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Memorandum

To: Abby Goldenfarb
Trinity Financial, Inc.
75 Federal Street, 4th Floor
Boston, MA 02110

Date: May 20, 2022

Project #: 15677.00

From: VHB

Re: Medfield State Hospital Strategic Reuse
Preliminary Utilities and Infrastructure Memo
Proposed Re-Zoning at Town Meeting

This memorandum is intended to serve as a preliminary due diligence evaluation of utility and infrastructure design components related to the Medfield State Hospital Strategic Reuse Project (the "Project"), submitted to the Town of Medfield Planning Board in support of the proposed Project to go before Town Meeting.

Summary

Site Description

The Project Site is an approximately 49-acre parcel of land (the Site) located at Hospital Road in Medfield, Massachusetts. The Site lies within the surface watershed of the Charles River and is bounded by the Charles River and Medfield Charles River State Reservation to the West/ North West; Dover Sherborn High School to the North East; Harding Street to the East; Chapel Hill Landing Condominiums to the South East; and N Meadows Road/ Route 27 to the South/ South West.

Project Description

The Project consists of a redevelopment of the existing Medfield State Hospital site to include a combination of 334 apartment units which include 502 bedrooms, a Clubhouse, and Cultural Arts Center. The project will preserve public access and as many of the historic buildings as feasible. The redevelopment will include a replacement of the aging on-site utilities, including water, sewer, and storm drain.

The following preliminary utility and infrastructure evaluation has been prepared based on the proposed redevelopment program included in [Appendix A](#). As shown on Exhibit A1, the Project is understood to include redevelopment of Buildings #1 through #29 and demolition of Buildings #10 and #27A. It is understood that the Town will retain ownership of Buildings #30-#36, therefore for the purposes of this analysis, VHB has assumed that those buildings are re-purposed by others to the program use identified in the Medfield State Hospital Strategic Reuse Master Plan, dated 2018. The Cultural Alliance of Medfield (CAM) will also be undertaking a new Arts Center in buildings #24 and #25.

As shown on the FEMA Flood Insurance Rate Map included in [Appendix B](#), the Project Site is not located within the 100-year Floodplain. There are no wetland resource areas within the Site.

Preliminary Utility and Infrastructure Assessment:

The design and engineering team have assessed the proposed utility impacts anticipated with the Project and offers the summary below. Please note that the overall site area warranting infrastructure to/from Hospital Road includes the proposed Redevelopment, and the CAM/Town Retained buildings by others. The program comparison has been

provided to identify the capacity considerations of the Redevelopment Project alone, but also in the context of the full/potential development of the Site for clarification. A preliminary Utility Programming Concept has been included in [Appendix A](#) to outline the intent of the main utility corridors anticipated to support the Project.

Sanitary Sewer

Previous analysis of the wastewater generation was performed by Pare Engineering Corporation based on the redevelopment program as specified in the Medfield State Hospital Strategic Reuse Master Plan, dated 2018, which estimated the wastewater generation to be **96,910 gallons per day (GPD)**. This analysis, including a peer review performed by Environmental Partners, noted that the additional wastewater generated by the Project could be accommodated by the downstream municipal system with the improvements as identified in the Proposed Sewer Plan. The proposed redevelopment is anticipated to generate **56,295 GPD** of wastewater based on MassDEP rates per 310 CMR 15: System Sewage Flow Design Criteria for peak estimated sewer generation. Due primarily to the reduction in proposed residential units from the original Master Plan to the proposed redevelopment, the wastewater generation associated with the redevelopment is held well within the capacity identified in the original analysis and therefore still sufficient capacity in the municipal system to accommodate. A full program summary of both the initial Master Plan program and redevelopment programs, with associated wastewater generation is included in [Appendix A](#).

Sanitary sewer utility improvements associated with the Project will be generally consistent with the recommendations of the 2018-2020 analysis. Due to concerns with combined sewer systems, aged infrastructure/clay pipe, and sources of inflow and infiltration (I&I) and illicit connections, the Project will provide a network of new PVC sanitary sewer mains/services and precast sanitary sewer manholes to support the redevelopment, all installed to the Medfield Water & Sewer Department standards. New infrastructure will be installed within the Site and extended down to Hospital Road. It is also anticipated that the project will require a sewer extension/replacement from Cottage Street, down Hospital Road to Copperwood Road. While ultimate sizes of new sanitary sewer services and mains will be verified through design, the proposed network will mimic the intent of the Pare Engineering Corporation proposed Sewer Plan, dated February 13, 2020 and included in [Appendix A](#).

As a result of the new sanitary utility network, the Project is anticipated to provide a near total reduction of inflow and infiltration (I&I) into the sanitary sewer system as the existing sewer system is being replaced, removing any sources of inflow/infiltration or illicit connections.

Water

The Project team has evaluated the proposed program against the water system improvements identified in the November 14, 2019 memorandum included in the Master Plan, and utilize the Proposed Water Plan as prepared by Pare Engineering Corporation, dated September 25, 2019 for the preliminary basis of design.

Estimated water demand for the Redevelopment Project is **61,925 GPD** based on a 10-percent increase over the estimated sewer flows to account for non-consumptive uses. This usage is below the projected demand of approximately **114,000 GPD** from the water and sewer report by Pare Engineering, which stated that the projected demand could be accommodated under current authorized limits.

