Application for Project Eligibility
2072 Massachusetts Avenue
Cambridge, MA 02140

Submitted by:
CC HRE 2072 Mass Ave Tenant LLC

Submitted to:

Massachusetts Department of Housing and Community Development

October 14, 2020

CC HRE 2072 Mass Ave Tenant LLC
c/o Capstone Communities LLC
1087 Beacon Street, Suite 302
Newton, MA 02459

October 14, 2020

Ms. Catherine Racer, Associate Director
Department of Housing and Community Development
100 Cambridge Street, Suite 300
Boston, MA 02114

Re: Application for Project Eligibility
2072 Massachusetts Avenue, Cambridge, MA

Dear Ms. ~~Racer:~~ Kate,

We are pleased to submit the enclosed Project Eligibility Application in accordance with M.G.L. c.40B for 2072 Massachusetts Avenue, a proposed 100% affordable apartment community located near the Porter Square and North Cambridge neighborhoods. CC HRE 2072 Mass Ave Tenant LLC ("Applicant"), an affiliate of Capstone Communities LLC (www.capstonecommunities.com) ("Capstone") and Hope Real Estate Enterprises LLC ("Hope"), intend to construct a new building on the existing 2072 Massachusetts Avenue lot (the "Site"). The resulting residential community will consist of 49 rental apartment homes with a variety of unit sizes –14 one-bedroom, 21 two-bedroom, and 14 three-bedroom apartments – that will be affordable to individuals and families earning a range of incomes – from 30% to 60% of the area median income (the "Project"). The Project will be pursuing Passive House (PHIUS) certification in addition to incorporating other sustainable features such as a green roof and a rooftop solar array.

Over the past month, the development team has engaged the community through individual abutter Zoom meetings and a large Zoom community meeting. The development team has maintained a website, www.2072massaveapts.com, that provides updated and detailed information on the proposal. The website includes copies of plans, FAQs, news and events, information on the development team, and contact information for the community to provide feedback and ask questions. The development team has also been working with all the relevant City departments for many months to refine the plans.

Capstone and Hope have created separate entities that own/will own the Site/Project and that will develop the Project. CC HRE 2072 Mass Ave LLC, whose managing members are HRE 2072 Mass Ave LLC (50%, Sean D. Hope sole member) and Capstone 2072 Mass Ave LLC (50%, Jason Korb sole member), purchased the 2072 Massachusetts Avenue building using loan proceeds from the City of Cambridge Affordable Housing Trust in April of 2018.

CC HRE 2072 Mass Ave LLC will enter into a long-term ground lease for 2072 Massachusetts Avenue with CC HRE 2072 Mass Ave Tenant LLC. As the lessee under the ground lease, CC HRE 2072 Mass Ave Tenant LLC will pursue the financing, construction, and operation of the Project and is the Comprehensive Permit Applicant. CC HRE 2072 Mass Ave Tenant LLC is a Limited Dividend Organization under M.G.L. c.40B, §§ 20 through 23. Pursuant to 760 CMR 56, CC HRE 2072 Mass Ave Tenant LLC is applying to the Department of Housing and Community Development, as the Subsidizing Agency, for Project Eligibility under the following subsidy programs: Affordable Housing Trust Fund, DHCD Housing Stabilization Fund

(HSF), HUD HOME Program (Rental Production), Massachusetts Low Income Housing Tax Credits, and the Federal Low Income Housing Tax Credit Program (LIHTC). An affordable housing restriction will be recorded against the land and buildings with a term not less than 30 years[1] and Frost Terrace will comply with the Affirmative Fair Housing Marketing and Resident Selection Plan as required by 760 CMR 56.

Pursuant to 760 CMR 56.04(2), enclosed are the following elements of our application:

(a) the name and address of the Applicant:
CC HRE 2072 Mass Ave Tenant LLC
c/o Capstone Communities LLC
1087 Beacon Street, Suite 302
Newton MA 02459

(b) the address of the site and site description:
2072 Massachusetts Avenue
Cambridge, MA 02140
Please refer to the *Development Proposal – Existing Site Conditions* in **Section 1 - Development Narrative**

(c) a locus map identifying the site within a plan of the neighborhood, accompanied by photographs of the surrounding buildings and features that provide an understanding of the physical context of the site:
Please refer to **Section 2 – 2072 Massachusetts Avenue Site and Neighboring Photographs** and **Section 3 – Locus Map and Assessor Plat**

(d) a tabulation of proposed buildings with the approximate number, size (number of bedrooms, floor area), and type (ownership or rental) of housing units proposed:
Please refer to **Section 4 - Plans**

(e) the name of the housing program under which Project Eligibility is sought:
Affordable Housing Trust Fund, DHCD Housing Stabilization Fund (HSF), HUD HOME Program (Rental Production), Massachusetts Low Income Housing Tax Credits, and the Federal Low Income Housing Tax Credit Program (LIHTC)

(f) relevant details of the particular Project if not mandated by the housing program (including percentage of units for low or moderate income households, income eligibility standards, the duration of restrictions requiring Low or Moderate Income Housing, and the limited dividend status of the Applicant):
Please refer to **Section 5 – Project Details** and **Section 6 – Applicant's Operating Agreement**

(g) conceptual design drawings of the site plan and exterior elevations of the proposed buildings, along with a summary showing the approximate percentage of the tract to be occupied by buildings, by parking and other paved vehicular areas, and by open areas, the approximate number of parking spaces, and the ratio of parking spaces to housing units:
Please refer to **Section 4 – Plans**

[1] The development team is proposing that Frost Terrace will be affordable in perpetuity.

(h) a narrative description of the approach to building massing, the relationships to adjacent properties, and the proposed exterior building materials:

Please refer to *Building Program and Site Design* in **Section 1 – Development Narrative**

(i) a tabular analysis comparing existing zoning requirements to the Waivers requested for the Project:

Please refer to **Section 7 - Requested Waivers from Local Requirements and Regulations**

(j) evidence of control of the site:

Please refer to **Section 8 – Site Control.**

We have also enclosed a check payable to the Massachusetts Housing Partnership for $3,970, which represents the base fee of $2,500 plus $30 per unit.

We look forward to working with you and your team on this exciting proposal. Please contact Jason Korb at (617) 513-6320 when you are ready to schedule a site visit.

Sincerely,

Jason Korb
managing member of managing member

Sean D. Hope
managing member of managing member

Cc: Louis A. DePasquale, City Manager, City of Cambridge
City of Cambridge Community Development Department

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Table of Contents

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 1

- 2072 Massachusetts Avenue Development Narrative

Section 1 – Development Narrative

2072 Mass Ave Apartments

CC HRE 2072 Mass Ave Tenant LLC ("Applicant"), an affiliate of Capstone Communities LLC (www.capstonecommunities.com) ("Capstone") and Hope Real Estate Enterprises LLC ("Hope"), intend to construct an affordable housing community located at 2072 Massachusetts Avenue near Cambridge's Porter Square and North Cambridge neighborhoods (the "Site"). The resulting residential community will consist of 49 rental apartment homes with a variety of unit sizes – 14 one-bedroom, 21 two-bedroom, and 14 three-bedroom apartments – that will be affordable to individuals and families earning a range of incomes – from 30% to 60% of the area median income (the "Project"). Capstone is a Newton-based developer of mixed income, affordable, and historic apartment communities, and Hope is a Cambridge-based real estate development company with significant zoning consultation and permitting expertise. Capstone and Hope are currently developing Frost Terrace, a 40-apartment 100% affordable housing community located a few blocks away at 1785-1791 Massachusetts Avenue which is anticipated to open in Spring 2021. Previously, Hope and Capstone developed Port Landing, a 20-apartment, 100% affordable housing community in The Port/Kendall Square neighborhood of Cambridge in 2016.

Capstone and Hope have created separate entities that own/will own the Site/Project and that will develop 2072 Mass Ave Apartments. CC HRE 2072 Mass Ave LLC, whose managing members are HRE 2072 Mass Ave LLC (50%, Sean D. Hope sole member) and Capstone 2072 Mass Ave LLC (50%, Jason Korb sole member), purchased the 2072 Mass Ave land and building using loan proceeds from the City of Cambridge Affordable Housing Trust in April 2018. The Site is currently occupied by Darul Kabab, a local restaurant serving Bangladeshi, Indian and Pakistani cuisine and operates out of the 1-story, 1,860 sf building that currently sits on the Site.

CC HRE 2072 Mass Ave LLC will enter into a long-term ground lease for the 2072 Massachusetts Avenue land with CC HRE 2072 Mass Ave Tenant LLC. As the lessee under the ground lease, CC HRE 2072 Mass Ave Tenant LLC will pursue the financing, construction, and operation of the Project and is the Comprehensive Permit Applicant. CC HRE 2072 Mass Ave Tenant LLC is a Limited Dividend Organization under M.G.L. c.40B, §§ 20 through 23. Pursuant to 760 CMR 56, CC HRE 2072 Mass Ave Tenant LLC is applying to the Department of Housing and Community Development, as the Subsidizing Agency, for Project Eligibility under the following subsidy programs: Affordable Housing Trust Fund, DHCD Housing Stabilization Fund (HSF), HUD HOME Program (Rental Production), State Low Income Housing Tax Credit Program, and the Federal Low Income Housing Tax Credit Program (LIHTC). An affordable housing restriction will be recorded against the land and buildings with a term not less than 30 years[1] and 2072 Mass Ave Apartments will comply with the Affirmative Fair Housing Marketing and Resident Selection Plan as required by 760 CMR 56.

Development Proposal

Existing Site Conditions

Located with frontage on Massachusetts Avenue and Walden Street to the West, the Site is comprised of one lot with approximately 8,515 buildable square feet. Currently, the Site is occupied by a 1,860 sf, one-story building leased to Darul Kabab restaurant that has operated out of the space since 2011. Prior to 2011, the building was occupied by Kentucky Fried Chicken.

[1] The development team is proposing that 2072 Massachusetts Avenue will be affordable in perpetuity.

The immediate context along Massachusetts Avenue includes a mix of commercial, residential, and institutional buildings directly fronting the avenue. The current one-story building and surface parking lot on the site were constructed in 1971 and replaced a ca. 1890 four-story Odd Fellows Building which occupied most of the parcel. Though the Massachusetts Avenue corridor maintained a small-scale residential character throughout much of the 19th century, by the early 20th century the blocks north of Porter Square were dominated by commercial, civic, and religious buildings, often multi-story and directly fronting the Avenue. While some historic buildings in the vicinity have been replaced with contemporary construction, Massachusetts Avenue remains a densely developed artery lined with multi-story commercial, residential, and institutional buildings.

I.O.O.F. Building formerly located at 2072 Massachusetts Avenue, depicted during the 1968 fire which led to its demolition (*Cambridge Chronicle*).

Proposal Summary

2072 Mass Ave Apartments will include 49 apartments of 100% affordable rental housing. Approximately 71% (35 apartments) will be two and three bedrooms for families. Specifically, the proposal includes 14 one-bedroom apartments, 21 two-bedroom apartments, and 14 three-bedroom apartments. Units average in size from 670 sf (one-bedroom apartments) to 838 sf (two-bedroom apartments) to 1,110 sf (three-bedroom apartments). The high proportion of two- and three-bedroom units will provide safe and accommodating housing to families.

Additionally, the Project will include three handicap accessible parking spaces and two short-term drop-off/pick-up spaces in a covered garage area at the rear of the Site, along with 51 long term bike parking spaces located on the lower level of the building. Electric vehicle charging stations will be provided for the three accessible spaces and power outlets will be provided in the bike room for electric bicycles and repairs. The Project will also include retail space on Massachusetts Avenue and a resident amenity space within the first floor. The retail space will be funded by $200,000 in deferred developer fee and will be slated for a community use. Therefore, no income or expenses are underwritten for the retail space. The Project's

operating budget also includes a part-time resident services coordinator who will plan events for families and others in the building and will assist with creating a community tutoring and mentorship program if it is desired by the residents.

Current Condition

Proposed Condition

The new eight-story building will be constructed to Passive House US standards and will target PHIUS Certification, and will include a green roof, rooftop solar along with a stormwater management system. The resilient, environmentally friendly materials used to construct the contemporary building façade will ensure long-term sustainability for the Project while adding dimension and rhythm to the Avenue.

Neighborhood

Situated to the southeast (less than 0.3 miles from the center) of Porter Square, 2072 Mass Ave Apartments will complement an already vibrant mixed-use area of institutional, residential, restaurant and retail uses. Several residential neighborhoods abut the Project, including the North Cambridge Neighborhood to the northwest of the Project and Neighborhood Nine to the southwest. Further to the northeast are residential and retail uses along Somerville Avenue, the city boundary with Somerville. Further to the southeast is the Agassiz neighborhood, which extends south to Kirkland Street to the east of Massachusetts Avenue. Directly to the Site's east, and also fronting on Massachusetts Avenue, is the six-story age restricted Russell House Apartments that is owned and operated by the Cambridge Housing Authority. This building is approximately 60' in height and contains 52 apartments. The six-story historic Henderson Carriage Building is located across Massachusetts Avenue from the Site and the St. James Church is located one block away. Support letters from these abutters are included in this Application.

Area Amenities

This Site is very well-served by public transit. The Porter Square MBTA Redline and Commuter Rail stations are less than 0.3 miles from the Site and the Davis Square MBTA Redline is located 0.5 miles from the Site. In addition, two MBTA bus routes are at the Site, the nearest Bluebikes station is located directly across the street, and the nearest Zipcar space is less than 200 feet away. These various rapid transit options provide access to jobs, services, and amenities throughout Cambridge, Boston, and the suburbs. Additionally, the Site is located within walking distance to the Porter Square Shopping Center, which provides several key family-friendly amenities including a grocery store, pharmacy, hardware store and various other community-serving businesses. In the context of Cambridge's extreme shortage of affordable family housing, 2072 Mass Ave Apartments will provide forty-nine (49) households with access to a desirable, transit oriented, and

thriving neighborhood. According to Walkscore.com, the Site's Walk Score is 97, which is considered a Walker's Paradise.

The Site is also within walking distance to a number of public elementary schools and daycare centers including the Rindge Avenue Upper School (0.2 miles or 6-minute walk), Wild Rose Montessori School (0.3 miles or 7-minute walk) and Benjamin Banneker Public Charter School (0.4 miles or an 8-minute walk). Below is a partial list of amenities within 0.5 miles of the Site.

Restaurants		Groceries		Shopping	
Wasabi at Porter	0.03 Miles	Star Market	0.2 Miles	China Fair	0.01 Miles
McCabe's on Mass	0.08 Miles	Pemberton Farm	0.2 Miles	Barefoot Books	0.04 Miles
Andy's Diner	0.1 Miles	Spindler Confections	0.2 Miles	Seth Berman Gardeners	0.05 Miles
Posto	0.2 Miles	Stop & Shop	0.3 Miles	Drinkwater's	0.05 Miles
Palm Sugar Thai Cuisine	0.2 Miles	Davis Square Farmers Market	0.3 Miles	Big Picture Framing	0.09 Miles
Dakzen	0.2 Miles			General Optical Co.	0.01 Miles
The Shawarma Place	0.2 Miles	Parks		Fun Antiques	0.2 Miles
Newtowne Grille	0.2 Miles	Bergin Playground	0.2 Miles	Stellabella toys	0.2 Miles
Domino's Pizza	0.2 Miles	Rindge Field	0.2 Miles	The Caning Shoppe	0.2 Miles
Sugar & Spice Thai	0.2 Miles	Kenney Park	0.3 Miles	Books by Design	0.2 Miles
Urban Hearth	0.3 Miles	Corcoran Playground	0.4 Miles	Nebia	0.2 Miles
Punjabi Grill	0.3 Miles	Statute Park	0.4 Miles	Buffalo Exchange	0.3 Miles
Rosebud American Cuisine	0.3 Miles	Sheridan Square	0.4 Miles	Watch Shop	0.3 Miles
Snappy Kitchen	0.3 Miles	Seven Hills Park	0.4 Miles	Ace Wheel Works	0.3 Miles
Anna's Taqueria	0.3 Miles	Saint Peters Field	0.5 Miles	Michaels	0.3 Miles
Christopher's	0.3 Miles			Family Dollar Store	0.3 Miles
Café Barada	0.3 Miles	Schools		Magpie	0.3 Miles
Redbones BBQ	0.3 Miles	Ringe Avenue Upper School	0.2 Miles	Sprint	0.3 Miles
Toad	0.3 Miles	Wild Rose Montessori School	0.3 Miles	Mind's Eye Yarns	0.3 Miles
Wok N Roll Restaurant	0.3 Miles	Benjamin Banneker Public Charter	0.4 Miles	Porter Square Books	0.3 Miles
Panera Bread	0.3 Miles	Cambridge Friends School	0.4 Miles	Bike Boom	0.4 Miles

Building Program and Site Design

The design for 2072 Mass Ave Apartments balances a complex set of contextual priorities for the Site which have arisen from analysis, community meetings, and various meeting with the City of Cambridge Urban Planning, Community Development and Traffic and Parking teams. The design goals are:

Create a high-quality affordable housing apartment community for families in Cambridge.
The design reflects its context, a strong corner on Cambridge's main street. The building massing is slender, allowing for light and air for all apartment homes. The site is linked to amenities and services in this walkable neighborhood and the unit interiors are simple, but elegant.

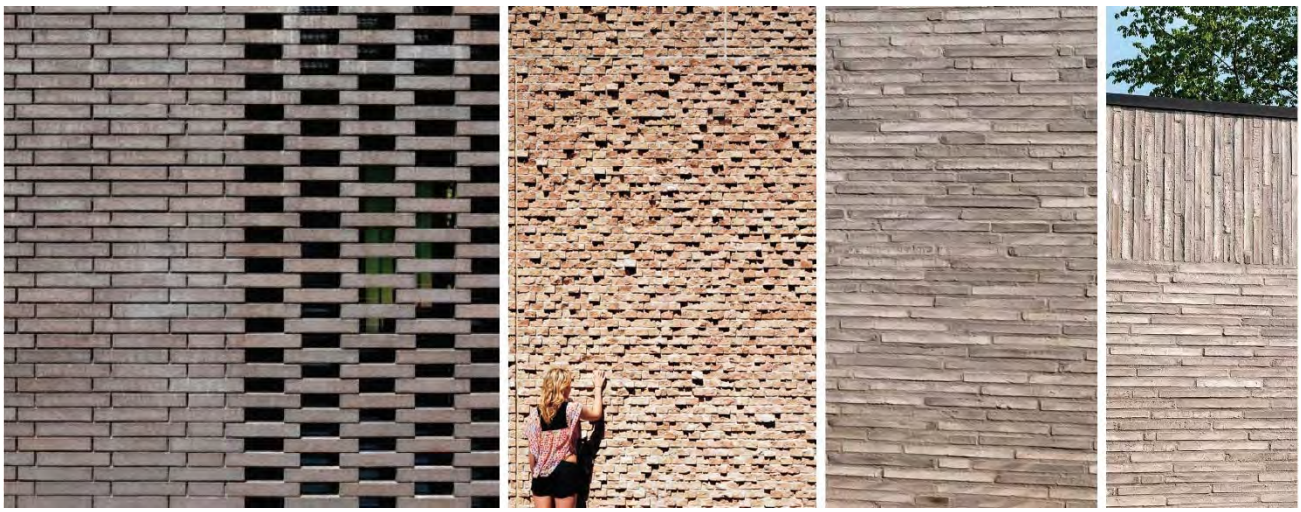
Create significant transparency: Activate the streetscape
A primary design goal is to maintain transparency at street level to facilitate visual connections and to activate the streetscape. The first floor along Mass Ave will be wrapped with transparent storefront glazing. The storefront turns the corner onto Walden St, which it continues and transitions to a pedestrian-scaled entry for the Project's residents. An entrance to limited parking and services area is hidden on the rear part of the site.

Shaping: Building Form

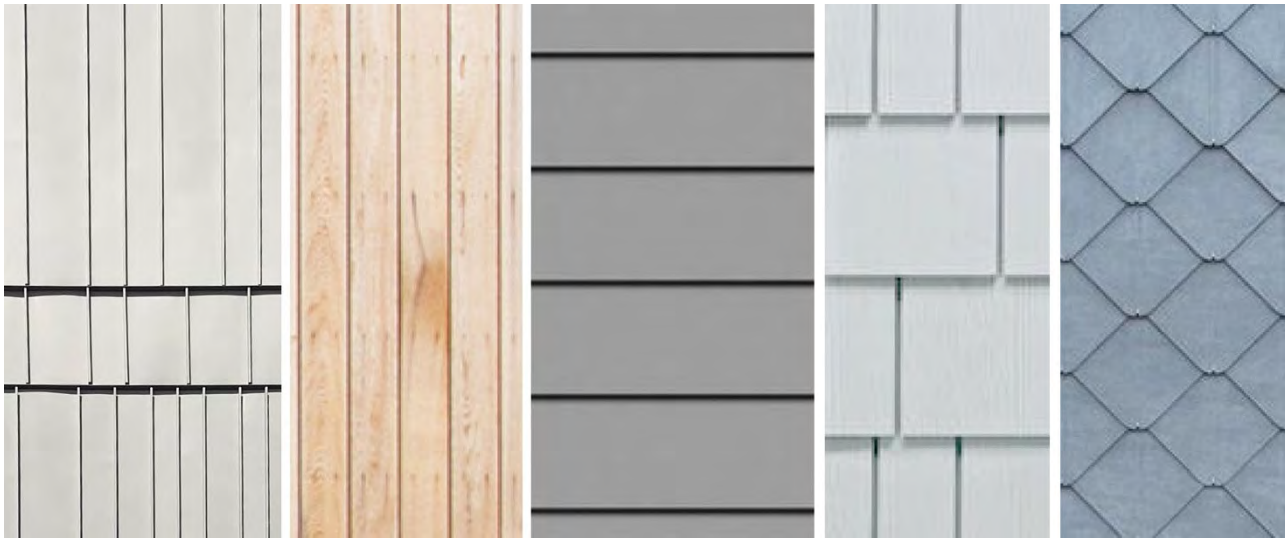
The building consists of two interconnected 8-story volumes. Along Massachusetts Avenue and West along Walden Street, a seven-story suspended aluminum clad cube sits above one story of recessed with storefront glazing. The suspended cube of the floors is clad in light colored anodized aluminum / zinc vertical panels with a staggered pattern, creating a light and airy volume that floats above the street, minimizing the Project's perceived mass, and also has a strong corner presence that is visible from the street intersection. A grid of openings accentuates the suspended cube, incorporating large windows which provide natural daylight into the interior units, as well as vertical infill composite panels that resemble wood, bringing warmth and texture. Each window and infill panel pair are framed with a metal projection that provides a rhythm to the façade.

Human Scale: Material Palette

The residential anchor consists of a materials palette that relates to the surrounding residential buildings. The brick plinth / base is located on the ground floor, most prominently at and adjacent to the residential entry along Walden Street. The crafted long brick at street levels enlivens the pedestrian experience and allows for interactions as the wall angles back and forth. This culminates in a gradient of increasingly frequent openings that also serve as visibility into the parking area, as well as creating ventilation. Above the parking entry, the brick is oriented vertically as a contemporary response to the traditional lintel approach, while highlighting the playfulness of the material.



Above the brick plinth, painted clapboard comprises the main field of the body. Proportionately sized and spaced windows bordered by a trim are located along all orientations of the residential anchor. On the south elevations, each window has an infill panel below, clad in a lighter colored shingle panel to provide an accent from the main field, as well as to give the perception of the same proportions compared to windows on the north and west facades. In addition, solar shades are proposed on the South façade that not only livens the rhythm of the façade, but also serves a functional purpose of providing shade to reduce the building's overall energy consumption. The top of the residential anchor is defined by a cornice band of half-round shingles.



Suspended cube and residential anchor material precedents

Streetscape and Greenery

While there is no open space or landscaping on the site, several street trees are located on Walden Street. Planters and fences supporting the growth of vertical green are located on the Project's south facade of the Project at the openings to the parking and service areas. An intensive green roof is also visible along Walden Street above the parking entrance, with a variety of non-invasive plant species.

The Project is designed to comply with the requirements of 521 CMR, Massachusetts Architectural Access Board (MAAB), the Fair Housing Act, the Americans with Disabilities Act (ADA), as well as the Uniform Federal Accessibility Standards (UFAS). 3 apartments (1 of each bedroom type) in the Project will be Group 2 units for individuals with mobility difficulties (521 CMR 9.4), with the rest being Group 1 units (521 CMR 9.3). In addition, 1 apartment will be a Group 1 unit that also provides sleeping accommodations for persons who are deaf or hard of hearing (521 CMR 9.7).

<u>Sustainability</u>

The 2072 Mass Ave Apartments will incorporate sustainable and resilient design strategies that reflect a commitment to environmental stewardship that aligns with affordable housing with a strong focus on lowering utility costs, carbon and greenhouse gases reduction and creating healthy environments. The Project is targeting Passive House certification to the standards set by the Passive House Institute US (PHIUS) for their PHIUS+ Core rating system, as well as certifying through the EPA Indoor air PLUS program. The PHIUS+ CORE rating system includes stringent and verified building performance metrics as well as professional testing of the building envelope and air sealing at two stages during building construction. EPA Indoor air PLUS certification includes verification of indoor air quality (IAQ) quality control measures including but not limited to: moisture control, HVAC venting and sealing, and use of low VOC materials in construction. In addition, the design team is also planning to conduct a systems commissioning process in addition to the envelope. The above will result in a highly efficient building that lowers utility costs, protects occupant health through excellent indoor air quality, as well as contribution to the overall reduction in carbon and greenhouse gases emissions. Specifications for a simple, durable materials palette will emphasize the choice of healthier building materials and reinforce the Passive House approach, these measures also act as quality-of-life improvements for the residents, and will be integrated with the management of the property.

In terms of addressing resiliency concerns such as extreme weather events and future climate change, the project team evaluated the flood risk based on current maps and future projections for the site and surrounding area. In addition, various protection, adaptation, and backup strategies have been incorporated. Additional details can be found in **Section 11: 2072 Mass Ave Passive House Net Zero Narrative**.

Affordable Housing

Due to its unit mix and income set asides, 2072 Massachusetts Avenue's forty-nine (49) apartment homes will attract a variety of households. Forty-one (41) units will be set aside for households that earn at or below 60% of AMI, currently a household income ranging from $53,760 – $82,920, depending on household size. Eight (8) units will be Section 8 PBV units set aside for households that earn at or below 30% of AMI, currently there is no minimum household income, and a maximum income of $30,720 – $41,460, depending on household size. Including all utilities and for the 60% AMI apartments, monthly one-bedroom rents are estimated to be $1,440, monthly two-bedroom rents are estimated to be $1,728, and monthly three-bedroom rents are estimated to be $1,995. When accounting for utilities, these rents are approximately 40% of the neighborhood's market rate rents, which are deeply unaffordable to households in this income range.

The proposed income mix provides housing that is affordable to families and individuals earning a range of incomes. The immediate market area shows strong demand for this unit mix as effective vacancy rates are 0%. The demand for affordable units is even more significant than that for market rate apartments. At Port Landing, which was opened in 2016, 1,386 applicants applied for its 20 apartments prior to the lottery. Data obtained from The Finch, an affordable apartment community owned by Homeowner's Rehab which completed its lease-up in 2020, showed that 2,261 individuals or families applied for 98 apartment homes. There are currently 20,703 unique applicants on the Cambridge Housing Authority waitlists.

To the extent permitted by Department of Housing and Community Development, 70% of the apartments will give preference to current Cambridge residents, municipal and school department employees, and employees of local businesses.

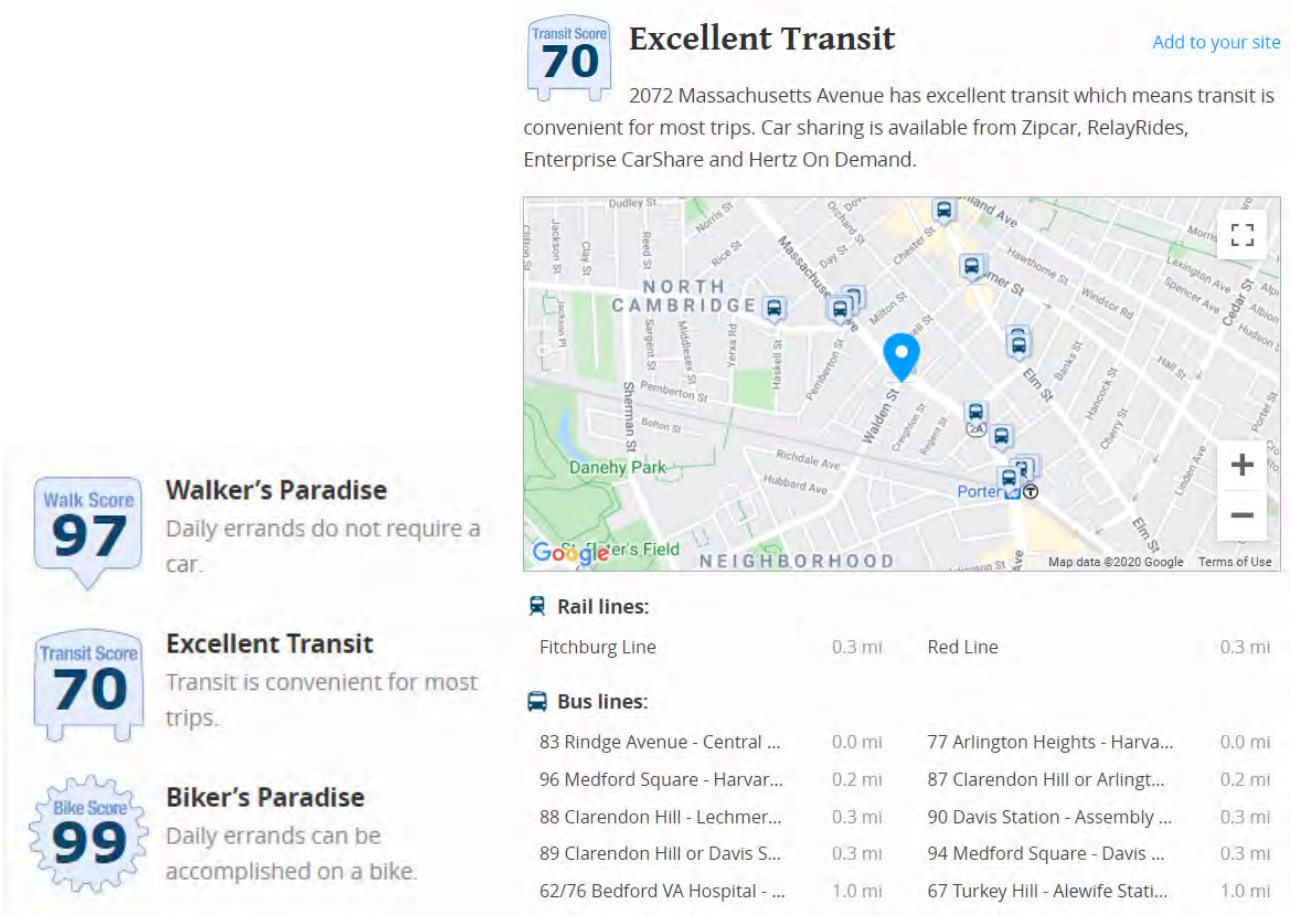
Transportation and Parking

The site plan proposes three covered, on-site accessible parking spaces that will be dedicated to residents and guests with disability plates or placards. In addition, the site plan also proposes to have two short-term drop-off and pick-up spaces located within the rear garage area to aid in reducing congestion along Walden Street.

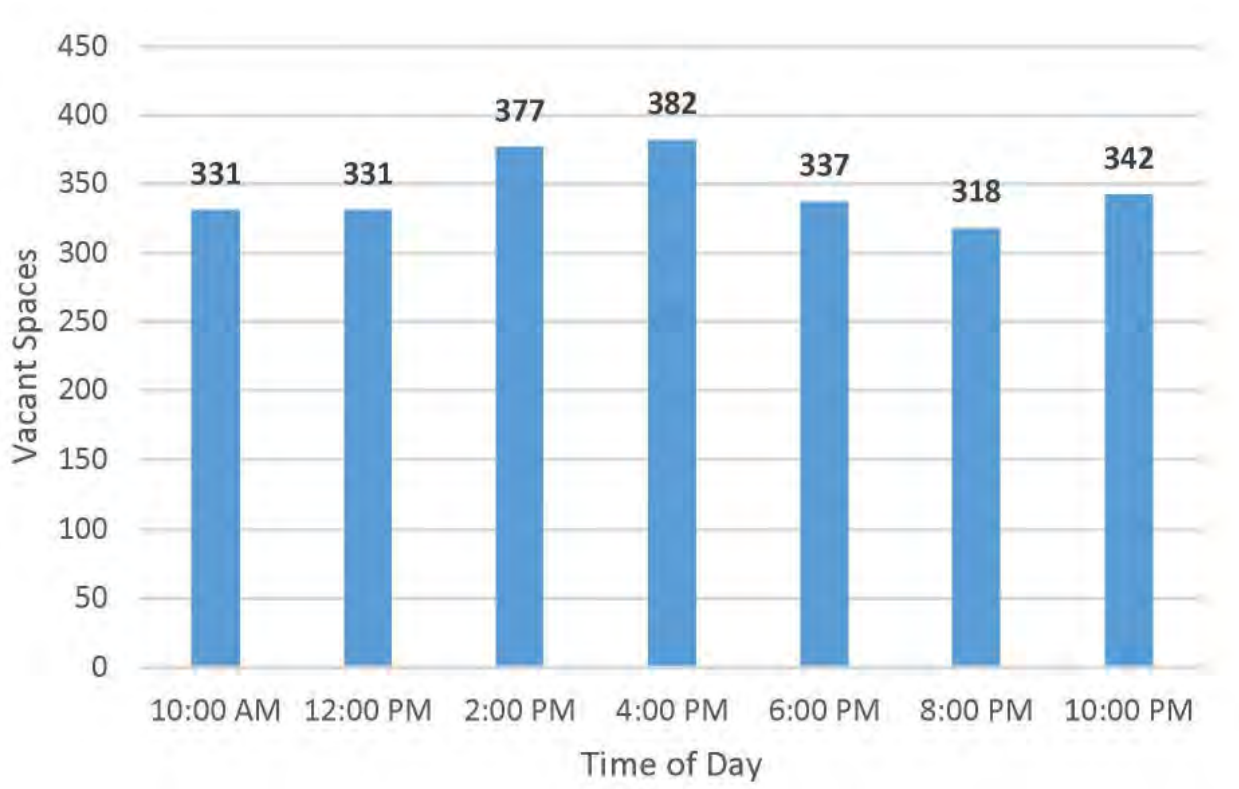
As previously indicated, the Site is a short walk from numerous forms of transit options including the Porter Square Station less than 0.3 miles from the Project that includes the MBTA subway Red Line, Fitchburg/South Acton Commuter Rail Line, four Bus Lines (Bus Route #77, 96, 83 and 87) and several car sharing locations. The vehicle ownership data from Port Landing, other affordable rental buildings in Cambridge, and the Parking and Traffic Assessment by Vanasse & Associates, Inc. (VAI) included in **Section 10** suggests approximately half of the building's households, or ~25 households, will have cars. Those residents with or without cars will benefit from Transportation Demand Management (TDM) that will include subsidizing MBTA passes, Bluebike memberships, or ride sharing memberships, as further detailed in the VAI report. In addition, the nearest Bluebike station is located directly across the street from the Project and the installation of public transportation and ride share timing screens at a centralized location will provide residents with information for easy access to transit. Ownership and building management will help to facilitate the matching of residents who desire to carpool with other residents and will provide

information at move-in to all residents on all public transportation options within a short distance of the Site.

Below is a map from Walkscore.com highlighting the Site's adjacent transit options:



VAI determined the Project's projected parking demand and quantified the availability of on-street parking within 1/4 of a mile from the Site during peak parking demand hours. In summary, at the time of its study on Tuesday, September 22, 2020, VAI determined that the peak hour demand was at 8:00pm at which time a total of 318 on-street parking spaces were available within a quarter mile of the Site. VAI concludes its report by stating: "In summary, a detailed parking survey was completed in the area of the Project and based upon this data it can be concluded that there is more than sufficient availability of on-street parking to accommodate the Project. The Project proponent is committed to implementing a Travel Demand Management plan which promotes alternatives modes of transportation and will minimize the Project's impact on available on-street parking and traffic in the area."



VAI Parking Study, October 13, 2020, Figure 4

It is expected that a significant portion of the residents of the Project will utilize alternative modes of transportation other than automobiles. Based upon the U.S. Census and 2018 American Community Survey data for Census Tract 3547, the tract in which the Project is located, the mode split characteristics of the Project are estimated as follows: 32 percent automobile trips; 43 percent transit; 10 percent walk; 6 percent bicycle, and 9 percent other trips. Pursuant to VAI's report, the Project is expected to generate approximately 98 vehicle trips on an average weekday (49 entering/49 exiting), with approximately 6 vehicle trips (2 entering/4 exiting) expected during the weekday morning peak-hour. During the weekday evening peak hour, the Project is expected to generate approximately 9 new vehicle trips (5 entering/4 exiting).

2072 Mass Ave Apartments' proximity to several alternative transit options and community serving amenities (schools, pharmacy, grocery store) within walking distance will produce a thriving walkable residential community. 2072 Massachusetts Avenue's design is consistent with smart growth principles and the Cambridge City Council's goal to reduce reliance on vehicle usage while promoting alternative forms of transportation.

<u>Evidence of Need for Affordable Housing:</u>

The City of Cambridge historically was the home of immigrants and low and middle-income earners that were vital to Cambridge's glassworks and furniture factories from the 1920's through the 1970's. However, since rent control ended in 1994, Cambridge has experienced an exponential increase in land value, resulting in a disproportionate impact on the availability of affordable housing options for low and middle-income individuals and families. HUD defines "cost burdened" households as those who pay more than 30%

of their income for housing.[2] According to the U.S. Census Bureau, 43% of renters in Cambridge are paying 30% or more of their household income on rent and are therefore considered cost burdened.[3]

Lower and middle income families in Cambridge find it exceptionally difficult to secure family friendly housing throughout the City. In the last six (6) months, accordingly to MLS, the median sale price for a single family home in Cambridge was $1,733,500 and the average condominium sale price was $812,500. Based on an informal October 2020 survey of larger apartment communities in the immediate market area, two-bedroom apartment rents are $3,600 and three-bedroom apartment rents are $4,500.[4] In order to afford these rents and not be cost burdened, a household would need to earn at least $152,000 – $190,000 annually. Over 60% of Cambridge households make less than $150,000, making these units unaffordable to a majority of current Cambridge residents.[5]

The City's housing stock is also older and many units contain lead based paint hazards, which further constrain families from locating safe, quality housing for their children. In fact, 71.4% of Cambridge's housing inventory was constructed prior to 1980.[6] Upon completion, all of 2072 Massachusett's Avenue's apartments will be new.

Once completed, the 2072 Mass Ave Apartments residential community will provide urgently needed affordable housing in an area where a significant number of families and individuals are unable to afford quality housing. Additionally, the high number of three-bedroom apartments (29%) will specifically be occupied by families.

Financing

If 2072 Massachusetts Avenue's Site eligibility application and zoning application are approved, the development team anticipates applying for an array of local, state and federal subsidies as well as private investments. The development team will apply to the Massachusetts Department of Housing and Community Development for an allocation of state and federal low-income housing tax credits as well as additional subsidies.

In 2018 the Cambridge Affordable Housing Trust provided a $3.8 million loan to finance the Site acquisition and certain predevelopment expenses. If 2072 Massachusetts Avenue receives its permitting, the development team anticipates applying for additional City funding and for eight Cambridge Housing Authority Section 8 Project Based Vouchers.

Permitting and Community Process

The area along Massachusetts Avenue adjacent to the Site is mixed use and is characterized by mostly four to eight-story brick apartment, commercial office and retail buildings. According to the Zoning Map, the majority of the Parcel has a base zoning of Business A-2 and a small portion (13'+/-) at the rear of the parcel is in the Residence B base zoning district. Both districts allow for residential uses as of right although the Business A-2 district also allows for a range of commercial/retail and multi-family residential uses whereas

[2] U.S. Department of Housing and Urban Development, "Housing Choice Voucher Program" https://www.hud.gov/hudprograms/hcvp (accessed October 9, 2020)
[3] U.S. Census Bureau American Community Survey 2019: ACS 1-Year Estimates TableID DP04
[4] The Wyeth – 120 Rindge Avenue, Cambridge
[5] U.S. Census Bureau American Community Survey 2019: ACS 1-Year Estimates TableID S2503
[6] U.S. Census Bureau American Community Survey 2019: ACS 1-Year Estimates TableID DP04

the Residence B district is a one- and two-family district only. The Parcel also is in the Massachusetts Avenue Overlay District and North Massachusetts Overlay Sub- district (the "Massachusetts Avenue Overlay").

The development team is proposing to obtain all of 2072 Massachusetts Avenue's local approvals through an MGL Chapter 40B comprehensive permit from the Cambridge Board of Zoning Appeals (BZA). Since the City of Cambridge has met its obligations under MGL Chapter 40B, the development team will be requesting that the BZA accept this Comprehensive Permit application. Pursuant to 760 CMR 56.05(7), please refer to **Section 7** for a detailed list of requested Waivers from Local Requirements and Regulations.

Over the past month, the development team has engaged the community through individual abutter Zoom meetings and a large Zoom community meeting on September 29, 2020 that was attended by 82 people. The development team has maintained a website, www.2072massaveapts.com, that provides updated and detailed information on the proposal. The website includes copies of plans, FAQs, news and events, information on the development team, and contact information for the community to provide feedback and ask questions. The development team has also been working with all the relevant City departments for many months to refine the plans.

Development Team

The following development team has been formed to include industry experts ensuring a seamless and successful completion:

- **Developers**:
    - *Capstone Communities LLC* (www.capstonecommunities.com), is a Newton, Massachusetts based real estate development firm experienced in structuring complex financing involving multiple federal and state subsidies. Jason Korb is the principal of Capstone Communities LLC where he has developed market rate, mixed income, and 100% affordable housing. Since founding Capstone in October 2010, Jason has successfully completed a total of $60,000,000 of development transactions in Cambridge, Somerville, Arlington, Newton and Brockton Massachusetts. These include converting Brockton's first brick shoe factory into 25 mixed-income apartments, co-developing 20 100% affordable family apartments on a vacant lot in Cambridge's Port neighborhood. Additionally, Capstone and Hope are currently developing Frost Terrace, a 40 apartment, 100% affordable community in Porter Square which is estimated to be complete in Spring of 2021.

      Prior to forming Capstone, Jason was the Vice President of Acquisitions at Beacon Communities LLC, a developer, owner, and manager of over 9,000 apartment homes in the Northeast. At Beacon, Jason was responsible for sourcing new acquisitions and overseeing mixed income, affordable and market rate development and financing opportunities. In his seven years at Beacon, Jason was responsible for developing over 600 apartment homes totaling over $100M. Prior to joining Beacon in 2004, Jason was a Housing Project Manager at the Fenway Community Development Corporation in Boston. Jason is a former Director of Caritas Communities and a former Vice-Chair of Preservation Massachusetts. Jason received an MS from the Massachusetts Institute of Technology's Center for Real Estate and a BA from the University of Michigan, Ann Arbor. Jason's MIT thesis, The Low Income Housing Tax Credit: HERA, ARRA, and Beyond has been cited by Harvard University's Joint Center for Housing Studies and the US Senate Budget Committee.

- *Hope Real Estate Enterprises LLC*, is led by Cambridge based attorney and Real Estate Developer Sean D. Hope who specializes in Zoning and municipal permitting/consulting. Sean was co-developer with Jason Korb of Port Landing - a 100% affordable housing development located in The Port/Kendall Square that opened at the end of 2016 providing 20 units of family friendly housing to the Port neighborhood where Sean's family first moved to from the island of Barbados. Additionally, Hope has partnered with Capstone again to develop Frost Terrace, a 40 apartment, 100% affordable community in Porter Square which is estimated to be complete in Spring of 2021. Sean has also represented developers and property owner on numerous construction projects in Cambridge including new construction, historic preservation and adaptive reuse projects. Prior to entering into private practice in 2008 Sean was an associate member of the Cambridge Board of Zoning Appeal voting on several keys applications including Print Shop Condominiums, an affordable home ownership project developed by CASCAP in 2007. Sean also serves as in-house counsel for Pentecostal Tabernacle in Cambridge and is former member of the Cambridge Historic Society.

- **Preconstruction Cost Estimator**: *Callahan Construction Managers* (www.callahan-inc.com): Established in 1954, Callahan Construction Managers is a full-service construction company experienced with a variety of building types and construction methods in Massachusetts and the Northeast. Callahan specializes in a wide range of preconstruction and construction management services, and including projects in multi-family residential, senior housing, hospitality, retail, corporate office, life sciences, educational, and other markets. Most recently, Callahan began the historic renovation, addition, and new construction project at Squirrelwood Apartments, an affordable housing community owned by Just-A-Start Corporation in Cambridge, MA. The Squirrelwood Apartments contain 88 units and the new construction building will be built to Passive House Standards.

- **Architect**: *Bruner/Cott & Associates (Bruner/Cott)* (www.brunercott.com): Bruner/Cott is a mid-sized, full service architecture and planning firm, located in the Central Square area of Cambridge, Massachusetts. Founded 45 years ago, Bruner/Cott is dedicated to enhancing the quality of life, economic vigor, and sense of community through thoughtful, sustainable design. As pioneers in transformative reuse, Bruner/Cott strives to recognize the character and value of an existing structure and understand that sustainable design extends beyond the boundaries of a single building. Whether new construction, transformative reuse, historic preservation, or a large-scale planning project, Bruner/Cott makes buildings that communicate with their surroundings, transforming place by creating architecture of enduring value.

  Bruner/Cott is committed to its mission of achieving design excellence through collaboration, creativity, and critical thinking, crafting thoughtful design solutions that fulfill their clients' aspirations, and enhancing the human experience while respecting the natural environment. The firm's work has been consistently recognized for design, winning awards for renovation, adaptive reuse, and new construction. In the Cambridge/Boston area, Bruner/Cott recently completed the Lunder Arts Center at Lesley University in Porter Square and The Viridian at 1282 Boylston Street.

- **Legal (General and Zoning)**: *Nixon Peabody LLP* (www.nixonpeabody.com): Nixon Peabody is a full-service law firm with more than 600 lawyers nationwide and internationally. Our clients range from developers (for-profit and nonprofit), financing institutions and governmental entities to *Fortune* 100 companies. Nationally recognized in real estate, the firm handles highly complex development and financing transactions involving every class of assets, and has been at the forefront of financing,

developing and preserving affordable housing for more than 45 years. In fact, with approximately 25 attorneys and paralegals possessing significant experience working with federal, state and local governmental agencies, NP has one of the largest affordable housing legal teams in the country.

The NP team also handles land use, zoning and permitting for a range of development projects, and is regularly brought into transactions to review site plans and perform zoning analyses. Through this work, the team has developed a comprehensive understanding of the local zoning and permitting processes and the multiple administrative steps that developers face during the course of development, which can include navigating the zoning approval process, obtaining Comprehensive Permit approvals, or establishing zoning overlay district areas and zoning map amendments.

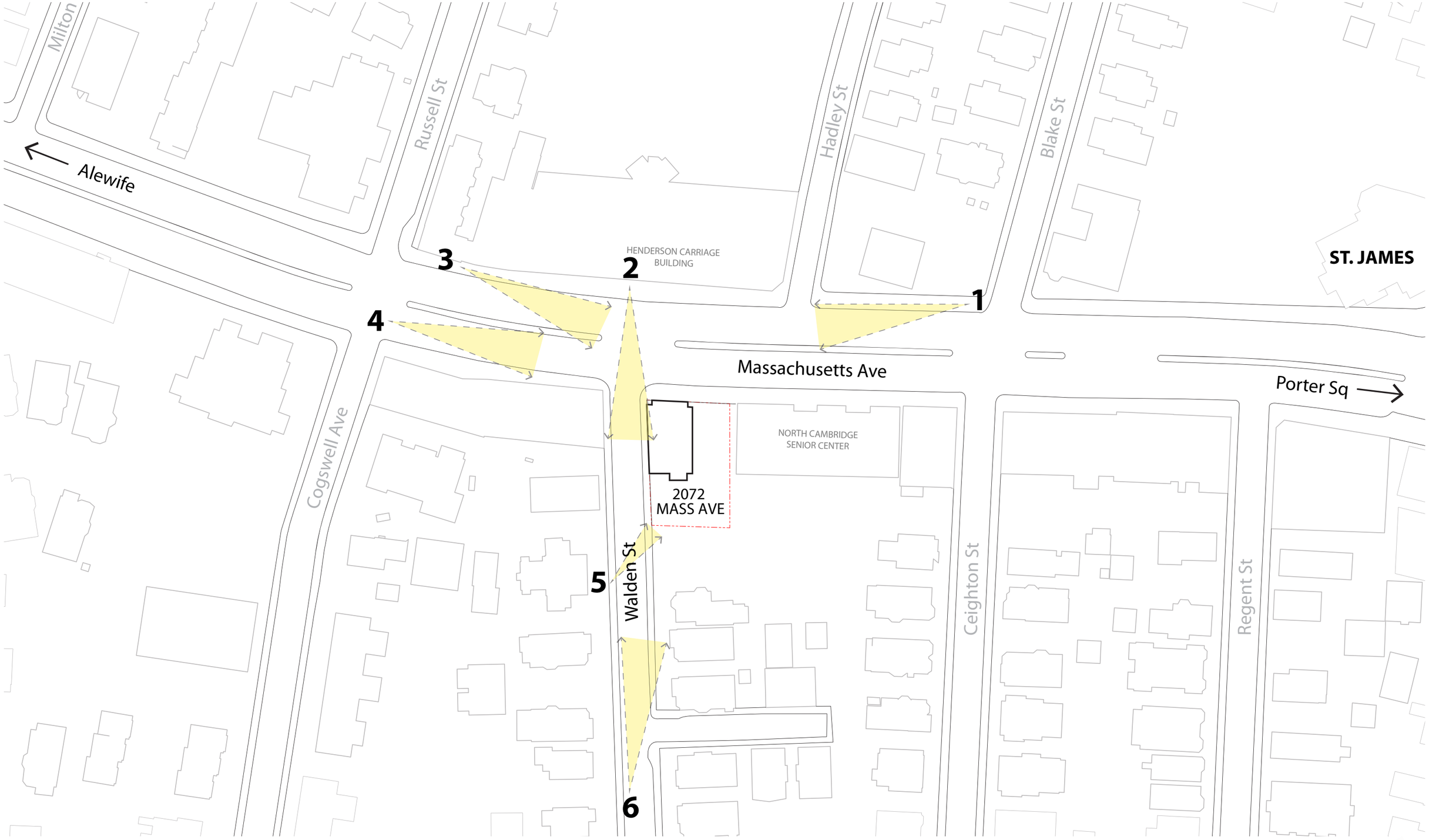
Conclusion

2072 Mass Ave Apartments will bring high-quality housing to the Porter Square neighborhood that is affordable to a diverse array of low- and moderate-income households. With immediate proximity to rapid transit and essential community services, the Site can provide critically needed housing in an attractive, sustainable development. Designed to provide contemporary amenities with a focus on transit-oriented development and sustainability, 2072 Mass Ave Apartments will be high-quality family housing in the heart of one of Cambridge's most vibrant neighborhoods.

