2010-077

FLOW TEST ANALYSIS

$$Q_o = Q_t \left(\frac{P_s - P_o}{P_s - P_t} \right)^{0.54}$$

Q_o = flow at pressure P_o (gpm)
Q_t = hydrant test flow (gpm)
P_s = static pressure during test (psi)
P_o = Pressure at which Q_o is to be calculated (psi)
P_t = residual pressure during test (psi)

Q_t = 1120 gpm
P_s = 69 psi
P_o = 20 psi
P_t = 53 psi

$$Q_o = 1120 \left(\frac{69 - 20}{69 - 53} \right)^{0.54} = 2049.74 \text{ gpm}$$

head (ft)	flow (gpm)
159.39 (69 psi)	0 gpm
122.43 (53 psi)	1120 gpm
46.20 (20 psi)	2050 gpm

WATER COMPANY

FLOW TEST REPORT

G·Y·M·O
ARCHITECTURE, ENGINEERING & LAND SURVEYING,P.C.
220 Sterling Street, Watertown, New York 13601
tel.315.788.3900 fax.315.788.0668 e-mail. gymopc@gymopc.com

LOCATION: Ives Hill Enriched Living Facility DATE: 7/14/10

TEST MADE BY: THK/BJD (GYMO, PC) TIME: 9:00 am

REPRESENTATIVE OF: GYMO, PC.

WITNESS: City Water Dept.

PURPOSE OF TEST: Flow characteristics in project area

CONSUMPTION RATE DURING TEST: 1120 gpm

IF PUMPS AFFECT TEST, INDICATE PUMPS OPERATING: NA

FLOW HYDRANTS:

	A1	A2	A3	TOTAL
SIZE NOZZLE				
PITOT READING				
GPM				

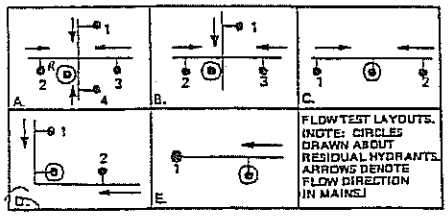
STATIC B: 69 PSI RESIDUAL B: 53 PSI

PROJECTED RESULTS: @ 20 PSI RESIDUAL 2050 GPM; OR @ _____ PSI RESIDUAL _____ GPM

REMARKS: _____

LOCATION MAP: SHOW LINE SIZES AND DISTANCE TO NEXT CROSS CONNECTED LINE. SHOW VALVES AND HYDRANT BRANCH SIZE. INDICATE NORTH, SHOW FLOWING HYDRANTS – LABEL A1, A2, A3. SHOW LOCATION OF STATIC AND RESIDUAL – LABEL B.

