

PETITION FOR SPECIAL PERMIT UNDER ENVIRONMENTAL DESIGN REVIEW

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RE: 882-892 Massachusetts Avenue

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TOWN OF ARLINGTON
REDEVELOPMENT BOARD

Application for Special Permit In Accordance with Environmental Design
Review Procedures (Section 3.4 of the Zoning Bylaw)

Docket No. _____

1. Property Address 882-892 Massachusetts Ave
 Name of Record Owner(s) 882-892 Massachusetts Ave, LLC Phone 781-654-6306
 Address of Owner 452 Massachusetts Ave, Ste 203, Arlington, MA 02474
Street City, State, Zip
2. Name of Applicant(s) (if different than above) Same as above
 Address _____ Phone _____
 Status Relative to Property (occupant, purchaser, etc.) _____
3. Location of Property Map 126, Block 1, Lots 6 and 7
Assessor's Block Plan, Block, Lot No.
4. Deed recorded in the Registry of deeds, Book 1523, Page 101;
 -or- registered in Land Registration Office, Cert. No. _____, in Book _____, Page _____
5. Present Use of Property (include # of dwelling units, if any) Retail, Service, Restaurant
6. Proposed Use of Property (include # of dwelling units, if any) Mixed-Use
22 Apartment Units, 700 SF Retail
7. Permit applied for in accordance with the following Zoning Bylaw section(s)

<u>3.4</u>	<u>Environmental Design Review</u>
<u>5.26</u>	<u>Open Space</u>
<u>5.53</u>	<u>Mixed-Use</u>
<small>section(s)</small>	<small>title(s)</small>
8. Please attach a statement that describes your project and provide any additional information that may aid the ARB in understanding the permits you request. Include any reasons that you feel you should be granted the requested permission.
 See Attached

(In the statement below, strike out the words that do not apply)

The applicant states that 882-892 Massachusetts Ave, LLC is the owner -or- occupant -or- purchaser under agreement of the property in Arlington located at 882-892 Massachusetts Ave which is the subject of this application; and that unfavorable action -or- no unfavorable action has been taken by the Zoning Board of Appeals on a similar application regarding this property within the last two years. The applicant expressly agrees to comply with any and all conditions and qualifications imposed upon this permission, either by the Zoning Bylaw or by the Redevelopment Board, should the permit be granted.

Signature of Applicant(s)

1171 Mass Ave., Arlington, MA 02476

781-646-4911

Address

Phone

TOWN OF ARLINGTON

REDEVELOPMENT BOARD

Petition for Special Permit under Environmental Design Review (see Section 3.4. of the Arlington Zoning Bylaw for Applicability)

1. Preservation of Landscape.

Landscaping has been provided on the submitted plans and one parking space has been eliminated in order to add green space to the site and in addition tree plantings are proposed along the Lockland Avenue side of the property which abuts the residential neighborhood.

2. Relation of Buildings to Environment.

The existing site contains a number of small retail stores with the height of the existing building comprising the stores being one story. Petitioner proposes a four story residential commercial mixed use building at the site and suggests to the Members of the Arlington Redevelopment Board that the proposed building will relate harmoniously to the terrain and to the use, scale and architecture of existing buildings in the vicinity of the property. The abutting building on the westerly side of the site consists of a six story apartment building and the proposed building will not adversely impact that abutting apartment building but essentially will be compatible with the physical characteristics of that building. The building fronts on Massachusetts Avenue and the property located along the easterly side of the property across Lockland Avenue consists of a bank with a large parking lot and a drive up teller operation.

The building across Massachusetts Avenue consists of a mixed use building recently approved by the Arlington Redevelopment Board consisting of three retail units on the first level and 2, two bedroom units on the second level and 2, two bedrooms units on the third level with parking located to the rear of that building.

The building which is the subject of this Petition has been designed having in mind that its physical characteristics should not have an adverse massing effect on the residential properties to the rear of the building and also not create a

shadow impact with respect to the residential properties.

3. Open Space.

The landscaped open space at the property would improve with respect to the construction with landscaped square feet being increased from 0 square feet to 1,470 square feet, i.e. 10.2%. The useable open space would be 1,707 square feet, i.e. 11.9% and would require a Special Permit.

4. Circulation.

The circulation with respect to vehicular, pedestrian and bicycle circulation, including entrances and exits are shown on Petitioner's plans and provide for twenty-five (25) parking spaces, outdoor bicycle racks, an indoor short-term bicycle room and a long-term bicycle room which would be accessed by an elevator down to the basement level. All vehicular traffic will enter and exit on the Lockland Avenue side of the property and relevant signage will direct traffic in and out of the parking area.

The total parking spaces at the property will in part consist of a long-term storage bicycle room in the basement which will have the capacity to store twenty-four bicycles with the tenants taking the elevator down one story to that storage room and tenants will also have the option to use other storage areas which are rather of a large capacity in the basement for storage of their bicycles as well.

On the first floor of the building there will be a combination mailroom with "hanging short term" bicycle storage for nine (9) bicycles and the entrance to that room would occur as one rounds Massachusetts Avenue onto Lockland Avenue onto a flat surface with no stairs of any kind being utilized with the result that tenants will have direct access to that short-term bicycle room. There will also be two (2) outdoor short-term bicycle storage racks which will be able to hold another eight to ten bicycles.

The total capacity for bicycle store at the property will be at least forty (40) bicycles.

5. Surface Water Drainage.

The Petitioner has engaged the services of Allen & Major Associates and that firm has conducted a storm water management study and has drafted a mixed-use redevelopment drainage summary letter dated February 26, 2020 which is addressed to Jennifer Raitt, Director of Planning and Community Development describing the existing conditions at the site and proposed conditions at the site.

The report in part provides that the Petitioner proposes to demolish the existing structure and construct a four story 4,693 square foot mixed use building with a combination of residential and retail uses.

There will be twenty-two (22) residential apartments and a 700 square foot retail component and the parking area would be reconstructed within the constraints of the existing pavement area.

The storm water management system would be improved with the installation of a new catch basin with a sump and hood at the outlet pipe to provide storm water treatment. The quantity of storm water runoff would be reduced with the installation of landscaped areas on site as shown on Petitioner's plans.

The proposed work would result in approximately 1,440 square feet of impervious material being replaced with landscaped areas.

Runoff flows were estimated for both pre and post development conditions and the chart in the study points No. 1 and No. 2 contained on the second page of the report demonstrate that flows will enter the on-site catch basin and discharge to the municipal drainage system. In addition the storm water flows that flow onto Massachusetts Avenue will be collected within the street catch basin.

Both study points show that the project will cause a reduction in the peak rate of runoff and volume of storm water leaving the site at both study points No. 1 and No. 2.

In summary, the report indicates that the proposed development will have a positive impact on the sewer water management system by reducing the rate and volume of storm water runoff from the site.

Aaron Mackey, the Representative of Allen & Major Associates has spoken with the Town Engineer with respect to the proposed construction and the Town Engineer has indicated his approval of the storm water drain management system proposed by Petitioner.

6. Utility Service.

All utility service will be located underground.

7. Advertising Features.

There are currently no plans for advertising although advertising signs may be required once a tenant is signed up for the commercial space. It would be the Petitioner's expectation that the signage required could be handled administratively with the Planning Department but if that is not the case then of course a Special Permit would be required.

The owner has indicated that there is a possibility of having an office tenant occupy all of the 700 square feet of commercial base.

8. Special Features.

All equipment servicing the building will be located on the roof such as heating, air conditioning, etc. and will be set back in such a fashion that most of it will be buffered from the view of individuals at ground level by the building parapet. The dumpsters and the totes are located in the back of the property as shown on Petitioner's plans and are sufficient for the needs of both the residential tenants and any future commercial tenants as well.

9. Safety.

The access to and from the parking area at the building is sufficient for fire apparatus to access the property from the parking lot as well as any emergency personnel and equipment.

10. Heritage.

The property is not on the Arlington Historical list and is not in a historical district.

11. Microclimate.

The owner does not contemplate that there will be any installation of machinery which emits heats, vapor or fumes from the site in connection with the proposed construction.

12. Sustainable Building and Site Design.

Petitioner has submitted a LEED checklist prepared by Market Square Architects, LLC entitled: LEED v4 for Building Design and Construction: Homes and Multifamily Lowrise - Project Name: 882-892 Massachusetts Ave, Arlington, MA 02476 – dated March 26, 2020.

The substance of the checklist shows the type of building materials to be used at the site and will demonstrate how the LEED performance objectives will be incorporated into the project.

In addition, projects subject to Environmental Design Review must address and meet the following Special Permit Criteria (see Section 3.3.3 of the Zoning Bylaw):

1. The use requested is listed as a special permit in the use regulations for the applicable district or is so designated elsewhere in this Bylaw.

See Section 3.4 of the Zoning Bylaw and Section 5.5.3 of the Zoning Bylaw which allows an apartment building in a B2 zone.

2. The requested use is essential or desirable to the public convenience or welfare.

It has become more and more apparent over the last year or two that there is dire need for additional residential living space, not only in the Town but in the State as well. The Master Plan for the Town encourages owners and developers to create additional living space in the Town, therefore the creation of twenty-two (22) additional residential units would be essential or desirable to the public convenience or welfare. There will be three (3) affordable housing units located in the building.

3. The requested use will not create undue traffic congestion or unduly impair pedestrian safety.

Proper and adequate steps have been taken to design the parking and traffic circulation at the site appropriately so that there will not be impairment of pedestrian safety.

4. The requested use will not overload any public water, drainage or sewer system or any other municipal system to such an extent that the requested use or any developed use in the immediate area or in any other area of the Town will be unduly subjected to hazards affecting health, safety or the general welfare.

The requested use will not overload any public water, drainage or sewer system or any other municipal system to such an extent that the requested use or any developed use in the immediate area or in any other area of the Town will be unduly subjected to hazards affecting health, safety or the general welfare.

5. Any special regulations for the use as may be provided in this Bylaw are fulfilled.

Not applicable.

6. The requested use will not impair the integrity or character of the district or adjoining districts, nor be detrimental to the health, morals or welfare.

The requested use will not impair the integrity or character of the district or adjoining districts, nor be detrimental to the health, morals or welfare of inhabitants of the Town or the neighborhood in which the property is located because the construction will occur in a mixed commercial and residential area fronting on Massachusetts Avenue which is mainly commercial in the neighborhood of the property and the proposed construction will not adversely impact neighboring properties whether commercial or residential.

- 7. The requested use will not, by its addition to a neighborhood, cause and excess of the particular use that could be detrimental to the character of said neighborhood.**

The proposed construction will not cause an excess of that use in the neighborhood of the property, particularly so in light of the fact that there is a need for additional residential living space and the creation of additional living space is encouraged by the Town Master Plan and the Amended Zoning Bylaw.

**SUPPLEMENT INFORMATION WITH RESPECT TO PETITION UNDER
ENVIRONMENTAL DESIGN REVIEW
SECTION 3.4 of the Arlington Zoning Bylaw**

The 822-892 Massachusetts Avenue real estate contains a total size of 14,381 square feet and is identified on the Town's Tax Map 126 Block 1 as Lots 6 and 7 with Lot 6 covered by an existing one story brick building containing approximately 4,780 square feet consisting of four separate retail stores and Lot 7 consisting of a paved parking area comprising the balance of the property of 9,595 square feet.

The property is located in a B2 Zone as defined within the Arlington Zoning Bylaw.

Petitioner proposes to construct a twenty-two (22) unit mixed use development at the property after demolishing the existing building.

The Petition for Zoning Relief is filed under Section 3.4., i.e. Environmental Design Review as well as the mixed use section of the bylaw defined in the Table of Dimensional and Density Regulations D District Lot Regulations, Sections 526 through 530.

Petitioner proposes in addition to the twenty-two (22) one bedroom residential units to have an office use within the building containing approximately 700 square feet.

The building would contain four stories and there would be twenty-five (25) parking spots within the paved parking portion of the property.

Access to the parking area would be through the curb cut which currently exists on the Lockland Avenue easterly side of the property onto Lockland Avenue.

There would be clearly marked signs indicating the entrance and exist points to and from the parking lot and the parking spots would be clearly marked and lined and would also comply with the parking regulations contained within the Zoning Bylaw with respect to length and width.

The building itself would contain three (3) affordable housing units and there would be ample bicycle parking provided for both with respect to outside bicycle racks, an indoor short term bicycle room and an indoor long term bicycle room. In addition residents would have ample room in their storage units to store bicycles if they so desired.

The proposed bicycle rooms and bicycle parking are depicted on the plans submitted with the Petitioner's Application.

The landscaped space at the property would improve with respect to the construction with the landscaped square feet being increased from 0 square feet to 1,470 square feet, i.e. 10.2%. The useable open space would be 1,707 square feet, i.e. 11.9% and would require a Special Permit.

The front yard setback of the property is currently 0 feet and would be increased 2.8 feet while the zoning requirement in a mixed use development would be 0 feet.

The right side yard setback which is currently 53.6 feet would be increased to 65.3 feet and the left side yard setback would be increased from 1.3 feet to 1.9 feet.

The height of the building would increase from one story to four stories or from 13.5 feet to 39 feet while the zoning bylaw allows a 50 foot height.

The floor area ratio which is presently 0.35 would increase to 1.25 while the maximum required by the zoning bylaw is 1.50.

The abutting property on the westerly side of the building is a six floor multi-unit apartment building and the property located on the easterly side of Lockland Avenue consists of a large parking area and a bank while the abutter properties to the rear consist of residential properties.

Directly across the street is a three level building recently approved by the Arlington Redevelopment Board for three retail stores on the first level, 2 two-bedroom residential units on the second floor and 2 additional two-bedroom units on the second level.

Diagonally across Massachusetts Avenue there is a large Stop & Shop store complex with an accompanying parking area and a liquor store located between the Stop & Shop store and the building mentioned previously recently approved by the Arlington Redevelopment Board.

The Arlington High School is located diagonally across from the property in a north-easterly direction.

The property is located in a long existing mixed use area with a combination of residential and commercial uses with the uses mainly located on Massachusetts Avenue being commercial uses.

Petitioner's plans have been designed to comport with the provisions of the zoning bylaw at Section 5.5.1, further subsection (b) which defines a B2 Zoning District as follows:

B2: Neighborhood Business District. The Neighborhood Business District is intended for small retail and service establishments serving the needs of adjacent neighborhoods and oriented to pedestrian traffic, and mixed-use buildings. Locations are almost all along Massachusetts Avenue or Broadway. The Town discourages uses that would detract from the district's small-scale business character or otherwise interfere with the intent of this Bylaw.

The property has been the subject of prior zoning cases in 1988 and 1991 before the Zoning Board of Appeals for special permits and not for variances and those zoning cases would now be superseded by any action of the Arlington Redevelopment Board with respect to its Special Permit authority under Environmental Design Review and with respect to the Special Permit relief requested by Petitioner.

The owners of the property have indicated their preference for twenty-two (22) one bedroom residential units with respect to the development in part based upon a report they have obtained from Greater Metropolitan Real Estate at 872 Main Street, Winchester, Massachusetts, Kristen Welch, the substance of which indicates that following a study of the real estate market in Arlington and particularly in the neighborhood of the property which is the subject of the

Petition that studio and one bedroom units are always the most sought after and have always been rented fairly quickly.

Two bedroom units will rent but will take longer according to Ms. Welch. She indicates that on average two professional roommates are the most likely clients for a two or even a three bedroom unit and they are willing to pay the higher rental amount attributable to the multi bedroom units.

She indicates that the high rents for such units do not generally attract families.

She further indicates that with proximity to the bike path and bus line most of her clients are young professionals who use the proximity to the bike path and use the adjacent bus line for travelling to and from work in Cambridge, Boston or other nearby cities and towns.

She indicates that she does represent families but the families she represents are mainly looking for a multi-family or single family home with a yard.



Town of Arlington Redevelopment Board
 Application for Special Permit in accordance with
 Environmental Design Review (Section 3.4)

Required Submittals Checklist

Two full sets of materials and one electronic copy are required. A model may be requested. Review the ARB's Rules and Regulations, which can be found at arlingtonma.gov/arb, for the full list of required submittals.

- Dimensional and Parking Information Form (see attached)
- Site plan of proposal
- Model, if required
- Drawing of existing conditions
- Drawing of proposed structure
- Proposed landscaping. May be incorporated into site plan
- Photographs
- Impact statement
- Application and plans for sign permits
- Stormwater management plan (for stormwater management during construction for projects with new construction)

FOR OFFICE USE ONLY

_____ Special Permit Granted	Date: _____
_____ Received evidence of filing with Registry of Deeds	Date: _____
_____ Notified Building Inspector of Special Permit filing	Date: _____

TOWN OF ARLINGTON

Dimensional and Parking Information
for Application to
The Arlington Redevelopment Board

Docket No. _____

Property Location 882-892 Massachusetts Ave

Zoning District B2

Owner: 882-892 Massachusetts Ave, LLC

Address: 452 Massachusetts Ave, Arlington, MA

Present Use/Occupancy: No. of Dwelling Units:

Uses and their gross square feet:

Retail, Service, Restaurant

1-Story 5,016 SF

Proposed Use/Occupancy: No. of Dwelling Units:

Uses and their gross square feet:

Mixed-Use, 22 Apartment Units & 700 SF Retail

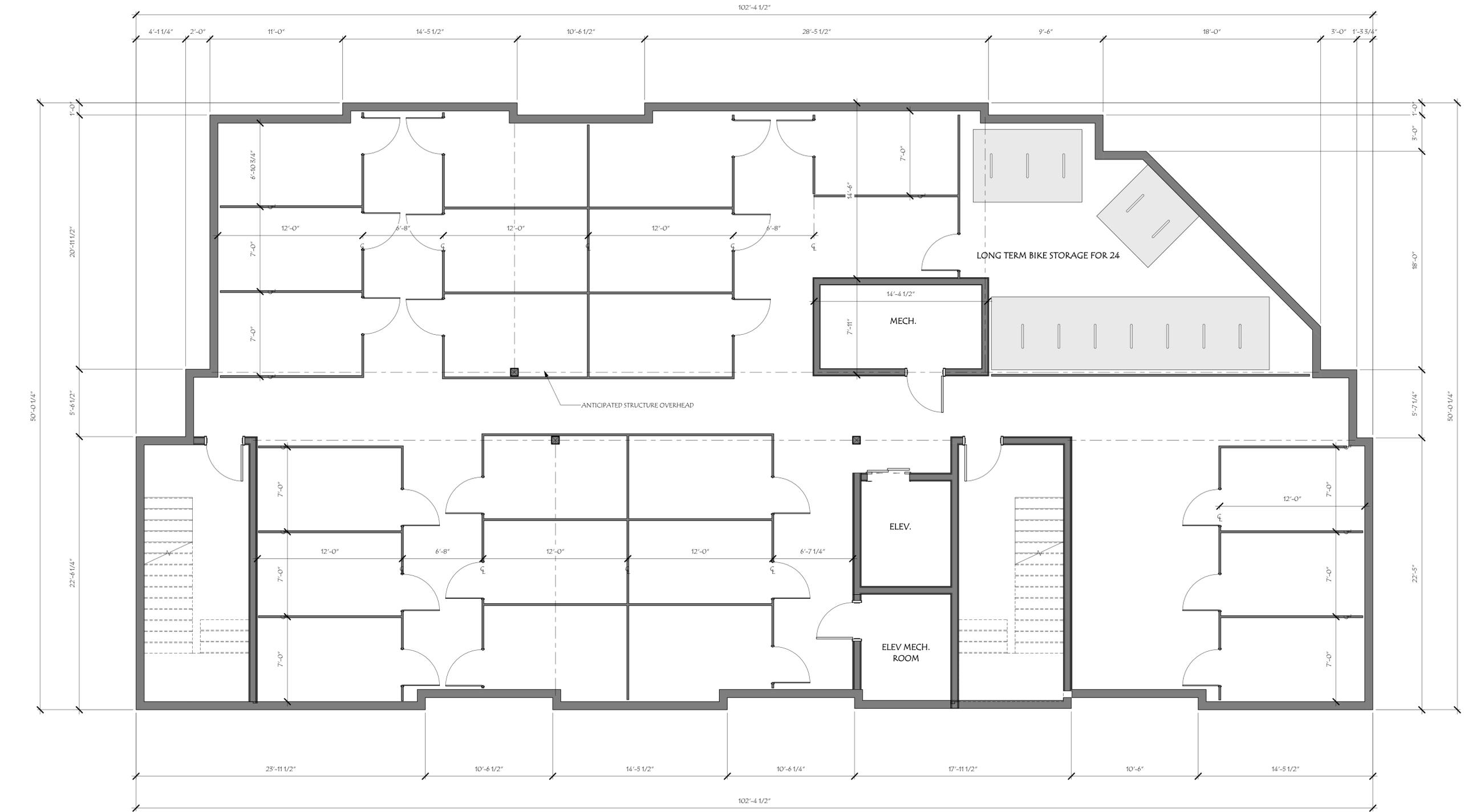
4-Story Mixed-Use 18,009 GSF

	Present Conditions	Proposed Conditions	Min. or Max. Required by Zoning for Proposed Use
Lot Size	14,381 SF	14,381 SF	min. ----
Frontage	208 FT	208 FT	min. ----
Floor Area Ratio	0.35	1.25	max. 1.5
Lot Coverage (%), where applicable	34.9%	32.6%	max. ----
Lot Area per Dwelling Unit (square feet)	N/A	654 SF	min. ----
Front Yard Depth (feet)	0 FT		min. ----
Side Yard Width (feet)			
right side	53.6 FT	65.3 FT	min. ----
left side	1.3 FT	1.9 FT	min. ----
Rear Yard Depth (feet)	N/A	N/A	min. N/A
Height	----	-----	min. -----
Stories	1-STORY	4-STORY	stories 4-STORY
Feet	13.5 FT	39 FT	feet 50 FT
Open Space (% of G.F.A.)	-----	-----	min. -----
Landscaped (square feet)	0 SF	1,470 SF(10.2%) _(s.f.)	1,438 SF (10%)
Usable (square feet)		1,707 SF(11.9%) _(s.f.)	2,876 SF (20%)
Parking Spaces (No.)	UNKNOWN	25 SPACES	min. 25 SPACES
Parking Area Setbacks (feet), where applicable	0 FT	1 FT	min. 5 FT
Loading Spaces (No.)	N/A	N/A	min. N/A
Type of Construction	NEW CONSTRUCTION		
Distance to Nearest Building	12.1 FT	16.3 FT	min.

