TETRA TECH

MEMORANDUM

To: **Westwood Planning Board**

Fr: Tetra Tech

Re: **University Station**
Updated Utility Summary

Dt: November 30, 2012

This utility memorandum has been drafted to provide an update of anticipated utility requirements for the proposed University Station project. After sitting idle during the recent economic downturn, the Westwood Station project has been reduced in scale and is now known as University Station. The proposed University Station project is still a mixed use development comprised of retail, residential, office, hotel and restaurant uses. However, the build-out has been reduced to approximately 2,100,000 square feet, as compared to the 4,500,000 SF build-out originally planned for Westwood Station. As expected, the utility demands for the University Station project are significantly less than previously estimated for Westwood Station.

The sections below present the anticipated utility demands. As the Proponent continues to refine the project design, it is anticipated that the project team will engage in ongoing dialogue via meetings and working sessions with various Town Boards and Departments. This dialogue will be integral to refining the utility infrastructure design requirements to serve University Station, as well as identifying the appropriate offsite improvements and utility entrance fees.

Wastewater

Consistent with the previous approvals, wastewater is planned to be directed to the municipal sewer in University Avenue. From University Avenue wastewater will flow to the MWRA interceptor system and on to the Deer Island Treatment Plant. In previous MEPA filings it had been documented that there would be sufficient capacity in the existing downstream systems to receive the projected wastewater flows from the Westwood Station project.

Anticipated wastewater flow rates have been calculated based on the current plan and in accordance with Title V on an unadjusted basis. The anticipated average daily wastewater flows are summarized for each building in the attached table labeled University Station Estimated Building Flows.

Engineering and Architecture Services
One Grant Street
Framingham, MA 01701
Tel 508.903.2000 Fax 508.903.2001

The average daily wastewater flow rate for the University Station project is anticipated to be 228,367 gpd. The prior proposal, Westwood Station, was anticipated to generate an average daily flow of 452,455 GPD (when calculated using Title V flow rates on an unadjusted basis). The University Station project will result in a 49.5% decrease in daily wastewater flows when compared to the previous proposal.

The new on-site sewers are anticipated to be 8-inches in diameter and will connect to the 16-inch town sewer that currently exists in University Avenue. All sewer manholes located with the Zone 1 Wellhead Protection Area will be installed with watertight covers with locking or bolted gasket assemblies. All sewer piping within the Zone I will be SDR 35 PVC with bell and spigot joints. The attached Figure 1 shows the proposed sewer layout.

A hydraulic analysis similar to what had been previously prepared for the Westwood Station project has been developed for the University Station project. Anticipated wastewater flows have been entered into the sewer network and corresponding velocities have been calculated for peak hour flows, average daily flows and low flow conditions. To determine peak flows, the average daily flow rates were increased by a factor of 2.0. To determine low flows, the average daily flows were decreased to 1/8th of their Title V value, which is in accordance with the sewer diurnal curve developed by the MWRA's Master Plan and CSO Facility Planning – System Master Plan: Development of Flows (prepared by Metcalf & Eddy). Please see the attached University Station Hydraulic Analysis for further detail.

In addition to the on-site sewer construction, a new sewer main will be constructed within the relocated portion of Rosemont Avenue. Also, approximately 2,500 lineal feet of existing 16" sewer main within University Avenue will be re-lined.

Water

Consistent with the previous approvals, water will be supplied by the Dedham/Westwood Water District from their White Lodge Water Treatment Plant located on University Avenue, adjacent to the site. Based on unadjusted Title V estimates, water demand is anticipated to be 238,367 gpd (including an allowance of 10,000 gpd of HVAC makeup water). The new on-site water mains serving University Station will connect to the existing water mains in University Avenue and since University Avenue will no longer be relocated, much of the existing infrastructure will be preserved. The existing water main within the discontinued portion of Rosemont Avenue will be relocated. This relocation will be coordinated with the Dedham/Westwood Water District. Also, the

portion of the existing 12" water main that was laid during the original construction of University Avenue with excessive bury depth will be replaced at a usual depth as part of this project. The length of replacement is expected to be in the 2,000 lineal foot range. Please refer to the attached Figure 2 for the proposed water distribution system layout.

Average daily water demands for each building are expected to be the same as the wastewater generation rates discussed in the above section. Please refer to the attached University Station Estimated Building Flows for further detail. HVAC make up water has been estimated to be 10,000 gpd for the overall project.

Fire flow demands have been provided by Wegmans and Target. Wegmans requires a fire flow rate of 1,200 gpm with a residual pressure of 65 psi. Target requires a fire flow rate of 1,490 gpm with a residual pressure of 50 psi. Actual fire flow needs for other tenants and uses have not yet been determined, but are anticipated to be no greater than Target or Wegmans fire flow requirements.