INDICATE B HYDRANT_____ SPRINKLER_____ OTHER (IDENTIFY)_____

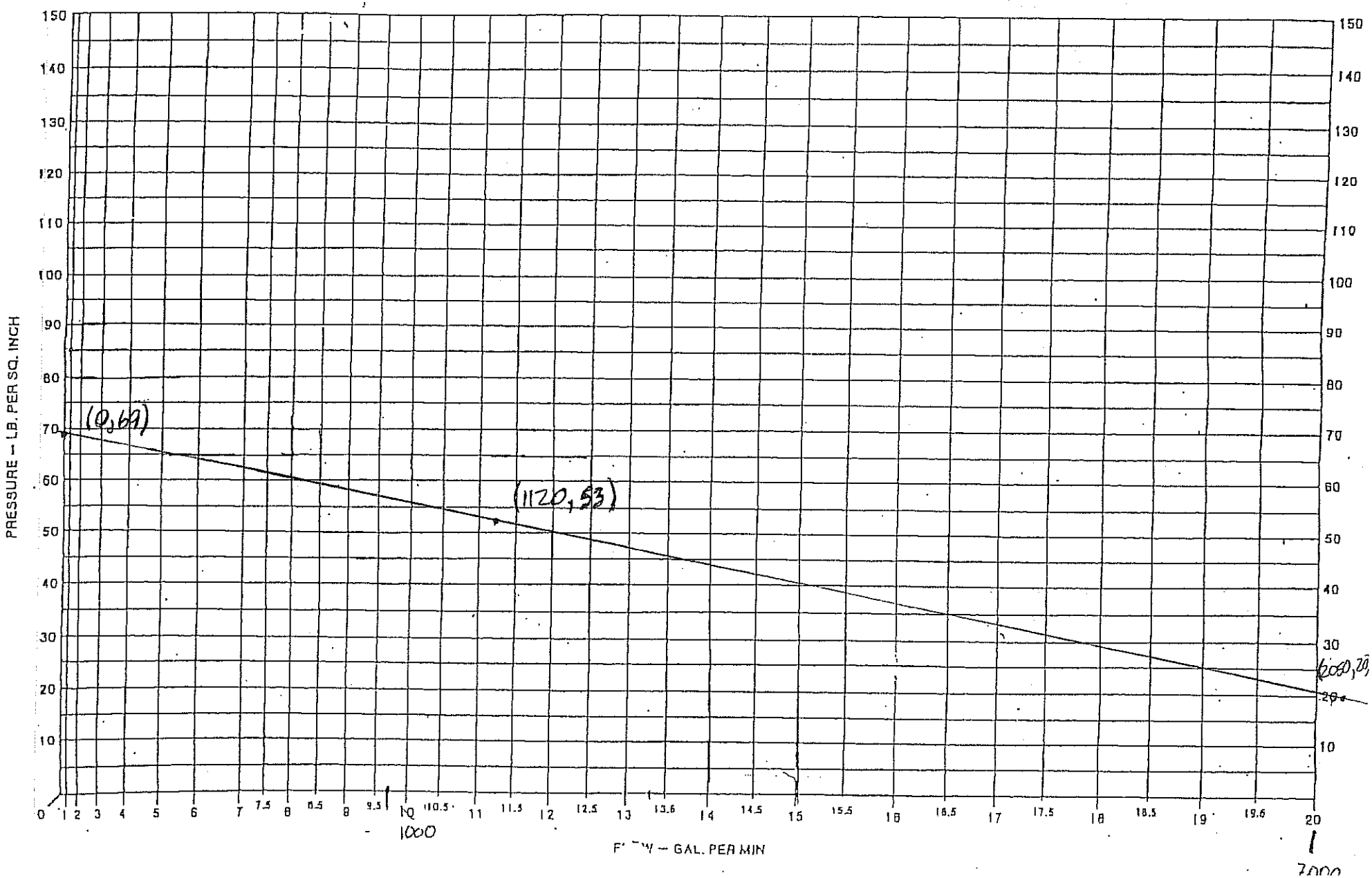


LAYOUT OF TEST. AFTER THE LOCATION AT WHICH THE TEST IS TO BE RUN HAS BEEN DETERMINED, A GROUP OF TEST HYDRANTS IN THE VICINITY IS SELECTED. ONCE SELECTED, DUE CONSIDERATION SHOULD BE GIVEN TO POTENTIAL INTERFERENCE TO TRAFFIC FLOW PATTERNS, DAMAGE TO SURROUNDINGS (E.G., ROADWAYS, SIDEWALKS, LANDSCAPES, VEHICLES, AND PEDESTRIANS), AND POTENTIAL FLOODING PROBLEMS BOTH LOCAL AND REMOTE FROM THE TEST SITE. ONE HYDRANT IS CHOSEN TO BE THE RESIDUAL HYDRANT AT WHICH THE NORMAL PRESSURE WILL BE OBSERVED WITH THE OTHER HYDRANTS IN THE GROUP CLOSED, AND THE RESIDUAL PRESSURE WILL BE OBSERVED WITH THE OTHER HYDRANTS FLOWING. THIS HYDRANT IS CHOSEN SO THAT THE HYDRANTS WHICH WILL BE FLOWED ARE THE NEXT HYDRANTS BETWEEN IT AND THE LARGER MAINS, WHICH CONSTITUTE THE IMMEDIATE SOURCES OF SUPPLY IN THE AREA.
THE NUMBER OF HYDRANTS TO BE USED IN ANY TEST DEPENDS UPON THE STRENGTH OF THE DISTRIBUTION SYSTEM IN THE VICINITY OF THE TEST LOCATION. TO OBTAIN SATISFACTORY TEST RESULTS FOR THEORETICAL CALCULATION OF EXPECTED FLOWS OR RATED CAPACITIES, SUFFICIENT DISCHARGE SHOULD BE ACHIEVED TO CAUSE A DROP IN PRESSURE AT THE RESIDUAL HYDRANT OF AT LEAST 25 PERCENT OR TO FLOW THE TOTAL DEMAND NECESSARY FOR FIRE FIGHTING PURPOSES. IF THE MAINS ARE SMALL AND THE SYSTEM ID WEAK, ONLY ONE OR TWO HYDRANTS NEED TO BE FLOWED. IF, ON THE OTHER HAND, THE MAINS ARE LARGE AND THE SYSTEM IS STRONG, IT MAY BE NECESSARY TO FLOW AS MANY AS SEVEN OR EIGHT HYDRANTS.

Gozalkowski, Yaussi, Moncriel & Olley
ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.

HYDRANT FLOW DATA SUMMARY

City Watertown State NY Zip 13601 ~~Witnessed~~ PERFORMED by BJD, THP, City Water Dept Date 7/14/2010,



FLOW TEST ANALYSIS - IVES & BARBEAU

$$Q_o = Q_t \left(\frac{P_s - P_o}{P_s - P_t} \right)^{0.54}$$

Q_o = flow at pressure P_o (gpm)

Q_t = hydrant test flow (gpm)

P_s = static pressure during test (psi)

P_o = Pressure at which Q_o is to be calculated (psi)

P_t = residual pressure during test (psi)

Q_t = 1075 gpm

P_s = 65 psi

P_o = 20 psi

P_t = 50 psi

$$Q_o = 1075 \left(\frac{65 - 20}{65 - 50} \right)^{0.54}$$

$$= 1945.60 \text{ gpm}$$

head (ft)	flow (gpm)
150.15' (65 psi)	0 gpm
115.50' (50 psi)	1075 gpm
46.20' (20 psi)	1946 gpm

9

WATER COMPANY

FLOW TEST REPORT

G·Y·M·O
ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.
220 Sterling Street, Watertown, New York 13601
tel.315.788.3900 fax.315.788.0668 e-mail, gymopc@gymopc.com

LOCATION: IVES HILL - BARBEN & IVES ST. DATE: 8/9/10

TEST MADE BY: THR TIME: 10 AM

REPRESENTATIVE OF: GYMOPC

WITNESS: DAVE OBRIEN, CITY DPW

PURPOSE OF TEST: DETERMINE CHARACTERISTICS OF @ 8" WATER NEAR IVES HILL COMMUNITY

CONSUMPTION RATE DURING TEST: 1075 gpm

IF PUMPS AFFECT TEST, INDICATE PUMPS OPERATING:

FLOW HYDRANTS:

	A1	A2	A3	TOTAL
SIZE NOZZLE				
PITOT READING				
GPM				

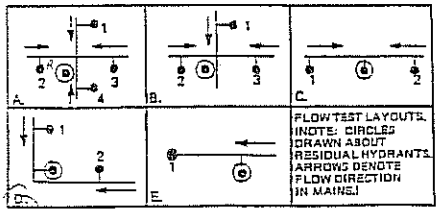
STATIC B: ~~64~~ 65 PSI RESIDUAL B: 50 PSI

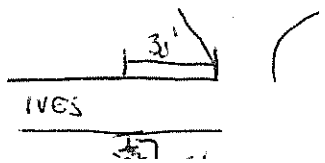
PROJECTED RESULTS: @ 20 PSI RESIDUAL _____ GPM; OR @ _____ PSI RESIDUAL _____ GPM

REMARKS: DISTANCE BTW HYDRANTS: 475 FT (30' PAST IHC DRIVEWAY)
FLOWED BARDEN, MONITOR IVES ST (1+1C)

LOCATION MAP: SHOW LINE SIZES AND DISTANCE TO NEXT CROSS CONNECTED LINE. SHOW VALVES AND HYDRANT BRANCH SIZE. INDICATE NORTH, SHOW FLOWING HYDRANTS – LABEL A1, A2, A3. SHOW LOCATION OF STATIC AND RESIDUAL – LABEL B.