NOT FOR CONSTRUCTION

ARLINGTON MIXED USE

892 MASS AVE
 ARLINGTON, MA



1 BASEMENT
 1/4" = 1'-0"

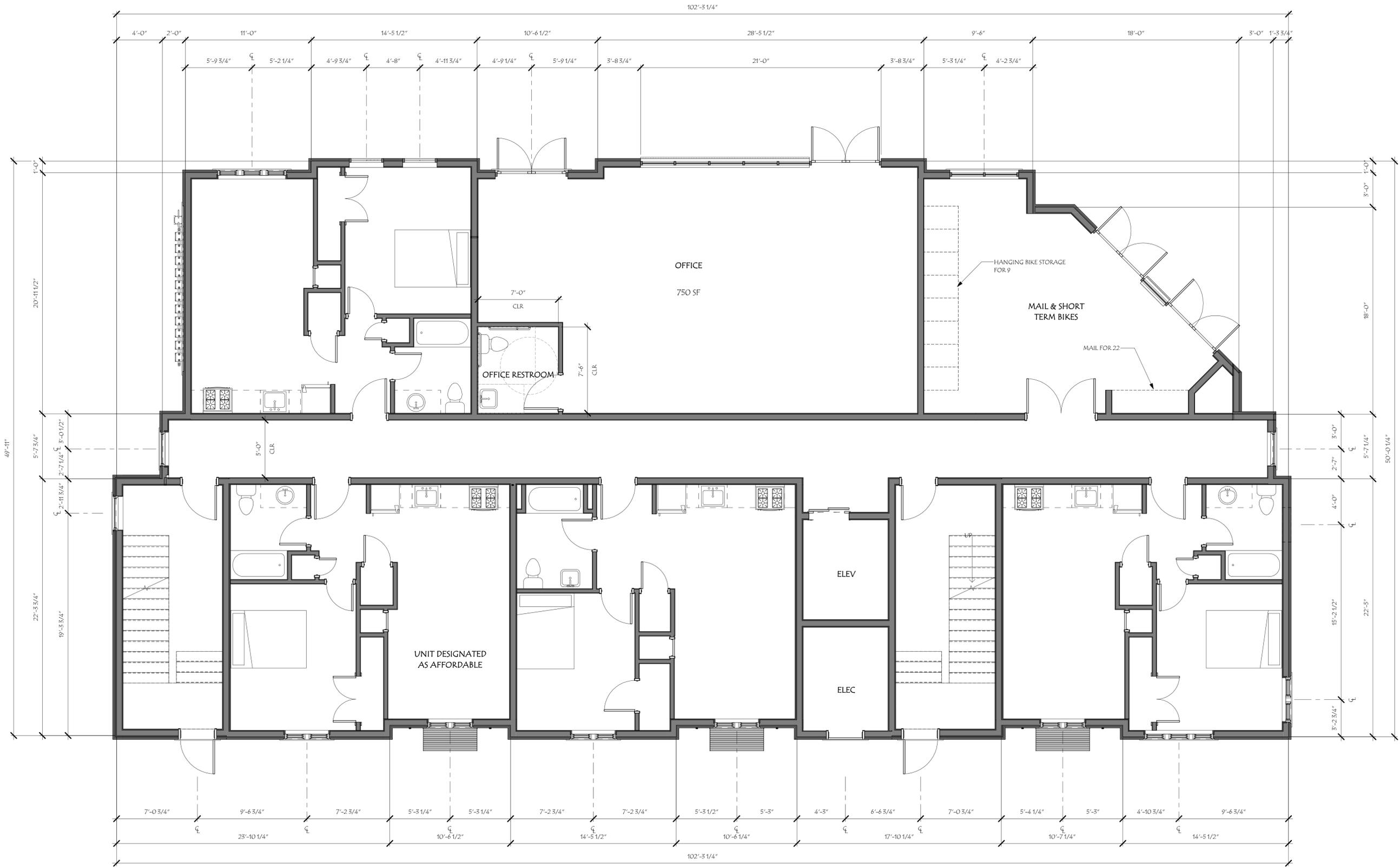
Revisions:	#	Description	Date

Scale:	1/4" = 1'-0"
Drawn By:	PPS
Checked By:	ALW
Project No.:	2020004
Date:	04/05/20

Title:
BASEMENT FLOOR PLAN

A1.00

NOTE:
SEE CIVIL FOR SITE INFORMATION.



1ST FLOOR
1/4" = 1'-0"

NOT FOR CONSTRUCTION

ARLINGTON MIXED USE

892 MASS AVE
ARLINGTON, MA

Revisions:	#	Description	Date

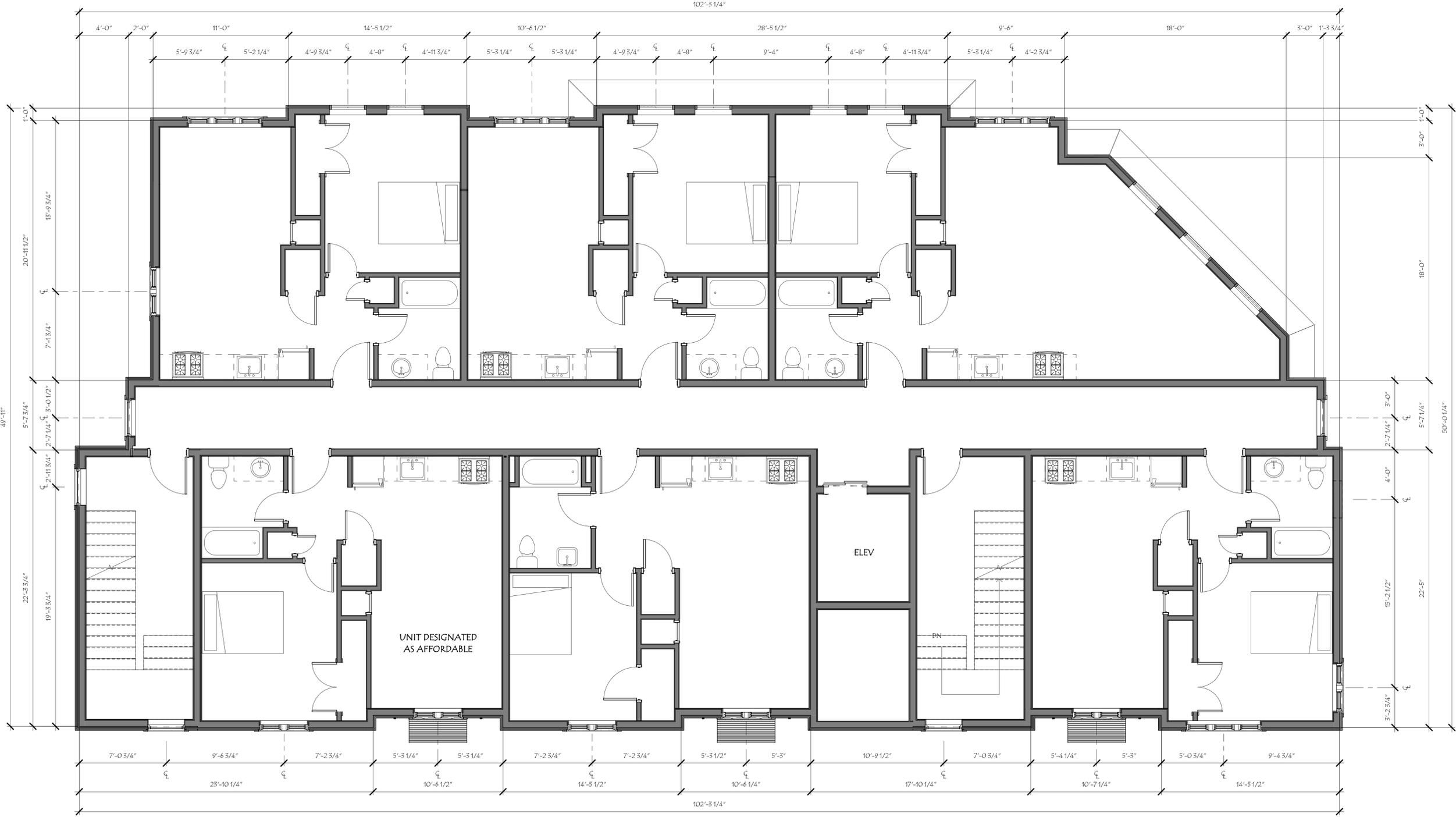
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Drawn By:	PPS
Checked By:	ALW
Project No.:	2020004
Date:	04/05/20

Title:	FIRST FLOOR PLAN
Sheet No.:	A1.01

NOT FOR CONSTRUCTION

ARLINGTON MIXED USE

892 MASS AVE
 ARLINGTON, MA



UNIT DESIGNATED AS AFFORDABLE

ELEV

DN

1 2ND AND 3RD FLOORS
 1/4" = 1'-0"

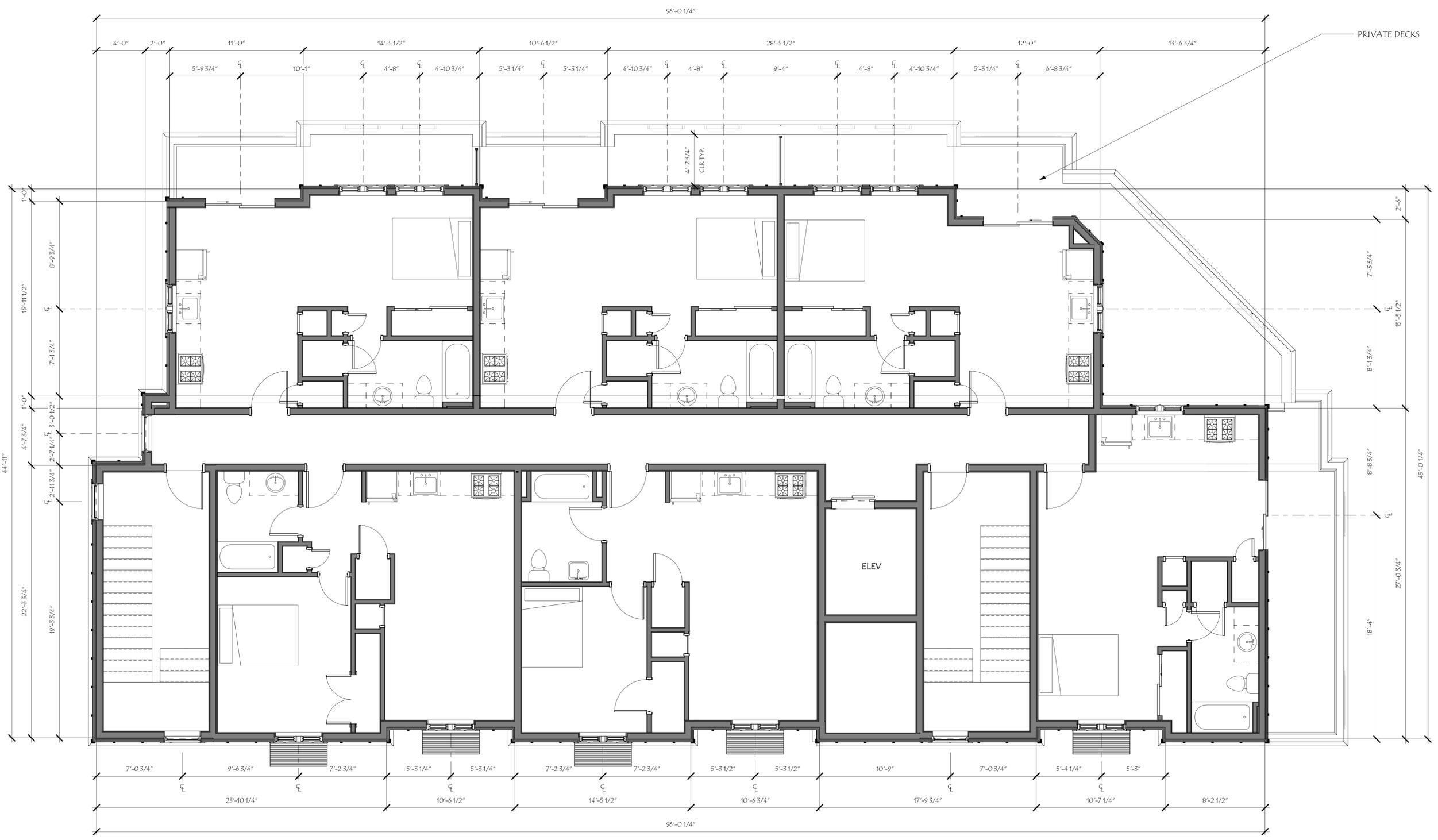
Revisions:	#	Description	Date

Scale:	1/4" = 1'-0"
Drawn By:	PPS
Checked By:	ALW
Project No.:	2020004
Date:	04/05/20

Title:	SECOND AND THIRD FLOOR PLAN
Sheet:	A1.02

NOT FOR CONSTRUCTION

ARLINGTON MIXED USE
 892 MASS AVE
 ARLINGTON, MA



1 4TH FLOOR
 1/4" = 1'-0"

Revisions:	Description	Date

Scale:	1/4" = 1'-0"
Drawn By:	PPS
Checked By:	ALW
Project No.:	2020004
Date:	04/05/20

Title:	FOURTH FLOOR PLAN
Sheet:	A1.03

NOT FOR CONSTRUCTION

ARLINGTON MIXED USE

892 MASS AVE
 ARLINGTON, MA

Revisions:	Description	Date

Scale:	1/8" = 1'-0"
Drawn By:	PPS
Checked By:	ALW
Project No.:	2020004
Date:	04/05/20

Title:	BUILDING ELEVATIONS
Scale:	A2.00

© 2019 Market Square Architects 3/27/2020 3:52:40 PM



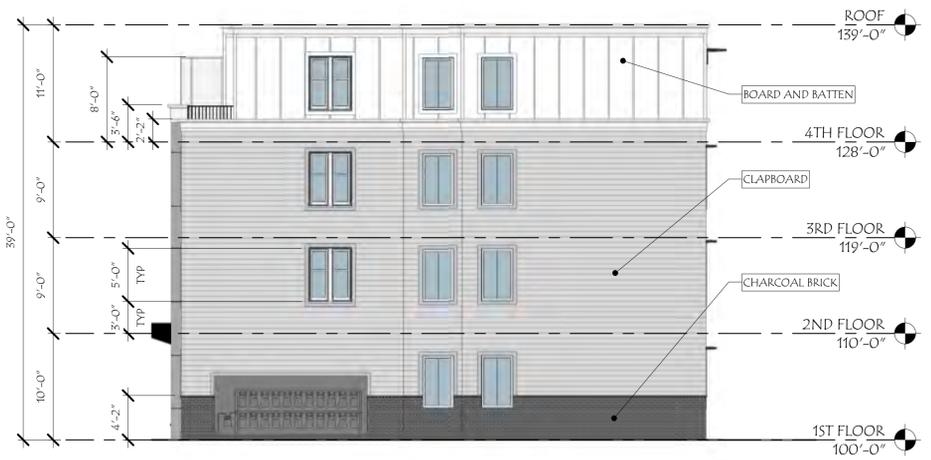
3 CORNER ELEVATION
 1/8" = 1'-0"



2 SOUTH ELEVATION
 1/8" = 1'-0"



1 NORTH ELEVATION
 1/8" = 1'-0"



5 WEST ELEVATION
 1/8" = 1'-0"



4 EAST ELEVATION
 1/8" = 1'-0"



NOT FOR CONSTRUCTION

ARLINGTON MIXED USE
892 MASS AVE
ARLINGTON, MA

Revisions:	#	Description	Date

Scale:	PPS	ALW
Drawn By:		
Checked By:		
Project No.:	2020004	
Date:	04/05/20	

Title:	3D RENDER- MASS AVE
	A9.00



NOT FOR CONSTRUCTION

ARLINGTON MIXED USE
 892 MASS AVE
 ARLINGTON, MA

Revisions:	#	Description	Date

Scale:	PPS	
Drawn By:	ALW	
Checked By:		
Project No.:	20200004	
Date:	04/05/20	

Title:	3D RENDER - LOCKELAND
	A9.01



To whom it may concern,

I have had experience in the rental market in Arlington over the last 8 plus years. I currently have many exclusive landlords that I work with in Arlington and about 60 plus units. The studio and one bedroom units are always the most sought after and always move fairly quickly. Two bedroom units will rent but do take longer. Professional couple wanting a home office or two professional roommates is the most common client for a 2 bed especially in a building and they are willing to pay the high end price. The new and modern two bedroom rentals in a building are usually high end and priced high so this does not attract families. Also on Mass Ave with a bike path and bus line most of my clients are young professionals and not families. I do have some families but mainly looking for a multi family or single family with a yard and neighborhood where you get more or your money. Hope this helps with your research and rental in the Mass Ave Arlington area.

Thanks,

Kristine Welch

Greater Metropolitan Real Estate

872 Main St Winchester, Ma 01890



LEED v4 for Building Design and Construction: Homes and Multifamily Lowrise

Project Checklist

Project Name: 882-892 Massachusetts Ave, Arlington, MA 02476

Date: 3/26/2020

Y ? N

Y	?	N	Credit	Integrative Process	2
8	5	0	Location and Transportation		15
Y			Prereq	Floodplain Avoidance	Required
PERFORMANCE PATH					
			Credit	LEED for Neighborhood Development Location	15
PRESCRIPTIVE PATH					
4	3		Credit	Site Selection	8
2			Credit	Compact Development	3
	2		Credit	Community Resources	2
2			Credit	Access to Transit	2
2	2	0	Sustainable Sites		7
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	No Invasive Plants	Required
	1		Credit	Heat Island Reduction	2
	1		Credit	Rainwater Management	3
2			Credit	Non-Toxic Pest Control	2
4	1	0	Water Efficiency		12
Y			Prereq	Water Metering	Required
PERFORMANCE PATH					
			Credit	Total Water Use	12
PRESCRIPTIVE PATH					
4			Credit	Indoor Water Use	6
	1		Credit	Outdoor Water Use	4
15	12	0	Energy and Atmosphere		38
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Energy Metering	Required
Y			Prereq	Education of the Homeowner, Tenant or Building Manager	Required
PERFORMANCE PATH					
			Credit	Annual Energy Use	29
BOTH PATHS					
2	3		Credit	Efficient Hot Water Distribution System	5
			Credit	Advanced Utility Tracking	2
1			Credit	Active Solar Ready Design	1
	1		Credit	HVAC Start-Up Credentialing	1
PRESCRIPTIVE PATH					
Y			Prereq	Home Size	Required
			Credit	Building Orientation for Passive Solar	3
2			Credit	Air Infiltration	2
	1		Credit	Envelope Insulation	2
3			Credit	Windows	3
			Credit	Space Heating & Cooling Equipment	4

EA PRESCRIPTIVE PATH (continued)					
	3		Credit	Heating & Cooling Distribution Systems	3
	3		Credit	Efficient Domestic Hot Water Equipment	3
2			Credit	Lighting	2
2			Credit	High Efficiency Appliances	2
3	1		Credit	Renewable Energy	4

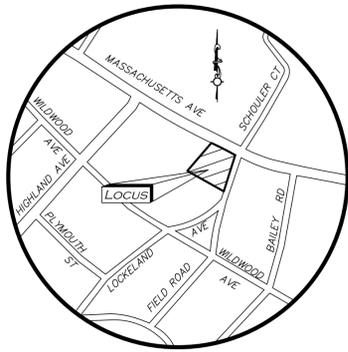
6	2	0	Materials and Resources		10
Y			Prereq	Certified Tropical Wood	Required
Y			Prereq	Durability Management	Required
	1		Credit	Durability Management Verification	1
3	1		Credit	Environmentally Preferable Products	4
3			Credit	Construction Waste Management	3
			Credit	Material Efficient Framing	2

7	2	0	Indoor Environmental Quality		16
Y			Prereq	Ventilation	Required
Y			Prereq	Combustion Venting	Required
Y			Prereq	Garage Pollutant Protection	Required
Y			Prereq	Radon-Resistant Construction	Required
Y			Prereq	Air Filtering	Required
Y			Prereq	Environmental Tobacco Smoke	Required
Y			Prereq	Compartmentalization	Required
1			Credit	Enhanced Ventilation	3
2			Credit	Contaminant Control	2
	2		Credit	Balancing of Heating and Cooling Distribution Systems	3
1			Credit	Enhanced Compartmentalization	1
			Credit	Enhanced Combustion Venting	2
			Credit	Enhanced Garage Pollutant Protection	2
3			Credit	Low Emitting Products	3

0	2	0	Innovation		6
Y			Prereq	Preliminary Rating	Required
	1		Credit	Innovation	5
	1		Credit	LEED AP Homes	1

0	0	0	Regional Priority		4
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

42	26	0	TOTALS		Possible Points: 110
<p>Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110</p>					



LOCUS MAP
NOT TO SCALE

SITE DEVELOPMENT PLAN SET

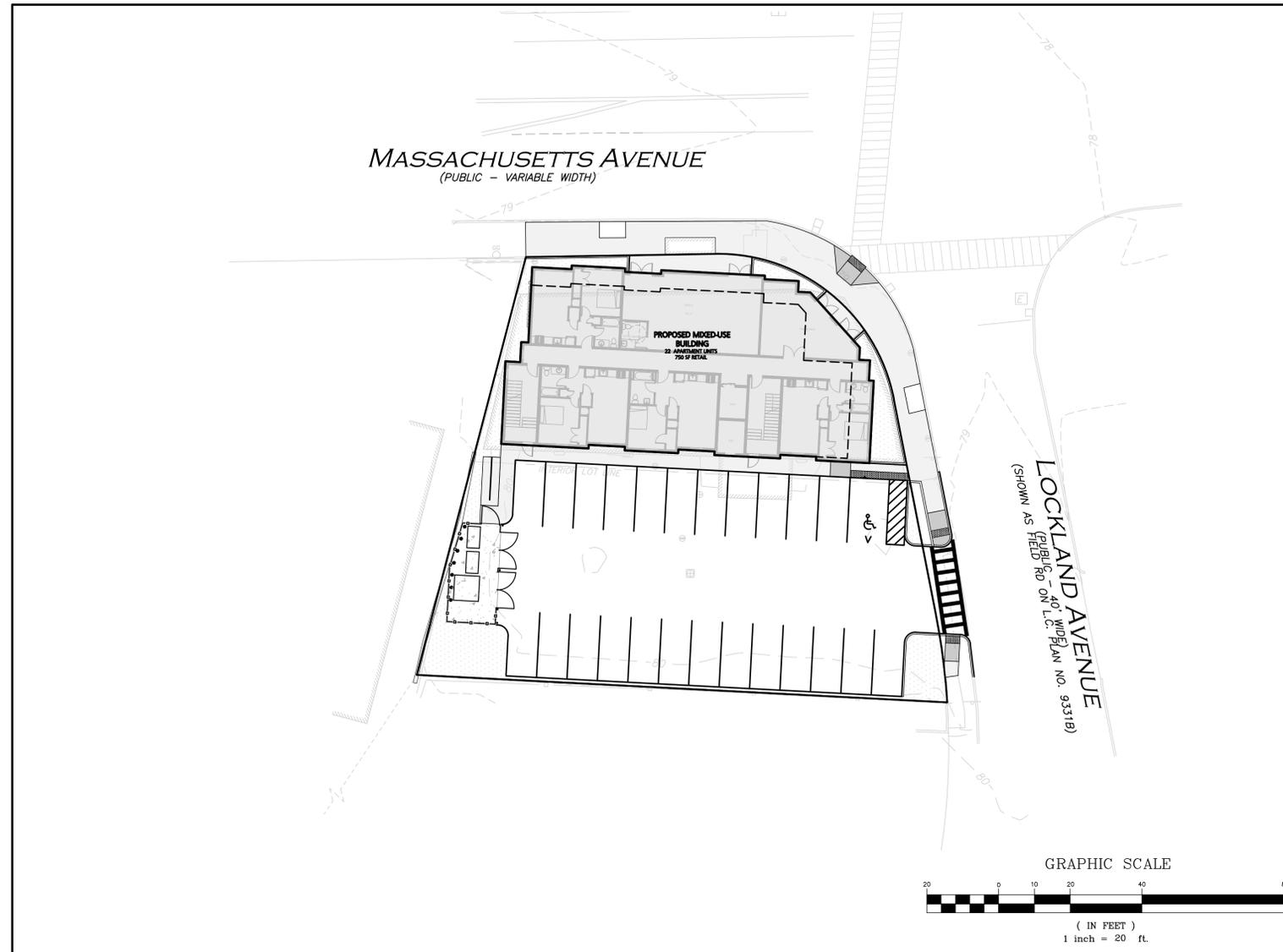
882-892 MASSACHUSETTS AVE

ARLINGTON, MA 02476

APPLICANT:
882-892 MASSACHUSETTS AVE, LLC
452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