Tetra Tech has developed a hydraulic model of the main water loop that includes University Avenue, the northern retail driveway, southern retail driveway, Harvard Street and the water main located in front of the core retail buildings. Assuming that the Dedham lower pressure system is operating on a hydraulic grade line of 234 feet, 1,500 gpm can be delivered at the west end of the southern retail drive with a residual pressure of 72 psi. The hydraulic calculations are attached for review. Weston and Sampson previously estimated that the main system in University Avenue at the Rosemont intersection could deliver a fire flow of approximately 3700 gpm at 20 psi.

Protection of Dedham Westwood Water District Wells

To minimize the impact to the Dedham/Westwood Water District water supply and distribution system, University Station will incorporate the following mitigation measures.

- Pre-treated stormwater recharge to replenish the aquifer. Pretreatment will be in accordance with the MADEP Stormwater Management Policy for working within Zone II's.
- All stormwater infiltration structures will be located outside of the Zone I.
- Landscape irrigation with non-potable water combined with using drought tolerate, hardy native plant species.

- Implementation of water conservation practices.
- Continued monitoring of groundwater wells located within the Zone I radius, as agreed to as part of the Westwood Station Watershed Resource Protection District.
- All new sanitary sewer manholes within the Zone I will feature water tight, locking gasket covers. All sewer piping within the Zone I will be SDR35 PVC with bell and spigot joints.

Water Budget

The pre-redevelopment industrial park consisted of 15 industrial buildings with an estimated 42,080 gallons per day (gpd) or about 15,000,000 gallons per year water usage. All of that came from the adjacent Dedham Westwood Water District (DWWD) wells. While the proposed redevelopment project uses that same supply, it dramatically offsets its increased demand by collecting, treating and recharging approximately 53,500,000 gallons per year or nearly 60% of its projected Title 5 water demand.

The prior Westwood Station proposal, in its approved environmental assessment, used a modified Title V flow for its water demand. This adjustment resulted from incorporation of modern water conservation measures, which are also included in the proposed project. In a head-to-head comparison, the prior proposal would have generated an average water demand of 211,600 gpd (or 77,234,000 gallons per year) compared to the current project demand of 104,724 gpd (or 38,224,260 gallons per year).

The proposed infiltration recharge design will return to the same aquifer 140% of its annual consumption (53.5 million gallons versus 38.2 million gallons). It is therefore very likely that the proposed project, when built, will recharge its actual water consumption, leaving the demand on the basin's groundwater resources unchanged. If the prior MEPA approved demand estimates prove true, then the project will not only replace its consumption but will add to the base flow of the Neponset River.

Electric, Telephone, Cable and Gas

Connections to the existing Electric, Telephone, Cable and Gas infrastructure in University Avenue are currently anticipated. The Proponent will work closely with NStar (electric and gas), Verizon (telephone) and Comcast (cable television) to design the

on-site infrastructure as well as plan any necessary off-site improvements. Given that the University Station project is less than half of the previously proposed Westwood Station, it is anticipated that service demands will also be less than half of what was previously planned for. Please refer to the attached Figure 3 for the proposed Public Utilities Service layout.

The above discussion summarizes the current utility designs. The Proponent and the project team looks forward to working with Town Boards and Departments, as well as the public utility companies to further refine the utility infrastructure requirements and design details.

Site figures and calculations follow.

