



**LEBANON PLANNING BOARD
JANUARY 10, 2022 - 6:30 PM
COUNCIL CHAMBERS, CITY HALL OR
REMOTE VIA VIRTUAL PLATFORM
LEBANONNH.GOV/LIVE**

-
- 1. Call to Order**
 - 2. Notice of Regional Impact**
 - 3. Public Hearing Items**
 - A. Mount Support Development, LLC (applicant) and Sylvia D. Lahaye Revocable Trust & Pat Lumber Jack, Inc. (property owners), 402 & 392 Mount Support Road (Tax Map 24, Lots 9 & 10), zoned R-1:** Request for Site Plan Review to construct a proposed 4-building multi-family development consisting of 204 dwelling units, together with parking, utilities, landscaping, access, and other related site improvements. PB2021-33-SPR - Continued from December 13, 2021
 - B. Trustees of Dartmouth College, 56 Etna Road (Tax Map 50, Lot 28), zoned IND-L:** Request for Site Plan Review to construct a +/-19,672 sq. ft. library storage building and related site improvements. PB2022-03-SPR - *Completeness review only on 01/10/2022, public hearing to commence on 02/14/2022*
 - C. Noah Lynd & Josh Garrison (applicants) and Chaloux, LLC (property owner), 25 & 0 Labombard Road (Tax Map 64, Lot 25 & Tax Map 51, Lot 15), zoned IND-L:** Request for approval of a Boundary Line Adjustment between lands located at 25 & 0 Labombard Road. PB2022-04-BLA
Postponed until 02/14/2022
 - D. Noah Lynd & Josh Garrison (applicants) and Chaloux, LLC (property owner), 25 & 0 Labombard Road (Tax Map 64, Lot 25 & Tax Map 51, Lot 15), zoned IND-L:** Request for Site Plan Review to construct a +/-12,250 sq. ft. building for a health club to include a climbing gym, yoga studio and accessory retail space, together with site improvements consisting of a new parking lot, sidewalks, patio, sewer and water utility connections, and stormwater improvements. PB2022-05-SPR
Completeness review only on 01/10/2022, public hearing to commence on 02/14/2022
 - E. Robert & John Oakes, 92 Riverside Drive (Tax Map 111, Lot 16), zoned RL-1:** Request for Site Plan Review to construct a +/-26,176 sq. ft. commercial self-storage unit facility together with related site

improvements. PB2022-06-SPR

Completeness review only on 01/10/2022, public hearing to commence on 02/14/2022

F. **Cicotte Properties, LLC and Johanna Cicotte, 175 Heater Road (Tax Map 64, Lot 30) and 30 Little Heater Road (Tax Map 78, Lot 61), zoned IND-L:** Request for approval of a Boundary Line Adjustment between lands located at 175 Heater Road and 30 Little Heater Road. PB2022-01-BLA

G. **Edwards Properties, LLC, 9 Pershing Street (Tax Map 78, Lot 48), zoned IND-L:** Request for a Conditional Use Permit to convert a previously approved contractor's yard to a car wash. PB2022-02-CUP

4. Other Business

5. Approval of Minutes

A. December 13, 2021

6. Election of Officers

A. Chair and Vice Chair

7. Adjournment

The order of agenda items is subject to change.

Meetings are open for in-person and remote attendance. Members of the public that wish to attend remotely may do so by going to LebanonNH.gov/Live where you will find instructions on how to enter the meeting. Members of the public will be able to participate and ask questions through the City's virtual platform or by phone. Please note: Should technical difficulties occur during the meeting that disrupts virtual or phone connection(s), the meeting will continue without remote access capabilities.

**Agenda
Planning Board
January 10, 2022**

**Agenda Item #3A
Public Hearing Items**

**Mount Support Development, LLC
(applicant) and Sylvia D. Lahaye
Revocable Trust & Pat Lumber
Jack, Inc. (property owners), 402 &
392 Mount Support Road (Tax Map
24, Lots 9 & 10), zoned R-1
PB2021-33-SPR**



CITY OF LEBANON ~ PLANNING & DEVELOPMENT

PLANNING BOARD

January 10, 2022 Meeting

Staff Memorandum – PB2021-33-SPR – *con't from 12/13/21*

APPLICATION INFORMATION

Agenda Item: 3.A

Application ID: PB2021-33-SPR

Application Type:

Site Plan Review of a 204-unit multi-family residential development

Property Location & Tax Map:

402 Mount Support Road (Tax Map 24, Lot 9) and 392 Mount Support Road (Tax Map 24, Lot 10)

Applicant: Mount Support Development, LLC

Property Owners:

Sylvia D. Lahaye Revocable Trust (402 MS Rd) and Pat Lumber Jack, Inc. (392 MS Rd)

Property Size (per City Assessor's records):

+/-14.21 acres (consisting of +/-6.55 acres for 402 MS Rd, and +/-7.66 acres for 392 MS Rd)

Existing Use & Improvements:

- 402 MS Rd: +/-3,552 (gross) sq. ft. one-family dwelling, constructed in 1986 (a conforming use in the R-1 District per §308.2), and accessory structures
- 392 MS Rd: vacant

Proposed Use:

204-unit multi-family development consisting of four (4) buildings

Zoning District: Residential One (R-1)

Overlay Districts:

Wetlands Conservation District

Future Land Use Map:

Residential – High and Rural

LEGAL NOTICE

Mount Support Development, LLC (applicant) and Sylvia D. Lahaye Revocable Trust & Pat Lumber Jack, Inc. (property owners), 402 & 392 Mount Support Road (Tax Map 24, Lots 9 & 10), zoned R-1: Request for Site Plan Review to construct a proposed 4-building multi-family development consisting of 204 dwelling units, together with parking, utilities, landscaping, access, and other related site improvements. PB2021-33-SPR

PLANS AND APPLICATION MATERIALS

- ▶ Application forms (**attachment, pgs 1-2**)
- ▶ Letter dated November 8, 2021, from Nicholas A. Fiore, PE, of Engineering Ventures, PC (project description; 5 pages) (**pgs 3-7**)
- ▶ Application for Waivers (5 pages) (**pgs 8-12**)
- ▶ Site Plan Review Regulations Technical Checklist (10 pages) (**pgs 13-22**)
- ▶ Letter dated December 13, 2021, from Nicholas A. Fiore, PE, of Engineering Ventures, PC (addressing Section 6.9.B – Areas of Study and Information; 3 pages) (**pgs 23-25**)
- ▶ Fiscal Impact Analysis, dated December 9, 2020, prepared by Fougere Planning and Development (14 pages) (**pgs 26-39**)
- ▶ Architectural renderings prepared by Burnell Johnson Architects, dated October 19, 2021, last revised November 1, 2021 (2 sheets) (**pgs 40-41**)
- ▶ Plan set titled “402 Mr. Support Road – Residential Development Site Plan Review” prepared by Engineering Ventures, PC, dated November 8, 2021, EV Project #19324 (33 Sheets) (**pgs 42-74**)
- ▶ *Other:* Letter from Alex Belenzs, Planner with the Upper Valley Lake Sunapee Regional Planning Commission, undated (4 pages) (**pgs 75-78**)

On-line only (not included with Planning Board hard copy agenda packets):

- ▶ Letter dated December 20, 2021, from Nicholas A. Fiore, PE, of Engineering Ventures, PC (response to staff comments; 16 pages) (**pgs 79-94**)
- ▶ Lithonia Lighting specifications for D-Series Size 0 LED Area Luminaire fixture, WDGE2 LED Architectural Wall Sconce fixture,

- ▶ VCPG LED Parking Garage fixture, LDN4 WallWash LED Downlight fixture, and anchor base poles (25 pages) (**pgs 95-119**)
- ▶ Bike stall specifications by CycleSafe (10 pages) (**pgs 120-129**)
- ▶ Wetland Determination Data Forms (2) (6 pages total) (**pgs 130-135**)
- ▶ Traffic impact assessment memo dated April 27, 2020, from Jason R. Plourde, P.E., of VHB, to Ken Braverman (26 pages plus appendices) (**pgs 136-286**)
- ▶ Pipe Capacity Analysis, dated December 14, 2021, EV Project #19324 (16 pages) (**pgs 287-302**)
- ▶ Stormwater Appurtenance Inspection and Maintenance Manual (7 pages) (**pgs 303-309**)
- ▶ Drainage Analysis titled, "402 Mt Support Rd Residential Development," dated November 8, 2021, prepared by Engineering Ventures, PC, EV Project #19324 (59 pages) (**pgs 310-368**)
- ▶ Additional drainage analysis submitted on December 20, 2021 (31 pages) (**pgs 369-399**)

COMPLETENESS REVIEW

On December 13, 2021, the Planning Board found that the application is complete enough to accept jurisdiction and to commence review.

Figure 2. Bird's Eye View of Subject Properties (looking east).



Image ©2021 Eagleview (image taken 4/4/2021)

APPLICATION OVERVIEW

402 Mount Support Road is a +/-6.3 acre lot currently improved with a one-family dwelling. 392 Mount Support Road is +/-7.9 acres in size and is currently vacant. The applicant proposes to merge the lots and redevelop the merged property as a 204-unit multi-family dwelling complex consisting of four buildings. Collectively, the subject properties will be referred to herein as “the property”.

The property is a total of +/-14.14-acres and is located in the Residential One (R-1) zoning district. Consistent with the R-1 zoning, the property is designated “Residential – High” on the Master Plan Future Land Use Map. Portions of the lot are located within the Wetlands Conservation District. However, the project layout, as proposed, will not encroach into any wetland. The property is not located within the Riverbank Protection or Floodplain overlay districts.

The property has 917 ft. of frontage on the east side of Mount Support Road, and is located directly across from the Michaels/Dartmouth College multi-family development, currently under construction. The site is within walking and biking distance of the Dartmouth Hitchcock Medical Center and other area employers located along Mount Support Road and the Centerra planned business park located on the east side of NH Route 120.

The applicant proposes to remove the existing one-family dwelling and to construct a 204-unit multi-family housing complex, together with associated site improvements including parking, landscaping, drainage features, and other site amenities. Each building will be 3-stories with a one-level parking garage underneath. The project is further described in the attached letter from Engineering Ventures dated November 8, 2021.

At its meeting on November 8, 2021, the Planning Board deemed the project to have the potential for regional impact. Accordingly, a copy of the plans was provided to the Town of Hanover and to the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC). Comments from the ULVRPC were received on December 23, 2021, and are attached (see pgs 75-78 of the attachment). As of the date of this memo, the Town of Hanover has not submitted any comments.

STAFF COMMENTS**PLANNING****I. SITE PLAN REVIEW REGULATIONS:**

Jurisdiction: Planning Board approval of the proposed project is required pursuant to Section 3.1.D of the Site Plan Review Regulations.

Phasing: The project is proposed to be constructed in phases pursuant to Section 4.9 of the Site Plan Review Regulations. The purpose of phasing is to allow a development to be constructed over a longer period of time than what is otherwise permitted under the requirements of the Site Plan Review Regulations. These include the various timing requirements (i.e. 2 years from the date of approval to record the plat (Sec. 7.12.B), 2 years from the date of approval to achieve active and substantial development (Sec. 8.4.A.2), and 5 years from the date of approval to achieve substantial completion (Sec. 8.4.B.2), and the requirements relative to the issuance of certificates of occupancy (Sec. 8.1). As required by Section 5.1.G.1, the applicant has provided a proposed phasing schedule on Sheet 4 of the plan set (“Project Phasing Plan”). See page 45 of the staff memo attachment.

Waiver Requests

Pursuant to Section 7.1 (“Waiver of Regulations”), the applicant has requested waivers from certain provisions of Article VI (“Design and Construction Requirements”) of the Site Plan Review Regulations as set forth in the attached Application for Waivers (see pages 8-12 of the staff memo attachment).

Pursuant to Section 7.1 of the Site Plan Review Regulations, the Board may grant a waiver of any part of the Regulations if it finds, by majority vote, that either:

- A. Strict conformity would pose an unnecessary hardship to the Applicant and waiver would not be contrary to the spirit and intent of the regulations; or
- B. Specific circumstances relative to the site plan, or conditions of the land in such site plan, indicate that the waiver will properly carry out the spirit and intent of the regulations.

The applicant’s basis for each waiver request is described in the attached Application for Waivers. Note that the granting of a waiver from a design requirement does not relieve an applicant from making the improvements that are depicted on the approved site plan, even if the depicted improvement would have been covered by the waiver had it not been included on the approved site plan.

SECTION 5 – SUBMISSION REQUIREMENTS

5.1 (Drawings and Other Submittals): The applicant has provided the attached materials in accordance with the submission requirements of Section 5.1 of the Site Plan Review Regulations. For a discussion of the project, please see the attached letter from Engineering Ventures dated November 8, 2021.

SECTION 6 – DESIGN AND CONSTRUCTION REQUIREMENTS

6.1 (General Requirements): In general, the project is consistent with the spirit and intent of the R-1 District regulations and the “Residential – High” designation on the Future Land Use Map. It also matches the high-density residential development under construction across Mount Support Road (Michaels/Dartmouth College), the existing multi-family development immediately to the south (Timberwood), and the proposed Marek development at 343 Mount Support Road. Located adjacent to an Advance Transit bus route and the Mount Support Road multi-use path, and within proximity to area employers, the property is an ideal location for the type of development proposed.

6.2 (Landscaping Standards): The applicant has submitted a landscaping plan in accordance with Section 5.1.E.15 of the Site Plan Review Regulations and the landscaping design standards set forth in Section 6.2. See pages 58 and 59 of the staff memo attachment. As noted in the attached Application for Waivers, the applicant requests waivers from the following requirements:

- Section 6.D which requires landscaping of 10 ft. in width around all buildings.
- Section 5.1.E.16 which requires that, “[e]xisting trees over 12 inches in diameter, measured 4.5 feet above the ground surface, and within 25 feet of the disturbed area, must be counted and shown on the plan, if included towards fulfilling the landscaping requirements.”
- Section 6.2.L which requires that, “[l]andscaped areas within and adjacent to all parking and vehicular areas shall be protected by curbing, wheel stops, or fencing[.]”
- Section 6.2.B.1 which requires a landscaped area of at least 15 feet in width is provided along the front, side, and rear property lines.

6.3 (Utilities & Fire Protection): The proposed development will be connected to the City's water and sewer systems and fire hydrants will be provided within the development. The Fire Department has reviewed the plans and has no concerns at this time. Planning staff has provided the plans to the Fire Department and anticipates receiving written comment prior to the January 10th hearing.

6.4 (Fees and Assessments in Effect at time of Connection): The creation of new residential square footage will be subject to the City's Impact Fee Ordinance and fee schedule adopted by the Board on October 12, 2021.

6.5 (Coordination of Roads, Parking, Loading, Recreation, and Safety): The project is proposed to have two vehicular access points from Mount Support Road: at the north end site directly opposite from the main entrance to the Michaels/Dartmouth College development at 401 Mount Support Road, and a second access drive at the southern end of the site. Pedestrian access to the development from the abutting multi-use path is provided via walkways located near each access drive. The applicant has requested waivers from the requirements of Sections 6.5.C.2 and 6.5.C.3, as described in the attached Application for Waivers. See pages 9-10 of the staff memo attachment.

6.6 (Stormwater Management): At the time of the writing of this memo, the Reviewing Engineer has not yet completed his review of the applicant's revised plans – including a review of the applicant's drainage report. A copy of the Reviewing Engineer's memo will be provided to the Board and to the applicant as soon as possible prior to the hearing on January 10th.

6.7 (Lighting): The applicant has submitted a lighting plan in accordance with Section 5.1.E.12 of the Site Plan Review Regulations, and the lighting design standards set forth in Section 6.7. See page 61 of the staff memo attachment.

6.8 (Off-Site Improvements): The applicant is not proposing any off-site improvements at this time other than the construction of a bus shelter to the north of the north access drive. As a condition of approval, staff recommends that the Board require the applicant to coordinate the design and proposed location of the bus shelter with Advance Transit, as required by Section 6.5.D.9.

The applicant prepared a traffic study for the development in April of 2020 (see traffic impact assessment memo dated April 27, 2020, from Jason R. Plourde, P.E., of VHB, beginning on page 286 of the staff memo attachment). This traffic study, together with the traffic studies prepared for the DHMC patient tower, the 401 Mount Support Road project, and the 343 Mount Support Road project, were utilized to prepare preliminary plans for a major redesign of the Heater Road/Mount Support Road intersection. Full design and construction of the intersection improvements will be funded through a special assessment district that has been created by the City Council. Through the special assessment district, the 402 Mount Support Road project will pay its fair share towards the design and construction of the intersection improvements which the new development at DHMC and on Mount Support Road collectively necessitates.

6.9 (Premature and Scattered Development): This section provides that the Planning Board "may disapprove a site plan application if it determines by majority vote that such application proposes development that is scattered or premature, so as to involve danger or injury to health, safety, or prosperity of the community by reason of the lack of water supply, drainage, transportation, schools, fire department, or other public services or which necessitates an excessive expenditure of public funds for the supply of such services." A multi-family dwelling development resulting in a net increase of 50 dwelling units or more shall be considered scattered or premature if "it will cause, or poses an undue risk of causing, a substantial or appreciable adverse impact upon any of the factors or parameters [...] set forth

in Section 6.9.B[.]” The applicant has addressed the Section 6.9.B areas of study and information in the attached letter dated December 13, 2021, from Nicholas A. Fiore, PE, of Engineering Ventures, PC (pgs 23-25 of the staff memo attachment) and in the attached Fiscal Impact Analysis, dated December 9, 2020, prepared by Fougere Planning and Development (pgs 26-39 of the staff memo attachment).

II. ZONING ORDINANCE:

Multi-family housing is a permitted use in the R-1 zoning district. The project design complies with all R-1 district minimum yard requirements and density calculations, as well as the applicable parking regulations set forth in Section 607 of the Zoning Ordinance.

CITY ASSESSOR

No comment at this time.

BUILDING INSPECTOR

No comment at this time.

ENGINEERING/PUBLIC WORKS

At the time of the writing of this memo, the Reviewing Engineer has not yet completed his review of the applicant's revised plans. A copy of the Reviewing Engineer's memo will be provided to the Board and to the applicant as soon as possible prior to the hearing on January 10th.

FIRE DEPARTMENT

Planning staff has provided the plans to the Fire Department and anticipates receiving written comment prior to the January 10th hearing.

POLICE DEPARTMENT

No comment at this time.

STAFF RECOMMENDATIONS

If the Planning Board moves to approve this request, then based on the information reviewed by City staff, the Planning and Development Department recommends that the Planning Board approve the application with the conditions noted below (*please note that staff will propose additional comments based on the Reviewing Engineer's report and to reflect the applicant's proposed phasing schedule*):

Conditions to be Satisfied Prior to Application for a Building Permit

1. The applicant shall make the following revisions to the plan set to the satisfaction of the Planning and Development Department and the City Engineer:
 - a) Amend the cover sheet to:
 - i. Provide description of plan revisions (5.1.E.4.d).
 - ii. Note that the plan was approved to the Site Plan Review Regulations adopted May 13, 1991, last revised September 13, 2021.
 - iii. Amend the Zoning Chart to:
 1. Provide the dwelling unit density calculation.
 2. Identify the number of proposed dwelling units and the unit mix (total number of studios, one-bedrooms, two-bedrooms, etc.)

- b) Amend Sheet 16 (Utilities Plan) to add a note indicating that underground utilities, electric, telephone and cable, must maintain a minimum clearance of 10 ft. from all proposed water lines.

The applicant shall provide the Planning and Development Department with one (1) full size copy of the revised plan set, and a digital copy of the revised plan set saved in a PDF-A format for archival purposes.

- 2. The applicant shall schedule and hold a pre-building permit application meeting with the Planning and Development Department, City Building Inspectors, City Engineer/Department of Public Works, and Fire Department, in order to help streamline the building permit review process and to review applicable code requirements.
- 3. The applicant shall obtain approval from the City Council or the City Manager's office for any additional water and/or sewer flows in accordance with the applicable Chapter 136 and 182 of the City Code.
- 4. All engineering review fees shall be paid in full as required by Section 4.7.E.1 of the Site Plan Review Regulations.

Conditions to be Satisfied Prior to the Issuance of a Building Permit

- 5. The City shall retain the services of an independent third-party inspector, for which the applicant shall be responsible for all inspection fees related to the construction of on-site sewer and water and for all work within the City's right-of-way (water, sewer, road, drainage), in accordance with Chapters 136 and 182 of the City Code and Section 8.2 of the Site Plan Review Regulations. The applicant shall provide funding for inspection services in a form and amount acceptable to the City, and shall sign a Water & Sewer Extension and Inspection Agreement in accordance with Chapters 136 and 182 of the City Code.
- 6. The development shall be subject to City of Lebanon Impact Fees, pursuant to Section 213 of the Zoning Ordinance. The Impact Fee shall be calculated at the time of Building Permit issuance based on the Impact Fee Schedule adopted on October 12, 2021. In accordance with RSA 674:39, the approved site plan shall be exempt from any future changes in impact fees and methodology for five years from the date of approval; however, any building permits which are issued after the end of that five-year period shall be fully subject to whatever impact fees and methodology are in effect at the time of building permit issuance.
- 7. A water flow test shall be completed on Mount Support Road to be witnessed and approved by the Lebanon Fire Department.
- 8. All water and sewer fees shall be paid as set forth in City Code Chapter 68.
- 9. The applicant shall coordinate the design and proposed location of the bus shelter with Advance Transit, as required by Section 6.5.D.9 of the Site Plan Review Regulations.
- 10. Prior to the start of any construction activities on the property, the applicant shall obtain or update (if appropriate) any required State approvals including, but not limited to, the following:
 - a) NHDES Sewer Connection Permit, if necessary
 - b) NHDES Alteration of Terrain Permit, if necessary

Conditions to be Satisfied Prior to the Issuance of a Certificate of Occupancy

11. The impact fee calculated pursuant to Condition of Approval #6 shall be paid.
12. Third-party engineer or design engineer inspection reports and as-built drawings provided by the applicant (PDF format and CAD .dwg format, using the NH State Plane Coordinate System), including tie sheets, shall be reviewed and approved by the City Engineer prior to acceptance of any utility improvements by the City.
13. All improvements depicted on the plan shall be completed, and shall be constructed as depicted on the approved plan, including any modifications to the plan as may be approved by the Planning Board in accordance with the Site Plan Review Regulations.
14. The applicant shall prepare and record an easement granting the City of Lebanon the right to enter the property for purposes of accessing the water system. Prior to recording, the draft easement shall be provided to the Planning & Development Department and shall be reviewed and approved the City of Lebanon's legal counsel.

General Conditions

15. The applicant shall obtain an Excavation Permit from the Department of Public Works for any site work in the public right-of-way prior to any work in the right-of-way.
16. Construction or installation of any new driveway(s) shall require a Driveway Permit and Excavation Permit from the City.
17. All required landscape plantings shall meet the minimum size requirements for such plantings set forth in Section 6.2.B of the Site Plan Review Regulations at the time of installation.
18. Edge-of-disturbance fencing shall be installed and maintained before and during any site work, to be verified by the City Engineer or City's third-party inspector on site.
19. The applicant shall implement and maintain NHDES Site Specific Best Management Practices before, during, and after construction.
20. The property owner is responsible for the maintenance and operation of the stormwater management system in accord with the O&M plan, and such responsibility shall run with the land. (Section 6.6.H.2.b of the Site Plan Review Regulations).

Attachments

cc: Ken Braverman, Mount Support Development, LLC (via e-mail)
Sylvia D. Lahaye Revocable Trust (via e-mail)
Pat Lumber Jack, Inc. (via e-mail)
Nicholas A. Fiore, PE, of Engineering Ventures, PC (via e-mail)
File

APPLICATION FOR

SPECIAL EXCEPTION	☐	☒ SITE PLAN REVIEW
VARIANCE	☐	☐ SUBDIVISION
MOTION FOR REHEARING	☐	☐ LOT LINE ADJUSTMENT
APPEAL OF AN ADMIN. DECISION	☐	☐ CONDITIONAL USE PERMIT
☐ OTHER _____		

PROPERTY OWNER (APPLICANT):

NAME: Sylvia D Lahaye Rev Trst // Pat Lumber Jack Inc. TEL.#: 603-448-2720 // 603.746.4923
MAILING ADDRESS: Kevin F. Carr, Esq., 29 School St, Lebanon NH 03766 // James P. Fredyma 109 Carriage Ln, Contoocook, NH 03229
E-MAIL ADDRESS: Kevin@bakerandhayes.com // fredymaj@comcast.net

CO-APPLICANT, AGENT, OR LESSEE:

NAME: Mount Support Development LLC TEL.#: 802-343-6300
MAILING ADDRESS: Braverman Co. 214 Barnes Hill Rd, Stowe, VT 05672 // Anaganost Invst, 1662 Elm St, Manchester, NH 03101
E-MAIL ADDRESS: kb@bravermancompany.com

PROJECT LOCATION:

TAX MAP #: 24 LOT#: 9 & 10 PLOT #: ZONE: R1
STREET ADDRESS OF PROJECT: 402 & 392 Mount Support Road
IS THIS PROPERTY LOCATED IN THE: **WETLANDS** ☒ YES ☐ NO **HISTORIC DISTRICT** ☐ YES ☒ NO
FLOOD PLAIN ☐ YES ☒ NO

SCOPE OF PROJECT:

Four three-story apartment buildings with 51 units each in a mix of 1-, 2-, and 3-bedrooms. 45+/- parking spaces below each building, additional on site parking, plus new water, sewer, and stormwater facilities.

TYPE OF OCCUPANCY:

EXISTING ☐ VACANT ☒ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☐ COMMERCIAL ☐ INDUSTRIAL
PROPOSED ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☒ MULTI-FAMILY ☐ COMMERCIAL ☐ INDUSTRIAL
IF USE IS **COMMERCIAL** OR **INDUSTRIAL**, PLEASE NOTE **SPECIFIC** USE: _____

SIGNATURE BLOCK:

FOR PLANNING BOARD APPLICATIONS ONLY: I, the undersigned, hereby submit this application on the date noted below with the knowledge and understanding that the Planning Board shall determine if the submitted application is complete according to its regulations at its next regularly scheduled meeting on _____, 20____, unless I personally request, in writing, that the Board delay its determination of completeness to a later date.

PROPERTY OWNER: Pat Lumber Jack, Inc. by J. P. Hayes, President DATE: 10/29/21

NOTE: IF, AS OWNER, YOU WISH TO DESIGNATE AN AGENT TO ACT ON YOUR BEHALF, PLEASE READ THE FOLLOWING AND SIGN BELOW: I hereby designate the person listed above as my agent for the purpose of procuring the necessary local permits for the proposed work as described herein. Representations made by my agent may be accepted as though made by me personally, and I understand that I am bound by any official decision made on the basis of such representation.

PROPERTY OWNER: Pat Lumber Jack, Inc. by J. P. Hayes, President DATE: 10/29/21

DATE RECEIVED	FILE # (MAP/LOT)	APPLICATION #	FEE - \$ AMOUNT	DATE PAID	VOUCHER #
11-8-21	24/9 & 24/10	PB2021-34-SPR			

CITY OF LEBANON
APPLICATION FOR

SPECIAL EXCEPTION	☐	☒ SITE PLAN REVIEW
VARIANCE	☐	☐ SUBDIVISION
MOTION FOR REHEARING	☐	☐ LOT LINE ADJUSTMENT
APPEAL OF AN ADMIN. DECISION	☐	☐ CONDITIONAL USE PERMIT

☐ OTHER _____

PROPERTY OWNER (APPLICANT):

NAME: Sylvia D Lahaye Rev Trst // Pat Lumber Jack Inc.

TEL.#: 603-448-2720 // 603.746.4923

MAILING ADDRESS: Kevin F. Carr, Esq., 29 School St, Lebanon NH 03766 // James P. Fredyma 109 Carriage Ln, Contoocook, NH 03229

E-MAIL ADDRESS: Kevin@bakerandhayes.com // fredymaj@comcast.net

CO-APPLICANT, AGENT, OR LESSEE:

NAME: Mount Support Development LLC

TEL.#: 802-343-6300

MAILING ADDRESS: Braverman Co. 214 Barnes Hill Rd, Stowe, VT 05672 // Anaganost Invst, 1662 Elm St, Manchester, NH 03101

E-MAIL ADDRESS: kb@bravermancompany.com

PROJECT LOCATION:

TAX MAP #: 24

LOT#: 9 & 10

PLOT #:

ZONE: R1

STREET ADDRESS OF PROJECT: 402 & 392 Mount Support Road

IS THIS PROPERTY LOCATED IN THE: **WETLANDS** ☒ YES ☐ NO **HISTORIC DISTRICT** ☐ YES ☒ NO**FLOOD PLAIN** ☐ YES ☒ NO

SCOPE OF PROJECT:

Four three-story apartment buildings with 51 units each in a mix of 1-, 2-, and 3-bedrooms. 45+/- parking spaces below each building, additional on site parking, plus new water, sewer, and stormwater facilities.

TYPE OF OCCUPANCY:

EXISTING ☐ VACANT ☒ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☐ COMMERCIAL ☐ INDUSTRIALPROPOSED ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☒ MULTI-FAMILY ☐ COMMERCIAL ☐ INDUSTRIALIF USE IS **COMMERCIAL** OR **INDUSTRIAL**, PLEASE NOTE **SPECIFIC**

USE: _____

SIGNATURE BLOCK:

FOR PLANNING BOARD APPLICATIONS ONLY: I, the undersigned, hereby submit this application on the date noted below with the knowledge and understanding that the Planning Board shall determine if the submitted application is complete according to its regulations at its next regularly scheduled meeting on Jan. 10, 2022, unless I personally request, in writing, that the Board delay its determination of completeness to a later date.

PROPERTY

OWNER: D J LahayeDATE: 11-2-2021

NOTE: IF, AS OWNER, YOU WISH TO DESIGNATE AN AGENT TO ACT ON YOUR BEHALF, PLEASE READ THE FOLLOWING AND SIGN BELOW: I hereby designate the person listed above as my agent for the purpose of procuring the necessary local permits for the proposed work as described herein. Representations made by my agent may be accepted as though made by me personally, and I understand that I am bound by any official decision made on the basis of such representation.

PROPERTY

OWNER: _____

DATE: _____

DATE RECEIVED	FILE # (MAP/LOT)	APPLICATION #	FEE - \$ AMOUNT	DATE PAID	VOUCHER #



208 Flynn Avenue, Suite 2A, Burlington, VT 05401 • Tel: 802-863-6225
85 Mechanic Street, Suite E2-3, Lebanon, NH 03766 • Tel: 603-442-9333
414 Union Street, Schenectady, NY 12305 • Tel: 518-630-9614

November 8, 2021

City of Lebanon Planning & Development Department
Attn: Tim Corwin, Senior Planner and Zoning Administrator
51 North Park St
Lebanon, NH 03766

RE: Site Plan Review Application
402 Mt Support Rd Residential Development
Tax Map 24 Lots 9 & 10

Dear Mr. Corwin,

On behalf of Anagnost Investments and The Braverman Company (dba, Mt Support Development LLC), Engineering Ventures, PC (EV) is pleased to submit the enclose Site Plan Review application package for the 402 Mt Support Rd Residential Development project. The following is a summary of the project.

Summary

The proposed development is an affordable workforce housing project to be located at 402 (Map 24, Lot 9) and 392 (Map 24, Lot 10) Mount Support Road, located in the City's high-density R1 Zoning District. Pending project approval, the two parcels will be merged for a combined parcel of 14.2± acres.

The project is planned to be 204 residential units; constructed in four 3-story buildings. Each building will include a parking garage under the building footprint; minimizing the need for surface parking and avoiding wetland impacts. The property is a strong smart growth location with exceptional access to the region's largest employers, public transportation, and existing bike and pedestrian connectivity.

402 Mt Support Rd is currently occupied by a residence and landscaping operation. 392 Mt Support Rd is currently undeveloped. The site is moderately sloped and includes a mix of open fields, woods, and wetland areas. The project is designed as a conservation development, which concentrates the buildings and parking near Mt Support Road in the upland areas while preserving the existing wetland areas and wildlife corridor located along the site's south boundary line.

Site Layout

The development is designed to create a compact neighborhood setting. Two buildings will be just off the front set back line, a central drive will be behind them, and two more buildings behind that.

City of Lebanon Planning & Development Department

Site Plan Review Application, 402 Mt Support Rd Residential Development, Tax Map 24 Lots 9 & 10

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The central drive will have on-street parking that creates a “downtown street” feel with sidewalks and street trees where residents can interact in sidewalk conversations. Adequate parking is provided for residents and visitors in surface lots and below the buildings. Recreation areas are provided in the two fenced play areas and a fenced dog park. On-site multi-use paths make direct connections to the Mt Support Rd multi-use path which provides access to nearby Boston Lots trails. A majority of the land is preserved in its natural state.

Transportation

Two driveways provide access to the site from Mt Support Road. This provides flexible vehicular circulation and emergency vehicle access redundancy. The northern driveway is designed exactly opposite the driveway to the Michaels Student Living project to provide a traditional intersection configuration. Sidewalks and internal mixed-use paths connect to the Mt Support Road mixed-use path providing good pedestrian access. Advance Transit’s Blue Line services Mt Support Rd and new bus shelter is proposed (by others) near the north property corner of this development. Covered bike parking is provided in the garage below each building. A Traffic Impact and Access Study by VHB is included with this Site Plan Application.

Wetlands and Wildlife

The rear portion of the parcel includes wetlands that are part of a larger wetland complex between Mt Support Road and Route 120. The Lebanon Natural Resources Inventory classifies these wetlands as Medium-Low Value. The wetlands within the project site were delineated by Audra L. Klumb, NH Certified Wetland Scientist #222 of A&D Klumb Environmental, LLC, Webster, NH, in September 2021. The project is designed to avoid impacts to these wetland areas and therefore does not require any wetland waivers for approvals from the City or State.

The Natural Resources Inventory also identifies a wildlife corridor south of the project site. The development is designed to conserve the integrity of this corridor.

Stormwater Management

The development’s stormwater management system is designed in accordance with City of Lebanon and NHDES Alteration of Terrain (AoT) regulations. An AoT permit application is pending. Stormwater treatment and mitigation will be accomplished through construction of a gravel wetland system as indicated on the plans. Pretreatment for the north and west end of the site will be provided by a stormwater chamber system which will filter out sediment and provide flow attenuation to the gravel wetland. Drainage from the south and east ends of the site will be directed to a precast concrete sediment forebay for pretreatment prior to discharging to the gravel wetland system. Stormwater will be directed to the pretreatment systems through a series of roadside swales, grate drains, yard inlets, catch basins, and parking lot curbing. The gravel wetland

City of Lebanon Planning & Development Department

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will then treat and attenuate flows prior to discharging to the existing natural wetlands east of the site.

For further details of existing and proposed drainage catchment please refer to the HydroCAD printout and the Drainage Plans included in this application's plan set. Sample calculations for the drainage analysis are as follows:

- $WQ_v = (P)(R_v)(A)$
- $P = 1''$ of rainfall (NHDES standard)
- $R_v = \text{Runoff Coefficient} = 0.05 + (0.9 * I)$
- $I = \% \text{ impervious draining to practice}$
- $A = \text{Area draining to practice}$
- $A_i = \text{Impervious area draining to practice}$
- WQ_v Calculations for area draining to POI-1:
 - $P = 1''$
 - $A = 6.68 \text{ acres}$
 - $A_i = 4.27 \text{ acres}$
 - $I = 4.27/6.68 = 0.64$
 - $R_v = 0.05 + (0.9 * 0.64) = 0.63 \text{ unitless}$
 - $WQ_v = (1'') (0.63) (6.68) = 4.18 \text{ ac-in}$
 - $WQ_v = 15,170 \text{ cf} (4.18 \text{ ac-in} * 43,560 \text{ sf/ac} * 1'/12'')$

Stormwater analysis was conducted using HydroCAD Version 10.0 to compute the post-construction conditions for the 1", 2-year, 10-year, 25-year, 50-year, and 100-year 24-hour storm events. This program uses the TR-20 stormwater calculation method. The following table shows the results of the post-development analysis versus pre-development analysis.

Table 1 – HydroCAD Results

POI 1	2-yr Storm		10-yr Storm		25-yr Storm		50-yr Storm		100-yr Storm	
	cfs	cf	cfs	Cf	cfs	cf	cfs	cf	cfs	cf
Pre-Development	3.70	13,764	8.97	29,917	13.60	44,149	18.11	58,166	23.56	75,300
Post-Development	1.87	19,692	8.95	43,111	13.35	61,558	16.56	78,732	21.26	98,900
Δ	-1.83	5,928	-0.02	13,194	-0.25	17,409	-1.55	20,566	-2.30	23,600

Soil Erosion and Sedimentation Control

Standard erosion and sedimentation control measures will be implemented during construction of the project. Inlet protections will be installed at basin inlets. Silt fencing will be installed along downhill edges of the site work and where otherwise indicated on the plans. Stone construction

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Site Plan Review Application, 402 Mt Support Rd Residential Development, Tax Map 24 Lots 9 & 10

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entrances will be implemented to prevent vehicles from transporting dirt and soil off the site. Once final grades are established, landscaping features will be installed for the project area.

This project will require that the developer and contractor are covered by and EPA Construction General Permit during construction activities. This includes developing and following a Stormwater Pollution Prevention Plan (SWPPP).

Utilities and Fire Protection

The development will be served by municipal water and sewer, Liberty Utilities for electric service, and private contractors for propane and communications. It is EV's understanding that all services have adequate capacity to meet the needs of the development.

An 8-inch water main will tee off the City's 12-inch main in Mt Support Rd, loop through the development via the two driveways and the central drive, and connect again to the City's main at the other end of the site. A service to each building will be provided from within the central drive, as will services to three fire hydrants within the site. All buildings will have complete sprinkler systems for fire protection.

Sewer service will be provided by gravity-flow pipes from the buildings to the newly constructed City sewer main in Mt Support Rd. One sewer main within the development will run under the center drive and each building will connect to it. The connection point to the City's main will be a manhole just south of the property's southern boundary. As-built information for the existing sewer was provided by Lebanon DPW and was used in designing this project's system.

City of Lebanon Sewer Allocation and NH DES Sewer Connection Permit are pending.

Landscaping

New landscaping will be planted around and throughout the development. Trees and shrubs will provide perimeter landscaping along Mt Support Rd and the property's northern boundary. The trees along Mt Support Rd were selected to match the road side planting scheme of Michaels Student Living project. Additional screening from Mt Support Rd will be provided along the fronts of the building closest to the road. Existing vegetated buffers along the southern and western property lines will remain unaltered. Shade trees will be planted in parking lot islands and provide the requisite shading. Additional plantings are provided around each building where space is available. This project is seeking a waiver from Section 6.2.D, which requires a 10-foot landscaping strip around the buildings. The compact nature of the site design is an effort to preserve the wetlands on the property. The landscape areas around the buildings have been maximized while maintaining that goal. Including a full 10 feet of landscaping around the building would result in significant impacts to the wetlands.

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Snow Removal

Snow storage will generally occur along the sides of the driveways and in pockets around the site as indicated on the landscaping plans. The compact design of the site will necessitate the hauling of snow off site periodically.

Construction Schedule

Pending permit approvals, construction will begin in Spring 2022 and be completed in Spring 2023. At this time project phasing is still being determined.

Thank you for your time and consideration with this project. We look forward to review this project with you and the City staff. In the meantime, please do not hesitate to call or email if you have any questions or need additional information.

Sincerely,

ENGINEERING VENTURES, PC

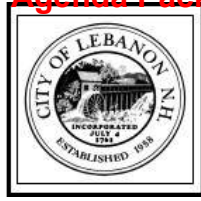


Nicholas A. Fiore, PE

Project Manager/Principal

Direct: (603) 727-7029

Enc: Application Form x 2
Fee Schedule
Certified Notification List
Application for Waivers
Technical Checklist
Lighting cut sheets (4 cut light sheets plus 1 light pole cut sheet)
Architectural Plans
Stormwater modeling report
Traffic Memo by VHB



City of Lebanon, New Hampshire APPLICATION FOR WAIVERS

Office Use Only

Date Received: _____ File No.: _____

PROJECT INFORMATION

Name of Applicant: Mt Support Development LLC
Project Name: 402 Mt Support Rd Residential Development
Project Address: 402 & 392 Mt Support Rd

WAIVER REGULATIONS

In order to grant a Waiver from a requirement of the City of Lebanon Site Plan Review or Subdivision Regulations, the Planning Board must find that the Waiver is justified under one of the following criteria (See Article VII of the Site Plan Review Regulations and Section 7.15 of the Subdivision Regulations):

Criteria A. Strict conformity would pose an unnecessary hardship to the Applicant and waiver would not be contrary to the spirit and intent of the regulations;

OR

Criteria B. Specific circumstances relative to the site plan, or conditions of the land in such site plan, indicate that the waiver will properly carry out the spirit and intent of the regulations.

WAIVER REQUEST(S)

I (we) hereby request a Waiver from:

[You can respond in the space provided, or attach a separate statement. Please be prepared to address each request during your public hearing. You must show that you have justified granting the Waiver(s).]

- Section 6.2.D of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because Requiring a 10 foot buffer around buildings. The compact nature of the site design is an effort to preserve the wetlands on the property. The landscape areas around the buildings have been maximized while maintaining that goal. Including a full 10 feet of landscaping around the building would result in significant impacts to the wetlands.
- Section 5.1.E(16) of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because The design team did not anticipate needing this waiver at the time of the survey of the site and the specific locations of 12-inch trees were not collected. The areas left undisturbed have a mix of vegetation and will provide good screening.

3. Section ^{6.5.C.2} ___ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____
Please see attached supporting statements.
4. Section ^{6.5.C.3} ___ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____
Please see attached supporting statements.
5. Section ^{6.2.L} ___ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____
Please see attached supporting statements.
6. Section ^{6.2.B.1} ___ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____
Please see attached supporting statements.
7. Section ___ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____
8. Section ___ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

SIGNATURE

I (we) hereby submit this application to the Planning Board and attest that to the best of my (our) knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As the applicant or as the agent of the applicant, I attest that I am duly authorized to act in this capacity.

Signature of Applicant:  Date: 12/20/2021

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PB2021-33-SPR

Site Plan Review Application – Additional Waiver Request Supporting Statements

6.5.C.2 – “At least one primary entrance to the building shall face the public way on which the lot has frontage”

Providing a primary entrance facing the public right-of-way would require a driveway and parking area between the buildings and Mt Support Rd. Parking is not allowed in the front yard of this property, so this would significantly increase the footprint and impacts of the development by shifting site elements to the east and forcing the disturbance of wetlands. A driveway and parking area in front of the building would also increase the amount of asphalt on site, which will increase the heat-island effect, result in additional sand and salt treatments during winter months, and require increased impacts from larger stormwater treatment practices. The proposed design protects the wetlands, provides better screening of the parking lots, and better protects the natural resources around the site.

6.5.C.3 – “Pedestrian entrances shall be provided at least every 60 linear feet along the ground floor of the primary façade”

Each building includes three (3) pedestrian entrances into common space foyers and hallways. Providing additional entries would lengthen the buildings and increase the impacts of the development. The project would have to expand to the south towards the wildlife corridor. Added entrances would also displace parking spaces in the garages. These spaces would have to be located outside, thereby increasing the impervious areas on site and potentially impacting wetlands. Each residential unit does have a small outdoor patio, which adds doors along the buildings’ façades. A half-wall and landscaping at the front of these patios. Eliminating these items to create direct entries from the sidewalks would eliminate the privacy and security provided by these features. The façades also have varying planes, rooflines, and architectural features to break up the massing of the buildings.

6.2.L – Landscape areas to be protected by curbing, wheel stops, or fencing.

This request is specific to the east side of the eastern parking lot and the small lot between Buildings 1 and 2. Stormwater will flow away from the edges in question so curbing is not needed for stormwater control. Wheel stops are regularly broken or damaged by snowplows and cause damage to snowplows. Trees, fencing, and other visual clues will let drivers know where to stop pulling forward in a parking space.

6.2.B.1 – Perimeter Landscaping.

This request is specific to the northern property line of the site where the project abuts undeveloped land. The driveway is ten (10) feet off the property line. It is also higher than existing ground by as much as four (4) feet in order to maintain appropriate roadway slopes. There is a gravel shoulder and guard rail along the norther edge of the driveway, and a stone 1:1 slope drops behind the guard rail to the exiting ground just off the property line. These site elements combine to create a space that is not ideal for planning trees and shrubs. The driveway is as far south as it can be without having to move the entire site design to the south. That would push the development further towards the wild life corridor.



Wetland delineations for this project show wetlands just north of the entire length of the northern property line. The City of Lebanon's wetland mapping show that the property north of the project site is largely encumbered by wetlands. Any future development north of the project site will likely avoid impacts to the wetlands.

As seen in the photographs below, the existing vegetation along and north of the northern property line is thick well established and contains a variety of sizes and heights. The vegetation let in place will provide sufficient screening to a future development, should one ever occur.





CITY OF LEBANON, NH SITE PLAN REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: 402 Mt Support Rd Residential Development	
APPLICANT: Mount Support Development, LLC	DATE: 11/08/2021
GENERAL SUBMISSION REQUIREMENTS:	

All applications to the Planning Board for Site Plan Review must be submitted by 12:00 Noon on the day of the filing cutoff. [§4.7.B] Submissions must be accompanied by the following information or review of the application may be delayed:

A properly completed and signed Application Form *(available at www.lebanonnh.gov)*. [§5.1.A]

The appropriate filing fees. [§5.1.B]

A written project description. [§5.1.C]

A list of the names and mailing addresses of all persons to be notified, by certified mail, of the public hearing. [§5.1.D]

A completed and signed Application for Waivers *(available at www.lebanonnh.gov)* [§5.1.G.3]

A completed and signed Technical Checklist *(available at www.lebanonnh.gov)*. [§4.7.B]
[Applicants must complete the entire checklist to ensure that all necessary information and materials have been provided with the application or that written requests for waivers have been properly provided in accordance with Article VII of the Site Plan Review Regulations, as appropriate.]

Two (2) full-size sets of the Site Plan set. [§5.1.E]

A digital copy of the Site Plan set in .PDF format. [§5.1.F]

NOTE: Applications shall contain sufficient information to enable the City Staff and the Planning Board to evaluate the proposed development for compliance with the Zoning Ordinance, the Planning Board's Regulations, and other applicable City Codes, and for the Planning Board to make an informed decision.

All required application materials shall be submitted as a single inclusive package, including any appropriate waiver requests as permitted by the Regulations. Submission of a complete application package ensures that the review process by City Staff is as efficient and effective as possible.

The purpose of the filing deadline is to provide adequate time for City review of the proposal. Submission of any altered, additional, or substitute application materials required by Article V of these Regulations, subsequent to the filing deadline, other than as directed by City Staff, shall cause the application to be deemed untimely filed, and such application shall not be heard until a subsequent month.

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

PLAN SUBMITTAL TECHNICAL CHECKLIST:

NOTE: Site plan drawings shall include the information described below pursuant to Article V of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted for Site Plan Review shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning & Development Department.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§5.1.G(4)] NOTE: The submission requirements described in paragraphs 5.1.E(1) through 5.1.E(4) shall not be waivable under the procedures of Article VII of the Site Plan Review Regulations. [§5.1.E]

[Checklist begins on following page]

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(6) - Existing and proposed grades, including topographic contours with spot elevations, (referenced to USGS or FEMA Flood Insurance Rate Map datums, as appropriate) prepared by a professional engineer or land surveyor licensed in NH. (Where grades are less than 20%, contours shall be at 2 ft. intervals; otherwise they shall be at 5 ft. intervals.)	☒	☐
5.1.E(7) - Shape, size, height, and location of all existing structures located on site and within 200 feet of site.	☒	☐
5.1.E(7) - Elevation views indicating shape, size, height, and location of all proposed structures, including expansions of or additions to existing buildings. Such elevation views shall provide sufficient detail to allow for review by the Board and City staff of the adequacy of proposed access and egress points, walkways, lighting, and other site-related improvements.	☒	☐
5.1.E(8) - Location of existing natural features such as streams, marshes, lakes, ponds, wetlands, rock outcrops, or wooded areas, and existing man-made features such as roads and structures. Indicate those natural and man-made features that are to be removed, retained, or altered.	☒	☐
5.1.E(8) - Wetlands on the property, if any, shall be delineated by a NH Certified Wetlands Scientist, whose seal and signature shall appear on the plan. Documentation in the form of U.S. Army Corps of Engineers New England District Wetlands Delineation Data Sheets and/or other field notes and materials concerning the delineation shall be submitted.	☒	☐
5.1.E(9) - Zoning District, Tax Map and Lot number, and use of abutting properties within 200 feet of property.	☒	☐
5.1.E(9) - Location of streets, pedestrian paths/trails, and bicycle routes within 200 feet of the site boundary; and the location of curb cuts and vehicle accesses within 200 feet of the site boundary.	☒	☐
5.1.E(10) - Proposed streets, driveways, emergency vehicle accesses, parking spaces, and sidewalks, with indication of dimensions and direction of travel. Show required sight distances at curb cuts and dimensions for the inside radii of all curves.	☒	☐
5.1.E(10) - Vehicle and bicycle parking spaces shall be numbered.	☒	☐
5.1.E(10) - Loading spaces and facilities used in connection with any structures on the site shall be shown	☒	☐
5.1.E(10) - Total square footage and percentage of the lot covered by impervious cover shall be shown.	☒	☐
5.1.E(11) - Parking area safety measures including raised crosswalks/speed tables, signage, walkway lighting, striping and similar markings such as dedicated pedestrian/bicycle crossings and lanes through parking areas, fire lanes, compact and/or electric vehicle parking/charging, parking wayfinding, ADA signage and access aisles.	☒	☐
5.1.E(12) - Size and location of all existing and proposed public and private utilities. (Note: the applicant is encouraged to submit a Sewer Use Permit Application and obtain a Notice of Permitted Allocation, and to obtain a Water Use Permit prior to submission of the Site Plan Review application.)	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
<u>5.1.E(13)</u> - Plan for outdoor lighting showing proposed location, mounting height, fixture type, lamp type, color correlated temperature (CCT), and wattage of all exterior free-standing lighting or building-mounted fixtures.	☒	☐
<u>5.1.E(13)</u> - Analyses and illuminance-level diagrams, to include average and minimum foot-candle measurements, showing that proposed installation conforms to the lighting-level standards in Site Plan Review Regulations.	☒	☐
<u>5.1.E(13)</u> - Manufacturer's specification information for each proposed light fixture and lamp (NOTE: This information may be provided on the plan or as a separate attachment).	☒	☐
<u>5.1.E(13)</u> - Drawings of all relevant building elevations showing location and height of all building-mounted fixtures, illumination levels of walls or architectural features, and aiming points for any remote light fixtures.	☒	☐
<u>5.1.E(14)</u> - Plan for location of free-standing or building-mounted signs, including location, mounting, aiming, and shielding of any remote light fixtures for externally-lit signs.	☒	☐
<u>5.1.E(14)</u> - For internally-lit signs, relevant information concerning the method of illumination and the opacity of the sign background, showing that the proposed installation conforms to the requirements of the Regulations.	☒	☐
<u>5.1.E(15)</u> - 100-yr flood elevation, floodway, and floodplain limits, where relevant.	N/A	☐
<u>5.1.E(16)</u> - Landscaping plan showing proposed new plantings to be installed and existing natural vegetation to be retained. Plan shall show in detail the number, size (height and/or caliper), and species (botanical and common names) of all proposed shrubs and trees.	☒	☐
<u>5.1.E(16)</u> - Existing trees over 12 inches in diameter (measured 4.5 feet above ground surface) within 25 feet of the disturbed area, must be counted and shown on the plan, if included towards fulfilling landscaping requirements.	☐	☒
<u>5.1.E(16)</u> - Calculations for square footage of perimeter landscaping.	☒	☐
<u>5.1.E(16)</u> - Parking lot shading calculations shall be provided by depicting new trees and shrubs at 10-year crown size.	☒	☐
<u>5.1.E(17)</u> - Existing and proposed surface and subsurface storm drainage facilities, including City storm drainage facilities located within 200' of site.	☒	☐
<u>5.1.E(17)</u> - Plans for retention, detention, slow release, and treatment of storm water shall be provided, where necessary.	☒	☐
<u>5.1.E(17)</u> - Drainage plans prepared by a professional engineer registered in NH, whose seal and signature shall appear on plan(s).	☒	☐
<u>5.1.E(18)</u> - Section 6.6. Stormwater Management submission requirements.	See Stormwater Checklist	
<u>5.1.E(19)</u> - Plans for snow removal and storage.	☒	☐
<u>5.1.E(20)</u> - A plan for the development showing provisions for automobile, transit, bicyclist, and pedestrian access and circulation. Such plan shall show both existing and proposed means of access to the site including connections with, public streets, sidewalks, transit stops, and formal paths/trails. Plans shall include any traffic calming and traffic control devices necessary in conjunction with the site development, as well as the location of all existing transit routes and transit stops located or passing within 1/4 mile (1,320 feet) of the property.	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(21) - Construction detail drawings including, but not limited to, pavements, walks, steps, curbing, drainage structures, water and/or sewer utilities, ground-mounted signage (e.g., fire lanes, ADA parking, commercial), surface treatments, transit shelters, energy generation units (e.g., solar), bike rack style, electric vehicle charging, outdoor lighting, outdoor furniture, retaining walls, tree boxes and other site systems or structures. Accompanying specifications and cutsheets may be required.	☒	☐
5.1.E(21) - Where applicable, roadway, drainage, water and sewer utility profile drawings shall be provided at a scale of 1"=40 feet (horizontal) and 1"=4 feet (vertical) and typical cross-section drawings shall be provided at a scale of 1"=5 feet (horizontal and vertical), unless prior approval is granted by the City Engineer.	☒	☐
5.1.E(22) - Depict any current and proposed easements, rights-of-way, and deed restrictions including those related to sewer, electrical utility, shared access, etc.	N/A	☐
5.1.E(23) - For multi-family structures, plans for on-site recreational facilities.	☒	☐
5.1.E(24) - Plans for fire protection including emergency vehicle turn radius diagrams, if requested by the Lebanon Fire Department.	☒	☐
Supporting Documents and Information, Where Applicable	Info. Provided	Not Applicable
5.1.G(1) - An estimated timetable, to include phasing schedules, for construction and completion of buildings, parking, facilities, landscaping, and other required improvements.	☒	☐
5.1.G(2) - Any development estimated to generate a net increase of 100 peak hour trips or 1,000 average daily trips (based upon the most current edition of the ITE Trip Generation Manual) shall prepare and submit a Traffic Impact Study in accordance with standard traffic analysis conventions as set forth by the NHDOT. The Board may, at its discretion, require the submission of a Traffic Impact Study for developments estimated to generate less than 100 peak hour trips or 1,000 average daily trips if the Board has reason to believe such development could adversely affect levels of service or have other adverse impacts.	☒	☐
5.1.G(3) - Written requests for waivers from all applicable provisions of these Regulations shall be provided pursuant to Article VII - "Waiver Procedure". (note: use <i>Application for Waivers form</i>).	☒	☐
5.1.G(4) - For multi-family dwelling developments and mixed-use developments resulting in a net increase of 50 dwelling units or more, the application shall include the information and impact statements identified in Section 6.9.B.	Pending	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE V OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: _____

**CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST**

CITY OF LEBANON, NH STORMWATER REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: 402 Mt Support Rd Residential Development	
APPLICANT: Mount Support Development, LLC	DATE: 11/08/2021

NOTE: Stormwater plans shall include the information described below pursuant to Article VI of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning Office.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§6.6.I]

[Stormwater checklist begins on following page]

**CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
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[illegible]

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
g. Plan references and notes (including sequence of soil disturbance) h. Proposed and existing public and private utilities i. Proposed project components to become property of or the responsibility of the City shall be labeled as such j. Existing and proposed impervious cover, with areas used to calculate effective impervious cover (EIC, as defined herein) clearly identified and the square footage of each type identified and labeled. k. Test Pit(s) locations and data where stormwater practices are proposed, as appropriate. l. Details of individual design elements shown on separate plan sheets following the Proposed Conditions SMP. The Existing Conditions SMP & the Proposed Conditions SMP shall be provided on sheets no larger than 24" x 36", at a scale of one (1) inch = 20 feet for urban areas, and one (1) inch = 40 feet for non-urban areas. The City Engineer will make the final determination as to the appropriate scale, ensuring that all important site and hydrologic features are easily recognized. If plan shall encompass more than two (2) sheets, at the required 1:40 or 1:20 scale, a separate large scale representation plan sheet (e.g. 1:100) is required to be provided, so as to show entirety of site, as well as off-site contributing areas.	☒ ☒ ☒ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐ ☐
6.6.C.2 - In addition to the above described SMP plan sheets, the following SMP supplemental information is required: 1. A drainage analysis that includes calculations comparing pre- and post-development stormwater runoff rates (cubic feet per minute) and volumes (cubic feet) based on a 1-inch rainstorm, and the 2-year, 25-year, 50-year, and 100-year, 24-hour frequency storms. Calculations shall include, but not be limited to, the sizing of all structures and BMPs, including sizing of emergency overflow structures based on the 50-year 24-hour frequency storm discharge rate, with 1-foot of free-board. Storm rates shall be based on current design depths from the Northeast Regional Climate Center - http://precip.eas.cornell.edu. <i>Any site that was primarily wooded in the last five years shall be considered undisturbed woods Any site from which wooded vegetation has been removed within 5 years prior to the first submission to the planning board with respect to a proposed development, or upon which, at some earlier time, clearing has occurred in anticipation of development, shall be treated as undisturbed woodland for purposes of calculating pre-development runoff volumes. For purposes of this paragraph any tree cutting which occurred without leaving stands of healthy, growing trees within areas near waters and highways, as required by RSA 227-J:9, I, shall be presumed to have occurred in anticipation of development</i>	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
2. A drainage analysis results summary tabulated (pre & post) for each proposed outfall or catchment outlet point including runoff rates and volumes for each storm event analyzed above.	☒	☐
3. An Erosion and Sediment Control Plan for all proposed construction activities in accordance with the NH Stormwater Management Manual Volume 3, (December 2008 or current revision; downloadable from the website)	☒	☐
4. A comprehensive Operation and Maintenance Plan for long-term maintenance of all proposed stormwater management elements and BMPs including the proposed schedule of inspections and anticipated maintenance (see section H.2 Operations & Maintenance Plan for detailed requirements).	☒	☐
<u>6.6.D</u> - Phased Development: For phased developments, the plans and calculation requirements under this section (6.6) shall apply as though the development of the entire parcel were being proposed in one single application. The review and approval process for phased development applications is provided in section 4.9 of the Lebanon Site Plan Regulations.	☐	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE VI OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: Nicholas A. Fiore

(Last Revised 04/19/2021)

Planning office Use Only:

Date Received ___/___/___ Checklist Complete YES or NO Checked by: _____



MEMO

208 Flynn Avenue, Suite 2A, Burlington, VT 05401 • Tel: 802-863-6225
85 Mechanic Street, Suite E2-3, Lebanon, NH 03766 • Tel: 603-442-9333
414 Union Street, Schenectady, NY 12305 • Tel: 518-630-9614

Date: December 13, 2021

To: Tim Corwin, Senior Planner and Zoning Administrator
City of Lebanon Planning & Development Department

From: Nik Fiore

Re: PB2021-32-SPR
Site Plan Review Application – Section 6.9.B
402 Mt Support Rd Residential Development
Tax Map 24 Lots 9 & 10

Dear Mr. Corwin,

On behalf of Mt Support Development, LLC and pursuant to Lebanon's Site Plan Review Regulations Section 6.9.B, the following statements are provided to demonstrate the effects of the proposed development.

1. *Statement of impact of the proposed development on natural resources and environmental quality including, but not limited to, water quality, air quality, wetlands, soil erosion and agricultural soils and a statement of pollution control and environmental impact mitigation measures.*

The Project is within close proximity to jobs and services while also having strong pedestrian and public transportation connections. Residents will be less dependent on automobiles- having the ability to walk, bike, or take the bus to work to reduce their environmental footprint.

A priority of the project design is to avoid wetland impacts. This was accomplished by making the development area as compact as possible and by adding significant lengths of walls around the perimeter of the development area to avoid filling the wetlands. The wetlands within the subject properties were delineated by Audra L. Klumb, NH Certified Wetland Scientist #222 of A&D Klumb Environmental, LLC, Webster, NH, in September 2021, and are classified as Medium-Low Value in the Lebanon Natural Resources Inventory

The Natural Resources Inventory also identifies a wildlife corridor south of the project site. The development's design conserves the integrity of this corridor by keeping the southern limits of the site work as far north as possible.

Throughout construction a stormwater pollution prevention plan will be implemented, monitored, and maintained in accordance with the EPA's National Pollutant Discharge Elimination System.

2. *Capacity of the school system; effect on school bus transportation and distance of the proposed subdivision from the nearest elementary school.*

The development is approximately 1.5 miles from Hanover Street School. Please see the enclosed "*Fiscal Impact Analysis, 392 - 402 Mt. Support Road, Lebanon, NH, December 9, 2021*" by Fougere Planning & Development for statements on the impacts to the school system.

3. *Adequacy of streets and/or sidewalks in the general area of the development including major intersections providing access, and such other areas as requested by the Board.*

Please refer to the Traffic Impact Assessment by VHB provide in this project's Site Plan Review application package.

4. *Sufficiency, availability and capacity of utility services to provide water, fire protection, and sewer, and further, the impact of the development on the municipal solid waste disposal facilities.*

An application for sewer allocation was submitted to the City in 2020, and an updated version was submitted on December 3, 2021. According to conversations with Brian Vincent, City Engineer, the City's model runs have shown that capacity exists and that official allocation will be made once he receives the payment for 20% of the Sewer Development Charge. A check for the fee was FedEx'd from Mount Support Development, LLC to Mr. Vincent on Friday, December 10, 2021.

Mr. Vincent also does not expect there to be any issues with the City's water supply system to provide domestic and fire protection flows. The model of the City's water system is being checked to confirm, and Mr. Vincent will supply the project team with water pressure numbers in the project area for use in designing the building's sprinkler systems.

The site will have four (4) six-yard dumpsters, one for each building. Anticipated trash pick-ups are twice per week during building fit-outs and once per week thereafter.

5. *(If applicable) The impact of on-site subsurface sewage disposal systems as to adjacent wells, water supply systems, and any known aquifers so designated by the United States Geological Survey.*

Not applicable.

6. *Any special fire, police and public safety problems due to location and/or special conditions related to the site's proposed type of use.*

City of Lebanon Planning & Development Department
PB2021-32-SPR, Site Plan Review Application – Section 6.9.B
December 13, 2021
Page 3 of 3

Lebanon's Police Department and Fire Department raised no concerns during reviews with the project team.

7. *Impact of storm drainage from the development on abutting properties and potential storm drainage problems both on the site of the development and downstream from the development.*

The development's stormwater management system is designed in accordance with City of Lebanon and NHDES Alteration of Terrain (AoT) regulations.

The project will redevelop approximately 6.86 acres and add approximately 4.27 acres of impervious area. Stormwater treatment and mitigation will be accomplished through construction of a gravel wetland system and detention system as indicated on the plans. These systems will treat the site's stormwater the detain it for slower release.

The project site is within a sub-watershed area formed by Mount Support Road, Lahaye Drive, Route 120, and Memorial Drive/Bassy Street. This area is approximately 181 acres, of which approximately 108 acres are wetlands. Redevelopment of a relatively small portion of this area will have a negligible impact on area downstream of the system.

8. *Fiscal impact statement analyzing the impact of the development on municipal, school and county revenues and expenditures, including estimated potential tax revenue and estimated number of school children.*

Please see the enclosed "Fiscal Impact Analysis, 392 - 402 Mt. Support Road, Lebanon, NH, December 9, 2021" by Fougere Planning & Development for relevant statements.

Please accept this information as sufficient to satisfy Section 6.9.b. Thank you for your time and consideration with this project. Please do not hesitate to call or email if you have any questions or need additional information.

Sincerely,
ENGINEERING VENTURES, PC



Nicholas A. Fiore, PE
Project Manager/Principal

Cc: Ken Braverman, The Braverman Company
Dick Anagnost, Anagnost Investments

Fiscal Impact Analysis

392 - 402 Mt. Support Road
Lebanon, NH
December 9, 2021



FOUGERE PLANNING & DEVELOPMENT, Inc.
Mark J. Fougere, AICP

253 Jennison Road Milford, New Hampshire 03055
phone: 603-315-1288 email: Fougereplanning@comcast.net

FISCAL IMPACT ANALYSIS

392 – 402 Mnt. Support Road
Lebanon, NH

December 9, 2021

1. Introduction

Fougere Planning and Development has been engaged by Mount Support Development, LLC (herein referred to as “Developer”) to undertake this Fiscal Impact Analysis to outline potential General Fund property taxes and revenue increases, as well as demand for service impacts to the City of Lebanon from the proposal to develop 204 workforce apartments units with a mixture of one, two and three bedroom units as outlined in Table One (herein referred to as the “Project”). The proposed project will greatly assist the community to address the ongoing critical affordable housing crisis impacting the upper valley. These housing units will be targeted to those individuals who are at or below 60% of the areas median income. The apartment units will provide much needed housing to both young and old individuals, along with families in a location that is close to the regions largest employers, has access to public transportation and has existing bike-ped connectivity.

Table One
Apartment Unit Profile

	Units
One Bedroom	120
Two Bedroom	72
Three Bedroom	12
Total	204

The Project will be constructed on a 14.2 acre property located at 402 Mount Support Road. These units will be located in four, 3-story buildings and will include both surface and covered parking areas.

All on site drives and trash pickup will be privately maintained by the project owner; public water and sewer will service the property.

This Report will address a number of municipal impacts as required in Lebanon's Subdivision Regulations Section 12.3, B. Areas of Study and Information:

2. Capacity of School System; effect on school bus transportation and distance of the proposed subdivision from the nearest elementary school.

6. Any special fire, police, and public safety problems due to the location and/or special conditions relative to the type of use.

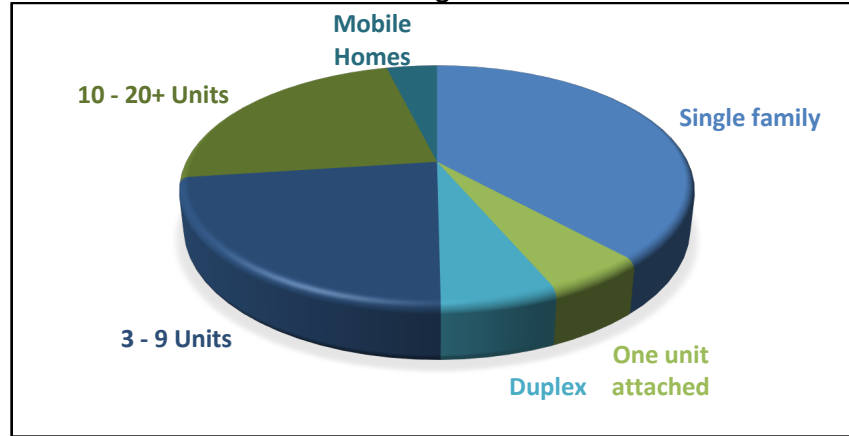
8. Fiscal impact statement analyzing the impact of the subdivision on municipal, school and county revenues and expenditures, including estimated potential tax revenue and estimated number of school children.

2. Regional and Local Trends

Census figures report that from 2000 to 2010 Lebanon's population increased from 12,568 to 13,151 over the 10 year period. The 2020 Census reports Lebanon's population to be 14,282, a 8.6% increase since 2010.

Approximately 38.1% of Lebanon's housing stock consists of single family homes, with the Census data reporting 2,552 single family homes out of a total housing stock of 6,689 units as outlined in Figure One.

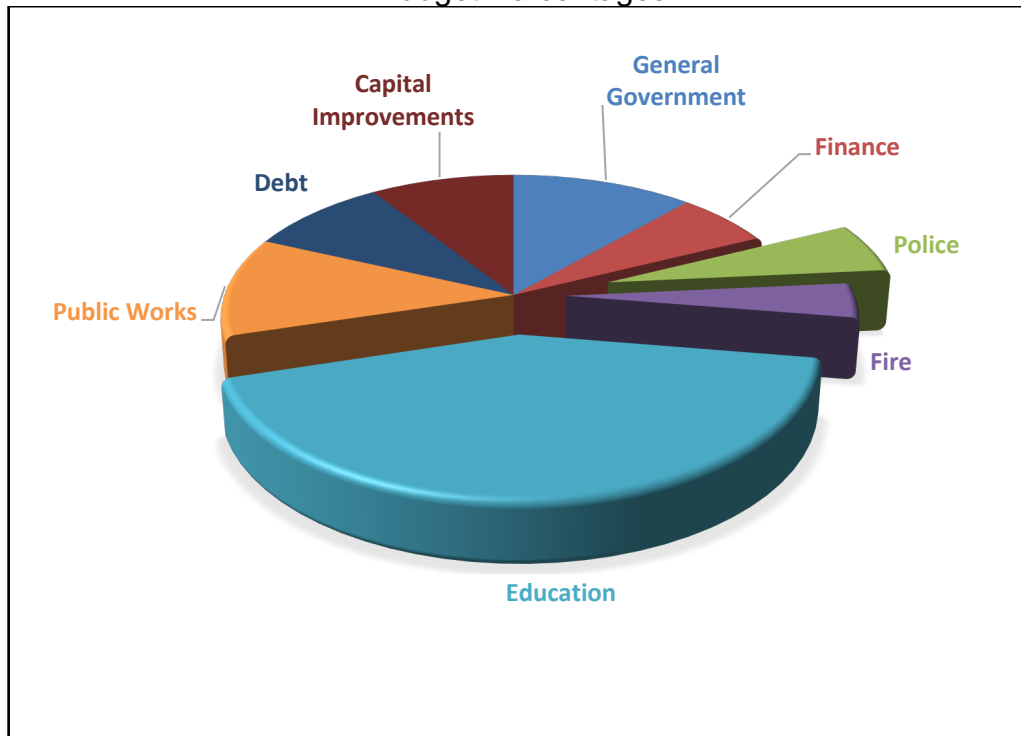
Figure One
Housing Stock



3. Budgets

As outlined in Figure Two, education is the largest municipal budget line item, followed by the emergency service departments. Based on case studies of comparable properties, given the proposed use of the Project, cost impact considerations will be focused primarily on emergency service departments, along with the school department.

Figure Two
Budget Percentages



4. Fiscal Methodology Approach

Fiscal Impact Analyses can have many connotations, this analysis will follow the classic definition of fiscal impact as follows *“A projection of the direct, current public costs and revenues associated with residential or nonresidential growth to the local jurisdiction in which the growth is taking place¹.”*

There are a number of methodologies that are used to estimate fiscal impacts of proposed development projects. The Per Capita/Unit Multiplier Method is the most often used analysis to determine municipal cost allocation. This method is the classic “average” costing method for projecting the impact of population growth on local spending patterns and is used to establish the costs of existing services for new development. The basic premise of this method is that current revenue/cost ratios per person and/or per unit is a potential indicator of future revenue/cost impacts occasioned by growth. The advantage of this approach is its simplicity of implementation; however, the downside of this approach is that the methodology calculates the “average” cost as being the expected cost, which is often not the case, and costs can be exaggerated—in some cases significantly. For most new land uses, many department budgets are not measurable impacted in any long term way.

The Marginal Cost Approach is an alternative methodology that can be used to estimate and measure developmental impacts based on actual costs that occur in the community. At this time, a “level of service” exists in Lebanon to serve the community. This existing service level, for the most part, addresses the needs of the community through existing tax collections. As new development occurs, pressures are placed on some departments to address increased demands, while other departments see little, if any measurable impacts. In reviewing the potential impacted departments specifically, a truer picture of anticipated costs impacts can be determined. For this analysis, we will apply both the Average Cost and Marginal Cost Approach methodologies to review municipal service demand cost increases.

¹ Burchell.

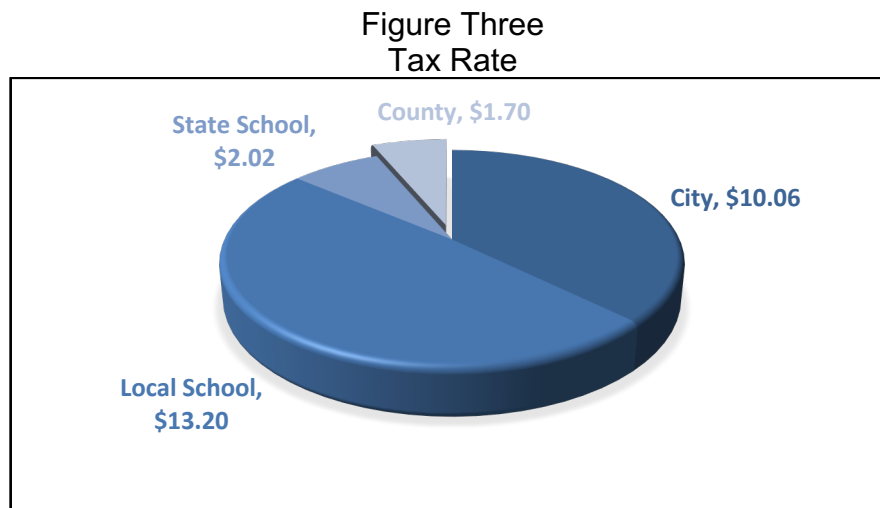
Given the nature of the proposed Project, as will be seen by the analysis below, few significant impacts will be felt by most City departments. Solid waste generated by the project will be removed by a private hauler. Any water and sewer expenses will be offset through user fees. All onsite driveways will be private and all maintenance expense will be paid for by the project owner. This is not to infer that no costs will occur as a result of this project. Measurable operational influences will be felt by a few departments, most noticeable the Police/Fire and School Departments.

The Report will outline General Fund revenues and municipal service costs. All data, tax rates and costs are assumed to be in FY2021. It should be noted the costs outlined are “estimates” and no actual costs will be realized without review and approval by appropriate department heads, administrators and City elected officials. It is likely that few real costs will be realized from this development.

5. Local Revenues

A) Property Taxes

Local property taxes provide the bulk of municipal revenues for New Hampshire communities. The 2021 total Tax Rate for Lebanon is \$26.98. Figure Three outlines the breakdown of the various components of the tax rate.



The project development group is in discussions with New Housing Finance Authority relative to providing funding through the issuance of tax-exempt bonds, 4% low-income housing tax credits, as well as capital subsidies available through the State of New Hampshire. The applicant, Anagnost Investments, has used these programs elsewhere in the State to construct 100% affordable housing units including a 152 unit complex in the City of Nashua. Based on these experiences, it is anticipated that the proposed complex will have a assessed value of \$75,000 a unit, translating to a total project value estimated to be \$15,300,000. As a local comparison of value, the applicant owns Altaria apartment complex which consist of 153 market rate units which is presently assessed for \$150,289 per unit. As the proposed site will be 100% affordable, a lower property assessment will result.

Based upon the estimated assessment of \$15,300,000, as outlined in Table Two, we believe the development will generate \$412,794 in annual property tax payments, with \$153,918 being paid in local City property taxes and \$232,866 generated in school property taxes (\$386,784 total local taxes). The existing property generates \$9,272 in total tax payments.

Table Two Estimated Property Tax Revenue					
Units	Total Value	City Revenue	School Revenue	County Revenue	Total Taxes
204	\$15,300,000	\$153,918	\$232,866	\$26,010	\$412,794

Another source of potential revenue to the community is from vehicle registrations; Lebanon is anticipating \$2,500,500 in vehicle registrations in 2020. Table Three outlines the projected motor vehicle permit fee revenue stream for the proposed project.

Table Three Motor Vehicle Permit Fees	
246 vehicles ² x \$12,000	
x \$12/\$1,000 =	\$35,424

² 1 vehicle per one bed, 1.5 per 2 & 3 bedroom.

Total estimated project revenues total \$422,208 as outlined in Table Four.

Table Four	
Total Estimated Local Revenues	
Local Property Taxes	\$386,784
Motor Vehicle Fees	\$35,424
Total	\$422,208

6. Municipal Service Costs

Police & Fire

The Police and Fire Departments are projected to experience some measurable impact from the proposed project. For fiscal year 2021, the Police Department budget was \$6,220,120 and the Fire Department budget was \$4,334,960. To assess the degree of impact this Project would have on these departments, emergency calls to similar apartment developments in New Hampshire were analyzed. As emergency calls are a reliable metric that provides a more realistic measure of demand for service, we will use this average costing method to allocate costs to the apartment use. Emergency call data was obtained from New Hampshire police and fire departments and averaged to determine the numbers of annual calls per unit. These ratios were then totaled to derive a total average call volume per unit, which was then used to generate projected emergency calls for each Department; Table Five.

Extrapolating from the comparable call data, increases in call volume are projected to the City's Police and Fire Departments. Annual Police calls are projected to increase by 75 new calls per year (1.4 calls per week, Department 2020 Calls: 25,000), annual fire calls are projected to increase by 20 new calls (10 fire/10 EMS) per year (.38 calls per week, 3,529 total department calls in 2020).

Table Five
Average Calls: Police-Fire-EMS

Project	Town	Units	Avg. Police Call Per Year	Avg. Call Per Unit	Projected Calls
Herritage on the Merrimack	Bedford	240	79	0.33	
Bowers Landing	Merr.	104	117	1.13	
Bay Ridge	Nashua	412	129	0.31	
Royal Crest	Nashua	902	388	0.43	
Boulder Park	Nashua	482	62	0.13	
Tara Meadows	Somersworth	270	105	0.39	
Totals		2,410	881	0.37	
Projected Calls	Apartments	204		0.37	75
Project	Town	Units	Avg. Fire Calls Per Year	Avg. Call Per Unit	Projected Calls
Heritage on the Merrimack	Bedford	240	3.00	0.013	
Bowers Landing Apts..	Merr.	104	2.33	0.022	
Bay Ridge Apts.	Nashua	412	31.67	0.077	
Royal Crest Apts.	Nashua	902	65.67	0.073	
Boulder Park Apts.	Nashua	482	6.33	0.013	
Tara Meadows	Somersworth	270	6.00	0.022	
Totals		2,410	115	0.048	
Proposed Apt.		204		0.048	10
Project	Town	Units	Avg. EMS Call Per Year	Avg. Call Per Unit	Projected Calls
Heritage on the Merrimack	Bedford	240	15.33	0.064	
Bowers Landing	Merrimack	104	6.67	0.064	
Bay Ridge	Nashua	412	23.67	0.057	
Royal Crest	Nashua	902	46.67	0.052	
Boulder Park	Nashua	482	13.33	0.028	
Totals		2,140	105.67	0.05	
Proposed		204		0.05	10

Police Department

Based upon past discussions with Captain Tim Cohen of the Lebanon Police Department, he noted that a single project, by itself, is not of great concern as it relates to increased call demands, but the combination of all new development that is occurring in the community will place further demands on the department over time. In addition, traffic accidents in the area may increase as a result of the additional population in the area.

The average cost of a police officer in Lebanon, with benefits, ranges from \$110,000 to \$120,000 a year. To assign some cost to the community from the proposed new land use, we have calculated an average cost per call of \$249 and based on the estimated call volumes, as detailed in Table Six, a cost of \$18,675 is derived.

Table Six
Fire Department Impact

Department	FY 2021 Budget	Yearly Calls	Cost/call	Est. Calls	Annual Cost
Police	\$6,220,120	25,000	\$249	75	\$18,675

This cost estimate is not inferring the Police Budget will increase as a result of the proposed development, but assigns a “cost” to account for this expanded land use in the community.

Fire Department

A projected increase of 20 new calls (10 fire/10 EMS) are anticipated for the Fire Department. Based upon past discussions with Fire Department Staff, they noted similar comments as Captain Cohen. Projects similar to the one proposed, when combined with other proposed developments in the community will increase demands on the Department. In addition, it is anticipated that increased vehicle accidents may occur in the area as a result of these new residents. The average cost of a fire fighter with benefits is \$110,000. As with the police department, as outlined in Table Seven, we have used cost averaging to estimate a \$24,580 impact on the Fire Department.

Table Seven
Fire Department Impact

Department	FY 2020 Budget	Yearly Calls	Cost/call	Est. Calls	Annual Cost
Fire	\$4,334,960	3,529	\$1,229	20	\$24,580

It should be noted that EMS services is a revenue generator for the City and in FY2021 Budget, an estimated \$830,000 in revenue is anticipated. As such,

costs associated with EMS calls to the subject site will be somewhat mitigated by the EMS revenues.

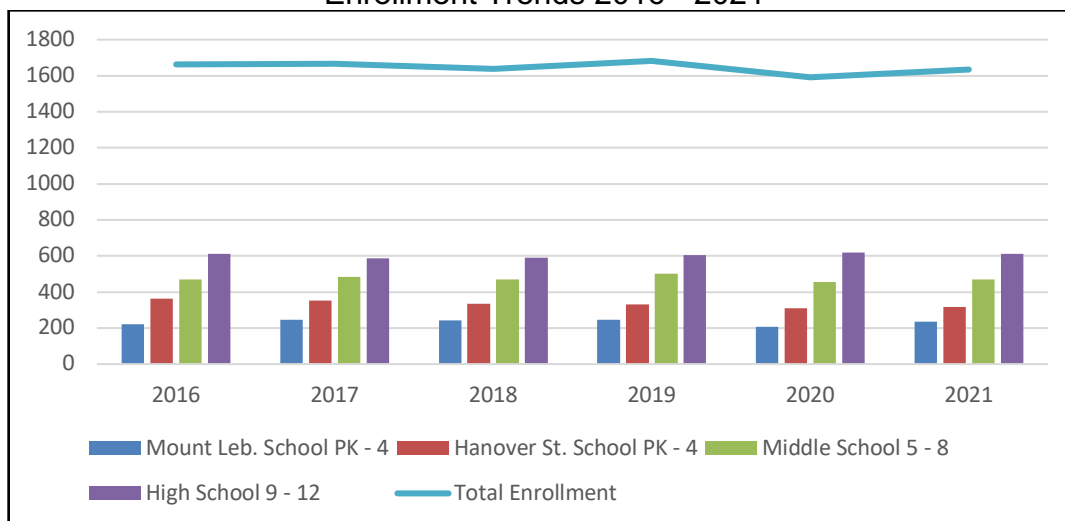
School Department

Table Eight and Figure Four outline enrollment trends within the Lebanon School District since 2016. Overall enrollments have remained flat over the last six year and all schools are well within their building capacity³. The Hanover Street School has seen the largest decline in enrollment of 13.1%, which will be the elementary school for the subject site's students. Overall enrollment has declined by 1.8% during this six year time period.

Table Eight
School Enrollment 2016 - 2021

School	2016	2017	2018	2019	2020	2021	% Change	Capacity
Mount Leb. School PK - 4	221	246	243	245	208	236	6.79%	310
Hanover St. School PK - 4	364	351	334	331	310	316	-13.19%	383
Middle School 5 - 8	468	483	470	500	454	469	0.21%	600
High School 9 - 12	611	586	591	606	619	613	0.33%	720
Total Enrollment	1,664	1,666	1,638	1,682	1,591	1,634	-1.80%	2,013

Figure Four
Enrollment Trends 2016 - 2021



³ City of Lebanon Impact Fee Update Oct. 2021.

As noted above, the Project will involve the construction of 204 housing units. Any elementary students who reside at the proposed complex will attend the Hanover Street Elementary School which is 1.2 miles from the site. To estimate the number of School Age Children (SAC) that may reside within the residential community, we relied upon the recently completed Impact Fee Update Report prepared by BCM Planning⁴. Based upon SAC ratios calculated per 1,000 square feet of living area for non-single family housing units, an estimated 21 SAC may reside with the proposed complex as summarized in Table Nine.

Table Nine
School Age Children Ratios

	#	Sq. Ft. / Unit	Total Sq. Ft.	Enrollment Per 1,000 Sq. Ft.	SAC
One Bedroom	120	766	91,920		
Two Bedroom	72	978	70,416		
Three Bedroom	12	1,237	14,844		
Total	204		177,180	0.120	21

Using these same SAC ratios, the anticipated grade breakdown of these 21 students is outlined in Table Ten.

Table Ten
Estimated Enrollment Breakdown

Elementary	177,180	0.05	9
Middle	177,180	0.04	7
High School	177,180	0.03	5

To gain insight into the current state of Lebanon schools, we arranged a meeting with the School Superintendent as well as other school staff members. The Superintendent noted that the planned improvements to Hanover Street School have been scaled back, as the original plan did not obtain voter approval. The updated program still involves a updating and modernization oriented improvement than expanding capacity. Classrooms are being proposed but they

⁴ City of Lebanon Impact Fee Update 2021, August 20, 2021, BCM Planning, LLC.

are geared towards addressing existing operational needs (special education) than capacity related issues. Other concerns at the School include sharing cafeteria space with the high school, the vehicle drop off area, office space and drainage. The Superintendent noted that the average cost of a teacher, with benefits, is estimated to be approximately \$110,000 annual. Ample capacity exists to accommodate the proposed students, including at the Hanover Elementary School which has seen a 48 student decline over the last six years. Although few new schools costs are anticipated, we will carry an expense of **\$55,000**, which would accommodate the cost of ½ a teacher's salary.

Other Departments

As noted previously, all areas within the development will be private (maintenance & refuse) and water/sewer expenses will be addressed through connection and user fees. The Project will also be paying Special Assessment District charges totaling \$58,166. Impact fee charges are anticipated to be \$517,583. Any costs to the Building Department will be offset by an estimated \$286,765 building permit fee. Given the unique type of development proposed no other measurable impacts are anticipated to other City departments. To be conservative, we will account for **\$10,000** potential miscellaneous City related costs.

County Impacts

As noted in Table One, we are estimating \$3,468 in County property tax revenue from this project. Grafton County oversees a number of services for the region including nursing homes, sheriff's department and the court system. Estimating new costs that may impact County services, with any confidence, would be extremely challenging and unreliable, therefore a estimated cost impact was not calculated for this analysis.

SUMMARYTable Nine
Fiscal Findings

Local Gross Local Property Taxes & Revenue		\$422,208
Municipal Costs		
	Police	-\$18,675
	Fire	-\$24,580
	Schools	-\$55,000
	Misl.	-\$10,000
Total Estimated Costs		-\$108,255
Net Negative Fiscal Impact		+\$313,953

Based upon the report's findings, gross yearly local property taxes and revenues generated by the proposed project are estimated to total \$422,208. The anticipated fiscal impact to the City is estimated to be \$108,255, resulting with a positive fiscal impact from the proposed development of approximately \$313,953. All anticipated costs are estimates and no definitive costs are reported. However, as schools are the most cost sensitive of all municipal departments, the noted costs for schools have a higher likelihood to occur than costs noted for other City Departments.

Key findings supporting this conclusion include:

- ✚ Calls to the Police Department are projected to increase by less than 1%.
- ✚ Calls to the Fire Department will realize less than a 1% increase in call volume.
- ✚ The proposed project will include private drives and trash collection.
- ✚ \$517,583 in impact fee payments will be made for fire, police, schools and recreation. In addition, Special Assessment District costs are estimated to total \$58,166.
- ✚ Full time jobs will be created managing the new apartment complex along with temporary construction jobs.



CONCEPTUAL RENDERING
– LOOKING SOUTHEASTERLY WITH BUILDING 1 IN FOREGROUND

BUILDING TABULATIONS:		TOTAL SQ. FT.
GARAGE PLAN		18,510
FIRST FLOOR PLAN GROSS AREA		13,148
SECOND FLOOR PLAN GROSS AREA		13,148
THIRD FLOOR PLAN GROSS AREA		13,148
TOTAL BUILDING AREA (3 FLOORS)		39,444
TOTAL BUILDING UNIT SPACE		44,831

UNIT COUNTS PER FLOOR:		
FIRST FLOOR		
(8)	ONE BEDROOM UNITS	766
(7)	TWO BEDROOM UNITS	978
(1)	THREE BEDROOM UNITS	1237
	TOTAL RESIDENTIAL	14,971
SECOND FLOOR		
(8)	ONE BEDROOM UNITS	766
(7)	TWO BEDROOM UNITS	978
(1)	THREE BEDROOM UNITS	1237
	TOTAL RESIDENTIAL	14,971
THIRD FLOOR		
(8)	ONE BEDROOM UNITS	766
(7)	TWO BEDROOM UNITS	978
(1)	THREE BEDROOM UNITS	1237
	TOTAL RESIDENTIAL	14,971

BURNELL

JOHNSON

ARCHITECTS

80 STARK STREET
(603) - 625-5098
(603) - 625-5167 FAX

MANCHESTER, N.H.
03101

BUILDING RENDERING

MOUNT SUPPORT RD

ANAGNOST INVESTMENTS #P1n

19 OCT 2021
1 NOV 2021

A-P1.01

DO NOT SCALE DRAWINGS. USE WRITTEN DIMENSIONS WHERE THERE ARE NO DIMENSIONS PROVIDED. CONSULT THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.

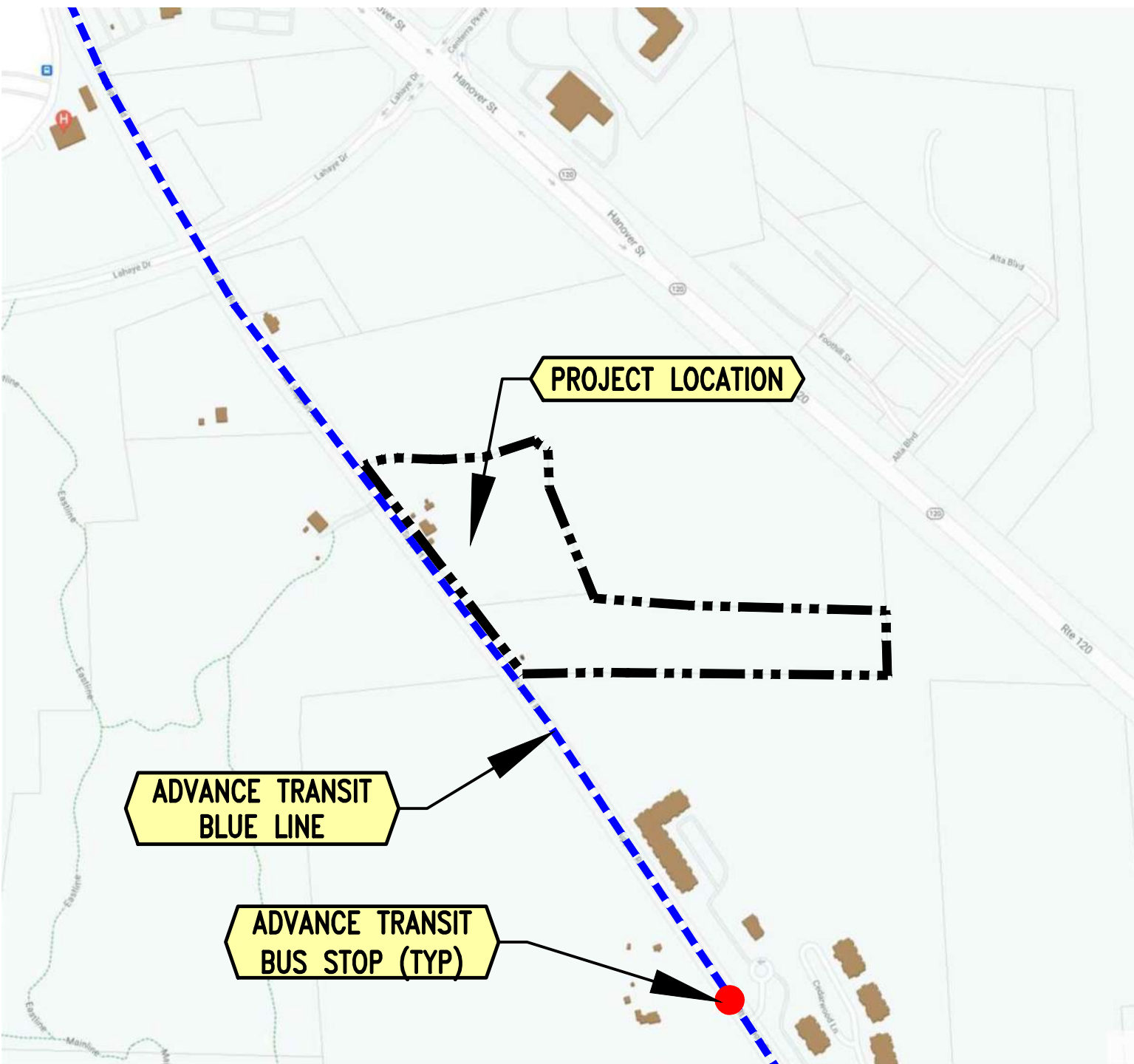


CONCEPTUAL RENDERING
– LOOKING SOUTHERLY WITH BUILDING 3 IN FOREGROUND

BURNELL		JOHNSON	
A R C H I T E C T S		A R C H I T E C T S	
80 STARK STREET (603) - 625-5098 (603) - 625-5167 FAX		MANCHESTER, N.H. 03101	
BUILDING RENDERING			
MOUNT SUPPORT RD			
ANAGNOST INVESTMENTS #Pin			
19 OCT 2021 1 NOV 2021		B-P1.01	

DO NOT SCALE DRAWINGS. USE WRITTEN DIMENSIONS WHERE THERE ARE NO DIMENSIONS PROVIDED. CONSULT THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.