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 2

- 2072 Massachusetts Avenue Site and Neighboring Photographs



SITE PLAN

Bruner/Cott ARCHITECTS

APPLICANT: CC HRE 2072 MASS AVE LLC

2072 MASSACHUSETTS AVENUE

OCTOBER 8, 2020

View on Massachusetts Avenue
Looking North-West

SITE PHOTOS

View towards Walden Street
Looking South-East

SITE PHOTOS

Corner of Massachusetts Avenue & Walden Street
Looking South

SITE PHOTOS

4

View on Massachusetts Avenue
Looking South-East

SITE PHOTOS

View of property rear & adjacent city parking lot
Looking East

SITE PHOTOS

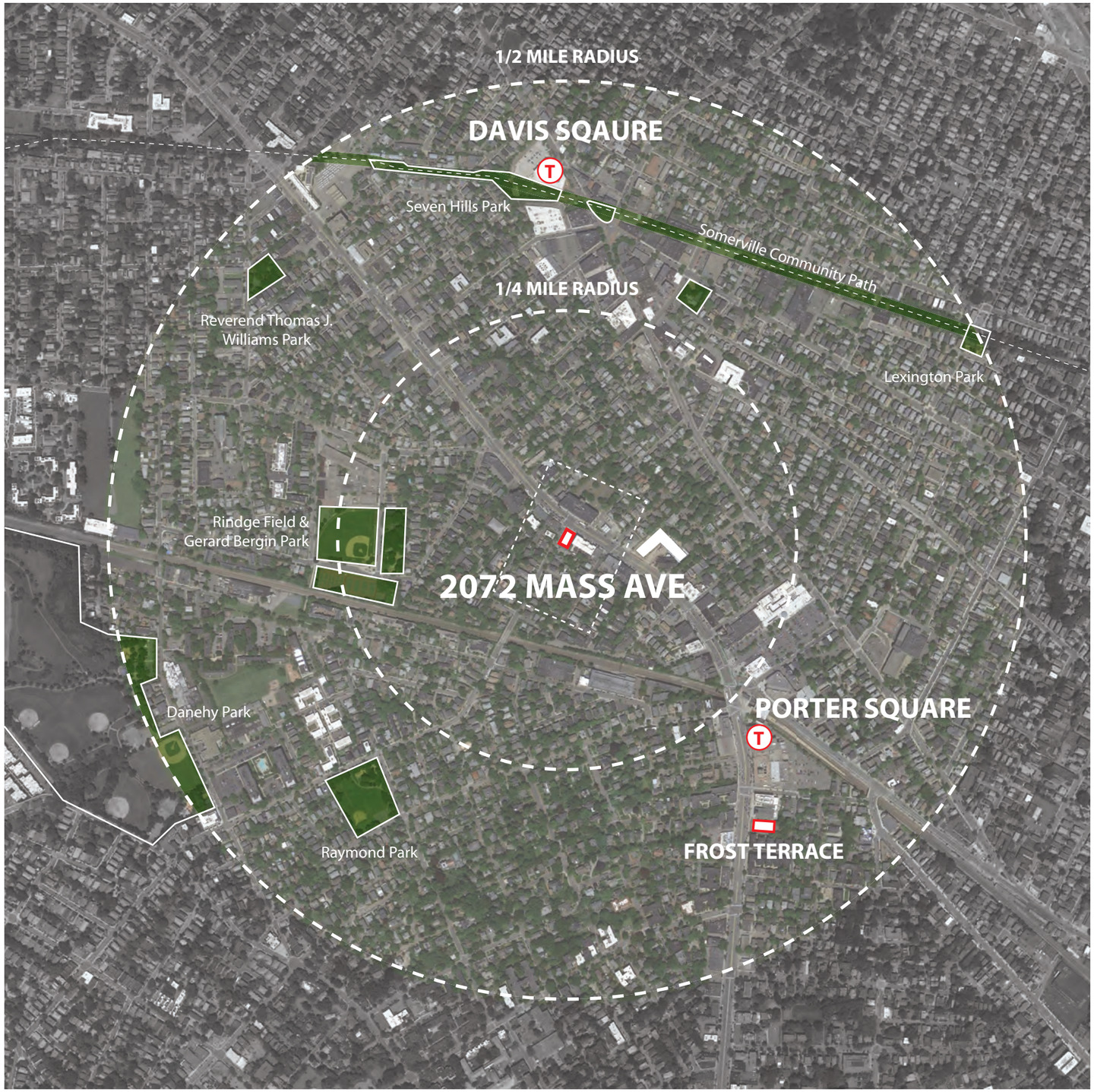
View of Walden Street towards Massachusetts Avenue
Looking North

SITE PHOTOS

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 3

- Locus Map and Assessor Plat



LOCUS MAP

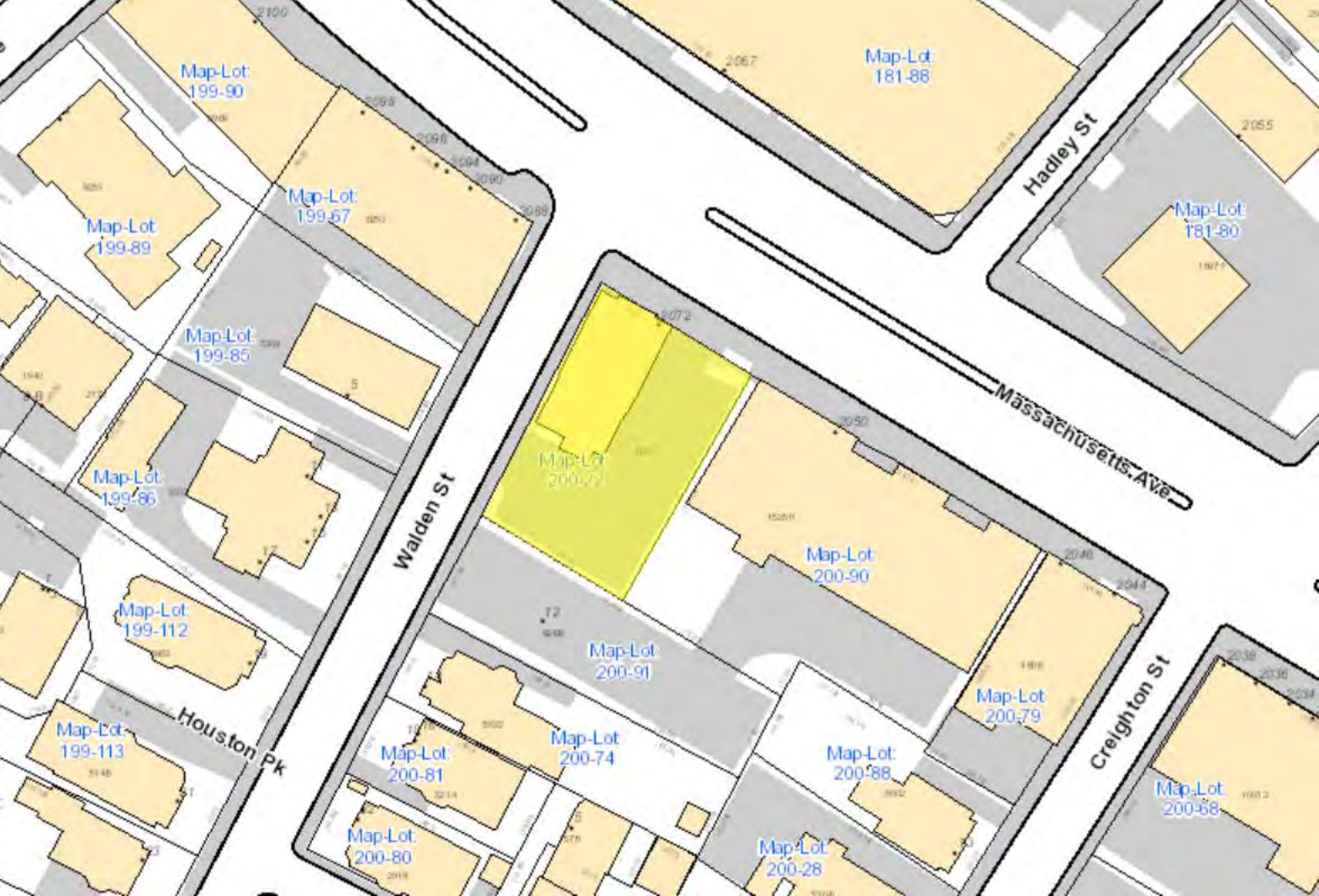
Bruner/Cott ARCHITECTS

APPLICANT: CC HRE 2072 MASS AVE LLC

N

2072 MASSACHUSETTS AVENUE

OCTOBER 8, 2020


Map-Lot
199-90
Map-Lot
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Map-Lot
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199-86
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199-112
Map-Lot
199-113
Houston Pk
Walden St
Map-Lot
200-72
Map-Lot
200-91
Map-Lot
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Map-Lot
200-79
Map-Lot
200-88
Map-Lot
200-28
Massachusetts Ave
Hadley St
Map-Lot
181-88
Map-Lot
181-80
Creighton St
Map-Lot
200-58

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 4

- Plans and Materials and Perspectives

RENDERING - VIEW OF MASS AVE & WALDEN ST INTERSECTION LOOKING SOUTH-EAST

RENDERING - VIEW ALONG MASS AVE LOOKING SOUTH-EAST

RENDERING - VIEW AT MASS AVE TOWARDS WALDEN ST LOOKING NORTH-WEST

Bruner/Cott
ARCHITECTS

225 Friend St., Suite 701
Boston, MA 02114
617.492.8400
www.brunercott.com

Rev	Date	Remarks

Date	OCTOBER 8, 2020
Scale	
Project Number	20.001
Drawn By	Author

2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION

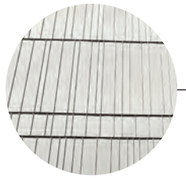
PERSPECTIVES

A-305

IF THIS SHEET IS NOT: 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

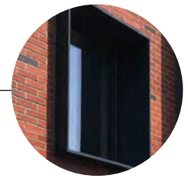
10/8/2020 5:03:18 PM

RENDERING - VIEW OF WALDEN ST LOOKING WEST



METAL PANEL WITH EXPOSED SEAMS

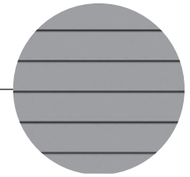
VERTICAL INFILL WOOD TEXTURE COMPOSITE PANEL



PASSIVE HOUSE APPROVED OPERABLE UPVC WINDOW WITH MTL FRAME

LONG MASONRY AT STREET LEVEL

MASONRY SOLDIER COURSE AT HEADER



FIBER CEMENT CLAPBOARD SIDING, PTD

OPENINGS IN MASONRY FACADE

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2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION

PERSPECTIVES

A-306

RENDERING - VIEW OF WALDEN ST TOWARDS MASS AVE LOOKING NORTH

PERFORATED MTL SUN SHADES

GREEN ROOF

HALF ROUND FIBER CEMENT SHINGLES, PTD

FIBER CEMENT CLAPBOARD SIDING, PTD

FIBER CEMENT SHAKE SHINGLES, PTD

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Boston, MA 02114
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www.brunercott.com

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Date	OCTOBER 8, 2020
Scale	
Project Number	20.001
Drawn By	Author

2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION

PERSPECTIVES

A-307

2072 MASS AVE

2072 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140

	HC	PICK-UP/DROP-OFF	TOTAL
PARKING	3	2	**5**

DHCD SITE ELIGIBILITY APPLICATION

OCTOBER 8, 2020

CC HRE 2072 MASS AVE LLC
OWNER

C/O CAPSTONE COMMUNITIES LLC
1087 BEACON ST, SUITE 302
NEWTON CENTRE, MA 02459

C/O HOPE REAL ESTATE ENTERPRISES LLC
907 MASSACHUSETTS AVE, SUITE 300
CAMBRIDGE, MA 02139

BRUNER/COTT ARCHITECTS
ARCHITECT

225 FRIEND ST, SUITE 701
BOSTON, MA 02114

NITSCH ENGINEERING INC.
CIVIL ENGINEER

2 CENTER PLAZA, #430
BOSTON, MA 02108

PETERSEN ENGINEERING INC.
MEP/FP ENGINEER

127 PARROTT AVE
PORTSMOUTH, NH 03801

L.A. FUESS PARTNERS
STRUCTURAL ENGINEER

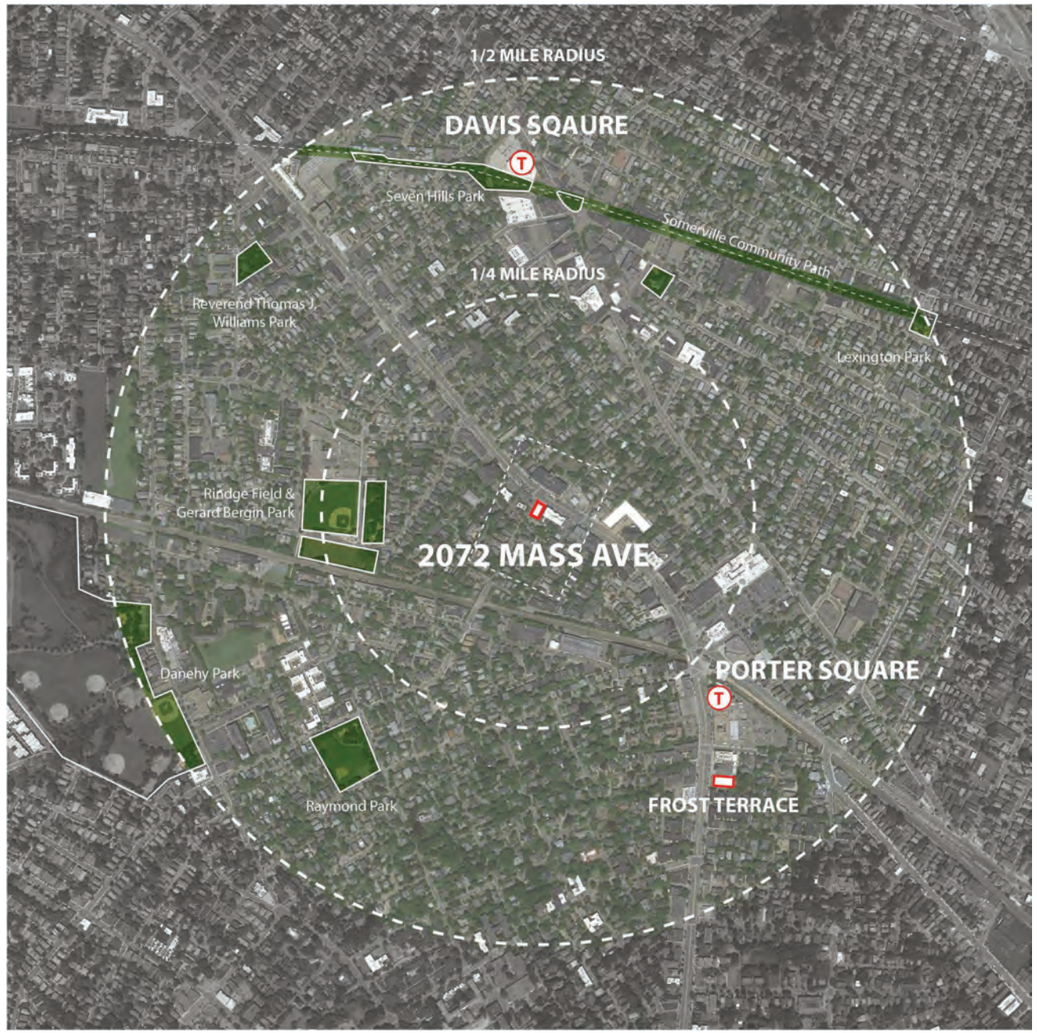
211 CONGRESS ST, SUITE 810
BOSTON, MA 02110

NEW ECOLOGY INC
SUSTAINABILITY CONSULTANT

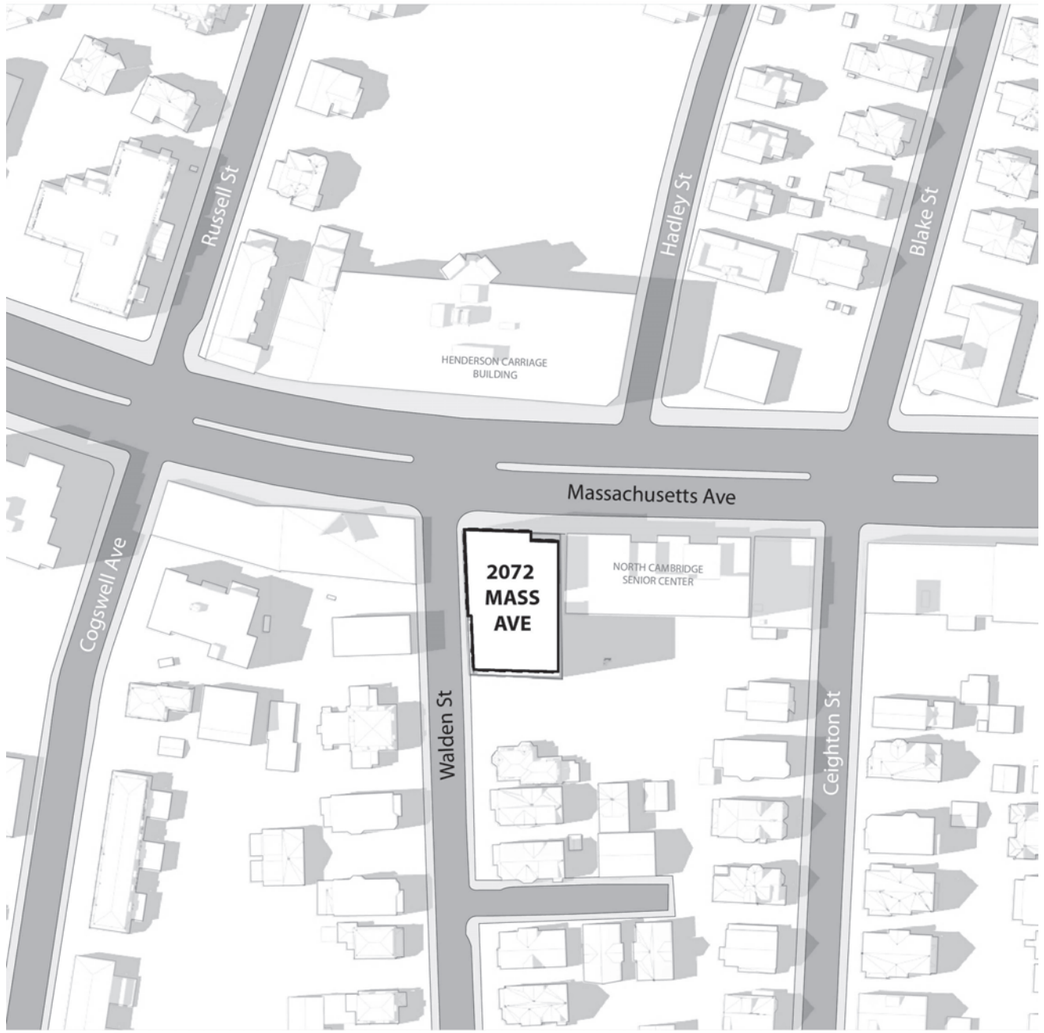
15 COURT SQ, SUITE 420
BOSTON, MA 02108

CODE RED CONSULTANTS LLC
CODE CONSULTANT

154 TURNPIKE RD, SUITE 200
SOUTHBOROUGH, MA 01772



NEIGHBORHOOD MAP



SITE PLAN

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Rev	Date	Remarks

Date	OCTOBER 8, 2020
Scale	
Project Number	20.001
Drawn By	Author

2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION
NOT FOR CONSTRUCTION

NEIGHBORHOOD MAP/ SITE PLAN

G-100

DRAWING LIST

GENERAL

G-100	NEIGHBORHOOD MAP/ SITE PLAN
G-101	DRAWING LIST, UNIT MATRIX, ZONING SUMMARY
G-102	EXISTING SURVEY

CIVIL

C-1	SITE IMPROVEMENT & SITE UTILITY PLAN

ARCHITECTURAL

A-100	BASEMENT FLOOR PLAN
A-101	FIRST FLOOR PLAN
A-102	TYPICAL FLOOR PLAN (FLRS 2-8)
A-109	ROOF PLAN
A-300	EXTERIOR ELEVATIONS
A-301	EXTERIOR ELEVATIONS
A-302	EXTERIOR ELEVATIONS
A-303	EXTERIOR ELEVATIONS
A-304	EXTERIOR ELEVATIONS
A-305	PERSPECTIVES
A-306	PERSPECTIVES
A-307	PERSPECTIVES
A-400	BUILDING SECTION
A-401	BUILDING SECTION

2072 Massachusetts Avenue, Cambridge, MA
Building Tabulations
Prepared by Bruner/Cott Architects

Site and Building

Building Footprint (SF)	4,755

Building GSF

Basement	Excluded
First Floor	4,755
Second Floor	7,515
Third Floor	7,515
Fourth Floor	7,515
Fifth Floor	7,515
Sixth Floor	7,515
Seventh Floor	7,515
Eighth Floor	7,515
TOTAL GSF	**57,500**

Total Parcel Size (SF)	8,515
FAR	6.75
Parking Ratio (Excludes Drop-Off/Pick-Up)	6%
Long Term Bike Parking Ratio	104%
Open Space	0%

Parking

	HC	PICK-UP/DROP-OFF	TOTAL	HC UNIT : SPACE RATIO
Covered Parking	3	2	5	1:1

* Commercial parking is waived under Article 6.36 based on actual quantity required being below four (4) required spots

	Long-Term	Tandem	Short-Term	Total
Bike Parking	48	3	0*	51

* Project team is seeking alternative public contribution option of satifying short-term bike parking requirements per Article 6.104.2 (b)

Unit Mix

	STUDIO	1 BR	2 BR	3 BR	TOTAL
Basement	0	0	0	0	0
Ground	0	0	0	0	0
Second	0	2	3	2	7
Third	0	2	3	2	7
Fourth	0	2	3	2	7
Fifth	0	2	3	2	7
Sixth	0	2	3	2	7
Seventh	0	2	3	2	7
Eighth	0	2	3	2	7
TOTAL	**0**	**14**	**21**	**14**	**49**

% PER UNIT TYPE	0%	29%	42%	29%

% 2 AND 3 BR COMBINED	71%

UNIT NUMBER	UNIT TYPE	UNIT AREA (SF)
Unit 1	1 BR	605
Unit 2	1 BR	735
Unit 3	3 BR	1180
Unit 4	2 BR	800
Unit 5	2 BR	850
Unit 6	3 BR	1040
Unit 7	2 BR	865

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Date	OCTOBER 2, 2020
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Project Number	20.001
Drawn By	Author

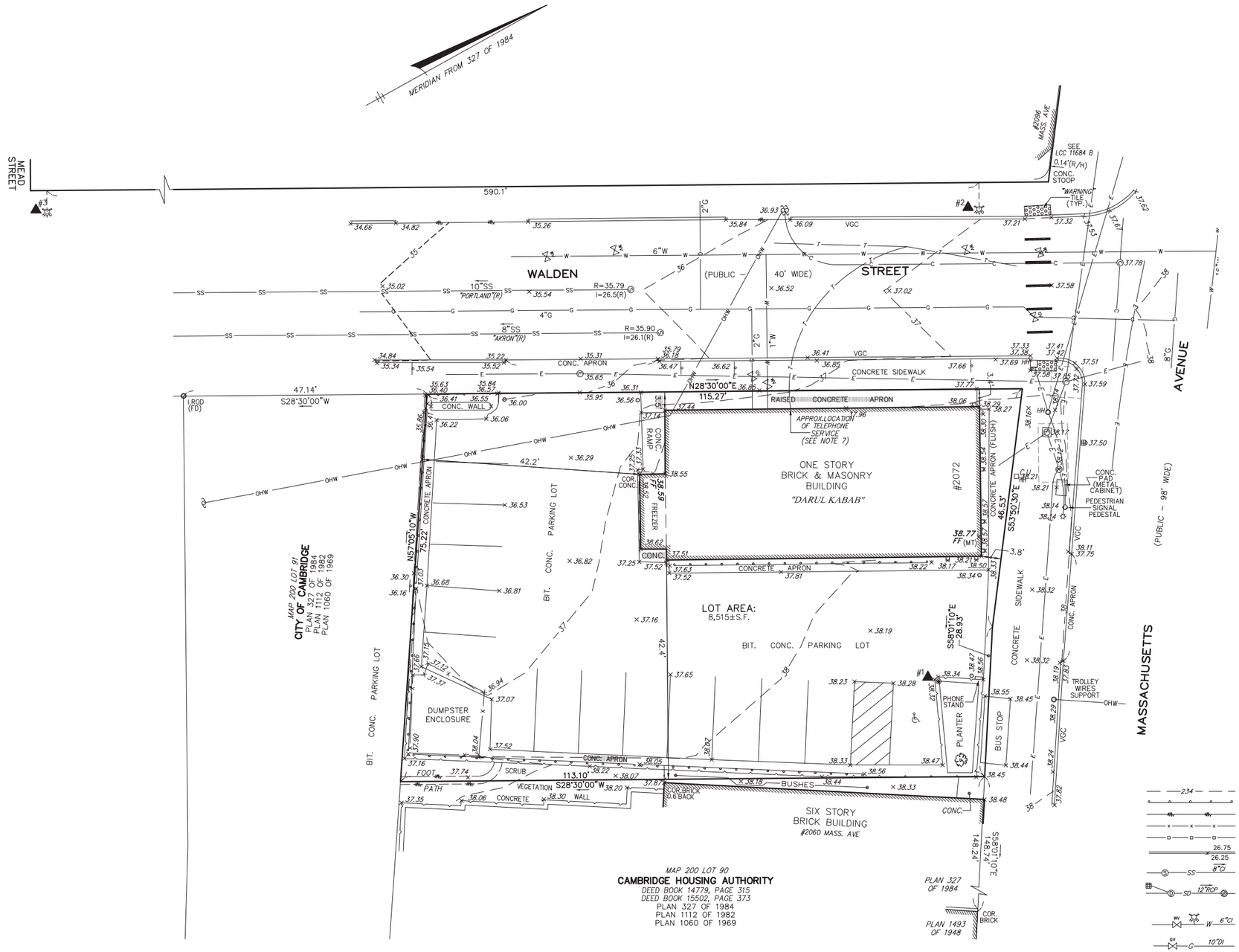
2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

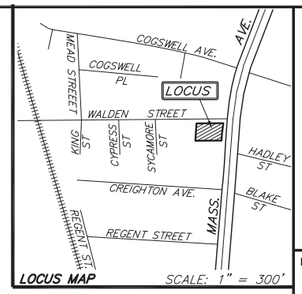
COMPREHENSIVE PERMIT
NOT FOR CONSTRUCTION

DRAWING LIST, UNIT MATRIX, ZONING SUMMARY

G-101



▲	ELEVATION BENCH MARKS **DATUM:** CAMBRIDGE CITY BASE	
NO.	DESCRIPTION	ELEV.
1.	FIRE HYDRANT; BOLT OVER MAIN OUTLET	38.98
2.	TOP CONC. WALL; TOP DRILL HOLE (SET)	38.95
3.	HYDRANT; CHISELED "X" IN BONNET BOLT	41.28



LOCUS MAP SCALE: 1" = 300'

ASSESSORS: MAP 200, LOT 22

REFERENCES: DEED BOOK 70018, PAGE 247
PLAN 1060 OF 1969
PLAN 1112 OF 1982
PLAN 327 OF 1984
LCC 11684 B

RECORD OWNER: 2072 MASS AVE LLC

NOTES:

1) ELEVATIONS SHOWN HEREON REFER TO CAMBRIDGE CITY BASE.
2) PROJECT SOURCE BENCHMARK IS A CHISELED "X" IN HYDRANT BONNET BOLT SHOWN HEREON AS BENCHMARK #3 AS SHOWN ON SKETCH PROVIDED BY CAMBRIDGE DEPARTMENT OF PUBLIC WORKS.
3) UNDERGROUND UTILITIES SHOWN HEREON ARE COMPILED FROM FIELD LOCATIONS OF STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE CAMBRIDGE D.P.W., MASS HIGHWAY DEPT. AND UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER AND THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG–SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.
4) BUILDING OFFSETS SHOWN HEREON ARE TO CORNER BRICK UNLESS OTHERWISE NOTED.
5) SOME SNOW AND ICE WAS ON THE PREMISES AT THE TIME OF THE SURVEY; SOME SITE DETAIL MAY HAVE BEEN OBSCURED.

LEGEND

234	SURFACE CONTOUR	232.6	SPOT ELEVATION
	METAL GUARDRAIL	☼	LIGHT POLE
	EDGE OF PAVEMENT	205.24 Ⓜ	MONITORING WELL WITH TOP METAL CASING EL.
x x x	CHAIN LINK FENCE		D GRATE CATCHBASIN
	WOOD FENCE		PROMINENT DECIDUOUS TREE
26.75 / 26.25	CURB WITH TOP AND BOTTOM CURB ELEVATION	∘	BOLLARD
S SS 8"Cl	SEWERLINE & MANHOLE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION		SIGN
SD 12"RCP	DRAINLINE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION, CATCHBASIN, MANHOLE & ROUND CATCHBASIN	Ⓜ	MANHOLE (UNKNOWN UTILITY)
WV W 6"Cl	WATER MANHOLE, WATER MAIN WITH SIZE, TEE, GATE VALVE & FIRE HYDRANT	RCP	REINFORCED CONCRETE PIPE
GV G 10"DI	GAS MAIN WITH SIZE & GATE VALVE	CI	CAST IRON
#181 OHW	UTILITY POLE WITH DESIGNATION OVERHEAD WIRES AND GUY POLE	CMP	CORRUGATED METAL PIPE
E	ELECTRIC MANHOLE & UNDERGROUND ELECTRIC LINES	ASB.	ASBESTOS PIPE
C	CABLE TV MANHOLE & UNDERGROUND CABLE LINES	VC	VITRIFIED CLAY
T	TELEPHONE MANHOLE & UNDERGROUND TELEPHONE LINES	PVC	POLYVINYL CHLORIDE
28.8 / 23.2	RETAINING WALL WITH TOP AND BOTTOM ELEVATIONS	(R)	RECORD
		(C)	CALCULATED
		(R/H)	RECORD AND HELD
		(M)	FIELD MEASURED
		DH	DRILL HOLE
		I.PIPE	IRON PIPE
		I.ROD	IRON ROD
		VGC	VERTICAL GRANITE CURB
		38.77 FF (MT) ×	ENTRANCE ELEV. (METAL THRESHOLD)

SCALE: 1" = 10'
0 10 20 40

2072 MASSACHUSETTS AVENUE

Cambridge, Massachusetts

PREPARED FOR:

CC HRE 2072 MASS AVE LLC

1155 Walnut Street #31
Newton Highlands, Massachusetts 02461

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Wetland Scientists

185 CENTRE STREET, DANVERS, MA 01923
VOICE (978) 777–3050, FAX (978) 774–7816
WWW.HANCOCKASSOCIATES.COM

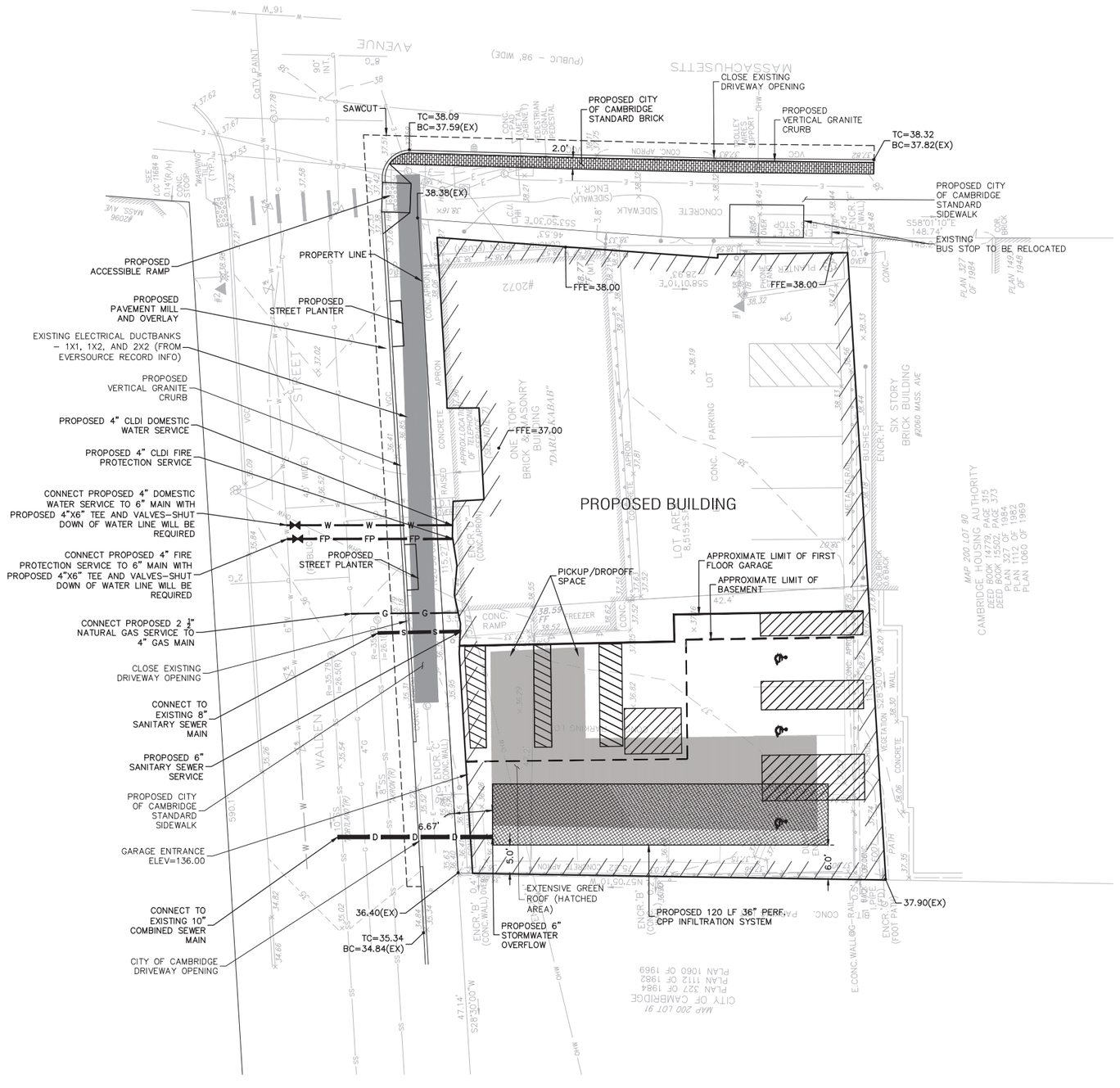
NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION

DATE: 03/12/2018 DRAWN BY: JMS
SCALE: 1" = 10' CHECK BY:

EXISTING CONDITIONS PLAN OF LAND IN CAMBRIDGE, MA

PLOT DATE: Aug 28, 2020 - 12:11 pm
PATH: F:\Civil 3D Projects\21130 – Captsone Communities – Cambridge

DWG: 21130sv.dwg
LAYOUT: EC
SHEET: 1 OF 1
PROJECT NO.: 21130



Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472

- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

SITE IMPROVEMENT & SITE UTILITY PLAN

2072 MASSACHUSETTS AVENUE
CAMBRIDGE, MA

PREPARED FOR:
CC HRE 2072 MASS AVE LLC
1087 BOYLSTON STREET, SUITE 302, NEWTON, MA

REV.	COMMENTS	DATE
	REVISIONS	

NITSCH PROJECT #	14047
FILE:	14047CUT.DWG
SCALE:	1"=10'
DATE:	9-25-2020
PROJECT MANAGER:	MLC
SURVEYOR:	
DRAFTED BY:	MRD
CHECKED BY:	MLC

SHEET:

C-1

OF REV.

1 FLOOR PLAN - BASEMENT
SCALE: 1/8" = 1'-0"

FLOOR AREA PLAN

BIKE RM	2129 SF
CORR	592 SF
ELEC RM	250 SF
ELEV MACHINE RM	57 SF
FIRE PUMP RM	221 SF
FUEL STORAGE FM	165 SF
STAIR 01	232 SF
STAIR 02	186 SF
STORAGE	412 SF
TRANSFORMER RM	759 SF
WATER ENTRY RM	88 SF

10/8/2020 5:01:57 PM

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Rev	Date	Remarks

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Project Number	20.001
Drawn By	Author

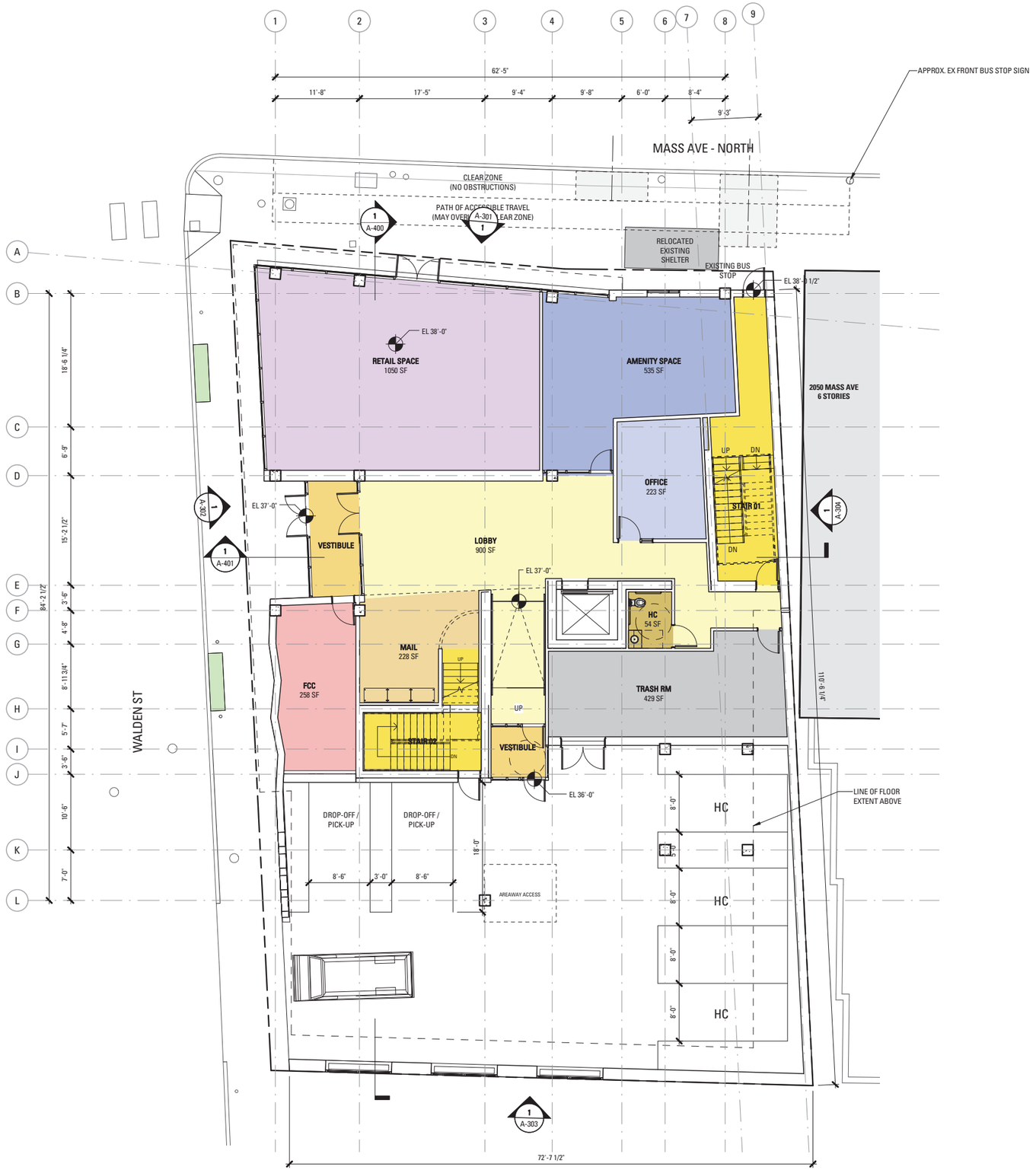
2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION
NOT FOR CONSTRUCTION

BASEMENT FLOOR PLAN

A-100



1 FLOOR PLAN - FIRST FLOOR
SCALE: 1/8" = 1'-0"

FLOOR AREA PLAN

AMENITY SPACE	535 SF
LOBBY	258 SF
RETAIL SPACE	54 SF
FCC	900 SF
HC	228 SF
MAIL	223 SF
OFFICE	1050 SF
STAIR 01	291 SF
STAIR 02	201 SF
TRASH RM	429 SF
VESTIBULE	184 SF

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Project Number	20.001
Drawn By	Author

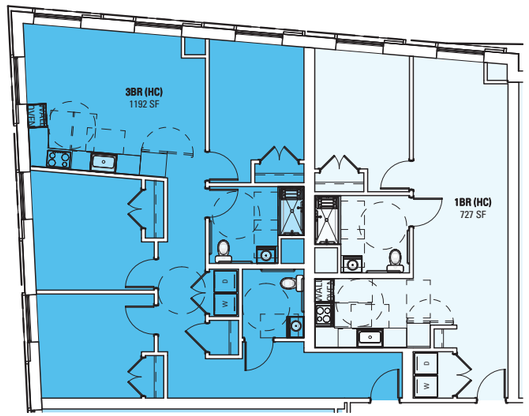
2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION
NOT FOR CONSTRUCTION

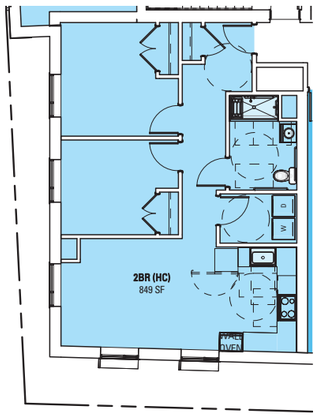
FIRST FLOOR PLAN

A-101



*NOTE: 3 BR GROUP 2 UNIT LOCATED ON FLR 2
1 BR GROUP 2 UNIT LOCATED ON FLR 3

2 GROUP 2 UNITS - 1BR & 2BR
SCALE: 1/8" = 1'-0"



*NOTE: 2 BR GROUP 2 UNIT LOCATED ON FLR 4

3 GROUP 2 UNITS - 3BR
SCALE: 1/8" = 1'-0"

1 FLOOR PLAN - TYP FLOORS (FLRS 2-8)
SCALE: 1/8" = 1'-0"

FLOOR AREA PLAN

1BR	1332 SF
2BR	2528 SF
3BR	2231 SF
CORR	390 SF
ELEC. CLOSET	15 SF
STAIR 01	186 SF
STAIR 02	193 SF

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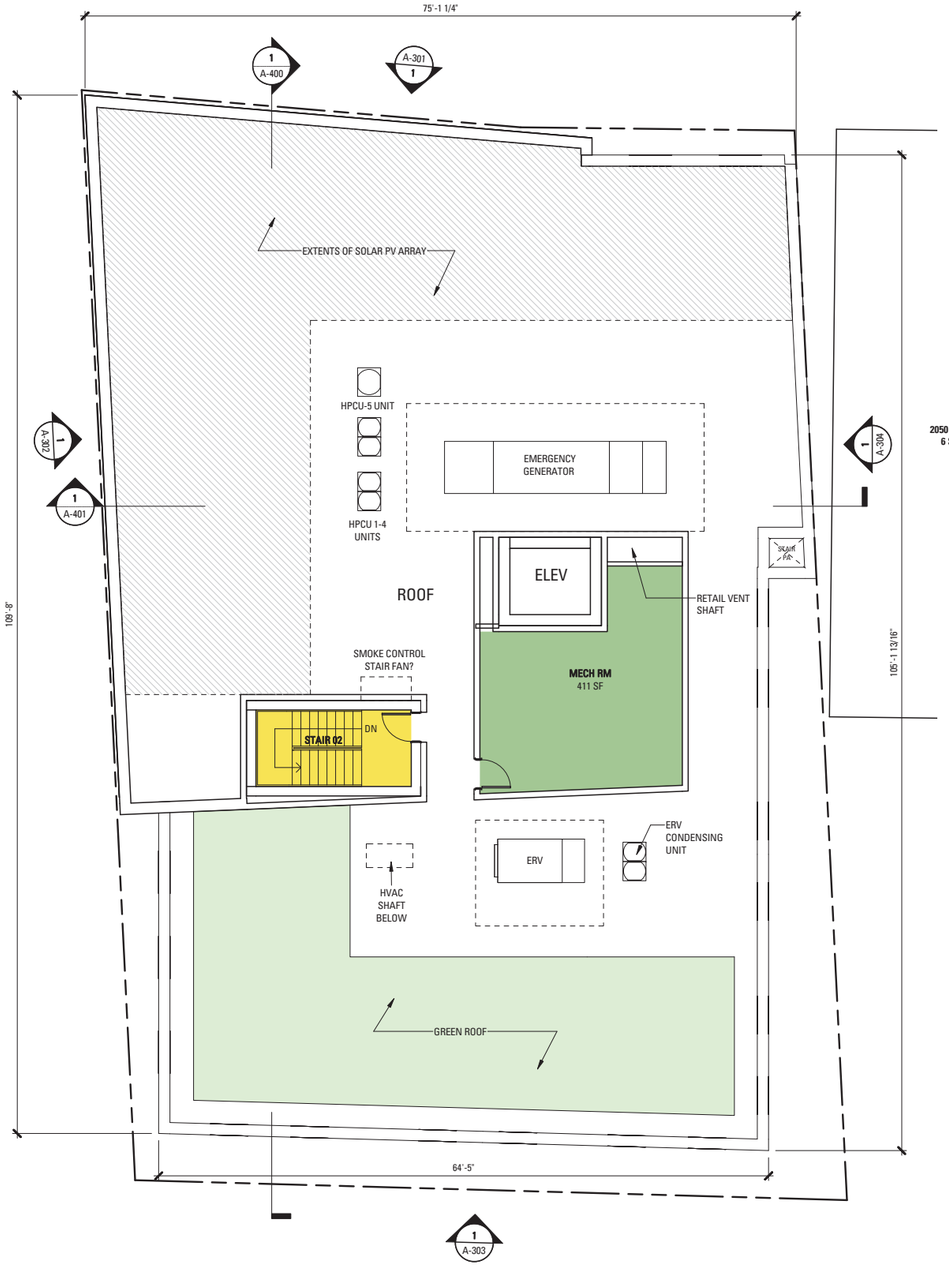
TYPICAL FLOOR PLAN (FLRS 2-8)

A-102



1 FLOOR PLAN - ROOF
SCALE: 1/8" = 1'-0"

FLOOR AREA PLAN

MECH RM	411 SF
STAIR 02	133 SF

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ROOF PLAN

A-109

1 CONTEXT ELEVATION - NORTH
SCALE: 1/16" = 1'-0"

2 ELEVATION - WEST
SCALE: 1/16" = 1'-0"

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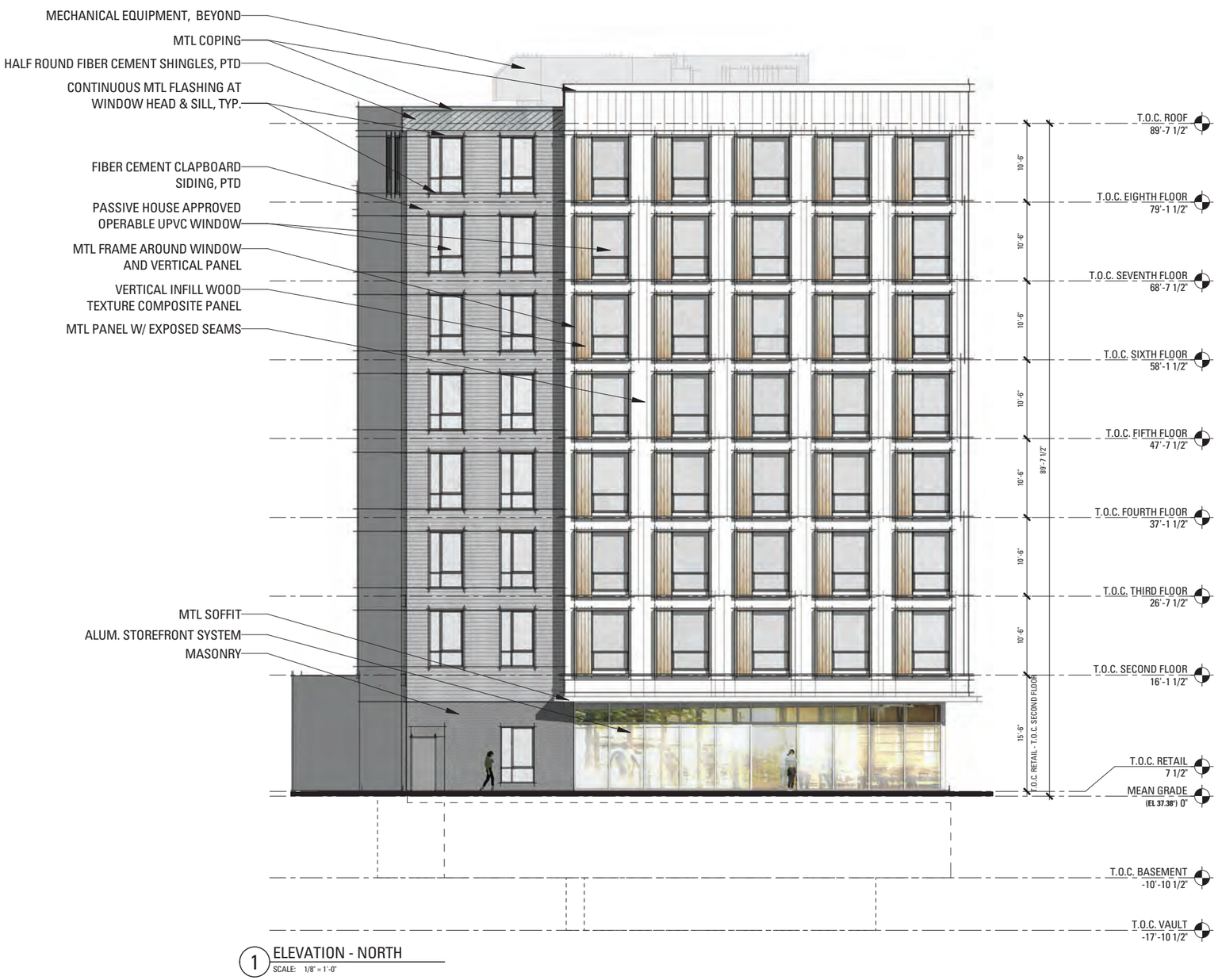
EXTERIOR ELEVATIONS

