Montachusett Veterans Outreach Center, Inc.
268 Central Street
Gardner, Massachusetts 01440
Phone (978)632-9601 Fax (978)632-9476
www.veterans-outreach.org

Town of Winchendon
Comprehensive Permit Application
Streeter and Poland School

MONTACHUSETT VETERANS OUTREACH CENTER

40B COMPREHENSIVE PERMIT APPLICATION

TABLE OF CONTENTS

Planning Decision Petition

TOWN OF WINCHENDON
PLANTATION OF IPSWICH CANADA NOVA SCOTIA
MASS.
1735
1764

Fee Rec'd

An additional fee will be due for advertising

Project Number

Zoning Board of Appeals

- [x] Special Permit(s)
- [ ] Variance
- [ ] Administrative Appeal
- [x] Comprehensive Permit

Planning Board

- [ ] Site Plan Approval
- [ ] ANR endorsement
- [ ] Preliminary Subdivision Approval
- [ ] Definitive Subdivision Approval
- [ ] Special Permit(s)
- [ ] Low Impact Development Endorsement

Submission Materials to be included with this Petition Form are outlined in the Town of Winchendon Zoning Bylaws and the Planning Board Regulations. This application shall not be deemed complete unless all required items are included or appropriate waivers have been requested.

Property Address: Oak st & Murdock Ave.
Property Owner's Name: Town of Winchendon
Owner's Address: 109 Front st
Montachusett Veterans outreach Center
Petitioner's name:
Petitioner's Phone No.: 978-632-9601
Petitioner's address: 268 Central St
Gardner, MA 01440

Date: March 31,2021
Book: 742/492
Map: 5B2-0-118 /5B2-0-117
Lot Size: 3.8 Acres
Frontage: 330'Murdock ave, 511' Oak st
Zone: R-10 Neighborhood Residential

Project Summary & Decision Sought: Redevelopment of the vacant Streeter & Poland Schools into 44 units of Veterans housing. Seeking a 40B comprehensive approval for the site plan and the following zoning variances: building height and use,unit density and off street parking provided.

I hereby certify that the information provided in this application, and the accompanying drawing(s) of the property as well as any supporting datea are accurate, true and correct to the best of my knowledge and belief.

Signature of Applicant (or their representative) — Date: March 31, 2021

Signature of Property Owner — Date

Tax Certification (Treasurer has up to 10 days to complete this certification):

Pursuant to the provisions of Massachusetts General Law, Chapter 40, Section 57, the Town Bylaw, Licenses and Permits of Delinquent Taxpayer, Section 21.1: "Any Board... shall deny application... for any person, corportation or businss enterprise who has neglected to pay any local taxes, fees, assessments, betterments or any municipal charge."

I hereby certify that the applicant or the owner of record owes no debt to the Town of Winchendon for a period of time greater than twelve (12) months.

Winchendon Treasurer — Date

Overall Project Objective:

The project goal is to repurpose the vacant Streeter and Poland School Buildings into 44 single resident apartments of veterans housing, with support spaces located on the 3.8 acre site, zoned R10 – Neighborhood Residential. The housing will be provided in a mix of historic renovation of the two existing schools, and new additions to those buildings. The total size of the project is 39,731 gsf on three levels. Streeter School, 14,870 gsf in size and Poland School, 8,230 gsf**,** are to be fully renovated. New construction includes 16,631 gsf to be added in two portions—between the existing buildings and on the eastern end of Streeter School.

The existing site will be improved with a new entry drive, parking for 22 vehicles, new sidewalks at Murdock Ave. and Oak Street, walkways throughout the complex, new plantings and exterior lighting. Activity areas are planned, with furnishings and equipment to invite resident use. Additionally, the new site will include a courtyard along with recreational areas such a bocce court, grill area and raised planning beds for gardening. In recognition of the veterans living at the development, there will be a columbarium memorial to provide a final resting place for residence.

The existing buildings will be fully renovated and repurposed for housing. Upon completion of the renovation, the Streeter building will yield 17 1-bedroom units and the Poland building will yield 7 1-bedroom units. An additional 20 new units will be newly constructed as part of the addition adjoining the two buildings. Units will vary in size, between 470 SF and 690 SF. The table below illustrates the proposed unit mix.

Unit Size	Poland Building (Rehab)	Streeter Building (Rehab)	New Construction	Total
1BR	7	17	20	44
2BR				
3BR				
TOTAL	**7**	**17**	**20**	**44**

The project has been deemed eligible for historic tax credits, and work on the two schools will carefully preserve historic features that contribute to the architectural significance of the schools. In Streeter school, built in 1939, original woodwork, doors, plaster finishes, chalkboards, and hardwood floors will be retained. Poland School, built in 1924, has deteriorated more; the existing stamped metal ceilings will be preserved or refurbished.

New construction will complement the handsome red brick masonry and wood features in the historic schools, with metal and cement board siding, new casement and fixed light glazing. The new construction is scaled to harmonize with the architecture of the original schools.

Details are provided in the accompanying drawings for the unit layouts, building exterior design and finishes and site improvements. Supporting this work and included are, code and building assessment reports, traffic and parking studies, stormwater, and drainage calculations.

Zoning Variance Requests:

The applicant, Montachusett Veterans Outreach Center is requesting project approval under Commonwealth of Massachusetts 40B Comprehensive Permit regulations
The site is described by the Winchendon Tax Assessor as Map 5B2, Lot 118 and lot 117, is zoned as residential. The 40B eligibility approval from the Commonwealth has been established and their approval notice is provided.
Variances are being requested as the proposed project and some design elements do not conform to the Town of Winchendon's existing regulations.

Variance and Zoning relief will be needed for the following design elements:

- **Use as multifamily:** The proposed use is noted in the zoning code as requiring a Special Permit. The proponent requests a variance for this use.

- **Density- Number of Units**: The zoning code allows for 6 units per acre. The proposed development is for 44 residential units, exceeding the number of units permitted on the 3.8 acre site. Proponent requests an increase in density from 6 units per acre to 13 units per acre.

- **Building Height**: The development is in a R-10 residential zone where building height is not to exceed 2.5 stories. The proposed redevelopment will result in a 3-story building (including basement). The building heights do not exceed the height of the existing structure, Poland, and Streeter. As part of the sites redevelopment grades around the buildings will be lower increasing the overall height through calculation. The proponent requests a variance to increase allowable height from 2.5 stories to 3 stories.

- **Parking:** The zoning code requires one space per one unit of parking and allows for both on street and off-street in its calculation. The project includes 22 off-street parking spaces, exceeding the allowable number of parking spaces for the total site size, per the Town of Winchendon. Further, the proposed 22 parking spaces require an additional variance as it is insufficient parking for a 44-unit development. A variance is requested for parking to be provided at .5 cars per unit. Traffic and parking concerns are addressed in the included reports prepared by the design team.

- **Lighting**: The town requires externally lit signs, display, buildings, and aesthetic lighting must be lit from the top and shine down. The proponent requests a variance to light the flag poles included in our plans from the base.

- **HVAC Units:** All efforts will be made to keep rooftop HVAC equipment from being visible, however the flat roof MAY require additional screening.

SUPPORT DOCUMENTS INCLUDED WITH THE APPLICATION:

DHCD ELIGIBILITY LETTER
BDG DRAWINGS, SITE SURVEY, SITE PLAN, PHOTOMETRICS, STORMWATER DETAILS, SITE CONSTRUCTION DETAILS
JWA DRAWINGS, FLOOR PLANS, ELEVATIONS, AND 3D MODELING
EXISTING CONDITIONS SURVEY
CODE REPORT
STORMWATER CALCULATIONS
TRAFFIC LETTER
PARKING LETTER

Commonwealth of Massachusetts
DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT
Charles D. Baker, Governor ◆ Karyn E. Polito, Lt. Governor ◆ Jennifer D. Maddox, Undersecretary

December 21, 2020

Mr. Charles Murphy
Montachusett Veterans Outreach Center, Inc.
268 Central Street
Gardner, MA 01440

RE: Poland and Streeter Schools Redevelopment, Winchendon, MA- Site Approval Letter

Dear Mr. Murphy:

I am pleased to inform you that your application for project eligibility determination for the proposed Poland and Streeter Schools Redevelopment project located in Winchendon, Massachusetts, has been approved under the Low Income Housing Tax Credit (LIHTC) program. The property is located at 0 Oak Avenue in Winchendon, Massachusetts. This approval indicates that the proposed plan is for 44 units, all of which will be affordable (100%) at no more than 60% of area median income. The proposed development will consist of 44 one-bedroom units and the rental structure as described in the application is generally consistent with the standards for affordable housing to be included in the community's Chapter 40B affordable housing stock. This approval does not constitute a guarantee that LIHTC funds will be allocated to the Poland and Streeter Schools Redevelopment project. It does create a presumption of fundability under 760CMR 56.04, and permits Montachusett Veterans Outreach Center, Inc. (the "Applicant") to apply to the Winchendon Zoning Board of Appeals for a comprehensive permit. The sponsor should note that a One Stop submission for funding for this project must conform to all Department of Housing and Community Development (DHCD) program limits and requirements in effect at the time of submission.

As part of the review process, DHCD has made the following findings:

1. The proposed project appears generally eligible under the requirements of the Low Income Housing Tax Credit program.

2. DHCD has performed an on-site inspection of the proposed Poland and Streeter Schools Redevelopment project and has determined that the proposed site is an appropriate location for the project. The development will place veterans housing in an existing residential neighborhood. The 3.8 acre former schools site has a good deal of land behind the schools. It also borders a small park and is close to the town senior center.

3. The proposed housing design is appropriate for the site. The former schools will be renovated and repurposed for housing. The schools are eligible for historic tax credits and will be renovated carefully to preserve historic features. There will also be new additions to these buildings. The site

will be improved with a new entry drive, parking for 22 vehicles, and new sidewalks and walkways throughout the complex. There will also be exterior activity areas.

4. The proposed project appears financially feasible in the context of the Winchendon housing market. It will offer housing to 44 households earning up to 60% of the area median income.

5. The initial proforma for the project appears financially feasible and consistent with the requirements for cost examination and limitations on profits on the basis of estimated development and operating costs. Please note again that a One Stop submission for funding for this project must conform to all DHCD program limits and requirements in effect at the time of submission.

6. The Low-Income Housing Tax Credit Program Guidelines state that the allowable acquisition value of a site with a comprehensive permit must be equal to or less than the value under pre-existing zoning, plus reasonable carrying costs.

7. The ownership entity will be a limited dividend limited liability company or limited partnership, controlled by Montachusett Veterans Outreach Center, Inc. that meets the general eligibility standards of the Low Income Housing Tax Credit program.

8. The Applicant is the designated developer of the site.

9. During the review period, DHCD did not receive comments. We anticipate that all issues will be thoroughly reviewed by the appropriate town boards and resolved to the satisfaction of all parties and the project sponsor.

The proposed project will have to comply with all state and local codes not specifically exempted by a comprehensive permit. In applying for a comprehensive permit, the project sponsor should identify all aspects of the proposal that will not comply with local requirements.

If a comprehensive permit is granted, construction of this project may not commence without DHCD's issuance of Final Approval pursuant to 760 CMR 56.04 (7) and an award of LIHTC funds. This project eligibility determination letter is not transferable to any other project sponsor or housing program without the express written consent of DHCD.

This letter shall expire two years from this date or on December 21, 2022, unless a comprehensive permit has been issued.

We congratulate you on your efforts to work with the Town of Winchendon to increase its supply of affordable housing.

Sincerely,

Catherine Racer
Associate Director

Cc: Mike Barbaro, Chairman, Winchendon Board of Selectmen

JONES WHITSETT ARCHITECTS

MVOC Schematic Design
August 19, 2020

Vol. 1

Existing Conditions & Assessments

1. Architectural Assessments
2. Historic: Form A, Streeter & Poland School Complex
3. Structural Assessments
4. Mechanical, Electrical & Plumbing Assessments

Vol. 2

Proposed Plans: Lower, Middle, and Upper floors & Roof plans
Proposed Elevations
Site Plan

Existing Plans
Existing Elevations
Site Survey

4.1
Existing Conditions – Architectural Assessment

Streeter and Poland Schools are former schools for Winchendon, and as such were built to last and to be heavily used. This historic Sanborn map shows their 1947 position on a parcel where all town schools were originally located. Please refer to the detailed Form A for these properties, which has been certified by the Massachusetts Historical Commission as eligible as National Register eligible properties, and therefore qualified for state and federal historic tax credits. For a review of masonry conditions and structural assessment, see Structural Assessment of this report.

STREETER SCHOOL
EXTERIOR CONDITIONS


Murdoch Ave. view from southwest


South elevation


North elevation from west


East elevation

Streeter School, built in 1939, is a two story, masonry bearing wall structure, occupying the northwest section of the town owned 2.44 acre former school site. Originally built as the Amro W. Streeter Junior High School, it has 4 classrooms each on the first and second floor, and two classrooms and a larger common space in the basement, mostly likely used as an indoor play and shared programming space. The mechanical room is located there as well. Total size of the structure is 14,871 gsf on 3 floors.

While the building was vacated in the 1990s as a school, it has been used for other purposes in the meantime, including as a veteran's outreach center and for emergency personnel (fire) drills.

The condition of this building is solid. On the exterior, the red brick masonry, with cast stone pilasters, sills, entablature, and other details, is in good condition. There is little staining, spauling, or mortar deterioration, with what may be the original sand mortar. A few areas of masonry staining and deterioration are at the parapet, likely evidence of some prior roof leakage. The parapet area at the east elevation may have been built at a different time, given a slight difference in color and texture. Overall, the structure's masonry walls appear straight and true, with the only concern at the parapet. Portions of the membrane roofing seem to be loosely hanging over on the east side.

The poured-in-place, wood formed concrete foundation, exposed above ground for a half level, is also intact and in good condition. A few areas of cast stone trim have been chipped, and stairs have areas of stain and some deterioration. Wood double hung windows at the "front" or west elevation, have been replaced with vinyl modern units. Certain window openings are boarded over, with the existing windows in place behind. All glazing will require replacement.

At the eastern end of the building, there is a concrete walled area, one story, open to the elements, where there may have been storage or some other feature which is no longer present. The walled surround will need to be removed.

INTERIORS

Interior photos:

First floor classroom space

Stairs

First floor Murdock Ave. entrance

Classroom at east end


Basement Common Room


Glimpse into mechanical room

On the interior of Streeter School, hardwood floors, interior trim and doors, and wood wainscots are mostly intact, with natural, stained finish. It appears that the current roofing is functioning effectively. Plaster walls and original glazed tile walls in the toilet rooms are generally in good condition. Fiberboard and batten painted ceilings on the upper floors are original and remain in good shape.

Existing stairways are also in good condition, being constructed of iron stringers with concrete treads, iron balusters and corner columns and wood handrails. Existing stained hardwood paneled wainscot in halls, slate chalkboards, and natural wood doors and transom lights are in good condition and remain throughout. There are recent wall finishes in the toilets, and some later renovations which will easily be removed. Electrical conduit and other mechanical, electrical and fire alarm items have been installed over the original construction. Please refer to later reports, but they will need careful removal to retain the historic substrate and finishes.

The condition of the basement level is less intact than the two upper floors, due to heavier use, poorer quality finishes to begin with, and later interventions that are not appropriate. It is filled with piping below the ceiling (and in front of windows), and many paint color selections are unfortunate. However, plaster finishes are generally solid, the floor slab is in good condition, and there is no evidence of moisture damage to walls, or poor air quality. A single roof drain is damaged or plugged, causing one area of moisture build up in the northwest area. This seems to be recent development.

Overall, Streeter School is a handsome and well-built structure, with many original features that are worthy of further preservation and reuse.

POLAND SCHOOL

EXTERIOR ELEVATIONS

Murdoch Ave. view (West) from southwest

South elevation, Oak Street

East elevation

North elevation.

This smaller, less architecturally distinctive masonry school building was built in 1924, originally as a Junior High School. The narrow two and half story structure faces Oak Street, with a formal pedimented entrance door at the center. The two upper floors contain two classrooms, with stairs to the east and west. The full basement houses toilet rooms and other support spaces.

The school is constructed of red brick masonry, with precast lintels and cast stone details, including a classical revival entablature at the front door, consisting of cast stone pilasters, a pedimental roof extension, and cast stone name panel over the double door and transom light. The brick masonry walls have areas of deteriorated mortar, and portions which are out of plumb, indicating separation between wythes and structural deficiency. For specific conditions, again please refer to Structural Report, however the walls are generally in fair condition, without signs of serious failure. Cracks exist at the

half poured foundation walls, at corners. The north extension at the basement level is in poor condition and will be removed. Areas of the parapet and the chimney above the roof are in disrepair.

All windows are covered by plywood, hiding appearance and condition.

INTERIORS

Interior photos:

Second floor classroom

Central Stair

First floor Murdock Ave. entrance

First floor classroom, west side

The interior of Poland School was quite modest to start, and due to water damage, lack of heating, and general neglect, there is little of significance left to preserve. Plaster walls, wood window and door trim are in fair condition, and floor finishes are in poor condition. The major feature that is of architectural merit is the tin ceilings, which are in moderate to fair condition,

found in the hallways, stairwells, and classrooms. In areas where the roof failure was most pronounced, the ceilings have fallen and are in major disrepair.

Poland School is a modest masonry structure, reflecting the limited means of the community at the time that it was built. Yet it is a solid, historic building with stature, contributing architectural presence to this notable school site.

FORM A - AREA

Assessor's Sheets	USGS Quad	Area Letter	Form Numbers in Area
See Data Sheet	Winchendon		WIN.69-.70

MASSACHUSETTS HISTORICAL COMMISSION
MASSACHUSETTS ARCHIVES BUILDING
220 MORRISSEY BOULEVARD
BOSTON, MASSACHUSETTS 02125

Photograph

Town/City: Winchendon

Place *(neighborhood or village)*:
North Winchendon Village

Name of Area: Streeter and Poland Schools Complex

Present Use: Vacant

Construction Dates or Period: 1925-1939

Overall Condition: Good

Major Intrusions and Alterations: Window replacements (Streeter School), late 20th cen.; ADA accessible ramp (Streeter School), late 20th cen.; Window and door infill (Poland and Streeter School) late 20th cen.

Acreage: 2.44 acres

Recorded by: Quinn R. Stuart

Organization: VHB

Date *(month/year):* July 2020

Locus Map

See Continuation Sheet

☒ *see continuation sheet*

☒ Recommended for listing in the National Register of Historic Places.
If checked, you must attach a completed National Register Criteria Statement form.

Use as much space as necessary to complete the following entries, allowing text to flow onto additional continuation sheets.

ARCHITECTURAL DESCRIPTION

Describe architectural, structural and landscape features and evaluate in terms of other areas within the community.

The Streeter and Poland Schools Complex (1924-1939) comprises the Poland School, the Amro W. Streeter School, and their immediate surroundings in North Winchendon Village in Winchendon. The complex is sited on a slighted raised lot surrounded by Oak Street to the south, Murdock Avenue to the west, and Park Street to the north. The eastern boundary is defined by the existing right-of-way for a section of Morse Street, which was removed in the late twentieth century. Both schools are set back from the street with lawns and concrete walkways leading to the primary entrances. A system of concrete walkways also runs between the two schools and the sidewalk along Murdock Avenue.