402 MT. SUPPORT ROAD - RESIDENTIAL DEVELOPMENT SITE PLAN REVIEW



LEBANON GIS MAP

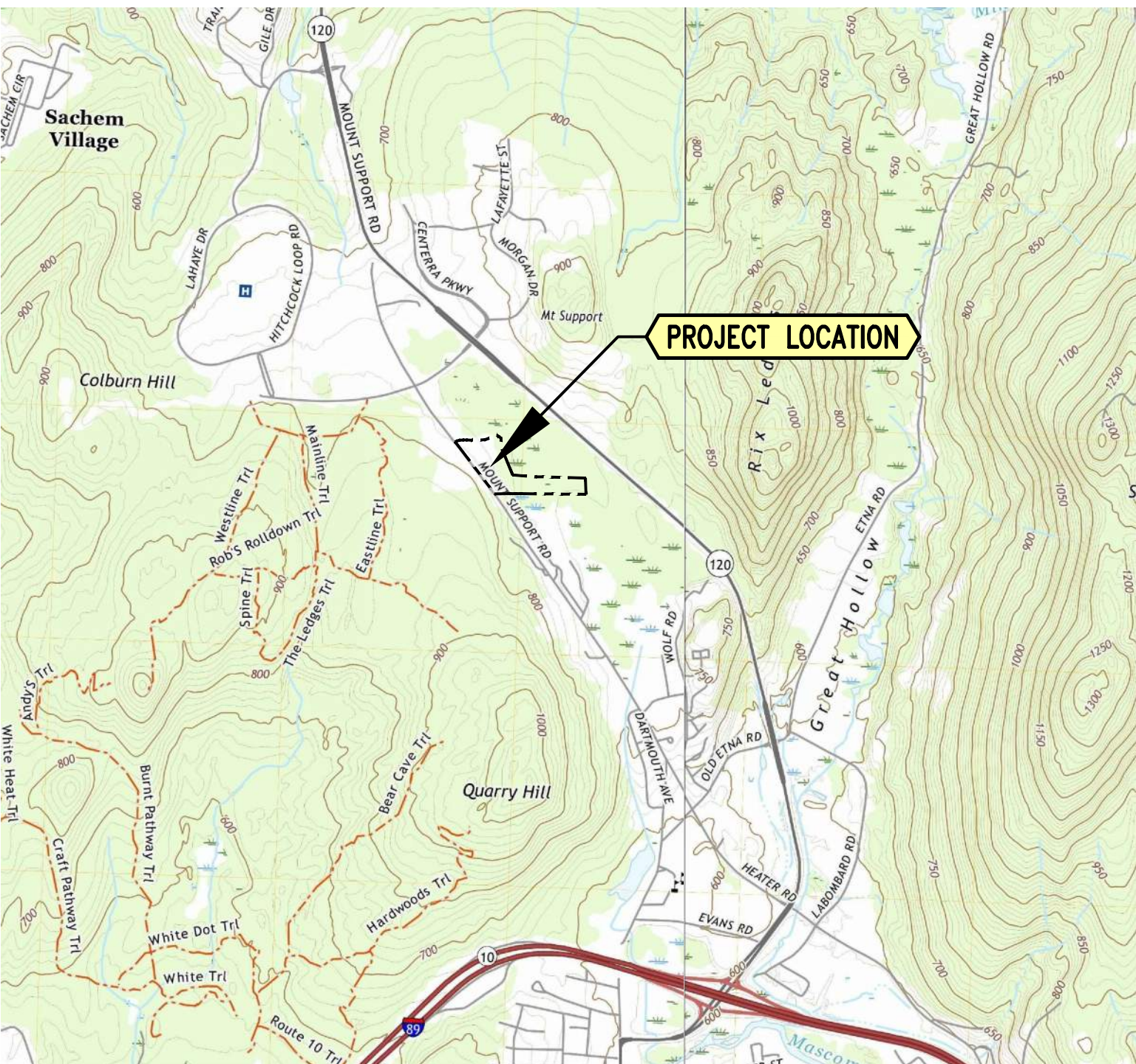
1"=500'

ZONING CHART

	Existing	Proposed	Notes
Zoning District	R1	R1	
Tax Map / Lot #	24 / 9 & 24 / 10	24 / 9	
Use	One-Family Dwelling	Multi-Family Dwelling	
Number of Dwelling Units	1 & 0	204	
Property Class	3	1	
Minimum Area of Lot	10,000 sf	14.14 acres	
Area of Lot (acres)	6.55 & 7.68	14.21	1
Building Footprints (sf)			
Building 1	1,190	20,233	2
Building 2	1,402	20,233	
Building 3	225	20,233	
Building 4		20,233	
Total Footprint	2,817	80,932	
Gross Floor Area (sf)			
Building 1 - Level 1	1,168	19,148	2
- Level 2	291	19,148	
- Level 3	0	19,148	
Building 2 - Level 1	0	19,148	
- Level 2	0	19,148	
- Level 3	0	19,148	
Building 3 - Level 1	0	19,148	
- Level 2	0	19,148	
- Level 3	0	19,148	
Building 4 - Level 1	0	19,148	
- Level 2	0	19,148	
- Level 3	0	19,148	
Total Gross Floor Area	1,459	229,776	
Building Heights	45' max.	45' max.	3
Building 1	20' +/-	44' 11"	2
Building 2	22' +/-	44' 11"	
Building 3		44' 11"	
Building 4		44' 11"	
Number of Stories	2	3	
Building Coverage Max	15%	25%	
Building Coverage	0.99%	13.07%	
Parking Spaces Required	2	306	4
Parking Spaces Provided	5+	390	
Loading Spaces	0	0	
Bicycle Spaces - Short-Term / Long Term	0	128	5
Impervious Area (sf)	8,870	196,111	
Impervious Area (% of lot)	3.0%	30.07%	
Setbacks - Required / Provided (ft)			
Front	25' /	20' / 20.6'	
Side	25' /	15' / 68.8'	
Rear	30' /	20' / 96.0'	
City Overlay Districts	Wetlands	Wetlands	
NHDES Shoreland Jurisdiction	NA	NA	
FEMA Flood Hazard Designation	Zone X	Zone X	6

Notes:

1. AREA OF LOT PER BOUNDARY SURVEY BY LATITUDE LAND SURVEYING
2. PROPOSED BUILDING AREA AND HEIGHT PER BRUNELL ARCHITECTS
3. PER SECTION 308.4 BUILDING HEIGHTS OF UP TO 55' ARE ALLOWED BY CONDITIONAL USE PERMIT
4. SEE PARKING SUMMARY TABLE FOR ADDITIONAL PARKING TALLY INFORMATION
5. ALL BICYCLE PARKING IS IN GARAGE. SHORT-TERM AND LONG-TERM SPACES ARE INTERCHANGEABLE
6. PER FEMA ZONE X IS AN AREA OF MINIMAL FLOOD HAZARD

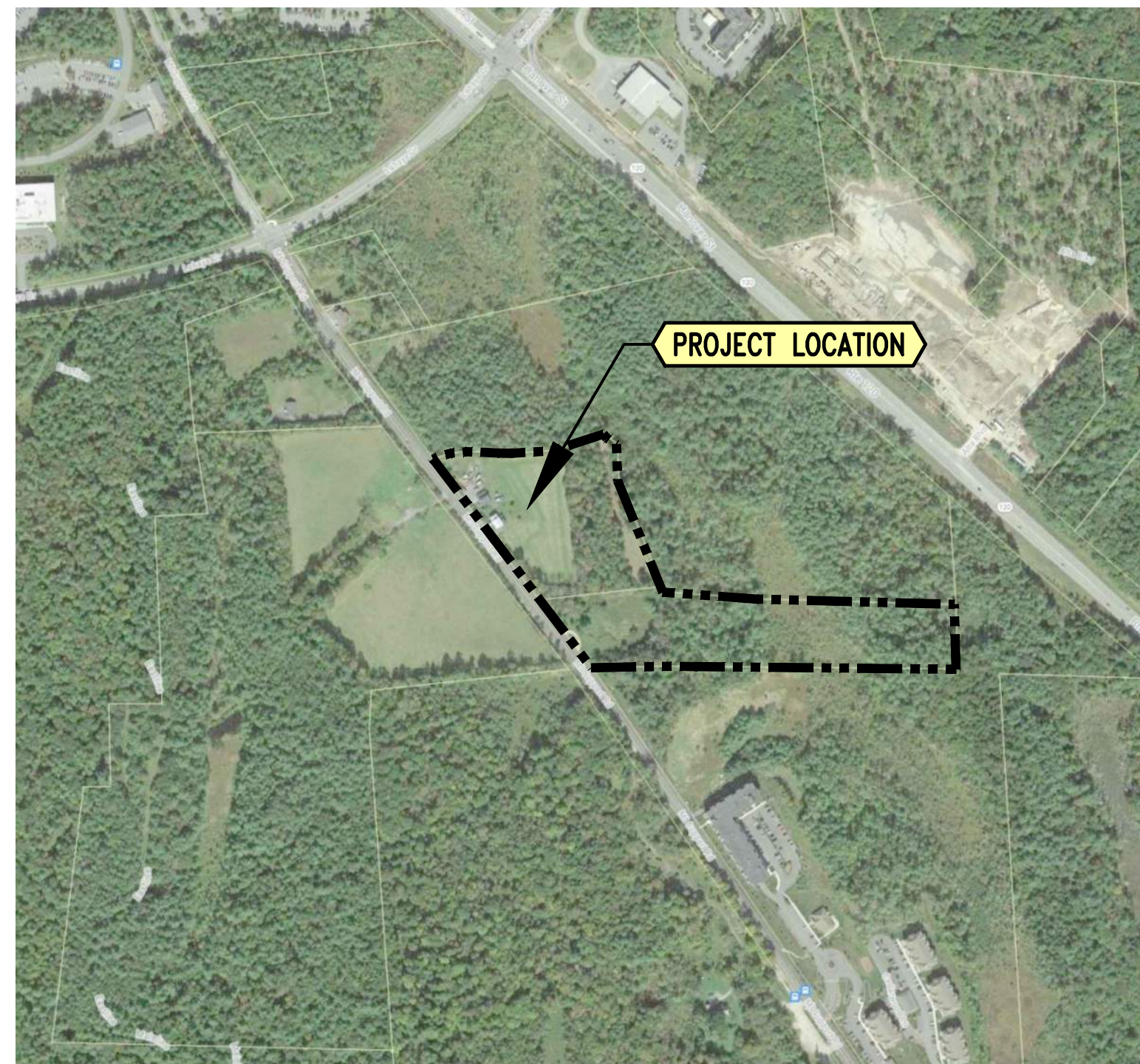


USGS MAP

1"=2,000'

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BP1.06	BUILDING 3 & 4 ELEVATIONS	BURNELL JOHNSON ARCHITECTS	(33 OF 33)



AERIAL PHOTOGRAPH

1"=250'

PARKING SUMMARY

Use	Independent Variable	Independent Variable Value	Min. Spaces Required	120% of Min	150% of Min	Parking Space Provided		
						In Structures	Outdoors	Total
Apartments	1.5/Unit	204	306	367.2	459	184	206	390

SUBJECT PROPERTY:

TAX MAP 24 LOTS 9 AND 10
CITY OF LEBANON
GRAFTON COUNTY
NEW HAMPSHIRE, 03766

OWNER\APPLICANTS:

PROPERTY OWNERS:
LOT 9:
SYLVIA D. LAHAYE REV. TRUST
KEVIN F. CARR, ESQ.
29 SCHOOL STREET
LEBANON, NH 03766
(603) 448-2720

LOT 10:
PAT LUMBER JACK, INC.
JAMES P. FREDYMA
109 CARRIAGE LANE
CONTOOCOOK, NH 03229
(603) 746-4923

APPLICANT:
MOUNT SUPPORT DEVELOPMENT, LLC (CONSISTING OF):

BRAVERMAN COMPANY
214 BARNES HILL ROAD
STOWE, VT 05672

AND

AGNANOST INVESTMENTS
1662 ELM STREET
MANCHESTER, NH 03101

CONSULTANTS:

CIVIL ENGINEER:
ENGINEERING VENTURES, PC
NICHOLAS A. FIORE, PE
85 MECHANIC ST. SUITE B2-2
LEBANON, NH 03766
(603) 442-9333

ARCHITECT:
BURNELL JOHNSON ARCHITECTS
STEPHEN BURNELL, AIA
180 STARK STREET
MANCHESTER, NH 03101
(603) 625-5098

TOPOGRAPHIC SURVEY:
LATITUDES LAND SURVEYING
NATE YAGER, L.L.S.
129B SPRUCE STREET
BURLINGTON, VT 05401
(802) 825-6545

WETLAND SCIENTIST:
A&D KLUMB ENVIRONMENTAL, LLC
AUDRA L. KLUMB
34 CENTENNIAL DRIVE
WEBSTER, NH 03303

Stamp

Date	Description	No.

ENGINEERING VENTURES PC

208 Flynn Avenue, Suite 2A, Burlington, VT 05401 • 802-863-6225
208 Flynn Avenue, Suite 2A, Lebanon, NH 03766 • 603-442-9333
85 Mechanic Street, Schemm, NH 03766 • 603-442-9333
414 Union Street, Schemm, NH 03766 • 603-442-9333
www.engineeringventures.com

MT SUPPORT DEVELOPMENT, LLC
ANAGNOST INVESTMENTS
& THE BRAVERMAN COMPANY
214 BARNES HILL ROAD
STOWE, VT 05672
802-344-6330

COVER SHEET

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #

19324

Drawn By:

JWF

Checked By:

NAF

Scale:

NOT TO SCALE

Date:

11/08/2021

C0.0

Page 42 of 399

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STANDARD ABBREVIATIONS

BENCHMARK	BM	END OF VERTICAL CURVE ELEVATION	EVCE	LIMITS OF CONSTRUCTION	LOC	REINFORCED CONCRETE PIPE	RCP
BEGINNING OF VERTICAL CURVE ELEVATION	BVCE	END OF VERTICAL CURVE STATION	EVCS	LIMITS OF DISTURBANCE	LOD	RIGHT-OF-WAY	ROW
BEGINNING OF VERTICAL CURVE STATION	BVCS	EXISTING	EX	MAXIMUM	MAX	SANITARY	SAN
CAST-IN-PLACE	CIP	EXISTING GRADE/GROUND	EG	MINIMUM	MIN	SANITARY MANHOLE	SMH
CAST IRON	CI	FINISHED FLOOR	FF	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES	MUTCD	SEPTIC TANK	ST
CATCH BASIN	CB	FINISHED GRADE/GROUND	FG	MONITORING WELL	MW	SILT FENCE	SF
CENTERLINE	CL	FIELD INLET	FI	MONUMENT	MON	SLOPE	S=
CLEAN OUT	C/O	FLARED END SECTION	FES	NOT IN CONTRACT	NIC	STATION	STA
CORRUGATED METAL PIPE	CMP	FOOT, FEET	FT	NOT TO SCALE	NTS	STORM MANHOLE	DMH
CUBIC FEET	CF	FOOTING	FTG	POINT OF CURVATURE	PC	TANGENT	TAN
CUBIC FEET PER SECOND	CFS	FOUNDATION	FND	POINT OF INTERSECTION	PI	TANGENT TO CURVE	TC
CUBIC YARD	CY	GALLONS PER MINUTE	GPM	POLYETHYLENE, PROFESSIONAL ENGINEER	PE	TAPPING SLEEVE AND VALVE	TS&V
DIAMETER	DIA	GATE VALVE	GV	PROPERTY LINE	PL	TEMPORARY BENCHMARK	TBM
DISTRIBUTION BOX	D-BOX	HEADWALL	HW	PERC TEST, POINT OF TANGENCY	PT	TEST PIT	TP
DUCTILE IRON	DI	HIGH DENSITY POLYETHYLENE	HDPE	POLYETHYLENE, PROFESSIONAL ENGINEER	PE	TOP OF BANK	TOB
EDGE OF CONCRETE	EOC	HYDRANT	HYD	POLYVINYL CHLORIDE	PVC	TOP OF CURB	TOC
EDGE OF GRAVEL	EOG	INTERSECTION	INT	POINT OF VERTICAL INTERSECTION	PVI	TOP OF WALL	TOW
EDGE OF PAVEMENT	EOP	INVERT	INV	POND	PND	TYPICAL	TYP
ELECTRIC	ELEC	IRON PIN	IP	POINT OF VERTICAL INTERSECTION	PVI	VERIFY IN FIELD	VIF
ELECTRIC MANHOLE	EMH	IRON PIPE SIZE	IPS	QUANTITY	QTY	QUALITY ASSURANCE	QA
ELEVATION	ELEV	LENGTH	L=	QUALITY CONTROL	QC	WATER VALVE	WV
				RADIUS	R=		

GENERAL NOTES

- UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXACT UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ARCHITECT, OWNER, AND ENGINEER. SITE CONTRACTOR SHALL CALL UTILITY LOCATOR SERVICE AND UTILITY OWNERS 72 HOURS, EXCLUSIVE OF WEEKENDS AND HOLIDAYS, PRIOR TO ANY DIGGING, DRILLING, OR BLASTING:
 - CALL DIG-SAFE (TEL: #811)
 - CONTACT ANY NON DIG-SAFE MEMBER FACILITY OPERATORS IF KNOWN. A LIST OF DIG-SAFE MEMBERS BY STATE CAN BE FOUND ON THE DIG-SAFE WEBSITE OR HERE: [HTTP://WWW.DIGSAFE.COM/MEMBER_COMPANIES.PHP](http://www.digsafe.com/member_companies.php)
 - CALL CITY OF LEBANON PUBLIC WORKS DEPARTMENT (TEL:448-2671)
- THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL FROM THE ENGINEER.
- THE CONTRACTOR IS INSTRUCTED TO COOPERATE WITH ANY AND ALL OTHER CONTRACTORS PERFORMING WORK ON THIS JOB SITE DURING THE PERFORMANCE OF THIS CONTRACT.
- THE CONTRACTOR SHALL RESTORE LAWNS, DRIVEWAYS, CULVERTS, SIGNS AND OTHER PUBLIC OR PRIVATE PROPERTY DAMAGED OR REMOVED TO EXISTING CONDITIONS OR BETTER AS DETERMINED BY THE ENGINEER. ANY DAMAGED TREES, SHRUBS AND/OR HEDGES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE, UNLESS NOTED OTHERWISE.
- THE CONTRACTOR SHALL COMPLY WITH ALL REQUIRED PERMITS.
- THE OWNER SHALL BE RESPONSIBLE FOR OBTAINING, AND INCURRING THE COST OF ALL REQUIRED PERMITS, INSPECTIONS, AND CERTIFICATES.
- THE CONTRACTOR WILL PROTECT EXISTING PROPERTY LINE MONUMENTATION. ANY MONUMENTATION DISTURBED OR DESTROYED, AS JUDGED BY THE ENGINEER OR OWNER SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE UNDER THE SUPERVISION OF A NEW HAMPSHIRE STATE LICENSED LAND SURVEYOR.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE ALL PLAN SHEETS AND SPECIFICATIONS, AND COORDINATE WORK WITH ALL CONTRACTS FOR THE SITE.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONDUCT EXPLORATORY TEST PITS AS MAY BE REQUIRED TO DETERMINE UNDERGROUND CONDITIONS.
- ALL TRENCH EXCAVATION AND ANY REQUIRED SHEETING AND SHORING SHALL BE DONE IN ACCORDANCE WITH THE LATEST OSHA REGULATIONS FOR CONSTRUCTION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND THE MAINTENANCE OF SURFACE DRAINAGE DURING THE COURSE OF WORK.
- MAINTAIN FLOW FOR ALL EXISTING UTILITIES, UNLESS NOTED OTHERWISE.
- ALL SITE FILL SHALL MEET SELECTED FILL STANDARDS UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- CONTRACTOR TO GRADE ALL AREAS ON THE SITE TO PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDINGS AND IMPERVIOUS SURFACES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL FIELD LAYOUT. THE CONTRACTOR SHALL PROVIDE MARKED-UP AS-BUILT PLANS FOR ALL UTILITIES SHOWING CONNECTIONS, BENDS, VALVES, LENGTHS OF LINES AND INVERTS. AS-BUILT PLANS SHALL BE REVIEWED BY THE OWNER AND HIS REPRESENTATIVES BEFORE UTILITIES WILL BE ACCEPTED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER INSTALLATION, MONITORING, MAINTENANCE AND REMOVAL OF ALL TEMPORARY EROSION CONTROL MEASURES AND TAKING PRECAUTIONARY STEPS TO AVOID ANY SEDIMENT TRANSFER TO NEIGHBORING SITES OR WATERS OF THE STATE.
- FOLLOWING ANY WARRANTY PERIOD, THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR MAINTAINING ALL LANDSCAPING, TO INCLUDE GRASS AND MULCH, IN GOOD, HEALTHY CONDITION SO AS TO PRESENT A NEAT AND ORDERLY APPEARANCE.
- AFTER THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY, THE STORAGE, DISPLAY, OR PARKING OF MOTOR VEHICLES, BOATS, MOBILE HOMES, TRAILERS, OR CONSTRUCTION EQUIPMENT WITHIN LANDSCAPED AREAS, BUFFERS, OR SCREENS, SHOWN AS SUCH ON THE APPROVED LANDSCAPE PLAN, IS EXPRESSLY PROHIBITED AND A VIOLATION OF THE NOTICE OF ACTION.

EPA 2017 CONSTRUCTION GENERAL PERMIT

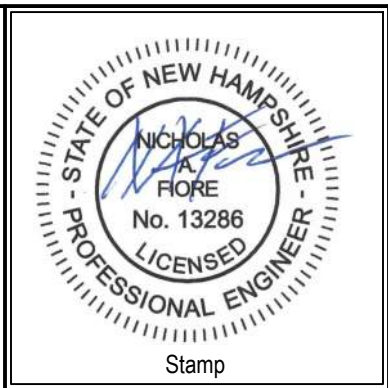
- THIS PROJECT IS SUBJECT TO AN EPA 2017 CONSTRUCTION GENERAL PERMIT (CGP).
- CONTRACTOR SHALL PREPARE AN NOI IN ACCORDANCE WITH THE EPA 2017 CGP.
- CONTRACTOR SHALL FUNCTION AS AND MEET ALL REQUIREMENTS FOR ELIGIBILITY AS AN OPERATOR AS DEFINED BY THE CGP.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER INSTALLATION, MONITORING, MAINTENANCE, AND REMOVAL OF ALL TEMPORARY EROSION CONTROL MEASURES AND TAKING PRECAUTIONARY STEPS TO AVOID ANY SEDIMENT TRANSFER TO NEIGHBORING SITES OR WATERS OF THE STATE AS REQUIRED BY THE SUBMITTED SWPPP AND THE CGP.

SYMBOL LEGEND

PROPOSED FEATURES	EXISTING FEATURES
TP1 	TP1
 CATCH BASIN (SQUARE)	 CATCH BASIN (SQUARE)
 CATCH BASIN (ROUND)	 CATCH BASIN (ROUND)
 HEADWALL	 HEADWALL
 FLARED END SECTION	 FLARED END SECTION
 STONE APRON	 STONE APRON
 DRAIN MANHOLE (DMH)	 DRAIN MANHOLE (DMH)
 DRAINAGE CLEAN OUT	 DRAINAGE CLEAN OUT
 SANITARY SEWER MANHOLE (SMH)	 SANITARY SEWER MANHOLE (SMH)
 SANITARY CLEAN OUT	 SANITARY CLEAN OUT
 HYDRANT	 HYDRANT
 WATER SHUTOFF	 WATER SHUTOFF
 TAPPING SLEEVE & VALVE	 TAPPING SLEEVE & VALVE
 GATE VALVE	 GATE VALVE
 UTILITY POLE	 UTILITY POLE
 ELECTRICAL MANHOLE	 ELECTRICAL MANHOLE
 BUILDING MOUNTED LIGHT	 BUILDING MOUNTED LIGHT
 LIGHT POST	 LIGHT POST
 BOLLARD	 BOLLARD
 SINGLE POLE SIGN	 SINGLE POLE SIGN
+100.5 SPOT ELEVATION	+100.00 SPOT ELEVATION
 ACCESSIBLE PARKING STALL	 ACCESSIBLE PARKING STALL
 DRAINAGE FLOW	 DRAINAGE FLOW
 DECIDUOUS TREE	 DECIDUOUS TREE
 CONIFEROUS TREE	 CONIFEROUS TREE

LINETYPE LEGEND

PROPOSED FEATURES	EXISTING FEATURES
100 MAJOR CONTOUR	100 MAJOR CONTOUR
98 MINOR CONTOUR	98 MINOR CONTOUR
EDGE OF RIVER	EDGE OF RIVER
PROPERTY LINE	PROPERTY LINE
SETBACK	SETBACK
EASEMENT	EASEMENT
LOC LIMIT OF CONSTRUCTION	LOC LIMIT OF CONSTRUCTION
LOD LIMIT OF DISTURBANCE	LOD LIMIT OF DISTURBANCE
SF SILT FENCE	SF SILT FENCE
DEMOLITION WORK	DEMOLITION WORK
CENTERLINE	CENTERLINE
EDGE OF PAVEMENT	EDGE OF PAVEMENT
EDGE OF GRAVEL	EDGE OF GRAVEL
EDGE OF CONCRETE	EDGE OF CONCRETE
CURB	CURB
FENCE (CHAIN LINK)	FENCE (CHAIN LINK)
FENCE (WOODEN)	FENCE (WOODEN)
GUARD RAIL	GUARD RAIL
TREE LINE	TREE LINE
EDGE OF WETLANDS - DELINEATED	EDGE OF WETLANDS - DELINEATED
EDGE OF WETLANDS - APPROXIMATE	EDGE OF WETLANDS - APPROXIMATE
STONE WALL	STONE WALL
S SANITARY SEWER	S SANITARY SEWER
FM SEWER FORCEMAIN	FM SEWER FORCEMAIN
SD STORM LINE	SD STORM LINE
(ST) STORM LINE APPROX.	(ST) STORM LINE APPROX.
UD UNDER DRAIN	UD UNDER DRAIN
DITCH/SWALE	DITCH/SWALE
UGE UNDERGROUND ELECTRIC	UGE UNDERGROUND ELECTRIC
OHE OVERHEAD ELECTRIC	OHE OVERHEAD ELECTRIC
SL ELECTRICAL SITE LIGHTING	SL ELECTRICAL SITE LIGHTING
W WATER LINE	W WATER LINE
GAS GAS LINE	GAS GAS LINE



Date	Description	No.
12/20/21	REVISED PER STAFF REVIEW COMMENTS	1

ENGINEERING VENTURES PC

MT SUPPORT DEVELOPMENT, LLC
ANAGNOST INVESTMENTS
& THE BRAVERMAN COMPANY
214 BARNES HILL ROAD
STOWE, VT 05672
802-343-6330

208 Flynn Avenue, Suite 2A, Burlington, VT 05401 • 802-863-6225
885 Mechanic Street, Suite E2-3, Lebanon, NH 03766 • 603-442-9333
414 Union Street, Schenectady, NY 12305 • 518-630-9614
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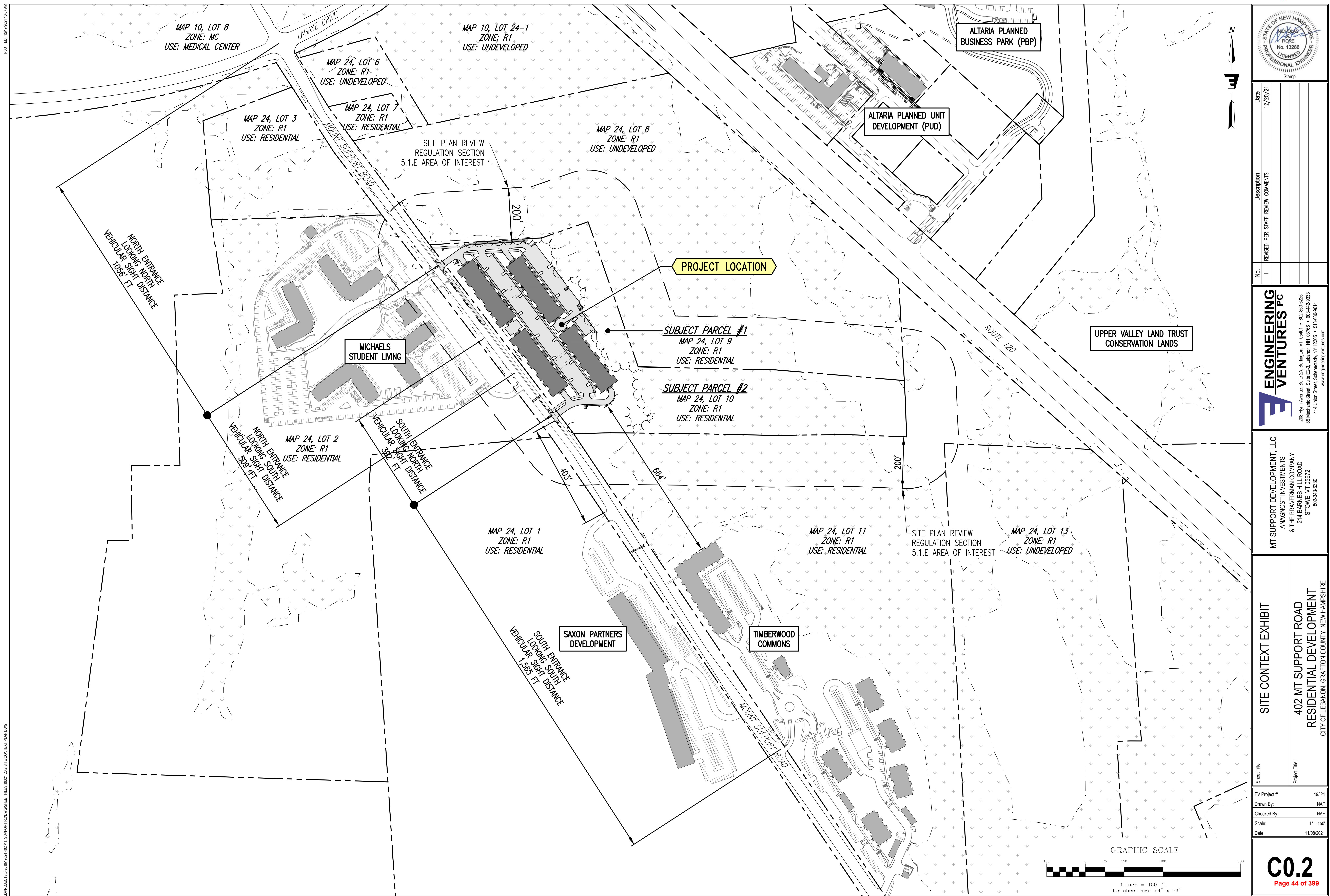
SITE LEGEND AND NOTES

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT

CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #	19324
Drawn By:	JWF
Checked By:	NAF
Scale:	NOT TO SCALE
Date:	11/08/2021

S:\PROJECTS\2019\1924\402 MT SUPPORT ROAD\GWSHEET FILES\1924 01 SITE LEGEND AND NOTES.DWG



PROJECT PHASING

CONSTRUCTION IS SCHEDULE TO BEGIN IN SPRING 2022. PHASE 1 IS SCHEDULED TO BE COMPLETE APPROXIMATELY 12 MONTHS AFTER CONSTRUCTION BEGINS, AND SUBSEQUENT PHASES ARE SCHEDULED TO BE COMPLETED EVERY 3 MONTHS.

PHASE 1 - (INCLUDES SITE WIDE BASE PREPARATION TO BRING ALL BUILDINGS TO A "PAD READY" STATE)

- MOBILIZE ON SITE, INSTALL CONSTRUCTION ENTRANCE
- BASE LAYOUT, FLAG FOR CLEARING AND WETLANDS DELINEATION
- INSTALL EROSION CONTROL MEASURES
- CLEAR AND GRUB WOODED AREAS
- INSTALL UTILITY INFRASTRUCTURE FOR SEWER, WATER, STORM DRAINAGE AND UNDERGROUND
- PHONE/CABLE/ELECTRIC AND GAS
- INSTALL SITE LIGHTING
- RETAINING WALL CONSTRUCTION
- INSTALL SELECTED ROADWAY/PARKING GRAVELS
- BASE COAT PAVING
- CONSTRUCT FOUNDATIONS FOR BUILDINGS 1, 2, 3 AND 4
- CONSTRUCT BUILDING 1 (INCLUDING ASSOCIATED SIDEWALKS, LANDSCAPING, DUMPSTER PAD/ENCLOSURE, FENCING, MISC. CONCRETE PADS AND TEMPORARY PAVEMENT STRIPING)

PHASE 2

- CONSTRUCT BUILDING 2 (INCLUDING ASSOCIATED SIDEWALKS, LANDSCAPING, DUMPSTER PAD/ENCLOSURE, FENCING, MISC. CONCRETE PADS AND TEMPORARY PAVEMENT STRIPING)

PHASE 3

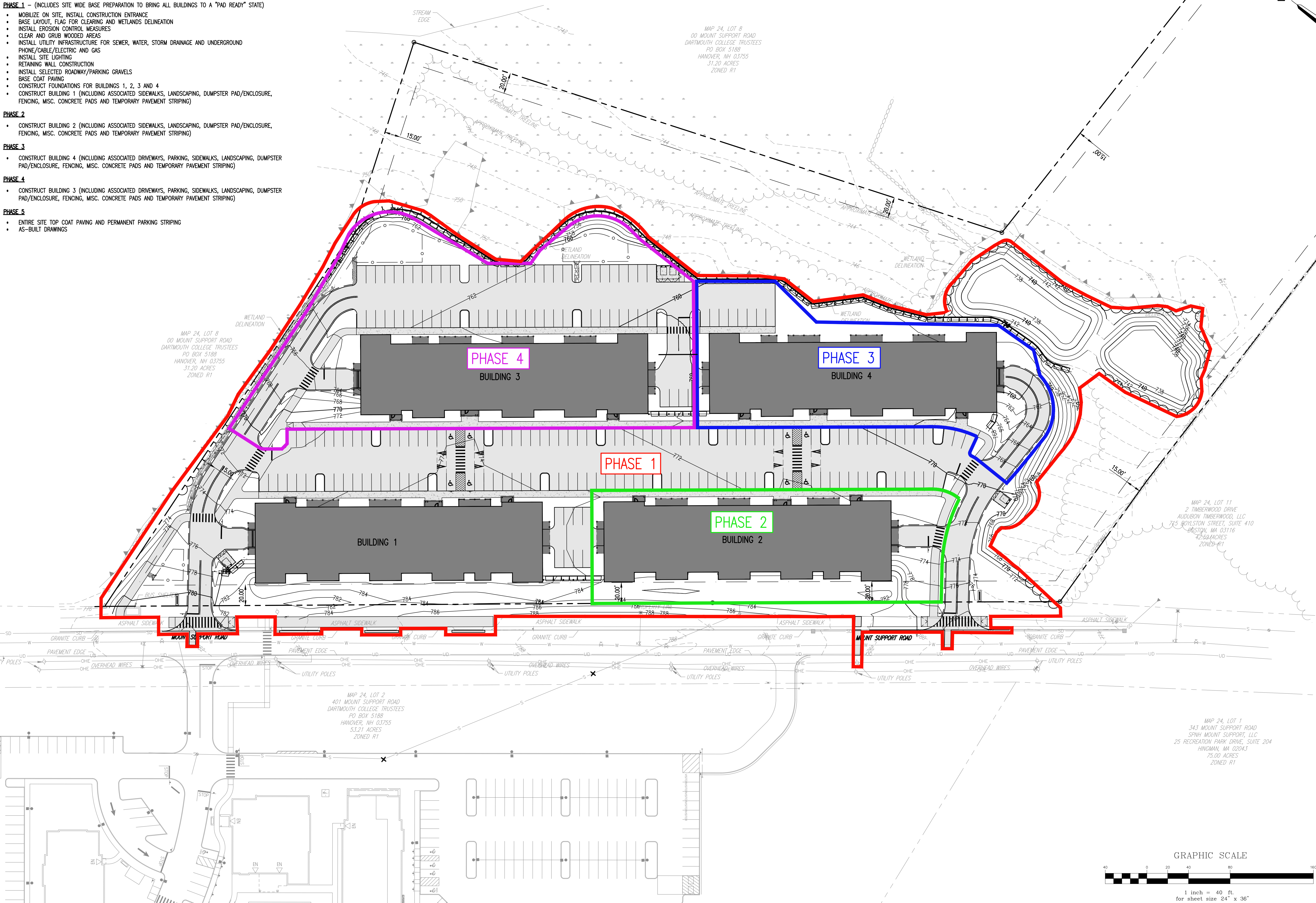
- CONSTRUCT BUILDING 4 (INCLUDING ASSOCIATED DRIVEWAYS, PARKING, SIDEWALKS, LANDSCAPING, DUMPSTER PAD/ENCLOSURE, FENCING, MISC. CONCRETE PADS AND TEMPORARY PAVEMENT STRIPING)

PHASE 4

- CONSTRUCT BUILDING 3 (INCLUDING ASSOCIATED DRIVEWAYS, PARKING, SIDEWALKS, LANDSCAPING, DUMPSTER PAD/ENCLOSURE, FENCING, MISC. CONCRETE PADS AND TEMPORARY PAVEMENT STRIPING)

PHASE 5

- ENTIRE SITE TOP COAT PAVING AND PERMANENT PARKING STRIPING
- AS-BUILT DRAWINGS



No.	1	REVISED PER STAFF REVIEW COMMENTS
Date	12/20/21	
Description		

ENGINEERING VENTURES PC

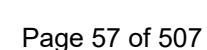
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ANAGNOST INVESTMENTS
& THE BRAVERMAN COMPANY
214 BARNES HILL ROAD
STOWE, VT 05672
802-343-6330

PROJECT PHASING PLAN
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #	19324
Drawn By:	JWF
Checked By:	NAF
Scale:	1" = 40'
Date:	12/13/2021

C0.3
Page 45 of 399

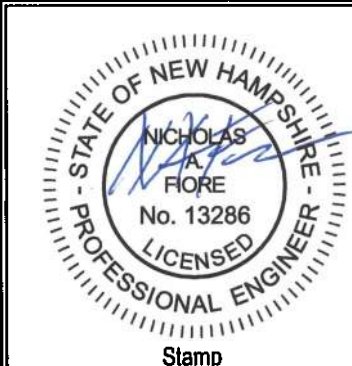


1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE EXISTING CONDITIONS OF THIS PROPERTY.
2. THE PROPERTY LINES SHOWN HERE ARE BASED ON A BOUNDARY SURVEY ENTITLED "BOUNDARY SURVEY PLAT, LANDS OF SYLVIA D. LAHAYE REVOCABLE TRUST & PAT LUMBER JACK INC.", AS PREPARED BY LATITUDES LAND SURVEYING, DATED 11/05/2021.
3. TOPOGRAPHIC AND PHYSICAL FEATURE INFORMATION SHOWN ON THIS PLAN ARE BASED UPON AN Aerial ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY NATE YAGER LLS OF LATITUDES LAND SURVEYING IN NOVEMBER OF 2019.
4. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON FIELD OBSERVATIONS AND INFORMATION OF RECORD. THEY ARE NOT WARRANTED TO BE EXACTLY LOCATED NOR IS IT WARRANTED THAT ALL UNDERGROUND UTILITIES OR OTHER STRUCTURES ARE SHOWN ON THIS PLAN.
5. HORIZONTAL DATUM IS NEW HAMPSHIRE STATE PLAN, N.A.D. 1983.
6. CONTOURS AND SPOT ELEVATIONS SHOWN ARE BASED UPON N.A.V.D. 1988.

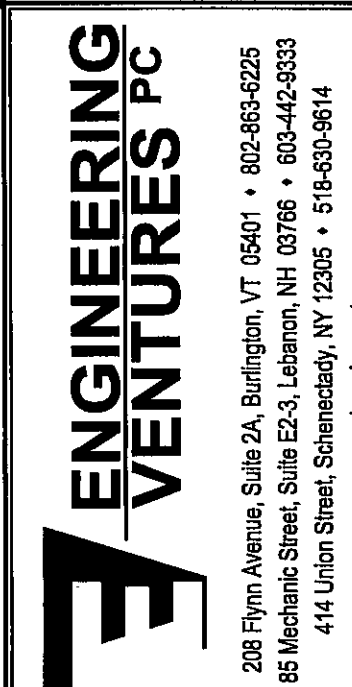
1. PARCELS 24-9 AND 24-10 WILL BE MERGED FOLLOWING PERMIT APPROVALS AND LAND OWNERSHIP TRANSFER



1. AUDRA L. KLUMB, NH CERTIFIED WETLAND SCIENTIST #222 OF ADO KLUMB ENVIRONMENTAL, LLC, WEBSTER, NH, PERFORMED THE WETLAND MAPPING FOR THIS SITE ON SEPTEMBER 4, 2019 AND OCTOBER 9, 2019 ACCORDING TO THE TECHNICAL CRITERIA OF THE US ARMY CORPS OF ENGINEERS DELINEATION MANUAL (TECHNICAL REPORT Y-67-1, JANUARY 1987), THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHEASTERN AND NORTHEAST REGION, VERSION 2.2 (JANUARY 2012), AND THE STATE REGULATORY CRITERIA FOR WETLANDS.
2. WETLAND CLASSIFICATION LOCATED IN THE FIELD UTILIZING STANDARD SURVEY METHODS.
3. THE CITY OF LEBANON NATURAL RESOURCES INVENTORY CLASSIFIES WETLANDS ON THE SUBJECT PROPERTIES AS MEDIUM-LOW VALUE.



No.	Description	Date
	12/20/2021 - WETLAND SCIENTIST'S STAMP	
1	REVISED PER STAFF REVIEW COMMENTS	12/20/21



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 ANAGNOST INVESTMENTS
 & THE BRAVERMAN COMPANY
 214 BARNES HILL ROAD
 STOWE, VT 05672
 802-343-6330

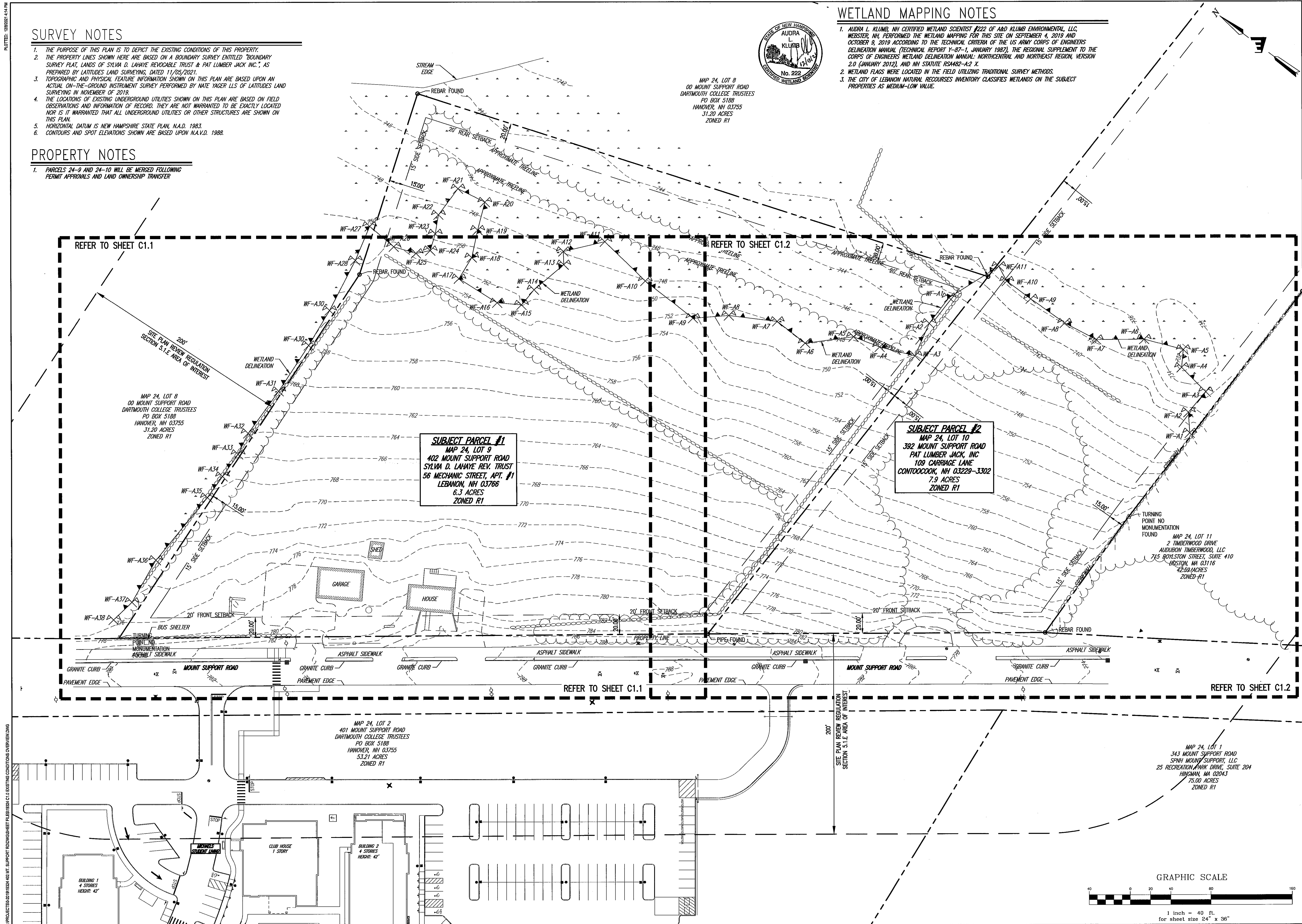
EXISTING CONDITIONS OVERVIEW

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT

Sheet Title:	Project Title:
EV Project #	193
Drawn By:	JV
Checked By:	N
Scale:	1" =
Date:	11/08/20

C1.0

Page 47 of 399



DEMOLITION NOTES

- ALL DEMOLITION ITEMS FROM THE DEMOLITION, UNLESS NOTED BY THE OWNER TO BE STORED OR REUSED, BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROMPTLY REMOVED FROM THE SITE. SOIL DISPOSAL SHALL BE AS DIRECTED BY OWNER.
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 - X6 WOOD FENCE TO BE REMOVED AND PROPERLY DISPOSED OF
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 - X9 CONCRETE LID, ASSUMED TO BE A COVER FOR A DUG WELL. WELL, COVER, AND SUPPLY LINES TO BE REMOVED AND PROPERLY DISPOSED OF
 - X10 STONE WALL TO BE REMOVED, RE-USE STONES ON-SITE AS FILL IN NON-STRUCTURAL/NON-SELECT FILL AREAS
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SURVEY NOTES

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WETLAND MAPPING NOTES

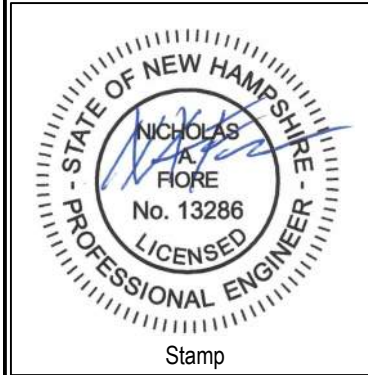
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 - WETLAND FLAGS WERE LOCATED IN THE FIELD UTILIZING TRADITIONAL SURVEY METHODS.
 - THE CITY OF LEBANON NATURAL RECOURES INVENTORY CLASSIFIES WETLANDS ON THE SUBJECT PROPERTIES AS MEDIUM-LOW VALUE.

MAP 24, LOT 8
00 MOUNT SUPPORT ROAD
DARTMOUTH COLLEGE TRUSTEES
PO BOX 5188
HANOVER, NH 03755
31.20 ACRES
ZONED R1

SUBJECT PARCEL #1
MAP 24, LOT 9
402 MOUNT SUPPORT ROAD
SYLVIA D. LAHAYE REV. TRUST
56 MECHANIC STREET, APT. #1
LEBANON, NH 03766
6.3 ACRES
ZONED R1

PROPERTY NOTES

- PARCELS 24-9 AND 24-10 WILL BE MERGED FOLLOWING PERMIT APPROVALS AND LAND OWNERSHIP TRANSFER



Date	Description	No.
12/20/21	REVISED PER STAFF REVIEW COMMENTS	1

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EXISTING CONDITIONS AND
DEMOLITION PLAN (1 OF 2)

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

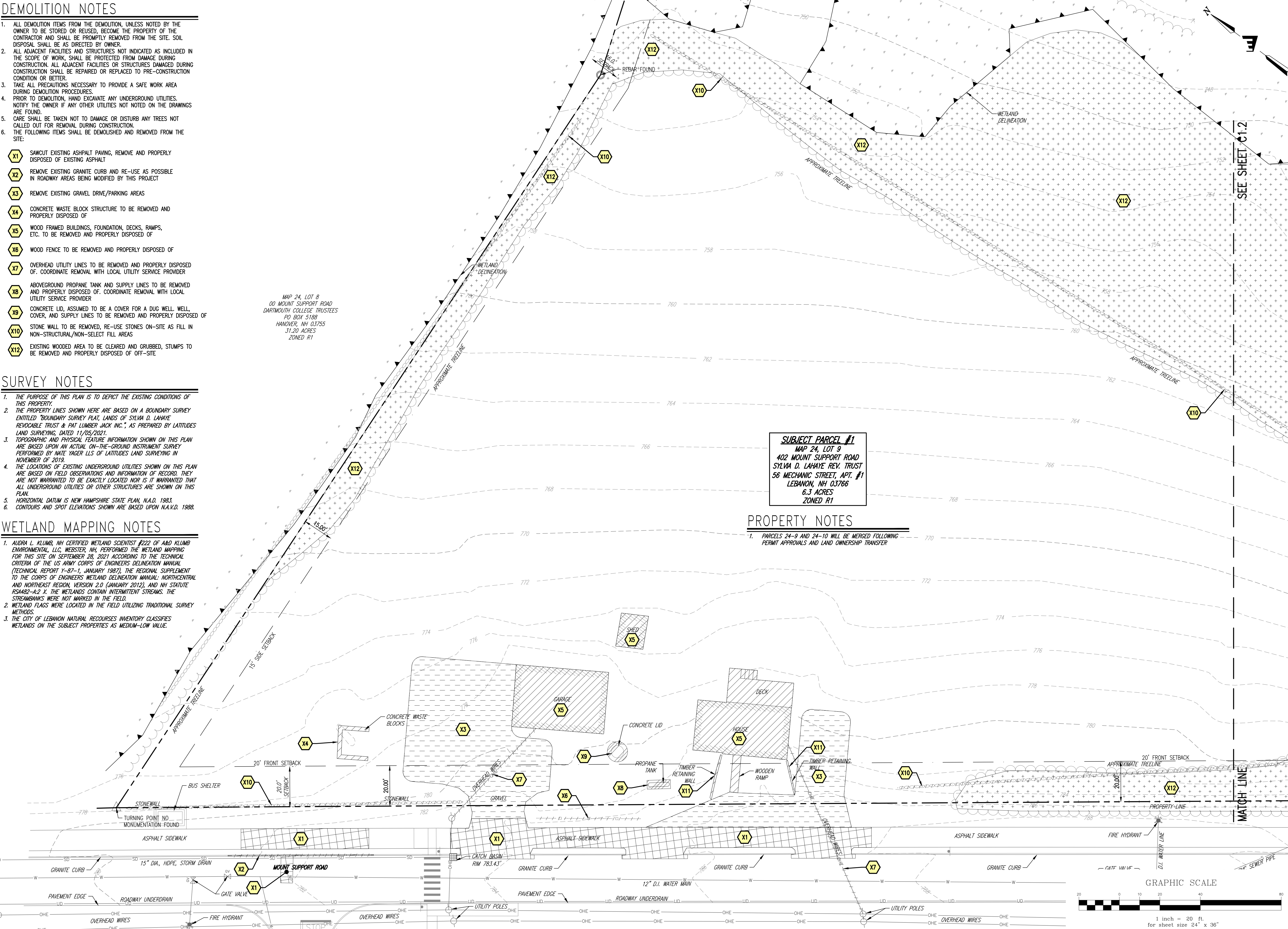
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Checked By:	NAF
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Date:	11/08/2021

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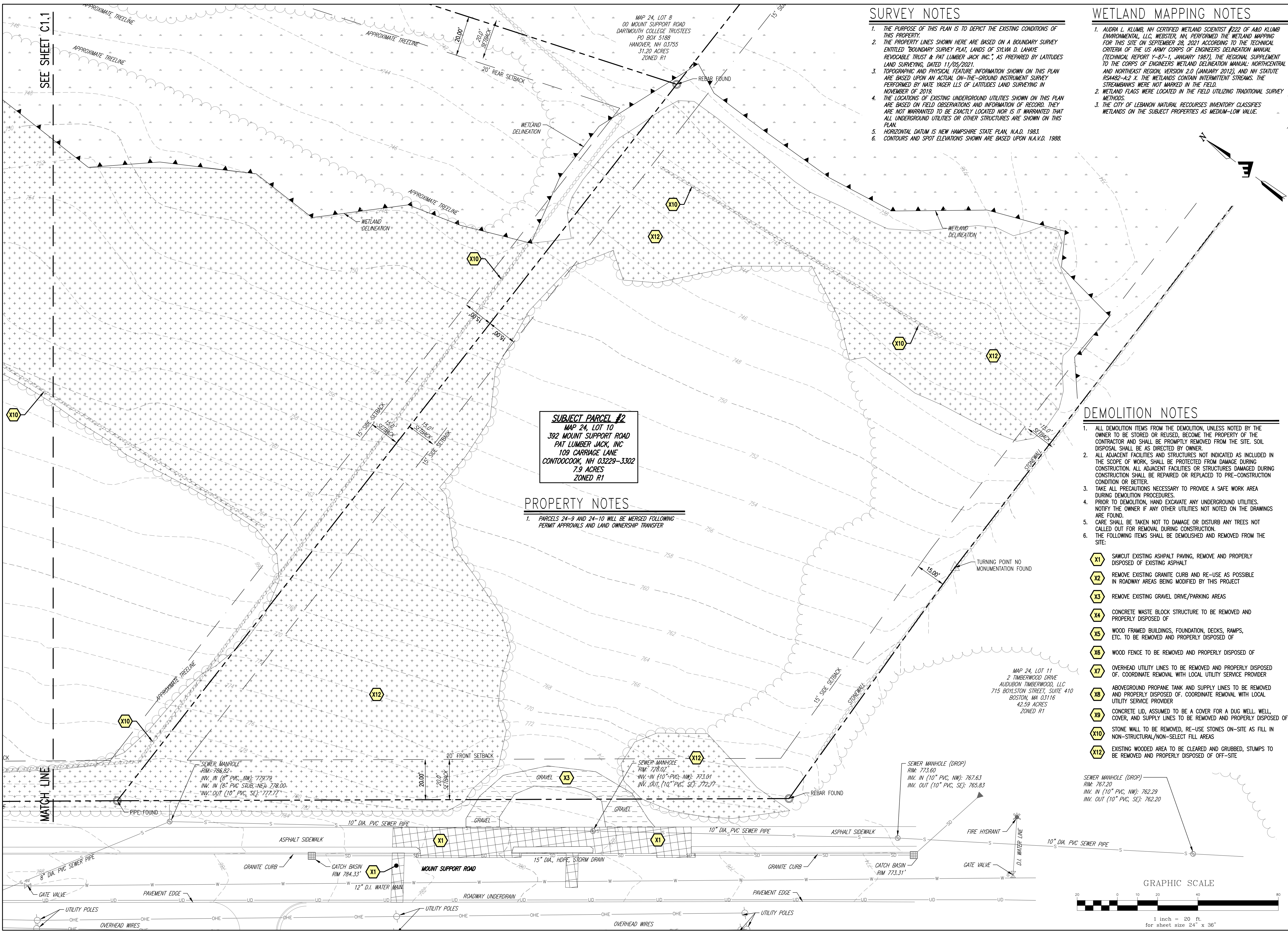
Page 48 of 399

S:\PROJECTS\2019\19324\402 MT SUPPORT RD\DWGS\19324 C1.X EXISTING CONDITIONS.dwg

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PROJECTS: 20191024 402 MT SUPPORT ROAD/SHSHEET FILES: 10324 C1.X EXISTING CONDITIONS DWG
PLOTTED: 12/10/2021 1:25 PM



SURVEY NOTES

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STATE OF NEW HAMPSHIRE

NOTARIAL PUBLIC

NO. 13286

EXPIRES 12/31/2024

Stamp

Date

12/20/21

No.

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Description

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802-343-6330

EXISTING CONDITIONS AND DEMOLITION PLAN (2 OF 2)

402 MT SUPPORT ROAD

RESIDENTIAL DEVELOPMENT

CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

Sheet Title:

EV Project #

19324

Drawn By:

JWF

Checked By:

NAF

Scale:

1" = 20'

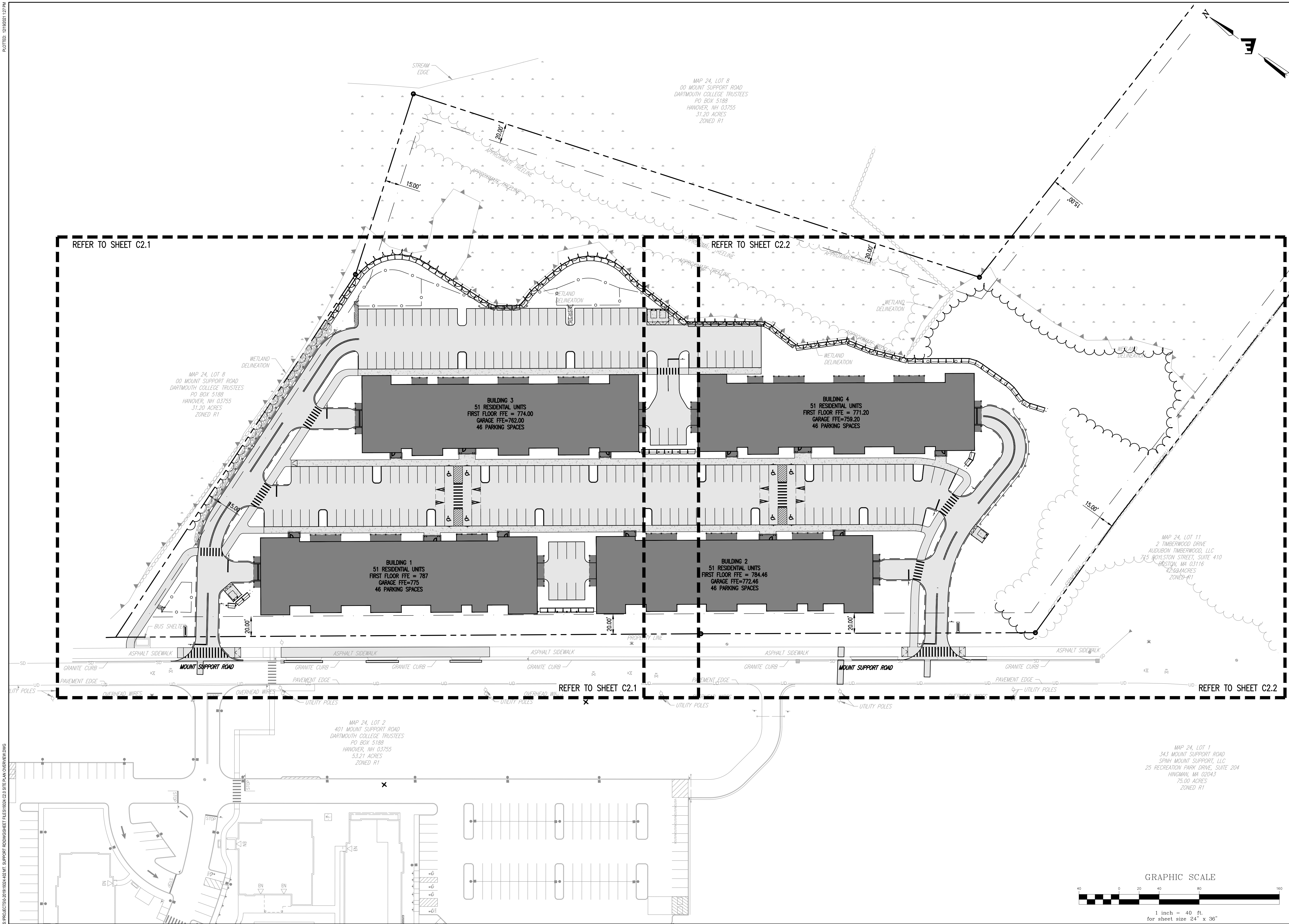
Date:

11/08/2021

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Page 49 of 399

Page 60 of 507



Sheet Title: SITTE PLAN OVERVIEW		EV Project # 19324	
Project Title: 402 MT SUPPORT ROAD RESIDENTIAL DEVELOPMENT CITY OF LEBANON, GRATION COUNTY, NEW HAMPSHIRE		Drawn By: JWF	
		Checked By: NAF	
		Scale: 1" = 40'	
		Date: 11/08/2021	
C2.0 Page 50 of 399			

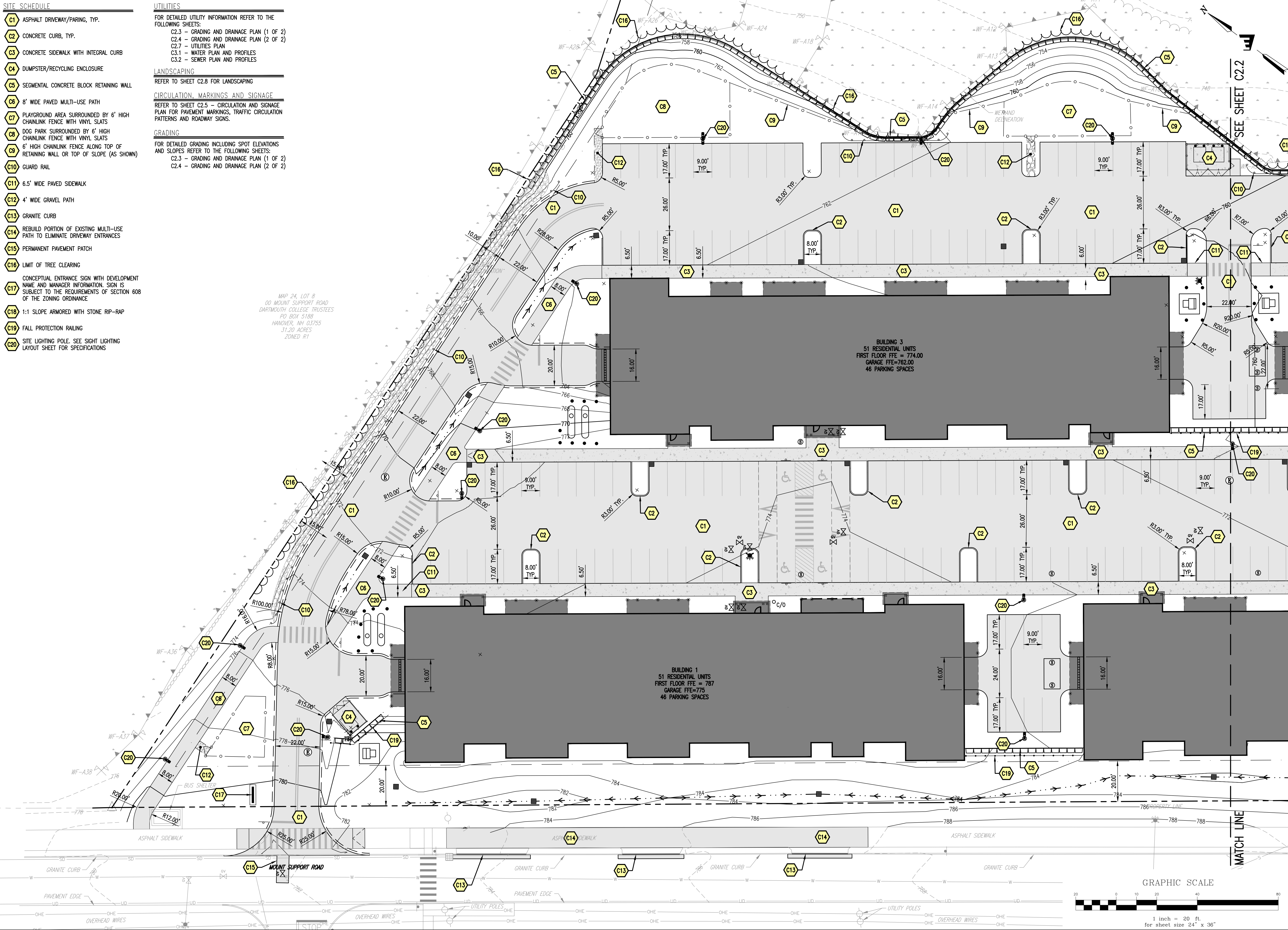
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S:\PROJECTS\2019\1024\402 MT SUPPORT ROAD\WORKSHEET FILES\1024 C2.2 SITE LAYOUT PLANS.DWG

- SITE SCHEDULE**
- C1 ASPHALT DRIVEWAY/PARKING, TYP.
 - C2 CONCRETE CURB, TYP.
 - C3 CONCRETE SIDEWALK WITH INTEGRAL CURB
 - C4 DUMPSTER/RECYCLING ENCLOSURE
 - C5 SEGMENTAL CONCRETE BLOCK RETAINING WALL
 - C6 8' WIDE PAVED MULTI-USE PATH
 - C7 PLAYGROUND AREA SURROUNDED BY 6' HIGH CHAINLINK FENCE WITH VINYL SLATS
 - C8 DOG PARK SURROUNDED BY 6' HIGH CHAINLINK FENCE WITH VINYL SLATS
 - C9 6' HIGH CHAINLINK FENCE ALONG TOP OF RETAINING WALL OR TOP OF SLOPE (AS SHOWN)
 - C10 GUARD RAIL
 - C11 6.5' WIDE PAVED SIDEWALK
 - C12 4' WIDE GRAVEL PATH
 - C13 GRANITE CURB
 - C14 REBUILD PORTION OF EXISTING MULTI-USE PATH TO ELIMINATE DRIVEWAY ENTRANCES
 - C15 PERMANENT PAVEMENT PATCH
 - C16 LIMIT OF TREE CLEARING
 - C17 CONCEPTUAL ENTRANCE SIGN WITH DEVELOPMENT NAME AND MANAGER INFORMATION. SIGN IS SUBJECT TO THE REQUIREMENTS OF SECTION 608 OF THE ZONING ORDINANCE
 - C18 1:1 SLOPE ARMORED WITH STONE RIP-RAP
 - C19 FALL PROTECTION RAILING
 - C20 SITE LIGHTING POLE. SEE SIGHT LIGHTING LAYOUT SHEET FOR SPECIFICATIONS

- UTILITIES**
- FOR DETAILED UTILITY INFORMATION REFER TO THE FOLLOWING SHEETS:
- C2.3 - GRADING AND DRAINAGE PLAN (1 OF 2)
 - C2.4 - GRADING AND DRAINAGE PLAN (2 OF 2)
 - C2.7 - UTILITIES PLAN
 - C3.1 - WATER PLAN AND PROFILES
 - C3.2 - SEWER PLAN AND PROFILES
- LANDSCAPING**
- REFER TO SHEET C2.8 FOR LANDSCAPING
- CIRCULATION, MARKINGS AND SIGNAGE**
- REFER TO SHEET C2.5 - CIRCULATION AND SIGNAGE PLAN FOR PAVEMENT MARKINGS, TRAFFIC CIRCULATION PATTERNS AND ROADWAY SIGNS.
- GRADING**
- FOR DETAILED GRADING INCLUDING SPOT ELEVATIONS AND SLOPES REFER TO THE FOLLOWING SHEETS:
- C2.3 - GRADING AND DRAINAGE PLAN (1 OF 2)
 - C2.4 - GRADING AND DRAINAGE PLAN (2 OF 2)

MAP 24, LOT 8
00 MOUNT SUPPORT ROAD
DARTMOUTH COLLEGE TRUSTEES
PO BOX 5188
HANOVER, NH 03755
31.20 ACRES
ZONED R1



STATE OF NEW HAMPSHIRE
NOTARY PUBLIC
No. 13286
LICENSED
Stamp

Date
12/20/21

Description
REVISED PER STAFF REVIEW COMMENTS

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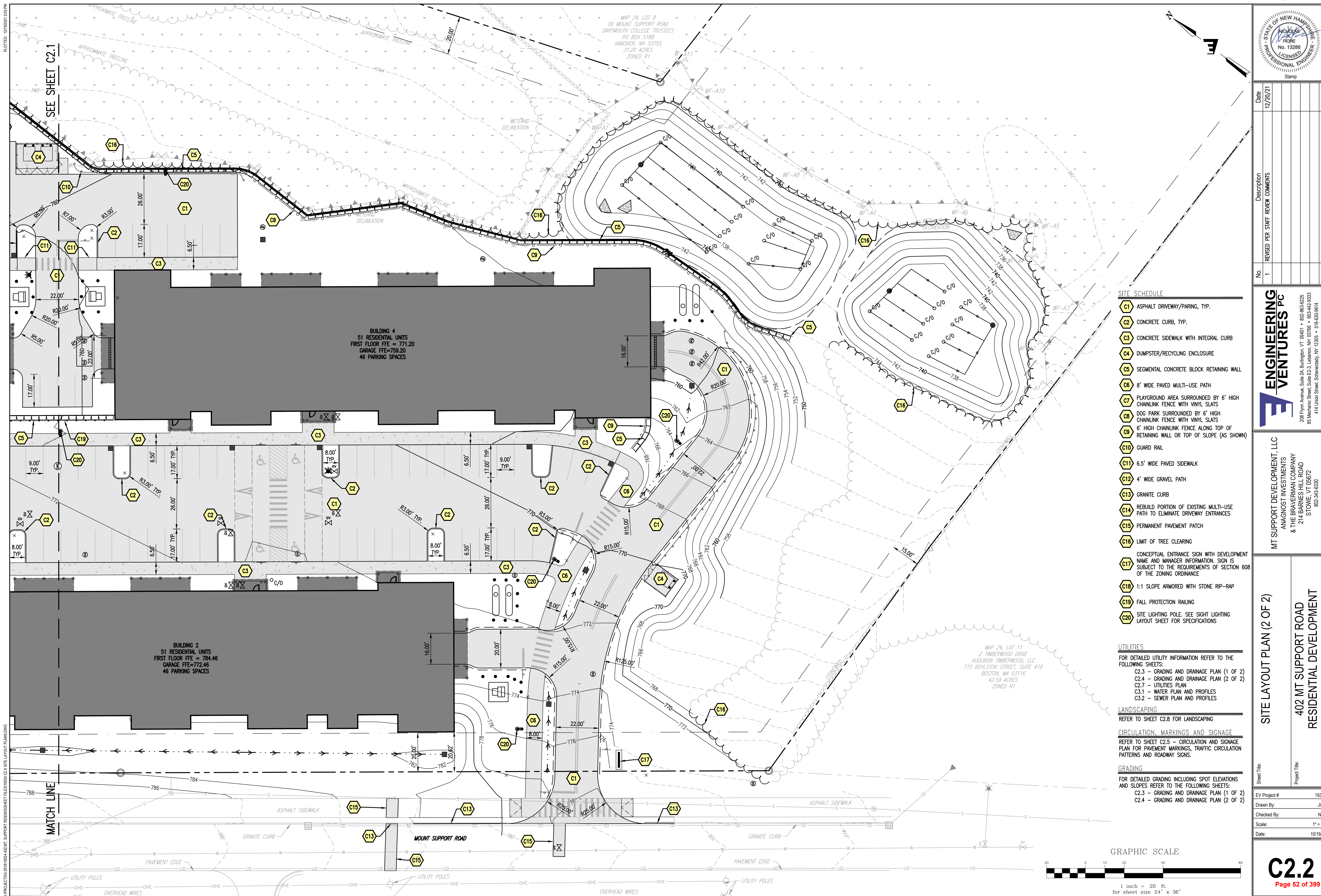
SITE LAYOUT PLAN (1 OF 2)

**402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT**

CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project # 19324
Drawn By: JWF
Checked By: NAF
Scale: 1" = 20'
Date: 10/19/21

C2.1
Page 51 of 399



No.	Description	Date
1	REVISED PER STAFF REVIEW COMMENTS	12/20/21

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802-343-6330

SITE LAYOUT PLAN (2 OF 2)

Sheet Title:	Project Title:
EV Project #	193
Drawn By:	JL
Checked By:	N
Scale:	1" =

Date: 10/19/2019

C2.2

Page 52 of 399

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STORMWATER SCHEDULE

- D2

5' I.D. DRAIN MANHOLE
RIM: 758.07
INV. IN: 750.96 (24" HDPE)
INV. OUT: 744.09 (24" HDPE)
SUMP: 743.76
- D3

5' I.D. OUTLET STRUCTURE
RIM: 758.70
INV. IN: 752.20 (24" HDPE)
INV. IN: 750.90 (36" PVC)
INV. OUT: 752.00 (24" HDPE)
INV. OUT: 750.75 (15" VERTICAL ORIFICE)
INV. OUT: 755.00 (24" HDPE)
SUMP: 748.75
- D4

5' I.D. CATCH BASIN
RIM: 758.61
INV. OUT: 752.40 (24" HDPE)
INV. OUT: 751.10 (24" HDPE)
INV. OUT: 755.00 (24" HORIZ. ORIFICE)
SUMP: 749.10
- D5

5' I.D. CATCH BASIN
RIM: 760.50
INV. IN: 751.20 (24" HDPE)
INV. OUT: 751.10 (24" HDPE)
INV. OUT: 752.20 (24" HDPE, 24" HORIZ. WEIR ELEV. = 755.0)
SUMP: 749.10
- D6

4' I.D. CATCH BASIN
RIM: 762.22
INV. IN: 757.78 (15" HDPE)
INV. IN: 757.50 (12" HDPE)
INV. OUT: 757.30 (18" HDPE)
SUMP: 755.30
- D7

5' I.D. CATCH BASIN
RIM: 767.13
INV. IN: 763.50 (15" HDPE)
INV. OUT: 763.40 (15" HDPE)
SUMP: 761.40
- D8

4' I.D. CATCH BASIN
RIM: 772.32
INV. IN: 767.60 (12" HDPE)
INV. IN: 767.60 (12" HDPE)
INV. OUT: 767.50 (15" HDPE)
SUMP: 765.50
- D9

4' I.D. CATCH BASIN
RIM: 775.81
INV. IN: 770.90 (12" HDPE)
INV. OUT: 770.80 (12" HDPE)
SUMP: 768.80
- D11

4' I.D. CATCH BASIN
RIM: 771.18
INV. IN: 760.55 (24" HDPE)
INV. OUT: 751.90 (24" HDPE)
SUMP: 749.90
- D12

4' I.D. CATCH BASIN
RIM: 772.26
INV. IN: 761.83 (18" HDPE)
INV. IN: 764.81 (12" HDPE)
INV. OUT: 761.63 (24" HDPE)
SUMP: 759.63
- D13

4' I.D. CATCH BASIN
RIM: 773.35
INV. IN: 763.10 (15" HDPE)
INV. OUT: 762.90 (18" HDPE)
SUMP: 760.90
- D14

4' I.D. CATCH BASIN
RIM: 772.67
INV. IN: 765.45 (12" HDPE)
INV. OUT: 765.20 (15" HDPE)
SUMP: 763.20
- D15

4' I.D. CATCH BASIN
RIM: 771.13
INV. OUT: 766.46 (12" HDPE)
SUMP: 764.46
- D17

5,000 GALLON SEDIMENT FOREBAY
RIM: 759.46
INV. IN: 753.45 (15" HDPE)
INV. OUT: 753.35 (15" HDPE)
SUMP: 748.35
- D18

4' I.D. CATCH BASIN
RIM: 769.03
INV. IN: 761.32 (12" HDPE)
INV. IN: 758.24 (12" HDPE)
INV. OUT: 757.75 (15" HDPE)
SUMP: 755.75
- D19

4' I.D. CATCH BASIN
RIM: 770.60
INV. IN: 762.20 (12" HDPE)
INV. OUT: 762.00 (12" HDPE)
SUMP: 760.00
- D20

4' I.D. CATCH BASIN
RIM: 774.18
INV. IN: 769.48 (12" HDPE)
INV. OUT: 764.91 (12" HDPE)
SUMP: 762.91
- D21

4' I.D. CATCH BASIN
RIM: 769.33
INV. IN: 759.20 (12" HDPE)
INV. OUT: 759.10 (12" HDPE)
SUMP: 757.10
- D22

4' I.D. CATCH BASIN
RIM: 770.44
INV. IN: 762.83 (12" HDPE)
INV. OUT: 760.43 (12" HDPE)
SUMP: 758.43
- D23

4' I.D. CATCH BASIN
RIM: 770.55
INV. OUT: 766.12 (12" HDPE)
SUMP: 764.12
- D24

4' I.D. CATCH BASIN
RIM: 759.24
INV. IN: 754.00 (15" HDPE)
INV. IN: 754.00 (12" HDPE)
INV. OUT: 753.90 (15" HDPE)
SUMP: 751.90
- D25

5' I.D. OUTLET STRUCTURE
RIM: 739.95
INV. OUT: 737.30 (24" HDPE)
INV. OUT: 740.00 (10" VERTICAL ORIFICE (8))
SUMP: 736.71
- D26

CULTEC R902HD 4 ROWS OF 54 CHAMBERS
(216 CHAMBERS)
STONE INVERT = 750.0
FIELD HEIGHT = 5.75'
FOREBAY AND DETENTION SYSTEM
- D27

GRAVEL WETLAND
CELL 1 AREA = 3,700 SF
CELL 2 AREA = 2,600 SF
- D28

ISOLATOR ROW 1 ROW OF 54 CHAMBERS
- D29

24" HDPE WEIR OVERFLOW AND MANIFOLD BYPASS SYSTEM
- D39

TRENCH DRAIN
START INV. = 774.5
END INV. = 774.2
- D40

TRENCH DRAIN
START INV. = 761.5
END INV. = 761.2
- D41

TRENCH DRAIN
START INV. = 771.8
END INV. = 771.5
- D42

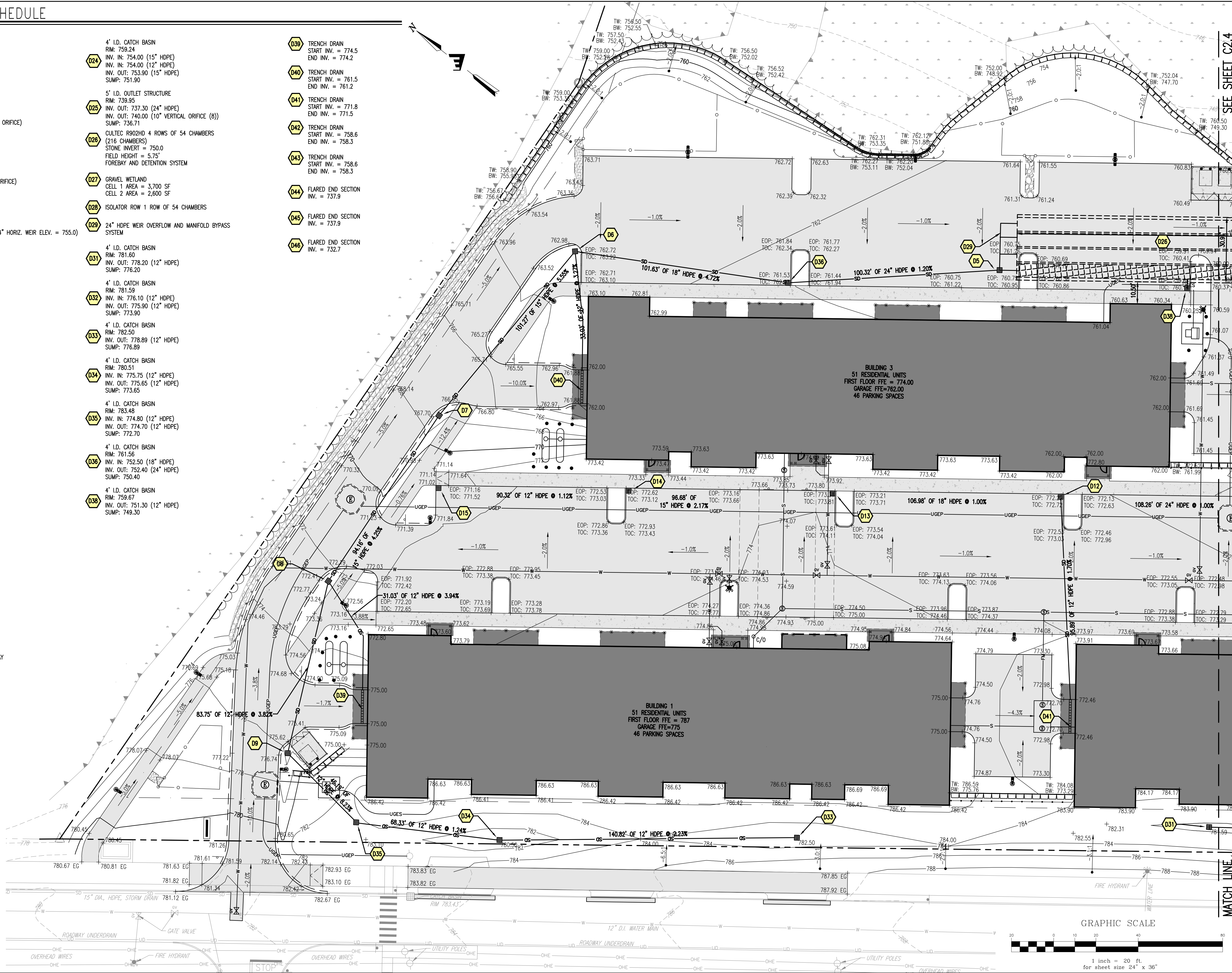
TRENCH DRAIN
START INV. = 758.6
END INV. = 758.3
- D43

TRENCH DRAIN
START INV. = 758.6
END INV. = 758.3
- D44

FLARED END SECTION
INV. = 737.9
- D45

FLARED END SECTION
INV. = 737.9
- D46

FLARED END SECTION
INV. = 732.7



SEE SHEET C2.4

DATE: 12/20/21

NO. 1

REVISION PER STAFF REVIEW COMMENTS

DESCRIPTION

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NOTARY PUBLIC
No. 13286
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GRADING AND DRAINAGE PLAN (1 OF 2)

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project # 19324
Drawn By: AM/JF
Checked By: NAF
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C2.3

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S:\PROJECTS\2019\19324 402 MT SUPPORT RD\DWGS\DRN\19324 C2.3 DRAINAGE.DWG

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PAVEMENT MARKINGS

- PM1** 4" WIDE, DSLY, PAINTED CENTERLINE STRIPING, TYP.
- PM2** 4" WIDE, SSLW, PARKING STALL STRIPING, TYP.
- PM3** 10' WIDE CROSSWALK CONSISTING OF 12" WIDE, SSLW, PAINTED BARS SPACED 24" APART.
- PM4** 36"x36", BLUE & WHITE, ADA WHEELCHAIR SYMBOL FOR ACCESSIBLE PARKING STALLS, TYP.
- PM5** 18" WIDE, SSLW, STOP BAR, TYP.
- PM6** 4" WIDE, SSLW, DIAGONAL ACCESS AISLE STRIPING, TYP.
- PM7** 9" WIDE CROSSWALK CONSISTING OF 12" WIDE, SSLW, PAINTED BARS SPACED 24" APART.
- PM8** 6.5' WIDE CROSSWALK CONSISTING OF 12" WIDE, SSLW, PAINTED BARS SPACED 24" APART.
- PM9** 6' WIDE CHEVRON CONSISTING OF TWO, 12" WIDE, SSLW, PAINTED BARS SPACED 12" APART.

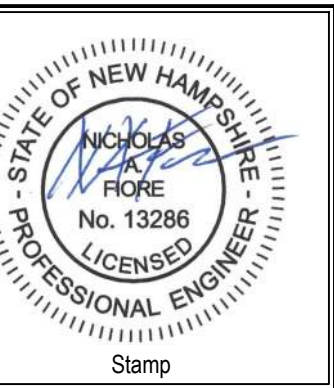
SIGN SCHEDULE

SIGN KEY:			
SIGN DESIGNATIONS	MUTCD COMMON NAME	SIZE	
A D9-6	HANDICAPPED	24" x 24"	
B D9-6P	VAN ACCESSIBLE (PLAQUE)	18" x 9"	
C R2-1	15-MPH SPEED LIMIT	24" x 30"	
D R1-1	STOP	30" x 30"	

GRAPHIC SCHEDULE

- DIRECTION OF TRAVEL ARROWS PROVIDED FOR REFERENCE ONLY, **NOT** TO BE PAINTED ON PAVEMENT SURFACE
- PARKING STALL NUMBER PROVIDED FOR REFERENCE ONLY, **NOT** TO BE PAINTED ON PAVEMENT SURFACE
- ADA ACCESSIBLE ROUTE TO MOUNT SUPPORT ROAD PROVIDED FOR REFERENCE ONLY, **NOT** TO BE PAINTED ON PAVEMENT SURFACE

MAP 24, LOT 8
00 MOUNT SUPPORT ROAD
DARTMOUTH COLLEGE TRUSTEES
PO BOX 5188
HANOVER, NH 03755
31.20 ACRES
ZONED R1



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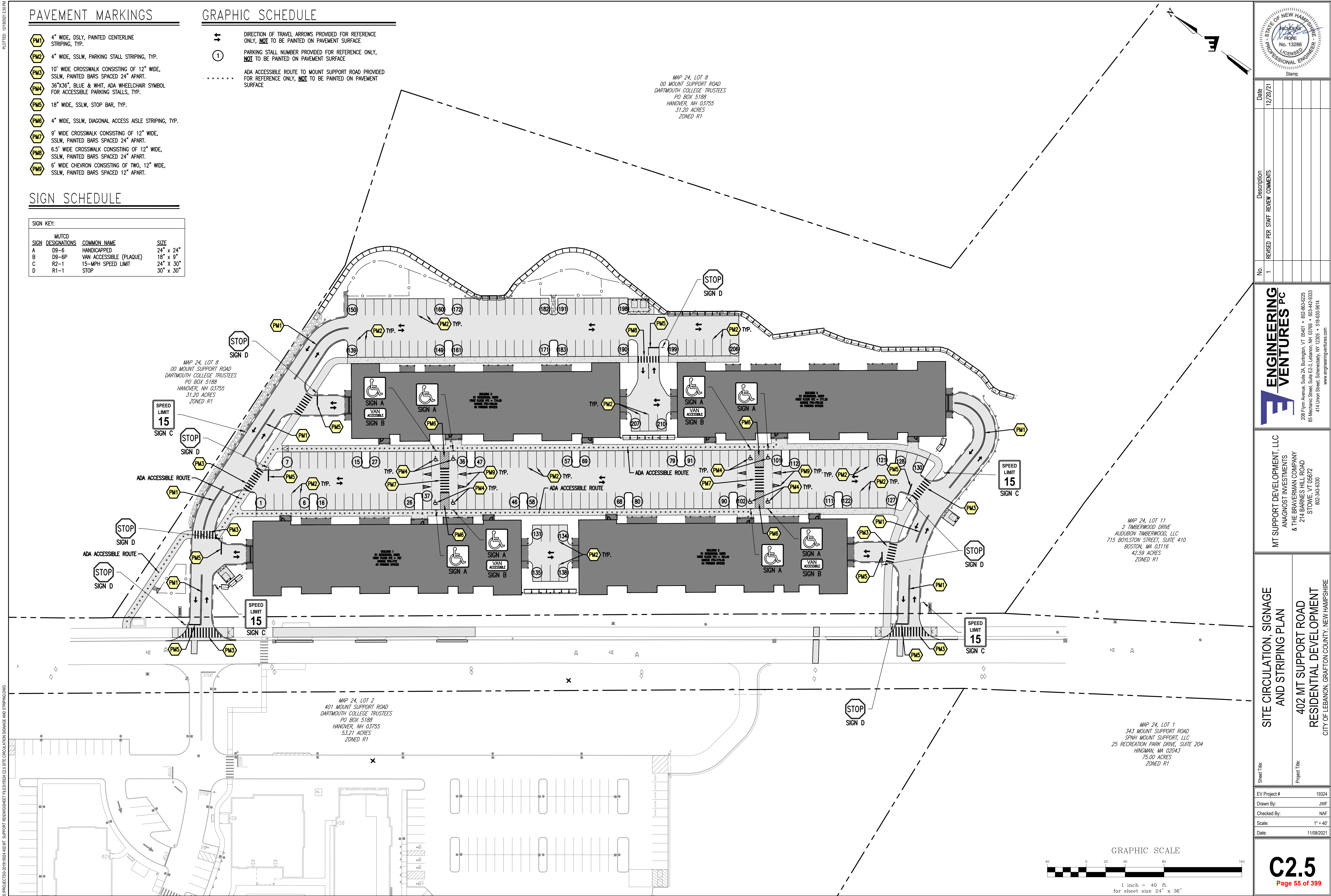
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SITE CIRCULATION, SIGNAGE AND STRIPING PLAN
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

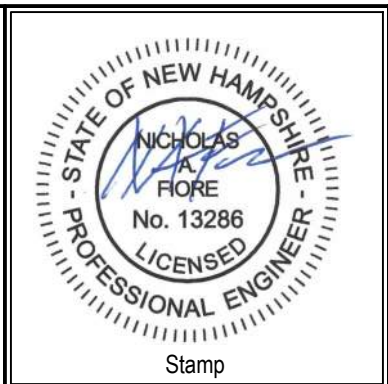
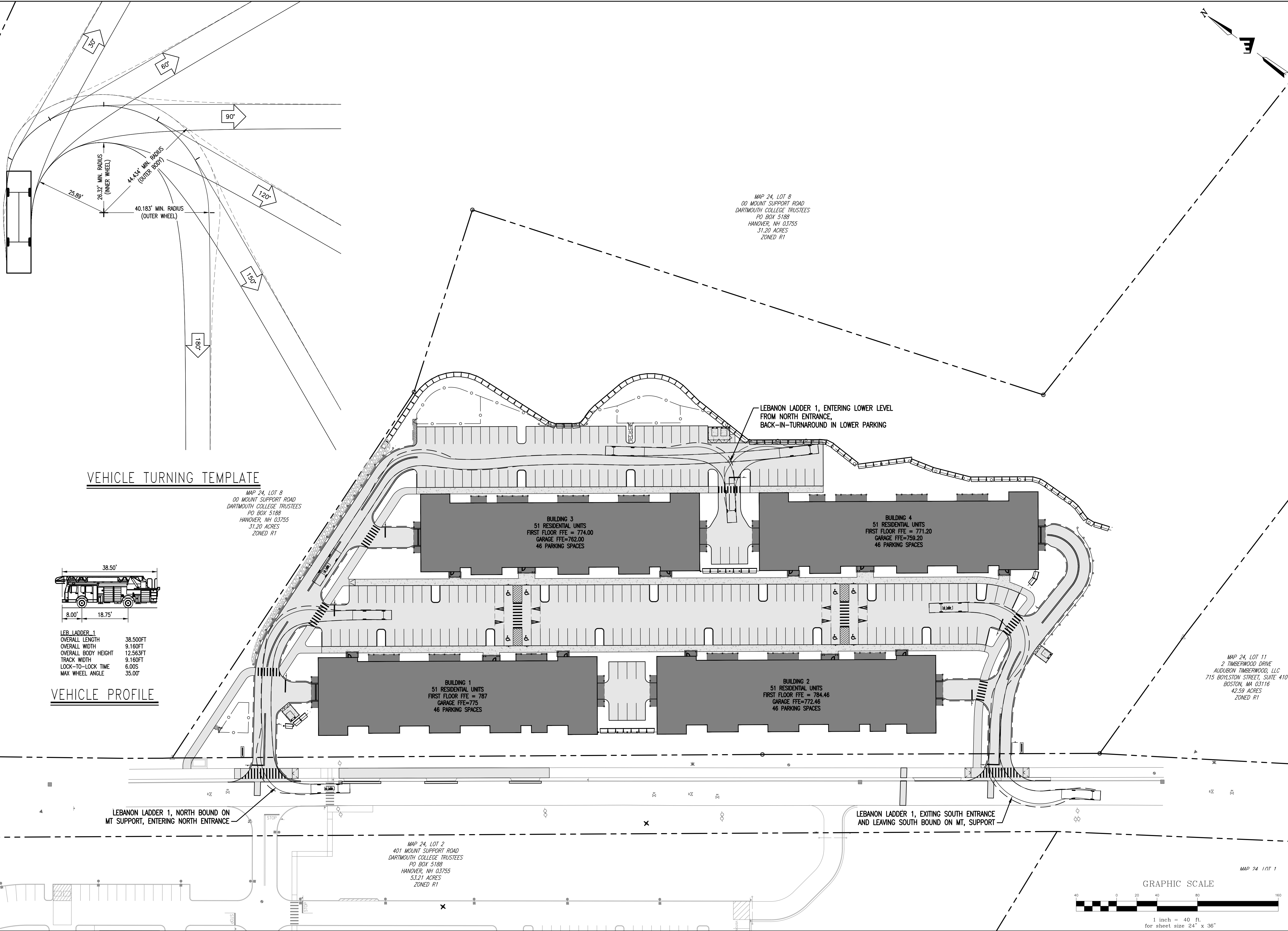
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C2.5
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3
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S:\PROJECTS\2019\1024\402 MT SUPPORT ROAD\DWG\SHEET FILES\1024 C2.6 SITE CIRCULATION FIRE TRUCK TURNING.DWG



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SITE CIRCULATION, FIRE TRUCK TURNING MOVEMENTS
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

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WATER NOTES

SEE SHEETS C3.1 FOR WATER SYSTEM PLAN AND PROFILES. SEE SHEET C4.6 FOR WATER DETAILS AND NOTES.

SEWER NOTES

SEE SHEETS C3.2 FOR SANITARY SEWER COLLECTION SYSTEM PLAN AND PROFILES. SEE SHEET C4.5 FOR SEWER DETAILS AND NOTES.

FIRE ALARM NOTES

THE PROPOSED MUNICIPAL FIRE ALARM LOOP SHALL BE PROVIDED IN A DEDICATED 2" CONDUIT, SAME TRENCH AS THE TELECOMM UTILITIES, WITH NO POWER, AND MUNICIPAL FIRE ALARM BOXES SHALL BE LOCATED ON EACH BUILDING TO THE SATISFACTION OF THE LEBANON FIRE DEPARTMENT.

ELECTRICAL NOTES

- E1** PROPOSED ELECTRICAL TRANSFORMER
- E2** PROPOSED ELECTRICAL VAULT
- E3** PROPOSED ELECTRICAL DUCT BANK — (4") 2X2 AND (6") 2X2
- E4** PROPOSED ELECTRICAL DUCT BANK — (4") 2X1
- E5** EXACT LOCATION AND ELEVATION OF SERVICE ENTRANCE TO BE DETERMINED BY ELECTRICAL ENGINEER. REFER TO MEP PLANS AND DETAILS.

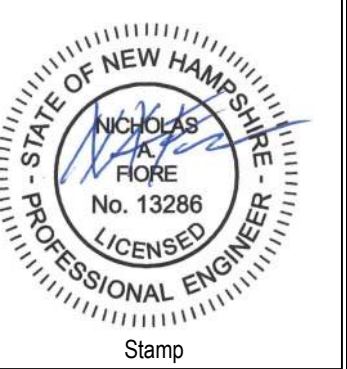
PROPANE NOTES

- P1** 1,000 GALLON, UNDERGROUND, PROPANE TANKS. PROVIDE CONCRETE ANCHOR PADS AND TIE-DOWN STRAPS AS SPECIFIED BY LOCAL PROPANE SUPPLIER. COORDINATE EXACT LOCATION WITH LOCAL PROPANE SUPPLIER TO CONFIRM CONFORMANCE WITH NFPA SETBACKS.
- P2** PROPANE LINE. REFER TO MEP PLANS FOR SIZE, DEPTH AND MATERIALS.



RECORD DRAWINGS

AS-BUILT* INFORMATION SHALL BE PREPARED BY THE CONTRACTOR AT THE TIME OF COMPLETION OF THE SYSTEM PER CITY OF LEBANON DPW STANDARDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORD NORTHING, EASTING (STATE PLANE COORDINATES) AND ELEVATION ON ALL UNDERGROUND UTILITY LINES AT BENDS, GRADE CHANGES, CROSSINGS WITH OTHER UNDERGROUND UTILITIES, STRUCTURES, VALVES AND CLEANOUTS DURING CONSTRUCTION. RECORD PLANS SHALL BE COMPILED AND SUBMITTED IN AUTOCAD FORMAT WITH THREE SETS OF HARD COPY TIE SHEETS. RECORD UTILITY PROFILES AND DETAIL SHEETS NEED TO BE ANNOTATED TO REFLECT ANY PROJECT MODIFICATIONS OR ADDENDA DISTRIBUTED DURING THE CONSTRUCTION PHASE. RECORD PROFILES AND DETAIL SHEETS SHALL BE PROVIDED IN PDF FORMAT WITH THREE SETS OF FULL SIZE HARD COPIES.