A-300



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

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Project Number	20.001
Drawn By	Author

2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION
NOT FOR CONSTRUCTION

EXTERIOR ELEVATIONS

A-301

1 ELEVATION - WEST
SCALE: 1/8" = 1'-0"

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Project Number	20.001
Drawn By	Author

2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION

EXTERIOR ELEVATIONS

A-302

1 ELEVATION - SOUTH
SCALE: 1/8" = 1'-0"

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Project Number	20.001
Drawn By	Author

2072 MASS AVE

2072 Massachusetts Avenue, Cambridge, MA 02140

DHCD SITE ELIGIBILITY APPLICATION
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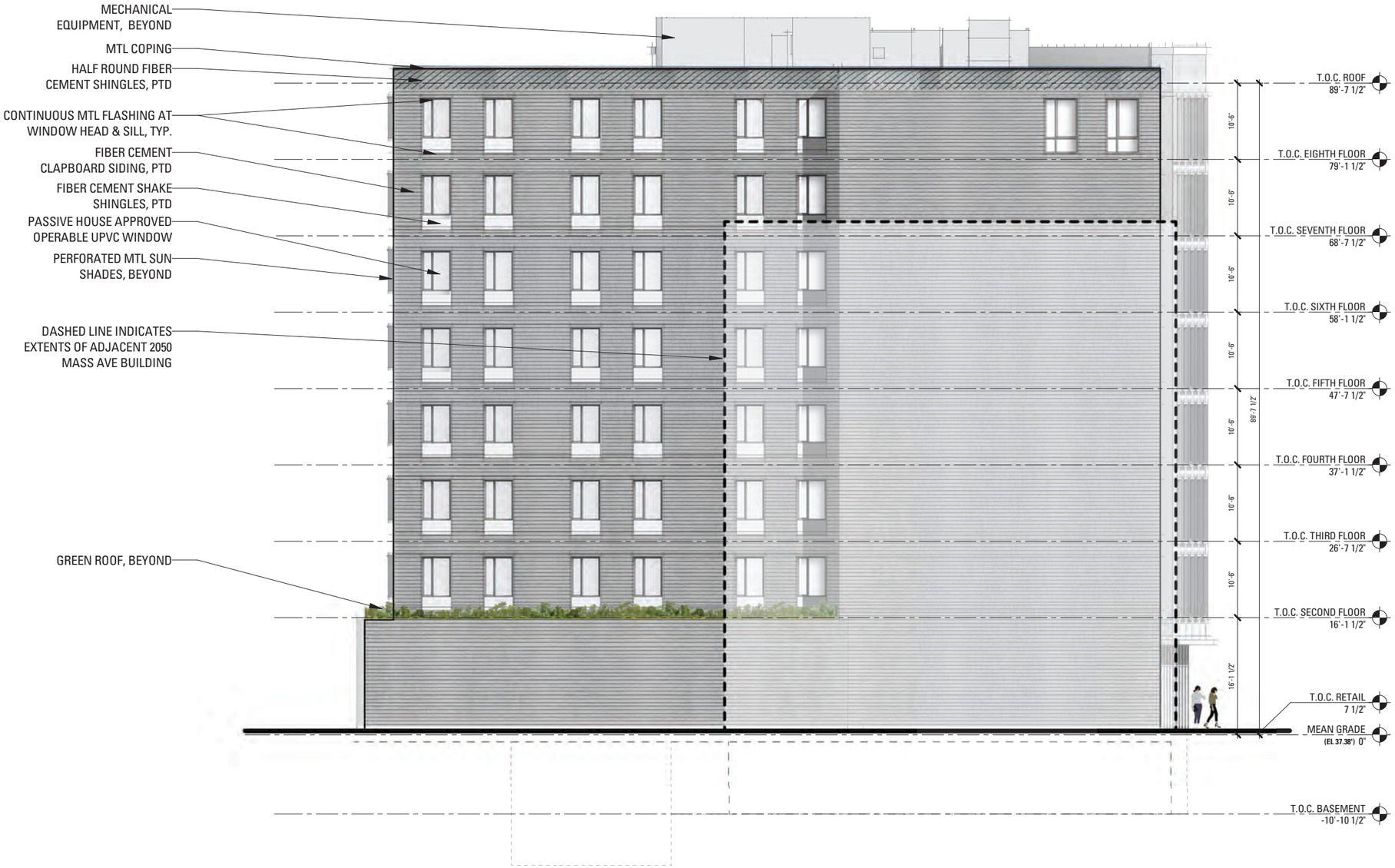
EXTERIOR ELEVATIONS

A-303



1 ELEVATION - EAST
SCALE: 1/8" = 1'-0"

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DHCD SITE ELIGIBILITY APPLICATION

EXTERIOR ELEVATIONS

A-304

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 7

- Requested Waivers from Local Requirements and Regulations

LIST OF REQUESTED EXEMPTIONS/ EXCEPTIONS/WAIVERS FROM THE APPLICABLE CITY OF CAMBRIDGE ORDINANCES AND REGULATIONS for CC HRE 2072 MASS AVE TENANT LLC (Updated as of October 14, 2020)

CAMBRIDGE ZONING ORDINANCE – CHAPTER 17 OF MUNICIPAL CODE

	Section	Provision	Requested Exemption/Exception/Waivers
1.	§ 5.11 Development Standards – General Regulations	No building or structure shall be built nor shall any existing building or structure be enlarged which does not conform to the regulations as to maximum ratio of floor area and lot areas, minimum lot sizes, minimum lot area for each dwelling unit or equivalent, minimum lot width, minimum dimensions of front, side and rear yards and maximum height of structures.	The Applicant seeks zoning relief to allow the proposed Multifamily Development as shown on the Plans. Specific requests are set forth below. A Comprehensive Permit may provide all local permits and approvals per M.G.L. c. 40B.
2.	§ 5.31 and Table 5-1 - Table of Dimensional Requirements – Residence B and Business A-2 District	BA-2 Maximum Ratio of Floor Area to Lot Area = 1.0 for Non-residential Uses and 1.75 for Residential Uses. Residence B Maximum Ratio of Floor Area to Lot Area i s .50.	To waive the requirement for a dimensional variance and to allow the proposed Multifamily Development as shown on the Plans. The existing Ratio of Floor Area to Lot Area is approximately 0.22 and the proposed Ratio of Floor Area to Lot Area is approximately 6.74.
3.	§ 5.31 and Table 5-1 - Table of Dimensional Requirements – Residence B and Business A-2 District	BA-2 Minimum Lot Area for Each Dwelling Unit = 600 sf. Per dwelling unit. Residence B Minimum Lot Area for Each Dwelling Unit = 2,500 per dwelling unit.	To waive the requirement for a dimensional variance and to allow the proposed Multifamily Development as shown on the Plans. The proposed 49 dwelling units cannot comply with the Minimum Lot Area for Each Dwelling Unit requirement.
4.	§ 5.31 and Table 5-1 - Table of Dimensional Requirements – Residence B and Business A-2 District	BA-2 Minimum Front Yard = 5’ Residence B Minimum Front Yard = 15’	To waive the requirement for a dimensional variance and to allow the proposed Multifamily Development as shown on the Plans. The smallest existing front yard setback is approximately 0’; the smallest proposed front yard setback will be approximately 0’.
5.	§ 5.31 and Table 5-1 - Table of Dimensional Requirements – Residence B and Business A-2 District	BA-2 Minimum Side Yard = 10’ on both side yards. Residence B Minimum Side Yard = 7'6" (sum of 20).	To waive the requirement for a dimensional variance and to allow the proposed Multifamily Development as shown on the Plans. The smallest existing side yard setback is approximately 42.4’; the smallest proposed side yard setback will be approximately 0’.
5.	§ 5.31 and Table 5-1 - Table of Dimensional Requirements Residence B and Business A-2 District	BA-2 Minimum Rear Yard = 20’ or two-thirds (2/3) of the height of the rear wall whichever is greater; Residence B Minimum Rear Yard = 25’	The lot is located on a corner; therefore, no rear setback applies.

	Section	Provision	Requested Exemption/Exception/Waivers
6.	§ 5.31 and Table 5-1 - Table of Dimensional Requirements – Residence B and Business A-2 District	BA-2 Maximum Height = 45' Residence B Maximum Height =35'	Due to the need for a building height of approximately 89' and considering the adjustments that may occur during development of the plans and drawings from design development to full construction drawings, the Applicant seeks a waiver of the height requirement not less than 89' and not greater than 95'
7.	§6.36.1 – Schedule of Parking and Loading Requirements	In Business A-2 District, there is a one parking space per dwelling requirement.	To waive the requirement for a parking reduction special permit to allow the proposed Multifamily Dwelling with three (3) proposed accessible off-street parking spaces and two drop off spaces as shown on the Plans. A Comprehensive Permit may provide all local permits and approvals per M.G.L. c. 40B.
9.	§6.43.4(c) – Design and Maintenance of Off-Street Parking Facilities – Driveways	Grade and design of driveway shall provide a clear view to the driver of any car exiting from the facility, or traffic on the street and of pedestrians.	Due to constrains of the driveway location and building, the clear view from the driveway to Massachusetts Avenue when looking south may be compromised. The Applicant requests a waiver from the requirement for a variance and to allow the proposed Multifamily Development as shown on the Plans.
11.	§19.00- §19.45 *Special District Threshold.* §19.50 -19.59 *Building and Site Plan Requirements*		To waive all the applicable article 19.000 requirement for a Planning Board special permits and to allow the proposed Multifamily Dwelling without a special permit from the Planning Board for the proposed building that exceeds 20,000 gross square feet. A Comprehensive Permit may provide all local permits and approvals per M.G.L. c. 40B.
12.	§20.100 Massachusetts Avenue Overlay District		To waive all the applicable article 20.100 requirement for a Planning Board special permits and to allow the proposed Multifamily Dwelling without a special permit from the Planning Board. A Comprehensive Permit may provide all local permits and approvals per M.G.L. c. 40B.
13.	Article 22 – Sustainable Design and Development	Requires specific narrative of each LEED requirement.	To allow the Applicant to submit a LEED checklist without specific narratives for each requirement. The building shall be Passive House certified.

MUNICIPAL CODE

	Section	Provision	Requested Exemption/Exception/Waivers and Notes
1.	Chapter 12.04.020 - Street Numbers	The City Council shall assign numbers to houses.	To waive the requirements of this provision of the Municipal Code so that no separate approval is required from the City Council. To allow the Board of Zoning Appeals to delegate the task of assigning house number(s) for the proposed Multifamily Development to the Building Department, to be completed prior to issuance of Certificates of Occupancy. A Comprehensive Permit may provide all local permits and approvals per M.G.L. c. 40B.
2.	Chapter 12.12.010 – Street Excavations	No excavation in a public way or disturbance of any sidewalk without a license from the Superintendent of Streets or approval from the City Council.	To waive the requirements of this provision of the Municipal Code so that no separate approval is required from the Superintendent of Streets and/or the City Council. To allow the Board of Zoning Appeals to allow any necessary excavation or disturbance of any public way or sidewalk needed for the construction and operation of the Multifamily Development, as shown on the Plans. A Comprehensive Permit may provide all local permits and approvals per M.G.L. c. 40B.
3.	Stretch Energy Code – Chapter 51, Section N1106.1	Stretch Energy Code as adopted by the City of Cambridge requires compliance with specific Energy Rating Indexes.	To exempt the existing structures from the requirements of the Stretch Energy Code. To waive the requirements of this provision to allow the proposed Multifamily Development to apply the efficiency ratings required to meet 'Certified' Level under LEED New Construction Version 4.

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 8

Site Control

- 2072 Massachusetts Avenue Deed

Middlesex South Registry of Deeds

Electronically Recorded Document

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Recording Information

Document Number	: 48349
Document Type	: DEED
Recorded Date	: April 10, 2018
Recorded Time	: 01:57:08 PM
Recorded Book and Page	: 70850 / 295
Number of Pages(including cover sheet)	: 4
Receipt Number	: 2196120
Recording Fee (including excise)	: $16,541.00

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MASSACHUSETTS EXCISE TAX
Southern Middlesex District ROD # 001
Date: 04/10/2018 01:57 PM
Ctrl# 279156 10927 Doc# 00048349
Fee: $16,416.00 Cons: $3,600,000.00
****

Middlesex South Registry of Deeds
Maria C. Curtatone, Register
208 Cambridge Street
Cambridge, MA 02141
617-679-6300
www.middlesexsouthregistry.com

After recording return to:
Day Pitney LLP
One International Place
Boston, MA 02110
Attn: Gemma Cashman, Esq.

QUITCLAIM DEED

2072 Mass Ave LLC, a Massachusetts limited liability company whose address is 33 Church Street, Cambridge, Massachusetts ("Grantor")

for consideration paid of Three Million Six Hundred Thousand and 00/100 Dollars ($3,600,000.00),

grants to CC HRE 2072 Mass Ave LLC, a Massachusetts limited liability company whose address is c/o Capstone Communities LLC, 1155 Walnut Street #31, Newton Highlands, Massachusetts ("Grantee"),

WITH QUITCLAIM COVENANTS

A certain parcel of land situated in Cambridge, Middlesex County, Massachusetts, bounded and described as follows:

A certain parcel of land with the buildings thereon situated in said Cambridge on the Southeasterly corner of Massachusetts Avenue and Walden Street, and more particularly bounded and described as follows:

NORTHWESTERLY:	By said Walden Street, one hundred and fifteen and 27/100 (115.27) feet more or less;
SOUTHWESTERLY:	By land of Ferguson, seventy-five and 22/100 (75.22) feet more or less;
SOUTHEASTERLY:	By land of Daniel O'Connell, one hundred and thirteen and 10/100 (113.10) feet more or less;
NORTHEASTERLY:	By said Massachusetts Avenue, seventy-five and 46/100 (75.46) feet more or less in two lines.

Containing eight thousand five hundred and fifteen (8,515) square feet of land more or less.

Grantor is not taxed as a business corporation, but rather as a partnership, and therefore is not subject to the provisions of M.G.L. c. 62C.

Property address: 2072 Massachusetts Avenue, Cambridge, MA

The within conveyance is made subject to rights of existing tenants, and easements, rights, reservations and restrictions of record, if any, insofar as the same are in force, applicable, and survive the sale described herein, however not intending to revive any of the same hereby.

For title see deed in Book 70018, Page 247.

[Signature Page to Follow.]

WITNESS my hands and seals this 9th day of April, 2018.

2072 MASS AVE LLC

By: _____
Name: William Senne
Title: Authorized Signatory

COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss

On this 9th day of April, 2018, before me, the undersigned notary public, William Senne as Authorized Signatory for 2072 Mass Ave LLC, personally appeared, proved to me through satisfactory evidence of identification, which were personal knowledge, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he signed it voluntarily for its stated purpose as Authorized Signatory of 2072 Mass Ave LLC as the voluntary act of the limited liability company.

_____
Notary Public Gemma R. Cashman
My Commission Expires 12/10/2021

GEMMA R. CASHMAN
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
December 10, 2021

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 9

- Civil Infrastructure Narrative
- Draft Stormwater Management Plan

Nitsch Engineering

2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

2072 Massachusetts Avenue – Nitsch Project #14047
Infrastructure Narrative

Sanitary Sewer

The existing site is currently comprised of a restaurant with associated access, parking, and utilities.

A breakdown of the site's existing sanitary sewer flow rates are as follows:

Existing Sanitary Sewer Flows (per 310 CMR 15.203)

Use	Unit Sewer Flow Rate (gpd)	Size	Existing Sewer Flow Rate (gpd)
Restaurant	35 (per seat)	37 seats	1,295
Total			**1,295**

The project proposes to redevelop the site into an eight-story building containing affordable housing units with ground floor retail. The sanitary sewage from the proposed building will be collected in new onsite sewer infrastructure and discharge into the existing 8-inch sewer main in Walden Street.

A breakdown of the site's proposed sanitary sewer design flow rates are as follows:

Proposed Sanitary Sewer Flows (per 310 CMR 15.203)

Use	Unit Sewer Flow Rate (gpd)	Size	Proposed Sewer Flow Rate (gpd)
Residential Occupancy	110 (per bedroom)	98 bedrooms	10,780
Retail	50 (per 1000 sf)	4,380 square feet	219
Total			**10,999**

Stormwater/Drainage

The proposed drainage system is designed in compliance with MassDEP's Stormwater Management Standards, as well as the City of Cambridge's design requirements. These requirements include the use of NOAA Atlas 14 precipitation frequency estimates and the 2030 City of Cambridge storms in stormwater modeling, as well as phosphorus removal.

The majority of the stormwater runoff from the site will be collected and directed to an onsite stormwater detention/infiltration system located underneath the proposed parking garage. The system has been designed to meet the City's attenuation and treatment requirements. The stormwater detention/infiltration system will overflow to the City's combined sewer main in Walden Street.

Peak Runoff Rates

The Project proposes to collect the entire roof area (a majority of the site), including 1,170 square feet of green roof and direct it to an infiltration system. The proposed stormwater system is able to achieve the reduction of the peak flow rate for the proposed 25-year storm event to the existing 2-year storm event using 2030 Cambridge storm events. The project will also reduce the peak flow rates of all analyzed storm events to meet the MassDEP Stormwater Standards.

Peak Rates of Runoff (cfs) for the Total Site

Storm Event	Existing (Total, DP1)	Proposed
2-Year	**0.62***	0.31
10-Year	1.05	0.49
25-Year	1.36	**0.61***
100-Year	1.91	1.88

***Indicates comparison for 25-to-2 Requirement for City of Cambridge**

Water Quality

The proposed infiltration system will provide 80% TSS removal rate as required by the MassDEP Stormwater Standards, as well as 65% Total Phosphorus removal as required by the City of Cambridge.

PHOSPHORUS REMOVAL CALCULATIONS

Land Conversion

	Existing			Proposed		
	Area ac	Export Rate lbs/acre/yr	Phosphorus Load lbs P/yr	Area ac	Export Rate lbs/acre/yr	Phosphorus Load lbs P/yr
Impervious - Pavement	0.15	1.78	0.27	0.02	2.32	0.04
Impervious - Roof*	0.04	1.1	0.05	0.11	1.1	0.12
Pervious - Planted Roof	0.00	0.12	0.00	0.07	0.12	0.01
Pervious **	0.00	0.21	0.00	0.00	0.27	0.00
Total	0.20		0.32	0.20		0.17
Total Phosphorus Removal through Land Conversion						0.14
Phosphorus reduction required (65% of Existing Phosphorus Load)						**0.20**
Remaining reduction required after land-use change						**0.06**

*Export rate using average value from compiled research data

Structural Stormwater Strategies

	Surface Type	Treated Area (ac)	P Load Rate (lbs/ac/yr)	Starting P Load (lbs/yr)	P Removal (%)	P Removed (lbs/yr)
Infiltration	Roof	0.111	1.1	0.122		0.105
	Pavement	0.000	1.78	0.000	86%	0.00
	Landscape	0.000	0.27	0.000		0.000
				0.12		**0.11**

Total Phosphorus Removed	**0.25**

Groundwater Recharge

The annual recharge from the post-development site will approximate the annual recharge from pre-development conditions using the guidelines provided in the MassDEP Stormwater Management Handbook. The guidelines are based on soil type and the Project Site is an HSG C type soil.

Impervious Area in HSG C = 8,510 square feet
Rv (Recharge Volume) = 8,510 x 0.25 in. / (12 inches/ft)
= 177 cubic feet

Proposed Recharge Volumes

Infiltration BMP	Recharge Volume (cf)
Subsurface Infiltration System	**666**

A minimum two feet of separation has been maintained between the bottom of the infiltration system and seasonal high groundwater.

Conclusions

The project has been designed to meet, and in some cases, exceed, the MassDEP Stormwater Standards as well as the City of Cambridge's stormwater requirements.

Domestic Water and Fire Protection Service

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 310 CMR 15.203 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project's estimated domestic water demand is 12,099 gallons per day. The project proposes to install new domestic and fire protection services that connect to the City water main in Walden Street in accordance with the Cambridge Water Department regulations and requirements. All water service connections will be fully coordinated with the City Water Department.

A hydrant flow test was recently completed to determine pressure in the existing water main. Based on the results, it is anticipated that a water pressure booster pump will be required for the domestic water system, and a fire pump will be required to provide the required pressure for the building's sprinkler system. The fire protection system design will be coordinated with the City Fire Chief.

Nitsch Engineering

October 7, 2020

DRAFT

STORMWATER MANAGEMENT PLAN

for the

City of Cambridge: Department of Public Works

STORMWATER CONTROL PERMIT APPLICATION

(PERMIT NO. _____)

2072 MASSACHUSETTS AVENUE
2072 Massachusetts Avenue
Cambridge, MA 02141

Assessor's Parcel: Map/Lot:

Existing Impervious Area= 0.193 acres
Proposed Impervious Area= 0.129 acres

Owner:

CC HRE 2072 MASS AVE LLC
1087 Boylston Street, Suite 302
Newton, MA
Contact: Jason Korb
Email:jkorb@capstonecommunities.com

Designer and Applicant:

NITSCH ENGINEERING, INC.
2 Center Plaza, Suite 430
Boston, MA 02108
Contact: Michelle Callahan
Phone: 857-206-8676
Email: mcallahan@nitscheng.com

Nitsch Project #14047

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

Nitsch Engineering has prepared this Stormwater Management Plan for the City of Cambridge Department of Public Works' Stormwater Control Permit application for the proposed redevelopment of 2072 Massachusetts Avenue in Cambridge, Massachusetts. CC HRE 2072 Mass Ave LLC is proposing the redevelopment of the site and construction of the proposed building to include affordable housing, as well as ground floor retail, landscape and pedestrian improvements, supporting utilities including a stormwater management system, which has been designed in compliance with the City of Cambridge requirements. The project also includes new street planters and accessible improvements to curb ramps and crosswalks where necessary to meet Americans with Disabilities Act (ADA) standards.

2.0 EXISTING SITE CONDITIONS

2.1 Site Description

The existing 8,500±-square foot (sf) site is located at 2072 Massachusetts Avenue and is bounded by Massachusetts Avenue to the north, a parking lot to the south, Walden Street to the west, and an existing 6-story building to the east. The existing property contains 1,840± sf building footprint and is mostly impervious area.

The site topography is sloped from the northern part of the site at approximately 39 (all elevations in feet, Cambridge City Base) to the southern portion of the site at an elevation of approximately 36. There are two (2) existing entrances, one along Massachusetts Avenue and one along Walden Street.

There is a 10-inch combined sewer service in Walden Street. There is also a 36-inch by 32-inch combined sewer service in Massachusetts Avenue. It appears that the roof runoff from the existing building discharges to grade on the Walden Street side of the site.

All site drainage around the building runs off untreated to municipal catch basins within adjacent streets.

2.2 Soils and Groundwater

The Natural Resources Conservation Services (NRCS) designates the majority of the soils at the project site as Urban land, with no designated Hydrologic Soil Group. Based on borings completed in May 202 by Haley and Aldrich, fill, marine sand, marine clay, and glacial till was found throughout the site.

Groundwater elevation was observed in an on-site observation well. Haley and Aldrich recommends assuming a maximum groundwater elevation of 28.0 based on the observation readings.

A falling head infiltration test was completed in the area of the proposed infiltration system. Based on the results of the test, Haley and Aldrich recommends an infiltration rate of 3.5 inches per hour.

See attached Preliminary Geotechnical Investigation and Recommendations Subsurface Conditions and Geotechnical Design Recommendations prepared by Haley and Aldrich.

3.0 PROPOSED SITE IMPROVEMENTS

3.1 Site Description

The proposed construction consists of the demolition of the existing building and construction of the proposed building and associated minimal site area. A parking garage is proposed within the building on the first floor. The proposed building will include a green roof.

Table 1 provides a comparison of the existing and proposed land use for the project site. The project will result in a 1,000± sf decrease in impervious area.

Table 1: Area Summary Table (in square feet)

Land Use	Existing (sf)	Proposed (sf)	Change	Percent Change
Buildings	1,840	6,715	+4,875	
Planted Roof	0	1,170	+1,170	
Site Pavement	6,561	625	-5,936	
Grass/Landscaping	109	0	-109	
Total	8,510	8,510	---	--

Although not included in the totals above, the project proposes to increase landscaping within the public way along Walden Street. Due to the presence of underground electrical ductbanks in the sidewalks, street trees cannot be planted. However, above grade street planters are proposed to provide additional green space along the public way. The increase in landscape cover will provide additional stormwater benefits (in both quantity and quality) to impervious surfaces within the public way that would otherwise discharge unmitigated to the City of Cambridge storm drainage system.

The walkways adjacent to the building on Massachusetts Avenue and Walden Street will also include concrete sidewalk to meet ADA requirements. New sewer, water, and gas utilities will service the building. Refer to the Site Utility Plan for location of utility connections.

3.2 Stormwater Management and Low Impact Design Techniques

Under the existing condition, it appears that roof runoff from the building discharges to grade near Walden Street. All site drainage appears to sheet flow off-site toward Walden Street where it eventually enters municipal catch basins. In the proposed condition, all roof runoff will be collected and directed to a subsurface infiltration system located underneath the proposed parking area. Overflow from the system will discharge to the main in Walden Street. There will be minimal sheet flow off the site from small, paved areas adjacent to the building.

Based on GIS information from the City of Cambridge, the stormwater enters a combined sewer in Walden Street.

The proposed project includes subsurface infiltration to provide water quantity and quality mitigation in consideration of local and state regulatory requirements. A summary of the treatment train proposed to provide water quantity control and water quality improvement at the proposed project site is provided below.

Treatment Train
Roof → Subsurface Infiltration System →
City of Cambridge Closed Drainage System

Subsurface Infiltration System

The subsurface infiltration system is located beneath the first-floor garage of the proposed building. The system will collect, treat, detain and infiltrate the runoff from roof of the proposed building. The system consists of 120 linear feet of 36-inch perforated pipes. The system is configured into 2 rows of 50 linear feet of pipe connected by two header pipes. The system will have a 6-inch base of crushed stone. The system is 59± feet long by 11± feet wide.

4.0 STORMWATER MANAGEMENT ANALYSIS

4.1 Methodology

Nitsch Engineering completed a hydrologic analysis of the existing project site utilizing Soil Conservation Service (SCS) Runoff Curve Number (CN) methodology. The SCS method calculates the rate at which the runoff reaches the design point is using several factors: the slope and flow lengths of the subcatchment area, the soil type of the subcatchment area, and the type of surface cover in the subcatchment area. HydroCAD Version 10.00 computer modeling software was used in conjunction with the SCS method to determine the peak rates of runoff for the 2-, 10-, 25- and 100-year, 24-hour storm events. The proposed project site is being analyzed with the same methodology.

4.2 Precipitation Data

Nitsch Engineering used Atlas 14 map selection developed by the National Oceanic Atmospheric Administration (NOAA) to estimate the rainfall for the 2-year, 10-year, 25-year, and 100-year 24-hour storms for the year 2030 in Cambridge. The rainfall values used are as follows:

Storm Event	24–hour Rainfall (inches)
2-year	3.34
10-year	5.60
25-year	7.25
100-year	10.20

4.3 Hydrologic Analysis

The existing project site drains to one design point:

- DP-1: Piped Flow to the City of Cambridge Closed Drainage System

The existing and proposed watersheds draining to this design point were delineated as shown in Figures 1 and 2 – Existing and Proposed Drainage Areas. The land cover type for both conditions is provided in Table 1 (Section 3.1). The existing site contains a single design point to the south of the site (DP-1). Under proposed conditions, the site will discharge to the same design point to the south of the site (DP-1). Figure 3 shows the proposed drainage areas and the stormwater management systems.

Table 2 compares the pre- and post-development peak runoff rates for the 2-, 10-, 25-, and 100-year design storms. The design storms used were the 2030 City of Cambridge storm events. See Appendices B and C for detailed calculations.

Table 2: Peak Rates of Runoff (cfs) for the Total Site

Storm Event	Existing (Total, DP1)	Proposed
2-Year	**0.62***	0.31
10-Year	1.05	0.49
25-Year	1.36	**0.61***
100-Year	1.91	1.88

***Indicates comparison for 25-to-2 Requirement for City of Cambridge**

The proposed stormwater management system will significantly reduce peak rate of runoff being discharged from the site and will comply with the City of Cambridge requirement to reduce the proposed 25-year peak runoff rate to match the existing 2-year peak runoff rate. This is discussed further in Section 5.1.

5.0 CITY OF CAMBRIDGE STORMWATER REQUIREMENTS

5.1 Peak Flow Reduction ("25-to-2" Rule)

The project proposes to collect the entire roof area, including 1,170 square feet of green roof, to an infiltration system. The proposed stormwater system is able to achieve the reduction of the peak flow rate for the proposed 25-year storm event to the existing 2-year storm event using 2030 Cambridge storm events. The project will reduce the peak flow rates of all storm events to meet the state Stormwater Standards. Refer to Table 2 for peak runoff rates and the attached hydrologic calculations for existing and proposed conditions.

5.2 Phosphorus Removal Requirement

The City of Cambridge requires that 65% of phosphorus is removed from stormwater generated by proposed site re-development on an annual basis. Nitsch Engineering proposes to achieve the required removal using the following strategies:

- Change in use of the project site; and
- Direct stormwater from impervious surfaces to the infiltration system.

The project proposes to replace existing impervious pavement area on site with new roof and green roof area. Due to the reduction in pavement surfaces, the potential pollutant loading will be significantly reduced.

The phosphorus load calculations and the approach to controlling phosphorus on-site to meet the target removal requirement are summarized below. Refer to Appendix 1C for calculations.

Using the draft phosphorus calculation guidelines developed by the EPA under the *2016 MA MS4 General Permit, Appendix F*, Nitsch Engineering estimates the phosphorus load from the proposed site to be **0.21 pounds per year**. This value is based on the phosphorus load export rates of 1.78 lbs/acre/year for impervious pavement surfaces, 0.27 lbs/acre/year for pervious surfaces, and 0.12 lbs/acre/year for planted roofs according to Table 1-1 in Attachment 1 to EPA's Appendix D. Nitsch Engineering also separated out the roof surfaces from the pavement surfaces and assigned an

average annual phosphorus loading rate of 1.1 lbs/acre to the roof areas. This average loading rate is supported by a compilation of research data that suggests that phosphorus loading rates for roofs are about half that of paved surfaces (see Table 3).

Table 3: Compiled Research Data for Phosphorus Loads from Impervious Surfaces

Study Location	Land Use	Concentration (mg/L)	Average Annual TP Loading (lbs/acre)
Goldsboro, NC[1]	Residential/Rural Roof	0.05	0.56
Marquette, MI[2]	Residential Roof	0.06	0.43
Madison, WI[3]	Residential Roof	0.15	1.02
Kinston, NC[1]	Commercial Roof	0.09	1.08
Marquette, MI[2]	Commercial Roof	0.09	0.65
Madison, WI[3]	Commercial Roof	0.20	1.36
Allston, MA[4]	Commercial Roof	0.03	0.32
Madison, WI[3]	Industrial Roof	0.75	0.75
Madison, WI[3]	Industrial Parking Lot	0.39	2.65
Marquette, MI[2]	Commercial Parking Lot	0.20	1.45
Madison, WI[3]	Commercial Arterial Street	0.47	3.20
Marquette, MI[2]	High Traffic Street	0.31	2.24
Marquette, MI[2]	Low Traffic Street	0.14	1.01

[1]Moran, A. C. 2004. A North Carolina Field Study to Evaluate Greenroof Runoff Quantity, Runoff Quality, and Plant Growth. M.S. thesis, Biological and Agricultural Engineering Dept., Raleigh, North Carolina: North Carolina State University.
[2]Center for Watershed Protection. Stormwater Pollution Source Areas Isolated in Marquette, Michigan. Article 15, Technical Note #105 from Watershed Protection Techniques. 3(1): 609-612.
[3]Bannerman, R., D. Owens, R. Dodd and N. Hornewer. 1993. Sources of Pollutants in Wisconsin Stormwater. Water Science Technolgogy. 28(3-5): 241:259.
[4]Unpublished data collected for 5.95-acre rooftop in Allston, MA.

Nitsch Engineering calculates the 65% phosphorus removal requirement for the proposed site to be 0.20 pounds per year. Due to change in land cover, the proposed site provides a phosphorus reduction of **0.14 pounds per year**. Infiltration is proposed to collectively reduce the remaining phosphorus reduction.

Infiltration System

The project proposes to capture and infiltrate stormwater runoff from the proposed roof area. The required infiltration volume of 657 cubic feet is provided within the system beneath the lowest orifice from the outlet control structure. Based on the draft phosphorus calculation guidelines developed by the EPA in the 2016 MA MS4 General Permit, Appendix F, the infiltration system will remove **0.11 pounds per year** of phosphorus from the stormwater discharging to the combined sewer.

Total Phosphorus Removal from the Site

Nitsch Engineering estimates that with the change in land cover as well as the infiltration system proposed for the site, the project, as a whole, is anticipated to remove a total of **0.25 pounds per year** of phosphorus from the stormwater that discharges from the site. Thus, the phosphorus removed meets the required 65% phosphorus reduction of 0.20 pounds per year.

5.3 Infiltration & Inflow Calculations

Infiltration & Inflow (I/I) calculations were prepared to determine the change in sewer flow to the municipal sewer system. The approximated sanitary load generated by the existing building is approximately 740 GPD. The proposed building is anticipated to generate approximately 11,000 GPD, yielding a net increase of 10,000 GPD. The flows were established using 310 CMR DEP Title V standards. The average flows based on building usage are summarized in Table 5

Table 5: Sewer Flow Summary

Use	Unit Sewer Flow Rate (gpd)	Existing Sewer Flow Rate (gpd)	Proposed Sewer Flow Rate (gpd)
Residential Occupancy	110 (per bedroom)	0	10,780
Fast Food Restaurant	20 (per seat)	740	9,800
Retail	50 (per 1000 sf)	0	219
Total		**740**	**10,999**

Because the increase in estimated daily sewer flow from the site is less than 15,000 GPD, Infiltration & Inflow (I/I) mitigation is not required for this redevelopment project. However, the project is reducing stormwater flows to the combined system with the installation of the proposed stormwater infiltration system.

6.0 SOURCE CONTROLS FOR POLLUTION PREVENTION

The Owner and occupants should follow good housekeeping procedures to reduce the possibility of accidental releases and to reduce safety hazards, which shall include but not be limited to the following:

- Proper handling, storage, disposal, and recycling of hazardous materials and waste products
- Proper handling, storage and inventory of household chemicals
- Prompt cleanup and removal of spills and releases

6.1 Storage of Hazardous Materials

To prevent leaks and spills, keep hazardous materials and waste products under cover or inside. Use spill containment systems to prevent chemicals from entering the drainage system. Inspect storage areas for materials and waste products at least once per year to determine amount and type of the material on site, and if the material requires disposal.

Securely store liquid petroleum products and other liquid chemicals in federally- and state-approved containers. Restrict access to maintenance personnel and administrators.

Store fluid fertilizers in labeled containers and/or structures that prevent the discharge of fluid fertilizers and are resistant to corrosion, puncture, or cracking. Store and handle dry fertilizers in a manner to prevent pollution by minimizing losses to the air, surface water, ground water, or subsoil.

6.2 Storage of Waste Products

Collect and store all waste materials in securely lidded dumpster(s) or other secure containers as applicable to the material. Keep dumpster lids closed and the areas around them clean. Do not fill the dumpsters with liquid waste or hose them out. Sweep areas around the dumpster regularly and put the debris in the garbage, instead of sweeping or hosing it to drains or off-site. Legally dispose of collected waste on a regular basis.

Segregate liquid wastes from solid waste and recycle through hazardous waste disposal companies, whenever required. Contact a hazardous waste hauler for proper disposal of unwanted pesticides to a hazardous waste collection center.

6.3 Minimize Soil Erosion

Soil erosion facilitates mechanical transport of nutrients, pathogens, and organic matter to surface water bodies. Landscaping on-site is limited to the green roof.

6.4 Vehicle Washing

Vehicle washing shall not occur on the property.

6.5 Maintenance of Lawns and Landscaped Areas

Pesticides and fertilizers shall not be used on the project site. No irrigation shall be used in the landscaped areas for this project beyond the establishment of plantings.

6.6 Storage of Fertilizers, Herbicides, and Pesticides

No fertilizers, herbicides, or pesticides shall be used on the property.

6.7 Pet Waste Management

Pet waste contributes to poor water quality that affects the drainage system and surrounding water bodies. The property owner shall implement a cleanup program where pet owners must put the pet waste into bags and dispose of the waste in the trash.

6.8 Management of Deicing Chemicals and Snow

The qualified contractor selected for snow plowing and deicing shall be made fully aware of the requirements of this section.

No road salt (sodium chloride) shall be stored onsite. The use of magnesium chloride de-icing product with a 0.5 to 1.0 percent sodium chloride mix for snow and ice treatment is permitted. The product shall be stored in a locked room inside the building and shall be used at exterior walkways. The snow plow contractor shall adhere to the magnesium chloride use and storage requirements.

Snow removal on-site is limited to sidewalks and maintain access to areas of egress.

Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris.

7.0 MassDEP STORMWATER MANAGEMENT STANDARDS

The proposed 2072 Massachusetts Avenue project is considered a ***redevelopment*** under the MassDEP Stormwater Management Standards since the existing site is completely developed and the proposed work will reduce the impervious area.

Since the project is a redevelopment project, it will be required to meet the following Stormwater Management Standards to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges will comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions. The project has been designed to meet these Standards as summarized below:

Standard 1: No New Untreated Discharges

The proposed project will not discharge any untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. Stormwater from the proposed project site will be collected and treated in accordance with the MassDEP Stormwater Management Standards.

Standard 2: Peak Rate Attenuation

The proposed stormwater management system was designed so that the proposed peak discharge rates and runoff volumes do not exceed existing conditions for the 2-, 10-, 25- and 100-year storm events. Reduction in impervious area and structural stormwater BMPs that promote water infiltration and detention will be used to meet this standard. The existing and proposed stormwater runoff calculations for the 2-year, 10-year, 25-year, and 100-year 24-hour storms are included with this report in Appendices 1B and 1C.

Standard 3: Groundwater Recharge

The project is considered a redevelopment under the MassDEP Stormwater Standards and as such, the annual recharge from the proposed site must approximate the annual recharge from the existing site to the maximum extent practicable. The annual recharge from the post-development site will approximate the annual recharge from pre-development conditions based on soil type using the guidelines provided in the MassDEP Stormwater Management Handbook.

Impervious Area in HSG C = 8,510 square feet
Rv (Recharge Volume) = 8,510 x 0.25 in. / (12 inches/ft)
= 177 cubic feet

Table 6 – Proposed Recharge Volumes for Stormwater BMPs

Infiltration BMP	Recharge Volume (cf)
Subsurface Infiltration System	**666**

A minimum 2 feet of separation has been maintained between the bottom of the infiltration system and seasonal high groundwater.

Standard 4: Water Quality Treatment

All redevelopment projects must improve existing conditions and new stormwater controls must be incorporated into the design and result in a reduction in annual stormwater pollutant loads from the site. This project includes water quality treatment BMPs in the stormwater management system to provide increased TSS removal over existing conditions.

Structural and non-structural water quality BMPs have been incorporated into the design and sized to provide over 80% TSS removal. Discharges to DP-1 meet the 80% TSS removal requirement. A Long-Term Operation and Maintenance (O&M) Plan for the proposed storm drainage system will be prepared.

Standard 5: Land Uses with Higher Potential Pollutant Loads

The project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-8).

Standard 6: Critical Areas

The project does not contain areas of Sensitive Resources and will not discharge untreated stormwater to a sensitive resource area. This project complies with this standard.

Standard 7: Redevelopments

Since the proposed project is a redevelopment project, the following Stormwater Management Standards are only required to be met to the maximum extent practicable, however all the standards will be met: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6 (see compliance narrative for Standards 2, 3, 4, 5, and 6). Existing stormwater discharges will comply with Standard 1 only to the maximum extent practicable (see compliance narrative for Standard 1). This project will comply with all other requirements of the Stormwater Management Standards and improve existing conditions (see compliance narratives for Standards 8, 9, and 10).

Standard 8: Construction Period Pollution Prevention and Sedimentation Control

Since the project will not disturb more than one (1) acre of land, the site Owner and Contractor will not be required to submit a NOI to the Environmental Protection Agency (EPA) for coverage under the General Permit of the National Pollution Discharge Elimination System (NPDES). As part of this application a draft Storm Water Pollution Prevention Plan (SWPPP) has been prepared and the Contractor will implement the measures in the draft SWPPP and update the SWPPP as needed throughout the course of construction.

The SWPPP, which is to be kept on site, includes erosion and sediment controls (stabilization practices and structural practices), temporary and permanent stormwater management measures, Contractor inspection schedules and reporting of all SWPPP features, materials management, waste disposal, off-site vehicle tracking, spill prevention and response, sanitation, and non-stormwater discharges.

Standard 9: Operation and Maintenance Plan

A Long-Term Operation and Maintenance plan including long-term BMP operation requirements has been prepared and will assure proper maintenance and functioning of the stormwater management system.

Standard 10: Prohibition of Illicit Discharges

There will be no illicit discharges to the stormwater management system associated with this project.

8.0 CONCLUSION

In conclusion, the proposed 2072 Massachusetts Avenue project and associated stormwater management system will reduce peak runoff rates and improve the water quality of stormwater being discharged from the project site. The Project has utilized several methods to remove phosphorus from the stormwater discharges. The project is being designed in accordance with the City of Cambridge Stormwater Control Permit requirements and the MassDEP Stormwater Management Standards.

FIGURES

Figure 1 - Existing Drainage Areas

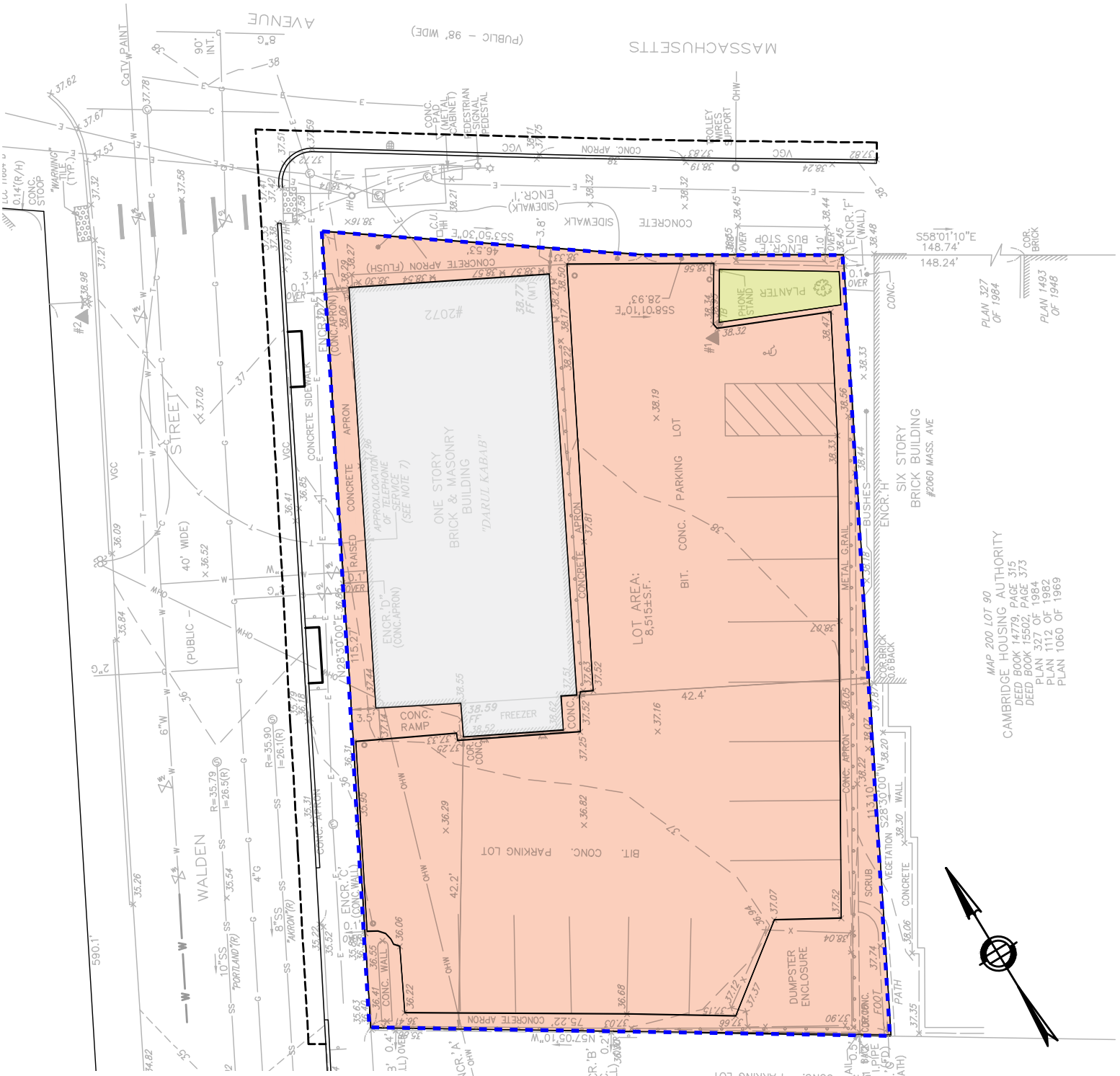


Figure 2 - Proposed Drainage Areas

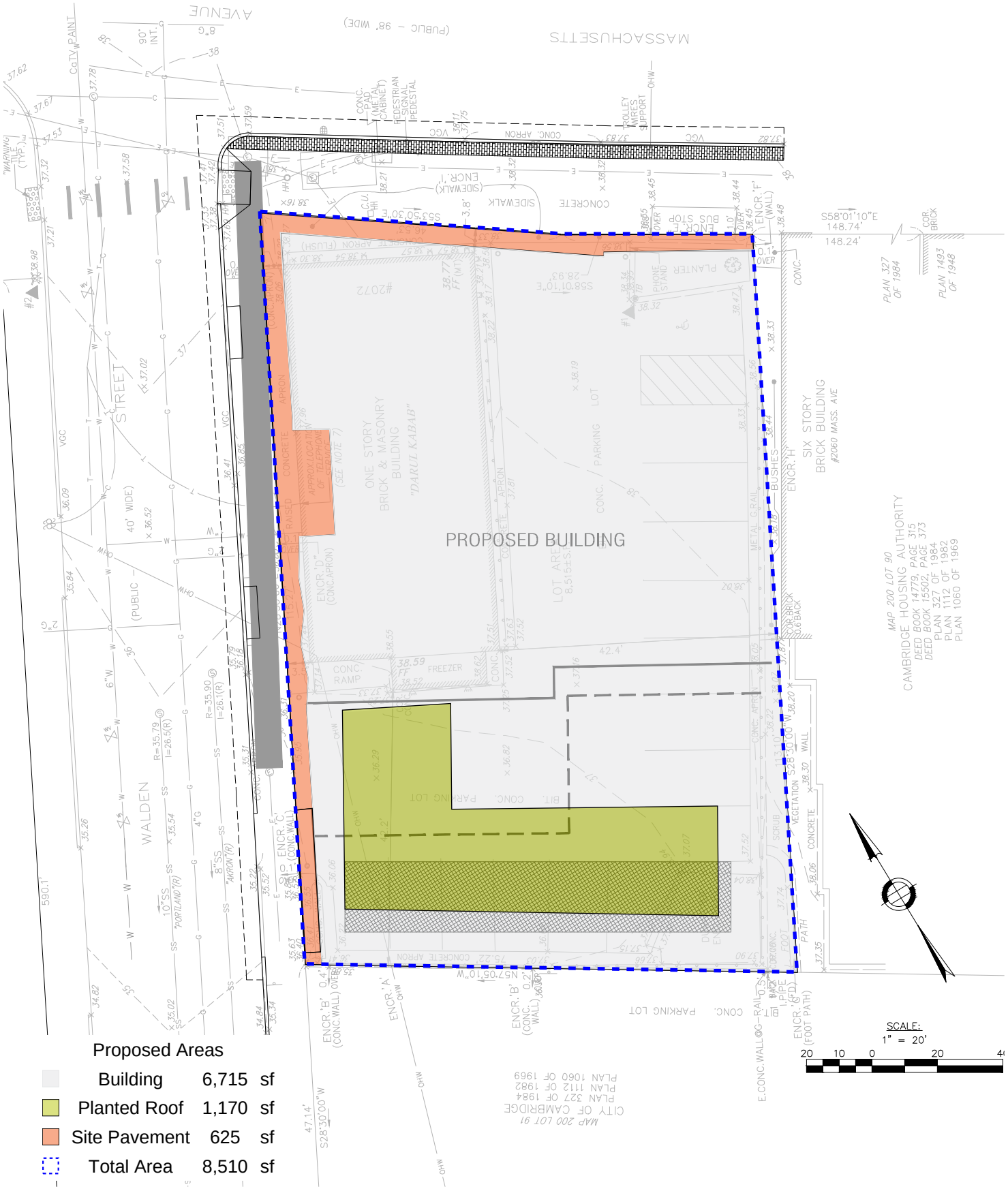


Figure 3 - Stormwater Management

APPENDICES

Appendix 1A Geotechnical Report

Appendix 1B HydroCAD Calculations

Appendix 1C Supporting Calculations

- Phosphorus Removal Calculations

APPENDIX 1A: GEOTECHNICAL REPORT

HALEY ALDRICH

www.haleyaldrich.com

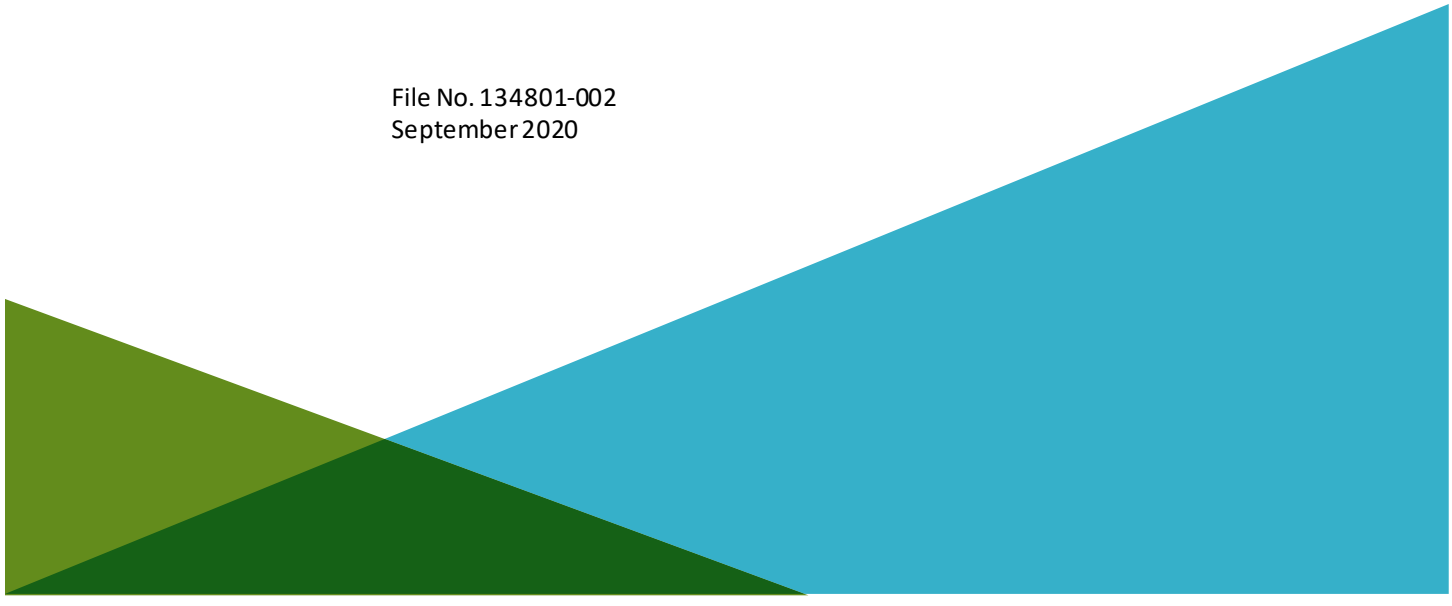
REPORT ON

SUBSURFACE CONDITIONS AND GEOTECHNICAL DESIGN RECOMMENDATIONS
PROPOSED 2072 MASSACHUSETTS AVENUE DEVELOPMENT
2072 MASSACHUSETTS AVENUE
CAMBRIDGE, MASSACHUSETTS

by
Haley & Aldrich, Inc.
Boston, Massachusetts

for
CC HRE 2072 Mass Ave LLC
c/o Capstone Communities LLC
Newton, Massachusetts

File No. 134801-002
September 2020



HALEY & ALDRICH, INC.
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18 September 2020
File No. 134801-002

CC HRE 2072 Mass Ave LLC
c/o Capstone Communities LLC
1087 Beacon Street, Suite No. 302
Newton, Massachusetts 02459

Attention: Mr. Jason Korb, Ms. Jenny Tamarkin, and Mr. Sean Hope

Subject: Subsurface Conditions and Geotechnical Design Recommendations
Proposed 2072 Massachusetts Avenue Development
2072 Massachusetts Avenue
Cambridge, Massachusetts

Ladies and Gentlemen:

The purpose of this geotechnical report is to summarize our subsurface exploration program and provide geotechnical design recommendations and construction considerations in connection with the proposed 2072 Massachusetts Avenue mixed-use residential development in Cambridge, Massachusetts. This work was performed in accordance with our proposal dated 22 April 2020, which was subsequently authorized by CC HRE 2072 Mass Ave LLC.