INDICATE B HYDRANT_____ SPRINKLER_____ OTHER (IDENTIFY)_____





LAYOUT OF TEST. AFTER THE LOCATION AT WHICH THE TEST IS TO BE RUN HAS BEEN DETERMINED, A GROUP OF TEST HYDRANTS IN THE VICINITY IS SELECTED. ONCE SELECTED, DUE CONSIDERATION SHOULD BE GIVEN TO POTENTIAL INTERFERENCE TO TRAFFIC FLOW PATTERNS, DAMAGE TO SURROUNDINGS (E.G., ROADWAYS, SIDEWALKS, LANDSCAPES, VEHICLES, AND PEDESTRIANS), AND POTENTIAL FLOODING PROBLEMS BOTH LOCAL AND REMOTE FROM THE TEST SITE. ONE HYDRANT IS CHOSEN TO BE THE RESIDUAL HYDRANT AT WHICH THE NORMAL PRESSURE WILL BE OBSERVED WITH THE OTHER HYDRANTS IN THE GROUP CLOSED, AND THE RESIDUAL PRESSURE WILL BE OBSERVED WITH THE OTHER HYDRANTS FLOWING. THIS HYDRANT IS CHOSEN SO THAT THE HYDRANTS WHICH WILL BE FLOWED ARE THE NEXT HYDRANTS BETWEEN IT AND THE LARGER MAINS, WHICH CONSTITUTE THE IMMEDIATE SOURCES OF SUPPLY IN THE AREA.
THE NUMBER OF HYDRANTS TO BE USED IN ANY TEST DEPENDS UPON THE STRENGTH OF THE DISTRIBUTION SYSTEM IN THE VICINITY OF THE TEST LOCATION. TO OBTAIN SATISFACTORY TEST RESULTS FOR THEORETICAL CALCULATION OF EXPECTED FLOWS OR RATED CAPACITIES, SUFFICIENT DISCHARGE SHOULD BE ACHIEVED TO CAUSE A DROP IN PRESSURE AT THE RESIDUAL HYDRANT OF AT LEAST 25 PERCENT OR TO FLOW THE TOTAL DEMAND NECESSARY FOR FIRE FIGHTING PURPOSES. IF THE MAINS ARE SMALL AND THE SYSTEM ID WEAK, ONLY ONE OR TWO HYDRANTS NEED TO BE FLOWED. IF, ON THE OTHER HAND, THE MAINS ARE LARGE AND THE SYSTEM IS STRONG, IT MAY BE NECESSARY TO FLOW AS MANY AS SEVEN OR EIGHT HYDRANTS.

