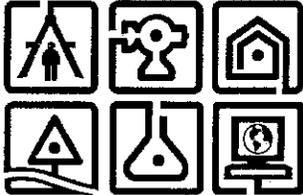


Appendix E

Draft Engineers Report for Water System Analysis March 3, 2006

March 3, 2006

DRAFT



*Engineer's Report for
Water System Analysis*

Town of Ballston
Saratoga County, New York

Prepared for:

TOWN OF BALLSTON
P.O. Box 67
Burnt Hills, New York 12027

Prepared by:

C.T. MALE ASSOCIATES, P.C.
50 Century Hill Drive
P.O. Box 727
Latham, New York 12110
(518) 786-7400
FAX (518) 786-7299

*C.T. Male Project No: 06.6072
Reference Drawing No.: 06-0223*

Unauthorized alteration or addition to this
document is a violation of Section 7209
Subdivision 2 of the New York State
Education Law.

© Copyright 2006
C.T. MALE ASSOCIATES, P.C.

ENGINEER'S REPORT FOR
WATER SYSTEM ANALYSIS
TOWN OF BALLSTON

TABLE OF CONTENTS

	<u>Page</u>
1.0 EXECUTIVE SUMMARY.....	1
1.1 INTRODUCTION.....	3
2.0 HYDRAULIC MODEL	3
2.1 Existing Conditions	3
2.2 Full Build-Out Conditions	5
3.0 MODEL RESULTS.....	7
3.1 Existing Conditions	8
3.2 Existing Conditions with a Connection to the Saratoga County Water System.....	8
3.3 Full Build-Out Conditions with a Supply from the Town of Glenville	9
3.4 Full Build-Out Conditions with a Supply from the Saratoga County Water System.....	10
4.0 COST ESTIMATES FOR PROPOSED IMPROVEMENTS.....	11
5.0 CONCLUSIONS	14

APPENDICES:

APPENDIX A:	SYSTEM PRESSURE MAP UNDER EXISTING CONDITIONS
APPENDIX B:	SYSTEM PRESSURE MAP UNDER EXISTING CONDITIONS WITH A CONNECTION TO THE COUNTY SYSTEM
APPENDIX C:	SYSTEM PRESSURE MAP UNDER FULL BUILD-OUT CONDITIONS- SUPPLY BY TOWN OF GLENVILLE
APPENDIX D:	SYSTEM PRESSURE MAP UNDER FULL BUILD-OUT CONDITIONS- SUPPLY BY COUNTY SYSTEM
APPENDIX E:	SYSTEM FIRE FLOW MAP UNDER EXISTING CONDITIONS

APPENDIX F: SYSTEM FIRE FLOW MAP UNDER FULL BUILD-OUT
CONDITIONS-SUPPLY BY COUNTY SYSTEM

1.0 EXECUTIVE SUMMARY

C.T. Male Associates, P.C. was contracted by the Town of Ballston to perform a water system analysis of the Burnt Hills-Ballston Lake (BHBL) Water District No. 2. This report summarizes the existing and future build out conditions within the BHBL Water District under current and proposed zoning, summarizes the results of the hydraulic model, and outlines improvements to the system needed in response to development within the Town of Ballston.

1. The Burnt Hill-Ballston Lake Water District No. 2 currently serves approximately 1,700 customers in the Town of Ballston with adequate water pressure and fire flows.
2. THE BHBL Water District No. 2 can be adequately serviced by a connection to the proposed Saratoga County System, at the intersection of Route 67 and Eastline Road. A pump station on Route 67 near Curtis Lumber would be needed to hydraulically connect the two systems.
3. During full build-out conditions in the BHBL Water District No. 2 and future district extensions, the Water District will be able to meet demand and maintain adequate system pressures under current and proposed zoning.
4. During full build-out conditions in the BHBL Water District No. 2 and future district extensions, the Water District will be able to meet fire flow requirements of the proposed developments at all but one of the junctions in the system¹ under current and proposed zoning.
5. Improvements to the water system must be made in response to current needs and future development within the Town of Ballston. These improvements include all or a combination of the following:
 - Replacement of the pumps and controls at the Burnt Hills pump station.

¹ This junction is located on Route 50/67 adjacent to the Rossi property and the existing McDonalds. The fire flow available at this node is less than the required flows for a large commercial development.

- Connection to the future Saratoga County Transmission Main at Eastline Road.
- Construction of a pump station on Route 67 near Curtis Lumber to boost the hydraulic grade line (HGL) of the Saratoga County system to the HGL of the Town of Ballston system.
- Construction of proposed water mains on the east side of Ballston Lake, along Eastline Road, Lake Road and Outlet Road, in the Garrett/Mann Road area and in the Middleline/Charlton/Saunders Road area, if these areas are to be served.
- Increasing the volume of tank storage to equal the future daily demand in the system.

1.1 INTRODUCTION

C.T. Male Associates, P.C. was contracted by the Town of Ballston to perform a water system analysis of the Burnt Hills-Ballston Lake (BHBL) Water District No. 2. The water system was analyzed under current conditions, and with full buildout of the system in accordance with existing zoning and the new comprehensive plan and zoning prepared by Saratoga Associates. The new proposed zoning generally affects the commercial areas along Route 50 and 67, as well as residential areas in the Mann Road/Garrett Road portion of the Town. Mapping of the existing and future water district can be found in Appendices A through D. A hydraulic model was prepared using the computer program H2OMap Water² which analyzed the functionality of the system, including adequate supply of water, adequate pressure, and fire flows supplied to users in the system. In order to supply water to future development, several water district extensions and infrastructure improvements would need to be made. A description of the improvements and a cost estimate of each improvement are provided in Section 4.0.

2.0 HYDRAULIC MODEL

A hydraulic model of the Burnt Hills-Ballston Lake Water District was created using data from a 1987 Kentucky Pipe model and information on infrastructure built in the Town since 1987. Modeling of future district extensions and infrastructure improvements was achieved through use of topographic maps and past studies of water district extensions. Demands are applied to the system at model junctions and will be discussed in this section. The results of the analysis and discussion will be provided in Section 3.0.

2.1 Existing Conditions

²H2OMap Water GIS Suite 6.0 was developed and maintained by Montgomery Watson Harza's MWHSoft.

The existing BHBL Water District map is provided in Appendix A. The district is supplied with water from the Town of Glenville at a connection point and pump station located near the intersection of Lake Hill Road and Sherwood Lane. There are two elevated tanks within the system to maintain system pressure and to store water for high demand periods and firefighting. One tank is located in Burnt Hills, off Route 50, and stores 500,000 gallons, while the second tank is located off of McCrea Hill Road and stores 400,000 gallons. Both tanks have an overflow of USGS elevation 564 feet. The elevation of water in the tanks provides adequate pressure (in the range of 50 to 120 psi) throughout the entire system, except for the Goode Street/Charlton Road area. The BHBL Water District No. 2 Extension #14 (Goode Street and Charlton Road), is served by a booster pump station near the intersection of Goode Street and Skaarland Drive. The booster station is needed due to the higher ground elevation in this district extension relative to the rest of the system. The hydraulic grade line of the system does not provide adequate pressures to homes in this district extension without the booster pump station. There is one pressure reducing valve (PRV) in the system, located on Main Street (Route 146A), which reduces pressures to users along West Side Drive and in the Hamlet of Ballston Lake. In addition, the Town of Ballston requires all new customers to install individual pressure reducing valves that reduce pressure to 40-70 psi depending on the user-defined setting.

The hydraulic model for existing conditions represents the water system under current development conditions. The demands were applied to the system using standard design demands, which are quite conservative. The demand for single family homes is 300 gallons per day (gpd), while the demands for other customers, like schools and commercial properties were derived from the flow calculations from the *Evaluation of Sanitary Sewer in the Ballston Lake Watershed*, by C.T. Male Associates, P.C., dated March 24, 2005. During this study, a map was created to show the location of single family homes within the study area. This map and the flow calculation from the sewer study were used to apply demands to each junction within the model, and it was assumed that each single family home or active business along a water main is currently connected to the BHBL Water District.

The average day demand applied to the hydraulic model during existing conditions is approximately 742,000 gpd. Based upon the *Annual Water Consumer Confidence Report & Water Quality Report for 2004* provided by the Town of Ballston, the daily average

demand was approximately 301,000 gpd. The discrepancy between the modeled average daily demand and the existing daily demand is acceptable for this hydraulic model. The standard demand for a single family home (300 gpd) is conservative, and most homes use less than the standard. The model also assumes that each home or active business within the water district is connected to the water main. This is not the case in many areas where the district extensions are relatively new, and/or the property owner does not wish to tie into the main. The purpose of this model is to assess the water system under current development conditions and future maximum build-out conditions, as well as to analyze any improvements that are needed to the system.

In addition to assessing the system under existing conditions, the future connection of the BHBL Water District to the Saratoga County Water System was modeled. The existing system components and demands were used in this analysis, since it is possible that a connection to the proposed County main will be made the near future. If a connection to the County main is made, the Town of Glenville would no longer need to be the supplier of water to the Town of Ballston. A connection to the County System would be made at the intersection of Eastline Road and Route 67. A pump station would be needed to make this connection, since the hydraulic grade line of the County System is much lower than the Town of Ballston system. A pump station was modeled on Route 67 near Curtis Lumber, along the existing 12" main.