The Poland School, at the northeast corner of Oak Street and Murdock Avenue (1924) (Photos 1-2) is a rectangular, two-and-one-half-story, three-bay-by-three-bay, masonry, Neoclassical-style building facing south. It has a flat, composite roof with a brick parapet and aluminum coping. A wood cornice with a molded profile runs below the parapet wall around the south, east, and west elevations. The walls are red brick and rest on a raised concrete foundation. A one-story, two-bay-by-two-bay storage and furnace room extends north from the center of the north (rear) elevation at the basement level. A slightly projecting center bay on the south (façade) elevation contains the primarily entrance, which consists of a late twentieth century, partially glazed aluminum replacement door with a single, partially glazed fixed sidelight to the west with a transom. The transom retains its original wood frame but is infilled with modern plywood. The entire entrance has a cast stone surround comprising pilasters supporting a broken pediment with a central urn, scroll brackets and a swag-and-urn motif in the entablature. A cast stone panel inscribed with “POLAND SCHOOL” is set above the primary entrance. Secondary entrances are at the north ends of the east and west elevations. The door on the west elevation consists of a late twentieth century, partially glazed aluminum replacement door with a single, fully glazed fixed sidelight to the west with an infilled transom. The door and transom on the east elevation are both infilled with plywood. Additional entrances with paneled wood doors are on the east and west elevation of the one-story basement storage room. Window openings are arranged in long rectangular bands with original wood frames, cast stone sills and lintels on the east and west ends of the façade. Windows on the secondary elevations and in the basement level are rectangular with original wood frame and cast stone sills and lintels arranged singularly, in pairs, or in groups of three. All windows have been covered with modern plywood.

The basement of Poland School is inaccessible at this time due to exposed asbestos. The first and second floors are similar in plan with a single-loaded corridor connecting the stairhalls at the east and west ends. Classrooms are in the southwest and southeast corners of the plan of the first and second floors (Photo 3). The main entrance in the center of the plan connects to the single-loaded corridor on the first floor and a teachers’ room sits between the two classrooms on the second floor (Photo 4). The basement is divided into smaller spaces with bathrooms at the east and west ends of the plan. The stairs feature wood treads, risers and balustrade. Finishes in the corridors and classrooms include a combination of low pile carpeting and vinyl tiles, and plaster walls. The ceilings in the corridors and classrooms are covered with tin tiles in fair condition in the corridors and a mix of fair to poor to in the classrooms. Each classroom has at least one wall featuring a chalkboard with original wood trim. Interior window and door trim are wood, and most of the original partially glazed doors are present.

The Amro W. Streeter School at the southeast corner of Murdock Avenue and Park Street (1939) (Photos 1, 5) is a roughly rectangular, two-and-one-half-story, seven-bay-by-five-bay, Classical Revival-style building facing west. It has a flat, composite roof with a brick parapet and aluminum coping. A wood cornice with molded profile runs below the parapet wall across the west (façade) elevation and around the west half of the north and south elevations. The walls are red brick and rest on a raised concrete foundation. A large areaway sits below grade along the east (rear) elevation exposing the basement level. The space is surrounded by poured concrete retaining walls and is accessed by a set of concrete stairs at the southwest corner of the space. A one-story, wood-frame lean-to used for storage is attached the east elevation of the school in the large areaway. The building stylistically consists of two blocks constructed at the same time: the main block at the western half of the plan and the rear ell at the eastern half of the plan. The main block has slightly elevated architectural detailing in comparison to the rear ell. Examples of this include the cast stone pilasters that vertically divide the elevations of the main block, which are reduced to red brick pilasters with cast stone capitals at the rear ell. The center bay on the façade is demarcated by cast concrete blocks flanked by Doric pilasters. The primary entrance is recessed in the center bay and accessed by a set of concrete stairs that extend the full width of the center bay with a modern replacement metal handrail. The main entrance consists of a pair of partially glazed, paneled wood doors flanked by partially glazed paneled wood sidelights with a multi-light transom, all of which appear to be original. The recessed entry bay has a projecting, molded lintel supported by brackets all surmounted by a replacement balustrade. A modern sign reading “Montachusett Veterans Outreach Center Inc” is affixed to the balustrade. A late twentieth century ADA ramp runs from the southern elevation to the main entrance. Secondary entrances in the main block are in the eastern-most bays of the north and south elevations and each consists of a late twentieth century, partially glazed aluminum replacement door with a single, partially glazed fixed sidelight. Each of the secondary entrances are capped by a shed roof supported by wood brackets. The only entrances in the rear ell of the building are at the basement level on the north and east elevations. Fenestration consists primarily of rectangular openings divided by the pilasters with a pair of windows with cast stone sills and lintels of soldier courses of red brick. Window openings in the basement level are also rectangular with a pair of windows but with concrete sills. Windows in the upper levels are replacement vinyl sash on the first story but retain the original wood frames. Windows on the second story are original six-over-six or four-over-four, double-hung wood sash. Basement windows are primarily pairs of four-light or six-light, wood hopper sash.

The interior of the Streeter School is arranged with double-loaded, cross-shaped hallways on the first and second floor flanked by four classrooms on each level situated in the northeast, northwest, southeast, and southwest corners of the plan (Photo 6). The basement has a double-loaded central corridor running north-south with two classrooms to the east and a large multi-purpose space occupying the west end of the plan. Each hallway is divided by walls with partially glazed double doors, full-height glazed sidelights, and multi-light transoms that are original to the plan (Photo 7). Stairhalls featuring iron staircases with concrete treads and wood handrails are located at the north and south ends of the north-south hallway. Secondary spaces set between the classrooms include custodial closets, offices, and bathrooms. The majority of the classroom, hallway, and secondary room doors are solid or partially glazed paneled wood, both original. Finishes include late twentieth century ceiling panels throughout the building, except for the basement which is plaster in the classrooms and exposed concrete in the multi-purpose space. Interior window sills consist of bullnosed buff brick, some of which is now painted. Walls are plaster with original, half-height wood wainscoting the hallways and late twentieth century particle board paneling above the chalkboards in most classrooms. Chalkboards with original trim run along at least one wall of each classroom. Some chalkboards have been painted over and some have been replaced with homosote or corkboard material. Each classroom also has at least one built-in cabinet unit. Flooring consists of smooth concrete in the basement, late twentieth century vinyl tile in the hallways, ceramic tile in the bathrooms, and original hardwood in the classrooms.

HISTORICAL NARRATIVE

Explain historical development of the area. Discuss how this relates to the historical development of the community.

The Town of Winchendon was incorporated in 1764 and remained primarily agrarian until the early nineteenth century, except for a significant local shingle industry. New transportation routes through Winchendon were established in the early nineteenth century, allowing for the development of additional industries, namely textile manufacturing in the villages of Glen Allen and Spring Village, also known as Winchendon Springs, and woodworking in the villages of Waterville and Hydewille. These industries led to rapid development in town and growth and diversification of the population. Winchendon Village (WIN.Z, NRIND 1992) developed into the primary commercial and institutional district and residential neighborhood for the upper-middle class (MHC 1984:1-2). In 1847-1848, two railroads passed through town. The Cheshire Railroad was established between Ashburnham, MA and Keene, NH with a station at North Village in Winchendon and the Vermont and Massachusetts Railroad passed through the southwest corner of town. In 1873, Morton E. Converse purchased a mill to make wooden products, including toys which became very popular. As a result of the railroad and toy manufacturing, between 1850 and 1900 the population in the town more than doubled from 2,445 to 5,001 residents. The majority of new residents arriving after 1870 were foreign born, primarily French Canadian. By 1915, more than 60% of the men were employed in one of the town's industries (MHC 1984). By 1920, the population had reached about 5,900 residents, but the economy, which was primarily based on manufacturing by this point, suffered during the Great Depression. The population grew slightly in the Post-World War II era with about 6,590 residents by 1950, raising by about 500 residents a year through the remainder of the twentieth century (US Census 1920-1990).

History of Winchendon Schools

In the early nineteenth century, the educational system in Winchendon was still based on district schools strategically located within smaller villages in the community. In 1843, the Winchendon Academy (WIN.46; not extant) was established by resident Ephraim Murdock, Esq. as a private, free, co-ed high school for both students in Winchendon and outside. The Academy was located in the village at the corners of School Street, School Square, and Front Street. Murdock left the building to the town in his will in 1853, on the stipulation it be used for educational purposes and subsequently the first public high school was established in Winchendon. Due to the rising population the town soon found the Academy building inadequate for a high school and in 1866, purchased land offered by Ephraim Murdock Jr. nearby on present-day Oak Street to construct a new high school referred to as the "Brick School" (not extant) (Marvin 1868:204-223).

Ephraim Murdock Jr. provided for the erection of the "Murdock School" in his will for children over age 10. The (Old) Murdock High School (WIN.71, NRIND1988) opened in the fall of 1887 on Murdock Avenue. The Murdock School was funded and managed by the Trustees of Ephraim Murdock Jr., but was under the supervision of the Superintendent of Schools.[1] The Brick School was converted from a high school to an elementary school. In 1904, all of the schools were renamed in honor of distinguished men of the town, most of whom had also served on the school committee. The Brick School was renamed the Wheeler School[2] after Rev. Charles Wheeler, first minister of the Church of the Unity. The old Academy building at School Square was renamed the Ephriam Murdock School, more commonly known as the E. Murdock School (Winehill 1979; Greenwood 1970:294).

By 1900, there were at least eight schools, including the Wheeler and E. Murdock Schools, serving first through eighth grades throughout town. However, by the early 1920s, overcrowding in the grammar schools became an immediate issue. In 1922, the E. Murdock School was so overcrowded that the all three grades were attending only part-time. To alleviate the overcrowding, Columbia Hall on Grove Street was rented, and the sixth grade of the Wheeler School was transferred there. The third grade of the E. Murdock School was moved to the Wheeler School. The town voted to allocate $40,000 to

[1] The Murdock School would be officially conveyed to the town in 1950.
[2] To avoid confusion, the names assigned in 1904 for the various schools in Winchendon will be used in the remainder of the document.

building a new four-classroom school building at the corner of Oak and Murdock Streets on the grounds of the Wheeler School. In March 1924, the Poland School (WIN.69) (Figure 1), named for Wheeler Poland who sat on the school committee for 34 years, opened for grades six through eight, but within a year shifted to seventh and eighth grades (Greenwood 1970:299-300; WHS n.d.; Winchendon 1924-1925).

Plans for the Poland School were drawn by the architectural firm Haynes & Mason (see *Architects* below). The design called for four classrooms, two on each the first and second floors, a teachers' room on the second floor, and a girls' and boys' playroom and bathrooms in the basement. The fuel and boiler rooms were in a one-story, concrete structure on the north (rear) elevation. The school had little ornamentation to conserve funds, but used tin ceiling tile in the classrooms, corridors and stairhalls, and expanses of blackboards were installed in each classroom. Exterior architectural ornamentation is designed in the Classical Revival style with cast stone trim elements and a metal cornice.

Through the late 1920s and early 1930s, funding sources were scarce due to the economic downturn of the time and there were no repairs or upgrades made to the town's schools. In spite of the economic hardships, the schools were again overcrowded. In 1933, the Poland School had two, eighth grade rooms that had 54 students in each room and the two, seventh grade rooms had 42 students each. These rooms were designed for a capacity of only 30-35 students (Winchendon 1933). In 1935, the school committee and superintendent of schools turned to the Works Progress Administration (WPA) to discuss much-needed funding maintenance on their existing educational infrastructure and the construction of a new school. A five-year program was developed to repair the school buildings in the town. With the WPA, 33 school projects were completed between 1935 and 1939. In 1936, the town officially voted to build a new school with the funds available from the Amro W. Streeter Fund. Streeter had left about $25,000 to the town for educational purposes (Greenwood 1970:301). However, due to delays getting approval for matching funds from the WPA, the project did not begin until 1938. The same year, an application by the town for the foundation of a gymnasium section for Streeter was approved by the WPA. In September 1939, the main school building of the Amro W. Streeter School (WIN.70) (Figure 2) opened but only the foundation of the gymnasium section was completed and construction was expected to resume in the Spring of 1940 (Winchendon 1935-1939). Due to a lack of funds, the gymnasium addition was never completed, and the foundation remained until the late twentieth century when it was finally demolished (WHS n.d.; NETR 1971, 1997).

The Streeter School and gymnasium was designed by Harry L. Meacham (see *Architects* below), who was hired by the town to design the school and to supervise work on all the WPA school projects. The school design called for eight "standard" classrooms, principal's office, nurse and clinic room, manual training room, household arts room, and a lunchroom "of ample size complete with serving kitchen" (Winchendon 1938); however, the nurse's room wasn't added until 1949. Streeter School served as a "partner" school to the Poland School (Winchendon 1949). The two buildings shared a heating system and students at the Poland School were served lunch in Streeter School's cafeteria. In 1939, the Town's education system changed from a 6-3-3 system, to a 6-6 system, meaning curriculuma are divided as first through sixth grades and then seventh through twelfth grades. The superintendent of schools changed the education system to provide more vocational opportunities to students in grades seven and eight. There was a significant drop-out rate of students entering high school and more after their sophomore year as enrollment was only compulsory to age 16. During Streeter School's first full year in service (1940), it is listed in the annual report as "Murdock-Streeter-Poland" with an attendance of 620 students total. After the first year, the annual schedules list it as "Streeter-Poland," with combined attendance records (Winchendon 1939, 1940; WHS n.d.).

Enrollment in the public-school system remained relatively steady into the 1940s with an average of about 1350 students total. In the late 1940s, there was a sharp increase in elementary school enrollment, from 717 elementary students in 1945 to 792 in 1950. This was exacerbated in the 1950s due to the "baby boom" in the Post-World War II era.[3] By 1957, there was a total of 1451 student enrolled in the public schools in Winchendon, with 878 in elementary school. The

[3] "Baby Boomer" are defined as someone born between the end of World War II in 1946 and 1964. 76 million Americans were born during this time period.

superintendent anticipated that by the time the first class of baby boomers reached junior high there would be no room to accommodate the students. (Winchendon 1940-1957).

Plans were put in place for a new school to serve the middle and senior high school grades seven through twelve and in September 1961 a new junior-senior high school opened on Grove Street just north of the Murdock School. The new school was named the Murdock Junior-Senior High School and the former Murdock School was renamed the "Old Murdock School." The E. Murdock and Wheeler Schools were closed, the fifth and sixth grades were transferred to the Streeter School, and the first through fourth grades were moved to Poland School (Greenwood 1970:350-351). The Wheeler School was ultimately demolished in 1965 and the E. Murdock School was demolished ca. 1999.

In 1975, Memorial School was constructed on Elmwood Road to house the first through sixth grades. This caused the closure of three of the remaining neighborhood elementary schools, which were subsequently sold into private ownership (two are extant). Poland was also closed and used for storage. Streeter and Old Murdock Schools were used for the seventh and eighth grades and was referred to as "Winchendon Middle School" at that time. These two schools were finally closed in 1995 when Murdock Middle-High School on Memorial Drive was opened for the sixth through twelfth grades. Murdock Junior-Senior High School was renamed Toy Town Elementary School for grades three through five. Memorial School houses grades Kindergarten through second (WHS n.d.).

Poland School continued to be used for storage but was left primarily vacant and neglected. Streeter School was leased for a Veterans' Day Activities Center operated by the Montachusett Veterans Outreach Center (MVOC) but it is currently vacant (WHS n.d.). The schools are currently proposed for reuse as residential development.

Architects

Haynes & Mason

Haynes & Mason was a Fitchburg-based architecture firm made up of partners Stephen Wesley Haynes and Harold E. Mason, who were in operation from 1922 until ca. 1932. They are notable for their use of Classical and Colonial Revival styles and worked on many public works projects on Cape Cod and Eastern Massachusetts. Haynes was born in Leominster in 1892 and attended architecture classes at the Boston Architectural Center (now the Boston Architectural College). He was employed as a draughtsman for Peabody & Sterns (1912-1916) and later at Allen & Collins (1916-1918). Starting in 1921, he worked independently in Fitchburg and began an association with Mason in 1922. After their partnership dissolved, Haynes started the S.W. Haynes and Associates firm, and continued to design buildings into the 1960s, many of which were schools including the Bourne High School (BOU.4, NRIND 2012) addition (1934) in Bourne and the Otter River School (TEM.84, 1934) in Templeton. Relatively little is known about Harold E. Mason, although he did design the Barnstable County Hospital in Bourne, the Barnstable County Jail (BRN.57, NRDIS 1987; ca. 1935), and the Sheriff's House (BRN.56, NRDIS 1987; ca. 1935), in Barnstable, MA. Buildings designed by Haynes & Mason include the Community Memorial Hospital (AYE.127, NRIND 2004; 1929) in Ayer, the Central Fire Station in Falmouth (FAL.1029, NRIND 1998; 1929), and the Teaticket Elementary School (FAL.1034, NRIND 2002; 1928) in Falmouth (Adams and Harrington 1997; Jones and Klein 2012).

Harold L. Meacham

Harold (Harry) L. Meacham (ca. 1884-1957) was a Worcester-based architect. He was born in Worcester, but there is no available information about his architectural or engineering training. Relatively little is also known about his career. In the early 1920s, he was employed as a draughtsman with the New England Power Company and Connecticut River Power Company in Worcester, as well as for the engineering firm of Samuel H. Pitcher Company, all in Worcester. By the late 1920s, he is listed in Worcester City Directories as working on his own as an architect. By 1940, his firm was listed as Harry L. Meacham Associates, architects and engineers. There are only a few buildings identified in the Massachusetts

Cultural Resources Information System (MACRIS) by Meacham, including the Tuttle Square School (AUB.70, NRIND 2001; 1922) in Auburn, the Chaffins School (HOL.379; 1922; demolished) in Holden, and Saint Joseph's Abbey (SPE.105; 1951) in Spencer (Ceccacci 2001).