ARCHITECT:
MARKET SQUARE ARCHITECTS
104 CONGRESS STREET, STE 203
PORTSMOUTH, NH 03801
(603) 501-0202

**CIVIL ENGINEER, LANDSCAPE ARCHITECT &
LAND SURVEYOR:**
ALLEN & MAJOR ASSOCIATES, INC.
100 COMMERCE WAY, SUITE 5
WOBURN, MA 01801
(781) 985-6889



LIST OF DRAWINGS			
DRAWING TITLE	SHEET	ISSUED	REVISED
EXISTING CONDITIONS	V-101	4/10/2020	-
SITE PREPARATION PLAN	C-101	4/10/2020	-
LAYOUT & MATERIALS PLAN	C-102	4/10/2020	-
GRADING & DRAINAGE PLAN	C-103	4/10/2020	-
UTILITIES PLAN	C-104	4/10/2020	-
DETAILS	C-501	4/10/2020	-
DETAILS	C-502	4/10/2020	-
DETAILS	C-503	4/10/2020	-
LANDSCAPE PLAN	L-101	4/10/2020	-
LANDSCAPE DETAILS	L-501	4/10/2020	-



PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

PREPARED BY:

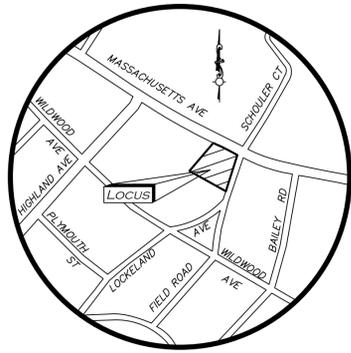


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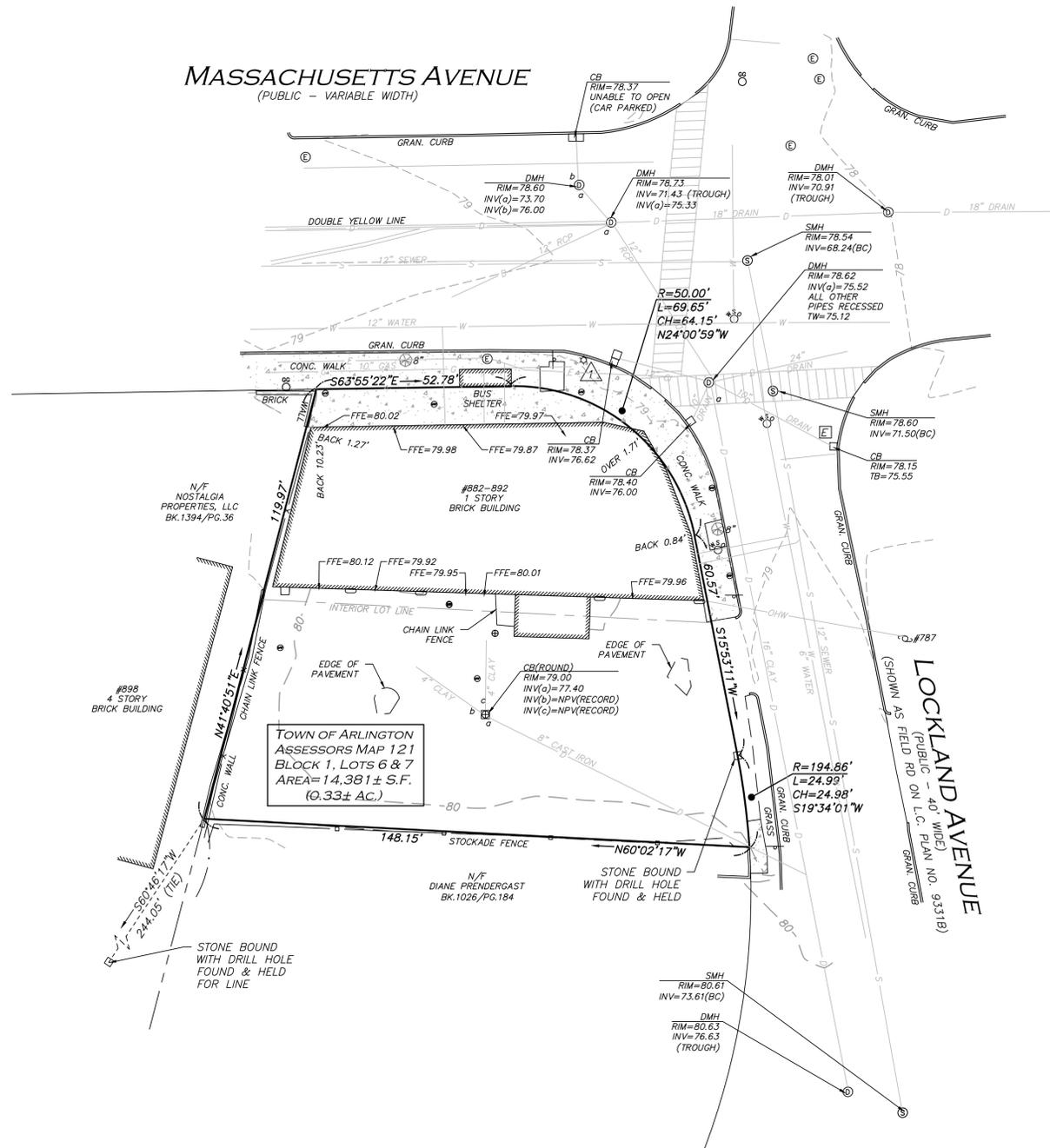
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ISSUED FOR ARB REVIEW: 4/10/2020



LOCUS MAP
(NOT TO SCALE)

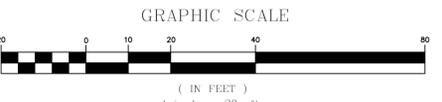
MASSACHUSETTS AVENUE
(PUBLIC - VARIABLE WIDTH)



LEGEND

STONE BOUND (SB)	⊞
DRAIN MANHOLE (DMH)	⊕
SEWER MANHOLE (SMH)	⊙
ELECTRIC MANHOLE (EMH)	⊖
MISC. MANHOLE (MH)	⊗
TELEPHONE MANHOLE (TMH)	⊘
CATCH BASIN (CB)	⊠
ROUND CATCH BASIN (RCB)	⊡
MONITOR WELL	⊞
DOWNSPOUT	⊞
WATER GATE	⊞
GAS GATE	⊞
BOLLARD	⊞
TREE	⊞
CONCRETE	⊞
BUILDING	⊞
1' CONTOUR	---5.3---
5' CONTOUR	---5.5---
PROPERTY LINE	---
ABUTTERS LINE	---
EDGE OF PAVEMENT	---
CURB	---
CHAIN LINK FENCE	x
STOCKADE FENCE	⊞
WATER LINE	W
SEWER LINE	S
DRAIN LINE	D
GAS LINE	G
ELECTRIC LINE	E
TELEPHONE LINE	T
FINISHED FLOOR ELEVATION	FFE
BITUMINOUS	BIT.
CONCRETE	CONC.
GRANITE	GRAN.
NOW OR FORMERLY	N/F
BOOK	BK.
PAGE	PG.
CERTIFICATE OF TITLE	COT
LAND COURT	L.C.
LAND COURT CASE	L.C.C.

- LOCUS REFERENCES**
- TOWN OF ARLINGTON ASSESSORS MAP 26, BLOCK 1, LOTS 6 & 7.
 - RECORD OWNER: 882-892 MASSACHUSETTS AVENUE, LLC
 - L.C. BOOK 1523, PAGE 101
 - L.C.C. #9331E
- PLAN REFERENCES**
- L.C.C. 9331B
 - L.C.C. 13975B
- NOTES**
1. NORTH ARROW IS BASED ON MASSACHUSETTS GRID COORDINATE SYSTEM (MAINLAND ZONE) (NAD 83).
 2. BOOK/PAGE AND PLAN REFERENCES ARE TAKEN FROM MIDDLESEX (SOUTH) REGISTRY OF DEEDS IN CAMBRIDGE, MA.
 3. VERTICAL DATUM IS NAVD 88 ESTABLISHED USING RTK GPS OBSERVATION.
 4. CONTOUR INTERVAL IS ONE FOOT (1').
 5. THERE WERE NO STRIPED PARKING SPACES OBSERVED ON SITE AT THE TIME OF SURVEY.



UTILITY STATEMENT

THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. ALLEN & MAJOR ASSOCIATES, INC. (A&M) MAKES NO GUARANTEE THAT THE UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. A&M FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. A&M HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

BENCHMARK SUMMARY

TBM #	DESCRIPTION	ELEV.
△	CHISEL SQUARE ON LIGHT POLE BASE	79.15

WE HEREBY CERTIFY THAT THIS PLAN IS THE RESULT OF AN ACTUAL ON THE GROUND SURVEY PERFORMED ON DECEMBER 12, 2019.

04/10/20
PROFESSIONAL LAND SURVEYOR FOR ALLEN & MAJOR ASSOCIATES, INC.



REV	DATE	DESCRIPTION

APPLICANT/OWNER:
FRANK PASCIUTO
455 MASSACHUSETTS AVENUE, STE 1
ARLINGTON, MA 02474

PROJECT:
892 MASSACHUSETTS AVENUE
ARLINGTON, MA

PROJECT NO. 2729-01 DATE: 01/14/20

SCALE: 1" = 20' DWG. NAME: S-2729-01-EC

DRAFTED BY: AJR CHECKED BY: NIL

PREPARED BY:

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civil engineering • land surveying
environmental consulting • landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801-8501
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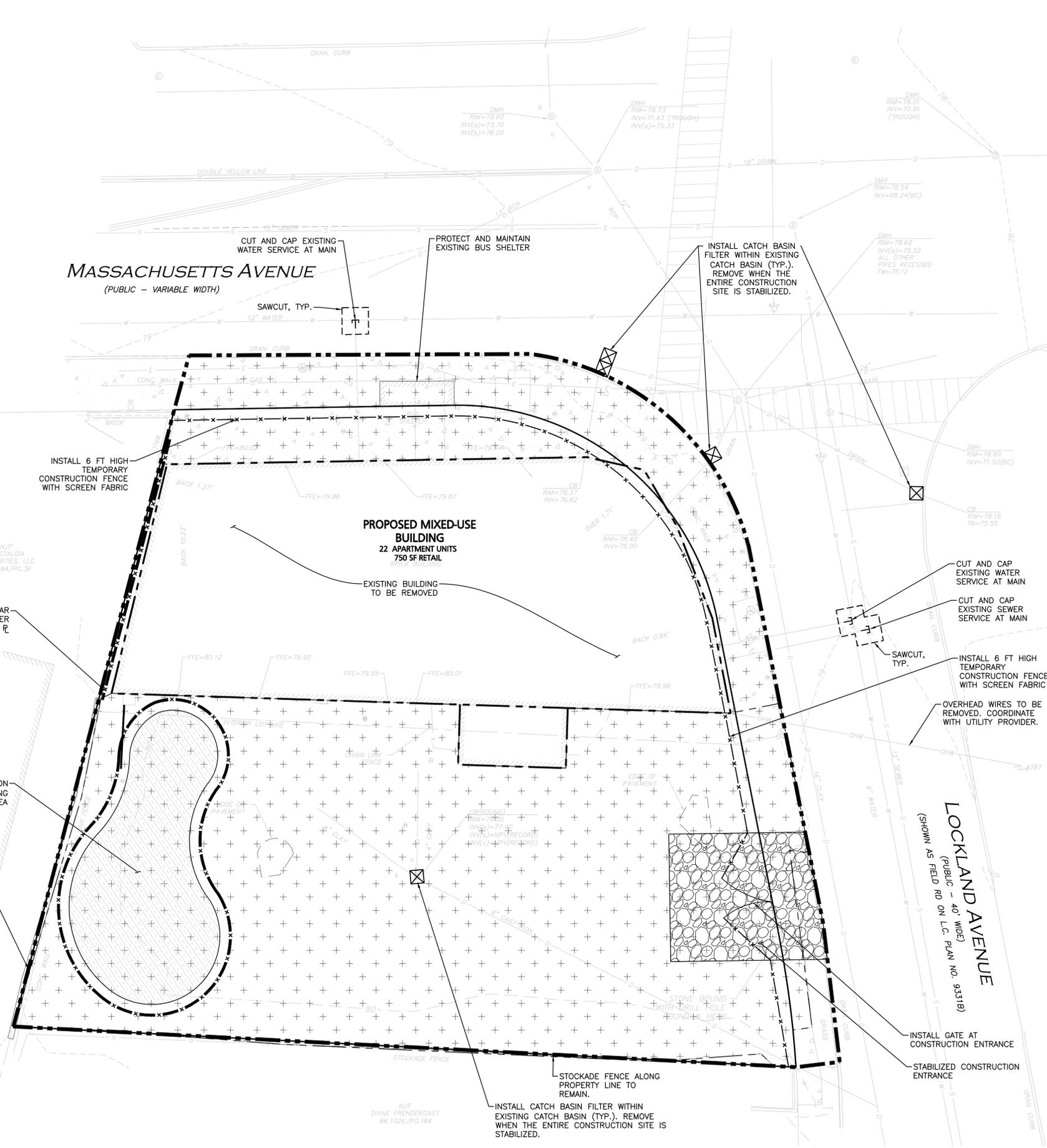
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DRAWING TITLE: **EXISTING CONDITIONS** SHEET NO. **V-101**

R:\PROJECTS\2729-01\CIVIL\DRAWINGS\CURRENT\C-2729-01_SITE-PREP-DWG

MASSACHUSETTS AVENUE
(PUBLIC - VARIABLE WIDTH)



LEGEND	
TUBULAR BARRIER	— x — x —
CATCH BASIN FILTER	⊠
STABILIZED ENTRANCE	▨
STOCKPILE/STAGING AREA	▨
LIMIT OF DISTURBANCE	— · — · —
LIMIT OF 'CLEAR AND GRUB'	— · — · —
BUILDING TO BE REMOVED	▨
PAVEMENT TO BE REMOVED	▨
UTILITY CUT AND CAP	E
TEMPORARY FENCE	— x — x —

SITE PREPARATION NOTES:

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
2. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY, AND "DIGSAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES AND THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
3. ALTHOUGH CERTAIN ITEMS HAVE BEEN NOTED ON THIS DRAWING FOR DEMOLITION, NO ATTEMPT HAS BEEN MADE TO DELINEATE EACH AND EVERY ITEM THAT REQUIRES DEMOLITION FOR THE COMPLETION OF THE PROJECT. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL NECESSARY DEMOLITION WORK TO COMPLETE THE PROJECT. ALLEN & MAJOR ASSOCIATES, INC. IS NOT RESPONSIBLE FOR SITE DEMOLITION ITEMS NOT SHOWN ON THE SURVEY, OR SPECIFICALLY NOTED. THE DEMOLITION NOTES AND ARROWS ON THIS PLAN ARE TYPICAL AND DO NOT REFLECT QUANTITY.
4. EXISTING WATER AND SEWER CONNECTIONS SHALL BE CUT AND CAPPED IN ACCORDANCE WITH THE TOWN OF ARLINGTON REQUIREMENTS.
5. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.
6. ALL INSTALLED CATCH BASINS AND AREA DRAINS SHALL HAVE A FILTER INSTALLED IMMEDIATELY, AND THE FILTER SHALL BE REMOVED WHEN THE ENTIRE SITE IS STABILIZED.



PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT/OWNER:
882-892 MASSACHUSETTS AVE, LLC
452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

PROJECT:
892 MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO. 2729-01 DATE: 04-10-20

SCALE: 1" = 10' DWG. NAME: C272901

DESIGNED BY: ARM CHECKED BY: BDJ/RC

PREPARED BY:



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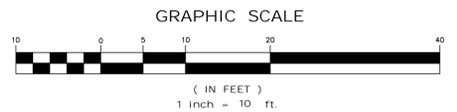
DRAWING TITLE: SHEET No.

SITE PREPARATION PLAN C-101

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ZONING SUMMARY TABLE
B2-NEIGHBORHOOD BUSINESS (MIXED-USE <=20,000SF)

ITEM	REQUIRED/ALLOWED	EXISTING	PROPOSED
MINIMUM LOT AREA	----	14,380± SF	14,380± SF
MINIMUM LOT AREA PER UNIT	----	N/A	575± SF
MINIMUM FRONTAGE	50 FT	208± FT	208± FT
MINIMUM FRONT YARD SETBACK	----	0 FT	1.9 FT
MINIMUM SIDE YARD SETBACK	----	1.3 FT	1.9 FT
MINIMUM REAR YARD SETBACK	N/A	N/A	N/A
LANDSCAPED OPEN SPACE	10%	0%	10.2%
USABLE OPEN SPACE	20%	5.3%	11.9% ⁽²⁾
MAXIMUM HEIGHT	50 FT	13.5± FT	39 FT
MAXIMUM HEIGHT STORIES	4 ⁽¹⁾	1	4
FLOOR AREA RATIO	1.50	0.35	1.25

PARKING SUMMARY TABLE

USE	CALCULATION	MIN. REQUIRED	TOTAL PROPOSED
APARTMENT BUILDING	1.15 SPACES PER 1 BED UNIT 18 X 1.15 = 21 REQUIRED	21	21
	1 SPACE PER EFFICIENCY UNIT 4 X 1 = 4 REQUIRED	4	4
GENERAL RETAIL	1 PER 300 SF 729 SF (UNDER 3,000 SF PARKING N/A)	N/A	N/A
		25	25

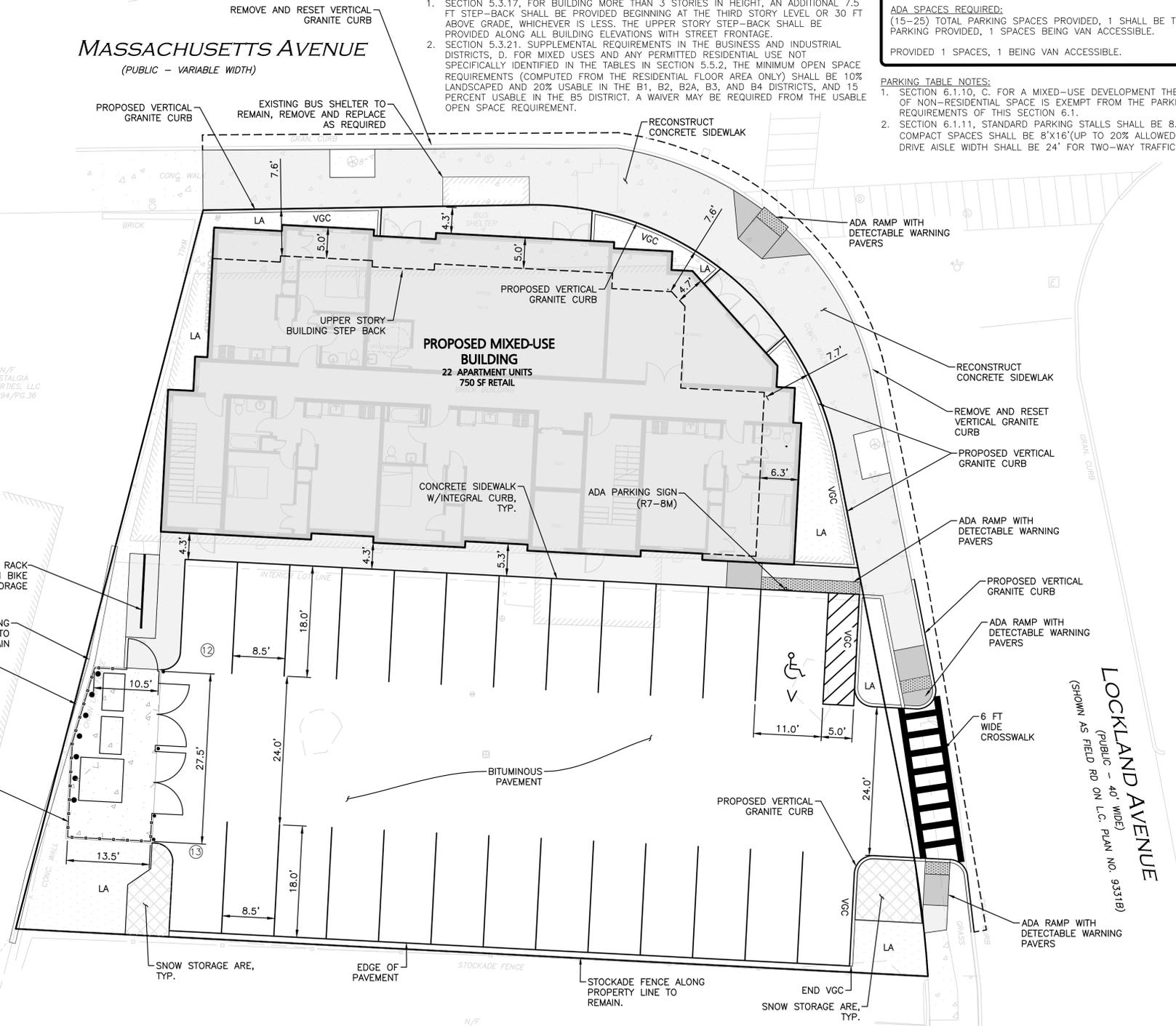
ADA SPACES REQUIRED:
(15-25) TOTAL PARKING SPACES PROVIDED, 1 SHALL BE THE MINIMUM ADA PARKING PROVIDED, 1 SPACES BEING VAN ACCESSIBLE.
PROVIDED 1 SPACES, 1 BEING VAN ACCESSIBLE.