2.2 Full Build-Out Conditions

In order to assess the BHBL Water District during full build-out conditions, a number of infrastructure improvements were added to the model. Two previously studied district extensions were added to the model, see Appendices C and D. These areas included properties on the east side of Ballston Lake, along East Side Drive and Lake Road, in the Charlton Road/Middleline Road/Saunders Road area, and in the Garrett Road/Mann Road areas. These areas were previously evaluated based on the need for and interest in public water for the three areas. A potential new source of water to the BHBL Water District is the Saratoga County Water System at Eastline Road and Route 67, which is modeled.

The current zoning of the Town of Ballston makes it highly unlikely that public water service would be viable in the northwest corner of the Town. Therefore, under the full build-out conditions, public water will not be supplied to this area.

A 16" main is proposed to be built along Eastline Road by developers of the Eastline Farms Subdivision and the Clifton Park Water Authority (CPWA), to connect their system to the future County System. This 16" main will connect users on the east side of Ballston Lake to the existing water district via the 12" main at the intersection of Route 67 and Eastline Road. A 12" main is also modeled to be constructed along Outlet Road to serve as an additional loop to the system if the water district is extended to the east side of Ballston Lake.

Two different assessments of the system under full build out conditions were made: one with a future connection to the County system and one with the Town of Glenville continuing to supply the entire system. Improvements such as larger pump stations at both the County connection and the Town of Glenville connection will be needed due to the increased demands at full build-out. Per Department of Health requirements and to meet future hydraulic conditions, the amount of storage in the system must also be increased to meet the future daily demand.

The demands associated with a full build-out of the water district under current zoning were primarily taken from the *Evaluation of Sanitary Sewer in the Ballston Lake Watershed*. Most of the BHBL Water District was included in the study area, except for the northern portion of the Town. Future residential development was calculated as one home per developable acre on vacant/large parcels. Future commercial development on Route 50 south of Brookline Road was assessed a water demand of 900 gpd per parcel³. Future water demand for the commercially zone area on Route 50/67 north of Brookline Road is based upon maximum build-out as calculated by Saratoga Associates. The water demand was approximated as 0.01 gpd/square foot of commercial space. The average day demand applied to the hydraulic modeling during

³ The average sewer demand for commercial properties within the Town of Ballston during the sewer study was 900 gpd. For this study it was assumed that the water demand and sewer demand would be equal for commercial properties.

full build-out conditions under current zoning is approximately 2.183 million gallons per day.

Under proposed zoning, changes will be made to the zoning in the commercial and residential areas north of Brookline Road, and the commercial properties along Route 50 in Burnt Hills. The zoning in the Garrett Road/Mann Road future district extension was revised to be "Hamlet Residential," with the densest possible build-out of 20,000 s.f. per developable acre. The zoning on the Route 50 and Route 67 corridor is proposed to be changed to "Mix Use Center," which can contain smaller stores, restaurants, office buildings and townhomes/apartments. The water demand from this type of development is higher than the demand under the current zoning, and the model reflects this increase. The commercial zoning along the southern section of Route 50 will be "Business Highway," which has slightly less water demand than under the current zoning. The average day demand applied to the hydraulic model during full build-out conditions with proposed zoning is approximately 2.334 million gallons per day, approximately 150,000 gallons more than full build-out under current zoning.

3.0 MODEL RESULTS

This section outlines the results of the H20Map Water model. Appendices A through D show the average pressures across a 24-hour period for the following four conditions:

- Existing conditions
- Existing conditions with a connection to the County Main
- Full build-out under proposed zoning with a supply from the Town of Glenville
- Full build-out under proposed zoning with a supply from the County system

Appendices E and F show the available fire flows in the system while maintaining a pressure of 20 psi for the following 2 conditions:

- Existing conditions
- Full build-out under proposed zoning with a supply from the County system

Results of the modeling for full build-out under current zoning are also discussed in this report, but not included in the mapping.

3.1 Existing Conditions

Under existing conditions the Town of Ballston system supplies water to its customers at satisfactory pressures and in sufficient quantities for fire protection. Appendix A shows the pressure contours and Appendix E the available fire flows.

The lowest pressures in the system occur in the Forest Road/Jenkins Road area. The pressure in this area is approximately 60 psi, which is a good pressure for users. In fact, the pressures in the Town of Ballston system can be high (greater than 100 psi) in many areas, particularly upstream of the Ballston Lake PRV, along Route 67 and on Blue Barns Road. The Town requires all new customers to install individual PRV's in their homes or businesses to due to the high pressures observed in these areas of the system.

The available fire flows calculated by H20Map give the flows available to fight fires, keeping the system pressure to 20 psi or greater. A fire flow of over 500 gpm is acceptable for residential areas given existing density, and fire flow in the range of 1000-2000 gpm is acceptable for larger commercial developments that are generally serviced by a sprinkler system. The fire flows are achieved by using storage from the tanks in combination with water being supplied by the pump station. The Town of Ballston system sees good available fire flows throughout the system, on the range of 800 gpm to 4000+ gpm across the system. The only area that sees marginal fire flows is along the 6" line on West Side Drive. This is expected due to the head losses associated with a long 6" line, combined with a lack of a looped system in this area. The fire flows at the end of the line are near 400 gpm, which is functional for fire fighting purposes.

The Burnt Hills pump station, under existing conditions, supplies 550 to 900 gpm to the system on an average day, and with both pumps working, the pump station is operating well within its design range of 600-1200 gpm. Both of the elevated tanks fill and drain in response to system demand and have enough storage to deliver fire flows.

3.2 Existing Conditions with a Connection to the Saratoga County Water System

It is possible that a connection between the County System and the BHBL Water District No. 2 will be made in the near future. In this situation, the pump station connecting the

system to the Town of Glenville would not need to operate, and a new pump station would be required along Route 67 near Curtis Lumber. The hydraulic grade line (HGL) of the County system is modeled at elevation 487 feet, assuming that the County tank is operating at a level lower than its maximum elevation of 495 feet. Under existing conditions, the Route 67 pump station would need to operate at 500-750 gpm, delivering approximately 85 feet of head. Under these conditions, the Town of Ballston will be able to deliver water to its customers with satisfactory pressures and fire flows.

The pressures in the system will not change drastically if a connection to the County main is made, since the elevation of the tanks is the primary factor controlling system pressure. The customers along Route 67 west of the intersection with Brookline Road will actually see a good reduction in pressures. Currently these customers are seeing pressures of 110-120 psi, which is high. If the connection to the County main is made, the pressures will be reduced to 90-95 psi, since this area will run off the hydraulic grade line of the County system. The area north and west of the proposed pump station will see a manageable increase in pressures on the magnitude of 10-15 psi.

There will be no significant change in available fire flows in the system if the Town is connected to the County main. This is due to the fact that most fire flows are supplied by water stored in each of the tanks, not through the flows provided by the pump station.

3.3 Full Build-Out Conditions with a Supply from the Town of Glenville

Under full build-out conditions, the BHBL Water District will be able to supply water to its customers with adequate pressure and fire flows, given that system storage is increased to equal future daily demand, and the Lake Hill Road Pump Station is upgraded to deliver the increased flows. Appendix C shows the average pressure in the system under these conditions.

The highest demand under full build-out conditions (2.334 MGD) is associated with the proposed zoning change, since Mixed-Use Development uses more water than commercial development. For purposes of assessing the system under full build-out, the water use under proposed zoning will be used.

The Department of Health requires that a system have storage equal to the average daily demand. For modeling purposes, the existing tanks were modified to increase the future storage in the system to 2.3 MG. The Burnt Hills Tank is modeled to have 1.2 MG storage, and the McCrea Hill Road Tank is modeled to have 1.1 MG storage. In reality, it is likely that new tanks would be built in lieu of increasing the storage at the existing tank locations, but for modeling purpose increasing the two tanks' storage is accurate. The existing pump station would need to be rehabilitated to increase the capacity of the pumps to 1300-1500 gpm with 62 feet of head.

The system pressures with the proposed improvements are satisfactory across the system. The pressure in the Burnt Hills area sees little to no change from existing conditions, but other areas within the system will see differing pressures under full build-out conditions due increased demand and head losses in the system. The pressures on the east side of Ballston Lake are quite high, on the range from 90-110 psi. The pressures in the Mann Road/Garrett Road area are 70-80 psi, while the pressures on Route 50-67 north of Brookline Road range from 80-90 psi. The pressure on Route 50 south of Brookline Road decreases when compared to existing conditions, and ranges from 60-80 psi.

The available fire flow under full build-out conditions is acceptable for nearly all of the areas within the system. The fire flows range from 1000 gpm to 4000 gpm west of Ballston Lake, and areas east of Ballston Lake will see lower fire flows, in the range of 800-1500 gpm. The only area in the system seeing less than adequate fire flows is the Rossi property on Route 50/67. The available fire flow at that junction of McDonalds near the Rossi property is 1,630 gpm in this scenario. If the main from the intersection of Route 50/67 was increased from 8" to 12" in this area, the available fire flow for the Rossi property will be nearly 2,500 gpm.

3.4 Full Build-Out Conditions with a Supply from the Saratoga County Water System

Under full build-out conditions, the BHBL Water District will be able to supply water to its customers with adequate pressure and fire flows, if system storage is increased to equal future daily demand, and a pump station is constructed along Route 67 to deliver the increased flows. Appendix D shows the average pressure in the system under these conditions, and Appendix F shows the available fire flows.

The Route 67 Pump Station would need to deliver 1150-1400 gpm at approximately 133 feet of head to adequately supply the system. If a connection to the County is made in the near future, the pump station would need to be sized considerably smaller given existing demands (500-750 gpm). If this is done, the pump station may need to be upgraded in the future to account for full build-out conditions.