Sincerely yours,
HALEY & ALDRICH, INC.

Hugo C. Meggitt, E.I.T.
Geotechnical Engineer

Nathan A. Sherwood, P.E.
Project Manager

Mark H. Balfe, P.E.
Principal

Enclosures

c: Bruner/Cott Architects; Jason Forney, Shaun Dempsey, Karno Widjaja
L.A. Fuess Partners; Aaron Ford, Travis Mitchell, Amir Mesgar
Nitsch Engineering, Inc.; Aaron Gallagher, Michelle Callahan, Maddie DeClerck
Loureiro Engineering Associates, Inc.; Sam Butcher

Table of Contents

Table of Contents

List of Tables

List of Figures

1. Existing Site Conditions

The existing one-story, brick restaurant building (Darul Kabab), located at 2072 Massachusetts Avenue in Cambridge, Massachusetts, is positioned in the northwest corner of the site (refer to Figures 1 and 2). The remainder of the site consists of a paved parking lot. The site is surrounded by Massachusetts Avenue to the north, an existing six-story brick building (2050 Massachusetts Avenue) to the east, a parking lot to the south, and Walden Street to the west. Existing site grades range from approximately El. 39[1] along the northern side of the site and gradually slope down to El. 36 towards the south.

2. Proposed Development

Based on the latest plans and discussions with the project team, we understand that the proposed mixed-use residential development generally consists of demolishing the existing restaurant building and constructing a new six- to eight-story residential building with approximately 1,565 square-feet of retail and amenity space on the ground floor. We understand that one basement level is planned and will extend approximately 11 feet (ft) below the existing ground surface (bgs) and the transformer room extends deeper. The below-grade space will extend below approximately the northern ¾ of the site, from Massachusetts Avenue south.

3. Subsurface Exploration and Field Testing Programs

Three test borings designated as HA20-1(OW), HA20-2, and HA20-3 were drilled by New England Boring Contractors between 7 and 11 May 2020 at the approximate locations shown on Figure 2. The test borings were monitored and logged by a Haley & Aldrich, Inc. (Haley & Aldrich) geologist and were drilled to depths ranging from approximately 46 ft to 54 ft bgs. A groundwater observation well was installed within completed test boring HA20-1(OW). Test boring logs prepared by Haley & Aldrich are provided in Appendix A.

Two test pits designated HA20-TP-1 and HA20-TP-2 were excavated on 11 August 2020 by Earthwork Industries, Inc. The purpose of the test pits was to document the depth and configuration of the existing western 2050 Massachusetts Avenue foundation that abuts the eastern property line of the site. A Haley & Aldrich engineer documented the conditions encountered in the test pits. Figure 2 shows the approximate locations of the
test pits. Sketches and photographs indicating the conditions observed in the test pits are provided in Appendix B.

Representative samples of soil were obtained from the test borings for laboratory testing to aid in soil classification purposes. Grain size analyses were conducted by Haley & Aldrich on two soil samples in general accordance with ASTM D422. Laboratory test data is provided in Appendix C.

In-situ, falling head permeability tests were performed in the completed test boring HA20-1(OW). The data was used to assess infiltration characteristics of the Fill/Marine Sand. Results of the testing are summarized in Section 5.9.

[1] Elevations indicated herein are given in feet and reference the Cambridge City Base (CCB) datum.

4. Subsurface Conditions

The results of the test borings drilled generally indicate the following sequence of subsurface units listed in Table 1, in order of occurrence from ground surface downward, including estimated top of stratum elevation and range in thickness.

Table 1. Summary of Subsurface Stratum Elevations and Thicknesses

Subsurface Stratum	Top of Stratum Elevation (ft)	Range in Thickness (ft)
Fill	El. 37.9 to El. 36.2	6.7 to 9.7
Marine Sand	El. 29.5 to El. 27.3	5.5 to 7.5
Marine Clay	El. 23.0 to El. 20.7	24.0 to 27.0
Glacial Till	El. -3.3 to El. -4.7	4.5 to 11.5
Probable Bedrock	El. -16.2	N/A

Fill – Fill was encountered beneath the 4-inch (in.)-thick layer of asphalt, and generally consisted of loose to very dense brown silty to poorly graded SAND, with varying amounts of gravel, ash, and cinders. Significant brick fragments were encountered near the bottom of the Fill in test borings HA20-2 and HA20-3. The significant brick fragments and high blow counts indicate the potential presence of remnant foundations within the Fill soils. Further, during the test pit excavations, significant brick obstructions were encountered near the bottom of the existing western 2050 Massachusetts Avenue foundation and appeared to be remnant foundations located within the site.

Marine Sand – The Marine Sand Deposit consisted of medium dense to dense brown silty SAND, with interbedded layers of silt and lean clay encountered in test boring HA20-2.

Marine Clay – The Marine Clay Deposit consisted of medium stiff to stiff gray lean CLAY.

Glacial Till – The Glacial Till generally consisted of very dense gray clayey SAND with varying amounts of gravel.

Probable Bedrock – Argillite fragments in the drill wash were encountered in test boring HA20-2, indicating probable top of bedrock.

The groundwater level within the installed observation well HA20-1(OW) was measured to be approximately 10.5 ft bgs (El. 25.6) on 23 May 2020 and approximately 11.4 ft bgs (El. 24.7) on 8 September 2020. The Groundwater Observation Well Installation and Monitoring Report is provided in Appendix D.

Groundwater levels vary with season, precipitation, construction activity in the area, below-grade structures, leakage from utilities, and other factors. As a result, groundwater levels observed during and following construction may vary from those observed in the observation well.

5. Geotechnical Design Recommendations

The following recommendations pertain to the design of the proposed building and associated site improvements. The recommendations provided herein are in general accordance with the Ninth Edition of the Massachusetts State Building Code (Code).

Based on the anticipated subsurface conditions and estimated total and differential post-construction settlements, we recommend the proposed building be supported on conventional reinforced concrete foundations bearing in the Marine Sand.

Due to the over-excavation depths required to reach the Marine Sand for foundation support, we evaluated the feasibility of supporting the proposed building on ground improvement elements. However, based on the estimated settlements as discussed later in Section 5.4, and since the ground improvements will likely elastically compress an additional 0.5 in. to 0.8 in., the total (up to 2.3 in. with the elastic compression of the ground improvement elements) and differential post-construction settlements will not likely be tolerable by the design team.

5.1 FOUNDATION DESIGN

We recommend the following for foundation design.

- The Fill is unsuitable bearing strata for foundation support. Naturally deposited, inorganic soils (i.e., Marine Sand) is the uppermost stratum suitable for foundation bearing. The top elevation of Marine Sand (foundation bearing soils) encountered in the test borings are indicated on Figure 2 as well as the test boring logs in Appendix A.

- Foundations should bear directly in the naturally deposited Marine Sand, compacted structural fill, or lean concrete placed above the Marine Sand after removal of overlying Fill and other unsuitable materials.

- For foundations located outside the proposed basement excavations, design foundations using a maximum allowable bearing capacity of 4 kips per square (sq.) ft (ksf).

- For foundations located inside the proposed basement excavations, design foundations using a maximum allowable bearing capacity of 5 ksf.

- Design foundations to have a least lateral dimension of 3 ft or greater.

- Structural loads will need to be reviewed once design is developed to adjust foundations and determine if some support may require combined footings to effectively distribute loads to maintain the recommended maximum allowable bearing capacity and restrain settlements within acceptable values.

- Exterior and interior foundations to bear a minimum of 4 ft and 1.5 ft, respectively, below the lowest adjacent ground or slab surface subject to freezing.

- Where compacted structural fill is used beneath foundations, it should be placed down to the top of Marine Sand, beneath the foundations, and beneath the zone of influence (ZOI), which is defined as imaginary lines extending from points 2 ft laterally beyond the footing outer bottom edge, and out and down on a 1 horizontal to 1 vertical (1H:1V) slope.

- Design foundations to bear below a reference line drawn upward and outward on a 1.5H:1V slope from the bottom of adjacent utilities or other underground structures, or future planned excavations. Where possible, foundation elevations should be coordinated with utility elevations to allow utilities to pass through the foundation wall (rather than through or beneath the foundation). Foundation bearing surfaces may locally need to be lowered or stepped to achieve this criterion.

- Tops of foundations should be positioned a minimum of 4 in. beneath the underside of the ground floor slab.

5.2 LATERAL AND SLIDING RESISTANCE

The following recommendations may be used to design building and retaining wall foundations.

- Calculate passive pressures using an equivalent fluid unit weight of 225 pounds per cubic ft (pcf). The top of the assumed passive zone should be 6 in. below the top of adjacent soil surface.

- A coefficient of friction between cast-in-place concrete foundation bases and the bearing strata equal to 0.35 may be used to calculate ultimate sliding resistance. A factor of safety of at least 1.5 should be applied to calculate the allowable sliding resistance.

5.3 SLAB DESIGN

We understand that the slab(s) for the below-grade space(s) will be a reinforced structural mat foundation bearing in the Marine Sand.

Reinforced structural mat foundations bearing in Marine Sand may be designed using a factored modulus of subgrade reaction of 45 pounds per cubic in. (pci).

5.4 POST-CONSTRUCTION FOUNDATION SETTLEMENTS

Post-construction foundation settlements (total and differential) will depend on the final foundation layout and loadings, local soil conditions, foundation subgrade preparation, limits and depths of basement excavations, and placement of structural backfills.

LAFP and BCA, with input from other members of the design team and ownership, should determine if the estimated total and differential post-construction settlement values presented in this section are acceptable.

5.4.1 Total Post-Construction Settlement

The predominately cohesionless Marine Sand anticipated beneath the foundations will undergo elastic compression in response to the stress increase. Elastic settlements due to these changes in the soil's in-

situ effective stress are anticipated to be small and will occur during construction as the foundations are constructed and loaded. Construction and/or surcharge loads could also introduce elastic settlements. However, these settlements will occur relatively quickly.

The compressible Marine Clay beneath the Marine Sand will experience settlement due to primary consolidation and secondary compression (determined to be negligible in our analyses). Accordingly, we have evaluated post-construction[2] settlements of foundations based on foundation loads (dead and live loads) developed and summarized in a memorandum that we received via email on 20 May 2020 by L.A. Fuess Partners (LAFP, Project Structural Engineer). We received updated loads and a preliminary column layout plan from LAFP via email on 9 September 2020. The foundation loads were provided for Infinity framing systems for six-, seven-, and eight-story designs. We only evaluated settlements for the six- and eight-story designs since these designs represent the minimum and maximum loads that we have received.

Based on the foundation loads provided by LAFP, the proposed basement excavation depths and limits, anticipated stress history of the Marine Clay at the site, and the historical laboratory testing performed by Haley & Aldrich for the nearby Davis Square MBTA Station in the late 1970s, we estimate the following total post-construction settlements will occur as indicated in Table 2 below.

Table 2. Estimated Total Post-Construction Foundation Settlements

No. of Story	Range of Provided Column Loads (kips)			Estimated Total Post-Construction Settlement[2,3] (in.)
	Dead	Live	Settlement-Causing[1]	
6	159 to 357	45 to 102	170 to 383	up to 1.3
8	190 to 427	59 to 133	205 to 460	up to 1.5

Notes:
1. Settlement causing load assumed to be the total of 100% of dead load plus 25% of live load.
2. Footing widths based on allowable bearing capacity of 5 ksf for foundations bearing on Marine Sand (inside basement) and 4 ksf for foundations outside basement excavation.

5.4.2 Differential Post-Construction Settlement

There will be an unload/relief of vertical effective stresses in the Marine Clay, due to the basement excavation. Therefore, the maximum differential post-construction settlements will likely occur between foundations located inside the basement and foundations located outside the basement. We estimate that maximum differential post-construction settlements between individual foundations, within a 24-ft distance between foundations, will not exceed 0.5 in. If the estimated maximum differential post-construction settlements are not acceptable, expansion joints could be installed within the foundation walls that separate where the proposed building transitions from the basement to the near at-grade portions.

[2] Post-construction settlement considers primary consolidation and secondary compression and does not consider elastic settlement of the Marine Sand during construction.

5.5 SEISMIC DESIGN

The applicable seismic design criteria (Article 1613) are as follows:

Site Class = D
S_s = 0.216g
S_1 = 0.069g
F_a = 1.6
F_v = 2.4

Based on the results of the test borings, the foundation bearing soils at the site are not considered susceptible to liquefaction or seismic densification during the design earthquake in accordance with criteria in the Code.

5.6 LATERAL EARTH PRESSURES ON BELOW-GRADE WALLS

Below-grade walls retaining earth should be designed to resist permanent static, seismic, and surcharge loadings indicated below.

We recommend all site below-grade walls include drainage behind the wall to relieve any potential water pressure from behind the walls.

Design walls that are braced or restrained at the top for the following "at-rest" lateral earth pressures:

- Static: Use an equivalent fluid weight of soil equal to 60 pcf.
- Seismic: Calculate in accordance with the Code (Article 1610.2) using a total soil unit weight (γ_t) of 125 pcf.
- Surcharge: Calculate a uniform lateral pressure equal to 0.5 times the vertical surcharge load (pounds per square ft), acting on the backside of the wall, applied over the full height of the wall.

Design walls that are not restrained at the top for the following "active" lateral earth pressures:

- Static: Use an equivalent fluid weight of soil equal to 40 pcf.
- Seismic: Calculate in accordance with the Code (Article 1610.2) using a total soil unit weight (γ_t) of 125 pcf.
- Surcharge: Calculate a uniform lateral pressure equal to 0.5 times the vertical surcharge load (pounds per square ft), acting on the backside of the wall, applied over the full height of the wall.

5.7 DESIGN GROUNDWATER LEVEL

Based on groundwater measurements from the observation well, we recommend a design maximum groundwater level of El. 28 for calculation of hydrostatic pressures on below-grade structures and design of waterproofing systems.

5.8 FOUNDATION DRAINAGE AND WATERPROOFING

Structures extending below the design groundwater level (El. 28) should be fully waterproofed and designed to resist hydrostatic pressures associated with a groundwater level at the underside of the structure. Similarly, LAFP should design the basement slab to resist hydrostatic uplift forces acting on the underside of the slab, unless an underslab foundation drainage system is installed.

If an underslab drainage system is installed, and if the effluent from the underslab drainage system cannot be directed by gravity to nearby proposed drainage structures, a sump may be required. Additionally, redundant pumps connected to emergency backup power should be included, to eject the water to site drainage features.

As an additional measure, surface runoff should be directed away from the building. In general, the ground surface within 10 ft immediately around the building should be sloped downward away from the structure to divert surface runoff.

5.9 STORMWATER MANAGEMENT

Based on discussions with the Project Civil Engineer (Nitsch Engineering), the project is planning to direct stormwater to a stormwater recharge infiltration system near the southern side of the site.

During the subsurface exploration program, a falling head infiltration test was completed in test boring HA20-1(OW). The infiltration test was performed above the groundwater table during drilling near the footprint of the proposed infiltration area. The falling head test was performed by advancing a 4-in. inner diameter steel casing to the prescribed depths and cleaning (removing soil) out the casing. To test a 2 ft zone, pea gravel was added into the casing and the casing was jacked out 2 ft to expose the test section of soil. The casing was then filled with water and the rate of water drop inside the casing was measured over time.

The falling head test data was reduced using an unsaturated infiltration testing method by ILRI. The test was completed from 6 ft to 8 ft bgs at test boring HA20-1(OW). Table 3 below summarizes the data.

Table 3. Falling Head Infiltration Test Data

Test Boring No.	Test Date	Ground Surface Elevation (ft, CCB)	Top Elevation of Test Zone (ft, CCB)	Bottom Elevation of Test Zone (ft, CCB)	Soil Type of Test Zone	Coefficient of Permeability (k, cm/sec)
HA20-1(OW)	8 May 2020	36.5	30.5	28.5	silty SAND	$5x10^{-3}$

For purposes of stormwater infiltration, the recommended value of infiltration is 50 percent of the lowest measured value of infiltration. This would result in a recommended rate of $2.5x10^{-3}$ cm/sec, which is equivalent to 3.5 in./hour.

Existing Fill and Marine Sand, for hydrologic purposes, may be classified as Soil Group B, per USDA Natural Resources Conservation Service (Part 630 Hydrology, National Engineering Handbook, Chapter 7 – Hydrologic Soil Groups).

For the design of stormwater infiltration systems, we recommend a design seasonal high-water level of El. 28.

5.10 UTILITIES

In general, we recommend that site utilities be soil-supported and constructed using conventional procedures.

For utility connections to the proposed building, we recommend that flexible connections be used to accommodate potential differential settlements, due to consolidation and settlement of the Marine Clay over the lifespan of the proposed building. Oversized holes through the foundation wall or grade beams should be utilized to reduce the potential for utility breakage long term.

6. Construction Considerations

The primary purpose of this section is to comment on the items related to excavation, foundation drainage, foundation construction, earthwork, and related geotechnical engineering aspects of the proposed construction. Prospective Contractors for this project should evaluate potential construction issues based on their knowledge and experience with similar soils conditions in the Cambridge area, considering their own proposed construction methods.

In addition to the construction guidelines and recommendations made herein, construction should conform to the requirements of OSHA and all other applicable Municipal, State, and Federal regulations.

6.1 EARTHWORK

6.1.1 Excavation

Excavations to construct the foundations will extend into Fill and into the Marine Sand. Excavated materials may include pavements, existing utilities, possibly miscellaneous debris. As discussed in Section 4, remnant foundations/slabs may be present beneath the site.

We recommend that pre-excavation be conducted along the temporary support of excavation alignments to remove obstructions in the Fill.

Conventional construction equipment appears practical for excavation and performing the required earthwork.

Temporary cut slopes should be globally stable if excavated no steeper than about 1.5H:1V, and protected from erosion due to surface water, precipitation, and freeze/thaw. Some sloughing and raveling should be anticipated on temporary earth slopes.

6.2 TEMPORARY SUPPORT OF EXCAVATION

The need for lateral support of excavation will be based on location, the proposed foundation layout, and the Contractor's proposed construction sequencing/means and methods. The actual temporary support of excavation system designs should be performed by the Contractor in consideration of the final design configuration and in accordance with requirements to be established in the construction Contract Documents.

Depending on construction sequencing/means and methods, excavation for foundations near the center of the site can likely be completed as open-cut, following the recommendations presented in Section 6.1.1.

Localized temporary lateral earth support, such as the use of trench boxes or slide rail systems, may be required along the south and west (along Walden Street) sides of the site, where excavations for foundations will be in close proximity to the existing sidewalks, utilities, and roadways and outside the limits of the proposed basement excavation. We recommend that the outer edges of the proposed foundations not encroach within 2 ft from the south and west portions of the property lines, to minimize the potential for undermining sidewalks, utilities, and roadways during construction (see offset distance

lines shown on Figure 2). If localized excavation supported systems are used, we recommend that once excavations have encountered competent, natural soils for foundation support, lean concrete be placed from the competent foundation subgrade up to the bottom of foundation elevation. This will avoid a challenging scenario where the Contractor is compacting structural fill within the tight confines of a trench box.

If localized temporary earth support systems are not feasible, more robust temporary support of excavation systems, such as cantilevered soldier pile and lagging, could be used to provide temporary excavation support safely and efficiently. In consideration of the proximity to the neighboring occupied 2050 Massachusetts Avenue building and to reduce noise and vibrations, the soldier piles should be drilled in (not vibrated or driven). If soldier piles are utilized and they are located outside the property limits, following completion of the work, the soldier piles will need to be cut off a minimum of 6 ft bgs. If the soldier piles are located within the property limits, we recommend the soldier piles be cut off a minimum of 4 ft bgs.

6.2.1 Excavations Adjacent to the 2050 Massachusetts Avenue Building Foundation

Based on the recent test pit findings, the bottom of foundation of the western side of the 2050 Massachusetts Avenue building is at approximately El. 27.

To avoid undermining the adjacent 2050 Massachusetts Avenue building during construction, we recommend that the outer edge of the proposed building foundations be positioned outside the ZOI of the 2050 Massachusetts Avenue building and a portion of the associated concrete retaining wall to the south of the building (as depicted on Figure 2). Based on the proposed maximum bottom of excavation elevation along the 2050 Massachusetts Avenue building (approximately El. 24), the outer edge of the proposed foundation should be located no closer than 5 ft from the edge of the 2050 Massachusetts Avenue foundation.

6.2.2 Dewatering

Foundations shall be completed in-the-dry. Dewatering should be performed as necessary to protect subgrades and allow all final excavation, subgrade preparation, foundation construction, and backfilling to be conducted in-the-dry. We anticipate that dewatering can be accomplished by sumping from shallow pits, trenches, and drainage ditches and will mostly be required to control precipitation and runoff.

The site soils are variably silty and can be very susceptible to disturbance in the presence of water. Dewatering should be performed in a manner that avoids pumping of fines or disturbance to subgrades and bearing surfaces. The Contractor should always control the flow of surface water and seepage water into excavations.

Dewatering effluent must be discharged in accordance with all regulatory requirements. It may be possible to locally recharge dewatering effluent on the site depending on the volume that requires management.

If effluent is discharged directly to municipal systems, it would be subject to regulatory requirements including discharge permitting (by Loureiro Engineering Associates, Inc., Project Environmental Consultant). Typically, sedimentation and pH control will be required prior to off-site discharge of

construction dewatering effluent in addition to possible treatment for other constituents if indicated by groundwater quality test data.

6.2.3 Backfilling

We recommend that lean concrete or compacted structural fill be used for fill or backfill within the ZOI of foundations.

6.2.3.1 Structural Fill

Structural fill placed beneath slabs and foundations should consist of mineral, bank run sand and gravel, free of organic material, snow, ice, or other unsuitable materials and should be well graded within the following limits presented in Table 4.

Table 4. Structural Fill Gradation Requirements

Sieve Size	Percent Finer by Weight
½ in.	35 to 80
¼ in.	25 to 65
No. 40	0 to 30
No. 200	0 to 8

6.2.3.2 Common Fill

Common fill should consist of uncontaminated mineral sandy or gravelly soil, free from organic matter, plastic, metal, wood, ice, snow, debris, or other deleterious material and should have the characteristic that it can be readily placed and compacted. Common fill imported to the site should have a maximum of 80 percent passing the No. 4 sieve and a maximum of 25 percent finer than the No. 200 sieve. Silty common fill soils may require moisture control during placement and compaction. The existing Fill soils may be acceptable to be used as common fill at the discretion of Haley & Aldrich.

6.2.3.3 Reuse of On-site Excavated Materials

The materials to be excavated include Fill as described herein and indicated on the test boring logs. The existing Fill typically consisted of silty SAND. Based on the grain size laboratory tests completed on the Fill sample, the Fill contained approximately 28 percent fines. Oversize materials may also be present in the Fill. Due to the likely high fines content, we recommend that the existing Fill not be reused as compacted structural fill. The existing Fill would likely be acceptable for reuse as common fill. Final determinations of the potential for re-use should be made when the materials are exposed during construction and the intent of the potential re-use is further understood.

Rainfall or melting snow can readily affect stockpiled silty soils and the ability to re-use them as compacted fill. Providing drainage from and covering a stockpile can help limit this potential problem. Silty site soils will probably require considerable drying if left in an unprotected stockpile, especially during wet or cold weather.

6.2.4 Compaction Requirements

Recommended compaction requirements are shown in Table 5.

Table 5. Compaction Requirements

Location	Minimum Compaction Requirements
Within ZOI and around footings, and beneath slabs-on-grade	95%
Within 3 ft below parking, roadways, and sidewalks	95%
Deeper than 3 ft below parking, roadways, and sidewalks	92%
Landscaped areas	By Landscape Architect

Minimum compaction requirements refer to percentages of the maximum dry density determined in accordance with ASTM D1557.

Compacted fills should be placed in horizontal lifts not more than 12 in. thick prior to compaction. Compaction equipment should consist of a large, self-propelled vibratory roller. Where hand-guided compaction equipment such as a vibratory plate compactor is used in confined areas, the loose lift thickness should not exceed 8 in. Each layer of fill should receive at least four complete coverages with suitable compaction equipment. The maximum particle size should not exceed two-thirds of the loose lift thickness.

6.2.5 Earthwork During Freezing Weather

Precautions should be taken if earthwork will be performed when temperatures fall below freezing. No fill should be allowed to freeze prior to compaction. Placement of fill should not be conducted when air temperatures are below freezing. Soil bearing surfaces below slabs and foundations must be protected against freezing, before and after placement of concrete. Frost protection should be provided as soon as possible after foundations are constructed. Fill materials should not be placed on snow, ice, or frozen subgrades.

6.3 INSTRUMENTATION MONITORING PROGRAM AND PROTECTION OF ADJACENT STRUCTURES

Construction will be near the 2050 Massachusetts Avenue building and surrounding utilities and streets. A geotechnical instrumentation and monitoring program are recommended to be implemented prior to during construction. The monitoring program could likely be terminated once the ground floor is constructed and backfill is completed between the temporary support of excavation and building foundation walls. The purpose of the program is to document conditions prior to and during construction, and to provide early warning of any construction related impacts on abutting structures so that mitigation measures can be developed. Performance criteria will be incorporated into the Contract Documents and monitoring will be undertaken during construction to document conformance with the criteria and off-site impacts.

The instrumentation program may include the following:

- Pre-construction condition survey of the basement and ground floors of the 2050 Massachusetts Avenue building.
- Vibration monitoring (with engineering mobile seismographs) during temporary support of excavation installation.
- Settlement reference points on the 2050 Massachusetts Avenue building (points positioned near the ground level) and select utilities and/or underground structures surrounding the site.

6.4 FOOTING AND SLAB SUBGRADE PREPARATION

6.4.1 Footing Bearing Surface Preparation

If encountered at the design subgrade level, unsuitable materials must be removed from within the ZOI of foundations down to the suitable bearing strata. During the excavation and foundation construction operations, precautions should be taken to minimize disturbance to the bearing soils. Disturbance by construction traffic and standing water should be avoided. The following guidelines are recommended.

- Exposed soil subgrades must be observed in the field by Haley & Aldrich to confirm suitable foundation bearing conditions in accordance with this report. It may be necessary to require over-excavation and replacement of weak, disturbed, or otherwise unacceptable foundation bearing material to achieve suitable bearing conditions.
- Any over-excavation of disturbed or unsuitable soils below design foundation bearing grade should be backfilled with compacted structural fill, flowable fill, or lean concrete.
- Exposed subgrade soils should be recompacted with at least two passes with a self-propelled vibratory compactor until firm.
- Soil bearing surfaces below completed foundations must be protected against freezing before and after foundation construction. If construction is performed during freezing weather, footings should be backfilled to a sufficient depth (up to 4 ft) as soon as possible after they are constructed. Alternatively, insulating blankets, heating, or other means may be used for protection against freezing. Footing bearing levels could also be lowered such that they are protected from freezing temperatures after backfilling.
- Below the basement mat slab, we recommend a lean concrete “mud mat” be placed over the exposed subgrade to provide protection and allow waterproofing material to be installed.
- Smooth edged buckets should be used to prevent the disturbance of bearing soils. Use of non-smooth-edged buckets to excavate soils at final subgrade will disturb subgrades.

6.4.2 Slab Subgrade Preparation

For slab subgrade areas, following the excavation to desired elevation, the resulting subgrade should be proof compacted with several passes of a large vibratory roller imparting at least 25,000 lbs of dynamic force. Any areas that are observed to be cutting, weaving, or are observed to be unstable under compaction should be excavated and replaced with compacted structural fill.

6.5 PAVEMENT DESIGN AND CONSTRUCTION

The following heavy-duty (truck traffic), flexible pavement section is recommended.

- 4-inch-thick bituminous concrete.
- 12-inch-thick Commonwealth of Massachusetts – Standard Specifications for Highways and Bridges, Massachusetts Highway Department (MHD), Gravel Base Course (M1.03.0 – Gravel Borrow, Type b).

Reclaimed Base Course material may be substituted for the gravel borrow material if it meets the appropriate MHD specifications. Refer to MHD Standard Specifications for material and gradation requirements for Reclaimed Base Course.

Base course material should be placed in a maximum 8-in.-thick loose lifts and compacted at approximately optimum water content to a dry density of at least 95 percent of maximum dry density as determined by ASTM D1557.

Subgrade soils in paved areas should be cleaned of all vegetation, concrete slabs, existing bituminous concrete, organic material, debris, cobbles, boulders, and any other objectionable materials, and then proof-rolled under the supervision of the Project Geotechnical Engineer.

Exposed soil subgrades beneath pavements should be observed by Haley & Aldrich to confirm pavement design assumptions and then proof-compacted with a minimum of four passes of a heavy vibratory roller imparting at least 25,000 lbs of dynamic force or a loaded 10-wheel dump truck. If soft or unsuitable material, or weaving, is encountered at the exposed subgrade, we recommend that the exposed unsuitable material be over-excavated and backfilled with suitable compacted structural fill.

These pavement recommendations assume that a stable, firm subgrade is achieved beneath the base course, and that subgrades are prepared as recommended in Construction Documents.

6.6 EXCAVATED SOIL MANAGEMENT

If site development generates excess or unsuitable soil that requires off-site disposal, the management of the exported soils must be performed in accordance with all applicable Municipal, State, and Federal laws and regulations, including the requirements of the Massachusetts Contingency Plan (MCP, 310 CMR 40.000).

The Contractor should coordinate with Loureiro Engineering Associates, Inc. during planning stages of the proposed construction to understand how site environmental conditions may impact construction procedures and sequence.

7. Additional Recommendations

7.1 SUBMITTAL, SPECIFICATION, AND PLAN REVIEW

We recommend Haley & Aldrich be provided the opportunity to review geotechnical aspects of final Construction Documents (plans and specifications) to confirm that the recommendations made in this report were interpreted and implemented as intended. It is recommended that Haley & Aldrich be provided the opportunity to prepare technical provisions of specifications for earthwork. It is also recommended that Haley & Aldrich be provided the opportunity to review Contractor submittals related to geotechnical aspects of project construction.

7.2 CONSTRUCTION MONITORING

It is recommended that a Haley & Aldrich representative qualified by training and experience is present during construction to provide monitoring as required by the Code. The field representative should be present to monitor the following construction activities:

- Monitor the installation of the foundation systems including footings, preparation of foundation and fill bearing surfaces including removal of existing unsuitable foundation materials from foundation and slab areas and confirm the character of the material encountered at bearing levels activities (required by the Code).

- Observe placement and test compaction of compacted structural fill beneath foundations (required by the Code).

- Confirm that fill and backfill materials meet the requirements of project plans and specifications and help make judgments regarding the suitability of excavated soils for reuse as fill activities (required by the Code when impacting structures).

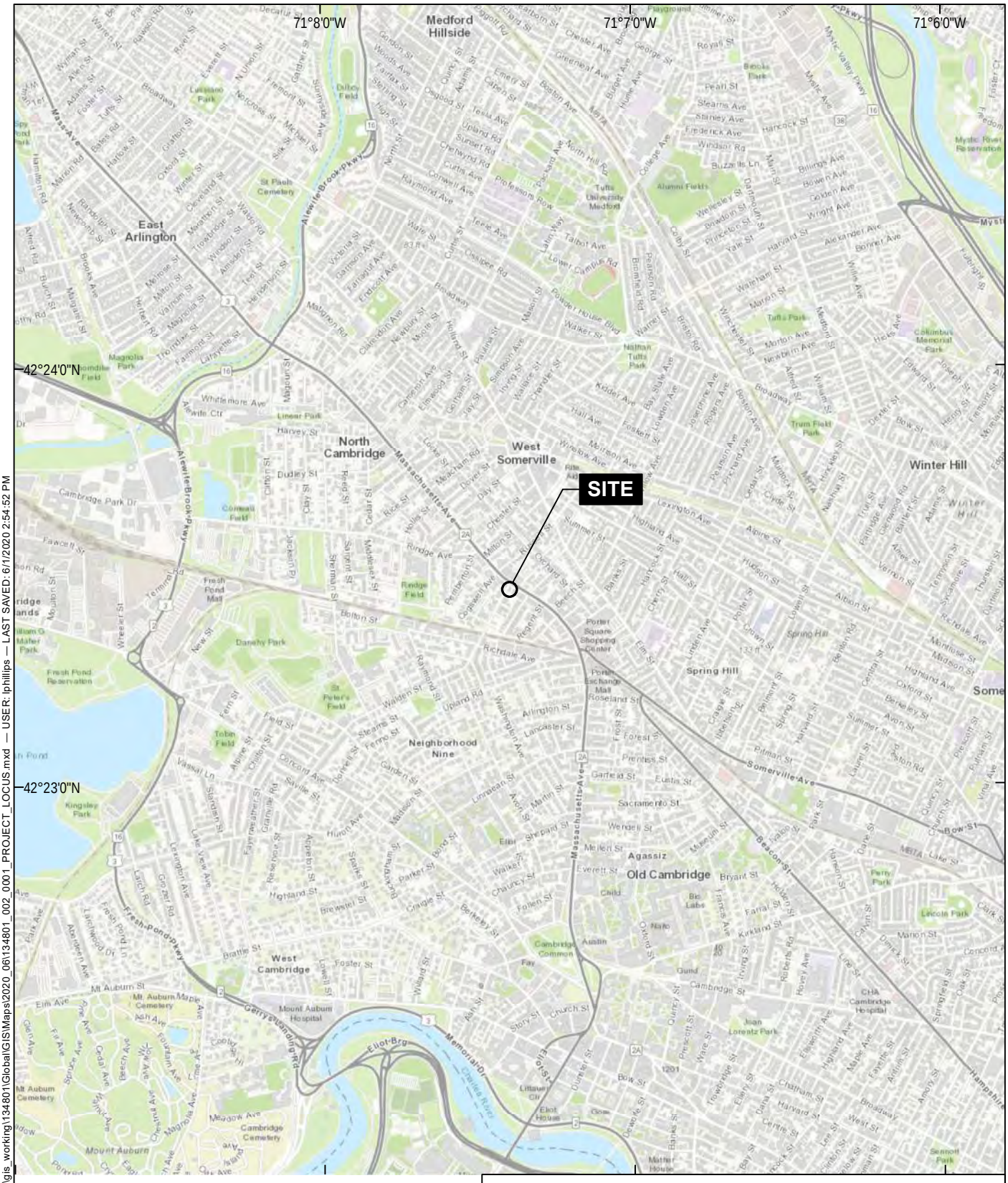
We recommend that Haley & Aldrich be retained to provide these monitoring services during construction. This will enable us to observe compliance with the design concepts, assumptions, and specifications, and to facilitate design changes if subsurface conditions differ from those anticipated prior to the start of construction. The recommendations provided in this report are contingent upon Haley & Aldrich performing the recommended monitoring.

8. Limitations

This report has been prepared for specific application to the proposed 2072 Massachusetts Avenue development in Cambridge, Massachusetts, as understood at this time, in accordance with generally accepted geotechnical engineering practice common to the local area. In the event that changes in the nature, design, or location of the building or other features are planned (e.g., the limits and depths of the excavation(s)), the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed by Haley & Aldrich, Inc. and the conclusions of this report are modified or verified in writing. The recommendations provided in this report are based on the current ninth edition of the Code. If the building permit is approved after the forthcoming tenth edition of the Code is available, it may be necessary reevaluate the analyses and recommendations in this report.

The analyses and recommendations are based, in part, upon the data obtained from the referenced subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations then appear, it may be necessary to reevaluate the recommendations of this report.

FIGURES



GIS FILE PATH: C:\Users\lphillips\Desktop\gis_working\134801\Global\GIS\Maps\2020_0611348O1_002_0001_PROJECT_LOCUS.mxd — USER: lphillips — LAST SAVED: 6/1/2020 2:54:52 PM

HALEY ALDRICH

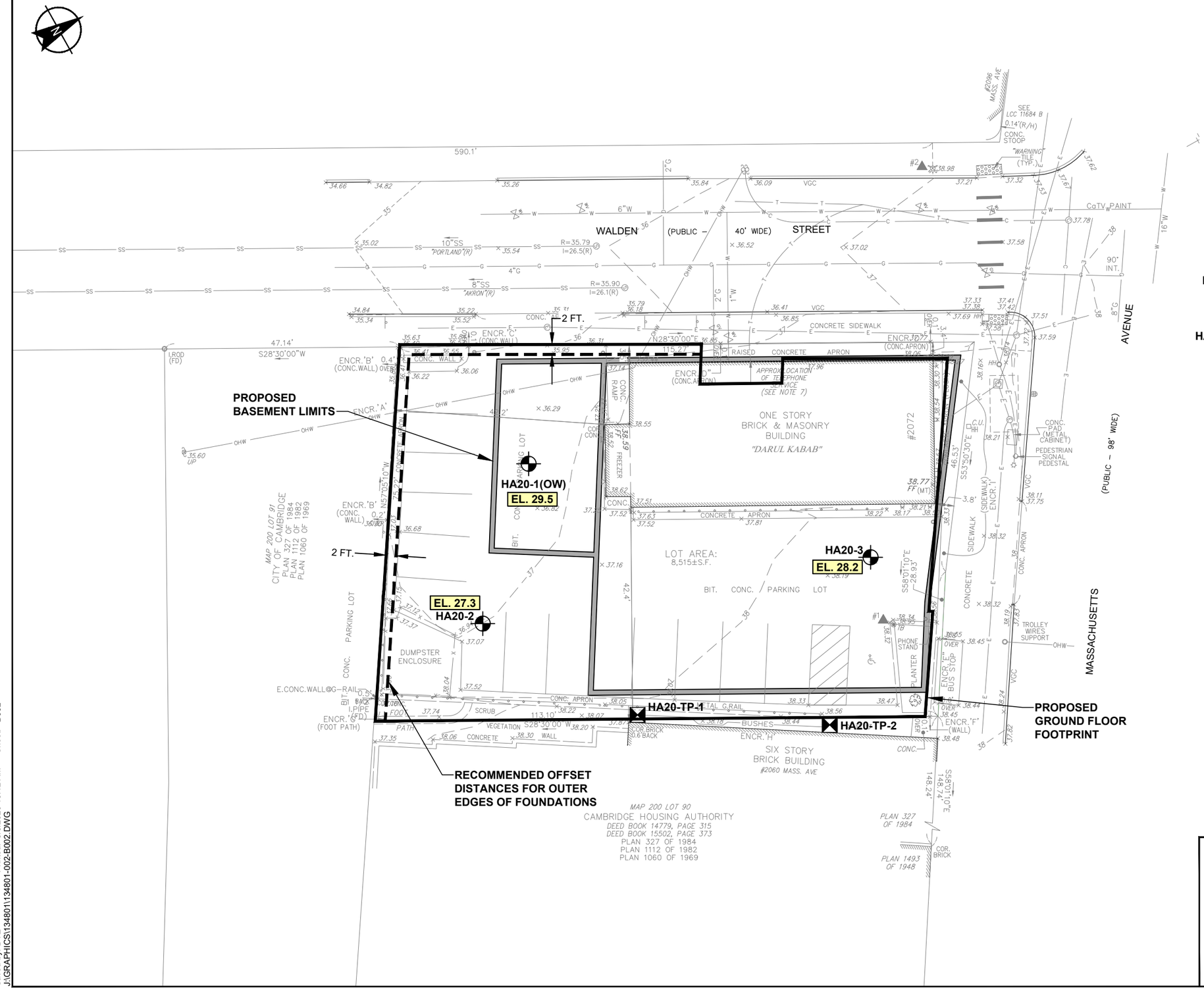
2072 MASSACHUSETTS AVENUE
CAMBRIDGE, MASSACHUSETTS

PROJECT LOCUS

MAP SOURCE: ESRI
SITE COORDINATES: 42°23'28"N, 71°07'24"W

APPROXIMATE SCALE: 1 IN = 2000 FT
SEPTEMBER 2020

FIGURE 1



LEGEND

HA20-TP-1	DESIGNATION AND APPROXIMATE LOCATION OF TEST PIT EXCAVATED BY EARTHWORK INDUSTRIES, INC. ON 11 AUGUST 2020 AND DOCUMENTED BY HALEY & ALDRICH, INC.
HA20-1(OW)	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS ON 7 TO 11 MAY 2020 AND MONITORED BY HALEY & ALDRICH, INC.
(OW)	INDICATES OBSERVATION WELL INSTALLED IN COMPLETED BOREHOLE
EL. 29.5	ELEVATION OF TOP OF FOUNDATION BEARING SOIL

NOTES

1. ELEVATIONS ARE IN FEET AND ARE REFERENCED IN CAMBRIDGE CITY BASE.
2. BASE PLAN TAKEN FROM AN ELECTRONIC DRAWING TITLED, "14047_Survey-Model.dwg", RECEIVED FROM NITSCH ENGINEERING ON 2 JUNE 2020.
3. PROPOSED BUILDING LIMITS TAKEN FROM ELECTRONIC DRAWING TITLED, "200601 - 2072 Mass Ave-Floor Plan - 01 GROUND FLOOR_FLOOR PLAN.dwg", RECEIVED FROM BRUNER/COTT ON 1 JUNE 2020.
4. PROPOSED BASEMENT LIMITS TAKEN FROM ELECTRONIC DRAWINGS TITLED, "200908 - 2072 Mass Ave_00_BASEMENT FLOOR PLAN.dwg", RECEIVED FROM BRUNER/COTT ON 8 SEPTEMBER 2020.