PARKING TABLE NOTES:
1. SECTION 6.1.10, C. FOR A MIXED-USE DEVELOPMENT THE FIRST 3,000 SF OF NON-RESIDENTIAL SPACE IS EXEMPT FROM THE PARKING REQUIREMENTS OF THIS SECTION 6.1.
2. SECTION 6.1.11, STANDARD PARKING STALLS SHALL BE 8.5'X18', AND COMPACT SPACES SHALL BE 8'X16'(UP TO 20% ALLOWED WITH S.P.). DRIVE AISLE WIDTH SHALL BE 24' FOR TWO-WAY TRAFFIC.

LEGEND

PROP. PROPERTY LINE	---
SIGN	+
BOLLARD	•
BUILDING	[Hatched Box]
BUILDING ARCHITECTURE	[Hatched Box]
BUILDING INTERIOR WALLS	[Hatched Box]
CURB	---
RETAINING WALL	[Hatched Box]
PARKING STRIPING	[Hatched Box]
ROADWAY STRIPING	[Hatched Box]
SIDEWALK	[Hatched Box]
ADA ACCESSIBLE RAMP	[Hatched Box]
ADA DET. WARNING SURFACE	[Hatched Box]
SNOW STORAGE	[Hatched Box]
SETBACK LINE	---
BASELINE	---
SAW-CUT LINE	---
PARKING COUNT	Ⓣ
COMPACT PARKING STALL	Ⓞ
CHAIN LINK FENCE	-x-x-
WOOD FENCE	-□-□-

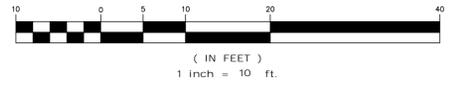
MASSACHUSETTS AVENUE
(PUBLIC - VARIABLE WIDTH)



NOTES

- WRITTEN DIMENSIONS ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS OR CONDITIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR. ALL SITE ITEMS SHALL BE LAID OUT AND AS BUILT BY A LICENSED LAND SURVEYOR.
- THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

GRAPHIC SCALE



PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

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452 MASSACHUSETTS AVE, STE 1
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PROJECT:
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ARLINGTON, MA 02476

PROJECT NO.	2729-01	DATE:	04-10-20
SCALE:	1" = 10'	DWG. NAME:	C272901
DESIGNED BY:	ARM	CHECKED BY:	BDJ/RC

PREPARED BY:

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DRAWING TITLE:	SHEET No.
LAYOUT & MATERIALS PLAN	C-102

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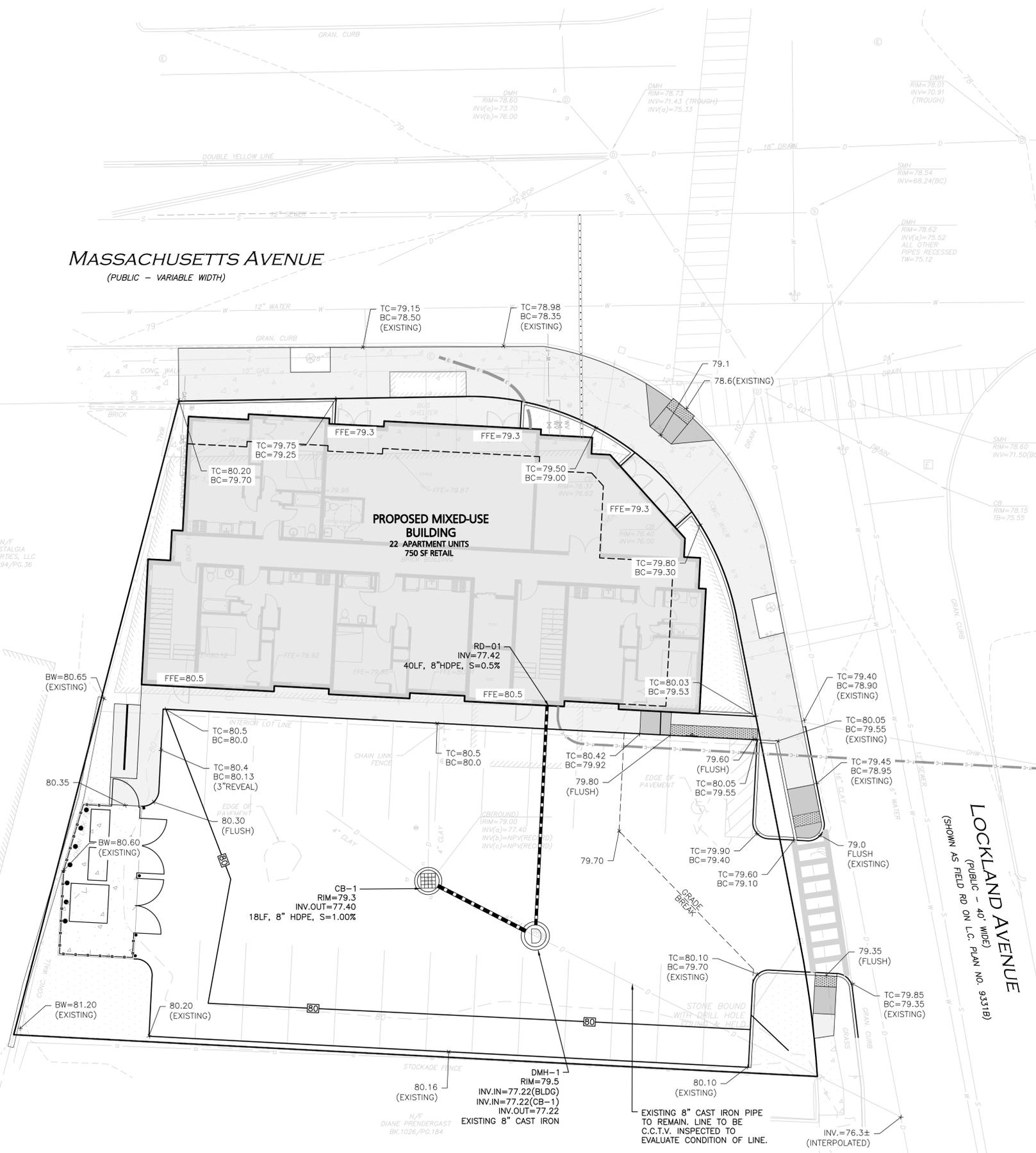
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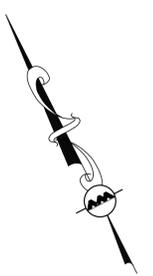
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MASSACHUSETTS AVENUE
(PUBLIC - VARIABLE WIDTH)



LEGEND

- DRAIN MANHOLE
- CATCH BASIN
- DRAIN LINE
- 10' CONTOUR
- 2' CONTOUR
- SPOT GRADE 79.50



- PLAN NOTES:**
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
 - CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF EXISTING STRUCTURES INCLUDING REMOVAL OF ANY EXISTING UTILITIES SERVING THE STRUCTURE. UTILITY CONNECTIONS SHOULD BE COORDINATED WITH THE MEP PRIOR TO CONSTRUCTION.
 - EXISTING DRAINAGE STRUCTURES TO REMAIN ARE TO BE INSPECTED AND REPAIRED AS NEEDED, AND EXISTING PIPES TO BE CLEANED OUT TO REMOVE ALL SILT AND DEBRIS.
 - IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
 - CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ENSURE A SMOOTH FIT AND CONTINUOUS GRADE.
 - CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS.
 - THE CONTRACTOR SHALL COORDINATE WITH THE ARCHITECT FOR THE FINAL LOCATIONS OF PROPOSED ROOF DRAINS. LOCATIONS ARE SHOWN HEREON FOR COORDINATION PURPOSES ONLY.
 - WRITTEN DIMENSIONS ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS OR CONDITIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR.
 - ANY DAMAGE TO PRIVATE OR PUBLIC PROPERTIES DUE TO THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AND RESTORED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
 - ALL PROPERTY MARKERS AND STREET LINE MONUMENTS SHALL BE PROPERLY PROTECTED DURING CONSTRUCTION. ANY DAMAGE TO THESE ITEMS SHALL BE REPAIRED AND RESTORED BY A LAND SURVEYOR LICENSED IN THE COMMONWEALTH OF MASSACHUSETTS AT THE CONTRACTOR'S EXPENSE.
 - THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ADDITIONAL BENCHMARK INFORMATION IF REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING BENCHMARKS. IF IT IS NECESSARY TO RELOCATE A BENCHMARK, IT SHALL BE RELOCATED BY A MASSACHUSETTS LAND SURVEYOR AND DONE SO AT THE CONTRACTOR'S EXPENSE.
 - ALL PERMITS AND APPROVALS NECESSARY FROM AGENCIES GOVERNING THE WORK SHALL BE OBTAINED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORK.
 - CONSTRUCTION DURING WET WEATHER OR WINTER CONDITIONS IS TO BE ANTICIPATED AND PROVISIONS TO ADEQUATELY ADDRESS THESE CONDITIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
 - ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS INCLUDING THE TOWN OF ARLINGTON, MADOT, MADEP, MWRA, MUTCD, AND AASHTO.
 - THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS AT THE SITE. THESE PLANS, PREPARED BY ALLEN & MAJOR ASSOCIATES DO NOT EXTEND TO OR INCLUDE SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THEIR EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK, OR THE OWNER'S EMPLOYEES, CUSTOMERS, OR THE GENERAL PUBLIC. THE SEAL OF THE ENGINEER AS INCLUDED IN THE PLAN SET DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PROVIDE THE APPROPRIATE SAFETY SYSTEMS WHICH MAY BE REQUIRED BY THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), STATE, AND LOCAL REGULATIONS.
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PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT/OWNER:
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452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

PROJECT:
892 MASSACHUSETTS AVE
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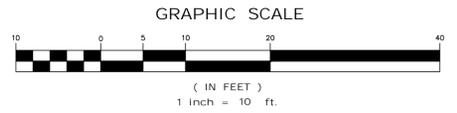
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DRAWING TITLE: **GRADING & DRAINAGE PLAN** SHEET No. **C-103**



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MASSACHUSETTS AVENUE
(PUBLIC - VARIABLE WIDTH)

GAS SERVICE SHOWN FOR COORDINATION PURPOSES ONLY. CONTRACTOR TO COORDINATE WITH GAS COMPANY.

GAS SERVICE BY OTHERS, INSTALL METERS AT BUILDING FACE.

N/F NOSTALGIA PROPERTIES, LLC BK.1394/PG.36

ELECTRIC SERVICE SHOWN FOR COORDINATION PURPOSES ONLY. CONTRACTOR TO COORDINATE WITH UTILITY PROVIDER.

PROPOSED MIXED-USE BUILDING
22 APARTMENT UNITS
750 SF RETAIL

TELE/DATA SERVICE SHOWN FOR COORDINATION PURPOSES ONLY. CONTRACTOR TO COORDINATE WITH UTILITY PROVIDER.

SEWER SERVICE
INV.=74.0
41LF, 6" DI,
S=2.00%

SEWER CHIMNEY CONNECTION TO EXISTING 12" SEWER.
INV.=68.2± (12" SEWER)
INV.=73.18 (6"D.I., TOP CHIMNEY INV.)

SAWCUT, TYP.
12"x6" TAPPING SLEEVE WITH GATE VALVE

6" FIRE SERVICE

2" WATER SERVICE

UTILITY NOTES:

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
2. A MINIMUM OF 18" VERTICAL CLEARANCE SHALL BE MAINTAINED WHERE WATER SERVICES CROSS STORM DRAIN AND SEWER LINES. WATER SERVICES SHALL BE ENCASED IN CONCRETE REGARDLESS OF CLEARANCE WHEN PASSING BELOW STORM DRAIN AND SEWER LINES. ENCASEMENT SHALL EXTEND ALONG WATER SERVICE A MINIMUM DISTANCE OF EIGHT FEET CENTERED ON THE CROSSING POINT OF THE OTHER PIPE AS MEASURED NORMALLY FROM ALL POINTS ALONG THE PIPE.
3. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
4. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY, AND "DIGSAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES AND THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
5. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

LEGEND

- SEWER MANHOLE
- SEWER CLEANOUT
- SEWER VENT
- SEWER LINE
- WATER LINE
- WATER (FIRE SERVICE)
- WATER (DOMESTIC SERVICE)
- WATER VALVE
- GAS LINE
- GAS VALVE
- ELECTRICAL CONDUIT
- TELE/CABLE CONDUIT



PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT/OWNER:
882-892 MASSACHUSETTS AVE, LLC
452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

PROJECT:
892 MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO. 2729-01 DATE: 04-10-20

SCALE: 1" = 10' DWG. NAME: C272901

DESIGNED BY: ARM CHECKED BY: BDJ/RC

PREPARED BY:

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environmental consulting • landscape architecture
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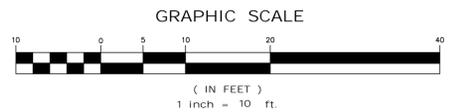
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DRAWING TITLE: UTILITIES PLAN SHEET No. C-104

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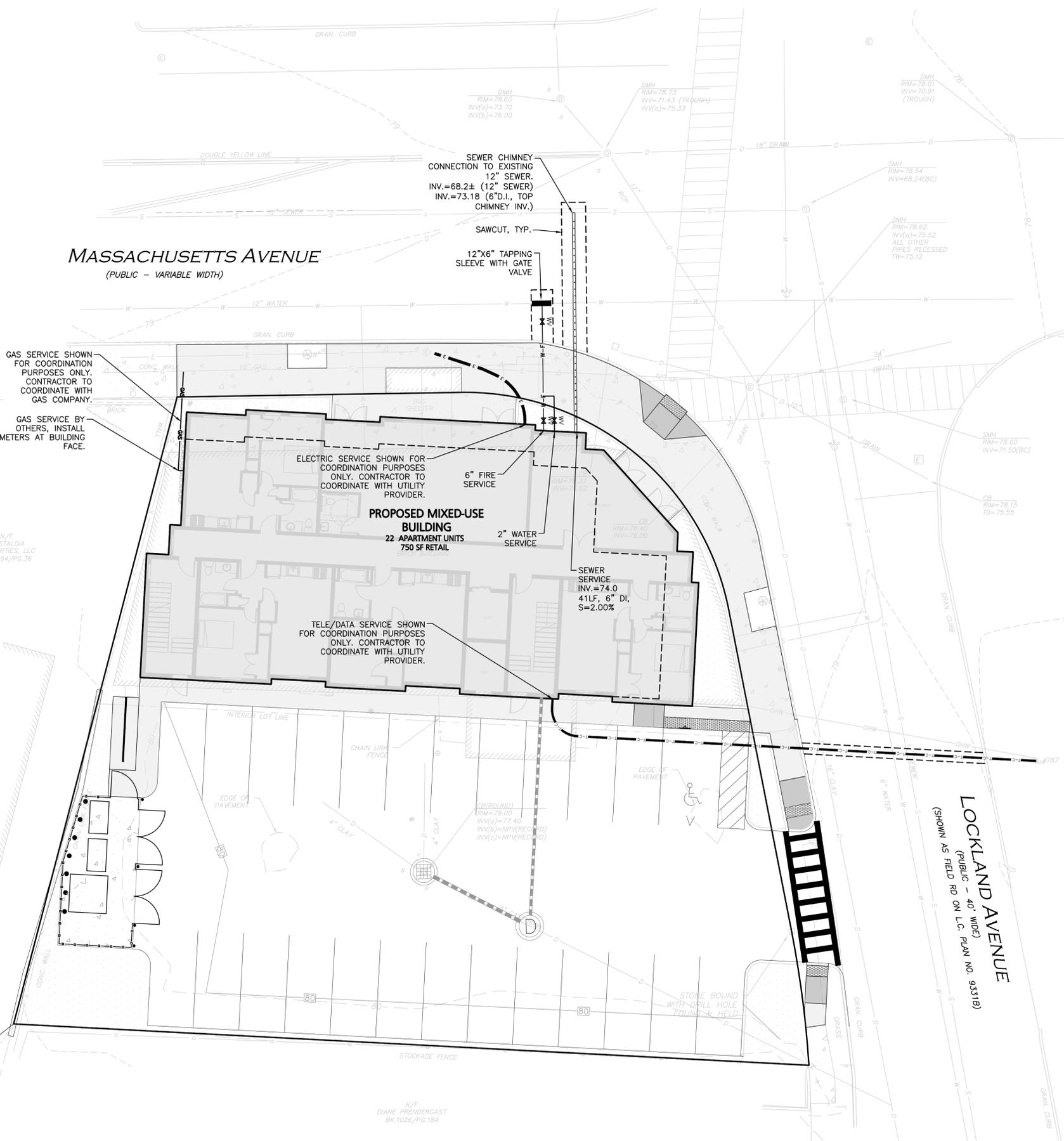
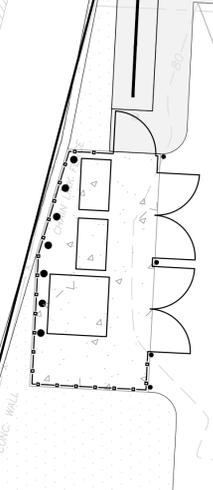
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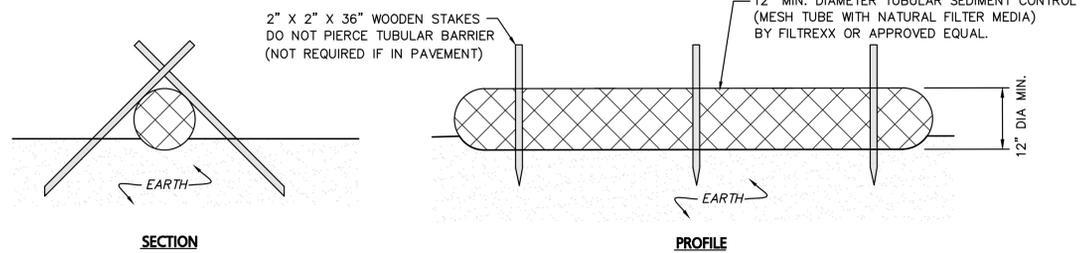


LOCKLAND AVENUE
(PUBLIC - 40' WIDE)
(SHOWN AS FIELD RD ON L.C. PLAN NO. 9331B)

N/F DIANE PRENDERGAST BK.1026/PG.184

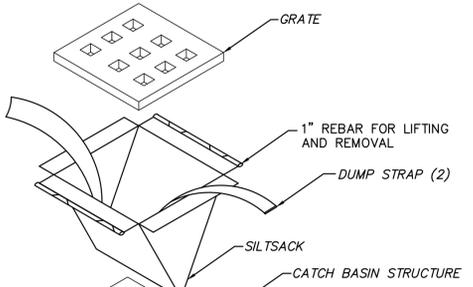
#89B 4 STORY BRICK BUILDING





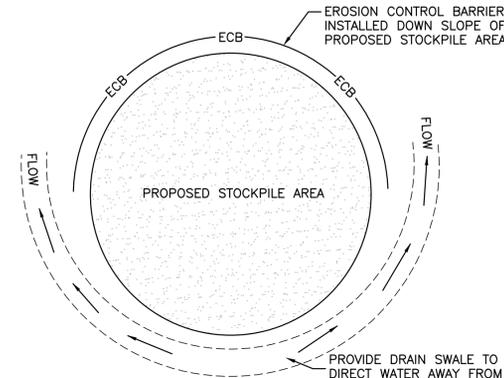
- NOTES:
1. ALL MATERIALS TO MEET MANUFACTURERS SPECIFICATIONS.
 2. INSTALL WOODEN STAKES IN A CRISS-CROSS PATTERN EVERY 8' ON CENTER.
 3. OVERLAP TUBULAR BARRIER SEGMENTS A MINIMUM OF 12".
 4. THE CONTRACTOR SHALL MAINTAIN THE TUBULAR BARRIERS IN A FUNCTIONAL CONDITION AT ALL TIMES. THE CONTROLS SHALL BE ROUTINELY INSPECTED BY THE CONTRACTOR.
 5. WHERE THE TUBULAR BARRIERS REQUIRE REPAIR OR SEDIMENT REMOVAL, IT WILL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST.
 6. AT A MINIMUM, THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE WHEN THEY REACH 1/3 THE EXPOSED HEIGHT OF THE BARRIER.

TUBULAR SEDIMENT BARRIER
NOT TO SCALE



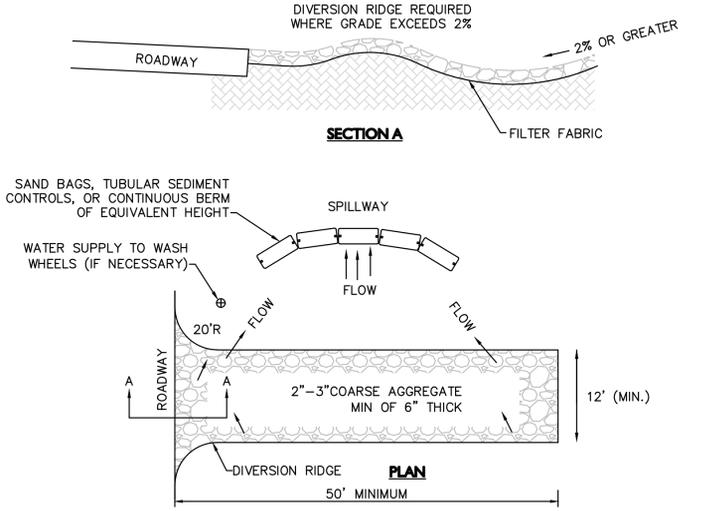
- NOTE:
1. INSTALL SILTSACK PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. EMPTY OR REMOVE SEDIMENT FROM SILTSACK WHEN RESTRAINT CORD IS NO LONGER VISIBLE. CLEAN, RINSE, AND REPLACE AS NEEDED.
 2. SILT SACKS TO BE INSTALLED DURING CONSTRUCTION OPERATIONS WHEN THE POTENTIAL FOR SEDIMENT TO ENTER EXISTING & PROPOSED BASINS EXISTS.