The system pressures given these proposed improvements are different than if the system were supplied from the Town of Glenville. The hydraulic grade line (HGL) for the future development on the east side of Ballston Lake will be directly related to the HGL from the County System, independent of the pressures produced by the Town tanks and the pump station. The pressure in the area east of Ballston Lake will be in the range of 60-95 psi. The pressures in the northern portion of the system will be higher than in the Town of Glenville connection scenario, ranging from 85 psi in the Mann Road area to 90-100 psi in the Route 50/67 area. The pressures in the rest of the system, particularly south and west of Brookline Road will be similar to those under the Town of Glenville supply scenario, since the elevation of the tanks will determine the pressure.

The available fire flow under full build-out conditions is acceptable for nearly all of the areas within the system. The fire flows range from 1000 gpm to 4000 gpm west of Ballston Lake, and the future district extension east of Ballston Lake will see higher fire flows than under the connection to Town of Glenville system, in the range of 800 - 4000+ gpm. The available fire flow at that junction of McDonalds and the Rossi property is 1,950 gpm in this scenario. If the main from the intersection of Route 50/67 was increased from 8" to 12" in this area, the available fire flow for the Rossi property will be nearly 3,000 gpm.

4.0 COST ESTIMATES FOR PROPOSED IMPROVEMENTS

There are five proposed improvements to the Town of Ballston water system in which all or a combination of would need to be made in order to adequately supply future residential and business development within the BHBL Water District. These improvements include additional water mains, rehabilitation of the existing pump station and/or the construction of a new pump station, or a connection to the Saratoga

County Water System, and increasing the storage within the system. A discussion of these improvements and their cost in 2006 dollars is presented below.

- Water Main Extensions: The first water district extension would be to serve the areas along East Side Drive, Lake Road and other areas on the east side of Ballston Lake. This district would connect to the system at Eastline Road. A cost estimate was prepared for this district extension in 2003 dollars, as part of a petition for a district extension (which failed). The cost for the infrastructure associated with the East Side Drive area in 2006 dollars is \$2,590,000.

The second water district extension included the Garrett Road/Mann Road area and the Middleline Road/Charlton Road area. Both of these areas were part of a petition for a water district extension that also included the Goode Street extension. The Goode Street extension has been constructed, but main extensions to the other portions of the area was not constructed. Based on the 2003 cost analysis, the cost for the infrastructure associated with the water main extension to Garrett/Mann Road and Middleline/Charlton Road in 2006 dollars is \$2,680,000.

The total cost for the water main extensions is estimated at \$5,270,000.

- Rehabilitation of BHBL Water District No. 2 Pump Station: The only pump station existing in the BHBL Water District at this time is the pump station near the intersection of Lake Hill Road and Sherwood Lane. This pump station connects the Town of Ballston system with the Town of Glenville system and boosts pressures to acceptable levels for the Town of Ballston system.

The pump station was built in the 1970's, therefore the pumps and controls within the pump station will need to be rehabilitated or replaced. If the Town does not connect with the County system in the near future, it is recommended that the Town replace the pumps with variable speed pumps and controls with similar operating points as the existing pumps. These pumps will operate much more efficiently than the existing pumps. The estimated cost of two pumps and two sets of controls in 2006 dollars is \$80,000.

The cost to upgrade to the pump station under full build-out conditions would be approximately \$100,000.

- Connection to Saratoga County Water System: The developer of the proposed Eastline Farms subdivision off Eastline Road will be constructing a 16" water main along Eastline Road, connecting to the Town of Ballston system via the 12" main near the Stewart's on Route 67. This construction will occur before the Saratoga County Water Line is constructed in the Saratoga County Sewer District Easement, which crosses Eastline Road just south of Route 67. When the County Main is constructed, a connection to the 16" line will be made. This connection will tie the Town of Ballston system into the County system at no cost to the Town. In addition, the Clifton Park Water Authority (CPWA) will extend the 16" main from Eastline Farms south to their water system to connect CPWA to the County system, at no cost to the Town.
- Construction of Pump Station on Route 67: Once the connection to the Saratoga County Transmission Main is made, the Town of Ballston would need to install a pump station on Route 67 near Curtis Lumber. If the connection is made under existing conditions, the pump station would be smaller, producing 500-750 gpm with 85 feet of head. The cost for this pump station would be approximately \$250,000.

Under full build-out conditions, the pumps at the Route 67 pump station would need to be larger, producing 1150-1400 gpm with 133 feet of head. The cost for a station with the larger pumps would be \$270,000.
- Increase of Tank Storage to Meet Future Demands: Based upon full build-out water demands of 2.33 MGD, the storage in the system would need to be increased to 2.3 million gallons. The storage would be increased by constructing new tanks somewhere in the system. At this time, the cost for this improvement is uncertain since the exact location for new storage is unknown. If tank was similar in style and height to the McCrea Hill Road tank, its construction cost estimate is \$2,000,000.

5.0 CONCLUSIONS

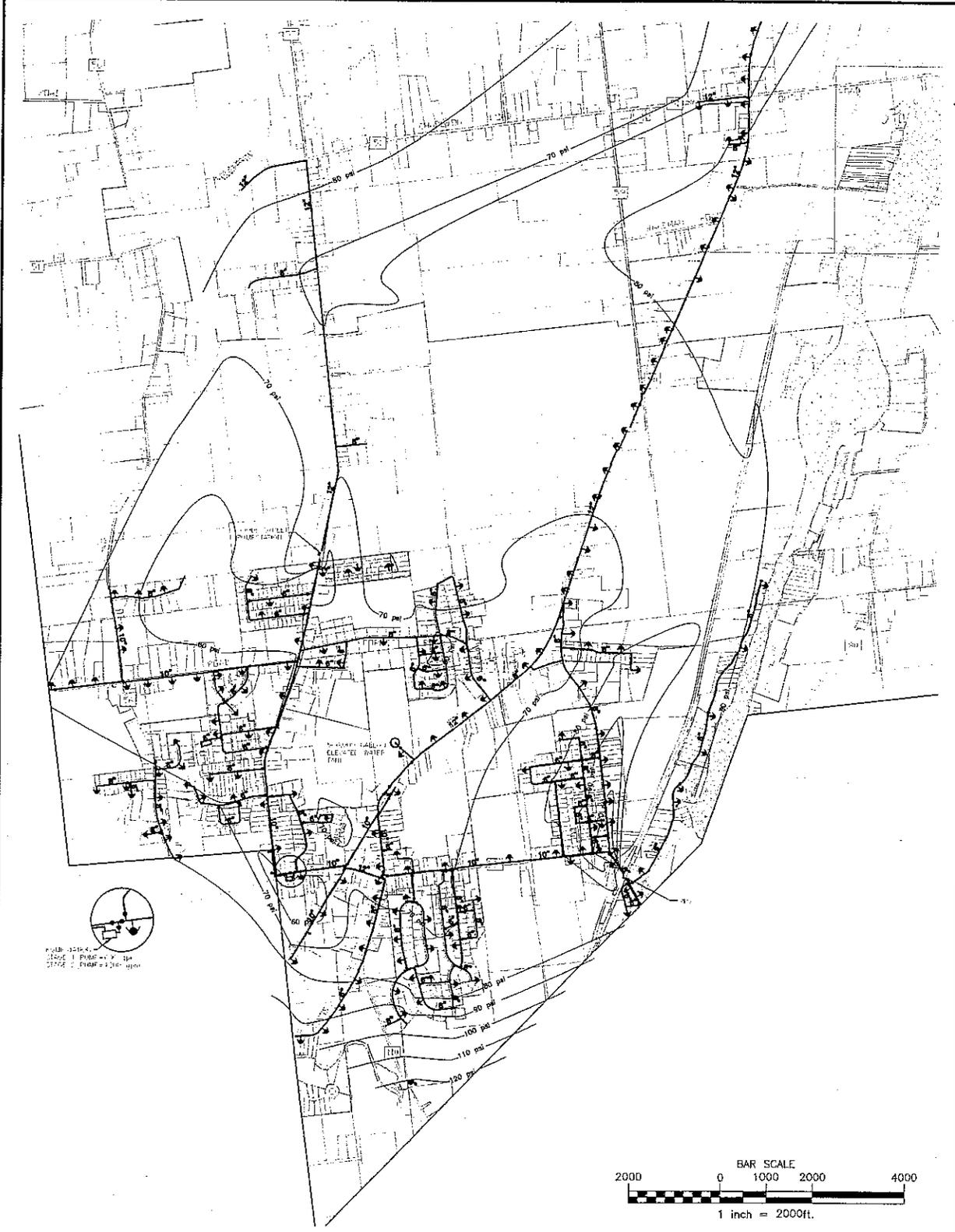
The Burnt Hills-Ballston Lake Water District No. 2, which currently services the Town of Ballston, has sufficient capacity to service the system under current conditions and at full build-out of the Town under current and proposed zoning. The system will be able to supply water under full build-out conditions, but a number of system improvements are required. The improvements include water main extensions, rehabilitation of the existing pump station or construction of a new booster pump station, and an increase in system storage.

Respectfully submitted,

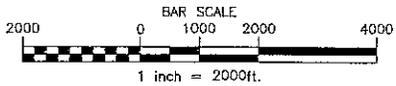
C.T. MALE ASSOCIATES, P.C.