The Project will include all new water distribution infrastructure designed and installed to the Medfield Water & Sewer Department's standards and will be fed via the existing water storage tank located in The Water Tower sub-district and existing 16" water main that extends down towards Hospital Road. This will include installation of a new 8" ductile iron water distribution loop system with associated copper building service connections, gate valves, hydrants and a

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minimum of two (2) connections back to the active portion of existing 16" water main located at the eastern portion of the Site and the existing 12" main located in Hospital Road if an additional system loop is needed.

Water system improvements shall also include fire service connections to the renovated buildings as required to support the building life safety systems.

Fire Prevention

The Project will provide and maintain emergency vehicle access to all buildings, structures and places of assembly within the Site via site drives and access lanes in coordination with the Medfield Fire Department. Spacing and location of fire hydrants shall be provided in accordance with NFPA and the Medfield Fire Department, throughout the development at a minimum of 500-ft apart as well as no less than 100-ft from any building exterior fire department connection (FDC), where applicable.

It is anticipated that the buildings will be sprinklered as required by Code.

Stormwater Management

Upgrades to the Site's stormwater management system will be provided to ensure positive drainage with the Site Plan modifications and bring the Project up to current regulatory requirements. The Project will be designed to comply with the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards.

Where feasible, the Project team will look to utilize existing storm drain infrastructure for conveyance of flows, supplemented with new inlets to reflect modifications to the site layout and grading. VHB will perform hydraulic calculations to support sizing of the proposed closed-drainage system and replace/up-size any infrastructure that is compromised and/or has insufficient capacity.

A preliminary analysis of existing and proposed cover types has been performed and is outlined in [Appendix B](#), Exhibits B3 and B4, and are summarized in Table 1.0 below. It should be noted that preliminary cover types were established for an approximate watershed boundary beyond the redevelopment-specific parcel limits:

Table 1.0 Existing and Preliminary Proposed Areas Summary

Cover Type	Existing Conditions (Acres)	Proposed Conditions (Acres)	Delta (Acres)
Building	6.1	5.0	(1.1)
Site Impervious	12.0	12.3	0.3
Pervious	40.4	41.1	0.8
Total	58.5	58.5	-

Source: VHB, based on schematic site plan prepared by ICON Architects, dated July 7, 2021

The Project will ultimately prepare a full hydrologic report to evaluate existing and proposed conditions, including a hydrologic model to determine existing and proposed peak runoff rates and volumes for storm events with recurrence intervals of 2-, 10- and 100-years, and provide stormwater attenuation BMPs to mitigate any increase in runoff associated with the Project. Based on the preliminary cover type comparison, it is anticipated that the proposed redevelopment will not result in a significant change in impervious cover types which would require volume

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mitigation. However, as part of the full analysis all design points will be evaluated for pre- and post- conditions ensuring no increases in peak runoff rates of the latter.

The Project will provide water quality treatment per the Massachusetts Department of Environmental Protection (DEP) stormwater requirements. Opportunities for low-impact development stormwater solutions will be prioritized where feasible, and focus on providing water quality treatment of new site impervious runoff surfaces. According to the Natural Resources Conservation Service (NRCS), included in [Appendix B](#), surface soils on the Site include Woodbridge-Urban land complex and Paxton fine sandy loam, and are classified primarily as Hydrologic Soil Group (HSG) C/D and C, respectively. These Soil conditions are generally not conducive to infiltration methods, but LID stormwater solutions could still be utilized to an extent for water quality purposes when supplemented with underdrainage systems.

Electrical and Telecommunications

The Project anticipates implementing high-efficiency energy systems, cable and network connectivity. New electrical and telecommunications services will be evaluated for connection to the Site via Hospital Road. From the existing overhead wires, all new electrical and telecommunications infrastructure is anticipated to be installed in below-grade ductbanks as feasible.

Gas

The Project does not anticipate providing gas utility services for the Project in an effort to focus on the benefit of high-efficiency electric energy systems.

APPENDICES:

Appendix A: Water/Sewer Appendix

- Exhibit A1: Program Reference Key Plan
- Exhibit A2: Program Comparison for Infrastructure Assessment
- Exhibit A3: Utility Programming Concept
- Exhibit A4: Proposed Sewer Plan, prepared by Pare Engineering Corporation, dated February 13, 2020
- Exhibit A5: Proposed Water Plan, prepared by Pare Engineering Corporation, dated September 25, 2019

Appendix B: Stormwater Appendix

- Exhibit B1: FEMA Floodplain
- Exhibit B2: NRCS Web Soil Survey
- Exhibit B2: Existing Cover Areas
- Exhibit B3: Preliminary Proposed Cover Areas

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A

Water/Sewer Appendix

Exhibit A1: Program Reference Key Plan

Exhibit A2: Program Comparison for Infrastructure Assessment

Exhibit A3: Utility Programming Concept

Exhibit A4: Proposed Sewer Plan, Pare Engineering, 2/3/2020

Exhibit A5: Proposed Water Plan, Pare Engineering, 9/25/2019

Proposed Redevelopment	
Town Retained Building	
CAM Building	



5/20/2022

EXHIBIT A2

Project: Medfield State Hospital Redevelopment
 Location: Medfield, MA
 Calculated by: RD
 Checked by: JK
 Title: Exhibit A1 - Program Comparison for Infrastructure Assessment