SILTSACK INLET DETAIL
NOT TO SCALE



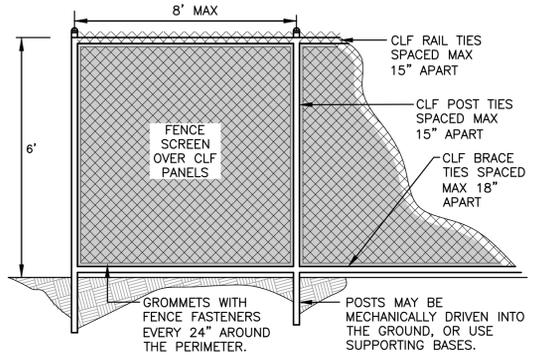
- NOTES:
1. SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR LESS THAN 90 DAYS SHALL BE COVERED WITH STRAW AND MULCH (AT 100LBS/1,000 SF), OR WITH AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.
 2. SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR 90 DAYS OR MORE SHALL BE SEEDED WITH WINTER RYE (FOR FALL SEEDING AT 1LB/1,000 SF) OR OATS (FOR SUMMER SEEDING AT 2LB/1,000 SF) AND THEN COVERED WITH STRAW MULCH (AT 100LB/1,000 SF) OR AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.

STOCKPILE PROTECTION DETAIL
NOT TO SCALE



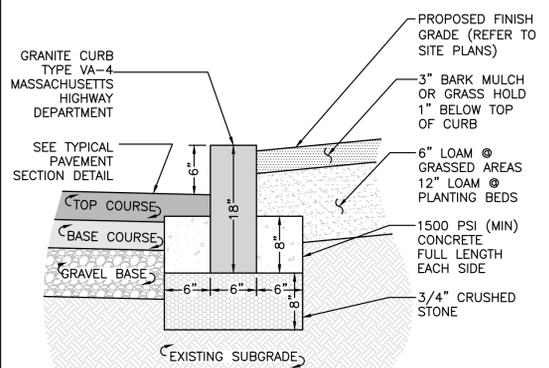
- NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
 2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTERING THE PUBLIC RIGHT-OF-WAY.
 3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
 4. USE SANDBAGS, TUBULAR SEDIMENT CONTROLS, OR OTHER APPROVED METHODS TO CHANNELIZE RUNOFF TO BASIN AS REQUIRED.

TEMPORARY CONSTRUCTION ENTRANCE/EXIT
NOT TO SCALE

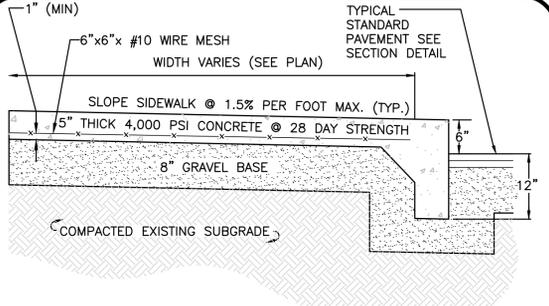


- NOTES:
1. SCREEN MATERIAL SHALL BE MADE FROM KNITTED HIGH DENSITY POLYETHYLENE WITH UV ADDITIVES.
 2. SCREEN FILAMENT STRENGTH SHALL BE A MINIMUM OF 50LBS/FT.
 3. SCREEN MATERIAL BREAK STRENGTH SHALL BE A MINIMUM OF 500 LBS/FT.
 4. SCREEN SHADE / WIND BLOCKAGE SHALL BE A MINIMUM OF 85%.
 5. SCREEN COLOR SHALL BE GREEN OR BLACK.

TEMPORARY CONSTRUCTION FENCE w/ SCREEN
NOT TO SCALE

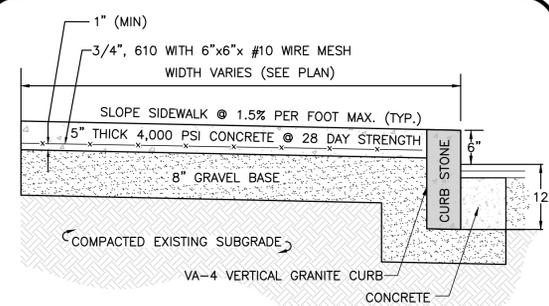


VERTICAL GRANITE CURB
NOT TO SCALE



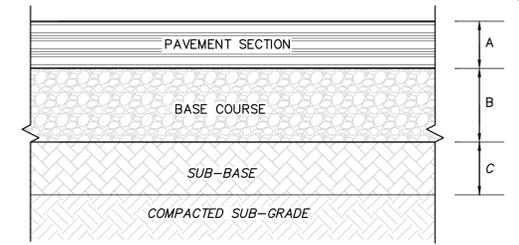
- NOTES:
1. SIDEWALK TO HAVE TOOLED JOINTS IN A 5' x 5' (TYP.) GRID WITH EXPANSION JOINTS 15' ON CENTER WITH PREMOLDED FILLER.
 2. SEE PLAN FOR ELEVATIONS AT CURB
 3. SIDEWALK CROSS SLOPE TO BE 1.5% MAX & SIDEWALK LONGITUDINAL RUNNING SLOPE TO BE 4.5% MAX, TYP.
 4. APPLY BRUSH MARKS PERPENDICULAR TO TRAVEL PATH.

CONCRETE SIDEWALK WITH MONOLITHIC CURB
NOT TO SCALE



- NOTES:
1. SIDEWALK TO HAVE TOOLED JOINTS IN A 5' x 5' (TYP.) GRID WITH EXPANSION JOINTS 15' ON CENTER AND PREMOLDED FILLER.
 2. SEE PLAN VIEW FOR ELEVATIONS AT CURB
 3. SIDEWALK CROSS SLOPE TO BE 1.5% MAX & SIDEWALK LONGITUDINAL RUNNING SLOPE TO BE 4.5% MAX, TYP.

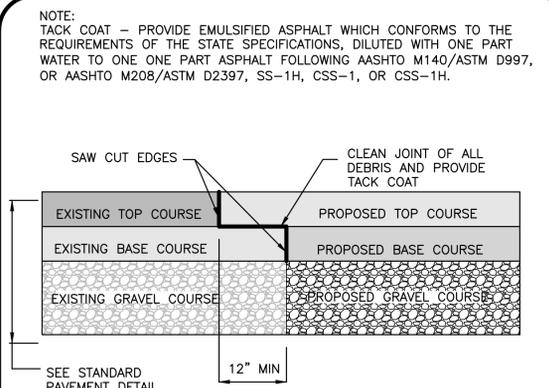
CONCRETE SIDEWALK WITH VGC CURBSTONE
NOT TO SCALE



- NOTES:
1. PAVEMENT SECTION, BASE COURSE, AND SUBGRADE SHALL BE PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. IN THE ABSENCE OF A GEOTECHNICAL ENGINEER'S RECOMMENDATION, THE MATERIALS AND THICKNESS SHALL BE AS SHOWN HEREON.
 2. SUBGRADE SHALL BE COMPACTED TO 95% OF PROCTOR
 3. EXISTING SUBSURFACE SOILS SHALL BE PROOF-ROLLED.

- MATERIALS AND THICKNESSES:
- A = 1.5" ASPHALT CONCRETE - SURFACE COURSE (M3.11.0, TABLE A, TOP COURSE)
 - 2.5" ASPHALT CONCRETE - BINDER COURSE (M3.11.0, TABLE A, BINDER COURSE)
 - B = 6" PROCESSED GRAVEL BASE (MHD M2.01.7)
 - C = 12" BANK RUN GRAVEL MHD M1.03.0 TYPE B)

ASPHALT PAVEMENT SECTION
NOT TO SCALE



PAVEMENT KEY CUT DETAIL
NOT TO SCALE



PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

882-892 MASSACHUSETTS AVE, LLC
452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

892 MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO. 2729-01 DATE: 04-10-20

SCALE: AS SHOWN DWG. NAME: C2729-01

DESIGNED BY: ARM CHECKED BY: BDJ/RC

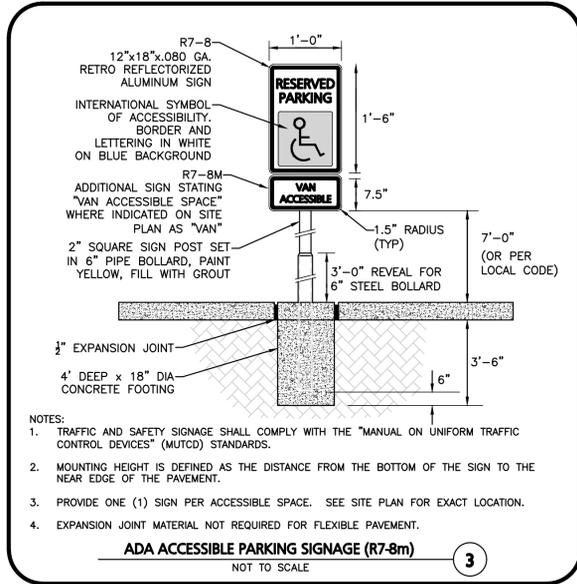
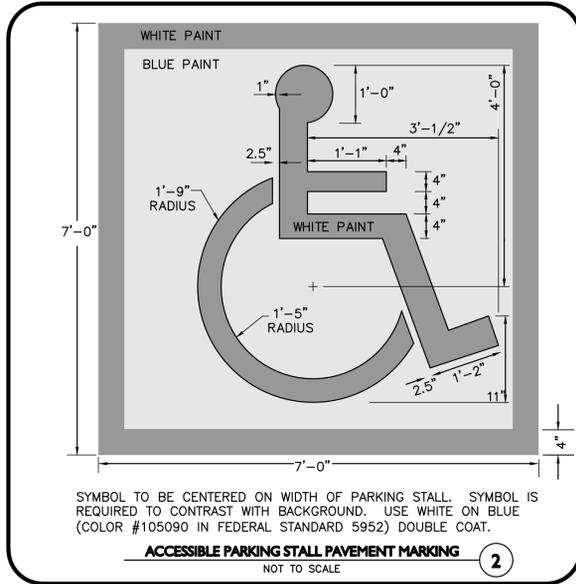
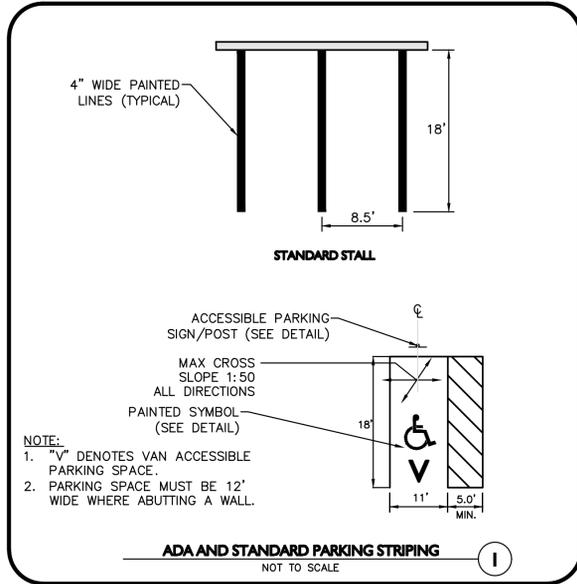
PREPARED BY:

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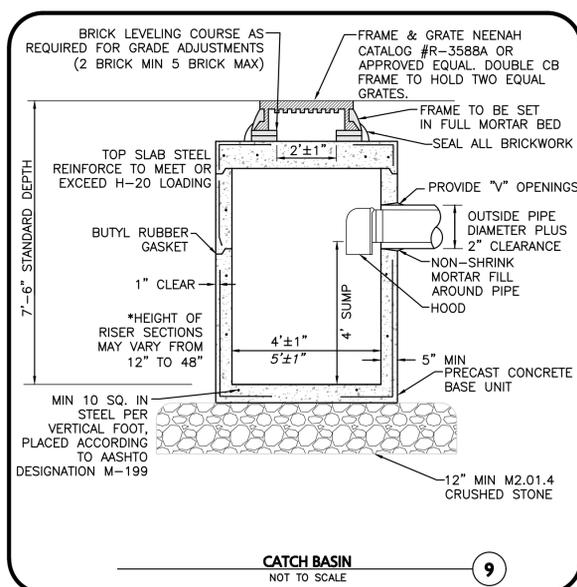
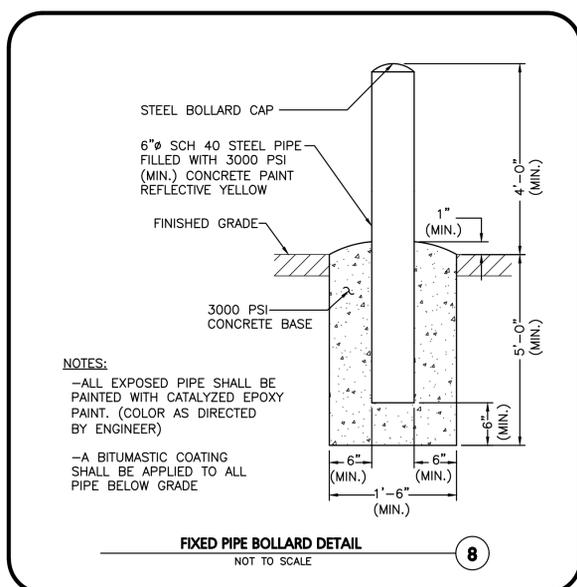
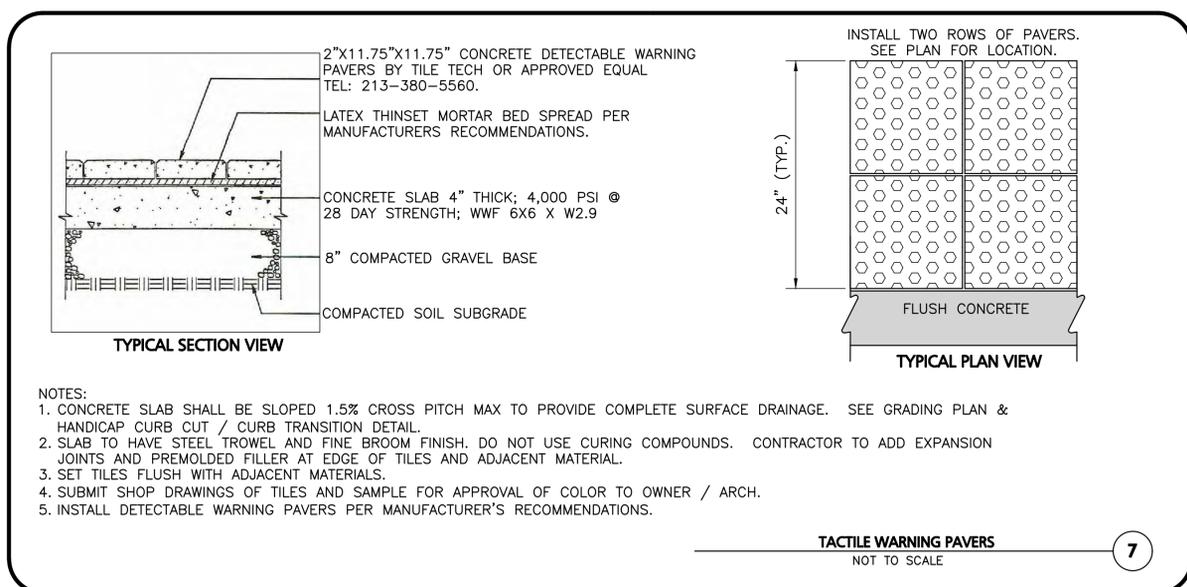
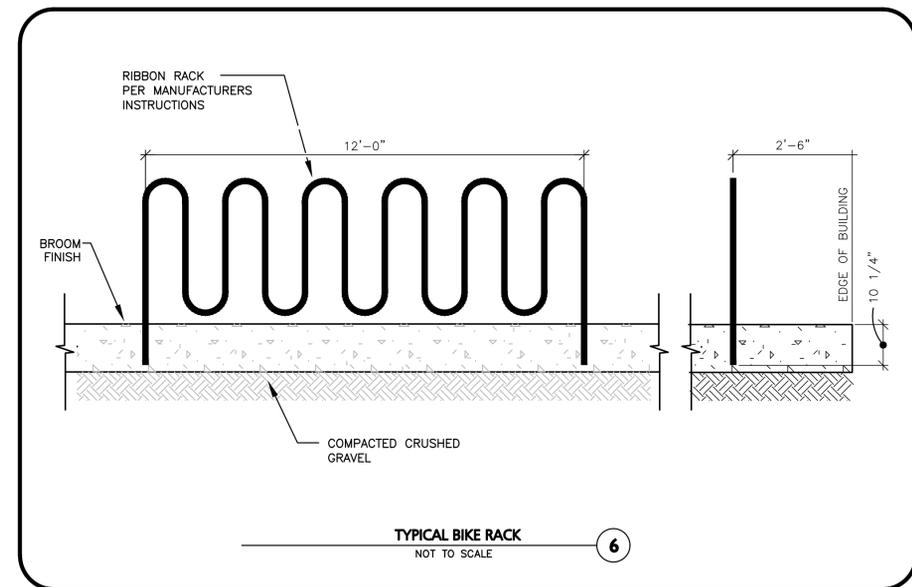
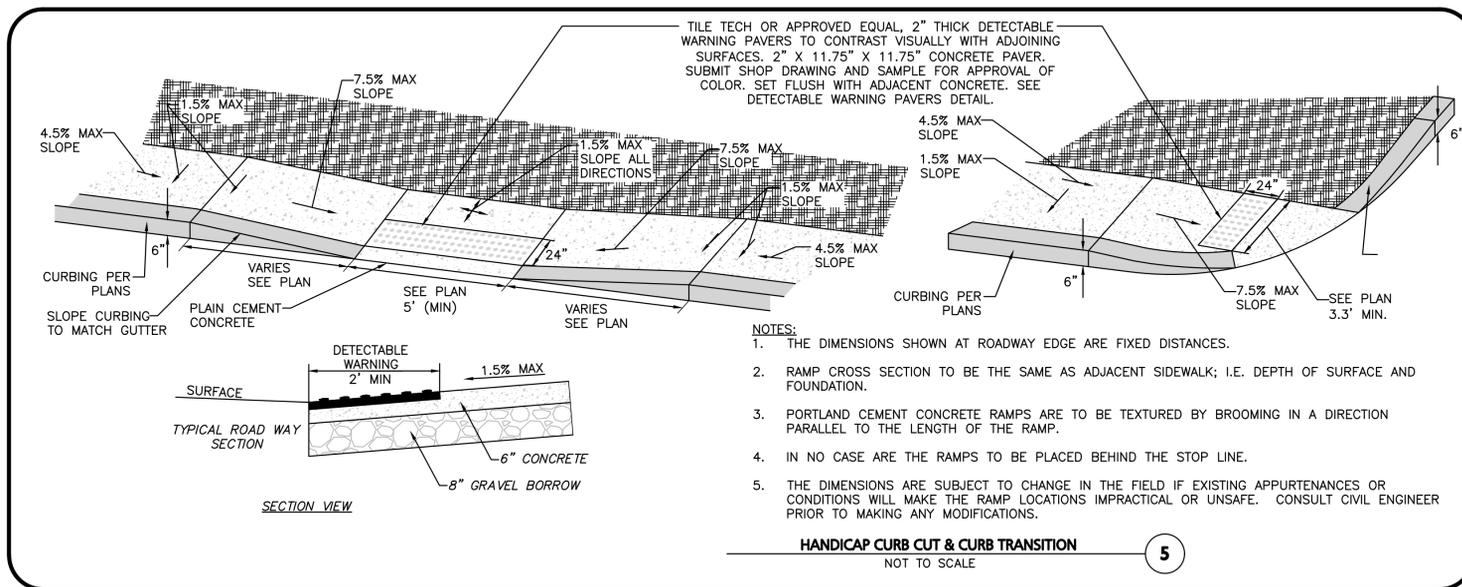
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DESC.	SIGN	SIZE	MOUNTING HEIGHT	DESCRIPTION	REFLEC-TORIZED
R7-8M (MODIFIED)		12" x 26"	7' - 0"	WHITE TEXT ON BLUE FIELD WITH WHITE BORDER	YES

SIGN TABLE
NOT TO SCALE



PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

882-892 MASSACHUSETTS AVE, LLC
452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

892 MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO. 2729-01 DATE: 04-10-20

SCALE: AS SHOWN DWG. NAME: C2729-01

DESIGNED BY: ARM CHECKED BY: BDJ/RC



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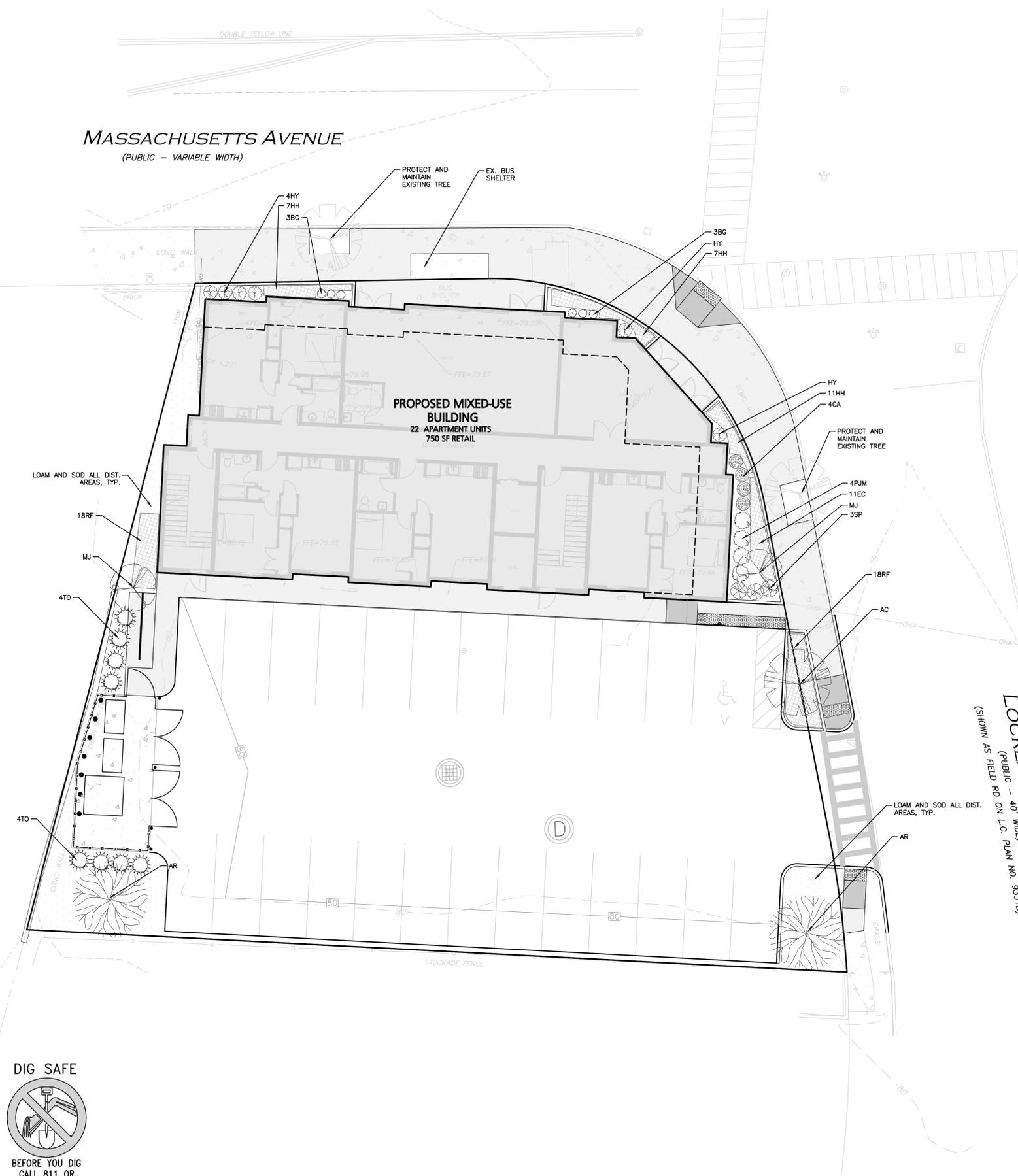
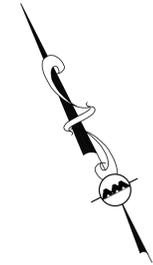
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MASSACHUSETTS AVENUE
(PUBLIC - VARIABLE WIDTH)