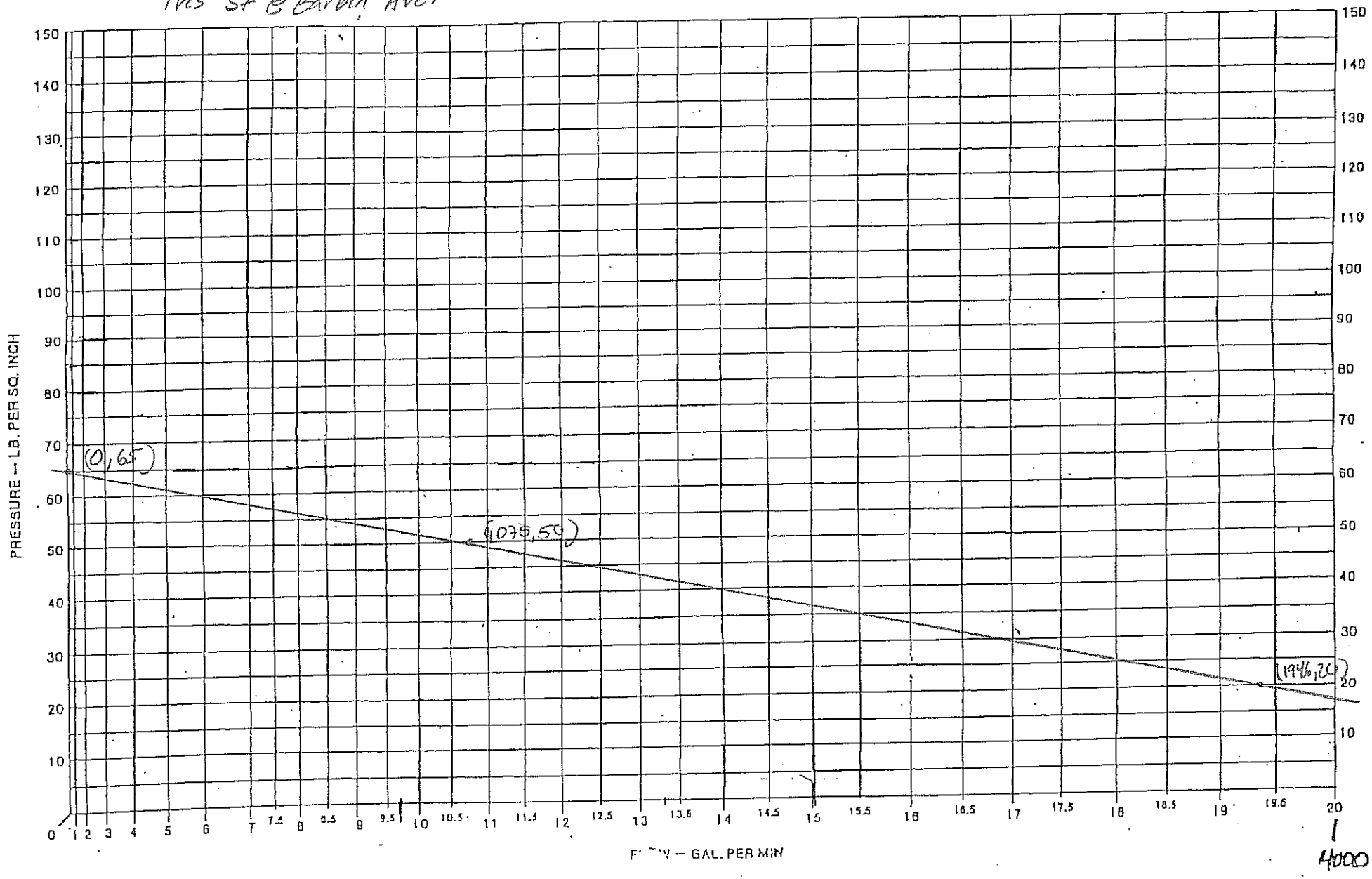
475' TO HYDRANT ON BARDEN

Gozalkowski, Yaussi, Moncrief & Olley
ARCHITECTURE, ENGINEERING & LAND SURVEYING, P.C.

HYDRANT FLOW DATA SUMMARY

City Watertown State NY Zip ____ ~~Witnessed~~ PERFORMED by THR, City Water Dpt. Date 8/9/10 10 am

Ives St @ Barbin Ave.



Scenario: Base
Current Time Step: 0.000 Hr
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
30	J-1	476.50	<None>	<Collection: 1 item>	0	571.32	41.0
32	J-2	476.00	<None>	<Collection: 0 items>	0	570.70	41.0
34	J-3	479.00	<None>	<Collection: 0 items>	0	561.34	35.6
36	J-4	479.50	<None>	<Collection: 0 items>	0	566.44	37.6
39	J-5	476.00	<None>	<Collection: 0 items>	0	570.21	40.8
44	J-7	473.00	<None>	<Collection: 0 items>	0	572.83	43.2
46	J-8	471.00	<None>	<Collection: 0 items>	0	571.78	43.6
48	J-9	471.00	<None>	<Collection: 0 items>	0	571.62	43.5
50	J-10	471.00	<None>	<Collection: 0 items>	0	571.60	43.5
56	J-13	470.20	<None>	<Collection: 0 items>	0	571.29	43.7
58	J-14	471.50	<None>	<Collection: 0 items>	0	571.07	43.1
60	J-15	471.50	<None>	<Collection: 0 items>	0	571.05	43.1
62	J-16	471.00	<None>	<Collection: 0 items>	0	570.93	43.2
64	J-17	471.80	<None>	<Collection: 0 items>	0	570.70	42.8
66	J-18	475.50	<None>	<Collection: 0 items>	0	569.95	40.9
70	J-19	470.00	<None>	<Collection: 0 items>	0	570.70	43.6
72	J-20	469.50	<None>	<Collection: 0 items>	0	570.70	43.8
74	J-21	469.50	<None>	<Collection: 0 items>	0	570.70	43.8
76	J-22	469.50	<None>	<Collection: 0 items>	0	570.70	43.8
78	J-23	473.00	<None>	<Collection: 0 items>	0	571.78	42.7
80	J-24	472.50	<None>	<Collection: 0 items>	0	572.99	43.5
82	J-25	472.00	<None>	<Collection: 0 items>	0	573.02	43.7
84	J-26	470.50	<None>	<Collection: 0 items>	0	573.11	44.4
86	J-27	469.90	<None>	<Collection: 0 items>	0	573.21	44.7
88	J-28	468.50	<None>	<Collection: 0 items>	0	573.26	45.3
90	J-29	468.00	<None>	<Collection: 0 items>	0	573.32	45.6
92	J-30	468.00	<None>	<Collection: 0 items>	0	573.33	45.6
94	J-31	468.00	<None>	<Collection: 0 items>	0	573.34	45.6
96	J-32	468.20	<None>	<Collection: 0 items>	0	573.37	45.5
98	J-33	468.00	<None>	<Collection: 0 items>	0	573.38	45.6
101	J-35	467.90	<None>	<Collection: 0 items>	0	573.40	45.6
103	J-36	468.10	<None>	<Collection: 0 items>	0	573.45	45.6
105	J-37	469.00	<None>	<Collection: 0 items>	0	573.49	45.2
107	J-38	469.30	<None>	<Collection: 0 items>	0	573.51	45.1
109	J-39	470.00	<None>	<Collection: 0 items>	0	573.54	44.8
111	J-40	470.10	<None>	<Collection: 0 items>	0	573.55	44.8
113	J-41	470.80	<None>	<Collection: 0 items>	0	573.57	44.5
119	J-43	480.75	<None>	<Collection: 2 items>	2,474	527.10	20.1 ← E.L.F.
121	J-44	480.75	<None>	<Collection: 1 item>	4	561.34	34.9
124	J-45	474.00	<None>	<Collection: 0 items>	0	572.86	42.8
132	J-49	474.00	<None>	<Collection: 0 items>	0	572.84	42.8
135	J-50	478.50	<None>	<Collection: 0 items>	0	573.44	41.1
137	J-51	479.00	<None>	<Collection: 1 item>	0	573.44	40.9
139	J-52	482.20	<None>	<Collection: 0 items>	0	573.89	39.7
141	J-53	482.20	<None>	<Collection: 0 items>	0	573.97	39.7
143	J-54	482.20	<None>	<Collection: 0 items>	0	573.99	39.7
145	J-55	482.40	<None>	<Collection: 0 items>	0	574.04	39.6
147	J-56	483.40	<None>	<Collection: 0 items>	0	574.32	39.3
149	J-57	484.50	<None>	<Collection: 0 items>	0	574.61	39.0
151	J-58	484.50	<None>	<Collection: 0 items>	0	574.68	39.0
153	J-59	483.50	<None>	<Collection: 0 items>	0	575.24	39.7
155	J-60	472.00	<None>	<Collection: 0 items>	0	573.93	44.1
157	J-61	471.00	<None>	<Collection: 0 items>	0	573.65	44.4
163	J-63	485.00	<None>	<Collection: 1 item>	0	574.66	38.8
167	J-64	485.00	<None>	<Collection: 1 item>	0	574.59	38.8
173	J-66	485.00	<None>	<Collection: 1 item>	0	574.60	38.8