Prepared by: Kathryn L. Cyr, E.I.T. Civil Engineer 1	Reviewed and Approved by: Edwin L. Vopelak, Jr., P.E. Vice President
--	--

Appendix A
**System Pressure Map Under Existing
Conditions**



12" x 18" - 12/16/06
 12" x 18" - 12/16/06
 12" x 18" - 12/16/06



CAD DWG. FILE NAME

UNAUTHORIZED ALTERATION OR
 ADDITION TO THIS DOCUMENT
 IS A VIOLATION OF SECTION
 7209 SUBDIVISION 2 OF THE
 NEW YORK STATE EDUCATION
 LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 DESIGNED : KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO: 06.6072
 SCALE : 1" = 1000'
 DATE : MARCH 3, 2006

**SYSTEM PRESSURE MAP- CURRENT CONDITIONS
SOUTHWEST OF BALLSTON LAKE**

TOWN OF BALLSTON WATER DISTRICT MAP

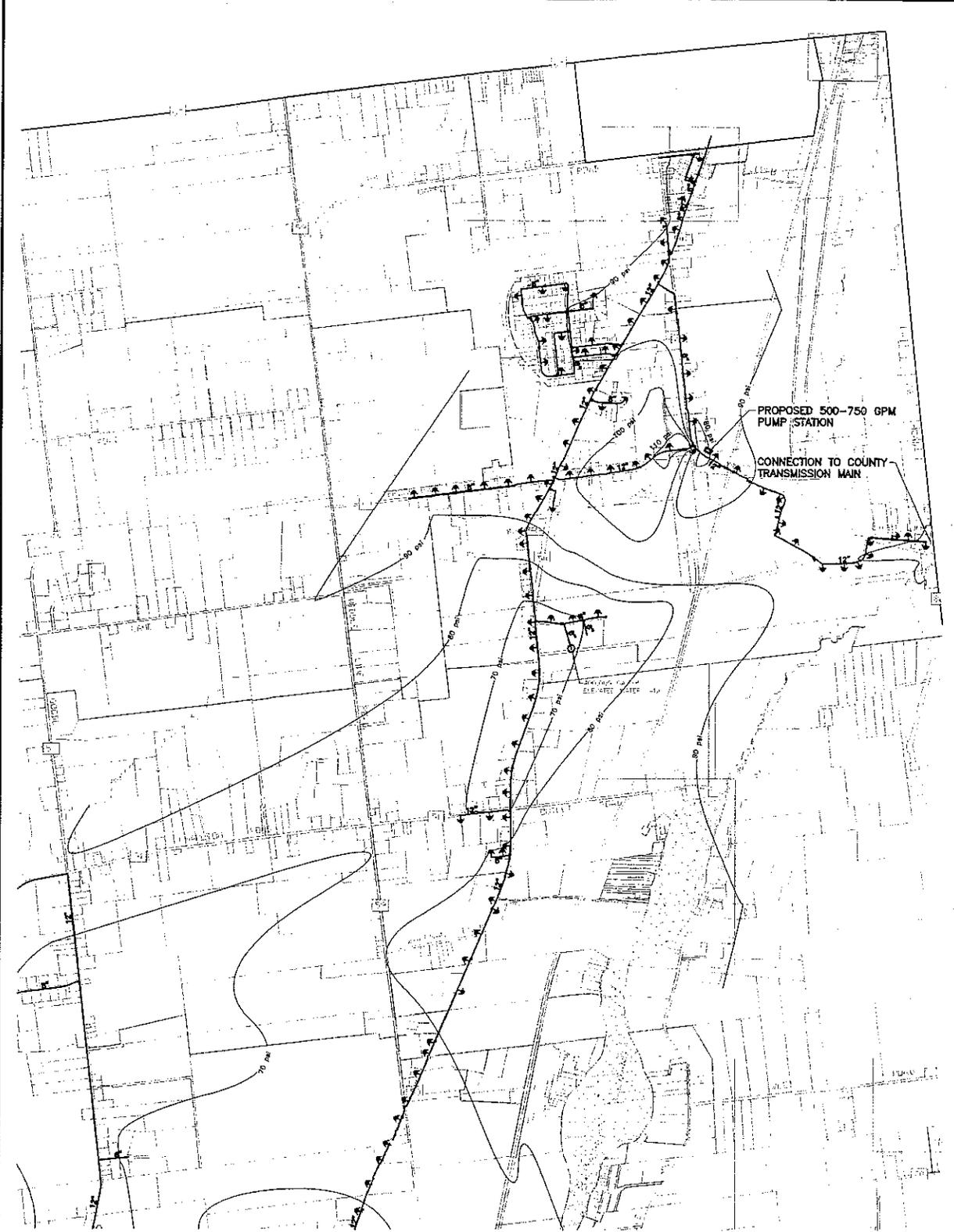
TOWN OF BALLSTON SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 • FAX 518.786.7299
 ARCHITECTURE & BUILDING SYSTEMS ENGINEERING • CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES • SURVEY & LAND INFORMATION SERVICES



C2
 SHEET 2 OF 12
 DWG. NO: 06-0223

Appendix B
**System Pressure Map Under Existing
Conditions With a Connection to the
County System**



WD2 EXISTING CONNECTION TO COUNTY.DWG

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 DESIGNED : KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO : 06.6072
 SCALE : 1" = 1000'
 DATE : MARCH 3, 2006

SYSTEM PRESSURE MAP- EXISTING CONDITIONS WITH CONNECTION TO COUNTY SYSTEM NORTH OF BALLSTON LAKE

TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON

SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.

50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

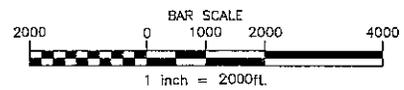
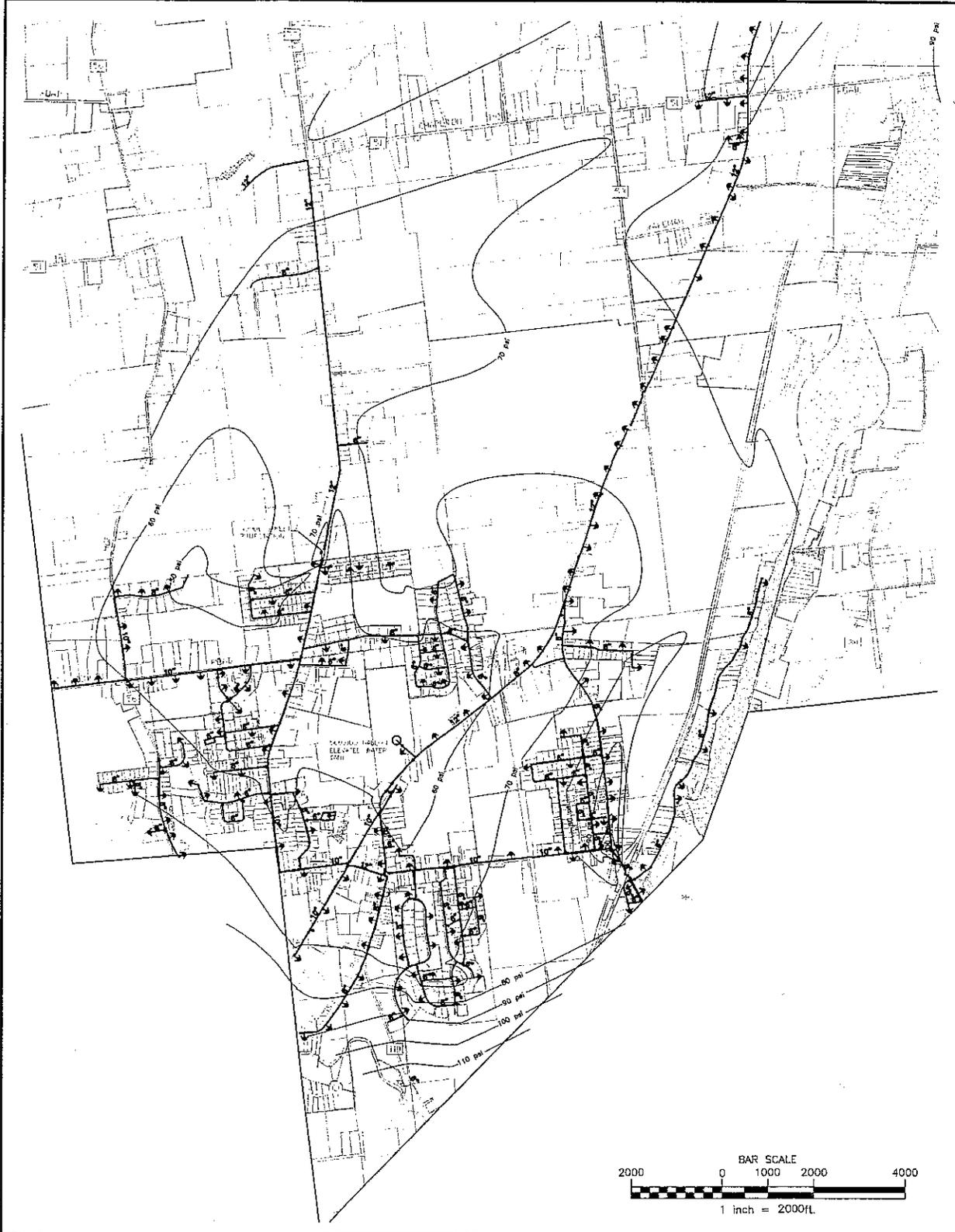
ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES



C3

SHEET 3 OF 12

DWG. NO:06-0223



UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 DESIGNED : KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO: 06.6072
 SCALE : 1" = 1000'
 DATE : MARCH 3, 2006

**SYSTEM PRESSURE MAP- EXISTING CONDITIONS
 WITH CONNECTION TO COUNTY SYSTEM
 SOUTHWEST OF BALLSTON LAKE**
TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON

SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.