LEGEND

- DECIDUOUS TREE
- EVERGREEN TREE
- FLOWERING TREE
- SHRUBS
- MULCH BED
- PERENNIALS/GROUNDCOVER
- WILDFLOWER SEED MIX
- EROSION CONTROL SEED MIX



PLANTING SCHEDULE-TREES, SHRUBS, GROUNDCOVERS & PERENNIALS

KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	MIN. SIZE	SPACING	COMMENTS
EVERGREEN TREES						
TO	6	THUJA O. 'WINTERGREEN'	WINTERGREEN ARBORVITAE	6-7' HT	AS SHOWN	B&B
FLOWERING TREES						
AC	1	AMELANCHIER CANADENSIS	SHADBLOW SERVICEBERRY	2.5-3" CAL.	AS SHOWN	B&B
AR	2	ACER RUBRUM 'BOWHALL'	BOWHALL RED MAPLE	2.5-3" CAL.	AS SHOWN	B&B
MJ	2	MAGNOLIA LILIFLORA 'JANE'	JANE MAGNOLIA	5-6' HT.	AS SHOWN	B&B
SHRUBS						
CA	4	CORNUS ALBA 'IVORY HALO'	IVORY HALO DOGWOOD	#3	AS SHOWN	POT
BG	6	BUXUS 'GREEN MOUNTAIN'	GREEN MOUNTAIN BOXWOOD	#2	AS SHOWN	POT
HY	6	HYDRANGEA ARBORESCENS 'INCREDIBALL'	INCREDIBALL HYDRANGEA	#5	AS SHOWN	POT
PJM	4	RHODODENDRON 'PJM COMPACT CLONE'	COMPACT PJM RHODODENDRON	#3	AS SHOWN	B&B
SP	3	SYRINGA PATULA 'MISS KIM'	MISS KIM LILAC	#5	AS SHOWN	POT
PERENNIALS						
EC	13	ECHINACEA PURPUREA 'KIMS KNEEHIGH'	KIMS KNEEHIGH CONEFLOWER	#1	24" O.C.	STAGGERED
HH	29	HOSTA 'HADSPEN BLUE'	HADSPEN BLUE HOSTA	#1	24" O.C.	STAGGERED
RF	41	RUDBECKIA FULGIDA 'CITY GARDEN'	CITY GARDEN BLACK EYED SUSAN	#1	24" O.C.	STAGGERED



REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

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ARLINGTON, MA 02474

PROJECT:
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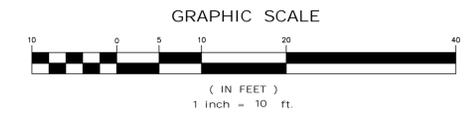
PROJECT NO. 2729-01 DATE: 04-10-20
SCALE: 1" = 10' DWG. NAME: C2729-01
DESIGNED BY: BCD CHECKED BY: BDJ/RC

PREPARED BY:

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DRAWING TITLE: LANDSCAPE PLAN SHEET No. L-101



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LOAM AND SODDING NOTES

CONTRACTOR SHALL SOD AREAS NOTED ON THE PLANS.

SOD IS TO BE A BLEND OF FOUR TO FIVE CURRENT AND IMPROVED HYBRID BLUEGRASS AND FESCUE MIXES APPROPRIATE FOR BOTH SEMI-SHADED AND AREAS OF SUN.

HYBRIDS MAY INCLUDE: BLACKSTONE KENTUCKY BLUEGRASS, AWARD KENTUCKY BLUEGRASS, CHALLENGER KENTUCKY BLUEGRASS, BLACKBURG II KENTUCKY BLUEGRASS OR COMPARABLE AND EQUAL BLUEGRASS HYBRIDS.

1. SOD SHALL BE HIGH QUALITY, NURSERY GROWN ON CULTIVATED MINERAL AGRICULTURAL SOILS. SOD SHALL BE MOIST, AND MACHINE CUT AT A UNIFORM SOIL THICKNESS OF AT LEAST 3/8" AT TIME OF CUTTING. MEASUREMENT FOR THICKNESS SHALL INCLUDE TOP GROWTH AND THATCH. SOD SHALL BE FREE OF DISEASES, WEEDS, BARE SPOTS, OR INSECTS.

2. SODDING TO BE COMPLETED "IN SEASON" BETWEEN APRIL 1 TO JUNE 15 OR AUGUST 15 TO OCTOBER 1, EXCEPT FOR RE-SODDING OF BARE SPOTS. IF UNABLE TO SOD WITHIN THESE TIMEFRAMES, CONTRACTOR TO INSTALL EROSION CONTROL MATS ON ALL SLOPES 3:1 AND OVER, HYDROSEED ALL EXPOSED AREAS, ADD SOIL STABILIZER "FLUX TERRA HP-FGM SOIL STABILIZER" AS MANUFACTURED BY "PROFILE" TO HYDROSEED (AT RATE OF 3,000 LBS PER ACRE), AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR TO COMPLETE ALL ABOVE "OUT OF SEASON" REQUIREMENTS AND THEN ALSO BE RESPONSIBLE FOR RE-GRADING AND RE-SODDING ALL DISTURBED, ERODED, OR BARE SPOTS WITHIN NEXT CLOSEST PLANTING SEASON IN FALL OR SPRING AT NO ADDITIONAL COST TO OWNER. CONTRACTOR RESPONSIBLE FOR ALL MAINTENANCE UNTIL FINAL ACCEPTANCE OF LAWN AREAS INCLUDING: WATERING, ADDING FERTILIZERS AND LIME AND MOWING AT NO ADDITIONAL COST TO OWNER.

3. COMMERCIAL FERTILIZER SHALL BE APPLIED AT THE RATE OF 25 POUNDS PER 1000 SQ. FT. OR AS RECOMMENDED BY THE TESTING AGENCY. LIME TO BE SPREAD AT THE RATE OF 100 POUNDS PER 1000 SQ. FT. OR AS RECOMMENDED BY THE TESTING AGENCY. COMMERCIAL FERTILIZER SHALL BE A COMPLETE FERTILIZER CONTAINING AT LEAST 50% OF THE NITROGEN OF WHICH IS DERIVED FROM NATURAL ORGANIC SOURCES OF UREA-FORM. IT SHALL CONTAIN THE FOLLOWING PERCENTAGES BY WEIGHT: NITROGEN (N) 10%, PHOSPHORUS (P) 6%, POTASH (K) 4%. LIME SHALL BE AN APPROVED AGRICULTURAL LIMESTONE CONTAINING NOT LESS THAN 85% OF TOTAL CARBONATES. LIMESTONE SHALL BE GROUND TO SUCH FINENESS THAT 50% WILL PASS A 100 MESH SIEVE AND 90% WILL PASS THROUGH A 20 MESH SIEVE.

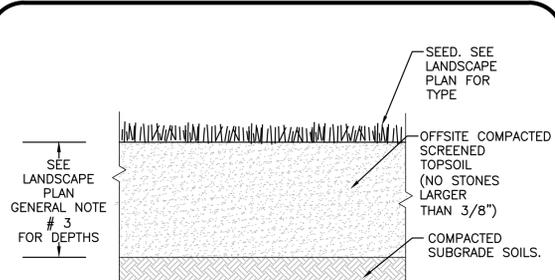
4. CONTRACTOR RESPONSIBLE FOR WATERING, MOWING, AND RE-SODDING OF LAWN BARE SPOTS UNTIL A UNIFORM, HEALTHY STAND OF GRASS IS ESTABLISHED AND ACCEPTED.

LANDSCAPE NOTES CONT.

- ALL DISTURBED AREAS NOT OTHERWISE NOTED SHALL RECEIVE 6" OF SUITABLE LOAM & SEED LAWNS WITH 3:1 OR GREATER SLOPES SHALL BE PROTECTED WITH AN EROSION CONTROL BARRIQUET.
- ANY FALL TRANSPLANTING HAZARD PLANTS SHALL BE DUG IN THE SPRING AND STORED FOR FALL PLANTING.
- TREES SHALL HAVE A MINIMUM CALIPER AS INDICATED ON THE PLANTING SCHEDULE TAKEN ONE FOOT ABOVE THE ROOT CROWN.
- ALL PLANT BEDS AND TREE SAUCERS TO RECEIVE 3" OF PINE BARK MULCH. GROUND COVER AREAS SHALL RECEIVE 1" OF PINE BARK MULCH.
- ALL DECIDUOUS TREES ADJACENT TO WALKWAYS AND ROADWAYS SHALL HAVE A BRANCHING PATTERN TO ALLOW FOR A MINIMUM OF 7' OF CLEARANCE BETWEEN THE GROUND AND THE LOWEST BRANCH.
- ALL TREE STAKES SHALL BE STAINED DARK BROWN.
- CONTRACTOR RESPONSIBLE FOR WATERING, AND RESEEDING OF BARE SPOTS UNTIL A UNIFORM STAND OF VEGETATION IS ESTABLISHED AND ACCEPTED.
- ALL PARKING ISLANDS PLANTED WITH SHRUBS SHALL HAVE 24" OF TOP SOIL. FINISH GRADE SHALL BE EQUAL TO THE TOP OF CURB.
- SOIL SAMPLES, TESTS, AND SHOP DRAWINGS SHALL BE PROVIDED TO THE LANDSCAPE ARCHITECT OR THE OWNER FOR APPROVAL PRIOR TO CONSTRUCTION.
- AN MINIMUM 18" WIDE BARRIER OF 1" GRAY OR TAN PEASTONE SHALL BE INSTALLED IN ALL PLANT BEDS WHICH ABUT THE BUILDINGS. NO MULCH IS ALLOWED WITHIN 18" OF ALL BUILDINGS PER THE LATEST EXECUTIVE OFFICE OF PUBLIC SAFETY AND SECURITY DEPARTMENT OF FIRE SERVICES REGULATION (527 CMR 17.00). INSTALL 6" DEEP OF PEASTONE WITH MIRAFI WEED FABRIC BENEATH AND STEEL EDGING BETWEEN THE PEASTONE AND ADJACENT MULCH BED.
- ALL PROPOSED LANDSCAPE AREAS INCLUDING MOWED LAWNS, TREES, SHRUB BEDS, AND PERENNIALS SHALL BE PROVIDED WITH WATER EFFICIENT UNDERGROUND IRRIGATION. DESIGN AND INSTALLATION OF IRRIGATION SYSTEM TO BE PERFORMED BY AN APPROVED IRRIGATION DESIGN BUILD CONTRACTOR OR BY AN APPROVED EQUAL, TO BE DETERMINED BY THE OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT. IRRIGATION SYSTEM IS TO BE DESIGNED FOR EFFICIENT WATER USAGE INCLUDING: USE OF DRIP IRRIGATION FOR SHRUBS AND PERENNIALS, IRRIGATION SYSTEM WITH HEAD-TO-HEAD COVERAGE, A CENTRAL SHUT-OFF VALVE, AND A RAIN SENSOR TO SHUT OFF IRRIGATION DURING RAIN EVENTS.

LANDSCAPE NOTES

- ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWN OF ARLINGTON, MA.
- PLANTING PLAN IS DIAGRAMMATIC IN NATURE. FINAL PLACEMENT OF PLANTS TO BE APPROVED BY THE LANDSCAPE ARCHITECT IN THE FIELD.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES, ANY PERMITTING AGENCIES, AND "DIG-SAFE" (1-888-344-7233) AT LEAST 72 HOURS IN ADVANCE OF ANY WORK THAT WILL REQUIRE EXCAVATION. CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY CONFLICTS IN WRITING.
- NO PLANT MATERIAL SHALL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA, ANY TREES NOTED AS "SEAL OR SELECTED SPECIMEN" SHALL BE TAGGED AND SEALED BY THE LANDSCAPE ARCHITECT.
- ALL TREES SHALL BE BALLED AND BURLAPPED (B&B) UNLESS OTHERWISE NOTED OR APPROVED BY THE OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT.
- CONTRACTOR SHALL VERIFY QUANTITIES SHOWN ON PLANT LIST. QUANTITIES SHOWN ON PLANS SHALL GOVERN OVER PLANT LIST.
- ANY PROPOSED PLANT SUBSTITUTIONS MUST BE APPROVED IN WRITING BY OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT.
- ALL PLANT MATERIALS INSTALLED SHALL MEET THE GUIDELINES ESTABLISHED BY THE STANDARDS FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
- ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF ACCEPTANCE.



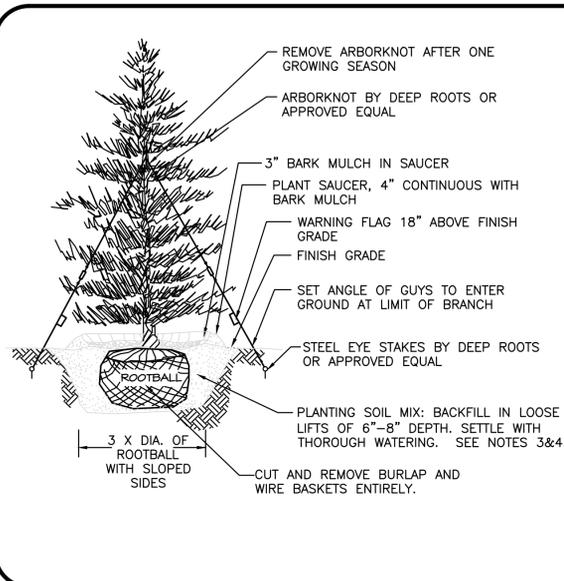
TEXTURE CLASS	% OF TOTAL WEIGHT
SAND	45% - 65%
SILT	15% - 35%
CLAY	5% - 20%

SIEVE	% PASSING
3/8"	100
NO. 4	85-100
NO. 40	60-85
NO. 100	38-60
NO. 200	10-35
20 um	LESS THAN 5%

NOTES:

- TOP OF LOAM (TOPSOIL) IS FINISH GRADE.
- ALL TOPSOIL (BOTH ONSITE AND OFFSITE SOURCES) SHALL BE COMPOSED OF A NATURAL, FERTILE, FRIABLE SOIL TYPICAL OF CULTIVATED TOPSOILS OF THE LOCALITY. OFFSITE SOIL SHALL BE SUITABLE FOR THE GERMINATION OF SEEDS AND SUPPORT OF VEGETATIVE GROWTH, WITH ADDITIVES, IF REQUIRED, TO ACHIEVE PARTICLE DISTRIBUTION AND ORGANIC CONTENT BELOW. TOPSOIL SHALL BE TAKEN FROM A WELL-DRAINED, ARIABLE SITE, FREE OF SUBSOIL, LARGE STONES, EARTH CLODS, STICKS, STUMPS, CLAY LUMPS, ROOTS, OTHER OBJECTIONABLE, EXTRANEIOUS MATTER OR DEBRIS NOR CONTAIN TOXIC SUBSTANCES.
- THE CONTRACTOR SHALL PROVIDE THE OWNER / LANDSCAPE ARCHITECT WITH TOPSOIL TEST RESULTS (RECOMMEND UMASS AMHERST SOIL TESTING LAB) FOR APPROVAL PRIOR TO OBTAINING AND PLACING THE SOIL. IF ANY TOPSOIL IS PURCHASED OR PLACED PRIOR TO APPROVAL BY OWNER / LANDSCAPE ARCHITECT, IT IS AT CONTRACTORS RISK, AND IT CAN BE REMOVED AT NO ADDITIONAL COST TO THE OWNER. IF THE PLANTING SOIL (BOTH ONSITE AND OFFSITE SOURCES) DOES NOT FALL WITHIN THE REQUIRED SIEVE ANALYSIS, TEXTURAL CLASS, ORGANIC CONTENT, OR PH RANGE, IT SHALL BE ADJUSTED TO MEET THE SPECIFICATIONS THROUGH THE ADDITION OF SAND, COMPOST, LIMESTONE, OR ALUMINUM SULFATE TO BRING IT WITHIN THE SPECIFIED LIMITS AT NO ADDITIONAL COST TO THE OWNER.
- TOPSOIL SHALL HAVE A PH VALUE BETWEEN 5.5 AND 6.5. TOPSOIL SHALL CONTAIN BETWEEN 4% AND 8% ORGANIC MATTER OF TOTAL DRY WEIGHT AND SHALL CONFORM TO THE FOLLOWING GRADATION AND TEXTURE CLASS ABOVE.

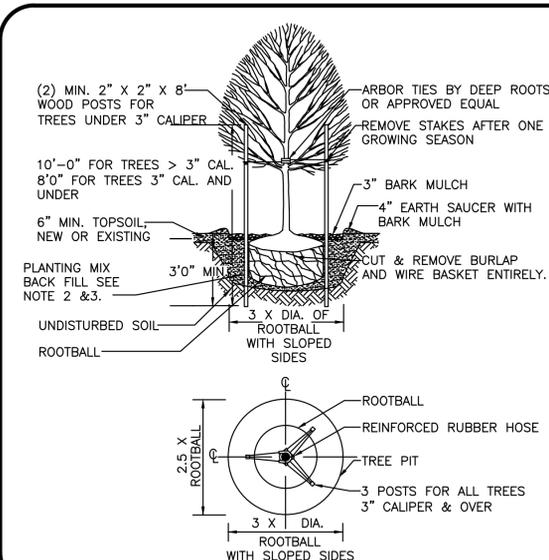
TOPSOIL FOR LAWN, TREES, SHRUBS, & PERENNIALS
NOT TO SCALE



EVERGREEN TREE DETAIL
NOT TO SCALE

NOTES:

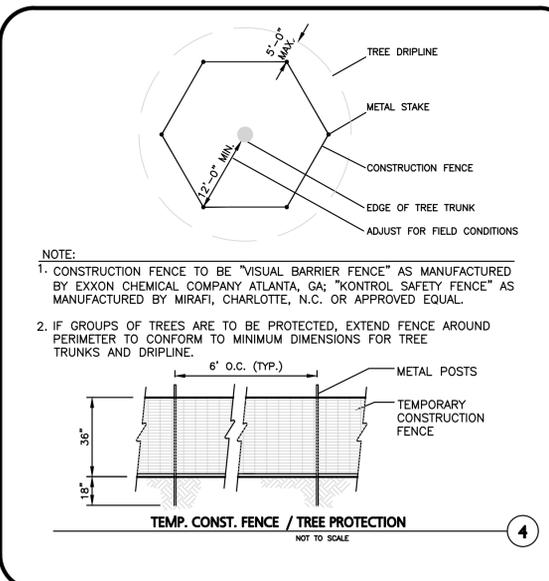
- TREES SHALL BEAR SAME RELATIONSHIP TO FINISH GRADE AS IT BORE TO NURSERY OR FIELD GRADE. ROOT FLARE SHALL BE 2" ABOVE FINISH GRADE. REMOVE SOIL FROM TRUNK FLARE OF TREE TO DETERMINE ACTUAL TOP OF ROOTBALL AREA.
- INSTALL THREE GUYS PER TREE; EQUALLY SPACED AROUND BALL.
- ATTACH GUYS AT 2/3 HEIGHT OF TREE.
- BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
- ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.



DECIDUOUS TREE DETAIL
NOT TO SCALE

NOTES:

- ALL TREES SHALL HAVE THE SAME RELATIONSHIP TO FINISH GRADE AFTER PLANTING AS THEY HAD AT THE ORIGINAL NURSERY SETTING. ROOT FLARE SHALL BE 2" ABOVE FINISH GRADE. REMOVE SOIL FROM TRUNK FLARE OF TREE TO DETERMINE ACTUAL ROOTBALL AREA.
- BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
- ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.



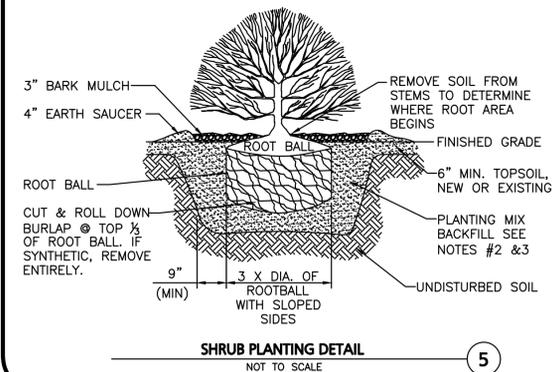
TEMP. CONST. FENCE / TREE PROTECTION
NOT TO SCALE

NOTE:

- CONSTRUCTION FENCE TO BE "VISUAL BARRIER FENCE" AS MANUFACTURED BY EXXON CHEMICAL COMPANY ATLANTA, GA; "KONTROL SAFETY FENCE" AS MANUFACTURED BY MIRAFI, CHARLOTTE, N.C. OR APPROVED EQUAL.
- IF GROUPS OF TREES ARE TO BE PROTECTED, EXTEND FENCE AROUND PERIMETER TO CONFORM TO MINIMUM DIMENSIONS FOR TREE TRUNKS AND DRILLINE.