175	J-67	483.60	<None>	<Collection: 2 items>	0	574.32	39.3
177	J-68	483.00	<None>	<Collection: 1 item>	0	574.04	39.4
179	J-69	483.00	<None>	<Collection: 1 item>	0	573.96	39.4
181	J-70	483.00	<None>	<Collection: 1 item>	0	573.98	39.4
183	J-71	483.00	<None>	<Collection: 1 item>	0	573.88	39.3
185	J-72	478.75	<None>	<Collection: 0 items>	0	573.49	41.0
188	J-73	479.00	<None>	<Collection: 1 item>	0	573.49	40.9
190	J-74	485.00	<None>	<Collection: 1 item>	0	574.67	38.8
197	J-78	492.50	<None>	<Collection: 0 items>	0	595.45	44.5

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Scenario: Base
Current Time Step: 0.000 Hr
FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)	Has Us Define Length
29	P-1	14.08	R-3	PMP-1	42.0	Ductile Iron	130.0	False	0.000	1,495	0.35	0.000	True
31	P-2	15.26	PMP-1	J-1	42.0	Ductile Iron	130.0	False	0.000	1,495	0.35	0.000	True
33	P-3	37.17	J-1	J-2	8.0	Ductile Iron	130.0	False	0.000	954	6.09	0.017	False
35	P-4	212.72	J-2	J-3	8.0	Ductile Iron	130.0	False	0.000	1,608	10.26	0.044	False
37	P-5	361.69	J-3	J-4	8.0	Ductile Iron	130.0	False	0.000	-870	5.56	0.014	False
41	P-8	189.22	J-5	J-1	8.0	Ductile Iron	130.0	False	0.000	-541	3.45	0.006	False
45	P-10	57.79	J-45	J-7	8.0	Ductile Iron	130.0	False	0.000	135	0.86	0.000	False
47	P-11	450.29	J-7	J-8	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
49	P-12	68.82	J-8	J-9	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
51	P-13	10.68	J-9	J-10	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
57	P-16	132.84	J-10	J-13	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
59	P-17	93.47	J-13	J-14	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
61	P-18	6.38	J-14	J-15	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
63	P-19	51.77	J-15	J-16	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
65	P-20	99.38	J-16	J-17	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
67	P-21	248.13	J-4	J-18	8.0	Ductile Iron	130.0	False	0.000	-870	5.56	0.014	False
68	P-22	45.16	J-18	J-5	8.0	Ductile Iron	130.0	False	0.000	-541	3.45	0.006	False
69	P-23	320.66	J-17	J-18	8.0	Ductile Iron	130.0	False	0.000	329	2.10	0.002	False
71	P-24	127.53	J-17	J-19	8.0	Ductile Iron	130.0	False	0.000	0	0.00	0.000	False
73	P-25	28.08	J-19	J-20	8.0	Ductile Iron	130.0	False	0.000	0	0.00	0.000	False
75	P-26	70.11	J-20	J-21	8.0	Ductile Iron	130.0	False	0.000	0	0.00	0.000	False
77	P-27	19.10	J-20	J-22	8.0	Ductile Iron	130.0	False	0.000	0	0.00	0.000	False
79	P-28	210.33	J-8	J-23	4.0	Ductile Iron	130.0	False	0.000	0	0.00	0.000	False
81	P-29	175.03	J-7	J-24	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
83	P-30	39.67	J-24	J-25	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
85	P-31	96.04	J-25	J-26	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
87	P-32	113.47	J-26	J-27	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
89	P-33	61.85	J-27	J-28	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
91	P-34	64.60	J-28	J-29	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
93	P-35	17.26	J-29	J-30	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
95	P-36	8.67	J-30	J-31	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
97	P-37	30.00	J-31	J-32	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
99	P-38	18.82	J-32	J-33	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
104	P-40	63.35	J-35	J-36	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
106	P-41	38.67	J-36	J-37	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
108	P-42	26.80	J-37	J-38	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
110	P-43	36.00	J-38	J-39	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
112	P-44	7.35	J-39	J-40	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
114	P-45	20.48	J-40	J-41	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
120	P-48	86.21	J-3	J-43	6.0	Ductile Iron	130.0	True	0.000	2,474	28.08	0.397	False
122	P-49	20.00	J-3	J-44	6.0	Ductile Iron	130.0	True	0.000	4	0.05	0.000	False
123	P-50	14.86	J-35	J-33	8.0	Ductile Iron	130.0	False	0.000	195	1.24	0.001	False
133	P-55	257.15	J-2	J-49	8.0	Ductile Iron	130.0	False	0.000	-654	4.18	0.008	False
134	P-56	19.89	J-49	J-45	8.0	Ductile Iron	130.0	False	0.000	-188	1.20	0.001	False
136	P-57	134.10	J-49	J-50	8.0	Ductile Iron	130.0	False	0.000	-467	2.98	0.004	False
138	P-58	21.63	J-50	J-51	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
142	P-60	17.90	J-52	J-53	8.0	Ductile Iron	130.0	False	0.000	-468	2.98	0.004	False
144	P-61	6.00	J-53	J-54	8.0	Ductile Iron	130.0	False	0.000	-468	2.99	0.004	False
146	P-62	10.51	J-54	J-55	8.0	Ductile Iron	130.0	False	0.000	-468	2.99	0.004	False
148	P-63	62.06	J-55	J-56	8.0	Ductile Iron	130.0	False	0.000	-469	2.99	0.004	False
150	P-64	63.73	J-56	J-57	8.0	Ductile Iron	130.0	False	0.000	-469	2.99	0.004	False
152	P-65	15.49	J-57	J-58	8.0	Ductile Iron	130.0	False	0.000	-469	3.00	0.004	False
154	P-66	124.18	J-58	J-59	8.0	Ductile Iron	130.0	False	0.000	-470	3.00	0.005	False
156	P-67	243.12	J-59	J-60	8.0	Ductile Iron	130.0	False	0.000	517	3.30	0.005	False
158	P-68	94.75	J-41	J-61	8.0	Ductile Iron	130.0	False	0.000	-195	1.24	0.001	False
159	P-69	352.98	J-61	J-45	8.0	Ductile Iron	130.0	False	0.000	323	2.06	0.002	False
160	P-70	51.08	J-60	J-61	8.0	Ductile Iron	130.0	False	0.000	517	3.30	0.005	False
164	P-72	83.05	J-58	J-63	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
168	P-75	83.19	J-64	J-57	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
174	P-79	39.61	J-57	J-66	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
176	P-80	8.25	J-56	J-67	6.0	Ductile Iron	130.0	False	0.000	0	0.00	0.000	False
178	P-81	40.30	J-68	J-55	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
180	P-82	38.09	J-53	J-69	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
182	P-83	64.93	J-70	J-54	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
184	P-84	64.84	J-52	J-71	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
187	P-86	88.57	J-72	J-52	8.0	Ductile Iron	130.0	False	0.000	-467	2.98	0.004	False
189	P-87	20.40	J-72	J-73	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
191	P-88	37.55	J-58	J-74	1.0	Copper	135.0	False	0.000	0	0.14	0.000	False
193	P-89	12.06	J-72	J-50	8.0	Ductile Iron	130.0	False	0.000	467	2.98	0.004	False
201	P-92	18.62	R-4	PMP-2	42.0	Ductile Iron	130.0	False	0.000	987	0.23	0.000	True
202	P-93	454.33	PMP-2	J-78	8.0	Ductile Iron	130.0	False	0.000	987	6.30	0.018	False
205	P-95	1,133.08	J-59	J-78	8.0	Ductile Iron	130.0	False	0.000	-987	6.30	0.018	False