50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 * FAX 518.786.7299

ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES



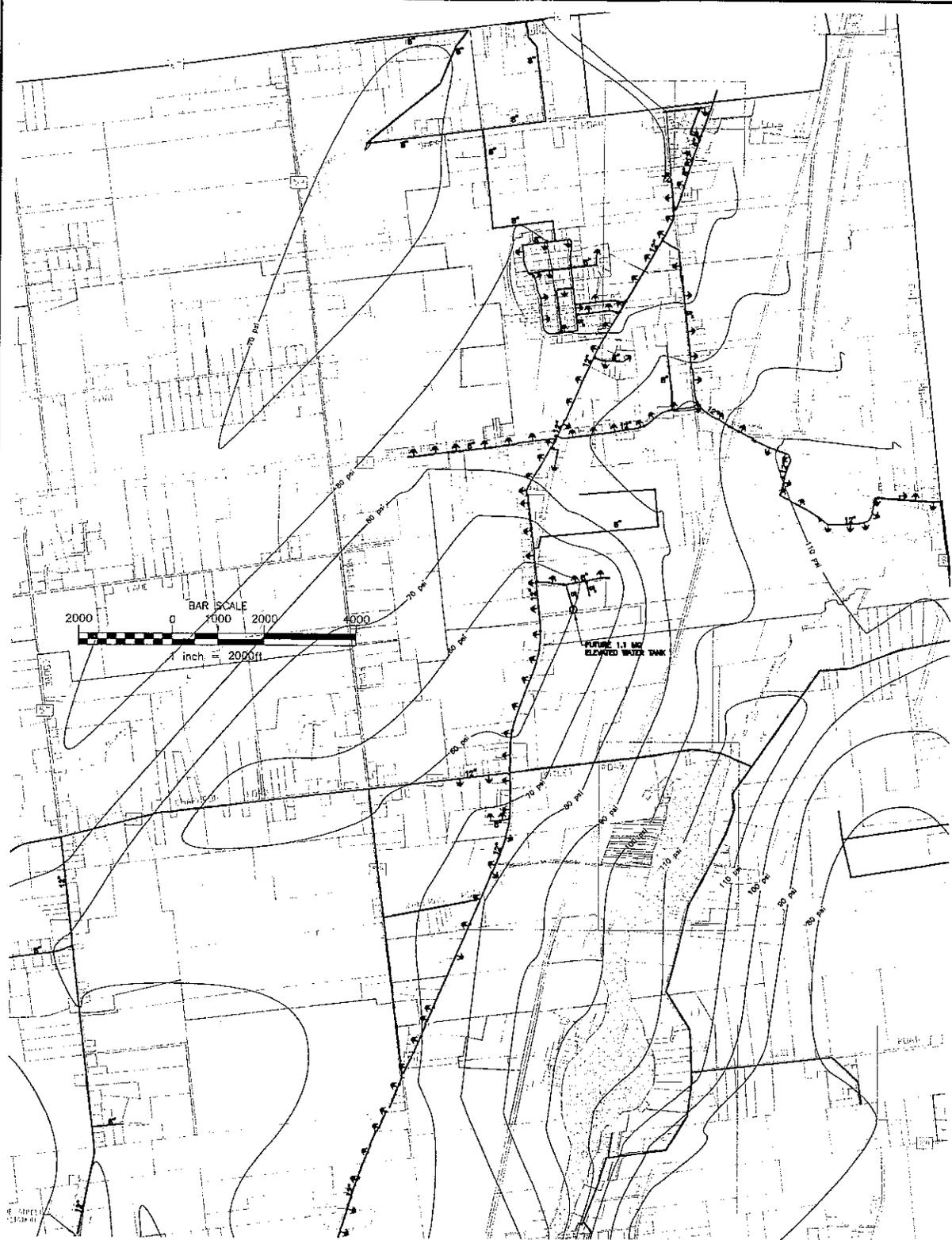
C4

SHEET 4 OF 12

DWG. NO: 06-0223

Appendix C

**System Pressure Map Under Full Build-
Out Conditions- Supply by Town of
Glenville**



WD3 FULL BUILD OUT BURNT HILLS SUPPLY PRESSURE CONTOURS.DWG

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 APPROVED: KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO: 06.6072
 SCALE : 1" = 2000'
 DATE : MARCH 3, 2006

SYSTEM PRESSURE MAP- FULL BUILD-OUT CONDITIONS WITH TOWN OF GLENVILLE SUPPLY NORTH OF BALLSTON LAKE

TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON

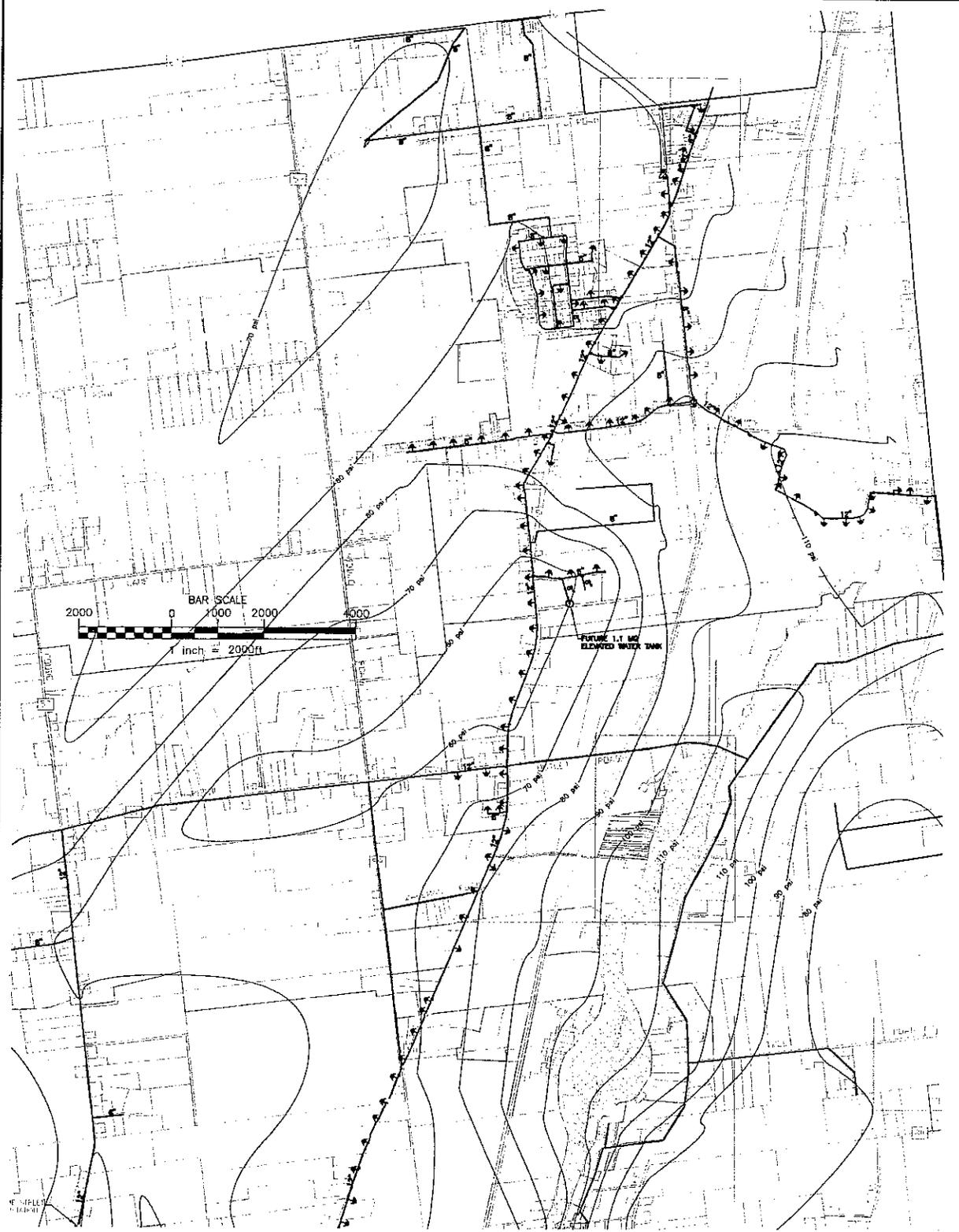
SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 * FAX 518.786.7288

ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES



C5
 SHEET 5 OF 12
 DWG. NO:06-0223



WD3 FULL BUILD OUT BURNT HILLS SUPPLY PRESSURE CONTOURS.DWG

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 APPROVED: KLC
 DRAFTED: MAF
 CHECKED: KLC
 PROJ. NO: 06.6072
 SCALE: 1" = 2000'
 DATE: MARCH 3, 2006

SYSTEM PRESSURE MAP- FULL BUILD-OUT CONDITIONS WITH TOWN OF GLENVILLE SUPPLY NORTH OF BALLSTON LAKE
TOWN OF BALLSTON WATER DISTRICT MAP