Project # 15677.00
 Sheet 1 of 1
 Date: 5/20/2022
 Date: 5/20/2022



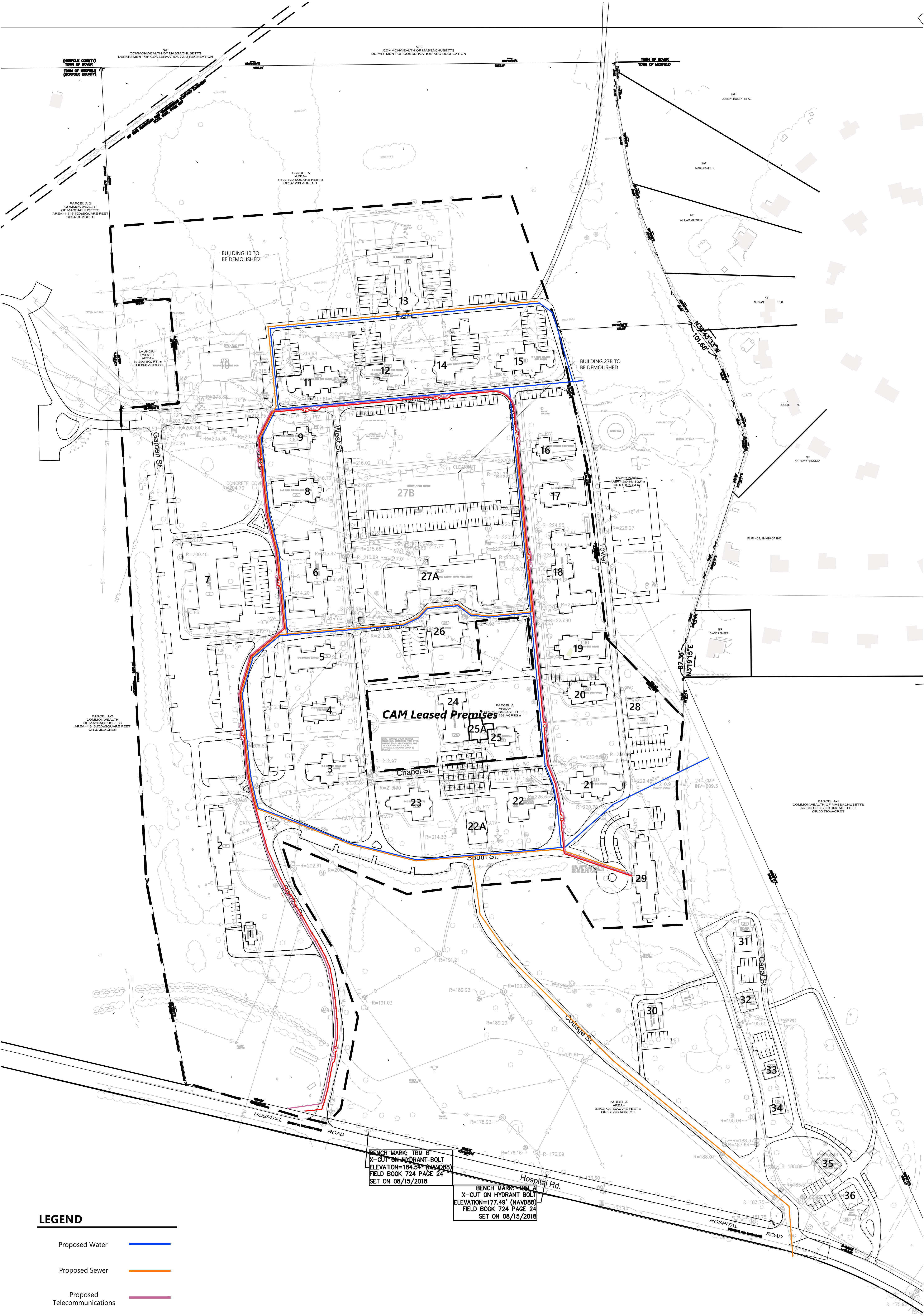
		2022 Proposed Redevelopment Summary				2018-2019 Master Plan/Capacity Analysis ¹				
BLDG #	BUILDING NAME	BLDG. SF W/O ATTIC/BASEMENT	TOTAL BEDROOMS	Sewer Generation (GPD)	Water Generation (GPD)	BLDG. SF W/O ATTIC/BASEMENT	TOTAL BEDROOMS	Sewer Generation (GPD)	Water Generation (GPD)	
1	HILLSIDE HOUSE	2,336	6	660	726	2,336	0	175	206	
2	WEST HALL (MAIN)	17,470	27	2,970	3,267	28,075	40	4,400	5,176	
3	WEST HALL (WINGS)									
3	C-2 BLDG	11,426	14	1,540	1,694	16,226	20	2,200	2,588	
4	D-2 BLDG	6,688	10	1,100	1,210	8,975	18	1,980	2,329	
5	E-2 BLDG	11,094	14	1,540	1,694	14,670	20	2,200	2,588	
6	F-2 WARD	21,220	38	4,180	4,598	29,733	48	5,280	6,212	
7	S BLDG TRAINING	29,960	39	4,290	4,719	47,423	0	8,407	9,890	
8	L-2 WARD	11,094	14	1,540	1,694	17,495	20	2,200	2,588	
9	D-3 WARD	6,688	10	1,100	1,210	8,975	16	1,760	2,071	
10	MACHINE SHOP ²					18,000	0	900	1,059	
	10-B - N/A ²	0	0	0	0	27,000	36	3,960	4,659	
	10-C - N/A ²					27,000	54	5,940	6,988	
	10-D - PAINT SHOP ²					600	0	45	53	
	C-3 WARD	11,426	14	1,540	1,694	16,226	18	1,980	2,329	
12	B-3 WARD	10,120	14	1,540	1,694	14,425	18	1,980	2,329	
13	R BLDG	21,400	40	4,400	4,840	0	0	0	0	
14	B-4 WARD	10,120	14	1,540	1,694	14,425	18	1,980	2,329	
15	C-4 WARD	5,713	14	1,540	1,694	16,226	18	1,980	2,329	
16	D-4 WARD	6,688	10	1,100	1,210	8,975	8	600	706	
17	L-1 BLDG	11,094	14	1,540	1,694	17,495	9	675	794	
18	F-1 BLDG	21,220	38	4,180	4,598	29,733	24	2,643	3,109	