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Scenario: Base
Current Time Step: 0.000 Hr
FlexTable: Pump Table

ID	Label	Elevation (ft)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
28	PMP-1	475.00	Pump Definition - 1	On	475.00	571.32	1,495	96.32
199	PMP-2	483.00	Pump Definition - 2	On	483.00	603.55	987	120.55

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APPENDIX #4

SANITARY SEWER PUMPING STATION CALCULATIONS

- ORIGINAL PHASE I CALCULATIONS/DESIGN
- UPDATED PUMP STATION CALCULATIONS

ORIGINAL PUMP STATION CALCS

97-036 (1)
PJScordo
[redacted] 9/18/97

IVES PUMPING STATIONS DESIGN

NOTES: MIN 2 F/S, goal 4-5 F/S, < 15 cycles/hr, No run time concern per ITT Representative, Goal for < 20 MINS IN wet wel

FLOWS: IVES

Pumping Sta. #1 = Ph. I + II + III + Priests

1BR Apt. = 85 gpd 2BR Apt = 125 gpd

Phase I = 32 sing. B.R. + 24 Dbl. B.R.

= 32 (85) + 24(125) = 5720 say 6000gpd

Phase II = — 24(125) = 3000 gpd

Phase III = 32(85) + 64 (125) = 10,720 gpd

Priests = 10 Apts @ 300 = 3000 gpd

Pumping Sta. #1 = I + II + III + Priests

= 6000 + 3000 + 10720 + 3000 = 22720 gpd

= 16 gpm

Peak = 4. Avg. = 4. 16 = **64 gpm**

12/11/97: Initially only see conn = 32(85) + 12(125) = 4220 = 3 gpm peak = 12 gpm

Pumping Sta. #2 = II + Part III + Priests

= 3000 + 20 Dupl. · 2(125) + 3000 = 11000 gpd

= 7.6 gpm

Peak = 4. Avg = 4. 7.6 = **31 gpm**

LOSSES:

Pumping Sta. #1

Static:

Low Level = 459.5 to ex. MH. El. 473.0 = 13.5'

Dynamic:

580' to Weldon / Kieff MH

Bends / Fittings = IN: CV, GV, 3(90°), (2) 45° See Flyght pg 12-3

$19.8 + 1.6 + 3(7.7) + 2(3.6) = 52'$ (L. Swp.)