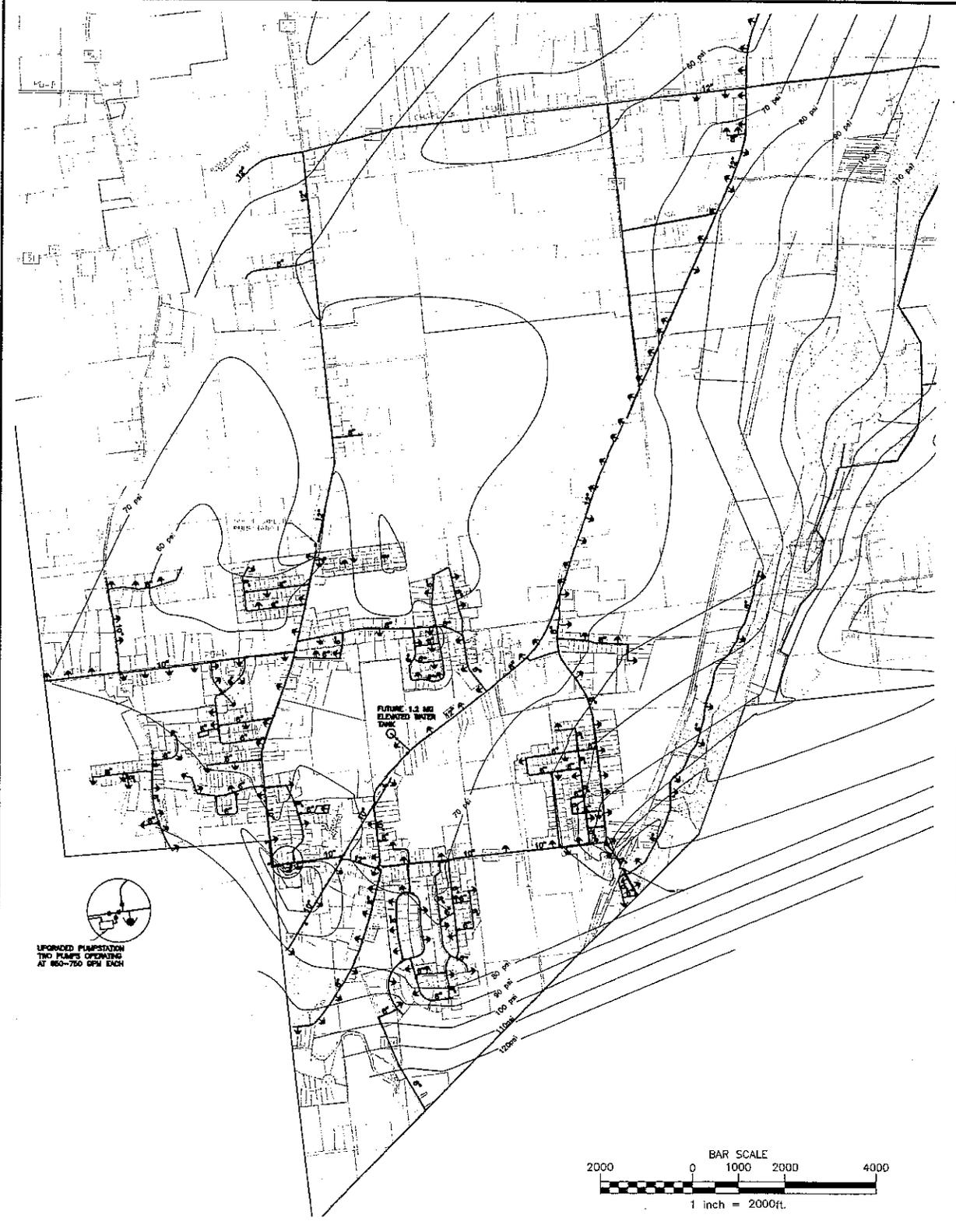
TOWN OF BALLSTON

SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 • FAX 518.786.7299
 ARCHITECTURE & BUILDING SYSTEMS ENGINEERING • CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES • SURVEY & LAND INFORMATION SERVICES



C5
 SHEET 5 OF 12
 DWG. NO: 06-0223



UPGRADED PUMPSTATION
TWO PUMPS OPERATING
AT 650-750 GPM EACH

WD 5 FULL BUILD-OUT PROPOSED ZONING AVAILABLE FIRE FLOW MAP.DWG

UNAUTHORIZED ALTERATION OR
ADDITION TO THIS DOCUMENT
IS A VIOLATION OF SECTION
7209 SUBDIVISION 2 OF THE
NEW YORK STATE EDUCATION
LAW.
© 2006
C.T. MALE ASSOCIATES, P.C.
APPROVED: KLC
DRAFTED : MAF
CHECKED : KLC
PROJ. NO: 06.6072
SCALE : 1" = 2000'
DATE : MARCH 3, 2006

**SYSTEM PRESSURE MAP- FULL BUILD-OUT
CONDITIONS WITH TOWN OF GLENVILLE SUPPLY
SOUTH WEST OF BALLSTON LAKE**

TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON

SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.

50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

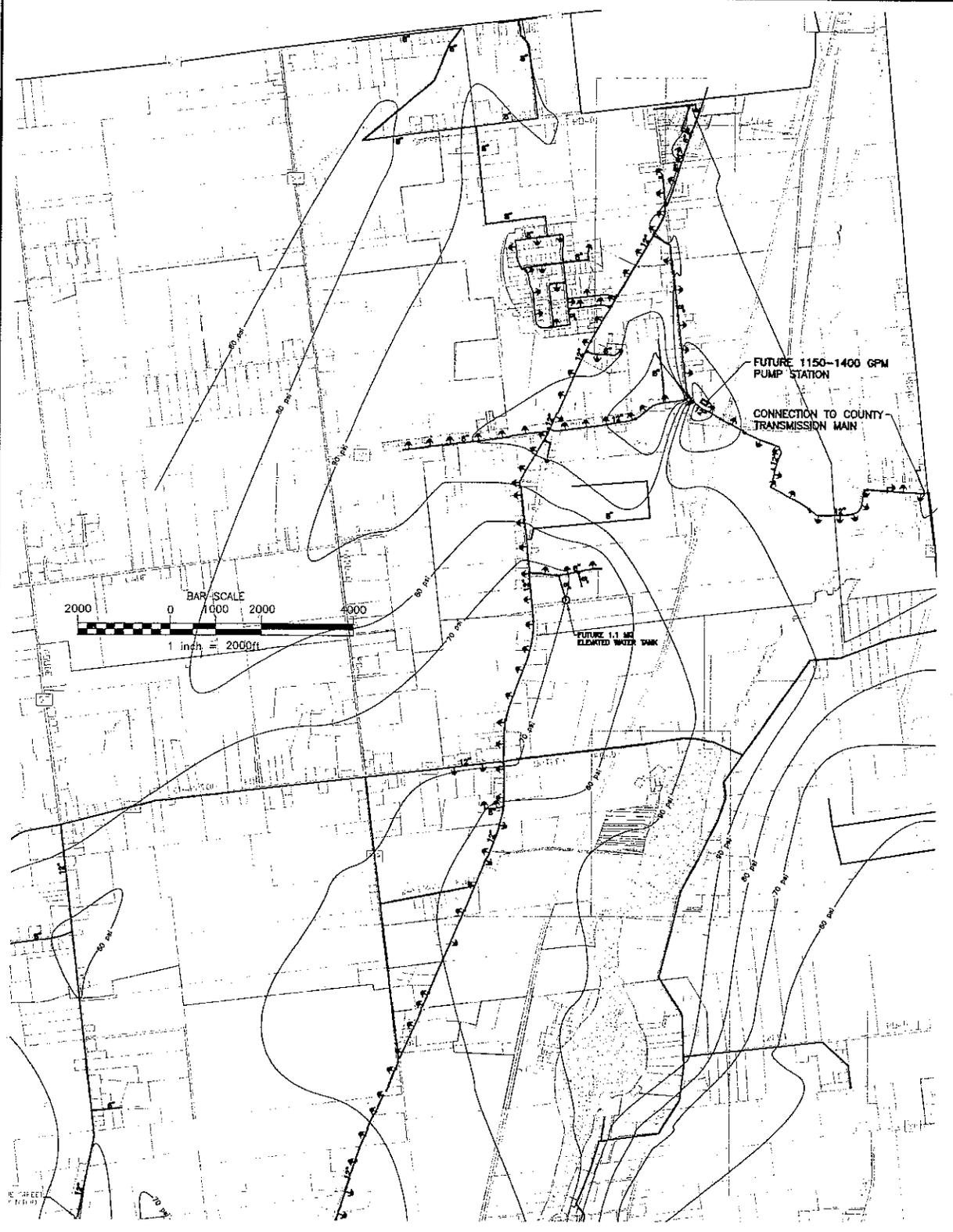
ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES



C6
SHEET 6 OF 12
DWG. NO:06-0223

Appendix D

**System Pressure Map Under Full Build-
Out Conditions- Supply by County
System**



WD4 FULL BUILD OUT COUNTY LINE SUPPLY PRESSURE CONTOURS.DWG

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 APPROVED: KLC
 DRAFTED: MAF
 CHECKED: KLC
 PROJ. NO: 06.6072
 SCALE: 1" = 2000'
 DATE: MARCH 3, 2006

**SYSTEM PRESSURE MAP- FULL BUILD-OUT
 CONDITIONS WITH COUNTY SYSTEM SUPPLY
 NORTH OF BALLSTON LAKE
 TOWN OF BALLSTON WATER DISTRICT MAP**

TOWN OF BALLSTON

SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 * FAX 518.786.7289
 ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES



C7
 SHEET 7 OF 12
 DWG. NO: 06-0223



WD 5 FULL BUILD-OUT PROPOSED ZONING AVAILABLE FIRE FLOW MAP.DWG

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 APPROVED: KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO: 06.6072
 SCALE : 1" = 2000'
 DATE : MARCH 3, 2006