0 20 40
SCALE IN FEET

HALEY ALDRICH

2072 MASSACHUSETTS AVENUE
CAMBRIDGE, MASSACHUSETTS

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN

SCALE: AS SHOWN
SEPTEMBER 2020

FIGURE 2

Saved by: DTE Printed: 9/9/2020 10:12 AM Sheet: B002
J:\GRAPHICS\134801\134801-002-B002.DWG

APPENDIX A

Test Boring Logs

TEST BORING REPORT

Boring No. HA20-1(OW)

Project	2072 MASSACHUSETTS AVENUE, CAMBRIDGE, MA
Client	CC HRE 2072 MASS AVE LLC
Contractor	NEW ENGLAND BORING CONTRACTORS

File No. 134801-002
Sheet No. 1 of 2
Start May 8, 2020
Finish May 8, 2020
Driller K. Smith
H&A Rep. D. Palleiko
Elevation 36.5
Datum Cambridge City Base
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	--	Rig Make & Model: GEFCO Strata Star 15, Track
Inside Diameter (in.)	4	1 3/8	--	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: HW Drive to 14.0 ft
				Hoist/Hammer: Winch / Automatic Hammer
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	USCS Symbol	Well Diagram	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0						36.2	-BITUMINOUS CONCRETE-										
	18 20 15	S1 8	0.5 2.0	SM		0.3	Dense brown to gray brown silty SAND with gravel (SM), mps 0.8 in., no structure, no odor, moist	5	10	5	20	30	30				
	10 14 25 13	S2 10	2.0 4.0	SM			Dense gray brown silty SAND with gravel (SM), mps 0.8 in., occasional layer of ash fill up to 4 in. thick, no odor, moist, trace brick		35	11	15	11	28				
							-FILL-										
5	12 10 9 8	S3 10	4.0 6.0	SM			Medium dense gray brown silty SAND with gravel (SM), mps 1.0 in., no structure, moist, 80-90% ash in fragments, particles, and specks	5	15	10	15	30	25				
	6 3 5 6	S4 12	6.0 8.0	SM		29.5 7.0	Loose gray brown to light brown silty SAND with gravel (SM), mps 1.0 in., occasional pocket of ash up to 4 in. thick, no odor, moist, poorly graded sand in tip		15	5	20	45	15				
	5 7 8 10	S5 15	8.0 10.0	SM			Medium dense brown to red brown silty SAND (SM), mps 0.05 in., no structure, no odor, moist				5	95					
							-MARINE SAND-										
10	10 9 9 12	S6 15	10.0 12.0	SM			Similar to above				5	95					
						23.0 13.5											
15	2 5 2 3	S7 22	14.0 16.0	CL			Medium stiff gray lean CLAY (CL), mps 0.05 in., frequent interbeds of silt, up to 1.0 in. thick, no odor, wet						100 100	N R	M L	M N	
							-MARINE CLAY-										
20	5 7	S8 21	19.0 21.0	CL			Stiff gray lean CLAY (CL), mps 0.10 in., no structure, no odor, wet						100	N	M	M	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
- O - Open End Rod
- T - Thin Wall Tube
- U - Undisturbed Sample
- S - Split Spoon Sample

Well Diagram
- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

Overburden (ft) 46.0
Rock Cored (ft) -
Samples S13

Boring No. HA20-1(OW)

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. HA20-1(OW)
File No. 134801-002
Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	USCS Symbol	Well Diagram	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	7 11						PP = 1.25-2.0 tsf Note: PP = Pocket Penetrometer										
25	2 4 5 6	S9 24	24.0 26.0	CL			Stiff gray lean CLAY (CL), mps 0.05 in., no structure, no odor, wet PP = 1.0-1.25 tsf						100	N	M	M	
30	3 5 4 4	S10 24	29.0 31.0	CL			Stiff gray lean CLAY (CL), mps 0.05 in., occasional fine sand partings, no odor, wet PP = <0.25-0.5 tsf -MARINE CLAY-						100	N	M	M	
35	WOH/12" 6 8	S11 24	34.0 36.0	CL			Medium stiff gray lean CLAY (CL), mps 0.05 in., no structure, no odor, wet PP = <0.25 tsf						100	N	M	M	
40	2 4 5 16	S12 24	39.0 41.0	CL		-4.0 40.5	Stiff gray lean CLAY (CL), mps 0.9 in., gravel increases below 40.5 ft, no odor, wet PP = 0.75 tsf -GLACIAL TILL-		10			5	85	N	M	M	
45	24 31 57 27	S13 11	44.0 46.0	SC		-9.5 46.0	Very dense gray clayey SAND with gravel (SC), mps 1.5 in., weakly to moderately bonded, no odor, wet BOTTOM OF EXPLORATION 46.0 FT Note: Observation well installed adjacent to test boring.	10	15	15	20	25	15				

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA20-1(OW)

GROUNDWATER OBSERVATION WELL INSTALLATION REPORT

HALEY ALDRICH

Well No. HA20-1(OW)

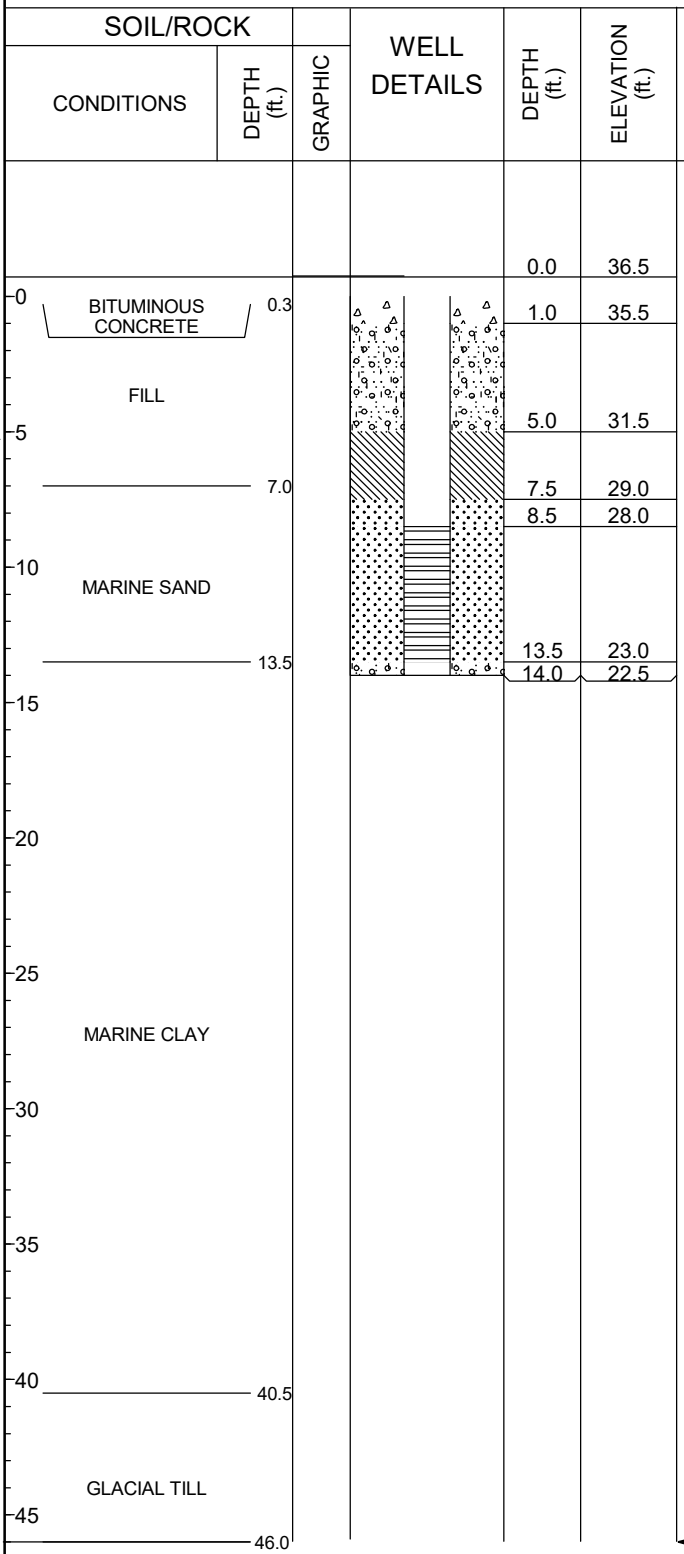
Project 2072 MASSACHUSETTS AVENUE
Location CAMBRIDGE, MA
Client CC HRE 2072 MASS AVE LLC
Contractor NEW ENGLAND BORING CONTRACTORS
Driller K. Smith

Initial Water Level (depth bgs) 10.5 ft

Well Diagram
- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

File No. 134801-002
Date Installed 8 May 2020
H&A Rep. D. Palleiko
Location See Plan

Ground El. 36.5
Datum Cambridge City Base



WELL CONSTRUCTION DETAILS

Type of protective cover: Compression - pent. bolt
Depth of HW below ground surface: 0.0 ft
Height of top of riser above ground surface: 0.3 ft
Type of protective casing: HW
Length: 0.8 ft
Inside diameter: 6.0 in.
Depth of bottom of HW: 0.8 ft
Type of riser pipe: Schedule 40 PVC
Inside diameter of riser pipe: 2.0 in.
Depth of bottom of riser pipe: 8.5 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Concrete	0.0	1.0
Bentonite	5.0	7.5
	-	-
	-	-

Diameter of borehole: 4.5 in.
Depth to top of well screen: 8.5 ft
Type of screen: Machine slotted Sch 40 PVC
Screen gauge or size of openings: 0.010 in.
Diameter of screen: 2.0 in.
Type of Backfill around Screen: Filter Sand
Depth to bottom of well screen: 13.5 ft
Bottom of silt trap: 13.5 ft
Depth of bottom of well: 14.0 ft
Depth of bottom of borehole: 46.0 ft

COMMENTS:

TEST BORING REPORT

Boring No. HA20-2

Project	2072 MASSACHUSETTS AVENUE, CAMBRIDGE, MA
Client	CC HRE 2072 MASS AVE LLC
Contractor	NEW ENGLAND BORING CONTRACTORS

File No. 134801-002
Sheet No. 1 of 3
Start May 7, 2020
Finish May 7, 2020
Driller K. Smith
H&A Rep. D. Palleiko
Elevation 37.3
Datum Cambridge City Base
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	--	Rig Make & Model: GEFCO Strata Star 15, Track
Inside Diameter (in.)	4	1 3/8	--	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: HW Drive to 54.0 ft
				Hoist/Hammer: Winch / Automatic Hammer
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					37.0	-BITUMINOUS CONCRETE-										
	7 17 15	S1 5	0.5 2.0	SM	0.3	Dense gray brown silty SAND (SM), mps 0.8 in., no structure, no odor, moist, trace brick		10		10	40	40				
						-FILL-										
					35.3											
	9 7 7 8	S2 2	2.0 4.0	SP	2.0	Medium dense brown poorly graded SAND (SP), no structure, no odor, moist		10		10	75	5				
5	6 4 4 3	S3 5	4.0 6.0	SP		Loose brown poorly graded SAND (SP), mps 0.5 in., no structure, no odor, moist, 10-15% ash		10		10	75	5				
						-FILL-										
	3 4 100/1"	S4 4	6.0 7.0	SP		Very dense gray brown poorly graded SAND (SP), mps 0.5 in., no structure, no odor, moist, 10-20% ash, cinders		10		10	75	5				
					29.3											
	24 17 16 17	S5 4	8.0 10.0	GP	8.0	Dense red poorly graded GRAVEL (GP), mps 1.2 in., no structure, no odor, moist, significant brick fragments present	90			5	5					
						-FILL-										
10					27.3											
	32 23 23 29	S6 16	10.0 12.0	SM	10.0	Dense brown silty SAND (SM), mps 0.5 in., occasional layer of lean clay up to 0.5 in. thick, no odor, wet at 11.2 ft										
						-MARINE SAND-										
	7 6 6 8	S7 12	14.0 16.0	SM		Medium dense brown silty SAND (SM) with frequent interbeds of silt and lean clay up to 4 in. thick, no odor, wet				5	90	5				
15					21.8											
					15.5											
						-MARINE CLAY-										
	4 5	S8 17	19.0 21.0	CL		Stiff gray lean CLAY with sand (CL), mps 0.2 in., decreasing sand with depth, no odor, wet				5	5	90	N	M	M	
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
5/7/2020	1300	0.25	54.0	54.0	12.48

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft) 54.0
Rock Cored (ft) -
Samples S14

Boring No. HA20-2

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA20-2
File No. 134801-002
Sheet No. 2 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	5 10					PP = 1.75-2.25 tsf										
						Note: PP = Pocket Penetrometer										
	2 4 5 8	S9 24	24.0 26.0	CL		Stiff gray lean CLAY (CL), mps 0.1 in., no structure, no odor, wet						100	N	M	M	
25						PP = 0.75-1.25 tsf										
						-MARINE CLAY-										
	2 5 5 5	S10 24	29.0 31.0	CL		Stiff gray lean CLAY (CL), mps 0.10 in., no structure, no odor, wet		5				95	N	M	M	
30						PP = 1.0-2.0 tsf										
	WOH 3 3 3	S11 24	34.0 36.0	CL		Medium stiff gray lean CLAY (CL), mps 0.2 in., no structure, no odor, wet										
35						PP = 0.5-0.75 tsf										
	WOH 3 4 5	S12 24	39.0 41.0	CL		Medium stiff gray lean CLAY (CL), mps 0.05 in., no structure, no odor, wet										
40						PP = 0.5-0.75 tsf										
					-4.7 42.0	Note: Drill action indicates change at 42.0 ft.										
	15 15 26 35	S13 8	44.0 46.0	SC		Dense gray clayey SAND with gravel (SC), mps 1.2 in., weakly bonded, wet	15	10	10	20	30	15				
45						-GLACIAL TILL-										
	22	S14	49.0	SC		Very dense gray clayey SAND with gravel (SC), mps 0.8 in., moderate to										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA20-2

TEST BORING REPORT

Boring No. HA20-2
File No. 134801-002
Sheet No. 3 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50	42 100/3"	6	51.0			well bonded, no odor, wet										
						-GLACIAL TILL-										
					-16.2 53.5	Note: Drill action indicates change at 53.5 ft.										
	50/0"	NR 0	54.0		-16.7 54.0	TOP OF PROBABLE BEDROCK- Note: Wash contains ARGILLITE fragments. -PROBABLE BEDROCK- SPLIT SPOON REFUSAL AT 54.0 FT BOTTOM OF EXPLORATION 54.0 FT										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA20-2

TEST BORING REPORT

Boring No. HA20-3

Project	2072 MASSACHUSETTS AVENUE, CAMBRIDGE, MA
Client	CC HRE 2072 MASS AVE LLC
Contractor	NEW ENGLAND BORING CONTRACTORS

File No. 134801-002
Sheet No. 1 of 2
Start May 11, 2020
Finish May 11, 2020
Driller K. Smith
H&A Rep. D. Palleiko
Elevation 38.2
Datum Cambridge City Base
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	--	Rig Make & Model: GEFCO Strata Star 15, Track
Inside Diameter (in.)	4	1 3/8	--	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: HW Drive to 19.0 ft
				Hoist/Hammer: Winch / Automatic Hammer
				PID Make & Model: NA

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0					37.9	-BITUMINOUS CONCRETE-										
	15 65 36	S1 11	0.5 2.0	SC	0.3	Very dense brown changing to gray clayey SAND (SC), mps 0.3 in., single layer of ash 4 in. thick, no odor, moist		15	15	15	35	20				
					36.2	-FILL-										
	20 30 16 14	S2 5	2.0 4.0	SM	2.0	Dense dark gray silty SAND with gravel (SM), mps 1.0 in., no structure, no odor, moist, 100% ash, cinders, coal in fragments, particles, and specks		15		25	40	20				
						-FILL-										
					34.2											
	10 8 6 6	S3 7	4.0 6.0	SP	4.0	Medium dense brown poorly graded SAND (SP), mps 0.3 in., no structure, no odor, moist, trace brick in fragments				15	80	5				
5						-FILL-										
					32.2											
	5 6 23 19	S4 15	6.0 8.0	SM	6.0	Medium dense gray black and red silty SAND with gravel (SM), mps 1.0 in., no structure, no odor, moist, 60-70% ash, brick, cinders, in fragments, particles, and specks		15	10	20	35	20				
						-FILL-										
					30.2											
	10 12 11 6	S5 NR	8.0 10.0	GP	8.0	Medium dense red poorly graded GRAVEL (GP), mps 1.2 in., no structure, no odor, moist, significant brick fragments present	70	20			5	5				
						-FILL-										
					28.2											
10	5 7 7 8	S6 10	10.0 12.0	SM	10.0	Medium dense light brown with dark brown bands silty SAND (SM), mps 0.10 in., no structure, no odor, wet				5	90	5				
						-MARINE SAND-										
	9 11 11 12	S7 11	14.0 16.0	SM		Medium dense brown silty SAND (SM), mps 0.05 in., no structure, no odor, wet				2	78	20				
15					20.7											
					17.5	-MARINE CLAY-										
	5 6	S8 22	19.0 21.0	CL		Stiff gray lean CLAY (CL), mps 0.05 in., frequent interbeds of silt up to 2 in. thick, no odor, wet						100	N	M	M	
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
5/11/2020	1420	0.5 *Not Stabilized	19.0	44.0	11.73*

Sample ID
- O - Open End Rod
- T - Thin Wall Tube
- U - Undisturbed Sample
- S - Split Spoon Sample

Well Diagram
- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary
- Overburden (ft) 46.0
- Rock Cored (ft) -
- Samples S13

Boring No. HA20-3

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. HA20-3
File No. 134801-002
Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	USCS Symbol	Stratum Change Elev/Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	5 5					PP = 1.0 tsf										
						Note: PP = Pocket Penetrometer										
25	4 4 4 7	S9 21	24.0 26.0	CL		Medium stiff gray lean CLAY (CL), mps 0.05 in., frequent interbeds of silt up to 1 in. thick, no odor, wet						100	N	M	M	
						-MARINE CLAY-										
30	3 4 6 8	S10 23	29.0 31.0	CL		Stiff gray lean CLAY (CL) mps 0.05 in., no structure, no odor, wet PP = 0.75-1.0 tsf						100	N	M	M	
35	2 3 3 4	S11 24	34.0 36.0	CL		Medium stiff gray lean CLAY (CL), mps 0.05 in., no structure, no odor, wet PP = 0.75 tsf						100				
40	5 4 4 5	S12 24	39.0 41.0	CL		Medium stiff gray lean CLAY (CL), mps 0.05 in., no structure, no odor, wet PP = 0.75 tsf						100				
					-3.3 41.5	Note: Drill action indicates stratum change at 41.5 ft.										
						-GLACIAL TILL-										
45	24 40 27 46	S13 8	44.0 46.0	SC		Very dense gray clayey SAND with gravel (SC), mps 1.0 in., moderately bonded, no odor, wet										
					-7.8 46.0	BOTTOM OF EXPLORATION 46.0 FT										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA20-3

APPENDIX B

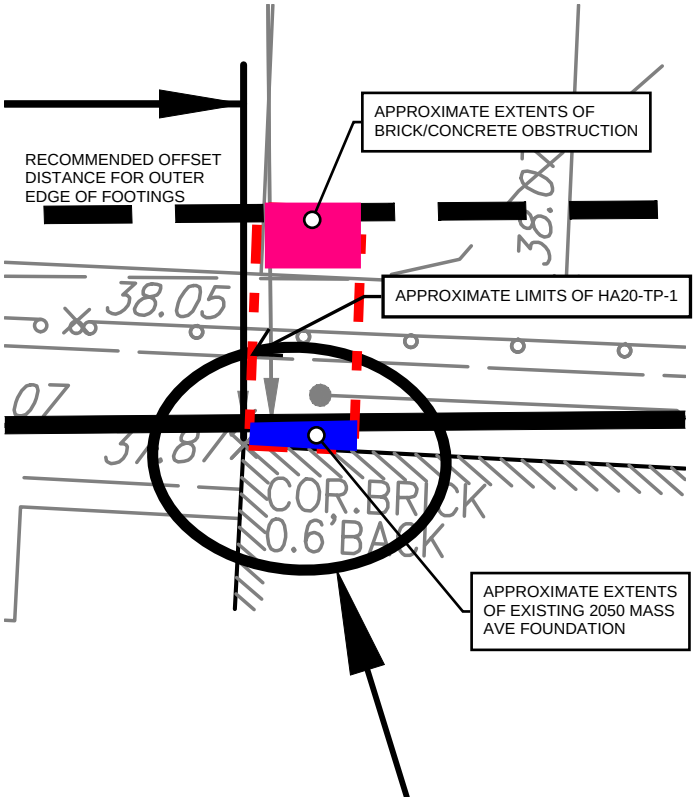
Test Pit Logs and Photographs

HALEY ALDRICH

CALCULATIONS

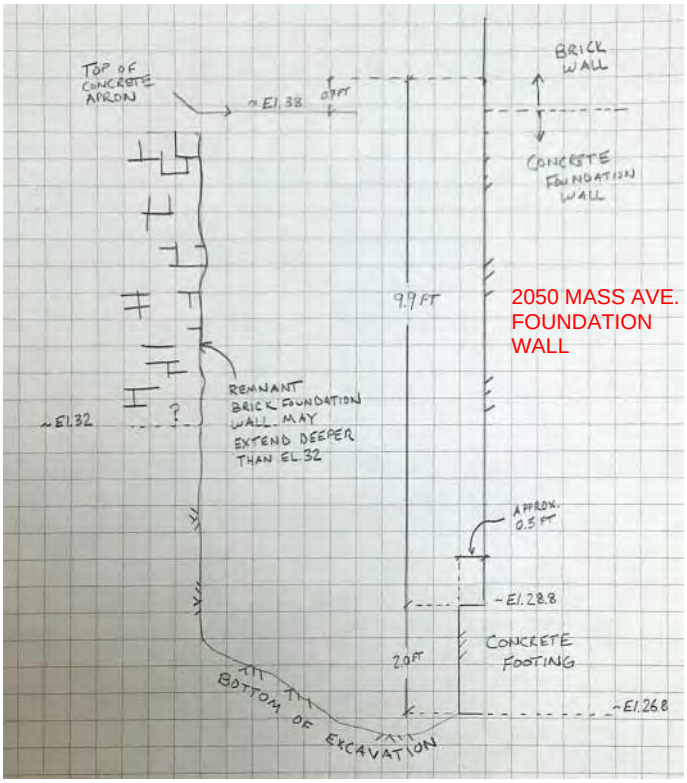
Client	CC HRE 2072 MASS AVE LLC
Project	2072 MASSACHUSETTS AVENUE
Subject	HA20-TP-1 SKETCH

File No.	134801-002
Sheet	1 of 2
Date	9 SEP. 2020
Computed By	HCM
Checked By	NAS

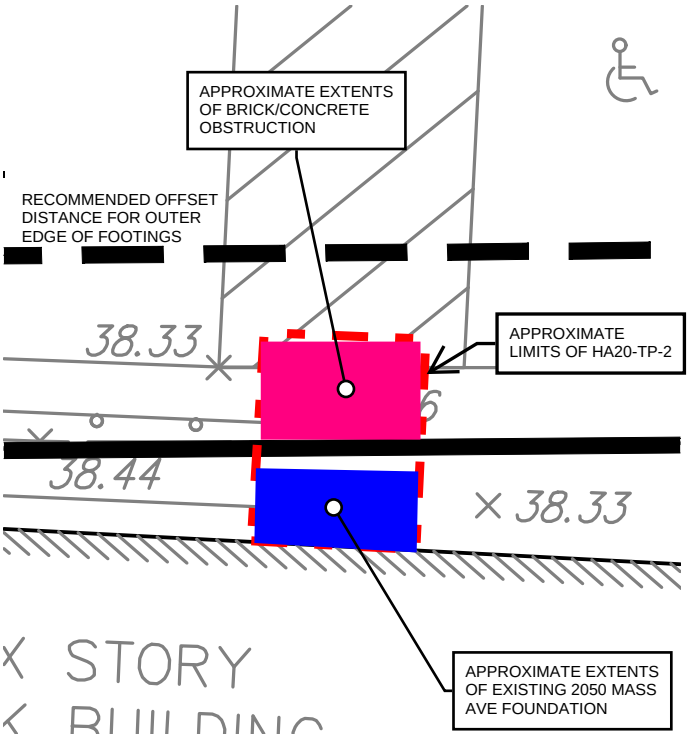


NOTES:

1. HAND SKETCH IS DRAWN TO SCALE.
2. TEST PITS EXCAVATED AND BACKFILLED ON 11 AUGUST 2020.
3. EXCAVATIONS PERFORMED USING TRACK-MOUNTED MINI EXCAVATOR.
4. EXCAVATION PERFORMED TO APPROXIMATELY 12 FT BELOW EXISTING GROUND SURFACE.
5. GROUNDWATER NOT ENCOUNTERED.
6. TAN BROWN SAND (EXISTING FILL) ENCOUNTERED WITHIN EXCAVATION. ROOTS PRESENT THROUGHOUT. SIDEWALLS REMAINED VERTICAL WITHIN EXCAVATION.
7. ELEVATIONS PRESENTED ARE REFERENCED TO CAMBRIDGE CITY BASE DATUM.

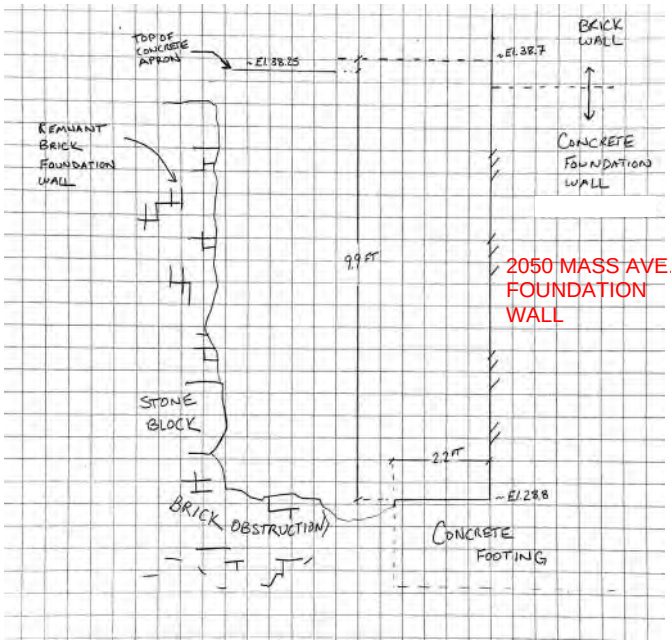


HALEY ALDRICH	CALCULATIONS	File No.	134801-002
		Sheet	2 of 2
Client	CC HRE 2072 MASS AVE LLC	Date	9 SEP. 2020
Project	2072 MASSACHUSETTS AVENUE	Computed By	HCM
Subject	HA20-TP-2 SKETCH	Checked By	NAS



NOTES:

1. HAND SKETCH IS DRAWN TO SCALE.
2. TEST PITS EXCAVATED AND BACKFILLED ON 11 AUGUST 2020.
3. EXCAVATIONS PERFORMED USING TRACK-MOUNTED MINI EXCAVATOR.
4. EXCAVATION PERFORMED TO APPROXIMATELY 12 FT BELOW EXISTING GROUND SURFACE.
5. GROUNDWATER NOT ENCOUNTERED.
6. TAN BROWN SAND (EXISTING FILL) ENCOUNTERED WITHIN EXCAVATION. ROOTS PRESENT THROUGHOUT. SIDEWALLS REMAINED VERTICAL WITHIN EXCAVATION.
7. ELEVATIONS PRESENTED ARE REFERENCED TO CAMBRIDGE CITY BASE DATUM.
8. BOTTOM OF 2050 MASS AVE FOUNDATION NOT OBSERVED DUE TO SIGNIFICANT BRICK OBSTRUCTION



Photograph No. 1: View facing 2050 Mass Ave foundation wall.

Photograph No. 2: View facing existing foundation wall in site (2072 Mass Ave).

Photograph No. 3: View facing southwestern corner of 2050 Mass Ave building. Existing foundation appears to protrude 6 in. from face of wall.

HALEY ALDRICH

2072 MASSACHUSETTS AVENUE
CAMBRIDGE, MASSACHUSETTS

PHOTOGRAPHS OF CONDITIONS OBSERVED AT HA20-TP-1

Photograph No. 4: View facing 2050 Mass Ave foundation wall. Rod positioned on top of foundation.

Photograph No. 6: View of 2050 Mass Ave foundation adjacent to obstruction.

Photograph No. 5: View facing brick foundation wall in site (2072 Mass Ave).

HALEY ALDRICH

2072 MASSACHUSETTS AVENUE
CAMBRIDGE, MASSACHUSETTS

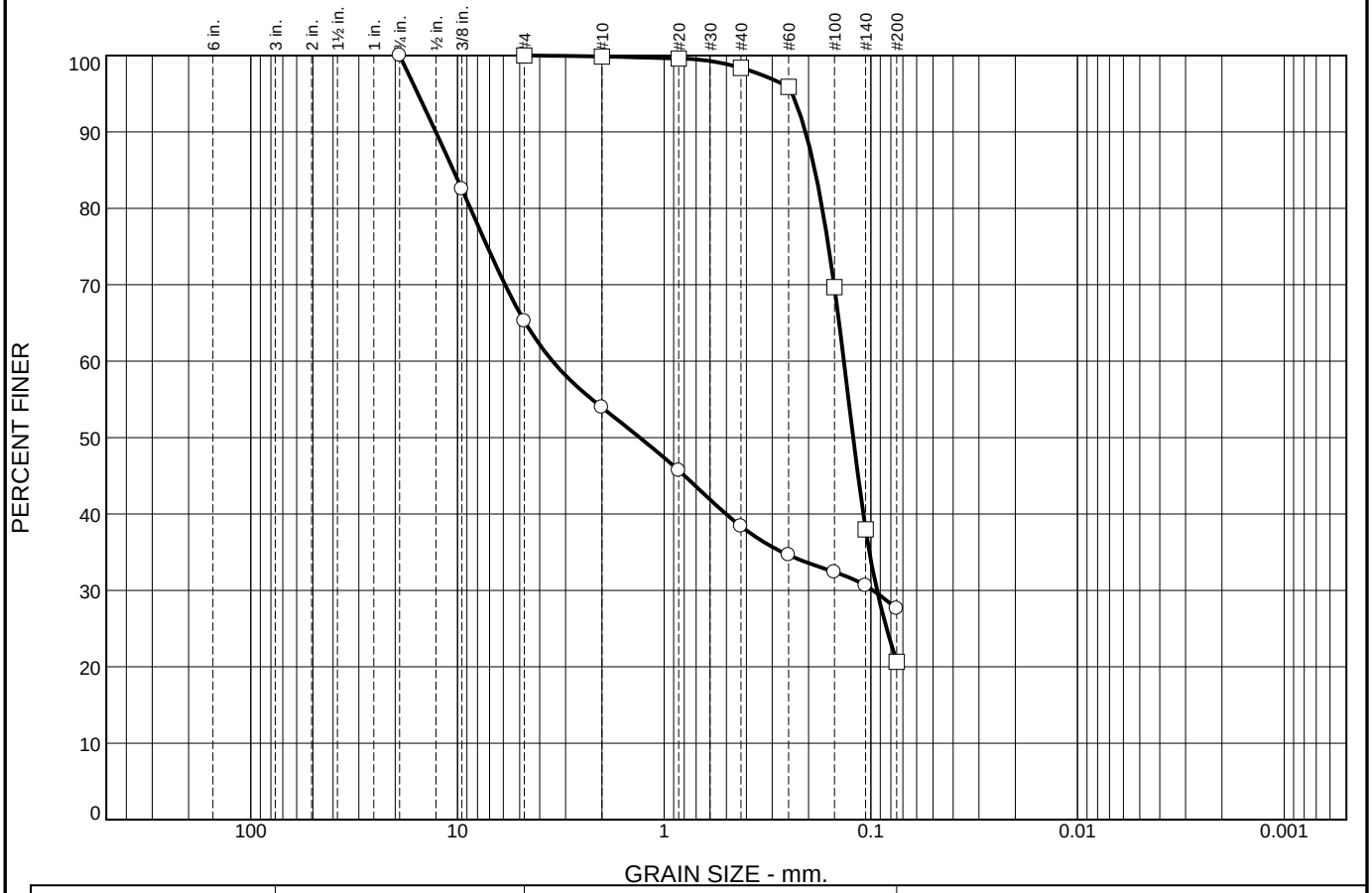
PHOTOGRAPHS OF CONDITIONS OBSERVED AT HA20-TP-2

FILE NO.: 134801-002 SEPTEMBER 2020

APPENDIX C

Geotechnical Laboratory Testing Results

U.S. STANDARD SIEVE SIZE



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	34.7	11.4	15.5	10.8	27.6	
□	0.0	0.0	0.0	0.1	1.5	77.7	20.7	

	Expl. No.	Sample No.	Depth (ft)	Atterberg Limits %			Water Content (%)	C_u	C_c	USCS
				w_L	w_P	I_P				
○	HA20-1(ow)	S02	2.0-4.0				12.1			SM
□	HA20-3	S07	14.0-16.0				25.7			SM

	Sample Description
○	Gray silty sand with gravel
□	Brown silty sand

Remarks:

HALEY ALDRICH

2072 Massachusetts Avenue - Design Development
Geotechnical Services
Cambridge, Massachusetts

GRAIN SIZE DISTRIBUTION

DATE: 5/28/2020

FILE NO: 134801-002

APPENDIX D

Groundwater Observation Well Monitoring Report

HALEY ALDRICH

GROUNDWATER MONITORING REPORT

OW NUMBER

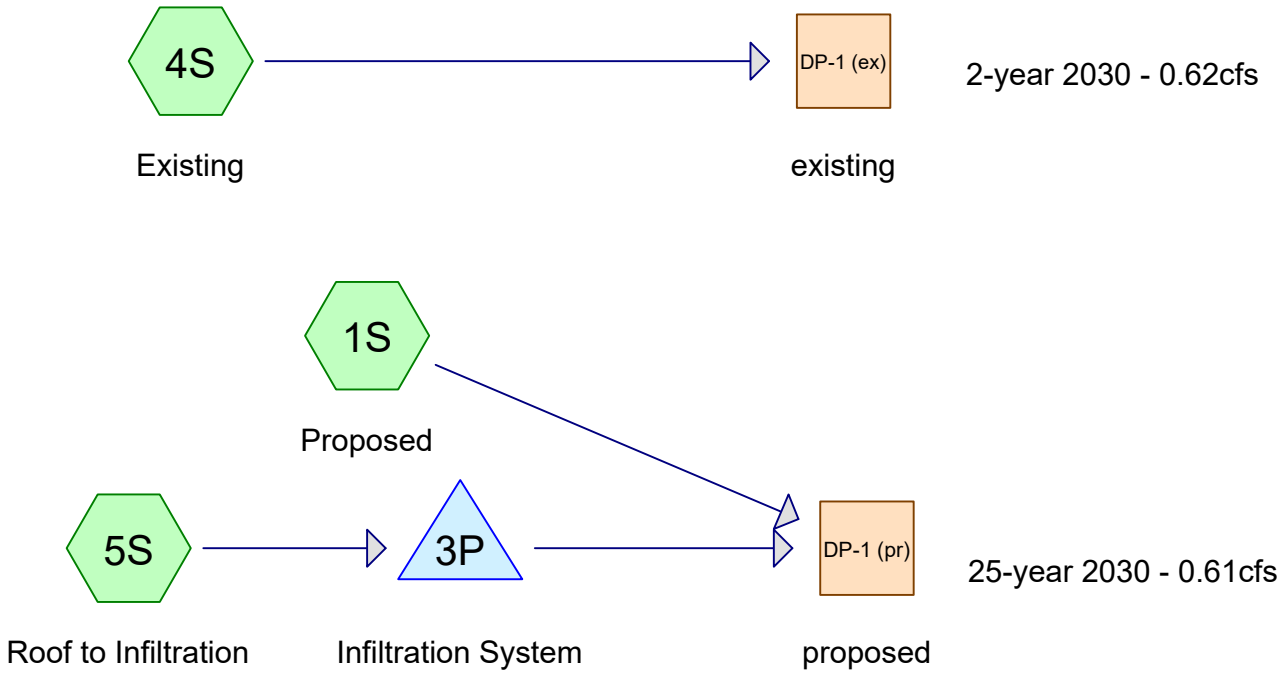
HA20-1(OW)

PROJECT	2072 Massachusetts Avenue	**H&A FILE NO.**	134494-002
LOCATION	Cambridge, Massachusetts	**PROJECT MGR.**	N. Sherwood
CLIENT	CC HRE 2072 Mass Ave	**FIELD REP.**	N. Sherwood
CONTRACTOR	New England Boring Contractors	**DATE**	9/8/2020

ELEVATION OF REFERENCE POINT (CCB) 36.5 **REFERENCE POINT:** **Ground Surface** ☑ **PVC** ☐ **Other** ☐

Date	Time	Elapsed Time (days)	Depth of Water from Reference Point (ft)	Elevation of Water (ft, CCB)	Remarks	Read By
5/23/2020	1430	15	10.5	25.6	--	N. Sherwood
9/8/2020	1030	123	11.4	24.7	--	N. Sherwood

APPENDIX 1B: HYDROCAD CALCULATIONS



Subcat Reach Pond Link

Routing Diagram for 14047 Drainage
Prepared by Nitsch Engineering, Printed 10/7/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.027	98	Green Roof (not analyzed) (5S)
0.003	74	Landscaping (4S)
0.165	98	Pavement (1S, 4S)
0.196	98	Roof (4S, 5S)

Summary for Subcatchment 1S: Proposed

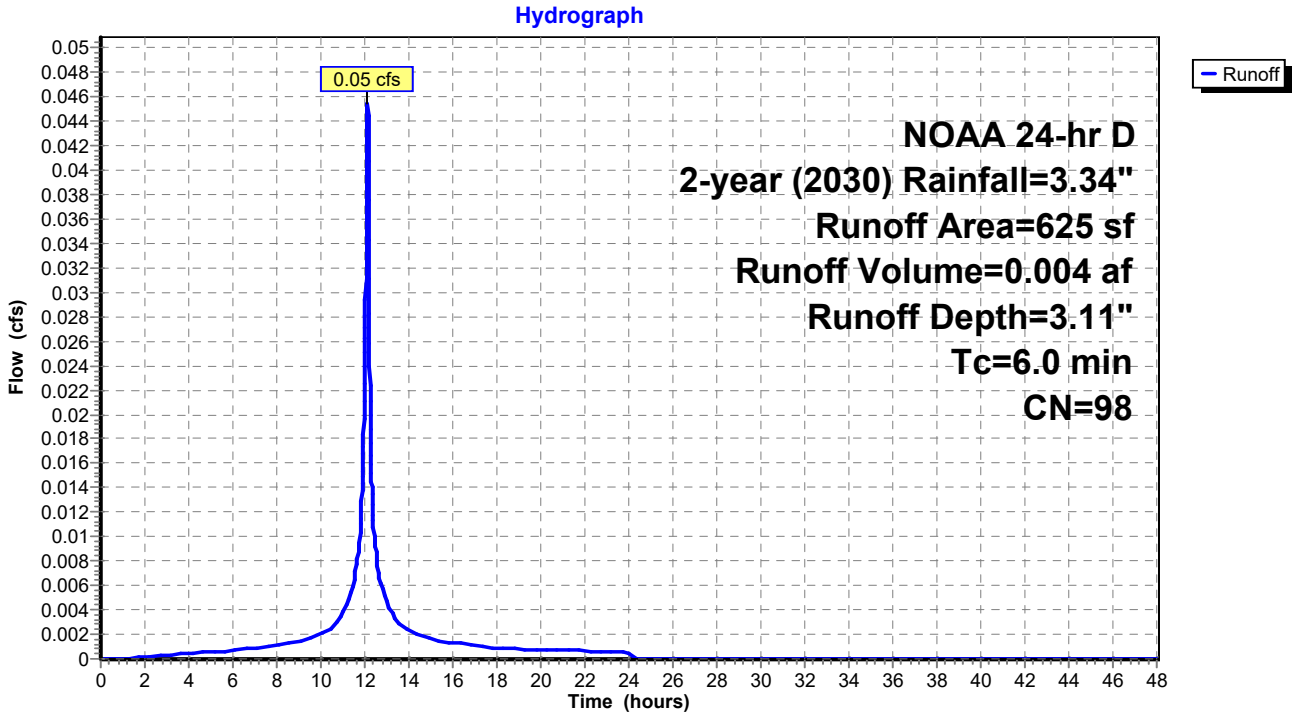
Runoff = 0.05 cfs @ 12.13 hrs, Volume= 0.004 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-year (2030) Rainfall=3.34"

	Area (sf)	CN	Description
*	625	98	Pavement
	625		100.00% Impervious Area

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

Subcatchment 1S: Proposed



Summary for Subcatchment 4S: Existing

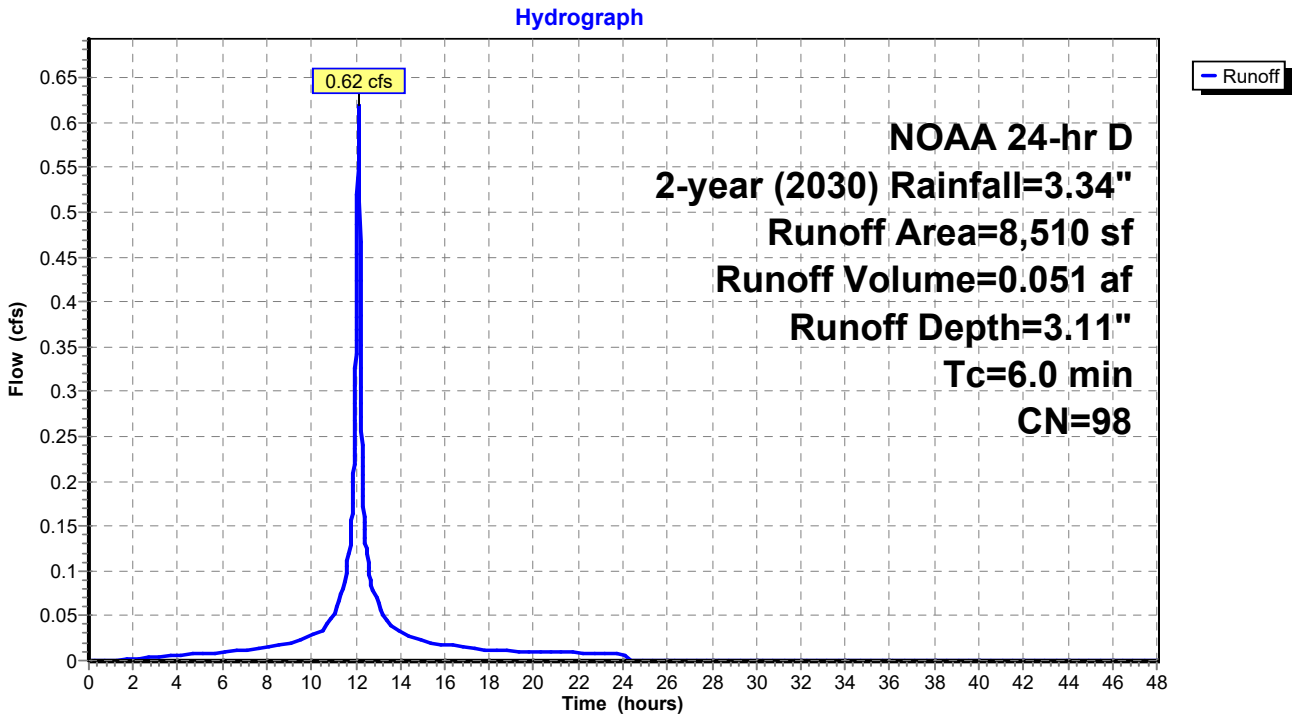
Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.051 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-year (2030) Rainfall=3.34"

	Area (sf)	CN	Description
*	6,561	98	Pavement
*	1,840	98	Roof
*	109	74	Landscaping
	8,510	98	Weighted Average
	109		1.28% Pervious Area
	8,401		98.72% Impervious Area

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

Subcatchment 4S: Existing



Summary for Subcatchment 5S: Roof to Infiltration

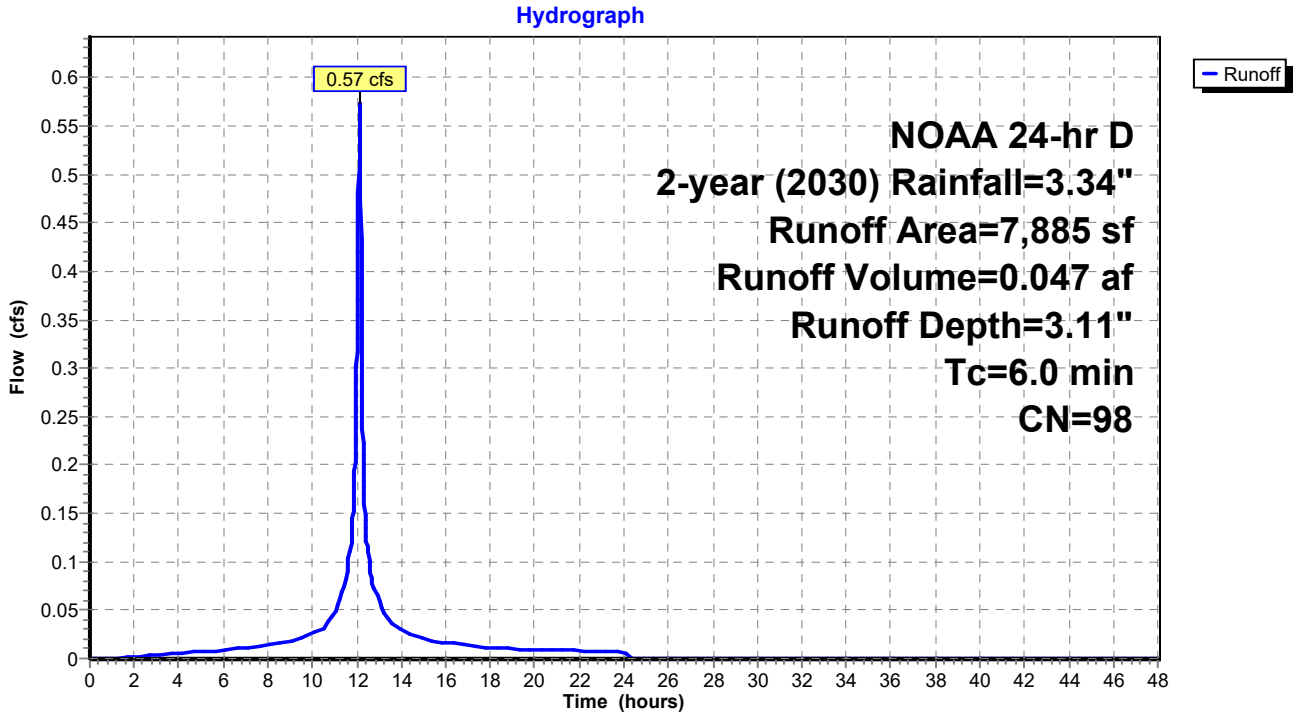
Runoff = 0.57 cfs @ 12.13 hrs, Volume= 0.047 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-year (2030) Rainfall=3.34"

	Area (sf)	CN	Description
*	6,715	98	Roof
*	1,170	98	Green Roof (not analyzed)
	7,885	98	Weighted Average
	7,885		100.00% Impervious Area

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

Subcatchment 5S: Roof to Infiltration

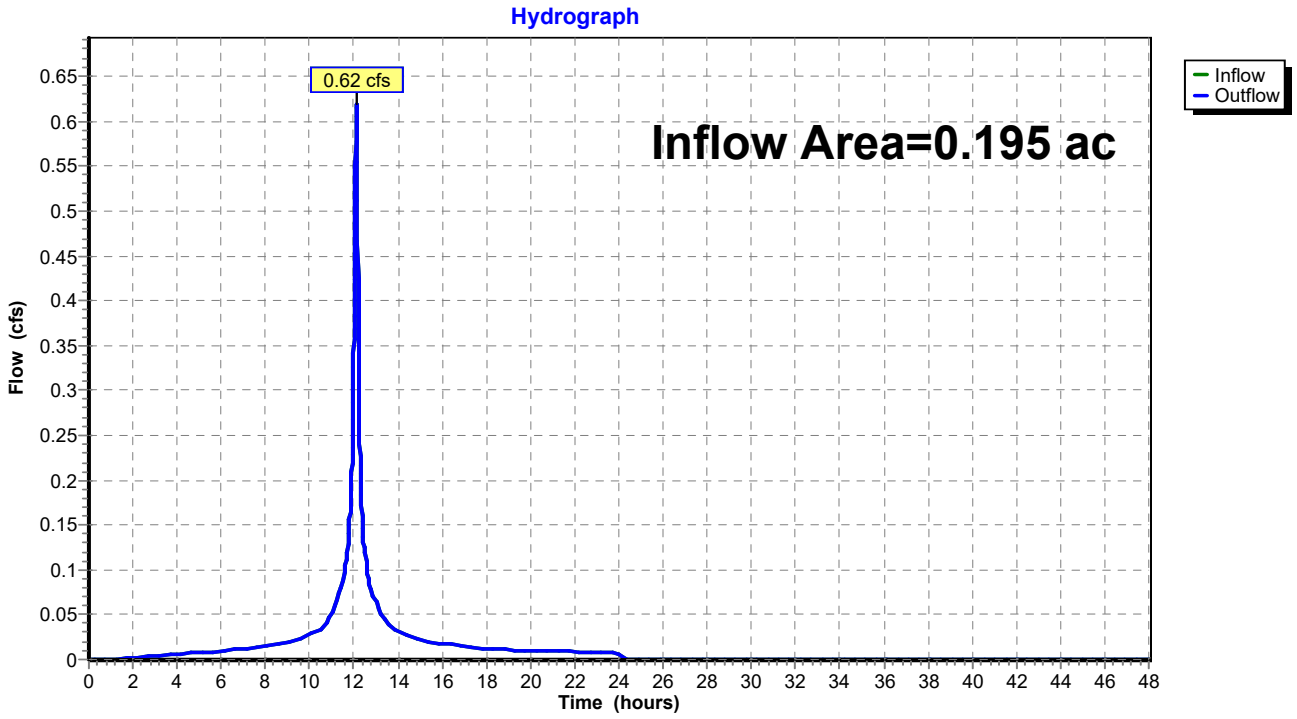


Summary for Reach DP-1 (ex): existing

Inflow Area = 0.195 ac, 98.72% Impervious, Inflow Depth = 3.11" for 2-year (2030) event
Inflow = 0.62 cfs @ 12.13 hrs, Volume= 0.051 af
Outflow = 0.62 cfs @ 12.13 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (ex): existing

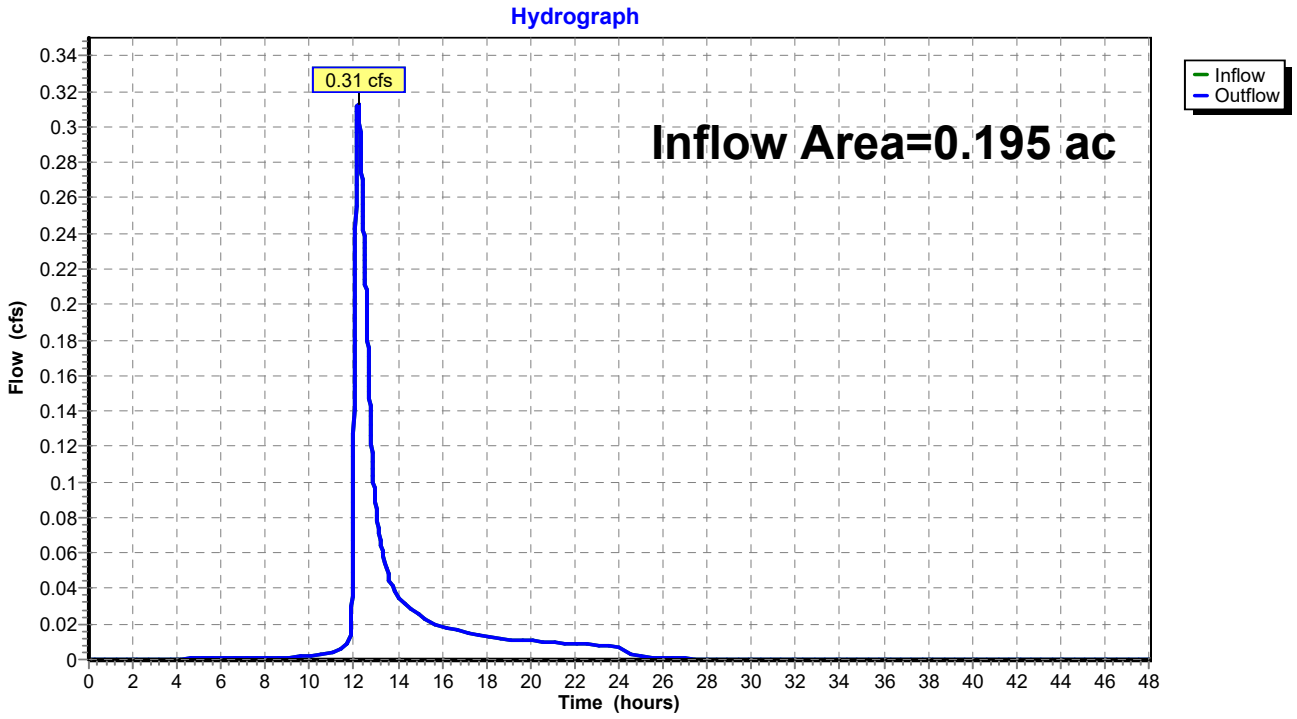


Summary for Reach DP-1 (pr): proposed

Inflow Area = 0.195 ac,100.00% Impervious, Inflow Depth = 2.17" for 2-year (2030) event
Inflow = 0.31 cfs @ 12.19 hrs, Volume= 0.035 af
Outflow = 0.31 cfs @ 12.19 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (pr): proposed



Summary for Pond 3P: Infiltration System

Inflow Area = 0.181 ac,100.00% Impervious, Inflow Depth = 3.11" for 2-year (2030) event
Inflow = 0.57 cfs @ 12.13 hrs, Volume= 0.047 af
Outflow = 0.29 cfs @ 12.23 hrs, Volume= 0.032 af, Atten= 50%, Lag= 6.0 min
Primary = 0.29 cfs @ 12.23 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 32.63' @ 12.23 hrs Surf.Area= 634 sf Storage= 952 cf

Plug-Flow detention time= 228.5 min calculated for 0.032 af (67% of inflow)
Center-of-Mass det. time= 120.9 min (878.3 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	30.00'	725 cf	**10.75'W x 59.00'L x 4.50'H Field A** 2,854 cf Overall - 1,041 cf Embedded = 1,813 cf x 40.0% Voids
#2A	30.50'	834 cf	**ADS N-12 36"** x 4 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= +10.00' x 7.10 sf x 2 rows 8.75' Header x 7.10 sf x 2 = 124.2 cf Inside
		1,559 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	32.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.29 cfs @ 12.23 hrs HW=32.63' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
2=Orifice/Grate (Orifice Controls 0.29 cfs @ 3.28 fps)

Pond 3P: Infiltration System - Chamber Wizard Field A

Chamber Model = ADS N-12 36" (ADS N-12® Pipe)
Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf
Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf
Row Length Adjustment= +10.00' x 7.10 sf x 2 rows

42.0" Wide + 21.0" Spacing = 63.0" C-C Row Spacing

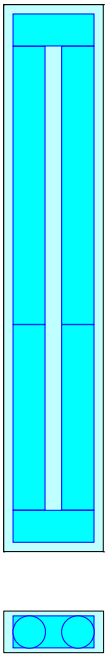
2 Chambers/Row x 20.00' Long +10.00' Row Adjustment +3.50' Header x 2 = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length
2 Rows x 42.0" Wide + 21.0" Spacing x 1 + 12.0" Side Stone x 2 = 10.75' Base Width
6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

4 Chambers x 142.0 cf +10.00' Row Adjustment x 7.10 sf x 2 Rows + 8.75' Header x 7.10 sf x 2 = 834.2 cf Chamber Storage
4 Chambers x 177.1 cf +10.00' Row Adjustment x 8.86 sf x 2 Rows + 8.75' Header x 8.86 sf x 2 = 1,040.7 cf Displacement