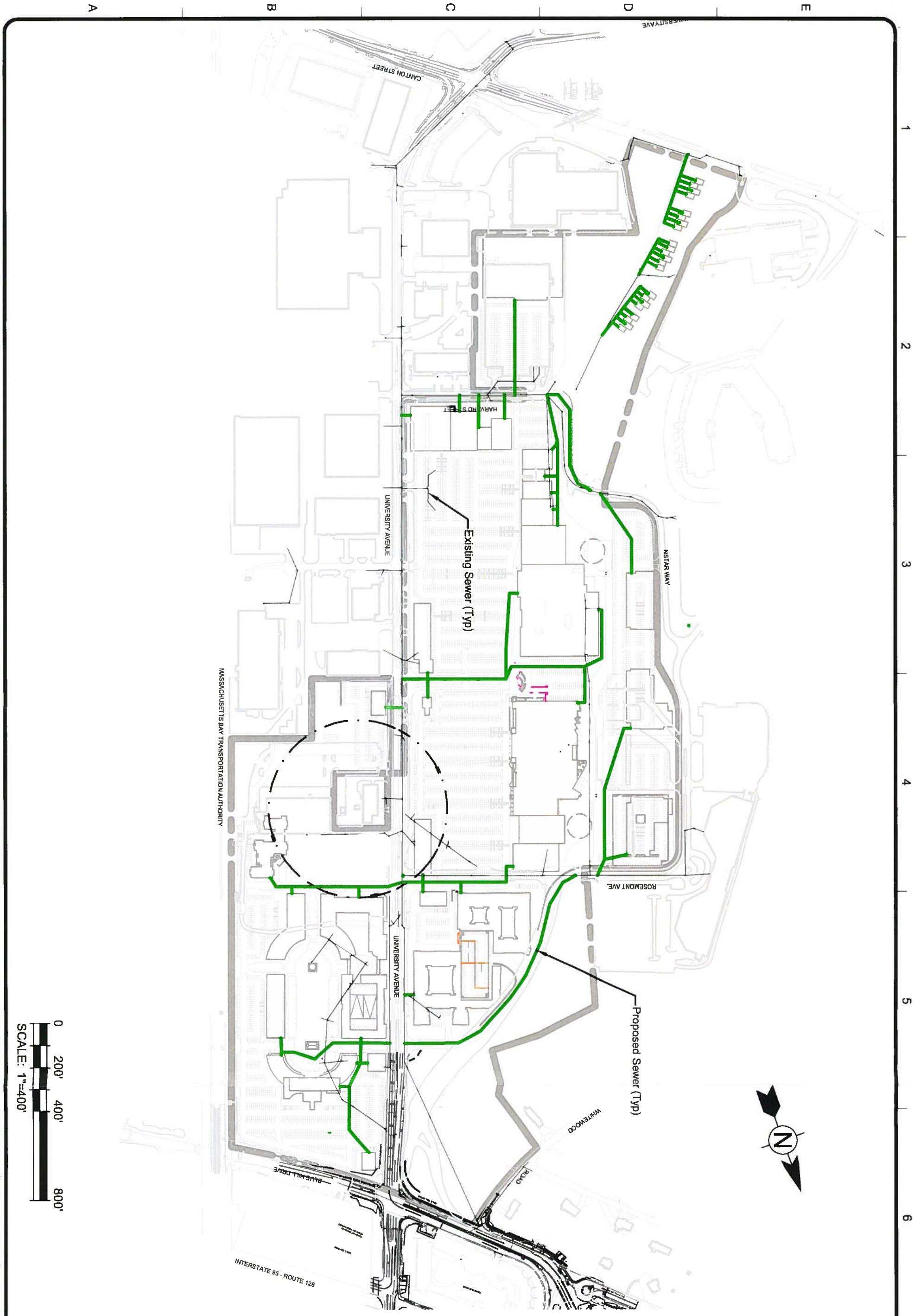

Figure 1

Westwood Marketplace Holdings LLC
University Ave, Westwood, MA

University Station - University Avenue Redevelopment

Proposed Sewer Layout

Project No.:	127-3659-12003
Designed By:	N.H.C.
Drawn By:	J.V.B.
Checked By:	R.F.D.

MARK	DATE	DESCRIPTION	BY
1	10/9/12	Preliminary Site Development Plans	N.H.C.
2	11/30/12	Revised Site Development Plans	N.H.C.

TETRA TECH
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Bar Measures 1 inch