19	E-1 BLDG	11,094	14	1,540	1,694	14,670	10	750	882	
20	D-1 BLDG	6,688	10	1,100	1,210	8,975	9	990	1,165	
21	C-1 BLDG	11,426	14	1,540	1,694	16,226	10	750	882	
22	B-1 BLDG SOUTHGATE	10,120	14	1,540	1,694	15,272	8	880	1,035	
22A	ADMIN. A BLDG	7,250	10	1,100	1,210	15,412	0	1,156	1,360	
23	B-2 BLDG	10,120	14	1,540	1,694	15,272	8	880	1,035	
26	CLUBHOUSE	11,834	0	888	976	11,834	0	888	1,044	
27-A	SERVICE BLDG (MAIN)	47,000	69	7,590	8,349	95,224	84	13,299	15,646	
	SERVICE BLDG (WINGS)									
27-B	BAKERY / FOOD SERVICE	0	0	0	0	0	0	0	0	
28	TB COTTAGE	2,500	0	188	206	40,500	100	15,000	17,647	
29	EAST HALL (MAIN)	17,470	27	2,970	3,267	20,459	24	2,640	3,106	
	EAST HALL (WINGS)									
SUBTOTAL		REDEVELOPMENT	351,259	502	56,295	61,925	617,857	638	88,518	104,134
24	LEE CHAPEL	15,593	0	1,169	1,286	15,593	0	1,169	1,376	
25	INFIRMARY	8,311	0	623	686	8,311	0	623	733	
25A	ARTS CENTER EXPANSION	2,603	0	195	215	0	0	0	0	
SUBTOTAL ³		CAM	26,507	0	1,988	2,187	23,904	0	1,793	2,109
30	SUPERINTENDENTS HOUSE	4,369	4	440	484	4,369	4	440	518	
31	EMPLOYEE COTTAGE 1	2,200	4	440	484	2,200	4	440	518	
32	EMPLOYEE COTTAGE 3	2,560	3	330	363	2,560	3	330	388	
33	EMPLOYEE COTTAGE 5	2,526	3	330	363	2,526	3	330	388	
34	EMPLOYEE COTTAGE 6	4,000	6	660	726	4,000	6	660	776	
35	STONEGATE HOUSE COTTAGE	4,000	6	660	726	4,000	6	660	776	
36	ASST. SUPT'S HOUSE	4,000	6	660	726	4,000	6	660	776	
SE QUAD OPT. B		0	0	0	0	12,600	28	3,080	3,624	
SUBTOTAL ⁴		FUTURE - TOWN RETAINED	23,655	32	3,520	3,872	23,655	60	6,600	7,764
TOTAL TO HOSPITAL ROAD ⁵			401,421	534	61,803	67,983	665,416	698	96,910	114,007