**SYSTEM PRESSURE MAP- FULL BUILD-OUT
 CONDITIONS WITH COUNTY SYSTEM SUPPLY
 SOUTH WEST OF BALLSTON LAKE**
TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 * FAX 518.786.7289
 ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES

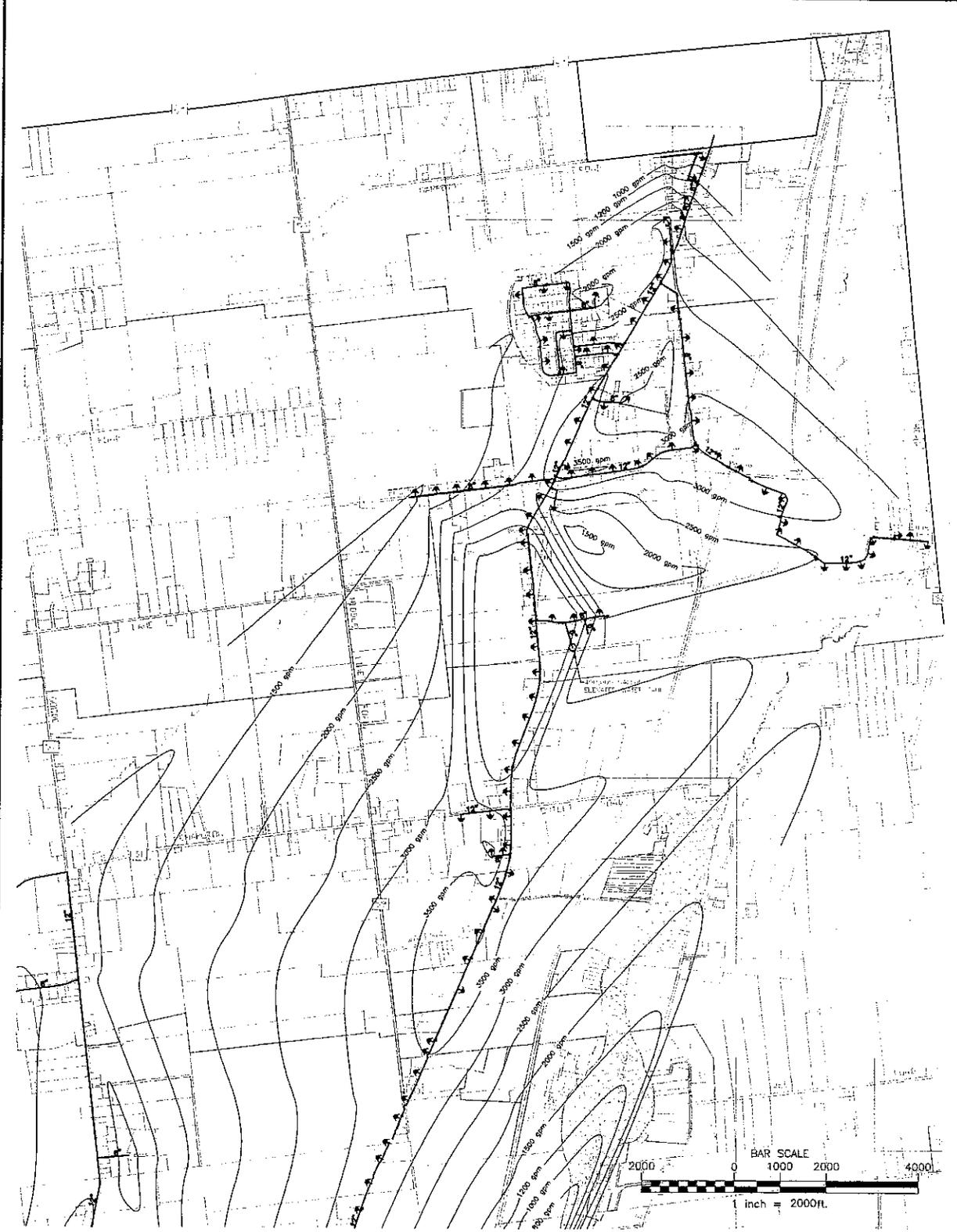


C8
 SHEET 8 OF 12
 DWG. NO:06-0223

Appendix E

C.T. MALE ASSOCIATES, P.C.

System Fire Flow Map Under Existing Conditions



UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 DESIGNED : KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO: 06.6072
 SCALE : 1" = 1000'
 DATE : MARCH 3, 2006

**AVAILABLE FIRE FLOW MAP
 UNDER EXISTING CONDITIONS
 NORTH OF BALLSTON LAKE**

TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON

SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.

50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 • FAX 518.786.7289

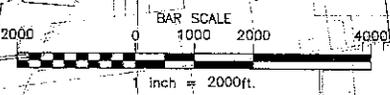
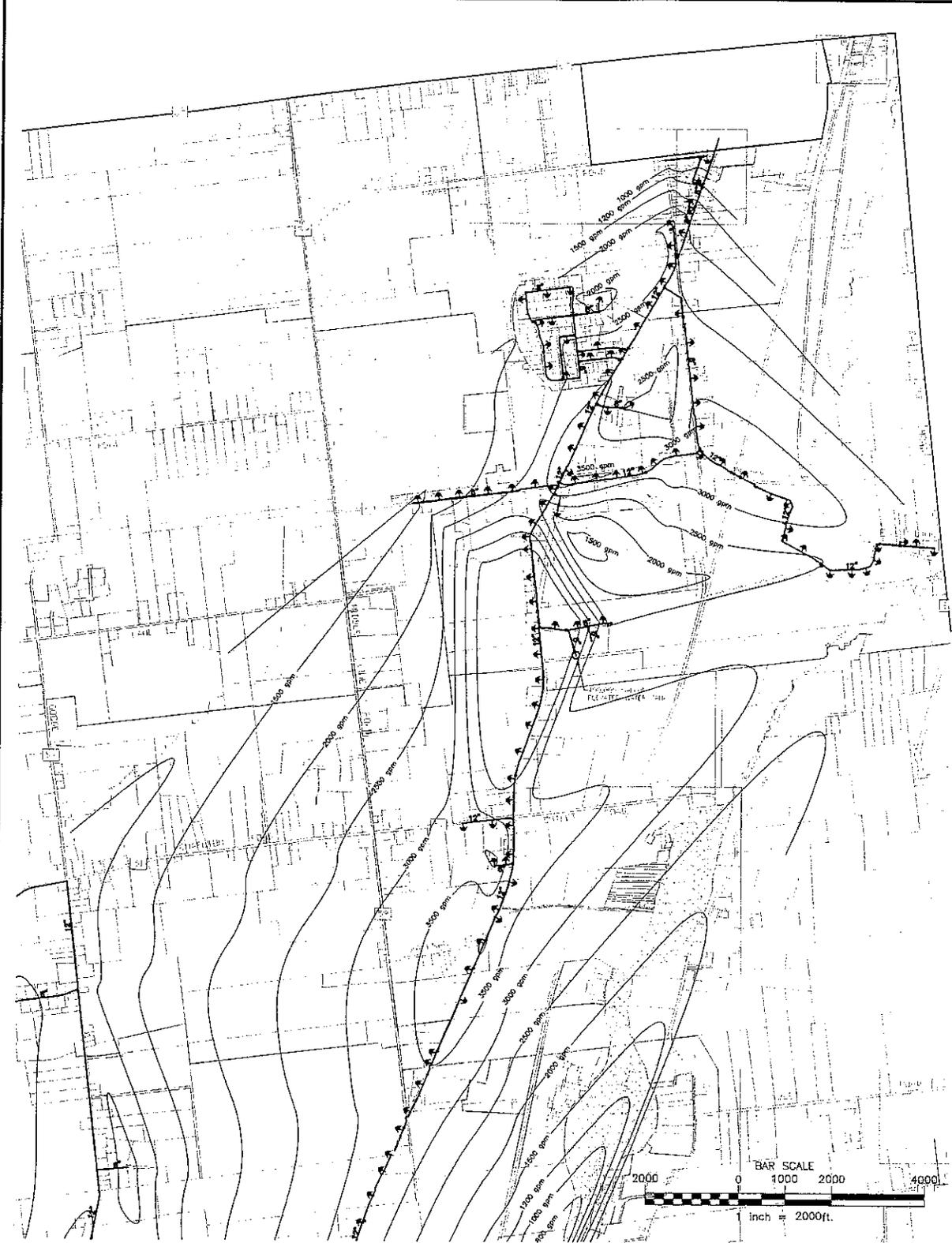
ARCHITECTURE & BUILDING SYSTEMS ENGINEERING • CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES • SURVEY & LAND INFORMATION SERVICES



C9

SHEET 9 OF 12

DWG. NO: 06-0223



UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 DESIGNED : KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO: 06.6072
 SCALE : 1" = 1000'
 DATE : MARCH 3, 2006