Streeter and Poland Schools Complex
Winchendon, MA
Data Sheet

Map No.	MHC No.	Assessor's No.	Address	Historic Name/Use	Est. Date of Const.	Architectural Style/Type	Photo No.	Contrib. To Area (C/NC)
1	WIN.69	5B2-0-118	0 Oak Street	Poland School	1924	Classical Revival	1-4	C
2	WIN.70	5B2-0-118	0 Oak Street	Amro W. Streeter School	1939	Classical Revival	1, 5-7	C

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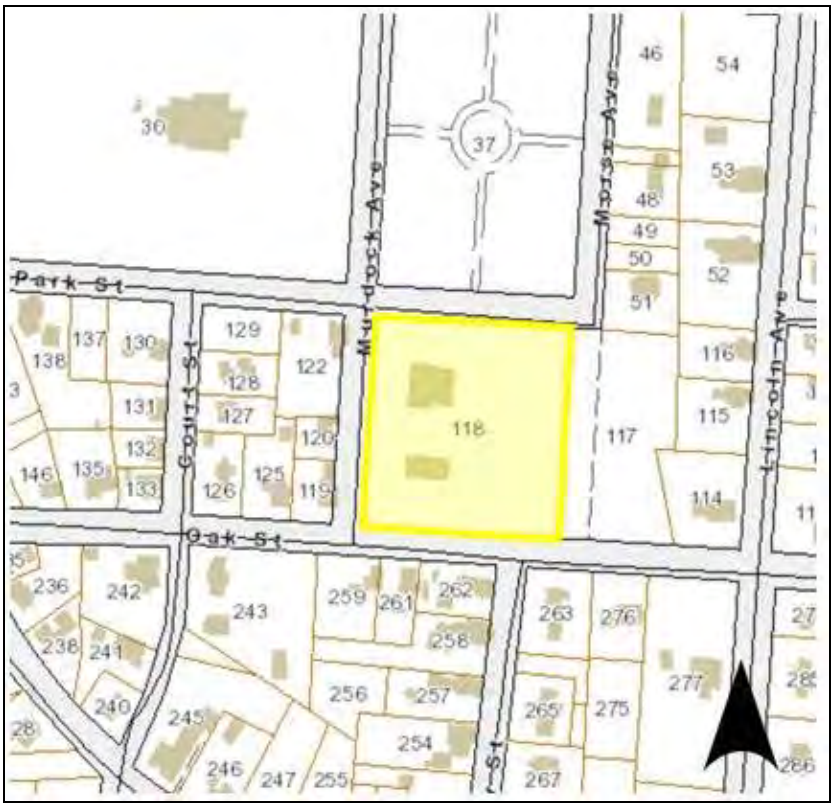
LOCUS MAP


Park St
Murdock Ave
Court St
Oak St
Lincoln Ave
118
117
37
36
46
54
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51
116
115
114
129
122
128
127
120
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AERIAL MAP


Streeter and Poland Schools Complex
Park St
Park St
Park St
Morse Ave
Court St
Murdock Ave
Murdock Ave
2
1
Oak St
Oak St
Oak St
Court St
Academy St

FIGURES

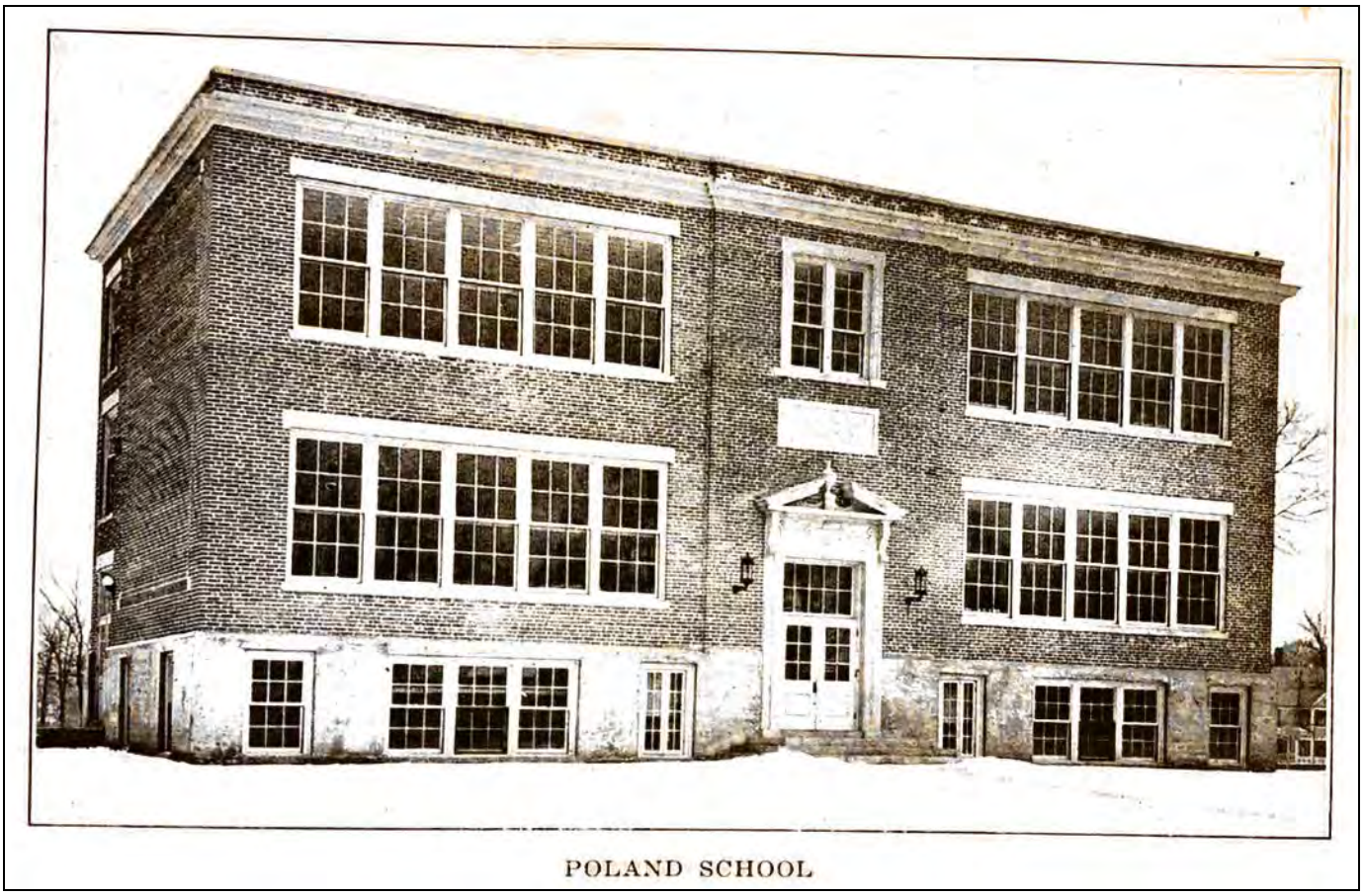

Figure 1. Historic photograph of Poland School, taken 1924 (Source: Town of Winchendon Annual Report 1924).

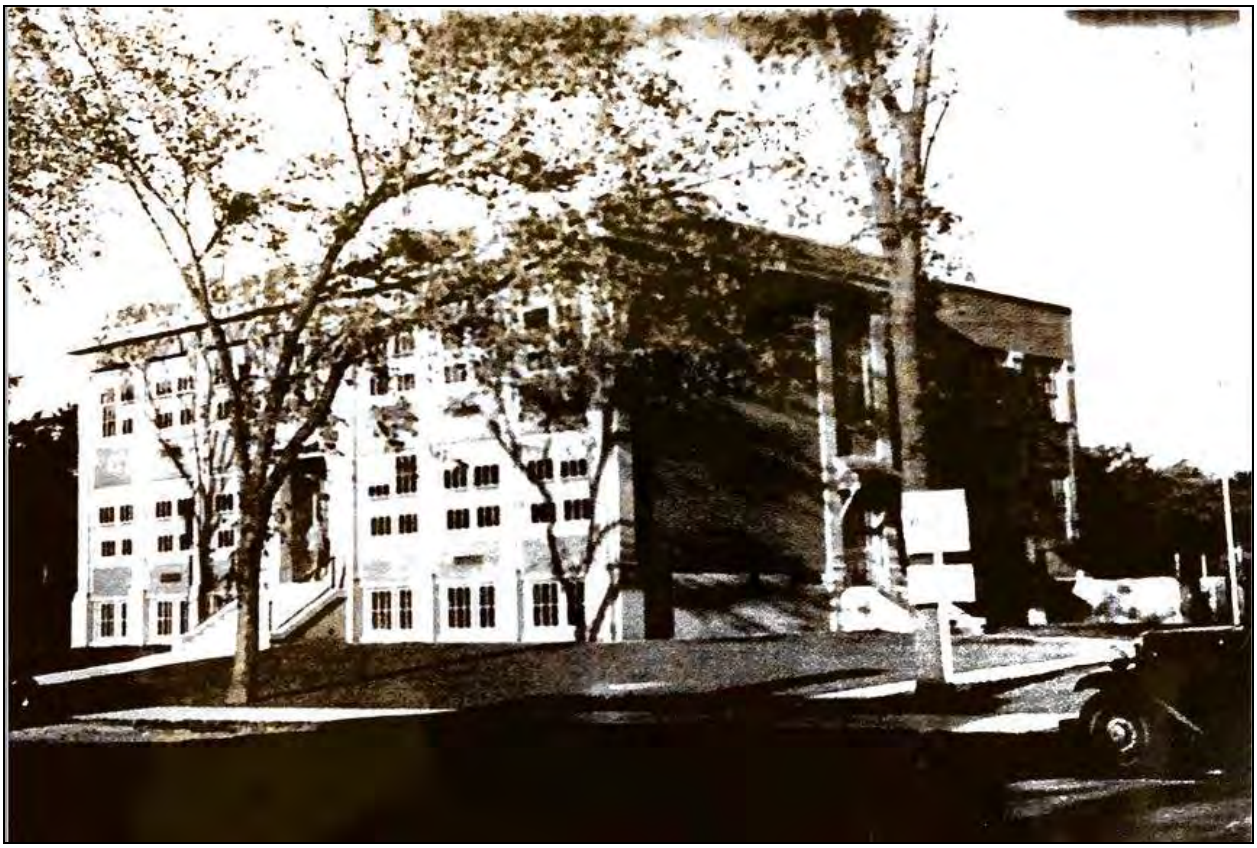

Figure 2. Historic Photograph of Streeter School, taken ca. 1970 (source: Winchendon Historical Society).

PHOTOGRAPHS

Photo 1. (front cover) View northeast of the west and south (façade) elevations of Poland School (right) and the west (façade) and south elevation of Streeter School (left) (2020).

Photo 2. View northeast of the west and south (façade) elevation of Poland School (2020).

Photo 3. View southwest of the southwest classroom, second floor of Poland School (2020).

Photo 4. View north of the main entry stairhall, first floor Poland School (2020).

Photo 5. View northeast of the west (façade) and south elevation of Streeter School (2020).

Photo 6. View northwest of the southeast classroom, second floor Streeter School (2020).

Photo 7. View west of the main entrance hall, first floor Streeter School (2020).

National Register of Historic Places Criteria Statement Form

Check all that apply:

☒ Individually eligible ☐ Eligible **only** in a historic district

☐ Contributing to a potential historic district ☐ Potential historic district

Criteria: ☒ **A** ☐ **B** ☒ **C** ☐ **D**

Criteria Considerations: ☐ **A** ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐ **F** ☐ **G**

Statement of Significance by Quinn R. Stuart, VHB

The criteria that are checked in the above sections must be justified here.

The Street and Poland Schools Complex appears eligible for the National Register of Historic Places under Criteria A and C at the local level in the areas of Community Planning and Development and Architecture for the period of 1924, the date of construction of the Poland School, to 1970, the current 50-year cut-off date; however, Streeter School continued to be used as a school until 1995.

The Streeter and Poland Schools Complex appears to be eligible under Criterion A for its associations with the broad patterns of development of the early-twentieth century in Winchendon, particularly as a representation of the town's reaction to significant population growth during that time as the town's textile and wood product manufacturing thrived and grew in the early twentieth century. Both the Streeter and Poland Schools were constructed in direct response to the town's growth in the early twentieth centuries. The Streeter and Poland Schools Complex also appears eligible under Criterion C as intact local examples of the use of the Classical Revival style on early-twentieth-century institutional architecture.

4.2
Existing Conditions – Structural Assessment

Streeter and Poland Schools are two of the three former schools that occupied the site. According to the historical data from 1927, the property was also the home of the Wheeler Elementary School which was demolished at some point in time. Refer to the Architectural and Historical consultant's reports for additional information.

Structural drawings for the original buildings were made available for use. The following descriptions are based on the limited visual observations conducted on the 30th of April as well as a follow up visit on the 18th of June 2020. In order to confirm the accuracy of these plans, some selective demolition was performed so that areas of the framing were exposed to view.

STREETER SCHOOL

Structural drawings for the original building were available. The following descriptions are based on the limited visual observations conducted on the 30th of April as well as a follow up visit on the 18th of June 2020. Observations were limited to the conditions exposed-to-view at the time of these visits.

According to the original drawings, the two-story building is wood framed with load-bearing exterior masonry walls. In order to reduce the spans, there are interior bearing lines that utilize either wood bearing walls or steel beams with columns. The elevated floor structure above the basement level consists of 2x wood joists spaced at approximately 16-inches on center. The elevated floor has a wood deck and is finished off with wood flooring. The Second Floor framing is similarly framed however the floor joists are indicated as 3x wood joists spaced at 12-inches on center. The shallow pitched roof structure roof structure is framed with 2x wood rafters spaced at 16- and 12-inches on center depending on the span. The existing drawings did not include a plan of the foundation, but it assumed that the building loads are transferred to the supporting soils by way of a cast in place concrete foundation system consisting of walls supported by conventional spread footings both of unknown width and thickness. The second assumption is that the interior columns bear upon isolated concrete column footings. The basement floor is a concrete slab on grade.

The exterior walls are load-bearing, and there are steel columns located in the mullions of the existing window openings. Given the age of the building, it is presumed that the wall construction is unreinforced masonry (URM), meaning it does not contain any vertical or horizontal steel reinforcing.


Southwest Corner (facing Murdoch Avenue)


South Elevation

Northwest Corner (facing Murdock Avenue)

East Elevation

EXTERIOR CONDITIONS

Streeter School, built in 1938, is a two-story, masonry bearing wall structure, occupying the northwest section of the site. The 2-story structure has a full basement and the total gross square footage is approximately 14,871 square feet.

The condition of the building's exterior is generally good. Around the perimeter of the building, approximately 5-feet of the cast in place concrete foundation wall is exposed to view. The top of the foundation wall has a decorative chamfer with a concrete watertable above the basement window openings. The depth of the watertable varies but in most cases, it covers the bottom flange of steel lintel. The bottom flange of the lintel assemblies all exhibited some degree of surface rust and due to the prolonged exposure to the elements are in generally fair condition. There are areas with minor hairline cracks in the foundation wall, but none appeared to a structural concern. Most of the foundation wall was in good overall condition. The exterior wall assembly consists of multi-wythe brick masonry. There are a series of cast stone pilasters that adorn the building's façade. The windows on the upper floors have cast sills with a header course brick along the head. The header course is supported with steel lintel assembly. The lintels were in generally good condition with only minimal surface rust observed from the ground. Typically, the main fields of the brickwork were in generally good condition with only minor staining, spalling, and deterioration of the mortar joints. The cast stone cornice is in good general condition however some of the mortar joints have deteriorated. The top 24- to 30- inches of the brick wall on the east elevation is in generally fair condition with deteriorating joints and brick that are no longer in the vertical plane of the wall. The same condition occurs in the southeast corner. Overall, the exterior masonry walls appear to be plumb and straight.

Southwest Corner (facing Murdoch Avenue)

South Elevation

Northwest Corner (facing Murdock Avenue)

East Elevation

On the north side of the building, there is a cast in place concrete ramp and retaining wall that allows access to the basement level. The ramp in in generally good condition however the exposed face of the retaining wall has areas of deterioration of the concrete and the reinforcing was exposed to view. Although this face of the wall is in fair condition, it appears that the remainder of the wall is structurally sound.

In the north- and south-east corners of the building there is a concrete wing wall structure that does not show on the original drawings. Based upon the cold joint at the interface of the building, this wall was not part of the original construction and its exact purpose is unknown. As it is not of the proposed renovations, its condition will not be addressed.

On the east side of the building, there is a three-sided concrete structure. The exact purpose of this subgrade structure is unknown and is not shown on the original drawings. This one-story open air structure is not being utilized as part of the renovations and additions so its condition will not be addressed.

Concrete Ramp

Concrete Ramp

Wing Wall – Typ. North- and Southwest Corners

Three-Sided Concrete Structure

At the main entry, facing Murdock Street, has a monumental stair leading to the doorway. Presently, there is a steel framed handicap ramp. The concrete stair assembly is in generally good condition, however there are a few areas were the stair tread has spalled and will require repair. There are also some additional isolated foundation elements (piers, footings) in place to support the steel framed ramp. These elements are independent of the building's foundation and can be removed without impacting the structural integrity of the building. The two side entries have concrete stair structures that have wood framed canopies over the doorways. The concrete stairs appear to be in good overall condition as do the shed style canopies.

The brick chimney, located in the center of the building, is a multi-wythe structural element that is for the most part hidden from view. Although the outermost wythe of the portion that extends above the roofline is in generally fair condition, the chimney appears to be straight and true. The exposed to view brickwork did have significant amount of joint deterioration and many of the brick faces have spalled.

Southwest Corner (facing Murdoch Avenue)

South Elevation

Existing Chimney

Existing Roof (Elevation

INTERIOR CONDITIONS

On the interior of Streeter School, the interior finishes (i.e. hardwood floors, plaster walls, and ceilings, etc.) limit observation of the floor framing systems. Based upon the condition of the plaster walls, the building has not suffered from differential settlement of the foundations. Observations holes made in the ceilings allowed limited access to view the floor framing.

Beginning in the basement, the floor is a concrete slab on grade. With the exception of the slab in the north stairwell, there were no visible signs of distress in the slab. In the north stairwell, it appears that at some point in time an underground water pipe failed and flooded the area thereby undermining the slab. The pipe was repaired but the slab was not. The slab will need removed and replaced. The interior bearing walls consist of multi-wythe brick, there was some minor step cracks in the brickwork. Typically, the step cracks that were observed radiated from the corners of the doorways. The cracks were minor in nature and the brick are still within the plane of the wall. The floor framing exhibited no sign of modifications through the years. The column, beam, joist sizes observed were consistent with the original drawings and they were all in good general condition. The First Floor's subfloor appeared to be tongue & groove wood decking with wood flooring for the floor finish.

Classroom (Basement)

Observation Hole (Exist. 1st Floor Framing)

Step Crack Radiating from Door Head

New Pipe and Undermined Slab (North Stair)

While on the First and Second Floors, the plaster walls and ceilings showed no signs of structural distress from overloading or excessive deflection of the Second Floor framing members (joists and beams) or building drift from the wind forces. The windows also appeared to level and plumb. There was also no evidence of moisture infiltration. The floor appears to be level and solid underfoot.

Overall, Streeter School shows no signs of structural distress such as differential settlement or overloading. The exposed to view framing appears to be in generally good condition. The required remedial measures are more cosmetic than structural in nature. While surveying the structure, the in-place framing systems appear to be consistent with that indicated on the original plans.

Existing Roof Framing (Attic Space)

Existing Roof Framing (Attic Space)

Existing Roof and Roof Drain (Southwest Corner)

Existing Roof, Chimney and Roof Drain (Southeast Corner)

POLAND SCHOOL

Structural drawings for the original building were available for use during this Conditions Assessment. The following descriptions are based on the limited visual observations conducted on the 30th of April as well as a follow up visit on the 18th of June 2020. Observations were limited to the conditions exposed-to-view at the time of these visits.

The original drawings for the two-story building indicate a wood framed structure with load-bearing exterior masonry walls. In order to reduce the spans, there are two interior bearing lines utilizing either 2x bearing walls or steel beams with steel columns. The elevated floor structure above the basement level consists of 2x wood joists spaced at approximately 16-inches on center. The elevated floor has a wood deck and is finished off with wood flooring. The Second Floor framing is similarly framed however the floor joists are indicated as 3x wood joists spaced at 12-inches on center. The shallow pitched roof structure roof structure is framed with 2x wood rafters spaced at 16-inches on center with 2x ceiling joists that are hung from the rafters. The existing drawings did not include a plan of the foundation, but it assumed that the building loads are transferred to the supporting soils by way of a cast in place concrete foundation system consisting of walls supported by conventional spread footings both of unknown width and thickness. The second assumption is that the interior columns bear upon isolated concrete column footings. The basement floor is a concrete slab on grade.