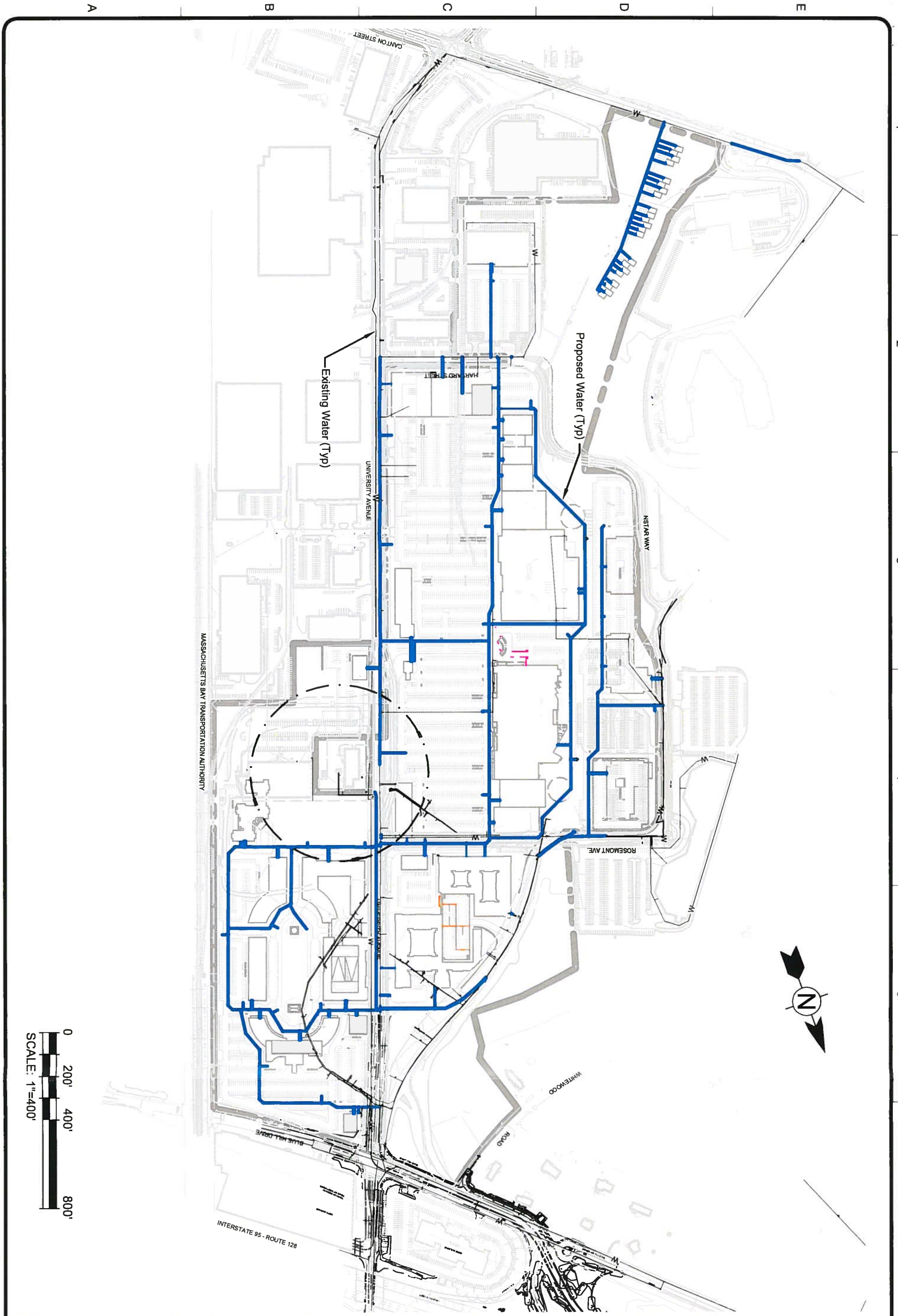

Figure 2

Propopsed Water Layout

Westwood Marketplace Holdings LLC
University Ave, Westwood, MA

University Station - University Avenue Redevelopment

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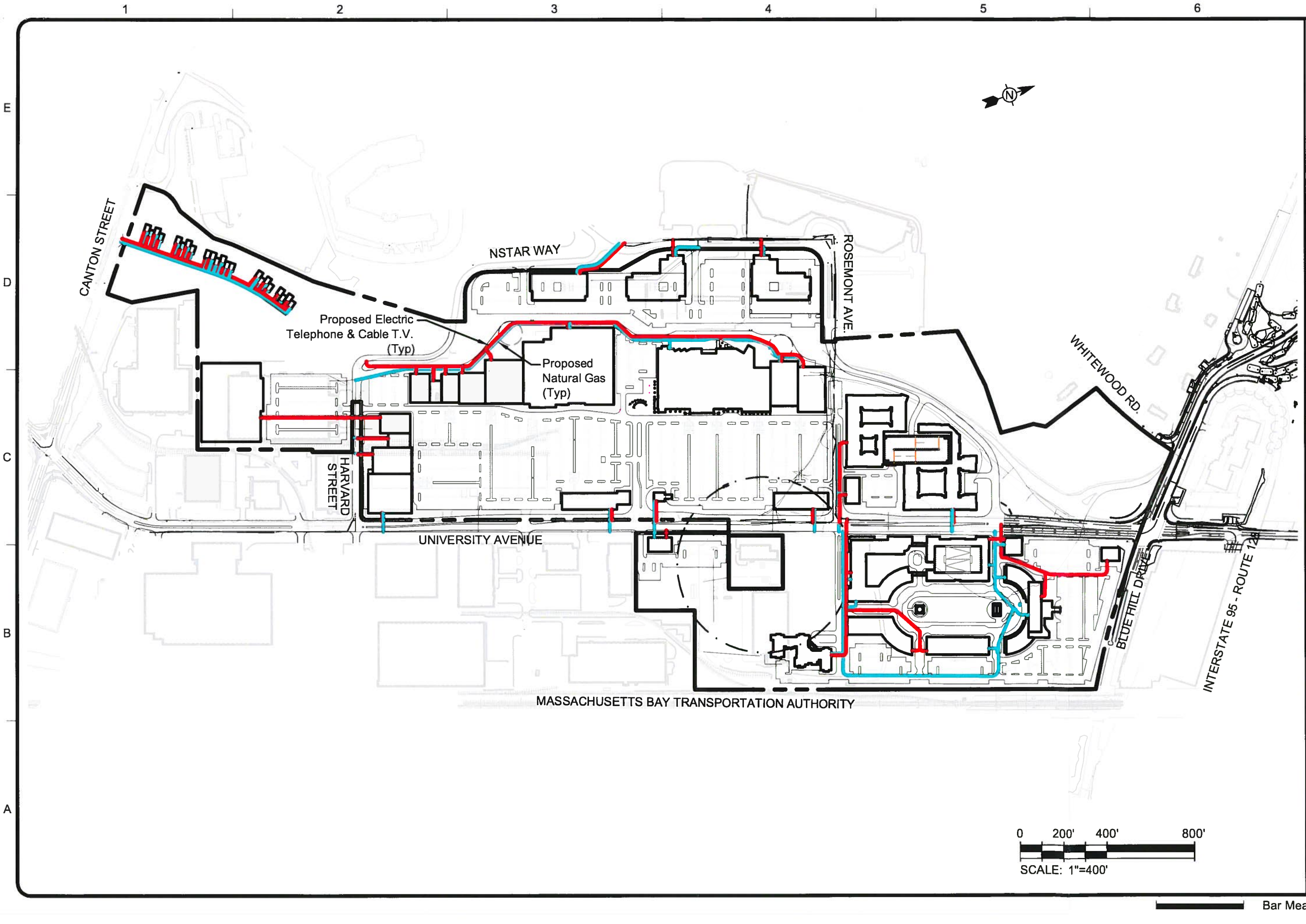