Date	Description	No.
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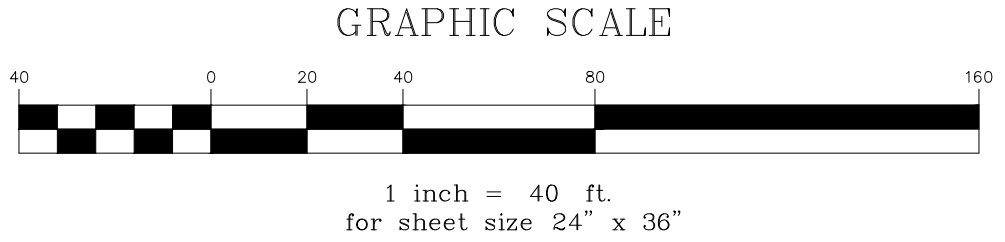
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UTILITIES PLAN
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

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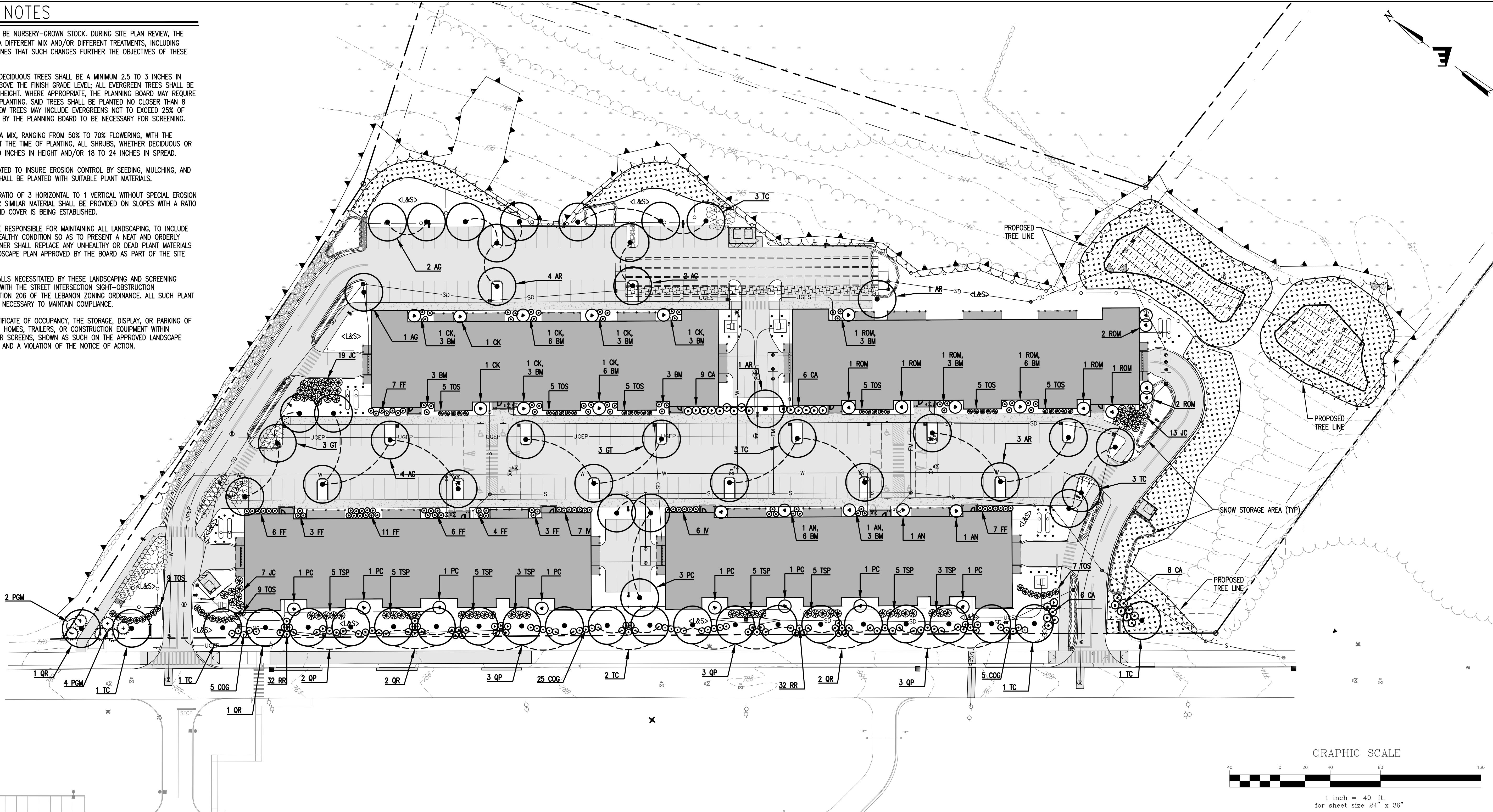
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LANDSCAPING NOTES

1. ALL NEW PLANT MATERIAL SHALL BE NURSERY-GROWN STOCK. DURING SITE PLAN REVIEW, THE PLANNING BOARD MAY REQUIRE A DIFFERENT MIX AND/OR DIFFERENT TREATMENTS, INCLUDING ADDITIONAL TREES, IF IT DETERMINES THAT SUCH CHANGES FURTHER THE OBJECTIVES OF THESE REGULATIONS.
2. AT THE TIME OF PLANTING, ALL DECIDUOUS TREES SHALL BE A MINIMUM 2.5 TO 3 INCHES IN CALIPER, MEASURED 6 INCHES ABOVE THE FINISH GRADE LEVEL; ALL EVERGREEN TREES SHALL BE A MINIMUM OF 6 TO 7 FEET IN HEIGHT. WHERE APPROPRIATE, THE PLANNING BOARD MAY REQUIRE LARGER TREES AT THE TIME OF PLANTING. SAID TREES SHALL BE PLANTED NO CLOSER THAN 8 FEET TO ANY PROPERTY LINE. NEW TREES MAY INCLUDE EVERGREENS NOT TO EXCEED 25% OF THE TOTAL, UNLESS DETERMINED BY THE PLANNING BOARD TO BE NECESSARY FOR SCREENING.
3. SHRUBS SHALL BE PLANTED AS A MIX, RANGING FROM 50% TO 70% FLOWERING, WITH THE REMAINDER BEING EVERGREEN. AT THE TIME OF PLANTING, ALL SHRUBS, WHETHER DECIDUOUS OR EVERGREEN, SHALL BE 24 TO 30 INCHES IN HEIGHT AND/OR 18 TO 24 INCHES IN SPREAD.
4. GRADED AREAS SHALL BE VEGETATED TO INSURE EROSION CONTROL BY SEEDING, MULCHING, AND FERTILIZING. DISTURBED AREAS SHALL BE PLANTED WITH SUITABLE PLANT MATERIALS.
5. GRADING SHALL NOT EXCEED A RATIO OF 3 HORIZONTAL TO 1 VERTICAL WITHOUT SPECIAL EROSION CONTROL MEASURES. NETTING OR SIMILAR MATERIAL SHALL BE PROVIDED ON SLOPES WITH A RATIO GREATER THAN 3:1 WHILE GROUND COVER IS BEING ESTABLISHED.
6. THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR MAINTAINING ALL LANDSCAPING, TO INCLUDE GRASS AND MULCH, IN GOOD, HEALTHY CONDITION SO AS TO PRESENT A NEAT AND ORDERLY APPEARANCE. THE PROPERTY OWNER SHALL REPLACE ANY UNHEALTHY OR DEAD PLANT MATERIALS IN CONFORMANCE WITH THE LANDSCAPE PLAN APPROVED BY THE BOARD AS PART OF THE SITE PLAN.
7. ALL PLANTINGS, FENCES, AND WALLS NECESSITATED BY THESE LANDSCAPING AND SCREENING REQUIREMENTS SHALL CONFORM WITH THE STREET INTERSECTION SIGHT-OBSTRUCTION REQUIREMENTS PROVIDED IN SECTION 206 OF THE LEBANON ZONING ORDINANCE. ALL SUCH PLANT MATERIALS MUST BE PRUNED AS NECESSARY TO MAINTAIN COMPLIANCE.
8. AFTER THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY, THE STORAGE, DISPLAY, OR PARKING OF MOTOR VEHICLES, BOATS, MOBILE HOMES, TRAILERS, OR CONSTRUCTION EQUIPMENT WITHIN LANDSCAPED AREAS, BUFFERS, OR SCREENS, SHOWN AS SUCH ON THE APPROVED LANDSCAPE PLAN, IS EXPRESSLY PROHIBITED AND A VIOLATION OF THE NOTICE OF ACTION.



PLANT SCHEDULE - TREES

DECIDUOUS TREES				
SYM	BOTANICAL NAME	COMMON NAME	QTY	SIZE
AG	ACER GINNALA	AMUR MAPLE	9	2.5-3" CAL
AR	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY MAPLE	9	2.5-3" CAL
GT	GLEDTISIA TRACANTHOS	HONEY LOCUST	9	2.5-3" CAL
PC	PRUNUS CERASUS 'NORTH STAR'	NORTH STAR CHERRY	3	2.5-3" CAL
QP	QUERCUS PALUSTRIS	PIN OAK	11	2.5-3" CAL
QR	QUERCUS RUBRA	RED OAK	6	2.5-3" CAL
TC	TILIA CORDATA	LITTLELEAF LINDEN	15	2.5-3" CAL

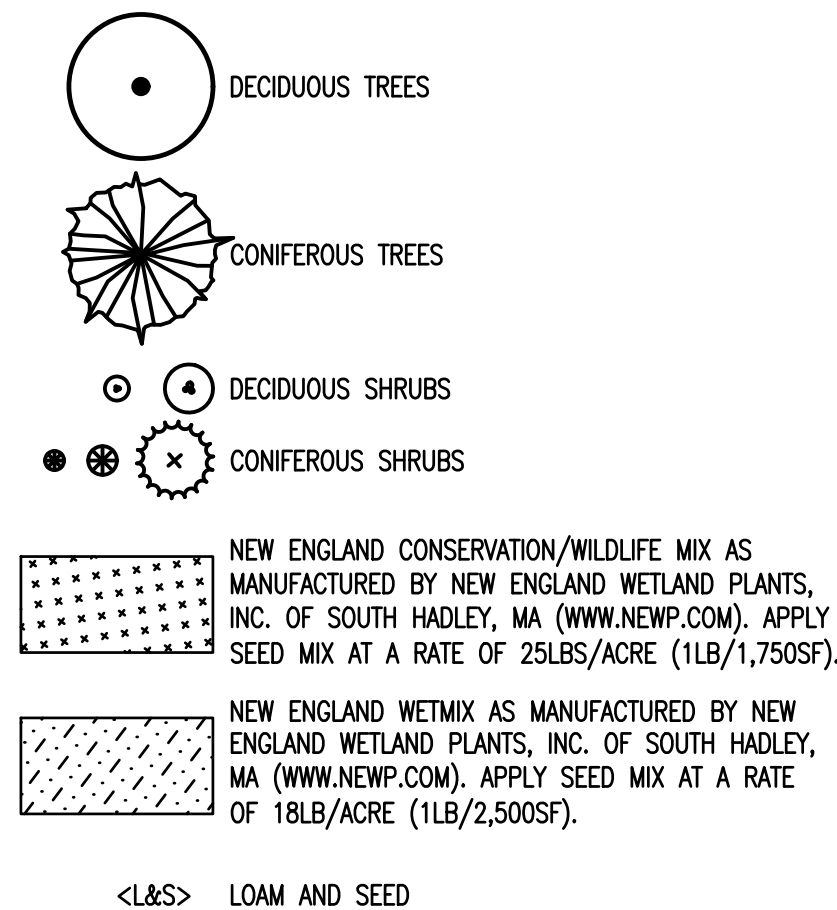
PLANT SCHEDULE - SHRUBS

NOTE:
AT THE TIME OF PLANTING, ALL SHRUBS, WHETHER DECIDUOUS OR EVERGREEN, SHALL BE 24 TO 30 INCHES IN HEIGHT AND/OR 18 TO 24 INCHES IN SPREAD.

DECIDUOUS SHRUBS			
SYM	BOTANICAL NAME	COMMON NAME	QTY
BM	BUXUS MICROPHYLLA 'FRANKLIN'S GEM'	FRANKLIN'S GEM BOXWOOD	51
CA	CLETHRA ALNIFOLIA	SUMMERSWEET	29
CK	CORNUS KOUSA	KOUSA DOGWOOD	8
FF	FORSYTHIA 'FIESTA'	FIESTA FORSYTHIA	47
IV	ILEX VERTICILLATA	WINTERBERRY	25
ROM	RHODODENDRON 'OLGA MEZITT'	OLGA MEZITT RHODODENDRON	7
RR	ROSA RUGOSA	RUGOSA ROSA	64

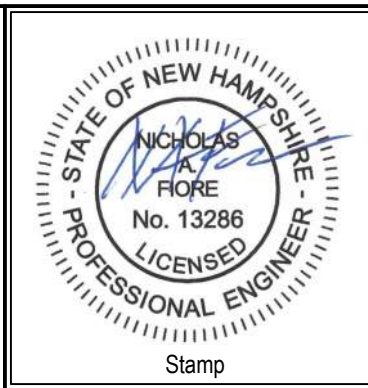
CONIFEROUS SHRUBS			
SYM	BOTANICAL NAME	COMMON NAME	QTY
COG	CHAMAECYPARIS OBTUSA 'GRACIOSA'	GRACIOSA HINOKI FALSECYPRESS	35
JC	JUNIPERUS CONFERTA 'BLUE PACIFIC'	BLUE PACIFIC JUNIPER	3P
PGM	PICEA GLAUCA 'MAC'S GOLDEN'	MAC'S GOLDEN WHITE SPRUCE	6
TOS	THUJA OCCIDENTALIS 'SMARAGO'	EMERALD GREEN ARBORVITAE	55
TSP	THUJA STANDISHII X PLICATA 'GREEN GIANT'	GREEN GIANT ARBORVITAE	36

PLANT LEGEND



PERIMETER LANDSCAPING

MT SUPPORT RD FRONTAGE	
LENGTH OF FRONTAGE	927.5'
LENGTH OF VEGETATION TO REMAIN	73.7'
FRONTAGE REQUIRING LANDSCAPING	853.8'
SHADE TREES	
REQUIRED: 917.9'x15'/600SF	23
PROVIDED:	23
UNDERSTORY TREES AND SHRUBS	
REQUIRED: 917.9'x15'/600SFx5	115
PROVIDED:	115
TOTAL:	138



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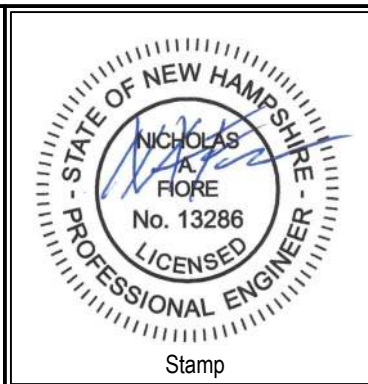
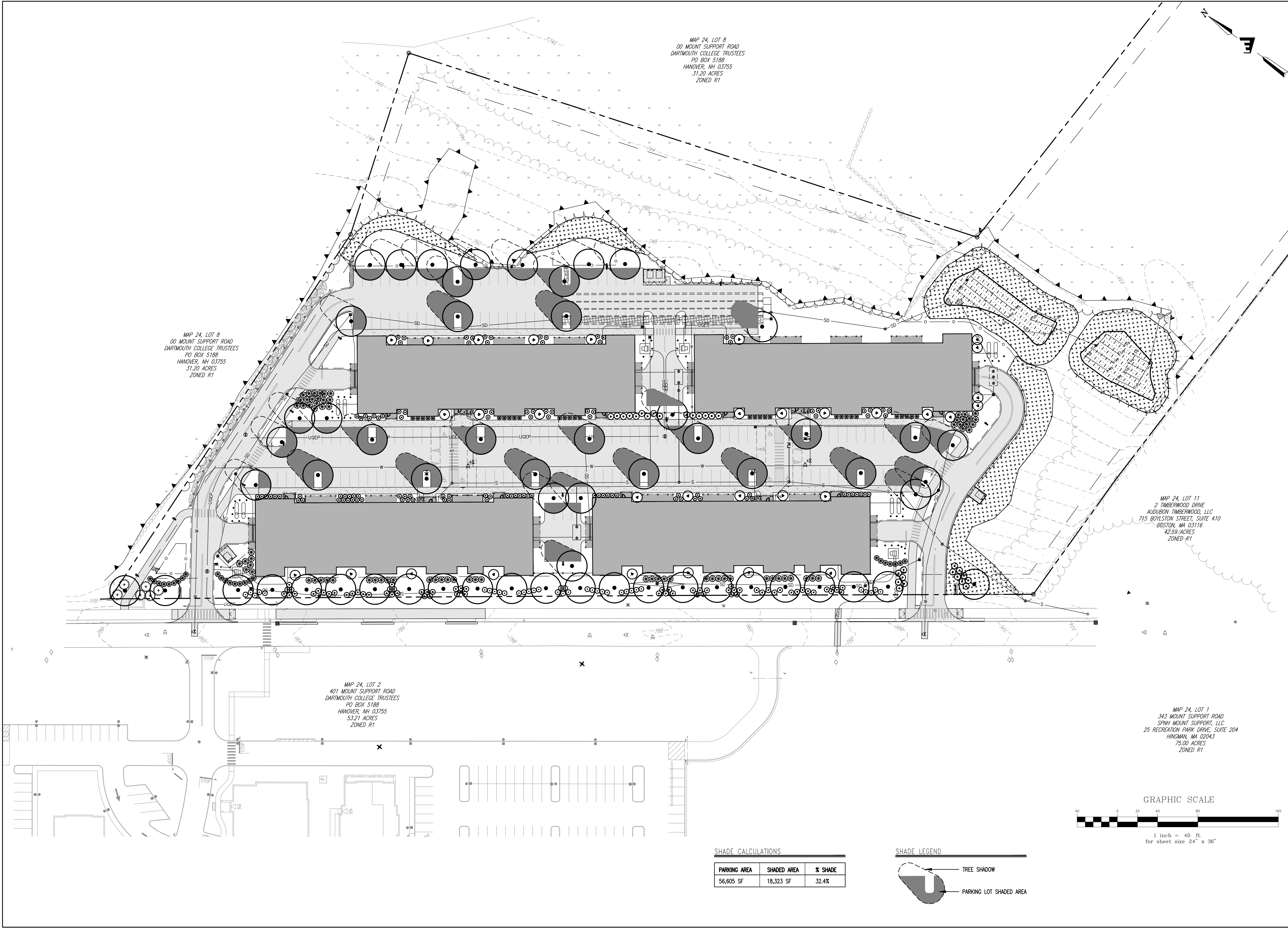
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LANDSCAPING PLAN
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #	19324
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S:\PROJECTS\2019\1524\402 MT SUPPORT RD\DWGSHEET FILES\1524 C2.9 LANDSCAPE PLANNING



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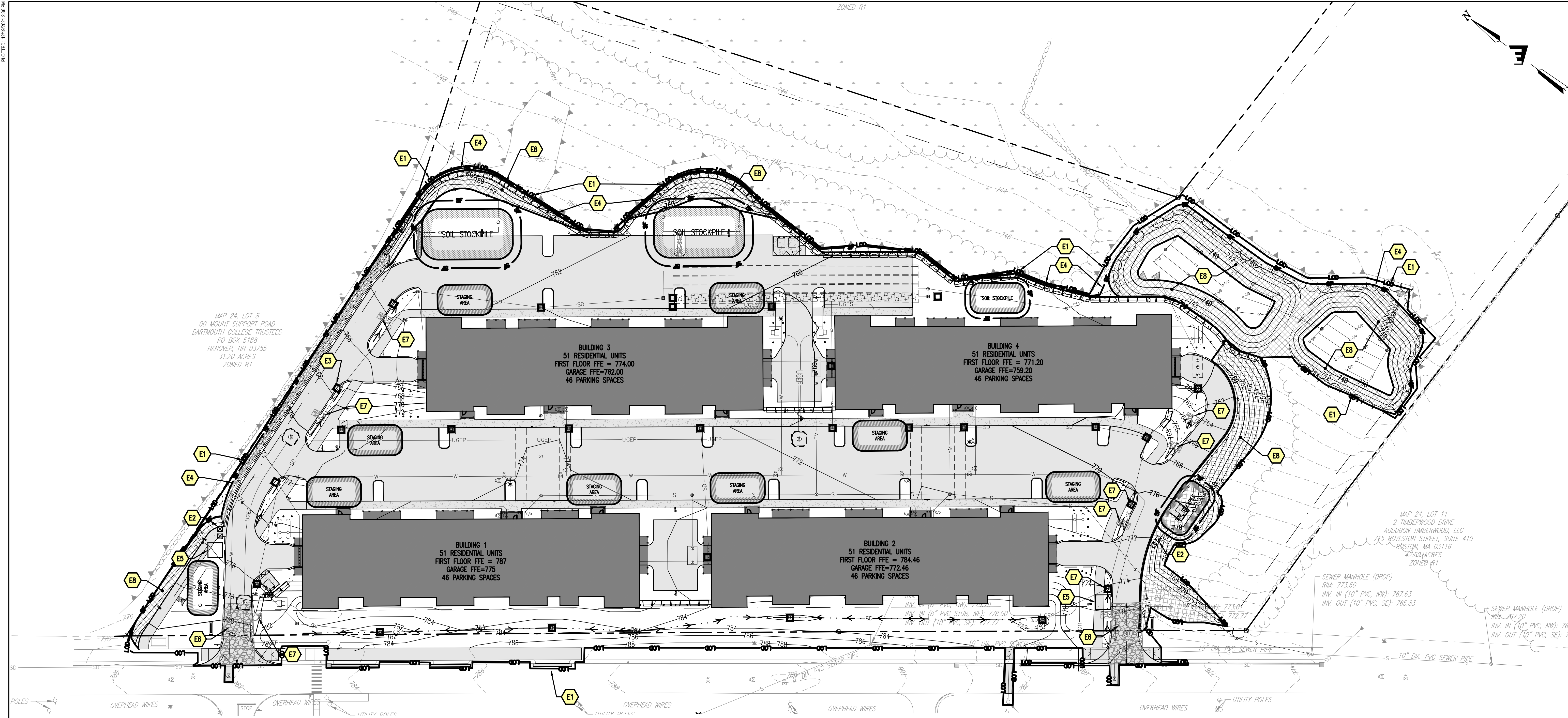
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Project Title: **402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT**
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

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S:\PROJECTS\2019\1024\402 MT SUPPORT BUILDING\2021\1024\1024-10 EROSION CONTROL PLAN.DWG



EROSION CONTROL LEGEND

EROSION PREVENTION AND SEDIMENT CONTROL STRATEGY
THE FOLLOWING TECHNIQUES WILL BE UTILIZED AS PART OF A SEDIMENT AND EROSION CONTROL PROGRAM. THE SEDIMENT AND EROSION CONTROL PROGRAM WILL BE IMPLEMENTED IN STAGES. CERTAIN ITEMS FROM ONE STAGE WILL LIKELY OVERLAP OR TAKE PLACE CONCURRENTLY WITH ITEMS FROM OTHER STAGES. HAY PRODUCTS SHALL NOT BE USED.

TEMPORARY INLET PROTECTION – STONE COLLARS AND/OR INLET SOCKS. INSTALL AS INDICATED ON PLANS. STONE TO BE REMOVED AND REPLACED WITH CLEAN STONE WHEN SEDIMENT IS $\leq 1/2$ DEPTH OF STONE. REMOVE ALL SEDIMENT COLLECTED IN STRUCTURE OR SOCK AS SOON AS POSSIBLE.

STONE CHECK DAM
THIS STRUCTURAL MEASURE IS ALONG DITCHES/ SWALES AND IN OTHER LOCATIONS INDICATED ON THIS PLAN TO SLOW STORMWATER RUNOFF AND TRAP SEDIMENT PARTICLES. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED.

PERMANENT EROSION CONTROL NETTING
THIS STRUCTURAL MEASURE IS INSTALLED IN AREAS THAT HAVE SLOPES 3:1 AND GREATER AND IN OTHER LOCATIONS INDICATED ON THIS PLAN TO STABILIZE THE SLOPE AND REDUCE THE EROSION POTENTIAL. THE NETTING IS TYPICALLY IMPREGNATED WITH GRASS SEED AND SOMETIMES STAPLED TO THE EXPOSED SOIL. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED.

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE
THIS STRUCTURAL MEASURE IS A STABILIZED PAD OF AGGREGATE UNDERLAIN WITH FILTER FABRIC LOCATED AT ANY POINT WHERE TRAFFIC WILL BE ENTERING OR LEAVING A CONSTRUCTION SITE TO OR FROM A PUBLIC RIGHT-OF-WAY, STREET, ALLEY, SIDEWALK, OR PARKING AREA. THE PURPOSE OF A STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY OR STREETS. THIS WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. ONCE REMOVED, THE IMPACTED AREA SHALL BE SEED AND MULCHED.

TEMPORARY SEDIMENT BASIN
THIS STRUCTURAL MEASURE INVOLVES CONSTRUCTING TEMPORARY SEDIMENT BASINS IN THE LOCATION OF PROPOSED STORMWATER PONDS. GENERALLY THE STORMWATER PONDS CAN BE CONSTRUCTED AS SHOWN ON THE PLANS HOWEVER ORIFICE ON THE OUTLET STRUCTURES SHALL BE OMITTED UNTIL THE SITE IS STABILIZED TO IMPROVE RUNOFF AND ALLOW FOR SETTLING OF SUSPENDED FINES. THIS WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. ONCE THE SITE IS STABILIZED, SEDIMENT SHALL BE REMOVED FROM THE BASINS AND THE OUTLET ORIFICE SHALL BE DRILLED INTO THE OUTLET STRUCTURE AS NOTED ON THE PLANS.

TEMPORARY STAGING AND WASTE AREAS (APPROXIMATE)
THESE ARE APPROVED LOCATIONS WHERE NON-SOIL, NON-ERODIBLE MATERIALS MAY BE STORED. SOILS SHALL NOT BE STORED IN THESE AREAS.

TEMPORARY SOIL STOCKPILE AREAS (APPROXIMATE)
THESE ARE APPROVED LOCATIONS WHERE TOPSOIL AND OTHER SOIL MATERIALS MAY BE STORED. THESE STOCKPILES WILL BE PROTECTED FROM EROSION BY A NUMBER OF METHODS, INCLUDING INSTALLING SILT FENCING AROUND THE DOWN GRADIENT PERIMETER OF THE STOCKPILE AND SEEDING AND MULCHING THE STOCKPILE WHEN NOT IN USE FOR MORE THAN FIVE DAYS.

TEMPORARY STRAW FIBER ROLL
STRAW FIBER ROLLS ARE FLEXIBLE, CYLINDRICAL SEDIMENT RETENTION FIBER ROLLS (SRFRs) COMPRISED OF VARIOUS TYPES OF COMPRESSED MATRICES, DESIGNED TO REDUCE HYDRAULIC ENERGY AND FILTER SEDIMENT-LOADED STORMWATER RUNOFF ON SLOPES AND IN CHANNELS. SRFRs ARE DESIGNED TO BE USED AS PERIMETER CONTROLS, SLOPE INTERCEPTOR DEVICES, CHECK DAMS, AROUND TEMPORARY SOIL STOCKPILES, AT CURB CUTS AND DRAIN INLETS. SRFRs SHOULD BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES AND SECURED WITH WOODEN STAKES. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED.

LIMITS OF DISTURBANCE
THE CONTRACTOR SHALL CONTAIN ANY EARTH MOVING ACTIVITIES WITHIN THE DESIGNATED LIMITS SHOWN ON THIS PLAN. THE ENGINEER SHALL REVIEW THE SITE TO MAKE ANY ADJUSTMENTS TO ACCOUNT FOR ENVIRONMENTALLY SENSITIVE AREAS, SPECIMEN TREES AND SPECIAL AREAS OF CONCERN.

CONSTRUCTION SEQUENCE

1. CONTRACTOR TO COORDINATE STOCKPILE AND STAGING AREAS WITH THE OWNER.
2. PRIOR TO THE START OF CONSTRUCTION THE CONTRACTOR SHALL HOST A PRECONSTRUCTION MEETING WITH OWNER, ENGINEER, CITY PLANNING, POLICE, FIRE, AND PUBLIC WORKS STAFF.
3. PRIOR TO ANY OTHER WORK, SILT FENCES SHALL BE INSTALLED GENERALLY 10 FEET FROM THE BASE OF THE FILL SLOPES, OR AS SHOWN ON THE EROSION CONTROL PLAN. THESE SHALL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN STABILIZED. SEDIMENT SHALL BE REMOVED FROM BEHIND THE SILT FENCE WHEN IT BECOMES 6 INCHES DEEP AT THE FENCE. THE SILT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A PROPER SEDIMENT BARRIER.
4. INSTALL TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT.
5. INSTALL INLET PROTECTION ON EXISTING CATCH BASINS AFFECTED DURING CONSTRUCTION.
6. ROUGH GRADE AND STOCKPILE TOPSOIL SURROUNDED BY SILT FENCE.
7. DEMO EXISTING STRUCTURES AS REQUIRED.
8. CLEAR AND GRUB, REMOVE LOOSE PAVING/DEMO PAVING AS REQUIRED AND HAUL OFF SITE USING EXISTING PARKING AREA AS STAGING.
9. GRADE DRIVE ENTRANCE AND EXCAVATE BUILDING PAD.
10. BEGIN VERTICAL CONSTRUCTION OF BUILDING FOUNDATION CONCURRENT WITH WATER AND SEWER UTILITIES.
11. CONSTRUCT STORMWATER SYSTEM.
12. EXCAVATE AND PREP FOR INFILTRATION SYSTEM, IMPORT BASE SUBGRADE MATERIALS AS NECESSARY.
13. COORDINATE INSTALLATION OF DRAINAGE DETENTION SYSTEM.
14. INSTALL STORMWATER PIPING AND STRUCTURES.
15. BACKFILL AND SUBGRADE PREP FOR NEW PARKING AND SIDEWALK AREAS.
16. COMPLETE FINAL GRADING OF SITE. PLACE TOPSOIL AND PERMANENTLY VEGETATE, LANDSCAPE, AND MULCH.
17. INSTALL LIGHT POLES.
18. PAVE BASE COURSE.
19. STABILIZE EXPOSED SLOPES AND SOILS AS SOON AS GRADED, REPAIR AND REESTABLISH ALL DISTURBED VEGETATED/PLANN AREAS, AND MAINTAIN UNTIL ADEQUATELY VEGETATED.
20. PAVE WEARING COURSE.
21. AFTER THE SITE IS APPROVED BY THE ENGINEER AS ADEQUATELY STABILIZED, REMOVE ALL TEMPORARY.
22. ANTICIPATED FINAL COMPLETION DATE SUMMER/FALL 2022.

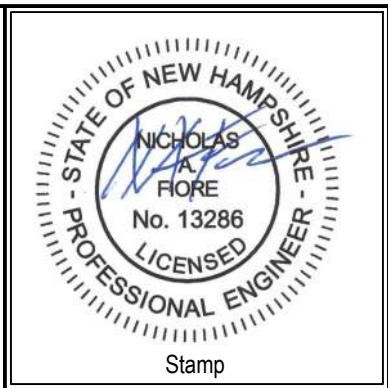
STORMWATER POLLUTION PREVENTION NOTES

- E1 LIMIT OF DISTURBANCE (AREA OF DISTURBANCE = 303,000 SF)
- E2 PORTABLE SANITATION FACILITIES, TO BE STAKED DOWN AND SECURED
- E3 INLET PROTECTION (TYP.)
- E4 STRAW FIBER ROLL
- E5 CONCRETE WASHOUT
- E6 STABILIZED CONSTRUCTION ENTRANCE
- E7 CHECK DAM
- E8 EROSION CONTROL NETTING

GRAPHIC SCALE



1 inch = 40 ft.
for sheet size 24" x 36"



Date	Description	No.
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EROSION PREVENTION AND SEDIMENT CONTROL PLAN
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #	19324
Drawn By:	ADM
Checked By:	NAF
Scale:	1" = 40'
Date:	11/08/2021

C2.10
Page 60 of 399



402 MT. SUPPORT APARTMENTS
Site Lighting Layout

Designer
Heidi G. Connors
Visible Light, Inc.
24 Stickney
Terrace
Suite 6
Hampton, NH
07842
Scale
1"=40'
Drawing No.
Summary

Schedule										
Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Filename	Lumens per Lamp	LLF	Wattage
	2S3	2	Lithonia Lighting	DSX0 LED P2 30K T3M MVOLT SPA DDBXD with SSS 15 4C DM28AS DDBXD	DSX0 LED Area Fixtures; pole-mounted at 15ft	LED	DSX0_LED_P2_30K_T3M_MV_OLT.ies	5416	0.9	98
	D	16	Lithonia Lighting	LDN4 30/10 L04AR LSS	4in LED Downlight; recessed at 10ft	LED	LDN4_30_10_L04AR_LSS.ies	1031	0.9	11
	PG	24	Lithonia Lighting	VCPG V4 LED P1 30K 80CRI T5M MVOLT SRM DDBXD	VCPG LED Parking Garage Fixture; mounted at 9ft	LED	VCPG_LED_P1_30K_T5M_MV_OLT.ies	3620	0.9	27
	S3	7	Lithonia Lighting	DSX0 LED P2 30K T3M MVOLT SPA DDBXD with SSS 15 4C DM19AS DDBXD	DSX0 LED Area Fixture; pole-mounted at 15ft	LED	DSX0_LED_P2_30K_T3M_MV_OLT.ies	5416	0.9	49
	S4	5	Lithonia Lighting	DSX0 LED P2 30K T3M MVOLT SPA DDBXD with SSS 15 4C DM19AS DDBXD	DSX0 LED Area Fixture; pole-mounted at 15ft	LED	DSX0_LED_P2_30K_T3M_MVOLT.ies	5576	0.9	49
	T3	2	Lithonia Lighting	DSX0 LED P1 30K BLC MVOLT	DSX0 LED P1 30K BLC MVOLT	LED	DSX0_LED_P1_30K_BLC_MV_OLT.ies	3585	0.9	38
	T4	1	Lithonia Lighting	DSX0 LED P1 30K T3M MVOLT SPA DDBXD with SSS 10 4C DM19AS DDBXD	DSX0 LED Area Fixture; mounted at 10ft	LED	DSX0_LED_P1_30K_T3M_MVOLT.ies	4373	0.9	38
	W3	20	Lithonia Lighting	WDGE2 LED P4 30K 80CRI T3M MVOLT SRM DDBXD	WDGE2 LED Wallpack; wall-mounted at 15ft	LED	WDGE2_LED_P4_30K_80CRI_T3M.ies	4065	0.9	35

Plan View
Scale - 1" = 40ft

Statistics

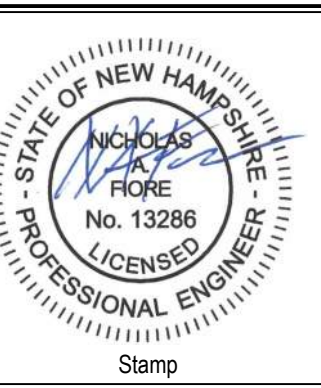
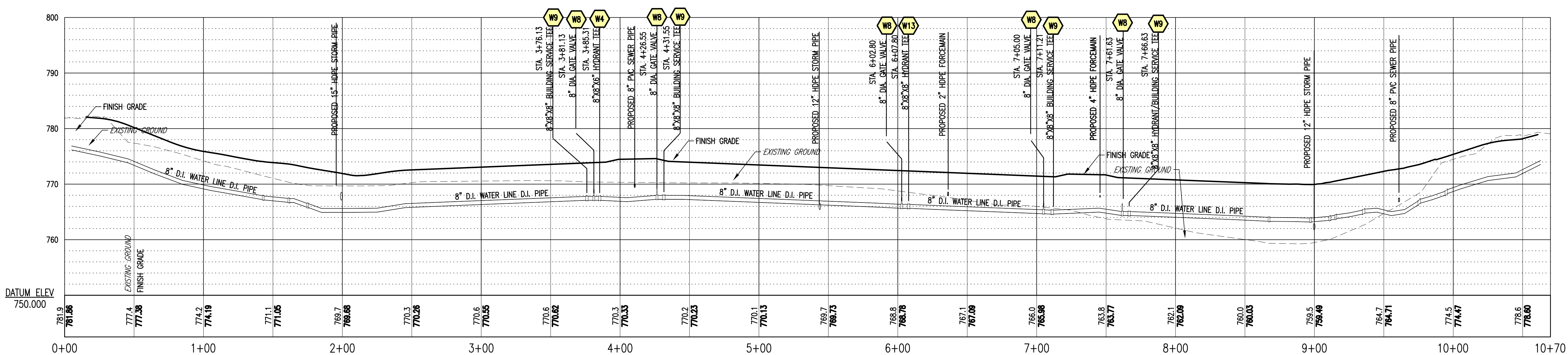
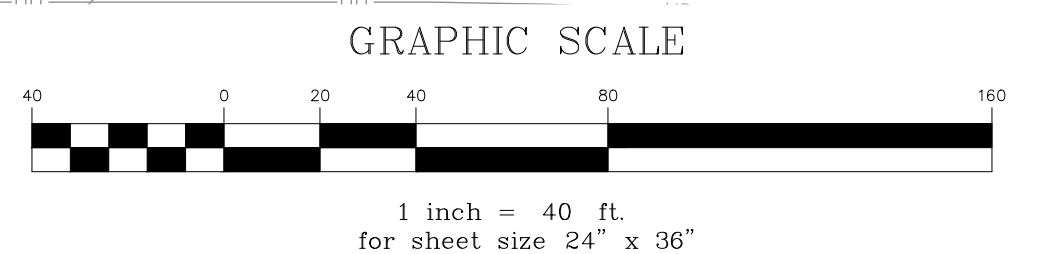
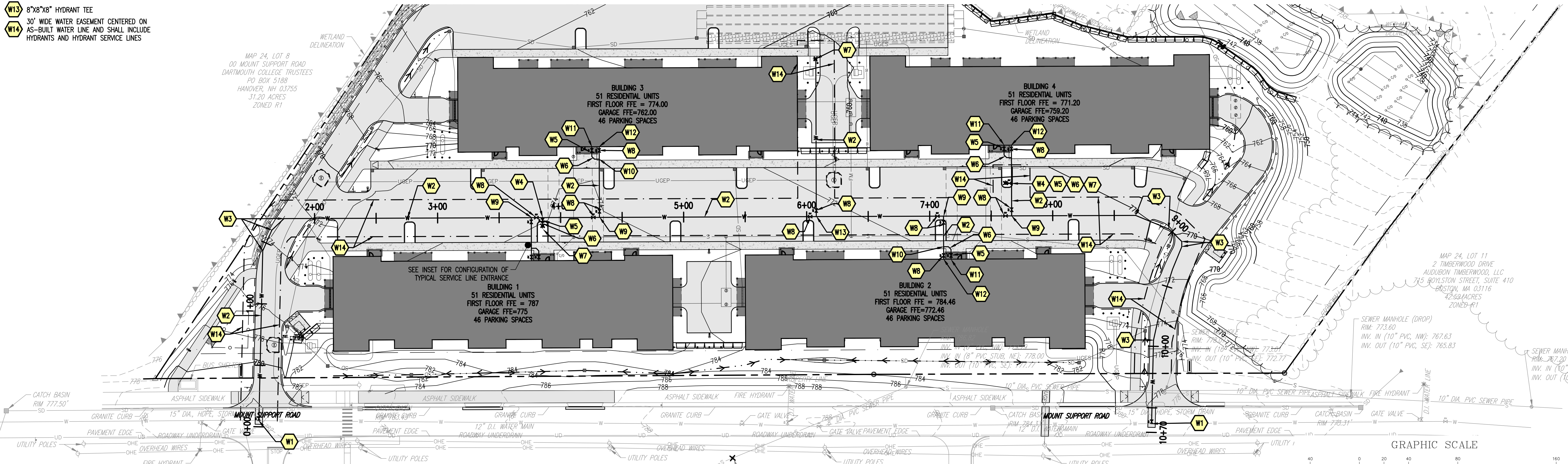
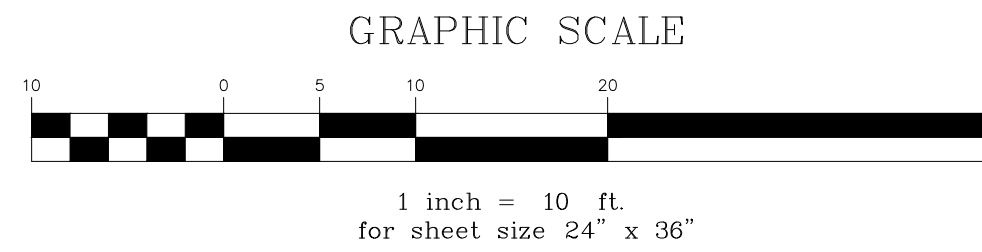
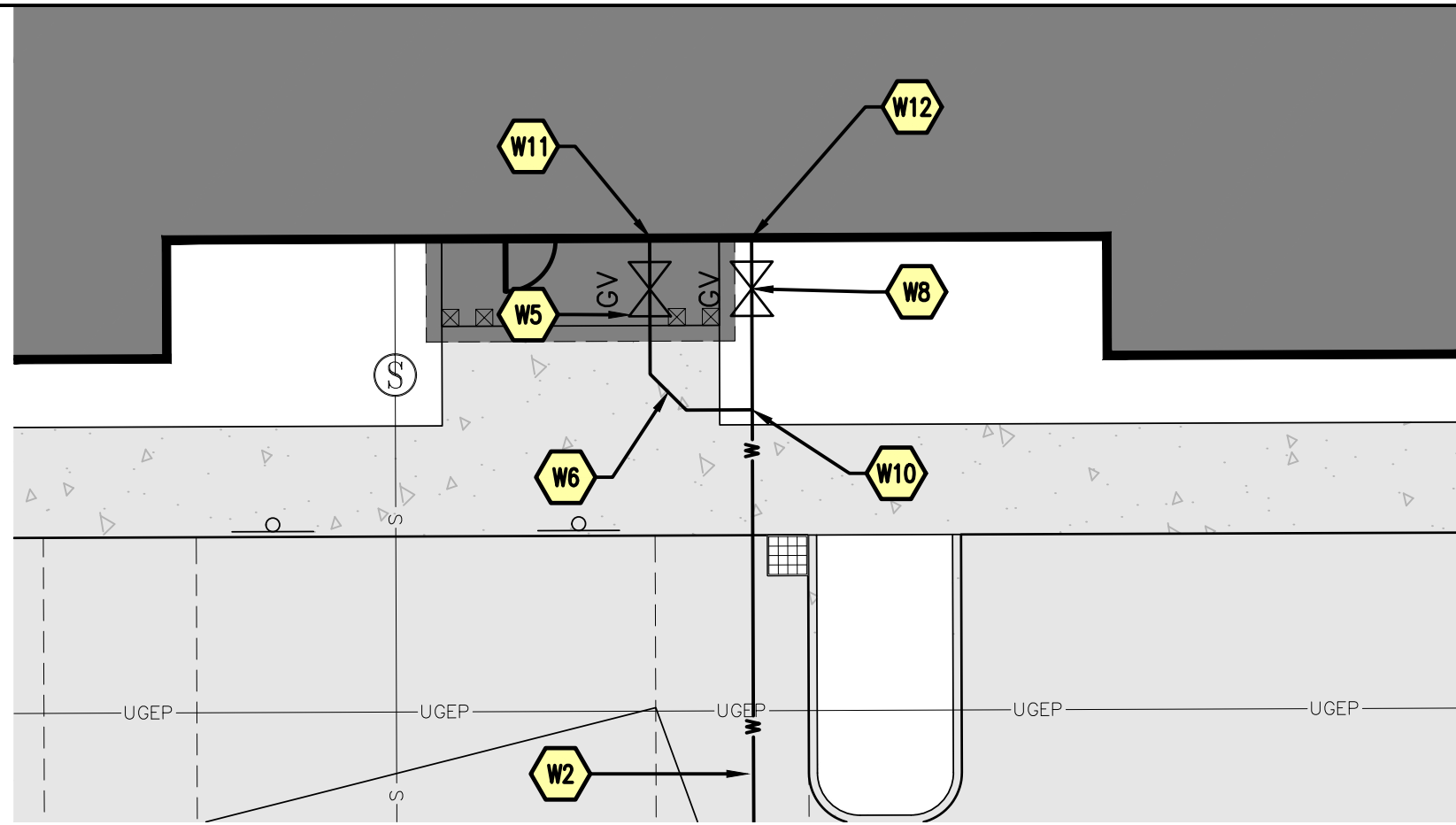
Description

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Area Northeast of Bldg 3		1.4 fc	3.0 fc	0.3 fc	10.0:1	4.7:1
Area Northeast of Bldgs 1 & 2		1.7 fc	10.4 fc	0.0 fc	N/A	N/A
Area Southwest of Bldgs 3 & 4		1.6 fc	11.4 fc	0.0 fc	N/A	N/A
Outside of Parking Lot		0.1 fc	6.2 fc	0.0 fc	N/A	N/A
Parking Lot		1.1 fc	8.0 fc	0.3 fc	26.7:1	3.7:1
Small Parking Lot Between Buildings		2.8 fc	5.9 fc	0.8 fc	7.4:1	3.5:1

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WATER SCHEDULE

- W1 12" TAPPING SLEEVE AND VALVE WITH 12"x8" REDUCER FOR CONNECTION TO EXISTING 12" WATERMAIN, COORDINATE WORK WITH LEBANON DEPARTMENT OF PUBLIC WORKS.
- W2 8" DIA. DUCTILE IRON WATER LINE
- W3 8" DIA. HORIZONTAL BEND FITTING AS NEEDED TO MATCH ALIGNMENT SHOWN, TYP.
- W4 8"x8"x6" REDUCING HYDRANT TEE, TYP.
- W5 6" DIA. GATE VALVE, MIXMJ WITH MECHANICAL RESTRAINTS, TYP.
- W6 6" DIA. DUCTILE IRON WATER LINE, TYP.
- W7 FIRE HYDRANT, TYP.
- W8 8" DIA. GATE VALVE, MIXMJ WITH MECHANICAL RESTRAINTS, TYP.
- W9 8"x8"x8" TEE FOR BUILDING SERVICE, TYP.
- W10 8"x8"x6" REDUCING TEE FOR DOMESTIC WATER SERVICE, TYP.
- W11 6" DOMESTIC WATER SERVICE ENTRANCE, TYP. INVERT ELEVATION TO MATCH FIRE SERVICE ENTRANCE ELEVATION SHOWN ON PROFILES.
- W12 8" FIRE SERVICE ENTRANCE, TYP.
- W13 8"x8"x8" HYDRANT TEE
- W14 30' WIDE WATER EASEMENT CENTERED ON AS-BUILT WATER LINE AND SHALL INCLUDE HYDRANTS AND HYDRANT SERVICE LINES



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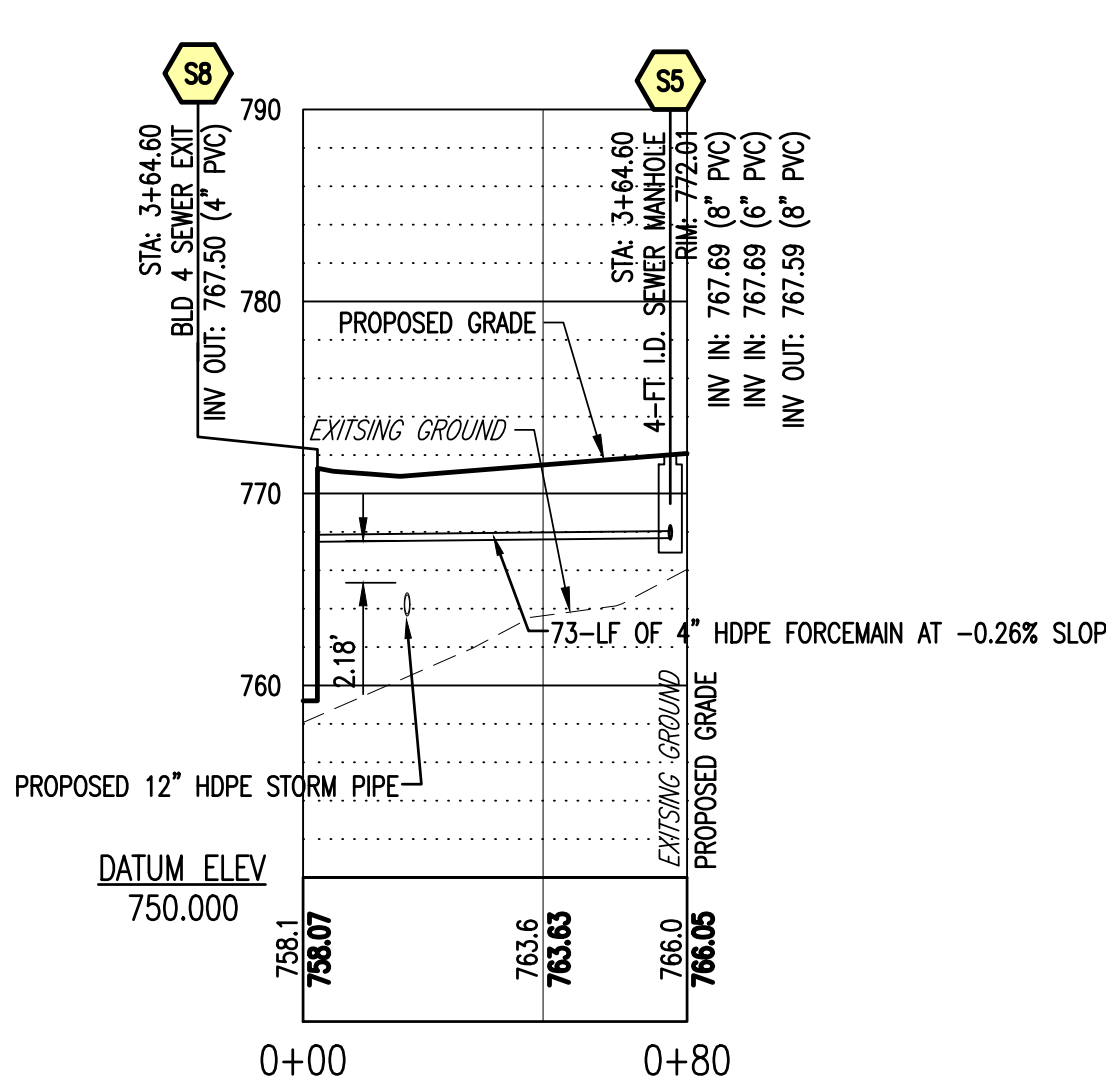
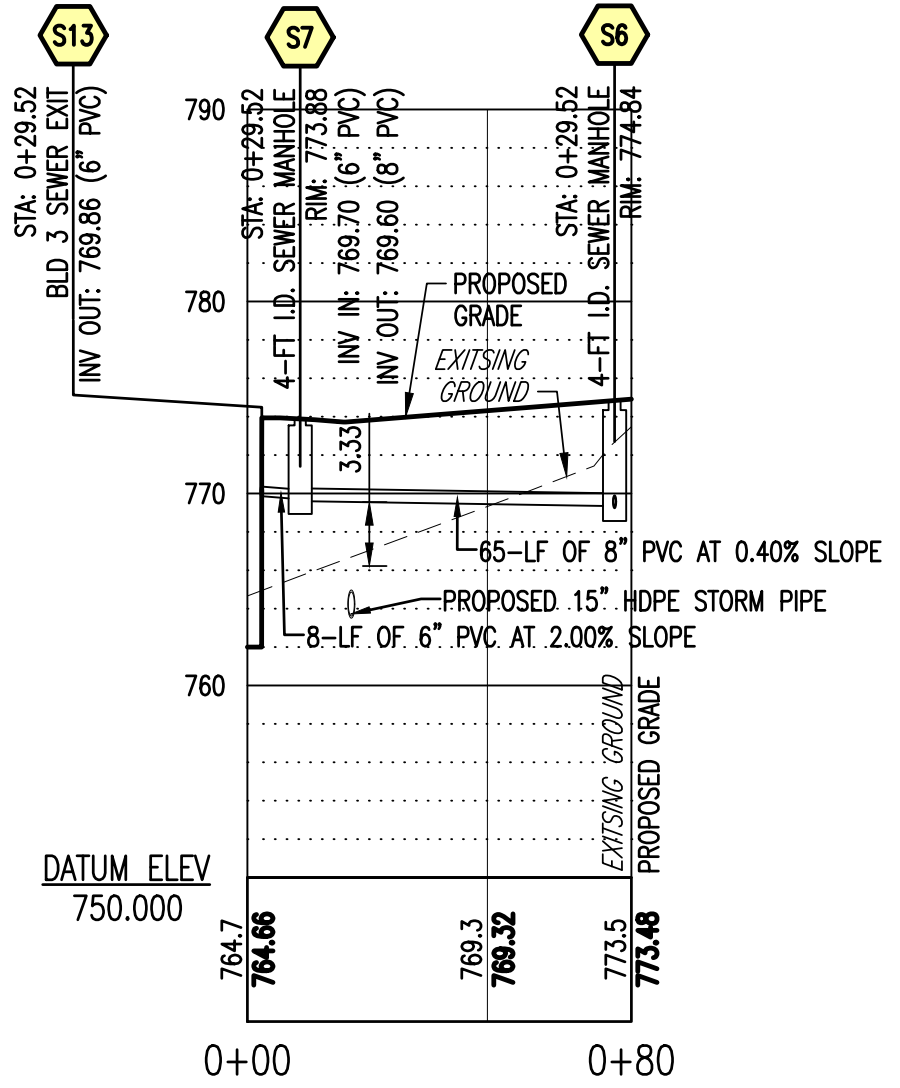
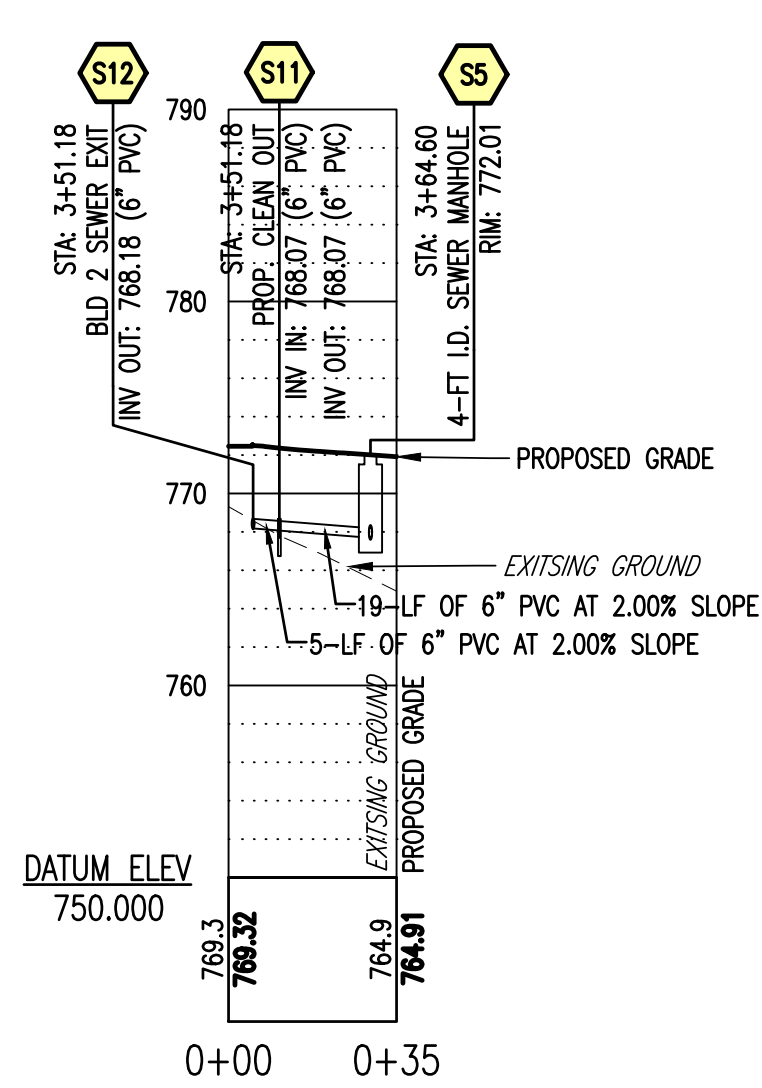
WATER PLAN & PROFILES

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #	19324
Drawn By:	JWF/HKW
Checked By:	NAF
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SEWER SCHEUDLE

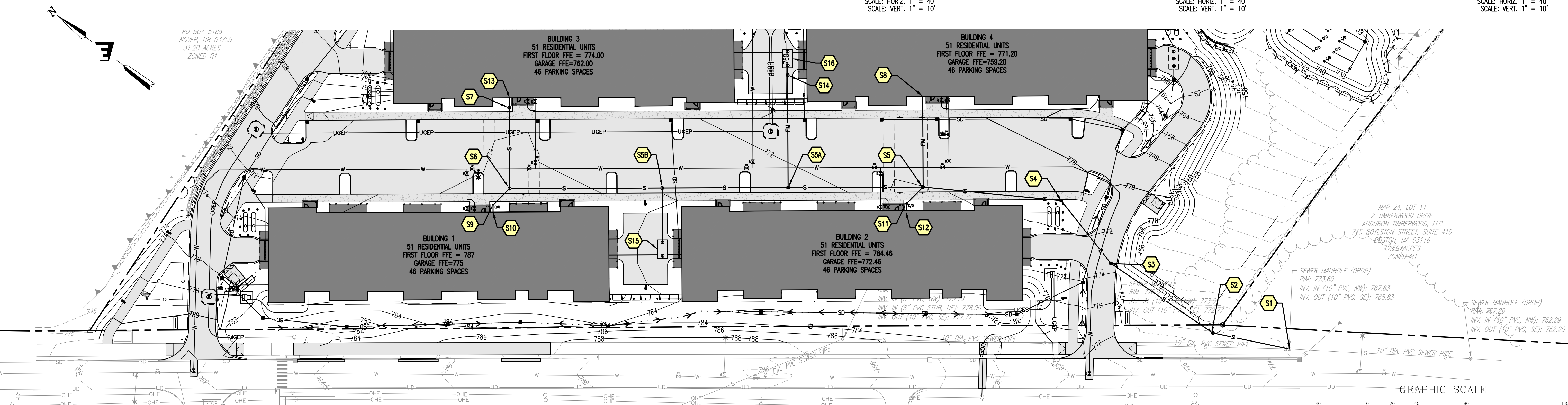
S1 EXISTING SEWER MANHOLE RIM: 773.89 INV. IN: 765.93 (8" PVC) INV. OUT: 767.63 (EX. 10" PVC) INV. OUT: 765.83 (EX. 10" PVC)	S5A 4-FT I.D. SEWER MANHOLE RIM: 772.41 INV. IN: 768.23 (8" PVC) INV. IN: 768.23 (2" HDPE FORCEMAIN) INV. OUT: 768.13 (8" PVC)	S8 BLD 4 SEWER EXIT INV. OUT: 767.50 (4" HDPE FORCEMAIN)
S2 4-FT I.D. SEWER MANHOLE RIM: 774.35 INV. IN: 766.28 (8" PVC) INV. OUT: 766.18 (8" PVC)	S5B 4-FT I.D. SEWER MANHOLE RIM: 773.42 INV. IN: 768.74 (8" PVC) INV. IN: 768.74 (8" PVC) INV. OUT: 768.64 (8" PVC)	S9 PROP. CLEAN OUT INV. IN: 769.72 (6" PVC) INV. OUT: 769.72 (6" PVC)
S3 4-FT I.D. SEWER MANHOLE RIM: 773.45 INV. IN: 766.78 (8" PVC) INV. OUT: 766.68 (8" PVC)	S6 4-FT I.D. SEWER MANHOLE RIM: 774.84 INV. IN: 769.34 (6" PVC) INV. IN: 769.34 (8" PVC) INV. OUT: 769.24 (8" PVC)	S10 BLD 1 SEWER EXIT INV. OUT: 769.83 (6" PVC)
S4 4-FT I.D. SEWER MANHOLE RIM: 771.24 INV. IN: 767.14 (8" PVC) INV. OUT: 767.04 (8" PVC)	S7 4-FT I.D. SEWER MANHOLE RIM: 773.88 INV. IN: 769.70 (6" PVC) INV. OUT: 769.60 (8" PVC)	S11 PROP. CLEAN OUT INV. IN: 768.07 (6" PVC) INV. OUT: 768.07 (6" PVC)
S5 4-FT I.D. SEWER MANHOLE RIM: 772.01 INV. IN: 767.69 (8" PVC) INV. IN: 767.69 (6" PVC) INV. OUT: 767.59 (8" PVC)		S12 BLD 2 SEWER EXIT INV. OUT: 768.18 (6" PVC)
		S13 BLD 3 SEWER EXIT INV. OUT: 769.86 (6" PVC)
		S14 5-FT I.D. PUMP STATION INV. IN: 755.59 (6" PVC) INV. OUT: 755.59 (2" HDPE FORCEMAIN)
		S15 1,500 GAL. OIL/GAS SEPARATOR INV. IN: 769.16 (6" PVC) INV. OUT: 768.91 (6" PVC)
		S16 1,500 GAL. OIL/GAS SEPARATOR INV. IN: 765.96 (6" PVC) INV. OUT: 755.71 (6" PVC)



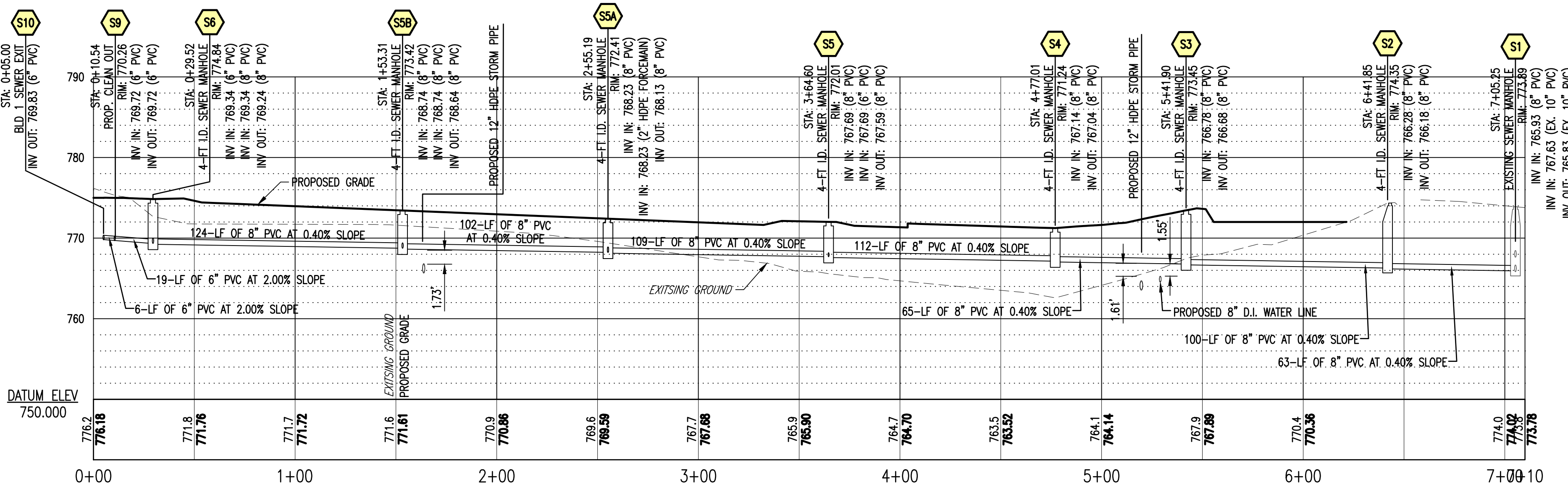
SEWER PROFILE, BUILDING 2 SERVICE

SEWER PROFILE, BUILDING 3 SERVICE

SEWER PROFILE, BUILDING 4 SERVICE



SEWER PLAN, 0+00 - 7+05



PROPOSED SEWER PROFILE, STA. 0+00 - 7+05

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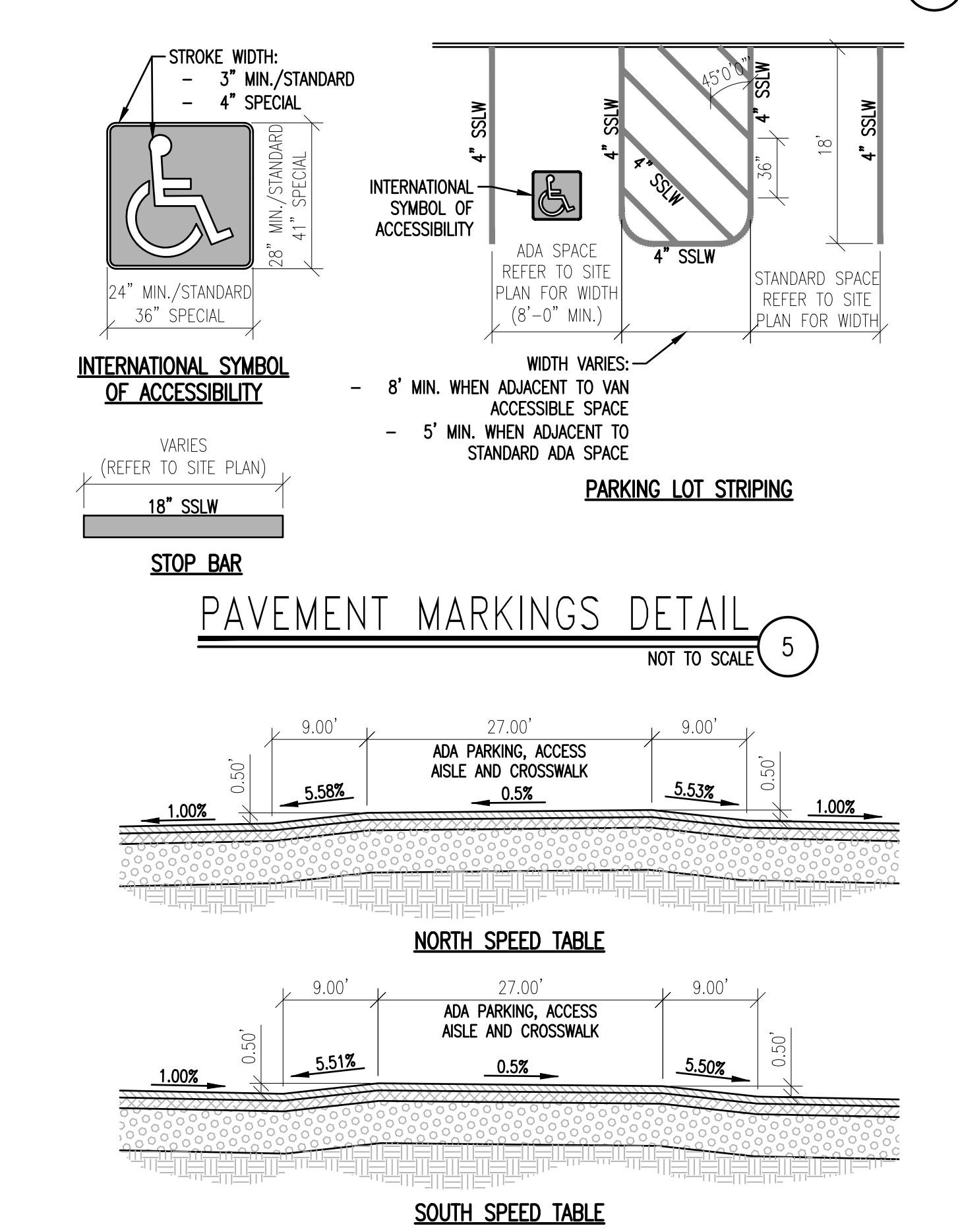
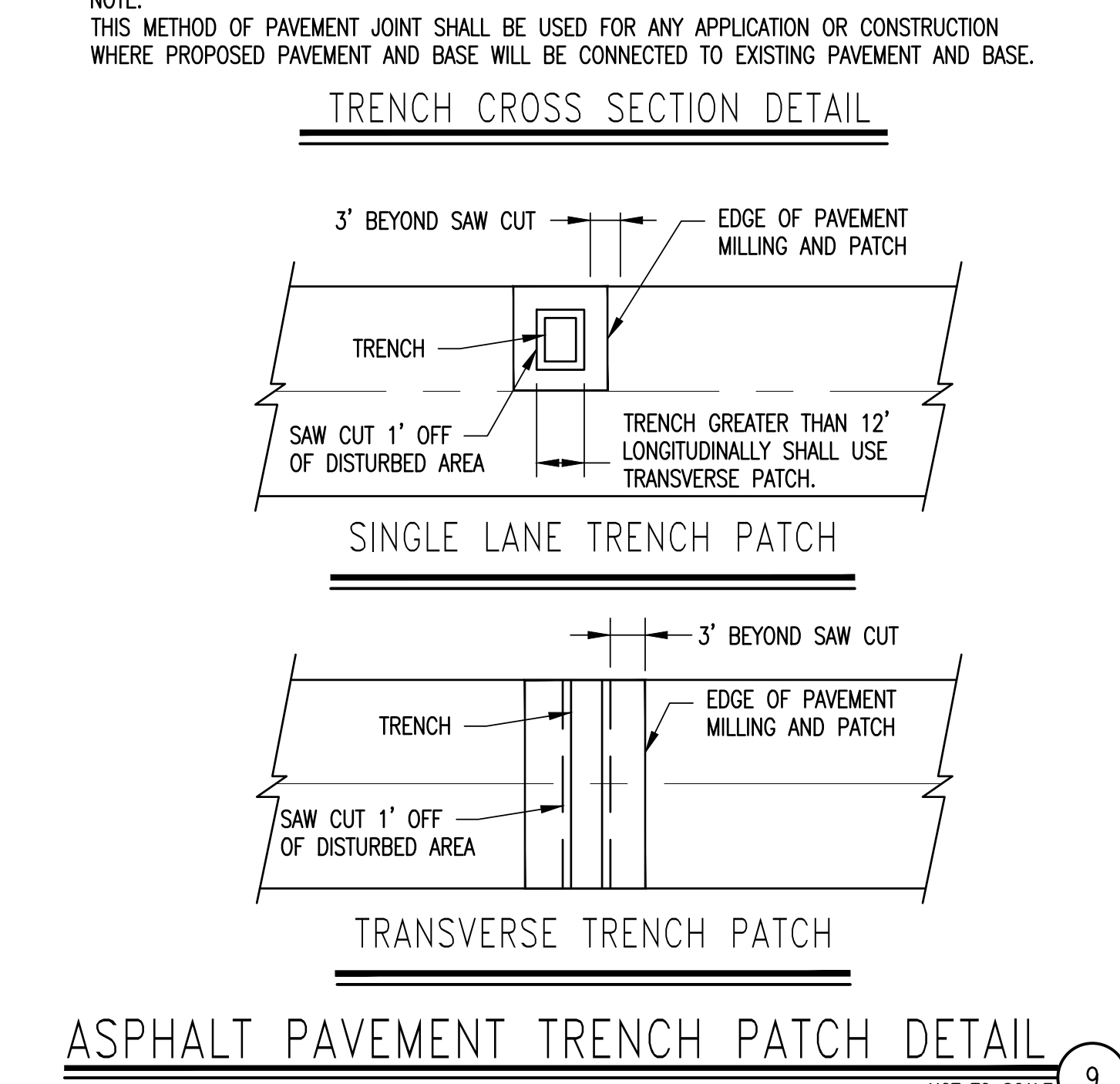
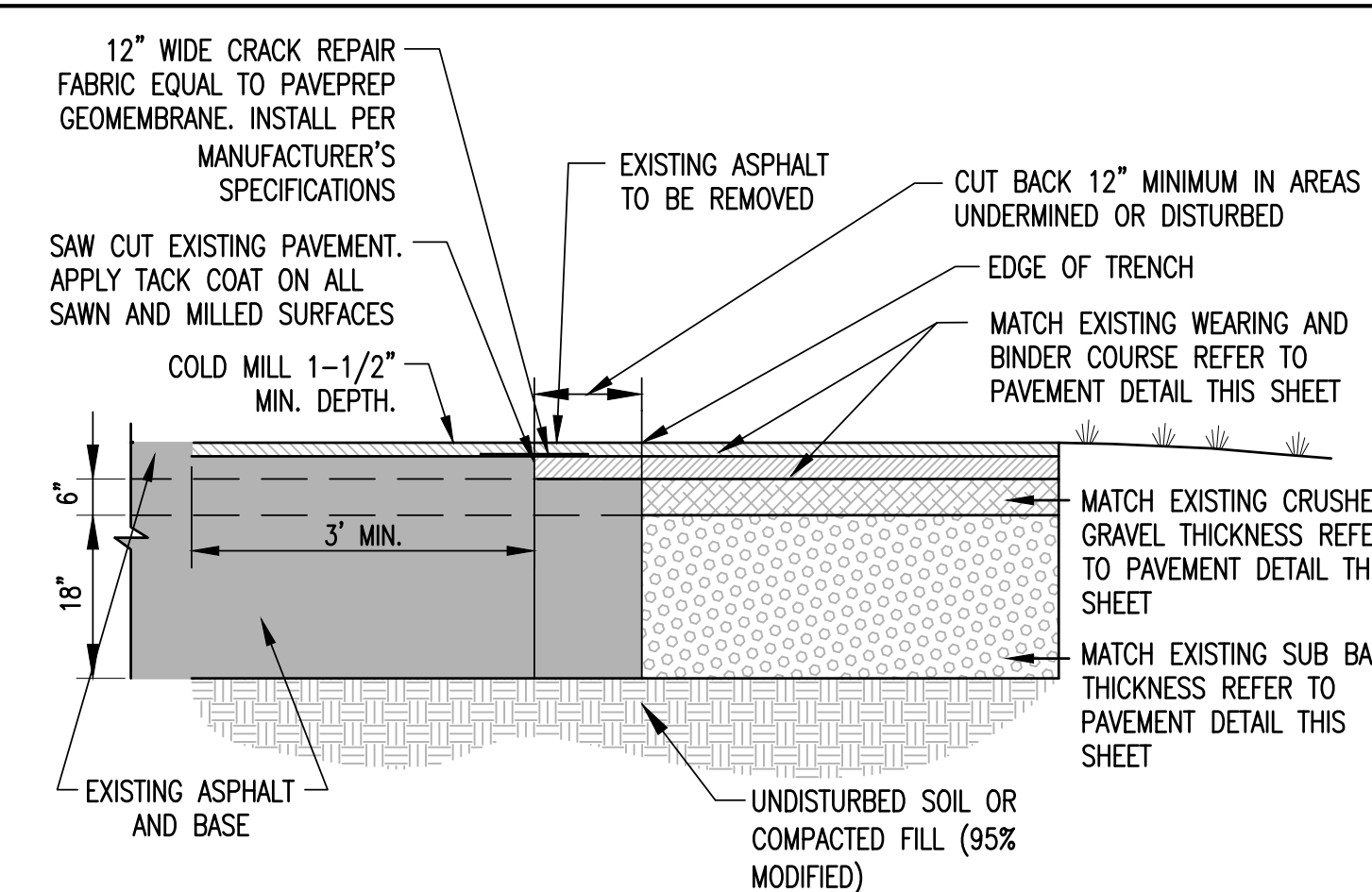
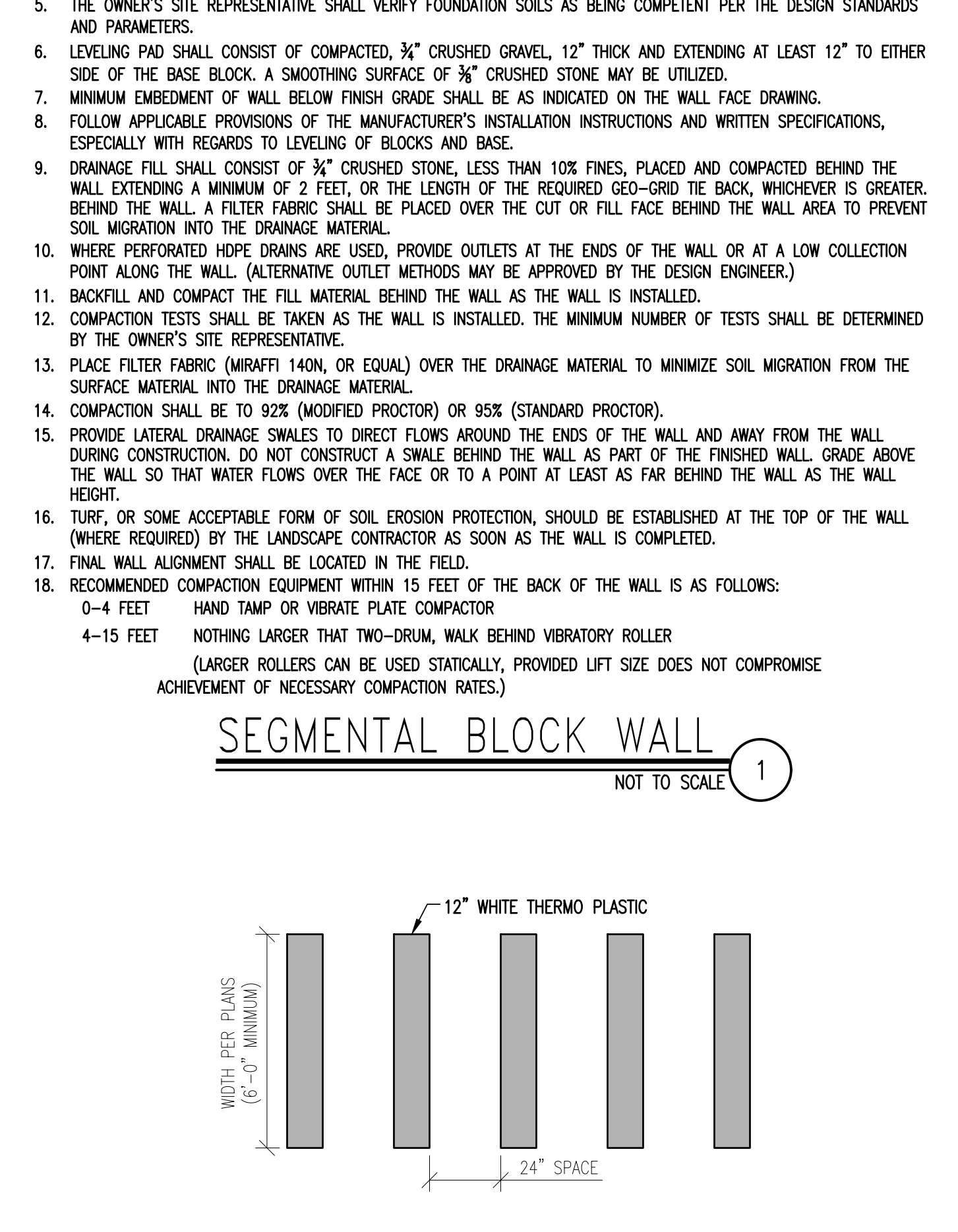
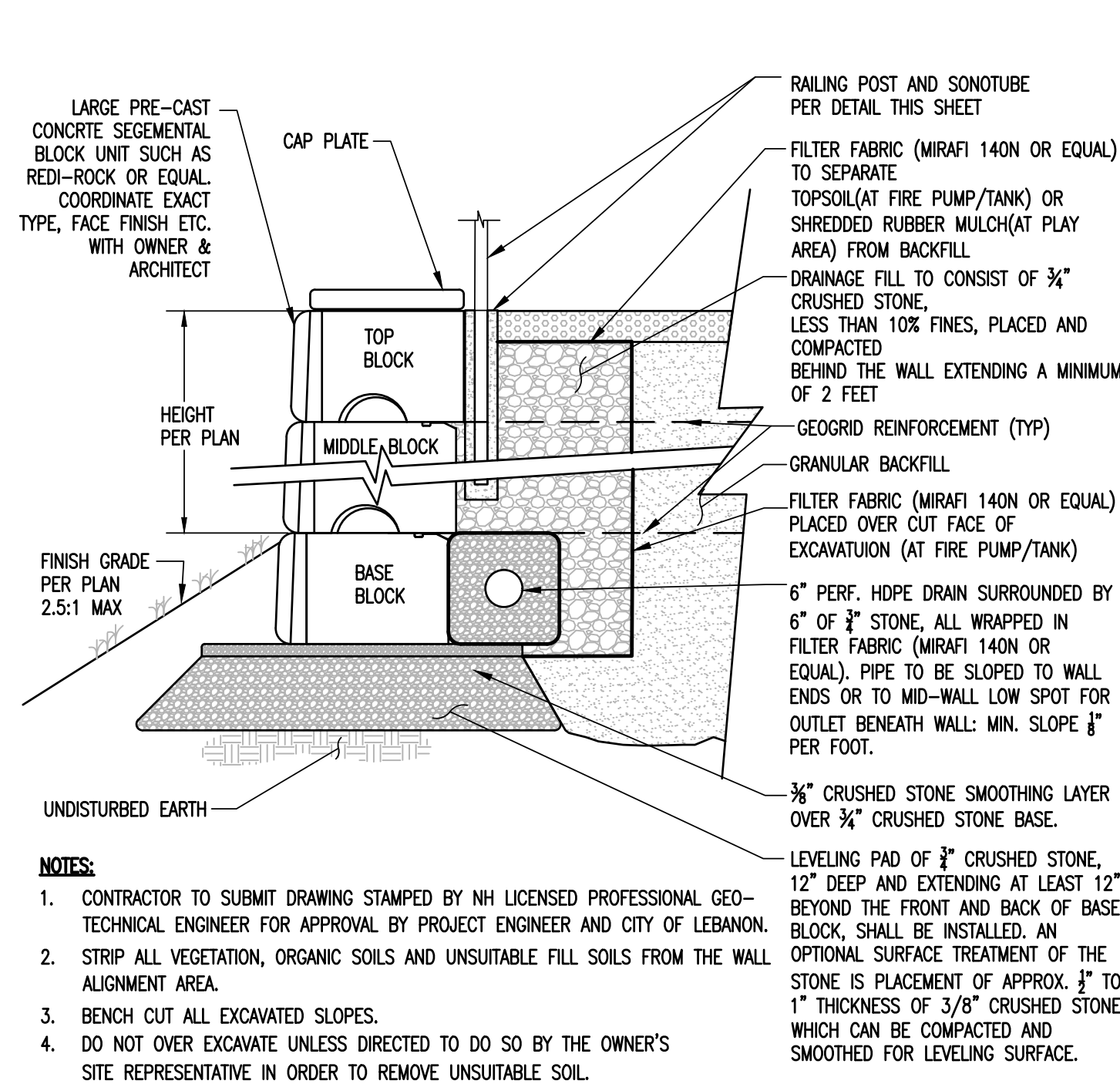
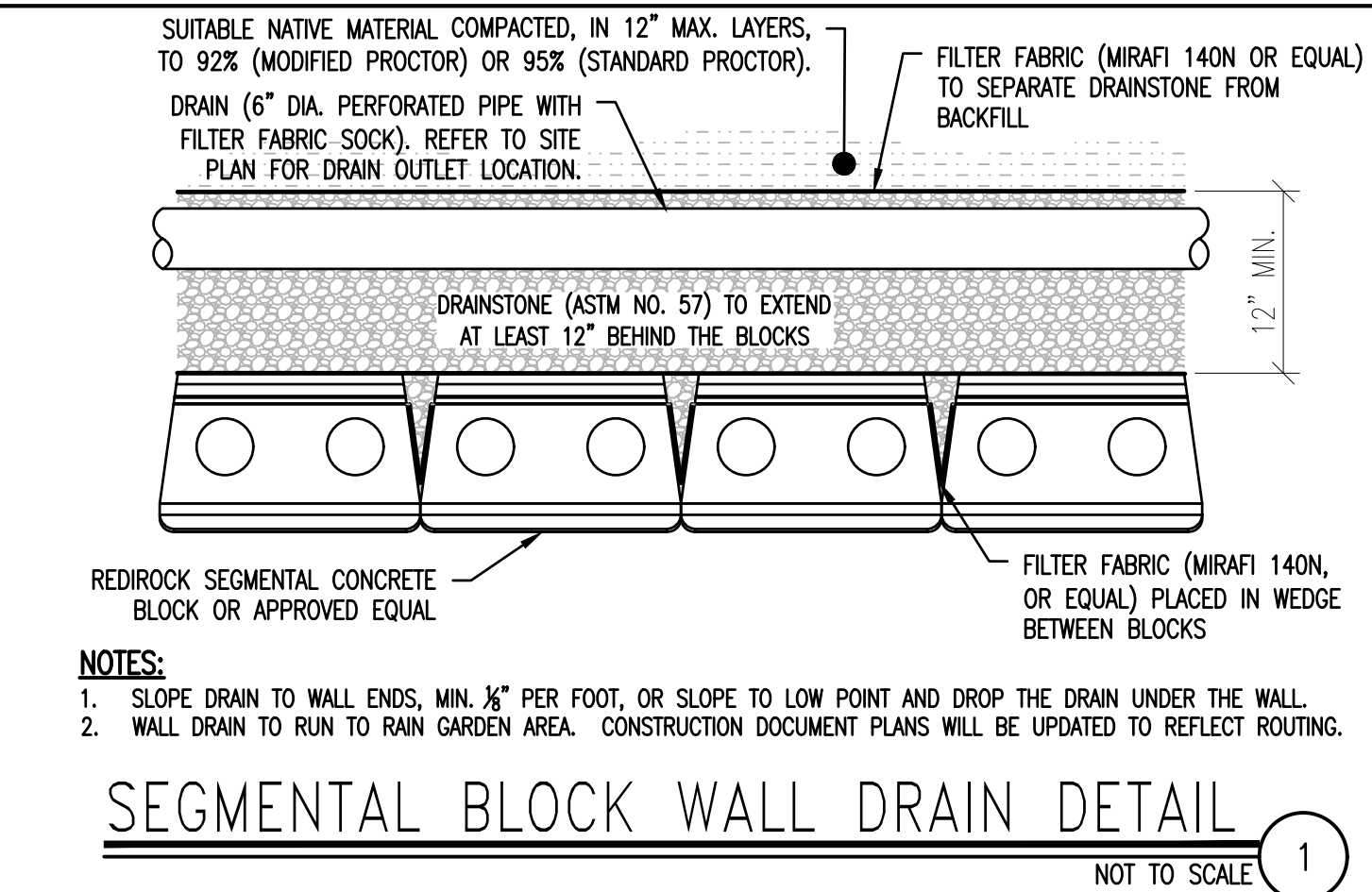
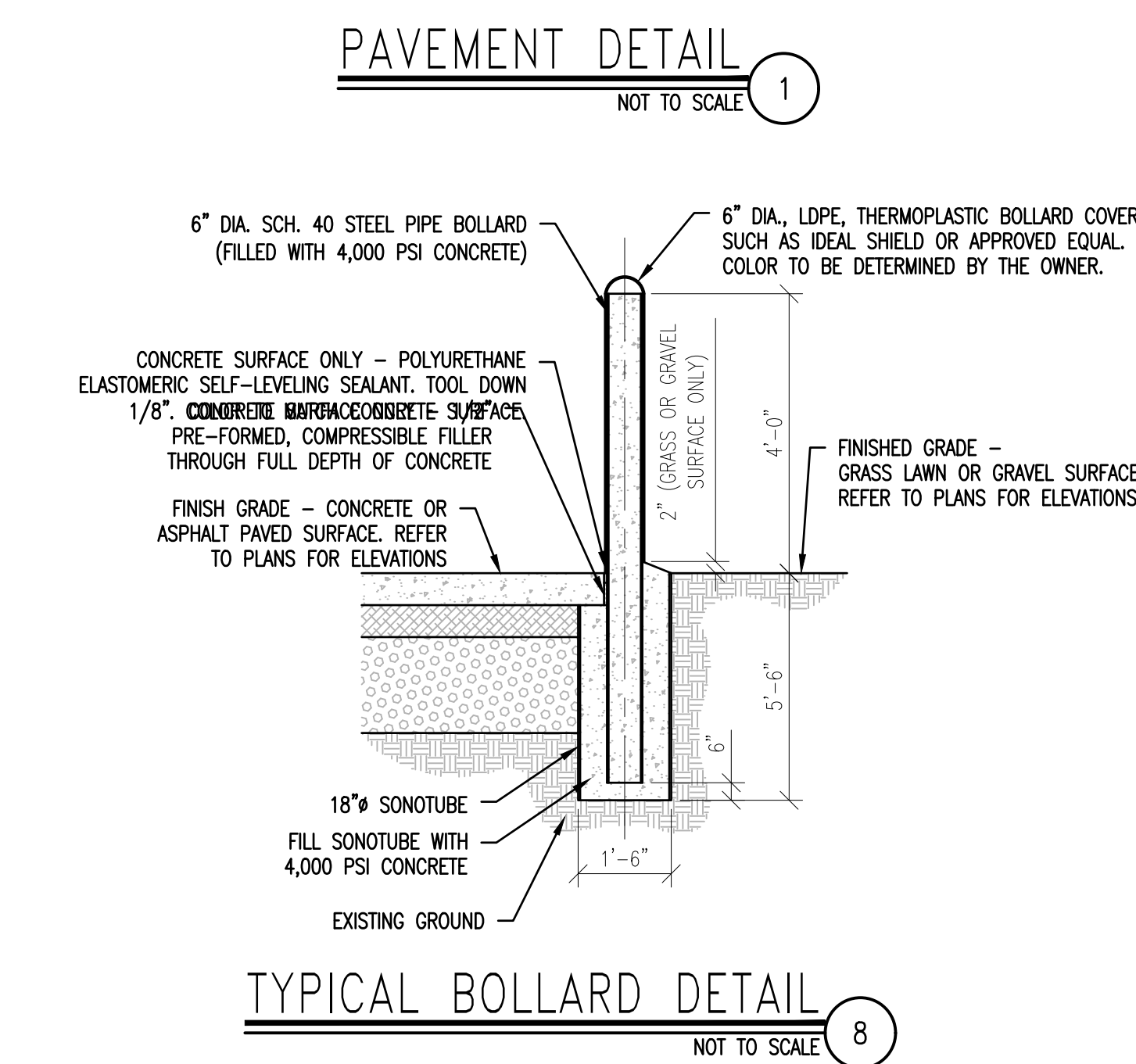
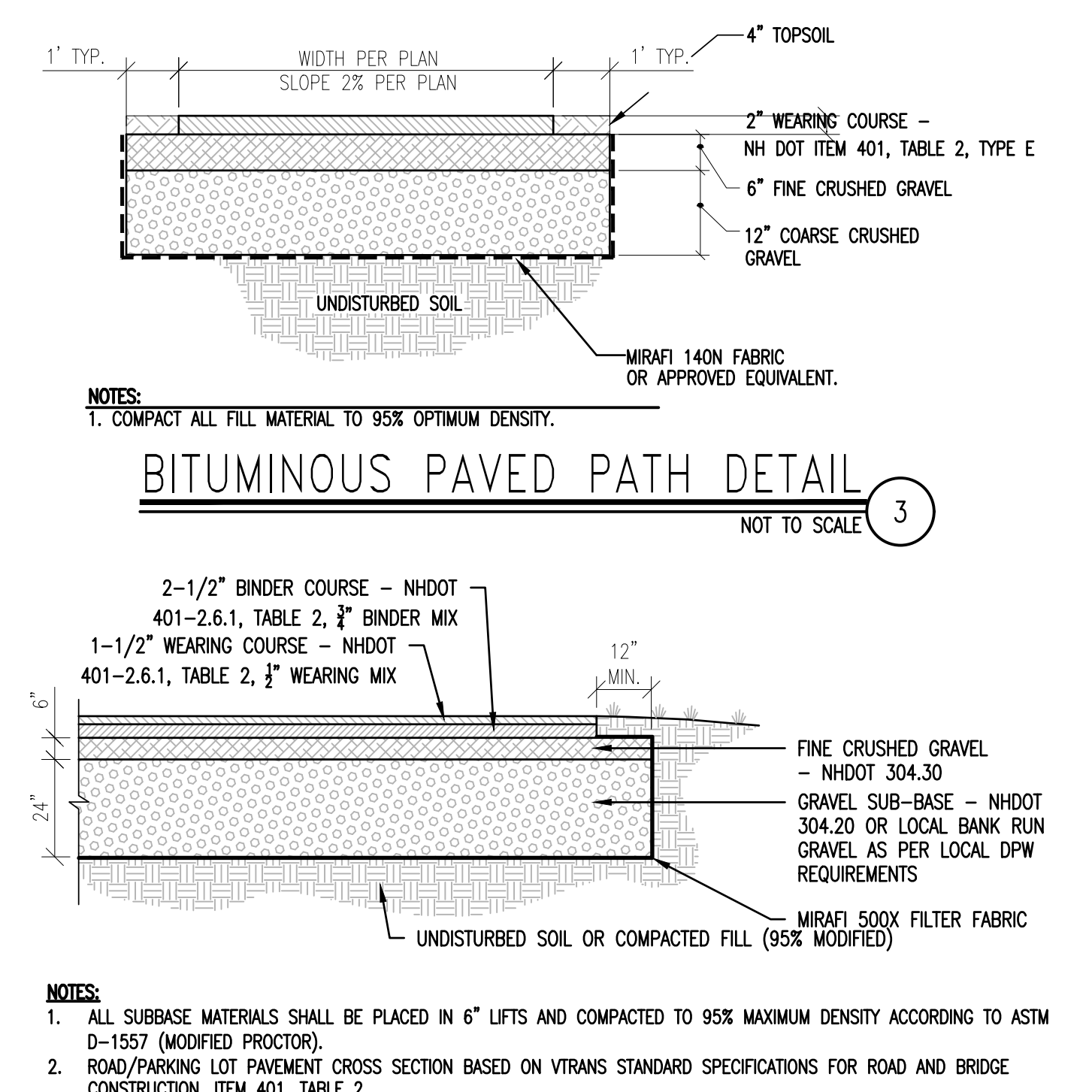
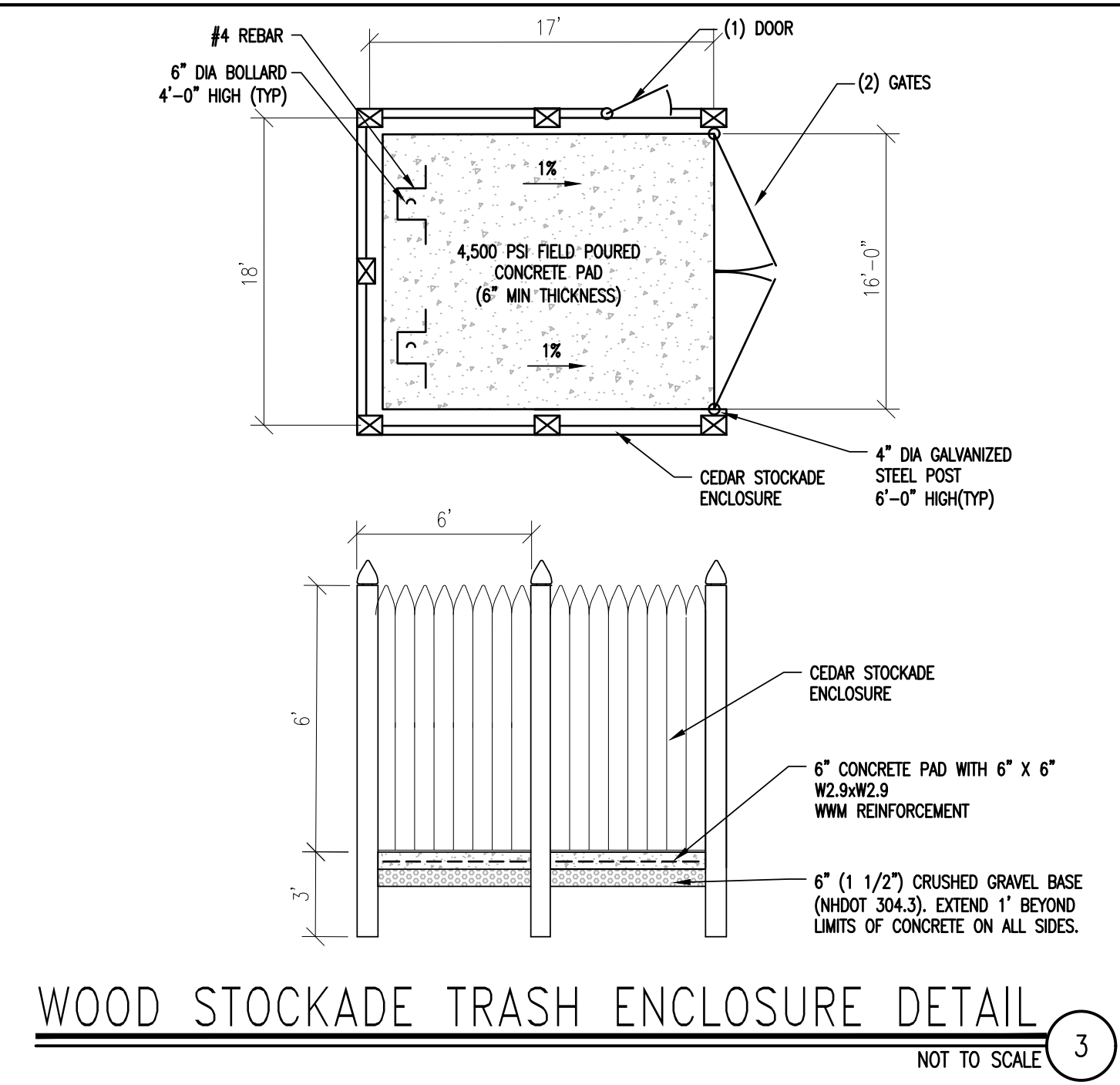
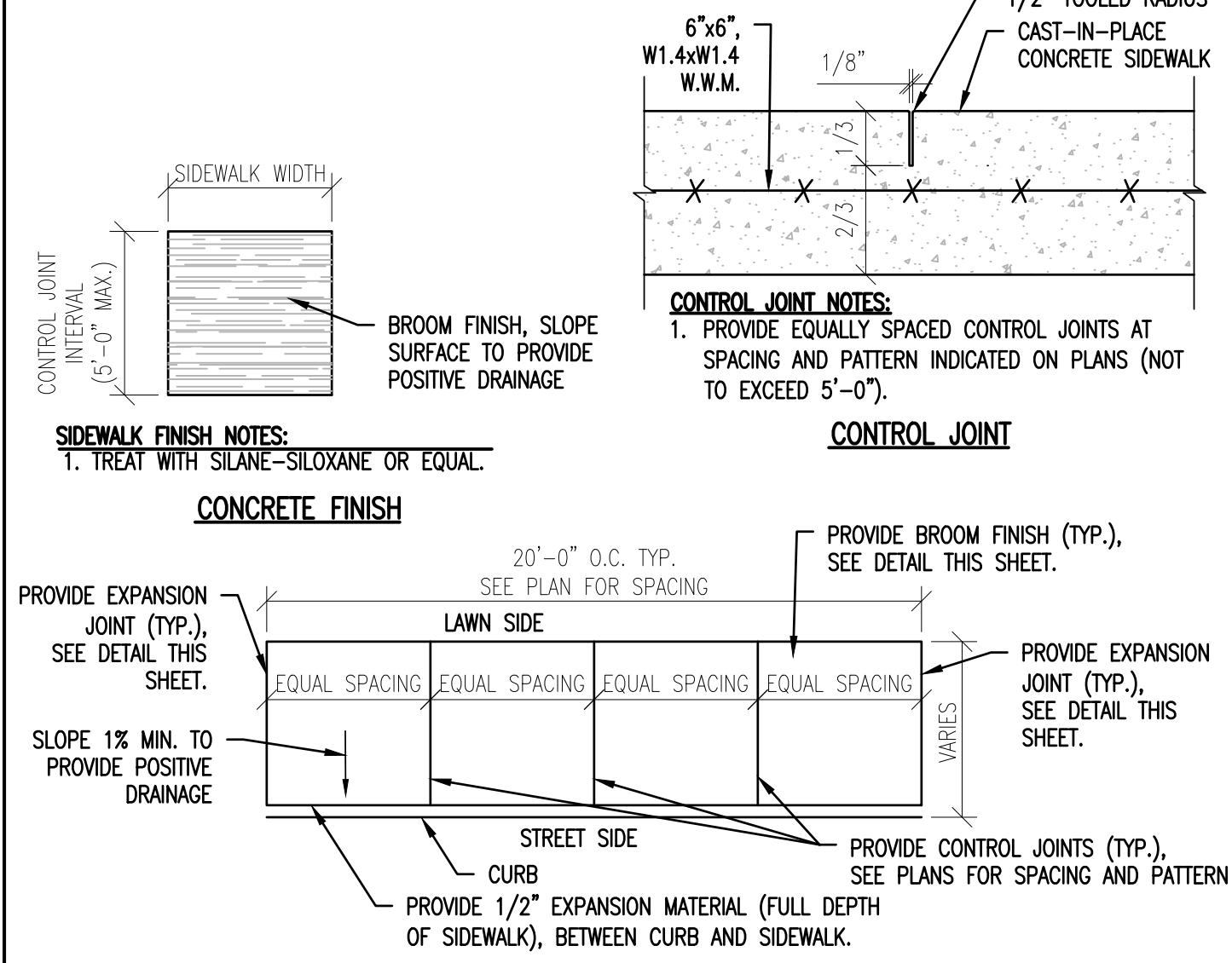
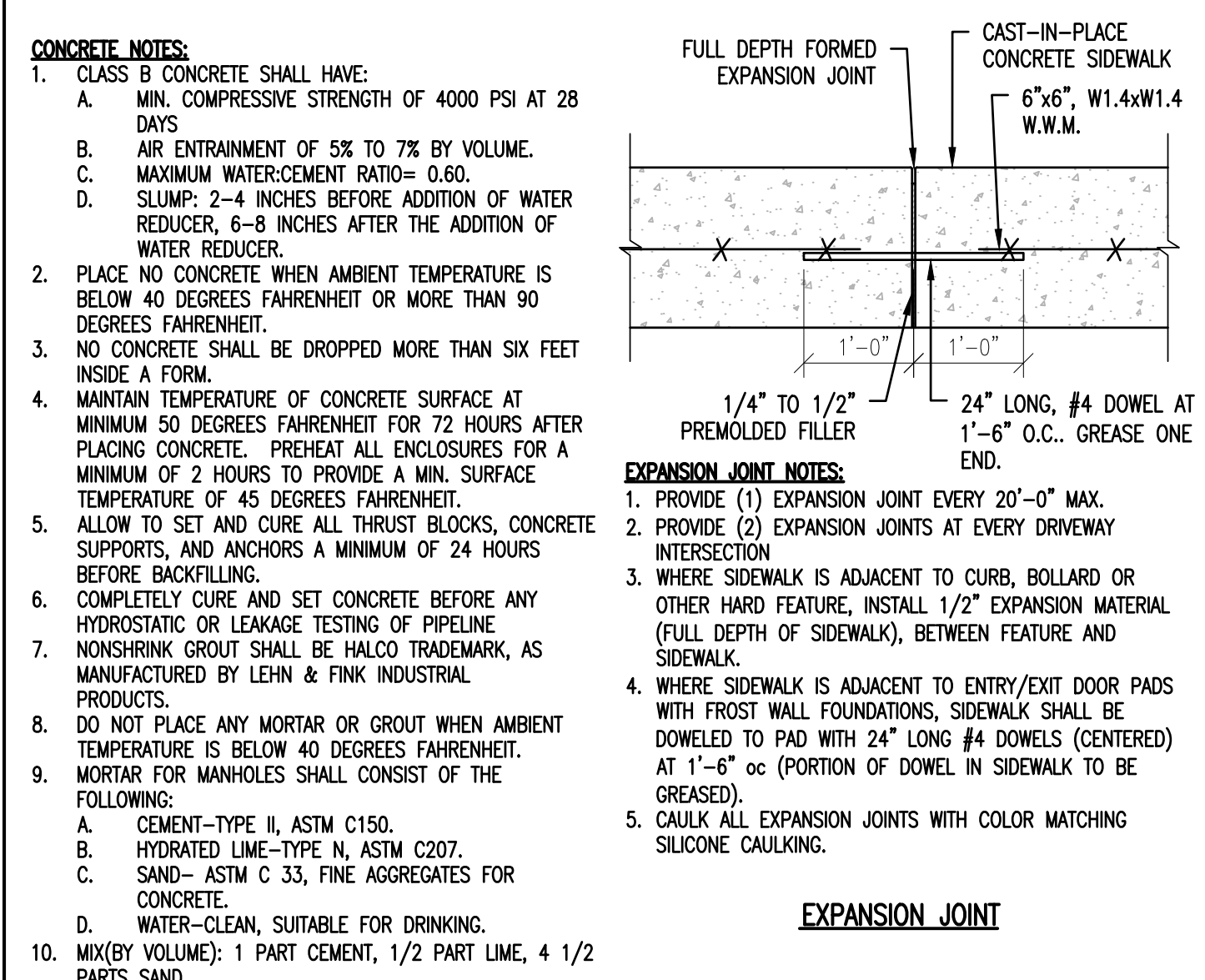
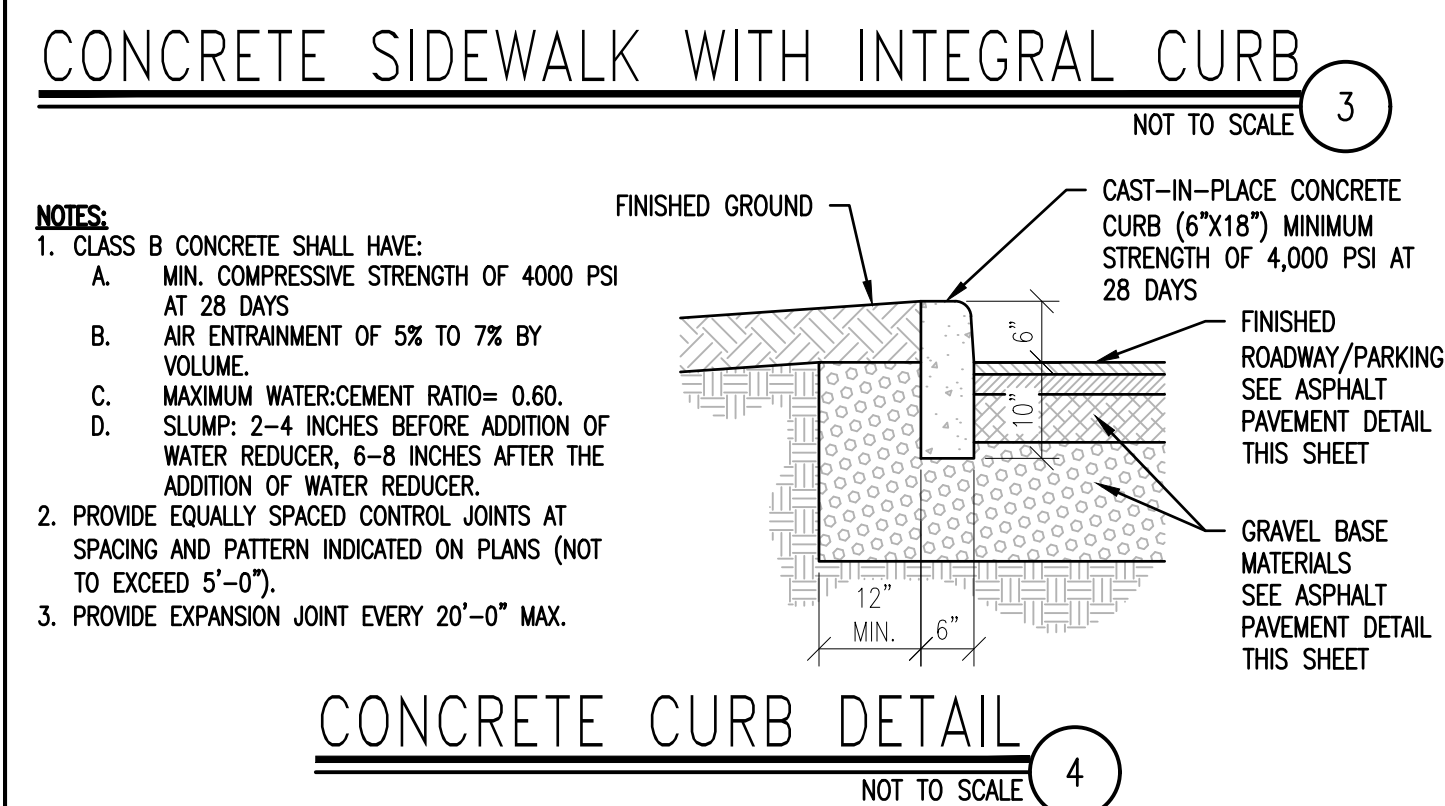
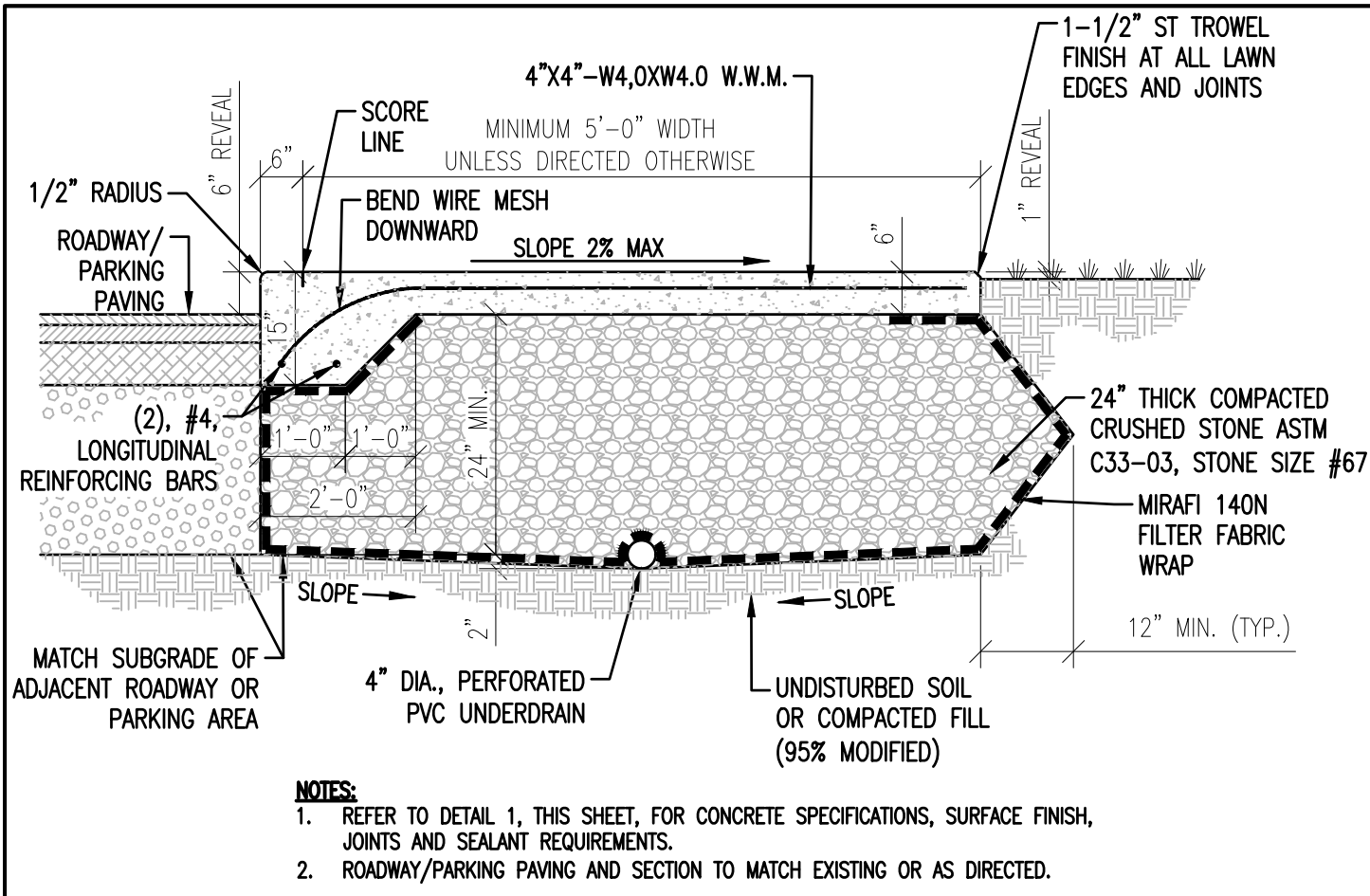
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SEWER PLAN & PROFILES
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CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE
Project Title:
EV Project # 19324
Drawn By: JWF/HKW
Checked By: NAF
Scale: AS NOTED
Date: 11/08/2021