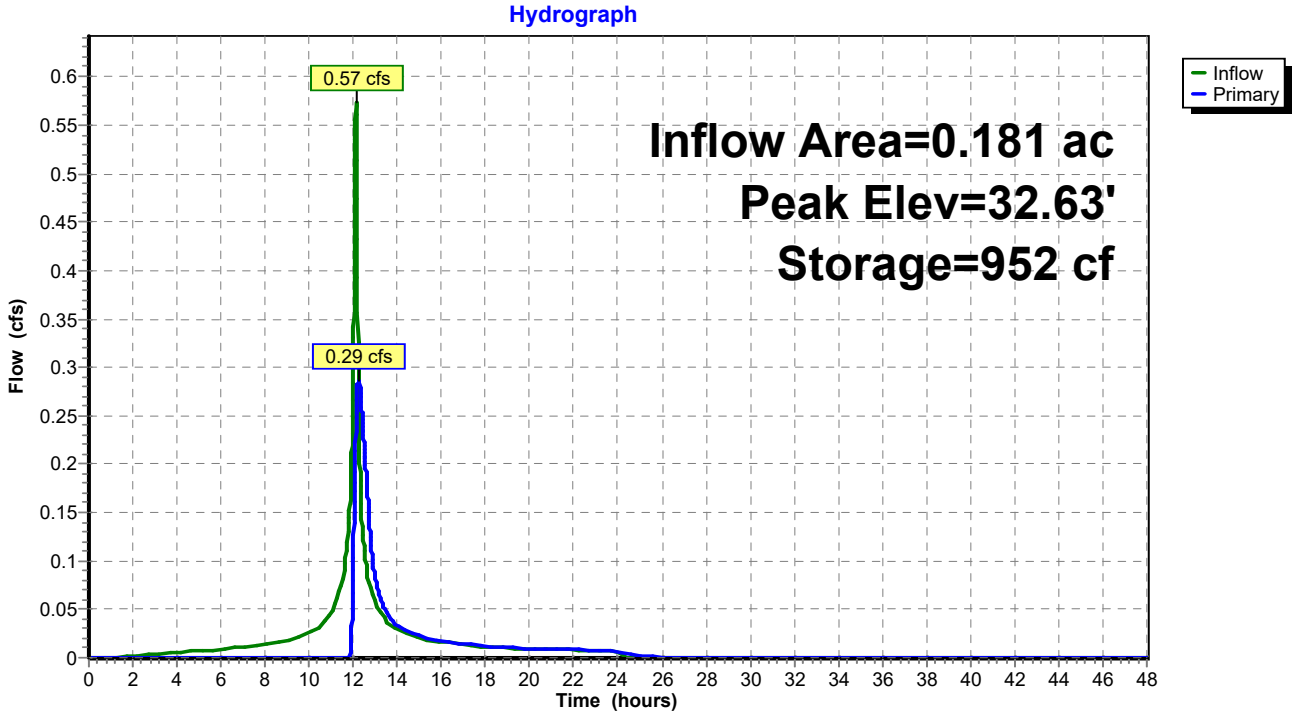
2,854.1 cf Field - 1,040.7 cf Chambers = 1,813.4 cf Stone x 40.0% Voids = 725.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,559.6 cf = 0.036 af
Overall Storage Efficiency = 54.6%
Overall System Size = 59.00' x 10.75' x 4.50'

4 Chambers
105.7 cy Field
67.2 cy Stone



Pond 3P: Infiltration System



Summary for Subcatchment 1S: Proposed

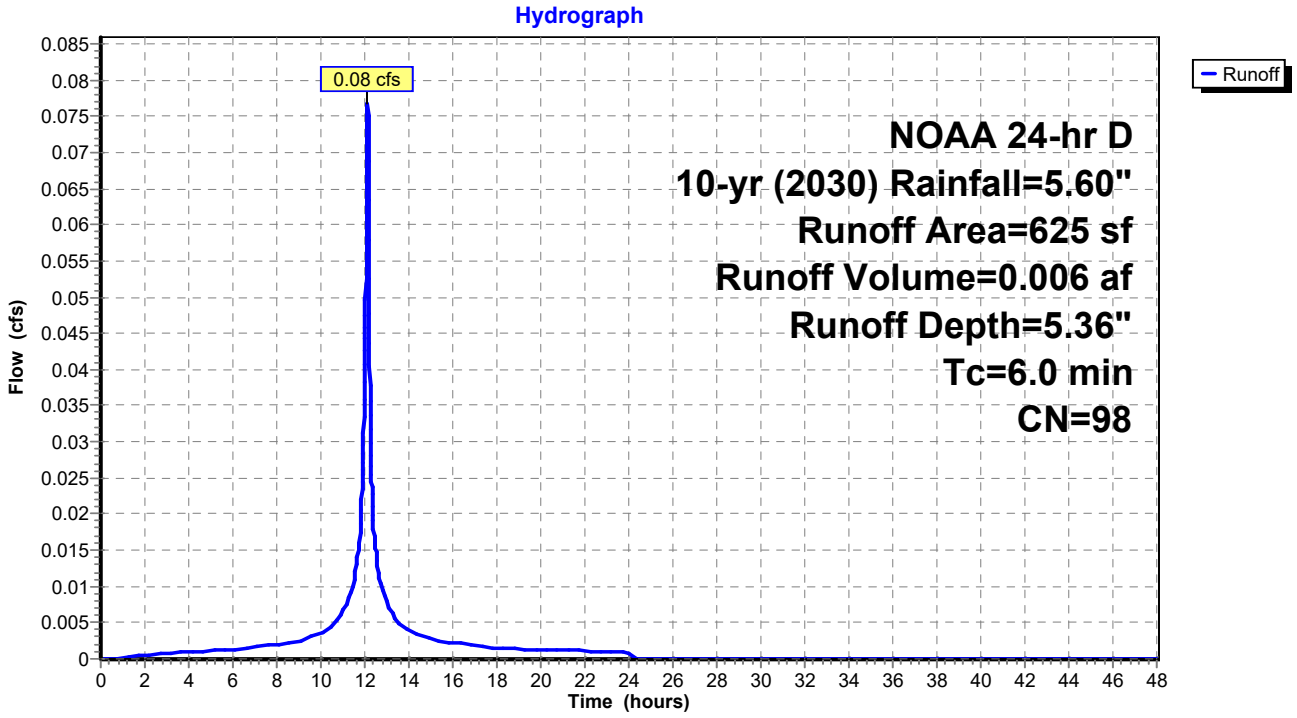
Runoff = 0.08 cfs @ 12.13 hrs, Volume= 0.006 af, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr (2030) Rainfall=5.60"

	Area (sf)	CN	Description
*	625	98	Pavement
	625		100.00% Impervious Area

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

Subcatchment 1S: Proposed



Summary for Subcatchment 4S: Existing

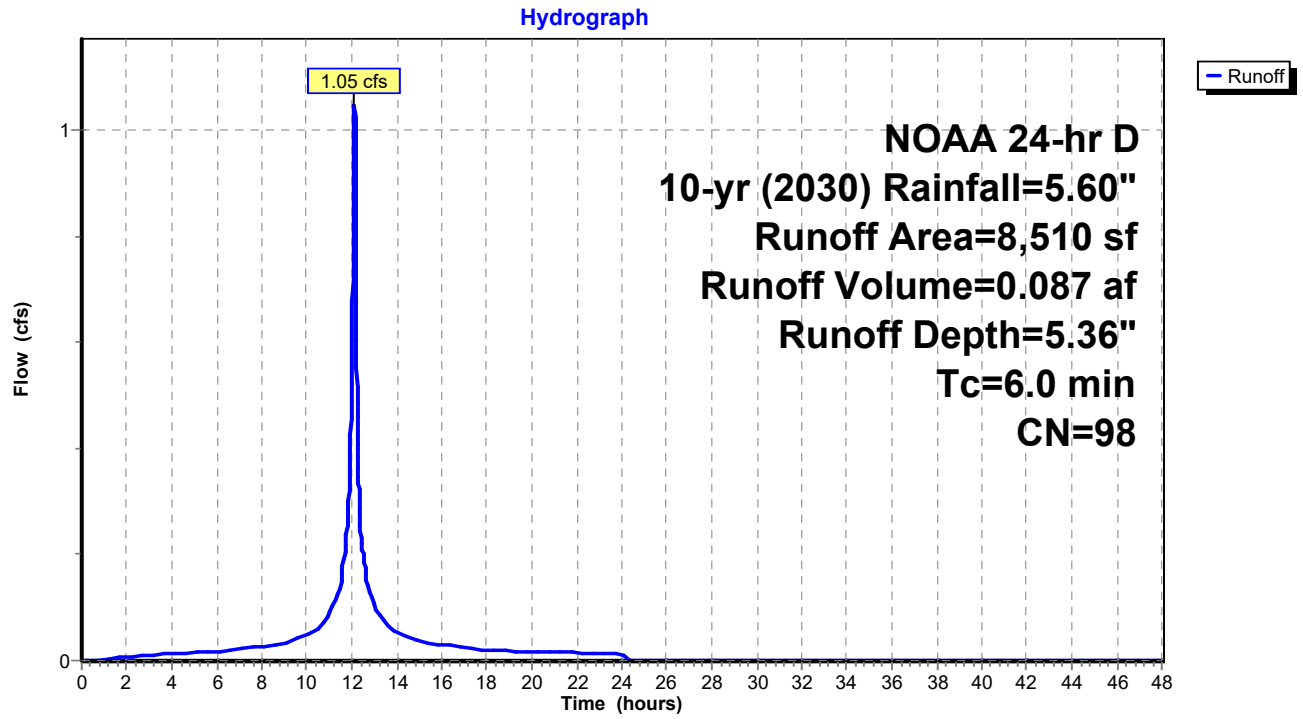
Runoff = 1.05 cfs @ 12.13 hrs, Volume= 0.087 af, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr (2030) Rainfall=5.60"

	Area (sf)	CN	Description
*	6,561	98	Pavement
*	1,840	98	Roof
*	109	74	Landscaping
	8,510	98	Weighted Average
	109		1.28% Pervious Area
	8,401		98.72% Impervious Area

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

Subcatchment 4S: Existing



Summary for Subcatchment 5S: Roof to Infiltration

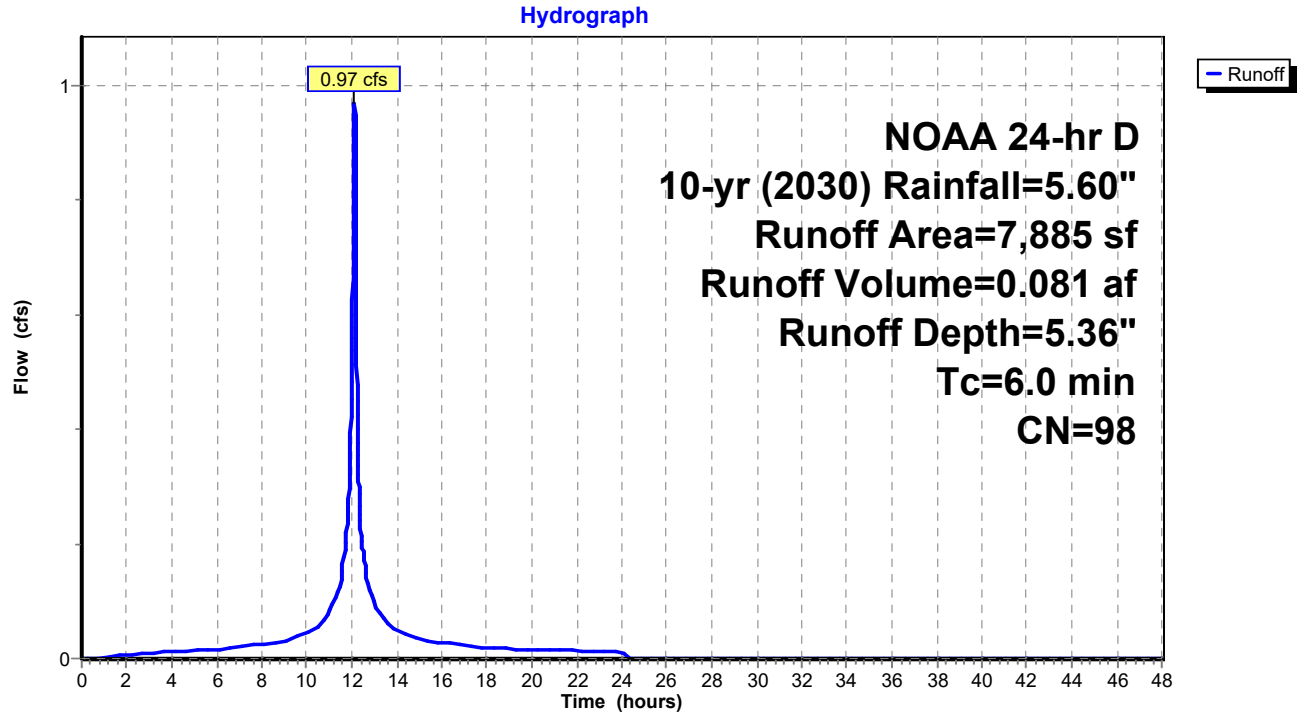
Runoff = 0.97 cfs @ 12.13 hrs, Volume= 0.081 af, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr (2030) Rainfall=5.60"

	Area (sf)	CN	Description
*	6,715	98	Roof
*	1,170	98	Green Roof (not analyzed)
	7,885	98	Weighted Average
	7,885		100.00% Impervious Area

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

Subcatchment 5S: Roof to Infiltration

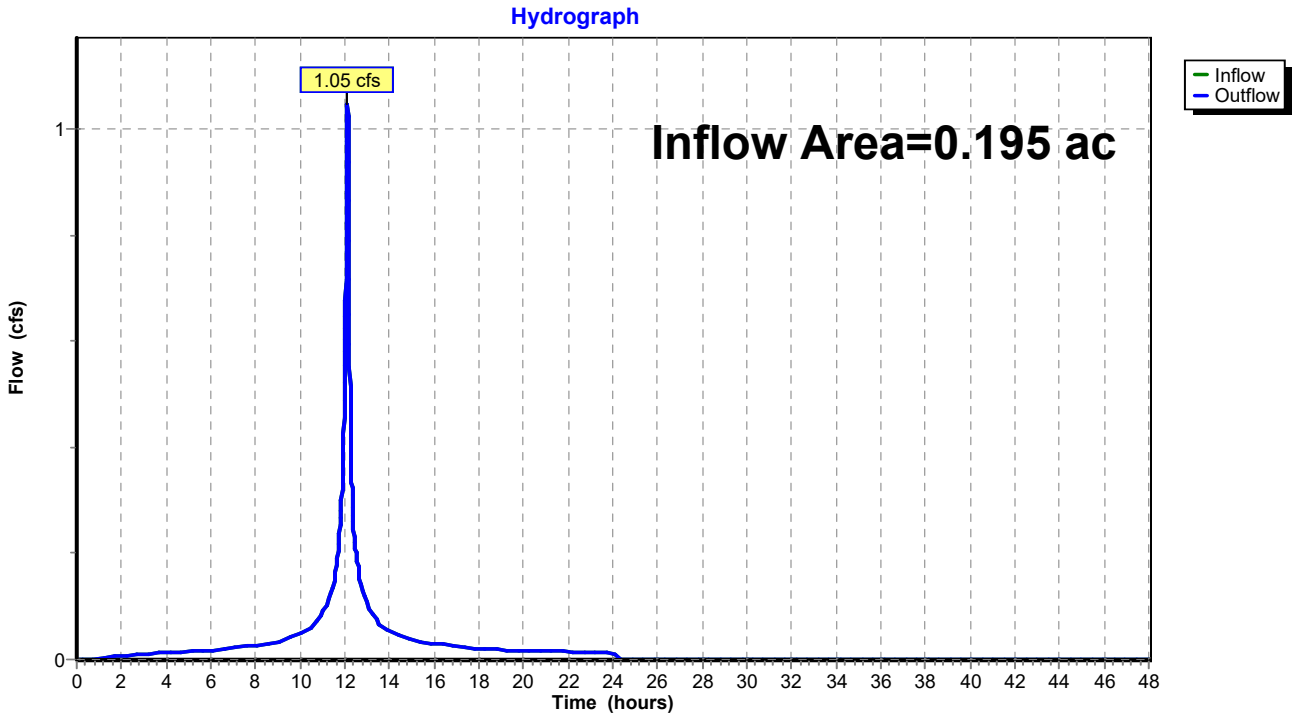


Summary for Reach DP-1 (ex): existing

Inflow Area = 0.195 ac, 98.72% Impervious, Inflow Depth = 5.36" for 10-yr (2030) event
Inflow = 1.05 cfs @ 12.13 hrs, Volume= 0.087 af
Outflow = 1.05 cfs @ 12.13 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (ex): existing

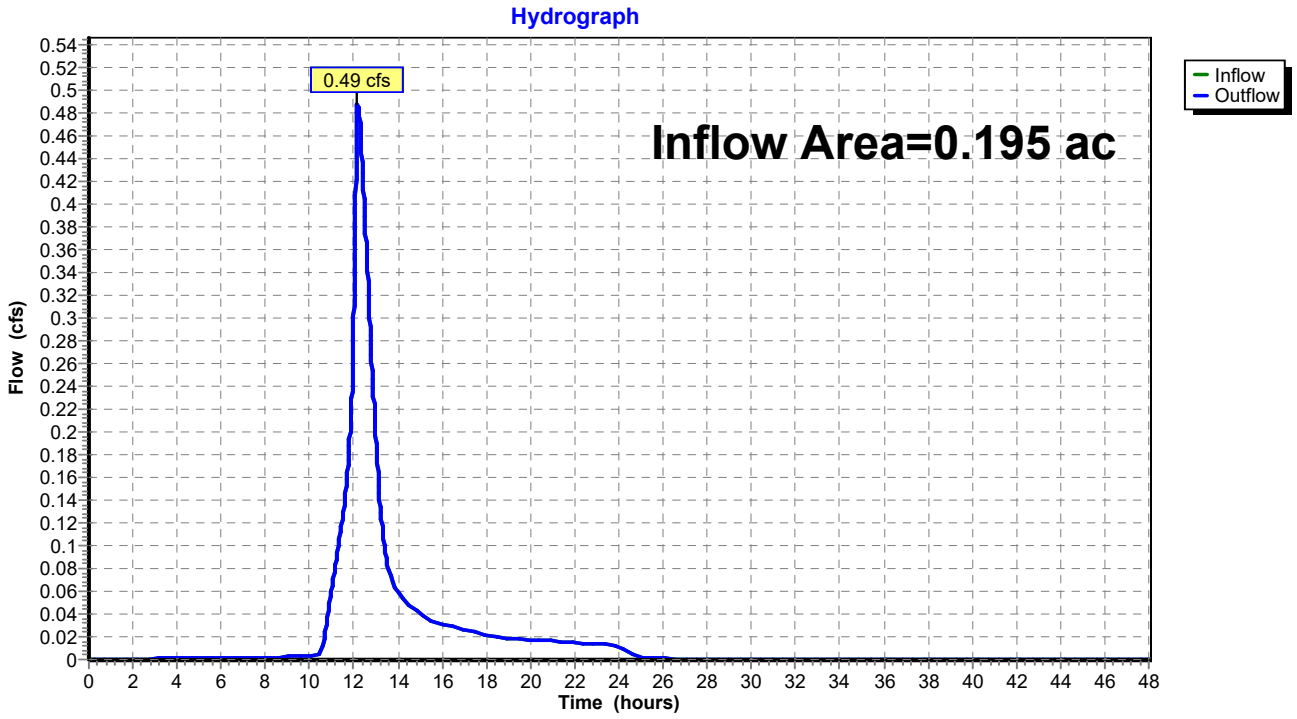


Summary for Reach DP-1 (pr): proposed

Inflow Area = 0.195 ac,100.00% Impervious, Inflow Depth = 4.42" for 10-yr (2030) event
Inflow = 0.49 cfs @ 12.18 hrs, Volume= 0.072 af
Outflow = 0.49 cfs @ 12.18 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (pr): proposed



Summary for Pond 3P: Infiltration System

Inflow Area = 0.181 ac,100.00% Impervious, Inflow Depth = 5.36" for 10-yr (2030) event
Inflow = 0.97 cfs @ 12.13 hrs, Volume= 0.081 af
Outflow = 0.44 cfs @ 12.24 hrs, Volume= 0.066 af, Atten= 54%, Lag= 6.8 min
Primary = 0.44 cfs @ 12.24 hrs, Volume= 0.066 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 33.28' @ 12.24 hrs Surf.Area= 634 sf Storage= 1,229 cf

Plug-Flow detention time= 176.3 min calculated for 0.066 af (81% of inflow)
Center-of-Mass det. time= 94.3 min (841.6 - 747.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	30.00'	725 cf	**10.75'W x 59.00'L x 4.50'H Field A** 2,854 cf Overall - 1,041 cf Embedded = 1,813 cf x 40.0% Voids
#2A	30.50'	834 cf	**ADS N-12 36"** x 4 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= +10.00' x 7.10 sf x 2 rows 8.75' Header x 7.10 sf x 2 = 124.2 cf Inside
		1,559 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	32.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.44 cfs @ 12.24 hrs HW=33.28' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
2=Orifice/Grate (Orifice Controls 0.44 cfs @ 5.09 fps)

Pond 3P: Infiltration System - Chamber Wizard Field A

Chamber Model = ADS N-12 36" (ADS N-12® Pipe)
Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf
Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf
Row Length Adjustment= +10.00' x 7.10 sf x 2 rows

42.0" Wide + 21.0" Spacing = 63.0" C-C Row Spacing

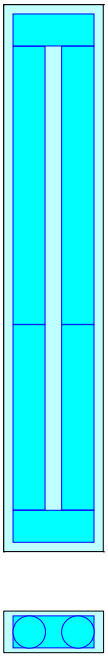
2 Chambers/Row x 20.00' Long +10.00' Row Adjustment +3.50' Header x 2 = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length
2 Rows x 42.0" Wide + 21.0" Spacing x 1 + 12.0" Side Stone x 2 = 10.75' Base Width
6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

4 Chambers x 142.0 cf +10.00' Row Adjustment x 7.10 sf x 2 Rows + 8.75' Header x 7.10 sf x 2 = 834.2 cf Chamber Storage
4 Chambers x 177.1 cf +10.00' Row Adjustment x 8.86 sf x 2 Rows + 8.75' Header x 8.86 sf x 2 = 1,040.7 cf Displacement

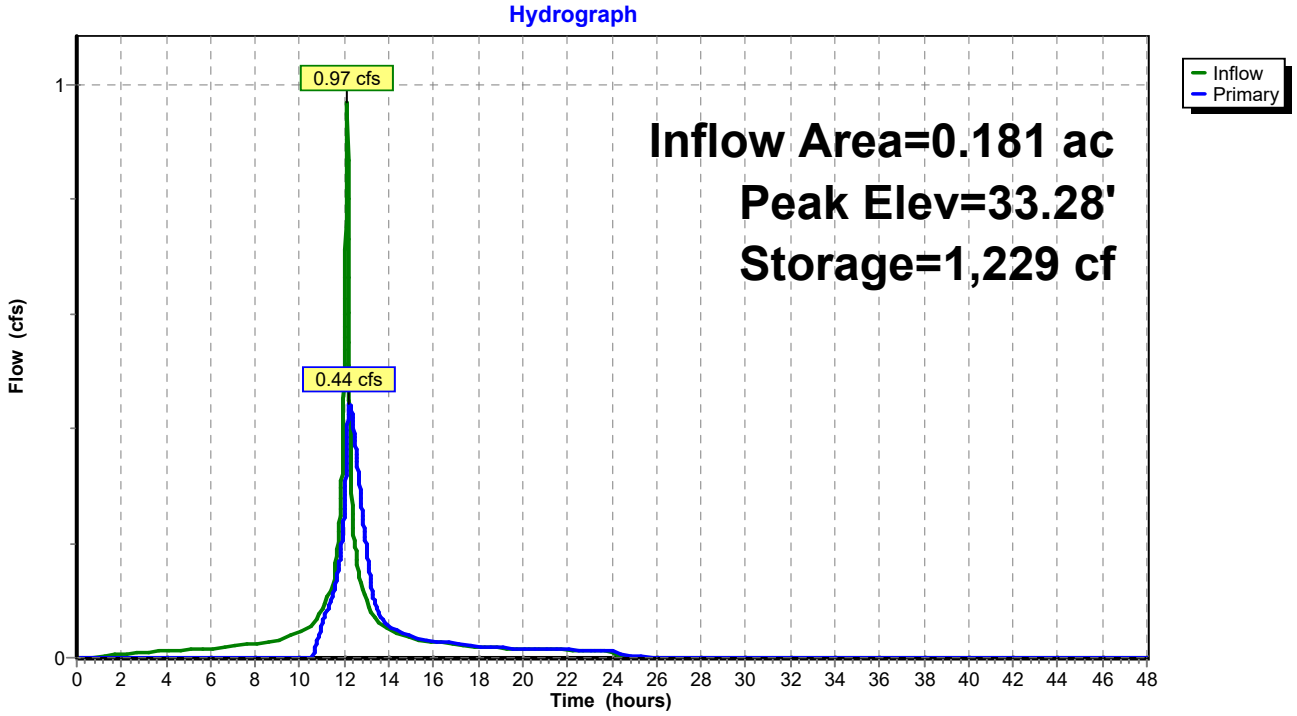
2,854.1 cf Field - 1,040.7 cf Chambers = 1,813.4 cf Stone x 40.0% Voids = 725.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,559.6 cf = 0.036 af
Overall Storage Efficiency = 54.6%
Overall System Size = 59.00' x 10.75' x 4.50'

4 Chambers
105.7 cy Field
67.2 cy Stone



Pond 3P: Infiltration System



Summary for Subcatchment 1S: Proposed

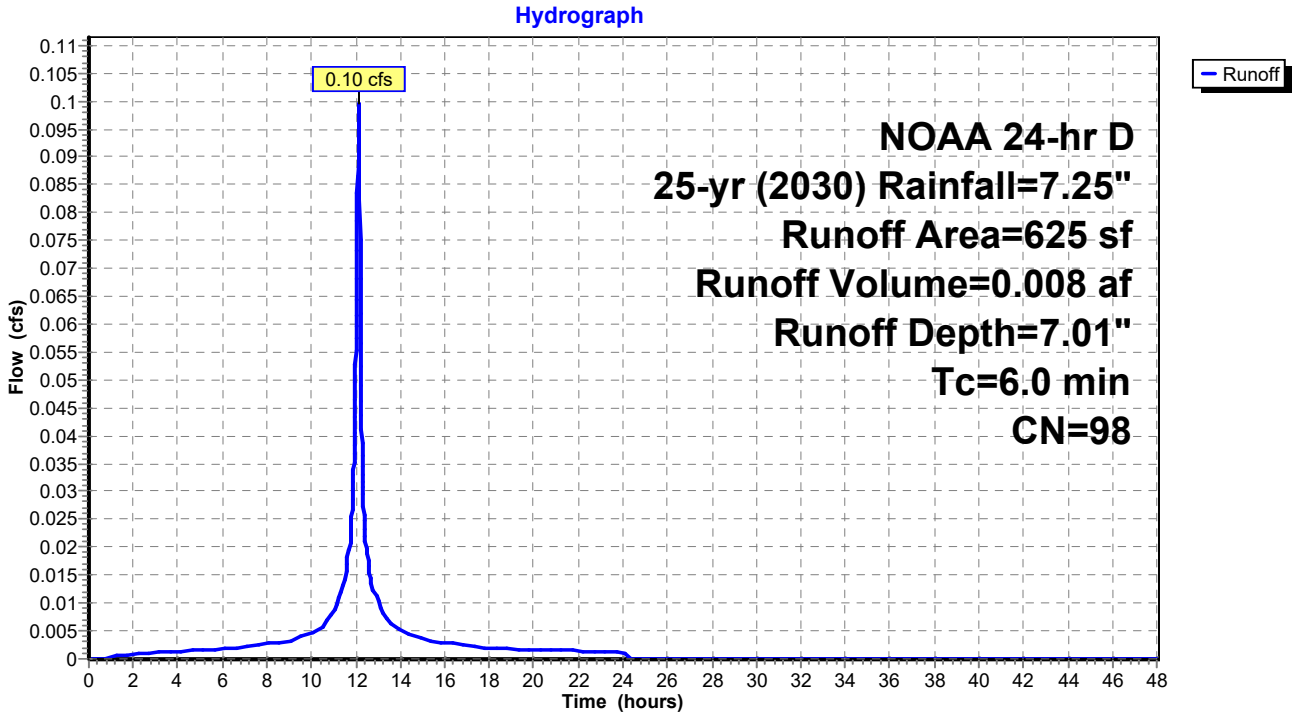
Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.008 af, Depth= 7.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr (2030) Rainfall=7.25"

	Area (sf)	CN	Description
*	625	98	Pavement
	625		100.00% Impervious Area

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

Subcatchment 1S: Proposed



Summary for Subcatchment 4S: Existing

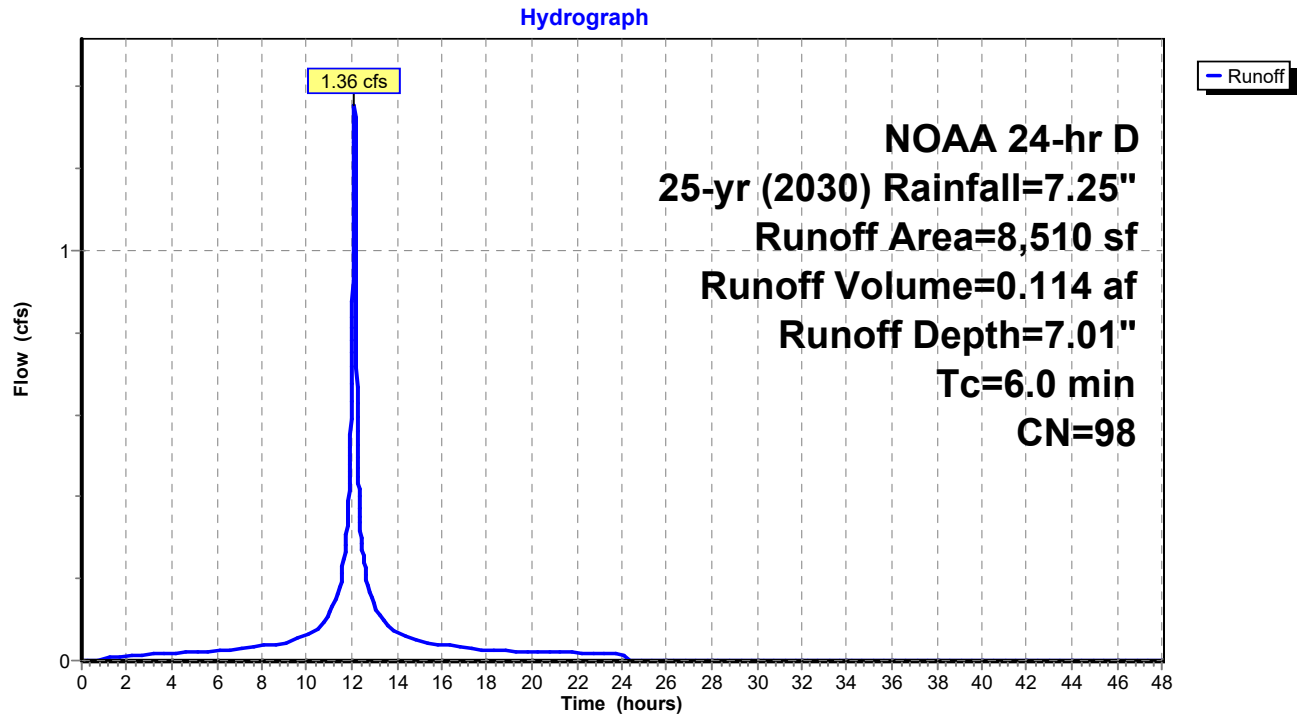
Runoff = 1.36 cfs @ 12.13 hrs, Volume= 0.114 af, Depth= 7.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr (2030) Rainfall=7.25"

	Area (sf)	CN	Description
*	6,561	98	Pavement
*	1,840	98	Roof
*	109	74	Landscaping
	8,510	98	Weighted Average
	109		1.28% Pervious Area
	8,401		98.72% Impervious Area

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

Subcatchment 4S: Existing



Summary for Subcatchment 5S: Roof to Infiltration

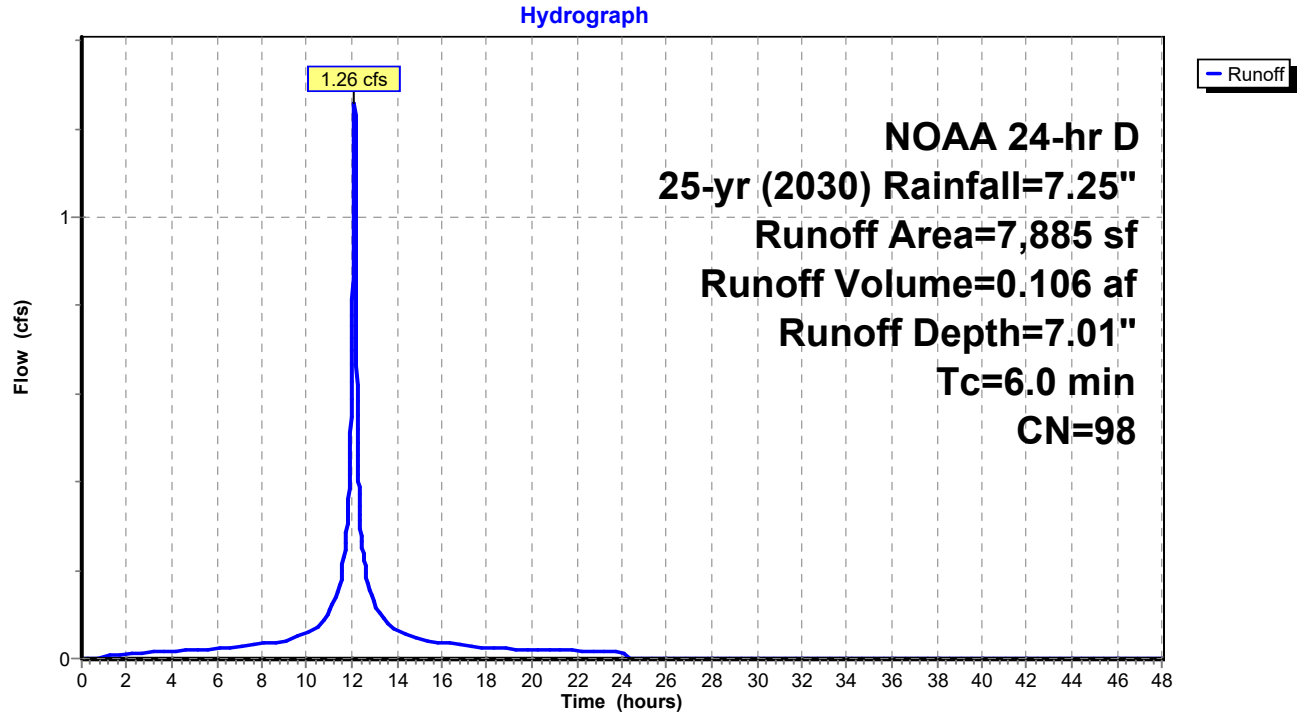
Runoff = 1.26 cfs @ 12.13 hrs, Volume= 0.106 af, Depth= 7.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr (2030) Rainfall=7.25"

	Area (sf)	CN	Description
*	6,715	98	Roof
*	1,170	98	Green Roof (not analyzed)
	7,885	98	Weighted Average
	7,885		100.00% Impervious Area

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

Subcatchment 5S: Roof to Infiltration

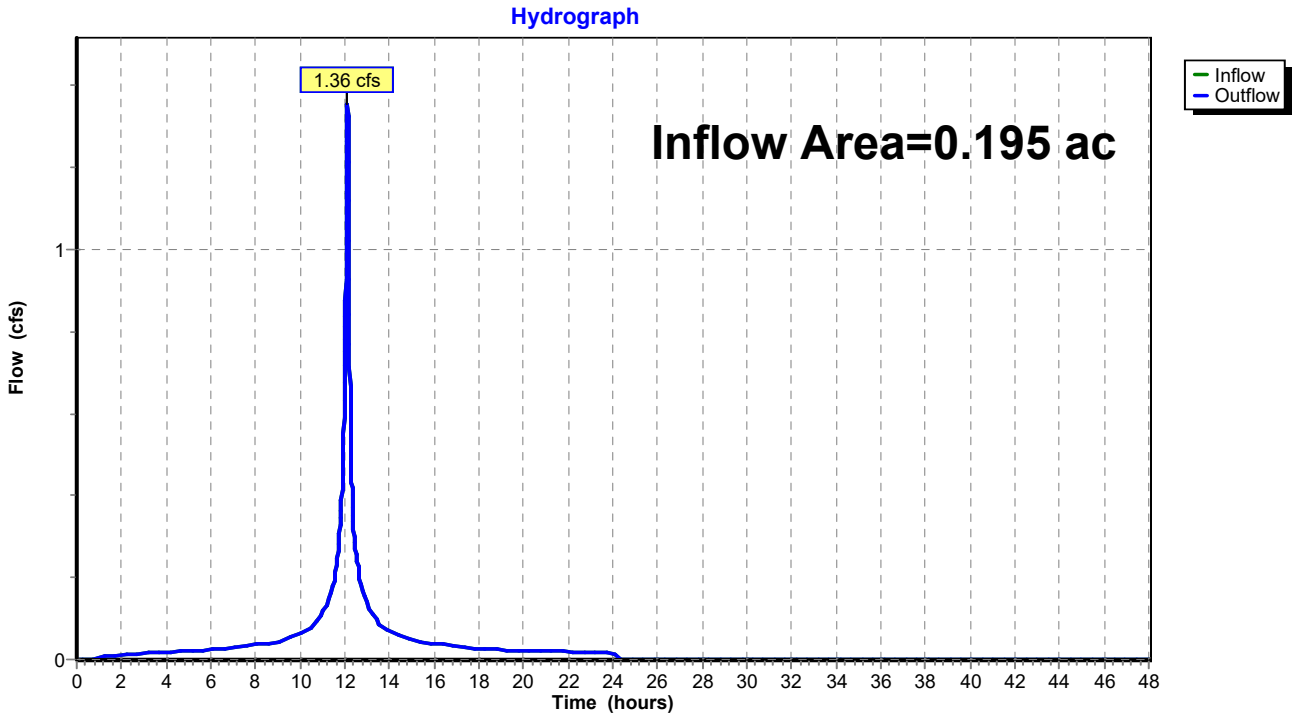


Summary for Reach DP-1 (ex): existing

Inflow Area = 0.195 ac, 98.72% Impervious, Inflow Depth = 7.01" for 25-yr (2030) event
Inflow = 1.36 cfs @ 12.13 hrs, Volume= 0.114 af
Outflow = 1.36 cfs @ 12.13 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (ex): existing

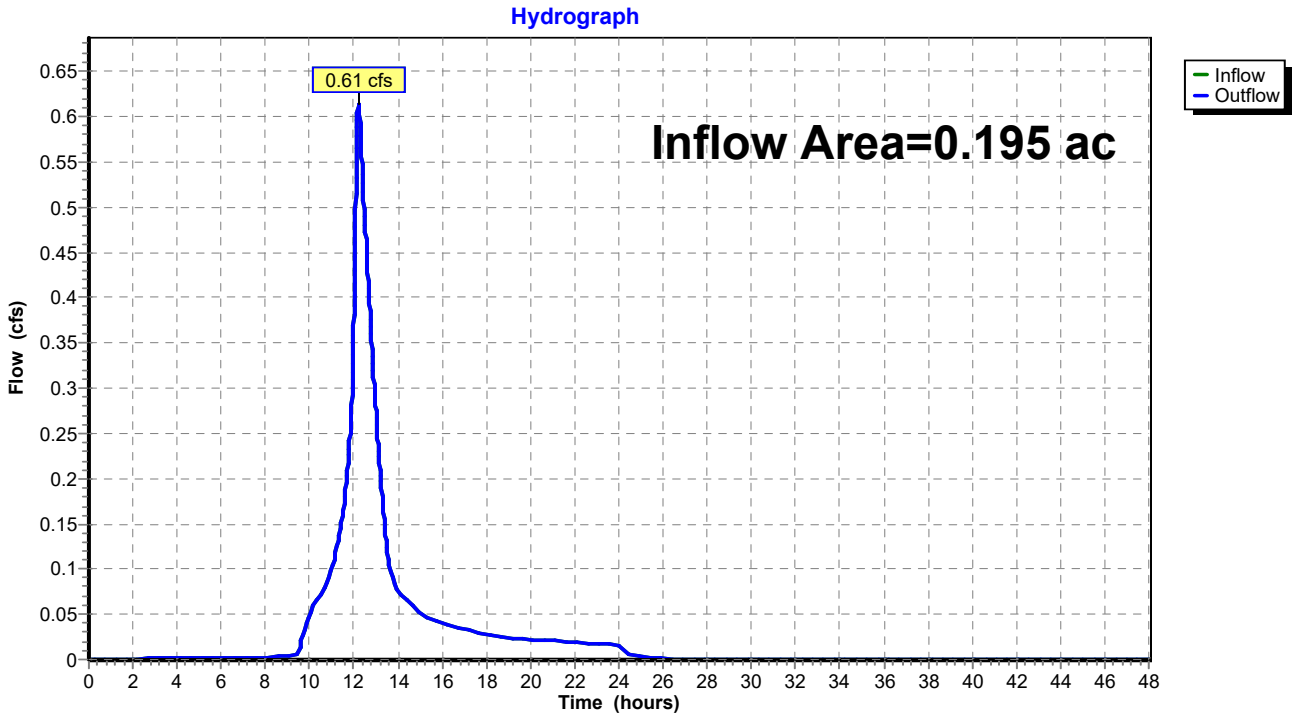


Summary for Reach DP-1 (pr): proposed

Inflow Area = 0.195 ac,100.00% Impervious, Inflow Depth = 6.07" for 25-yr (2030) event
Inflow = 0.61 cfs @ 12.21 hrs, Volume= 0.099 af
Outflow = 0.61 cfs @ 12.21 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (pr): proposed



Summary for Pond 3P: Infiltration System

Inflow Area = 0.181 ac,100.00% Impervious, Inflow Depth = 7.01" for 25-yr (2030) event
Inflow = 1.26 cfs @ 12.13 hrs, Volume= 0.106 af
Outflow = 0.56 cfs @ 12.25 hrs, Volume= 0.090 af, Atten= 55%, Lag= 7.0 min
Primary = 0.56 cfs @ 12.25 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 33.97' @ 12.25 hrs Surf.Area= 634 sf Storage= 1,425 cf

Plug-Flow detention time= 154.2 min calculated for 0.090 af (86% of inflow)
Center-of-Mass det. time= 84.3 min (827.6 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	30.00'	725 cf	**10.75'W x 59.00'L x 4.50'H Field A** 2,854 cf Overall - 1,041 cf Embedded = 1,813 cf x 40.0% Voids
#2A	30.50'	834 cf	**ADS N-12 36"** x 4 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= +10.00' x 7.10 sf x 2 rows 8.75' Header x 7.10 sf x 2 = 124.2 cf Inside
		1,559 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	32.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.56 cfs @ 12.25 hrs HW=33.97' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
2=Orifice/Grate (Orifice Controls 0.56 cfs @ 6.46 fps)

Pond 3P: Infiltration System - Chamber Wizard Field A

Chamber Model = ADS N-12 36" (ADS N-12® Pipe)
Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf
Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf
Row Length Adjustment= +10.00' x 7.10 sf x 2 rows

42.0" Wide + 21.0" Spacing = 63.0" C-C Row Spacing

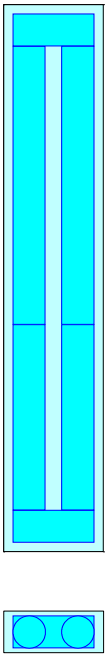
2 Chambers/Row x 20.00' Long +10.00' Row Adjustment +3.50' Header x 2 = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length
2 Rows x 42.0" Wide + 21.0" Spacing x 1 + 12.0" Side Stone x 2 = 10.75' Base Width
6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

4 Chambers x 142.0 cf +10.00' Row Adjustment x 7.10 sf x 2 Rows + 8.75' Header x 7.10 sf x 2 = 834.2 cf Chamber Storage
4 Chambers x 177.1 cf +10.00' Row Adjustment x 8.86 sf x 2 Rows + 8.75' Header x 8.86 sf x 2 = 1,040.7 cf Displacement

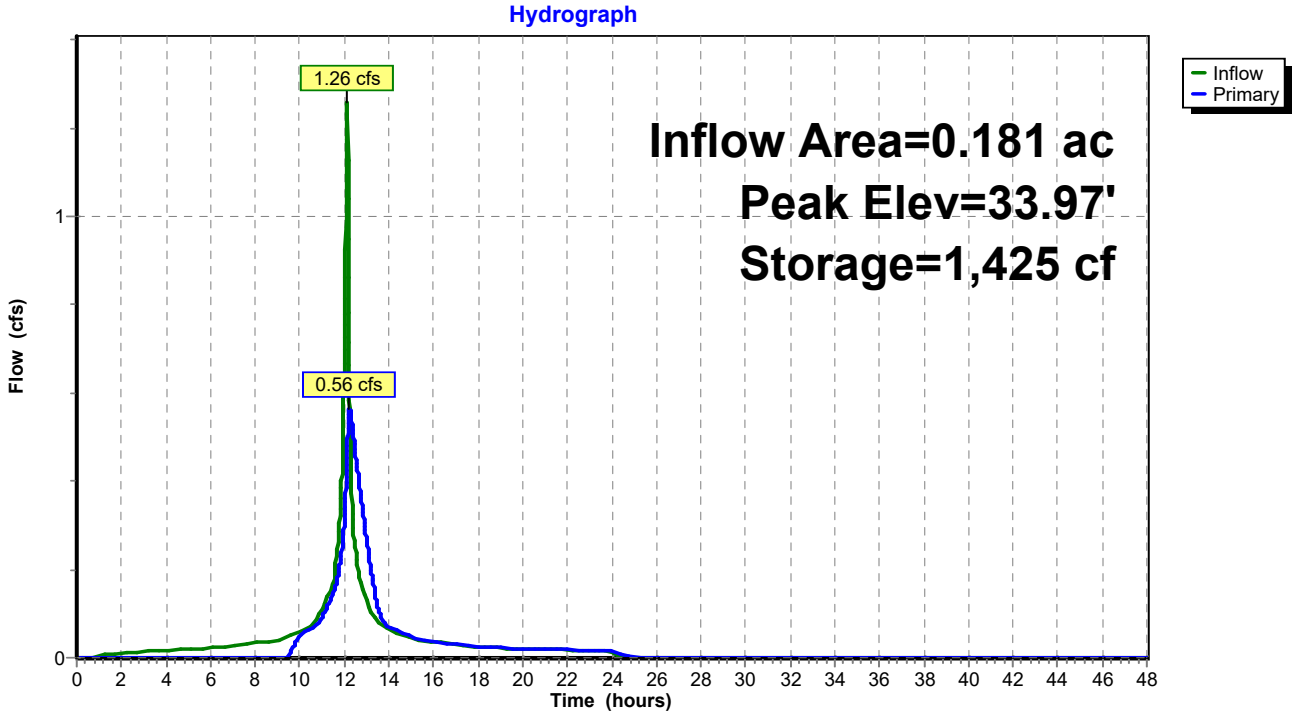
2,854.1 cf Field - 1,040.7 cf Chambers = 1,813.4 cf Stone x 40.0% Voids = 725.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,559.6 cf = 0.036 af
Overall Storage Efficiency = 54.6%
Overall System Size = 59.00' x 10.75' x 4.50'

4 Chambers
105.7 cy Field
67.2 cy Stone



Pond 3P: Infiltration System



Summary for Subcatchment 1S: Proposed

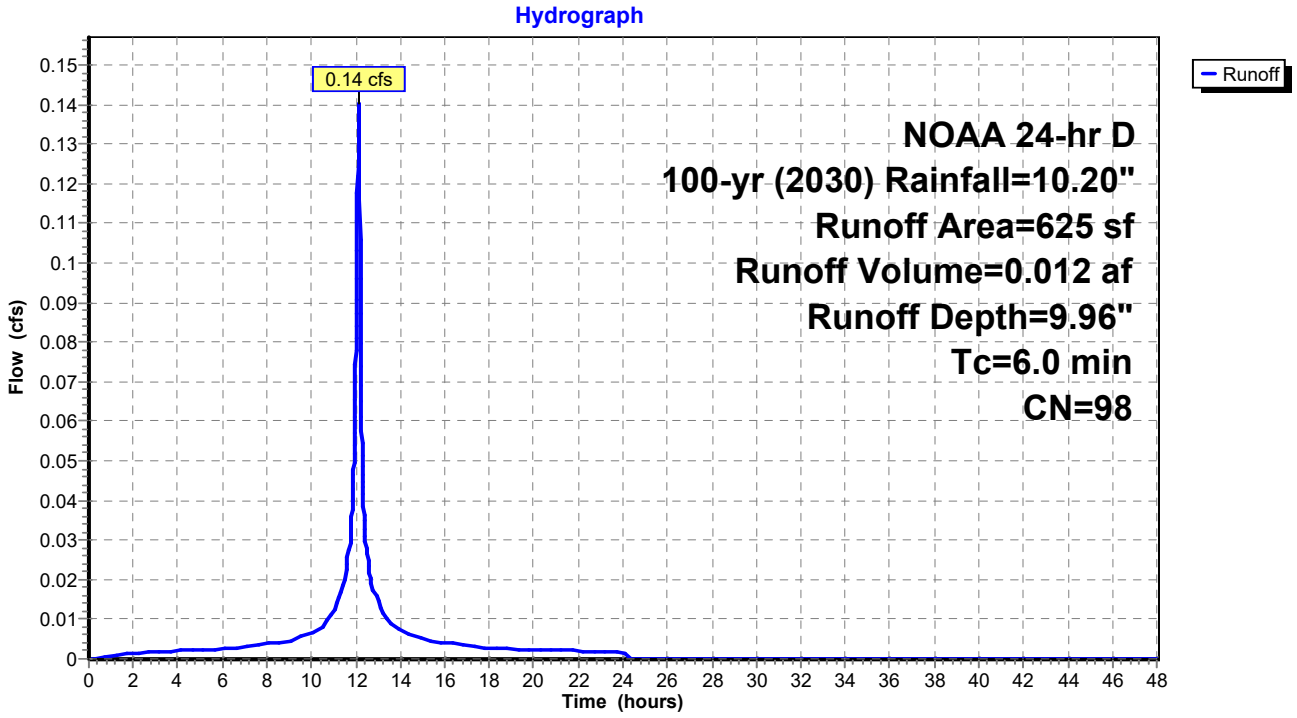
Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.012 af, Depth= 9.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr (2030) Rainfall=10.20"