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1	10/9/12	Preliminary Site Development Plans	N.H.C.
2	11/30/12	Revised Site Development Plans	N.H.C.

Westwood Marketplace Holdings LLC
University Ave. Westwood, MA

University Station - University Avenue
Redevelopment

Gas, Electric, Telephone & Cable Layout

Project No.:	127-3659-12003
Designed By:	N.H.C.
Drawn By:	J.V.B.
Checked By:	R.F.D.

Figure 3

Bar Measures 1 inch

UNIVERSITY STATION

DEVELOPMENT WASTEWATER FLOWS

AND

PROPOSED SYSTEMS HYDRAULICS

University Station Estimated Building Flows

Building	Type	S.F.	Estimated Flow			Enters System	
			Avg Day (gpd)	Peak Hour (gpd)	Min Day (gpd)	Upstream MH	Downstream MH
Retail A		35,000	1,750	3,500	219	ESMH-Univ Ave	ESMH-Univ Ave
Retail B		21,400	1,070	2,140	134	ESMH-Harvard	ESMH-Harvard
Retail C		6,400	320	640	40	ESMH-Harvard	ESMH-Harvard
Retail D		12,500	625	1,250	78	ESMH-Harvard	ESMH-Harvard
Retail E		12,000	600	1,200	75	SMH9.9	SMH9.8
Retail F		5,500	275	550	34	SMH9.10	SMH9.9
Retail G		10,500	525	1,050	66	SMH9.10	SMH9.9
Retail H		17,000	850	1,700	106	SMH9.10	SMH9.9
Retail I		36,000	1,800	3,600	225	SMH9.10	SMH9.9
Retail J		139,060	6,953	13,906	869	SMH4.10&4.5	SMH4.3
Retail K		140,000	13,580	27,160	1,698	SMH4.8	SMH4.7
Retail L		26,000	1,300	2,600	163	SMH3.4	SMH3.3
Retail M		26,000	1,300	2,600	163	SMH3.4	SMH3.3
Retail N		9,500	475	950	59	SMH3.1	SMH3.0
Retail O		18,675	934	1,868	117	SMH3.1	SMH3.0
Retail P		2,700	135	270	17	SMH4.1	SMH4.0
Retail Q		22,700	1,135	2,270	142	SMH4.1	SMH4.0
Retail R		163,800	8,190	16,380	1,024	SMH6.1	SMH6.0
Retail T		10,000	500	1,000	63	SMH5.2	SMH5.1
Retail U		10,000	500	1,000	63	SMH5.8	SMH5.7
Office A	3-Story	95,400	7,155	14,310	894	SMH9.8	SMH9.7
Office B	3-Story	122,100	9,158	18,315	1,145	SMH7.3	SMH7.2
Office C	3-Story	122,100	9,158	18,315	1,145	SMH7.1	SMH7.0
Office W	3-Story	60,000	4,500	9,000	563	SMH5.8	SMH5.7
Office X	3-Story	75,000	5,625	11,250	703	SMH3.7	SMH3.6
Restaurant A (seats)	200		7,000	14,000	875	ESMH-Univ Ave	ESMH-Univ Ave
Restaurant B (seats)	150		5,250	10,500	656	SMH5.2	SMH5.1
Restaurant C (seats)	125		4,375	8,750	547	SMH5.4	SMH5.3
Restaurant for Res B (seats)	150		5,250	10,500	656	SMH3.6	SMH3.5
Residential A1 (beds)	284		31,240	62,480	3,905	ESMH-Univ Ave	ESMH-Univ Ave
Residential A2 (beds)	271		29,810	59,620	3,726	SMH3.2	SMH3.1
Residential B (beds)	188		20,680	41,360	2,585	SMH3.6	SMH3.5
Residential C (beds)	125		13,750	27,500	1,719	SMH5.1	SMH5.0
Hotel (beds)	160		17,600	35,200	2,200	SMH5.3	SMH5.2
Assisted Living (units)	100		15,000	30,000	1,875	SMH3.8	SMH3.7
	Totals		**228,367**	**456,734**	**28,546**		