OUT: 3(45°), 1(T)

$3(3.6) + 1(15.5) = 26'$

Equiv. Length = 580' + 52' + 26' = **Say 660'**

Pumping Sta. #2

Static:

Low Level = 457.75 to new MH 472.2 = 14.5 **Say 15'**

Dynamic

1120' to New SN MH 12

Bends / Fittings = IN: 52' (Like PS #1)

OUT: 5(45°) (L. Swp), 3(22 1/2°) → not listed use ± 45°, 1(T)

$5(3.6) + 3(3.6)\frac{1}{2} = 24'$

Equiv. Length = 1120' + 52' + 24' = **Say 1200'**

TOTAL LOSSES

VEL	FLOW	STATIC		DYNAMIC		TOH	
	—	P.S. #1	P.S. #2	P.S #1	P.S. #2	P.S. #1	P.S. #
	10	13'	15'	660' ·	1200' ·		
	20			·	·		
1.4	30			·0.3 = 2	·0.3 = 4	15	19
1.8	40			·0.5 = 3.3	·0.5 = 6	17	21
2.0	50			·0.7 = 5	·0.7 = 9	18	24
2.7	60			·1.0 = 7	·1.0 = 12	20	27
2.9	64			·1.1 = 8	·1.1 = 13	21	28
3.2	70			·1.3 = 9	·1.3 = 16	22	31
3.6	80			·1.7 = 12	·1.7 = 21	25	36
4.1	90			·2.1 = 14	·2.1 = 25	27	40
4.5	100			·2.6 = 17	·2.6 = 31	30	46
5.7	125			·4.0 = 26	·4.0 = 48	39	63
				↑			
				Loss per 100'			

See Pump charts for Plot of Q vs. TOH for P.S. #1 & P.S. #2

less than 15 cycles/hr.

- < 20 mins in wet well

PUMP TIMES / RATES / CYCLES

Pumping Station #1 : Pumps at 86 gpm @ 25' TDH

Pipe Volume = 213 galls

6'ø MH Vol. = $1' \cdot \frac{6^2}{2} \cdot \pi$ = 212 galls

Avg

Qin = 16 gpm

@1' Fill = $\frac{212}{16}$ = 13 mins

Pump = $\frac{212}{86-16}$ = 3 mins

16 mins cycle time

= 3.75 /hr. OK ✓

Peak

Qin = 64 gpm

@1' Fill = $\frac{212}{64}$ = 3 mins.

Pump = $\frac{212}{86-64}$ = 12 mins

15 mins cycle time

= 4/hr. OK ✓

★ Look @ congregate only

Qin = 3 gpm

@1' Fill = $\frac{212}{3}$ = 71 mins. Too much! Try

@.5' Fill = $\frac{106}{3}$ = 35 mins. Too much

REVISE @.25' Fill = $\frac{53}{3}$ = 17 mins | Pump = $\frac{53}{86-3}$ = .64 = 18 mins. OK

CUMENTS

Qin = 12 gpm

@.25' Fill = $\frac{53}{12}$ = 5 mins

Pump = $\frac{53}{86-12}$ = 1

6 mins = 10/hr. OK ✓

Pumping Station #2 : Pumps at 68 gpm @ 30' TDH

Pipe Volume =

6'ø MH Vol. = $0.75' \cdot \left(\frac{6}{2}\right)^2 \cdot \pi$ = 160 galls

Avg

Qin = 7.6 gpm

@.75' Fill = $\frac{160}{7.6}$ = 21 mins

Pump = $\frac{160}{68-7.6}$ = 3 mins

24 mins cycle time ✓

= 2.5/hr. OK ✓

Peak

Qin = 31 gpm

@.25' Fill = $\frac{160}{31}$ = 5 mins

Pump = $\frac{160}{68-31}$ = 5 mins

10 mins cycle time ✓

= 6/hr. OK

Force Main

Max Pressure = For PS 1 + 2 = Say 40'

$\frac{40'}{2.3}$ = 17 psi

3" is only DR 17 = 100 psi OK

UPDATED PUMP STATION CALCS BJD 7/19/10

P.S. PHASE I

FLOW = PHASE I + PHASE II + (2) E.L.F. BUILDS + PRIESTS + DUPLEXES

= 6000 gpd + 3000 gpd + 3060 gpd + 3000 gpd + 12.50 gpd = 16,310 gpd

= 11.33 gpm

Peak = 4 · Avg = 4 · 11.33 = 45.32 gpm

P.S. pumps at 86 gpm @ 25' TDH, 6' DMH Vol = 212 gals

	Avg	Peak
	Q_{in} = 11.33 gpm	Q_{in} = 45.32 gpm
		Fill = 106 / 45.32 = 2.34 min
FILL	$\frac{106}{11.33}$ = 9.36 min @ 0.5' fill	Pump = 106 / (86 - 45.32) = 2.61 min
Pump	106 / (86 - 11.33) = 1.42 min	
	10.56 mins cycle	4.95 mins cycle time
	= 5.68 / hr ok ✓	12.12 / hr ok ✓

FLOATS ON EXISTING PHASE I PUMP SHOULD BE ADJUSTED TO REFLECT 0.5' FILL HEIGHT.

BSD 7/19/10

P.S. PHASE II

P.S. II = PHASE II + PRIESTS + M.F. DUPLEXES

= 3000 gpd + 3000 gpd + 1250 gpd = 7250 gpd

Peak = 4 · Avg = 4 · 5.03 gpm = 20.12 gpm

P.S. pumps @ 68 gpm @ 30' TDH, 6" ØMH = 212 gals

	Avg	Peak
	Q_{in} = 5.03 gpm	Q_{in} = 20.12 gpm
FILL	$\frac{106}{5.03}$ = 21.07 mins @ 0.5' FILL	$\frac{106}{20.12}$ = 5.27 min FILL
Pump	$\frac{106}{68-5.03}$ = 1.68 min	$\frac{106}{68-20.12}$ = 2.21 min
	22.75 min	7.48 min.
	2.64 cycles/hr ✓ ok	8.02 cycles/hr ok ✓

PHASE II P.S. FLOATS SHOULD BE ADJUSTED TO REFLECT 0.5' FILL HEIGHT.