Similar to Streeter School, the exterior walls are load-bearing brick, and there are steel columns located in the mullions of the existing window openings. Given the age of the building, it is presumed that the wall construction is unreinforced masonry (URM), meaning it does not contain any vertical or horizontal steel reinforcing.

West Elevation (facing Murdoch Avenue)

Southeast Elevation (1st and 2nd Floors)

Southwest Elevation (Basement & 1st Floor)

Southeast Elevation (Basement & 1st Floor)


North Elevation


East Elevation

EXTERIOR CONDITIONS

Poland Streeter School, built between 1900-1920, is a two-story wood framed structure is located in the southwest corner of the site. The building has a full basement and the total gross square footage is approximately 7,635 square feet.

The condition of the building's exterior is in generally fair. Around the perimeter of the building, approximately 8-feet of the cast in place concrete foundation wall is exposed to view. The top of the foundation wall coincides with the top of the concrete lintels above the basement window openings.

There are numerous areas with significant vertical and horizontal cracks in the foundation wall. Typically, the concrete lintels are in poor condition due to the deterioration of the reinforcing within. The cracks in the lintel assemblies vary from hairline to approximately 1/2-inch in width. The volumetric change in the steel reinforcing has also caused the failed concrete to protrude from the face of the wall. Based upon the degree of deterioration, water has and will continue to infiltrate the wall assembly. A similar type of failure also occurs at the basement windowsill. Again, the foundation poor condition.


Concrete Wall at Window (Basement)


Concrete Lintel at Window (Basement)


Concrete Windowsill (Basement)


Concrete Lintel at Window Infill (Basement)

The exterior wall assembly consists of multi-wythe brick masonry. There are decorative recessed brick panels on the north, south, and east elevations. Generally, the brick is in fair condition with a large percentage of the wall area exhibiting some degree of staining, spalling, and deterioration of the mortar joints. The windows on the upper floors have cast windowsills and headers. The header course is supported with steel lintel assembly. The lintels were in generally good condition with only minimal surface rust observed from the ground. The metal clad cornice is in generally fair condition. Along the east elevation, the center portion of the cornice has become dislodged from the building face. The brickwork of the parapet is in generally fair condition with deteriorating joints and brick that are spalling. Despite its visual condition, the exterior masonry walls appear to be plumb and straight.

East Elevation (Top Portion of Decorative Brick Panel)

East Elevation (Top Portion of Decorative Brick Panel)

Metal Clad Cornice (Southeast Corner)

South Elevation (Brick Panel between 1st and 2nd Floors)

Parapet Wall (South Elevation)

Parapet Wall (South Elevation)

On the north side of the building, there is a brick chimney. The brick chimney is a multi-wythe structural element that exposed to view. The portion that extends above the roofline is listing to the south and shows signs of multiple repairs and is in fair condition. The lower portion of the chimney appears to be straight, plumb, and in generally good condition.

Although the one story structure located on the north side is part of the original construction it is slated for demolition as part of the proposed renovations, its condition will not be addressed.

On the east and west sides of the building, there is an exterior concrete stair that serves the building. The railing assemblies are rusting and have stained the concrete. Without any protection from the weather, the concrete surfaces are weathered but the stair structures appear to be in good general condition.

At the main entry, facing Oak Street, has a wrap-around stair leading to the doorway. The concrete stair assembly is in generally good condition, however there are a few areas were the stair tread has spalled and will require repair. The concrete stair assembly appear to be in good overall condition.

Chimney on North Elevation
(deteriorating mortar joints)

Listing Chimney on North Elevation
(deteriorating mortar joints)

Stone Pediment over Main Entry

Main Entry on South Elevation
(facing Oak Street)

INTERIOR CONDITIONS

The interior finishes of Poland School (i.e. hardwood floors, plaster walls, and ceilings, etc.) limit observation of the floor framing systems. Based upon the condition of the plaster walls, the prolonged exposure to moisture and thermal changes have compromised the wall finish but the building does not exhibit any signs from differential settlement of the foundations. Observations holes were not made in the ceilings thereby limiting access to view the floor framing.

Beginning in the basement, there is substantial damage to the interior finishes and the floor framing in the southwest corner of the building. This is the result of a partial roof failure and prolonged exposure to water and moisture. The basement floor is a concrete slab on grade with no visible signs of distress. The steel columns and beams supporting the First Floor framing are in generally poor condition. The columns are in the advanced stage of deterioration. The steel beams also exhibit signs of varying degrees of rusting with the worse being isolated to the southwest corner of the building. The remainder of the building's steel appears to be in general good condition with isolated areas of surface rusting. As with the steel, the 2x wood floor joists and wood decking in the southwest corner have been saturated with rainwater and melting snow coming through the breach in the roof. Once the building is weathertight and the framing has dried out, further investigation, will be required to determine the structural integrity of the First and Second floor framing members.

Water Damage in Southwest Corner
(Exposed 1st Floor Framing)

Water Damage in Southwest Corner
(Exposed 1st Floor Framing)

Deteriorated Steel Column in Basement (mid-height)

Deteriorated Steel Column in Basement (base)

The interior bearing walls on the upper floors consist of 2x stud walls. The condition of these walls could not be determined due to the plaster finish. The remainder of the floor framing exhibited no sign of modifications through the years. The column, beam, joist sizes observed were consistent with the original drawings and they were all in good general condition. The typical subfloor is tongue & groove wood decking with wood flooring for the floor finish.

Although the condition of the plaster walls and ceilings was general poor, there were no signs of structural distress. Excluding the southwest corner, the floor appears to be level and solid underfoot. The roof framing was observed within the attic space. The 2x rafters appeared to be in good general condition and the member sizes were consistent with the original drawings. The membrane roof has a pea stone ballast of varying depth. There are also two wood framed penthouses with hipped roofs. These two structures are in fair condition.

Second Floor Framing (without tin ceiling)

Second Floor Framing (without tin ceiling)

Second Floor Framing (with tin ceiling intact)

Second Floor (facing the Exterior Wall)

Roof Framing (within attic space)

Roof Framing (within attic space)

While on the roof, there were a few areas that were not as solid underfoot. This may be a function of an issue with the roofing system and not necessarily a structural deficiency. As part of the proposed renovations, the entire structure will be reroofed. The structural adequacy of the roof framing system will be verified at a later date however the rafter sizes appear to be consistent with the spans.

Northeast Corner of Roof

Southwest Corner of Roof
(Wood Framed Penthouse on Right)

Southwest Corner of Roof
(Dark Region is the Location of Breach in Roofing System)

Close up of Southwest Corner of Roof
(Wood Framed Penthouse on Right)

Close up of Roof Penthouse Structures
(looking towards Murdock Avenue)

Southeast Corner of Roof
(looking towards Murdock Avenue)

Overall, the only structural deficiencies observed at the Poland School building are isolated to the framing in the southwest corner and the foundation walls. The remainder of the building's floor and roof framing systems did not exhibit any signs of structural distress such as differential settlement or overloading. In contrast to the remedial measures at Streeter School, the remedial measures for Poland School are structural in nature. While surveying the structure, the exposed to view framing appear to be consistent with that indicated on the original plans.

MECHANICAL, ELECTRICAL, PLUMBING & FIRE PROTECTION SYSTEMS NARRATIVE

FIRE PROTECTION

An automatic wet-type sprinkler system will be installed to provide full protection of the building. The required sprinkler system design will primarily be based on "light hazard", as defined by NFPA 13. Spaces such as the common area laundry facilities, mechanical spaces, and rooms used for miscellaneous storage, will likely be classified as "ordinary hazard" occupancies as defined by NFPA 13. A hydrant flow test will be required to determine the adequacy of the municipal water system with regard to supporting the proposed sprinkler system.

The sprinkler control and service entrance equipment will include, but not be limited to: reduced pressure zone valve (in accordance with the Winchendon Water Department requirements), flow alarm, valve/tamper supervisory switches, etc., and will be located in the mechanical room where the new water service lateral enters the building. Exterior Siamese type hose connections (4" Storz per Lee Fire Department) will be provided at the exterior of the building to permit fire department connection. All fire protection system controls, alarms, switches, etc., will be connected to the proposed fire alarm system.

Sprinkler piping will consist of black iron piping with threaded fittings or bolted couplings. Sprinkler types will vary throughout the building based on the use/occupancy of the respective space as well as the architectural features (ceiling finishes and type). Concealed type heads will be provided wherever gypsum ceilings are installed. Wire cages will be provided on heads in utility type spaces, such as mechanical rooms, janitor closets, storage rooms, etc.

Fire Protection Outline Specifications:

A. Wet Type Sprinkler Systems

1. Codes and Standards
   a. Building Code: IBC2015 with 780 CMR Massachusetts amendments. Massachusetts Fire Prevention Code 527 CMR Wet-Pipe Fire Sprinkler System: The building will be protected throughout with an automatic wet sprinkler system.
   b. The system will be hydraulically calculated to provide a water application rate of 0.10 GPM per square foot over the most remote 1500 square feet for light hazard areas, 0.15 GPM per square foot over the most remote 1500 square feet for ordinary hazard group 1 areas and 0.20 GPM per square foot over the most remote 1500 square feet for ordinary hazard group 2.
   c. Light Hazard areas will include: Office areas, bedrooms, living rooms and bathrooms.
   d. Ordinary Hazard areas will include: Storage areas, mechanical rooms, and electrical rooms.

2. Sprinkler Heads
    a. Heads will be concealed type, with white cover plate, at hung and gypsum ceiling areas.
    b. Mechanicalroomsandotherunfinishedareaswillbeprovidedwithexposedbrassfinishsprinklers equipped with sprinkler guards.
    c. Sprinklers for areas subject to freezing shall be dry type.
    d. Areasofthebuildingthatwillnotbeprovidedwithwetsprinklerprotectionare:
        - Areas above ceilings (if completely filled with insulation)
        - Main Electric Switchgear Room (if 2-hour rated)
        - Closets
    e. The inspector's test valvewill be located in the fire sprinkler room for testing and maintenance. Test drain piping to discharge outside the building to an appropriate location.

3. Sprinkler System Valves
    a. A reduced pressure type backflow assembly shall be provided on the fire service line. This device will be ASSE listed and Mass. Code approved. No further backflow equipment will be required on the fire service system.
    b. Fire department pumper connection (FDC) will be provided at the exterior wall of the building and will feed all site sprinkler systems and fire hydrants. The FDC shall be 4”x4” Storz type, or as required by the local Fire Department.
    c. All shut-off valves to be FM approved type and be equipped with supervisory tamper switches. These switches along with the flow switches shall be monitored by the building fire alarm system.
    d. All shut-off valves will be UL listed and FM approved type and be equipped with supervisory tamper switches. These switches along with the flow switches will be monitored by the building fire alarm system.

B. Materials

1. Pipe and Fittings
    a. Sprinkler piping 2" and smaller to be Schedule 40, black steel with black cast iron screwed fittings.
    b. Sprinkler piping 2-1/2" and larger to be Schedule 10 black steel pipe, roll grooved, with grooved end fittings.
    c. All drain piping and any piping exposed to the weather to be galvanized.
    d. Underground fire service piping to be minimum DICL Class 53.

2. Valves
    a. Gatevalves2-1/2"and larger to be iron body, bronze mounted, taper wedge, outside screw and yoke, rising stem and flanged ends. Indicating valves to be butterfly type, bronze type with grooved ends.

3. Hangers and Supports
    a. Seismic restraints will be installed on piping and comply with requirements in NFPA 13 for seismic-restraint device materials and installation.

b. Drain valves will be installed on standpipes and extended drain piping to outside of building.
c. Alarm devices will be installed in piping systems.
d. Hangers and supports for sprinkler system piping will be installed according to NFPA 13 and will comply with requirements in NFPA 13 for hanger materials.
e. Sleeves for piping penetrations of walls, ceilings, and floors will be installed.
f. Sleeve seals for piping penetrations of concrete walls and slabs will be installed.
g. Escutcheons for piping penetrations of walls, ceilings, and floors will be installed.

PLUMBING

Domestic Water, D.W.V and Storm:
A new domestic cold water service lateral will enter the building in the mechanical room. The building's water service should be equipped with isolation valves, pressure regulating valves and a meter in accordance with Winchendon Water Department standards. Domestic water systems will include copper piping with either soldered joints or press type fittings for piping larger than 1-inch. Branch piping 1-inch and smaller will be PEX tubing. Piping insulation will be installed on all domestic cold and hot water piping.

Interior drainage, waste and vent (D.W.V.) piping will consist of cast-iron, no-hub type or wrought copper with soldered joints for above-slab locations. Below slab piping will be cast-iron hub-and-spigot type. Drainage piping from each unit will be vertically stacked down to the basement, where they will join together and be discharged at a location coordinated with the site engineer. Vent piping will be combined into common stacks and extended to 18-inches above the roof. Roof drains will be provided on the flat roof section and connected to cast-iron piping discharging to the storm sewer system; horizontal storm water piping will be insulated.

Service Water Heating:
Domestic hot water will be provided from a central, high efficiency, condensing, propane-fired boiler coupled to an insulated storage tank(s). Hot water will be stored at a temperature of 140ºF. A thermostatic mixing valve will be installed downstream of the service water heating plant to safely control the domestic hot water supply temperature to the building. Hot water return (recirculation) will be incorporated into the distribution system to meet energy code requirements.

Based on preliminary load calculations, the domestic hot water plant should be sized to include approximately 240 gallons of storage with a500 MBH water heater.

Fixtures:
All fixtures will be code-compliant, residential type. Additionally, fixtures in applicable spaces will be compliant with the Massachusetts Architectural Access Board Regulations. Water closets will be floor-mount, vitreous china, flush tank type. Lavatories will be vitreous china, vanity mounted, with two handle center set faucets. Bath tubs and showers will be acrylic construction with acrylic surrounds. Stainless steel sinks with single control center set faucet and separate hand spray will be provided in kitchens. Faucets and fixtures will be the low-flow type and be equipped with

manual controls. Each unit will also include a dishwasher connected to the D.W.V. and domestic hot water supply system.

Drinking fountains will be provided where necessary to meet code requirements. Floor mounted, composite mop sinks will be provided for custodial purposes. Hose bibs and floor drains will be provided in restrooms where required by the Massachusetts Plumbing Code.

Propane:
A propane service lateral will be extended from an exterior 1,000-gallon storage tank to the mechanical and laundry rooms and be utilized for domestic water heating and clothes dryers. Gas piping will consist of schedule 40 steel piping with threaded fittings. Electric appliances (range/oven) will be provided in the apartments.

Plumbing Outline Specifications:

A. General Plumbing Design Considerations:

1. Scope of work will include the installation of entirelynew plumbing systems.
    a. Plumbing fixtures and trim.
    b. Domestic cold water and hot water distribution systems.
    c. Sanitary waste and vent systems.
    d. Storm water drainage system.
    e. LP gas system.
    f. Domestic hot water heating plant.

B. Plumbing Fixtures:

1. Water Closets:
    a. Water Closets: Floor mounted, elongated bowl, bottom outlet, 1.28 GPF,tank type.

2. Lavatories
    a. White vitreous china, vanity-mounted type. Provide with deck-mounted faucet, grid strainer, chrome supply with key stop, cast brass chrome plated escutcheon and cast brass chrome plated “P” trap with cleanout plug.

3. Kitchen Sinks:
    a. 18-gauge, Type 304 stainless steel, self-rimming, 8” deep single bowl sink with sound dampening coating. Provide with mounted faucet, 4” wrist blade handles, chrome plated gooseneck swing spout pressure compensating spray outlet, chrome supply with key stop, cast brass chrome plated escutcheon and cast brass chrome plated “P” trap with cleanout plug.
    b. Mop sinks: Floor mounted service sink, white composite, with 28”x28”x12” bowl. Provide with rigid spout mixing faucet with vacuum breaker, pail hook , wall brace and ¾” threaded hose outlet, stainless steel 16” high splash guard for side and back, hose hanger, mop hanger, 3” cast brass drain, coated wire rim guard and strainer.

4. Drinking Fountains and Coolers:

a. ADA, wall hung, stainless steel finish, self- contained electric water cooler type with push bar controls with front and side operation, HFC-134A refrigerant and a light grey granite finish. Provide with integral bottle filler.

5. Other Plumbing Fixtures:
   a. Interior Hose Bibbs: Exposed, Anti-Syphon, automatic draining, with integral backflow preventer, ¾" threaded inlet, ¾" male angled hose connection and operating key. Provide in each toilet room with two or more toilets or urinals, or two or more thereof in any combination and in all mechanical rooms or mechanical areas of similar use or nature. Basis of Design: Zurn, Model No. Z-1334-C
   b. Exterior Wall Hydrants: Exposed, automatic draining, with integral backflow preventer, ¾" threaded inlet, ¾" male angled hose connection and operating key. Provide wall hydrants located around building no more than 100-feet apart. Basis of Design: Zurn, Model No. Z-1321-C

C. Domestic Water Distribution:

1. Cold Water Service:
   a. The cold water supply will be provided by the municipal system. Service entrance equipment shall include strainer, meter, and backflow preventers.
   b. Piping insulation will be installed on all domestic cold water. Insulation shall be continuous through supports and include a vapor retarding jacket. Insulation for cold water piping 1-1/4" and smaller shall be 1/2" thick. For cold water piping 1-1/2" and larger insulation shall be 1" thick.

2. Hot Water Service:
   a. Domestic hot water will be provided from a high efficiency, condensing, LP-fired water heater coupled to insulated storage tank(s). Preliminary sizing includes two (2) 120-gallon storage tanks and one (1) 500,000 BTUH water heater, similar to Lochinvar's Armor AWN 500. A thermostatic mixing valve temperature control station will be provided to limit the delivery water temperature to avoid scalding.
   b. Hot water return (recirculation) will be incorporated into the distribution system and will include controls to monitor the return water temperature and enable/disable the associated circulator. Hand wash lavatories will have integral temperature limit stops and/or point-of-use mixers to provide 110°F maximum temperature.
   c. All domestic and protected hot water supply systems will be circulated using bronze circulating pumps controlled by immersion aquastats. Hot water will be circulated to directly behind all lavatories and other low-flow fixtures.
   d. Piping insulation will be installed on all domestic hot water and domestic hot water return piping. Insulation shall be continuous through supports and include a vapor retarding jacket. Insulation for hot water and hot water return piping 1-1/4" and smaller shall be 1" thick. For hot water and hot water return piping 1-1/2" and larger insulation shall be 1-1/2" thick. Insulation shields shall be installed to protect insulation at all pipe hangers.

D. Domestic Water Supply Equipment:

1. Water meter: Electronic per Winchendon Water Department requirements.

2. Provide reduced pressure principle backflow preventers as needed for equipment and systems to prevent cross contamination from non-potable liquids. These systems include but are not limited to: boilers, dishwashers, irrigation systems, etc.

3. Domestic water will be piped with lead-free type L hard drawn copper with lead-free soldered joint. Propress fittings shall be allowed.