	Area (sf)	CN	Description
*	625	98	Pavement
	625		100.00% Impervious Area

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

Subcatchment 1S: Proposed



Summary for Subcatchment 4S: Existing

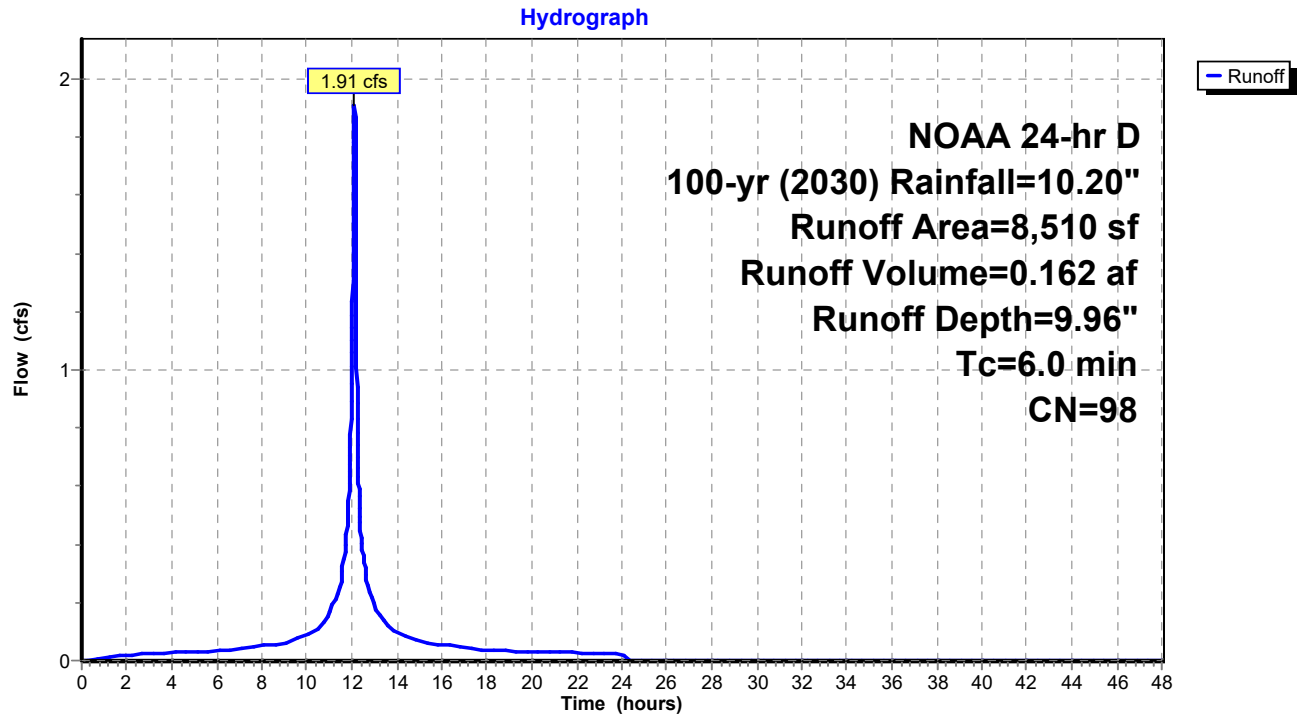
Runoff = 1.91 cfs @ 12.13 hrs, Volume= 0.162 af, Depth= 9.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr (2030) Rainfall=10.20"

	Area (sf)	CN	Description
*	6,561	98	Pavement
*	1,840	98	Roof
*	109	74	Landscaping
	8,510	98	Weighted Average
	109		1.28% Pervious Area
	8,401		98.72% Impervious Area

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

Subcatchment 4S: Existing



Summary for Subcatchment 5S: Roof to Infiltration

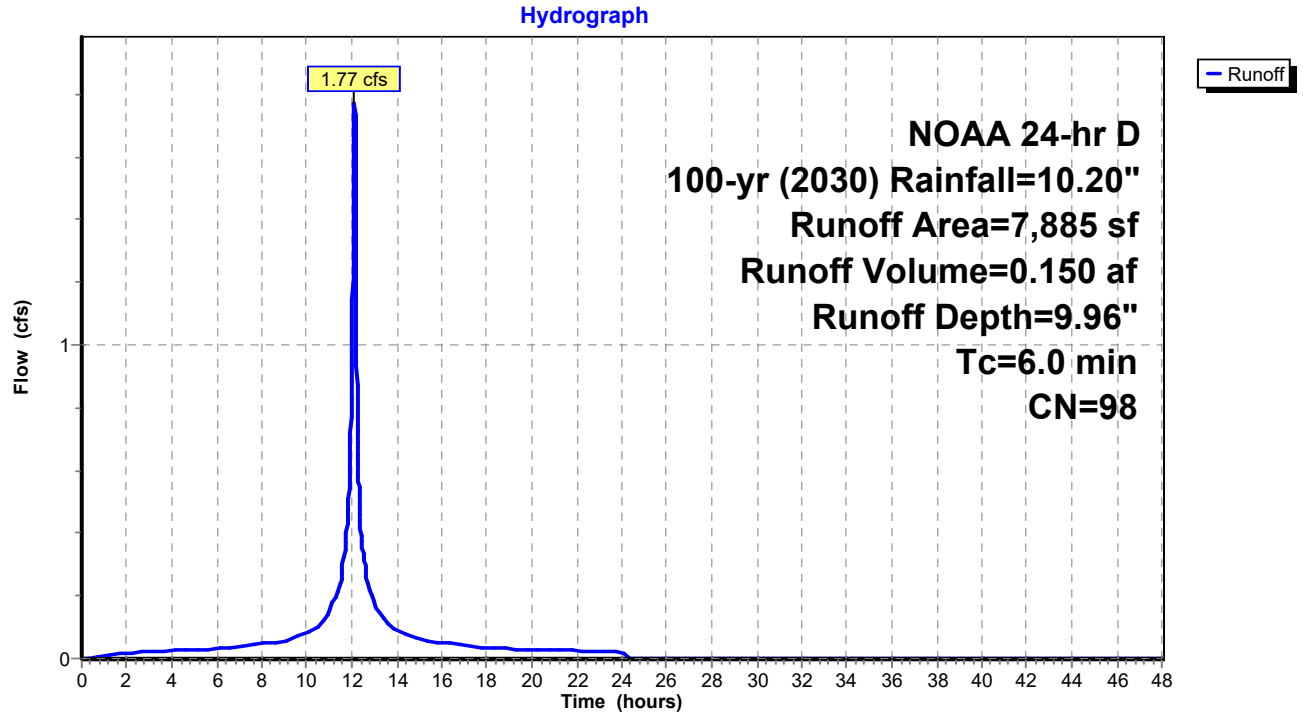
Runoff = 1.77 cfs @ 12.13 hrs, Volume= 0.150 af, Depth= 9.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr (2030) Rainfall=10.20"

	Area (sf)	CN	Description
*	6,715	98	Roof
*	1,170	98	Green Roof (not analyzed)
	7,885	98	Weighted Average
	7,885		100.00% Impervious Area

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

Subcatchment 5S: Roof to Infiltration

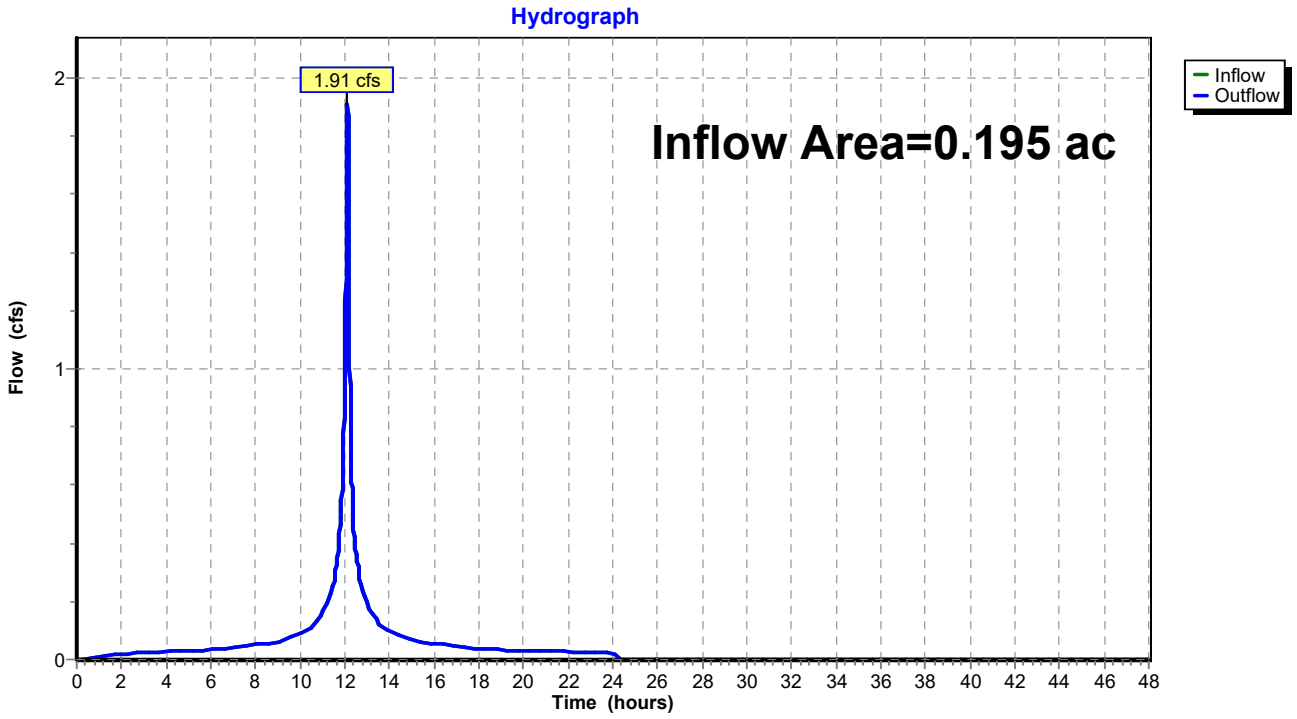


Summary for Reach DP-1 (ex): existing

Inflow Area = 0.195 ac, 98.72% Impervious, Inflow Depth = 9.96" for 100-yr (2030) event
Inflow = 1.91 cfs @ 12.13 hrs, Volume= 0.162 af
Outflow = 1.91 cfs @ 12.13 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (ex): existing

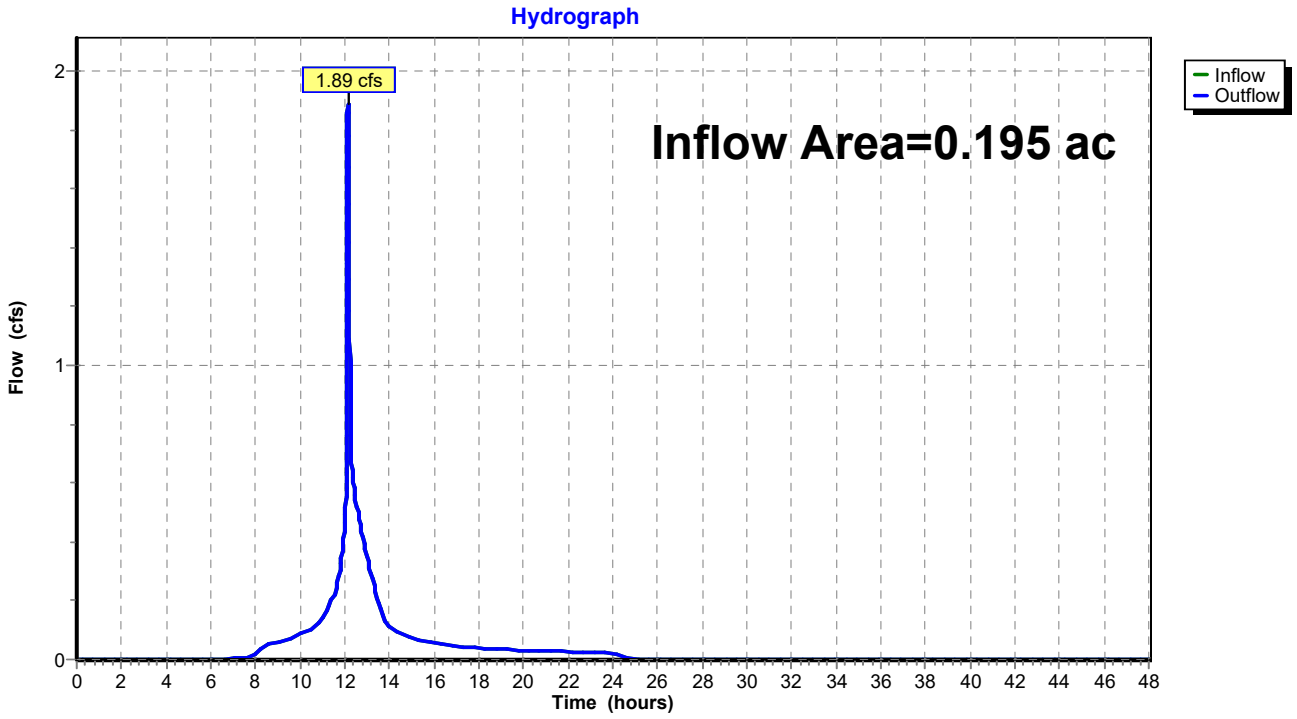


Summary for Reach DP-1 (pr): proposed

Inflow Area = 0.195 ac,100.00% Impervious, Inflow Depth = 9.02" for 100-yr (2030) event
Inflow = 1.89 cfs @ 12.14 hrs, Volume= 0.147 af
Outflow = 1.89 cfs @ 12.14 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP-1 (pr): proposed



Summary for Pond 3P: Infiltration System

Inflow Area = 0.181 ac,100.00% Impervious, Inflow Depth = 9.96" for 100-yr (2030) event
Inflow = 1.77 cfs @ 12.13 hrs, Volume= 0.150 af
Outflow = 1.75 cfs @ 12.14 hrs, Volume= 0.135 af, Atten= 1%, Lag= 0.7 min
Primary = 1.75 cfs @ 12.14 hrs, Volume= 0.135 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 34.20' @ 12.14 hrs Surf.Area= 634 sf Storage= 1,483 cf

Plug-Flow detention time= 125.0 min calculated for 0.135 af (90% of inflow)
Center-of-Mass det. time= 70.0 min (809.0 - 739.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	30.00'	725 cf	**10.75'W x 59.00'L x 4.50'H Field A** 2,854 cf Overall - 1,041 cf Embedded = 1,813 cf x 40.0% Voids
#2A	30.50'	834 cf	**ADS N-12 36"** x 4 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= +10.00' x 7.10 sf x 2 rows 8.75' Header x 7.10 sf x 2 = 124.2 cf Inside
		1,559 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	32.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.74 cfs @ 12.14 hrs HW=34.20' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 1.14 cfs @ 1.46 fps)
2=Orifice/Grate (Orifice Controls 0.60 cfs @ 6.86 fps)

Pond 3P: Infiltration System - Chamber Wizard Field A

Chamber Model = ADS N-12 36" (ADS N-12® Pipe)
Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf
Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf
Row Length Adjustment= +10.00' x 7.10 sf x 2 rows

42.0" Wide + 21.0" Spacing = 63.0" C-C Row Spacing

2 Chambers/Row x 20.00' Long +10.00' Row Adjustment +3.50' Header x 2 = 57.00' Row Length +12.0" End Stone x 2 = 59.00' Base Length
2 Rows x 42.0" Wide + 21.0" Spacing x 1 + 12.0" Side Stone x 2 = 10.75' Base Width
6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

4 Chambers x 142.0 cf +10.00' Row Adjustment x 7.10 sf x 2 Rows + 8.75' Header x 7.10 sf x 2 = 834.2 cf Chamber Storage
4 Chambers x 177.1 cf +10.00' Row Adjustment x 8.86 sf x 2 Rows + 8.75' Header x 8.86 sf x 2 = 1,040.7 cf Displacement

2,854.1 cf Field - 1,040.7 cf Chambers = 1,813.4 cf Stone x 40.0% Voids = 725.4 cf Stone Storage

Chamber Storage + Stone Storage = 1,559.6 cf = 0.036 af
Overall Storage Efficiency = 54.6%
Overall System Size = 59.00' x 10.75' x 4.50'

4 Chambers
105.7 cy Field
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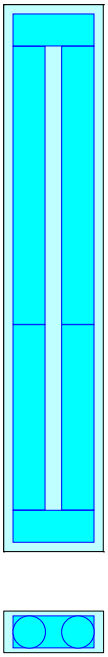
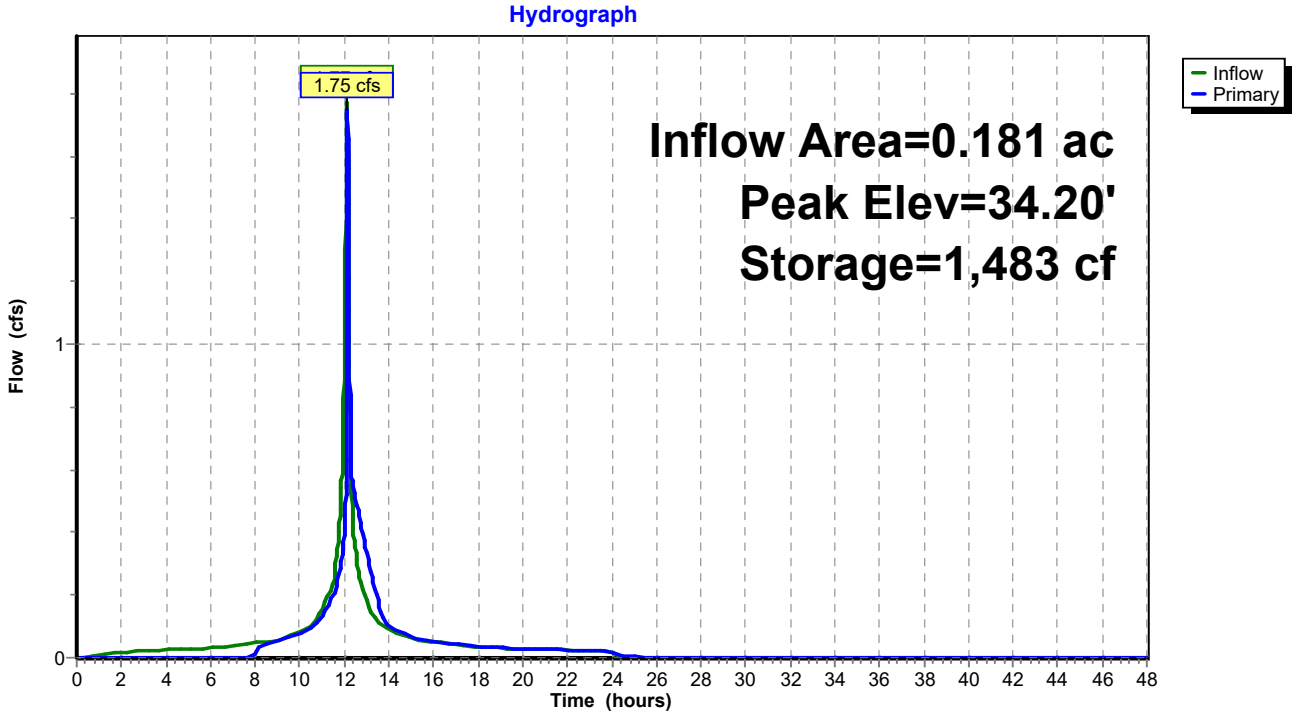


Pond 3P: Infiltration System



APPENDIX 1C: SUPPORTING CALCULATIONS

Phosphorus Removal Calculations

PHOSPHORUS REMOVAL CALCULATIONS

Land Conversion

	Existing			Proposed		
	Area ac	Export Rate lbs/acre/yr	Phosphorus Load lbs P/yr	Area ac	Export Rate lbs/acre/yr	Phosphorus Load lbs P/yr
Impervious - Pavement	0.15	1.78	0.27	0.02	2.32	0.04
Impervious - Roof*	0.04	1.1	0.05	0.11	1.1	0.12
Pervious - Planted Roof	0.00	0.12	0.00	0.07	0.12	0.01
Pervious **	0.00	0.21	0.00	0.00	0.27	0.00
Total	0.20		0.32	0.20		0.17
Total Phosphorus Removal through Land Conversion						0.14
Phosphorus reduction required (65% of Existing Phosphorus Load)						**0.20**
Remaining reduction required after land-use change						**0.06**

*Export rate using average value from compiled research data

** Extensive Green Roof considered pervious

0.57125913

Structural Stormwater Strategies

	Surface Type	Treated Area (ac)	P Load Rate (lbs/ac/yr)	Starting P Load (lbs/yr)	P Removal (%)	P Removed (lbs/yr)
Infiltration	Roof	0.111	1.1	0.122		0.105
	Pavement	0.000	1.78	0.000	86%	0.00
	Landscape	0.000	0.27	0.000		0.000
				0.12		**0.11**
Stormceptor	Roof	0.0	1.1	0.000		0.00
	Pavement	0.0	1.78	0.000	25%	0.00
	Landscape	0.0	0.27	0.000		0.00
				0.00		**0.00**

Total Phosphorus Removed	**0.25**

Table 2-1: Proposed average annual distinct P Load export rates for use in estimating P Load reduction credits in the MA MS4 Permit

Phosphorus Source Category by Land Use	Land Surface Cover	P Load Export Rate, lbs/acre/year	P Load Export Rate, kg/ha/yr
Commercial (Com) and Industrial (Ind)	Directly connected impervious	1.78	2.0
	Pervious	See* DevPERV	See* DevPERV
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	2.6
	Pervious	See* DevPERV	See* DevPERV
Medium -Density Residential (MDR)	Directly connected impervious	1.96	2.2
	Pervious	See* DevPERV	See* DevPERV
Low Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Highway (HWY)	Directly connected impervious	1.34	1.5
	Pervious	See* DevPERV	See* DevPERV
Forest (For)	Directly connected impervious	1.52	1.7
	Pervious	0.13	0.13
Open Land (Open)	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Agriculture (Ag)	Directly connected impervious	1.52	1.7
	Pervious	0.45	0.5
*Developed Land Pervious (DevPERV) – HSG A	Pervious	0.03	0.03
*Developed Land Pervious (DevPERV) – HSG B	Pervious	0.12	0.13
*Developed Land Pervious (DevPERV) – HSG C	Pervious	0.21	0.24
*Developed Land Pervious (DevPERV) – HSG C/D	Pervious	0.29	0.33
*Developed Land Pervious (DevPERV) – HSG D	Pervious	0.37	0.41

Notes:

- For pervious areas, if the hydrologic soil group (HSG) is known, use the appropriate value from this table. If the HSG is not known, assume HSG C conditions for the phosphorus load export rate.
- Agriculture includes row crops. Actively managed hay fields and pasture lands. Institutional land uses such as government properties, hospitals and schools are to be included in the commercial and industrial land use grouping for the purpose of calculating phosphorus loading.
- Impervious surfaces within the forest land use category are typically roadways adjacent to forested pervious areas.

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 10

- Parking and Traffic Assessment

MEMORANDUM

TO: Mr. Jason Korb
Sean Hope, Esq.
CC HRE 2072 Mass Ave LLC
c/o Capstone Communities LLC
1087 Beacon Street, Suite 302
Newton, MA 02459

FROM: F. Giles Ham, P.E. *and*
Derek Roach, E.I.T
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810
(978) 474-8800

DATE: October 13, 2020 **RE:** 8716

SUBJECT: Parking and Traffic Assessment - Proposed Residential Development
2072 Massachusetts Avenue, Cambridge, Massachusetts

Vanasse & Associates, Inc. (VAI) has completed a Parking and Traffic Assessment of a proposed 49-unit 100% affordable residential development with 1,040 square feet (sf) or ground floor retail to be located at 2072 Massachusetts Avenue in Cambridge, Massachusetts (Project). Two short-term drop-off/pick-up spaces are proposed on-site. Contained within this memorandum is a parking supply and demand analysis within a quarter mile radius of site, estimated trip generation by mode split and a recommended a Travel Demand Management plan (TDM) for the proposed project.

PARKING SUPPLY AND DEMAND ANALYSIS

A comprehensive field inventory of the existing parking supply within approximately a quarter-mile radius of the Project was conducted in September 2020. Figure 1 depicts the study area. The field inventory consisted of on-street parking by quantity and type (handicapped, permit only and regulations). The study area was subdivided into twenty-eight (28) parking zones in order to identify parking trends occurring within the study area. Figure 2 identifies the parking regulations and number of parking spaces (1,145) in the area. Figure 3 depicts the residential permit parking spaces, handicap spaces, and spaces with no regulations which total 985 of the 1,145 spaces.

In order to determine the availability of parking spaces, a parking demand survey was conducted during a typical weekday (Tuesday September 22, 2020). The parking observations were conducted every 2 hours from 10:00 AM to 10:00 PM. Table 1 and Figure 4 summarize the parking demand observations for the available resident parking.

As shown in Table 1 and Figure 4 the peak demand occurs at 8:00 PM when 318 spaces were vacant. The Project has proposed only 3 handicap spaces on-site and all other parking will be on-street. By not providing parking, the Project impact will be minimized as auto ownership will be discouraged. Auto ownership is expected at 0.50 vehicles per unit or 25 vehicles. Zoning requires one space per unit. Typical residential peak parking occurs at 10:00 PM and after, when most residents are home for the night on weekdays. Based upon the parking analysis, there is more than adequate on-street parking to accommodate the Project.

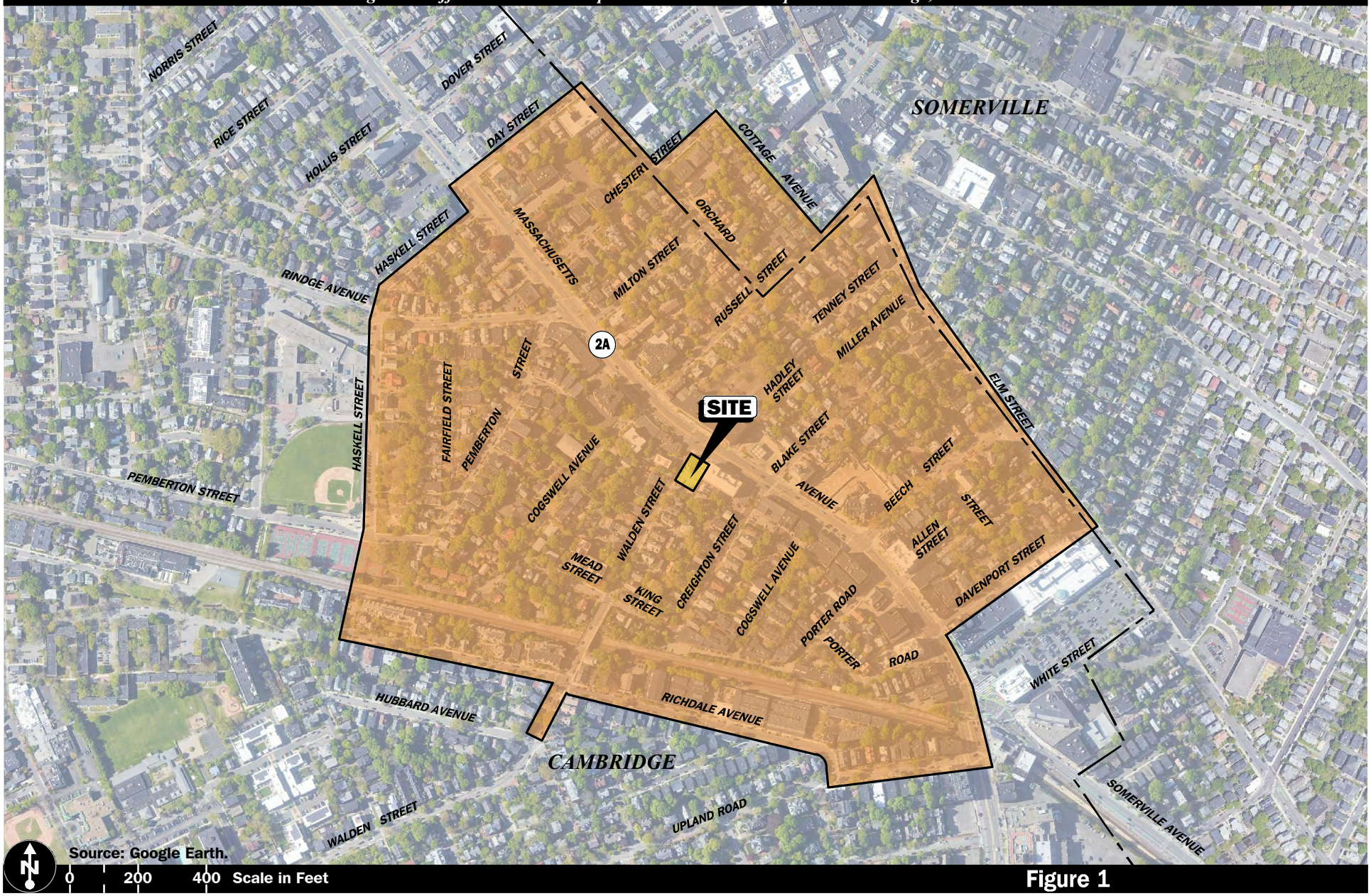


Figure 1

Parking Supply Area

Vanasse & Associates inc

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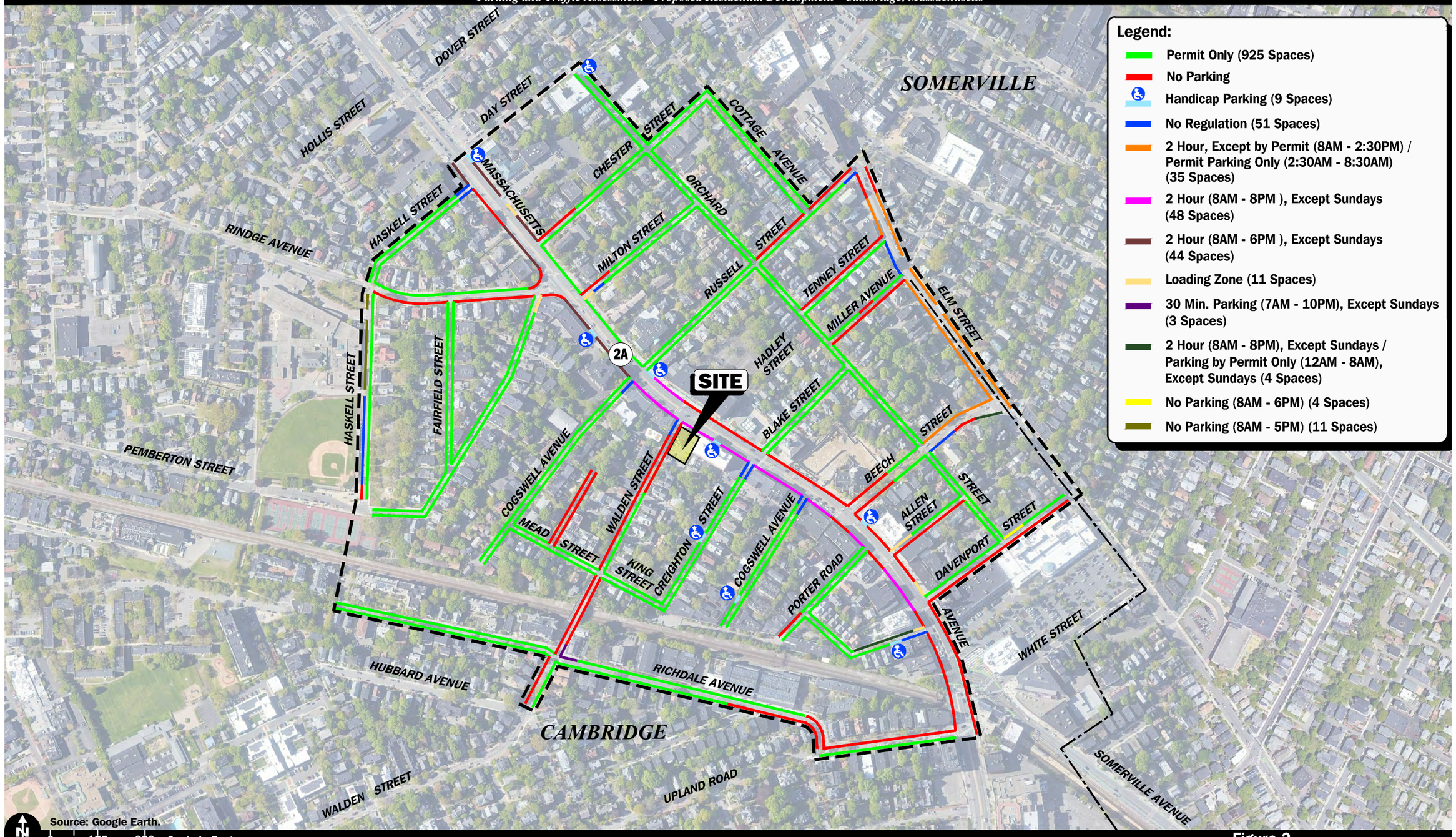

Source: Google Earth.

0 175 350 Scale in Feet

Figure 2

Existing Parking Regulations

Vanasse & Associates inc

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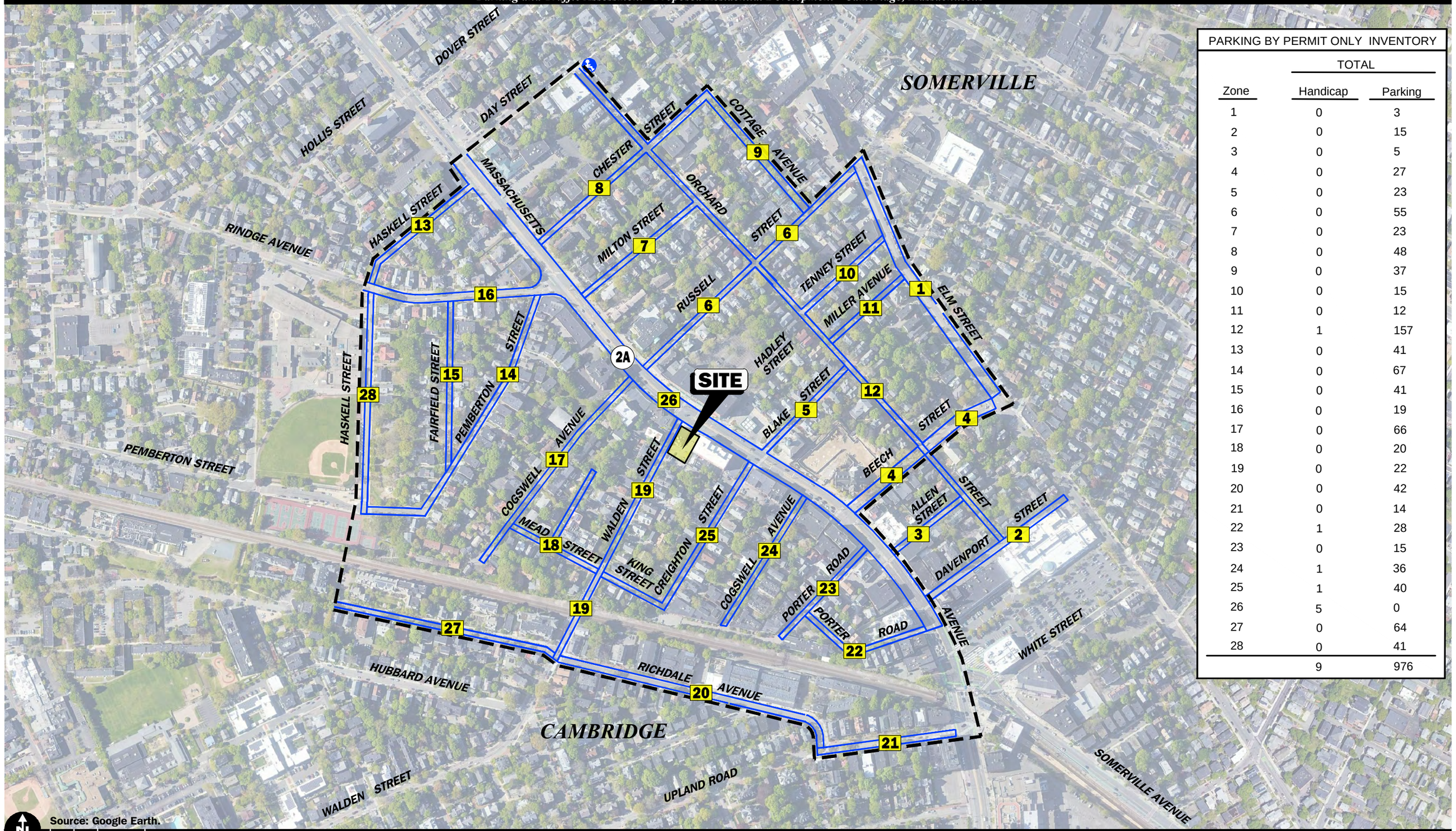

PARKING BY PERMIT ONLY INVENTORY

Zone	TOTAL Handicap	TOTAL Parking
1	0	3
2	0	15
3	0	5
4	0	27
5	0	23
6	0	55
7	0	23
8	0	48
9	0	37
10	0	15
11	0	12
12	1	157
13	0	41
14	0	67
15	0	41
16	0	19
17	0	66
18	0	20
19	0	22
20	0	42
21	0	14
22	1	28
23	0	15
24	1	36
25	1	40
26	5	0
27	0	64
28	0	41
	9	976

Source: Google Earth.

0 175 350 Scale in Feet

Figure 3

Existing Permit Only Parking / No Regulation Spaces

Vanasse & Associates inc

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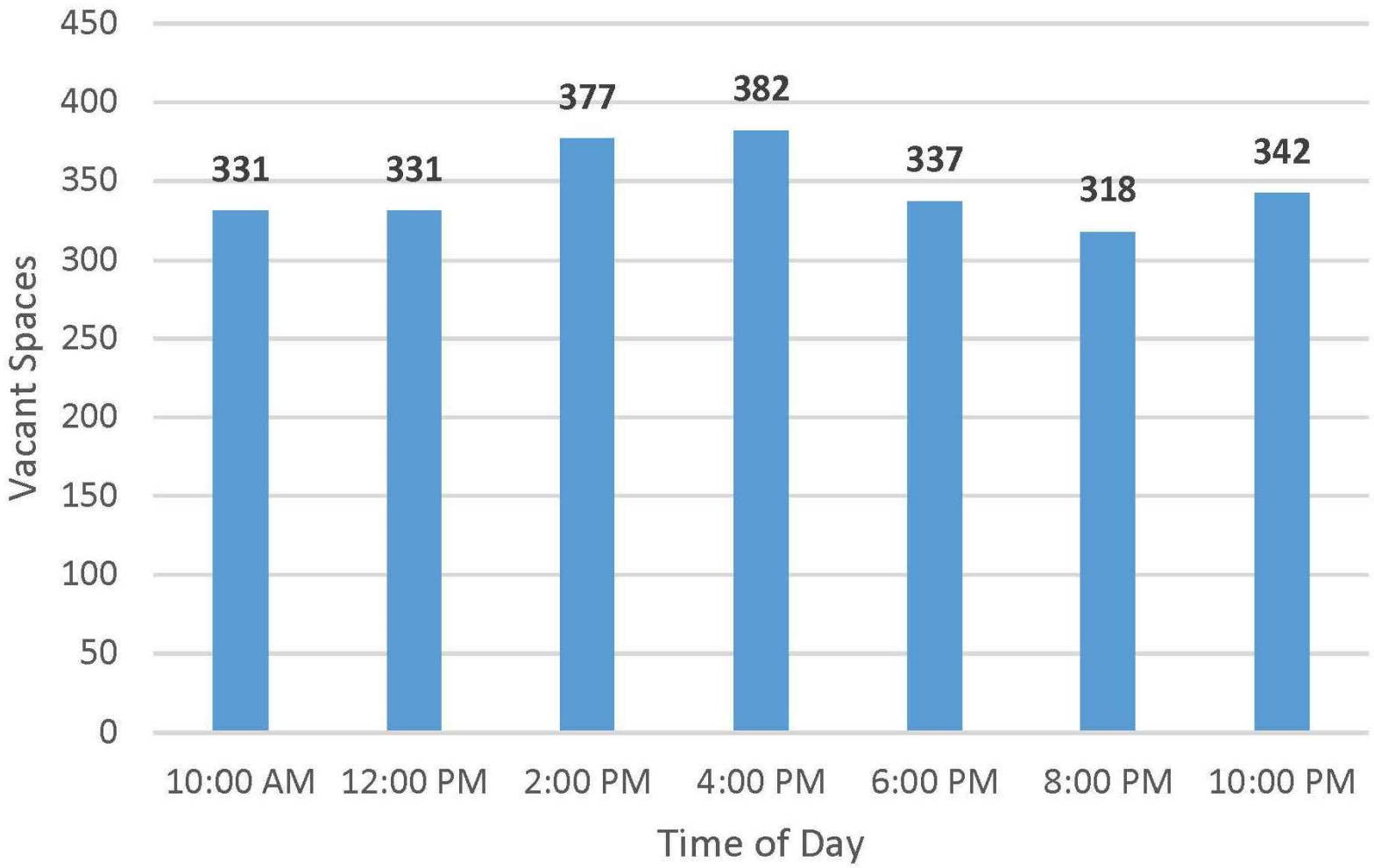


Figure 4

Parking Chart

Vanasse & Associates inc

Table 1
PARKING OBSERVATIONS
September 22, 2020

Zone	Parking Supply	Vacant Spaces						
		10:00 AM	12:00 PM	2:00 PM	4:00 PM	6:00 PM	8:00 PM	10:00 PM
1	45	20	17	24	24	14	16	22
2	19	6	5	3	2	7	5	5
3	6	0	1	2	0	1	0	0
4	30	2	3	2	6	1	3	3
5	23	12	11	12	8	9	10	9
6	55	18	18	18	21	20	23	21
7	25	5	9	10	8	5	7	7
8	48	16	12	14	10	19	13	9
9	37	6	8	5	6	2	2	3
10	15	5	3	7	6	3	4	4
11	12	5	4	2	4	3	2	3
12	158	33	35	47	34	27	22	24
13	41	12	12	14	16	17	14	12
14	70	23	25	24	22	23	20	20
15	41	6	7	10	13	15	4	6
16	19	3	5	4	5	4	3	5
17	66	19	17	23	19	15	12	12
18	20	10	9	9	7	10	8	9
19	23	4	8	4	6	7	6	6
20	44	8	7	13	17	14	17	15
21	14	0	2	0	3	0	1	1
22	35	13	12	12	14	18	15	14
23	15	5	2	4	5	2	2	3
24	37	13	9	14	11	6	9	5
25	41	10	9	10	12	5	2	3
26	90	44	48	47	62	56	63	84
27	64	23	21	27	27	21	20	24
28	52	10	12	16	14	13	15	13
TOTAL	**1145**	**331**	**331**	**377**	**382**	**337**	**318**	**342**

PROPOSED SITE TRIP GENERATION

Traffic volumes expected to be generated by the Project were determined by using the ITE *Trip Generation*[1] manual and utilized Land Use Code (LUC 221), Multifamily Housing (Mid-Rise) and LUC 820, Shopping Center. It should be noted that the project is proposing affordable housing units which have lower vehicle trip rates than market rate units therefore the actual trip increase due to the development will be less than what is estimated by LUC 221. In addition, it is expected that a significant portion of the residents of the Project will utilize alternative modes of transportation other than automobiles. Based upon the U.S. Census and 2018 American Community Survey data for Census Tract 3547, the tract in which the Project is located, the mode split characteristics of the Project are estimated as follows: 32 percent automobile trips; 43 percent transit; 10 percent walk; 6 percent bicycle, and 9 percent other trips.

The Project trip generation by mode is summarized in Table 2.

As can be seen in Table 2, the Project is expected to generate approximately 98 vehicle trips on an average weekday (49 entering/49 exiting), with approximately 6 vehicle trips (2 entering/4 exiting) expected during the weekday morning peak-hour. During the weekday evening peak hour, the Project is expected to generate approximately 9 new vehicle trips (5 entering/4 exiting).

[1] *Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

Table 2
PROJECT TRIP GENERATION SUMMARY

Time Period/Direction	ITE LUC 221 (A)[a]	ITE LUC 820 (B)[b]	ITE Total Vehcile Trips (C=A+B)	Vehicle Occupancy Rate (D)[c]	Person Trips: Total Trips (E=C*D)	Person Trips: Auto Trips[d] (F=E*0.32)	Person Trips: Transit Trips[e] (G=E*0.43)	Person Trips: Walk Trips[f] (H=E*0.10)	Person Trips: Bicycle Trips[g] (I=E*0.06)	Person Trips: Other Trips[h] (J=E*0.09)	Total Vehicle Trips (K=E/D)
Weekday Daily:	266	40	306	1.07	328	104	142	32	20	30	98
Weekday Morning Peak Hour:											
Entering	4	1	5	1.07	5	2	2	1	0	0	2
Exiting	13	0	13	1.07	14	4	7	1	1	1	4
Total	17	1	18	1.07	19	6	9	2	1	1	6
Weekday Evening Peak Hour:											
Entering	13	2	15	1.07	16	5	7	2	1	1	5
Exiting	9	2	11	1.07	12	4	5	1	1	1	4
Total	22	4	26	1.07	28	9	12	3	2	2	9

[a]Based on ITE LUC 221 Multifamily (Mid-Rise), 49 units.
[b]Based on ITE LUC 820 Shopping Center, 1,040 sf.
[c]Source: United States Census and American Community Survey 2018 5-year estimates; Census Tract 3547.
[d]Automobile trips are 32 percent of total person trips, Census Tract 3547.
[e]Transit trips are 43 percent of total person trips, Census Tract 3547.
[f]Walking trips are 10 percent of total person trips, Census Tract 3547.
[g]Bicycle trips are 6 percent of total person trips, Census Tract 3547.
[h]Other trips are 6 percent of total person trips, Census Tract 3547. Includes work from home.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

Reducing the amount of traffic generated by the Project is an important component of the development plan. The goal of the TDM plan is to reduce the use of Single Occupant Vehicles by encouraging car/vanpooling, bicycle commuting, the use of public transportation and pedestrian travel. The following measures will be implemented as a part of the proposed project management team in an effort to reduce the number of vehicle trips generated:

- In order to encourage the use of public transportation, the property management team will make available public transportation schedules, which will be posted in a centralized location for residents.

- In order to encourage car/vanpooling, the property management team will coordinate with MassRIDES and the Charles River Transportation Management Association (CRTMA) to identify car/vanpool resources that may be available to residents. This information will be posted in a centralized location.

- The property management team will investigate joining the CRTMA. The CRTMA could provide a ridematching program among the residents.

- The property management team will provide information on available pedestrian and bicycle facilities in the vicinity of the project site. This information will be posted in a centralized location.

- Bicycle racks and a bicycle "Fix-it" station will be provided on-site.

- Annually, upon initial move-in and lease renewal, residents will be offered the choice of: (1) annual Bluebikes membership (including one-time discounted helmet through bluebikes), (2) $90 credit for ride share service; (3) 1-month adult MBTA Monthly LinkPass, and/or (4) 3-month Student or Senior Monthly LinkPass. This will be provided PER RESIDENT (not per household) on an annual basis.

The above strategies will encourage non-auto travel by the residents.

SUMMARY

In summary, a detailed parking survey was completed in the area of the Project and based upon this data it can be concluded that there is more than sufficient availability of on-street parking to accommodate the Project. The Project proponent is committed to implementing a Travel Demand Management plan which promotes alternatives modes of transportation and will minimize the Project's impact on available on-street parking and traffic in the area.

APPENDIX

TRIP GENERATION CALCULATIONS

TRIP GENERATION CALCULATIONS

Institute of Transportation Engineers (ITE)
Trip Generation, 10 th Edition
Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 49

AVERAGE WEEKDAY DAILY

T = 5.45 * (X) - 1.75
T = 5.45 * 49 - (1.75)
T = 265.30
T = 266 vehicle trips
with 50% (133 vpd) entering and 50% (133 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln T = 0.98 * Ln(X) - 0.98
Ln T = 0.98 * Ln 49 - (0.98)
Ln T = 2.83
T = 17.01
T = 17 vehicle trips
with 26% (4 vph) entering and 74% (13 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln T = 0.96 * Ln(X) - 0.63
Ln T = 0.96 * Ln 49 - (0.63)
Ln T = 3.11
T = 22.33
T = 22 vehicle trips
with 61% (13 vph) entering and 39% (9 vph) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 10 th Edition
Land Use Code (LUC) 820 - Shopping Center

Average Vehicle Trips Ends vs: 1,000 Square Feet Gross Leasable Area
Independent Variable (X): 1.040

AVERAGE WEEKDAY DAILY

T = 37.75 * X
T = 37.75 * 1.040
T = 39.26
T = 40 vehicle trips
with 50% (20 vpd) entering and 50% (20 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.94 * (X)
T = 0.94 * 1.040
T = 0.98
T = 1 vehicle trips
with 62% (1 vph) entering and 38% (0 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 3.81 * X
T = 3.81 * 1.040
T = 3.96
T = 4 vehicle trips
with 48% (2 vph) entering and 52% (2 vph) exiting.