APPENDIX #5

TRAFFIC ANALYSIS

18-Jul-10

ITE Trip Generation Rates - 8th Edition
Pass-by rates from ITE Trip Generation Handbook - 2nd Edition

Instructions: Enter Expected Unit Volumes into Column 'M'

Description/ITE Code	Units	ITE Vehicle Trip Generation Rates (peak hours are for peak hour of adjacent street traffic unless highlighted)								Expected Units	Total Generated Trips			Total Distribution of Generated Trips					
		Weekday	AM	PM	Pass-By	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	Pass-By	PM In	PM Out	Pass-By
Single Family Homes 210	DU	9.57	0.75	1.01		25%	75%	63%	37%		0	0	0	0	0	0	0	0	0
Single Family Homes 210	Acres	26.04	2.06	2.74		31%	69%	66%	34%		0	0	0	0	0	0	0	0	0
Single Family Homes 210	Persons	2.55	0.21	0.28		31%	69%	66%	34%		0	0	0	0	0	0	0	0	0
Single Family Homes 210	Vehicles	6.02	0.51	0.67		31%	69%	66%	34%		0	0	0	0	0	0	0	0	0
Apartment 220	DU	6.65	0.51	0.62		20%	80%	65%	35%		0	0	0	0	0	0	0	0	0
Apartment 220	Persons	3.31	0.28	0.40		NA	NA	NA	NA		0	0	0	NA	NA	0	NA	NA	0
Apartment 220	Vehicles	5.10	0.46	0.60		NA	NA	NA	NA		0	0	0	NA	NA	0	NA	NA	0
Low Rise Apartment 221	Occ.DU	6.59	0.46	0.58		21%	79%	65%	35%		0	0	0	0	0	0	0	0	0
High Rise Apartment 222	DU	4.20	0.30	0.35		25%	75%	61%	39%		0	0	0	0	0	0	0	0	0
Mid-Rise Apartment 223	DU	NA	0.30	0.39		31%	69%	58%	42%		0	0	0	0	0	0	0	0	0
Rental Townhouse 224	DU	NA	0.70	0.72		33%	67%	51%	49%		0	0	0	0	0	0	0	0	0
Resd. Condo/Townhouse 230	DU	5.81	0.44	0.52		17%	83%	67%	33%		0	0	0	0	0	0	0	0	0
Resd. Condo/Townhouse 230	Persons	2.49	0.19	0.24		16%	84%	67%	33%		0	0	0	0	0	0	0	0	0
Resd. Condo/Townhouse 230	Vehicles	3.34	0.24	0.32		16%	84%	66%	34%		0	0	0	0	0	0	0	0	0
Low Rise Resd. Condo 231	DU	NA	0.67	0.78		25%	75%	58%	42%		0	0	0	0	0	0	0	0	0
High Rise Resd. Condo 232	DU	4.18	0.34	0.38		19%	81%	62%	38%		0	0	0	0	0	0	0	0	0
Luxury Condo/Townhouse 233	Occ. DU	NA	0.56	0.55		23%	77%	63%	37%		0	0	0	0	0	0	0	0	0
Mobile Home Park 240	Occ. DU	4.99	0.44	0.59		20%	80%	62%	38%		0	0	0	0	0	0	0	0	0
Mobile Home Park 240	Persons	2.46	0.20	0.26		18%	82%	63%	37%		0	0	0	0	0	0	0	0	0
Mobile Home Park 240	Acres	39.61	3.20	4.45		18%	82%	63%	37%		0	0	0	0	0	0	0	0	0
Mobile Home Park 240	Vehicles	3.38	0.27	0.36		16%	84%	63%	37%		0	0	0	0	0	0	0	0	0
Senior Adult Housing-Detached 251	DU	3.71	0.22	0.27		35%	65%	61%	39%	20.0	74	4	5	2	3	0	3	2	0
Senior Adult Housing- Attached 252	Occ.DU	3.48	0.13	0.16		36%	64%	60%	40%		0	0	0	0	0	0	0	0	0
Congregate Care Facility 253	Occ.DU	2.15	0.06	0.17		61%	39%	56%	44%		0	0	0	0	0	0	0	0	0
Congregate Care Facility 253	DU	2.02	0.06	0.17		59%	41%	55%	45%		0	0	0	0	0	0	0	0	0
Assisted Living 254	Occ. Beds	2.74	0.17	0.29		73%	27%	52%	48%		0	0	0	0	0	0	0	0	0
Assisted Living 254	Beds	2.66	0.14	0.22		65%	35%	44%	56%	18.0	48	3	4	2	1	0	2	2	0
Assisted Living 254	Employees	3.93	NA	0.55		NA	NA	NA	NA		0	NA	0	NA	NA	0	NA	NA	0
Retirement Community 255	Occ. Units	2.61	0.18	0.29		64%	36%	48%	52%		0	0	0	0	0	0	0	0	0
Recreational Homes 260	DU	3.16	0.16	0.26		67%	33%	41%	59%		0	0	0	0	0	0	0	0	0
Recreational Homes 260	Acres	1.33	0.07	0.11		67%	33%	41%	59%		0	0	0	0	0	0	0	0	0
Timeshare 265	DU	10.03	0.48	0.75		NA	NA	NA	NA		0	0		NA	NA	0	NA	NA*	0
Residential PUD 270	DU	7.56	0.51	0.62		22%	78%	65%	35%		0	0	0	0	0	0	0	0	0
Residential PUD 270	Acres	46.78	2.88	4.05		NA	NA	NA	NA		0	0	0	NA	NA	0	NA	NA	0

RED Rates = CAUTION - Use Carefully - Small Sample Size
Green Rates = **Peak Hour of Generator** - (no peak rate for the rush hour of adjacent street traffic)
Blue Rates = **Saturday Daily total** - (no weekday daily rate)

***Pass-By % are Rates from Weekay PM Peak Period**
*The Total Pass-By Trips will be Distributed: **50% IN / 50 % OUT**

NA = Not Available
DU = Dwelling Unit
Occ.Room = Occupied Room
KSF = Units of 1,000 square feet
Fuel Position = the number of vehicles that could be fueled simultaneously