4. Trap primers:
   a. Systems will provide make-up water to fixture and drain traps to maintain liquid trap seals. Trap primers will automatically operate based upon pressure fluctuation in the cold water system.
   b. Piping insulation will be installed on all trap primer piping above ground. Insulation will be continuous through supports and include a vapor retarding jacket. Insulation for trap primer piping will be 1/2" thick.

5. Valves:
   a. Shut off valves - Valves 3"and smaller shall be full port lead free ball valves, bronzebody. Valves larger than 3" shall be iron body, bronze mounted, insidescrew, non-rising stem gate valve.
   b. Balancing valves shall be lead free approved circuit setters.
   c. Checkvalvesshallbebronzebody,bronzeswingdisc, lead free.

6. Piping:
   a. Below slab interior water system; Type K copper with brazed copper joints.
   b. Above slab water piping: Lead-free, type L, hard drawn copper with 95/5 soldered copper joints or propess type fittings.

E. Sanitary Waste:

1. Waste Piping:
   a. Drainage, waste, and vent (D.W.V.) piping will be installed to collect liquid wastes at plumbing fixtures, equipment, and drains requiring waste connections. Horizontal collection of the vertical stacks will be below the first floor slab.
   b. Several building drains will exit the building and connect by gravity to the municipal sewer
   c. Pipe & Fittings:
      i. Below Slab: Cast iron hub and spigot with neoprene gasket joints
      ii. Above Slab: No-hub cast iron with stainless steel clamps. 2" and smaller may be type DWV copper with wrought soldered copper drainage pattern fittings.

2. Floor Drains:
   a. Floor drains - Toilet Room: A floor drain will be required in all common area toilet rooms. Floor drains shall be epoxy coated cast iron body construction, heavy duty grade with anchor flange, clamping collar, round nickel bronze strainer and p-trap with ½" tap for trap primer connection. Basis of Design: Watts, Model No. FD-100A.

b. Floor Drains - Mechanical Rooms: Floor drains shall be epoxy coated cast iron body construction, heavy duty grade with anchor flange, clamping collar and light duty hinged grate, 6”x6” square nickel bronze strainer and p-trap with ½” tap for trap primer connection. Basis of Design: Zurn, Model No. Z400SH.

3. Storm Water Drainage Piping:
   a. Storm water drainage system will be installed to collect discharge of storm water from all roof drains. Piping will be installed at all roof drains and routed vertically down at building columns or chases and collected below the first floor slab. Building drains will exit the building and extend by gravity to outside the building.
   b. A secondary overflow roof drainage system will be required. Secondary overflow drainage piping will be installed at all roof drains and run from the roof drain locations, horizontally at 1/8” slope, to the exterior of the building and connect to a downspout nozzle.
   c. Pipe & Fittings:
      i. Below Slab: Cast iron hub and spigot with neoprene gasket joints
      ii. Above Slab: No-hub cast iron with stainless steel clamps. 2" and smaller may be type DWV copper with wrought soldered copper drainage pattern fittings.

4. Roof Drains:
   a. Bi-Functional Roof Drains: Cast iron assembly with primary and secondary drainage piping connections. Provide with deck mounting plate, overflow strainer profile, sump drain pan, finishing ring, deck clamp and extensions as required for complete roof drain assembly. Basis of Design: Froet, Model No. 200C5.
   b. Downspout Nozzles: Cast bronze nozzle with threaded outlet and flange to secure to wall. Provide with stainless steel birdscreen. Basis of Design: Wade, Model No. 3945.

5. Pipe Insulation:
   a. Piping insulation will be installed on all horizontal storm water piping and roof drain bodies to prevent condensation. Insulation will be 1/2” thick and be continuous through supports and include a vapor retarding jacket. Insulation shields will be installed to protect insulation at pipe hangers.

F. Other Plumbing Systems:

1. Propane:
   a. Propane will be extended from the exterior storage tank to water heaters and clothes dryers.
   b. Gas pressure within the building will be low pressure, under 1/2 psig (14” wc).
   c. Pipe, Fittings & Valves:
      i. `Pipe & Fittings - 2" pipe and smaller shall be Schedule 40 black steel with malleable iron threaded fittings. 2-1/2" and larger shall be Schedule 40 black steel with welded joints
      ii. Valves - 2" and smaller shall be threaded bronze ball valve. Larger than 2" shall be semi-steel, lubricated, wrench operated, plug valve.

MECHANICAL

Residential Units (Tenant Spaces):
Each residential unit will be equipped with a high-efficiency mini-split, heat pump system to provide heating and air conditioning. Each unit will be equipped with fan coil type heat pump installed concealed above the finish ceiling. Ductwork will be extended to the living room, bedroom, and kitchen.

The indoor units will be provided with a local thermostat with user interface, multi-speed fan and will be connected, via refrigerant piping, to the outdoor unit, which will be equipped with variable-speed, inverter compressors. The outdoor units will be strategically located the roof as required to accommodate maximum refrigerant pipe length constraints defined by the respective manufacturer. Heat pumps will be powered from the respective apartments' electrical load center.

Common Spaces:
Common spaces, including corridors, offices, laundry etc., will be heated and cooled with a Variable Refrigerant Flow (VRF) system. Refrigerant piping will be extended from the outdoor unit to a distribution unit and piped to indoor evaporator units. The evaporator units will be a combination of cassette type, wall mounted and fan coil/ducted type units as applicable to the finish ceiling type in the space. Cassette units will be un-ducted and located recessed in the suspended ceiling within their respective room. Fan coils will be used to condition larger areas; and will be located above ceilings with ductwork extended to their respective areas. Ductless, wall mounted units will be installed in spaces without ceilings.

Ventilation:
Ventilation (outside air) for common spaces and apartments will be provided via roof-mounted, energy recovery ventilators (ERV's). The ERV's will be equipped an enthalpy cross-counterflow heat exchanger, electric post heater, frost protection, bypass for free-cooling andsupply/exhaust fans with ECM motors. Supply air will be ducted from the ERV's to grilles located in the common spacesand apartments. It is anticipated that two (2) ERV's will be located on the roof of the Poland and Streeter buildings, respectively.ERV exhaust ductwork will be connected to toilet exhaust grilles in apartments. Outside air will be delivered to the building at approximately 70°F.Make-up air for the community laundry room will also be provided by the ERV.

Exhaust:
Dedicated exhaust fans will be provided for janitor closets and similar spaces. Grilles, volume dampers and controls will be incorporated into the work. All exhaust fans will be fractional horsepower, direct drive type with adjustable speed controllers, equipped with motorized dampers.Common area toilet rooms will be exhausted to the ERV on the roof. Clothes dryer exhaust will be ganged together and exit vertically through a single variable-speed dryer exhaust fan located on the roof.

Exhaust for all apartment toilet rooms will be connected to a common system exhausted to the ERV on the roof. Vertical ducts will be located in rated shafts with fire dampers at horizontal branches as applicable. Each residential unit will also be equipped with an exhaust hood in the kitchen, connected to a roof mounted exhaust fanthat will exhaust a small amount of air from all

hoods 24/7. When cooking occurs, the resident will enable the direct drive fan (integral to the hood) to increase airflow at the hood so that odor, fumes, and smoke are adequately removed.

Temperature Control Systems:
DDC type controls will generally be utilized for all HVAC systems. Controllers for common area HVAC systems will include time-of-day schedules that define unoccupied/occupied schedules, optimal start algorithms and setback temperature features for unoccupied periods. Residential units will be provided with thermostats equipped with user-interface to permit local set-point adjustments.

Mechanical Outline Specifications:

A. Design Basis:

1. Outdoor Air Ventilation:
   a. Minimum outside air will be introduced as required by the greater of ASHRAE Standard 62.1, "Ventilation for Acceptable Indoor Air Quality" and the International Mechanical Code.

B. Refrigerant Systems:

1. Apartment Heat Pump Systems:
   a. Split system configuration with roof mounted, air cooled condensing unit(s) piped to remotely installed in-ceiling fan coil heat pump units.

2. Variable Refrigerant Flow Systems – Common Areas
   a. Split system configuration with roof mounted, air cooled condensing unit(s) piped to remotely installed wall mounted, fan coil and cassette type heat pump units.

3. Piping
   a. Type ACR copper tubing with brazed fittings for refrigerant piping with insulated liquid and suction piping.
   b. Type L copper condensate drain piping with fiberglass insulation.

C. Distribution Systems:

1. Ducted Systems:
   a. The following duct systems are proposed, sized, and installed in accordance with SMACNA guidelines:
      i. Supply Ductwork – Galvanized rectangular or round ductwork with 1-1/2" foil-faced fiberglass insulation or 1" lining, where noted. Exterior ductwork will be double wall with 2" thick insulation.
      ii. Return Ductwork – Galvanized rectangular or round ductwork.
      iii. Exhaust Ductwork – Galvanized rectangular or round ductwork.
2. Registers, Grilles and Diffusers
   a. All occupied spaces will be served by air supply and return services through a system of diffusers and grilles. Aluminum grilles to be provided in all toilet rooms.

D. Facility Air Distribution Systems:

1. ERV's – Energy Recovery Ventilator Air Systems:
   a. Energy Recovery Ventilator Units (Basis of Design; Aaon):
      i. ERV-Streeter: Airflow 3,000 CFM
      ii. ERV-Poland: Airflow 2,000 CFM
   b. The ERVS units will be provided with the following components:
      i. Supply Side
         - Outdoor air intake hood
         - OA isolation damper
         - MERV 7/13 Filter Bank
         - Energy Recovery Wheel with bypass dampers
         - Supply fan w/VFD
         - Supply isolation damper
      ii. Exhaust Side
         - Bottom Inlet with isolation damper
         - MERV 7 filter bank
         - Exhaust fan w/VFD
         - Exhaust outlet isolation damper
         - Exhaust outlet hood with isolation damper
   c. Roof curb with spring isolation
   d. DDC controls, factory installed

2. Testing, Adjusting and Balancing
   a. The piping and air systems testing, adjusting, and balancing will be performed by a Balancing Contractor certified by either Associated Air Balance Council (AABC), or National Environmental Balancing Bureau (NEBB).
   b. Systems to be balanced:
      i. Outside Air
      ii. Exhaust Air
      iii. Supply Air
      iv. Return Air
      v. Domestic Hot Water Recirculation

ELECTRICAL

Electrical Service and Main Power distribution:
The electrical service to the building will be provided underground from a utility pad mounted transformer to the service entrance rated equipment. The service is expected to be 208/120V, 3 phase, 4 wire. Preliminary load calculations indicate the size of the service to be 2000A. The main service switchboardwill be installed exterior to the building and will feed the building's 600A main distribution panel (MDP) via a current transformer(CT) cabinet. The MDP will provide power to all house building loads including the elevator, laundry room equipment, energy recovery ventilators, common area VRF system, as well as domestic hot water equipment. Smaller sub-panels, fed from the MDP, will be utilized to power common area convenience outlets, lighting, etc. All panels will be strategically placed in orderto minimize branch circuit and feeder length. The main service entrance will feed an array of tenant's meter banks (installed on exterior of building) through which the power will be delivered to load centers in individual apartments. The service equipment will be arranged in such a way as to allow future connection of a photovoltaic system in accordance with 780 CMR, Section C402.3.6.

Lighting:
LED lighting will be installed throughout the interior spaces. A variety of different luminaires will be employed to distribute lights in a controlled way that will be efficient and will correspond to the architectural solutions in respective spaces. Recessed cove or surface wall mounted linear perimeter type LED fixtures will be installed in common corridors. Occupancy sensors will be provided where required by code. Life safety fixtures will include LED exit signs with battery backup and emergency egress lighting (wall units equipped with battery packs).

Exterior building mounted and parking lot lighting will be provided. Parking lot lighting will consist of LED fixtures mounted on 18-foot poles and will meet Night Sky lighting requirements and/or specific local standards. Controls for exterior fixtures will be via photocell or timeclock.

Individual Apartments (Living Units):
Power in individual apartments will be distributed from a 30 circuit,225A load centerfed from a single phase 150-ampere meter. Apartment panels will supply all individual unit loads, including electric stove and heat pumps.

Receptacles in individual apartments will be provided so that no point along the floor line in any wall space is more than 6 feet, measured horizontally from an outlet in that space, including any wall space 2 feet or more in width. All receptacles in bedrooms and living spaces will be provided with arc-flash circuit-interrupter protection. Two 20 Amp small appliance circuits will be provided to serve receptacles outlets at the kitchen counter area. GFCI receptacles will be provided in vicinity of sinks where required by the National Electric Code(NEC). Each bathroom will be equipped with a dedicated 20 Amp circuit feeding GFCI receptacle. A duplex receptacle will be provided next to all phone jacks to accommodate teletypewriter (TTY) devices for potential hearing-impaired individuals.

Automatic door openers will be provided at all fully accessible unit entries with wiring provided for future door openers at all adaptable units.

Lighting in each apartment unit will include residential type fixtures able to accommodate a minimum of 2700 lumen lamps. All lighting fixtures will be controlled by manual rocker-type wall switches.

Hearing-Impaired Unit(s):
Applicable apartments will be equipped with additional provisions to accommodate an individual who is deaf or hard of hearing. Permanent wiring and backboxes will be provided in the living room and bedroom for future fire alarm strobe devices and audio/visual alert systems for telephone and doorbell/intercom signals. These alarm devices must be installed in the unit if a hearing-impaired tenant occupies the space, otherwise they may be stored for future use.

Fire Alarm System:
The building will be provided with an addressable fire alarm system, including control panel, battery backup and annunciators. Alarms will be annunciated at the fire alarm control panel located at the main entry. Manual pull stations will be provided at every exit from every level and additional pull stations will be provided as required to ensure the travel distance to the nearest pull station is not more than 200 feet. Audible and visual alarms will be provided throughout the facility to meet NFPA 72 and 780 CMR requirements. Wiring for future A/V devices will be provided in all units.

Smoke detectors will be provided in common spaces and in all apartments. Carbon monoxide detectors will be installed where required by 527 & 248 CMR.

CATV (Cable TV):
A Cable TV distribution system consisting of COAX cable and CATV outlets will be provided. The local cable television provider will deliver service to the building. CATV outlets will be provided at select locations in the common spaces of the facility as well as two outlets in each apartment – one in the living room and one in the master bedroom. Head-end equipment will be the responsibility of the local cable TV provider.

Telecommunication System:
A telecommunication distribution system consisting of CAT6and multi-port data outletswill be provided for the facility. The telephone/internet provider will deliver service to the building. The data-telecommunication outlets will be provided in select locations in the building with each apartment receiving two outlets, as well. One (1) wall mounted telephone jack with CAT5e, 4-pair cable will be provided in the kitchen and (1) dual RJ45 data jack with CAT6 cable at each living room and master bedroom. Cable homeruns in each apartment will be routed to the first floor electrical room.

Intercom and Security:
The main entry doors will be equipped with a key-fob access system. The main common entryway doors will be provided with an electric strike system connected to the apartment intercom system. Each individual apartment unit will include an intercom panel to communicate with the main entry panel and to release (unlock) the main entry doors.

Electrical Outline Specifications:

A. Materials and Equipment:

1. Grounding
   a. Furnish and install grounding system conforming to IEEE STD 142-1972, and as required by codes or standards.

2. Panelboards
   a. Panel boards shall be automatic circuit breaker type complete with cabinet and trim. Electric characteristics shall be 120/208 volts, 3-phase, 4-wire, 60 Hz (house panels), or 120/208 volts 1 phase, 3 wire (apartments).
   b. Circuit breakers, unless otherwise noted, shall be 125 volts DC, 240 volts AC, or 120/240 volts AC.
   c. Circuit breakers shall have bolted bus connections. Circuit breakers shall be arc-fault or GFI as required by NEC.
   d. Main bus shall be copper bars with compression lugs to accommodate feeder cables.
   e. Cabinets shall be galvanized code gauge steel provided with interior grounding bus and required lugs.
   f. Trims shall be level stretched steel with gray lacquer enamel finish, hinged door, directory, and combination flush cylinder lock and catch with two keys.

3. Raceways
   a. Install all feeder wiring in hot dipped galvanized, rigid steel conduit (RCS), intermediate metal conduit (IMC), or electrical metallic tubing (EMT), unless otherwise noted. Type "AC, SE, SER, NM & NMC" may be used if approved by the local inspector.
   b. Raceways and wiringshall be installed concealed. Raceways shall be exposed in mechanical and electrical spaces.
   c. Connections to portable equipment from junction boxes and conduit termination to transformers, and motor driven equipment shall be made with liquid-tight flexible metal conduit.

4. Conductors – Wire and Cable
   a. Conductors shall be insulated, Type THW, RHW, THWN, THHN, AVL 600-volt service, except conductors for signal systems and branch circuit wiring under 40 ampere capacity, may be Type TW, 600-volt service.
   b. Conductors shall be soft drawn copper.
   c. Conductors shall be minimum of No. 12 AWG solid.
   d. Wires, conductors, and cables shall be single conductor, except as otherwise specified. Wire No. 10 AWG shall be solid, except all grounding conductors shall be stranded.
   e. With approval of the Local Inspectors having Jurisdiction Type “SE” cable may beused to supply the individual unit panels from the meter center. Also, the use oftype “NM” (Romex) may be used in the individual units. Type “NM” cable may notbe used between the floors.

5. Wiring Devices
    a. Switches, receptacles, and other utilization devices shall be specification grade. “GFI” and arc-fault circuit interrupters (AFCI) devices shall be used in Kitchens, Bathrooms, and other areas as required by the Code. Switches shall have a minimum rating of 20 Amperes.

6. Wiring Device Plates
    a. Provide plastic device plates for all devices, switches, receptacles, and miscellaneous outlets.

7. Nameplates
    a. Provide nameplates for panel boards, contractors, pull boxes, junction boxes, motor disconnect switches, remote switches, motor control stations, and motor starters designating equipment controlled and function.

8. Outlets
    a. Where outlets of any system occur, provide suitable boxes and conduit so that they may be built in as the work progresses. Box offsets shall be made at all outlets to provide proper adjustment to structural finish.
    b. All outlets shall be tamper proof in compliance with NEC
    c. Exterior outlets shall include an operable in-use cover in compliance with NEC requirements

9. Motor Connections and Controls
    a. Wire to and connect all motors, and provide all motor disconnects switches.
    b. Motors 1/2 horsepower (HP) and larger shall be 208 volt, 1 or 3 phase, 60, motors less than 1/2 HP shall be 115-volt, single phase, 60 Hz.
    c. Provide motor starters, motor control centers and remote control and wire and connect all motor starters and started actuating equipment.
    d. Manual starters shall be of the toggle mechanism type for full voltage starting and shall have overcurrent relays in each phase providing running overcurrent protection.
    e. Starters shall have individual overcurrent running protection in each phase, overload type relays, trip-free with adjustable trip setting plus or minus ten percent, and with manual and automatic trip reset.
    f. 208-volt starters shall have control transformer with fuse protection and one line of secondary grounded.

10. Disconnect Switches
    a. Disconnect switches shall be fused or unfused as shown on the drawings, type HF or HU, NEMA heavy duty, with interlocking cover, insulated handle, side operated.
    b. Switches shall be rated 250 volts a-c, d-c.
    c. Switches shall be quick-make quick-break mechanism mounted on an insulated base, contacts silver-tungsten or silver plated, fuse clips positive metal type.

d. Enclosure shall be NEMA 1 for indoor use except when exposed to weather or wet or rain conditions. Switch enclosure shall be type RHF or RHU, NEMA 3R, except when other types of enclosures are required because of location.