Notes: 1.The location of all office uses has not yet been determined. For the purposes of the sewer hydraulic analysis office use has been considered in the upper office area as well as the Village Retail area. This table is not meant to suggest that office use will exceed 325,000 square feet. These calculations will be updated as the building program is further refined.

2. Residential bed counts assumes a split of approxiomately 60% one bedroom and 40% two bedrooms over a total of 650 residences.

3. Retail square footage, including restaurants, totals 750,000 square feet.

University Station Sewer Hydraulic Analysis

Office B & C Connection to Rosemont

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH7.3	SMH7.2	9,158	100.50	91.98	8	288	0.030	1.34	18,315	9,158	1145	2.10	1.70	0.90
SMH7.2	SMH7.1	0	91.88	82.12	8	315	0.031	1.38	18,315	9,158	1145	2.13	1.73	0.91
SMH7.1	SMH7.0	9,158	82.02	79.60	8	78	0.031	1.38	36,630	18,315	2289	2.63	2.13	1.13

~0.6' clearance below prop. SD at crossing

Rosemont to University Ave Connection Sewer (includes exist office building flow)

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH8	SMH1.7	30,128	74.00	71.79	8	68	0.032	1.41	60,255	30,128	3766	2.14	1.74	0.92
SMH1.7	SMH1.6	0	71.69	69.09	8	113	0.023	1.18	60,255	30,128	3766	1.91	1.54	0.81
SMH1.6	SMH1.5	0	68.99	64.85	8	180	0.023	1.18	60,255	30,128	3766	1.91	1.54	0.81
SMH1.5	SMH1.4	0	64.75	61.19	8	155	0.023	1.18	60,255	30,128	3766	1.91	1.54	0.81
SMH1.4	SMH1.3	0	61.09	58.44	8	115	0.023	1.18	60,255	30,128	3766	1.91	1.54	0.81
SMH1.3	SMH1.2	0	58.34	53.86	8	195	0.023	1.18	60,255	30,128	3766	1.91	1.54	0.81
SMH1.2	SMH1.1	0	53.76	51.14	8	114	0.023	1.18	60,255	30,128	3766	1.91	1.54	0.81
SMH1.1	SMH1.0	0	51.04	45.40	8	245	0.023	1.18	60,255	30,128	3766	1.91	1.54	0.81

Retail L, M, N, Building O and Residential A1 Connection to University Ave

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH3.4	SMH3.3	2,600	56.30	54.48	8	71	0.026	1.25	5,200	2,600	325	0.93	0.75	0.40
SMH3.3	SMH3.2	0	54.38	49.46	8	205	0.024	1.21	5,200	2,600	325	0.90	0.73	0.38
SMH3.2	SMH3.1	31,240	49.36	45.28	8	170	0.024	1.21	67,680	33,840	4230	2.00	1.61	0.85
SMH3.1	SMH3.0	1,409	45.18	43.00	8	91	0.024	1.21	70,498	35,249	4406	2.03	1.64	0.86

~4.5' clearance below prop. SD at crossing

University Station Sewer Hydraulic Analysis

Retail J,K, P,Q Connection to University Ave

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH4.10	SMH4.9	3,477	53.77	51.63	8	214	0.010	0.78	6,953	3,477	435	0.74	0.59	0.31
SMH4.9	SMH4.7	0	51.53	50.68	8	85	0.010	0.78	6,953	3,477	435	0.74	0.59	0.31
SMH4.8	SMH4.7	13,580	52.30	50.68	8	162	0.010	0.78	27,160	13,580	1698	1.12	0.90	0.48
SMH4.7	SMH4.6	0	50.58	47.26	8	332	0.010	0.78	34,113	17,057	2132	1.20	0.97	0.51
SMH4.6	SMH4.3	0	47.16	46.56	8	60	0.010	0.78	34,113	17,057	2132	1.20	0.97	0.51
SMH4.5	*SMH4.4*	3,477	55.50	*50.25*	8	255	0.021	1.12	41,066	20,533	2567	1.63	1.32	0.70
SMH4.4	*SMH4.3*	0	*50.15*	*47.49*	8	133	0.020	1.10	41,066	20,533	2567	1.61	1.30	0.69
SMH4.3	SMH4.2	0	46.46	44.27	8	219	0.010	0.78	41,066	20,533	2567	1.27	1.02	0.54
SMH4.2	SMH4.1	0	44.17	42.84	8	133	0.010	0.78	41,066	20,533	2567	1.27	1.02	0.54
SMH4.1	SMH4.0	1,270	42.74	41.60	8	114	0.010	0.78	43,606	21,803	2725	1.29	1.04	0.55