NOTES:

- ALL SHRUBS SHALL HAVE THE SAME RELATIONSHIP TO FINISH GRADE AFTER PLANTING AS THEY HAD AT THE ORIGINAL NURSERY SETTING. SET SHRUB 1"-2" ABOVE FINISH GRADE.
- BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
- ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.
- SHRUB BEDS TO HAVE 24" MIN. OF CONTINUOUS PLANTING SOIL.



SHRUB PLANTING DETAIL
NOT TO SCALE



REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT/OWNER:
882-892 MASSACHUSETTS AVE, LLC
452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

PROJECT:
892 MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO. **2729-01** DATE: **04-10-20**

SCALE: **NTS** DWG. NAME: **C272901**

DESIGNED BY: **BCD** CHECKED BY: **BDJ/RC**

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering • land surveying
environmental consulting • landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896

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DRAWING TITLE: **LANDSCAPE DETAILS** SHEET No. **L-501**

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CALL 811 OR
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1-888-344-7233

April 10, 2020

Jennifer Raitt
Director of Planning & Community
Development
730 Massachusetts Ave
Arlington, MA 02476

RE: Mixed-Use Redevelopment
Drainage Summary Letter
882-892 Massachusetts Ave
Arlington, MA 02476

Dear Ms. Raitt,

On behalf of our Client, 882-892 Massachusetts Ave, LLC, Allen & Major Associates (A&M) is pleased to provide this letter in support of the Special Permit application for the Mixed-Use Redevelopment project at 882-892 Massachusetts Ave. This letter will summarize the changes to the stormwater management system which are proposed as part of the redevelopment efforts.

Existing Conditions

The site is located on the corner of Lockeland Avenue and Massachusetts Avenue with access to the parking area from Lockeland Avenue. It is comprised of two property's, identified on the City tax Map 126, Block 1, Lots 6 and 7. Lot 6 is predominantly covered by an existing 1-story brick building, approximately 4,786 square feet. Lot 7 is predominantly covered by paved parking area. Elevations onsite range from elevation 79 to elevation 80. Elevation 79 is the low point on-site located at the existing catch basin, and elevation 80 runs along the southern property line. Stormwater sheet flows from the paved parking lot to onsite to the existing catch basin which discharges to the existing municipal system via an 8" cast iron pipe. The majority of the stormwater from the site discharges through this connection including the roof drainage and parking lot. A review of the NRCS soil report for Middlesex County indicates that the soil onsite is considered Merrimac-Urban Land which has a Hydrologic Soil Group rating of an "A". A copy of the Existing Watershed Plan is included herewith.

Proposed Conditions

The project, proposes to demolish the existing structure to construct a 4-story, 4,693 square foot Mixed-Use building with apartment and retail uses. There are 22 apartment units proposed and a 750 square foot retail component. The parking area is proposed to be reconstructed within the constraints of the existing pavement area. The stormwater management system will be improved with the installation of a new catch basin with a sump and hood at the outlet pipe to provide stormwater treatment. The quantity of stormwater runoff will be reduced with the installation of landscaped areas on-site. The proposed work will result in approximately 1,470 square feet of impervious material being replaced with landscaped areas.

Runoff flows were estimated for both pre and post development conditions using HydroCAD 10.00 software, at two specific "Study Points" (SP-1 & SP-2). Study Point 1 is the flows that will enter the on-site catch basin and discharge to the municipal drainage system. Study Point 2 is the stormwater flows that will flow onto Massachusetts Ave, and be collected within the street catch basins. The table below shows that the project causes a reduction in the peak rate of runoff and volume of stormwater leaving the site at both Study Points. Copies of the HydroCAD worksheets and Watershed Plans are included herewith.

STUDY POINT #1 (flow to on-site catch basin)			
	2-Year	10-Year	100-Year
Existing Flow (CFS)	1.02	1.55	2.83
Proposed Flow (CFS)	0.92	1.47	2.79
Decrease (CFS)	0.10	0.08	0.04
Existing Volume (CF)	3,400	5,267	9,812
Proposed Volume (CF)	2,833	4,671	9,212
Decrease (CF)	567	596	600

STUDY POINT #2 (flow to Mass Ave)			
	2-Year	10-Year	100-Year
Existing Flow (CFS)	0.06	0.09	0.16
Proposed Flow (CFS)	0.01	0.03	0.08
Decrease (CFS)	0.05	0.06	0.08
Existing Volume (CF)	192	297	554
Proposed Volume (CF)	31	81	241
Decrease (CF)	161	216	313

The surface water drainage requirements of the Town of Arlington Zoning Bylaw Environmental Design Review Standards have been reviewed and met with the proposed design. The proposed project will introduce landscaped areas to the site to reduce the impervious area, and a new catch basin is proposed with a sump and hood at the outlet pipe to provide stormwater treatment. The Town of Arlington, Article 15 Stormwater Mitigation, shall not apply as the proposed development will introduce a reduction in impervious area. However, with the proposed landscaped areas the project will reduce the runoff rates for all design storms, and comply with this bylaw.

Summary

As shown in the table above, the proposed development will have a positive impact on the stormwater management system by reducing the rate and volume of stormwater runoff from the site.

Very truly yours,

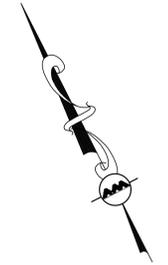
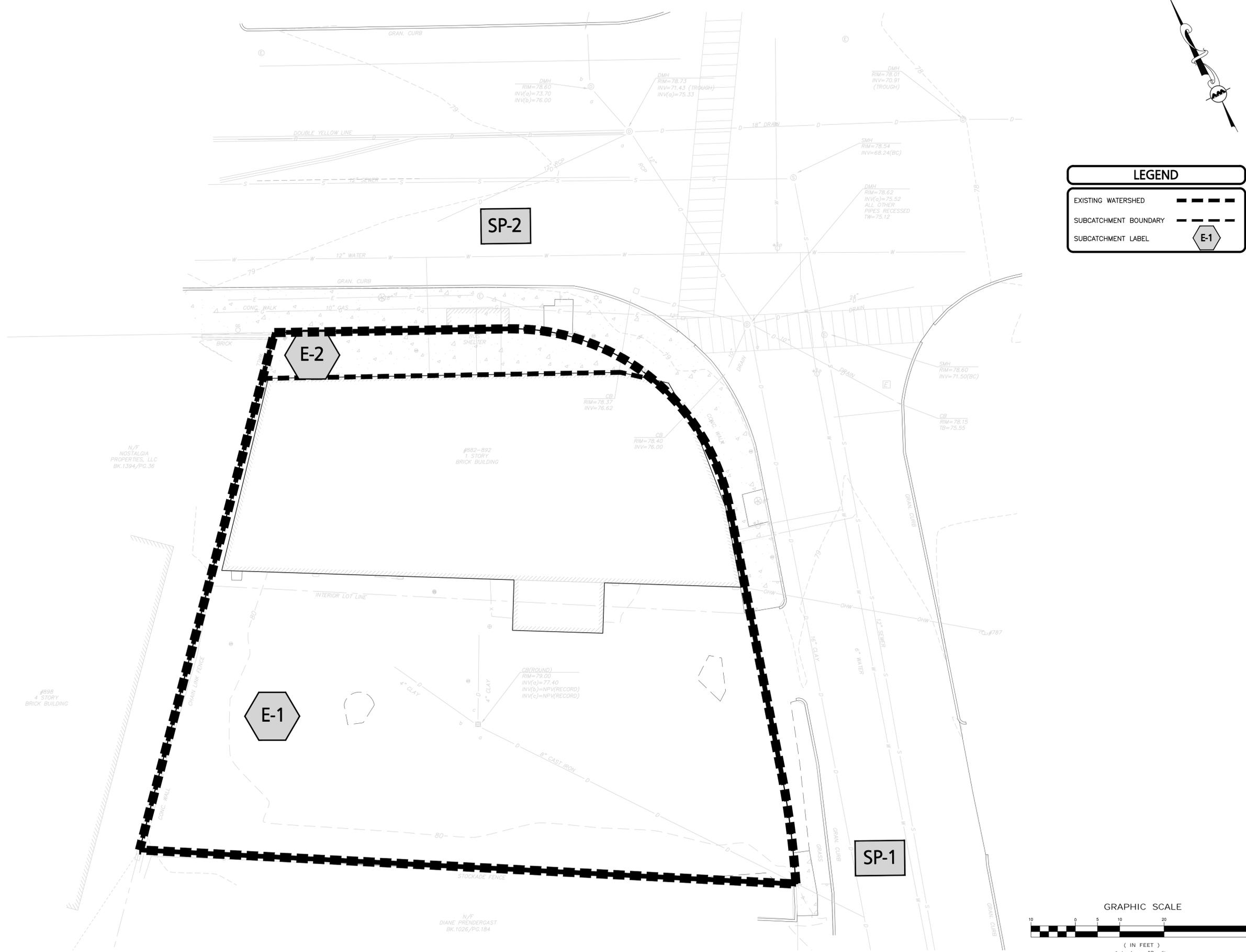
ALLEN & MAJOR ASSOCIATES, INC.

Aaron Mackey, PE
Project Engineer

Attachments:

1. Existing Watershed Plan
2. Proposed Watershed Plan
3. Pre development HydroCAD Calculations
4. Post development HydroCAD Calculations
5. Extreme Precipitation Tables
6. NRCS Soil Report

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LEGEND

EXISTING WATERSHED

SUBCATCHMENT BOUNDARY

SUBCATCHMENT LABEL E-1

REV	DATE	DESCRIPTION

APPLICANT/OWNER:
882-892 MASSACHUSETTS AVE, LLC
452 MASSACHUSETTS AVE, STE 1
ARLINGTON, MA 02474

PROJECT:
892 MASSACHUSETTS AVE
ARLINGTON, MA 02476

PROJECT NO. **2729-01** DATE: **04-10-20**

SCALE: **1" = 10'** DWG. NAME: **C272901**

DESIGNED BY: **ARM** CHECKED BY: **BDJ/RC**

PREPARED BY:

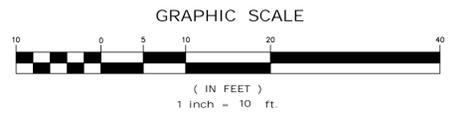
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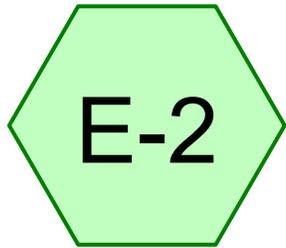
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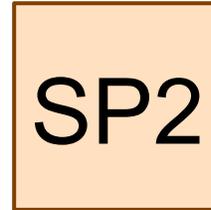
DRAWING TITLE: **EXISTING WATERSHED PLAN** SHEET No. **EWP**

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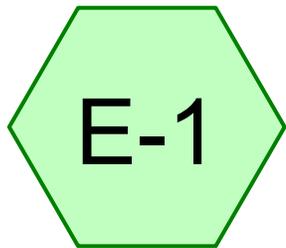




Subcat E-2



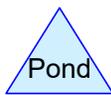
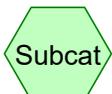
Study Point 2



Subcat E-1



Study Point 1



2729-01_Existing-Conditions

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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
9,372	98	Paved parking, HSG A (E-1, E-2)
5,008	98	Roofs, HSG A (E-1)
14,381	98	TOTAL AREA

2729-01_Existing-Conditions

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
14,381	HSG A	E-1, E-2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
14,381		TOTAL AREA

2729-01_Existing-Conditions

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Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
9,372	0	0	0	0	9,372	Paved parking	E-1, E-2
5,008	0	0	0	0	5,008	Roofs	E-1
14,381	0	0	0	0	14,381	TOTAL AREA	

2729-01_Existing-Conditions

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Type III 24-hr 2-Year Rainfall=3.23"

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Page 5

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1

Runoff Area=13,613 sf 100.00% Impervious Runoff Depth=3.00"
Tc=5.0 min CN=98 Runoff=1.02 cfs 3,400 cf

Subcatchment E-2: Subcat E-2

Runoff Area=768 sf 100.00% Impervious Runoff Depth=3.00"
Tc=5.0 min CN=98 Runoff=0.06 cfs 192 cf

Reach SP1: Study Point 1

Inflow=1.02 cfs 3,400 cf
Outflow=1.02 cfs 3,400 cf

Reach SP2: Study Point 2

Inflow=0.06 cfs 192 cf
Outflow=0.06 cfs 192 cf

Total Runoff Area = 14,381 sf Runoff Volume = 3,592 cf Average Runoff Depth = 3.00"
0.00% Pervious = 0 sf 100.00% Impervious = 14,381 sf

2729-01_Existing-Conditions

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Type III 24-hr 2-Year Rainfall=3.23"

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Page 6

Summary for Subcatchment E-1: Subcat E-1

Runoff = 1.02 cfs @ 12.07 hrs, Volume= 3,400 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
8,604	98	Paved parking, HSG A
5,008	98	Roofs, HSG A
13,613	98	Weighted Average
13,613		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.06 cfs @ 12.07 hrs, Volume= 192 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
768	98	Paved parking, HSG A
768		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

Inflow Area = 13,613 sf, 100.00% Impervious, Inflow Depth = 3.00" for 2-Year event
 Inflow = 1.02 cfs @ 12.07 hrs, Volume= 3,400 cf
 Outflow = 1.02 cfs @ 12.07 hrs, Volume= 3,400 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 768 sf, 100.00% Impervious, Inflow Depth = 3.00" for 2-Year event
 Inflow = 0.06 cfs @ 12.07 hrs, Volume= 192 cf
 Outflow = 0.06 cfs @ 12.07 hrs, Volume= 192 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

2729-01_Existing-Conditions

Type III 24-hr 10-Year Rainfall=4.88"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1

Runoff Area=13,613 sf 100.00% Impervious Runoff Depth=4.64"
Tc=5.0 min CN=98 Runoff=1.55 cfs 5,267 cf

Subcatchment E-2: Subcat E-2

Runoff Area=768 sf 100.00% Impervious Runoff Depth=4.64"
Tc=5.0 min CN=98 Runoff=0.09 cfs 297 cf

Reach SP1: Study Point 1

Inflow=1.55 cfs 5,267 cf
Outflow=1.55 cfs 5,267 cf

Reach SP2: Study Point 2

Inflow=0.09 cfs 297 cf
Outflow=0.09 cfs 297 cf

Total Runoff Area = 14,381 sf Runoff Volume = 5,565 cf Average Runoff Depth = 4.64"
0.00% Pervious = 0 sf 100.00% Impervious = 14,381 sf

2729-01_Existing-Conditions

Type III 24-hr 10-Year Rainfall=4.88"

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Summary for Subcatchment E-1: Subcat E-1

Runoff = 1.55 cfs @ 12.07 hrs, Volume= 5,267 cf, Depth= 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.88"

Area (sf)	CN	Description
8,604	98	Paved parking, HSG A
5,008	98	Roofs, HSG A
13,613	98	Weighted Average
13,613		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 297 cf, Depth= 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.88"

Area (sf)	CN	Description
768	98	Paved parking, HSG A
768		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

Inflow Area = 13,613 sf, 100.00% Impervious, Inflow Depth = 4.64" for 10-Year event
 Inflow = 1.55 cfs @ 12.07 hrs, Volume= 5,267 cf
 Outflow = 1.55 cfs @ 12.07 hrs, Volume= 5,267 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 768 sf, 100.00% Impervious, Inflow Depth = 4.64" for 10-Year event
 Inflow = 0.09 cfs @ 12.07 hrs, Volume= 297 cf
 Outflow = 0.09 cfs @ 12.07 hrs, Volume= 297 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

2729-01_Existing-Conditions

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Type III 24-hr 100-Year Rainfall=8.89"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1

Runoff Area=13,613 sf 100.00% Impervious Runoff Depth=8.65"
Tc=5.0 min CN=98 Runoff=2.83 cfs 9,812 cf

Subcatchment E-2: Subcat E-2

Runoff Area=768 sf 100.00% Impervious Runoff Depth=8.65"
Tc=5.0 min CN=98 Runoff=0.16 cfs 554 cf

Reach SP1: Study Point 1

Inflow=2.83 cfs 9,812 cf
Outflow=2.83 cfs 9,812 cf

Reach SP2: Study Point 2

Inflow=0.16 cfs 554 cf
Outflow=0.16 cfs 554 cf

Total Runoff Area = 14,381 sf Runoff Volume = 10,366 cf Average Runoff Depth = 8.65"
0.00% Pervious = 0 sf 100.00% Impervious = 14,381 sf

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Type III 24-hr 100-Year Rainfall=8.89"

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Summary for Subcatchment E-1: Subcat E-1

Runoff = 2.83 cfs @ 12.07 hrs, Volume= 9,812 cf, Depth= 8.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
8,604	98	Paved parking, HSG A
5,008	98	Roofs, HSG A
13,613	98	Weighted Average
13,613		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 554 cf, Depth= 8.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
768	98	Paved parking, HSG A
768		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

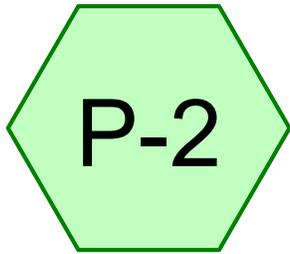
Inflow Area = 13,613 sf, 100.00% Impervious, Inflow Depth = 8.65" for 100-Year event
 Inflow = 2.83 cfs @ 12.07 hrs, Volume= 9,812 cf
 Outflow = 2.83 cfs @ 12.07 hrs, Volume= 9,812 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 768 sf, 100.00% Impervious, Inflow Depth = 8.65" for 100-Year event
 Inflow = 0.16 cfs @ 12.07 hrs, Volume= 554 cf
 Outflow = 0.16 cfs @ 12.07 hrs, Volume= 554 cf, Atten= 0%, Lag= 0.0 min

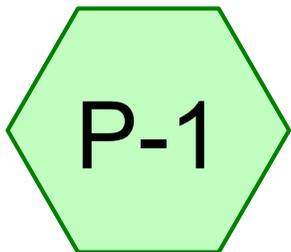
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3



Subcat P-2



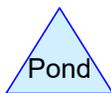
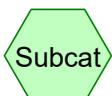
Study Point 2



Subcat P-1



Study Point 1



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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,470	39	>75% Grass cover, Good, HSG A (P-1, P-2)
8,217	98	Paved parking, HSG A (P-1, P-2)
4,693	98	Roofs, HSG A (P-1)
14,381	92	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
14,381	HSG A	P-1, P-2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
14,381		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
1,470	0	0	0	0	1,470	>75% Grass cover, Good	P-1, P-2
8,217	0	0	0	0	8,217	Paved parking	P-1, P-2
4,693	0	0	0	0	4,693	Roofs	P-1
14,381	0	0	0	0	14,381	TOTAL AREA	

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Type III 24-hr 2-Year Rainfall=3.23"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat P-1

Runoff Area=13,738 sf 92.26% Impervious Runoff Depth=2.47"
Tc=5.0 min CN=93 Runoff=0.92 cfs 2,833 cf

Subcatchment P-2: Subcat P-2

Runoff Area=643 sf 36.61% Impervious Runoff Depth=0.46"
Tc=5.0 min CN=61 Runoff=0.01 cfs 24 cf

Reach SP1: Study Point 1

Inflow=0.92 cfs 2,833 cf
Outflow=0.92 cfs 2,833 cf

Reach SP2: Study Point 2

Inflow=0.01 cfs 24 cf
Outflow=0.01 cfs 24 cf

Total Runoff Area = 14,381 sf Runoff Volume = 2,857 cf Average Runoff Depth = 2.38"
10.22% Pervious = 1,470 sf 89.78% Impervious = 12,910 sf

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Type III 24-hr 2-Year Rainfall=3.23"

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Summary for Subcatchment P-1: Subcat P-1

Runoff = 0.92 cfs @ 12.07 hrs, Volume= 2,833 cf, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
7,982	98	Paved parking, HSG A
4,693	98	Roofs, HSG A
1,063	39	>75% Grass cover, Good, HSG A
13,738	93	Weighted Average
1,063		7.74% Pervious Area
12,675		92.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.01 cfs @ 12.11 hrs, Volume= 24 cf, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.23"

Area (sf)	CN	Description
408	39	>75% Grass cover, Good, HSG A
235	98	Paved parking, HSG A
643	61	Weighted Average
408		63.39% Pervious Area
235		36.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

Inflow Area = 13,738 sf, 92.26% Impervious, Inflow Depth = 2.47" for 2-Year event
 Inflow = 0.92 cfs @ 12.07 hrs, Volume= 2,833 cf
 Outflow = 0.92 cfs @ 12.07 hrs, Volume= 2,833 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 643 sf, 36.61% Impervious, Inflow Depth = 0.46" for 2-Year event
 Inflow = 0.01 cfs @ 12.11 hrs, Volume= 24 cf
 Outflow = 0.01 cfs @ 12.11 hrs, Volume= 24 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

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Type III 24-hr 10-Year Rainfall=4.88"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat P-1

Runoff Area=13,738 sf 92.26% Impervious Runoff Depth=4.08"
Tc=5.0 min CN=93 Runoff=1.47 cfs 4,671 cf

Subcatchment P-2: Subcat P-2

Runoff Area=643 sf 36.61% Impervious Runoff Depth=1.30"
Tc=5.0 min CN=61 Runoff=0.02 cfs 70 cf

Reach SP1: Study Point 1

Inflow=1.47 cfs 4,671 cf
Outflow=1.47 cfs 4,671 cf

Reach SP2: Study Point 2

Inflow=0.02 cfs 70 cf
Outflow=0.02 cfs 70 cf

Total Runoff Area = 14,381 sf Runoff Volume = 4,740 cf Average Runoff Depth = 3.96"
10.22% Pervious = 1,470 sf 89.78% Impervious = 12,910 sf

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Type III 24-hr 10-Year Rainfall=4.88"

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Summary for Subcatchment P-1: Subcat P-1

Runoff = 1.47 cfs @ 12.07 hrs, Volume= 4,671 cf, Depth= 4.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=4.88"

Area (sf)	CN	Description
7,982	98	Paved parking, HSG A
4,693	98	Roofs, HSG A
1,063	39	>75% Grass cover, Good, HSG A
13,738	93	Weighted Average
1,063		7.74% Pervious Area
12,675		92.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 70 cf, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=4.88"

Area (sf)	CN	Description
408	39	>75% Grass cover, Good, HSG A
235	98	Paved parking, HSG A
643	61	Weighted Average
408		63.39% Pervious Area
235		36.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