11. Fuses
    a. Fuses shall be non-renewable current limiting.
    b. Combination switch and fuse shall have a short circuit interrupting rating equal to a minimum of 100,000 amperes.

12. Lighting Fixtures
    a. Light fixtures shall be complete with all required lamps, sockets, lenses, etc. as required to perform their designated tasks. All fixtures shall meet or exceed the energy requirements of the State of Massachusetts Energy Code.
    b. All fixtures shall be provided with LED lamps.
    c. Lamps of wattage, type and color indicated shall be furnished and installed in necessary quantity to completely lamp every fixture.

13. Switchboard and Metering
    a. Switchboard shall have silver plated aluminum busses sized as required. The main and branch circuit breakers shall have the I. C. Rating as required by the Utility Company. Main and branch circuit devices shall be molded case circuit breakers.

14. Fire Alarm System
    a. Furnish and install a complete Fire Alarm system in accordance with Massachusetts State Building Code sections 403 and 917, The Winchendon Fire Department and all other Federal, State and Local Authorities having Jurisdiction.
    b. The system shall be complete and fully acceptable by the Winchendon Fire Department, the Owner's Insurance Company, and the Engineer.
    c. The system shall consist of but not limited to the following equipment, hardware, and software:
        Fire Alarm Control Panel and annunciators; Batteries and chargers; Heat detectors; Smoke detectors; Duct smoke detectors; Manual pull stations; Speaker/strobe units; Strobe only units; Flow and tamper switches (for the sprinkler system); Exterior Strobe - Beacon Lights and Remote Test Stations.
    d. The control panel and all associated hardware shall be located in the Main Electrical Room.
    e. The activation of any alarm device, pull station, flow switch, tamper switch, smoke detector, duct smoke detector, heat detectors shall cause ALL of the following to happen: Activate the Fire Alarm Control Panel,indicate in a digital readout the device in alarm and notify third party monitoring company.

15. Telecommunication System
    a. Completely pre-wire the building for tele-communication system from living units and other areas indicated on drawings to interface panels located on each floor level.
    b. All wiring from units to interface (cut-down) panels shall be data compatible Category #6 cable. All main "back-bone" wiring shall be copper.

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Summary of Building Code Requirements
Massachusetts State Building Code - Ninth Edition

Montachusetts Veterans Housing
Oak Street, Winchendon, MA

It is proposed to combine two existing buildings on Oak Street in Winchendon, MA, with infill construction connecting the two buildings to create a single building to be occupied for apartments. Such a project is subject to the provisions of the Ninth Edition of the Existing Building Code of Massachusetts (EBCM9). However, given the scale of the project including the extent of new construction, it is proposed to regulate the project by the Prescriptive Compliance Method of the EBCM9. That Method essentially requires compliance with the new construction requirements of the Ninth Edition of the Massachusetts State Building Code (MSBC9)

The combined buildings will have the following physical and occupancy characteristics.

General Characteristics

The proposed building will have three stories. The garden level will be within the grade and is considered a grade level under the proposed use because the floor above will be more than 6 feet above exterior grade.The height to highest of the flat roofs of the building will be 37’ above the average revised grade plane.

The building area measured inside the exterior walls of the First Floor will be approximately 13,310 gsf. The aggregate area of all floors of the building is 39,409 gsf.

The building will be an apartment building classified in Use Group R-2 (Residential, Apartments) in accordance with MSBC9 Section 310.4. The residential levels of the building will be configured with double loaded corridors providing exit access via those corridors to two enclosed exit stairs and doors directly to the exterior at the Lower Level and to two enclosed exit stairs at the plan Second and Third Levels.

A portion of the plan First Floor at grade in the center of the building will be occupied for a Day Room classified in Use Group A-3 (assembly). As that Day Room will be devoted

to use by the building occupants and will occupy less than 10% of the First Floor area, it will be considered an accessory occupancy of the primary Use Group R-2 occupancy in accordance with MSBC9 Section 508.2.

Other accessory uses will include a small Clinic, and an Exercise Room.

The existing Streeter and Poland Schools that will be connected by the planned addition are subject to restrictions based on their designations as historic buildings. Within the Prescriptive Compliance Method Chapter 4, historic buildings are addressed as follows:

> 408.1 Historic buildings. The provisions of this code that require improvements relative to a building's existing condition or, in the case of repairs, that require improvements relative to a building's pre-damage condition, shall not be mandatory for historic buildings unless specifically required by this section.
> 408.2 Life safety hazards. The provisions of this code shall apply to historic buildings judged by the building official to constitute a distinct life safety hazard.

These provisions are essentially allowing existing conditions of a historic building to be grandfathered if accepted by the authority-having-jurisdiction. For example, in a fully sprinklered building, the lack of a rating for some doors of a corridor or stair enclosure should be acceptable.

Basic requirements of the MSBC9 for new construction under these circumstances are identified below. The details of the requirements affecting specific building features shall be determined from the Code as required.

Construction Type

(1) Utilize Type VB construction. (T-504.3, T-504.4, T-506.2)

Calculations of the allowable height and area of the building based on its Use Group R-2 occupancy, Type VB construction and automatic sprinkler protection are provided in Table No. 1.

Those calculations confirm that the building will comply with the height and area limitations of the OBC for its proposed use.

Occupancy Separations

(2) None required.

It is proposed to treat the Day Room as an accessory occupancy of the building in accordance with the provisions of MSBC9 Section 508.2. Section 508.2.4 explicitly waives occupancy separation requirements for accessory occupancies.

Although no occupancy separations are required on the basis of height and area limitations, the building is subject to dwelling unit separations in accordance with MSBC9 Section 420.0 as documented below.

Dwelling Unit and Corridor Separations

(3) Provide minimum one half-hour rated fire partitions between dwelling units. (420.2, 708.1, 708.3, Table 1020.1)

(4) Provide minimum one half-hour fire partitions for dwelling unit-to-corridor separation with appropriate opening protectives (doors). (1018.1, T-1018.1)

Bearing and non-bearing walls separating dwelling units and separating dwelling units from corridors will be required to have one-half hour fire ratings based on requirements of MSBC9 Section 420 and 708.3. Bearing walls supporting higher rated wall or floor assemblies such as one-hour rated fire barrier walls for stair enclosures will require the higher rating of the assembly supported.

The provisions concerning continuity of a rated corridor in MSBC9 Sections 1020.6, 1016.2, 3006.2 and 716.5.3 taken together require that the elevator hoistway of a building shall be separated by fire partitions from the corridors that are required to be fire rated on each level. The relevant code provisions do allow travel through the elevator lobby when the lobby is isolated by fire partitions from separate corridor segments.

Floor Systems

(5) Provide one-half hour rated floor assemblies for all floors serving as dwelling unit separations and provide one-hour fire ratings for the floor assemblies that support the one-hour rated stair and shaft enclosures. (Table 601, 420.3, 711.2.4.3)

Interior Walls and Partitions

(6) Provide minimum one half-hour rated fire partitions with 20 minute rated doors for enclosures of corridors. (420.2, 1020.1, T-1020.1, T-716.5)

Based on the historic designation of the Street and Poland Schools, a request for acceptance of several existing, unrated doors in corridor and stair enclosures will be requested.

(7) Provide minimum one half-hour rated fire partitions separating dwelling units. (420.2, 708.1, 708.3)

(8) Extend fire partitions enclosing dwelling units and corridors from the floor deck below to the underside of the floor or roof deck above or to the underside of the gypsum board membrane of the floor or roof deck above when that floor or roof deck is rated. (708.4)

The combination of requirements of Items 1 through 8 may be summarized as follows:

a. The roof assembly and its supporting structure may be unrated.
b. Floor assemblies serving as dwelling unit separations and corridor separations must have minimum one-half hour ratings.
c. Nonbearing walls and partitions separating dwelling units must have minimum one half-hour fire ratings.
d. Nonbearing walls and partitions enclosing corridors on all floors must have minimum one-half hour fire ratings
e. Interior and exterior bearing walls and partitions on all floors supporting only dwelling unit separations and dwelling unit to corridor separations may be unrated.
f. Fire barrier walls enclosing exit stair and mechanical shafts shall have a one-hour fire rating.
g. Floor assemblies and bearing walls supporting fire barrier walls must have one-hour fire ratings to match the rating of the one-hour rated shaft assemblies supported.
h. Other interior and exterior non-bearing walls and partitions including walls and partitions within dwelling units may be unrated.

Incidental Use Separations

(9) Provide unrated partitions designed to resist the passage of smoke constructed of combustible or non-combustible materials which extend from the floor below to the underside of the floor or roof above around the spaces as indicated in Table No. 2 concerning incidental use areas, if present in the building. (509.4, T-509)

The partitions required by Item 9 are *not* required to be smoke partitions (Section 710) or smoke barriers (Section 709) but are required to resist the passage of smoke. Duct penetrations of those partitions are not required to be provided with smoke dampers but air transfer openings, if provided, are required to have smoke dampers.

(10) Provide doors to the areas identified in Item 9 that are unrated but self-closing or arranged for automatic closing upon detection of smoke. (509.4.2)

Exterior Walls

(11) Provide one-hour rated exterior bearing walls for those portions of the exterior walls that support one-hour rated stair and shaft enclosures respectively. (Table 601, 420.3, 711.2.4.3)

(12) Provide unrated nonbearing exterior walls except as required by Item 14 below. (T-602)

(13) Utilize unlimited, unprotected openings in exterior walls except as required by Item 14 below. (T-705.8)

Non-bearing exterior wall may be unrated because the fire separation distances for all exterior walls exceeds 30 feet.

For fire separation distance of 30 feet or more, exterior walls may have up to 100% unprotected window and door opening on a story-by-story basis.

(14) Provide one-hour fire rated walls with 3/4 hour rated opening protectives as the exterior walls of interior exit stairs where the exit stairway walls are exposed by other parts of the building at an angle of less than 180 degrees

or

Provide one-hour fire rated walls with 3/4 hour opening protectives for the exterior walls below, within 10 feet horizontally of and to a point 10 feet above an unrated exterior wall or unprotected exterior opening in an exit stair enclosure where the stairway walls are exposed by other parts of the building at an angle of less than 180 degrees. (1023.7)

The requirements of MSBC9 Section 1023.7 concerning fire rating and opening limitations of exterior walls of the exit stair enclosures that are at an angle of less than 180 degrees to the exterior walls of adjacent use spaces of the building are applicable to portions of the exterior walls of the interior exit stairs. Fire rating and opening protection will be required for portions of the exit stair enclosure, for portions of the adjacent use space wall or for portions of both walls.

Based on the historic designation of the Street and Poland Schools, a request for acceptance of a small portion of the existing exterior walls of the stair in the Streeter School will be requested.

Roof Assembly

(15) Provide an unrated roof assembly. (T-601)

Fire Alarm System

(16) Provide a single manual fire alarm system pull station at an approved location in the building. (907.2.9.1, Exception 2, 907.2)

(17) Do not provide an automatic, system connected, smoke detection system for the common (public) spaces of the residential areas of the building. (907.2.9)

Because the building is required to be fully sprinklered and the waterflow detectors will activate building alarms, there is no requirement for common (public) area smoke detectors in a building of Use Group R-2 occupancy.

(18) Provide a waterflow detector for the automatic sprinkler system arranged to sound alarms throughout the building. (903.4.2, 907.5)

(19) Provide multiple station smoke alarms within the common spaces of the individual dwelling units in the immediate vicinity of the bedrooms. (907.2.11.2(1))

(20) Provide multiple station smoke alarms within the individual sleeping rooms. (907.2.11.2(2))

(21) Provide multiple station smoke alarms in each story within a dwelling unit, if multi-level dwelling units are utilized. (907.2.11.2(3))

(22) Utilize photoelectric type smoke detectors at all locations where smoke detectors or smoke alarms are required. (907.2.11)

(23) Arrange the fire protective signaling system for activation by the sprinkler system waterflow detector and any other smoke or fire detection device or fire suppression system except multiple station smoke alarms within individual dwelling units. (907.5)

The audibility requirements of NFPA 72 will probably require that building system alarm devices be placed in common (public) areas and on each level within the dwelling units.

Means of Egress

(24) Provide two exit or exit access paths from all rooms or spaces of Use Group R-2 occupancy having an occupancy of more than 10 persons or in which the common path of travel distance exceeds 125 ft. (1006.2.1,

T-1006.2.1)

(25) Limit dead ends of corridors to less than 50 ft. (1020.4, Exception 2)

The requirements of item 24 are applicable to individual dwelling units. However, there are no dwelling units with occupant loads of more than 10 persons or with interior travel distances of more than 125 feet.

The combined requirements of Items 24 and 25 are applicable to groups of rooms served by a dead end corridor. Together, they limit the dead end corridor to not more than 50 feet, the common path of travel within a dwelling unit and the dead end corridor to not more than 125 feet and the occupant load served by the dead end corridor to not more than 10 persons.

(26) Provide two exit or exit access paths from all rooms or spaces of Use Group A-3 occupancy having an occupancy of more than 49 persons or in which the common path of travel distance exceeds 75 ft. (1006.2.1, T-1006.2.1)

Based on its area of 600 sf and an occupant load factor of 15 sf/p for unconcentrated assembly use, the First Floor Day Room will have any occupant load of 40 persons. Its internal travel distance will be less than 75 feet. Therefore, based on the occupant load threshold, that space will not be required to have a two remotely located means of egress.

(27) Where two exit or exit access doors are required from a room or other space, separate the doors by a distance equal to or greater than one third of the longest diagonal of the area served. (1007.1.1, Exception 2)

(28) Provide common corridors, aisles and passageways with a minimum clear width of 44 inches when serving 50 or more occupants and 36 inches when serving less than 50 occupants. (1020.2, T-1020.2)

(29) Provide a minimum of two independent exits or exit access routes from each story of the building. (1006.3.1, T-1006.3.1)

The basic elements of the means of egress for the Lower Level will consist of an unenclosed exit access stair in the lobby area of that level and two enclosed exit stairs at the ends of the wings of the building.

The use of the unenclosed stair as means of egress stairs (exit access) is permitted by the MSBC9 Section 1019.3, Exception 1. That section states:

1019.3 Occupancies other than Groups I-2 and I-3. In

other than Group I-2 and I-3 occupancies, floor openings containing exit access stairways or ramps that do not comply with one of the conditions listed in this section shall be enclosed with a shaft enclosure constructed in accordance with Section 713.
1. Exit access stairways and ramps that serve or atmospherically communicate between only two stories.
Such interconnected stories shall not be open to other stories.

Occupants of the plan First, Second and Third Floors will have access to two enclosed exit stairs at opposite ends of the corridor system.

(30) Provide sufficient egress capacity for the occupant load of the individual rooms and floors of the building. (1005.1)

Sufficient egress capacities for the modest projected populations of the individual stories of the building are provided by the two means of egress stairs for above grade stories and doors to the outside from the at-grade stories.

(31) Utilize doors without locks on the egress side in all means of egress paths. (1010.1.9)

(32) Provide doors locked from the stairway side with remote unlocking capability in accordance with Exception 3 in Section 1010.1.9.11. (1010.1.9.11, Exception 3)

The basic requirement of Section 1010.1.9.11 is that stairway doors shall be without locks on both the egress and non-egress sides. In the cited Exception 3, doors in stairways serving not more than four stories are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from a single location inside the main entrance to the building. That unlocking arrangement is required to facilitate reentry of building occupants as well as to facilitate entry for firefighting operations.

(33) Locate exits as required to limit travel distances to less than 250 ft in spaces of R-2 and A-3 occupancy. (1017.1, T-1017.2)

(34) Provide exit discharge directly from stairs as allowed by Section 1027.0 directly to the exterior, to the exterior through an exit passageway or to the exterior through spaces on the level of exit discharge in accordance with the restrictions in Exception 1 of Section 1028.1. (1028.0)

(35) Provide access to the roof of the building via an enclosed stair or an alternating tread device, a ships ladder or permanent ladder. (1011.12)

Assuming the roof is to be unoccupied, Section 1011.12 allows access to the roof as described in Item 35.

Accessible Means of Egress

(36) Provide a minimum of two accessible exits from each floor of the building and from each space within the building that requires two exit or exit access paths. (1009.1)

(37) Arrange interior stairs as accessible exits but *without* (1) an area of refuge or an oversized stair landing within the stair enclosure, (2) an area of refuge outside the stair or (3) a horizontal exit through which access is provided to the stair. (1009.1, 1009.3, Exceptions 2 and 3)

An egress stair is permitted by the cited exceptions in Section 1007.3 to be considered an accessible means of egress without the listed features in a fully sprinklered building.

(38) Provide accessible routes from exit or exit accesses to a public way or provide an exterior area of assisted rescue . (1009.7)

A stair that does not have an exterior accessible route to a public way will require an exterior area for assisted rescue arranged in accordance with Section 1009.7.

Sprinkler Systems

(39) Provide a complete automatic suppression system designed in accordance with NFPA Standard 13 in all portions of the building. (T-903.2, Note a(1))

An NFPA 13 rather than an NFPA 13R sprinkler system is required because the aggregate area of the building on all floors exceeds 12,000 sf.

(40) Provide supervision of all suppression system control valves in accordance with the options indicated in Section 903.4.1. (903.4.1)

Standpipe

(41) Do not provide a fire standpipe system. (905.3.1)

Fire standpipes are not required in this building because the highest floor is not more than 30 feet above the lowest level of fire department vehicle access.

Water Supply

(42) Provide a water supply for the sprinkler systems using a connection to the municipal water supply system. (NFPA 13)

Fire Extinguishers

(43) Provide portable fire extinguishers having a minimum rating of 1-A:10-B:C within each dwelling unit, with a minimum rating of 2A in the assembly space and at locations specified in Section 906.1, Items 2 through 6. (906.1(1), Table 906.1)

The MSBC9 does not require common area fire extinguishers on the Use Group R-2 stories of the building. It does require extinguishers (1) within dwelling units as indicated in Item 43, (2) in the assembly space and (3) as required by Table 906.1 for several specific hazards. The details of those additional required extinguishers shall be determined from Section 906.

Emergency Power

(44) Provide emergency power for the fire alarm system, exit signs and emergency lights except. for self-luminous exit signs. (907.6.2, NFPA 72, 1011.5.3, 1006.3)

(45) Do not provide standby power for the elevator. (1009.2.1)

An elevator in a building that is four stories or less in height is not required by Section 1009.2.1 to be an accessible means of egress component. Therefore, the standby power requirement of Section 1009.4 for elevators that are part of an accessible means of egress is not applicable.

Interior Finish

(46) Utilize interior finish in the Use Group R-2 areas of the building as follows:

* Class C or better interior finish in exit stairs.

* Class C or better interior finish in exit access corridors.

* Class C or better interior finish the individual dwelling units.

(803.11, T-803.11)

(47) Utilize interior finish in spaces serving the Use Group A-3 area of the building as follows:

* Class B or better interior finish in exit access corridors.

* Class C or better interior finish the individual rooms.