~4.2' clearance below prop. SD at Univeristy Ave crossing
~5.6' clearance below prop. SD at SMH4.2-4.1 crossing
~6.7' clearance below prop. SD at SMH4.2 crossing
~0.6' clearance below prop. 30" SD at SMH4.3-4.4 crossing
~1.5' clearance below prop. 12" SD at SMH4.3-4.4 crossing
~0.7' clearance below prop. SD at SMH4.9-4.8 crossing

Retail R Connection to Harvard

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
Building R	SMH6.1	8,190	49.98	46.90	8	220	0.014	0.92	16,380	8,190	1024	1.08	0.86	0.45
SMH6.1	SMH6.0	0	46.80	43.90	8	207	0.014	0.92	16,380	8,190	1024	1.08	0.86	0.45

~4.5' clearance below prop. SD at crossing

Retail E, F, G, H, I Connection to Harvard

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH10.0	SMH9.9	3,450	55.50	49.54	8	298	0.020	1.10	6,900	3,450	431	0.93	0.75	0.39
SMH9.9	SMH9.0	600	49.44	45.00	8	222	0.020	1.10	8,100	4,050	506	0.98	0.75	0.41

~7' clearance below prop. SD at SMH9.0 crossing

University Station Sewer Hydraulic Analysis

Office A Connection to Harvard

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH9.8	SMH9.7	7,155	102.50	94.59	8	134	0.059	1.90	14,310	7,155	894	1.69	1.38	0.72
SMH9.7	ESMH9.6	0	94.49	79.00	8	267	0.058	1.88	14,310	7,155	894	1.69	1.36	0.71
ESMH9.6	SMH9.5	0	*78.90*	*75.40*	*8*	*42*	*0.083*	2.25	14,310	7,155	894	1.90	1.54	0.82
SMH9.5	SMH9.4	0	*75.30*	69.79	8	67	0.082	2.24	14,310	7,155	894	1.89	1.53	0.81
SMH9.4	SMH9.3	0	69.69	64.88	8	89	0.054	1.81	14,310	7,155	894	1.63	1.33	0.69
SMH9.3	SMH9.2	0	64.78	51.23	8	251	0.054	1.81	14,310	7,155	894	1.63	1.33	0.69
SMH9.2	SMH9.1	0	51.13	47.40	8	83	0.045	1.66	14,310	7,155	894	1.55	1.24	0.66
SMH9.1	ESMH9.0	0	47.30	45.00	8	51	0.045	1.66	14,310	7,155	894	1.55	1.24	0.66

~4 4' clearance below prop. SD at SMH9.1 crossing

~1' clearance below prop. SD at SMH9.2 crossing

Assisted Living, Office E, Residential B w/rest. Connection University Ave

Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH3.8	SMH3.7	15,000	46.00	45.78	8	72	0.003	0.44	30,000	15,000	1875	0.77	0.62	0.33
SMH3.7	SMH3.6	5,625	45.68	44.18	8	300	0.005	0.55	41,250	20,625	2578	1.00	0.81	0.42
SMH3.6	SMH3.5	25,930	44.08	43.44	8	128	0.005	0.55	93,110	46,555	5819	1.28	1.03	0.55
SMH3.5	SMH3.0	0	43.34	43.00	8	67	0.005	0.55	93,110	46,555	5819	1.28	1.03	0.55