Notes:

- Program summary and water/sewer generation analysis performed by PARE Engineering and peer reviewed by Environmental Partners based on 2018 Master Plan.
- Building #10 to be demolished under proposed redevelopment.
- Estimated program for Cultural Alliance of Medfield are based on Medfield Cultural Arts Center Schematic Design Pricing, 4/10/2020
- Buildings #30-36 within the Arboretum District are understood to be retained by the Town and are not part of the proposed redevelopment. For purposes of this utility capacity comparison, it has been assumed that those buildings are re-purposed as designated in the Medfield State Hospital Strategic Reuse Master Plan, 2018. Total program summary from prior analysis had excluded program area for SE Quad Option B.
- Additional program information provided for total of proposed and future areas to Hospital Road systems for holistic evaluation of water/sewer infrastructure. Scope relative to proposed redevelopment subtotalled to flag what is attributed from that portion of the project.

SUMMARY TABLE				
	Total Building Area (SF)	Total Bedrooms (EA)	Sewer Generation (GPD)	Water Generation (GPD)
2022 Program	401,421	534	61,803	67,983
2018/2019 Program	665,416	698	96,910	114,007
Difference	-263,995	-164	-35,107	-46,024

Ownership Legend	
Proposed Redevelopment	
Town Retained Buildings	
CAM Buildings	



LEGEND

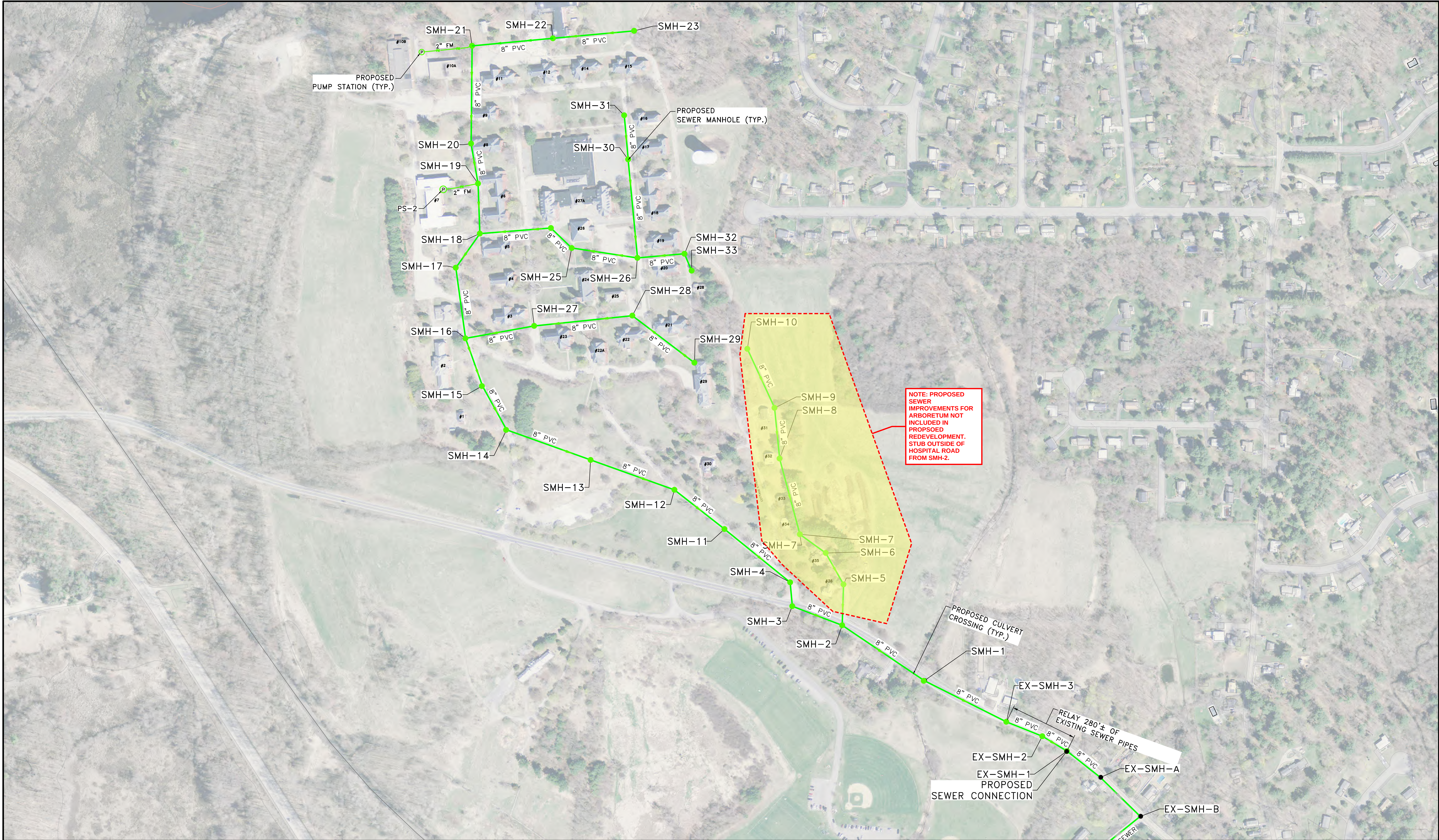
- Proposed Water
- Proposed Sewer
- Proposed Telecommunications
- Proposed Electric

BENCH MARK: TBM B
X-CUT ON HYDRANT BOLT
ELEVATION=184.58' (NAVD88)
FIELD BOOK 724 PAGE 24
SET ON 08/15/2018

BENCH MARK: TBM A
X-CUT ON HYDRANT BOLT
ELEVATION=177.49' (NAVD88)
FIELD BOOK 724 PAGE 24
SET ON 08/15/2018



0 50 100 200Feet



Scale: 1"=180'

0 90' 180' 360'