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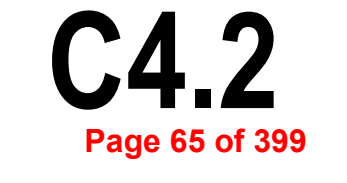
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SITE DETAILS (1 OF 2)
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

Project Title
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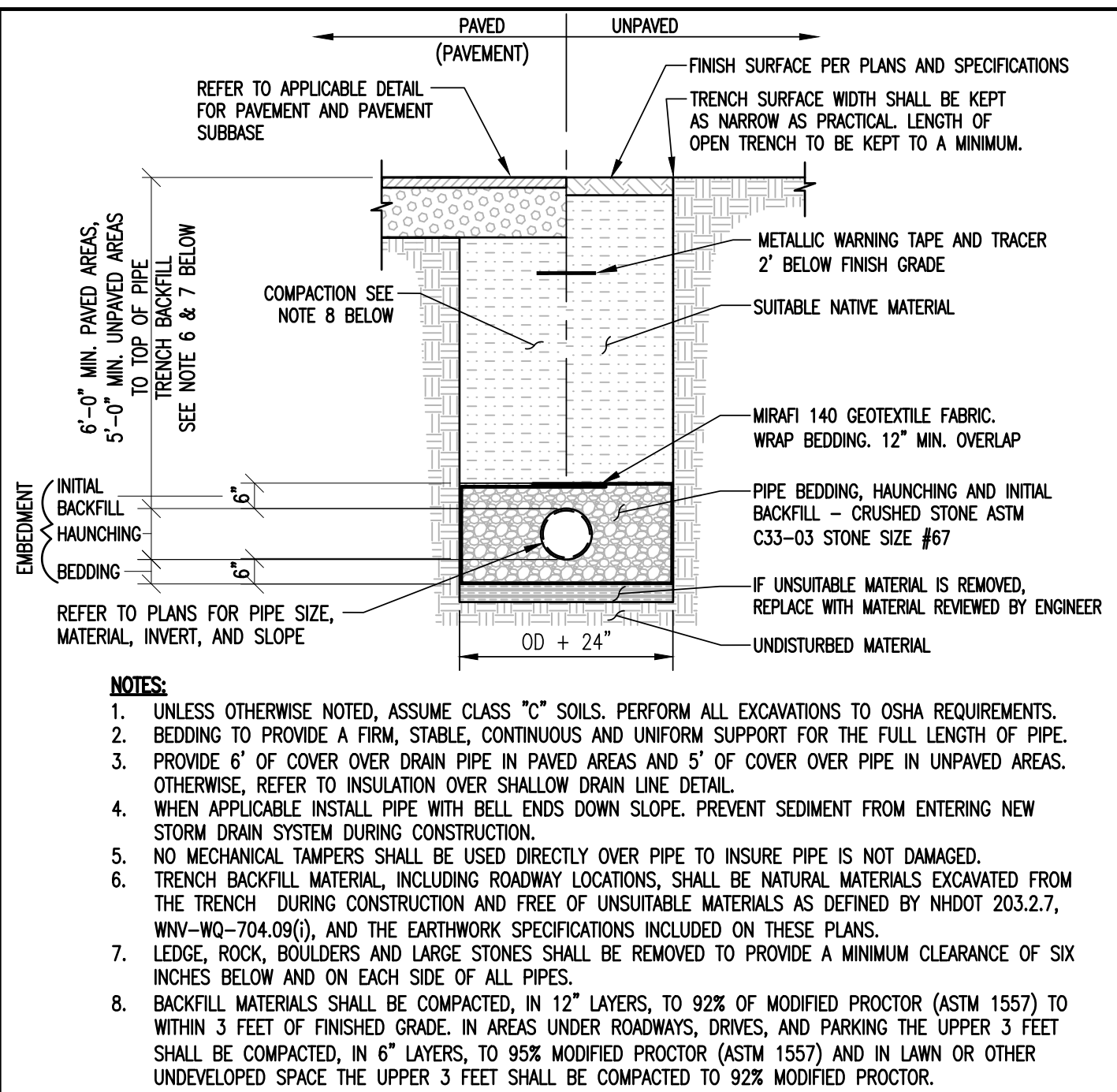
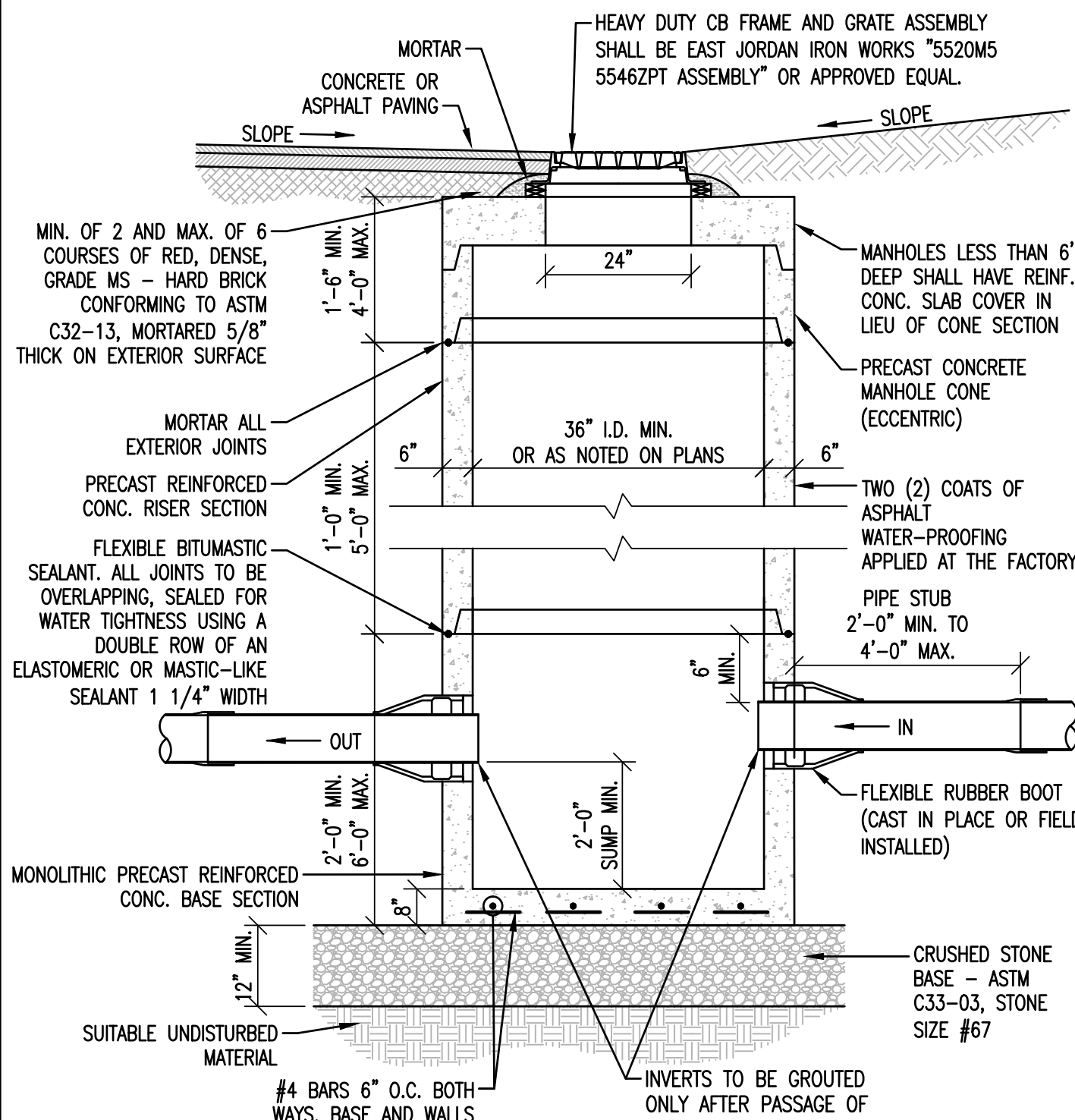
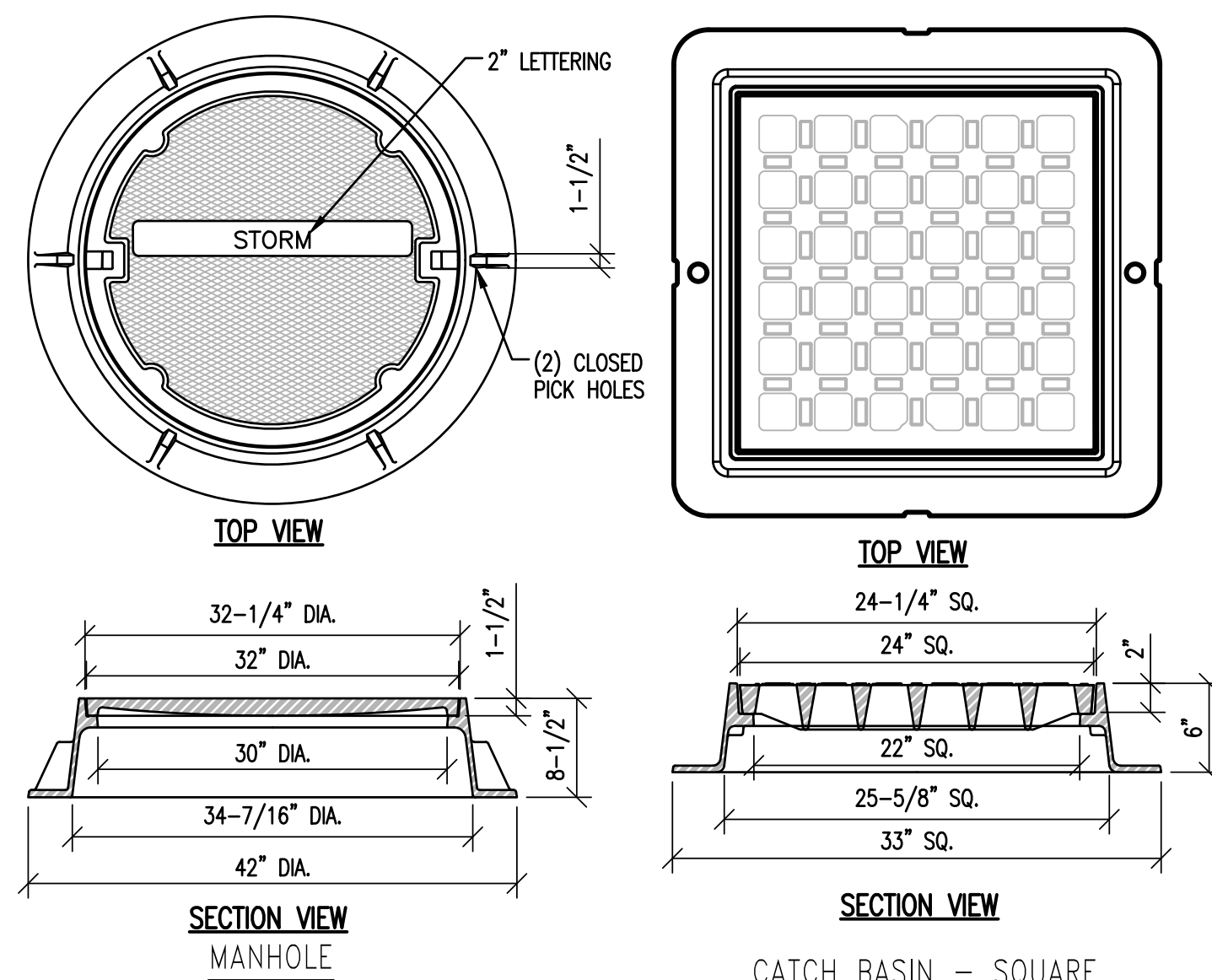
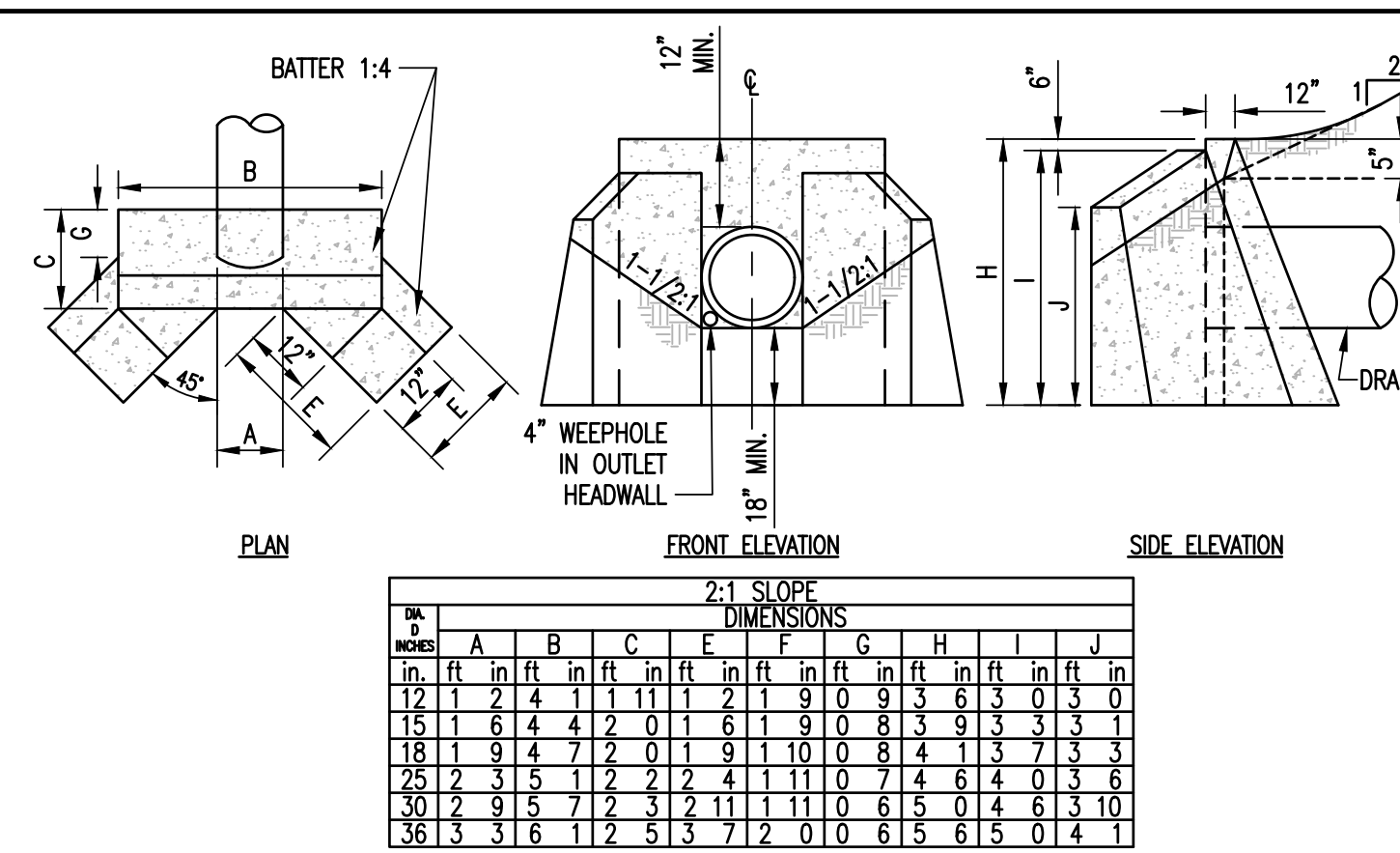
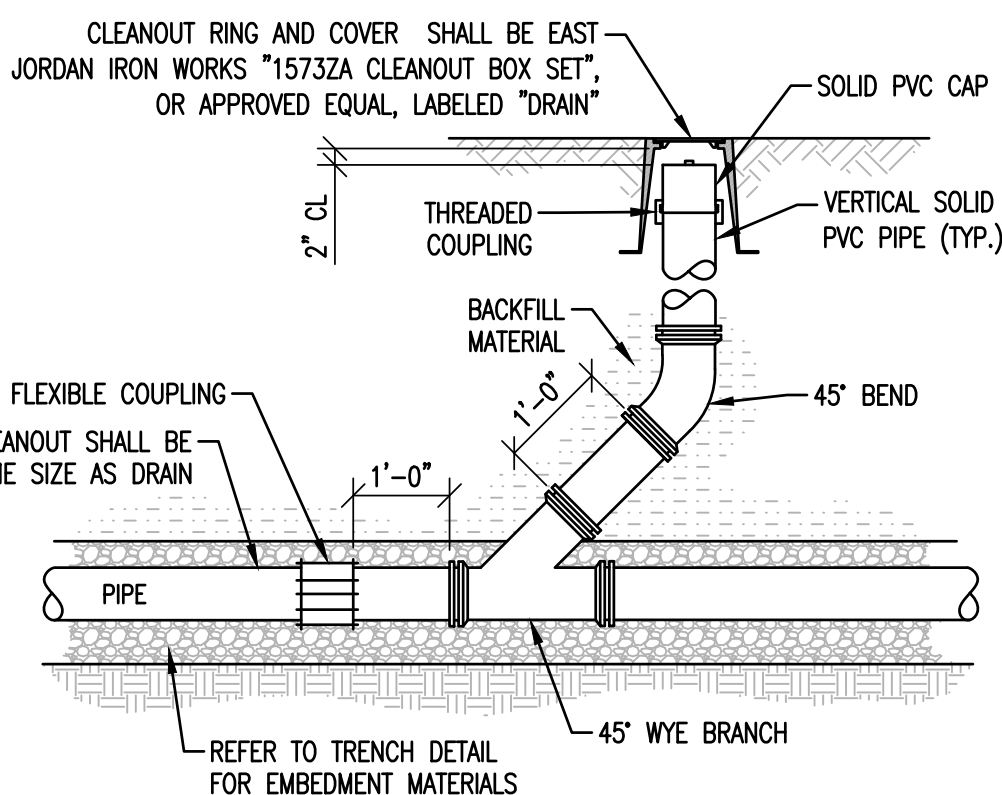
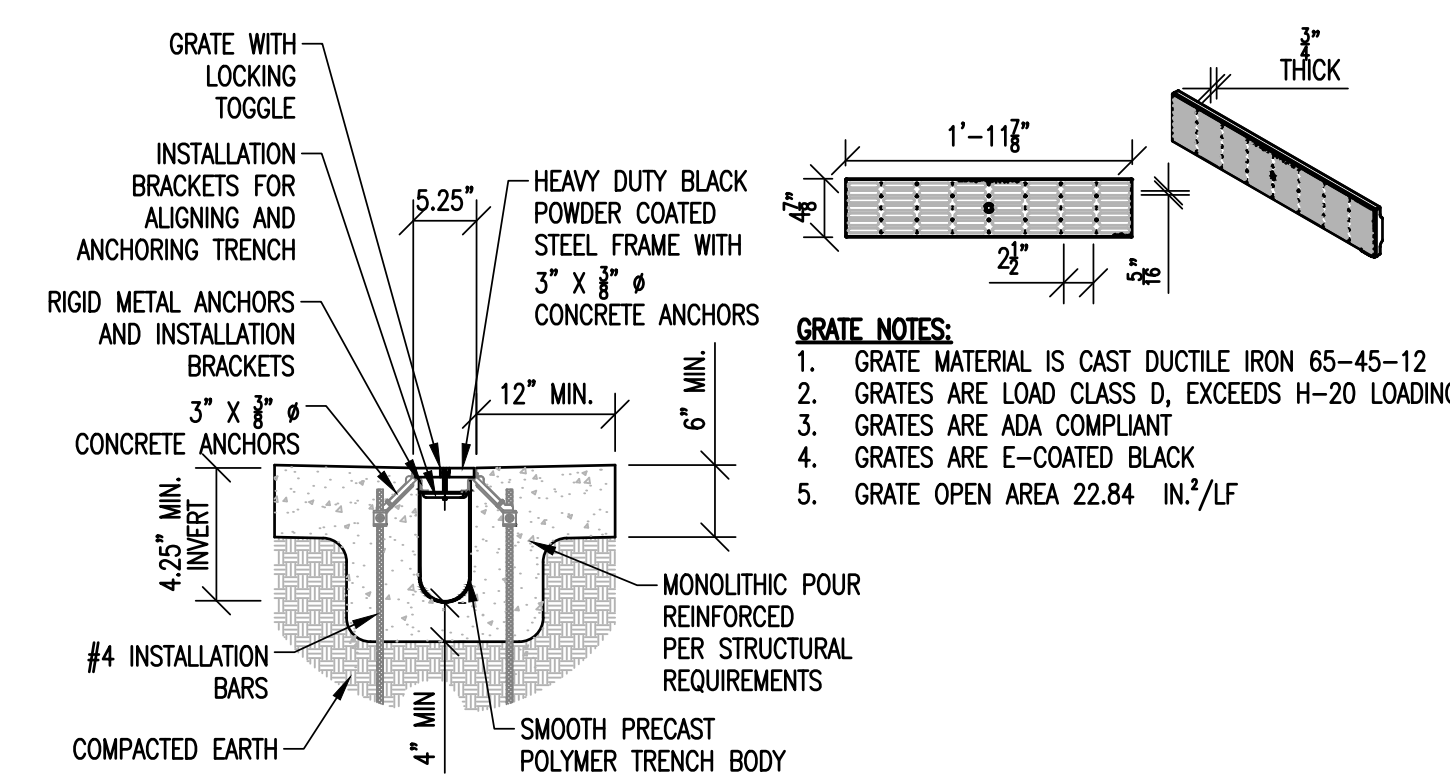
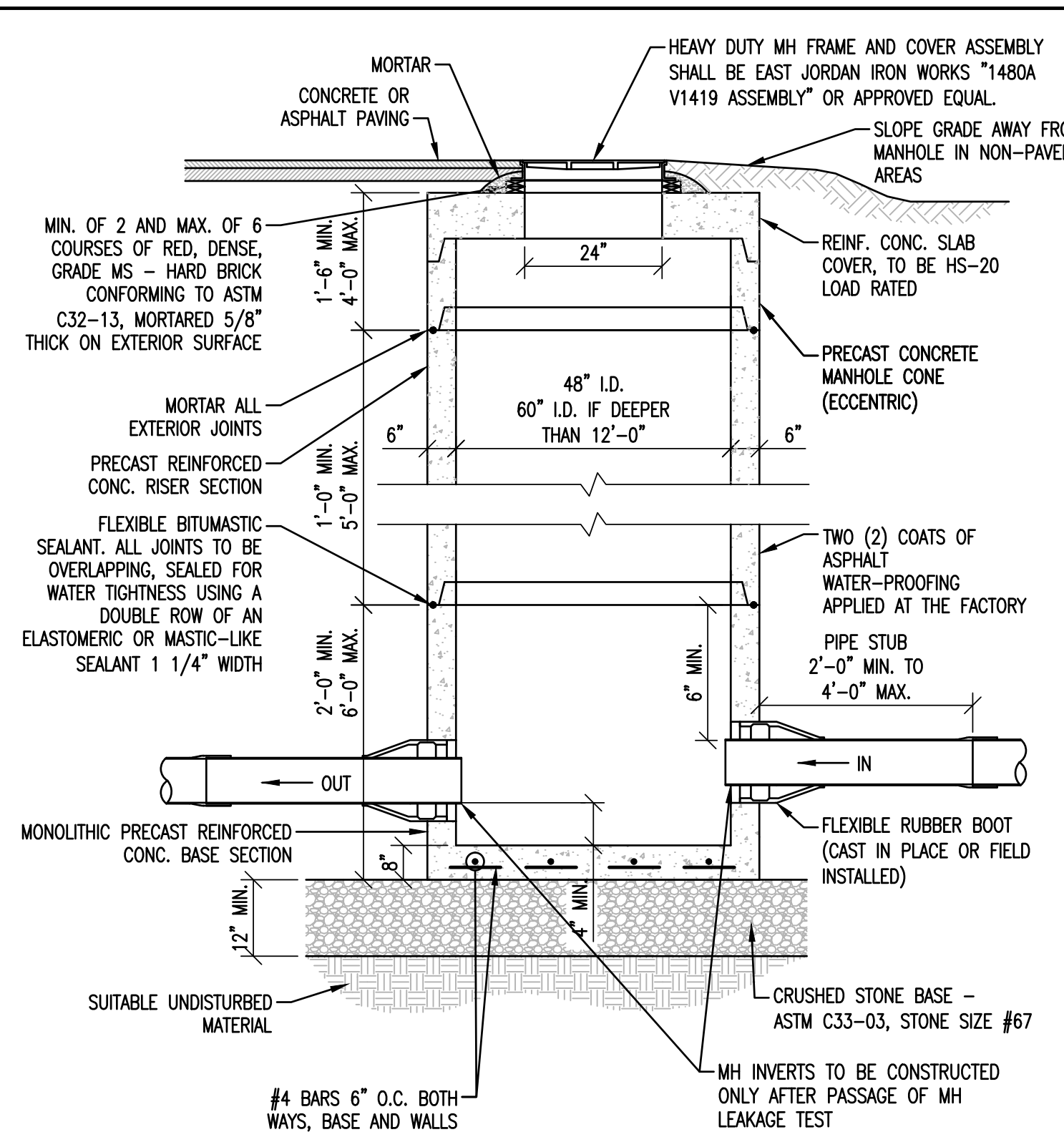
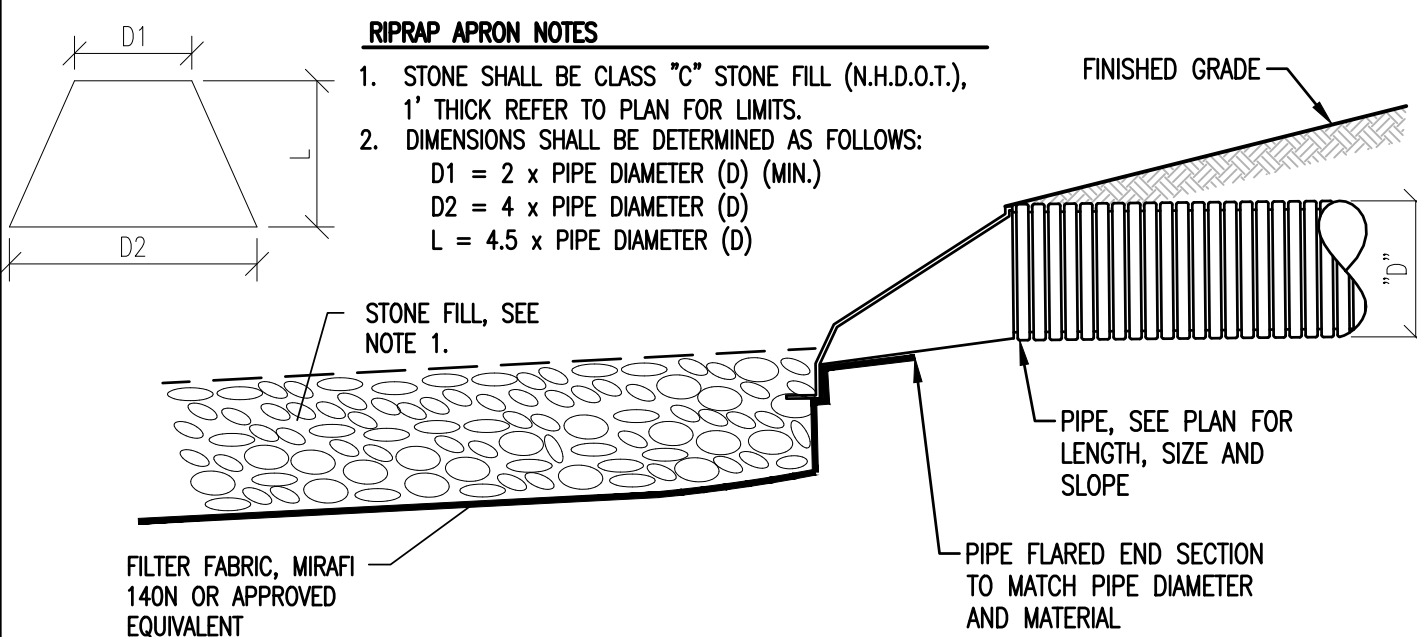
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S:\PROJECTS\2019\1024\402 MT SUPPORT RD\DWGS\SET FILES\0024 CAX CONSTRUCTION DETAILS.DWG

**TYPICAL STORM DRAIN TRENCH**
NOT TO SCALE 1**DRAINAGE MANHOLE (CONE SECTION)**
NOT TO SCALE 4**STORMWATER MH COVERS AND CB GRATES**
NOT TO SCALE 5**PRECAST CONCRETE HEADWALL**
NOT TO SCALE 6**DRAIN CLEANOUT**
NOT TO SCALE 7**TRENCH DRAIN**
NOT TO SCALE 8**DRAINAGE MANHOLE DETAIL (FLAT TOP)**
NOT TO SCALE 9**FLARED END SECTION W/STONE APRON**
NOT TO SCALE 3

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STORMWATER DETAILS (1 OF 2)
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

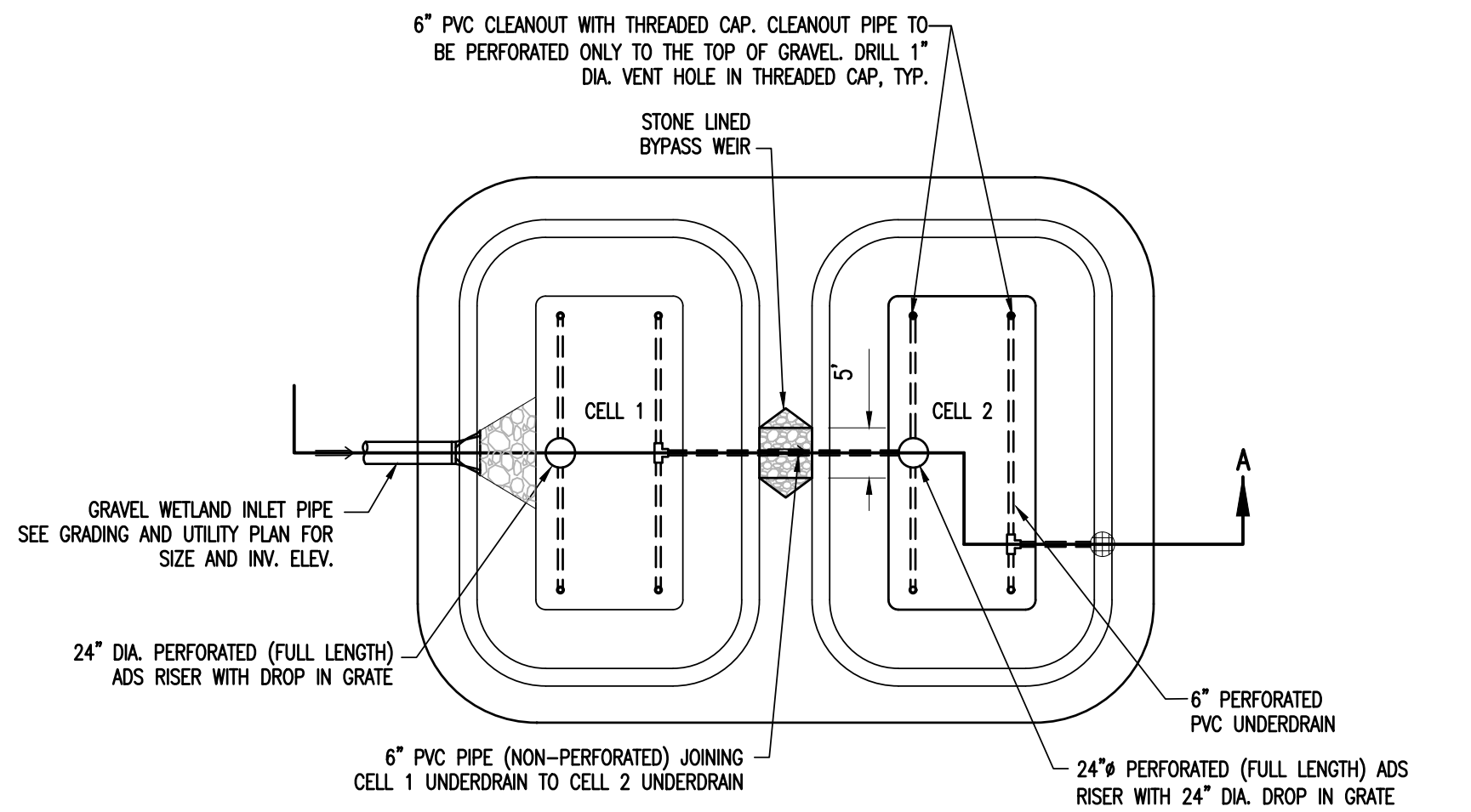
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Project Title:
EV Project #
19324
Drawn By:
JWF
Checked By:
NAF
Scale:
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Date:
11/08/2021

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Page 66 of 399

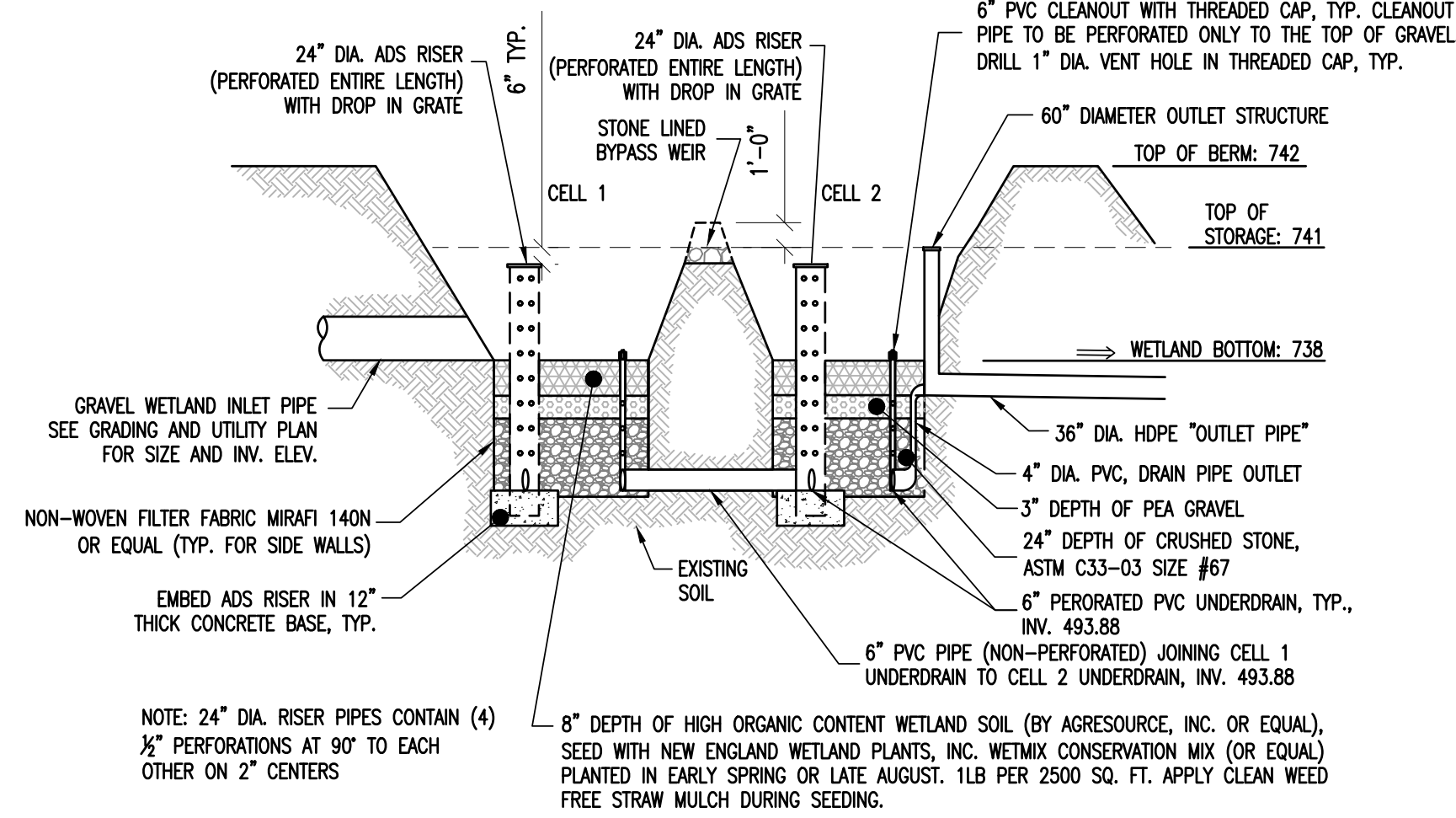
Page 77 of 507

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PLAN VIEW

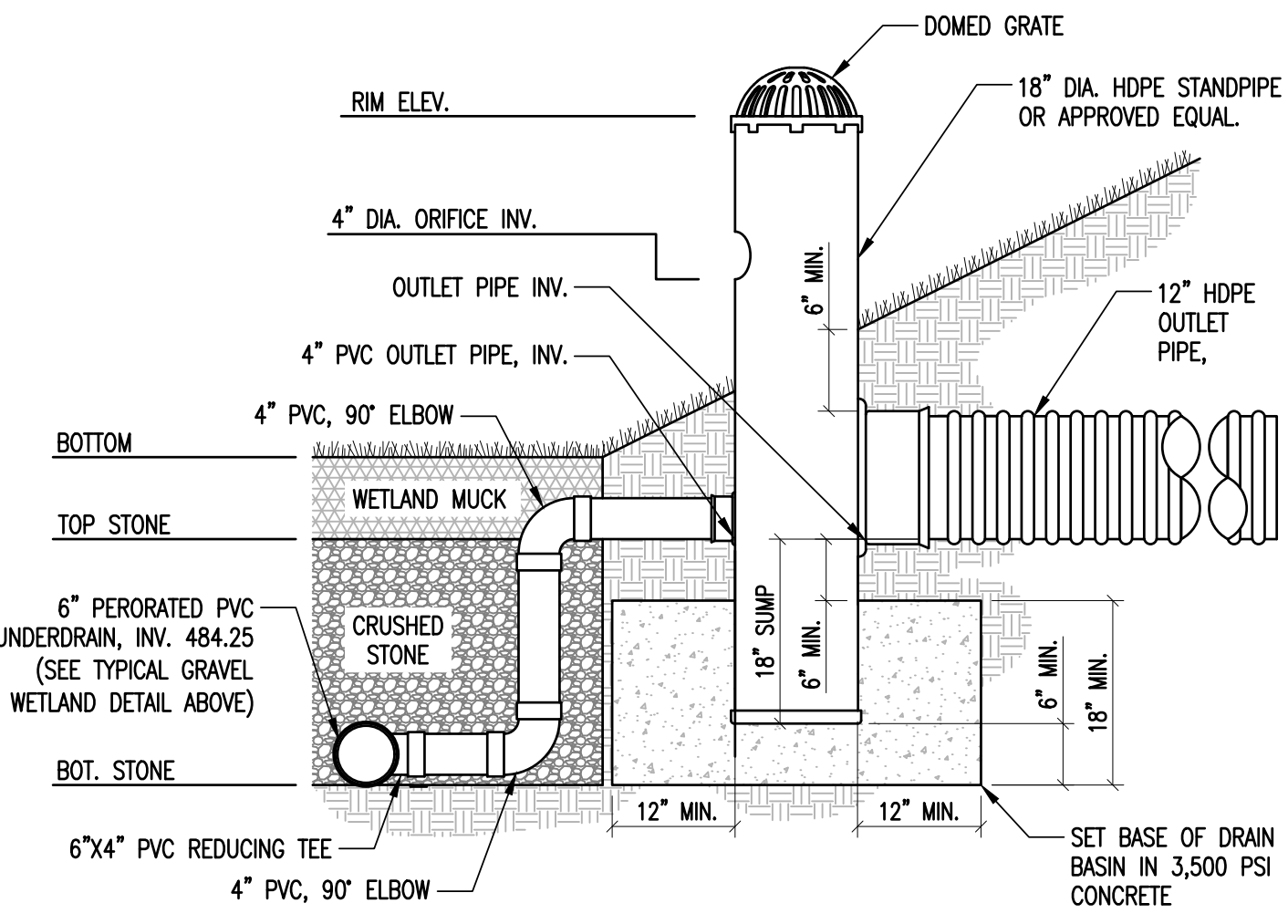


SECTION A-A (EXAGGERATED VIEW)

GRAVEL WETLAND

GRAVEL WETLAND

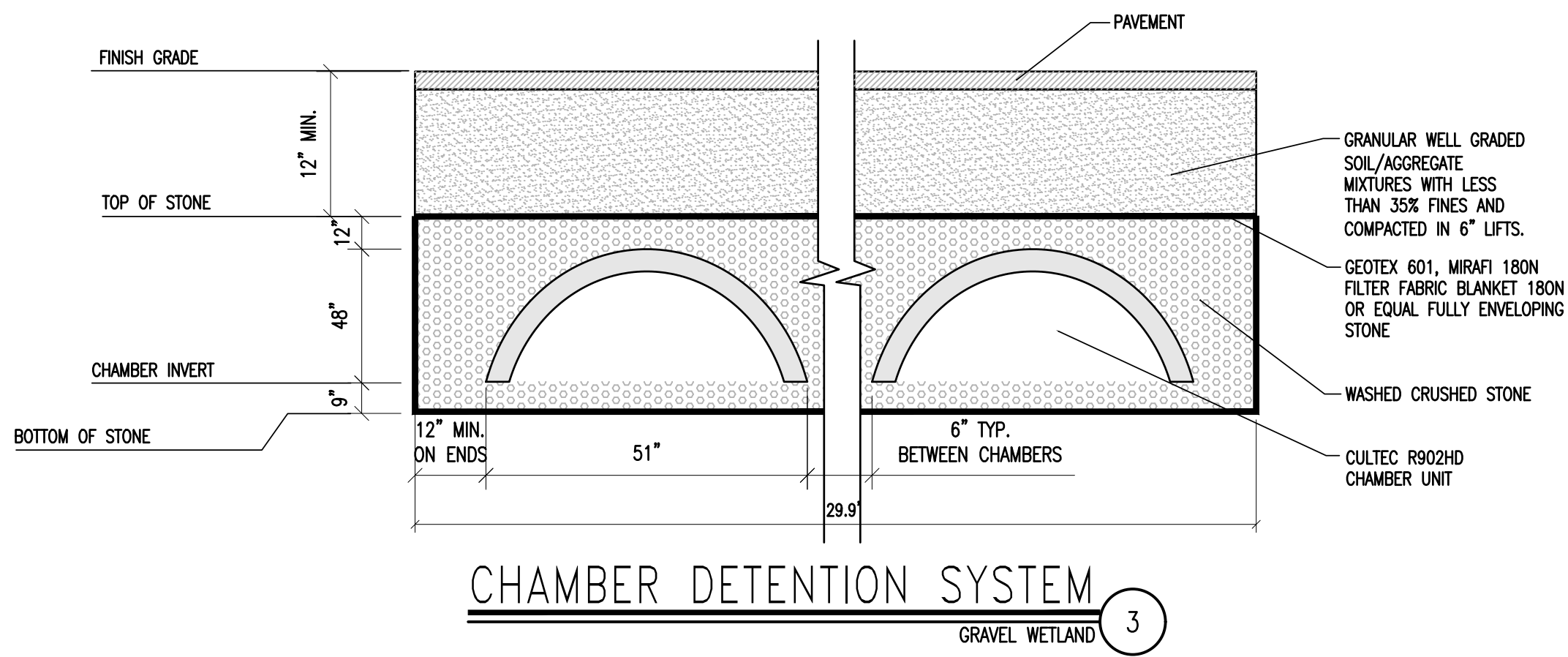
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GRAVEL WETLAND OUTLET RISER

NOT TO SCALE

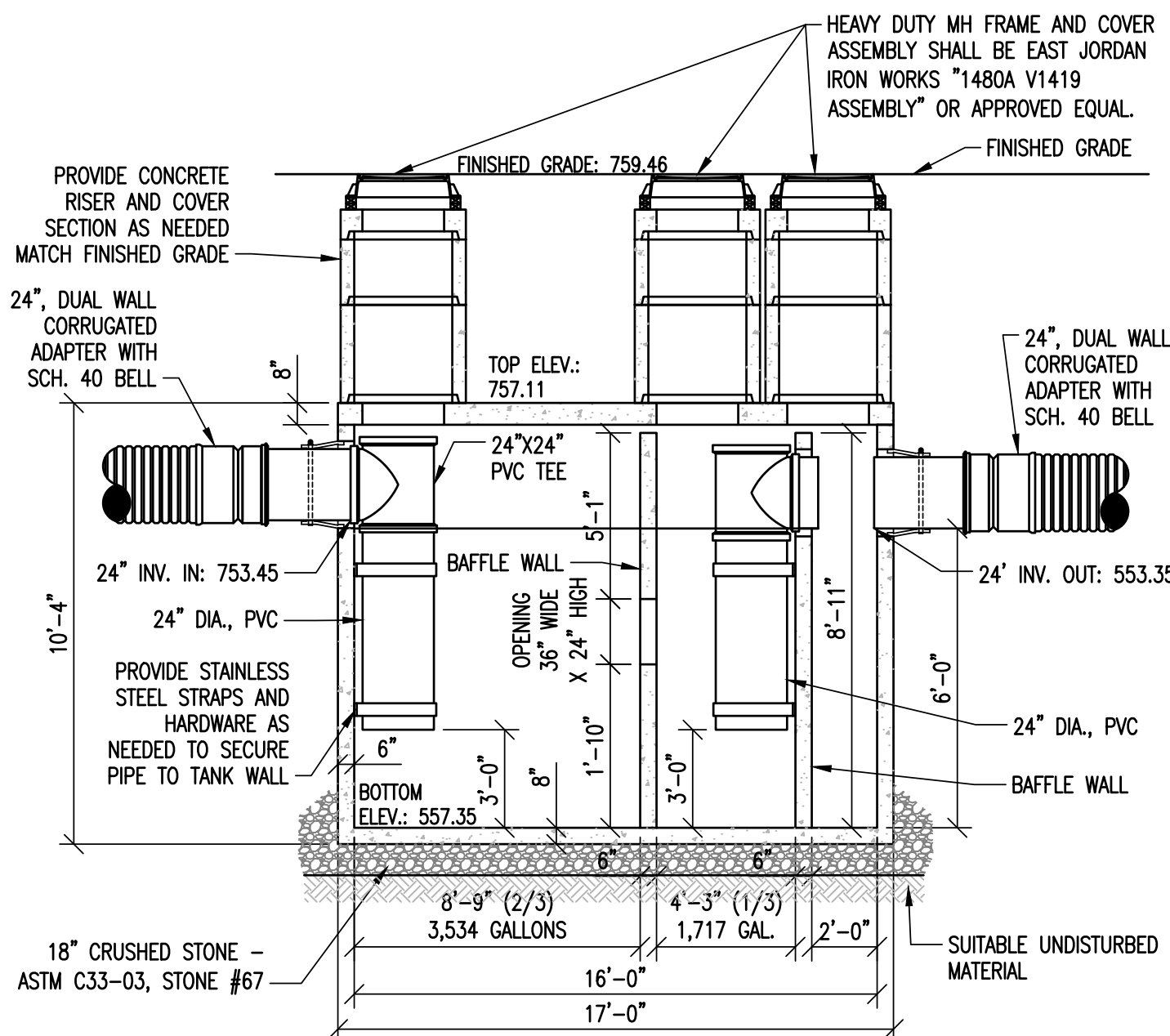
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CHAMBER DETENTION SYSTEM

GRAVEL WETLAND

3

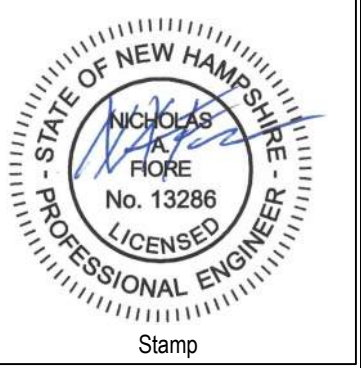


SEDIMENT FOREBAY

NOT TO SCALE

4

- NOTES:
1. TANK SHALL BE 10'X17'X10.3' (5,000 GALLON) PRE-CAST CONCRETE TANK.
 2. TANK SHALL BE DESIGNED FOR H-20 LOADING.
 3. THE EXTERIOR OF THE PRE-CAST CONCRETE STRUCTURE SHALL RECEIVE TWO COATS OF ASPHALT SEAL COATING AT THE FACTORY.
 4. JOINTS BETWEEN THE CONCRETE SECTIONS SHALL BE SEALED BY BUTYL MASTIC (MSHTO M-198).
 5. PIPE PENETRATIONS SHALL BE SEALED BY FLEXIBLE WATERTIGHT BOOTS WITH STAINLESS STEEL BANDS.
 6. THE WATER QUALITY UNIT AND RISERS SHALL BE FILLED WITH WATER AND SUBJECTED TO A 24 HOUR HYDROSTATIC LEAKAGE TEST. NO LEAKAGE WILL BE ALLOWED DURING THE TEST PERIOD.
 7. AN ALTERNATE VACUUM LEAKAGE TEST PRIOR TO BACKFILLING IS ALSO ACCEPTABLE. THE VACUUM TEST WILL REQUIRE THE INSTALLED VAULT AND RISERS TO HOLD A VACUUM PRESSURE OF NEGATIVE 5 INCHES MERCURY FOR 10 MINUTES WITH NO LOSS/GAIN.
 8. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE A WATERTIGHT STRUCTURE.
 9. SHOP DRAWINGS OF THE WATER QUALITY UNIT AND COMPONENTS SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.



Date	Description	No.
12/20/21	REVISED PER STAFF REVIEW COMMENTS	1

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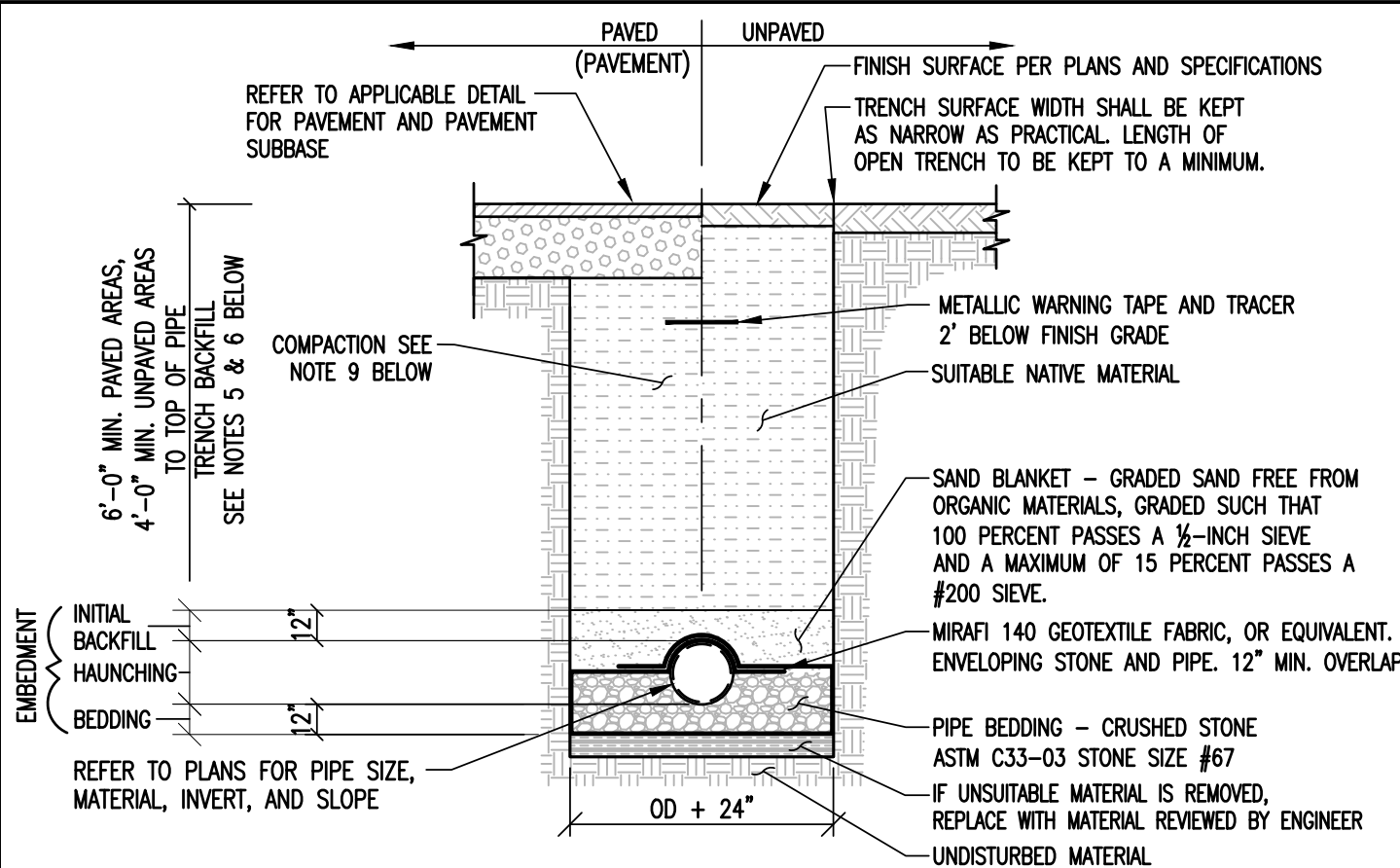
STORMWATER DETAILS (2 OF 2)

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #	19324
Drawn By:	JWF
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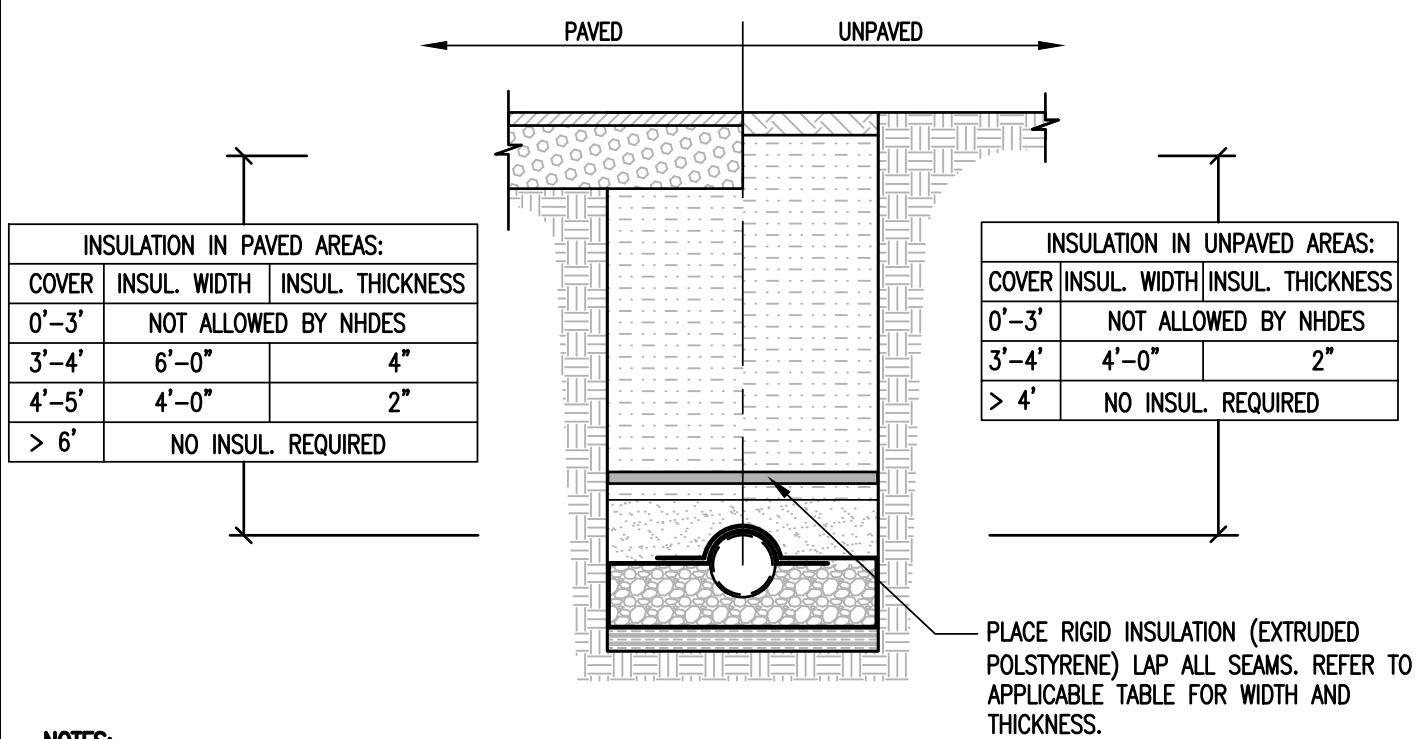


- NOTES:**
1. UNLESS OTHERWISE NOTED, ASSUME CLASS "C" SOILS. PERFORM ALL EXCAVATIONS TO OSHA REQUIREMENTS. BEDDING TO PROVIDE A FIRM, STABLE, CONTINUOUS AND UNIFORM SUPPORT FOR THE FULL LENGTH OF PIPE.
 2. FOR SEWER LINES THE MINIMUM DEPTH TO THE TOP OF THE PIPE SHALL BE 6'-0" IN PAVED AREAS AND 4'-0" IN UNPAVED AREAS. SHALLOWER DEPTHS REQUIRE APPROVAL FROM THE ENGINEER. REFER TO INSULATION OVER SHALLOW SEWER LINE DETAIL.
 3. LEDGE, ROCK, BOULDERS AND LARGE STONES SHALL BE REMOVED TO PROVIDE A MINIMUM CLEARANCE OF SIX INCHES BELOW AND ON EACH SIDE OF ALL PIPES.
 4. TRENCH BACKFILL MATERIAL, INCLUDING ROADWAY LOCATIONS, SHALL BE NATURAL MATERIALS EXCAVATED FROM THE TRENCH DURING CONSTRUCTION AND FREE OF UNSUITABLE MATERIALS AS DEFINED IN THE EARTHWORK SPECIFICATIONS INCLUDED ON THESE PLANS.
 5. WHEN APPLICABLE INSTALL PIPE WITH BELL ENDS DOWN SLOPE. PREVENT SEDIMENT FROM ENTERING NEW SEWER SYSTEM DURING CONSTRUCTION.
 6. ALLOWABLE TRENCH WIDTH AT A PLANE 12 INCHES ABOVE THE PIPE SHALL BE NO MORE THAN 36 INCHES FOR SEWER PIPE LESS THAN 15 INCHES IN DIAMETER.
 7. NO MECHANICAL TAMPERS SHALL BE USED DIRECTLY OVER PIPE TO INSURE PIPE IS NOT DAMAGED.
 8. BACKFILL MATERIALS SHALL BE COMPACTED, IN 12" LAYERS, TO 92% OF MODIFIED PROCTOR (ASTM 1557) TO WITHIN 3 FEET OF FINISHED GRADE. IN AREAS UNDER ROADWAYS, DRIVES, AND PARKING THE UPPER 3 FEET SHALL BE COMPACTED, IN 6" LAYERS, TO 95% MODIFIED PROCTOR (ASTM 1557) AND IN LAWN OR OTHER UNDEVELOPED SPACE THE UPPER 3 FEET SHALL BE COMPACTED TO 92% MODIFIED PROCTOR.

GRAVITY SEWER TRENCH DETAIL

NOT TO SCALE

1

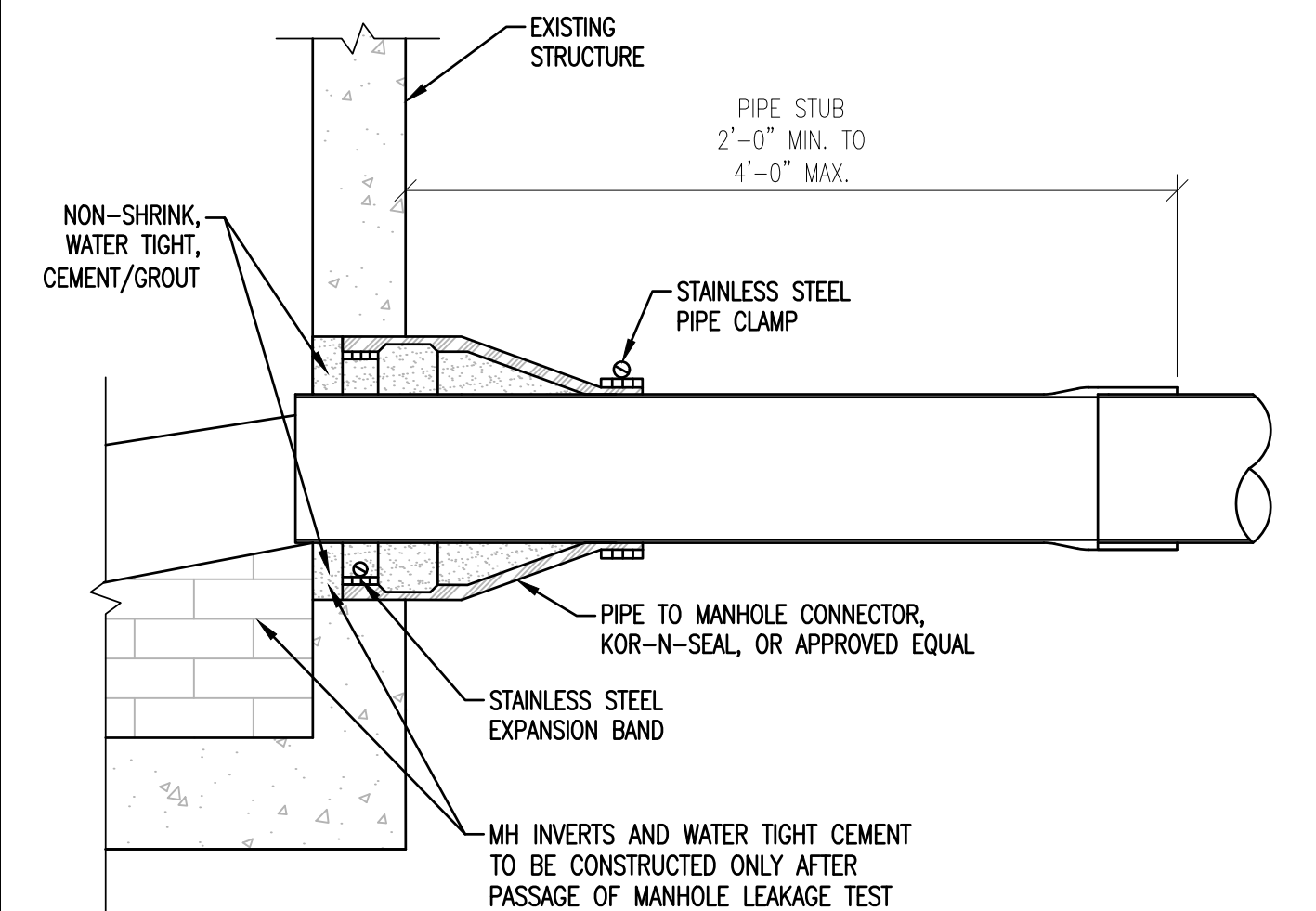


- NOTES:**
1. REFER TO APPLICABLE TRENCH DETAIL FOR SPECIFIC BACKFILL INFORMATION.
 2. NOTIFY DEPARTMENT OF PUBLIC WORKS TO REVIEW INSTALLATION AND BACKFILL.
 3. ALL SHALLOW SEWER INSTALLATIONS MUST BE APPROVED BY ENGINEER.
 4. THE MINIMUM DEPTH TO THE TOP OF THE PIPE SHALL BE 6'-0" IN PAVED AREAS AND 4'-0" IN UNPAVED AREAS. SHALLOWER DEPTHS REQUIRE APPROVAL FROM THE ENGINEER. REFER TO INSULATION OVER SHALLOW SEWER LINE DETAIL.

SHALLOW SEWER LINE INSULATION DETAIL

NOT TO SCALE

2

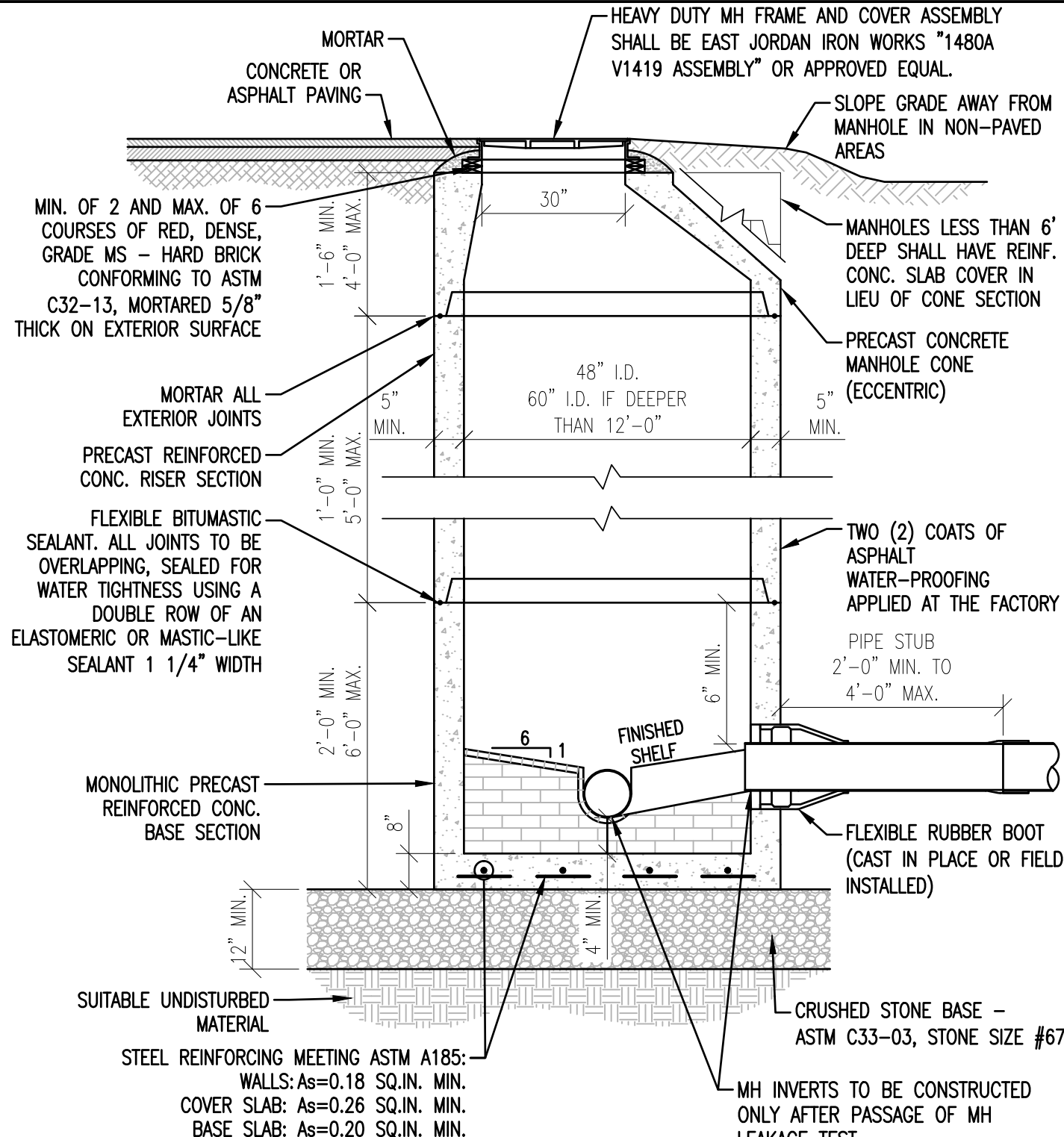


- NOTES:**
1. CORE HOLE SHALL BE SMOOTH, SYMMETRICAL, AND APPROPRIATELY SIZED FOR SEWER PIPE INSTALLATION.
 2. WHEN APPLICABLE CONTRACTOR SHALL RECONSTRUCT EXISTING SHELF IN MANHOLES TO PROVIDE POSITIVE FLOW TO INVERT OUT.

MANHOLE CONNECTION

NOT TO SCALE

3

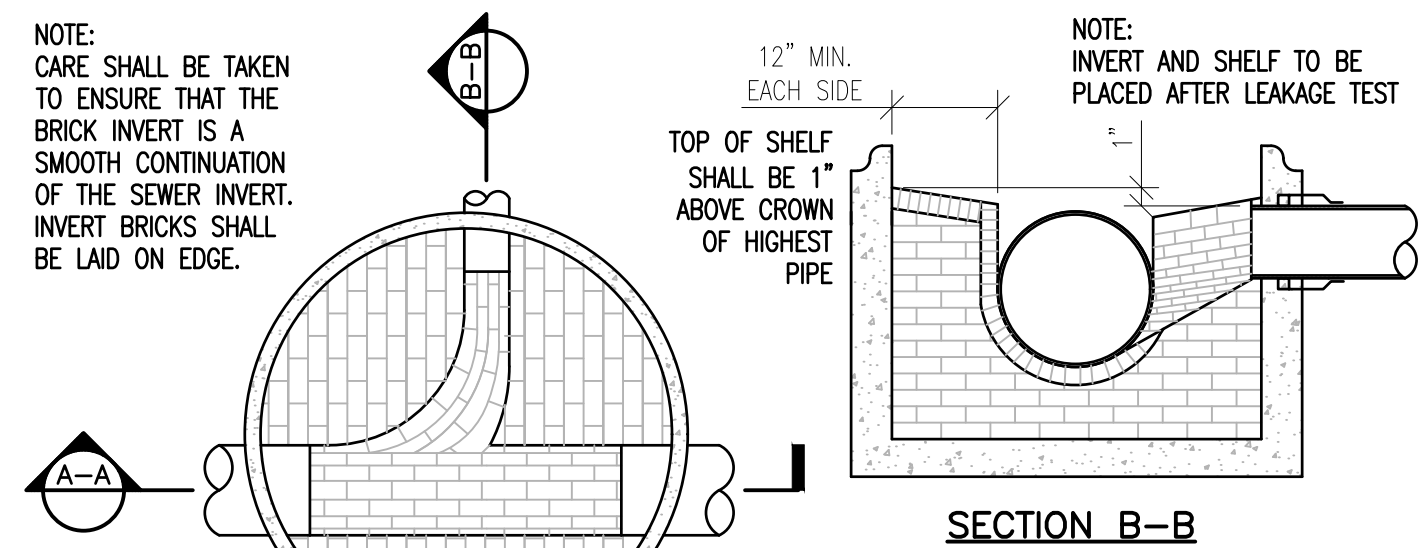


- NOTES:**
1. INVERTS OF MANHOLES SHALL BE FORMED WITH GRADE SS - HARD BRICK CONFORMING TO ASTM C32-13.
 2. PROVIDE SMOOTH SWEEPING TRANSITIONS BETWEEN INVERTS OF INTERSECTING PIPE.
 3. IF DEPTH OF MANHOLE IS 6 FT. OR LESS FROM RIM TO CENTERLINE INVERT, THEN A FLAT TOP MAY BE INSTALLED. IF DEPTH OF MANHOLE FROM RIM TO CENTERLINE INVERT IS MORE THAN 6 FT., THEN AN ECCENTRIC CONICAL TOP SHALL BE INSTALLED.
 4. MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW. AT CHANGES IN DIRECTION, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPED TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF THE INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY. INVERTS AND SHELVES SHALL BE PLACED AFTER TESTING.
 5. MANHOLE AND COVER SHALL BE DESIGNED FOR H2O LOADING.
 6. MANHOLE SHALL CONFORM TO ASTM C478 SPECIFICATIONS FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS".
 7. CONCRETE FC=4,000 PSI @ 28 DAYS MINIMUM
 8. BASE SECTION SHALL BE A ONE POUR MONOLITHIC SECTION

SEWER MANHOLE DETAIL

NOT TO SCALE

4

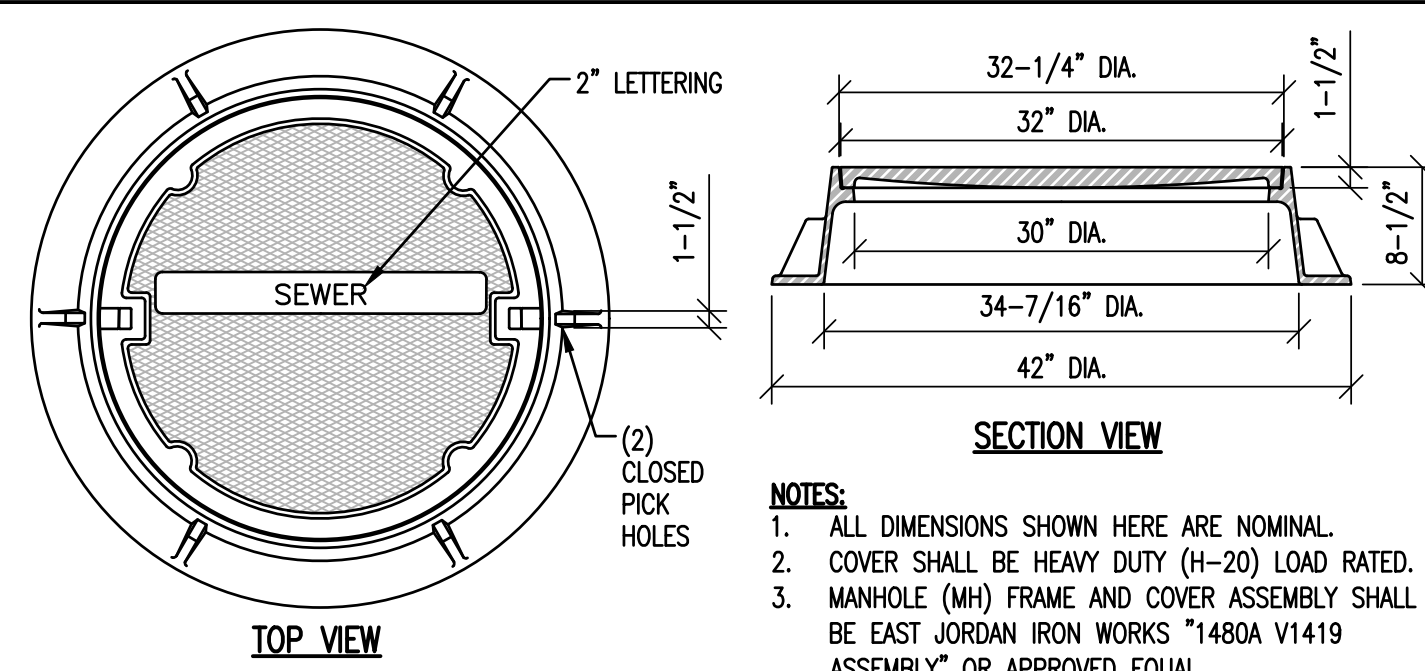


- NOTES:**
1. MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW AT CHANGES IN DIRECTION.
 2. INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES.
 3. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPED TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL.
 4. UNDERLAYMENT OF INVERT SHELF SHALL CONSIST OF BRICK MASONRY.

SEWER MANHOLE INVERT AND SHELF DETAIL

NOT TO SCALE

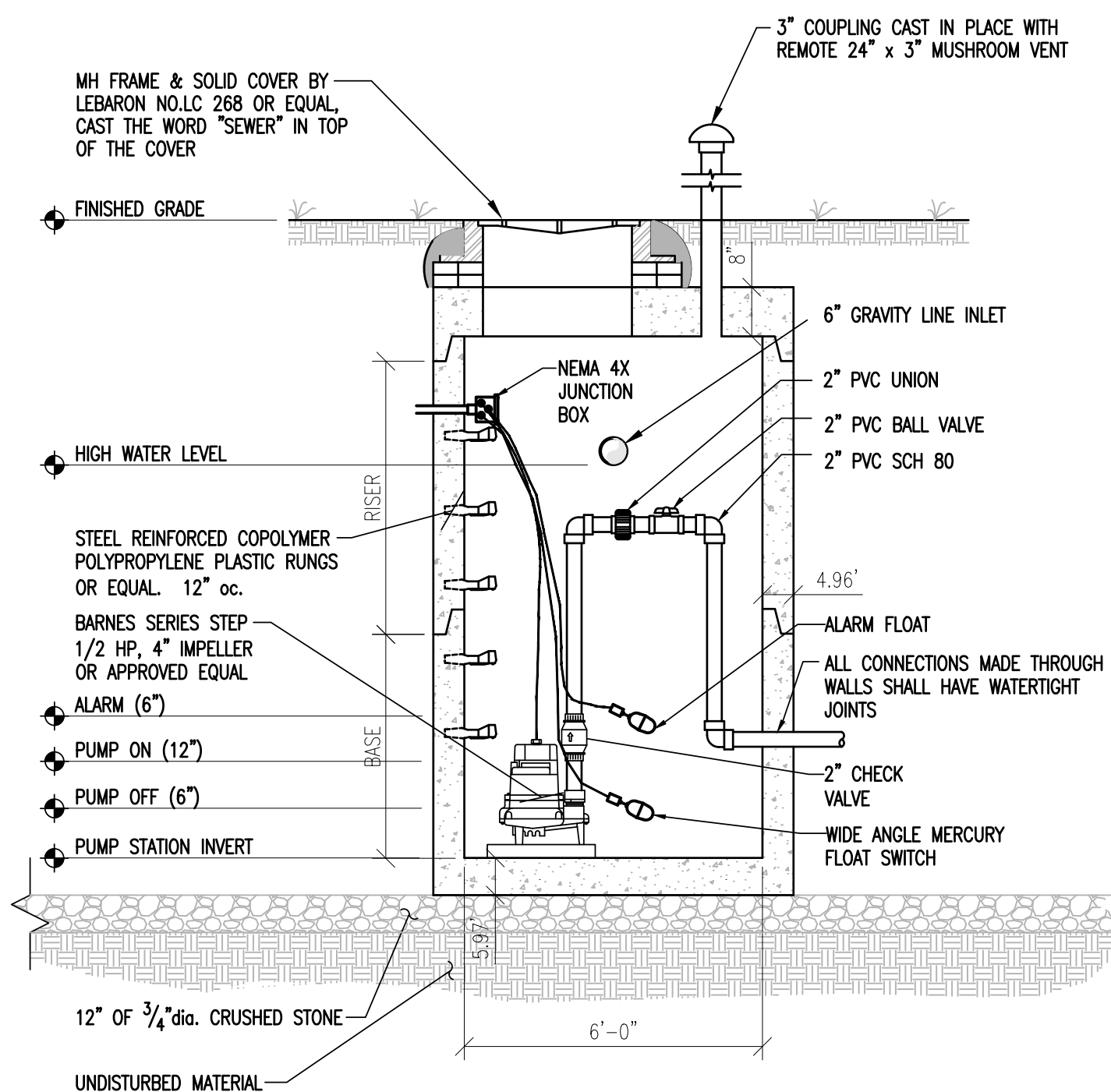
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SEWER MANHOLE FRAME & COVER

NOT TO SCALE

6



ELEVATION VIEW PUMP STATION

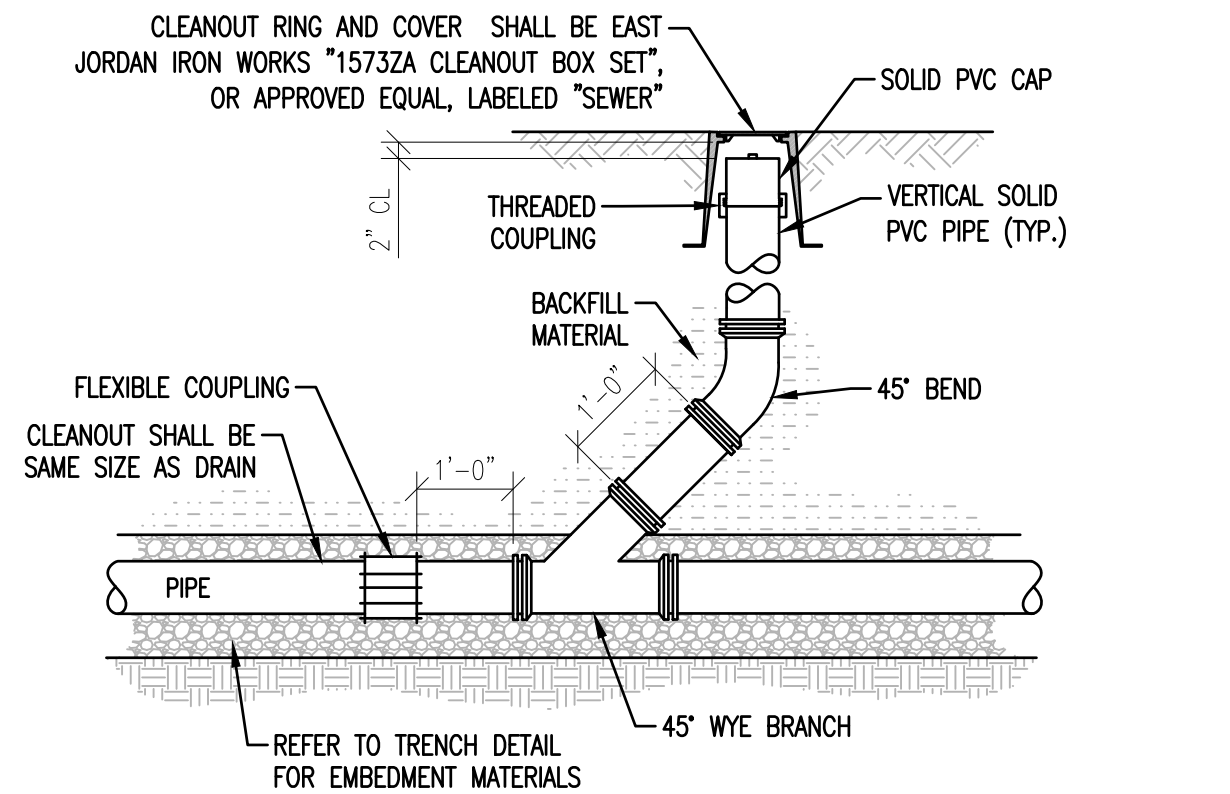
PUMP STATION NOTES:

1. WATER PROOF, SEAMLESS PUMP STATION SUPPLIED BY CAMP PRECAST, OR EQUIVALENT.
2. CONTROL PANEL TO BE LOCATED IN THE PROPOSED BUILDING. AND SHALL CONTAIN:
 - A. RUN LIGHTS
 - B. MANUAL ON/OFF AUTOMATIC CONTROL
 - C. ALARM SILENCE BUTTON
 - D. AUDIO AND VISUAL ALARM TO BE MOUNTED ON THE CONTROL PANEL BOX.
 - E. PUMP TIMER AND COUNTER
3. SPARE PARTS TO BE SUPPLIED TO INCLUDE:
 - A. EXTRA FLOAT SWITCH
 - B. TWO EXTRA RESET BLOCKS IN CONTROL PANEL
 - C. TWO ORIGINAL SETS OF MANUALS FOR BOTH THE PUMPS AND CONTROL PANELS.
4. ALL ELECTRICAL COMPONENTS TO BE UNDERWRITERS LABORATORY APPROVED, INSTALLED BY A LICENSED ELECTRICIAN IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
5. PUMP TO BE BARNES SERIES STEP, 1/2 HP, SINGLE PHASE SUBMERSIBLE PUMP WITH 4.00" IMPELLER.
6. ALL PIPE AND FITTINGS IN PUMP STATION SHALL BE FLANGED SCHEDULE 80 PVC.
7. TANK SHALL BE INSTALLED LEVEL ON A COMPACTED 12" GRAVEL BASE.
8. STEPS TO BE COPOLYMER POLYPROPYLENE PLASTIC WITH 3/8" GRADE 60 REBAR CONTINUOUS THROUGHOUT.