~4.3' clearance below prop. SD at SMH3.5-3.0 crossing

Office D, Retail S & T, Residential C, Hotel Connection University Ave

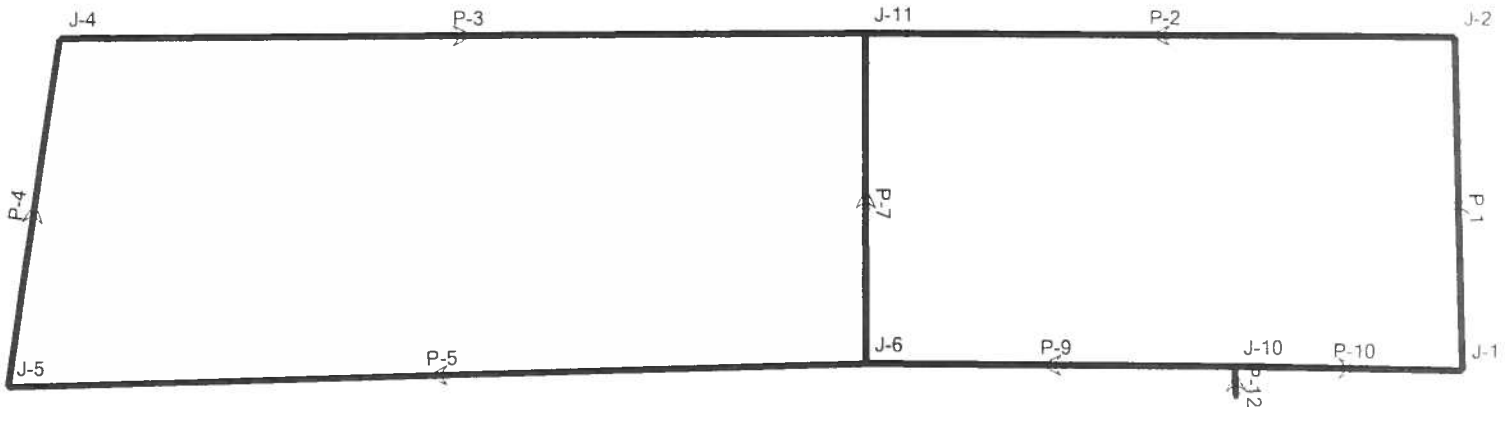
Upstream Manhole	Downstream Manhole	Max. Day Flow Added (gpd)	Upstream Invert Elev. (ft)	Downstream Invert Elev. (ft)	Pipe Size (in)	Length (ft)	Slope (ft/ft)	Flow Capacity Full (mgd)	Proposed Flow (gpd)			Velocity (ft/s)		
									High (peak hour)	Average (max day)	Low (min. day)	High	Average	Low
SMH5.8	SMH5.7	5,000	48.40	48.10	8	57	0.005	0.57	5,000	5,000	625	0.53	0.53	0.28
SMH5.7	SMH5.6	0	48.00	47.52	8	96	0.005	0.55	10,000	5,000	625	0.64	0.52	0.27
SMH5.6	SMH5.5	0	47.42	46.88	8	107	0.005	0.55	10,000	5,000	625	0.64	0.52	0.27
SMH5.5	SMH5.1	0	46.78	46.14	8	128	0.005	0.55	10,000	5,000	625	0.64	0.52	0.27
SMH5.4	SMH5.3	4,375	48.40	47.38	8	196	0.005	0.56	8,750	4,375	547	0.63	0.51	0.27
SMH5.3	SMH5.2	17,600	47.28	46.70	8	116	0.005	0.55	43,950	21,975	2747	1.02	0.83	0.44
SMH5.2	SMH5.1	5,750	46.60	46.14	8	91	0.005	0.55	55,450	27,725	3466	1.09	0.88	0.47
SMH5.1	SMH5.0	13,750	46.04	45.40	8	128	0.005	0.55	92,950	46,475	5809	1.28	1.03	0.55

* n for all sewers = 0.013

** low flow was developed by assuming 1/8 of the average daily flow according to the sewer diurnal curve developed by MWRA's Master Planning and CSO Facility Planning.

***In general, prop. upstream SMH INV is 7.5' below grade to ensure separation below watermain crossings and SS lateral exist through building foundations.

Scenario: Base



FlexTable: Junction Table (University Station_1.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
28	J-1	54.00	0	233.33	77.6
29	J-2	63.00	0	232.49	73.3
33	J-4	60.00	0	231.20	74.1
35	J-5	54.00	0	231.85	76.9
37	J-6	51.00	0	232.07	78.3
50	J-10	53.00	0	233.91	78.3
51	J-11	63.00	1,500	230.99	72.7

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FlexTable: Pipe Table (University Station_1.wtg)

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
30	P-1	504	J-1	J-2	12.0	Ductile Iron	100.0	615	1.75	0.002
32	P-2	895	J-2	J-11	12.0	Ductile Iron	100.0	615	1.75	0.002
34	P-3	1,216	J-11	J-4	12.0	Ductile Iron	100.0	-179	0.51	0.000
36	P-4	533	J-4	J-5	8.0	Ductile Iron	100.0	-179	1.14	0.001
38	P-5	1,296	J-5	J-6	12.0	Ductile Iron	100.0	-179	0.51	0.000
40	P-7	499	J-6	J-11	12.0	Ductile Iron	100.0	706	2.00	0.002
45	P-9	561	J-6	J-10	12.0	Ductile Iron	100.0	-885	2.51	0.003
46	P-10	345	J-10	J-1	12.0	Ductile Iron	100.0	615	1.75	0.002
55	P-12	46	T-1	J-10	12.0	Ductile Iron	100.0	1,500	4.26	0.009

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