COMMUTING CHARACTERISTICS BY SEX

United States Census Bureau

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

	Census Tract 3547, Middlesex County, Massachusetts		
	Total		Male
Label	Estimate	Margin of Error	Estimate
Workers 16 years and over	1,752	±232	865
MEANS OF TRANSPORTATION TO WORK			
Car, truck, or van	31.6%	±6.9	32.8%
Drove alone	27.9%	±6.6	28.9%
Carpooled	3.8%	±2.2	3.9%
In 2-person carpool	3.3%	±2	3.0%
In 3-person carpool	0.0%	±2	0.0%
In 4-or-more person carpool	0.5%	±0.7	0.9%
Workers per car, truck, or van	1.07	±0.05	1.07
Public transportation (excluding taxicab)	42.9%	±6.8	41.3%
Walked	9.5%	±3.9	5.3%
Bicycle	5.8%	±3.7	6.4%
Taxicab, motorcycle, or other means	1.7%	±1.3	3.4%
Worked at home	8.6%	±3.9	10.9%
PLACE OF WORK			
Worked in state of residence	99.0%	±1.2	98.8%
Worked in county of residence	64.4%	±6.2	63.2%
Worked outside county of residence	34.5%	±6	35.6%
Worked outside state of residence	1.0%	±1.2	1.2%
Living in a place	100.0%	±2	100.0%
Worked in place of residence	42.2%	±7.3	41.3%
Worked outside place of residence	57.8%	±7.3	58.7%
Not living in a place	0.0%	±2	0.0%
Living in 12 selected states	100.0%	±2	100.0%
Worked in minor civil division of residence	42.2%	±7.3	41.3%
Worked outside minor civil division of residence	57.8%	±7.3	58.7%
Not living in 12 selected states	0.0%	±2	0.0%
Workers 16 years and over who did not work at home	1,602	±237	771
TIME LEAVING HOME TO GO TO WORK			
12:00 a.m. to 4:59 a.m.	2.8%	±2.8	2.5%
5:00 a.m. to 5:29 a.m.	0.0%	±2.2	0.0%
5:30 a.m. to 5:59 a.m.	0.0%	±2.2	0.0%
6:00 a.m. to 6:29 a.m.	1.1%	±1.2	1.2%
6:30 a.m. to 6:59 a.m.	6.2%	±3.4	6.0%
7:00 a.m. to 7:29 a.m.	16.6%	±4.4	19.8%
7:30 a.m. to 7:59 a.m.	14.9%	±5.7	8.8%
8:00 a.m. to 8:29 a.m.	21.4%	±5.1	24.3%

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 11

- Draft Green Building Narrative

NEW ECOLOGY
Community-Based Sustainable Development

2072 Mass Ave. Passive House Net Zero Narrative

2072 Massachusetts Avenue Passive House

2072 Mass Ave., Cambridge MA, 02140
September 10, 2020

Submitted To:

Community Development Department, City of Cambridge
344 Broadway, Cambridge MA, 02138

15 COURT SQUARE, SUITE 420 | BOSTON, MA 02108 | P (617) 557-1700 F (617) 557-1770

NEW ECOLOGY
Community-Based Sustainable Development

PROJECT PROFILE

DEVELOPMENT CHARACTERISTICS

Lot Area (sq.ft.):	~8,515 SF
Existing Land Use(s) and Gross Floor Area (sq.ft.), by Use:	BA-2 / Business A02, ~1,860 GSF
Proposed Land Use(s) and Gross Floor Area (sq.ft.), by Use:	Residential Use, ~65,710 GSF (w/Basement), ~57,400 GSF (no basement)
Proposed Building Height(s) (ft. and stories):	~89'-0", 8 Stories
Proposed Dwelling Units:	49 affordable
Proposed Open Space (sq.ft.):	0
Proposed Parking Spaces:	3 handicapped
Proposed Bicycle Parking Spaces (Long-Term and Short-Term):	51 long-term (48 Long-Term & 3 Tandem), 5 short-term

GREEN BUILDING RATING SYSTEM

The Rating System Selected for this project is as follows:

Passive House Institute US (PHIUS)			
Rating System & Version:	PHIUS+ Core	**Seeking Certification?**	YES

PROPOSED PROJECT DESIGN CHARACTERISTICS

BUILDING ENVELOPE

Roof	Roof Trusses w/ ~R-32 c.i. (~6" XPS Insulation)
Foundation	Concrete Foundation w/ ~R-30 c.i. (6" Low GWP Closed-cell Spray Foam Insulation @ R-5/in)
Exterior Walls	6" metal stud wall w/ ~R-18 c.i. (3" Polyisocyanurate or XPS), exterior rainscreen system

Windows	PHIUS approved window assemblies, thermally broken storefront system
Window to Wall Ratio	~30%
Other Components	Project team is considering sun shades on the south facade

ENVELOPE PERFORMANCE

	Proposed		Baseline	
	Area (sf)	U-value	Area (sf)	U-Value
Window	~7,250 SF	U-0.17 (SHGC – 0.32)	~7,250 SF	U-0.38 (fixed), U-0.45 (operable), 0.38 (SHGC - South, East, West), 0.51 (SHGC - North)
Wall	~32,865 SF	~U-0.05	~32,865 SF	U-0.064
Roof	~7,500 SF	~U-0.031 c.i.	~7,500 SF	U-0.032

ENVELOPE COMMISSIONING PROCESS

The project team has planned to test and verify the envelope air barrier and air infiltration rates using bi-directional blower door testing both at construction midpoint and again after construction completion. Two (2) inspections will be performed after framing and air-sealing are complete but before insulation is installed, in order to identify any potential areas of thermal bridging and/or air infiltration. These inspections will be documented with site photos. Once installed, the air barrier will be tested with a bi-directional whole building blower door test conducted to PHIUS+ CORE standards. At the end of construction, the whole building blower door test will be repeated to confirm air-tightness, and 13 units will be blower door tested for air infiltration rates per RESNET sampling protocols. In addition, a two hour inspection using a thermal imaging camera will be conducted to show compliance with thermal bridging and air sealing protocols.

BUILDING MECHANICAL SYSTEMS

SYSTEM DESCRIPTIONS

System	System Description
Space Heating:	Central VRF (11.2 EER, 23.4 IEER, 3.30 COP at 47F, 24.7 SCHE)
Space Cooling:	Central VRF (11.2 EER, 23.4 IEER, 3.30 COP at 47F, 24.7 SCHE)
Heat Rejection:	See above systems
Pumps & Auxiliary:	See above systems
Ventilation:	Central rooftop energy recovery ventilator with 75% heat recovery efficiency wheel and DX coil for heating/dehumidification
Domestic Hot Water:	Central gas-fired boiler plant potentially located at a penthouse level mechanical room to allow for future conversion to an all-electric DHW system
Interior Lighting:	LED
Exterior Lighting:	LED
Other Equipment:	TBD

SYSTEMS COMMISSIONING PROCESS

The project will retain a licensed commissioning agent (CxA) who will develop a detailed commissioning plan based on the building specifications and systems. The CxA will develop a functional performance test sheet for each system to be commissioned, and will commission the following systems: Mechanical systems and equipment including Energy Recovery Ventilation (ERV) systems, common space exhaust fans, the central VRF heating and cooling system and all apartment fan coils, and all direct digital controls. For lighting systems, all common space lighting control systems including occupancy sensors will be commissioned and sampled at the appropriate rate. For plumbing systems, the domestic hot water heating system including hot water heaters, storage tanks, circulating pumps, thermostatic mixing valves, and controls will be sampled at the appropriate rate.

ANTICIPATED ENERGY LOADS AND GREENHOUSE GAS EMISSIONS

Assumptions

The project will pursue Passive House certification and utilize WUFI energy modeling to demonstrate energy loads and energy use. The anticipated baseline building (ASHRAE 90.1-2013) energy use is indicated in the table below. Building heating and cooling loads, hot water heating load, lighting in units and common spaces, appliance and plug loads as well as miscellaneous system loads were included in this preliminary energy model.

	Proposed	Baseline
Site EUI (kBtu/yr./sq.ft.)	20	43.9
Source EUI (kBtu/yr./sq.ft.)	48	124.8

Annual Projected Greenhouse Gas (GHG) Emissions:

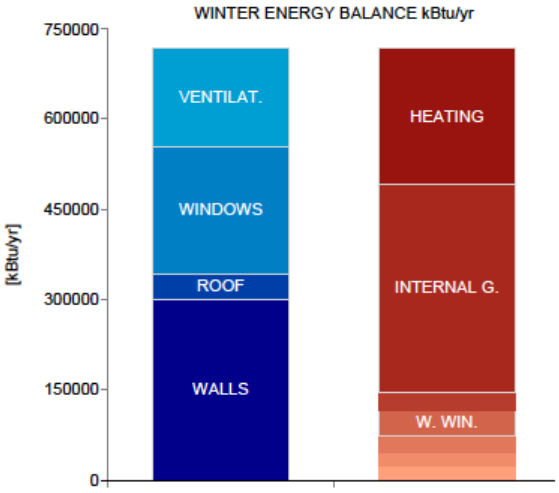
The annual expected Co2 emissions for the building based on the preliminary WUFI energy model are as follows:

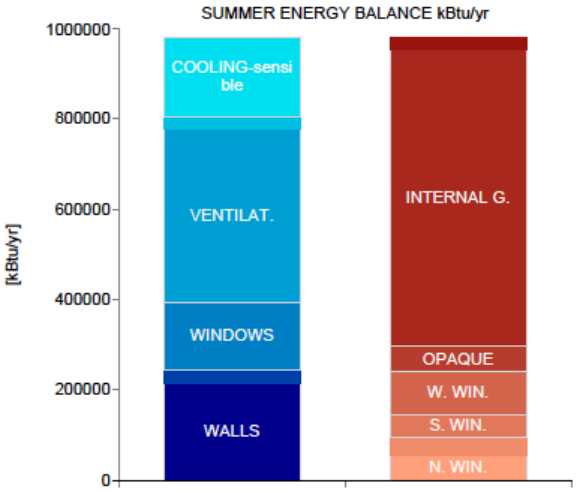
Utility	Co2 emissions in metric tons/yr.
Electricity	69.45
Natural Gas	14.98

Annual Projected Energy Consumption:
The annual expected energy consumption for the project is presented in the tables on the following pages. These tables were generated as part of the preliminary WUFI modeling exercise for the project.

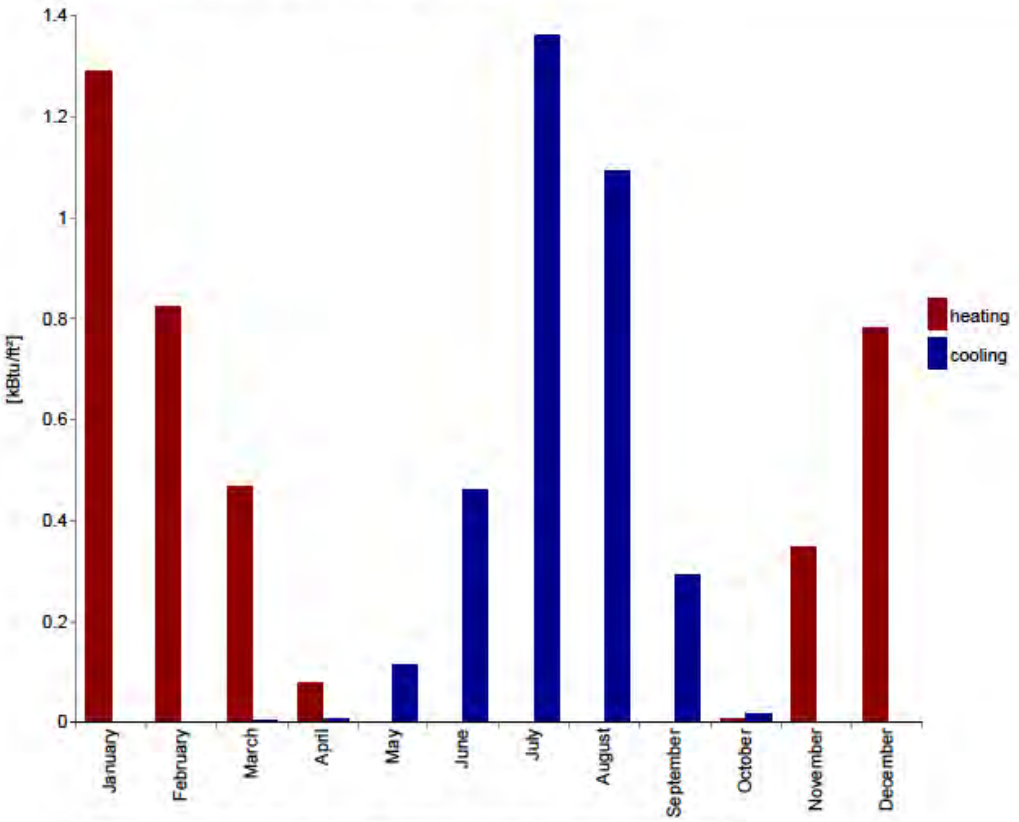
ANNUAL HEAT DEMAND		
Transmission losses :	**551,675**	kBtu/yr
Ventilation losses:	**164,937**	kBtu/yr
Total heat losses:	**716,611**	kBtu/yr
Solar heat gains:	**168,519**	kBtu/yr
Internal heat gains:	**399,611**	kBtu/yr
Total heat gains:	**568,130**	kBtu/yr
Utilization factor:	**86.2**	%
Useful heat gains:	**489,669**	kBtu/yr
Annual heat demand:	**226,943**	kBtu/yr
Specific annual heat demand:	**3,805.2**	Btu/ft²yr

ANNUAL COOLING DEMAND		
Solar heat gains:	**297,293**	kBtu/yr
Internal heat gains:	**656,805**	kBtu/yr
Total heat gains:	**954,098**	kBtu/yr
Transmission losses :	**836,470**	kBtu/yr
Ventilation losses:	**828,133**	kBtu/yr
Total heat losses:	**1,664,603**	kBtu/yr
Utilization factor:	**46.8**	%
Useful heat losses:	**779,693**	kBtu/yr
Cooling demand - sensible:	**174,405**	kBtu/yr
Cooling demand - latent:	**25,356**	kBtu/yr
Annual cooling demand:	**199,760**	kBtu/yr
Specific annual cooling demand:	**3.3**	kBtu/ft²yr





SPECIFIC HEAT/COOLING DEMAND MONTHLY



Month	Heating [kBtu/ft²]	Cooling [kBtu/ft²]
January	1.3	0
February	0.8	0
March	0.5	0
April	0.1	0
May	0	0.1
June	0	0.5
July	0	1.4
August	0	1.1
September	0	0.3
October	0	0
November	0.4	0
December	0.8	0

NEW ECOLOGY
Community-Based Sustainable Development

HEATING LOAD

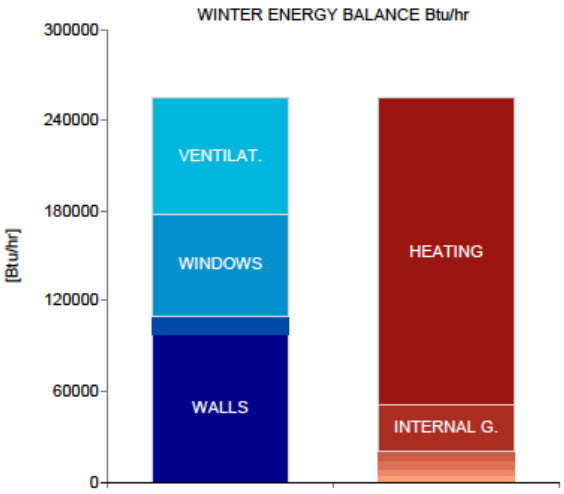
	First climate	Second climate
Transmission heat losses:	**178,137.7** Btu/hr	**126,703.6** Btu/hr
Ventilation heat losses:	**76,794.1** Btu/hr	**54,621.2** Btu/hr
Total heat loss:	**254,931.8** Btu/hr	**181,324.7** Btu/hr
Solar heat gain:	**20,522.7** Btu/hr	**11,605.6** Btu/hr
Internal heat gain:	**30,252.3** Btu/hr	**30,252.3** Btu/hr
Total heat gains heating:	**50,775** Btu/hr	**41,857.9** Btu/hr
Heating load:	**204,156.8** Btu/hr	**139,466.8** Btu/hr

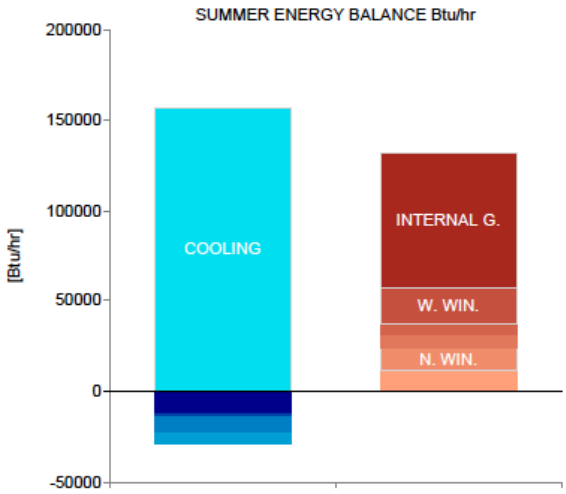
Relevant heating load: **204,156.8** Btu/hr
Specific heating load: **3.4** Btu/hr ft²

COOLING LOAD

Solar heat gain:	**56,811.3** Btu/hr
Internal heat gain:	**74,985.1** Btu/hr
Total heat gains cooling:	**131,796.4** Btu/hr
Transmission heat losses:	**-18,131** Btu/hr
Ventilation heat losses:	**-6,751.1** Btu/hr
Total heat loss:	**-24,882.1** Btu/hr
Cooling load - sensible:	**156,678.6** Btu/hr
Cooling load - latent:	**0** Btu/hr

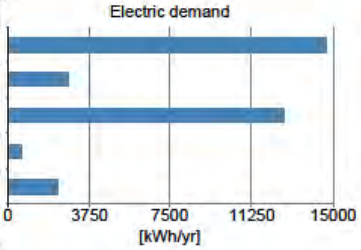
Relevant cooling load: **156,678.6** Btu/hr
Specific maximum cooling load: **2.6** Btu/hr ft²





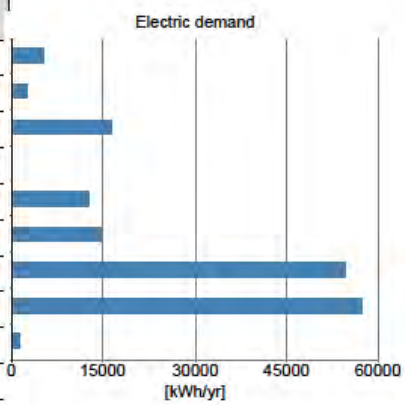
ELECTRICITY DEMAND - AUXILIARY ELECTRICITY

Type	Quantity	Indoor	Norm demand	Electric demand [kWh/yr]	Source energy [kBtu/yr]
Ventilation winter	1	no	1 W/cfm	14719.2	140613.4
Ventilation Defrost	1	no	14,790.3 W	2777.6	26534.9
Ventilation summer	1	no	1 W/cfm	12813.5	122407.8
DHW circulating pump	1	yes	77.8 W	649	6199.6
DHW storage load pump	1	yes	418.9 W	2311.7	22083.8
Σ				33271	317839.5



ELECTRICITY DEMAND RESIDENTIAL BUILDING

Type	Quantity	Indoor	Norm demand	Electric demand [kWh/yr]	Non-electric demand [kWh/yr]	Source energy [kBtu/yr]
Kitchen dishwasher	1	yes	1.2	5192.6	0	49605.4
Laundry - washer	1	yes	0.3	2381.6	0	22751.3
Laundry - dryer	1	yes	3.9	16487.5	0	157506.2
Energy consumed by evaporation	0	yes	3.1	0	1499.5	7350.9
Kitchen fridge/freeze combo	1	yes	0.7	12519.5	0	119599.5
Kitchen cooking	1	yes	0.2	14700	0	140429.9
User defined MELs	1	yes	54,532	54532	0	520947.1
User defined lighting	1	yes	57,607	57607	0	550322.8
User defined lighting	1	no	1,405	1405	0	13422
Σ	8			164825.2	1499.5	1581935.1



DHW AND DISTRIBUTION

DHW consumption per person per day:	**6.6**	gal/Person/day
Average cold water temperature supply:	**52.8**	°F
Useful heat DHW:	**249,984.9**	kBtu/yr
Specific useful heat DHW:	**4,191.6**	Btu/ft²yr
Total heat losses of the DHW system:	**32,418**	kBtu/yr
Specific losses of the DHW system:	**543.6**	Btu/ft²yr
Performance ratio DHW distribution system and storage:	**1.1**	
Utilization ratio DHW distribution system and storage:	**0.9**	
Total heat demand of DHW system:	**282,402.9**	kBtu/yr
Total specific heat demand of DHW system:	**4,735.1**	Btu/ft²yr
Total heat losses of the hydronic heating distribution:	**0**	kBtu/yr
Specific losses of the hydronic heating distribution:	**0**	Btu/ft²yr
Performance ratio of heat distribution:	**100**	%

BUILDING ENERGY PERFORMANCE MEASURES

Overview

Land Uses	The project is a mixed-use affordable housing transit-oriented development that is close to the Porter Square MBTA station. It also promotes walking and bicycling. Efficient use of limited building footprint includes approximately 525 square feet of amenity space, approximately 1040 square feet of neighborhood retail, and pedestrian scaled streetscapes.
Building Orientation/Massing	The proposed project is an eight (8) story tower with residential access to the building on Walden St, and retail space opening onto Mass. Ave.
Envelope Systems	High performance glazing and building envelope reduces the heating/cooling equipment sizes and low air infiltration rates improve indoor air quality and thermal comfort to the occupants.
Mech Systems	High efficiency mechanical systems include energy recovery ventilation, efficient air source heat pump technology, MERV 13 filtration, LED lighting, and low-flow plumbing fixtures.
Renewable Energy Systems	Preliminary WUFI energy models show that the project may meet the PHIUS site energy requirements without the inclusion of Solar PV. The project team will continue to track this item.
District Wide Energy Systems	N/A
Other	The project team has included 3 accessible parking spaces at the ground level and 2 temporary parking spaces to serve as a drop-off/pick-up area. The project has also focused on minimizing auto use, and has included 51 long term bike parking spaces (48 racks and 3 spaces for tandem or utility bikes).

INTEGRATIVE DESIGN PROCESS

The development team will present to the community on potential designs, design features, and the inclusion of affordable units as part of their early stage process. As part of the integrative design process, the developer, architect, mechanical engineer, and environmental consultant team have conducted a Green Charrette early on in the Schematic Design process and developed consensus on building systems and design that is consistent with PHIUS Passive House requirements.

SOLAR READY ROOF ASSESSMENT

To meet the very high level of performance required by the Passive House PHIUS+ CORE standard, results from preliminary energy models run by the project team indicated that this building likely does not require a PV array on the roof to meet the source energy goals. The project team is currently exploring placement of a mechanical room on the roof to enable a conversion to an all-electric DHW system in the future. This will limit available roof space for solar PV, but the building will be solar ready to allow for the potential addition of PV in the future. While this 49 unit building will be as energy efficient as possible, maximizing the potential to be a carbon neutral building in the future would likely involve purchasing renewable energy credits to offset the emissions from grid purchased power.

GREEN BUILDING INCENTIVE PROGRAM ASSISTANCE

Below is a description of programs applicable to this project that support improved energy performance or reduced greenhouse gas emissions, and which of those programs have been contacted and may be pursued.

The project plans to offset the costs of an energy efficient building envelope and electric heating and cooling system cost by utilizing all available rebate programs. The project is enrolled in the MassSave Passive House incentive program, and expects to use the Passive House Feasibility incentives from this program to offset the costs of energy modeling to meet Passive House standards. The project team plans to fully certify the building in order to be eligible for the full incentive package offered by MassSave. In addition, should the building systems qualify for the DOER Alternative Energy Certificate (AEC) incentive program, the project team will register for that incentive package as well.

NET ZERO SCENARIO TRANSITION

Below is a description of the technical framework by which the project can be transitioned to net zero greenhouse gas emissions in the future, acknowledging that such a transition might not be economically feasible at first construction. This description explains the future condition and the process of transitioning from the proposed design to the future condition.

	Net Zero Condition	**Transition Process**
Building Envelope	The building envelope will be built to PHIUS Passive House standards, making it an ideal structure to achieve Net Zero. The envelope will be well insulated and have a low level of air infiltration which will be tested and verified at construction.	This system will be a zero (site) emissions system at installation.
HVAC Systems	The heating system will be all-electric, with a highly efficient central VRF system installed at construction. In addition, central rooftop energy recovery ventilation will be used to capture energy from the ventilation system.	This system will have a zero (site) emissions system at installation.
Domestic Hot Water	A central gas-fired boiler plant will be included at construction. The project team is investigating the potential of locating these systems in a penthouse level mechanical room to allow for future conversion to an all-electric DHW system.	At the end of the system lifetime, the project team expects the all-electric DHW system technology to have advanced sufficiently to allow for conversion of this system to all-electric. The project team is investigating locating the DHW system on the roof specifically to allow for future conversion.
Lighting	The project will use LED lighting throughout at construction. The building energy model for this project, completed using WUFI modeling software for use in Passive House projects, does factor in and measure Lighting Power Density as a calculation in overall building energy	The building and management team will include updated technology as it is available and will update systems at the end of service life of the lighting systems.

	consumption. Fixtures have been modeled and will be specified in project documents to meet or exceed the energy requirement of the WUFI model.	
Renewable Energy Systems	The building will be Solar Ready at construction.	In order to become fully carbon neutral, this project will likely have to purchase renewable energy credits given the building footprint and limited roof area.
Other Strategies	The project is actively considering and modeling the use of window shading to reduce building energy consumption during summer months, while also allowing solar thermal gains during winter months.	

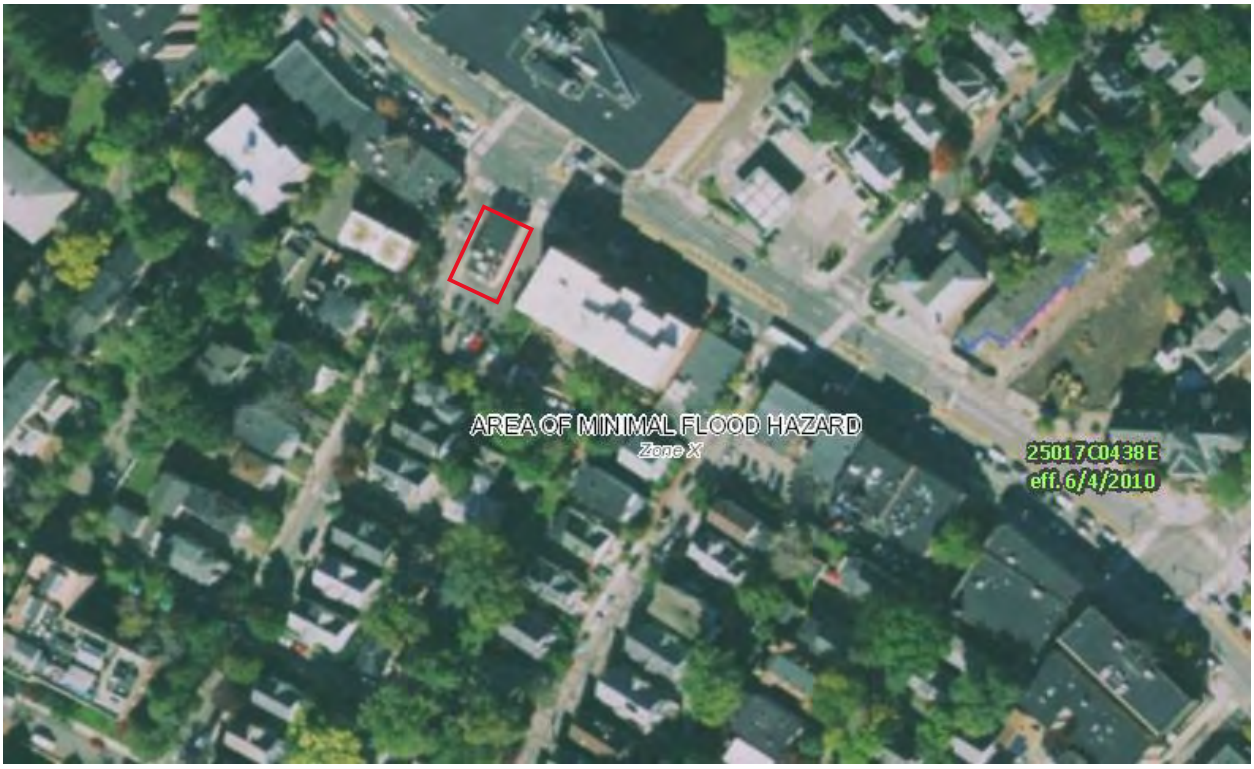
RESILIENCY

The project team has considered various resiliency strategies to reduce the project's and the residents' overall vulnerability. These resilience strategies are identified and summarized below in five sections.

EXISTING SITE ASSESSMENT

The project team has evaluated the flood risk based on current maps and future projections for the site and surrounding area. While the site is not located in a FEMA flood zone, and is not projected to be exposed to flood risk in forward looking models through the year 2070, the project team is actively considering resilience and risk mitigation strategies.

The project is at an average site elevation of ~35.95 ft-CCB, which translates to ~25.11 NGVD (ft-CCB is at 10.84 below NGVD). Based on the 2010 FEMA / FIRM Map, the site is located in Zone X Area of Minimal Flood Hazard, and is determined to be outside the 0.2% annual chance floodplain boundary (500-year flood scenario). Since the project is outside of the FEMA flood zones, FEMA has not determined a base flood elevation for this project site. The image below shows the project's location on the FEMA flood map.



Based on the City of Cambridge FloodViewer v2.1, the site is outside the boundary of both the 2070 – 10 and 100 Year flood elevations. The below diagram indicates the extents of 2070 – 100 Year Precipitation nearby further down Walden St, and across Massachusetts Avenue. Although the project is not projected to be impacted by flooding, the project team has considered how to mitigate impacts from extreme events, and has outlined a number of resilience strategies and actions below.

Address: 12 Walden St

Ground Elevation Min:	35.70 ft-CCB
Ground Elevation Max:	38.90 ft-CCB
2070- 100 Year- SLR/SS	N/A
2070- 100 Year - Precip	N/A
2070- 10 Year - SLR/SS	N/A
2070- 10 Year - Precip	N/A
2030- 100 Year - Precip	N/A
2030- 10 Year - Precip	N/A
Present Day - 100 Year	N/A
Present Day - 10 Year	N/A
FEMA 500 Year	N/A
FEMA 100 Year	N/A

Selected Map-Lot: 200-22
Selected Address: 12 Walden St

PROTECTION STRATEGIES

The project will use strategies to reduce the building's vulnerability to extreme weather. The basement area will be waterproofed, as the building is outside of future projected flood risk zones. Flood resistant materials will be used in the basement, with concrete being the main material used. Sealants will be applied as needed and any cracks and penetrations will be sealed. Drywall use will be minimized in the basement, and any drywall used in the basement will be moisture, mold and mildew resistant purple board.

The transformer room will be waterproofed as needed based on its location in the building. Equipment located in the basement that must be on the floor will be located on 6" or 12" concrete pads as appropriate. Electrical outlets will be located 3'-0" above basement floor level. To prevent water intrusion, backwater valves will be installed as appropriate. In order to remove any water that does enter the basement, a sump pump will be installed and connected to emergency power. The project team will also work with the owner to develop an O&M manual which will include steps to take during flooding events.

ADAPTATION STRATEGIES

The project team is exploring the following strategies to improve the facility's ability to adapt to changing climate conditions. These strategies include both building elements and mechanical systems.

Building adaptation strategies include, but are not limited to, the following: Passive House level building envelope with operable windows to help with "passive survivability" – keeping the building habitable during extended power outages in any season. Reduced urban heat island effect enabled by the use of light colored and vegetated roofs. Window sunshades installed on the southwest façade to reduce solar heat gain during the summer, and interior window treatments (blinds) to reduce heat gain while allowing in light as needed.

Building mechanical system adaptation strategies include, but are not limited to, the following: Decentralized VRF heat pump mechanical system for both heating and cooling locates mechanical equipment on roof and in units instead of an area that can be potentially damaged by flooding. Other mechanical equipment, including air handlers, energy recovery ventilators, and emergency generator, are located on the roof and away from flood risk. All residential living areas are elevated, all are located on the second floor or above. The project team is also actively considering the inclusion of a stormwater capture system, including infiltration tanks.

BACKUP STRATEGIES

The project team is exploring how to provide for critical needs if the building loses power or other services. The project team plans to include an emergency generator located on roof and appropriate emergency lighting for evacuation and “sheltering-in-place”. Storage space will be available to provide access to water storage containers and access to potable water in the event of a power outage.

COMMUNITY RESILIENCE STRATEGIES

The project team is exploring how to encourage behavior which enhances resilience through cooperation. To enable this, the building’s amenity room encourages community building among residents. The planned amenity room includes communications resiliency measures e.g. phone charging, emergency refrigeration, and access to potable water as mentioned above. The project team will also evaluate the creation of an emergency operations manual for residents.

2072 MASSACHUSETTS AVENUE
PROJECT ELIGIBILITY APPLICATION
October 14, 2020

Section 12

Letters of Support

- City of Cambridge Community Development Department
- Mayor Sumbul Siddiqui, City of Cambridge Mayor
- Alanna Mallon, City of Cambridge Vice Mayor
- The Davis Companies (abutter)
- Cambridge Housing Authority (abutter)
- St. James Episcopal Church (abutter)
- A Better Cambridge
- Community Members

CITY OF CAMBRIDGE
Community Development Department

IRAM FAROOQ
Assistant City Manager for Community Development

SANDRA CLARKE
Deputy Director Chief of Administration

KHALIL MOGASSABI
Deputy Director Chief Planner

October 14, 2020

Ms. Catherine Racer, Associate Director
Department of Housing and Community Development
100 Cambridge Street, Suite 300
Boston, MA 02139

RE: 2072 Massachusetts Avenue, Cambridge MA – 40B site eligibility

Dear Ms. Racer:

On behalf of the City of Cambridge and Cambridge Affordable Housing Trust, I am writing to share our strong support for Capstone Communities LLC and Hope Real Estate Enterprises LLC's Site Eligibility Application for the proposed redevelopment of 2072 Massachusetts Ave. Capstone/Hope's thoughtful design will result in a development which will transform an underutilized site into 49 units of vibrant family housing. The Trust has already financed the acquisition of this site and is looking forward to reviewing requests for additional funding at an upcoming Trust meeting as the project proceeds towards development.

City staff have been working closely with the Capstone/Hope team and support their decision to pursue a comprehensive permit in order to obtain the relief needed for the proposed design. We believe that this site is clearly appropriate for affordable housing and consistent with the intent of the Chapter 40B statute and, as a result, should receive Site Eligibility approval.

The acquisition and redevelopment of this site represents a unique and important opportunity to create a substantial number of affordable family-sized apartments. The site is ideally located for housing, in close proximity to the many amenities of Porter Square, including the MBTA and Commuter Rail Station, shopping center, and many restaurants and retail along Mass. Ave.

Affordable housing development opportunities such as this are rare, given the challenges of finding sites and assembling feasible development plans. The need for this housing is as great as ever, as market rents continue to far outpace what low, moderate and, more recently even middle-income families can afford. Capstone/Hope's plan to create almost 50 new affordable rental units, including 21 two-bedroom and 13 three-bedroom apartments, will go a long way toward helping to address this need.

344 Broadway
Cambridge, MA 02139
Voice: 617 349-4600
Fax: 617 349-4669
TTY: 617 349-4621
www.cambridgema.gov

We are hopeful that this project will be able to move forward quickly so that families can benefit from this much-needed housing. We appreciate the Department's longstanding support of affordable housing in Cambridge and look forward to continuing our partnership with the Department on important housing developments such as 2072 Massachusetts Avenue.

Sincerely,

Christopher Cotter
Housing Director

CITY OF CAMBRIDGE
OFFICE OF THE MAYOR
SUMBUL SIDDIQUI

mayor@cambridgema.gov
Phone: 617-349-4321

Sumbul Siddiqui, Mayor
City Hall
795 Massachusetts Ave
Cambridge, MA 02139

October 13, 2020

Kate Racer, Associate Director
Department of Housing and Community Development
100 Cambridge Street, Suite 300

Re: Application for Site Eligibility (2072 Mass Ave)

Dear Ms. Racer:

I am writing in support of Capstone Communities LLC and Hope Real Estate Enterprises LLC's Site Eligibility Application for its proposed redevelopment of 2072 Mass Ave on Massachusetts Avenue Cambridge, MA.

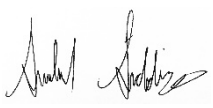
The creation and preservation of affordable housing opportunities has been the number one focus of the Cambridge City Council. Growing up in Cambridge's Public Housing, I understand how housing stability and access are essential to one's quality of life and sense of purpose. As a practicing attorney, and now Mayor of Cambridge, I have been a staunch supporter for the production of high-quality affordable family housing – especially projects that implement environmentally sound practices near public transit such as this.

As currently proposed, the resulting residential community will include 49 rental apartment homes with a variety of unit sizes – 14 one-bedrooms, 21 two-bedrooms and 13 three-bedrooms. These apartments are affordable to individuals and families earning a range of incomes – 30% and 60% of the area median income.

The site is also extremely well-served by public transit, including the Porter Square MBTA and Commuter Rail Station .3 miles away and MBTA Bus stop directly in front of the site. Additionally, the Porter Square shopping mall provides several community serving amenities include including a grocery store, pharmacy and hardware store.

I am very satisfied with the proponent's thoughtful plans and neighborhood outreach. I request that you give this application your strongest consideration and approval.

Sincerely,



Mayor Sumbul Siddiqui

CAMBRIDGE CITY COUNCIL

Alanna Mallon
Vice-Mayor

October 12, 2020

Kate Racer, Associate Director
Department of Housing and Community Development
100 Cambridge Street, Suite 300

Re: Application for Site Eligibility (2072 Mass Ave)

Dear Ms. Racer:

I am writing in support of Capstone Communities LLC and Hope Real Estate Enterprises LLC's Site Eligibility Application for its proposed redevelopment of 2072 Mass Ave on Massachusetts Avenue Cambridge, MA. This project is currently proposed as 49 rental apartment homes with a variety of unit sizes- 14 one-bedrooms, 21 two-bedrooms and 13 three-bedrooms apartments affordable to individuals and families earning between 30% and 60% of the area median income.

As a strong advocate for the production of high quality, affordable housing both personally and through my work as a Cambridge Vice-Mayor, I have seen the housing crisis only continue to grow as the supply of affordable homes for low and moderate income families continue to disappear. This is felt especially acutely by our families who require larger units. This project will provide approximately 70% of its units as two and three bedrooms that were designed with families in mind. These size units are in short supply and not often produced as part of Cambridge's inclusionary housing program.

The site is also extremely well-served by the transit including the Porter Square MBTA and Commuter Rail Station .3 miles away, and with an MBTA Bus stop directly in front of the site. These various transit options combined with the Porter Square shopping mall which has many family serving amenities including grocery store, pharmacy and hardware.

For all these reasons I urge to give this application your strongest consideration.

Alanna Mallon
Cambridge Vice-Mayor

CITY HALL, CAMBRIDGE, MASSACHUSETTS 02139
(617) 349-4280 FAX (617) 349-4287 TTY/TDD: (617) 349-4242 EMAIL: amallon@cambridgema.gov

The Davis Companies

T 617.451.1300
F 617.451.3604

125 High Street
Suite 2111
Boston, MA 02110

October 13, 2020

Kate Racer, Associate Director
Department of Housing and Community Development
100 Cambridge Street, Suite 300
Boston, MA 02114

Re: Application for Site Eligibility
2072 Massachusetts Avenue, Cambridge, MA

Dear Ms. Racer:

I am writing on behalf of The Davis Companies to express our strong support for CC HRE 2072 Mass Ave LLC's application for Site Eligibility for the proposed redevelopment of 2072 Massachusetts Avenue in Cambridge. As the owner and operator of the Henderson Carriage Building, a 95,000sf office and retail building located at 2067 Massachusetts Avenue directly across the street from the 2072 Massachusetts Avenue proposed development, we were thrilled to hear about the developer's plans to transform the site into much-needed affordable housing.

Along with retail and office space, The Davis Companies also specializes in residential construction, development and management and is all too familiar with the housing crisis affecting the Boston metro area and how it particularly affects low- and moderate-income individuals and families. We commend the developers for proposing a 100% affordable housing development that will serve those earning between 30% and 60% of the Area Median Income, while also providing potential ground-floor retail which will help to activate and enhance Massachusetts Avenue.

The Porter Square and North Cambridge neighborhoods are very dense, diverse, and well-served by transit and public accommodations, making this location extremely suitable for a building of this size. The Davis Companies strongly supports the developer's plans for 2072 Massachusetts Avenue and we kindly request that you give this application your consideration and approval. Thank you for your attention to this matter.

Sincerely,

Stephen Davis
Managing Director

CC: Jason Korb, CC HRE 2072 Mass Ave LLC

ST. JAMES'S
EPISCOPAL CHURCH

October 12, 2020

Kate Racer, Associate Director
Department of Housing and Community Development
100 Cambridge Street, Suite 300
Boston, MA 02114

Re: Application for Site Eligibility
2072 Massachusetts Avenue, Cambridge, MA

Dear Ms. Racer:

I am writing as the Priest-in-Charge at Saint James's Episcopal Church in strong support of CC HRE 2072 Mass Ave LLC's application for Site Eligibility for the proposed redevelopment of 2072 Massachusetts Avenue into affordable housing. St. James's is located at 1991 Massachusetts Avenue, one block from 2072 Massachusetts Avenue. As a faith community that believes that our neighborhood should provide housing for those of all economic levels and incomes, we believe that the development of forty-nine 100% affordable apartment homes, 71% of which will be for families, will be an excellent addition to our neighborhood.

Our congregation strongly advocates for affordable housing, and we understand the need our community is facing due to increasing rents, loss of jobs, and the ongoing COVID-19 pandemic. Based on the developer's existing work in Cambridge and elsewhere, we are confident that Capstone and Hope will construct and successfully manage 2072 Mass Ave with the same diligence and care, so that it will be an asset to its residents and the community. St. James's is also pleased to offer our outdoor play space to the future residents of 2072 Mass Ave as well as the broader community from 8am – dusk every day, with some exceptions, so that children have a safe and fun place to visit close to their homes.

St. James's Episcopal Church strongly supports the proposed development at 2072 Massachusetts Avenue and requests that you approve the Site Eligibility application. Please contact me if you have any questions.

Sincerely,

(The Rev'd) Matthew Stewart
Priest-in-Charge

CC: Jason Korb, CC HRE 2072 Mass Ave LLC

a better cambridge

Kate Racer, Associate Director
Department of Housing and Community Development
100 Cambridge Street, Suite 300

October 12, 2020
Re: Application for Site Eligibility (2072 Mass Ave)

Dear Ms. Racer:

A Better Cambridge ("ABC") supports the proposed 100% affordable housing development at 2072 Massachusetts Avenue in Cambridge; we hope that the Department of Housing and Community Development will agree and approve the Site Eligibility application for this valuable project.

Like many other communities in the Boston metro area, Cambridge has become increasingly unaffordable for low- and middle-income individuals and families alike over the prior two decades. As both rents and sale prices continue to escalate, we see more and more people forced to leave a community they have called home. As a housing advocacy nonprofit, ABC is working with elected officials, community members, and local developers to offset displacement in this tight housing market.

The proposed development at 2072 Massachusetts Avenue is part of this collective effort to build more affordable housing in the City. Brought forward by Capstone Communities LLC (Sean Hope and Jason Korb), this 49-unit rental project sits on an underutilized lot within 0.25 miles from the Porter Square T station. Not only will the new construction add important new units to Cambridge's housing inventory in this high-cost Porter Square neighborhood, but the site is also located close to several essential community and retail services. Although Cambridge very recently passed an Affordable Housing Overlay that will enable denser development of 100% affordable housing going forward, Capstone's pursuit of additional density at this very transit-oriented location is reasonable - we're excited about the design and use of this corner lot to provide much-needed housing. The 2072 Mass Ave development will provide residents with ready access to grocery stores, pharmacies, and other essential services without reliance on an automobile.

A Better Cambridge, an all-volunteer run non-profit advocating for more housing for all in Cambridge, has been active in local housing discussions since its founding in 2012. With 100+ members and a 1000+ network, ABC has been and continues to be a constructive voice in local debates. We consistently urge the creation of more housing for all as a crucial strategy for ensuring we have sufficient housing stock to meet the urgent and ever-increasing need.

ABC is supportive of the following components of this development:

- The creation of 49 units of rental housing, which will be 100% affordable in perpetuity.
- The majority of the units are family-sized (21 two-bedroom units and 13 three bed-room units), responding to the neighborhood and City's priorities for more family housing.
- The building will be Passive House-certified, setting a high bar for sustainable construction. This approach will increase resident comfort and reduce the development's carbon footprint for the long-term.
- The project will manage all stormwater retention on site, meeting local requirements for minimal environmental impact.
- The project includes three handicapped parking spaces, ensuring accessibility and meeting all relevant MAAB code requirements.

Not only does A Better Cambridge strongly support the 2072 Massachusetts Avenue development, but we also believe it meets many of DHCD's funding priorities for affordable housing in Massachusetts. We hope DHCD is able to approve the Site Eligibility application and the project can move forward.

Sincerely,

A Better Cambridge (ABC) Leadership

www.2072massaveapts.com Community Feedback

Taylor Pratt 3 days ago · 0 Likes

I live about a quarter mile from this address, and increased density of affordable housing is sorely needed in our neighborhood. I'm very excited and heartened by the scope of this proposal and amount of housing it intends to add. Taking into consideration some of the other surrounding (and much less visually appealing) buildings, I simply don't understand the comments here that want to cap this building at 3 stories. I very much hope the project goes forward as-is and does not decrease the number of units.

Sarah Klein 6 days ago · 0 Likes

I live around the corner on Russell St. and I'm very excited to see this proposal. I'm very happy to see this focus on affordable housing, particularly for families and during this very difficult time for many, financially. Visually, it will be an improvement relative to some of the surrounding buildings.

Jeanine Pearson A week ago · 0 Likes

I live on Cogswell Ave (1 block away) and I'm very excited to see this proposal. I fully support the design as-is. It's an aesthetic improvement over the existing building on the lot and visually I think it will make our neighborhood more appealing. I'm not concerned about the height as there are many other buildings of a similar size nearby. Cambridge desperately needs more affordable housing (as evidenced by the demand laid out in the presentation). I'm much happier to see new affordable housing than luxury housing in our area.

I also like the focus on sustainability in the design with the Passive House certification. Similarly, I think the location is great because of its access to public transit which helps to reduce the total number of cars on the road. W.r.t parking, I'm interested to see the study, as I live one block away and I never have trouble finding parking even on street sweeping days.

Jefferson Smith A week ago · 0 Likes

As a Cambridge resident, and the Executive Director of the non-profit Massachusetts Housing Coalition (MHC), I'd like to offer my full support, as well as the full support of our coalition for this project. I believe that Capstone and Hope Real Estate have set the standard for housing not just in Cambridge, but in Massachusetts, and that every resident in our city can and should stand behind this project.

Our coalition is the voice of the grassroots pro-housing movement in the Commonwealth. Instead of building barriers by using zoning regulations to stop homes from being built, MHC believes that we should encourage building homes for every income level, for every family, and in every neighborhood in Massachusetts.

It's been said many times that we are in a housing crisis. Our organization is responding directly to this crisis by advocating for brand new homes just like the ones being proposed at here. Our mission is to reduce the harmful influence of restrictive zoning regulations that have slowed production and

increased housing inequality and insecurity. MHC recognizes that we must do better for our residents and for the people that need housing regulations to work for them, not against them.

As far as parking for this project, the next generation of tenants and homeowners have little use for single occupancy vehicles and therefore little need for parking spaces. Our environment is also desperately in search of relief from single occupancy vehicles - we should be helping in any way that we can to make residents LESS dependent on cars. When you allow more parking, more pavement, or any other way to squeeze in more cars, you only succeed in increasing traffic. More parking spaces equal more cars. As a result of these well-known and well-documented facts, we should be doing just what 2072 Mass Ave is proposing — reduce parking spaces. Parking requirements are a costly and outmoded infrastructure requirement. We can make affordable housing more affordable by lowering costs for great projects like this and helping our environment, too.

Honestly, a very sincere thank you to Sean Hope, Jason Korb, and the Capstone Communities team for their vision and persistence in making this project a reality and prioritizing affordable housing for our community. There is no doubt that our organization and many others like it will be holding this as a model for future 100% affordable development and encouraging more like it throughout the state. Thank you again and congratulations on a very important project for our community!

Lee Farris A week ago · 0 Likes

I like that 71% of the units in the building 2 and 3 bedroom apts., which are much needed so families can stay in Cambridge, and that 8 apts. will be for very low income people, which is rare.

Larry Field A week ago · 0 Likes

This project checks critical boxes for me: 1) 100% permanently affordable, 2) in a suitable location for density, on a commercial corridor a short walk to subway/commuter rail and steps from bus, 3) Passive House, so cutting edge on climate, and 4) elegant design.

Even though the preliminary plan is suggesting the kind of use the City usually wants on the street level, I think the development team and the City should look at alternatives. We all know that retail was hard even before COVID and its future is more uncertain now. Vacancies don't help the owner or neighborhood.

I live on the other side of Porter Square (Mt Vernon), 2 blocks from the Frost Terrace project. Jason and Sean listened to community input and improved the design/lessened impact on abutters, while keeping the original vision. The traffic and parking study done for that project was very useful in assessing the neighborhood impact and I look forward to seeing the findings for 2072 Mass Ave.

claire silvers A week ago · 0 Likes

This seems to be a very well thought through project and there is no doubt that this kind of housing is sorely needed. (Anyone who doubts that should spend 5 minutes looking at available rentals within a

mile's radius.) We live a block away on Mead St, and have been pondering the fate of this parcel for years. First choice would have been what used to be called a vest-pocket park, esp. so the senior housing residents would have an outdoor place within reach that didn't require getting in a van. That is no doubt unrealistic. Then we are concerned about the fate of the restaurant's staff. But if the space is to be devoted to housing, this project is far & away better than the "luxury" overpriced block blot that we had assumed would materialize. The 1st floor treatment set-back makes it more appealing and our 1st impression of the design is that it is distinctive without being jarring, and the apts are well-laid out. Interesting materials. You will get many complaints about adding to parking. That doesn't worry us. The drop-off spots are essential--but the only thing we wonder about is the difficulty of making left turn off south-bound Walden into those spots. As you know, that intersection can become crazed at times, & even during calmer periods complex dynamics can develop when someone tries to left-turn into the restaurant parking lot. Don't know what the solution would be.

Michael Salib A week ago · 0 Likes

This project looks absolutely amazing! We desperately need more housing, and the building looks beautiful. I think it will fit in very well with that area. I live about a half mile away in North Cambridge and it is so wonderful to see projects like this coming online; I only wish we could get more and that the city would allow an extra floor or two. I hope that permitting and construction go smoothly so we can welcome our new neighbors!

James Zall A week ago · 0 Likes

I'm glad to see such a well-designed building and well-planned project coming to our neighborhood. With many stores and amenities within walking and biking distance and so close to subway and buses, this is an ideal location for the kind of affordable housing that is in short supply and so badly needed in Cambridge right now.

Thanks for your detailed presentation earlier this week. I hope you'll continue to keep the neighborhood informed as the project progresses.

Christopher Schmidt A week ago · 0 Likes

This project is super exciting! I really enjoy how this project connects to the context on Mass Ave: while it's slightly taller than some of the surrounding buildings, it flows well in the overall street, and doesn't "overpower" any of the nearby buildings.

The first floor amenity and retail space should provide a good frontage on Mass Ave, and I appreciate the thought that's gone into pulling back from the sidewalk on the corners of the lot to create more walking space -- I know that intersection can be narrow right now.

The location's strong access to transit -- both Davis and Porter, as well as the bus access -- make it a really good candidate for lowered parking; it's so important we move away from the induced demand of creating parking, for climate and other reasons.

I'm also really excited to see that the team is considering mass timber construction! I'd love to know more details about what we can do to support that, since I believe this is also an important climate mitigation element and will require additional state or city rules before it can be done, so I hope you'll share more on that as well.

I'm sure that there are some elements of this project that will raise concerns in the community, but I am super excited by the possibilities here and really look forward to it moving forward.

Eric Herot A week ago · 0 Likes

This project is very exciting and I would love to see it move forward. Zero parking projects are the future of Cambridge and I hope to see more projects like this go forward in the future. I strongly support this project as-is.