(803.11, T-803.11)

(48) Utilize traditional floor coverings such as wood, vinyl, linoleum, terrazzo or other resilient floor finish materials or carpeting which complies with the DOC FF-1 "pill test" (CPSC 16 CFR, Part 1630) in all spaces of Use Group R-2and A-3 occupancy including exits and exit access corridors. (804.4.21, Exception)

TABLE NO. 1		
MSBC9 ALLOWABLE HEIGHT AND AREA CALCULATIONS		
MONTACHUSETTS VETERANS HOUSING		
BASIC BUILDING AND SITE CHARACTERISTICS		
OCCUPANCY		R-2
CONSTRUCTION TYPE		VB
HEIGHT (FT.)		50
HEIGHT (ST.)		3
LARGEST SINGLE FLOOR AREA (SF.)		15,035
AGGREGATE BUILDING AREA (SF.)		44,180
SPRINKLERS (Y OR N)		y
% FRONTAGE		25
WIDTH OF PUBLIC WAY OR OPEN SPACE (FT.)		30
(SEE RESTRICTIONS IN SECTION 506.2.1)		
(20 =< W <= 30)		
ALLOWABLE HEIGHT DETERMINATION		
TABLE 504.3 LIMITATION W/AS (FT)		60
TABLE 504.3 LIMITATION W/AS (FT)		3
ALLOWABLE SINGLE FLOOR AREA DETERMINATION		
TABLE 506.2 LIMITATION W/AS (SF.)		21,000
TABLE 506.2 LIMITATION W/0/AS (SF.)		7,000
% INCREASE FOR FRONTAGE (506.2)		0.00
"=(% FRONTAGE - 25%)*(WIDTH/30)"		
NET INCREASE FOR FRONTAGE		0
TOTAL ALLOWABLE SINGLE FLOOR AREA (SF.)		21,000

Table No. 2
Protection Requirements for Incidental Use Areas in a Sprinklered Building
(See Section 509)

TABLE 509
INCIDENTAL USES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In ambulatory care facilities, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour
In Group I-2, physical plant maintenance shops	1 hour
In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater	1 hour
In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 100 square feet	1 hour
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptable power supplies	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m^3.

Note: The separation requirements for incidental uses shall be based on the sprinkler options of this table, where indicated, and the requirements for the separation listed in Items 9 and 10.

Stormwater Drainage Report

For

Montachusett Veterans Outreach Center
Winchendon Veterans Housing

Oak Street & Murdock Avenue
Winchendon, MA

March 31, 2021

Prepared by:

The Berkshire Design Group, Inc.

4 Allen Place, Northampton, Massachusetts 01060

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Figures

Appendices

I. Introduction

The following report presents an analysis of the stormwater runoff and stormwater management for the Winchendon Veterans Housing development. The site is located at the corner of Oak Street and Murdock Avenue.

The site is not located within a flood plain as per the most recent FEMA information. (See Appendix D) The site also does not contain any areas located within the NHESP Estimated Habitats of Rare Wildlife or Priority Habitats of Rare Species. (See Appendix E)

II. Site Terrain and Soils

The site contains two former school buildings, the foundation and slab of a former building, sidewalks and a gravel drive passing through from Oak Street to Park Street. The lot slopes in three directions: toward Oak Street; toward Murdock Avenue; and toward Park Street.

Five storm water test pits were excavated for the analysis. A map is included to show the locations of these test pits. TP-4 was not able to be excavated in the location as shown and was relocated to the north. The test pit location plan and soil logs are included in Appendix B.

The Natural Resources Conservation Service Web Soil Survey for Worcester County, Massachusetts classifies the site soils as:

365B – Skerry fine sandy loam, 3 to 8 percent slopes

The profile from the Web Soil Survey lists these soils as fine sandy loam. The receiving layer for TP-1 & TP-2 is loamy sand. From the Rawls Rates table in the MassDOT Stormwater Handbook, the infiltration rate for Loamy Sand is 2.41 inches/hour, which is used in the calculations. (see Appendix B for the soil report):

Per the Web Soil Survey Legend, the Skerry soils are listed as Hydrologic Soil Group "C/D". Since the soils are well drained, HSG "C" is used in the calculations. See Appendix B.

III. Existing Conditions

As noted above, the site contains a former 5,607± s.f. school building, a former 3,200± s.f. school building, the foundation and slab of a former building, sidewalks and a gravel drive passing through from Oak Street to Park Street. The existing conditions have been analyzed as three drainage areas. The existing drainage area boundaries are depicted on the Pre-Development Drainage Area Plan (Figure 1). The following is a brief description of the drainage areas:

Area E1

Area E1 is approximately 117,110 square feet (s.f.) in size and contains the northern and eastern portion of the site. This area contains a portion of the existing gravel drive, sidewalks, wooded areas and grass areas. This area drains northerly toward Park Street, which is control point (CP-E1).

Area E2

Area E2 is approximately 14,287 s.f in size and contains the western portion of the site. This area contains sidewalks, landscaped areas and grass areas. This area drains westerly toward Murdock Avenue, which is control point (CP-E2).

Area E3

Area E3 is approximately 36,488 s.f in size and contains the southern portion of the site. This area contains the two existing buildings, the slab, sidewalks, landscaped areas and grass areas. This area drains southerly toward Oak Street, which is control point (CP-E3).

IV. Proposed Conditions

The proposed development includes renovation of the two existing school buildings, building additions, new sidewalks, a columbarium, paved parking, outdoor seating areas, a bocci court, landscaping and grass areas. New utility services will be connected to the existing utilities in the area. Two new surface detention/infiltration basins will be constructed to receive the runoff from the roofs of the new buildings, the paved parking lot, a portion of the paved driveway and the landscaped areas east of the building. The proposed conditions will be analyzed with ten drainage areas. The proposed drainage area boundaries are depicted on the Post-Development Drainage Area Plan (Figure 2). The following is a brief description of the drainage areas:

Area P1A
Area P1A is approximately 18,350 s.f. in size containing detention/infiltration basin #1, a portion of the bocci court, the columbariuim, landscape areas, grass areas, sidewalks and landscape areas. Runoff drains overland northerly toward detention/infiltration basin #1, then overflows toward Park Street, which is control point (CP-P1).

Area P1B
Area P1B is approximately 42,820 s.f. in size containing the roof area of the new buildings, detention/infiltration basin #2, a portion of the bocci court, landscape areas, grass areas, sidewalks and landscape areas. Runoff drains through underground piping toward detention/infiltration basin #2, then through a culvert toward detention/infiltration basin #1.

Area P1C
Area P1C is approximately 5,164 s.f. in size and contains the front steps of a building, a grass swale and containment area and landscaping. This area drains to CB #8 which pipes directly to detention/infiltration basin #2.

Area P1D
Area P1D is approximately 8,107 s.f. in size and contains primarily the new paved parking lot, sidewalks and grass. Stormwater runoff from this area drains to CB #3 & CB #4 which are piped to the Stormceptor water quality structure. The Stormceptor is piped directly to detention/infiltration basin #1.

Area P1E
Area P1E is approximately 1,436 s.f. in size and contains a portion of the new paved driveway and sidewalks. Stormwater runoff from this area drains to CB #6 which is piped to CB #4.

Area P1F
Area P1F is approximately 10,666 s.f. in size and contains the front steps of a building, a grass swale and containment area and landscaping. This area drains to FES #4 which pipes directly to CB #6.

Area P1G
Area P1G is approximately 2,392 s.f. in size and contains a portion of the new paved driveway, the dumpster pad & drive, and sidewalks. Stormwater runoff from this area drains to CB #5 which is piped to CB #4.

Area P1H
Area P1H is approximately 117,110 s.f. in size and contains the northern and eastern portion of the site. This area contains primarily grass areas, wooded areas and sidewalks. This area drains overland northerly toward Park Street, which is control point (CP-P1).

Area P2
Area P2 is approximately 3,579 s.f. in size and contains the sidewalk along Murdock Avenue. This area sheet flows westerly toward Murdock Avenue, which is control point (CP-P2).

Area P3
Area P3 is approximately 9,598 s.f. in size and contains portions of the paved driveway, sidewalks along Oak Street, landscaping and grass areas. This area sheet flows southerly toward Oak Street, which is control point (CP-P3).

V. Calculations and Design

Drainage calculations were performed on Hydrocad Stormwater Modeling System version 10.0 using Natural Resources Conservation Service (NRCS) TR-20 methodology. The NRCS method is based on rainfall observations, which were used to develop the Intensity-Duration-Frequency relationship, or IDF curve. The mass curve is a dimensionless distribution of rainfall over time, which indicates the fraction of the rainfall event that occurs at a given time within a 24-hour precipitation event. This synthetic distribution develops peak rates for storms of varying duration and intensities. The NRCS distribution provides a cumulative rainfall at any point in time and allows volume dependent routing runoff calculations to occur. These calculations are included in the appendices.

The watershed boundaries for calculation purposes are divided according to the proposed site grading and the natural limits of the drainage areas. The curve numbers (CNs) and times of concentration for the existing and proposed subcatchment areas are based on the soil type and the existing and proposed cover conditions at the site. Watershed subcatchment areas, runoff coefficients and watercourse slopes are based on survey information.

Calculations were performed for the 2-, 10-, and 100-year frequency storms under existing and proposed conditions. The results of the calculations are presented in Table 1 below. Appendix A presents the Hydrocad calculations.

Point of Analysis	2 Year Storm		10 Year Storm		100-Year Storm	
	Peak Flow Rate(cfs)	Volume (ac-ft)	Peak Flow Rate(cfs)	Volume (ac-ft)	Peak Flow Rate(cfs)	Volume (ac-ft)
CP-E1	0.02	0.010	0.38	0.083	1.90	0.248
CP-P1	0.00	0.001	0.07	0.027	1.50	0.159
CP-E2	0.53	0.038	1.01	0.072	1.66	0.119
CP-P2	0.23	0.016	0.36	0.026	0.52	0.039
CP-E3	1.61	0.121	2.84	0.216	4.41	0.342
CP-P3	0.39	0.027	0.73	0.050	1.18	0.082

Table 1 Peak Flow and Volume Summary

VI. Summary

The use of the surface detention/infiltration basins will result in the reduction of the total offsite peak flow rates to the three control points for the 2-, 10- and 100-year storm frequencies for post-development conditions versus the pre-development conditions.

VII. Stormwater Standards Compliance

The following section details how the project will meet DEP Stormwater Management Policy requirements:

Standard 1 - Untreated Stormwater

A Stormceptor water quality structure is proposed for this project. Stormwater runoff from most area practicable of the new bituminous pavement will be routed to this BMP prior to discharge to the detention/infiltration basin #1.

No Erosion to Wetlands: There are no wetlands associated with this site.

Standard 2 - Post-Development Peak Discharge Rates and Runoff Volume

See Table 1 and the Summary above.

Standard 3 - Recharge

Required Recharge Volume:

Existing impervious area = 26,563 s.f.
Proposed impervious area = 40,192 s.f.

Rv = F x Impervious Area
Impervious Area = 40,192 s.f.
Per MADEP Stormwater Handbook, F = 0.25in for HSG C soils.

Rv = (0.25in)(1ft/12in)(40,192 s.f.) = **837 c.f.**

The recharge volume available in the two detention/infiltration basins up to elevation 998.50 = (10,174 c.f. for basin #1) & (3,495 c.f for basin #2)
Total proposed recharge volume = **13,669 c.f.**

Drawdown within 72 hours:

The detention/infiltration basins have the same bottom elevation (996.5) and are hydraulically connected with an 18" culvert. Therefore, drawdown will occur in both basins simultaneously.

$Time_{drawdown}$ = (Rv)(1/Infiltration Rate)(1/Bottom Area); Rv = 837 c.f.
Rawls Infiltration Rate (Loamy Sand) = 2.41 in/hr = 0.20 ft/hr
Bottom area from CAD at elev. 996.5 for both basins = 4,266 s.f.
$Time_{drawdown}$ = (837 c.f.)(1/0.20 ft/hr)(1/4,266 s.f.) = **1 hour, OK**

Standard 4 – Water Quality

Water Quality Treatment Volume:

$V_{WQ} = (D_{WQ}/12in./ft.) \times A_{IMP}$

D_{WQ} (Water Quality Depth): Infiltration Rate > 2.4 in./hr., use 1"

For Stormceptor: A_{IMP} draining to Stormceptor = 11,323 s.f.

$V_{WQ} = (1in./ 12in./ft.)(11,323 s.f.) =$ **944 c.f.**

TSS Removal: calculations are included in Appendix F.
The Stormceptor will remove ___% of TSS.

Standard 5 - Higher Potential Pollutant Loads

The proposed site is not classified as a land use with higher pollutant loads.

Standard 6 - Protection of Critical Areas

The project site does not discharge to critical areas as defined in MA DEP Stormwater Policy Handbook.

Standard 7 - Redevelopment Projects

The project does not qualify as a Redevelopment Project because there will be an increase in impervious area. Therefore, the project will meet all of the Standards as set forth in the MADEP Stormwater Handbook.

Standard 8 - Erosion/Sediment Control

Erosion and sediment controls have been incorporated into the project design plans to (1) prevent erosion, (2) control sediments, and (3) stabilize exposed soils during construction and land disturbance. The contractor is required to complete a SWPPP prior to beginning construction in order to ensure that all erosion and sediment control measures are adequately implemented.

Standard 9 - Operation/Maintenance Plan

An Operation and Maintenance Plan for the proposed project is included in Appendix C. It includes general controls for construction and long term maintenance of the stormwater management system.

Standard 10 – Prohibition of Illicit Discharges

Standard 10 of the Massachusetts Stormwater Handbook prohibits illicit discharges to stormwater management systems. As stated in the handbook, "The stormwater management system is for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater."

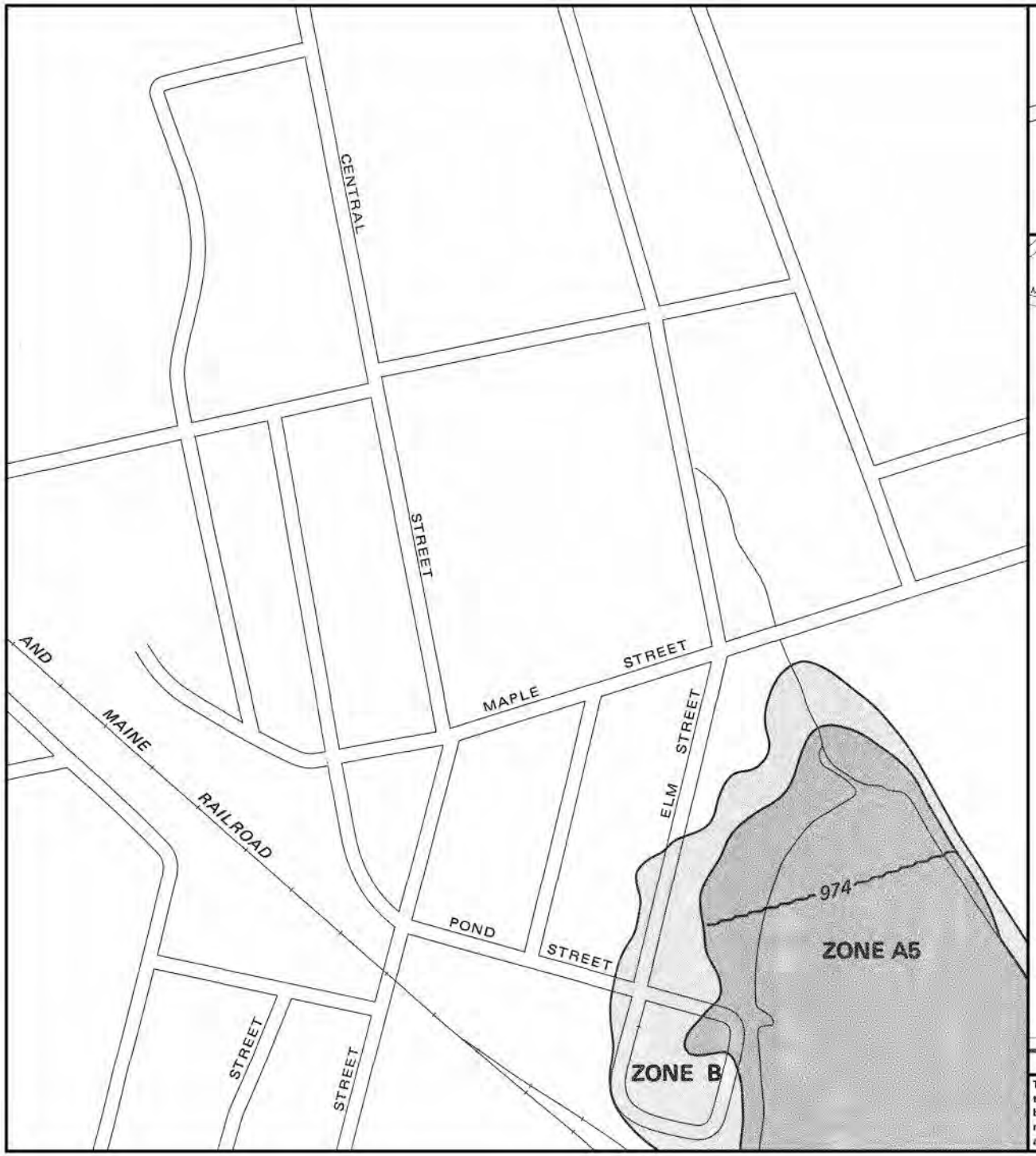
Standard 10 also states that "The Illicit Discharge Compliance Statement must be accompanied by a site map that is drawn to scale and that identifies the location of any systems for conveying stormwater on the site and shows that these systems do not allow the entry of any illicit discharges into the stormwater management system. The site map shall identify the location of any systems for conveying wastewater and/or groundwater on the site and show that there are no connections between the stormwater and wastewater management systems and the location of any measures taken to prevent the entry of illicit discharges into the stormwater management system." The site plans included with the Site Plan application and the Request for Determination of Applicability application displays the location of all of the stormwater management components on the project site and conforms to requirements of a "site map" to accompany the Illicit Discharge Compliance Statement.

The Illicit Discharge Compliance Statement for the Montachusett Veterans Outreach Center – Winchendon Veterans Housing project is as follows:

Illicit Discharge Compliance Statement

Per the requirements of Standard 10 of the Massachusetts Stormwater Management Standards it shall be stated there will be No Illicit Discharges under the scope of this project, the Montachusett Veterans Outreach Center – Winchendon Veterans Housing Project.