SIMPLEX PUMP STATION (ROUND)

NOT TO SCALE

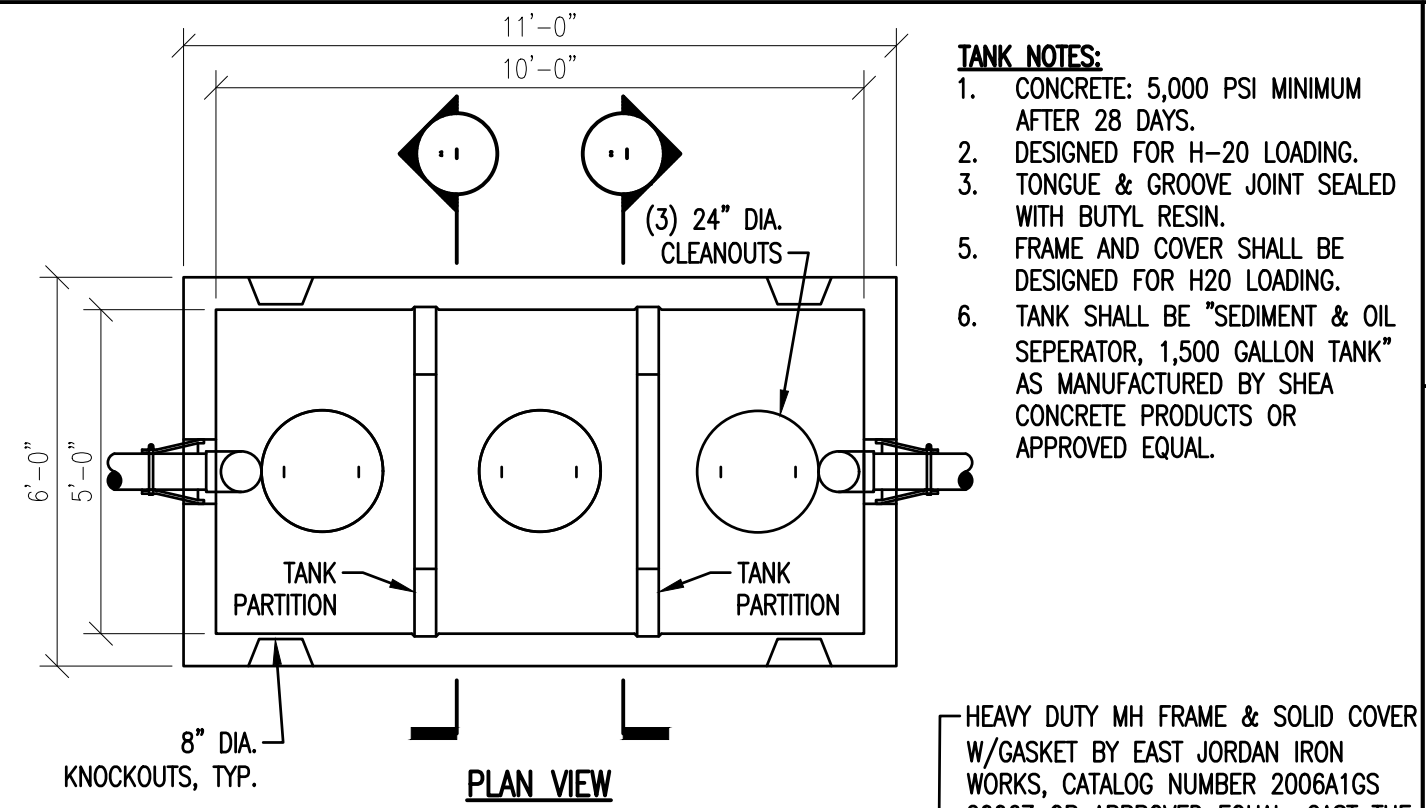
7



SEWER CLEANOUT DETAIL

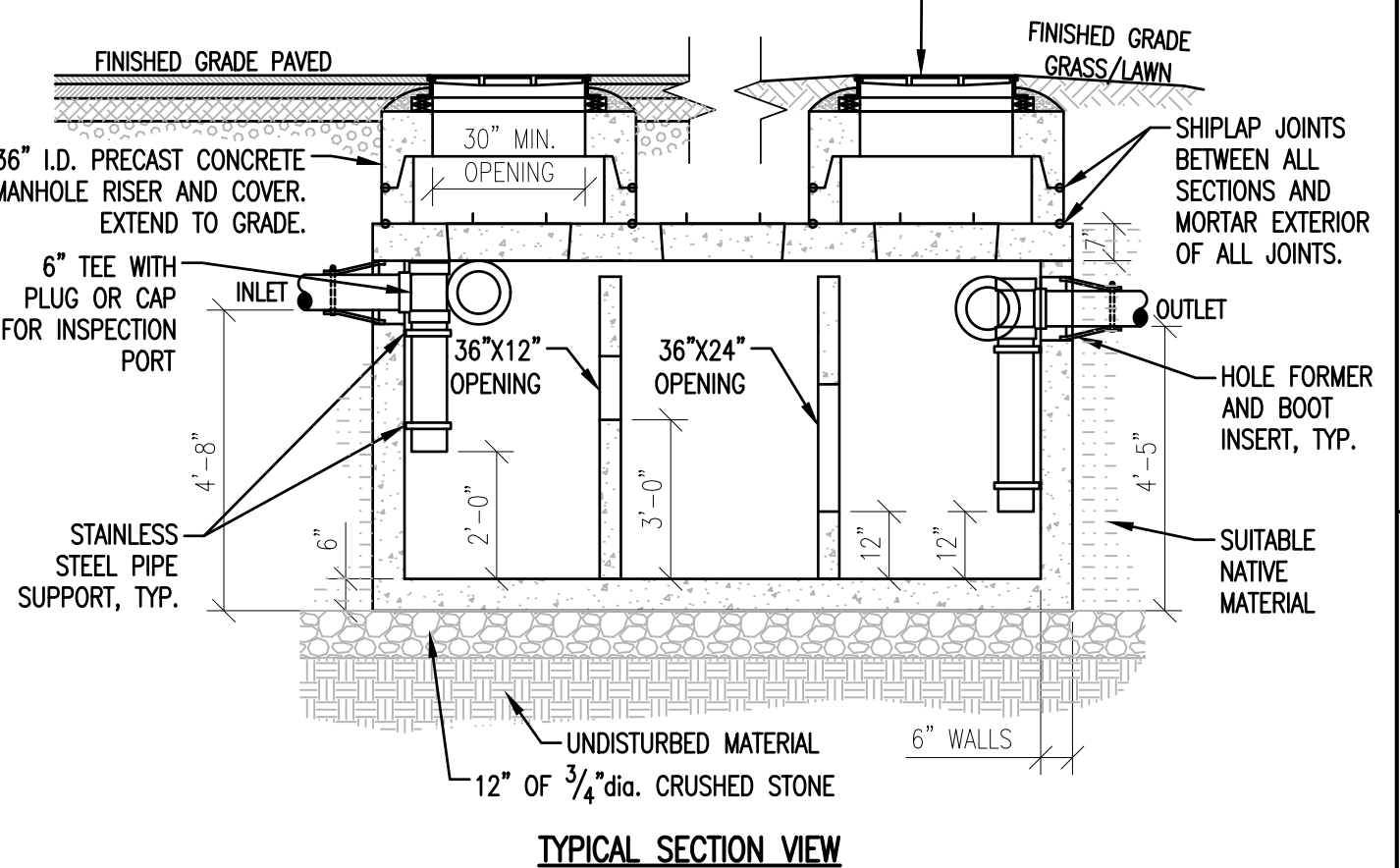
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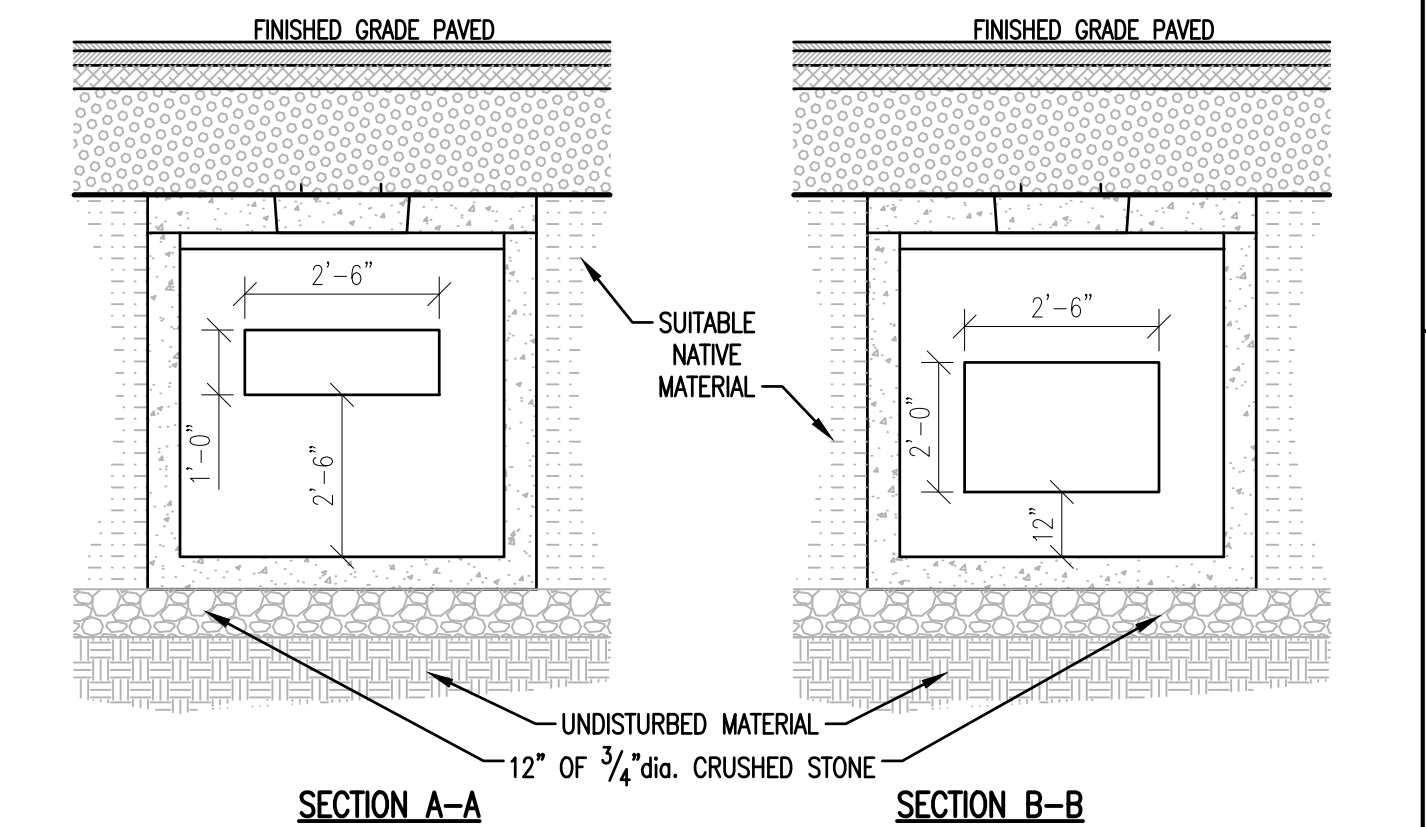


TANK NOTES:

1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGNED FOR H-20 LOADING.
3. TONGUE & GROOVE JOINT SEALED WITH BUTYL RESIN.
4. FRAME AND COVER SHALL BE DESIGNED FOR H2O LOADING.
5. TANK SHALL BE "SEDIMENT & OIL SEPARATOR, 1,500 GALLON TANK" AS MANUFACTURED BY SHEA CONCRETE PRODUCTS OR APPROVED EQUAL.



TYPICAL SECTION VIEW



GENERAL NOTES:

1. ITEMS OF WORK SHALL INCLUDE ALL NECESSARY MATERIALS AND THEIR INSTALLATION AS REQUIRED TO OPERATE THE GRIT/OIL SEPARATOR.
2. THE PRECAST STRUCTURE SHALL BE "SEDIMENT & OIL SEPARATOR, 1,500 GALLON TANK" AS MANUFACTURED BY SHEA CONCRETE PRODUCTS OR APPROVED EQUAL. THE PRE-CAST CONCRETE STRUCTURE AND RISERS SHALL BE CAPABLE OF WITHSTANDING H-20 LOADING AS CONFIGURED. THE EXTERIOR OF THE PRE-CAST CONCRETE STRUCTURE SHALL RECEIVE TWO COATS OF ASPHALT SEAL COATING AT THE FACTORY.
3. JOINTS BETWEEN THE CONCRETE SECTIONS SHALL BE SEALED BY BUTYL MASTIC (ASHTO M-198).
4. PIPE PENETRATIONS SHALL BE SEALED BY FLEXIBLE WATERIGHT BOOTHS WITH STAINLESS STEEL BANDS.
5. THE OIL-GRIT SEPARATOR AND RISERS SHALL BE FILLED WITH WATER AND SUBJECTED TO A 24 HOUR HYDROSTATIC LEAKAGE TEST. NO LEAKAGE WILL BE ALLOWED DURING THE TEST PERIOD.
6. AN ALTERNATE VACUUM LEAKAGE TEST IS ALSO ACCEPTABLE. THE VACUUM TEST WILL REQUIRE THE INSTALLED VAULT AND RISERS TO HOLD A VACUUM PRESSURE OF NEGATIVE 5 INCHES MERCURY FOR 10 MINUTES WITH NO LOSS/GAIN.
7. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE A WATERIGHT STRUCTURE.
8. VENT OIL-GRIT SEPARATOR IN CONFORMANCE WITH VERMONT AND INTERNATIONAL PLUMBING CODES.
9. SHOP DRAWINGS OF THE OIL-GRIT SEPARATOR AND COMPONENTS SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
10. BACKFILL MATERIALS SHALL BE COMPACTED, IN 12" LAYERS, TO 92% OF MODIFIED PROCTOR (ASTM 1557) TO WITHIN 3 FEET OF FINISHED GRADE. IN AREAS UNDER ROADWAYS, DRIVES, AND PARKING THE UPPER 3 FEET SHALL BE COMPACTED, IN 6" LAYERS, TO 95% MODIFIED PROCTOR (ASTM 1557) AND IN LAWN OR OTHER UNDEVELOPED SPACE THE UPPER 3 FEET SHALL BE COMPACTED TO 92% MODIFIED PROCTOR.

1,500 GALLON OIL-GRIT SEPARATOR

NOT TO SCALE

9

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Date: 12/20/21

REVIEWED PER STAFF COMMENTS

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SANITARY SEWER DETAILS

402 MT SUPPORT ROAD

RESIDENTIAL DEVELOPMENT

CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

Sheet Title:

EV Project #: 19324

Drawn By: JWF

Checked By: NAF

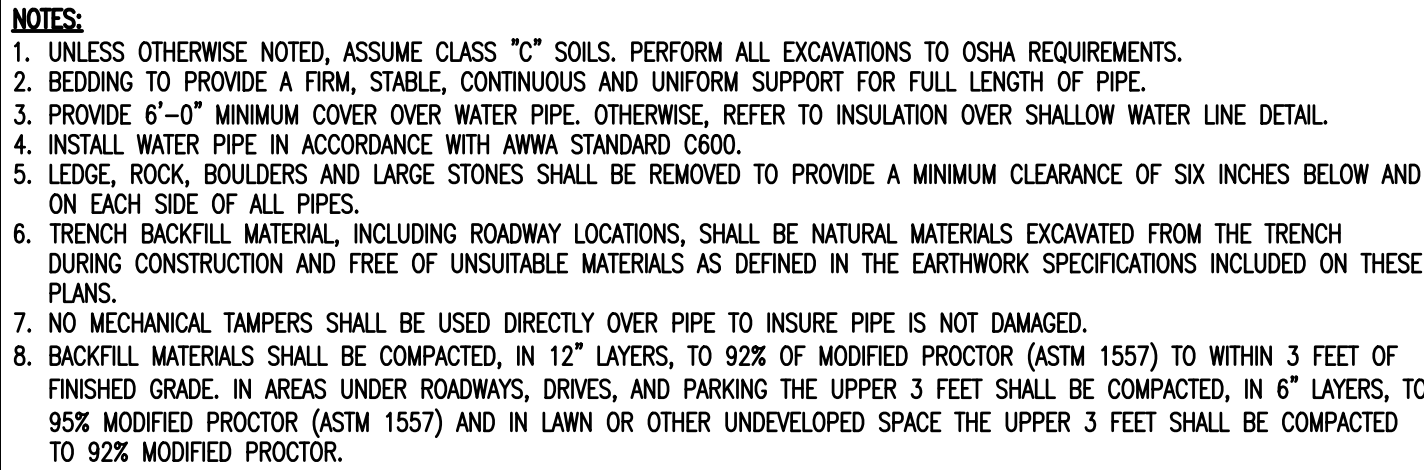
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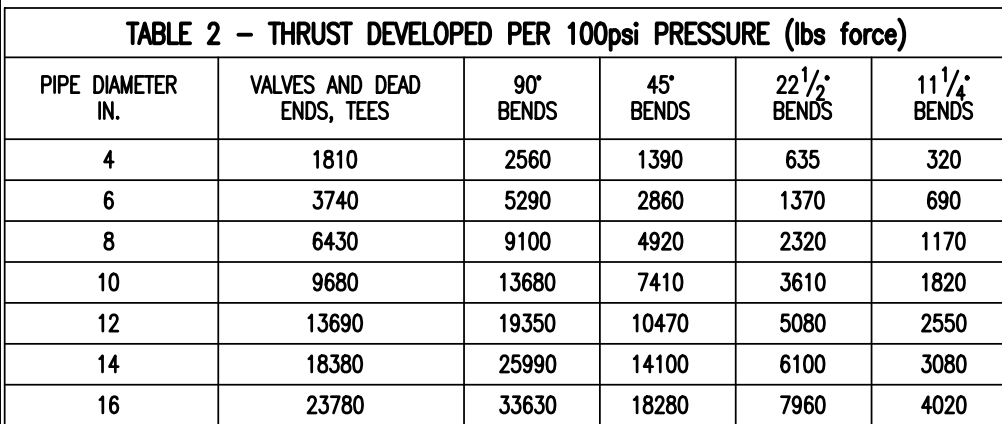
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DETERMINING MINIMUM BEARING CAPACITY:

THE AREA (H²) SHALL BE CALCULATED BY DETERMINING THE TOTAL THRUST GENERATED AT THE FITTING.

DIVIDED THE THRUST DEVELOPED (lbs force) (FROM TABLE 2) BY THE BEARING STRENGTH OF THE SOIL (FROM TABLE 1). THE RESULT IS THE AREA OF THE SOIL REQUIRED TO RESIST THE THRUST (A).

THE AREA CALCULATED WILL BE FOR THE AREA OF CONCRETE UP AGAINST THE TRENCH WALL (i.e. THE BACK SIDE OF THE BLOCK). USE THE TEST PRESSURE TO DETERMINE THE TOTAL THRUST.

NOT TO SCALE (2)



- ### TAPPING SLEEVE AND VALVE

NOT TO SCALE



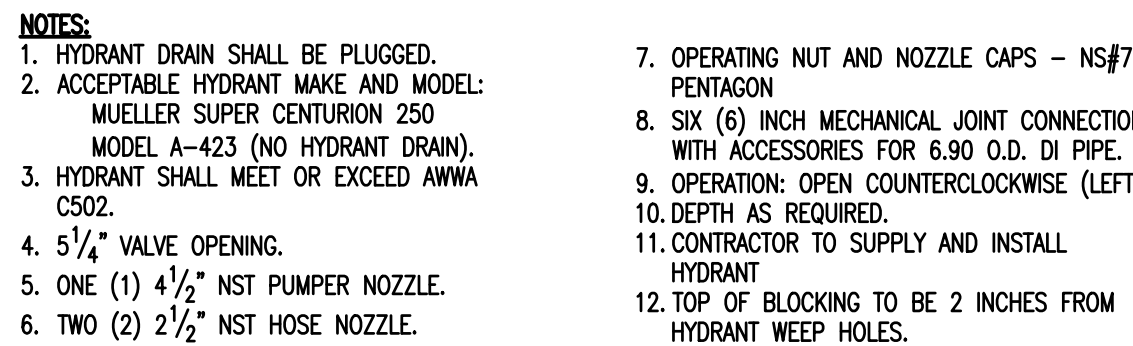
NOTE:
COVER MUST BE MARKED "WATER"

- NOT TO SCALE 5



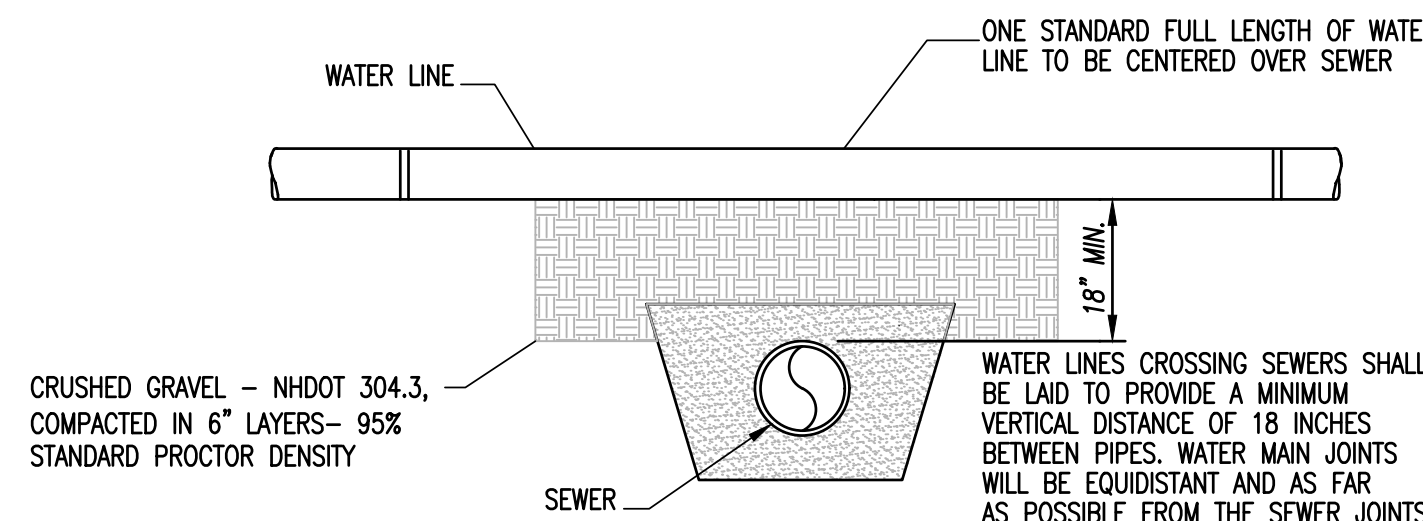
NOTE: COVER MUST BE MARKED "WATER"

- NOT TO SCALE



NOT TO SCALE

- NOTES:**
- | | |
|---|--|
| 1. HYDRANT DRAIN SHALL BE PLUGGED. | 7. OPERATING NUT AND NOZZLE CAPS - NS#7 |
| 2. ACCEPTABLE HYDRANT MAKE AND MODEL:
MUELLER SUPER CENTURION 250
MODEL A-423 (NO HYDRANT DRAIN). | 8. SIX (6) INCH MECHANICAL JOINT CONNECTO
WITH ACCESSORIES FOR 6.90 O.D. DI PIPE. |
| 3. HYDRANT SHALL MEET OR EXCEED ANWWA
C500 | 9. OPERATION: OPEN COUNTERCLOCKWISE (LEFT
TO RIGHT) AS REQUIRED. |
| 4. 5 1/2" VALVE OPENING. | 11. CONNECTION TO SUPPLY AND INSTALL
HYDRANT |
| 5. ONE (1) 4 1/2" NST PUMPER NOZZLE. | 12. TOP OF BLOCKING TO BE 2 INCHES FROM
HYDRANT WEEP HOLES. |
| 6. TWO (2) 2 1/2" NST HOSE NOZZLE. | |

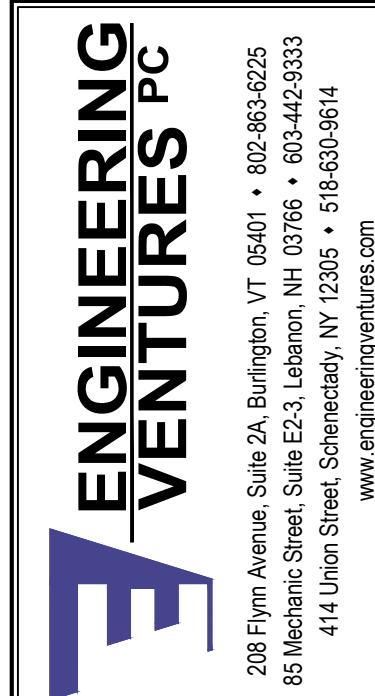
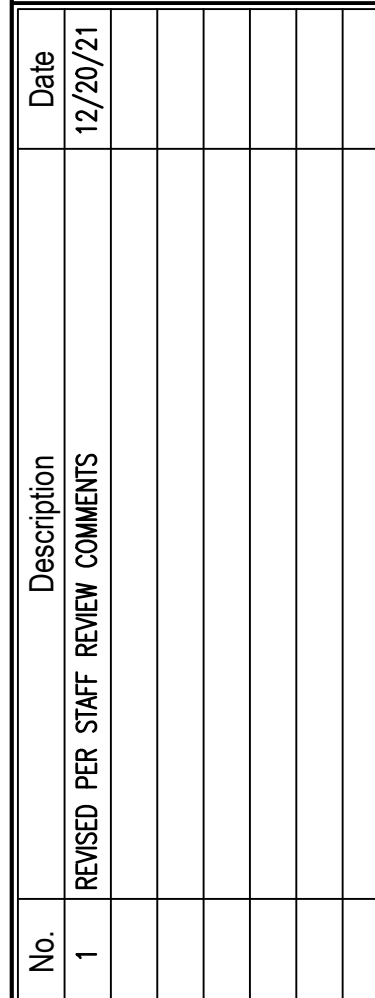


NOTE:

PROTECTION OF WATER SUPPLIES

- a. THERE SHALL BE NO PHYSICAL CONNECTION BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SUPPLY SYSTEM AND A SEWER OR SEWER APPURTENANCE WHICH WOULD PERMIT THE PASSAGE OF SEWAGE OR POLLUTED WATER INTO THE POTABLE SUPPLY. NO WATER PIPE SHALL PASS THROUGH OR COME IN ANY CONTACT WITH ANY PART OF A SEWER OR SEWER MANHOLE.
- b. NO SEWER SHALL BE LOCATED WITHIN THE WELL PROTECTIVE RADII ESTABLISHED IN ENV-WS 300 FOR ANY PUBLIC WATER SUPPLY WELL OR WITHIN 100 FEET OF ANY PRIVATE WATER SUPPLY WELL.
- c. SEWERS SHALL BE LOCATED AT LEAST TEN FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN.
- d. A DEVIATION FROM THE SEPARATION REQUIREMENTS OF (b) or (c) ABOVE SHALL BE ALLOWED WHERE NECESSARY TO AVOID CONFLICT WITH SUBSURFACE STRUCTURES, UTILITY CHAMBERS, AND BUILDING FOUNDATIONS PROVIDED THAT THE SEWER IS CONSTRUCTED IN ACCORDANCE WITH THE FORCE MAIN CONSTRUCTION REQUIREMENTS SPECIFIED IN ENV-Wq 704.06.
- e. WHENEVER SEWERS MUST CROSS WATER MAINS, THE SEWER SHALL BE CONSTRUCTED AS FOLLOWS:
 - 1.) VERTICAL SEPARATION OF THE SEWER AND WATER MAIN SHALL BE NOT LESS THAN 18 INCHES, WITH WATER ABOVE THE SEWER; AND
 - 2.) SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 9 FEET HORIZONTALLY FROM THE WATER MAIN.
- f. WATER-SEWER SEPARATION SHALL COMPLY WITH ENV-Wq 704.19 OR A WAIVER MUST BE REQUESTED FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.

NOT TO SCALE 8



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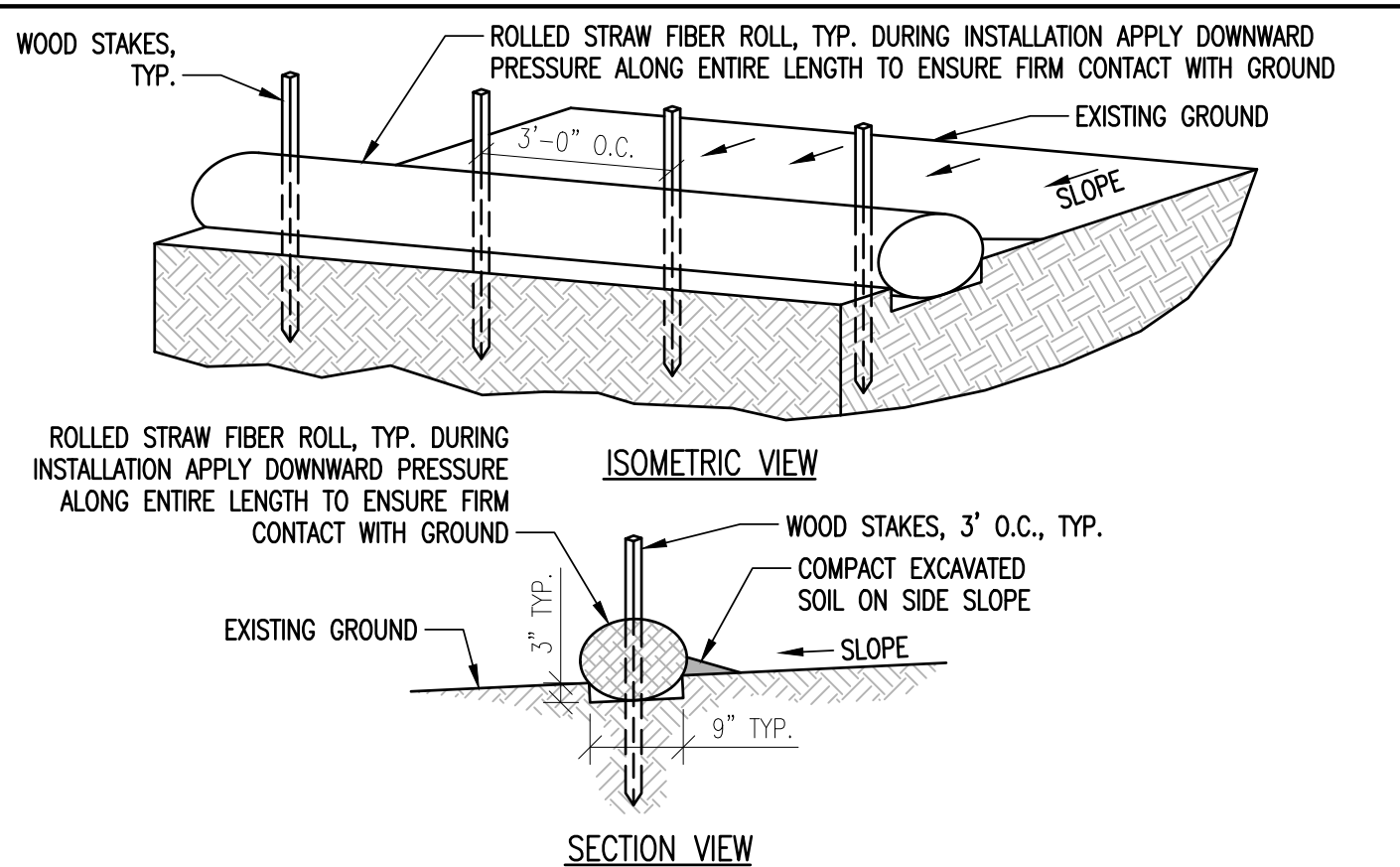
WATER DETAILS

402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF IBERNON, GRAFETON COUNTY, NEW HAMPSHIRE

Sheet Title:	Project Title:
EV Project #	19324
Drawn By:	JWF
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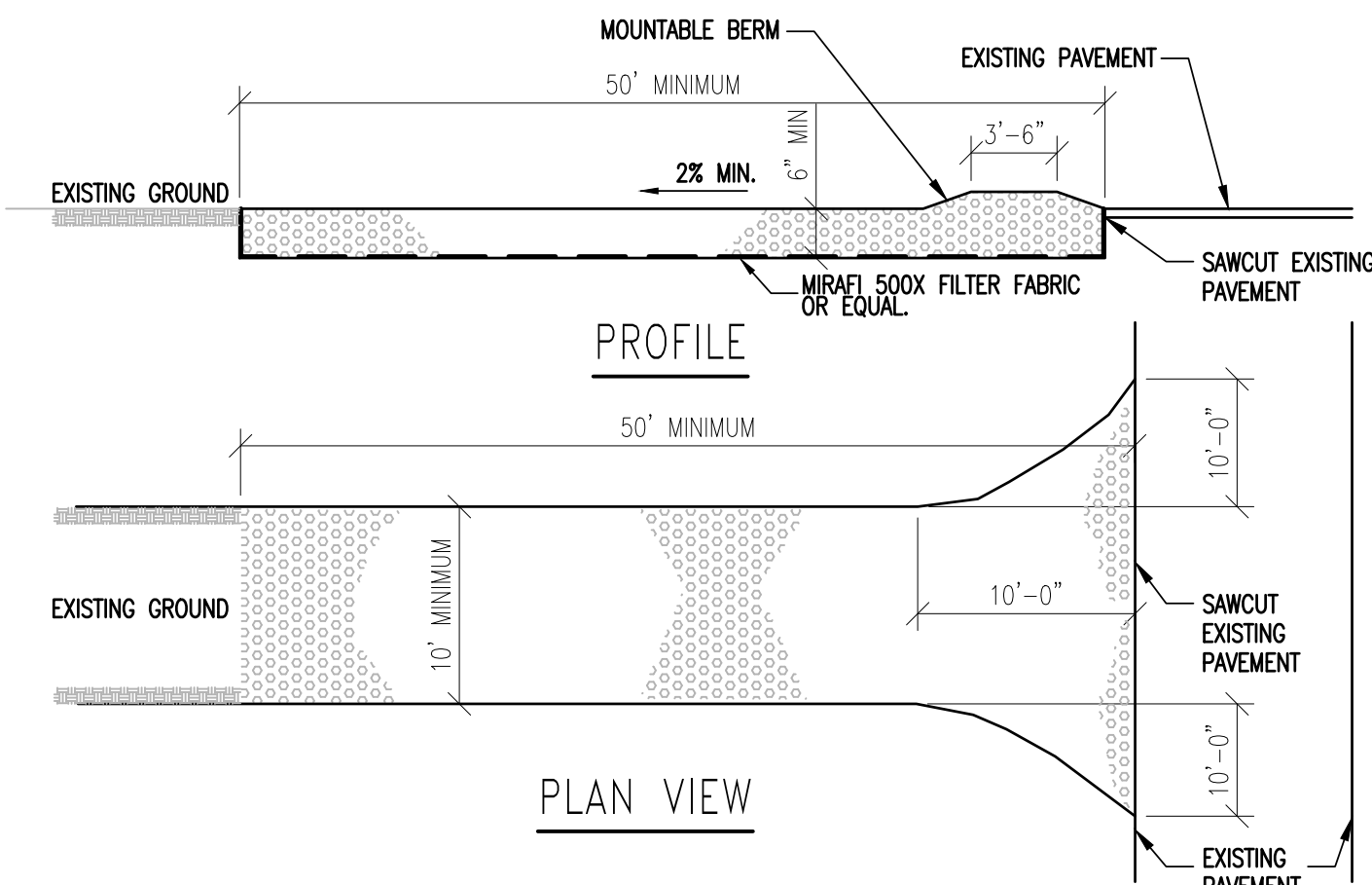
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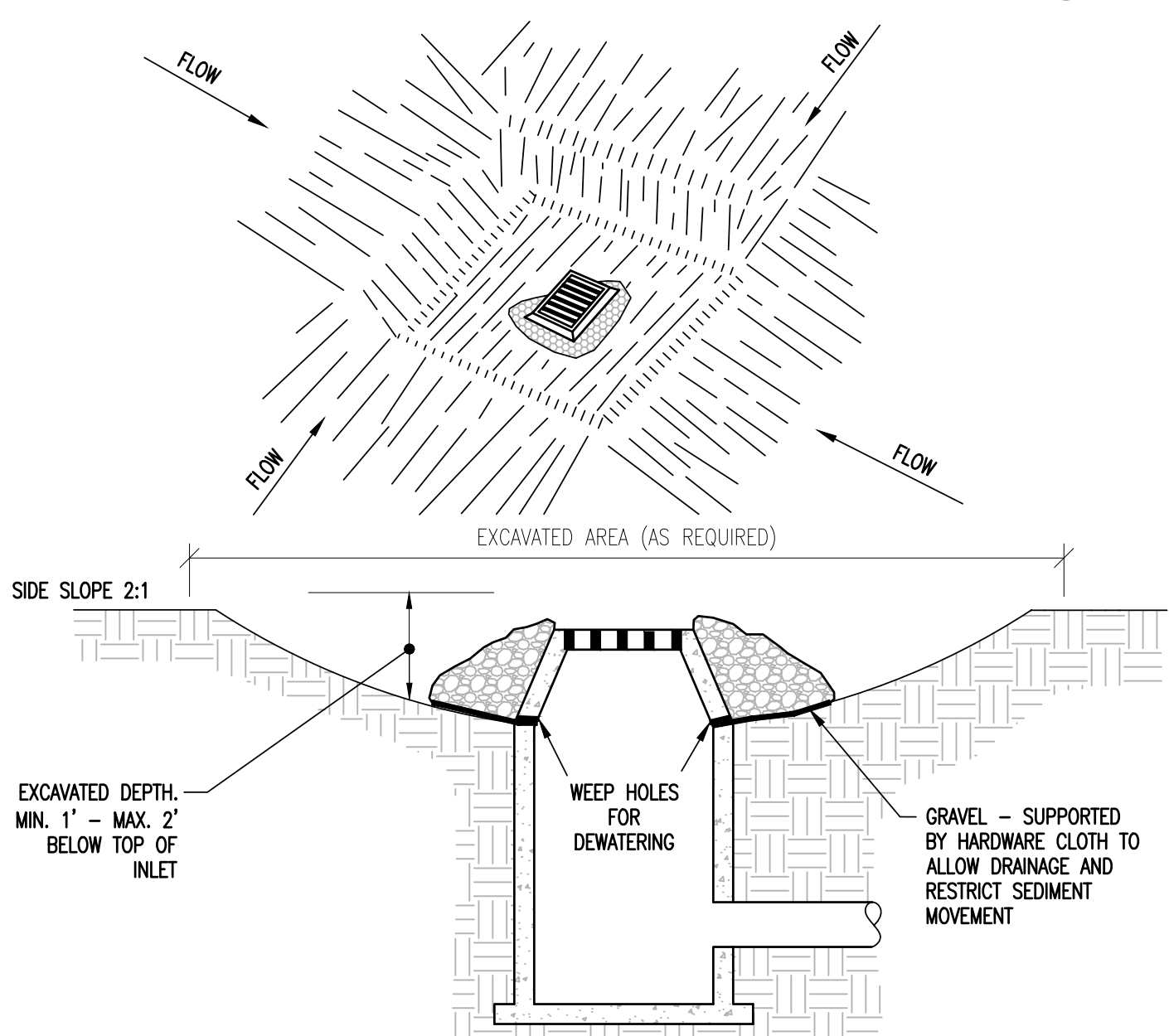
- STRAW FIBER ROLL NOTES**
1. INSTALL ROLLED STRAW FIBER ROLL PARALLEL ALONG THE CONTOUR OF THE SLOPE.
 2. TO MAXIMIZE SEDIMENT CONTAINMENT WITH THE STRAW FIBER ROLL, PLACE THE INITIAL STRUCTURE AT THE TOP/CREST OF THE SLOPE IF SIGNIFICANT RUNOFF IS EXPECTED FROM ABOVE. IF NO RUNOFF FROM ABOVE IS EXPECTED, THE INITIAL STRAW WATTLE CAN BE INSTALLED AT THE APPROPRIATE DISTANCE DOWNHILL FROM THE TOP/CREST OF THE SLOPE. THE FINAL STRUCTURE SHOULD BE INSTALLED AT OR JUST BEYOND THE BOTTOM/TOE OF THE SLOPE. WATTLES SHOULD BE INSTALLED PERPENDICULAR TO THE PRIMARY DIRECTION OF OVERLAND FLOW

STRAW FIBER ROLL - SOIL



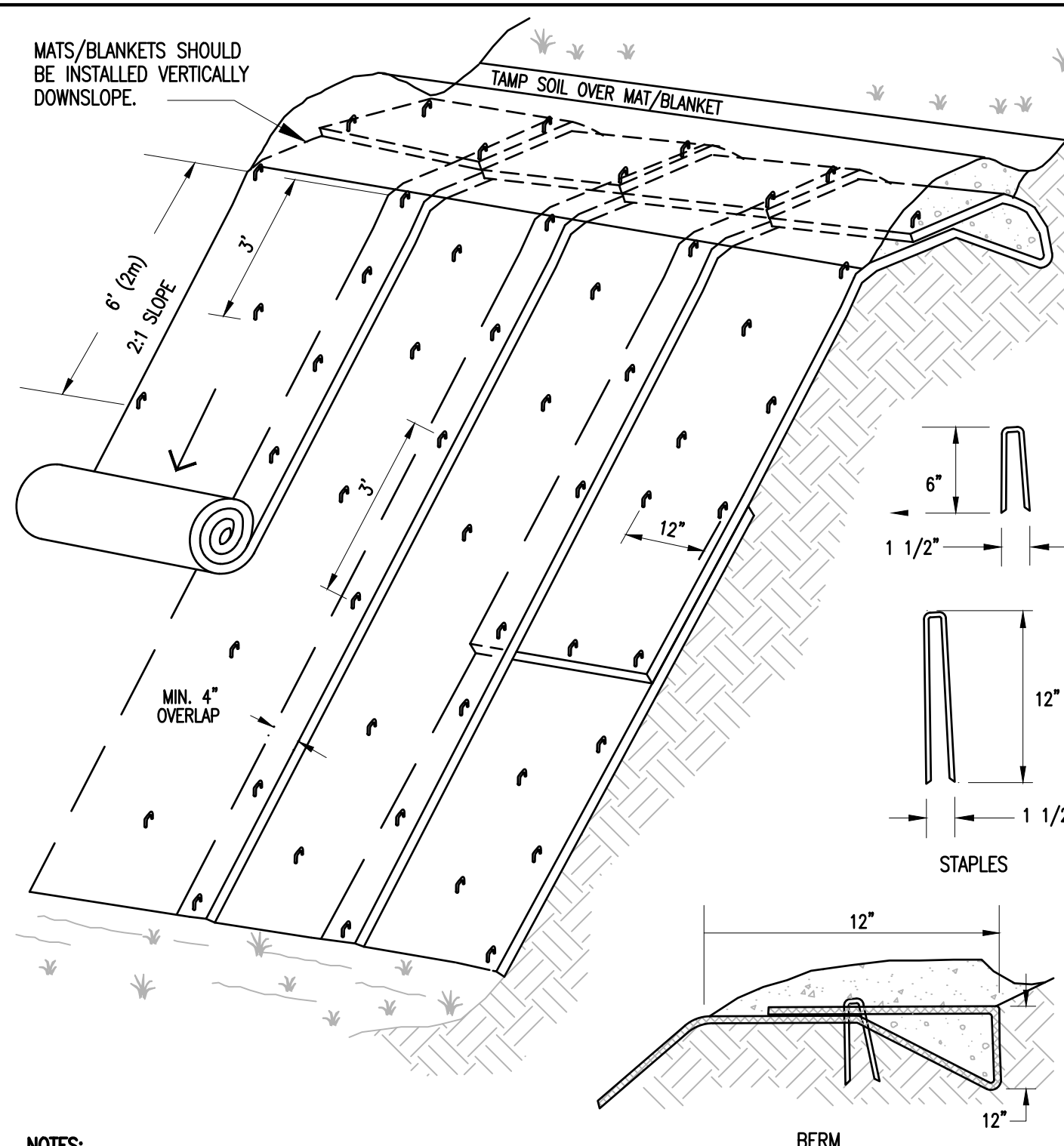
- NOTES:**
1. STONE SIZE: USE 3" (MIN) CRUSHED STONE.
 2. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS THE ENTRANCE.
 3. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. REPAIR AND/OR CLEANOUT ANY MEASURES USED TO TRAP SEDIMENT. TRACKING ONTO PUBLIC RIGHT-OF-WAYS SHALL NOT BE ALLOWED. ALL SEDIMENT SPILLED, DROPPED, OR WASHED ONTO PUBLIC RIGHT-OF-WAYS MUST BE REMOVED IMMEDIATELY AND ANY WASH WATER MUST BE CONTAINED AND PROPERLY DISPOSED OF.
 4. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
 5. WHEELS SHALL BE CLEARED TO REMOVE MUD PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

STABILIZED CONSTRUCTION ENTRANCE



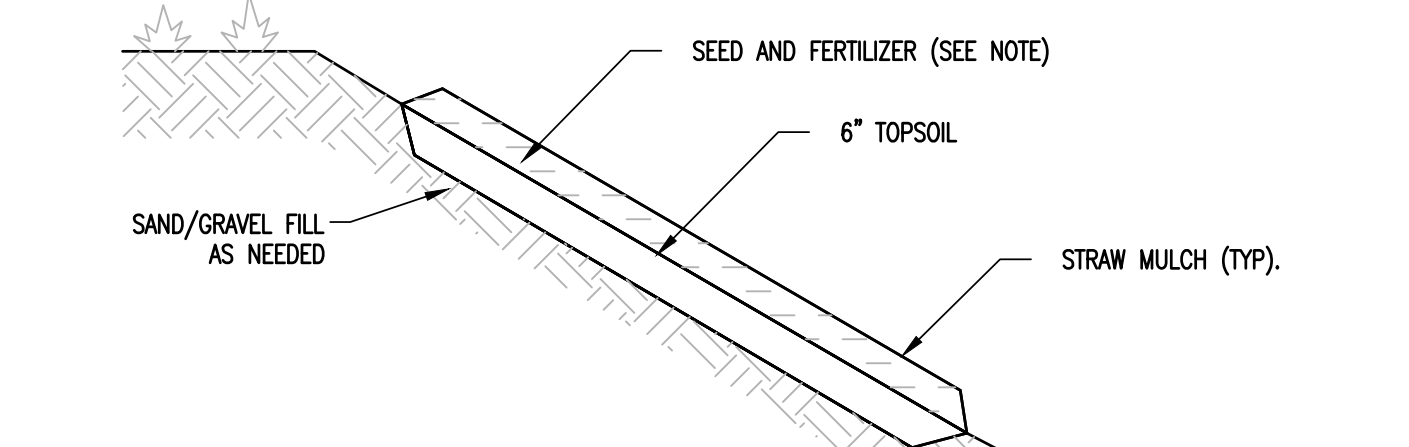
- NOTES:**
1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
 2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
 3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
 4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL BASIN WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

INLET PROTECTION



- NOTES:**
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/ BLANKETS SHALL HAVE GOOD SOIL CONTACT.
 2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
 3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

EROSION CONTROL BLANKET



- NOTES:**
1. SEEDING AND MULCHING OF DISTURBED AREAS SHALL TAKE PLACE WITHIN 48 HOURS OF FINAL GRADING.
 2. MULCH: HAY SHALL NOT BE USED. STRAW MULCH SHALL BE UTILIZED AND SHALL BE APPLIED AT A RATE OF 90-1,000 LBS/1,000 SF. MULCH SHALL NOT BE PLACED ON SLOPES OF GREATER THAN 3:1. SEED IMPREGNATED EROSION CONTROL NETTING SHALL BE USED IN ITS PLACE.
 3. SEED: SEEDING SHALL OCCUR AFTER APRIL 15 AND PRIOR TO SEPTEMBER 15TH IN ORDER TO ESTABLISH A STAND OF GRASS PRIOR TO GROUND FREEZING. SEED SHALL BE IN ACCORDANCE WITH SEED SPECIFICATION ON THIS SHEET.
 4. COVER SEED WITH 1/4 INCH SOIL UNLESS A HYDROSEEDER IS USED.
 5. MULCH ANCHORING: SHALL BE ACCOMPLISHED BY DEGRADABLE MULCH NETTING. USE WHEN SLOPES ARE GREATER THAN 10%.
 6. TOPSOIL AND MULCHING NOT TO BE APPLIED IN AREAS OF TRAVEL WAYS.

SEEDED AND MULCHED AREAS DETAIL

SEEDING SPECIFICATION:

URBAN MIX GRASS SEED- FOR USE IN GRASSED LAWN AREAS AROUND BUILDING AND PARKING - TEMPORARY AND PERMANENT APPLICATIONS		
% BY WEIGHT	LBS. LIVE SEED BY ACRE	TYPE OF SEED
66.0	40.0	CREeping RED FESCUE
33.0	20.0	KENTUCKY BLUEGRASS
100	60.0 # LIVE SEED/ ACRE	
CONSERVATION MIX GRASS SEED- FOR USE IN ALL OTHER AREAS		
% BY WEIGHT	LBS. LIVE SEED PER ACRE	TYPE OF SEED
50	15.0	SMOOTH BROMEGRASS
17	5.0	RYEGRASS
33	10.0	BIRDSFOOT TREFOLI
100	30.0 # LIVE SEED/ ACRE	

FERTILIZER- 10 LBS. PER 1000S.F.
SPRING SEEDING
FALL SEEDING

LIME- 90 LBS. PER 1000S.F.
DOLOMITIC GROUND LIMESTONE
NOT LESS THAN 85% OF THE TOTAL CARBONATE

TOP SOIL
4" MINIMUM APPROVED TOPSOIL

STRAW MULCH- 2 BALES PER 1000S.F.
APPLY BINDER OR NETTING AS NEEDED

SEED SEPCIFICATION

EROSION CONTROL NOTES

WINTER EROSION CONTROL NOTES

1. TO ADEQUATELY PROTECT WATER QUALITY DURING COLD WEATHER AND DURING SPRING RUNOFF, THE ADDITIONAL STABILIZATION TECHNIQUES SPECIFIED IN THIS SECTION SHALL BE EMPLOYED DURING THE PERIOD FROM OCTOBER 15 THROUGH MAY 1.
2. THE AREA OF EXPOSED, UNSTABILIZED SOIL SHALL BE LIMITED TO ONE ACRE AND SHALL BE PROTECTED AGAINST EROSION BY THE METHODS DESCRIBED IN THIS SECTION PRIOR TO ANY THAW OR SPRING MELT EVENT. THE ALLOWABLE AREA OF EXPOSED SOIL MAY BE INCREASED IF A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY NHDES.
3. ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING. ELSEWHERE, THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
4. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
5. AFTER OCTOBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
6. ALL PROPOSED STABILIZATION IN ACCORDANCE WITH THE ABOVE SHALL BE COMPLETED WITHIN A DAY OF ESTABLISHING THE GRADE THAT IS FINAL OR THAT OTHERWISE WILL EXIST FOR MORE THAN 5 DAYS.

GENERAL EROSION CONTROL NOTES

1. THE "ON-SITE EROSION CONTROL PLAN COORDINATOR" SHALL BE THE GENERAL CONTRACTOR. THIS INDIVIDUAL SHALL BE PRESENT ON-SITE FROM DAY-TO-DAY, AND SHALL BE RESPONSIBLE FOR ENSURING THAT THE EROSION CONTROL MEASURES REQUIRED BY THE EROSION CONTROL PLAN, DETAILS AND NOTES, ARE PROPERLY INSTALLED AND MAINTAINED. THE ONSITE EROSION CONTROL PLAN COORDINATOR SHALL KEEP A WRITTEN RECORD OF INSPECTIONS AND MAINTENANCE OF EROSION CONTROL FEATURES. A COPY OF THESE PLANS AND INSPECTION/MAINTENANCE RECORDS SHALL BE KEPT ONSITE AT ALL TIMES.
2. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE DISTURBED AT ANY ONE TIME DURING DEVELOPMENT. WHEN LAND IS DISTURBED, THE DISTURBANCE SHALL BE KEPT TO THE SHORTEST PRACTICAL DURATION AS APPROVED BY THE OWNER'S REP.
3. DUST SHALL BE CONTROLLED WITH WATER DISTRIBUTED BY A TRUCK MOUNTED SPRAY BAR. CALCIUM CHLORIDE (AASHTO M 144) OR SODIUM CHLORIDE (AASHTO M 143) SHALL BE USED AS DIRECTED BY THE OWNER'S REP.
4. ALL EROSION AND STORMWATER CONTROL SYSTEMS SHALL BE INSPECTED ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE OCCURRENCE OF A STORM EVENT OF 0.5" OR GREATER. NEEDED REPAIRS SHALL BE MADE IMMEDIATELY. SEDIMENT DEPOSITS SHALL BE REMOVED AS THEY ACCUMULATE AND PLACED IN AREAS WHERE FURTHER EROSION IS UNLIKELY.
5. A WRITTEN REPORT, STAMPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, SHALL BE SUBMITTED TO THE NHDES WITHIN 24 HOURS OF EACH INSPECTION THAT:
 - A) DESCRIBES THE PROGRESS OF THE PROJECT, INCLUDING WHETHER ALL CONDITIONS OF THE PERMIT ARE BEING MET AND, IF NOT, WHICH REQUIREMENTS ARE NOT BEING MET;
 - B) IF ANY REQUIREMENTS ARE NOT BEING MET, AN EXPLANATION OF THE CORRECTIVE ACTION(S) THAT WILL BE OR ARE BEING TAKEN TO BRING THE PROJECT INTO COMPLIANCE WITH APPLICABLE REQUIREMENTS AND THE DEADLINE BY WHICH SUCH ACTIONS WILL BE COMPLETED; AND
 - C) INCLUDES PHOTOGRAPHS OF THE SITE THAT ARE REPRESENTATIVE OF THE PROJECT; AND
6. RETAIN A COPY OF THE REPORT PREPARED PURSUANT TO (5), ABOVE, ON-SITE FOR REVIEW DURING SITE INSPECTIONS BY FEDERAL, STATE, AND LOCAL OFFICIALS
7. ALL PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH MOVING OPERATIONS.
8. DETENTION BASINS AND SWALES SHALL BE INSTALLED PRIOR TO ROUGH GRADING THE SITE.
9. ALL DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
10. ALL ROADWAYS AND PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
11. ALL CUT AND FILL SLOPES SHALL BE SEEDDED/LOADED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
12. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
 - A BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
 - A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
 - A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
 - EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
13. LOT DISTURBANCE OTHER THAN THAT SHOWN ON THE APPROVED PLANS SHALL NOT COMMENCE UNTIL AFTER THE ROADWAY HAS THE BASE COURSE TO DESIGN ELEVATION AND THE ASSOCIATED DRAINAGE IS COMPLETE AND STABLE.
14. APPROPRIATE SILTATION/EROSION/TURBIDITY CONTROLS SHALL BE IN PLACE PRIOR TO CONSTRUCTION, SHALL BE MAINTAINED DURING CONSTRUCTION, AND REMAIN IN PLACE UNTIL THE AREA IS STABILIZED. SILT FENCE(S) MUST BE REMOVED ONCE THE AREA IS STABILIZED.
15. DISCHARGE FROM DEWATERING OF WORK AREAS SHALL BE TO SEDIMENT BASINS THAT ARE:
 - A) LOCATED IN UPLANDS;
 - B) LINED WITH HAY BALES OR OTHER ACCEPTABLE SEDIMENT TRAPPING LINERS;
 - C) SET BACK AS FAR AS POSSIBLE FROM WETLANDS AND SURFACE WATERS, IN ALL CASES WITH A MINIMUM OF 20 FEET OF UNDISTURBED VEGETATED BUFFER.
16. WITHIN THREE DAYS OF FINAL GRADING, ALL EXPOSED SOIL AREAS SHALL BE STABILIZED BY SEEDING AND MULCHING DURING THE GROWING SEASON, OR IF NOT WITHIN THE GROWING SEASON, BY MULCHING WITH TACK OR NETTING AND PINNING ON SLOPES STEEPER THAN 3:1.
17. WHERE CONSTRUCTION ACTIVITIES HAVE BEEN TEMPORARILY SUSPENDED WITHIN THE GROWING SEASON, ALL EXPOSED SOIL AREAS SHALL BE STABILIZED WITHIN 14 DAYS BY SEEDING AND MULCHING.
18. WHERE CONSTRUCTION ACTIVITIES HAVE BEEN TEMPORARILY SUSPENDED OUTSIDE THE GROWING SEASON, ALL EXPOSED AREAS SHALL BE STABILIZED WITHIN 14 DAYS BY MULCHING AND TACK. SLOPES STEEPER THAN 3:1 SHALL BE STABILIZED BY MATTING AND PINNING.
19. PROPER HEADWALLS SHALL BE CONSTRUCTED WITHIN SEVEN DAYS OF CULVERT INSTALLATION.
20. CULVERT OUTLETS SHALL BE PROTECTED IN ACCORDANCE WITH THE DES BEST MANAGEMENT PRACTICES FOR URBAN STORMWATER RUNOFF MANUAL (JANUARY 1996) AND THE STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE (AUGUST 1992).
21. THE CONTRACTOR RESPONSIBLE FOR COMPLETION OF THE WORK SHALL UTILIZE TECHNIQUES DESCRIBED IN THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2006).
22. DO NOT PLACE THE BIORETENTION SYSTEM INTO SERVICE UNTIL ALL BMPs HAVE BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
23. DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM THE CONSTRUCTION ACTIVITIES (RUNOFF, WATER FROM EXCAVATIONS) TO BIORETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
24. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

EROSION CONTROL CONSTRUCTION SEQUENCE:

1. THE "ON-SITE EROSION CONTROL PLAN COORDINATOR" SHALL BE THE GENERAL CONTRACTOR. THIS INDIVIDUAL SHALL BE PRESENT ON SITE FROM DAY TO DAY, AND SHALL BE RESPONSIBLE FOR ENSURING THAT THE EROSION CONTROL MEASURES REQUIRED BY THE EROSION CONTROL PLAN, DETAILS AND NOTES, ARE PROPERLY INSTALLED AND MAINTAINED. THE ONSITE EROSION CONTROL PLAN COORDINATOR SHALL KEEP A WRITTEN RECORD OF INSPECTIONS AND MAINTENANCE OF EROSION CONTROL FEATURES. A COPY OF THESE PLANS AND INSPECTION/MAINTENANCE RECORDS SHALL BE KEPT ONSITE AT ALL TIMES.
2. HOLD PRE-CONSTRUCTION CONFERENCE AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION, WITH THE CONTRACTOR, OWNER, AND ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING ALL EROSION CONTROL MEASURES DELINEATED ON THE PLANS AND ANY ADDITIONAL MEASURES THAT ARE NECESSARY TO MINIMIZE EROSION. THE CONTRACTOR SHALL HAVE EROSION CONTROL MATERIALS AND INSTALLATION EQUIPMENT ON SITE AT ALL TIMES.
3. IF POSSIBLE, ALL TEMPORARY EROSION CONTROL MEASURES REQUIRED FOR WORK PROPOSED DURING THE WINTER (BETWEEN OCTOBER 15 AND MAY 1), SHALL BE INSTALLED PRIOR TO OCTOBER 1.
4. PRIOR TO ANY OTHER WORK, SILT FENCES SHALL BE INSTALLED GENERALLY 10 FEET FROM THE BASE OF THE FILL SLOPES, OR AS SHOWN ON THE EROSION CONTROL PLAN. THESE SHALL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN STABILIZED. SEDIMENT SHALL BE REMOVED FROM BEHIND THE SILT FENCE WHEN IT BECOMES 6 INCHES DEEP AT THE FENCE. THE SILT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A PROPER SEDIMENT BARRIER.
5. INSTALL TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT.
6. INSTALL INLET PROTECTION ON EXISTING AND NEW CATCH BASINS.
7. ROUGH GRADE AND STOCKPILE TOPSOIL SURROUNDED BY SILT FENCE.
8. STABILIZE EXPOSED SLOPES AND SOILS AS SOON AS GRADED, AND MAINTAIN UNTIL ADEQUATELY VEGETATED.
9. COMPLETE FINAL GRADING OF SITE. PLACE TOPSOIL AND PERMANENTLY VEGETATE, LANDSCAPE, AND MULCH.
10. AFTER THE SITE IS APPROVED BY THE ENGINEER AS ADEQUATELY STABILIZED, REMOVE ALL TEMPORARY MEASURES AND INSTALL PERMANENT VEGETATION ON THE DISTURBED AREAS.

TEMPORARY/CONSTRUCTION EROSION CONTROL MEASURES:

1. HAY SHALL NOT BE USED.
2. SILT FENCES SHALL BE INSTALLED GENERALLY 10 FEET FROM THE BASE OF THE FILL SLOPES, OR AS SHOWN ON THE PLANS. THESE SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE HAS BEEN STABILIZED. SEDIMENT SHALL BE REMOVED FROM BEHIND THE SILT FENCE WHEN IT BECOMES 6 INCHES DEEP AT THE FENCE. THE SILT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A PROPER SEDIMENT BARRIER.
3. INSTALL STONE CHECK DAMS IN GRASS-LINED SWALES 50 FEET ON CENTER TO PREVENT SILT FROM WASHING INTO THE DRAINAGE SYSTEM DURING CONSTRUCTION. SEDIMENT SHALL BE REMOVED FROM BEHIND THE DAMS WHEN IT BECOMES 6 INCHES DEEP. STONE CHECK DAMS SHALL BE REMOVED WHEN VEGETATION IS ESTABLISHED.
4. DROP INLET PROTECTION SHALL BE PROVIDED AROUND ALL EXISTING AND PROPOSED CATCH BASINS. PROTECTION SHALL REMAIN UNTIL ALL DISTURBED AREAS ARE STABILIZED. SEDIMENT SHALL BE REMOVED FROM DROP INLET PROTECTION WHEN THE STORAGE CAPACITY HAS BEEN APPROXIMATELY 50% FILLED. GRAVEL WILL BE CLEANED OR REPLACED WHEN IT NO LONGER DRAINS PROPERLY.
5. EXCAVATED MATERIAL FROM EARTH EXCAVATION AND DITCH DIGGING SHALL BE DISPOSED OF OFFSITE OR USED FOR PROJECT FILL MATERIAL IF DETERMINED SUITABLE BY THE OWNER'S REPRESENTATIVE.
6. STOCKPILED MATERIAL (TOPSOIL, BORROW, ETC.) SHALL HAVE SILT FENCE CONSTRUCTED AROUND THE PERIMETER. THE STOCKPILED MATERIAL SHALL BE SEEDDED AND MULCHED AS SOON AS POSSIBLE TO PREVENT SOIL EROSION AND SEDIMENTATION OFF SITE. LOCATE STOCKPILES ON THE UPHILL SIDE OF DISTURBED AREAS, IF POSSIBLE. DURING WINDY CONDITIONS, STOCKPILED MATERIAL SHALL BE COVERED OR WATERED APPROPRIATELY TO PREVENT WIND EROSION.

PERMANENT EROSION CONTROL MEASURES:

1. GRASS LINED SWALES SHALL BE TOP SOILED, SODDED AND FERTILIZED AREAS WHICH EXHIBIT SIGNS OF EROSION SHALL BE RE-SODDED IMMEDIATELY AND MAINTAINED UNTIL SOD HAS PERMANENT HOLD AND IS HEALTHY.
2. WHEN CONSTRUCTION IS COMPLETED IN AN AREA, IT SHALL BE IMMEDIATELY TOP SOILED, SEEDDED, FERTILIZED AND MULCHED.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTINUED MAINTENANCE OF ALL DISTURBED AREAS, INCLUDING WATERS, UNTIL THE AREA IS INSPECTED AND ACCEPTED BY THE OWNER OR ENGINEER.
4. AFTER THE SITE IS STABILIZED, REMOVE ALL TEMPORARY MEASURES AND INSTALL PERMANENT VEGETATION ON THE DISTURBED AREAS.
5. RE-SEEDING SHALL BE DONE UNTIL ALL AREAS ARE COMPLETELY COVERED WITH A MATURE STRAND OF GRASS. AN AREA SHALL BE CONSIDERED COVERED WHEN THE ENTIRE SURFACE CONTAINS A VERDOROUS STAND OF GRASS. AREAS THAT, IN THE OPINION OF THE ENGINEER, ARE PREDOMINATELY WEEDS SHALL BE PLOWED UP, FINE GRADED, FERTILIZED AND RE-SEEDDED IN THE MANNER SPECIFIED PREVIOUSLY, EXERCISING CAUTION NOT TO CAUSE DAMAGE TO NEW OR EXISTING PLANT MATERIAL.

STATE OF NEW HAMPSHIRE
NOTARIAL PUBLIC
No. 13286
LICENSED
Stamp

Date
12/20/21

Description
REVISED PER STAFF REVIEW COMMENTS

No.
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ENGINEERING
VENTURES PC

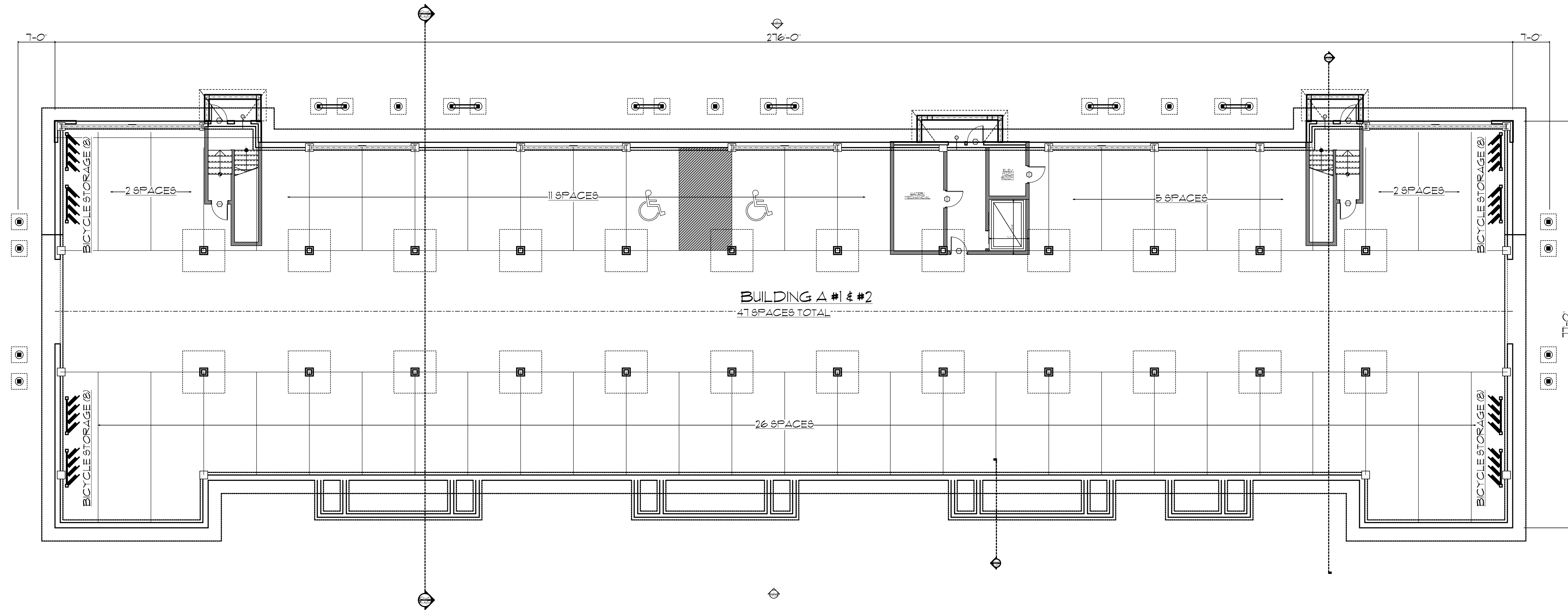
MT SUPPORT DEVELOPMENT, LLC
ANAGNOST INVESTMENTS
& THE BRAVERMAN COMPANY
208 Flynn Avenue, Suite 2A, Burlington, VT 05401 • 802-863-6225
85 Mechanic Street, Suite E2-3, Lebanon, NH 03766 • 603-442-9333
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EROSION PREVENTION AND
SEDIMENT CONTROL DETAILS
402 MT SUPPORT ROAD
RESIDENTIAL DEVELOPMENT
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

Sheet Title
EV Project # 19324
Drawn By: JWF
Checked By: NAF
Scale: NO SCALE
Date: 11/08/2021

C4.7
Page 70 of 399

Page 81 of 507



1 GARAGE PLAN
SCALE: 3/32" = 1'-0"

BURNELL JOHNSON	
A R C H I T E C T S	
80 STARK STREET (603) - 625-5098 (603) - 625-5167 FAX	
MANCHESTER, N.H. 03101	
BLDG 1 & 2 GARAGE PLAN	
MOUNT SUPPORT RD	
ANAGNOST INVESTMENTS #Pln	

19 OCT 2021 1 NOV 2021 1 DEC 2021	A-P1.02
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DO NOT SCALE DRAWINGS. USE WRITTEN DIMENSIONS WHERE THERE ARE NO DIMENSIONS PROVIDED. CONSULT THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.



1 BUILDING A FRONT ELEVATION
SCALE: 3/32" = 1'-0"



2 BUILDING A RIGHT ELEVATION
SCALE: 3/32" = 1'-0"



4 BUILDING A LEFT ELEVATION
SCALE: 3/32" = 1'-0"



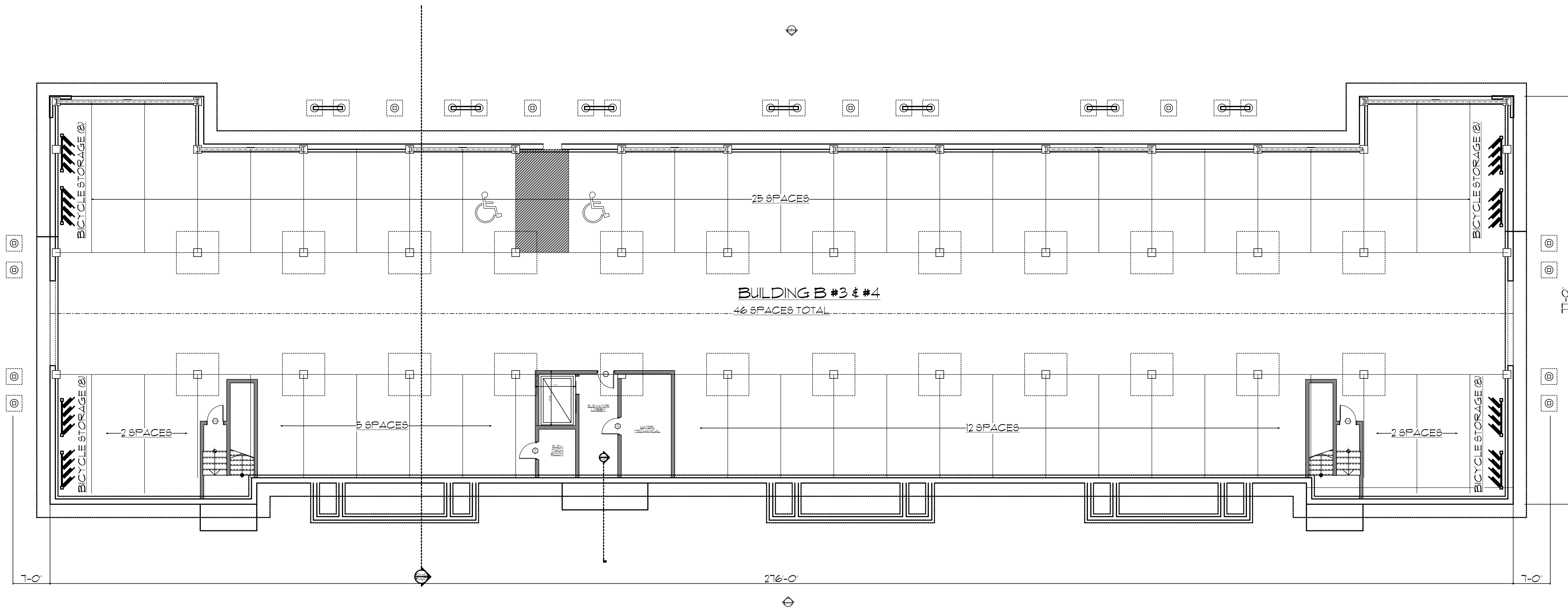
3 BUILDING A REAR ELEVATION
SCALE: 3/32" = 1'-0"

BURNELL ▲ JOHNSON
A R C H I T E C T S
80 STARK STREET MANCHESTER, N.H. 03101
(603) - 625-5098
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BLDG 1 & 2 PRELIM ELEVATIONS
MOUNT SUPPORT RD
ANAGNOST INVESTMENTS #Pln

19 OCT 2021
1 NOV 2021
1 DEC 2021

A-P1.06

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1 GARAGE PLAN
SCALE: 3/32" = 1'-0"

BURNELL ▲ JOHNSON	
A R C H I T E C T S	
80 STARK STREET (603) - 625-5098 (603) - 625-5167 FAX	MANCHESTER, N.H. 03101
BLDG 3 & 4 GARAGE PLAN	
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19 OCT 2021
1 NOV 2021
1 DEC 2021

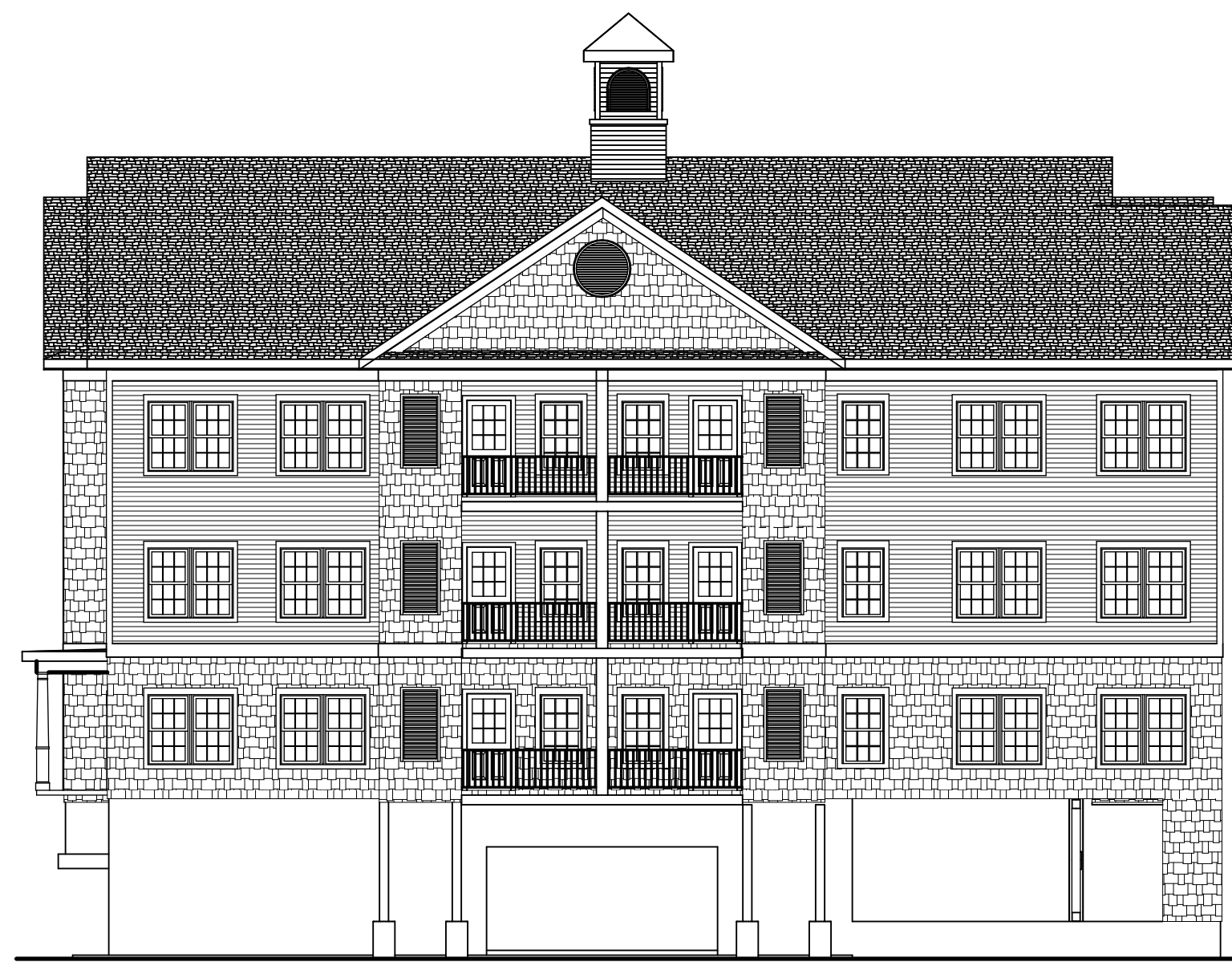
B-P1.02

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TYPICAL BUILDING MOUNTED LIGHT FIXTURE MOUNTED 15' ABOVE GRADE SEE LIGHTING PLAN FOR SPECIFICATIONS

1 BUILDING B FRONT ELEVATION
SCALE: 3/32" = 1'-0"



2 BUILDING B RIGHT ELEVATION
SCALE: 3/32" = 1'-0"



4 BUILDING B LEFT ELEVATION
SCALE: 3/32" = 1'-0"



TYPICAL BUILDING MOUNTED LIGHT FIXTURE MOUNTED 15' ABOVE GRADE SEE LIGHTING PLAN FOR SPECIFICATIONS

3 BUILDING B REAR ELEVATION
SCALE: 3/32" = 1'-0"

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ANAGNOST INVESTMENTS #Pln

19 OCT 2021
1 NOV 2021
1 DEC 2021

B-P1.06

DO NOT SCALE DRAWINGS. USE WRITTEN DIMENSIONS WHERE THERE ARE NO DIMENSIONS PROVIDED CONSULT THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.



Upper Valley Lake Sunapee
Regional Planning Commission

Attn: David Brooks, Planning & Development Director
City of Lebanon, NH
51 N. Park St
Lebanon, NH 03766

**UVLSRPC REGIONAL PLANNING COMMITTEE COMMENTS RE: 392 & 402 MT.
SUPPORT RD, LEBANON, NH – PROPOSED DEVELOPMENT OF REGIONAL
IMPACT**

Dear Planning Board Members,

Per the notice of regional impact for the proposed housing development at 392 & 402 Mt. Support Rd, UVLSRPC convened its Regional Planning Committee (RPC) to review the application and provide comments. The following is a summary of comments from UVLSRPC staff and RPC committee members.

Regional Housing Considerations:

- The cover letter (p. 18 of the application package) describes the proposed development as “affordable workforce housing”; it is our understanding from follow-up conversations with City staff that the applicant intends to provide subsidized rental prices.
- While there is a strong regional need for additional housing supply in the Upper Valley, there is a particularly strong need for homes that are affordable for lower-income residents¹. We are pleased that this proposed development appears to address both identified needs, although some clarification is needed regarding targeted affordability levels.
- Should this proposed development indeed include affordable units, we would like to see the Planning Board address long-term assurances of continued affordability during the approval process. This will help ensure housing stability for longer-term residents of this growing neighborhood on Mt. Support Rd.

Regional Transportation Considerations:

- This development is located in the highly-trafficked NH Route 120 transportation corridor, in close proximity to Dartmouth-Hitchcock Medical Center, the largest single-site employer in the state.

¹ <https://www.keystothevalley.com/report/2030-home-projections/>



Upper Valley Lake Sunapee
Regional Planning Commission

- UVLSRPC's draft *Regional Corridor Transportation Plan* notes that the Mt. Support Rd area "requires coordinated planning to ensure mobility & access for all roadway users" (p. 76)².
- The regional transportation impacts of this proposed development are related to 1) the site design and 2) the availability of multi-modal transportation infrastructure and services along Mt. Support Rd. Providing safe and convenient alternatives to single-occupant vehicle travel (e.g., walking, bicycling, and public transit) will help limit safety and congestion impacts in the NH Route 120 corridor, and will help alleviate the need for future infrastructure projects aimed at addressing congestion.
 - We note and appreciate the thoughtfully-designed pedestrian and bicycle connections from the site to the existing multi-use path along Mt. Support Rd, which will provide connectivity to the DHMC campus and eventually to Centerra Park with the completion of the future multi-use path along Lahaye Drive. The compact site design contributes to pedestrian and bicycle connectivity as well.
 - We note that the site is served by the Advance Transit Blue Line, which provides direct service to key regional destinations such as downtown Lebanon, DHMC, downtown Hanover, and Dartmouth College
 - If there are to be mitigation payments/exactions as part of the approval process, the Board should consider how these funds can sustain and/or enhance multi-modal infrastructure or services along Mt. Support Rd.
- We note that the number of parking spaces in the proposed design (390) is much higher than what is required by the City of Lebanon (306). Given 1) the proximate access to major employers and retail services and 2) the availability of multi-modal transportation services and infrastructure along Mt. Support Rd, there may be less of a need for on-site parking than what is proposed. The City could work with the applicant on a multi-phase approach to on-site parking, where construction of some surface parking areas are deferred until it is determined that there is sufficient need/demand. Recent research suggests that tenants will self-select their housing choices based on travel options and parking availability³.
 - We did not note any mention of electric vehicle charging infrastructure in the application. Given increased federal support for electric vehicle ownership and public charging infrastructure, we encourage the applicant to consider providing electric vehicle charging, or at least using a site design that enables future upgrades for electric vehicle charging equipment.
 - We note that the applicant proposes to provide covered bicycle parking in the ground-level garages under each building. We strongly support the inclusion of bicycle parking in the final site plan, including any assurances that these areas remain dedicated for bicycle parking.

² https://www.uvlsrpc.org/files/4416/3699/6449/120N_chapter_DRAFT.pdf

³ <https://www.jtlu.org/index.php/jtlu/article/view/730>
<https://www.vtpi.org/park-hou.pdf>



Upper Valley Lake Sunapee
Regional Planning Commission

Regional Environmental Considerations:

- We note and commend the use of a compact site design to avoid direct wetlands impacts.
- We suggest the applicant and City explore available mechanisms for conserving the undeveloped portion of the properties to maintain wildlife corridor connectivity, as identified in the City's 2016 *Wildlife Corridor Analysis*. This regional wildlife corridor connects highland habitats present on Mt. Support, Rix Ledges, and the Mink Brook sub-watershed. Additionally, the Open Space Institute has noted that preserving wildlife corridors in the Upper Valley is a key strategy in regional climate resilience.⁴
- We note that garbage dumpsters are proposed to be located away from buildings along the edge of the site – there may be other locations within the site that could be considered to reduce impacts to the wildlife corridor. Given the amount of bear activity in this area, ensuring bear safety of garbage storage areas will also be important for the safety of both residents and wildlife.
- We note that the increasing amount of development in this corridor is introducing new light pollution in area that has typically experienced darker skies, with potential impacts to the wildlife corridor. The applicant may consider installation of shielded (pointing downward) exterior lighting to minimize skyglow, glare, and light trespass onto adjacent properties. Some of the lighting in the application show shields as an “accessory,” and others do not show clearly that they are shielded or aimed downward. The International Dark-Sky Association recommends to minimize the harmful effects of light pollution, lighting should 1) only be on when needed; 2) only light the area that needs it; 3) be no brighter than necessary; 4) minimize blue light emissions; and 5) be fully shielded (pointing downward).

Regional Comprehensive Planning Considerations:

- We note that the applicant seeks to make the central drive of the development have “downtown feel.” However, we did not note any common outdoor spaces or other outdoor amenities such as benches, picnic tables, or patios in the site plan. In light of the above comments about surface parking, it would seem that converting even a small number of parking spaces (such as those provided in between buildings) to outdoor gathering spaces would improve the quality of life and community feel of the development. This can have the added benefit of limiting the need for local or regional travel to access these types of amenities.
- Relatedly, we note that this area of Mt. Support Rd is quickly becoming a “neighborhood” in terms of the number of present and future residents; however, there are no plans for traditional neighborhood amenities such as park space, community

⁴ <https://www.openspaceinstitute.org/news/open-space-institute-launches-18-million-appalachian-landscapes-protection-fund-to-accelerate-land-conservation-in-northern-appalachian-region-to-fight-climate-change>



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gathering areas, or other amenities, nor is there a comprehensive vision or plan covering development, design, infrastructure, transportation/streetscape, environmental conservation, and amenities. Such a plan (prepared by the Planning Board) would assist in promoting a strong, vibrant, and sustainable development pattern, as well as limiting regional impacts of future developments on the transportation system and environment.

Respectfully submitted,

Alex Belenz
Planner
UVLSRPC



MEMO

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Date: December 20, 2021

To: Tim Corwin, Senior Planner and Zoning Administrator
City of Lebanon Planning & Development Department

From: Nik Fiore

Re: PB2021-33-SPR
Site Plan Review Application
402 Mt Support Rd Residential Development
Tax Map 24 Lots 9 & 10

Dear Mr. Corwin,

On behalf of Mt Support Development, LLC please find below written responses to comments on the above referenced Site Plans Review application provided by yourself via e-mail on December 9, 2021 and Steven Keach of Keach-Nordstrom Associates, Inc in a letter dated December 02, 2021. The comments are repeated below and the responses follow each in blue.

T. Corwin comments:

B. Planning Comments

General

1. Phasing. If you anticipate requesting a Certificate of Occupancy for any one or more the buildings prior to completion of all required site improvements, you will need to request that the Planning Board approve a phasing plan for the development per Section 4.9. If you decide to phase the project, please review Section 4.9 and submit a phasing schedule as required by Section 5.1.G.1. The phasing schedule should be prepared per the requirements of Section 4.9.C.
 - This resubmission plan set includes a new sheet C0.3 with the phasing schedule.
2. Consider placing a conservation easement/deed restrictions over the undeveloped portion of the property, or at least the over the wildlife corridor.
 - The applicant is considering the options for a conservation easement or deed restrictions.
3. It appears a waiver or partial waiver may be required from the following requirements of the Site Plan Review Regulations (*please note that the identification of necessary waivers below should not – unless otherwise indicated - be construed as staff's support or endorsement of such waiver requests*).

- a. 6.2.B.1 – perimeter landscaping requirements – a waiver is needed at the northern end of the site where the sidewalk to the MS Rd multi-use path is located closer than 15 ft. ft. to the northern boundary line.
 - b. 6.2.B.10 – requiring trees along the front of the property, spaced no more than 40 ft. apart (this may be needed for the southern end of the front boundary)
 - c. 6.2.D - landscaping around buildings requirements
 - d. 6.5.C.2 – “At least one primary entrance to the building shall face the public way on which the lot has frontage”
 - e. 6.5.C.3 – “Pedestrian entrances shall be provided at least every 60 linear feet along the ground floor of the primary façade”
 - f. Any other Site Plan Review Reg requirements identified in the comments below that remain unaddressed.
- The resubmission package includes a revised Application for Waivers.
4. Provide an updated Application for Waivers to incorporate any additional required waiver per comment B.2 above, B.7 below, or otherwise.
 - a. Note that the Board must find either Criteria A or Criteria B (as identified on the Application for Waivers) is satisfied in order to grant the waiver. Each waiver request, therefore, should demonstrate how the request meets either Criteria A or B. It is not clear to staff that all of the necessary requested waivers can be justified, and recommends that the applicant try as much as possible to provide as much of the missing information as possible.
- The resubmission package includes a revised Application for Waivers with expanded reasonings.
5. Please identify how the project complies with Section 6.5.EG of the Site Plan Review Regulations (groundwater protection).
 - During construction the project will protect groundwater by first developing, implementing, monitoring, and maintaining a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the EPA’s National Pollutant Discharge Elimination System and Construction General Permit (CGP) for stormwater discharges. Once construction is complete the project will protect groundwater by routing runoff through the site’s stormwater management systems for treatment to prevent contaminants from leaving the site.
 - Domestic wastewater will be connected to the City’s sewer system.
 - Floor drains in the garages will be connected to the oil/grit separators and then to the City’s sewer system.
 - No domestic or non-domestic wastewater will be discharged to the ground.
6. Regarding the following statements made on page 4 of November 8, 2021 project description letter from EV:
 - a. “The connection point to the City’s main will be a manhole just south of the property’s southern boundary.” Just to confirm, the referenced manhole is within the City’s right-of-way, is that correct?
 - Correct. The connection manhole is within the multi-use path.

- b. "City of Lebanon Sewer Allocation and NHDES Sewer Connection Permit are pending."
Just to confirm, have applications for these permits been submitted?
 - The sewer allocation permit was submitted on December 3, 2021, payment of the required 20% of the Sewer Development Charge is in process.
 - The NHDES Sewer Connection application has not yet been submitted. This is typically done after the City approved the sewer allocation.

Plan Set Comments

General

- 7. The plan set must include the following information per Section 5.1.E (or a waiver must be requested):
 - a. A current survey certified by a land surveyor licensed in New Hampshire, depicting the perimeter boundaries of the lot(s) of the proposed site, including compass bearings, distances, and lot areas (5.1.E.5)
 - The plan set in this resubmission includes a stamped survey.
 - b. The plan shall indicate those natural and man-made features that are to be removed, retained, or altered (5.1.E.8)
 - The revised sheets C1.1 and C1.2 in the resubmission plan set now indicate the natural and man-made features that are to be removed, retained, or altered
 - c. Wetlands on the property shall be delineated by a NH Certified Wetlands Scientist, whose seal and signature shall appear on the plan (5.1.E.8)
 - The revised sheets C1.0 in the resubmission plan set includes the seal and signature of the NH Certified Wetlands Scientist who properly delineated the wetlands on the property.
 - d. Documentation in the form of the U.S. Army Corps of Engineers New England District Wetlands Delineation Data Sheets and/or other field notes and materials concerning the delineation shall be submitted to the Planning and Development Department (5.1.E.8)
 - These sheets were submitted to the Planning and Development Department on December 13, 2021.
 - e. Show required sight distances at curb cuts (5.1.E.10)
 - The revised sheet C0.2 in the resubmission plan set includes the sight distances at curb cuts.
 - f. Vehicle and bicycle parking spaces shall be numbered (5.1.E.10)
 - The resubmission plan set includes a revised sheet C2.5 with numbered surface parking spaces and revised sheets A-P1.02, and B-P1.02 with numbered garage vehicle and bicycle parking spaces.
 - g. A plan for outdoor lighting showing color correlated temperature (CCT) and wattage of all exterior free-standing or building-mounted light fixtures (5.1.E.13)

- The CCT is shown on the fixture schedule of Site Lighting Layout sheet of the original application package. The “30K” in the Catalog Number column represents a 3000 K color temperature. The revised Site Lighting Layout sheet in the resubmission plan set includes a revised fixture schedule with wattages.
- h. The plan shall also include drawings of all relevant building elevations, showing the location and height of all building-mounted fixtures (5.1.E.13)
 - The resubmission plan set includes revised sheets A-P1.06 and B-P1.06 showing the building mounted lights on the building elevations.
- i. Construction detail drawings for bike racks (5.1.E.21)
 - The resubmission plan set includes a revised sheet C4.2 showing construction details for the bike racks.
- j. Depiction of the proposed water loop easement (and any other proposed easements) (5.1.E.22).
 - The resubmission plan set includes a revised sheet C3.1 showing the water line easement.
- 8. Please update all plan sheets per required survey (i.e. existing plans and site plan sheets should be based off of a current property boundary survey, as required by 5.1.E.5).
 - All designs and plan sheets in the resubmission plan set are updated to the current property boundary survey.
- 9. Remove colored architectural renderings from plan sheet and provide as a separate exhibit.
 - The resubmission plan set omit the architectural renderings. The resubmission package includes them as a separate exhibit.

Sheet 1 (Cover Sheet)

- 10. Consider giving the development a name and adding the name at the top of the cover sheet
 - The applicant is still contemplating a name for the development.
- 11. Change the title of “Index of Sheets” to “Table of Contents” (Section 5.1.E).
 - a. Provide sheet number in the lower right hand corner of all plan sheets with a prominent font size
 - The revised plan set includes the requested sheet numbering.
- 12. Regarding the Zoning Chart:
 - a. For minimum area of lot, under the proposed column, shouldn’t this just be blank? Having asked that, why is there a difference in the number given there (14.14) and the number given for the proposed area of lot (14.21)?
 - The 14.14 in the Proposed column of the Minimum Area of Lot row is the minimum lot size for 204 units on a Class 1 lot in the R1 zoning district per Table 308.3 of the Lebanon Zoning Ordinance.

- The 14.21 in the Proposed column of the Area of Lot line of the total area of lots 24/9 and 24/10 once they are merged. The revised plans correct this area to 14.2 acres per the stamped survey.
 - b. Existing and proposed lot areas should be based on the survey (not the City assessing data as indicated in Note 1 of the zoning chart)
 - The revised plans correct the lot area per the stamped survey.
 - c. Bicycle spaces – just to confirm, the proposal is to include 80 short term spaces and 100 long term spaces?
 - The project now includes 128 bicycle spaces, 32 in the garage of each building. These spaces will be available for long-term and short-term bicycle parking.
13. Parking Summary Chart – independent is spelled in correctly
- The revised plans correct this typo.

Sheet 2 (Site Legend and Notes)

14. Ideally, a customized legend would be included with each plan sheet. However, if using a general legend, please remove symbols that do not appear anywhere in the plan set. For example, it does not appear that there are any chilled water or steam lines on site.
- The revised plans omit superfluous line types and symbols.

Sheet 3 (Site Context Exhibit)

15. Identify location of the wildlife corridor
- Per e-mails with Mr. Corwin, the plans do not need to identify the location of the wildlife corridor because limits of the corridor are not defined.

Sheets 4-6 (Existing Conditions plans)

16. Identify location of the wildlife corridor
- See response to Item 15 above.
17. Identify the existing structures to be demolished (5.1.E.8)
- The revised sheets C1.1 and C1.2 identify existing structures to be demolished.
18. Identify the existing vegetation to be removed (i.e. identify the proposed tree line) (5.1.E.8)
- The revised sheets C1.1 and C1.2 identify the vegetation to be removed.
19. Survey Note 2 (on Sheets 5 & 6): the existing conditions (and site plan) should be prepared utilizing a current boundary line survey. Please update note accordingly.
- All designs and plan sheets are updated to the current property boundary survey. Survey Note 2 is updated accordingly.