Inflow Area = 13,738 sf, 92.26% Impervious, Inflow Depth = 4.08" for 10-Year event
 Inflow = 1.47 cfs @ 12.07 hrs, Volume= 4,671 cf
 Outflow = 1.47 cfs @ 12.07 hrs, Volume= 4,671 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 643 sf, 36.61% Impervious, Inflow Depth = 1.30" for 10-Year event
 Inflow = 0.02 cfs @ 12.08 hrs, Volume= 70 cf
 Outflow = 0.02 cfs @ 12.08 hrs, Volume= 70 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

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Type III 24-hr 100-Year Rainfall=8.89"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat P-1

Runoff Area=13,738 sf 92.26% Impervious Runoff Depth=8.05"
Tc=5.0 min CN=93 Runoff=2.79 cfs 9,212 cf

Subcatchment P-2: Subcat P-2

Runoff Area=643 sf 36.61% Impervious Runoff Depth=4.14"
Tc=5.0 min CN=61 Runoff=0.07 cfs 222 cf

Reach SP1: Study Point 1

Inflow=2.79 cfs 9,212 cf
Outflow=2.79 cfs 9,212 cf

Reach SP2: Study Point 2

Inflow=0.07 cfs 222 cf
Outflow=0.07 cfs 222 cf

Total Runoff Area = 14,381 sf Runoff Volume = 9,433 cf Average Runoff Depth = 7.87"
10.22% Pervious = 1,470 sf 89.78% Impervious = 12,910 sf

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Type III 24-hr 100-Year Rainfall=8.89"

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Summary for Subcatchment P-1: Subcat P-1

Runoff = 2.79 cfs @ 12.07 hrs, Volume= 9,212 cf, Depth= 8.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
7,982	98	Paved parking, HSG A
4,693	98	Roofs, HSG A
1,063	39	>75% Grass cover, Good, HSG A
13,738	93	Weighted Average
1,063		7.74% Pervious Area
12,675		92.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 222 cf, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.89"

Area (sf)	CN	Description
408	39	>75% Grass cover, Good, HSG A
235	98	Paved parking, HSG A
643	61	Weighted Average
408		63.39% Pervious Area
235		36.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Assumed

Summary for Reach SP1: Study Point 1

Inflow Area = 13,738 sf, 92.26% Impervious, Inflow Depth = 8.05" for 100-Year event
 Inflow = 2.79 cfs @ 12.07 hrs, Volume= 9,212 cf
 Outflow = 2.79 cfs @ 12.07 hrs, Volume= 9,212 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 643 sf, 36.61% Impervious, Inflow Depth = 4.14" for 100-Year event
 Inflow = 0.07 cfs @ 12.08 hrs, Volume= 222 cf
 Outflow = 0.07 cfs @ 12.08 hrs, Volume= 222 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.164 degrees West
Latitude	42.417 degrees North
Elevation	0 feet
Date/Time	Wed, 22 Jan 2020 13:40:55 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.10	1yr	0.75	1.04	1.28	1.63	2.08	2.68	2.92	1yr	2.37	2.81	3.27	3.96	4.64	1yr
2yr	0.35	0.54	0.67	0.88	1.11	1.40	2yr	0.96	1.28	1.62	2.03	2.56	3.23	3.57	2yr	2.85	3.44	3.94	4.68	5.34	2yr
5yr	0.41	0.64	0.81	1.08	1.39	1.77	5yr	1.20	1.60	2.05	2.59	3.25	4.08	4.55	5yr	3.61	4.37	4.99	5.95	6.68	5yr
10yr	0.47	0.73	0.93	1.26	1.64	2.11	10yr	1.42	1.90	2.46	3.11	3.90	4.88	5.45	10yr	4.32	5.25	5.97	7.14	7.91	10yr
25yr	0.56	0.88	1.12	1.55	2.05	2.66	25yr	1.77	2.39	3.12	3.95	4.96	6.19	6.95	25yr	5.48	6.68	7.57	9.09	9.91	25yr
50yr	0.63	1.01	1.29	1.81	2.44	3.20	50yr	2.10	2.85	3.76	4.76	5.97	7.42	8.35	50yr	6.56	8.03	9.07	10.91	11.75	50yr
100yr	0.72	1.17	1.51	2.13	2.90	3.82	100yr	2.50	3.39	4.50	5.71	7.16	8.89	10.03	100yr	7.86	9.65	10.86	13.10	13.95	100yr
200yr	0.83	1.35	1.74	2.50	3.45	4.57	200yr	2.97	4.03	5.40	6.86	8.59	10.65	12.07	200yr	9.42	11.60	13.02	15.73	16.56	200yr
500yr	1.00	1.64	2.14	3.10	4.34	5.80	500yr	3.74	5.08	6.86	8.74	10.94	13.54	15.41	500yr	11.98	14.82	16.54	20.06	20.78	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.38	0.46	0.62	0.76	0.84	1yr	0.66	0.83	1.14	1.43	1.77	2.41	2.48	1yr	2.14	2.38	2.92	3.52	4.01	1yr
2yr	0.33	0.51	0.63	0.85	1.05	1.26	2yr	0.91	1.23	1.44	1.91	2.47	3.12	3.45	2yr	2.76	3.32	3.80	4.52	5.17	2yr
5yr	0.39	0.60	0.74	1.02	1.30	1.50	5yr	1.12	1.47	1.72	2.24	2.87	3.75	4.15	5yr	3.32	3.99	4.57	5.45	6.14	5yr
10yr	0.43	0.67	0.82	1.15	1.49	1.72	10yr	1.28	1.68	1.94	2.52	3.23	4.32	4.80	10yr	3.83	4.61	5.24	6.25	7.00	10yr
25yr	0.50	0.76	0.95	1.35	1.78	2.04	25yr	1.53	1.99	2.29	2.95	3.76	5.19	5.78	25yr	4.59	5.56	6.29	7.47	8.28	25yr
50yr	0.55	0.84	1.05	1.51	2.03	2.34	50yr	1.75	2.29	2.60	3.33	4.23	5.94	6.65	50yr	5.26	6.39	7.20	8.51	9.40	50yr
100yr	0.62	0.93	1.17	1.69	2.32	2.66	100yr	2.00	2.60	2.94	3.61	4.75	6.83	7.64	100yr	6.04	7.35	8.26	9.67	10.68	100yr
200yr	0.69	1.04	1.32	1.92	2.67	3.04	200yr	2.31	2.97	3.34	4.04	5.35	7.83	8.79	200yr	6.93	8.45	9.46	10.96	12.10	200yr
500yr	0.81	1.21	1.55	2.25	3.21	3.62	500yr	2.77	3.54	3.93	4.69	6.27	9.39	10.55	500yr	8.31	10.15	11.32	12.90	14.25	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.58	0.79	0.97	1.13	1yr	0.83	1.11	1.32	1.76	2.25	2.86	3.16	1yr	2.53	3.04	3.51	4.30	5.03	1yr
2yr	0.36	0.56	0.69	0.93	1.15	1.36	2yr	0.99	1.33	1.57	2.07	2.67	3.35	3.73	2yr	2.97	3.59	4.10	4.88	5.54	2yr
5yr	0.45	0.69	0.86	1.18	1.50	1.78	5yr	1.30	1.74	2.05	2.65	3.37	4.44	5.00	5yr	3.93	4.81	5.43	6.47	7.22	5yr
10yr	0.55	0.84	1.04	1.45	1.88	2.19	10yr	1.62	2.14	2.54	3.20	4.04	5.52	6.25	10yr	4.89	6.01	6.74	8.04	8.84	10yr
25yr	0.71	1.08	1.34	1.92	2.52	2.89	25yr	2.18	2.82	3.37	4.13	5.14	7.34	8.43	25yr	6.50	8.11	8.96	10.76	11.58	25yr
50yr	0.86	1.31	1.63	2.34	3.15	3.57	50yr	2.72	3.49	4.17	5.02	6.17	9.12	10.57	50yr	8.07	10.16	11.11	13.43	14.21	50yr
100yr	1.05	1.59	1.99	2.87	3.94	4.39	100yr	3.40	4.30	5.18	6.33	7.40	11.34	13.27	100yr	10.04	12.76	13.79	16.80	17.48	100yr
200yr	1.28	1.92	2.44	3.53	4.92	5.43	200yr	4.25	5.30	6.43	7.72	8.88	14.11	16.67	200yr	12.49	16.03	17.14	21.02	21.51	200yr
500yr	1.67	2.48	3.19	4.63	6.59	7.15	500yr	5.69	6.99	8.57	10.06	11.30	18.86	22.55	500yr	16.69	21.69	22.82	28.32	28.35	500yr





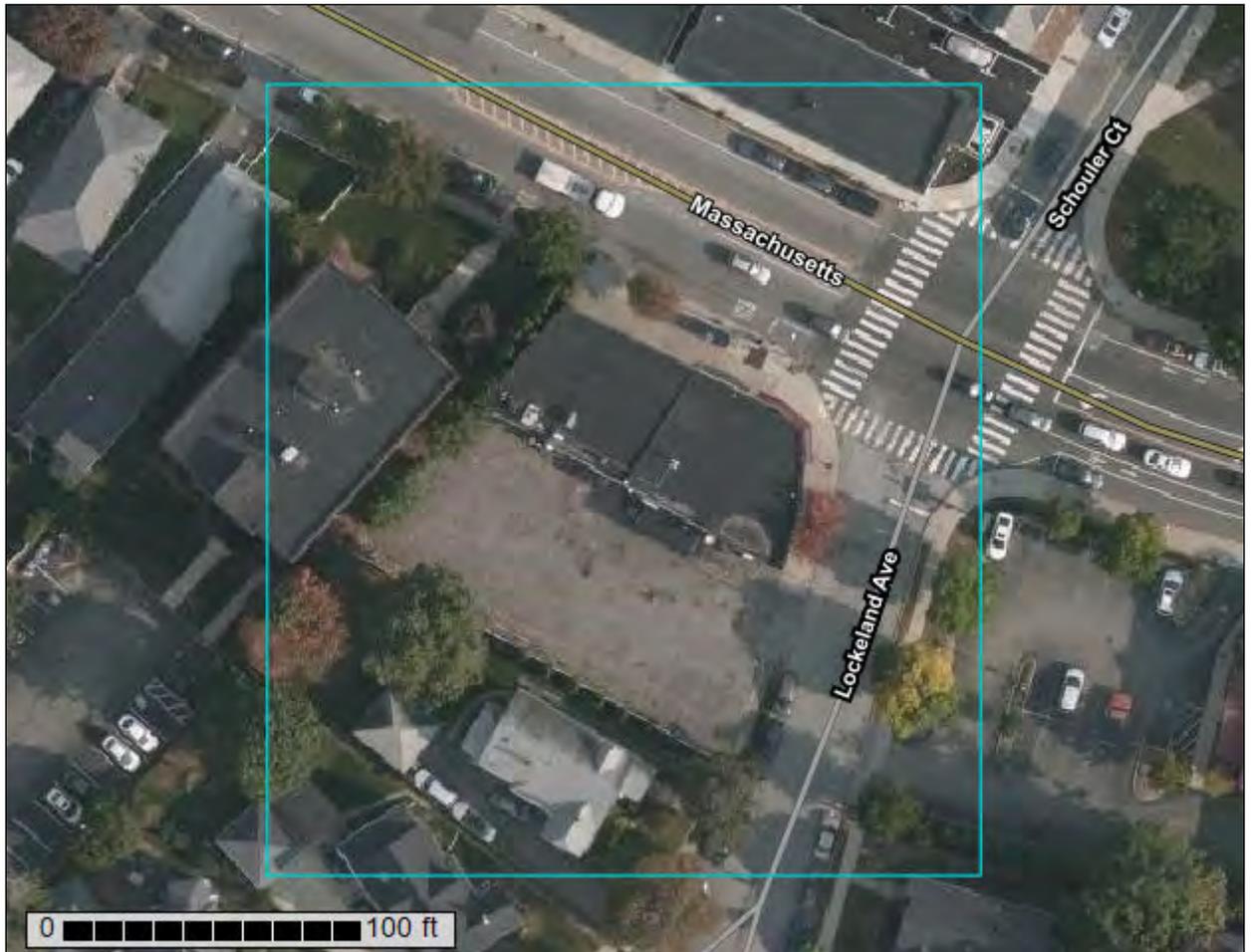
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Middlesex County, Massachusetts



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

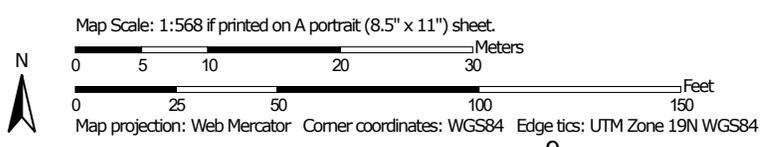
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

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: Middlesex County, Massachusetts
 Survey Area Data: Version 19, Sep 12, 2019

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

Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
602	Urban land	0.3	23.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	1.1	76.6%
Totals for Area of Interest		1.5	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

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onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

602—Urban land

Map Unit Setting

National map unit symbol: 9950
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Udorthents, wet substratum

Percent of map unit: 5 percent
Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 5 percent
Hydric soil rating: No

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches

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Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Moraines, outwash plains, kames, eskers, outwash terraces
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer

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Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Windsor

Percent of map unit: 5 percent

Landform: Deltas, outwash plains, dunes, outwash terraces

Landform position (three-dimensional): Riser, tread

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent

Landform: Terraces, deltas, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent

Landform: Deltas, outwash plains, kames, eskers

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, crest, head slope, side slope, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

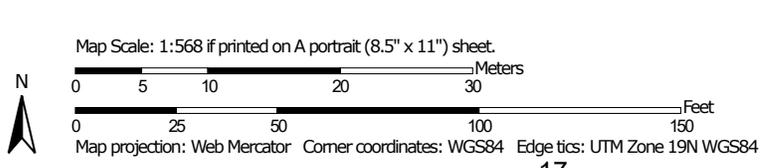
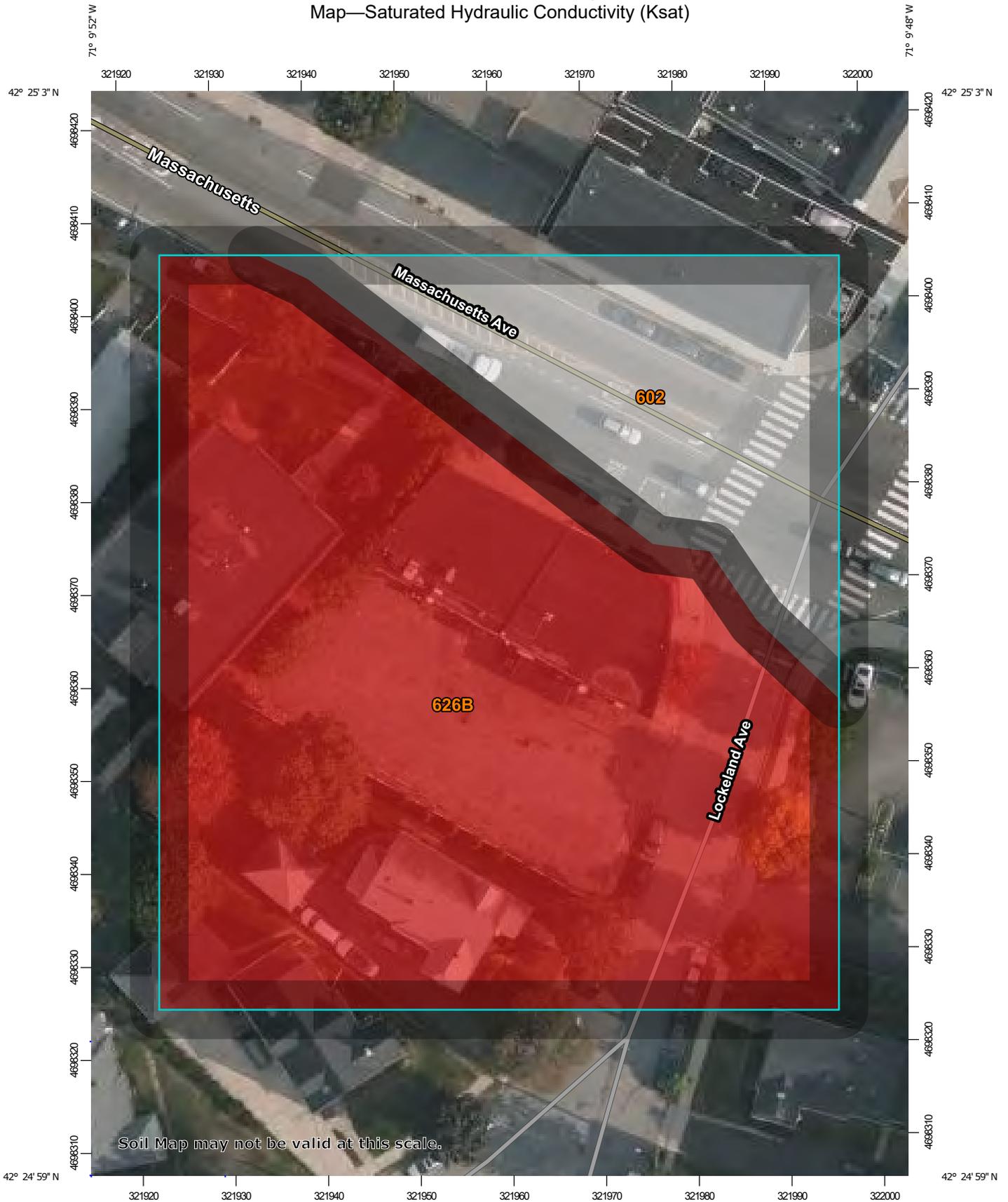
Saturated Hydraulic Conductivity (Ksat)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Custom Soil Resource Report
Map—Saturated Hydraulic Conductivity (Ksat)



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 = 100.0000

 Not rated or not available

Soil Rating Lines

 = 100.0000

 Not rated or not available

Soil Rating Points

 = 100.0000

 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: Middlesex County, Massachusetts
Survey Area Data: Version 19, Sep 12, 2019

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

Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, 2019

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.

Table—Saturated Hydraulic Conductivity (Ksat)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
602	Urban land		0.3	23.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	100.0000	1.1	76.6%
Totals for Area of Interest			1.5	100.0%

Rating Options—Saturated Hydraulic Conductivity (Ksat)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 24

Bottom Depth: 90

Units of Measure: Centimeters

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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:

Custom Soil Resource Report

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.

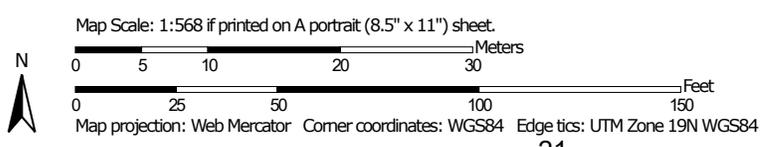
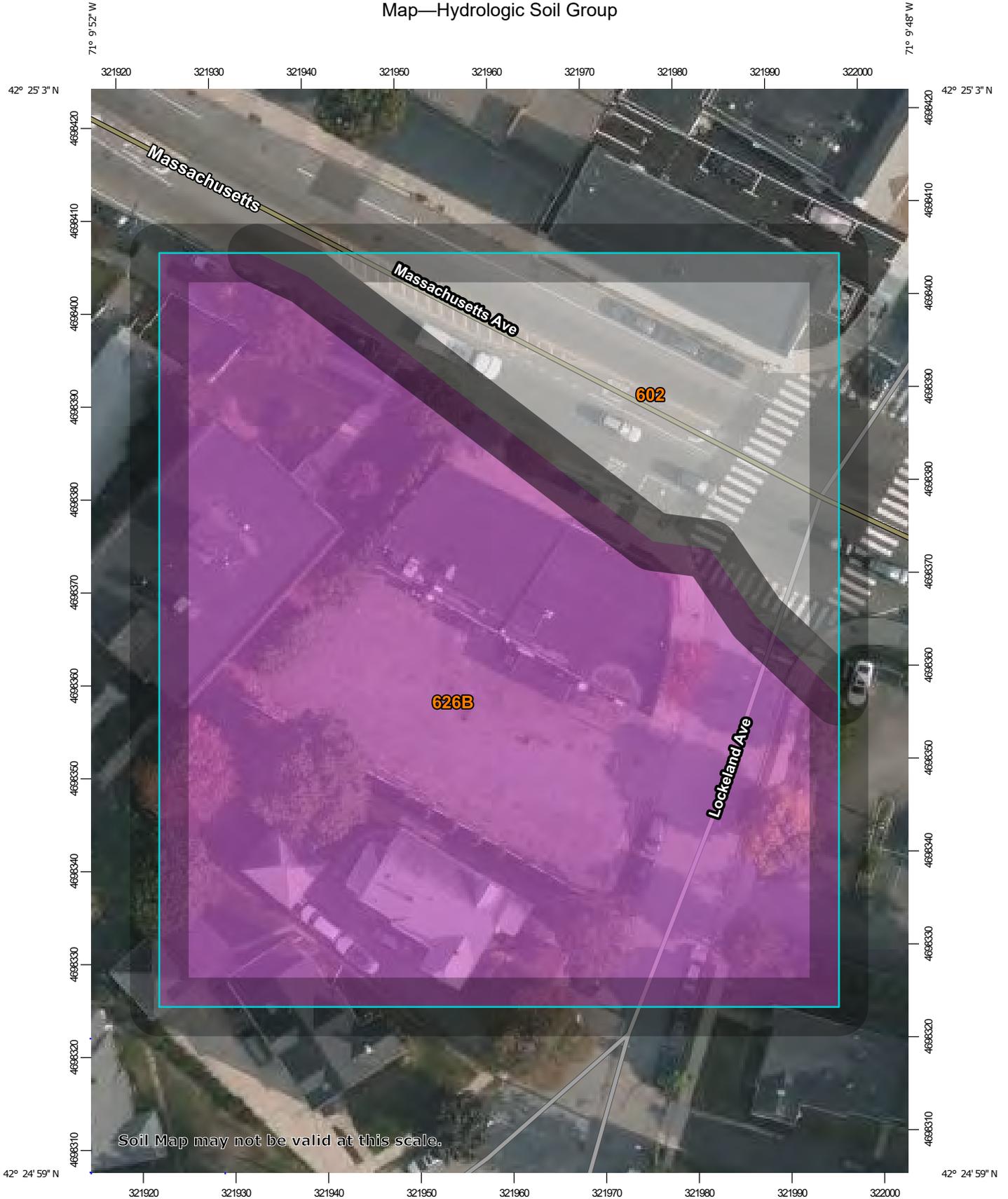
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



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

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 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

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Table—Hydrologic Soil Group

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Totals for Area of Interest			1.5	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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