Appendix D – Flood Plain Information
FEMA Firmette



WINDSOR ROAD

MAN ROAD

APPROXIMATE SCAL

400 0

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
WINCHENDON,
MASSACHUSETTS
WORCESTER
COUNTY

PANEL 16 OF 30
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250348 0016 B

EFFECTIVE DATE:
JUNE 15, 1982

Federal Emergency Management Agency

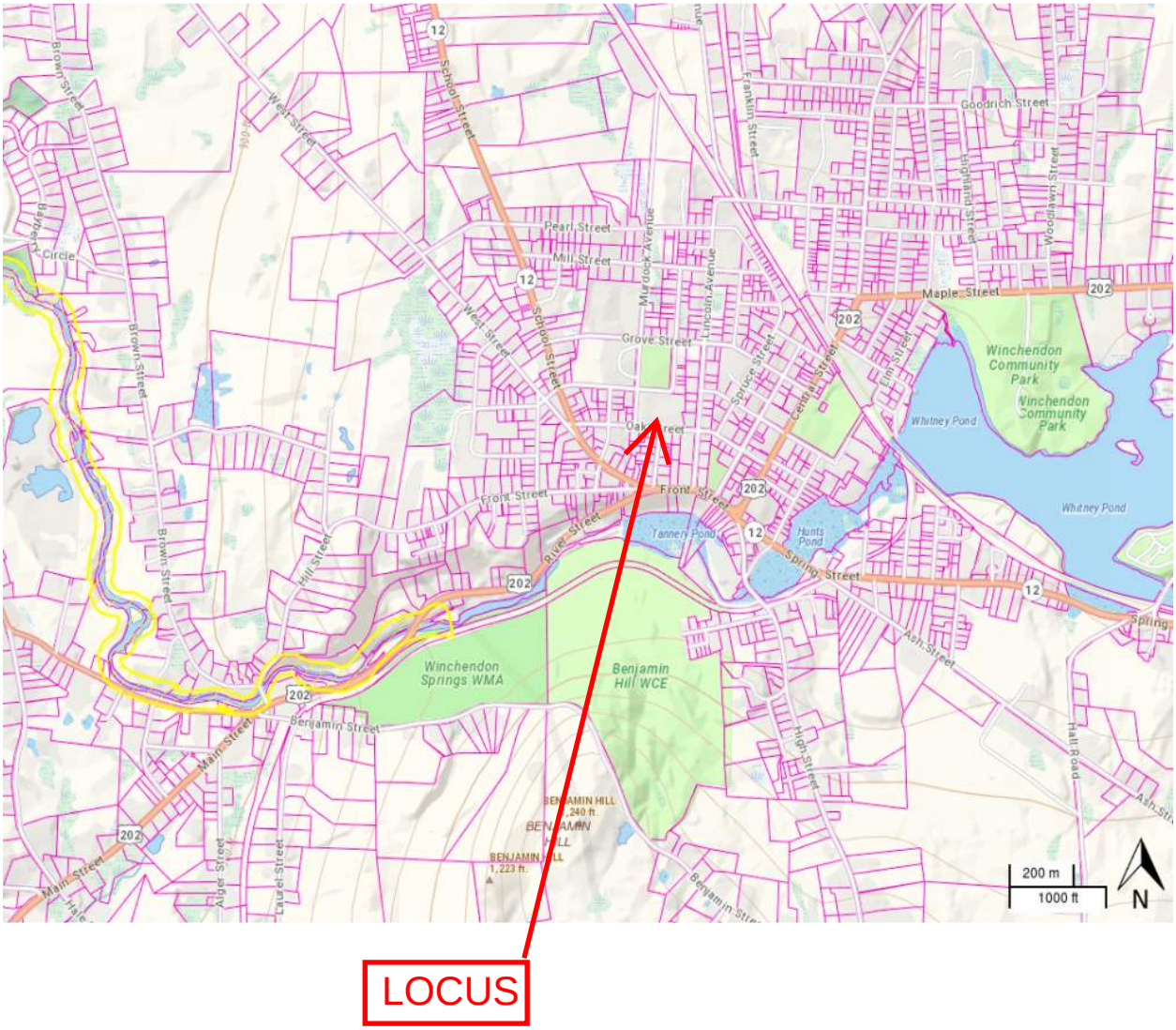
Appendix E – NHESP
Estimated and Priority Habitats

Montachusett Veterans Outreach Center Winchendon Veterans Housing

Oak Street & Murdock Avenue

Winchendon, MA

NHESP Priority Habitats



Appendix F –TSS Removal Calculations

Brief Stormceptor Sizing Report - Winchendon Veterans Housing

Project Information & Location			
Project Name	MVOC Winchendon	**Project Number**	SWTC #1
City	Winchendon	**State/ Province**	Massachusetts
Country	United States of America	**Date**	4/1/2021
Designer Information		**EOR Information (optional)**	
Name	Gregory Henson	**Name**	
Company	Berkshire Design Group	**Company**	
Phone #	413-582-7000	**Phone #**	
Email	gregh@berkshiredesign.com	**Email**	

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Winchendon Veterans Housing
Target TSS Removal (%)	80
TSS Removal (%) Provided	89
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	89
STC 900	93
STC 1200	93
STC 1800	94
STC 2400	95
STC 3600	96
STC 4800	97
STC 6000	97
STC 7200	98
STC 11000	98
STC 13000	98
STC 16000	99

Sizing Details

Drainage Area	
Total Area (acres)	0.27
Imperviousness %	95.0

Rainfall	
Station Name	WORCESTER WSO AP
State/Province	Massachusetts
Station ID #	9923
Years of Records	58
Latitude	42°16'2"N
Longitude	71°52'34"W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	1.95
Water Quality Flow Rate (CFS)	1.95

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Stormceptor STC 900

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Proprietary Treatment Practice	**0.93**	**1.00**	**0.93**	**0.09**
	0.00	**0.09**	**0.00**	**0.09**
	0.00	**0.09**	**0.00**	**0.09**
	0.00	**0.09**	**0.00**	**0.09**
	0.00	**0.09**	**0.00**	**0.09**

Total TSS Removal = **91%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: MVOC, Winchendon, MA
Prepared By: GPH
Date: 4/1/2021

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

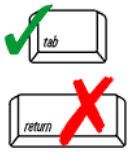
Appendix G - Checklist for Stormwater Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

☒ The ½" or 1" Water Quality Volume or

☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Figure 1
Pre- Development Drainage Area Plan

Figure 2
Post- Development Drainage Area Plan

PARK STREET
(PUBLIC 49.5' WIDE)

MORSE STREET (PUBLIC)

MURDOCK AVENUE
(PUBLIC 49.5' WIDE)

OAK STREET
(PUBLIC 49.5' WIDE)

ACADEMY STREET

E1

E2

E3

5B2-0-122
N/F
CROTEAU
35894/203

5B2-0-120
N/F
GIARDINI
10031-115

5B2-0-119
N/F
MICHAUD
20312/172

5B2-0-261
N/F

5B2-0-262

5B2-0-51
N/F
COUTURE
61419/77

5B2-0-116
N/F
DUNCHUS
23887/239

5B2-0-115
N/F
LANGFORD
37843/22

5B2-0-114
N/F
GIARDINI
10031-115

5B2-0-263

5B2-0-118
N/F
TOWN OF WINCHENDON
742/492
TOTAL AREA
3.8 Ac.+/-

5B2-0-117
N/F
TOWN OF WINCHENDON
742/492
TOTAL AREA
3.8 Ac.+/-

STREETER SCHOOL
BASEMENT ELEV=996.21
1ST FLOOR ELEV=1009.48
2ND FLOOR ELEV=1029.99
ROOF ELEV=1036.74

POLAND SCHOOL
1ST FLOOR ELEV=1010.17
2ND FLOOR ELEV=1020.01
ROOF ELEV=1042.48

PATH FOR TIME OF CONCENTRATION (TYP)

RIGHT OF WAY SHOWN ON ASSESSORS MAP

ASSESSORS' LOT LINE

BENCHMARK
MAG NAIL
ELEV=1001.34

BENCHMARK
MAG NAIL
ELEV=1002.78

FIGURE 1

ELTON + HAMPTON ARCHITECTS
Berkshire Design Group
JWA JONES WHITSETT ARCHITECTS
308 Main Street 413.773.5551
Greenfield, MA 01301 WWW.JONESWHITSETT.COM

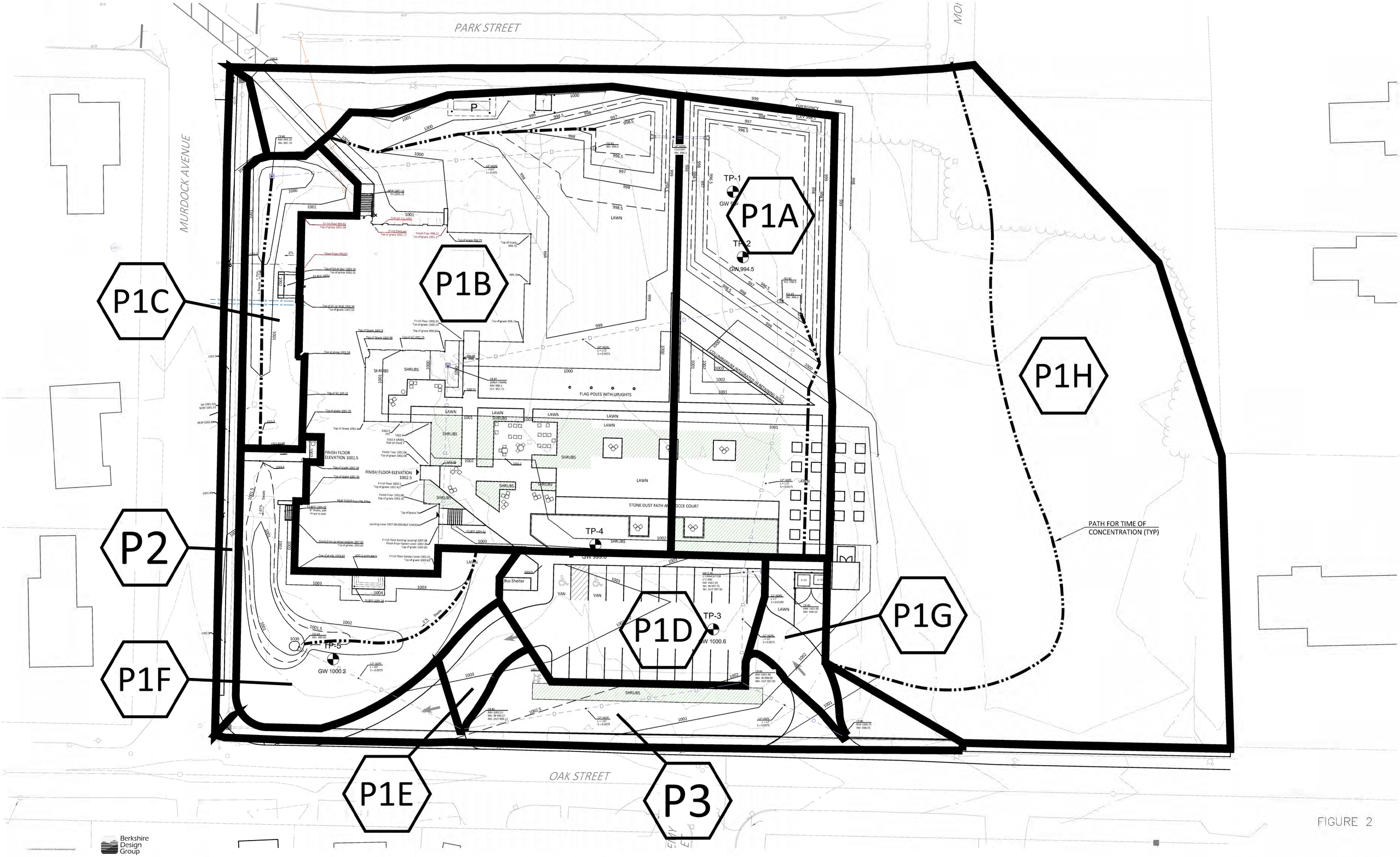
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Montachusett Veterans Outreach Center/ Winchendon Veterans Housing

PROJECT: XXXX
DATE: 03-03-21

SCALE: 1"= 20'-0"

DA-E



Berkshire Design Group

308 Main Street 413.773.5551
Greenfield, MA 01301 WWW.JONESWHITSETT.COM

POST-DEVELOPMENT DRAINAGE AREA PLAN

Montachusett Veterans Outreach Center/ Winchendon Veterans Housing

PROJECT: XXXX
DATE: 03-03-21

FIGURE 2

SCALE: 1"= 20'-0"

DA-P

Berkshire Design Group

March 1, 2021

Winchendon Zoning Board of Appeals
109 Front Street
Winchendon, MA 01475

RE: Traffic Impact Evaluation
Montachusett Veterans Housing

Dear Board Members:

Berkshire Design Group has assessed the traffic impacts of the proposed development of the Montachusett Veterans Housing project at the corner of Oak Street and Murdock Avenue in Winchendon. In general, we find that the proposed project will have minimal impact on traffic operations on adjacent streets.

Based upon our findings it is our opinion that a detailed traffic report is NOT warranted for this project. A more thorough traffic investigation may improve upon the quantity and detail of analysis of the traffic conditions; however, it would not yield information which would alter the scale or conclusion of this evaluation. The following is a summary of our findings.

Proposed Project

The project will consist of 44 residential units in a three-story apartment building. Vehicular access to the site will be via a proposed driveway on Oak Street. The program for the proposed project includes 3 staff members, including 2 social service case workers and 1 facility manager.

Estimated Traffic Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, was utilized to estimate the vehicle trips which could be expected to be generated y the project. Land Use Code 221 Multifamily Housing (Mid-Rise) was used to estimate the number of daily trips. This land use is inclusive of apartments buildings with between 3 and 10 floors. Note that the total number of trips = (# of vehicles entering) *plus* ((# of vehicles exiting).

Traffic generation from the residential units is estimated at 3.7 vehicle trips per day per dwelling unit. With 44 units, the projected daily traffic generated by the facility would be 163 vehicle trips per day:

Projected ADT = 239 vehicle trips per day

During peak times (either for the facility itself or the adjacent roadway), the estimated peak hour traffic is estimated to be 0.33 vehicle trips per dwelling unit. With 44 units, the projected peak-hour traffic generated by the facility would be 15 vehicle trips:

Projected Peak Hour Traffic = 19 vehicle trips per hour

Traffic Impacts

Average Daily Traffic

The Massachusetts Department of Transportation performed traffic counts at the following locations in 2019:

- School Street (North of Front St.): ADT = 6,550
- Front Street (West of Central St.): ADT = 8,890

- Central Street (North of Front St.): ADT = 10,617

Based on these counts, the estimated 239 that will be generated by the proposed project represent an increase in traffic of 2% to 3.5% on the major roads near the site. We note that the grid layout of the neighborhood surrounding the project allows for vehicles to approach from multiple directions. Therefore, the incremental increase in traffic to any one of these streets is likely to be somewhat lower than this estimate.

Peak Hour Traffic

The proposed project is estimated to generate a *maximum* of 19 trips per hour during the peak traffic periods, which is approximately equal to 1 vehicle every 3 minutes. The additional traffic generated by the proposed project will result in incremental increase in traffic volumes on Oak Street and the surrounding roads that will have minimal impact on traffic operations.

Sincerely,

Berkshire Design Group

Christopher Chamberland, P.E.
Principal

Berkshire Design Group

March 31, 2021

Winchendon Zoning Board of Appeals
109 Front Street
Winchendon, MA 01475

RE: Parking Summary
Montachusett Veterans Housing

Dear Board Members:

Berkshire Design Group has evaluated the proposed parking supply for the Montachusett Veterans Housing project at the corner of Oak Street and Murdock Avenue in Winchendon. In general, we find that the parking spaces available at the project are both reasonable for the proposed use and in compliance with the Winchendon Zoning Bylaw.

Proposed Project

The project will consist of 44 residential units in a three-story apartment building. Units will be affordable on an income-qualified basis, and are 1-bedroom single-occupant units.

Available Parking

The project includes an off-street parking lot with a total of 22 spaces.

The Winchendon Zoning Bylaw Section 8.2.3 provides that on-street parking along the property frontage may be used in the calculation of available parking. A total of up to 33 on-street parking spaces are available along the frontage of the project property.

A total of 55 parking spaces are available at the proposed project site.

Required Parking (Zoning)

The project is located in the R10 zoning district. Section 8.3.3 of the Winchendon Zoning Code provides that parking be provided in the R10 zone at a rate of 75% of the Institute of Transportation Engineers (ITE) guidelines for the proposed use, plus or minus 10%.

For the purposes of calculating the zoning requirement, the ITE Parking Generation Manual (4th Edition) was utilized to estimate the parking generation rate of the site. Land Use Code 221 Low/Mid-Rise Apartment was used. This land use is inclusive of apartment buildings of 1 to 3 floors. The peak parking demand for this land use occurs on Weekdays and is equal to 1.2 vehicles per unit.

ITE Parking Generation for the 44 units is 53 spaces. Applying the zoning bylaw ratio of 65% to 85% of the ITE ratio, the zoning code would require between 35 and 45 spaces for the proposed project.

Required Parking (Precedent)

Berkshire Design Group has worked on many low-to-moderate income residential projects in recent years. In our experience, affordable, multi-family rental units require significantly less parking that other types of residential land uses.

There are four combined factors that reduce the actual parking demand for the proposed development from what might typically be expected. These factors are: (1) rental housing generates less parking demand than ownership housing; (2) small units generate less parking demand than larger units; (3) affordable housing

generate less demand than market rate housing; (4) housing located in walk-able locations, in proximity to public transit, generates less demand than housing in other locations.

The accessory use of this property (service coordination) will naturally be timed so as to share parking with tenant uses. On-site staff (1-3 persons at any given time) and service providers who may be visiting clients will occur primarily during weekday business hours and will utilize on-street parking. Peak demand for tenant parking will occur overnight and on weekends. Based on experience at other properties, up to 50% of tenants with cars will drive to work, freeing up parking spaces during the weekday.

The table on the following page gives multiple, similar local examples of actual parking provided and utilized for low to moderate income housing. Note that several properties in Northampton, MA and Florence, MA provide no on-site parking. Among the properties that do provide on-site parking, the utilization of parking averages a rate of approximately 0.5 spaces per unit, consistent with the off-street parking proposed.

Location	Number of Units	Property Type	Parking Provided	Average Observed Vehicles	Utilization Ratio per Unit
96-98 King Street Northampton	10	Affordable, Single-Occupant Studio Apartments	0	0	N/A
82 Bridge Street Northampton	15	Affordable Lodging House	8	4	27%
16 N Maple Street Florence	17	Affordable, Single-Occupant Studio Apartments	0	0	N/A
1-3 N Main Street Florence	11	Affordable Lodging House	0	0	N/A
Earle Street Northampton	14	Affordable, Single-Occupant Studio Apartments	16	8	57%
The Lorraine 96 Pleasant Street Northampton	28	Affordable, Single-Occupant Studio Apartments	0	0	N/A
Live 155 155 Pleasant Street Northampton	70	Mixed Income Studios & 1-Bedroom Apartments	0	0	N/A
The Lumber Yard Northampton	55	Affordable Family Housing (1-3 Bedroom Apartments)	41	37	67%
Chestnut Crossings 275 Chestnut Street Springfield	101	Affordable, Single-Occupant Studio Apartments	100	34	34%
Aggregate Parking Across All Properties	321		165	83	26%
Aggregate for Properties that Provide Parking	185		165	83	45%

Conclusion

Based on the analysis presented here, it is our opinion that the proposed project provides a reasonable level of parking and is in compliance with the parking requirements of the Winchendon Zoning Bylaw.

The project proposes 22 off-street parking spaces, or 0.5 spaces per unit. In our experience with similar affordable residential project, this quantity of parking is consistent with the actual needs of the proposed project. After accounting for available on-street parking along the frontage of the project property, the project provides 55 parking spaces, which exceeds the minimum required by zoning.

Sincerely,

Berkshire Design Group

Christopher Chamberland, P.E.
Principal