

Existing and Proposed Conditions

Falconeiri Construction, Inc. requests permission to develop the property at 18 Elm Street as a single-family residence.

The lot is approximately 72,800 sf and is located in the Residence A District. It is an irregularly shaped lot bound by Main Street to the north, Elm Street and private properties to the west, town and state properties to the south, and private residential properties on the remaining sides. The lot is accessed from Elm Street, and there is no street access along Main Street. It is currently developed with a hard packed gravel driveway, A hard packed gravel parking area and lawn, with wooded areas around the perimeter. Most of the lot slopes down to a low area in the eastern corner (rear portion) of the lot. A small portion of the lot slopes down to Elm Street. The entire lot lies within FEMA Zone X. No wetland areas or their buffer zones and no overlay districts have been identified within the lot.

The proposed work includes the construction of a single-family dwelling and attached garage, a paved driveway and paved parking court, a rear patio and retaining wall, and other hardscape and landscape features. The proposed work increases the impervious area by approximately 11,905 sf. The overall topography is maintained, with most of the lot sloping down to the low area in the eastern corner, and a small area sloping down to Elm Street.

NRCS Soil Survey online data identifies the soils on site as excessively drained/very low runoff Quonset sandy loams, with 0-3% or 8-15% slopes. On site test pit data indicate several feet of fill with coarse sand below under the existing parking area, where the dwelling and paved parking are proposed. A second test pit determined loamy sands with medium sands and coarse sand and gravel beyond the parking area. A soils were used for modeling purposes.

Approximately 50,140 sf of the lot was modelled for stormwater analysis. This area includes the limit of work as well as undisturbed areas to understand runoff and drainage patterns onsite. Two subcatchment areas were modeled for the existing and proposed conditions to determine runoff conditions to Elm Street and to the low point in the rear yard. The HydroCAD results and subcatchment areas are provided in Section IV of this report.

The proposed project complies with the MA Stormwater Management Guidelines as follows:

Standard 1: No New Stormwater Conveyances of Untreated Stormwater or Erosion Offsite

The proposed modifications include new stormwater treatment that will improve the quality of the existing stormwater drainage. A portion of the roof leaders from the proposed dwelling and the runoff from the auto court are directed to a 10'X25' subsurface infiltration system located in the rear yard. A portion of the driveway runoff is directed to another 10'X18' subsurface infiltration system located in front of the dwelling. Runoff from the sport court and some of the surrounding area is directed to a 2'X2' gravel trench that surrounds the sport court. This results in matched or reduced peak flow and volume for the for all design storms under the proposed conditions. The gravel trenches that line the paved driveway were not modelled in hydroCAD, but will provide additional storage and exfiltration, which is expected to further reduce peak flow and volume offsite.

Standard 2: Peak Rate Attenuation

The existing and proposed site conditions were modelled in HydroCad for the 2, 10 and 100 year, 24-hour design storm events. The intensity of these rain events is 3.20", 4.65" and 6.80" respectively.

The overall peak rate and volume of runoff is matched or reduced for both subcatchments for all design storm events in the proposed design. This data is summarized below, and the HydroCAD report can be found in section IV:

Subcatchment 1 (740 sf) – to Elm St

Storm	Existing Conditions (cfs, af)	Post-Development Conditions (cfs, af)
2-Year-24 Hour (3.2")	0.01 cfs , 0.001 af	0.01 cfs , 0.001 af
10-Year-24 Hour (4.65")	0.03 cfs , 0.002 af	0.03 cfs , 0.002 af
100-Year-24 Hour (6.80")	0.06 cfs , 0.004 af	0.06 cfs , 0.004 af

Subcatchment 2 (49,400 sf) – to rear yard

Storm	Existing Conditions (cfs, af)	Post-Development Conditions (cfs, af)
2-Year-24 Hour (3.2")	0.00 cfs , 0.001 af	0.00 cfs , 0.001 af
10-Year-24 Hour (4.65")	0.05 cfs , 0.018 af	0.02 cfs , 0.010 af
100-Year-24 Hour (6.80")	0.65 cfs , 0.079 af	0.65 cfs , 0.057 af

Standard 3: Recharge and Discharge Volume

The applicant proposes adequate infiltration for the lot as required by the Massachusetts Stormwater Handbook as follows:

Existing Impervious Area = 0 ft²
 Proposed Impervious Area = 11,905 ft²
 Increase in impervious area = 11,905 ft²

A soils require 0.60" x impervious area of runoff to be recharged:
 (0.60"/12" per ft)(11,905 ft²) = 595 ft³

The subsurface infiltration systems have a combined storage capacity of 180+252 = 432 cf

The gravel trench around the sport court has a storage capacity of:
 2' X 2' X 250' X (40% voids) = 400 cf

The combined capacity of these 3 structures is = 432 + 400 = 832 cfs
 which exceeds the required volume. The runoff stored in the gravel trenches along the driveway below the invert of the outlet pipe will provide additional recharge.

Standard 4: Water Quality

The required Water Quality Volume (WQV) is calculated as follows:

Existing impervious vehicular areas: 0 sf
Proposed impervious vehicular areas: 4,010 sf
Net increase of pavement: 4,010 sf

WQV is calculated by multiplying 0.5 inch of runoff by the net increase in paved areas as follows:

$$\text{WQV} = (4,010 \text{ ft}^2)(0.5\text{in})/(12 \text{ in/ft}) = 167 \text{ ft}^3$$

Quarterly driveway and auto court sweeping will be performed, according to the long-term O&M plan. The gravel trenches along the driveway and autocourt provide pretreatment prior to discharge into the infiltration systems. The storage volume of the gravel trenches is:

$$(170'L + 66'L) \times 1.25'W \times 1.5' D * (40\% \text{ voids}) = 177 \text{ ft}^3 \text{ This standard is met.}$$

Standard 5: Land Uses with Higher Pollutant Loads (LUHPPLs)

The use of the property (residential) does not constitute a higher potential pollutant load use. This Standard 5 does not pertain to this project.

Standard 6: Critical Areas

The locus site is not located in a critical area.

Standard 7: Redevelopment

This project is considered redevelopment of an existing, residential lot.

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

The Operation and Maintenance Plan included with this submittal will ensure proper maintenance of the proposed pollution, erosion and sedimentation measures proposed during construction.

Standard 9: Long Term Operation and Maintenance Plan

The Long-Term Operation and Maintenance Plan is included within the Operation and Maintenance Plan enclosed in this submittal to ensure the proposed drainage improvements are maintained as intended.

Standard 10: Prohibition of Illicit Discharges

Routine visual inspections are scheduled as part of the Operations and Maintenance Plan to prevent illicit discharges into the stormwater system. Furthermore, an Illicit Compliance Statement is included in this submittal.