Sheet 7 (Site Plan Overview)

20. Identify location of the wildlife corridor - See response to Item 15 above.

- a. Will the stormwater ponds interfere with wildlife use of the corridor?
 - The gravel wetlands should not interfere with wildlife use of the corridor. A majority of the time they will appear as a vegetated area. Only during large rain events will they become inundated with water.
- 21. For the benefit of the Planning Board members and the site plan review process, please consider using this sheet to show only the above-ground proposed physical improvements without contours.
 - The revised sheet excludes the contours.

Sheets 8 and 9 (Site Layout Plan)

- 22. All structures must meet applicable setbacks (including the transformers currently proposed to be located within the front yard setback), except for the proposed freestanding sign.
 - The revised site plans comply with this requirement.
- 23. Add note that sign is conceptual only and is subject to the requirements of Section 608 ("Signs") of the Zoning Ordinance.
 - Call out C17 of sheets C2.1 and C2.2 in the revised plan set now includes this reference.
- 24. Please provide a customized legend on this page so that Board members do not have to go back and forth between this sheet and the legend on Sheet 2.
 - A master legend near the front of the plan set is an architecture and engineering industry standard. Providing customized legends for each sheet would require a large amount of time to get 100% correct, far more time than any benefit it may provide. It would also consume a large portion of the plan sheets, too much to leave room for the plan in some cases.

Sheet 15 (Landscaping Plan)

- 25. The northern boundary features are difficult to read. Please consider removing some of the underlying data, or anything else, to make it more readable and less confusing.
 - The revised plans do not show planting along the norther boundary and the project is seeking a waiver from perimeter landscaping in the area.
- 26. All trees must be planted a minimum of 8 ft. from any property line (6.2.B.4). It is difficult to verify this at the northern boundary line given the overlapping data layers.
 - The revised plans locate trees no closer than 8 feet to property lines.
- 27. Indicate how the dumpster and all above-ground utilities (transformers, propane tanks, etc.) will be screened as required by Section 6.2.B.8, and provide details.
 - Dumpsters have fences around them per Detail 3/C4.1.
 - The revised plans include shrubs one the street side the transformers to screen them.
 - Propane tanks will be underground.
- 28. Please review the Plant Schedules for consistency with what appears on the plan (e.g., the "TSP" plants are identified with a shrub symbol but are identified as trees in the plant schedule)

- As recommended by Mr. Corwin, the revised plan identify the TSP plants as shrubs.
29. Update the shrubs plant schedule to identify conformance with 6.2.B.5 ("At the time of planting, all shrubs, whether deciduous or evergreen, shall be 24 to 30 inches in height and/or 18 to 24 inches in spread")
- This note is added to the shrubs planting schedule.
30. Update the trees plant schedule to identify conformance with 6.3.B.5 ("New trees may include evergreens not to exceed 25% of the total")
- The revised plans now include zero evergreen trees.
31. In the Perimeter Landscaping table:
- a. "Trees Required" should be more specifically identified as "Shade Trees Required" (6.2.B.2)
 - The revised plans include this correction.
 - b. "Trees and Shrubs Required" should be more specifically identified as "Understory Trees and Shrubs Required" (6.2.B.2)
 - The revised plans include this correction.
 - c. For the Mt Support frontage, 106.7 understory trees and shrubs are required but only 90 are provided. Please update.
 - Based on the boundary survey, the length of the frontage is 917.9' and the project is no longer accounting for any vegetation to remain so the required number of understory trees and shrubs is 115, and that is the number provided.
 - d. Please verify measurements (e.g. length of frontage and length of vegetation to remain) utilizing a current boundary survey.
 - The length of frontage in the revised plan matches the survey. The plan no longer account for any vegetation to remain due to the routing of the projects sewer line.
32. Revise plan to demonstrate compliance with 6.2.L ("Landscaped areas within and adjacent to all parking and vehicular areas shall be protected by curbing, wheel stops, or fencing, with the potential exception of areas containing LID features"), e.g. the eastern end of the eastern-most parking area does not appear to satisfy 6.2.L, nor does the small lot located in between the front two buildings.
- The revised materials request a waiver from this requirement for these locations.
33. Please add notes relative to the planting and seeding of disturbed areas.
- Sheet C2.8 includes "<L&S>" callouts for typical areas typical of those to receive loam and seed. Sheet C4.7 includes a typical detail for areas to be loam and seeded and seep specifications.
34. Please add the following sections of the Site Plan Review Regulations as plan notes:
- a. 6.2.B.3 ("All new plant material shall be nursery-grown stock.")
 - b. 6.2.B.4 (just the first sentence)
 - c. 6.2.B.5

- d. 6.2.F.1
- e. 6.2.F.2
- f. 6.2.H.1
- g. 6.2.J
- h. 6.2.K

- The revised plans include these requested notes.

Sheet 16 (Parking Lot Shading Plan)

35. Only deciduous trees may be used for purposes of meeting the parking lot shading requirements (6.2.E.1). Please revise.

- The revised plans include only deciduous trees to provide parking lot shading.

Sheet 18 (Site Lighting Layout)

36. Consider adding walkway lighting along the pedestrian path at the northern end of the site that extends to the MS Rd multi-use path

- The revised plans include lighting along the pedestrian path at the northern end of the site.

37. The parking lot lighting uniformity ratio can be no greater than 4:1 (5:1 and 5.3:1 are proposed in two of the parking areas) (6.7.C.1). Please revise plan accordingly.

- The revised Site Lighting Layout conforms to the required 4:1 lighting uniformity ratio.

38. All parking areas must be illuminated (6.7.C.1). As required by 6.7.C.1, please provide additional lighting to ensure that all parking areas are lit, and update the maximum and minimum fc measurements and other calculations accordingly (the minimum horizontal illuminance for parking areas must be greater 0).

- All parking areas are properly illuminated. The 0 in the Statistics table is for area outside of parking areas.

39. Revise schedule to add column for wattage of each proposed lighting fixture, and to more clearly identify CCT. (5.1.E.12)

- The revised Site Lighting Layout sheet includes a wattage column in the fixture schedule. The "30K" in the Catalog Number column identifies the CCT as 3000 K.

S. Keach Comments:

General Comments

1. It appears this proposal will require the following State Agency Permits: (a) a NHDES Alteration of Terrain Permit; and (b) a NHDES Wastewater Connection Permit. We recommend each required permit be received prior to or as a condition of any approval ultimately granted by the Planning Board. In addition, we recommend receipt of each permit be acknowledged in the text of notes provided on Sheet C0.0 of the final site plan.

- It is standard for the Lebanon Planning Board to make obtaining the requisite NHDES permits a condition of approval, and the applicant's team expects the same with this project.
- 2. It is understood the planned residential development proposes to rely on public water and sewer utilities available at Mount Support Road. Accordingly, we recommend the applicant receive local Water Use and Sewer Use Permits necessary to support the extent of buildout contemplated prior to or as a condition of site plan approval.
 - The sewer allocation permit was submitted on December 3, 2021, payment of the required 20% of the Sewer Development Charge is in process.
 - Brian Vincent, City Engineer, has indicated that he does not expect there to be any issues with the City's water supply system to provide domestic and fire protection flows. The model of the City's water system is being checked to confirm, and Mr. Vincent will supply the project team with water pressure numbers in the project area for use in designing the building's sprinkler systems.
- 3. Given the extent of land area to be disturbed by planned construction activities, coupled with immediate proximity of this work to on-site wetland, abutting land and Mount Support Road, we recommend the Planning Board rely on authority of Section 8.3 of the Site Plan Review Regulations (SPRR's) to require, as a condition of approval, the applicant provide a performance guarantee, in an amount and form acceptable to your Department, to serve as a financial surety for: restoration of the site in the event of abandonment; installation and maintenance of appropriate erosion and sedimentation controls throughout construction; and full and final completion of any proposed public improvements and/or work within a public right-of-way.
 - Requiring a performance guarantee as a condition of approval is standard for the Lebanon Planning Board and the applicant expects the same with this project.
- 4. As acknowledged on Sheet C1.0 of the site plan, it is understood Lots 9 & 10, identified on Assessor's Map 24, are to be voluntarily merged in order to create a single parcel upon conclusion of project permitting and transfer of land to common ownership. We recommend voluntary merger be a condition of final site plan approval.
 - The applicant takes to exception to this recommendation.

Planning/Design Matters

1. A Zoning Chart provided Sheet C0.0 indicates a residential density of 204 dwelling units is planned. We recommend a footnote be added to this chart for the purposes of identifying the manner by which this density value was established under applicable provisions of the Zoning Ordinance.
 - The density calculation for the project are in accordance with City of Lebanon Zoning Ordinance Section 308.3
2. We note two minor scrivener's errors on Sheet C0.0. Specifically, drawings entitled Water Details and Sewer Details are identified in reverse order on the Drawing List; and the word "independent" is misspelled in the Parking Summary. Similarly, we note the word "trees" is misspelled in several locations on Sheet C2.8.
 - The revised plans correct these errors.

3. Collectively, Sheets C1.0, C1.1 & C1.2 represent an Existing Conditions Plan of the subject premises. Based upon our review of these drawings we offer the following remarks:
 - In order to satisfy the requirements of Section 5.1.E (5) of the SPRR's we recommend the drawings be expanded to include a full and complete boundary survey of the subject premises; which, in addition to defining parcel boundaries by metes and bounds, also defines the location, purpose and extent of any public or private easements which either benefit or encumber the subject premises.
 - The revised plan set includes a full and complete boundary survey.
 - In order to satisfy the requirements of Section 5.1.E (8) of the SPRR's we recommend the drawings be stamped by the Certified Wetland Scientist who identified and delineated the extent of wetland depicted thereon.
 - The revised sheets C1.0 in the resubmission plan set includes the seal and signature of the NH Certified Wetlands Scientist who properly delineated the wetlands on the property.
 - We understand that inspection of applicable FEMA Flood Insurance Rate Maps reveals the subject property is not situated in a designated Special Flood Hazard Area. If so, we recommend a note indicating same appear on the final drawings.
 - The Zoning Table of the revised plans includes the property's FEMA designation.
 - The drawings depict the extent and location of existing structures and related improvements that are to be razed or removed from the premises in order to accommodate planned improvements. We recommend a note acknowledging that intent appear on the final site plan.
 - The revised sheets C1.1 and C1.2 in the resubmission plan set now indicate the natural and man-made features that are to be removed, retained, or altered
4. Based upon our review of Sheets C2.1 and C2.2 (Site Layout Plan) we offer the following remarks:
 - The drawings indicate numerous lengths of proposed retaining wall are planned. We recommend the drawings be expanded to specify safety rail of an appropriate type and dimension is to be installed at all locations where such accommodation is required pursuant to applicable building code requirements. We further recommend corresponding construction details of rail installation be provided on the final drawings.
 - Sheet C4.2 of the revised plan set includes detail for fencing and railings.
 - The drawings identify areas of the site to be reserved for playground and dog park amenities. Notes provided on the drawings suggest these areas are to be enclosed with fencing. We recommend the drawings be expanded to specify fence type and height as well as surface preparation within fenced interiors.
 - Sheet C4.2 of the revised plan set includes detail for fencing.
 - The drawings identify several locations where granite curb installation is planned. We recommend the drawings provide a curb installation detail.

- Sheet C4.2 of the revised plan set includes detail for granite curbing.
 - Similarly, the drawings identify limited segments of an existing public multi-use path within the Mount Support Road right-of-way that are to be either constructed or reconstructed. We recommend the final site plan be expanded to provide a typical cross-section of this construction corresponding with original design specifications for the existing path.
 - Sheet C4.2 of the revised plan set includes a typical section for the multi-use path.
 - The drawings identify guardrail is to be installed at limited locations. We recommend a corresponding detail of this construction be provided.
 - Sheet C4.2 of the revised plan set includes detail for the construction of the guard rail.
 - Sections 6.5.E (3) and 6.5.E (4) of the SPRR's require minimum parking stall length and aisle width dimensions of 18 and 24-feet respectively. Taken together, required dimensions dictate an overall parking lot width dimension of 60-feet. Although the project plans provide for a total width of 60-feet, the drawings specify parking stall length and aisle width dimensions of 17 and 26feet respectively. We recommend the drawings be revised accordingly.
 - The City of Lebanon Fire Department requires 26-foot drive aisles where it may be required to park a fire truck. Section 6.5.E (3) allows for parking spaces to be reduced to 16 feet in areas where 2 feet of front overhang is provided over landscape areas and sidewalks of at least six feet in width, exclusive of curbing. The site as designed meets these requirements.
5. We recommend the Fire Department review and comment on the adequacy of site circulation, building accessibility, hydrant placement, building identification and other matters within the Department's purview.
- The fire department review the plans and provided comments during the Staff Review on December 2, 2021. The applicant expects the Department will review the plans again when the applicant submits a building permit.
6. We recommend the site plan be expanded to identify acceptable accommodations for resident mail delivery.
- Mail boxes are internal to the building.
7. Grading design information provided on Sheets C2.3 & C2.4 indicate intent to construct speed tables at two locations along the length of a drive aisle situated between easterly and westerly buildings. We recommend a corresponding detail of this construction be provided.
- Sheet C4.1 of the revised plan set includes details for the speed tables.
8. Architectural floor plans A-P1.02 and B-P1.02 appended to the site plan identify four separate areas located within each interior parking garage reserved for "bicycle storage". While it appears the availability of these spaces (sixteen spaces in total) should prove adequate for the intended use, we recommend the applicant's consultant demonstrate these spaces are in fact sufficient to satisfy applicable long and short-term bicycle storage requirements of Section 6.5.I (2) of the SPRR's as well as applicable provisions of Appendix A.

- The project now includes 128 bicycle spaces, 32 in the garage of each building. These spaces will be available for long-term and short-term bicycle parking.
9. As shown on Sheets C2.3 & C2.4 proposed construction adjoining the northerly and easterly limits of work is generally adjacent to wetland. While it is understood development constraints dictate immediate adjacency of work to mapped wetland along much of the length of the northerly parcel boundary, it appears possible to increase horizontal separation between limits of work and adjoining wetland to the east. In our view, a modest increase in horizontal separation would prove beneficial to the contractor in advancing work with less risk of inadvertent wetland impact.
- The horizontal separation from the wetlands is maximized while still providing adequate space above the walls for building construction and site use after construction is complete.
10. As presented, it would appear the extent of overall site and building development planned is conducive to phased construction to the extent it would appear desirable for each of the four multi-family residential buildings to be completed and occupied in a sequential manner. That said review of design plans for civil/site improvements suggest the majority of common site and infrastructure improvements (access, utilities, stormwater management, etc.) will need to be substantially complete prior to occupancy of the first building. If in fact the applicant anticipates seeking certificates of occupancy for individual buildings in sequential fashion, we would recommend the site plan be expanded to include a detailed phasing schedule corresponding to provisions of Section 5.1.G (1) of the SPRR's.
- The revised plans set includes a construction phasing sheet.
11. Based upon consideration and review of design plans of proposed stormwater management accommodations we offer the following remarks:
- Based on design elevations specified on Sheets C2.3 & C2.4 it appears limited soil cover over storm drain is planned at a number of locations. In order to provide adequate frost protection, we recommend a minimum of 3-feet of soil cover be provided over all segments of proposed storm drain.
 - The revised plans now provide a minimum of 3' of cover over all storm drain pipes.
- Sheets C2.3 & C2.4 specify exterior trench drain is planned at a total of three locations at enclosed parking garage entrances. We recommend a typical construction detail, together with corresponding design elevations for each installation, be specified on the final drawings.
- Sheets C2.3 and C2.4 of the revised plan set provide design elevations for the now five (5) trench drains. Sheet C4.3 of the revised plan set includes typical construction details for the trench drains.
- We recommend the proposed catch basin, to be situated to the south of proposed catch basin D6, be labeled on Sheet C2.3 together with associated design elevations. In addition, we recommend pipe data be provided for that length of proposed storm drain intended to connect this currently unlabeled catch basin with catch basin D5.
 - Sheet C2.3 of the revised plan set provides this information.
 - Similarly, we recommend proposed catch basin D32 be labeled on Sheet C2.4.

- Sheet C2.4 of the revised plan set provides this information.
- As shown on Sheets C2.3 & C2.4, a subsurface stormwater management (chamber) system is planned to the immediate east of proposed Buildings 3 and 4. We recommend a detailed system layout/design plan of all system components, structures and piping be added to the final site plan drawings. This remark includes a recommendation to include design information for immediately adjacent catch basins, drain manholes and control structures (i.e. D3 thru D5, D29 and D38) on the same detailed system layout/design plan. When preparing this plan, we recommend the design engineer recheck, and to the extent warranted, revise pipe diameter and invert elevations currently specified within the Stormwater Schedule provided on each sheet.
 - The Alteration of Terrain permit applications plans, and Construction Documents thereafter, will include additional detailing of the subsurface stormwater management system.
- An identical comment is offered with regard to the proposed gravel wetland to be constructed to the southeast of Building 4. When preparing the recommended detail, we suggest the design engineer reconcile design information for Outlet Structure D25 specified on Sheets C2.4 and C4.4 respectively. Although we acknowledge a typical detail of gravel wetland construction is provided on Sheet C4.4, we recommend this detail be edited to be site specific.
 - The Alteration of Terrain permit applications plans, and Construction Documents thereafter, will include additional detailing of the gravel wetland system.
- We recommend invert elevations be specified at flared end-sections discharging both to and from stormwater management areas depicted on Sheet C2.4.
 - The revised plans include invert elevations of the flared end sections.
- We recommend the design engineer consider accommodations for access to planned gravel wetland stormwater management areas to facilitate future maintenance functions.
 - The project team consider the options and do not feel further disturbance within the wildlife corridor warrants an access drive. Access can be gained from the southwest near the Mount Support Road right-of-way and from there the a small excavator can maneuver downslope to the ponds to perform maintenance as required.
- Sheet C4.3 includes a Typical Storm Drain Trench detail. Based upon our review of the same we offer the following remarks: (a) we recommend a minimum trench width dimension be specified; and (b) we recommend the design engineer recheck minimum depth of soil cover dimensions currently specified. Again, we recommend a minimum depth of 3-feet vertical feet of soil cover be provided over all segments of storm drain.
 - Sheet C4.3 of the revised plan set include a trench detail which indicates it's width. The design provides 3 feet of cover over pipes.

Sheet C4.3 includes a Typical Drainage Manhole detail. Similar to a Typical Catch Basin detail provided on the same drawing, we recommend the drain manhole detail include provisions for a "flat top" option to accommodate installation where a shallow depth of soil cover is available.

- Sheet C4.3 include a detail of a flat top drain manhole.
 - Sheet C4.4 includes a typical 5,000-gallon sediment forebay structure detail. We recommend the design engineer reconcile this detail with design data provided on Sheet C2.4 for consistency in terms of connecting pipe diameter. In addition, we recommend the detail be expanded to include specifications for structure bedding.
 - Sheet C4.4 of the revised plan set includes a detail for the sediment forebay.
12. Based upon review and consideration of the applicant's Drainage Analysis we offer the following series of remarks:
- In order to satisfy the requirements of Sections 6.6.C.1 (1) & 6.6.C.1 (2) of the SPRR's respectively, we recommend detailed existing conditions and proposed conditions stormwater management plans corresponding to specified requirements of the two referenced Sections of the SPRR's be prepared and submitted.
 - This resubmission package includes a revised drainage analysis which contains pre- and post-development drainage maps.
 - In order to satisfy the requirements of Section 6.6.C.2 (1) of the SPRR's we recommend the analysis be expanded to provide pre- and post-development stormwater runoff calculations corresponding to the specified family of return frequency design storm events, including the one-inch rainfall event.
 - The revised drainage analysis includes the specified family of return frequency design storm events
 - We recommend information submitted in order to satisfy applicable requirements of Section 6.6.C.2 (1) include confirmation of storm drain grate capacity sufficient to accommodate the 25-year return frequency design storm event.
 - This resubmission package includes a pipe and grate capacity spreadsheet which includes the grate capacity of the EJCO 5520M5 grate.
 - In order to satisfy the requirements of Section 6.6.C.2 (4) of the SPRR's we recommend a comprehensive operation and maintenance plan, corresponding with standards described at Section 6.6.H of the SPRR's, be prepared and submitted.
 - The resubmission package includes a Stormwater inspection & Maintenance Manual.
 - Section 6.6.E.11 (a) of the SPRR's requires closed drainage systems to be designed to accommodate design flow volumes associated with the 25-year return frequency design storm event and be checked for the 50 and 100-year return frequency events. We recommend calculations which satisfy these requirements be provided.
 - This resubmission package includes a pipe and grate capacity spreadsheet which compares flows using the Rational Method for each pipe at critical points. All pipes have adequate capacity to convey 25-year storm events.
 - We recommend the applicant's consultant address design standards for new development codified under Sections 6.6.F (1) through 6.6.F (3) of the SPRR's.

- Effective impervious cover is zero since the entire impervious area of the development is routed to the stormwater treatment system, therefore 6.6.F.1 is achieved
 - Peak runoff events are attenuated in all design storm events as detailed in the runoff summary table (found in the narrative), therefore section 6.6.F.2 is achieved.
 - A minimum of 80 percent of the average annual load of total suspended solids (TSS), floatable, greases, and oils, and at least 40% removal of phosphorus is achieved through the combined use of the infiltrator row in the Cultec system, the 5,000-gallon sediment forebay providing pretreatment for the gravel wetland system and the treatment received within the gravel wetland system. These BMP measures will meet or exceed the criteria specified in section 6.6.F.3 as reported by various studies of the above-mentioned treatment practices.
- As acknowledged above, a NHDES Alteration of Terrain Permit is needed for this project. We recommend the applicant's final Drainage Analysis/Report be expanded to include all information, computations and exhibits required for submission of a full and complete Alteration of Terrain Permit application.
 - The project team will submit a full and complete Alteration of Terrain Permit application to NHDES.

We recommend test pit information collected in the vicinity of proposed gravel wetland construction be provided to demonstrate soil and groundwater conditions are adequate to support gravel wetland construction and function at the selected location.

- The soil scientist who performed the Site-Specific Soil Mapping conducted test pits in the vicinity of the gravel wetlands the they will be provided to NHDES with the AoT application.
13. We recommend Sheet C2.8 (Landscape Plan) be expanded to include notes and specifications capturing applicable requirements of Section 6.2.H of the SPRR's regarding both workmanship and materials to be incorporated in the planned landscape installation as well as future maintenance of the same.
- Sheet C2.8 of the revised plan sets includes notes regarding both workmanship and materials to be incorporated in the planned landscape installation as well as future maintenance of the same.
14. Sheet C2.10 specifies intent to install fabric silt fence as a primary erosion and sedimentation control practice around the perimeter of the project work area. Given immediate proximity of planned earthwork and site improvements to adjoining land of others (northerly site boundary) and jurisdictional wetland (easterly limits of work) we recommend the design engineer consider specifying use of mulch berm, in lieu of fabric silt fence, for improved durability and performance throughout the duration of construction.
- The revised plans now use natural fiber coir rolls instead of silt fence. They require a smaller footprint than a mulch berm.
15. Based upon review of planned accommodations for sanitary sewer service provided on the project plans (See Sheet C3.2) we offer the following remarks:
- We recommend detailed sanitary sewer profiles with corresponding design elevations be provided for the following runs: (a) from floor drains at Buildings No. 1 & 2 to sewer

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manhole S15; (b) from sewer manhole S5 to sewer manhole S5B; (c) from floor drains at Buildings No. 3 & 4 to sewer manhole S16; and (d) from sewer manhole S16 to sewer manhole S5A.

- The design team will include additional profiles with plans for the NHDES Sewer Connection Permit, which are to be reviewed and approved by the City prior to submission to NHDES.
- As shown on Sheet C3.2, wastewater discharge from a proposed oil-grit separator receiving floor drain discharge from parking garages at Buildings No. 3 & 4, as well as sanitary wastewater discharge from Building No. 4 is to be delivered to gravity sewer via force main. Although a generic detail of a small simplex pump station is provided on Sheet C4.5, we recommend fully detailed design plans for each lift station corresponding with applicable NHDES and local requirements be added to the project plans.
- The design team will include additional details with plans for the NHDES Sewer Connection Permit, which are to be reviewed and approved by the City prior to submission to NHDES.
 - We recommend the construction detail of oil-grit separator installation provided on Sheet C4.5 be revised to specify bedding and backfill requirements.
- Sheet C4.5 of the revised plan set includes a detail for the oil-grit separator.

Please accept this information as sufficient to satisfy Section 6.9.b. Thank you for your time and consideration with this project. Please do not hesitate to call or email if you have any questions or need additional information.

Sincerely,
ENGINEERING VENTURES, PC



Nicholas A. Fiore, PE
Project Manager/Principal

Cc: Ken Braverman, The Braverman Company
Dick Anagnost, Anagnost Investments



D-Series Size 0 LED Area Luminaire



Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

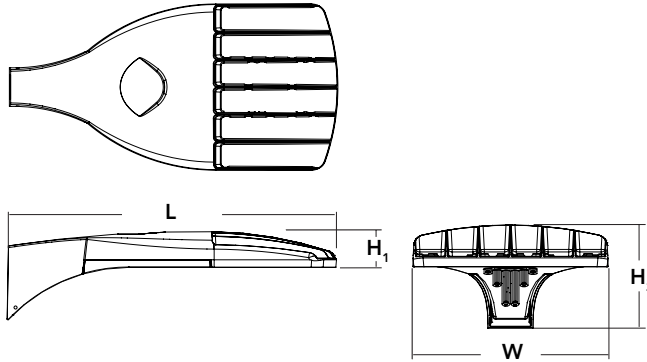
Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 70% and expected service life of over 100,000 hours.

Specifications

EPA:	0.95 ft ² (.09 m ²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height ₁ :	3" (7.62 cm)
Height ₂ :	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



Ordering Information

EXAMPLE: DSX0 LED P6 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED						
Series	LEDs	Color temperature	Distribution	Voltage	Mounting	
DSX0 LED	Forward optics	30K 3000 K	T1S Type I short (Automotive)	T5S Type V short ³	MVOLT (120V-277V) ^{5,6}	Shipped included
	P1 P5	40K 4000 K	T2S Type II short	T5M Type V medium ³	XVOLT (277V-480V) ^{7,8,9}	
	P2 P6	50K 5000 K	T2M Type II medium	T5W Type V wide ³	120 ⁶	
	P3 P7 ¹		T3S Type III short	BLC Backlight control ⁴	208 ⁶	
	P4 ¹		T3M Type III medium	LCCO Left corner cutoff ⁴	240 ⁶	
	Rotated optics		T4M Type IV medium	RCCO Right corner cutoff ⁴	277 ⁶	Shipped separately
	P10 ² P12 ²		TFTM Forward throw medium		347 ⁶	
	P11 ² P13 ^{1,2}		T5VS Type V very short ³		480 ⁶	

Control options			Other options		Finish <i>(required)</i>	
Shipped installed			Shipped installed		DDBXD	Dark bronze
NLTAIR2	nLight AIR generation 2 enabled ^{13,14}		HS	House-side shield ²²	DBLXD	Black
PIRHN	Network, high/low motion/ambient sensor ¹⁵		SF	Single fuse (120, 277, 347V) ⁶	DNAXD	Natural aluminum
PER	NEMA twist-lock receptacle only (control ordered separate) ¹⁶		DF	Double fuse (208, 240, 480V) ⁶	DWHXD	White
PER5	Five-pin receptacle only (control ordered separate) ^{16,17}		L90	Left rotated optics ²	DDBTXD	Textured dark bronze
PER7	Seven-pin receptacle only (leads exit fixture) (control ordered separate) ^{16,17}		R90	Right rotated optics ²	DBLBXD	Textured black
DMG	0-10V dimming extend out back of housing for external control (control ordered separate) ¹⁸		DDL	Diffused drop lens ²²	DNATXD	Textured natural aluminum
			HA	50°C ambient operations ¹	DWHGXD	Textured white
			BAA	Buy America(n) Act Compliant		
			Shipped separately			
			BS	Bird spikes ²³		
			EGS	External glare shield		

Ordering Information

Accessories

Ordered and shipped separately.

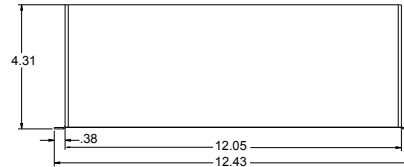
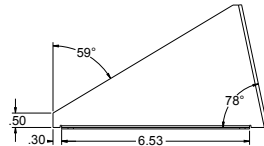
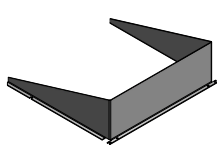
DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) ²⁴
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) ²⁴
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) ²⁴
DSHORT SBK U	Shorting cap ²⁴
DSX0HS 20C U	House-side shield for P1,P2,P3 and P4 ²²
DSX0HS 30C U	House-side shield for P10,P11,P12 and P13 ²²
DSX0HS 40C U	House-side shield for P5,P6 and P7 ²²
DSX0DDL U	Diffused drop lens (polycarbonate) ²²
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish) ²⁵
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish) ¹²
DSX0EGS (FINISH) U	External glare shield

For more control options, visit [DTL](#) and [ROAM](#) online.
Link to [nLight Air 2](#)

NOTES

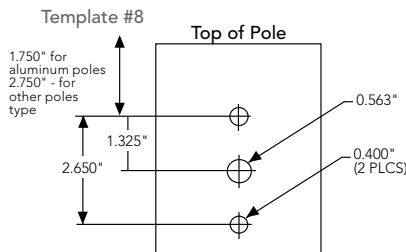
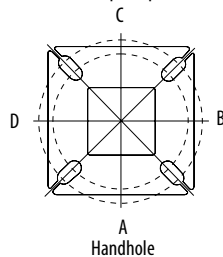
- HA not available with P4, P7, and P13.
- P10, P11, P12 and P13 and rotated options (L90 or R90) only available together.
- Any Type 5 distribution with photocell, is not available with WBA.
- Not available with HS or DDL.
- MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
- Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V. XVOLT not available with fusing (SF or DF).
- XVOLT only suitable for use with P4, P7 and P13.
- XVOLT operates with any voltage between 277V and 480V.
- XVOLT not available with fusing (SF or DF) and not available with PIR, PIRH, PIR1FC3V, PIRH1FC3V.
- Suitable for mounting to round poles between 3.5" and 12" diameter.
- Universal mounting brackets intended for retrofit on existing pre-drilled poles only. 1.5 G vibration load rating per ANCI C136.31. Only usable when pole's drill pattern is NOT Lithonia template #8.
- Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" diameter mast arm (not included).
- Must be ordered with PIRHN.
- Sensor cover available only in dark bronze, black, white and natural aluminum colors.
- Must be ordered with NLTAIR2. For more information on nLight Air 2 visit [this link](#).
- Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting Cap included.
- If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Shorting Cap included.
- DMG not available with PIRHN, PER5, PER7, PIR, PIRH, PIR1FC3V or PIRH1FC3V, FAO.
- Reference Controls Options table on page 4.
- Reference Motion Sensor Default Table on page 4 to see functionality.
- Not available with other dimming controls options.
- Not available with BLC, LCCO and RCCO distribution.
- Must be ordered with fixture for factory pre-drilling.
- Requires luminaire to be specified with PER, PER5 or PER7 option. See Controls Table on page 4.
- For retrofit use only. Only usable when pole's drill pattern is NOT Lithonia template #8

EGS – External Glare Shield



Drilling

HANDHOLE ORIENTATION (from top of pole)



Tenon Mounting Slipfitter

Tenon O.D.	Mounting	Single Unit	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
2-3/8"	RPA	AS3-5 190	AS3-5 280	AS3-5 290	AS3-5 390	AS3-5 320	AS3-5 490
2-7/8"	RPA	AST25-190	AST25-280	AST25-290	AST25-390	AST25-320	AST25-490
4"	RPA	AST35-190	AST35-280	AST35-290	AST35-390	AST35-320	AST35-490

Mounting Option	Drilling Template	Single	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS
Minimum Acceptable Outside Pole Dimension							
SPA	#8	2-7/8"	2-7/8"	3.5"	3.5"		3.5"
RPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
SPUMBA	#5	2-7/8"	3"	4"	4"		4"
RPUMBA	#5	2-7/8"	3.5"	5"	5"	3.5"	5"

DSX0 Area Luminaire - EPA

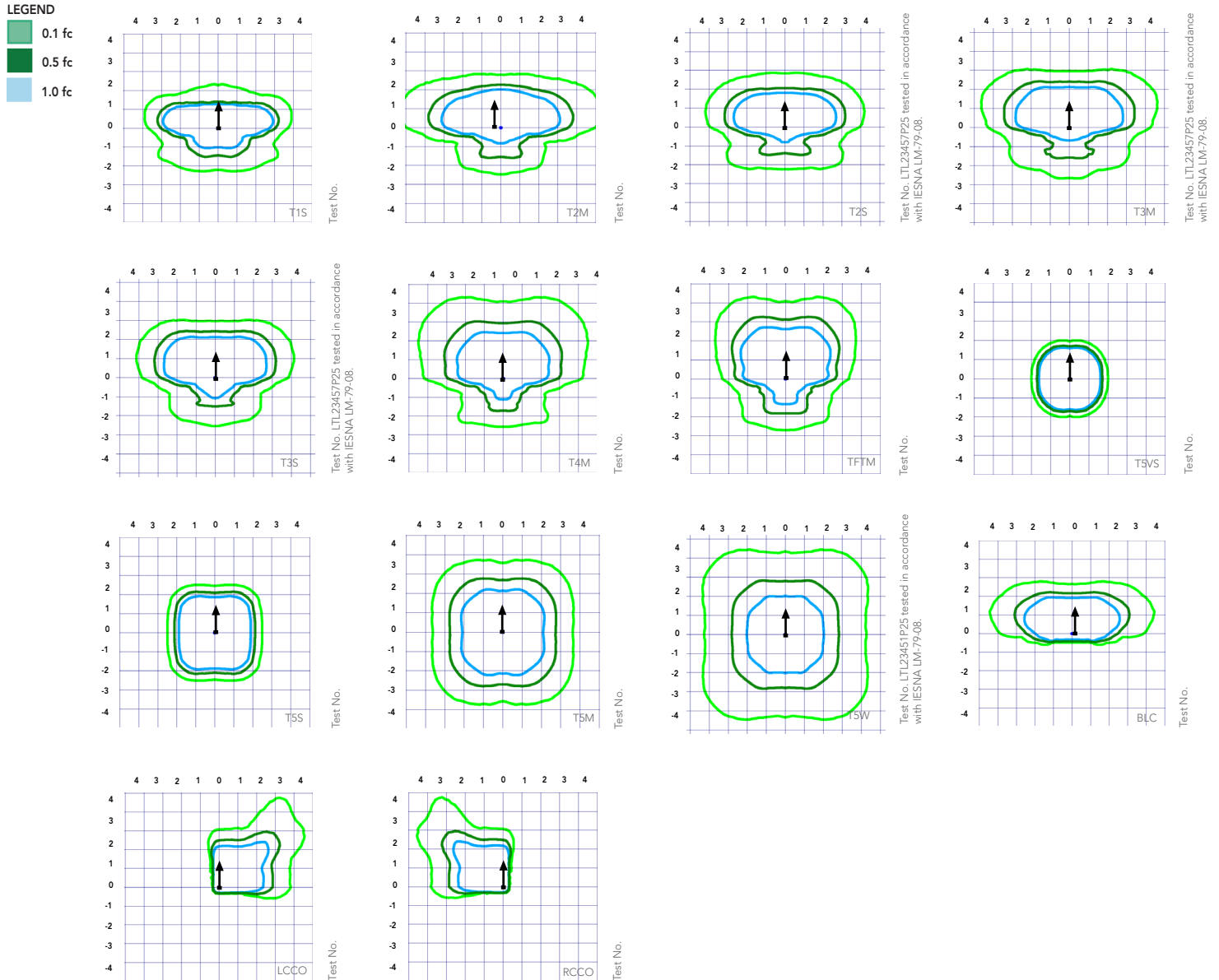
*Includes luminaire and integral mounting arm. Other tenons, arms, brackets or other accessories are not included in this EPA data.

Fixture Quantity & Mounting Configuration	Single DM19	2 @ 180 DM28	2 @ 90 DM29	3 @ 90 DM39	3 @ 120 DM32	4 @ 90 DM49
Mounting Type						
DSX0 LED	0.950	1.900	1.830	2.850	2.850	3.544

Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's [D-Series Area Size 0 homepage](#).

Isofootcandle plots for the DSX0 LED 40C 1000 40K. Distances are in units of mounting height (20').



Performance Data

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.04
5°C	41°F	1.04
10°C	50°F	1.03
15°C	59°F	1.02
20°C	68°F	1.01
25°C	77°F	1.00
30°C	86°F	0.99
35°C	95°F	0.98
40°C	104°F	0.97

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	Lumen Maintenance Factor
25,000	0.96
50,000	0.92
100,000	0.85

Motion Sensor Default Settings						
Option	Dimmed State	High Level (when triggered)	Photocell Operation	Dwell Time	Ramp-up Time	Ramp-down Time
PIR or PIRH	3V (37%) Output	10V (100%) Output	Enabled @ 5FC	5 min	3 sec	5 min
*PIR1FC3V or PIRH1FC3V	3V (37%) Output	10V (100%) Output	Enabled @ 1FC	5 min	3 sec	5 min

*for use when motion sensor is used as dusk to dawn control.

Controls Options

Nomenclature	Description	Functionality	Primary control device	Notes
FAO	Field adjustable output device installed inside the luminaire; wired to the driver dimming leads.	Allows the luminaire to be manually dimmed, effectively trimming the light output.	FAO device	Cannot be used with other controls options that need the 0-10V leads
DS	Drivers wired independently for 50/50 luminaire operation	The luminaire is wired to two separate circuits, allowing for 50/50 operation.	Independently wired drivers	Requires two separately switched circuits. Consider nLight AIR as a more cost effective alternative.
PERS or PER7	Twist-lock photocell receptacle	Compatible with standard twist-lock photocells for dusk to dawn operation, or advanced control nodes that provide 0-10V dimming signals.	Twist-lock photocells such as DLL Elite or advanced control nodes such as ROAM.	Pins 4 & 5 to dimming leads on driver, Pins 6 & 7 are capped inside luminaire
PIR or PIRH	Motion sensors with integral photocell. PIR for 8-15' mounting; PIRH for 15-30' mounting	Luminaires dim when no occupancy is detected.	Acuity Controls SBGR	Also available with PIRH1FC3V when the sensor photocell is used for dusk-to-dawn operation.
NLTAIR2 PIRHN	nLight AIR enabled luminaire for motion sensing, photocell and wireless communication.	Motion and ambient light sensing with group response. Scheduled dimming with motion sensor over-ride when wirelessly connected to the nLight Eclipse.	nLight Air rSDGR	nLight AIR sensors can be programmed and commissioned from the ground using the CIAIRity Pro app.

Electrical Load

					Current (A)					
	Performance Package	LED Count	Drive Current	Wattage	120	208	240	277	347	480
Forward Optics (Non-Rotated)	P1	20	530	38	0.32	0.18	0.15	0.15	0.10	0.08
	P2	20	700	49	0.41	0.23	0.20	0.19	0.14	0.11
	P3	20	1050	71	0.60	0.37	0.32	0.27	0.21	0.15
	P4	20	1400	92	0.77	0.45	0.39	0.35	0.28	0.20
	P5	40	700	89	0.74	0.43	0.38	0.34	0.26	0.20
	P6	40	1050	134	1.13	0.65	0.55	0.48	0.39	0.29
	P7	40	1300	166	1.38	0.80	0.69	0.60	0.50	0.37
Rotated Optics (Requires L90 or R90)	P10	30	530	53	0.45	0.26	0.23	0.21	0.16	0.12
	P11	30	700	72	0.60	0.35	0.30	0.27	0.20	0.16
	P12	30	1050	104	0.88	0.50	0.44	0.39	0.31	0.23
	P13	30	1300	128	1.08	0.62	0.54	0.48	0.37	0.27

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Forward Optics

Power Package	LED Count	Drive Current	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P1	20	530	38W	T1S	4,369	1	0	1	115	4,706	1	0	1	124	4,766	1	0	1	125
				T2S	4,364	1	0	1	115	4,701	1	0	1	124	4,761	1	0	1	125
				T2M	4,387	1	0	1	115	4,726	1	0	1	124	4,785	1	0	1	126
				T3S	4,248	1	0	1	112	4,577	1	0	1	120	4,634	1	0	1	122
				T3M	4,376	1	0	1	115	4,714	1	0	1	124	4,774	1	0	1	126
				T4M	4,281	1	0	1	113	4,612	1	0	2	121	4,670	1	0	2	123
				TFTM	4,373	1	0	1	115	4,711	1	0	2	124	4,771	1	0	2	126
				TSVS	4,548	2	0	0	120	4,900	2	0	0	129	4,962	2	0	0	131
				TSS	4,552	2	0	0	120	4,904	2	0	0	129	4,966	2	0	0	131
				TSM	4,541	3	0	1	120	4,891	3	0	1	129	4,953	3	0	1	130
				TSW	4,576	3	0	2	120	4,929	3	0	2	130	4,992	3	0	2	131
				BLC	3,586	1	0	1	94	3,863	1	0	1	102	3,912	1	0	1	103
				LCCO	2,668	1	0	1	70	2,874	1	0	2	76	2,911	1	0	2	77
				RCCO	2,668	1	0	1	70	2,874	1	0	2	76	2,911	1	0	2	77
P2	20	700	49W	T1S	5,570	1	0	1	114	6,001	1	0	1	122	6,077	2	0	2	124
				T2S	5,564	1	0	2	114	5,994	1	0	2	122	6,070	2	0	2	124
				T2M	5,593	1	0	1	114	6,025	1	0	1	123	6,102	1	0	1	125
				T3S	5,417	1	0	2	111	5,835	1	0	2	119	5,909	2	0	2	121
				T3M	5,580	1	0	2	114	6,011	1	0	2	123	6,087	1	0	2	124
				T4M	5,458	1	0	2	111	5,880	1	0	2	120	5,955	1	0	2	122
				TFTM	5,576	1	0	2	114	6,007	1	0	2	123	6,083	1	0	2	124
				TSVS	5,799	2	0	0	118	6,247	2	0	0	127	6,327	2	0	0	129
				TSS	5,804	2	0	0	118	6,252	2	0	0	128	6,332	2	0	1	129
				TSM	5,789	3	0	1	118	6,237	3	0	1	127	6,316	3	0	1	129
				TSW	5,834	3	0	2	119	6,285	3	0	2	128	6,364	3	0	2	130
				BLC	4,572	1	0	1	93	4,925	1	0	1	101	4,987	1	0	1	102
				LCCO	3,402	1	0	2	69	3,665	1	0	2	75	3,711	1	0	2	76
				RCCO	3,402	1	0	2	69	3,665	1	0	2	75	3,711	1	0	2	76
P3	20	1050	71W	T1S	7,833	2	0	2	110	8,438	2	0	2	119	8,545	2	0	2	120
				T2S	7,825	2	0	2	110	8,429	2	0	2	119	8,536	2	0	2	120
				T2M	7,865	2	0	2	111	8,473	2	0	2	119	8,580	2	0	2	121
				T3S	7,617	2	0	2	107	8,205	2	0	2	116	8,309	2	0	2	117
				T3M	7,846	2	0	2	111	8,452	2	0	2	119	8,559	2	0	2	121
				T4M	7,675	2	0	2	108	8,269	2	0	2	116	8,373	2	0	2	118
				TFTM	7,841	2	0	2	110	8,447	2	0	2	119	8,554	2	0	2	120
				TSVS	8,155	3	0	0	115	8,785	3	0	0	124	8,896	3	0	0	125
				TSS	8,162	3	0	1	115	8,792	3	0	1	124	8,904	3	0	1	125
				TSM	8,141	3	0	2	115	8,770	3	0	2	124	8,881	3	0	2	125
				TSW	8,204	3	0	2	116	8,838	4	0	2	124	8,950	4	0	2	126
				BLC	6,429	1	0	2	91	6,926	1	0	2	98	7,013	1	0	2	99
				LCCO	4,784	1	0	2	67	5,153	1	0	2	73	5,218	1	0	2	73
				RCCO	4,784	1	0	2	67	5,153	1	0	2	73	5,218	1	0	2	73
P4	20	1400	92W	T1S	9,791	2	0	2	106	10,547	2	0	2	115	10,681	2	0	2	116
				T2S	9,780	2	0	2	106	10,536	2	0	2	115	10,669	2	0	2	116
				T2M	9,831	2	0	2	107	10,590	2	0	2	115	10,724	2	0	2	117
				T3S	9,521	2	0	2	103	10,256	2	0	2	111	10,386	2	0	2	113
				T3M	9,807	2	0	2	107	10,565	2	0	2	115	10,698	2	0	2	116
				T4M	9,594	2	0	2	104	10,335	2	0	3	112	10,466	2	0	3	114
				TFTM	9,801	2	0	2	107	10,558	2	0	2	115	10,692	2	0	2	116
				TSVS	10,193	3	0	1	111	10,981	3	0	1	119	11,120	3	0	1	121
				TSS	10,201	3	0	1	111	10,990	3	0	1	119	11,129	3	0	1	121
				TSM	10,176	4	0	2	111	10,962	4	0	2	119	11,101	4	0	2	121
				TSW	10,254	4	0	3	111	11,047	4	0	3	120	11,186	4	0	3	122
				BLC	8,036	1	0	2	87	8,656	1	0	2	94	8,766	1	0	2	95
				LCCO	5,979	1	0	2	65	6,441	1	0	2	70	6,523	1	0	3	71
				RCCO	5,979	1	0	2	65	6,441	1	0	2	70	6,523	1	0	3	71

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Forward Optics

Power Package	LED Count	Drive Current	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P5	40	700	89W	T1S	10,831	2	0	2	122	11,668	2	0	2	131	11,816	2	0	2	133
				T2S	10,820	2	0	2	122	11,656	2	0	2	131	11,803	2	0	2	133
				T2M	10,876	2	0	2	122	11,716	2	0	2	132	11,864	2	0	2	133
				T3S	10,532	2	0	2	118	11,346	2	0	2	127	11,490	2	0	2	129
				T3M	10,849	2	0	2	122	11,687	2	0	2	131	11,835	2	0	2	133
				T4M	10,613	2	0	3	119	11,434	2	0	3	128	11,578	2	0	3	130
				TFTM	10,842	2	0	2	122	11,680	2	0	2	131	11,828	2	0	2	133
				TSVS	11,276	3	0	1	127	12,148	3	0	1	136	12,302	3	0	1	138
				TSS	11,286	3	0	1	127	12,158	3	0	1	137	12,312	3	0	1	138
				TSM	11,257	4	0	2	126	12,127	4	0	2	136	12,280	4	0	2	138
				TSW	11,344	4	0	3	127	12,221	4	0	3	137	12,375	4	0	3	139
				BLC	8,890	1	0	2	100	9,576	1	0	2	108	9,698	1	0	2	109
				LCCO	6,615	1	0	3	74	7,126	1	0	3	80	7,216	1	0	3	81
				RCCO	6,615	1	0	3	74	7,126	1	0	3	80	7,216	1	0	3	81
P6	40	1050	134W	T1S	14,805	3	0	3	110	15,949	3	0	3	119	16,151	3	0	3	121
				T2S	14,789	3	0	3	110	15,932	3	0	3	119	16,134	3	0	3	120
				T2M	14,865	3	0	3	111	16,014	3	0	3	120	16,217	3	0	3	121
				T3S	14,396	3	0	3	107	15,509	3	0	3	116	15,705	3	0	3	117
				T3M	14,829	2	0	3	111	15,975	3	0	3	119	16,177	3	0	3	121
				T4M	14,507	2	0	3	108	15,628	3	0	3	117	15,826	3	0	3	118
				TFTM	14,820	2	0	3	111	15,965	3	0	3	119	16,167	3	0	3	121
				TSVS	15,413	4	0	1	115	16,604	4	0	1	124	16,815	4	0	1	125
				TSS	15,426	3	0	1	115	16,618	4	0	1	124	16,828	4	0	1	126
				TSM	15,387	4	0	2	115	16,576	4	0	2	124	16,786	4	0	2	125
				TSW	15,506	4	0	3	116	16,704	4	0	3	125	16,915	4	0	3	126
				BLC	12,151	1	0	2	91	13,090	1	0	2	98	13,255	1	0	2	99
				LCCO	9,041	1	0	3	67	9,740	1	0	3	73	9,863	1	0	3	74
				RCCO	9,041	1	0	3	67	9,740	1	0	3	73	9,863	1	0	3	74
P7	40	1300	166W	T1S	17,023	3	0	3	103	18,338	3	0	3	110	18,570	3	0	3	112
				T2S	17,005	3	0	3	102	18,319	3	0	3	110	18,551	3	0	3	112
				T2M	17,092	3	0	3	103	18,413	3	0	3	111	18,646	3	0	3	112
				T3S	16,553	3	0	3	100	17,832	3	0	3	107	18,058	3	0	3	109
				T3M	17,051	3	0	3	103	18,369	3	0	3	111	18,601	3	0	3	112
				T4M	16,681	3	0	3	100	17,969	3	0	3	108	18,197	3	0	3	110
				TFTM	17,040	3	0	3	103	18,357	3	0	4	111	18,590	3	0	4	112
				TSVS	17,723	4	0	1	107	19,092	4	0	1	115	19,334	4	0	1	116
				TSS	17,737	4	0	2	107	19,108	4	0	2	115	19,349	4	0	2	117
				TSM	17,692	4	0	2	107	19,059	4	0	2	115	19,301	4	0	2	116
				TSW	17,829	5	0	3	107	19,207	5	0	3	116	19,450	5	0	3	117
				BLC	13,971	2	0	2	84	15,051	2	0	2	91	15,241	2	0	2	92
				LCCO	10,396	1	0	3	63	11,199	1	0	3	67	11,341	1	0	3	68
				RCCO	10,396	1	0	3	63	11,199	1	0	3	67	11,341	1	0	3	68

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Rotated Optics																			
Power Package	LED Count	Drive Current	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P10	30	530	53W	T1S	6,727	2	0	2	127	7,247	3	0	3	137	7,339	3	0	3	138
				T2S	6,689	3	0	3	126	7,205	3	0	3	136	7,297	3	0	3	138
				T2M	6,809	3	0	3	128	7,336	3	0	3	138	7,428	3	0	3	140
				T3S	6,585	3	0	3	124	7,094	3	0	3	134	7,183	3	0	3	136
				T3M	6,805	3	0	3	128	7,331	3	0	3	138	7,424	3	0	3	140
				T4M	6,677	3	0	3	126	7,193	3	0	3	136	7,284	3	0	3	137
				TFTM	6,850	3	0	3	129	7,379	3	0	3	139	7,472	3	0	3	141
				TSVS	6,898	3	0	0	130	7,431	3	0	0	140	7,525	3	0	0	142
				TSS	6,840	2	0	1	129	7,368	2	0	1	139	7,461	2	0	1	141
				TSM	6,838	3	0	1	129	7,366	3	0	2	139	7,460	3	0	2	141
				TSW	6,777	3	0	2	128	7,300	3	0	2	138	7,393	3	0	2	139
				BLC	5,626	2	0	2	106	6,060	2	0	2	114	6,137	2	0	2	116
				LCCO	4,018	1	0	2	76	4,328	1	0	2	82	4,383	1	0	2	83
				RCCO	4,013	3	0	3	76	4,323	3	0	3	82	4,377	3	0	3	83
P11	30	700	72W	T1S	8,594	3	0	3	119	9,258	3	0	3	129	9,376	3	0	3	130
				T2S	8,545	3	0	3	119	9,205	3	0	3	128	9,322	3	0	3	129
				T2M	8,699	3	0	3	121	9,371	3	0	3	130	9,490	3	0	3	132
				T3S	8,412	3	0	3	117	9,062	3	0	3	126	9,177	3	0	3	127
				T3M	8,694	3	0	3	121	9,366	3	0	3	130	9,484	3	0	3	132
				T4M	8,530	3	0	3	118	9,189	3	0	3	128	9,305	3	0	3	129
				TFTM	8,750	3	0	3	122	9,427	3	0	3	131	9,546	3	0	3	133
				TSVS	8,812	3	0	0	122	9,493	3	0	0	132	9,613	3	0	0	134
				TSS	8,738	3	0	1	121	9,413	3	0	1	131	9,532	3	0	1	132
				TSM	8,736	3	0	2	121	9,411	3	0	2	131	9,530	3	0	2	132
				TSW	8,657	4	0	2	120	9,326	4	0	2	130	9,444	4	0	2	131
				BLC	7,187	3	0	3	100	7,742	3	0	3	108	7,840	3	0	3	109
				LCCO	5,133	1	0	2	71	5,529	1	0	2	77	5,599	1	0	2	78
				RCCO	5,126	3	0	3	71	5,522	3	0	3	77	5,592	3	0	3	78
P12	30	1050	104W	T1S	12,149	3	0	3	117	13,088	3	0	3	126	13,253	3	0	3	127
				T2S	12,079	4	0	4	116	13,012	4	0	4	125	13,177	4	0	4	127
				T2M	12,297	3	0	3	118	13,247	3	0	3	127	13,415	3	0	3	129
				T3S	11,891	4	0	4	114	12,810	4	0	4	123	12,972	4	0	4	125
				T3M	12,290	3	0	3	118	13,239	4	0	4	127	13,407	4	0	4	129
				T4M	12,058	4	0	4	116	12,990	4	0	4	125	13,154	4	0	4	126
				TFTM	12,369	4	0	4	119	13,325	4	0	4	128	13,494	4	0	4	130
				TSVS	12,456	3	0	1	120	13,419	3	0	1	129	13,589	4	0	1	131
				TSS	12,351	3	0	1	119	13,306	3	0	1	128	13,474	3	0	1	130
				TSM	12,349	4	0	2	119	13,303	4	0	2	128	13,471	4	0	2	130
				TSW	12,238	4	0	3	118	13,183	4	0	3	127	13,350	4	0	3	128
				BLC	10,159	3	0	3	98	10,944	3	0	3	105	11,083	3	0	3	107
				LCCO	7,256	1	0	3	70	7,816	1	0	3	75	7,915	1	0	3	76
				RCCO	7,246	3	0	3	70	7,806	4	0	4	75	7,905	4	0	4	76
P13	30	1300	128W	T1S	14,438	3	0	3	113	15,554	3	0	3	122	15,751	3	0	3	123
				T2S	14,355	4	0	4	112	15,465	4	0	4	121	15,660	4	0	4	122
				T2M	14,614	3	0	3	114	15,744	4	0	4	123	15,943	4	0	4	125
				T3S	14,132	4	0	4	110	15,224	4	0	4	119	15,417	4	0	4	120
				T3M	14,606	4	0	4	114	15,735	4	0	4	123	15,934	4	0	4	124
				T4M	14,330	4	0	4	112	15,438	4	0	4	121	15,633	4	0	4	122
				TFTM	14,701	4	0	4	115	15,836	4	0	4	124	16,037	4	0	4	125
				TSVS	14,804	4	0	1	116	15,948	4	0	1	125	16,150	4	0	1	126
				TSS	14,679	3	0	1	115	15,814	3	0	1	124	16,014	3	0	1	125
				TSM	14,676	4	0	2	115	15,810	4	0	2	124	16,010	4	0	2	125
				TSW	14,544	4	0	3	114	15,668	4	0	3	122	15,866	4	0	3	124
				BLC	7,919	3	0	3	62	8,531	3	0	3	67	8,639	3	0	3	67
				LCCO	5,145	1	0	2	40	5,543	1	0	2	43	5,613	1	0	2	44
				RCCO	5,139	3	0	3	40	5,536	3	0	3	43	5,606	3	0	3	44

FEATURES & SPECIFICATIONS

INTENDED USE

The sleek design of the D-Series Size 0 reflects the embedded high performance LED technology. It is ideal for many commercial and municipal applications, such as parking lots, plazas, campuses, and pedestrian areas.

CONSTRUCTION

Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance and future light engine upgrades. The LED driver is mounted in direct contact with the casting to promote low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Low EPA (0.95 ft²) for optimized pole wind loading.

FINISH

Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

OPTICS

Precision-molded proprietary acrylic lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engines are available in 3000 K, 4000 K or 5000 K (70 CRI) configurations. The D-Series Size 0 has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL

Light engine(s) configurations consist of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L85/100,000 hours at 25°C). Class 1 electronic drivers are designed to have a power factor >90%, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Easily serviceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).

STANDARD CONTROLS

The DSX0 LED area luminaire has a number of control options. DSX Size 0, comes standard with 0-10V dimming driver. Dusk to dawn controls can be utilized via optional NEMA twist-lock photocell receptacles. Integrated motion sensors with on-board photocells feature field-adjustable programming and are suitable for mounting heights up to 30 feet.

nLIGHT AIR CONTROLS

The DSX0 LED area luminaire is also available with nLight® AIR for the ultimate in wireless control. This powerful controls platform provides out-of-the-box basic motion sensing and photocontrol functionality and is suitable for mounting heights up to 40 feet. Once commissioned using a smartphone and the easy-to-use CLAIRITY app, nLight AIR equipped luminaires can be grouped, resulting in motion sensor and photocell group response without the need for additional equipment. Scheduled dimming with motion sensor over-ride can be achieved when used with the nLight Eclipse. Additional information about nLight Air can be found [here](#).

INSTALLATION

Included mounting block and integral arm facilitate quick and easy installation. Stainless steel bolts fasten the mounting block securely to poles and walls, enabling the D-Series Size 0 to withstand up to a 3.0 G vibration load rating per ANSI C136.31. The D-Series Size 0 utilizes the AERIS™ series pole drilling pattern (template #8). Optional terminal block and NEMA photocontrol receptacle are also available.

LISTINGS

UL listed to meet U.S. and Canadian standards. UL Listed for wet locations. Light engines are IP66 rated; luminaire is IP65 rated. Rated for -40°C to 50°C ambient with HA option. U.S. Patent No. D672,492 S. International patent pending.

DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

International Dark-Sky Association (IDA) Fixture Seal of Approval (FSA) is available for all products on this page utilizing 3000K color temperature only.

BUY AMERICAN

Product with the BAA option is assembled in the USA and meets the Buy America(n) government procurement requirements under FAR, DFARS and DOT. Please refer to www.acuitybrands.com/buy-american for additional information.

WARRANTY

5-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/support/customer-support/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.



WDGE2 LED

Architectural Wall Sconce

Precision Refractive Optic



Catalog
Number

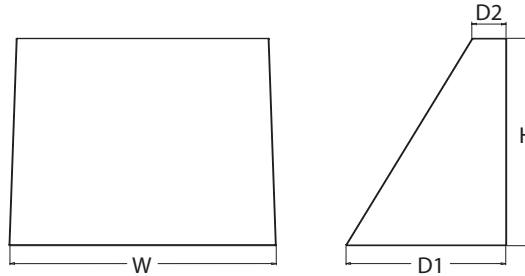
Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

Depth (D1): 7"
Depth (D2): 1.5"
Height: 9"
Width: 11.5"
Weight: 13.5 lbs
(without options)



Introduction

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE2 with industry leading precision refractive optics provides great uniform distribution and optical control. When combined with multiple integrated emergency battery backup options, including an 18W cold temperature option, the WDGE2 becomes the ideal wall-mounted lighting solution for pedestrian scale applications in any environment.

WDGE LED Family Overview

Luminaire	Optics	Standard EM, 0°C	Cold EM, -20°C	Sensor	Approximate Lumens (4000K, 80CRI)						
					P0	P1	P2	P3	P4	P5	P6
WDGE1 LED	Visual Comfort	4W		--	750	1,200	2,000	--	--	--	--
WDGE2 LED	Visual Comfort	10W	18W	Standalone / nLight	--	1,200	2,000	3,000	4,500	6,000	--
WDGE2 LED	Precision Refractive	10W	18W	Standalone / nLight	700	1,200	2,000	3,200	4,200	--	--
WDGE3 LED	Precision Refractive	15W	18W	Standalone / nLight	--	7,500	8,500	10,000	12,000	--	--
WDGE4 LED	Precision Refractive			Standalone / nLight	--	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information

EXAMPLE: WDGE2 LED P3 40K 80CRI VF MVOLT SRM DDBXD

Series	Package	Color Temperature	CRI	Distribution	Voltage	Mounting
WDGE2 LED	P0 ¹ P1 ² P2 ² P3 ² P4²	27K 2700K 30K 3000K 40K 4000K 50K 5000K AMB ³ Amber	70CRI ⁴ 80CRI LW ³ Limited Wavelength	T1S Type I Short T2M Type II Medium T3M Type III Medium T4M Type IV Medium TFTM Forward Throw Medium	MVOLT 347 ⁵ 480 ⁵	Shipped included SRM Surface mounting bracket ICW Indirect Canopy/Ceiling Washer bracket (dry/damp locations only) ⁶ Shipped separately AWS 3/8inch Architectural wall spacer PBBW Surface-mounted back box (top, left, right conduit entry). Use when there is no junction box available.

Options	Finish
E10WH Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, 5°C min)	DDBXD Dark bronze
E20WC Emergency battery backup, Certified in CA Title 20 MAEDBS (18W, -20°C min)	DBLXD Black
PE ⁷ Photocell, Button Type	DNAXD Natural aluminum
DMG ⁸ 0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)	DWHXD White
BCE Bottom conduit entry for back box (PBBW). Total of 4 entry points.	DSSXD Sandstone
	DDBTXD Textured dark bronze
	DBLBXD Textured black
	DNATXD Textured natural aluminum
	DWHGXD Textured white
	DSSTXD Textured sandstone

Standalone Sensors/Controls

PIR Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching.

PIRH Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn switching

PIR1FC3V Bi-level (100/35%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation.

PIRH1FC3V Bi-level (100/35%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation.

Networked Sensors/Controls

NLTAIR2 PIR nLightAIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.

NLTAIR2 PIRH nLightAIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights.

See page 4 for out of box functionality

Accessories

Ordered and shipped separately.

WDGEAWS DDBXD U WDGE 3/8inch Architectural Wall Spacer (specify finish)
WDGE2PB8W DDBXD U WDGE2 surface-mounted back box (specify finish)

NOTES

- 1 PO option not available with sensors/controls.
- 2 P1-P4 not available with AMB and LW.
- 3 AMB and LW always go together.
- 4 70CRI only available with T3M and T4M.
- 5 347V and 480V not available with E10WH or E20WC.
- 6 Not qualified for DLC. Not available with emergency battery backup or sensors/controls.
- 7 PE not available in 480V or with sensors/controls.
- 8 DMG option not available with sensors/controls.

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	System Watts	Dist. Type	27K (2700K, 80 CRI)					30K (3000K, 80 CRI)					40K (4000K, 80 CRI)					50K (5000K, 80 CRI)					Amber (Limited Wavelength)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
P0	7W	T1S	636	92	0	0	0	666	97	0	0	0	699	101	0	0	1	691	100	0	0	1	712	47	0	0	1
		T2M	662	96	0	0	0	693	101	0	0	0	728	106	0	0	0	719	104	0	0	0	741	48	0	0	0
		T3M	662	96	0	0	0	693	101	0	0	0	728	106	0	0	0	719	104	0	0	0	741	48	0	0	0
		T4M	648	94	0	0	0	679	98	0	0	0	712	103	0	0	0	704	102	0	0	0	726	47	0	0	0
		TFTM	652	95	0	0	0	683	99	0	0	0	717	104	0	0	0	708	103	0	0	0	730	48	0	0	1
P1	11W	T1S	1,105	99	0	0	1	1,157	104	0	0	1	1,215	109	0	0	1	1,200	107	0	0	1					
		T2M	1,150	103	0	0	1	1,204	108	0	0	1	1,264	113	0	0	1	1,249	112	0	0	1					
		T3M	1,150	103	0	0	1	1,205	108	0	0	1	1,265	113	0	0	1	1,250	112	0	0	1					
		T4M	1,126	101	0	0	1	1,179	106	0	0	1	1,238	111	0	0	1	1,223	110	0	0	1					
		TFTM	1,133	101	0	0	1	1,186	106	0	0	1	1,245	112	0	0	1	1,230	110	0	0	1					
P2	19W	T1S	1,801	95	1	0	1	1,886	99	1	0	1	1,981	104	1	0	1	1,957	103	1	0	1					
		T2M	1,875	99	1	0	1	1,963	103	1	0	1	2,061	109	1	0	1	2,037	107	1	0	1					
		T3M	1,876	99	1	0	1	1,964	103	1	0	1	2,062	109	1	0	1	2,038	107	1	0	1					
		T4M	1,836	97	1	0	1	1,922	101	1	0	1	2,018	106	1	0	1	1,994	105	1	0	1					
		TFTM	1,847	97	1	0	1	1,934	102	1	0	1	2,030	107	1	0	1	2,006	106	1	0	1					
P3	32W	T1S	2,809	87	1	0	1	2,942	92	1	0	1	3,089	96	1	0	1	3,052	95	1	0	1					
		T2M	2,924	91	1	0	1	3,062	95	1	0	1	3,215	100	1	0	1	3,176	99	1	0	1					
		T3M	2,925	91	1	0	1	3,063	95	1	0	1	3,216	100	1	0	1	3,177	99	1	0	1					
		T4M	2,862	89	1	0	1	2,997	93	1	0	1	3,147	98	1	0	1	3,110	97	1	0	1					
		TFTM	2,880	90	1	0	1	3,015	94	1	0	1	3,166	99	1	0	1	3,128	97	1	0	1					
P4	47W	T1S	3,729	80	1	0	1	3,904	84	1	0	1	4,099	88	1	0	1	4,051	87	1	0	1					
		T2M	3,881	83	1	0	1	4,063	87	1	0	1	4,267	91	1	0	1	4,216	90	1	0	1					
		T3M	3,882	83	1	0	1	4,065	87	1	0	1	4,268	91	1	0	1	4,217	90	1	0	1					
		T4M	3,799	81	1	0	1	3,978	85	1	0	1	4,177	90	1	0	1	4,127	88	1	0	1					
		TFTM	3,822	82	1	0	1	4,002	86	1	0	1	4,202	90	1	0	1	4,152	89	1	0	1					

Performance Package	System Watts	Dist. Type	27K (2700K, 70 CRI)					30K (3000K, 70 CRI)					40K (4000K, 70 CRI)					50K (5000K, 70 CRI)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
P0	7W	T3M	737	107	0	0	0	763	111	0	0	0	822	119	0	0	0	832	121	0	0	1
		T4M	721	105	0	0	0	746	108	0	0	0	804	117	0	0	1	814	118	0	0	1
P1	11W	T3M	1,280	115	0	0	1	1,325	119	0	0	1	1,427	128	1	0	1	1,445	129	1	0	1
		T4M	1,253	112	0	0	1	1,297	116	0	0	1	1,397	125	0	0	1	1,415	127	0	0	1
P2	19W	T3M	2,087	110	1	0	1	2,160	114	1	0	1	2,327	123	1	0	1	2,357	124	1	0	1
		T4M	2,042	108	1	0	1	2,114	111	1	0	1	2,278	120	1	0	1	2,306	121	1	0	1
P3	32W	T3M	3,254	101	1	0	1	3,369	105	1	0	1	3,629	113	1	0	1	3,675	114	1	0	1
		T4M	3,185	99	1	0	1	3,297	103	1	0	1	3,552	111	1	0	1	3,597	112	1	0	1
P4	47W	T3M	4,319	93	1	0	1	4,471	96	1	0	1	4,817	103	1	0	2	4,878	105	1	0	2
		T4M	4,227	91	1	0	1	4,376	94	1	0	2	4,714	101	1	0	2	4,774	102	1	0	2

Electrical Load

Performance Package	System Watts	Current (A)					
		120Vac	208Vac	240Vac	277Vac	347Vac	480Vac
P0	7.0	0.061	0.042	0.04	0.039	--	--
	9.0	--	--	--	--	0.031	0.021
P1	11.0	0.100	0.064	0.059	0.054	--	--
	14.1	--	--	--	--	0.046	0.031
P2	19.0	0.168	0.106	0.095	0.083	--	--
	22.8	--	--	--	--	0.067	0.050
P3	32.0	0.284	0.163	0.144	0.131	--	--
	37.1	--	--	--	--	0.107	0.079
P4	47.0	0.412	0.234	0.207	0.185	--	--
	53.5	--	--	--	--	0.153	0.112

Lumen Output in Emergency Mode
(4000K, 80 CRI, T3M)

Option	Lumens
E10WH	1,358
E20WC	2,230

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.03
10°C	50°F	1.02
20°C	68°F	1.01
25°C	77°F	1.00
30°C	86°F	0.99
40°C	104°F	0.97

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

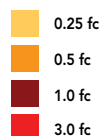
To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	>0.96	>0.93	>0.87

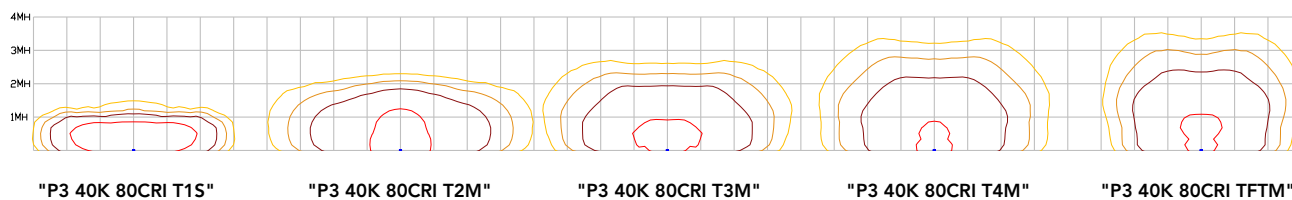
Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit the Lithonia Lighting WDGE LED homepage. Tested in accordance with IESNA LM-79 and LM-80 standards.

LEGEND



MH = 10ft
Grid = 10ft x 10ft



Emergency Egress Options

Emergency Battery Backup

The emergency battery backup is integral to the luminaire — no external housing required! This design provides reliable emergency operation while maintaining the aesthetics of the product. All emergency battery backup configurations include an independent secondary driver with an integral relay to immediately detect loss of normal power and automatically energize the luminaire. The emergency battery will power the luminaire for a minimum duration of 90 minutes (maximum duration of three hours) from the time normal power is lost and maintain a minimum of 60% of the light output at the end of 90minutes.

Applicable codes: NFPA 70/NEC – section 700.16, NFPA 101 Life Safety Code Section 7.9

Control / Sensor Options

Motion/Ambient Sensor (PIR_, PIRH_)

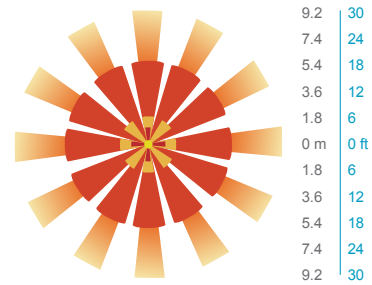
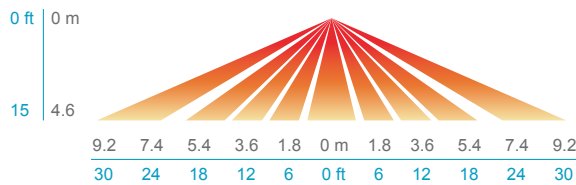
Motion/Ambient sensor (Sensor Switch MSOD) is integrated into the the luminaire. The sensor provides both Motion and Daylight based dimming of the luminaire. For motion detection, the sensor utilizes 100% Digital Passive Infrared (PIR) technology that is tuned for walking size motion while preventing false tripping from the environment. The integrated photocell enables additional energy savings during daytime periods when there is sufficient daylight. Optimize sensor coverage by either selecting PIR or PIRH option. PIR option comes with a sensor lens that is optimized to provide maximum coverage for mounting heights between 8-15ft, while PIRH is optimized for 15-40ft mounting height.

Networked Control (NLTAIR2)

nLight® AIR is a wireless lighting controls platform that allows for seamless integration of both indoor and outdoor luminaires. Five-tier security architecture, 900 MHz wireless communication and app (CLAIRITY™ Pro) based configurability combined together make nLight® AIR a secure, reliable and easy to use platform.

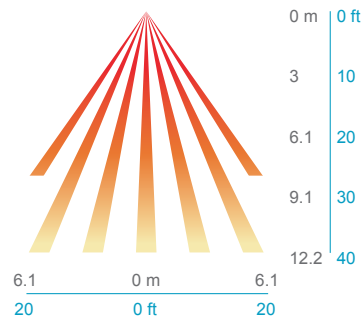
PIR

HIGH VIEW

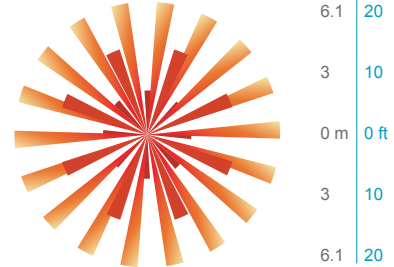


PIRH

SIDE VIEW



TOP VIEW



Option	Dim Level	High Level (when triggered)	Photocell Operation	Motion Time Delay	Ramp-down Time	Ramp-up Time
PIR or PIRH	Motion - 3V (37% of full output) Photocell - 0V (turned off)	10V (100% output)	Enabled @ 5fc	5 min	5 min	Motion - 3 sec Photocell - 45 sec
PIR1FC3V, PIRH1FC3V	Motion - 3V (37% of full output) Photocell - 0V (turned off)	10V (100% output)	Enabled @ 1fc	5 min	5 min	Motion - 3 sec Photocell - 45 sec
NLTAIR2 PIR, NLTAIR2 PIRH (out of box)	Motion - 3V (37% of full output) Photocell - 0V (turned off)	10V (100% output)	Enabled @ 5fc	7.5 min	5 min	Motion - 3 sec Photocell - 45 sec

Mounting, Options & Accessories



Motion/Ambient Sensor

D = 7"
H = 9" (Standalone controls)
11" (nLight AIR controls, 2" antenna will be pointing down behind the sensor)
W = 11.5"



PBBW – Surface-Mounted Back Box

Use when there is no junction box available.

D = 1.75"
H = 9"
W = 11.5"



AWS – 3/8inch Architectural Wall Spacer

D = 0.38"
H = 4.4"
W = 7.5"

FEATURES & SPECIFICATIONS

INTENDED USE

Common architectural look, with clean rectilinear shape, of the WDGE LED was designed to blend with any type of construction, whether it be tilt-up, frame or brick. Applications include commercial offices, warehouses, hospitals, schools, malls, restaurants, and other commercial buildings.

CONSTRUCTION

The single-piece die-cast aluminum housing integrates secondary heat sinks to optimize thermal transfer from the internal light engine heat sinks and promote long life. The driver is mounted in direct contact with the casting for a low operating temperature and long life. The die-cast door frame is fully gasketed with a one-piece solid silicone gasket to keep out moisture and dust, providing an IP66 rating for the luminaire.

FINISH

Exterior painted parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Standard Super Durable colors include dark bronze, black, natural aluminum, sandstone and white. Available in textured and non-textured finishes.

OPTICS

Individually formed acrylic lenses are engineered for superior application efficiency which maximizes the light in the areas where it is most needed. The WDGE LED has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL

Light engine consists of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L91/100,000 hours at 25°C). The electronic driver has a power factor of >90%, THD <20%. Luminaire comes with built in 6kV surge protection, which meets a minimum Category C low exposure (per ANSI/IEEE C62.41.2).

INSTALLATION

A universal mounting plate with integral mounting support arms allows the fixture to hinge down for easy access while making wiring connections. The 3/8" Architectural Wall Spacer (AWS) can be used to create a floating appearance or to accommodate small imperfections in the wall surface. The ICW option can be used to mount the luminaire inverted for indirect lighting in dry and damp locations. Design can withstand up to a 1.5 G vibration load rating per ANSI C136.31.

LISTINGS

CSA certified to U.S. and Canadian standards. Luminaire is IP66 rated. PIR options are rated for wet location. Rated for -40°C minimum ambient. DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified. International Dark-Sky Association (IDA) Fixture Seal of Approval (FSA) is available for all products on this page utilizing 2700K and 3000K color temperature only and SRM mounting only.

BUY AMERICAN

This product is assembled in the USA and meets the Buy America(n) government procurement requirements under FARS, DFARS and DOT. Please refer to www.acuitybrands.com/resources/buy-american for additional information.

WARRANTY

5-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.



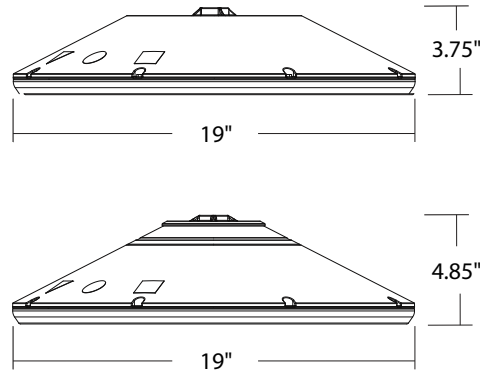
VCPG LED Parking Garage



Buy American

Specifications

Diameter: 19"

Height: 3.75"
(4.85" with Up-Light)Weight: 18 lbs
(max, with no options):

A+ Capable options indicated by this color background.

Catalog
Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

Introduction

The all new VCPG LED (Visually Comfortable Parking Garage) luminaire is designed to bring glare control, optical performance and energy savings into one package. The recessed lens design of VCPG LED minimizes high angle glare, while its precision molded acrylic lens eliminates LED pixilation and delivers the required minimums, verticals and uniformity. The dedicated up-light module option reduces the contrast between the luminaire and the ceiling creating a more visually comfortable environment.

The VCPG LED delivers up to 87% in energy savings when replacing 175W metal halide luminaires. With over 100,000 hour life expectancy (12+ years of 24/7 continuous operation), the VCPG LED luminaire provides significant maintenance savings over traditional luminaires.

Ordering Information

EXAMPLE: VCPG LED V4 P4 40K 70CRI T5M MVOLT SRM DNAXD

VCPG LED							
Series	LED Light Engines	Package	Color temperature	Color Rendering Index	Distribution	Voltage	Mounting
VCPG LED	V4 ¹ 4 Light Engines	P1 ¹	30K 3000 K	70CRI	TSM Type V, medium	MVOLT For ordering with fuse	Shipped included PM Pendant mount standard (24-inch length supply leads) SRM Surface mount (24-inch length supply leads) ARM Arm mount (use RSXWBA accessory to mount to a wall) Shipped separately YK Yoke/trunnion mount ³
	V8 ¹ 8 Light Engines	P2 ¹	35K 3500 K	80CRI	T5R ² Type V, rectangular	347 120	
		P3 ¹	40K 4000 K		TSW Type V, wide	480 208	
		P4 ¹	50K 5000 K		TSE Type V entry	240 277	
		P5 ¹			LANE ² Drive lane	347 480	
		P6 ¹					
		P7 ¹					

Options			Finish (required)	
Shipped installed			DWXXD White DNAXD Natural aluminum DDBXD Dark bronze DBLXD Black	
UPL1	Up-Light: 500 lumens	Standalone Sensors/Controls²		
UPL2	Up-Light: 700 lumens	PIR Motion/ambient sensor for 8-15' mounting heights		
E8WC	Emergency battery backup, Certified in CA Title 20 MAEDBS (8W, -20°C min) ^{4,5,6}	PIRH Motion/ambient sensor for 15-30' mounting heights		
E10WH	Emergency battery backup, Certified in CA Title 20 MAEDBS (10W, 5°C min) ^{4,5,6}	PIR3FC3V Motion/ambient sensor for 8-15' mounting heights, pre programmed to 3fc and 35% light output		
		PIRH3FC3V Motion/ambient sensor for 15-30' mounting heights, pre programmed to 3fc and 35% light output		
		PIR3FC3V924 UL924 Listed motion/ambient sensor for emergency circuit for 8-15' mounting heights, pre programmed to 3fc and 35% light output ⁸		
HA	High ambient (50°C, only P1-P4)	PIRH3FC3V924 UL924 Listed motion/ambient sensor for emergency circuit for 15-30' mounting heights, pre programmed to 3fc and 35% light output ⁸		
SF	Single fuse (120V, 277V, 347V)			
DF	Double fuse (208V, 240V, 480V)			
SPD10KV	10KV Surge Pack	Networked Sensors/Controls²		
LDS36	36in (3ft) lead length	NLTAIR2 PIR nLIGHT AIR Wireless enabled motion/ambient sensor for 8-15' mounting heights		
LDS72	72in (6ft) lead length	NLTAIR2 PIRH nLIGHT AIR Wireless enabled motion/ambient sensor for 15'-30' mounting heights		
LDS108	108in (9ft) lead length	NLTAIR2 PIR924 nLIGHT AIR Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 8-15' mounting heights ⁹		
DMG	External 0-10V leads (no controls) ⁷	NLTAIR2 PIRH924 nLIGHT AIR Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 15-30' mounting heights ⁹		
Shipped Separately		XAD XPoint™ Wireless enabled ¹⁰		
WG	Wire Guard	XAD924 XPoint™ Wireless enabled, UL 924 Listed for emergency circuit ^{8,10}		
BDS	Bird Shroud	XAD PIR XPoint™ Wireless enabled motion/ambient sensor for 8-15' mounting heights		
HS	House Side Shield	XAD PIRH XPoint™ Wireless enabled motion/ambient sensor for 15-30' mounting heights		
		XAD924 PIR XPoint™ Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 8-15' mounting heights ⁸		
		XAD924 PIRH XPoint™ Wireless enabled, UL 924 Listed motion/ambient sensor for emergency circuits for 15-30' mounting heights ⁸		

Ordering Information Cont.

Accessories

Ordered and shipped separately.

VCPGBDS DWXHD U	Bird shroud for PM (specify finish)
VCPGBDS YK DWXHD U	Bird shroud for YK (specify finish)
VCPGUBDS DWXHD U	Bird shroud for PM with Up-Light (specify finish)
VCPGUBDS YK DWXHD U	Bird shroud for YK with Up-Light (specify finish)
VCPGSRM U	Surface mount kit, with no Up-Light
VCPGSRM U	Surface mount kit, with Up-Light
VCPGWG U	Wire guard
SLVSQ	Quick mount pendant swivel kit, square
SLVRD	Quick mount pendant swivel kit, round
VCPG YK DWXHD U	Yoke mount kit (specify finish)
RSXWBA DWXHD U	RSX WBA wall bracket (specify finish)

NOTES

- 1 P1-P6 not available with V8. P7 not available with V4.
- 2 Not available with P7.
- 3 Only vertical height adjustment. No angle adjustment. Use PM and SLVSQ or SLVRD for mounting to angled ceiling or canopies.
- 4 Not available with 347V or 480V.
- 5 E8WC and E10WH only rated up to 35°C ambient.
- 6 E8WC & E10WH only available with P1-P4 packages.
- 7 DMG option not available with standalone or networked sensors/controls.
- 8 Power interruption delay >30 milliseconds required for operation. Refer sequence of operations on page 4 for more details. BDS not available with UPL1 or UPL2.
- 9 Not available with P6 & P7. Power interruption delay >200 milliseconds required for operation. Refer sequence of operations on page 4 for more details.
- 10 XAD & XAD924 not available with PIR3FC3V924 and PIRH3FC3V924.

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	Watts	Distribution Type	30K (3000K, 70 CRI)		35K (3500K, 70 CRI)		40K (4000K, 70 CRI)		50K (5000K, 70 CRI)	
			Lumens	LPW	Lumens	LPW	Lumens	LPW	Lumens	LPW
P1	27W	TSE	3,581	135	3,670	138	3,815	144	3,876	146
		TSM	3,620	136	3,710	140	3,856	145	3,917	147
		TSW	3,592	135	3,681	139	3,827	144	3,888	146
		TSR	3,464	130	3,550	134	3,690	139	3,749	141
		LANE	3,507	132	3,594	135	3,736	141	3,796	143
P2	34W	TSE	4,577	135	4,691	138	4,876	144	4,954	146
		TSM	4,626	136	4,741	140	4,928	145	5,007	147
		TSW	4,591	135	4,705	139	4,891	144	4,968	146
		TSR	4,427	130	4,537	134	4,716	139	4,791	141
		LANE	4,482	132	4,594	135	4,775	141	4,851	143
P3	43W	TSE	5,808	134	5,952	137	6,187	143	6,286	145
		TSM	5,870	135	6,015	139	6,253	144	6,353	146
		TSW	5,825	134	5,970	138	6,205	143	6,304	145
		TSR	5,617	130	5,757	133	5,984	138	6,079	140
		LANE	5,688	131	5,829	134	6,059	140	6,155	142
P4	56W	TSE	7,391	131	7,575	135	7,874	140	7,999	142
		TSM	7,470	133	7,656	136	7,958	141	8,085	144
		TSW	7,414	132	7,597	135	7,898	140	8,023	143
		TSR	7,149	127	7,326	130	7,615	135	7,737	137
		LANE	7,238	129	7,418	132	7,711	137	7,834	139
P5	82W	TSE	10,189	124	10,442	127	10,854	132	11,027	134
		TSM	10,298	125	10,553	128	10,970	134	11,145	136
		TSW	10,220	124	10,473	128	10,887	133	11,060	135
		TSR	9,855	120	10,099	123	10,498	128	10,665	130
		LANE	9,978	121	10,226	124	10,629	129	10,799	131
P6	108W	TSE	12,878	120	13,197	123	13,719	127	13,937	129
		TSM	13,015	121	13,338	124	13,865	129	14,086	131
		TSW	12,917	120	13,237	123	13,760	128	13,979	130
		TSR	12,455	116	12,764	119	13,268	123	13,480	125
		LANE	12,611	117	12,924	120	13,435	125	13,649	127
P7	122W	TSE	15,503	125	15,887	128	16,515	133	16,778	135
		TSM	15,668	126	16,057	129	16,691	135	16,957	137
		TSW	15,549	125	15,935	129	16,564	134	16,828	136

Up-light Lumen Output

Up-light Option	Watts	Lumens
UPL1	6.5W	519
UPL2	8.5W	715

Lumen Multiplier for 80CRI

CCT	Multiplier
30K	0.926
35K	0.945
40K	0.967
50K	0.965

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient	Lumen Multiplier
0°C 32°F	1.03
10°C 50°F	1.02
20°C 68°F	1.01
25°C 77°F	1
30°C 86°F	0.99
40°C 104°F	0.98

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	0.97	0.94	0.89

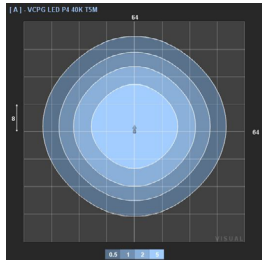
Electrical Load

Power Package	System Watts	Current (A)					
		120V	208V	240V	277V	347V	480V
P1	27W	0.22	0.13	0.12	0.10	0.08	0.06
P2	34W	0.28	0.16	0.14	0.13	0.10	0.08
P3	43W	0.37	0.21	0.18	0.16	0.13	0.09
P4	56W	0.48	0.28	0.24	0.21	0.16	0.12
P5	82W	0.68	0.40	0.35	0.30	0.24	0.18
P6	108W	0.91	0.52	0.45	0.39	0.32	0.23
P7	124W	1.03	0.59	0.51	0.44	0.37	0.27

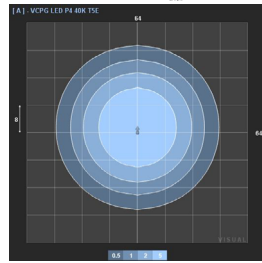
Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit the [Lithonia Lighting VCPG LED homepage](https://www.lithonia.com).
Tested in accordance with IESNA LM-79 and LM-80 standards

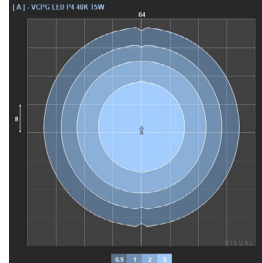
VCPG LED P4 T5M 40K



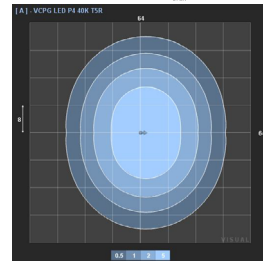
VCPG LED P4 T5E 40K



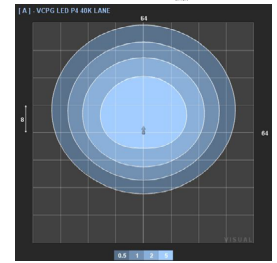
VCPG LED P4 T5W 40K



VCPG LED P4 T5R 40K



VCPG LED P4 LANE 40K



Control/Sensor Options

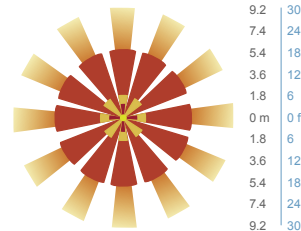
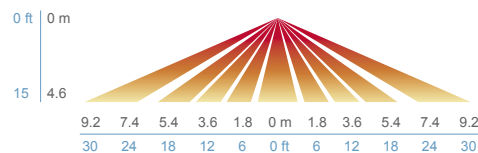
Motion/Ambient Sensor (PIR, PIRH)

Motion/Ambient sensor (Sensor Switch MSOD, Xpoint MSOD) is integrated into the luminaire. The sensor provides both Motion and Daylight based dimming of the luminaire. For motion detection, the sensor utilizes 100% Digital Passive Infrared (PIR) technology that is tuned for walking size motion while preventing false tripping from the environment. The integrated photocell enables additional energy savings during daytime periods when there is sufficient daylight. Optimize sensor coverage by either selecting PIR or PIRH option. PIR option comes with a sensor lens that is optimized to provide maximum coverage for mounting heights between 8-15ft, while PIRH is optimized for 15-40ft mounting height.

Networked Control (NLTAIR2)

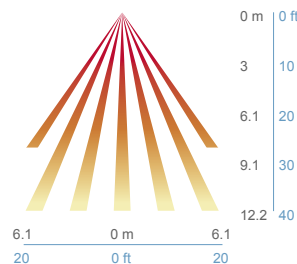
nLight® AIR is a wireless lighting controls platform that allows for seamless integration of both indoor and outdoor luminaires. Five-tier security architecture, 900 MHz wireless communication and app (CLAIRITY™ Pro) based configurability combined together make nLight® AIR a secure, reliable and easy to use platform.

PIR HIGH VIEW

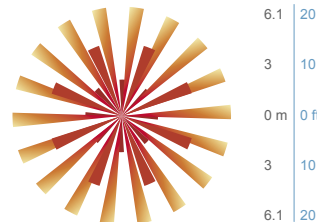


PIRH

SIDE VIEW



TOP VIEW



Motion/Ambient Sensor Default Settings

Option	Dim Level	High Level (when triggered)	Photocell Operation	Motion Time Delay	Ramp-down Time	Ramp-up Time
PIR or PIRH	Motion - 3V (37% of full output) Photocell - 0V (turned off)	10V (100% output)	Enabled @ 5fc	5 min	5 min	Motion - 3 sec Photocell - 45 sec
PIR3FC3V or PIRH3FC3V	Motion - 3V (37% of full output) Photocell - 0V (turned off)	10V (100% output)	Enabled @ 3fc	5 min	5 min	Motion - 3 sec Photocell - 45 sec

Sequence of Operations for UL924 Listed Controls/Sensors

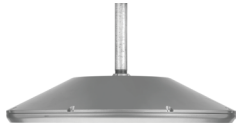
(PIR3FC3V924, PIRH3FC3V924, XAD924, NLTAIR2 PIR924, NLTAIR2 PIRH924)

The UL924 listed control/sensor ("device") is designed to provide full light output for 90 minutes following power loss ("Egress Mode"), ignoring both manual and automatic dimming/occupancy/daylight control signals during this time. The sequence of operations is as follows:

- Normal condition: device can dim and turn off the luminaire as normal, in response to automatic and manual control.
- Utility power fails, and luminaire loses power.
- Backup power source activates, transfer switch moves the emergency circuit powering the luminaire onto the backup source, and luminaire regains power.
- The device detects this power interruption, if it is >30ms (for PIR3FC3V924, PIRH3FC3V924, XAD924) or >200ms (for NLTAIR2 PIR924, NLTAIR2 PIRH924).
- The device ignores all dimming commands and controls the driver to full light output for 90 minutes.
- The device resumes normal dimming controls after 90 minutes.

These UL924 listed controls/sensors are not intended for use with Non-interruptible central emergency power systems. The power interruption, when transferring from normal utility power to emergency backup power, is required for the controller to activate its Egress Mode and provide full light output.

Mounting, Options & Accessories



PM – Pendant Mount
(compatible with ¾ NPT,
pendant stem provided by
others)

D = 19"
H = 4.1"



SRM – Surface Mount

D = 19"
H = 4.1"



**SRM – Surface Mount
with Up-Light**

D = 19"
H = 5.3"



YK – Yoke/Trunnion Mount

D = 19"
H (Yoke) = 10"-18"



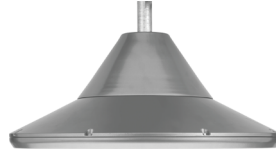
ARM – Arm Mount

L = 28"
W = 19"
H = 8"



**PIR & PIRH – Motion/
Ambient sensor**

D = 19"
H = 4.6" (no up-light)
or 5.6" (with up-light)



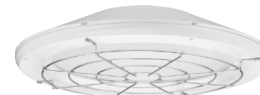
**BDS – Bird shroud for
pendant mount**

D = 19"
H = 8"



**BDS – Bird shroud for
yoke mount**

D = 19"
H (Yoke) = 10"-18"



WG – Wire guard

D = 19"
H = 4.9" (no uplight)
or 5.9" (with up-light)



HS – House side shield

D = 19"
H = 7.1" (no up-light) or
8.1" (with up-light)

FEATURES & SPECIFICATIONS

INTENDED USE

The visually comfortable optics, energy savings, and long life of the VCPG LED Parking Garage luminaire make it an ideal choice for new commercial installations and retrofit parking garage opportunities. It is designed to meet or exceed recommended illuminance criteria when installed as a direct replacement of most HID parking garage luminaires. Its modern dayform and aesthetics also make it appealing for indoor low-bay applications.

CONSTRUCTION

Two-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. The LED driver is separated from the heat generating light engines and mounted in direct contact with the casting to promote low operating temperatures, higher lumen maintenance and long life. The housing is completely sealed against moisture and environmental contaminants (IP66) and is suitable for hose-down application.

FINISH

Exterior painted parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling.

OPTICS

Light guide technology provides a diffused light source, reducing glare from direct view of the LEDs. The light source is recessed into the luminaire, further reducing the high angle glare from the luminaire. A combination of precision molded micro prismatic acrylic lenses and back reflectors provide five different photometric distributions tailored specifically to parking garage applications. Up-light option comes with a dedicated light engine and custom optic designed to efficiently spread light on to the ceiling, thus reducing the cave effect.

ELECTRICAL

Light engine consists of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L89/100,000 hours at 25°C). The electronic driver has a power factor of >90%, THD <20%, and a minimum 6.0 KV surge rating. When ordering the SPD10KV option, a separate 10kV (5kA) surge protection device is installed within the luminaire which meets a minimum Category C low operation (per ANSI/IEEE C62.41.2).

INSTALLATION

Standard configuration accepts a rigid or free-swinging ¾" NPT stem for pendant mounting. The surface mount option attaches to a 4x4" recessed or surface mount outlet box using a quick-mount kit (included); kit contains galvanized steel luminaire and outlet box plates and a full pad gasket. Kit has an integral mounting support that allows the luminaire to hinge down for easy electrical connections. Luminaire and plates are secured with set screws. Also, available with a yoke/trunnion mount option with ¾" NPT provision for flexible conduit entry (conduit by others); height can be adjusted from 10-18". Supply leads are 24" in length as standard. Longer supply leads are available as additional options. Design can withstand up to a 3.0 G vibration load rating per ANSI C136.31.

LISTINGS

CSA certified to U.S. and Canadian standards. IP66 rated for outdoor applications. PIR options are rated for wet location. Rated for -40°C minimum ambient. DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

BUY AMERICAN

This product is assembled in the USA and meets the Buy America(n) government procurement requirements under FARS, DFARS and DOT. Please refer to www.acuitybrands.com/resources/buy-american for additional information.