ESTIMATED WASTEWATER FLOW: 96,910 GPD



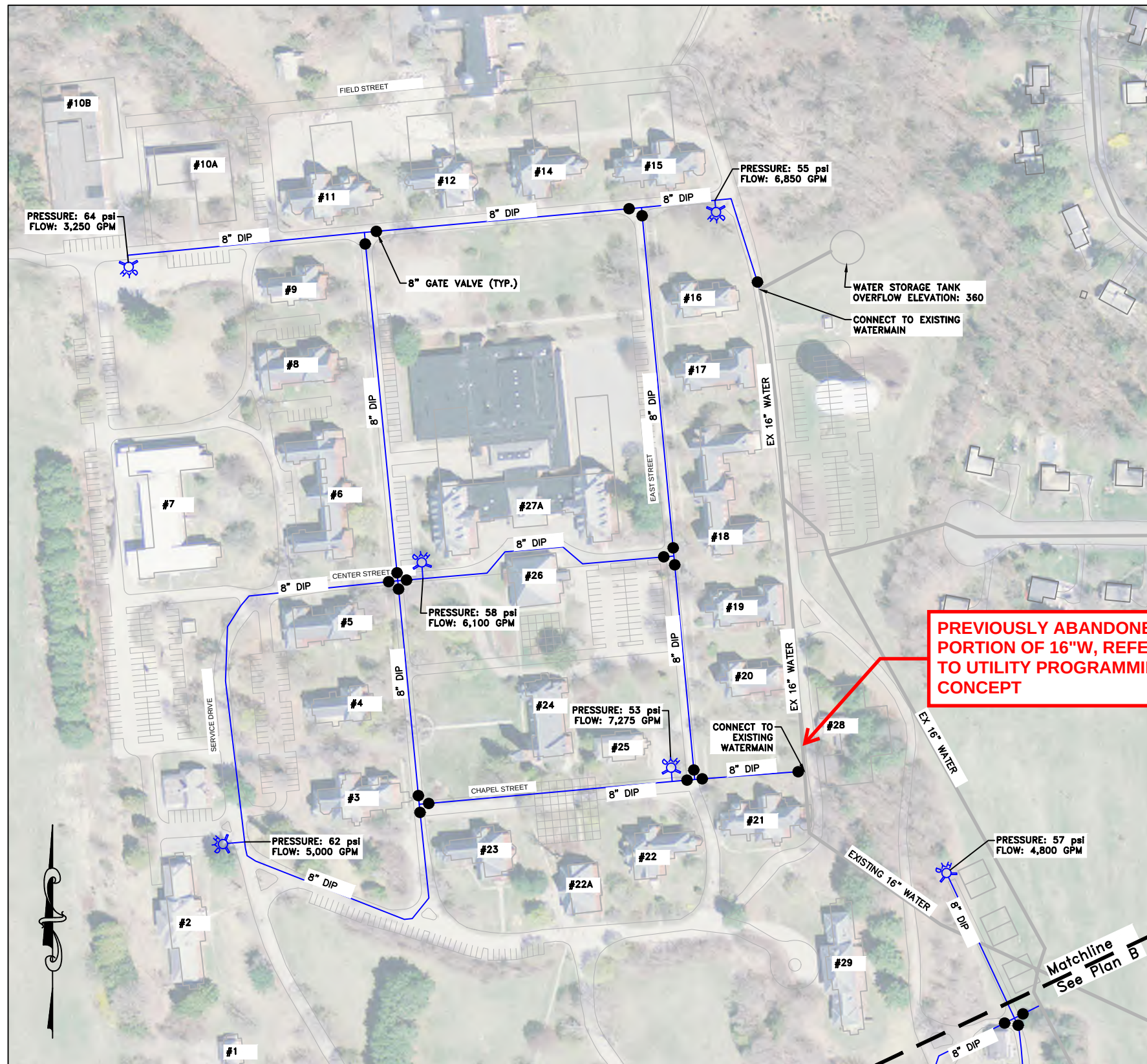
PARE ENGINEERING CORPORATION
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401 - 334 - 4100

SCALE:	AS SHOWN
DATE:	02/13/2020
PROJECT NO.:	17014.02
DESIGNED BY:	CRL
DRAWN BY:	CRL
CHECKED BY:	LMG

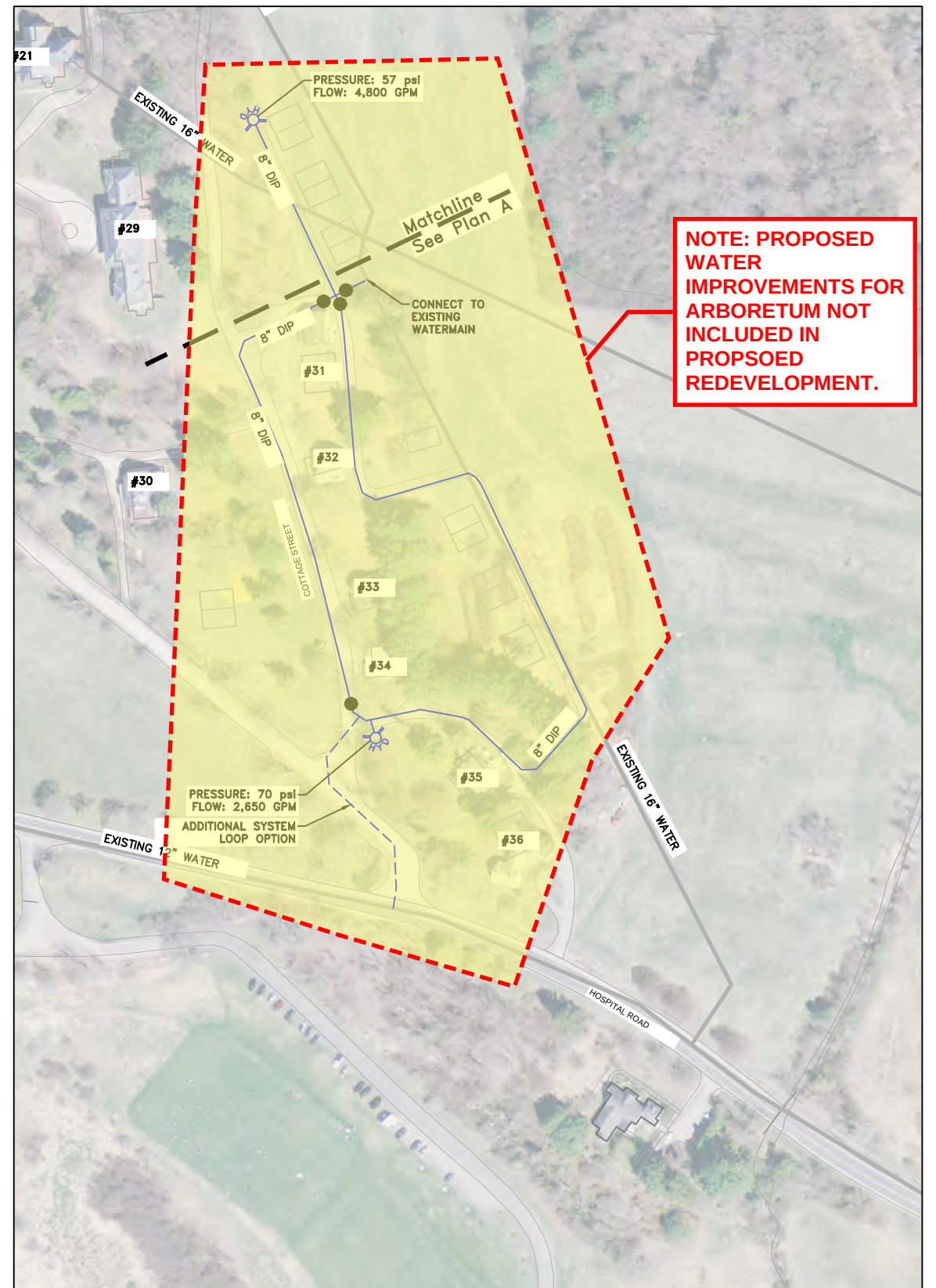
Medfield State Hospital
Utility Design
PROPOSED SEWER PLAN
Medfield, MA

FIGURE NO.