**AVAILABLE FIRE FLOW MAP
 UNDER EXISTING CONDITIONS
 SOUTHWEST OF BALLSTON LAKE
 TOWN OF BALLSTON WATER DISTRICT MAP**

TOWN OF BALLSTON

SARATOGA COUNTY, NY

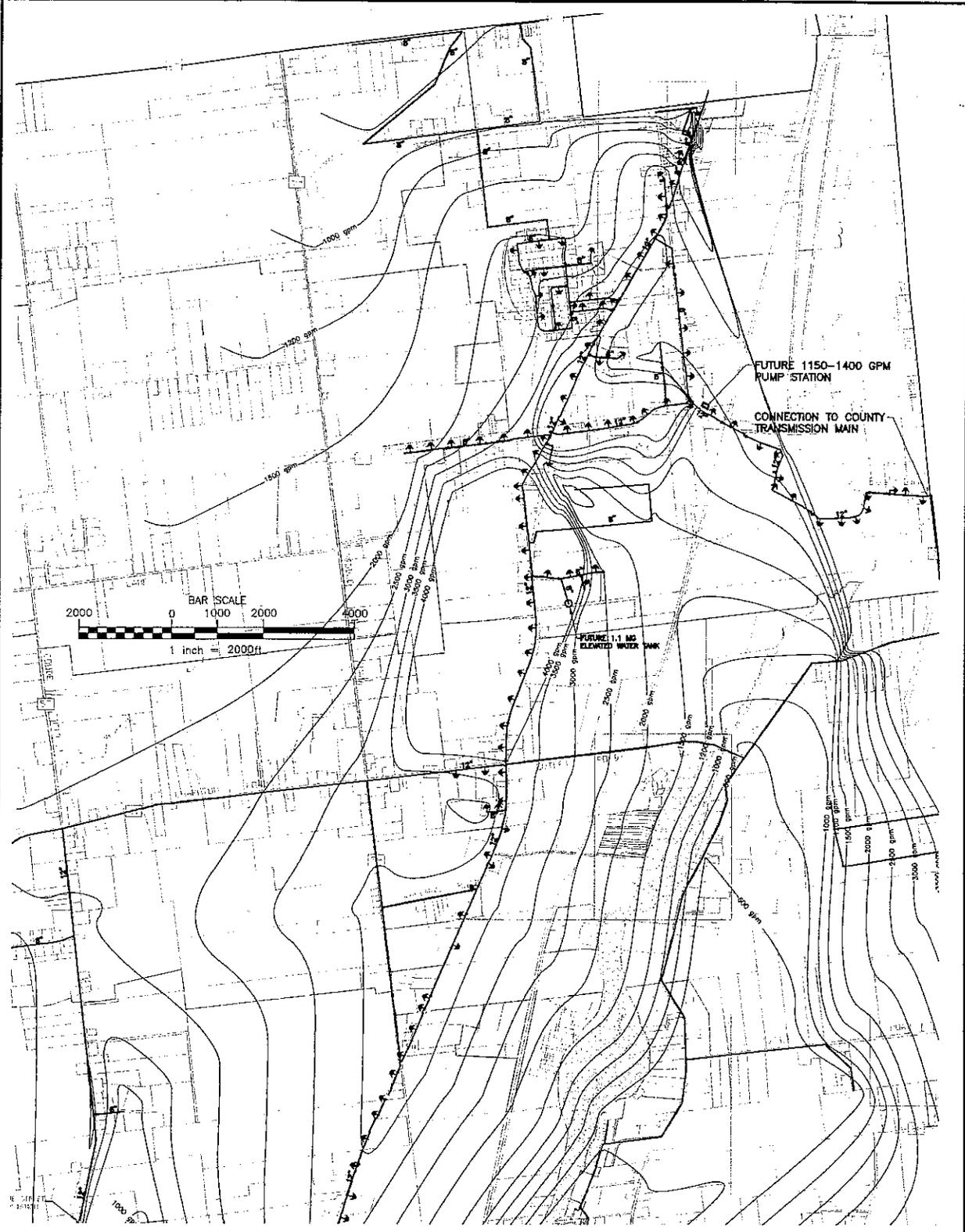
C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 * FAX 518.786.7289
 ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES



C10
 SHEET 10 OF 12
 DWG. NO: 06-0223

Appendix F

**System Fire Flow Map Under Full Build-
Out Conditions- Supply by County
System**



WD6 FULL BUILD OUT COUNTY LINE SUPPLY FIRE FLOWS.DWG

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7208 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 APPROVED: KLC
 DRAFTED: MAF
 CHECKED: KLC
 PROJ. NO: 06.6072
 SCALE: 1" = 2000'
 DATE: MARCH 3, 2006

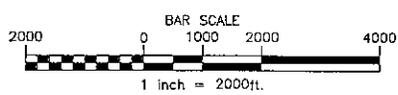
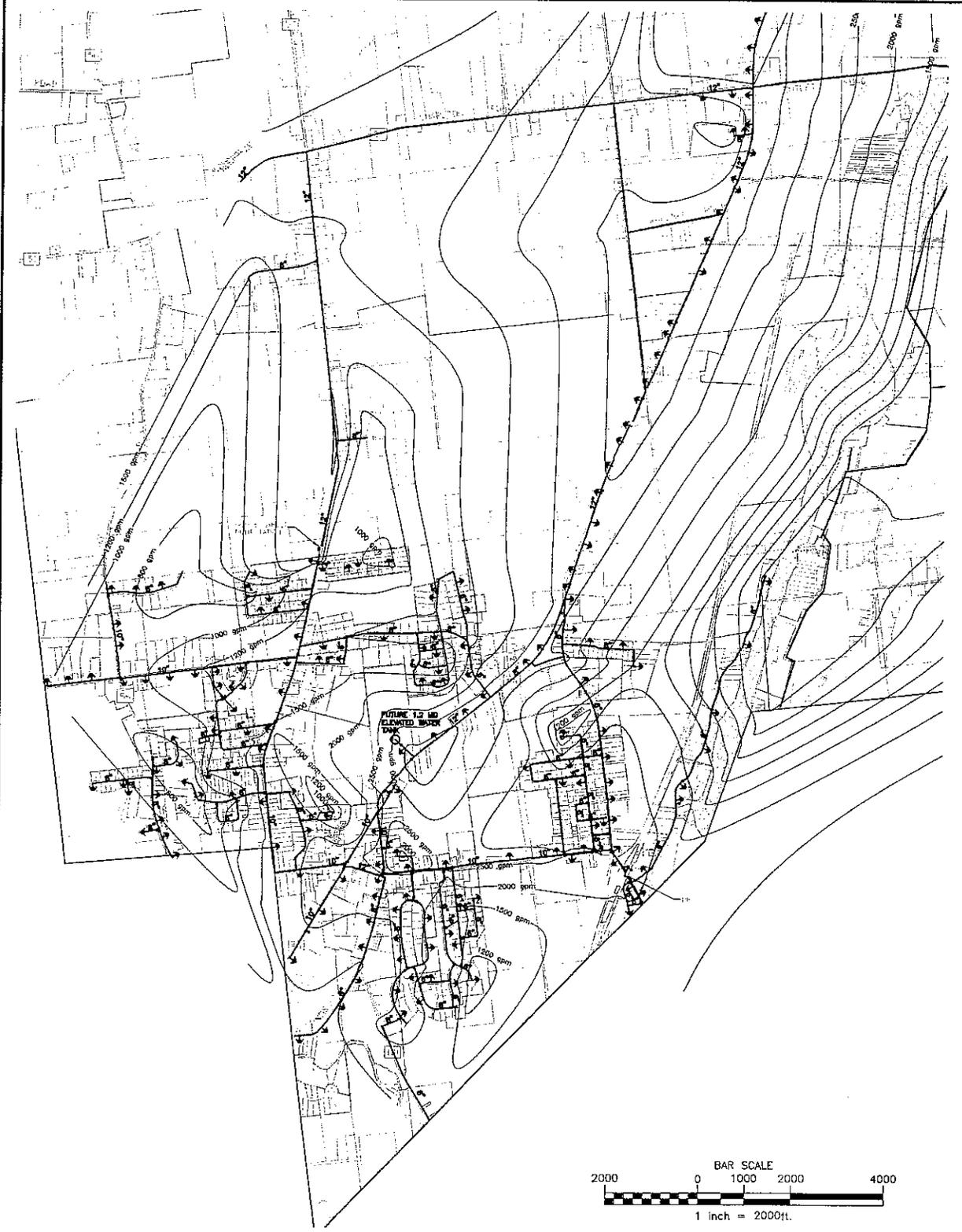
**AVAILABLE FIRE FLOW MAP- FULL BUILD-OUT
 CONDITIONS WITH COUNTY SYSTEM SUPPLY
 NORTH OF BALLSTON LAKE**
TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 * FAX 518.786.7299
 ARCHITECTURE & BUILDING SYSTEMS ENGINEERING * CML ENGINEERING
 ENVIRONMENTAL SERVICES * SURVEY & LAND INFORMATION SERVICES



C11
 SHEET 11 OF 12
 DWG. NO: 06-0223



WD 5 FULL BUILD-OUT PROPOSED ZONING AVAILABLE FIRE FLOW MAP.DWG

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
 © 2006
 C.T. MALE ASSOCIATES, P.C.
 APPROVED: KLC
 DRAFTED : MAF
 CHECKED : KLC
 PROJ. NO: 06.6072
 SCALE : 1" = 2000'
 DATE : MARCH 3, 2006

**AVAILABLE FIRE FLOW MAP- FULL BUILD-OUT
 CONDITIONS WITH COUNTY SYSTEM SUPPLY
 SOUTH WEST OF BALLSTON LAKE**

TOWN OF BALLSTON WATER DISTRICT MAP

TOWN OF BALLSTON

SARATOGA COUNTY, NY

C.T. MALE ASSOCIATES, P.C.
 50 CENTURY HILL DRIVE, P.O. BOX 727, LATHAM, NY 12110
 518.786.7400 • FAX 518.786.7299
 ARCHITECTURE & BUILDING SYSTEMS ENGINEERING • CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES • SURVEY & LAND INFORMATION SERVICES



C12
 SHEET 12 OF 12
 DWG. NO: 06-0223