WARRANTY

5-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/support/customer-support/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.





FEATURES & SPECIFICATIONS

INTENDED USE — Typical applications include corridors, lobbies, conference rooms and private offices.

CONSTRUCTION — Galvanized steel mounting/plaster frame; galvanized steel junction box with bottom-hinged access covers and spring latches. Reflectors are retained by torsion springs.

Vertically adjustable mounting brackets with commercial bar hangers provide 3-3/4" total adjustment.

Two combination 1/2"-3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out). No. 12 AWG conductors, rated for 90°C.

Accommodates 12"-24" joist spacing.

Passive cooling thermal management for 25°C standard; high ambient (40°C) option available. Light engine and drivers are accessible from above or below ceiling.

Max ceiling thickness 1-1/2".

OPTICS — LEDs are binned to a 3-step SDCM; 80 CRI minimum. 90 CRI optional.

LED light source concealed with diffusing optical lens.

General illumination lighting with 1.0 S/MH and 55° cutoff to source and source image.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes. Also available in white and black painted reflectors.

ELECTRICAL — Multi-volt (120-277V, 50/60Hz) 0-10V dimming drivers mounted to junction box, 10% or 1% minimum dimming level available.

0-10V dimming fixture requires two (2) additional low-voltage wires to be pulled.

70% lumen maintenance at 60,000 hours.

LISTINGS — Certified to US and Canadian safety standards. Wet location standard (covered ceiling). IP55 rated. ENERGY STAR® certified product.

BUY AMERICAN — Product with the BAA option is assembled in the USA and meets the Buy America(n) government procurement requirements under FAR, DFARS and DOT.

Please refer to www.acuitybrands.com/buy-american for additional information.

WARRANTY — 5-year limited warranty. Complete warranty terms located at:

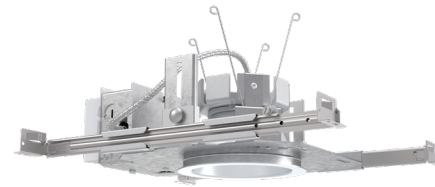
www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25°C.

Specifications subject to change without notice.

Catalog Number
Notes
Type



LDN4

**4" Open and WallWash LED
Non-IC
New Construction Downlight**



A+ Capable options indicated by this color background.

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: LDN4 35/15 L04AR LSS MVOLT EZ1

LDN4						
Series	Color temperature	Lumens ¹	Aperture/Trim Color	Finish	Voltage	
LDN4 4" round	27/ 2700K 30/ 3000K 35/ 3500K 40/ 4000K 50/ 5000K	05 500 lumens 07 750 lumens 10 1000 lumens 15 1500 lumens	20 2000 lumens 25 2500 lumens 30 3000 lumens 40 4000 lumens	L04 Downlight LW4 Wallwash AR Clear WR ² White BR ² Black	LSS Semi-specular LD Matte diffuse LS Specular	MVOLT Multi-volt 120 120V 277 277V 347 ³ 347V

Driver	Options
GZ10 0-10V driver dims to 10%	SF ⁴ Single fuse
GZ1 0-10V driver dims to 1%	TRW ⁶ White painted flange
EZ10 0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 10%	TRBL ⁶ Black painted flange
EZ1 0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 1%	EL ⁵ Emergency battery pack with integral test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
D10 Minimum dimming 10% driver for use with JOT	ELR ⁵ Emergency battery pack with remote test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
D1 Minimum dimming 1% driver for use with JOT	ELSD ⁵ Emergency battery pack with self-diagnostics, 10W Constant Power, integral test switch. Not Certified in CA Title 20 MAEDBS
EDAB eldoLED DALI SOLDRIIVE dim to dark	ELRSD ⁵ Emergency battery pack with self-diagnostics, 10W Constant Power, remote test switch. Not Certified in CA Title 20 MAEDBS
	E10WCP ⁵ Emergency battery pack, 10W Constant Power with integral test switch. Certified in CA Title 20 MAEDBS
	E10WCPR ⁵ Emergency battery pack, 10W Constant Power with remote test switch. Certified in CA Title 20 MAEDBS
	NPP16D ^{7,10} nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1).
	NPP16DER ^{7,10} nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1). ER controls fixtures on emergency circuit.
	N80 ⁸ nLight™ Lumen Compensation
	JOT ¹³ Wireless room control with "Just One Touch" pairing
	NPS80EZ ^{7,10} nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1).
	NPS80EZER ^{7,10} nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1). ER controls fixtures on emergency circuit.
	HAO ¹¹ High ambient option (40°C)
	CP ¹² Chicago Plenum
	RRL___ RELOC®-ready luminaire connectors enable a simple and consistent factory installed option across all ABL luminaire brands. Refer to RRL for complete nomenclature. Available only in RRLA, RRLB, RRLAE, and RRLC12S.
	NLTAIR2 ^{8,9} nLight® Air enabled
	NLTAIRER2 ^{9,10} nLight® AIR Dimming Pack Wireless Controls. Controls fixtures on emergency circuit, not available with battery pack options
	NLTAIREM2 ^{9,10} nLight® AIR Dimming Pack Wireless Controls. UL924 Emergency Operation, via power interrupt detection. Available with battery pack options.
	BAA Buy America(n) Act Compliant
	90CRI High CRI (90+)

Notes

- Overall height varies based on lumen package; refer to dimensional chart on page 3.
- Not available with finishes.
- Not available with emergency options.
- Must specify voltage 120V or 277V.
- 12.5" of plenum depth or top access required for battery pack maintenance.
- Available with clear (AR) reflector only.

- Specify voltage. ER for use with generator supply EM power. Will require an emergency hot feed and normal hot feed.
- Fixture begins at 80% light level. Must be specified with NPS80EZ or NPS80EZ ER. Only available with EZ10 and EZ1 drivers.
- Not available with CP, NPS80EZ, NPS80EZER, NPP16D, NPP16DER or N80 options.
- NLTAIR2, NLTAIRER2 and NLTAIREM2 not recommended for metal ceiling installations.

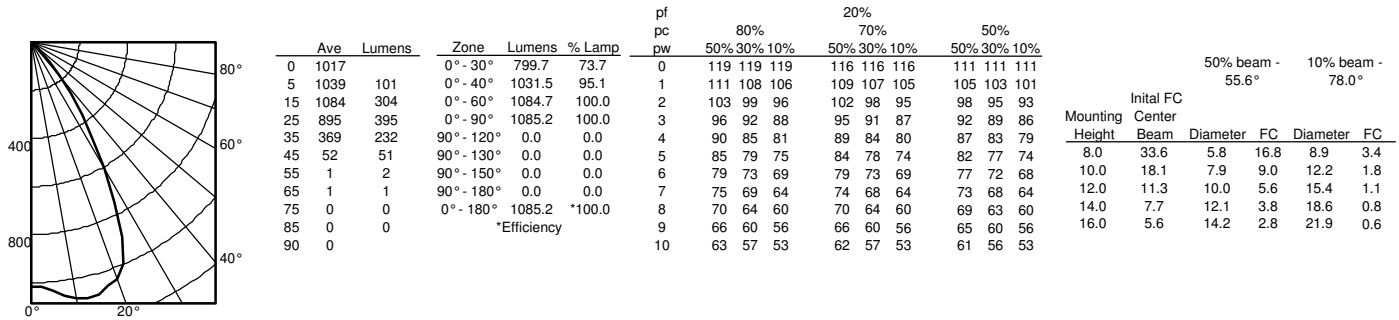
- Fixture height is 5-11/16" for all lumen packages with HAO.
- Must specify voltage for 3000lm. Not available with emergency battery pack option.
- Must specify D10 or D1 driver. Not available with nLight options. Not available with CP. Not recommended for metal ceiling installation. Not for use with emergency backup power systems other than battery packs.

LDN4

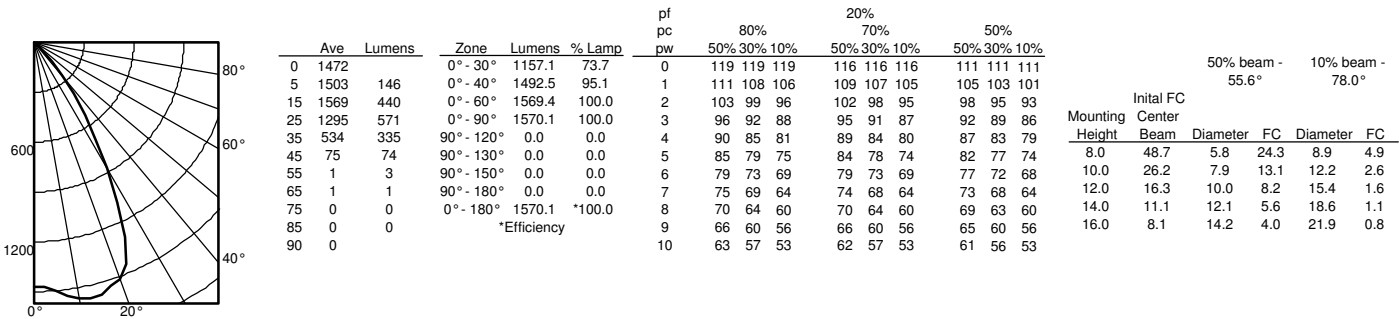
PHOTOMETRY

Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30" Above Floor for a Single Luminaire
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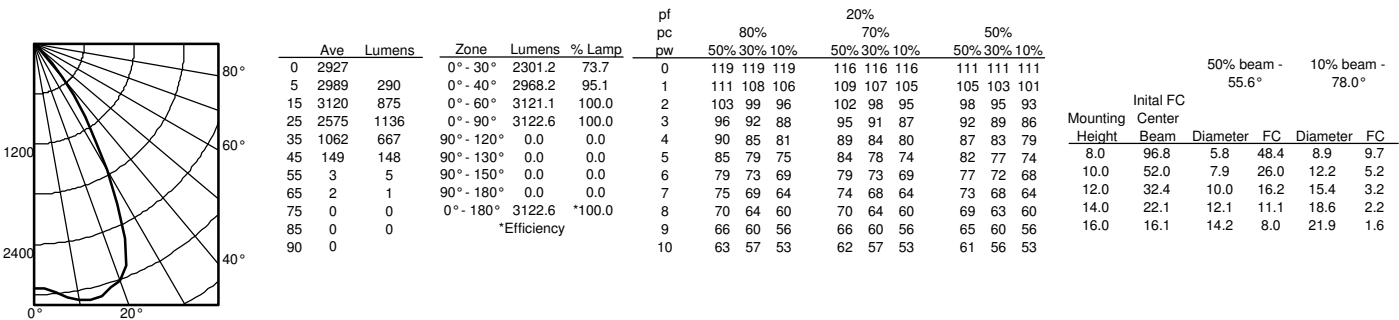
LDN4 35/10 L04AR, input watts: 10.58, delivered lumens: 1085.2, LM/W = 102.57, spacing criterion at 0= 1.04, test no. ISF 30712P229.



LDN4 35/15 L04AR, input watts: 17.5, delivered lumens: 1570.1, LM/W = 89.72, spacing criterion at 0= 1.04, test no. ISF 30712P234.



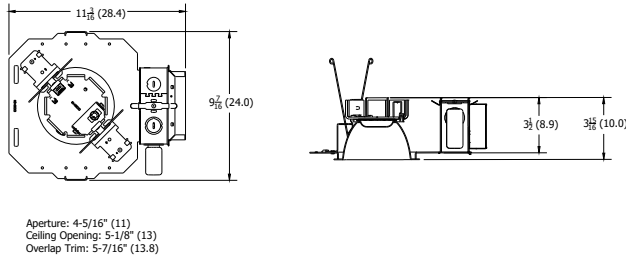
LDN4 35/30 L04AR, input watts: 32.1, delivered lumens: 3122.6, LM/W = 88.52, spacing criterion at 0= 1.04, test no. ISF 30712P249.



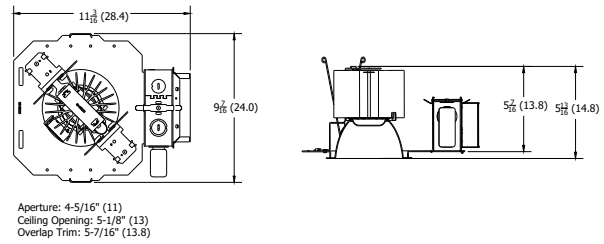
LDN4

* All dimensions are inches (centimeters) unless otherwise noted.

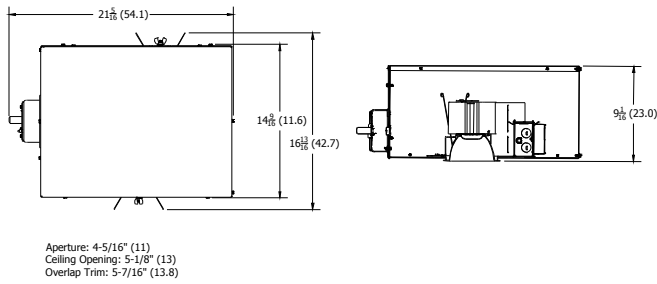
LDN4 500 - 2000 LUMENS



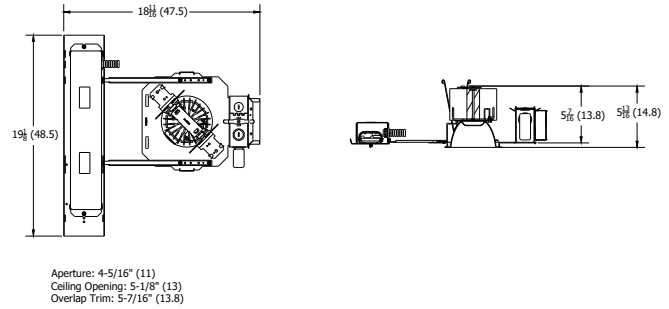
LDN4 2500 - 4000 LUMENS



LDN4 CP



LDN4 EL



LDN4			
Nominal	Lumens	Wattage	Lm/W
500	523.6	5.74	91.2
750	751.1	8.6	87.3
1000	1045	10.58	98.8
1500	1512	17.5	86.4
2000	2006	22.12	90.7
2500	2551	26.1	97.7
3000	3007	32.1	93.7
4000	4212	43	98.0

LUMEN OUTPUT MULTIPLIERS CCT					
	2700K	3000K	3500K	4000K	5000K
80CRI	0.950	0.966	1.000	1.025	1.101

HOW TO ESTIMATE DELIVERED LUMENS IN EMERGENCY MODE

Use the formula below to estimate the delivered lumens in emergency mode

$$\text{Delivered Lumens} = 1.25 \times P \times \text{LPW}$$

P = Output power of emergency driver. P = 10W for PS1055CP

LPW = Lumen per watt rating of the luminaire. This information is available on the ABL luminaire spec sheet.

The LPW rating is also available at [Designlight Consortium](https://www.designlightconsortium.com/).

LUMEN OUTPUT MULTIPLIERS FINISH			
	Clear (AR)	White (WR)	Black (BR)
Specular (LS)	1.0	N/A	N/A
Semi-specular (LSS)	0.950	N/A	N/A
Matte diffuse (LD)	0.85	N/A	N/A
Painted	N/A	0.87	0.73

Notes

- Tested in accordance with IESNA LM-79-08.
- Tested to current IES and NEMA standards under stabilized laboratory conditions.
- CRI: 80 typical.

LDN4

ADDITIONAL DATA



The Sensor Switch JOT enabled solution offers a wireless, app-free approach to single room lighting control. JOT enabled products use Bluetooth® Low Energy (BLE) technology to enable wireless dimming and switching.

Diagram



LDN4 Series

Sensor Switch
WSXA JOT

- 1. Power:** Install JOT enabled fixtures and controls as instructed.
- 2. Pair:** Insert the pairing tool into the pinhole on the wall switch; press and hold any button for 6 seconds.
- 3. Play:** Once paired, each fixture will individually dim down to 10% brightness. All products will be fully functional.

COMPATIBLE 0-10V WALL-MOUNT DIMMERS

MANUFACTURER	PART NO.	POWER BOOSTER AVAILABLE
Lutron®	Diva® DDTV	
	Diva® DVSCCTV	
	Nova T® NTFTV	
	Nova® NFTV	
Leviton®	AWSMT-7DW	CN100
	AWSMG-7DW	PE300
	AMRMG-7DW	
	Leviton Centura Fluorescent Control System	
	IllumaTech® IP7 Series	
Synergy®	ISD BC	RDMFC
	SLD LPCS	
	Digital Equinox (DEQ BC)	
Douglas Lighting Controls	WPC-5721	
Entertainment Technology	Tap Glide TG600FAM120 (120V)	
	Tap Glide Heatsink TGH1500FAM120 (120V)	
	Oasis OA2000FAMU	
Honeywell	EL7315A1019	EL7305A1010 (optional)
	EL7315A1009	
HUNT Dimming	Preset slide: PS-010-IV and PS-010-WH	
	Preset slide: PS-010-3W-IV and PS-010-3W-WH	
	Preset slide, controls FD-010: PS-IFC-010-IV and PS-IFC-010-WH-120/277V	
	Preset slide, controls FD-010: PS-IFC-010-3W-IV and PS-IFC-010-3W-WH-120/277V	
	Remote mounted unit: FD-010	
Lehigh Electronic Products	Solitaire	PBX
PDM Electrical Products	WPC-5721	
Starfield Controls	TR61 with DALI interface port	RT03 DALInet Router
WattStopper®	LS-4 used with LCD-101 and LCD-103	

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a **shaded background***
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a **shaded background***

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

LDN4

EXAMPLE

Group Fixture Control*

*Application diagram applies for fixtures with eldoLED drivers only.

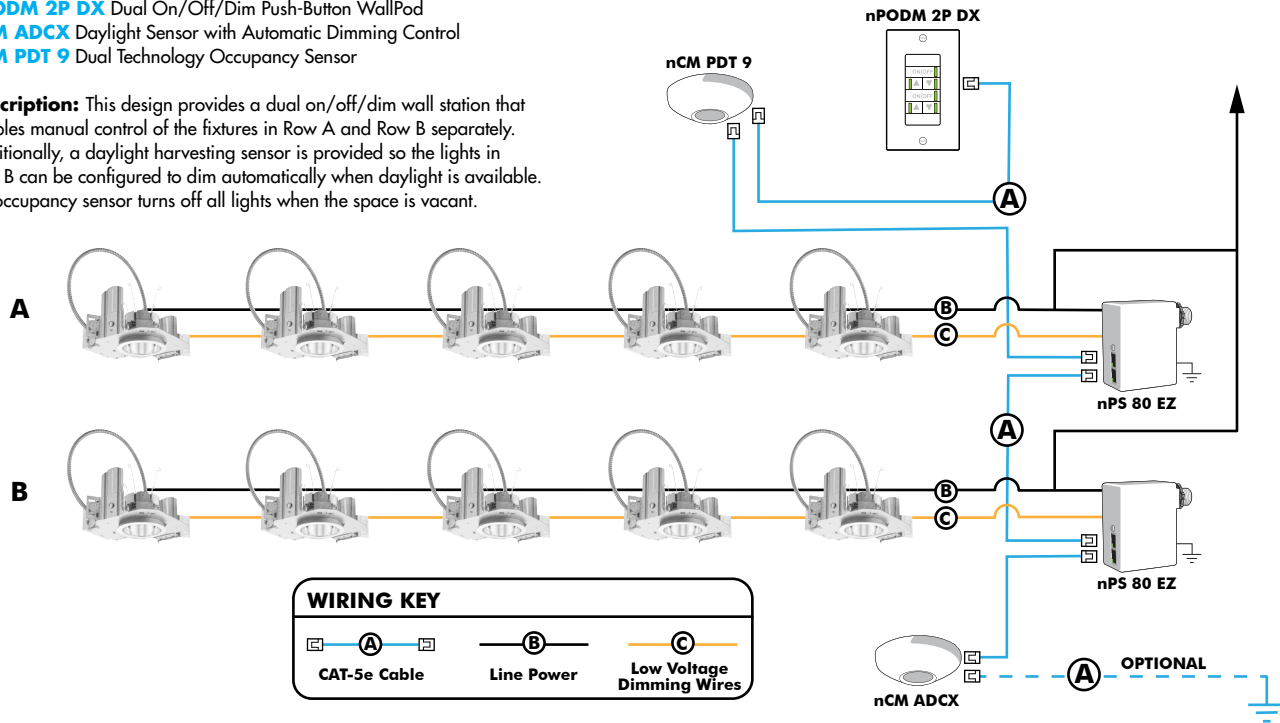
nPS 80 EZ Dimming/Control Pack (qty: 2 required)

nPODM 2P DX Dual On/Off/Dim Push-Button WallPod

nCM ADCX Daylight Sensor with Automatic Dimming Control

nCM PDT 9 Dual Technology Occupancy Sensor

Description: This design provides a dual on/off/dim wall station that enables manual control of the fixtures in Row A and Row B separately. Additionally, a daylight harvesting sensor is provided so the lights in Row B can be configured to dim automatically when daylight is available. An occupancy sensor turns off all lights when the space is vacant.



Choose Wall Controls

nLight offers multiple styles of wall controls - each with varying features and user experience.



Push-Button Wallpod

Traditional tactile buttons and LED user feedback



Graphic Wallpod

Full color touch screen provides a sophisticated look and feel

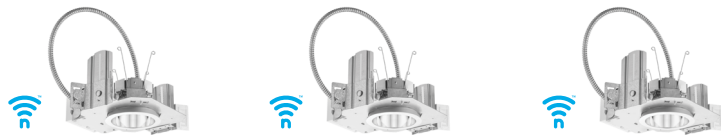
nLight® Wired Controls Accessories:

Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlight for complete listing of nLight controls.

WallPod Stations	Model number	Occupancy sensors	Model Number
On/Off	nPODM (Color)	Small motion 360°, ceiling (PIR/dual Tech)	nCM 9 / nCM PDT 9
On/Off & Raise/Lower	nPOD DX (Color)	Large motion 360°, ceiling (PIR/dual tech)	nCM 10 / nCM PDT 10
Graphic Touchscreen	nPOD GFX (Color)	Wide View (PIR/dual tech)	nWV 16 / nWV PDT 16
Photocell controls	Model Number	Wall Switch w/ Raise/Lower (PIR/dual tech)	nWSX LV DX / nWSX PDT LV DX
Dimming	nCM ADCX	Cat-5 cables (plenum rated)	Model Number
		10', CAT5 10FT	CAT5 10FT J1
		15, CAT5 15FT	CAT5 15FT J1

nLight AIR

nLight AIR is the ideal solution for retrofit or new construction spaces where adding communication is cost prohibitive. The integrated nLight AIR rPP20 Power Pack is part of each Lithonia LDN Luminaire. These individually addressable controls offer the ultimate in flexibility during initial setup and for space repurposing.



Simple as 1,2,3

1. Install the nLight® AIR fixtures with embedded smart sensor
2. Install the wireless battery-powered wall switch
3. With CLAIRITY app, pair the fixtures with the wall switch and if desired, customize the sensor settings for the desired outcome



nLight® AIR Control Accessories:	
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlightair .	
Wall switches	Model number
On/Off single pole	rPODB [color]
On/Off two pole	rPODB 2P [color]
On/Off & raise/lower single pole	rPODB DX [color]
On/Off & raise/lower two pole	rPODB 2P DX [color]
On/Off & raise/lower single pole	rPODBZ DX WH ¹

Notes

- 1 Can only be ordered with the RES7Z zone control sensor version.



FEATURES & SPECIFICATIONS

INTENDED USE — These specifications are for USA standards only. Square Straight Steel is a general purpose light pole for up to 39-foot mounting heights. This pole provides a robust yet cost effective option for mounting area lights and floodlights.

CONSTRUCTION — **Pole Shaft:** The pole shaft is of uniform dimension and wall thickness and is made of a weldable-grade, hot-rolled, commercial-quality steel tubing with a minimum yield of 55 KSI (11-gauge, .1196"), or 50 KSI (7-gauge, .1793"). Shaft is one-piece with a full-length longitudinal high-frequency electric resistance weld. Uniformly square in cross-section with flat sides, small corner radii and excellent torsional qualities. Available shaft widths are 4", 5" and 6".

Pole Top: A flush non-metallic black top cap is provided for all poles that will receive drilling patterns for side-mount luminaire arm assemblies or when ordered with PT option.

Handhole: A reinforced handhole with grounding provision is provided at 18" from the base on side A. Positioning the handhole lower may not be possible and requires engineering review; consult Tech Support-Outdoor for further information. Every handhole includes a cover and cover attachment hardware. The handhole has a nominal dimension of 2.5" x 5".

Base Cover: A durable ABS plastic two-piece full base cover, finished to match the pole, is provided with each pole assembly. Additional base cover options are available upon request.

Anchor Base/ Bolts: Anchor base is fabricated from steel that meets ASTM A36 standards and can be altered to match existing foundations; consult factory for modifications. Anchor bolts are manufactured to ASTM F1554 Standards grade 55, (55 KSI minimum yield strength and tensile strength of 75-95 KSI). Top threaded portion (nominal 12") is hot-dipped galvanized per ASTM A-153.

HARDWARE — All structural fasteners are high-strength galvanized carbon steel. All non-structural fasteners are galvanized or zinc-plated carbon steel or stainless steel.

FINISH — Extra durable standard powder-coat finishes include Dark Bronze, White, Black, Medium Bronze and Natural Aluminum colors. Classic finishes include Sandstone, Charcoal Gray, Tennis Green, Bright Red and Steel Blue colors. Architectural Colors and Special Finishes are available by quote and include, but are not limited to Hot-dipped Galvanized, Paint over Hot-dipped Galvanized, RAL Colors, Custom Colors and Extended Warranty Finishes. Factory-applied primer paint finish is available for customer field-paint applications.

BUY AMERICAN — Product with the BAA option is assembled in the USA and meets the Buy America(n) government procurement requirements under FAR, DFARS and DOT. Please refer to www.acuitybrands.com/buy-american for additional information.

WARRANTY — 1-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/support/warranty/terms-and-conditions

NOTE: Actual performance may differ as a result of end-user environment and application. Specifications subject to change without notice.

Catalog Number
Notes
Type



Anchor Base Poles

SSS

SQUARE STRAIGHT STEEL



ORDERING INFORMATION		Lead times will vary depending on options selected. Consult with your sales representative.				Example: SSS 20 5C DM19 DDB
Series	Nominal fixture mounting height	Nominal shaft base size/wall thickness ¹	Mounting ²		Options	Finish ¹⁰
SSS	10'-39' (for 1/2 ft increments, add -6 to the pole height. Ex: 20-6 equals 20ft 6in.) See technical information table for complete ordering information.)	4C 4" 11g (.1196") 4G 4" 7g (.1793") 5C 5" 11g (.1196") 5G 5" 7g (.1793") 6G 6" 7g (.1793") See technical information table for complete ordering information.)	Tenon mounting PT Open top (includes top cap) T20 2-3/8" O.D. (2" NPS) T25 2-7/8" O.D. (2-1/2" NPS) T30 3-1/2" O.D. (3" NPS) T35 4" O.D. (3-1/2" NPS) KAC/KAD/KSE/KSF/KVR/KVF Drill mounting³ DM19 1 at 90° DM28 2 at 180° DM28 PL 2 at 180° with one side plugged DM29 2 at 90° DM39 3 at 90° DM49 4 at 90° CSX/DSX/RSX/AERIS™/OMERO™/HLA/KAX Drill mounting³ DM19AS 1 at 90° DM28AS 2 at 180° DM29AS 2 at 90° DM39AS 3 at 90° DM49AS 4 at 90° RAD drill mounting³ DM19RAD 1 at 90° DM28RAD 2 at 180° DM29RAD 2 at 90° DM32RAD 3 at 120° DM39RAD 3 at 90° DM49RAD 4 at 90° ESX Drill mounting³ DM19ESX 1 at 90° DM28ESX 2 at 180° DM29ESX 2 at 90° DM39ESX 3 at 90° DM49ESX 4 at 90°		AERIS™ Suspend drill mounting^{3,4} DM19AST_ 1 at 90° DM28AST_ 2 at 180° DM29AST_ 2 at 90° DM39AST_ 3 at 90° DM49AST_ 4 at 90° OMERO™ Suspend drill mounting^{3,4} DM19MRT_ 1 at 90° DM28MRT_ 2 at 180° DM29MRT_ 2 at 90° DM39MRT_ 3 at 90° DM49MRT_ 4 at 90° Shipped installed L/AB Less anchor bolts (Include when anchor bolts are not needed) VD Vibration damper TP Tamper resistant handhole cover fasteners HAXy Horizontal arm bracket (1 fixture) ^{5,6} FDLxy Festoon outlet less electrical ⁵ CPL12/xy 1/2" coupling ⁵ CPL34/xy 3/4" coupling ⁵ CPL1/xy 1" coupling ⁵ NPL12/xy 1/2" threaded nipple ⁵ NPL34/xy 3/4" threaded nipple ⁵ NPL1/xy 1" threaded nipple ⁵ EHHxy Extra handhole ^{5,7} MAEX Match existing ⁸ BAA Buy America(n) Act Compliant IC Interior coating ¹⁰ UL UL listed with label (Includes NEC compliant cover) NEC NEC 410.30 compliant gasketed handhole (Not UL Labeled) Shipped separately (replacement kit available) (blank) FBC Full base cover (plastic) (blank) TC Top cap (blank) HHC Handhole cover	Standard colors DDBXD Dark bronze DWHXD White DBLXD Black DMBXD Medium bronze DNAXD Natural aluminum Classic colors DSS Sandstone DGC Charcoal gray DTG Tennis green DBR Bright red DSB Steel blue Architectural Colors and Special Finishes¹¹ Galvanized, Paint over Galvanized, RAL Colors, Custom Colors and Extended Warranty Finishes available.

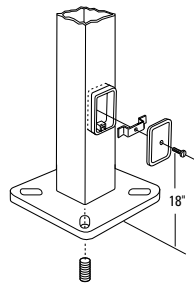
NOTES:

- Wall thickness will be signified with a "C" (11 Gauge) or a "G" (7-Gauge) in nomenclature. "C" - 0.1196" | "G" - 0.1793".
- PT open top poles include top cap. When ordering tenon mounting and drill mounting for the same pole, follow this example: DM28/T20.
The combination includes a required extra handhole.
- Refer to the fixture spec sheet for the correct drilling template pattern and orientation compatibility.
- Insert "1" or "2" to designate fixture size; e.g. DM19AST2.
- Specify location and orientation when ordering option.
For "x": Specify the height above the base of pole in feet or feet and inches; separate feet and inches with a "-".
Example: 5ft = 5 and 20ft 3in = 20-3
For "y": Specify orientation from handhole (A,B,C,D)
Refer to the Handhole Orientation diagram below.
Example: 1/2" coupling at 5' 8", orientation C = CPL12/5-8C
- Horizontal arm is 18" x 2-3/8" O.D. tenon standard, with radius curve providing 12" rise and 2-3/8" O.D. If ordering two horizontal arm at the same height, specify with HAXxy. Example: HA20BD.
- Combination of tenon-top and drill mount includes extra handhole.
- Must add original order number of existing pole(s).
- Use when mill certifications are required.
- Provides enhanced corrosion resistance.
- Additional colors available; see www.lithonia.com/archcolors or Architectural Colors brochure (Form No. 794.3). Available by formal quote only, consult factory for details.

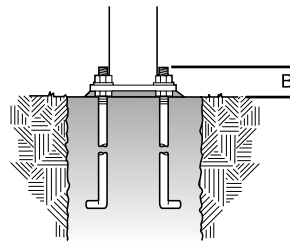
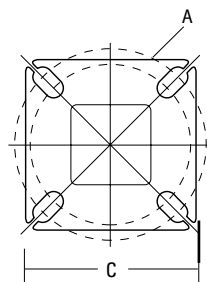
TECHNICAL INFORMATION — EPA (ft ²) with 1.3 gust													
Catalog Number	Nominal Shaft Length (ft.)*	Pole Shaft Size (Base in. x Top in. x ft.)	Wall thick (in)	Gauge	EPA (ft ²) with 1.3 gust						Bolt circle (in)	Bolt size (in. x in. x in.)	Approximate ship weight (lbs.)
					80 MPH	Max. weight	90 MPH	Max. weight	100 MPH	Max. weight			
SSS 10 4C	10	4.0 x 10.0	0.1196	11	30.6	765	23.8	595	18.9	473	8-9	3/4 x 18 x 3	75
SSS 12 4C	12	4.0 x 12.0	0.1196	11	24.4	610	18.8	470	14.8	370	8-9	3/4 x 18 x 3	90
SSS 14 4C	14	4.0 x 14.0	0.1196	11	19.9	498	15.1	378	11.7	293	8-9	3/4 x 18 x 3	100
SSS 16 4C	16	4.0 x 16.0	0.1196	11	15.9	398	11.8	295	8.9	223	8-9	3/4 x 18 x 3	115
SSS 18 4C	18	4.0 x 18.0	0.1196	11	12.6	315	9.2	230	6.7	168	8-9	3/4 x 18 x 3	125
SSS 20 4C	20	4.0 x 20.0	0.1196	11	9.6	240	6.7	167	4.5	150	8-9	3/4 x 18 x 3	140
SSS 20 4G	20	4.0 x 20.0	0.1793	7	14	350	11	275	8	200	8-9	3/4 x 30 x 3	198
SSS 20 5C	20	5.0 x 20.0	0.1196	11	17.7	443	12.7	343	9.4	235	10-12	1 x 36 x 4	185
SSS 20 5G	20	5.0 x 20.0	0.1793	7	28.1	703	21.4	535	16.2	405	10-12	1 x 36 x 4	265
SSS 25 4C	25	4.0 x 25.0	0.1196	11	4.8	150	2.6	100	1	50	8-9	3/4 x 18 x 3	170
SSS 25 4G	25	4.0 x 25.0	0.1793	7	10.8	270	7.7	188	5.4	135	8-9	3/4 x 30 x 3	245
SSS 25 5C	25	5.0 x 25.0	0.1196	11	9.8	245	6.3	157	3.7	150	10-12	1 x 36 x 4	225
SSS 25 5G	25	5.0 x 25.0	0.1793	7	18.5	463	13.3	333	9.5	238	10-12	1 x 36 x 4	360
SSS 30 4G	30	4.0 x 30.0	0.1793	7	6.7	168	4.4	110	2.6	65	8-9	3/4 x 30 x 3	295
SSS 30 5C	30	5.0 x 30.0	0.1196	11	4.7	150	2	50	--	--	10-12	1 x 36 x 4	265
SSS 30 5G	30	5.0 x 30.0	0.1793	7	10.7	267	6.7	167	3.9	100	10-12	1 x 36 x 4	380
SSS 30 6G	30	6.0 x 30.0	0.1793	7	19	475	13.2	330	9	225	11-13	1 x 36 x 4	520
SSS 35 5G	35	5.0 x 35.0	0.1793	7	5.9	150	2.5	100	--	--	10-12	1 x 36 x 4	440
SSS 35 6G	35	6.0 x 35.0	0.1793	7	12.4	310	7.6	190	4.2	105	11-13	1 x 36 x 4	540
SSS 39 6G	39	6.0 x 39.0	0.1793	7	7.2	180	3	75	--	--	11-13	1 x 36 x 4	605

* EPA values are based ASCE 7-93 wind map. For 1/2 ft increments, add -6 to the pole height. Ex: 20-6 equals 20ft 6in.

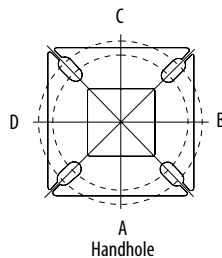
BASE DETAIL



POLE DATA								
Shaft base size	Bolt circle A	Bolt projection B	Base diameter C	Base plate thickness	Template description	Anchor bolt description	Anchor bolt and template number	Anchor bolt description
4"C	8" - 9"	3.25" - 3.75"	8" - 8.25"	0.75"	ABTEMPLATE PJ50004	AB18-0	ABSSS-4C	3/4"x18"x3"
4"G	8" - 9"	3.38" - 3.75"	8" - 8.25"	0.875"	ABTEMPLATE PJ50004	AB30-0	ABSSS-4G	3/4"x30"x3"
5"	10" - 12"	3.5" - 4"	11"	1"	ABTEMPLATE PJ50010	AB36-0	ABSSS-5	1"x36"x4"
6"	11" - 13"	4" - 4.50"	12.5"	1"	ABTEMPLATE PJ50011	AB36-0	N/A	1"x36"x4"



HANDHOLE ORIENTATION



Default DM19 is on side B.

IMPORTANT INSTALLATION NOTES:

- Do not erect poles without having fixtures installed.
- Factory-supplied templates must be used when setting anchor bolts. Lithonia Lighting will not accept claim for incorrect anchorage placement due to failure to use Lithonia Lighting factory templates.
- If poles are stored outside, all protective wrapping must be removed immediately upon delivery to prevent finish damage.
- Lithonia Lighting is not responsible for the foundation design.

Part #17492

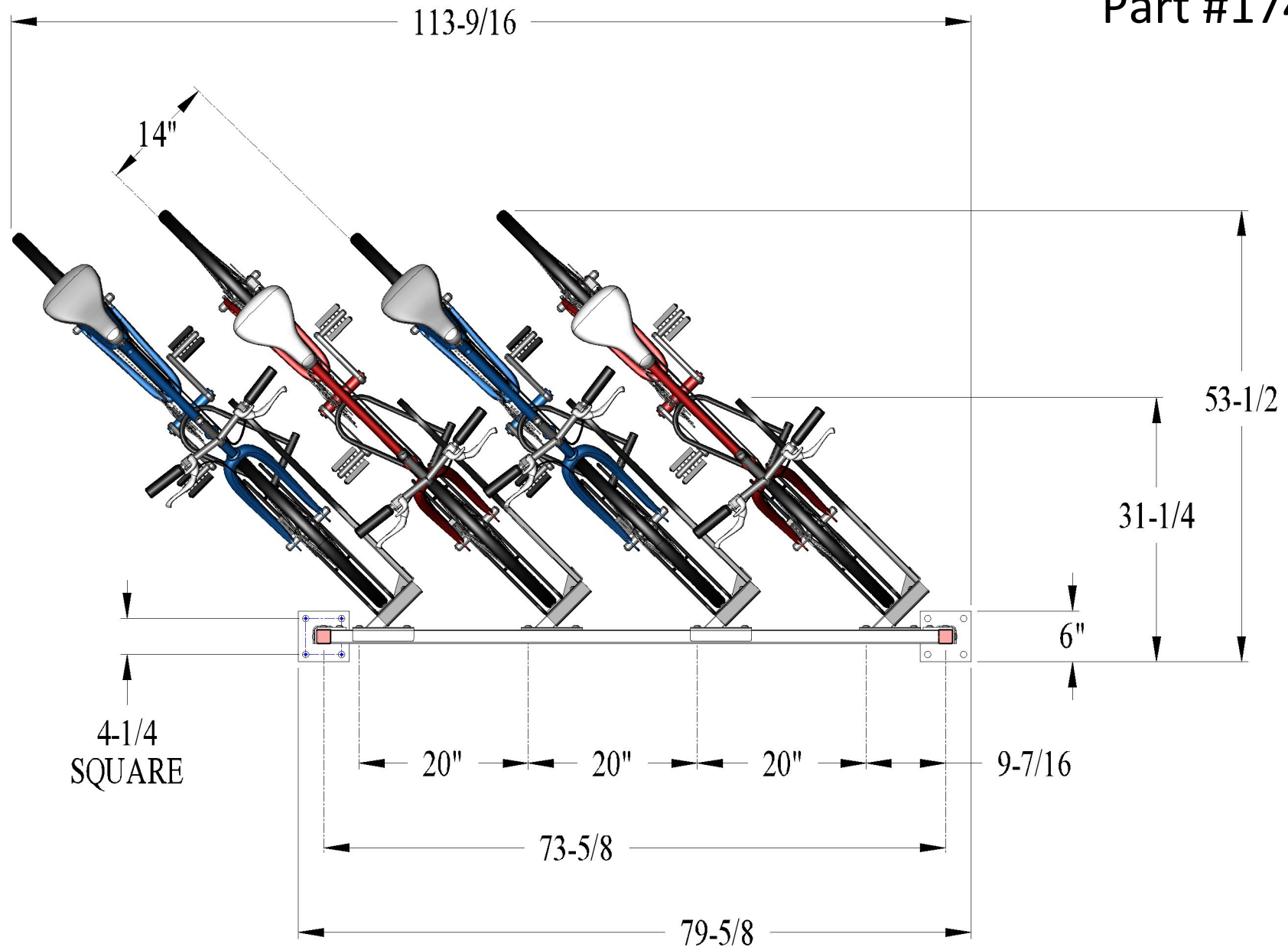


Bike Stall {4-Bike} U-Strut
Post Base {Angled} Master {Iso}



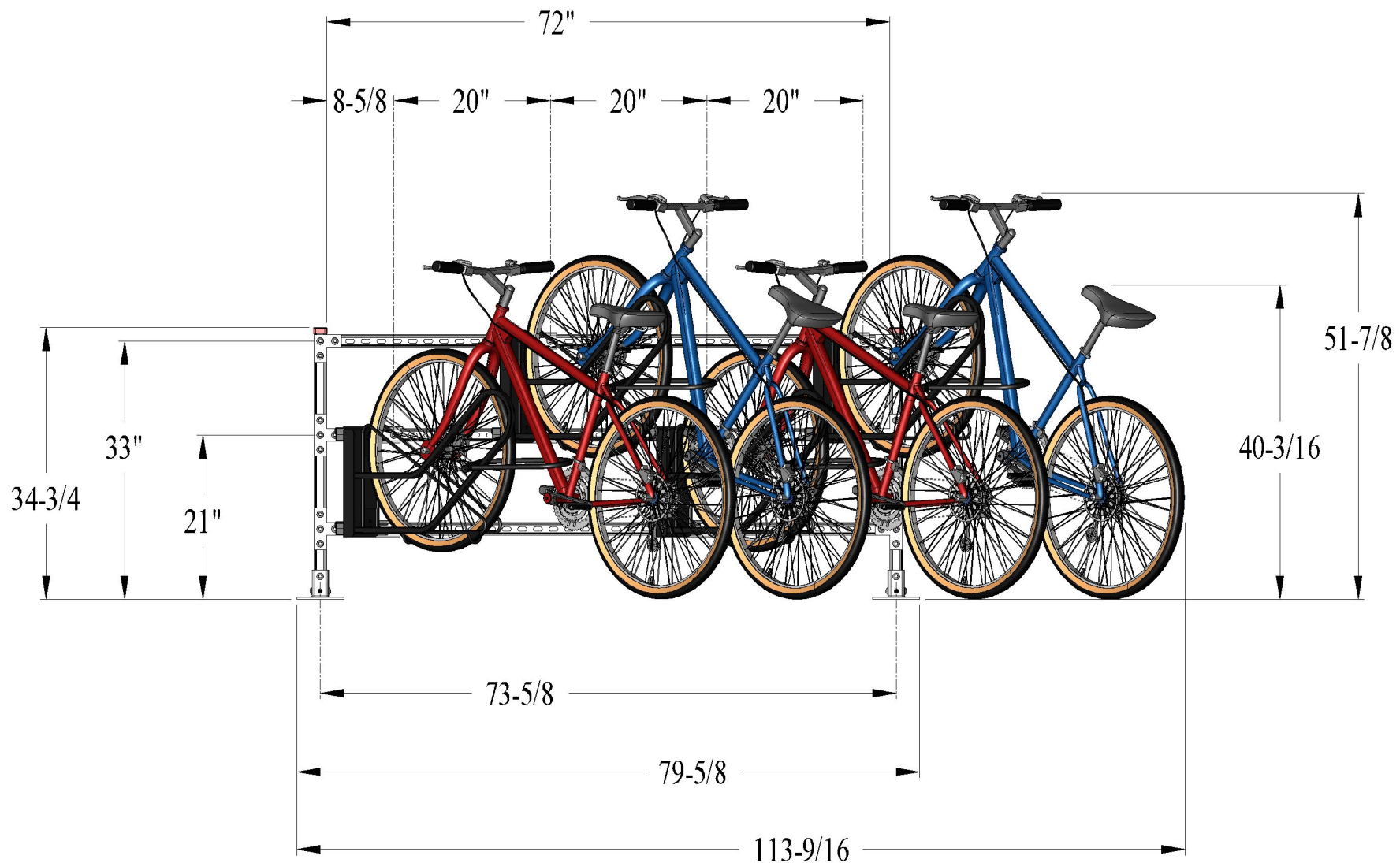
www.cyclesafe.com

Part #17492



Bike Stall {4-Bike} U-Strut
Post Base {Angled} Master {Top} Dim's

Part #17492

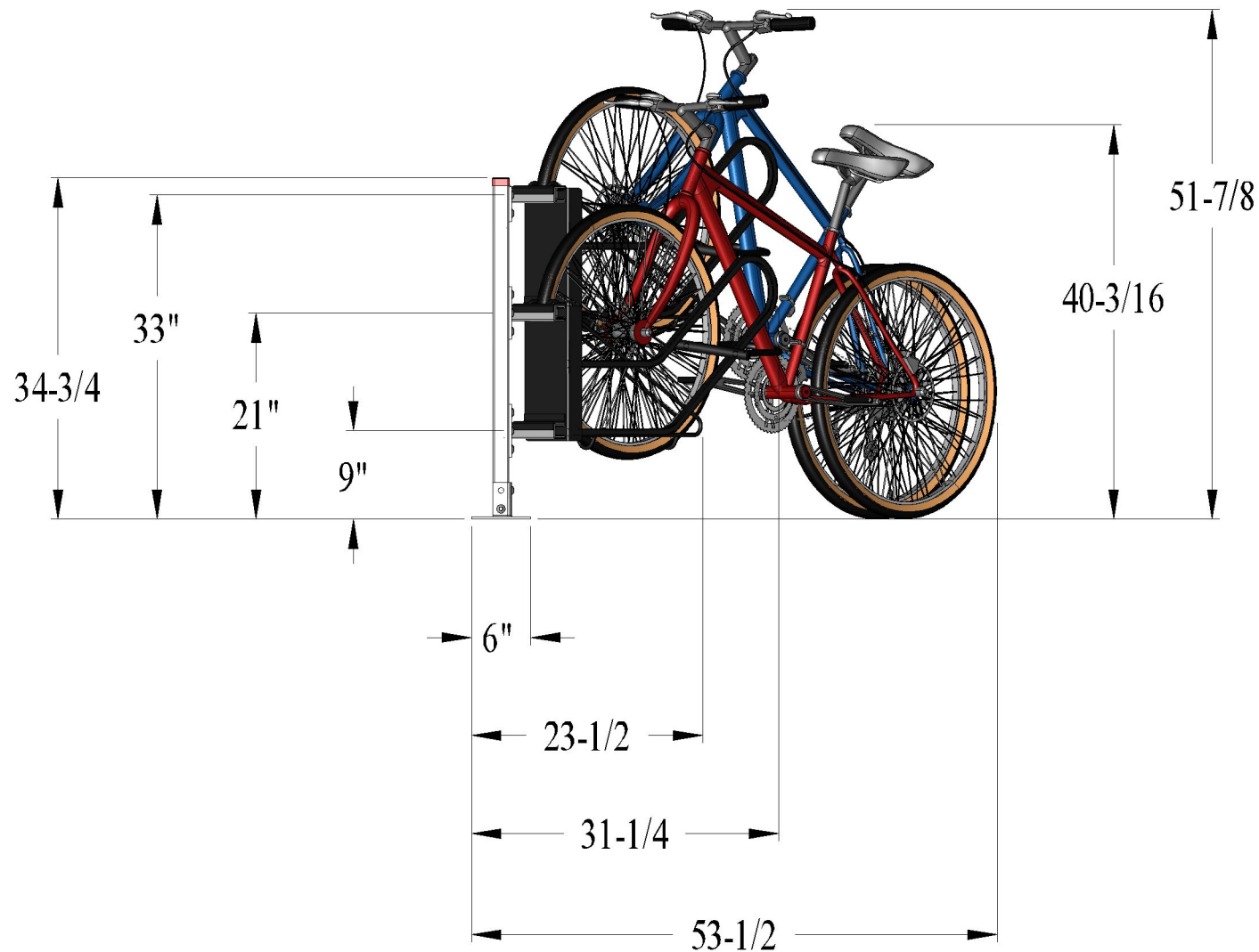


Bike Stall {4-Bike} U-Strut
Post Base {Angled} Master {Front} Dim's



www.cyclesafe.com

Part #17492

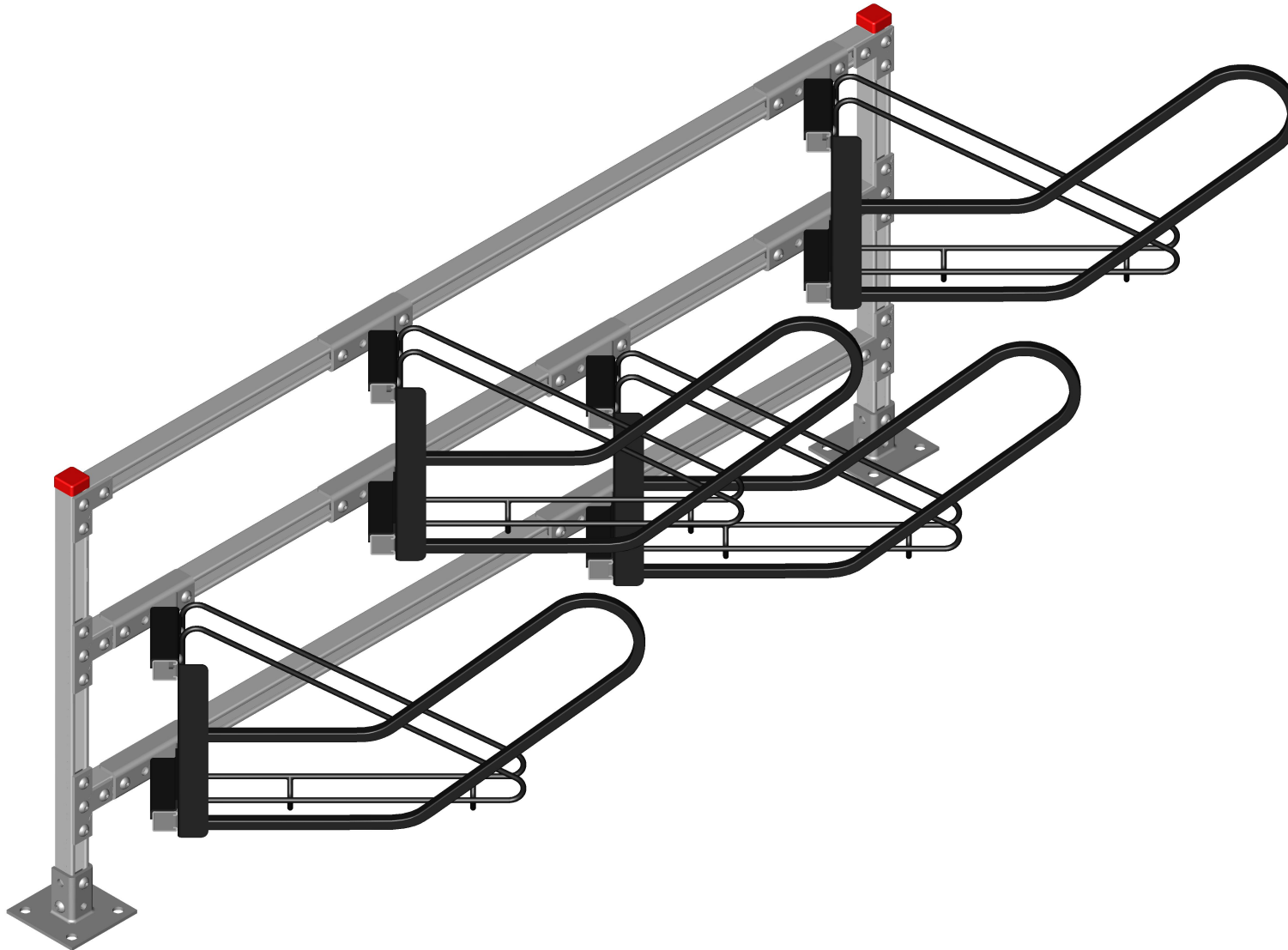


Bike Stall {4-Bike} U-Strut
Post Base {Angled} Master {Side} Dim's



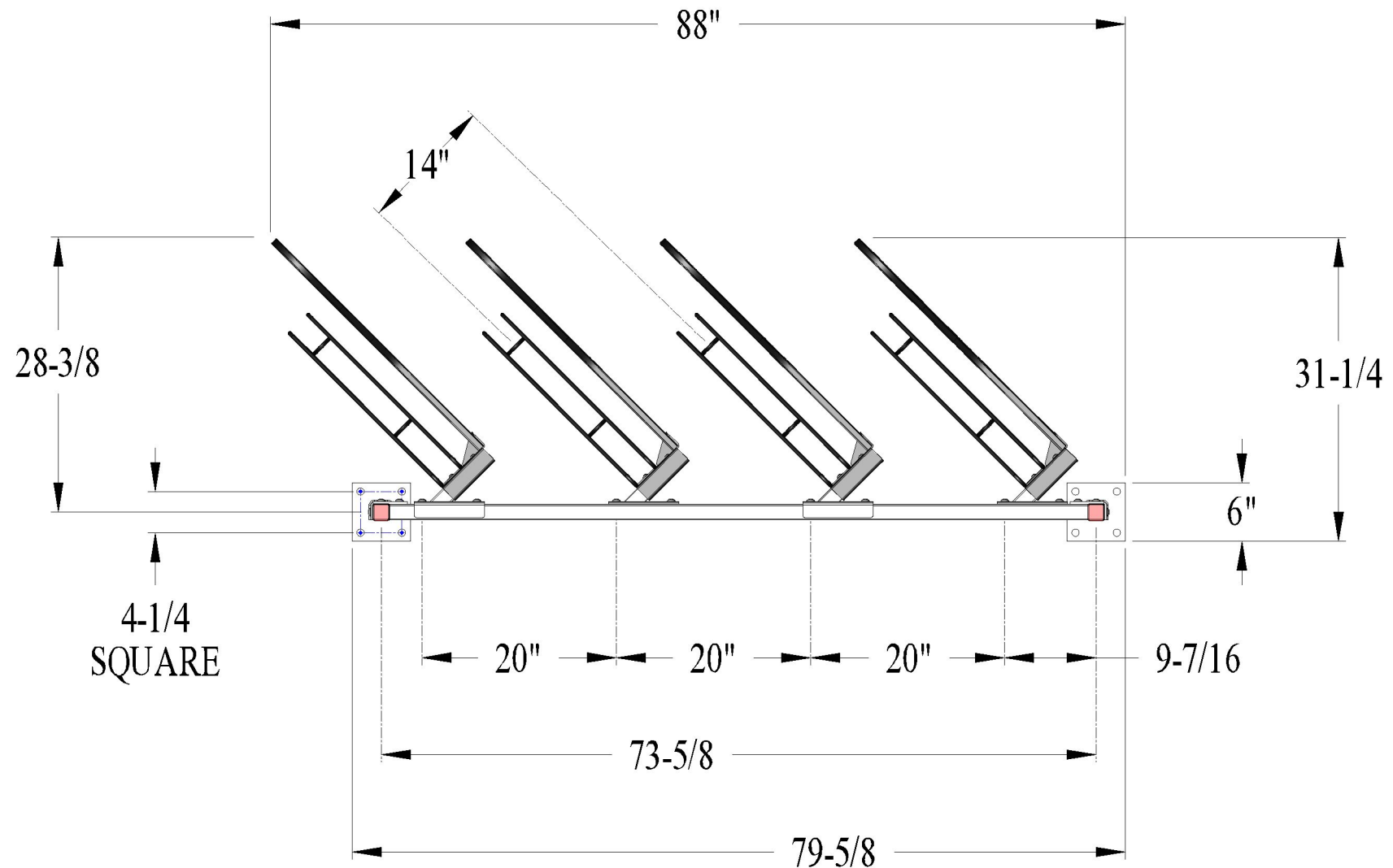
www.cyclesafe.com

Part #17492



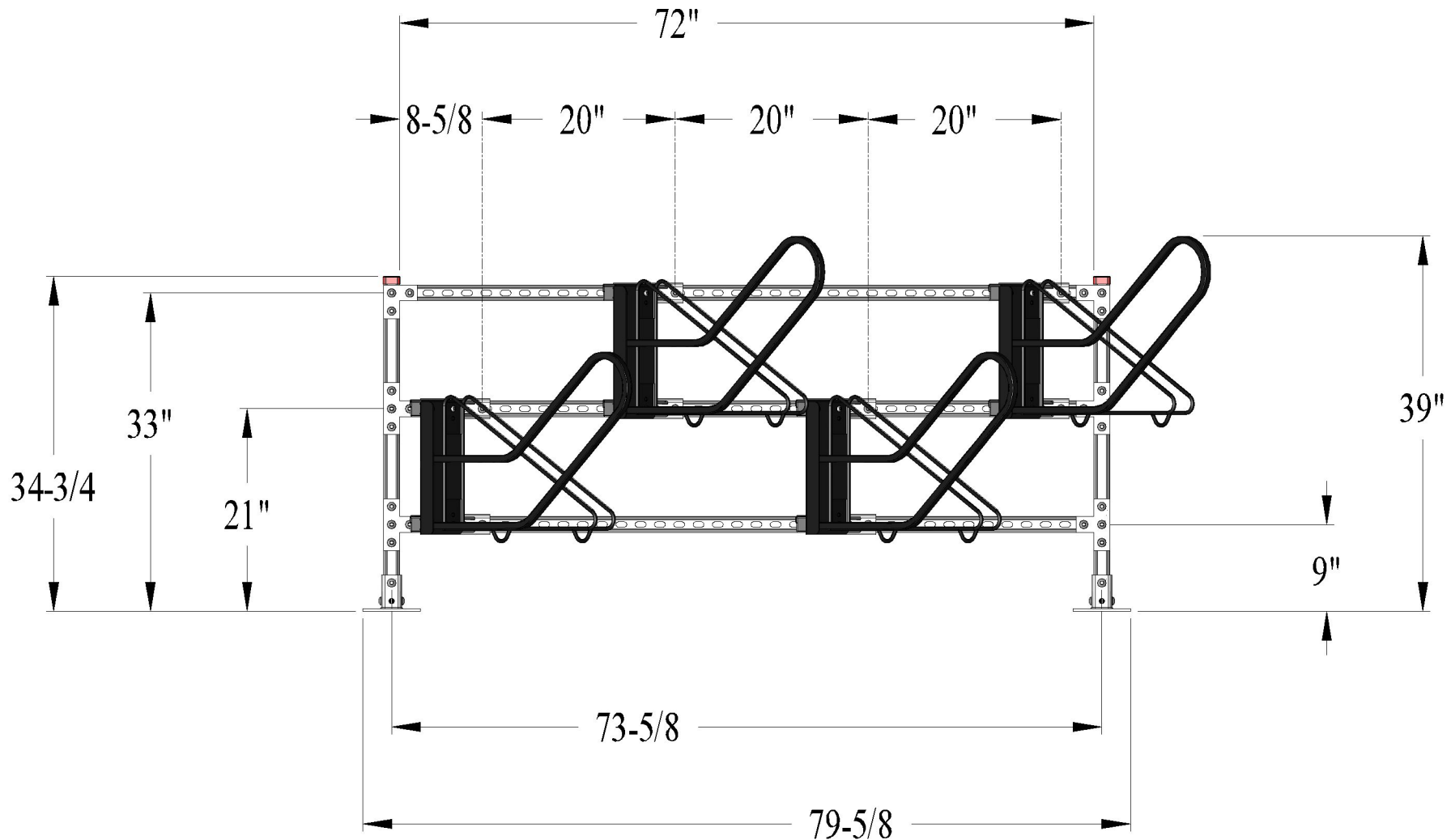
Bike Stall {4-Bike} U-Strut
Post Base {Angled} Assembly {Iso}

Part #17492



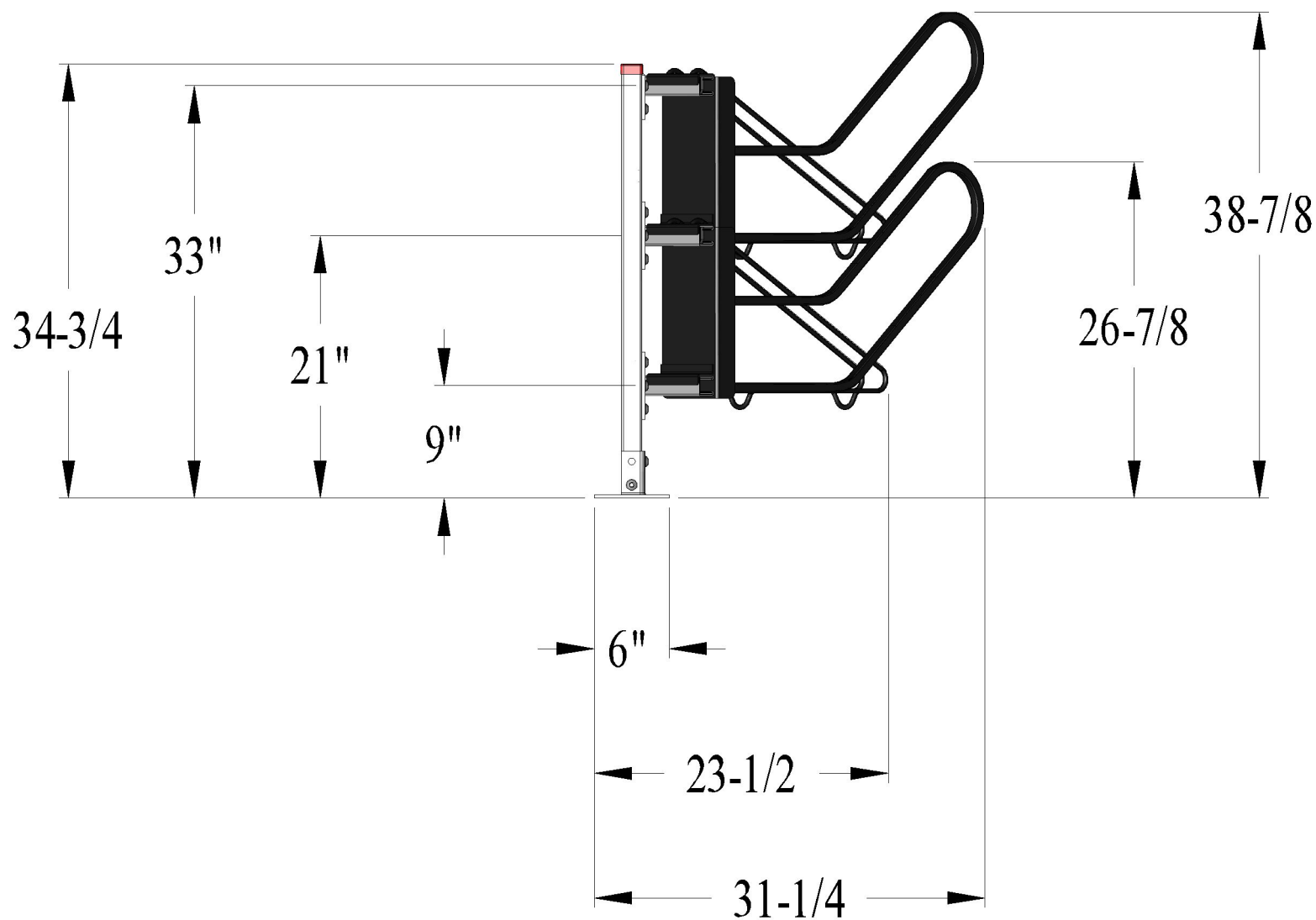
Bike Stall {4-Bike} U-Strut
Post Base {Angled} Assembly {Top} Dim's

Part #17492



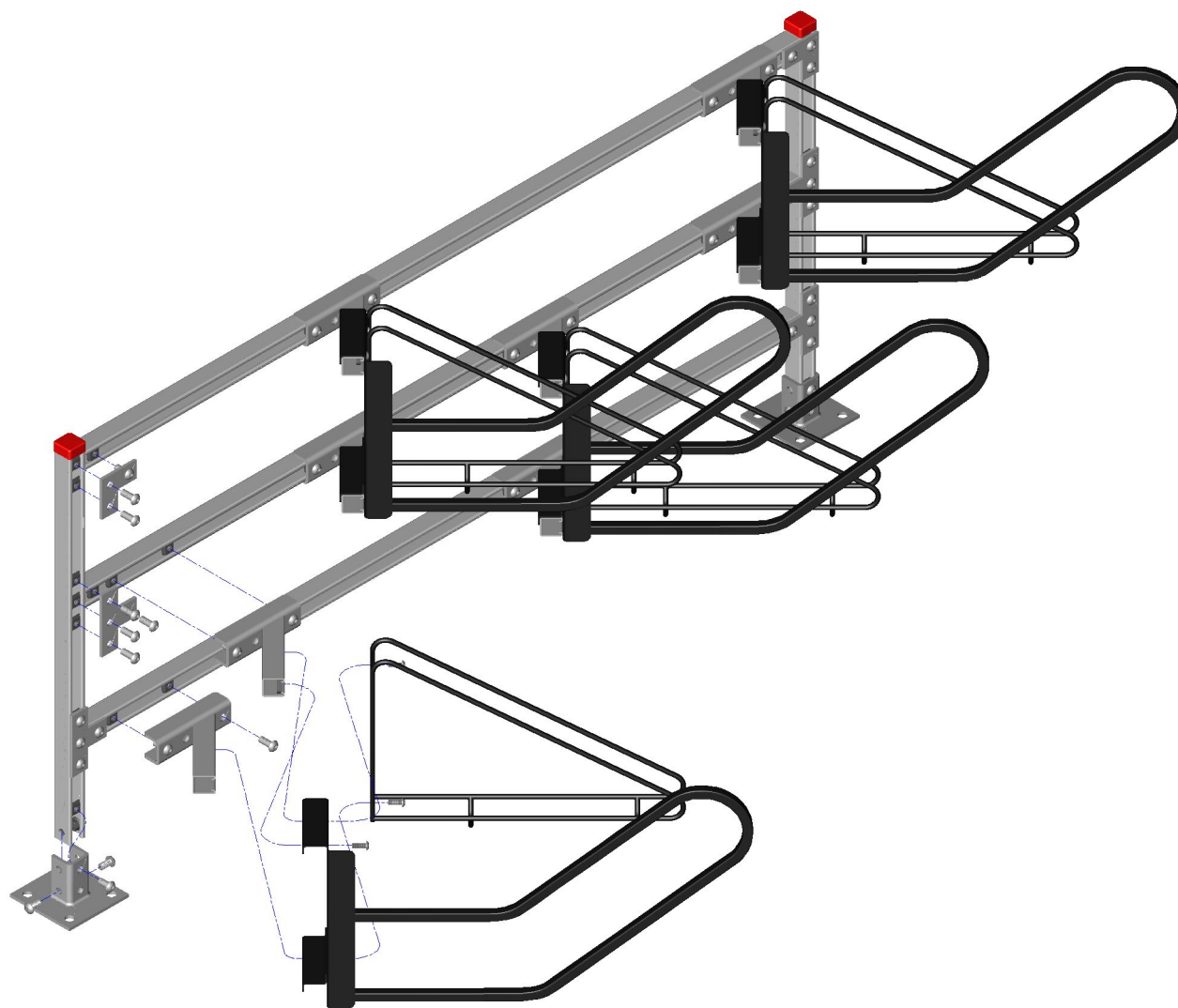
Bike Stall {4-Bike} U-Strut
Post Base {Angled} Assembly {Front} Dim's

Part #17492

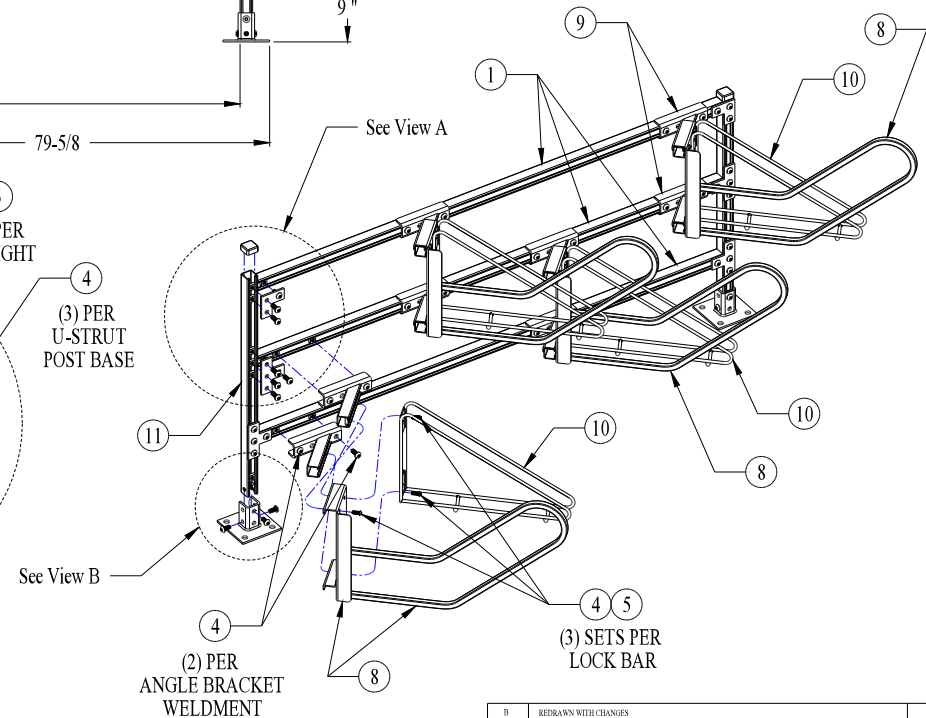
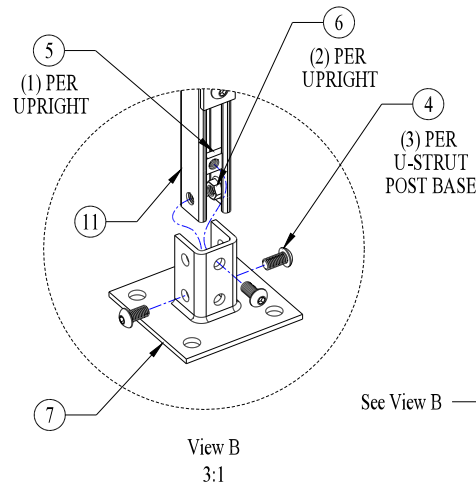
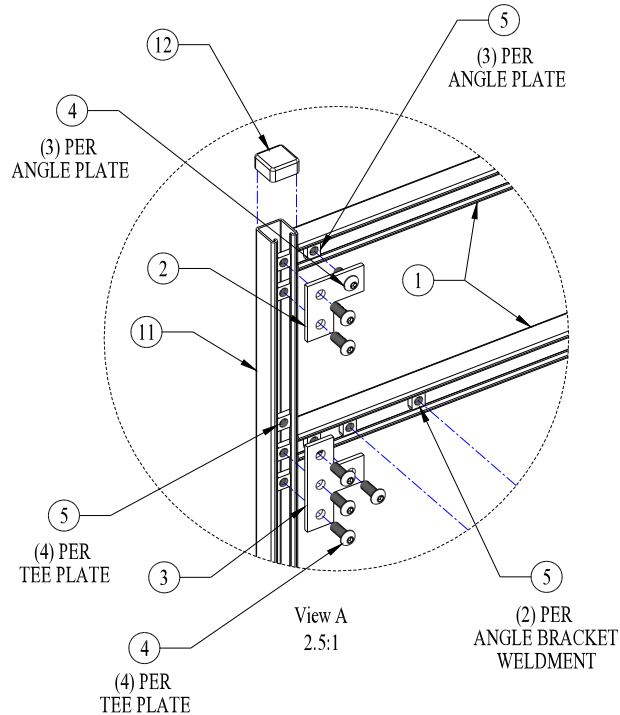
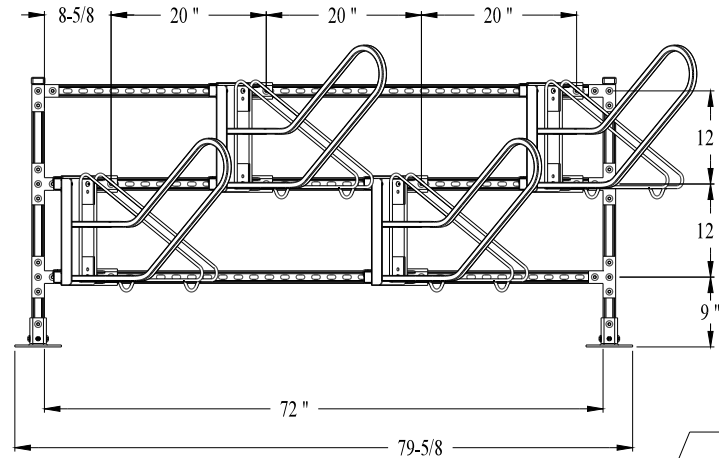
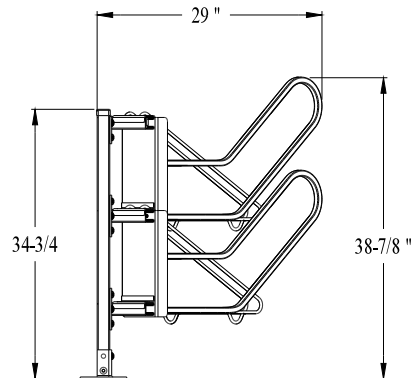


Bike Stall {4-Bike} U-Strut
Post Base {Angled} Assembly {Side} Dim's

Part #17492



Bike Stall {4-Bike} U-Strut
Post Base {Angled} Assembly {Exploded}



NOTES:

1. ALL MATERIALS MUST BE CLEAN AND FREE OF MILL LUBRICATION
2. ANY BLEMISHES OR RUST WILL NOT BE ALLOWED ON COMPLETED PRODUCTS
3. FOR "TAMPERPROOF" FASTENERS :
USE 3/8-16NC S/S TORX {PINNED} BHCS (17590)
IN PLACE OF ITEM #4

ITEM	QTY	DESCRIPTION	PART NO.
1	3	U-STRUT {SLOTTED} SPANNER x 72" LG.	17486
2	2	ANGLE PLATE	17528
3	4	TEE PLATE	17524
4	56	3/8-16NC x 1" LG {TORX} S/S BHCS	12724
5	54	3/8-16NC U-STRUT {ZINC} NUT	17525
6	2	3/8-16NC SERRATED FLANGE NUT {ZINC}	19567
7	2	U-STRUT {POST} BASE	17490
8	4	LOCK BAR WELDMENT {LEFT}	17549
9	8	ANGLE {SILVER} BRACKET WELDMENT	17541
10	4	WALL-RACK {BLACK} POWDER COATED	17502
11	2	U-STRUT {PLAIN} UPRIGHT x 34-3/8" LG.	17489
12	2	U-STRUT {PLASTIC} END CAP	17530

**SINGLE-SIDED
HIGH DENSITY**

SHEET 1 OF 1		B	REDRAWN WITH CHANGES	10/30/13
		A	RELEASE FOR PRODUCTION	03/28/13
		REV	DESCRIPTION	DATE
		WALL-RACK {CORRAL} U-STRUT {ANGLED}		
		Cycle Safe		
		5211 CASCADE RD SE, SUITE 210		
		GRAND RAPIDS, MI 49546		
		www.cyclesafe.com		
		GERI MOHR	11/28/12	
		CHECKED	03/28/13	
		APPROVED	DATE	
		POST BASE {4-BIKE} ASSEMBLY	17492	B

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 402 Mt. Support Road City/County: Lebanon Sampling Date: 9/4/2019
Applicant/Owner: _____ State: NH Sampling Point: 1
Investigator(s): Audra Klumb, CWS Section, Township, Range: Grafton County
Landform (hillside, terrace, etc.): slope Local relief (concave, convex, none): concave Slope %: 0-5%
Subregion (LRR or MLRA): LRR R Lat: 43 40' 8.98"N Long: 72 15' 36.32" W Datum: NAD83
Soil Map Unit Name: Bernardston Silt Loam NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.) Sample location with wooded area between the fields. Soil surface was rocky, possibly from removal from adjacent fields.	

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		_____ Surface Soil Cracks (B6)
_____ Surface Water (A1)	_____ Water-Stained Leaves (B9)	_____ Drainage Patterns (B10)
_____ High Water Table (A2)	_____ Aquatic Fauna (B13)	_____ Moss Trim Lines (B16)
_____ Saturation (A3)	_____ Marl Deposits (B15)	_____ Dry-Season Water Table (C2)
_____ Water Marks (B1)	_____ Hydrogen Sulfide Odor (C1)	_____ Crayfish Burrows (C8)
_____ Sediment Deposits (B2)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Saturation Visible on Aerial Imagery (C9)
_____ Drift Deposits (B3)	_____ Presence of Reduced Iron (C4)	_____ Stunted or Stressed Plants (D1)
_____ Algal Mat or Crust (B4)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Geomorphic Position (D2)
_____ Iron Deposits (B5)	_____ Thin Muck Surface (C7)	_____ ? Shallow Aquitard (D3)
_____ Inundation Visible on Aerial Imagery (B7)	_____ Other (Explain in Remarks)	_____ Microtopographic Relief (D4)
<u>X</u> Sparsely Vegetated Concave Surface (B8)		_____ FAC-Neutral Test (D5)
Field Observations:		Wetland Hydrology Present? Yes <u>X</u> No _____
Surface Water Present? Yes _____ No _____ Depth (inches): _____	Water Table Present? Yes _____ No _____ Depth (inches): _____	
Saturation Present? Yes _____ No _____ Depth (inches): _____ (includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION – Use scientific names of plants.

Sampling Point: 1

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Malus sp.</u>	<u>10</u>	<u>Yes</u>		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>42.9%</u> (A/B)																
2. <u>Acer saccharum</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>																	
3. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>																	
4. <u>Tilia americana</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>																	
5. <u>Populus tremuloides</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
	<u>60</u>	<u>=Total Cover</u>		Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>35</u></td> <td>x 2 = <u>70</u></td> </tr> <tr> <td>FAC species <u>10</u></td> <td>x 3 = <u>30</u></td> </tr> <tr> <td>FACU species <u>40</u></td> <td>x 4 = <u>160</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>85</u></td> <td>(A) <u>260</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.06</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>35</u>	x 2 = <u>70</u>	FAC species <u>10</u>	x 3 = <u>30</u>	FACU species <u>40</u>	x 4 = <u>160</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>85</u>	(A) <u>260</u> (B)	Prevalence Index = B/A = <u>3.06</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>35</u>	x 2 = <u>70</u>																			
FAC species <u>10</u>	x 3 = <u>30</u>																			
FACU species <u>40</u>	x 4 = <u>160</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>85</u>	(A) <u>260</u> (B)																			
Prevalence Index = B/A = <u>3.06</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
	_____	<u>=Total Cover</u>																		
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Onoclea sensibilis</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>Problematic Hydrophytic Vegetation¹ (Explain)</u> ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. <u>Rhamnus cathartica</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
	<u>35</u>	<u>=Total Cover</u>																		
Woody Vine Stratum (Plot size: <u>15'</u>)																				
1. _____	_____	_____	_____	Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
	_____	<u>=Total Cover</u>		Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>																

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point	1
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[illegible]

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 402 Mt. Support Road City/County: Lebanon Sampling Date: 9/4/2019
 Applicant/Owner: _____ State: NH Sampling Point: 2
 Investigator(s): Audra Klumb, CWS Section, Township, Range: Grafton County
 Landform (hillside, terrace, etc.): swamp Local relief (concave, convex, none): concave Slope %: 0-5%
 Subregion (LRR or MLRA): LRR R Lat: 43 40' 12.54"N Long: 72 15' 36.25" W Datum: NAD83
 Soil Map Unit Name: Pittstown Loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) Sample location with wooded area between the fields. Soil surface was rocky, possibly from removal from adjacent fields.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> _____ Surface Water (A1) _____ Water-Stained Leaves (B9) _____ High Water Table (A2) _____ Aquatic Fauna (B13) _____ Saturation (A3) _____ Marl Deposits (B15) _____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) _____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4) _____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Iron Deposits (B5) _____ Thin Muck Surface (C7) _____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks) <u>X</u> Sparsely Vegetated Concave Surface (B8)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) <u>X</u> Microtopographic Relief (D4) <u>X</u> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No _____ Depth (inches): _____ Water Table Present? Yes _____ No _____ Depth (inches): _____ Saturation Present? Yes _____ No _____ Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: Contiguous wetland is mapped by NWI as PFO4/SS1E.	

VEGETATION – Use scientific names of plants.

Sampling Point: 2

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Rhamnus cathartica</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>9</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>88.9%</u> (A/B)																
2. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>																	
3. <u>Ulmus americana</u>	<u>5</u>	<u>No</u>	<u>FACW</u>																	
4. <u>Amelanchier canadensis</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																	
5. <u>Pinus strobus</u>	<u>5</u>	<u>No</u>	<u>FACU</u>																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
<u>50</u> =Total Cover																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Rhamnus cathartica</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>55</u></td> <td>x 2 = <u>110</u></td> </tr> <tr> <td>FAC species <u>65</u></td> <td>x 3 = <u>195</u></td> </tr> <tr> <td>FACU species <u>5</u></td> <td>x 4 = <u>20</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>125</u> (A)</td> <td><u>325</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>2.60</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>55</u>	x 2 = <u>110</u>	FAC species <u>65</u>	x 3 = <u>195</u>	FACU species <u>5</u>	x 4 = <u>20</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>125</u> (A)	<u>325</u> (B)	Prevalence Index = B/A = <u>2.60</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>55</u>	x 2 = <u>110</u>																			
FAC species <u>65</u>	x 3 = <u>195</u>																			
FACU species <u>5</u>	x 4 = <u>20</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>125</u> (A)	<u>325</u> (B)																			
Prevalence Index = B/A = <u>2.60</u>																				
2. <u>Crataegus species</u>	<u>10</u>	<u>Yes</u>	_____																	
3. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
<u>45</u> =Total Cover																				
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Solidago gigantea</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% <u>X</u> 3 - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. <u>Onoclea sensibilis</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>																	
3. <u>Osmunda claytoniana</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
4. <u>Doellingeria sericocarpoides</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
<u>40</u> =Total Cover																				
Woody Vine Stratum (Plot size: <u>15'</u>)																				
1. _____	_____	_____	_____	Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
_____ =Total Cover																				

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point	2
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[illegible]



Memorandum

To: Mr. Ken Braverman
The Braverman Company, LLC
60 Winooski Falls Way
Winooski, VT 05404

Date: April 27, 2020

Project #: 52671.00

From: Jason R. Plourde, P.E., PTP

Re: Traffic Impact Assessment
Proposed Apartment Development
402 Mount Support Road, Lebanon, New Hampshire

Vanasse Hangen Brustlin, Inc. (VHB) has prepared this Traffic Impact Assessment to summarize the anticipated transportation impacts associated with a proposed apartment development to be located at 402 Mount Support Road in Lebanon, New Hampshire. As proposed, the development program consists of constructing 202 apartment units with access to be provided via a full access driveway.

This traffic study has been prepared in accordance with the City of Lebanon's Site Plan Regulations (Article V Section 5.1.G.2). Since Mount Support Road is under local jurisdiction and the volume of site trips for the proposed development is not estimated to be significant (i.e., traffic volume increases less than 100 vehicles per hour on an intersection approach), review and approval of the proposed apartment development is expected to be required only through the local permitting process. The limit of study for this evaluation includes the Mount Support Road corridor between the Heater Road and Old Etna Road intersection to the south and the Lahaye Drive intersection to the north. The site location in relation to the surrounding roadway network is shown on Figure 1.

For consistency purposes, much of the information provided within this traffic study was obtained from other recent developments that have filed with the City of Lebanon as part of the site plan review process.^{1, 2, 3} The intent of this approach is to provide consistent baseline conditions, identify the impacts of the proposed development, and to summarize the operations along the Mount Support Road corridor for master planning purposes.

Existing Conditions

Existing conditions were developed by conducting field reconnaissance and collecting traffic counts within the vicinity of the site. In preparing this study for the proposed development, the following 'study area' intersections have been analyzed and evaluated:

- Mount Support Road, Heater Road, and Old Etna Road
- Mount Support Road and Lahaye Drive
- Mount Support Road and proposed site driveway

¹ VHB. *Traffic Impact and Access Study, Dartmouth Hitchcock Medical Center Expansion*. Dec. 2019.

² VHB. *Traffic Impact Assessment, Proposed Multi-Use Family Housing Development, 401 Mount Support Road, Lebanon, New Hampshire*. 7 Feb. 2020.

³ VHB. *Traffic Impact Assessment, The Marek at Lebanon, NH, 343 Mount Support Road, Lebanon, New Hampshire*. 28 Feb. 2020.



0 500 1000 Feet



Site Location Map
Residential Development
402 Mount Support Road, Lebanon NH

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Figure 1

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Mount Support Road is functionally classified as a Local Roadway with a posted speed limit of 25 miles per hour (mph) within the study area. Directional flow is separated along the corridor by double yellow centerlines. From the south at the Heater Road and Old Etna Road intersection, an on-road bike route is marked along both sides of Mount Support Road with a sidewalk provided along the east side of this section of the corridor. Continuing to the north, a crosswalk is striped across Mount Support Road north of the Memorial Drive intersection, the on-road bike route along the west side of Mount Support Road terminates, and the sidewalk transitions to a shared-use path on the east side of Mount Support Road that accommodates pedestrians and bicyclists.

Mount Support Road intersects with Heater Road and Old Etna Road to form an All-Way Stop-Controlled (AWSC) intersection at the southern end of the study area. Along all four legs, the geometry consists of single lanes approaching the intersection and single lanes departing the intersection. Sidewalks are provided along the south side of the Old Etna Road eastern and western legs, along the west side of the Heater Road southern leg, and along the east side of the Mount Support Road northern leg. Crosswalks are striped across the Heater Road southern leg and across the Old Etna Road eastern leg.

Mount Support Road and Lahaye Drive intersect at a signalized intersection at the northern end of the study area. The Mount Support Road northbound approach consists of a shared left-turn/through lane and an exclusive right-turn lane. The Mount Support Road southbound approach is striped as an exclusive left-turn lane and a shared through/right-turn lane. The Lahaye Drive eastbound approach provides a single general-purpose travel lane. The Lahaye Drive westbound approach includes an exclusive left-turn lane, a through lane, and an exclusive right-turn lane. Crosswalks are striped across the Lahaye Drive east leg and across the Mount Support Road north leg.

Traffic Volumes

Traffic Counts

Base traffic conditions at the study area intersections were previously developed as part of the multi-family housing development to be located at 401 Mount Support Road (aka, Dartmouth College student housing development).⁴ At the time of this traffic study, that project was proceeding through the City of Lebanon review and approval process. As part of that study, the traffic counts were collected on Tuesday, January 7, 2020 during the weekday morning peak period (7:00 to 9:00 AM) and the weekday evening peak period (3:00 to 6:00 PM). In addition, automatic traffic recorder (ATR) counts were conducted along Mount Support Road between Lahaye Drive and Timberwood Commons to collect weekday daily traffic volumes and vehicle speed measurements. Those traffic count data are provided in the Appendix.

Seasonal Adjustment

Traffic on a given roadway typically fluctuates throughout the year depending on the area and the type of roadway. Based on New Hampshire Department of Transportation (NHDOT) guidelines for the preparation of a traffic study, existing traffic volumes must represent the peak of the monthly average peak-hour and daily conditions. Consistent with the traffic study prepared for the 401 Mount Support Road multi-family housing development, the January traffic

⁴ Ibid. 2.

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counts were increased by 10% to account for seasonal fluctuation in traffic volumes. The NHDOT seasonal adjustment data are provided in the Appendix. Figure 2 graphically depicts the 2020 Existing weekday morning and weekday evening peak hour traffic volumes. Table 1 provides a summary of the traffic volumes along Mount Support Road in the vicinity of the proposed development. These traffic volumes are consistent with those presented and evaluated as part of the traffic study prepared for the multi-family housing development to be located at 401 Mount Support Road.

Table 1 – Existing Traffic Volume Summary

Location/Time Period	Daily Traffic Volume (vpd) ^a	Peak Hour Traffic Volume (vph) ^b	K-Factor ^c	Directional Distribution ^d
Mount Support Road between Lahaye Drive and Timberwood Commons				
Weekday Daily	3,510			
Weekday Morning		420	12.0	79% NB
Weekday Evening		526	15.0	90% SB

^a In vehicles per day. Traffic counts seasonally increased by 10%.

^b In vehicles per hour. Traffic counts seasonally increased by 10%.

^c Percent of average daily traffic occurring during the peak hour.

^d Predominant traffic flow, with NB = northbound and SB = southbound.

As reflected in the field collected data and as summarized in Table 1, the predominant traffic flow is along Mount Support Road northbound during the weekday morning peak hour and along Mount Support Road southbound during the weekday evening peak hour. These traffic patterns are likely influenced by the nearby Dartmouth-Hitchcock Medical Center (DHMC), which is the major traffic generator in the area. Many rural and urban roadways experience a K-factor that falls between 9.0 and 10.0. The K-factor may exceed 10.0 for roadways with heavy peak traffic demand.⁵ As shown, the peak season K-factors for the weekday morning and weekday evening peak hours are greater than 10.0, which suggests that these traffic volumes peak during the weekday commuting time periods. These peaking characteristics are similar to those commonly found in residential areas.

Vehicle Speeds

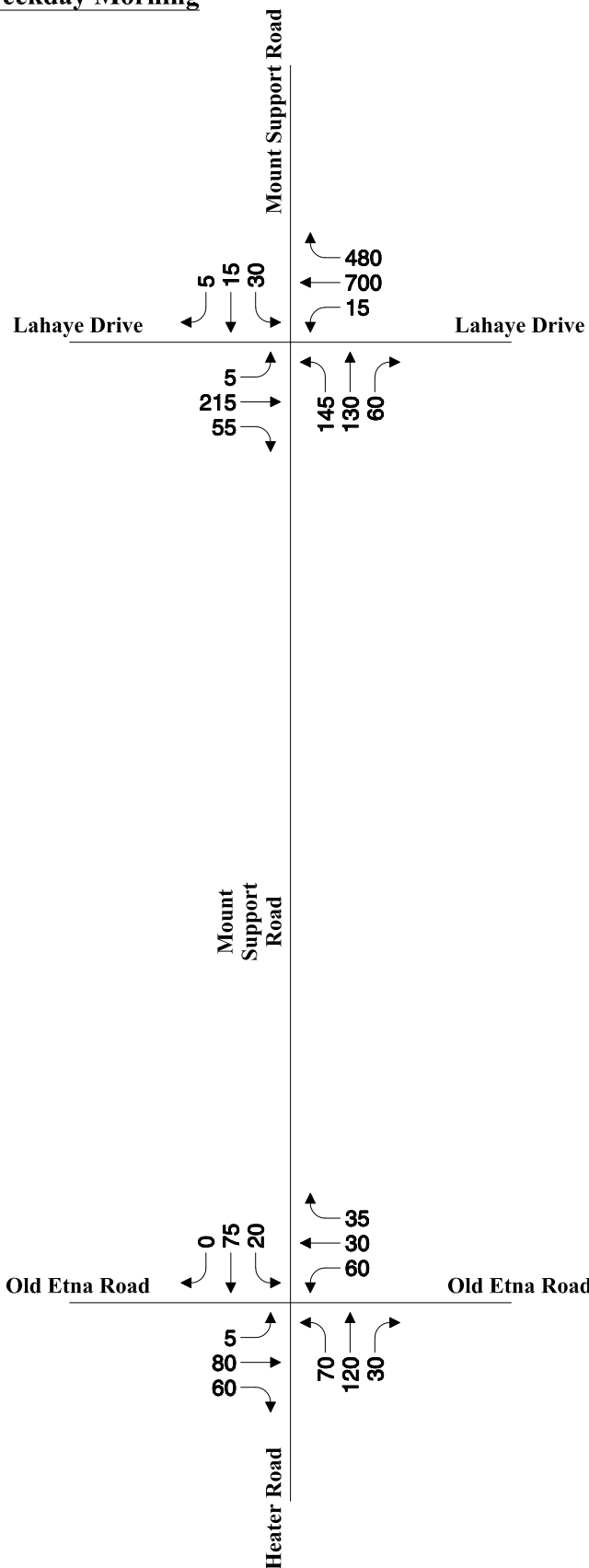
As part of the multi-family housing development to be located at 401 Mount Support Road, vehicle speed data were collected along Mount Support Road in the vicinity of the proposed development. Table 2 provides a summary of the speed study and the data are provided in the Appendix.

As shown in Table 2, the average and 85th percentile speeds along Mount Support Road were found to be higher than the posted speed limit. An existing speed pattern was noted with Mount Support Road southbound vehicles traveling slightly faster than northbound vehicles. The lower northbound vehicular travel speeds are likely attributed to vehicles slowing while approaching the Lahaye Drive signalized.

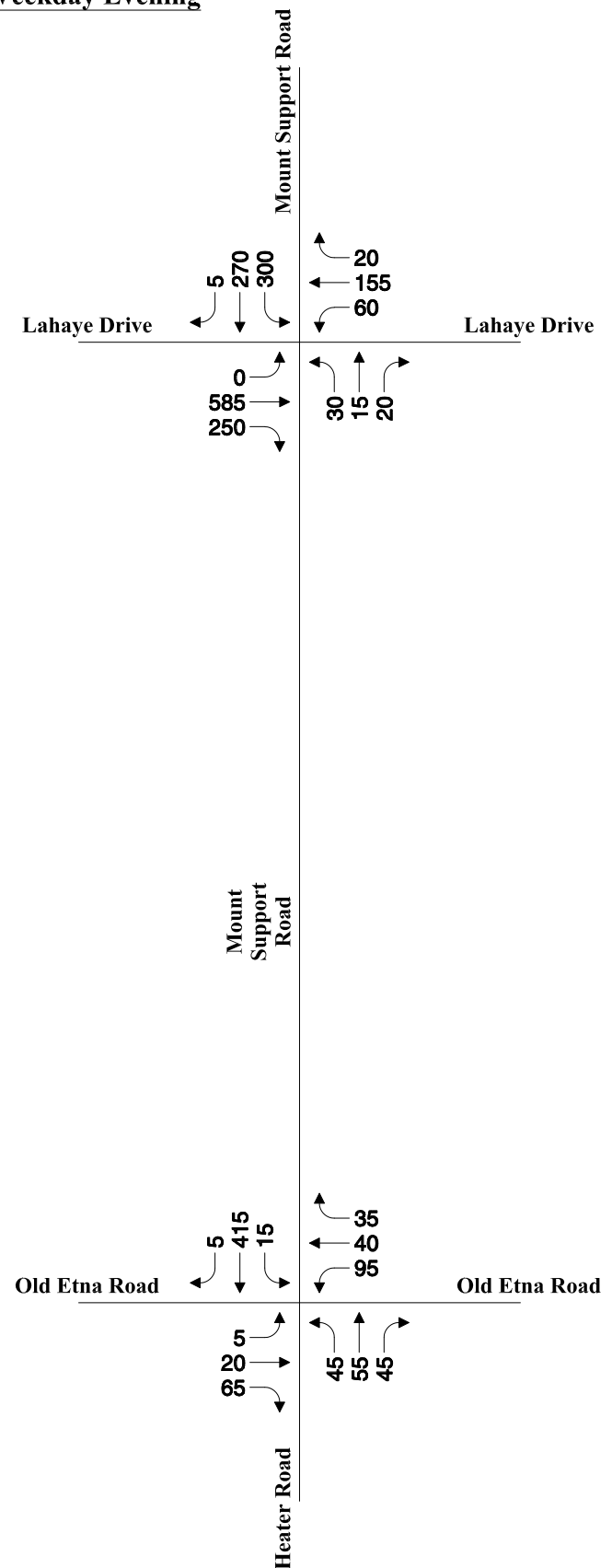
⁵ Dowling, Richard, et al. *Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual*. National Cooperative Highway Research Program Report 825, Washington, DC: National Academy of Sciences, 2016.