2



PLAN A



PLAN B

ESTIMATED WATER DEMAND (MAX DAY): 114,012 GPD



PARE ENGINEERING CORPORATION
3 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100

SCALE:	AS SHOWN
DATE:	02/14/2020
PROJECT NO.:	17014.02
DESIGNED BY:	LMG
DRAWN BY:	LMG/CRL
CHECKED BY:	LMG

Medfield State Hospital
Utility Design
PROPOSED WATER PLAN
Medfield, MA

FIGURE NO.

1

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B

Stormwater Appendix

Exhibit B1: FEMA Floodplain Map

Exhibit B2: NRCS Web Soil Survey

Exhibit B3: Existing Cover Areas

Exhibit B4: Preliminary Proposed Cover Areas

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only inlandward of 0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Massachusetts State Plane Mainland Zone (FIPS zone 2001). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was derived from digital orthophotography. Base map files were provided in digital format by Massachusetts Geographic Information Systems (MassGIS). Ortho imagery was produced at a scale of 1:5,000. Aerial photography is dated April 2005.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

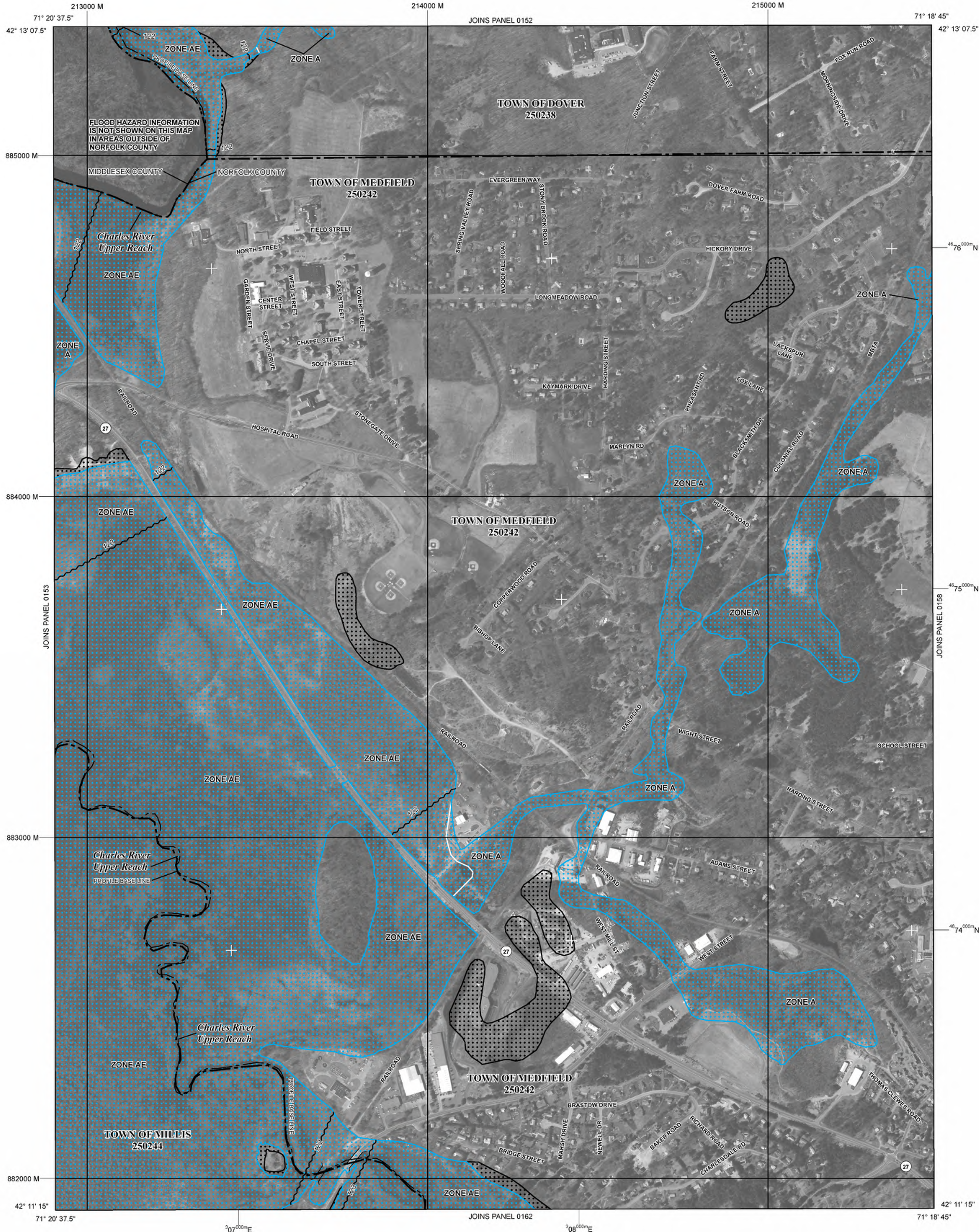
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations** and **floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/nfp>.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE AE** No Base Flood Elevations determined.
- ZONE AH** Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AR** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE A99** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE V** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- Culvert
- Bridge
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 4989000 M
- 1000-meter ticks: Massachusetts State Plane Mainland Zone (FIPS Zone 2001), Lambert Conformal Conic projection
- 1000-meter Universal Transverse Mercator grid values, zone 19N
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- MAP REPOSITORIES
- Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
- July 17, 2012
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0154E
FIRM
FLOOD INSURANCE RATE MAP
NORFOLK COUNTY,
MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 154 OF 430
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DOVER, TOWN OF	250238	0154	E
MEDFIELD, TOWN OF	250242	0154	E
MILLIS, TOWN OF	250244	0154	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25021C0154E
EFFECTIVE DATE
JULY 17, 2012
Federal Emergency Management Agency

Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
 Survey Area Data: Version 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 4, 2020—Oct 19, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	2.0	5.0%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	3.0	7.7%
623C	Woodbridge-Urban land complex, 3 to 15 percent slopes	C/D	34.4	87.3%
Totals for Area of Interest			39.4	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher





LEGEND

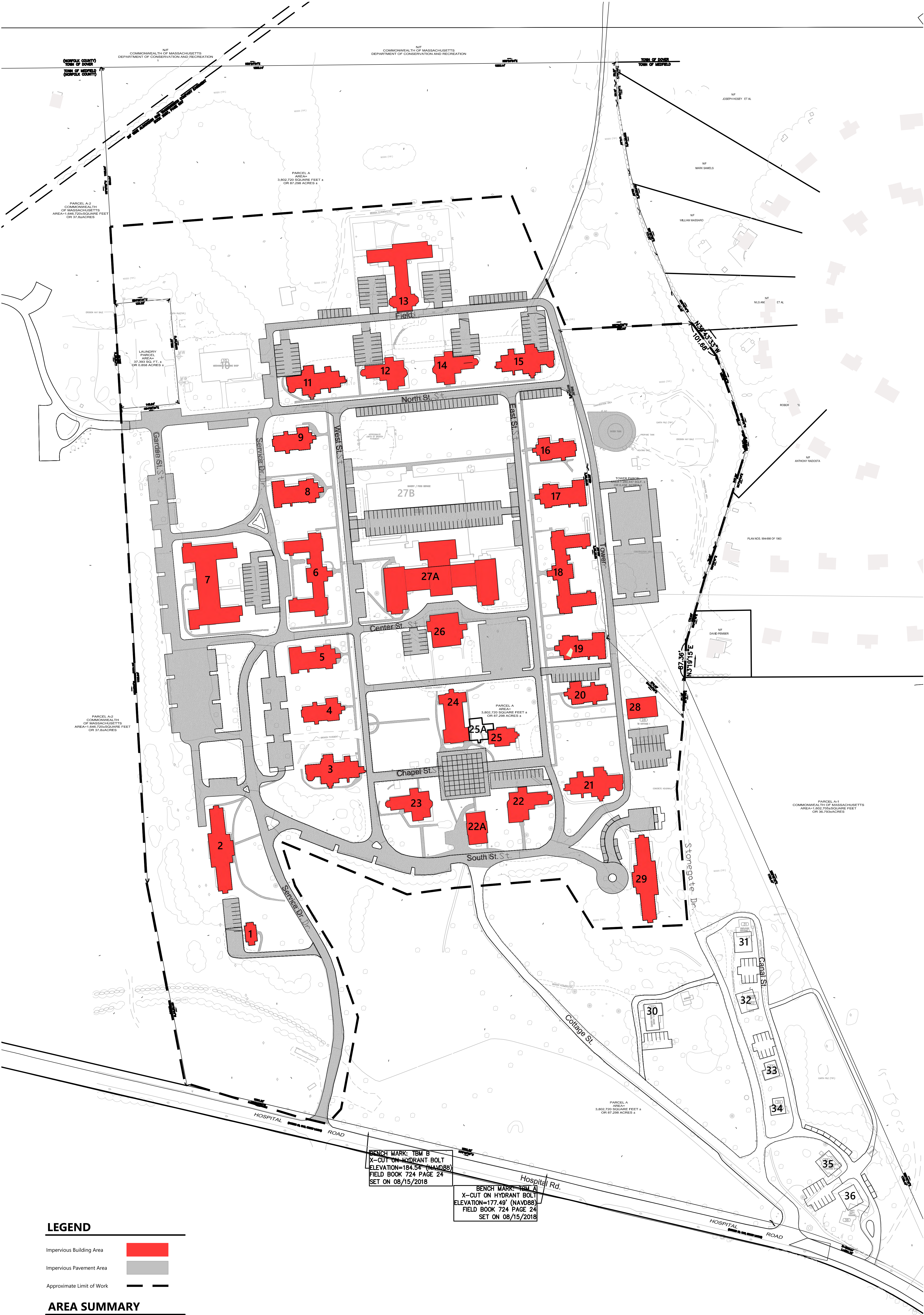
- Impervious Building Area
- Impervious Pavement Area
- Approximate Limit of Work

AREA SUMMARY

Total Building Area = 265,070
Total Pavement Area = 523,630
Total Impervious Area = 788,700



0 50 100 200Feet



0 50 100 200feet