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Weekday Morning



Weekday Evening



2020 Existing Peak Hour Traffic Volumes

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Table 2 – Vehicle Speed Summary

Season/Direction	Posted Speed Limit (mph)	Average Speed (mph)	85 th %ile Speed (mph)	10 mph Pace (mph)
Mount Support Road between Lahaye Drive and Timberwood Commons				
Northbound	25	33	38	26-35
Southbound	25	34	39	31-40
Combined	25	34	38	31-40

Transit

Within the study area, Advance Transit provides public transit along the Mount Support Road corridor. The Advance Transit Blue Bus Route is in operation between 5:15 AM and 7:10 PM on weekdays and provides stops within the study area on Mount Support Road at Timberwood Commons and at Memorial Drive/Dartmouth Avenue, as well as on Heater Road south of Mount Support Road and Old Etna Road.

Capacity and Queue Analyses

Capacity Analysis Methodology

Capacity analyses were performed for the study area intersections with the 2020 Existing traffic volumes during the weekday morning and weekday evening peak hours based on the concepts and procedures in the Highway Capacity Manual (HCM)⁶ using the *Trafficware Synchro Software* computer program. This software program is an NHDOT approved traffic analysis tools for determining intersection capacity operations.

The HCM 6th edition methodology does not support signalized intersections that do not adhere to strict National Electrical Manufacturers Association (NEMA) phasing. In addition, the current version of HCM does not support signalized intersections that include exclusive pedestrian phasing. Therefore, the HCM 2000 methodology and procedures have been used to evaluate intersection operations under all conditions at the study area intersections.

The analysis results are categorized in terms of Level of Service (LOS), which describes the qualitative intersection operational conditions based on the calculated average delay per vehicle. The criteria for unsignalized intersections are different than for signalized intersections because drivers expect different performance levels from each type of intersection. The relationship between LOS and delay is summarized in Table 3.

⁶ Transportation Research Board. *Highway Capacity Manual*. 2000.

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Table 3 – Level of Service Criteria

LOS	Unsignalized Intersection Criteria Average Total Delay (Seconds per Vehicle)	Signalized Intersection Criteria Average Total Delay (Seconds per Vehicle)
A	< 10.0	< 10.0
B	10.1 to 15.0	10.1 to 20.0
C	15.1 to 25.0	20.1 to 35.0
D	25.1 to 35.0	35.1 to 55.0
E	35.1 to 50.0	55.1 to 80.0
F	> 50.0	> 80.0

Source: *Highway Capacity Manual 2000*.

Queue Length Analysis Methodology

The study area intersections were also evaluated with respect to vehicle queuing. For unsignalized intersections, the quantitative measure of vehicle queue length is defined as the 95th percentile queue. The 95th percentile queue represents the percent of time during the peak period being analyzed that the calculated maximum back of queue would be equal to or less than the percentile estimate (i.e., the maximum queue length that would be exceeded only 5% of the time).

For signalized intersections, the quantitative measures of vehicle queue length are defined as the 50th and the 95th percentile queues. The 50th percentile queue represents the average queue length during the peak hour and the 95th percentile queue represents the calculated maximum back of queue that has a probability of 5% or less of being exceeded during the peak hour.

Using the *Trafficware Synchro Software* computer program for the Mount Support Road and Lahaye Drive signalized intersection under 2020 Existing weekday evening peak hour traffic-volume conditions, the queue analyses for the Lahaye Drive eastbound approach results in conditions that exceed capacity (average queues shown with "~"). This message indicates that the queue results could be longer than as modeled. Some reasons for oversaturated conditions could be related to spillback between intersections, spillback beyond turning lanes, forced lane changes, unbalanced lane usage for downstream turning movements, and other intricate traffic-flow interactions. Therefore, and for consistency purposes, the queue results for the study area intersections were evaluated using the *Trafficware SimTraffic Software* computer program. This program is an NHDOT approved traffic analysis tools for determining intersection capacity operations.

Intersection Analysis Calibration

At the Lahaye Drive and Mount Support Road signalized intersection, observations revealed that Lahaye Drive westbound left turning vehicles proceed through the intersection at the end of the permissive signal phase after the heavy demand of opposing Lahaye Drive eastbound vehicles have cleared the intersection. Therefore, the computer model was accordingly calibrated by providing a Lahaye Drive westbound lagging phase to reflect existing operational

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conditions. This methodology is consistent with that used within the traffic studies prepared for the DHMC patient tower expansion project and the 401 Mount Support Road multi-family housing development.

Intersection Operational Results

The capacity and queue length analysis results are summarized in Table 4 for the 2020 Existing traffic-volume conditions. The computer-generated analysis reports are provided in the Appendix.

Under 2020 Existing traffic-volume conditions, the Mount Support Road, Heater Road, and Old Etna Road approaches to this all-way stop-control intersection operate at LOS B during the weekday morning peak hour and at LOS C or better during the weekday evening peak hour.

Under 2020 Existing traffic volume conditions, the Mount Support Road signalized intersection with Lahaye Drive operates at LOS C during the weekday morning peak hour and at LOS E during the weekday evening peak hour. For the weekday evening peak hour, long delays (LOS E/F) are experienced on the Lahaye Drive eastbound approach and on the Mount Support Road northbound shared left/through lane. In addition, long vehicular queues are experienced on the Lahaye Drive eastbound approach during the weekday evening peak hour.

Table 4 – Capacity Analysis Summary: 2020 Existing Conditions

Intersection/Peak Hour/ Critical Movement or Lane Group	2020 Existing					
	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue
Mount Support Road, Heater Road, and Old Etna Road						
<i>Weekday AM:</i>						
Old Etna Rd EB Approach	0.28	10.0	B	550	43	74
Old Etna Rd WB Approach	0.21	9.6	A	1,400	38	62
Heater Rd NB Approach	0.34	10.7	B	1,850	48	78
Mount Support Rd SB Approach	0.23	9.9	A	1,450	29	56
<i>Weekday PM:</i>						
Old Etna Rd EB Approach	0.24	10.7	B	550	33	64
Old Etna Rd WB Approach	0.34	12.1	B	1,400	47	77
Heater Rd NB Approach	0.33	11.4	B	1,850	37	63
Mount Support Rd SB Approach	0.71	20.3	C	1,450	84	156

V/C = volume-to-capacity ratio.

Delay in seconds.

Storage lengths and queues in feet.

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Table 4 (continued) – Capacity Analysis Summary: 2020 Existing Conditions

Intersection/Peak Hour/ Critical Movement or Lane Group	2020 Existing					
	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue
Mount Support Road and Lahaye Drive						
<i>Weekday AM:</i>						
Lahaye Dr EB Approach	0.57	23.3	C	1,500	108	254
Lahaye Dr WB Left	0.04	23.1	C	125	12	68
Lahaye Dr WB Through	0.85	32.0	C	1,000	224	411
Lahaye Dr WB Right	0.49	19.1	B	1,000	84	174
Mount Support Rd NB Left/Through	0.79	46.8	D	7,150	118	212
Mount Support Rd NB Right	0.04	29.2	C	100	28	76
Mount Support Rd SB Left	0.36	48.3	D	115	22	52
Mount Support Rd SB Through/Right	0.04	21.6	C	1,200	21	59
Overall Intersection	0.79	29.5	C	--	--	--
<i>Weekday PM:</i>						
Lahaye Dr EB Approach	1.16	120.6	F	1,500	764	1,454
Lahaye Dr WB Left	0.55	52.5	D	125	40	82
Lahaye Dr WB Through	0.21	17.6	B	1,000	47	97
Lahaye Dr WB Right	0.02	16.0	B	1,000	7	26
Mount Support Rd NB Left/Through	0.65	65.5	E	7,150	32	74
Mount Support Rd NB Right	0.01	45.5	D	100	15	41
Mount Support Rd SB Left	0.80	44.6	D	115	136	219
Mount Support Rd SB Through/Right	0.51	25.4	C	1,200	140	270
Overall Intersection	0.93	72.3	E	--	--	--

V/C = volume-to-capacity ratio.
Delay in seconds.
Storage lengths and queues in feet.

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Future Conditions

The impact of site-generated traffic within the study area has been evaluated under two design horizons: 2021 and 2031 traffic-volume conditions. Traffic volumes on the roadway network would include existing traffic, new traffic due to normal traffic growth, and traffic related to significant development by others that are expected to be completed within the design horizons. The one-year design horizon (2021) represents conditions that can determine the impacts of the proposed development, whereas the 11-year design horizon (2031) is typically used for planning purposes.

Consideration of these factors resulted in the development of 2021 and 2031 No-Build traffic volumes, which assume the proposed housing project is not built. The incremental impacts of the proposed development may then be determined by adding site-generated traffic volumes (Build conditions) and making comparisons to the baseline conditions.

No-Build Conditions

Traffic growth is a function of the expected land development in a region. To predict a rate at which traffic can be expected to grow during the forecast periods, both historical growth and planned areas developments were examined.

Historical Growth

Consistent with the recent traffic studies prepared for the DHMC patient tower expansion project,⁷ the 343 Mount Support Road multi-family housing development,⁸ and the 401 Mount Support Road multi-family housing development,⁹ a 1% compounded annual growth rate was found to be indicative of general population growth and traffic generated by smaller developments in the area.

Background Developments

Traffic to be generated by planned developments anticipated to add substantial traffic volumes through the study area were considered in projecting future traffic volumes. Consistent with recent land development projects in the area and per coordination efforts with City of Lebanon officials, the following developments were included within the future traffic-volumes as part of this traffic study:

- The Altaria development is located along the east side of NH 120 south of Centerra Business Park. As permitted, the project would be constructed in two phases:
 - o Phase 1: a 120-room hotel, 40 residential condominium units, 87,600 square feet of office space, and 42,400 square feet of retail space.
 - o Phase 2: 120 residential condominium units and 240,000 square feet of office/research and development space.

⁷ Ibid. 1.

⁸ Ibid. 3.

⁹ Ibid. 2.

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- o Full Build: a 120-room hotel, 160 residential condominium units, 327,600 square feet of office/ research and development space, and 42,400 square feet of retail space.
 - o To date, the hotel has been constructed and occupied with the remainder of the development under construction. The remainder of that project has been included within the 2021 and 2031 No-Build traffic volume conditions as part of this traffic study for the proposed multi-family housing project. The traffic volumes associated with the Altaria mixed-use development were obtained from the traffic study prepared for that project.¹⁰
- The Investment Corporation of Vermont (ICV) development is located to the north of Etna Road.
 - o At this time, Phase 2 of the development has yet to be constructed (75 apartment units). Site trips for this project were obtained from the traffic study prepared for the project.¹¹
- The recently approved DHMC patient tower expansion project.
 - o The existing DHMC facility consists of 2,012,589 square feet of gross floor area.
 - o As approved through the City of Lebanon, a new patient tower would be constructed to support 233,500 square feet of gross floor area and 128 beds on four levels.
 - o The site trips associated with that expansion project were obtained from the traffic study prepared for that project.¹²
- The multi-housing residential development to be located at 343 Mount Support Road.
 - o In March 2020, a site plan review application was submitted to the City of Lebanon for the construction of 250 apartment units.
 - o The site trips associated with that expansion project were obtained from the traffic study prepared for that project.¹³
- The multi-housing residential development to be located at 401 Mount Support Road.
 - o In February 2020, a site plan review application was submitted to the City of Lebanon for the construction of 316 apartment units.
 - o The site trips associated with that expansion project were obtained from the traffic study prepared for that project.¹⁴

¹⁰ VHB. *Traffic Impact and Access Study, Proposed Mixed-Use Development, NH Route 120, Lebanon, NH*. 9 Jul. 2009.

¹¹ Resource Systems Group (RSG). *Memorandum: ICV Phase 2 Traffic Analysis 2016 Update: Apartment Building*. 17 Mar. 2016.

¹² Ibid. 1.

¹³ Ibid. 3.

¹⁴ Ibid. 2.

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Planned Roadway Improvements

As identified within the traffic studies prepared for the DHMC patient tower expansion project, the 343 Mount Support Road multi-family housing development, and the 401 Mount Support Road multi-family housing development, the City of Lebanon was selected for federal funds through the Transportation Alternatives Program (TAP) related to a proposed multi-use path along Lahaye Drive between Mount Support Road and NH Route 120. At the time of this traffic study, the design and timeline for any such improvements have not been finalized.

No-Build Traffic Volumes

The 2021 No-Build peak hour traffic volumes were accordingly developed by applying a 1% compounded annual traffic growth rate to the 2020 Existing volumes and adding traffic associated with the remainder of the Altaria mixed-use development, with Phase 2 of the ICV development, with the DHMC patient tower expansion project, with the 343 Mount Support Road multi-family housing development, and with the 401 Mount Support Road multi-family housing development. The 2021 No-Build traffic volumes are shown graphically for the study area intersections on Figure 3 for the weekday morning and weekday evening peak hours.

The 2031 No-Build peak-hour traffic volumes were accordingly developed by applying a 1% compounded annual traffic growth rate (or 11.6% over 11 years) to the 2020 Existing volumes and adding traffic associated with the remainder of the Altaria mixed-use development, with Phase 2 of the ICV development, with the DHMC patient tower expansion project, with the 343 Mount Support Road multi-family housing development, and with the 401 Mount Support Road multi-family housing development. The 2031 No-Build traffic volumes are shown graphically for the study area intersections on Figure 4 for the weekday morning and weekday evening peak hours.

Build Conditions

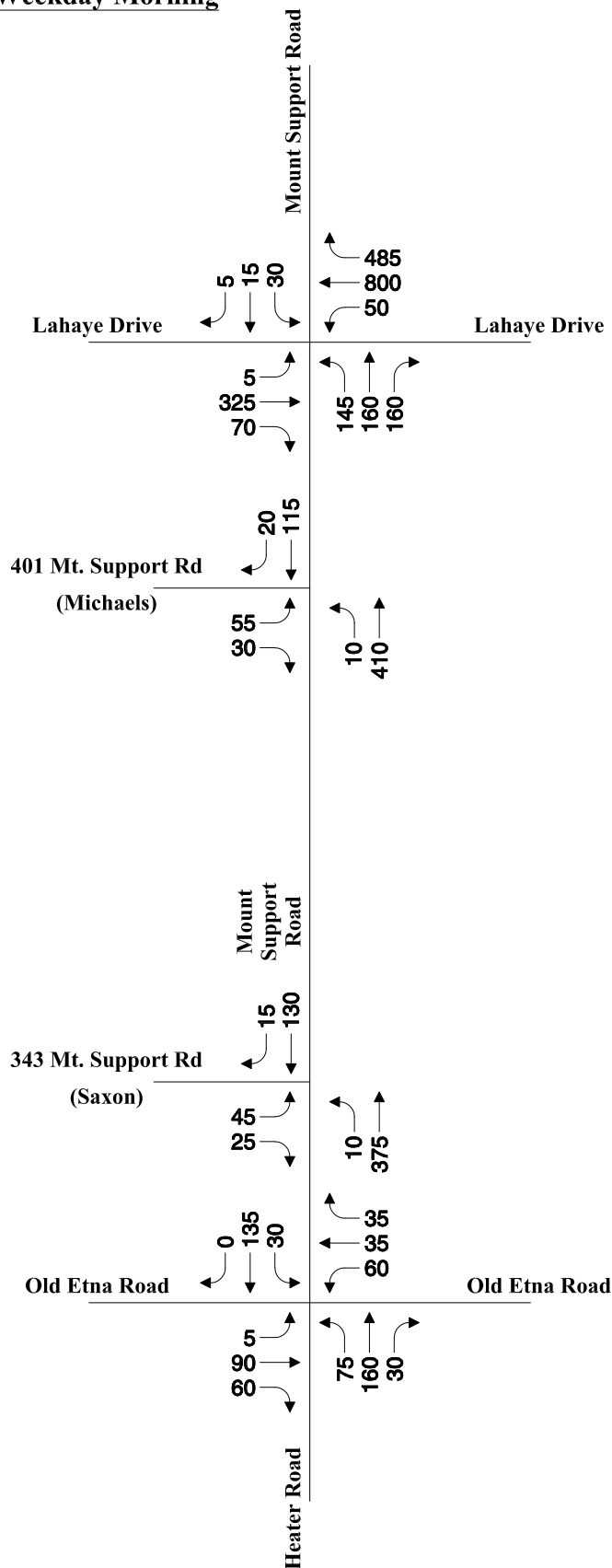
For purposes of this traffic study, the proposed development program evaluated consisted of constructing 202 apartment units at 402 Mount Support Road.

Trip Generation

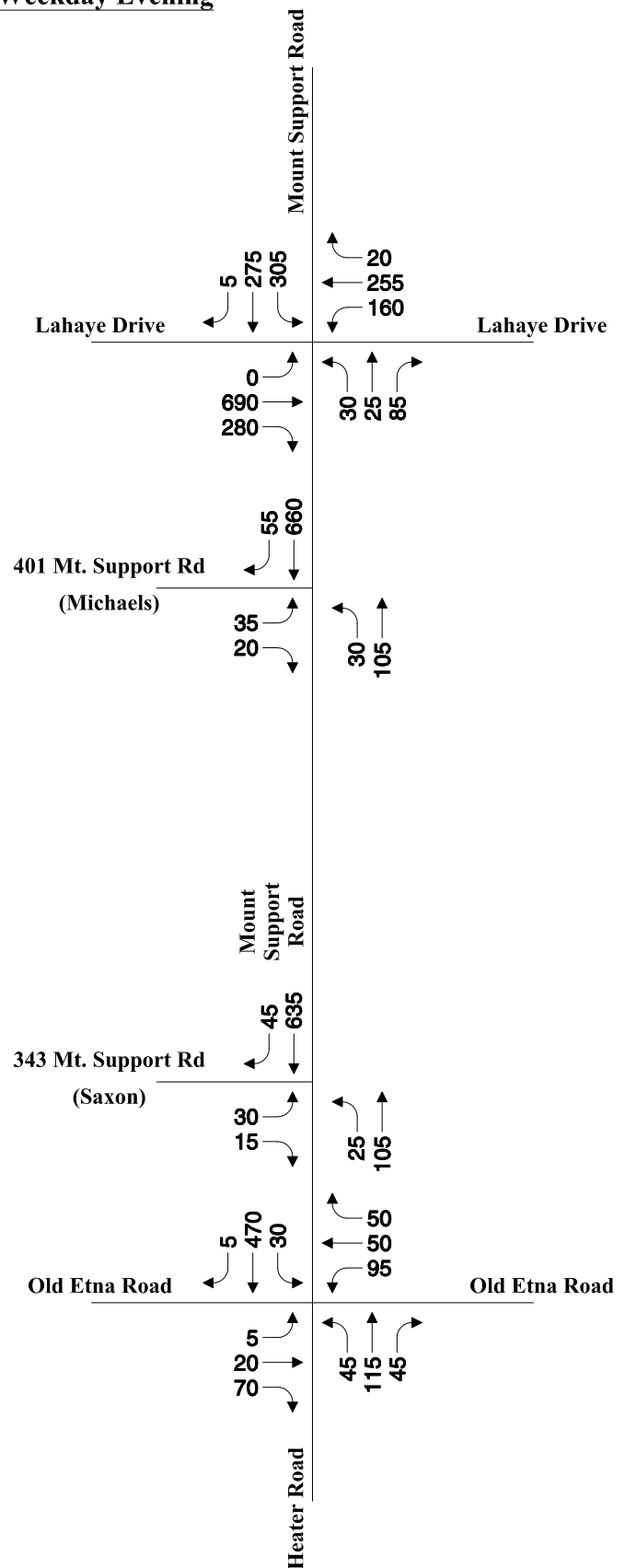
To estimate the volume of traffic to be generated by the proposed apartment development, trip rates published in the Institute of Transportation Engineers (ITE) Trip Generation Manual¹⁵ were researched for Land Use Code 210 (Multifamily Housing [Mid-Rise]). The trip-generation summary is provided in Table 5 with the trip-generation calculations provided in the Appendix.

¹⁵ Institute of Transportation Engineers. *Trip Generation Manual*, 10th ed. Washington, DC, 2017.

Weekday Morning



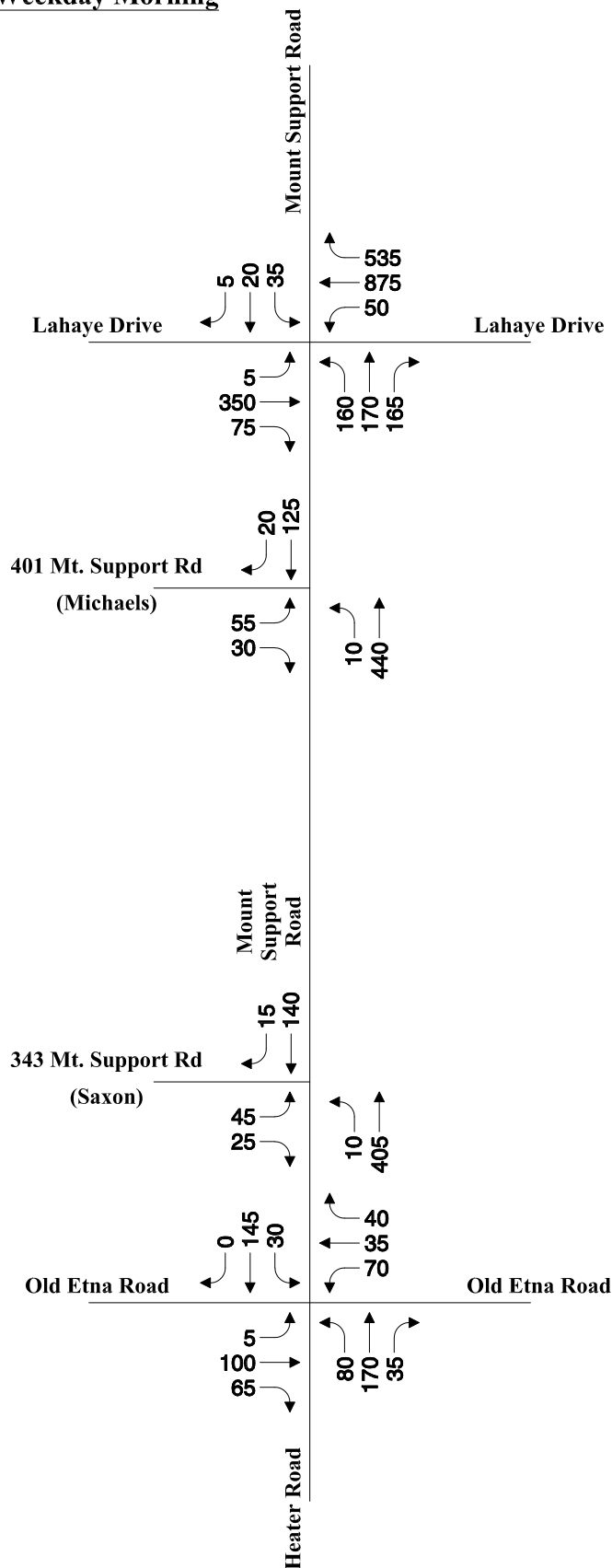
Weekday Evening



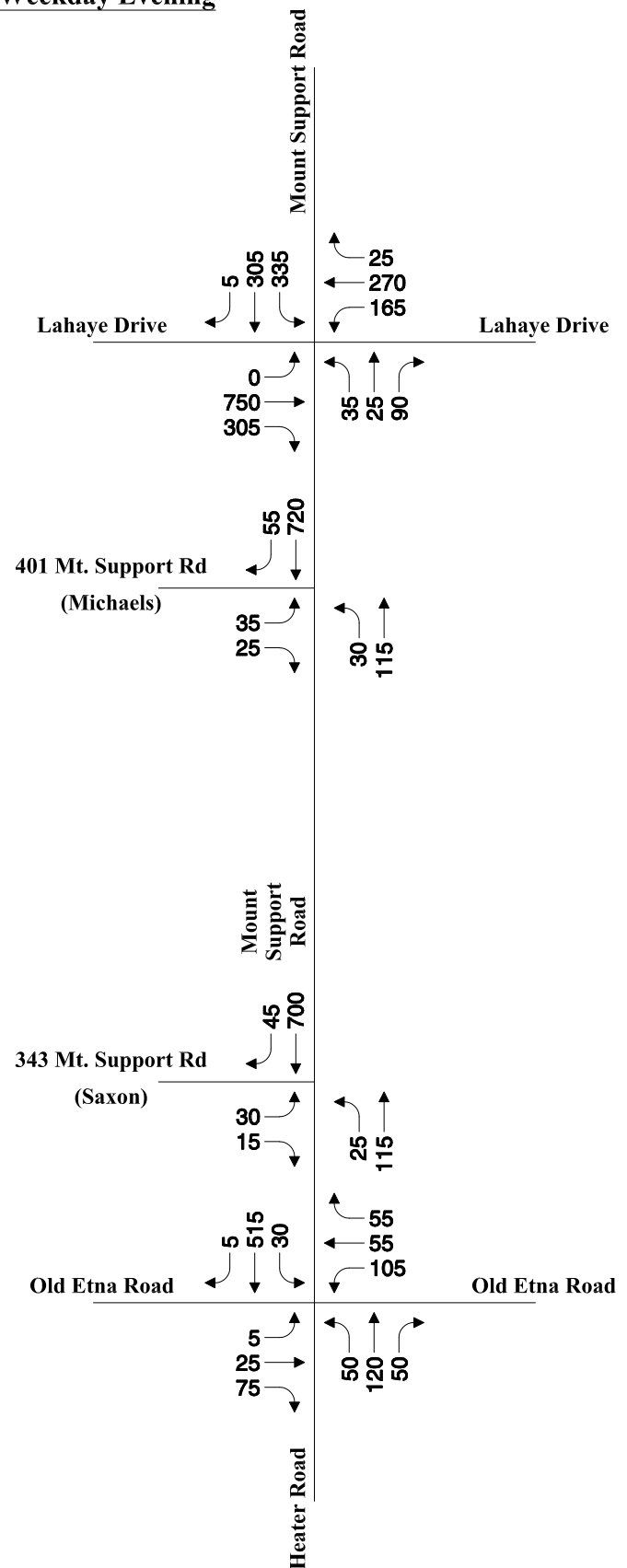
2021 No-Build Peak Hour Traffic Volumes

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Weekday Morning



Weekday Evening



2031 No-Build Peak Hour Traffic Volumes

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Table 5 – Trip-Generation Summary

Time Period/Direction	Site Trips ^a
Weekday Daily	
Enter	550
Exit	550
Total	1,100
Weekday AM Peak Hour	
Enter	19
Exit	54
Total	73
Weekday PM Peak Hour	
Enter	54
Exit	35
Total	89

^a ITE Land Use Code 210 (Multifamily Housing [Mid-Rise]) for 202 dwelling units.

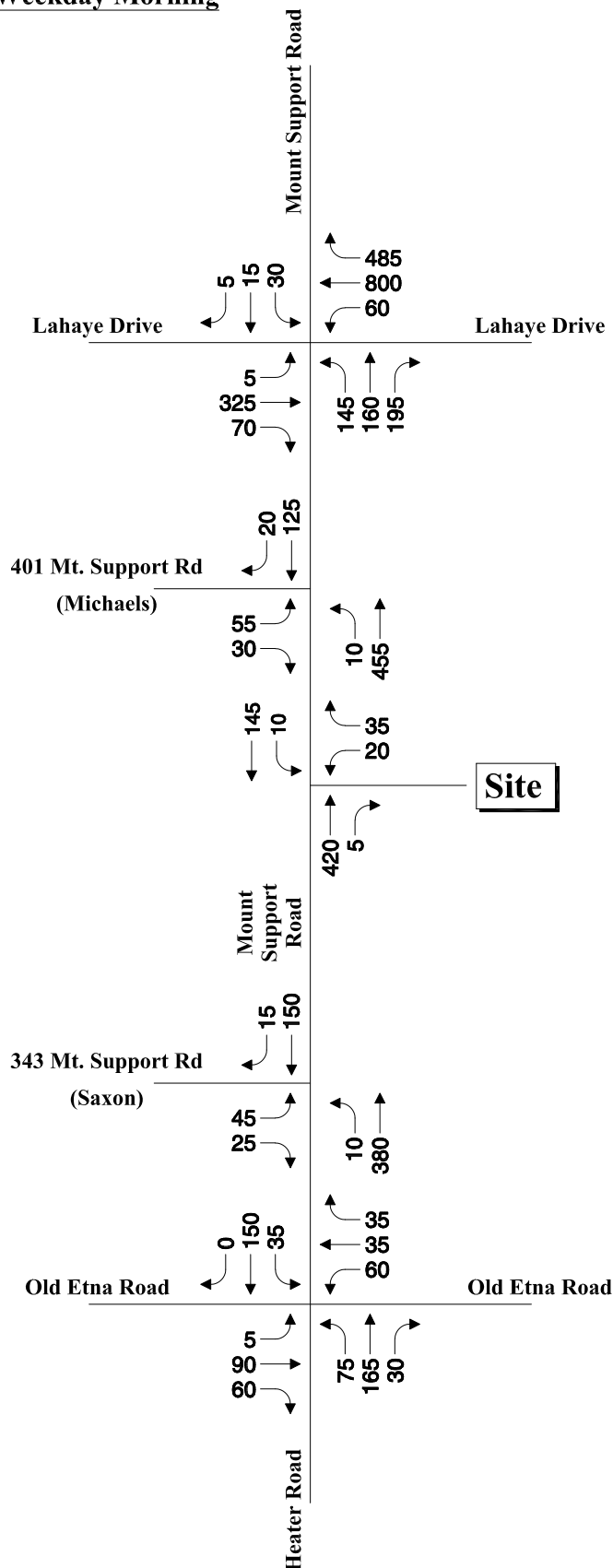
As shown in Table 5, the proposed apartment development is estimated to generate 1,100 trips (550 entering and 550 exiting) during an average weekday, with 73 trips (19 entering and 54 exiting) during the weekday morning peak hour and 89 trips (54 entering and 35 exiting) during the weekday evening peak hour. Based on United States Journey-to-Work Data for the City of Lebanon, approximately 90% of residents drive to and from work with the remaining 10% walking, bicycling, riding public transit, working from home, or using other means. Although there are multi-modal options available for residents of the proposed facility (e.g., Advance Transit bus stops and a multi-use path for pedestrians and bicyclists), all site trips were assumed to be non-transit vehicles in nature for planning purposes and to provide a conservative (worse case) analysis.

Build Traffic Volumes

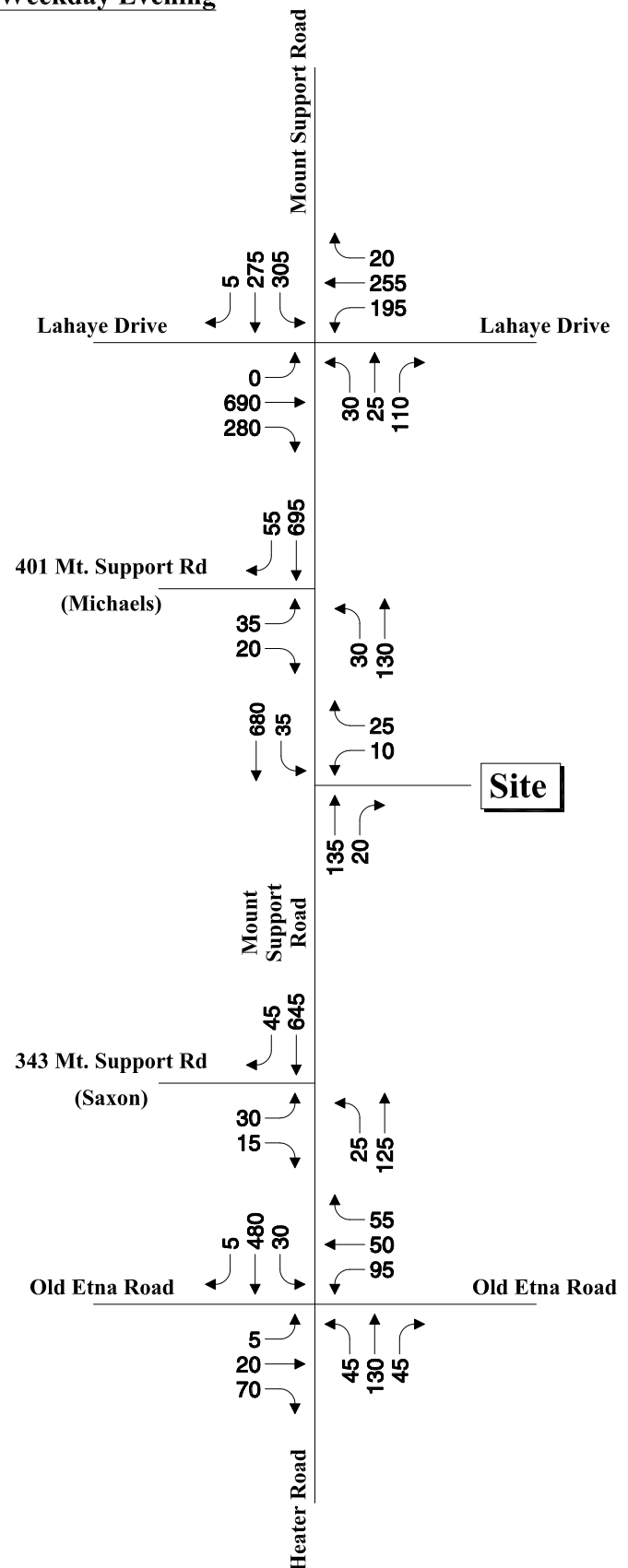
Consistent with the traffic studies prepared for the other residential developments along Mount Support Road that are currently in the City of Lebanon permitting process, the directional distribution of the site generated traffic was approximated based on United States Census data for the City of Lebanon and existing traffic flow patterns along Mount Support Road. A summary of the United States Census Bureau data is provided in the Appendix. Based on the traffic-generation and distribution estimates for the proposed multi-family housing development, the site trips were assigned to the adjacent roadway network. The project-generated traffic volumes are provided in the Appendix.

The project-generated traffic volumes were combined with the No-Build traffic volumes to develop the Build peak-hour traffic-volume networks. The 2021 Build weekday morning and weekday evening peak-hour traffic volumes are illustrated on Figure 5. The 2031 Build weekday morning and weekday evening peak-hour traffic volumes are illustrated on Figure 6.

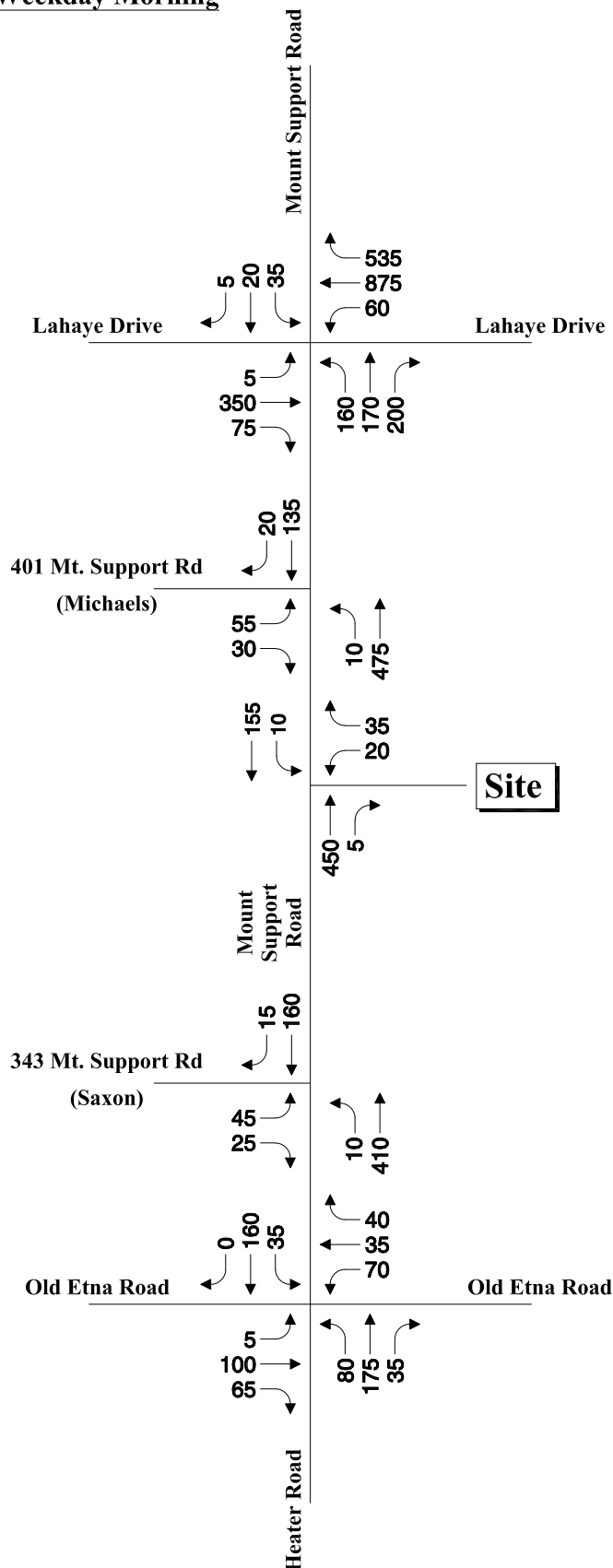
Weekday Morning



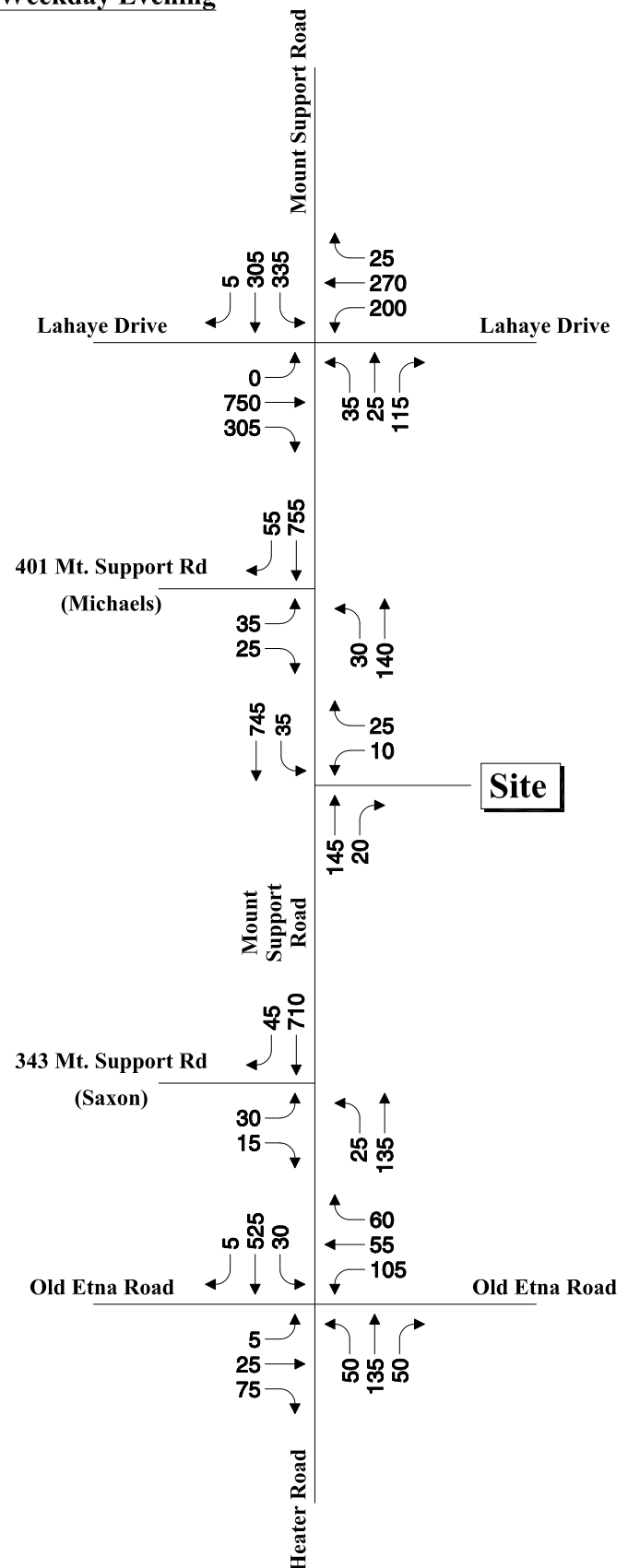
Weekday Evening



Weekday Morning



Weekday Evening



2031 Build Peak Hour Traffic Volumes

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Sight Distance

Sight distances have been evaluated at the proposed site driveway location to determine if the available sight distances for vehicles exiting the site meet or exceed the minimum distances required for approaching vehicles to safely stop. The available sight distances were compared with minimum requirements, as established by the American Association of State Highway and Transportation Officials (AASHTO).¹⁶ AASHTO is the national standard by which vehicle sight distance is calculated, measured, and reported.

Sight distance is the length of roadway ahead visible to the driver. The Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling at a certain speed to safely stop before reaching a stationary object in its path. The Intersection Sight Distance (ISD) is provided on minor street approaches to allow the drivers of stopped vehicles a sufficient view of the major roadway to decide when to enter the major roadway.

The available SSD and ISD at the proposed site driveway location were measured and compared to minimum requirements as established by AASHTO. Since the distance required to stop a vehicle is dependent on the speed of the vehicle, speed studies were conducted as presented previously detailed within this traffic study. Based on the posted speed limit and the observed travel speeds, the SSD and ISD requirements at the proposed site driveways were calculated. The required minimum sight distances for each speed are shown in Table 6.

Table 6 – Sight Distance Summary

Condition	Stopping Sight Distance (feet)	Intersection Sight Distance (feet)
Measured	450+	450+
Posted Speed (25 mph)	155	280
85 th %ile Speed NB (38 mph)	283	423
85 th %ile Speed SB (39 mph)	294	434

As indicated in Table 6, available sight distances to the north and south of the proposed site driveways exceed the AASHTO SSD and ISD requirements. To encourage safe and efficient flow of traffic to and from the site, proposed plantings, vegetation, landscaping, and signing along the site frontage and at the site driveway are recommended to be kept low to the ground or set back sufficiently from the edge of the roadways so as not to inhibit the available sight lines.

In addition, the available sight lines at the proposed site driveway were compared with minimum NHDOT requirements. The NHDOT All Season Safe Sight Distance¹⁷ is similar to AASHTO's ISD as this measurement is conducted from a motorist eye height on the minor street approaches to a motorist eye height on the mainline

¹⁶ *A Policy on Geometric Design of Highways and Streets*, 6th Edition. Washington, D.C.: American Association of State Highway and Transportation Officials (AASHTO), 2011.

¹⁷ *Policy Relating to Driveways and Access to the State Highway System*. New Hampshire Department of Transportation, 10 March 2000.

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approaching the driveway. Based on field inventories, available sight distances at the proposed Mount Support Road site driveway exceed the NHDOT's All Season Safe Sight Distance requirement of 400 feet.

Capacity and Queue Analyses

Analyses were performed for the study area intersections to examine operations under future traffic-volume conditions without the development (2021 and 2031 No-Build) and with the development (2021 and 2031 Build). A summary of the 2021 traffic-volume conditions is reflected in Table 7 and the 2031 analyses are summarized in Table 8. The capacity analysis worksheets are provided in the Appendix.

The comparison of the No-Build and Build intersection operations help to demonstrate a project's impacts on the adjacent roadway network and to identify if the added traffic to the transportation system would result in adverse effects. Should a development cause a significant degradation in intersection operations, then off-site improvements may be required to offset the increased traffic generated by the project (Section 6.5.B.3 and Section 6.8 of the City's Site Plan Review Regulations). In accordance with common traffic engineering practice, a development may have a noticeable impact if the addition of site trips would increase traffic volumes on an intersection approach by 100 vehicles or more.¹⁸ The rationale is that this magnitude could change vehicular operations (i.e., drop level of service or increase delay by 10 seconds or more).

The peak hour factor (PHF) is a measure of traffic demand fluctuations within the peak hour. In conformance with NHDOT Bureau of Traffic's February 13, 2019 draft guidelines, existing PHFs were increased to 0.90 for the 2031 No-Build and Build traffic operational analyses. For those approaches where existing PHFs were observed to be above 0.90, the PHFs were used as observed without a reduction.

Since modern traffic signals are dynamic in which the phases are controlled based on the density of traffic, intersection operations can vary based on the volume of approaching traffic. Therefore, the amount of green time provided for the different phases at the study area signalized intersection (intersection splits) was optimized based on each lane group's traffic demands. In addition, increased traffic volumes on one approach may extend the permissive phase (green ball) with no increase in traffic volumes on the other permissive approach (as shown in the actuated effective green time), resulting in improved operations for Build conditions over No-Build conditions.

¹⁸ *Transportation Impact Analyses for Site Development: An ITE Proposed Recommended Practice*. Washington, DC: Institute of Transportation Engineers, 2010.

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Table 7 – Capacity Analysis Summary 2021 Conditions

Intersection/Peak Hour/ Critical Movement or Lane Group	2021 No-Build						2021 Build					
	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue
Mount Support Road, Heater Road, and Old Etna Road												
<i>Weekday AM:</i>												
Old Etna Rd EB Approach	0.32	11.1	B	550	48	82	0.34	11.8	B	550	47	82
Old Etna Rd WB Approach	0.24	10.5	B	1,400	40	67	0.25	11.0	B	1,400	38	63
Heater Rd NB Approach	0.43	12.4	B	1,850	54	88	0.46	13.3	B	1,850	56	98
Mount Support Rd SB Approach	0.36	11.6	B	1,450	35	62	0.48	13.7	B	1,450	44	86
<i>Weekday PM:</i>												
Old Etna Rd EB Approach	0.30	12.5	B	550	35	61	0.31	12.9	B	550	35	68
Old Etna Rd WB Approach	0.43	14.9	B	1,400	52	86	0.45	15.6	C	1,400	51	87
Heater Rd NB Approach	0.51	15.8	C	1,850	48	82	0.56	17.4	C	1,850	52	94
Mount Support Rd SB Approach	0.91	40.9	E	1,450	138	294	0.94	48.1	E	1,450	128	277
Mount Support Road and Proposed Site Driveway												
<i>Weekday AM:</i>												
Site Driveway WB Approach	--	--	--	--	--	--	0.11	12.7	B	200	29	52
Mount Support Rd SB Left	--	--	--	--	--	--	0.01	0.6	A	500	5	27
<i>Weekday PM:</i>												
Site Driveway WB Approach	--	--	--	--	--	--	0.07	12.2	B	200	19	42
Mount Support Rd SB Left	--	--	--	--	--	--	0.03	0.7	A	500	6	35

V/C = volume-to-capacity ratio.
Delay in seconds.
Storage lengths and queues in feet.

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Table 7 (continued) – Capacity Analysis Summary 2021 Conditions

Intersection/Peak Hour/ Critical Movement or Lane Group	2021 No-Build						2021 Build					
	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue
Mount Support Road and Lahaye Drive												
<i>Weekday AM:</i>												
Lahaye Dr EB Approach	0.94	50.4	D	1,500	296	854	0.94	50.4	D	1,500	232	641
Lahaye Dr WB Left	0.16	23.8	C	125	47	151	0.19	24.1	C	125	57	171
Lahaye Dr WB Through	0.91	36.0	D	1,000	277	511	0.91	36.0	D	1,000	273	479
Lahaye Dr WB Right	0.45	16.3	B	1,000	105	284	0.45	16.3	B	1,000	92	209
Mount Support Rd NB Left/Through	0.95	73.3	E	7,150	148	255	0.95	73.3	E	7,150	158	290
Mount Support Rd NB Right	0.21	31.5	C	100	63	151	0.32	32.6	C	100	82	194
Mount Support Rd SB Left	0.46	49.9	D	115	23	55	0.46	49.9	D	115	25	61
Mount Support Rd SB Through/Right	0.05	23.4	C	1,200	18	52	0.05	23.4	C	1,200	18	54
Overall Intersection	0.89	39.5	D	--	--	--	0.89	39.5	D	--	--	--
<i>Weekday PM:</i>												
Lahaye Dr EB Approach	1.04	70.3	E	1,500	1,151	1,821	1.12	99.2	F	1,500	1,521	1,614
Lahaye Dr WB Left	1.75	431.1	F	125	224	229	1.36	249.1	F	125	223	237
Lahaye Dr WB Through	0.28	14.3	B	1,000	938	1,227	0.28	14.3	B	1,000	919	1,246
Lahaye Dr WB Right	0.02	12.1	B	1,000	801	1,425	0.02	12.1	B	1,000	719	1,435
Mount Support Rd NB Left/Through	0.91	136.2	F	7,150	62	127	0.91	136.2	F	7,150	80	190
Mount Support Rd NB Right	0.06	54.3	D	100	47	84	0.08	54.5	D	100	69	147
Mount Support Rd SB Left	1.09	122.5	F	115	192	254	1.09	122.5	F	115	184	255
Mount Support Rd SB Through/Right	0.68	40.7	D	1,200	477	1,104	0.68	40.7	D	1,200	370	883
Overall Intersection	1.49	95.5	F	--	--	--	1.23	95.7	F	--	--	--

V/C = volume-to-capacity ratio.
Delay in seconds.
Storage lengths and queues in feet.

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Table 8 – Capacity Analysis Summary 2031 Conditions

Intersection/Peak Hour/ Critical Movement or Lane Group	2031 No-Build						2031 Build					
	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue
Mount Support Road, Heater Road, and Old Etna Road												
<i>Weekday AM:</i>												
Old Etna Rd EB Approach	0.29	10.7	B	550	48	81	0.29	10.9	B	550	49	83
Old Etna Rd WB Approach	0.25	10.4	B	1,400	41	67	0.25	10.6	B	1,400	39	65
Heater Rd NB Approach	0.46	12.7	B	1,850	59	96	0.47	13.0	B	1,850	59	99
Mount Support Rd SB Approach	0.30	10.8	B	1,450	40	71	0.33	11.3	B	1,450	41	69
<i>Weekday PM:</i>												
Old Etna Rd EB Approach	0.20	11.3	B	550	37	62	0.21	11.5	B	550	36	62
Old Etna Rd WB Approach	0.44	14.6	B	1,400	56	94	0.46	15.2	C	1,400	60	105
Heater Rd NB Approach	0.42	13.5	B	1,850	54	92	0.45	14.3	B	1,850	57	103
Mount Support Rd SB Approach	0.94	45.2	E	1,450	210	466	0.97	52.3	F	1,450	204	480
Mount Support Road and Proposed Site Driveway												
<i>Weekday AM:</i>												
Site Driveway WB Approach	--	--	--	--	--	--	0.12	13.1	B	200	26	49
Mount Support Rd SB Left	--	--	--	--	--	--	0.01	0.6	A	1,000	3	22
<i>Weekday PM:</i>												
Site Driveway WB Approach	--	--	--	--	--	--	0.08	12.8	B	200	21	46
Mount Support Rd SB Left	--	--	--	--	--	--	0.03	0.7	A	1,000	7	40

V/C = volume-to-capacity ratio.
Delay in seconds.
Storage lengths and queues in feet.

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Table 8 (continued) – Capacity Analysis Summary 2031 Conditions

Intersection/Peak Hour/ Critical Movement or Lane Group	2031 No-Build						2031 Build					
	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue	v/c	Delay	LOS	Storage Length	50 th % Queue	95 th % Queue
Mount Support Road and Lahaye Drive												
<i>Weekday AM:</i>												
Lahaye Dr EB Approach	0.80	30.4	C	1,500	223	568	0.80	30.4	C	1,500	339	984
Lahaye Dr WB Left	0.13	19.6	B	125	50	167	0.15	19.8	B	125	69	198
Lahaye Dr WB Through	0.95	39.6	D	1,000	362	715	0.95	39.6	D	1,000	349	666
Lahaye Dr WB Right	0.49	15.3	B	1,000	157	485	0.49	15.3	B	1,000	158	471
Mount Support Rd NB Left/Through	1.14	133.5	F	7,150	201	393	1.14	133.5	F	7,150	210	407
Mount Support Rd NB Right	0.24	33.6	C	100	88	217	0.36	34.8	C	100	105	240
Mount Support Rd SB Left	0.46	50.9	D	115	26	62	0.46	50.9	D	115	24	56
Mount Support Rd SB Through/Right	0.05	25.4	C	1,200	25	66	0.05	25.4	C	1,200	23	59
Overall Intersection	0.97	44.9	D	--	--	--	0.97	44.7	D	--	--	--
<i>Weekday PM:</i>												
Lahaye Dr EB Approach	1.17	119.9	F	1,500	1,533	1,548	1.17	119.9	F	1,500	1,533	1,543
Lahaye Dr WB Left	1.11	156.4	F	125	200	277	1.35	244.2	F	125	221	248
Lahaye Dr WB Through	0.28	13.3	B	1,000	578	1,169	0.28	13.3	B	1,000	896	1,290
Lahaye Dr WB Right	0.02	11.2	B	1,000	246	910	0.02	11.2	B	1,000	718	1,435
Mount Support Rd NB Left/Through	0.98	163.6	F	7,150	82	182	0.98	163.6	F	7,150	72	148
Mount Support Rd NB Right	0.06	54.4	D	100	53	117	0.08	54.6	D	100	58	107
Mount Support Rd SB Left	1.09	123.4	F	115	210	237	1.09	123.4	F	115	210	237
Mount Support Rd SB Through/Right	0.66	41.7	D	1,200	925	1,549	0.66	41.7	D	1,200	875	1,486
Overall Intersection	1.09	96.6	F	--	--	--	1.23	104.8	F	--	--	--

V/C = volume-to-capacity ratio.
Delay in seconds.
Storage lengths and queues in feet.

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Mount Support Road, Heater Road and Old Etna Road

Based on the 2021 and 2031 No-Build and Build traffic volume conditions, the Mount Support Road, Heater Road, and Old Etna Road approaches to this all-way stop-control intersection operate at LOS B during the weekday morning peak hour. During the weekday evening peak hour, longer delays (LOS E/F) are expected to occur along the Mount Support Road southbound approach for the 2021 and 2031 No-Build and Build traffic volume conditions. The impacts associated with the proposed development are anticipated to be minimal with an increase of between 1 and 19 vehicles on each approach during the weekday morning and weekday evening peak hours, equating to 1 additional vehicle every 3.2 minutes to 1 hour. The impacts on the overall operations are shown not be significant with maximum increases in delays of 2.1 seconds during the weekday morning peak hour and 7.2 seconds during the weekday evening peak hour.

Mount Support Road and Site Driveway

During the 2021 and 2031 Build traffic volume conditions, the critical movements at the proposed site driveway unsignalized intersection with Mount Support Road are projected to operate at LOS B or better for the weekday morning and weekday evening peak hours.

Mount Support Road and Lahaye Drive

Based on the 2021 and 2031 No-Build and Build traffic volume conditions, the Mount Support Road and Lahaye Drive signalized intersection is projected to operate at LOS D during the weekday morning peak hour and over capacity during weekday evening peak hour (i.e., long delays and v/c ratio > 1.00). Long delays and vehicular queues are currently experienced on different lane groups and are independent of the increase in traffic volumes associated with historical growth, background developments, or the proposed expansion project. The impacts on the overall operations are shown not be significant with a maximum increase in intersection delay of 8.2 seconds during the weekday morning and weekday evening peak hours.

Improvements

The final component of a traffic study is the identification of improvement measures that are expected to be effective in eliminating or improving anticipated deficiencies resulting from the combination of existing, background, and project-generated traffic.

Auxiliary Turn Lane Evaluation

To determine if exclusive turn lanes should be constructed along the Mount Support Road approaches to the proposed site driveway unsignalized intersection, auxiliary lane warrant evaluations were conducted in accordance with National Cooperative Highway Research Program (NCHRP) Report 457.¹⁹ The following summarizes the results of this evaluation and the auxiliary lane calculation worksheets are provided in the Appendix.

¹⁹ Bonneson, James A. and Michael D. Fontaine. *Evaluating Intersection Improvements: An Engineering Study Guide*. National Cooperative Highway Research Program Report 457. Washington, DC: Transportation Research Board, 2001.
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- **Mount Support Road Southbound Left-Turn Lane:** Based on NCHRP 457 guidelines for the construction of an exclusive left-turn lane along the Mount Support Road southbound approach to the proposed site driveway, the 2031 Build traffic volumes would suggest that a left-turn lane is not warranted.
- **Mount Support Road Northbound Right-Turn Lane:** Based on NCHRP 457 guidelines for the construction of an exclusive right-turn lane along the Mount Support Road northbound approach to the proposed site driveway, the 2031 Build traffic volumes would suggest that a right-turn lane is not warranted.

Fair Share Contribution

The City of Lebanon's Zoning Ordinance (Section 213) authorizes the Planning Board to assess impact fees based on the type/use and square footage of new developments or expansions to existing uses. The impact fee is developed in proportion to the project's demand on the public capital facilities of the School District and the City (i.e., recreation, police department, and fire department). The assessment of the impact fee would accordingly be based on the per square foot of gross living area for the proposed multi-family housing development and does not include unheated areas (e.g., decks, porches, balconies, garages, and other unenclosed areas).

Mount Support Road Corridor Improvements

During the Planning Board process for the DHMC patient tower expansion project, that applicant committed to working with the City of Lebanon and developers in the area to implement and encourage multi-modal opportunities along Mount Support Road. The City of Lebanon Planning Department officials have initiated discussions with developers in the area regarding overall impacts to the transportation system and potential pedestrian, bicycle, transit, and vehicular measures that could be implemented. The apartment development applicant is committed to working with the City of Lebanon and Advance Transit officials in improving the efficiency of transit along the Mount Support Road corridor.

Summary of Findings

Existing and future conditions in the study area have been described, analyzed, and evaluated with respect to traffic operations and the impact of the proposed apartment development to be located at 402 Mount Support Road. Common traffic engineering practice suggests that a development may have a significant impact (i.e., drop level of service or increase delay by 10 seconds or more) if the addition of site trips increases traffic volumes on an intersection approach by 100 vehicles per hour or more. Based on the findings of this traffic study, the additional traffic through the study area intersections associated with the proposed apartment development does not trigger this threshold.

Based on United States Journey-to-Work Data for the City of Lebanon, approximately 90% of residents drive to and from work. To provide a conservative (worse case) assessment, however, a 10% credit was not applied to reduce the volume of estimated site trips associated with residents using the multi-modal options available in the area (e.g., Advance Transit bus stops and a multi-use path for pedestrians and bicyclists). Therefore, the traffic impacts evaluated within this traffic study represent an overestimated analysis scenario.

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The City of Lebanon is interested in improving existing traffic operations at the Mount Support Road and Lahaye Drive signalized intersection, as well as expanding the non-motorized facilities along the Mount Support Road corridor. With the understanding that there are developments in the area that have been approved or are proceeding through the local permitting process, the applicant appreciates the City of Lebanon Planning Department's initiative in upgrading the transportation system to improve progression and safety for all users. The applicant is committed to working with the City of Lebanon and other developers in master planning efforts to improve multi-modal mobility along the Mount Support Road corridor.

Appendices

Traffic Count Data

Traffic Volume Adjustment Data

Transit Data

Trip Generation Calculations

Capacity and Queue Analysis Worksheets

Auxiliary Turn Lane Evaluation Worksheets

Traffic Impact Assessment: 343 Mount Support Road Apartments

Traffic Count Data

Accurate Counts
978-664-2565

Page 1

Location : Mt. Support Road
Location : North of Timberwood Commons
City/State: Lebanon, NH

1852VOL1

Start Time	1/7/2020 Tue	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	15			4	38				
12:15		0	23			0	38				
12:30		0	20			1	21				
12:45		0	27	0	85	2	27	7	124	7	209
01:00		0	20			1	18				
01:15		1	24			0	24				
01:30		2	20			7	26				
01:45		0	28	3	92	0	24	8	92	11	184
02:00		0	17			0	22				
02:15		0	27			0	30				
02:30		0	18			3	38				
02:45		1	25	1	87	1	42	4	132	5	219
03:00		2	19			1	59				
03:15		0	16			3	52				
03:30		2	21			1	88				
03:45		1	26	5	82	0	78	5	277	10	359
04:00		2	11			0	96				
04:15		1	12			0	94				
04:30		4	15			0	104				
04:45		4	14	11	52	1	125	1	419	12	471
05:00		5	14			0	143				
05:15		3	16			3	148				
05:30		20	15			3	97				
05:45		23	9	51	54	4	64	10	452	61	506
06:00		19	16			2	36				
06:15		32	25			5	36				
06:30		61	10			4	32				
06:45		53	12	165	63	6	29	17	133	182	196
07:00		38	5			8	27				
07:15		80	9			18	35				
07:30		79	2			23	27				
07:45		88	3	285	19	20	19	69	108	354	127
08:00		54	6			20	20				
08:15		52	2			16	10				
08:30		51	7			16	8				
08:45		43	2	200	17	15	8	67	46	267	63
09:00		22	4			22	10				
09:15		26	3			14	11				
09:30		30	2			14	6				
09:45		20	1	98	10	29	6	79	33	177	43
10:00		17	1			24	1				
10:15		29	2			21	5				
10:30		23	3			13	8				
10:45		19	2	88	8	20	2	78	16	166	24
11:00		6	2			29	7				
11:15		23	1			28	0				
11:30		19	0			23	8				
11:45		32	0	80	3	24	5	104	20	184	23
Total		987	572			449	1852			1436	2424
Percent		63.3%	36.7%			19.5%	80.5%			37.2%	62.8%
Grand Total		987	572			449	1852			1436	2424
Percent		63.3%	36.7%			19.5%	80.5%			37.2%	62.8%
ADT		ADT 3,860		AADT 3,860							

Accurate Counts
978-664-2565

Page 1

Location : Mt. Support Road
Location : North of Timberwood Commons
City/State: Lebanon, NH

1852VOL1

Start Time	1/7/2020 Tue	NB	SB	Total
12:00 AM		0	7	7
01:00		3	8	11
02:00		1	4	5
03:00		5	5	10
04:00		11	1	12
05:00		51	10	61
06:00		165	17	182
07:00		285	69	354
08:00		200	67	267
09:00		98	79	177
10:00		88	78	166
11:00		80	104	184
12:00 PM		85	124	209
01:00		92	92	184
02:00		87	132	219
03:00		82	277	359
04:00		52	419	471
05:00		54	452	506
06:00		63	133	196
07:00		19	108	127
08:00		17	46	63
09:00		10	33	43
10:00		8	16	24
11:00		3	20	23
Total		1559	2301	3860
Percent		40.4%	59.6%	
AM Peak	-	07:00	11:00	-
Vol.	-	285	104	-
PM Peak	-	13:00	17:00	-
Vol.	-	92	452	-
Grand Total		1559	2301	3860
Percent		40.4%	59.6%	
ADT		ADT 3,860	AADT 3,860	

Accurate Counts
978-664-2565

Page 1

Location : Mt. Support Road
Location : North of Timberwood Commons
City/State: Lebanon, NH

1852SPD1

NB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/07/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	2	0	0	1	0	0	0	0	0	0	0	3
02:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	2	1	1	0	1	0	0	0	0	0	5
04:00	0	3	0	3	3	2	0	0	0	0	0	0	0	0	11
05:00	1	0	11	19	15	4	1	0	0	0	0	0	0	0	51
06:00	0	0	15	62	68	15	3	1	1	0	0	0	0	0	165
07:00	0	2	13	95	118	48	8	1	0	0	0	0	0	0	285
08:00	1	0	8	49	85	41	13	2	1	0	0	0	0	0	200
09:00	0	0	2	20	37	23	10	5	0	0	1	0	0	0	98
10:00	3	3	5	25	26	21	5	0	0	0	0	0	0	0	88
11:00	0	0	2	19	25	25	8	0	1	0	0	0	0	0	80
12 PM	0	0	2	17	33	23	8	2	0	0	0	0	0	0	85
13:00	0	0	6	16	32	31	7	0	0	0	0	0	0	0	92
14:00	1	0	6	16	20	33	10	0	1	0	0	0	0	0	87
15:00	0	0	7	16	28	24	6	1	0	0	0	0	0	0	82
16:00	0	0	3	11	23	10	5	0	0	0	0	0	0	0	52
17:00	0	0	8	18	15	11	2	0	0	0	0	0	0	0	54
18:00	0	0	2	11	30	15	4	1	0	0	0	0	0	0	63
19:00	0	0	0	2	10	3	4	0	0	0	0	0	0	0	19
20:00	0	0	1	3	7	4	2	0	0	0	0	0	0	0	17
21:00	0	0	0	3	3	4	0	0	0	0	0	0	0	0	10
22:00	0	0	0	0	3	5	0	0	0	0	0	0	0	0	8
23:00	0	0	0	1	1	1	0	0	0	0	0	0	0	0	3
Total	6	8	91	408	584	345	98	13	5	0	1	0	0	0	1559

Daily

15th Percentile : 26 MPH
50th Percentile : 32 MPH
85th Percentile : 38 MPH
95th Percentile : 41 MPH

Mean Speed(Average) : 33 MPH
10 MPH Pace Speed : 26-35 MPH
Number in Pace : 992
Percent in Pace : 63.6%
Number of Vehicles > 35 MPH : 462
Percent of Vehicles > 35 MPH : 29.6%

Grand Total	6	8	91	408	584	345	98	13	5	0	1	0	0	0	1559
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Overall

15th Percentile : 26 MPH
50th Percentile : 32 MPH
85th Percentile : 38 MPH
95th Percentile : 41 MPH

Mean Speed(Average) : 33 MPH
10 MPH Pace Speed : 26-35 MPH
Number in Pace : 992
Percent in Pace : 63.6%
Number of Vehicles > 35 MPH : 462
Percent of Vehicles > 35 MPH : 29.6%

Accurate Counts
978-664-2565

Page 2

Location : Mt. Support Road
Location : North of Timberwood Commons
City/State: Lebanon, NH

1852SPD1

SB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/07/20	0	0	1	2	2	2	0	0	0	0	0	0	0	0	7
01:00	0	0	3	1	2	2	0	0	0	0	0	0	0	0	8
02:00	0	0	2	2	0	0	0	0	0	0	0	0	0	0	4
03:00	1	0	1	0	0	2	0	1	0	0	0	0	0	0	5
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
05:00	0	1	2	3	3	1	0	0	0	0	0	0	0	0	10
06:00	0	0	2	6	6	1	2	0	0	0	0	0	0	0	17
07:00	0	1	10	27	26	3	2	0	0	0	0	0	0	0	69
08:00	0	0	0	18	36	11	2	0	0	0	0	0	0	0	67
09:00	0	0	0	9	30	27	12	0	1	0	0	0	0	0	79
10:00	0	0	6	10	27	25	9	1	0	0	0	0	0	0	78
11:00	0	0	7	5	35	44	12	1	0	0	0	0	0	0	104
12 PM	1	0	0	10	58	36	15	4	0	0	0	0	0	0	124
13:00	0	1	0	9	30	37	11	4	0	0	0	0	0	0	92
14:00	0	0	0	11	41	52	27	1	0	0	0	0	0	0	132
15:00	0	0	2	28	97	114	35	1	0	0	0	0	0	0	277
16:00	0	0	0	65	168	155	26	5	0	0	0	0	0	0	419
17:00	0	0	1	131	238	71	10	1	0	0	0	0	0	0	452
18:00	0	0	5	22	55	43	8	0	0	0	0	0	0	0	133
19:00	0	0	0	10	42	43	12	1	0	0	0	0	0	0	108
20:00	0	0	0	9	14	17	4	2	0	0	0	0	0	0	46
21:00	0	0	0	4	11	13	4	1	0	0	0	0	0	0	33
22:00	0	0	0	1	8	5	2	0	0	0	0	0	0	0	16
23:00	1	0	1	4	6	5	3	0	0	0	0	0	0	0	20
Total	3	3	43	387	936	709	196	23	1	0	0	0	0	0	2301

Daily

15th Percentile : 28 MPH
50th Percentile : 33 MPH
85th Percentile : 39 MPH
95th Percentile : 42 MPH

Mean Speed(Average) : 34 MPH
10 MPH Pace Speed : 31-40 MPH
Number in Pace : 1645
Percent in Pace : 71.5%
Number of Vehicles > 35 MPH : 929
Percent of Vehicles > 35 MPH : 40.4%

Grand Total	3	3	43	387	936	709	196	23	1	0	0	0	0	0	2301
-------------	---	---	----	-----	-----	-----	-----	----	---	---	---	---	---	---	------

Overall

15th Percentile : 28 MPH
50th Percentile : 33 MPH
85th Percentile : 39 MPH
95th Percentile : 42 MPH

Mean Speed(Average) : 34 MPH
10 MPH Pace Speed : 31-40 MPH
Number in Pace : 1645
Percent in Pace : 71.5%
Number of Vehicles > 35 MPH : 929
Percent of Vehicles > 35 MPH : 40.4%

Accurate Counts
978-664-2565

Page 3

Location : Mt. Support Road
Location : North of Timberwood Commons
City/State: Lebanon, NH

1852SPD1

NB, SB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/07/20	0	0	1	2	2	2	0	0	0	0	0	0	0	0	7
01:00	0	0	3	3	2	2	1	0	0	0	0	0	0	0	11
02:00	0	0	2	2	0	1	0	0	0	0	0	0	0	0	5
03:00	1	0	1	0	2	3	1	1	1	0	0	0	0	0	10
04:00	0	3	0	3	4	2	0	0	0	0	0	0	0	0	12
05:00	1	1	13	22	18	5	1	0	0	0	0	0	0	0	61
06:00	0	0	17	68	74	16	5	1	1	0	0	0	0	0	182
07:00	0	3	23	122	144	51	10	1	0	0	0	0	0	0	354
08:00	1	0	8	67	121	52	15	2	1	0	0	0	0	0	267
09:00	0	0	2	29	67	50	22	5	1	0	1	0	0	0	177
10:00	3	3	11	35	53	46	14	1	0	0	0	0	0	0	166
11:00	0	0	9	24	60	69	20	1	1	0	0	0	0	0	184
12 PM	1	0	2	27	91	59	23	6	0	0	0	0	0	0	209
13:00	0	1	6	25	62	68	18	4	0	0	0	0	0	0	184
14:00	1	0	6	27	61	85	37	1	1	0	0	0	0	0	219
15:00	0	0	9	44	125	138	41	2	0	0	0	0	0	0	359
16:00	0	0	3	76	191	165	31	5	0	0	0	0	0	0	471
17:00	0	0	9	149	253	82	12	1	0	0	0	0	0	0	506
18:00	0	0	7	33	85	58	12	1	0	0	0	0	0	0	196
19:00	0	0	0	12	52	46	16	1	0	0	0	0	0	0	127
20:00	0	0	1	12	21	21	6	2	0	0	0	0	0	0	63
21:00	0	0	0	7	14	17	4	1	0	0	0	0	0	0	43
22:00	0	0	0	1	11	10	2	0	0	0	0	0	0	0	24
23:00	1	0	1	5	7	6	3	0	0	0	0	0	0	0	23
Total	9	11	134	795	1520	1054	294	36	6	0	1	0	0	0	3860

Daily

15th Percentile : 27 MPH
50th Percentile : 33 MPH
85th Percentile : 38 MPH
95th Percentile : 42 MPH

Mean Speed(Average) : 34 MPH
10 MPH Pace Speed : 31-40 MPH
Number in Pace : 2574
Percent in Pace : 66.7%
Number of Vehicles > 35 MPH : 1391
Percent of Vehicles > 35 MPH : 36.0%

Grand Total	9	11	134	795	1520	1054	294	36	6	0	1	0	0	0	3860
-------------	---	----	-----	-----	------	------	-----	----	---	---	---	---	---	---	------

Overall

15th Percentile : 27 MPH
50th Percentile : 33 MPH
85th Percentile : 38 MPH
95th Percentile : 42 MPH

Mean Speed(Average) : 34 MPH
10 MPH Pace Speed : 31-40 MPH
Number in Pace : 2574
Percent in Pace : 66.7%
Number of Vehicles > 35 MPH : 1391
Percent of Vehicles > 35 MPH : 36.0%

N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 1

Groups Printed- Cars - Trucks

	Mt. Support Rd From North			Old Etna Rd From East			Heater Rd From South			Old Etna Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	1	13	0	15	11	7	17	27	7	0	10	10	118
07:15 AM	1	10	0	13	5	5	21	20	5	0	22	21	123
07:30 AM	8	27	0	11	4	11	13	31	5	1	19	11	141
07:45 AM	6	18	0	16	7	9	14	31	11	1	20	11	144
Total	16	68	0	55	27	32	65	109	28	2	71	53	526
08:00 AM	8	11	0	17	6	4	4	24	8	1	15	18	116
08:15 AM	4	11	0	7	3	10	4	22	9	1	7	3	81
08:30 AM	6	10	0	6	3	8	4	21	8	0	5	2	73
08:45 AM	3	5	0	12	1	13	0	21	4	0	5	1	65
Total	21	37	0	42	13	35	12	88	29	2	32	24	335
Grand Total	37	105	0	97	40	67	77	197	57	4	103	77	861
Apprch %	26.1	73.9	0	47.5	19.6	32.8	23.3	59.5	17.2	2.2	56	41.8	
Total %	4.3	12.2	0	11.3	4.6	7.8	8.9	22.9	6.6	0.5	12	8.9	
Cars	37	100	0	96	39	67	77	190	57	4	102	67	836
% Cars	100	95.2	0	99	97.5	100	100	96.4	100	100	99	87	97.1
Trucks	0	5	0	1	1	0	0	7	0	0	1	10	25
% Trucks	0	4.8	0	1	2.5	0	0	3.6	0	0	1	13	2.9

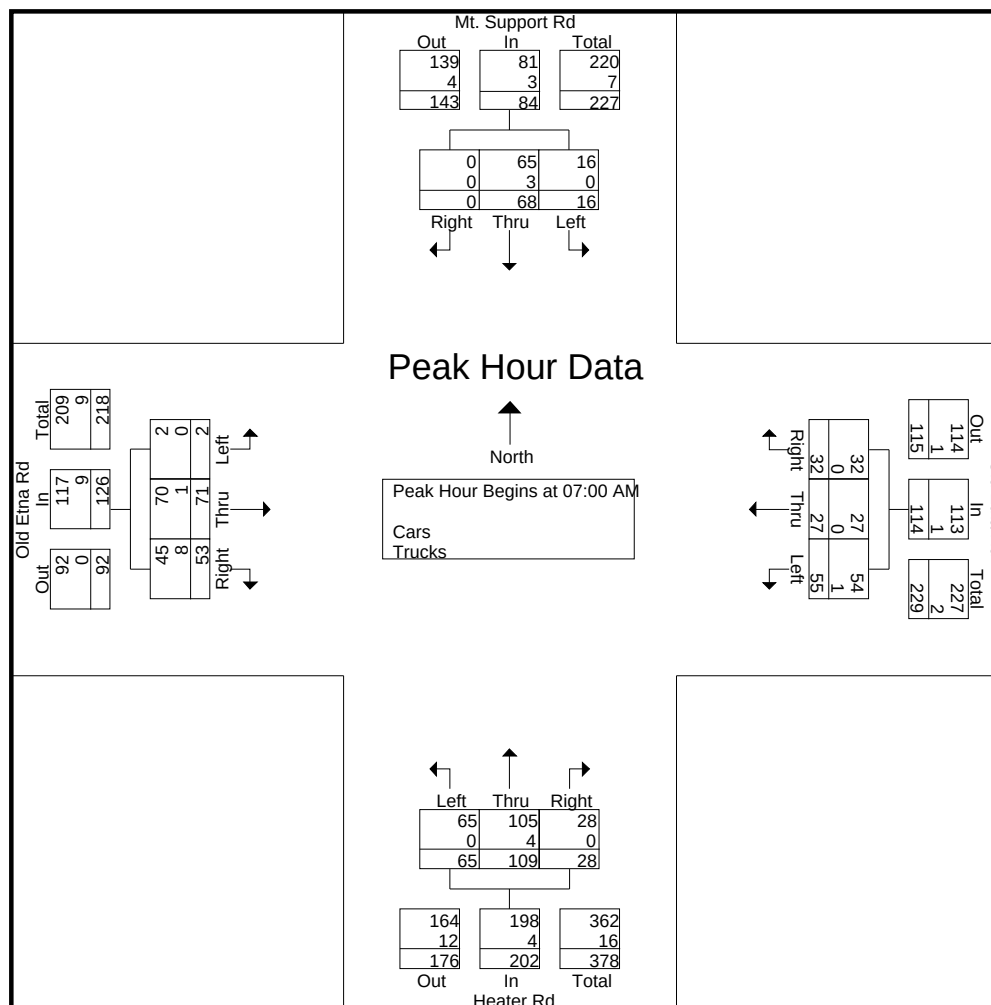
N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 2

	Mt. Support Rd From North				Old Etna Rd From East				Heater Rd From South				Old Etna Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	1	13	0	14	15	11	7	33	17	27	7	51	0	10	10	20	118
07:15 AM	1	10	0	11	13	5	5	23	21	20	5	46	0	22	21	43	123
07:30 AM	8	27	0	35	11	4	11	26	13	31	5	49	1	19	11	31	141
07:45 AM	6	18	0	24	16	7	9	32	14	31	11	56	1	20	11	32	144
Total Volume	16	68	0	84	55	27	32	114	65	109	28	202	2	71	53	126	526
% App. Total	19	81	0		48.2	23.7	28.1		32.2	54	13.9		1.6	56.3	42.1		
PHF	.500	.630	.000	.600	.859	.614	.727	.864	.774	.879	.636	.902	.500	.807	.631	.733	.913
Cars	16	65	0	81	54	27	32	113	65	105	28	198	2	70	45	117	509
% Cars	100	95.6	0	96.4	98.2	100	100	99.1	100	96.3	100	98.0	100	98.6	84.9	92.9	96.8
Trucks	0	3	0	3	1	0	0	1	0	4	0	4	0	1	8	9	17
% Trucks	0	4.4	0	3.6	1.8	0	0	0.9	0	3.7	0	2.0	0	1.4	15.1	7.1	3.2

N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 3

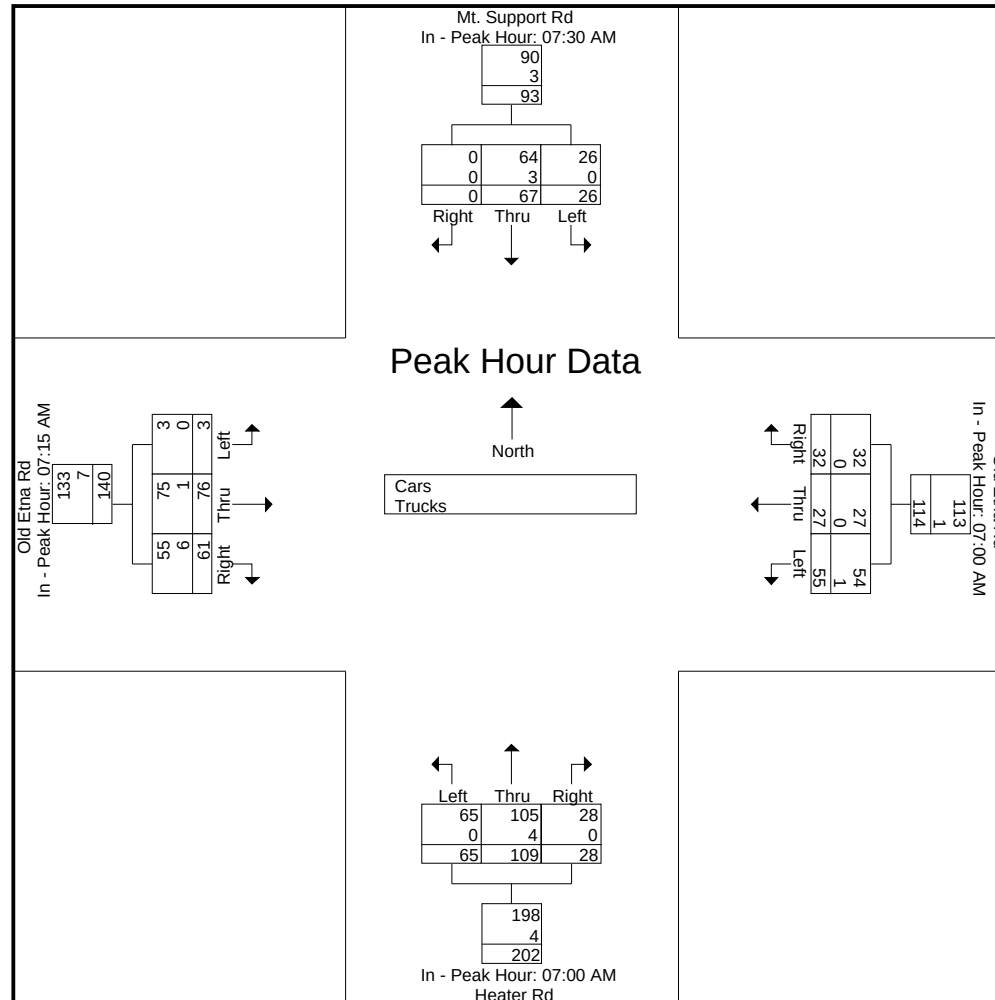


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM				07:00 AM				07:00 AM				07:15 AM			
+0 mins.	8	27	0	35	15	11	7	33	17	27	7	51	0	22	21	43
+15 mins.	6	18	0	24	13	5	5	23	21	20	5	46	1	19	11	31
+30 mins.	8	11	0	19	11	4	11	26	13	31	5	49	1	20	11	32
+45 mins.	4	11	0	15	16	7	9	32	14	31	11	56	1	15	18	34
Total Volume	26	67	0	93	55	27	32	114	65	109	28	202	3	76	61	140

% App. Total	28	72	0		48.2	23.7	28.1		32.2	54	13.9		2.1	54.3	43.6	
PHF	.813	.620	.000	.664	.859	.614	.727	.864	.774	.879	.636	.902	.750	.864	.726	.814
Cars	26	64	0	90	54	27	32	113	65	105	28	198	3	75	55	133
% Cars	100	95.5	0	96.8	98.2	100	100	99.1	100	96.3	100	98	100	98.7	90.2	95
Trucks	0	3	0	3	1	0	0	1	0	4	0	4	0	1	6	7
% Trucks	0	4.5	0	3.2	1.8	0	0	0.9	0	3.7	0	2	0	1.3	9.8	5



N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 9

Groups Printed- Trucks

	Mt. Support Rd From North			Old Etna Rd From East			Heater Rd From South			Old Etna Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	1	0	0	0	0	0	1	0	0	0	3	5
07:15 AM	0	0	0	1	0	0	0	1	0	0	0	3	5
07:30 AM	0	1	0	0	0	0	0	1	0	0	1	0	3
07:45 AM	0	1	0	0	0	0	0	1	0	0	0	2	4
Total	0	3	0	1	0	0	0	4	0	0	1	8	17
08:00 AM	0	1	0	0	1	0	0	1	0	0	0	1	4
08:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
08:30 AM	0	1	0	0	0	0	0	0	0	0	0	1	2
08:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	0	2	0	0	1	0	0	3	0	0	0	2	8
Grand Total	0	5	0	1	1	0	0	7	0	0	1	10	25
Apprch %	0	100	0	50	50	0	0	100	0	0	9.1	90.9	
Total %	0	20	0	4	4	0	0	28	0	0	4	40	

N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 13

Groups Printed- Bikes Peds

Start Time	Mt. Support Rd From North				Old Etna Rd From East				Heater Rd From South				Old Etna Rd From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6	0	6
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
07:45 AM	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	4	0	4
Total	0	0	0	0	0	0	0	1	0	0	0	10	0	0	0	0	11	0	11
08:00 AM	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	3	0	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	3	0	3
Grand Total	0	0	0	0	0	0	0	2	0	0	0	12	0	0	0	0	14	0	14
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 1

Groups Printed- Cars - Trucks

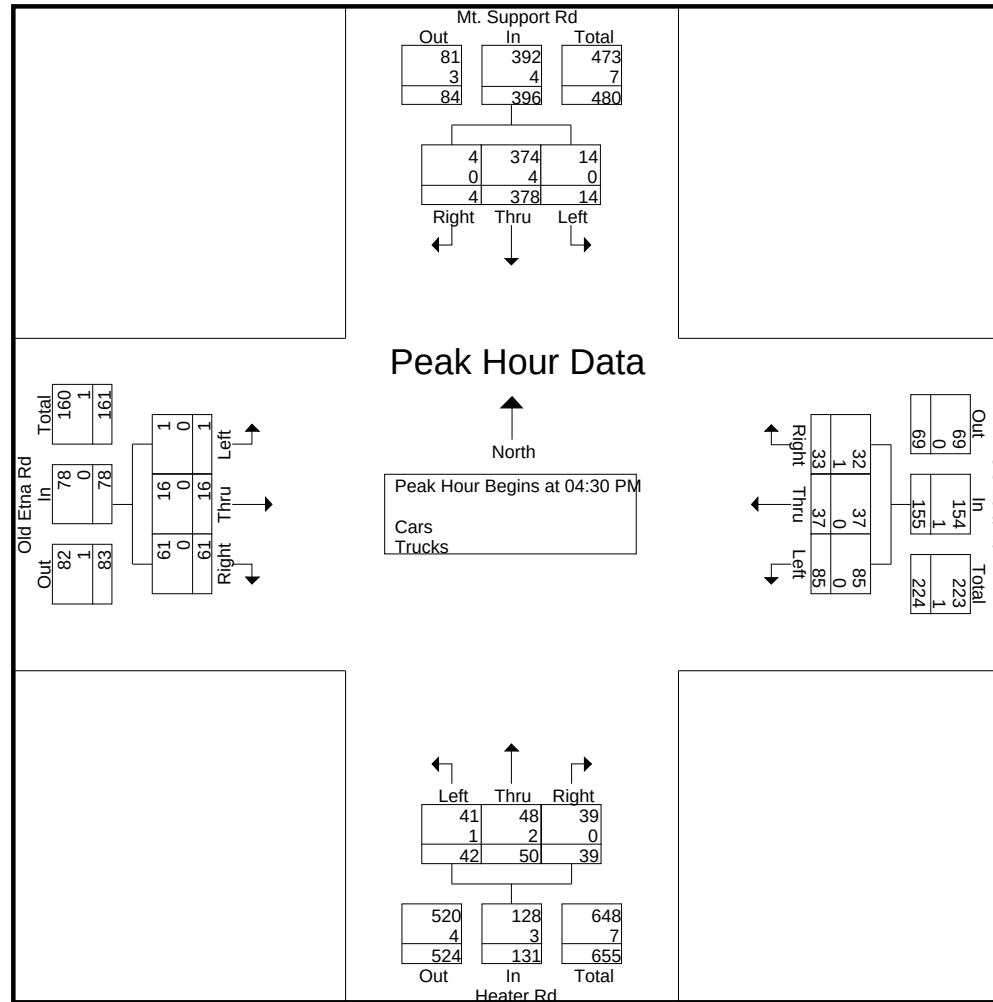
	Mt. Support Rd From North			Old Etna Rd From East			Heater Rd From South			Old Etna Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	5	43	1	19	8	3	6	15	11	0	6	38	155
03:15 PM	1	43	1	17	1	6	7	12	6	0	4	24	122
03:30 PM	6	60	1	21	2	2	8	19	5	1	3	6	134
03:45 PM	5	57	0	19	2	3	2	19	13	1	3	2	126
Total	17	203	3	76	13	14	23	65	35	2	16	70	537
04:00 PM	4	63	0	23	6	4	5	7	6	0	5	11	134
04:15 PM	5	71	1	15	9	3	10	13	15	0	1	13	156
04:30 PM	2	89	2	24	10	11	7	11	8	0	4	14	182
04:45 PM	2	86	1	14	8	8	19	19	9	1	3	16	186
Total	13	309	4	76	33	26	41	50	38	1	13	54	658
05:00 PM	3	102	0	32	5	8	6	15	11	0	5	28	215
05:15 PM	7	101	1	15	14	6	10	5	11	0	4	3	177
05:30 PM	4	65	4	15	0	3	6	12	12	0	3	9	133
05:45 PM	1	47	0	12	4	3	1	15	12	0	1	5	101
Total	15	315	5	74	23	20	23	47	46	0	13	45	626
Grand Total	45	827	12	226	69	60	87	162	119	3	42	169	1821
Apprch %	5.1	93.6	1.4	63.7	19.4	16.9	23.6	44	32.3	1.4	19.6	79	
Total %	2.5	45.4	0.7	12.4	3.8	3.3	4.8	8.9	6.5	0.2	2.3	9.3	
Cars	45	818	12	223	69	59	86	155	119	3	40	165	1794
% Cars	100	98.9	100	98.7	100	98.3	98.9	95.7	100	100	95.2	97.6	98.5
Trucks	0	9	0	3	0	1	1	7	0	0	2	4	27
% Trucks	0	1.1	0	1.3	0	1.7	1.1	4.3	0	0	4.8	2.4	1.5

N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 2

	Mt. Support Rd From North				Old Etna Rd From East				Heater Rd From South				Old Etna Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	2	89	2	93	24	10	11	45	7	11	8	26	0	4	14	18	182
04:45 PM	2	86	1	89	14	8	8	30	19	19	9	47	1	3	16	20	186
05:00 PM	3	102	0	105	32	5	8	45	6	15	11	32	0	5	28	33	215
05:15 PM	7	101	1	109	15	14	6	35	10	5	11	26	0	4	3	7	177
Total Volume	14	378	4	396	85	37	33	155	42	50	39	131	1	16	61	78	760
% App. Total	3.5	95.5	1		54.8	23.9	21.3		32.1	38.2	29.8		1.3	20.5	78.2		
PHF	.500	.926	.500	.908	.664	.661	.750	.861	.553	.658	.886	.697	.250	.800	.545	.591	.884
Cars	14	374	4	392	85	37	32	154	41	48	39	128	1	16	61	78	752
% Cars	100	98.9	100	99.0	100	100	97.0	99.4	97.6	96.0	100	97.7	100	100	100	100	98.9
Trucks	0	4	0	4	0	0	1	1	1	2	0	3	0	0	0	0	8
% Trucks	0	1.1	0	1.0	0	0	3.0	0.6	2.4	4.0	0	2.3	0	0	0	0	1.1

N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

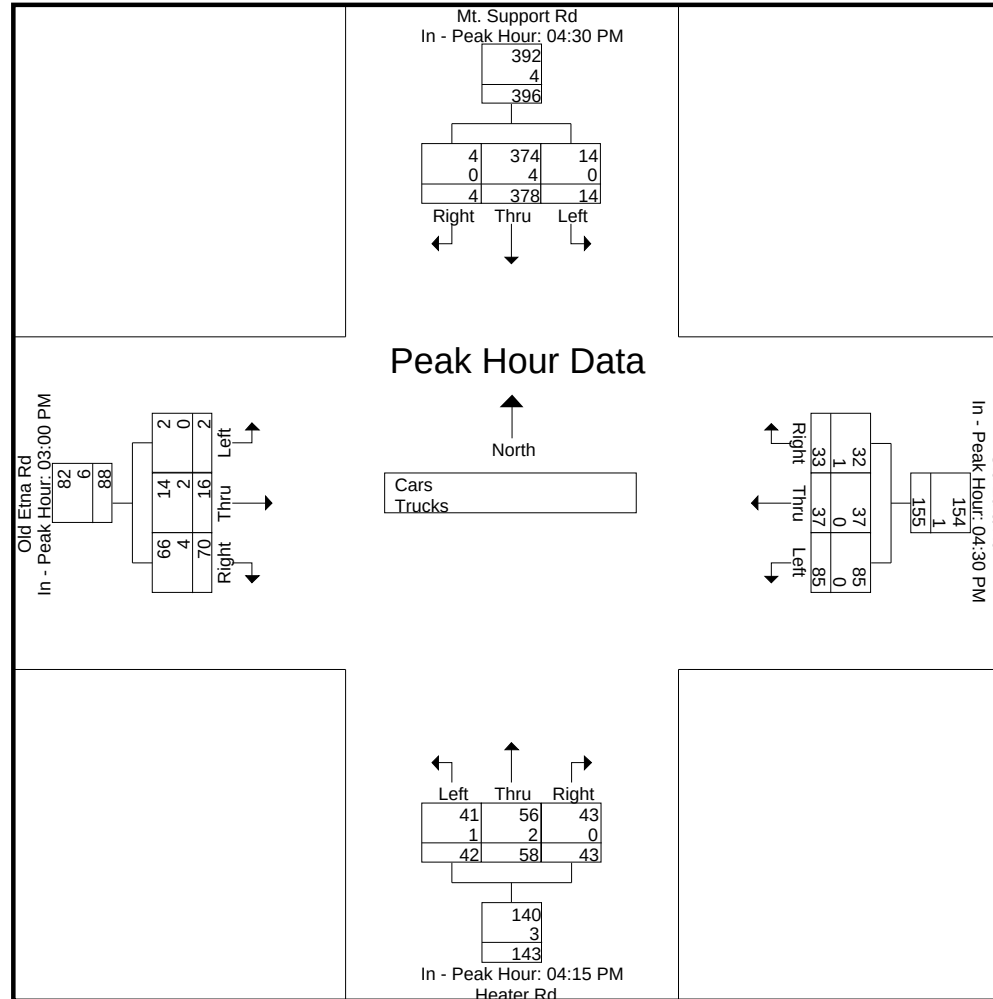


Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:15 PM				03:00 PM			
+0 mins.	2	89	2	93	24	10	11	45	10	13	15	38	0	6	38	44
+15 mins.	2	86	1	89	14	8	8	30	7	11	8	26	0	4	24	28
+30 mins.	3	102	0	105	32	5	8	45	19	19	9	47	1	3	6	10
+45 mins.	7	101	1	109	15	14	6	35	6	15	11	32	1	3	2	6
Total Volume	14	378	4	396	85	37	33	155	42	58	43	143	2	16	70	88
% App. Total	3.5	95.5	1		54.8	23.9	21.3		29.4	40.6	30.1		2.3	18.2	79.5	
PHF	.500	.926	.500	.908	.664	.661	.750	.861	.553	.763	.717	.761	.500	.667	.461	.500

Cars	14	374	4	392	85	37	32	154	41	56	43	140	2	14	66	82
% Cars	100	98.9	100	99	100	100	97	99.4	97.6	96.6	100	97.9	100	87.5	94.3	93.2
Trucks	0	4	0	4	0	0	1	1	1	2	0	3	0	2	4	6
% Trucks	0	1.1	0	1	0	0	3	0.6	2.4	3.4	0	2.1	0	12.5	5.7	6.8



N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 9

Groups Printed- Trucks

	Mt. Support Rd From North			Old Etna Rd From East			Heater Rd From South			Old Etna Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	0	0	0	2	0	0	0	0	0	0	0	1	3
03:15 PM	0	0	0	1	0	0	0	1	0	0	0	3	5
03:30 PM	0	1	0	0	0	0	0	1	0	0	1	0	3
03:45 PM	0	0	0	0	0	0	0	1	0	0	1	0	2
Total	0	1	0	3	0	0	0	3	0	0	2	4	13
04:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
04:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	1	1	0	0	0	0	2
Total	0	4	0	0	0	1	1	2	0	0	0	0	8
05:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	2	0	0	0	0	0	1	0	0	0	0	3
05:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	0	4	0	0	0	0	0	2	0	0	0	0	6
Grand Total	0	9	0	3	0	1	1	7	0	0	2	4	27
Apprch %	0	100	0	75	0	25	12.5	87.5	0	0	33.3	66.7	
Total %	0	33.3	0	11.1	0	3.7	3.7	25.9	0	0	7.4	14.8	

N/S Street : Mt. Support Rd / Heater Rd
E/W Street: Old Etna Road
City/State : Lebanon, NH
Weather : Clear

File Name : 18520002
Site Code : 18520002
Start Date : 1/7/2020
Page No : 13

Groups Printed- Bikes Peds

	Mt. Support Rd From North				Old Etna Rd From East				Heater Rd From South				Old Etna Rd From West				Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	0	7
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	2	1	3
03:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	1	0	2	0	0	0	8	0	0	0	0	10	1	11
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:30 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	3
Total	0	1	0	0	0	0	0	2	0	0	0	3	0	0	0	0	5	1	6
05:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2
Grand Total	0	1	0	0	0	1	0	5	0	0	0	12	0	0	0	0	17	2	19
Apprch %	0	100	0		0	100	0		0	0	0		0	0	0				
Total %	0	50	0		0	50	0		0	0	0		0	0	0		89.5	10.5	

N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
Page No : 1

Groups Printed- Cars - Trucks

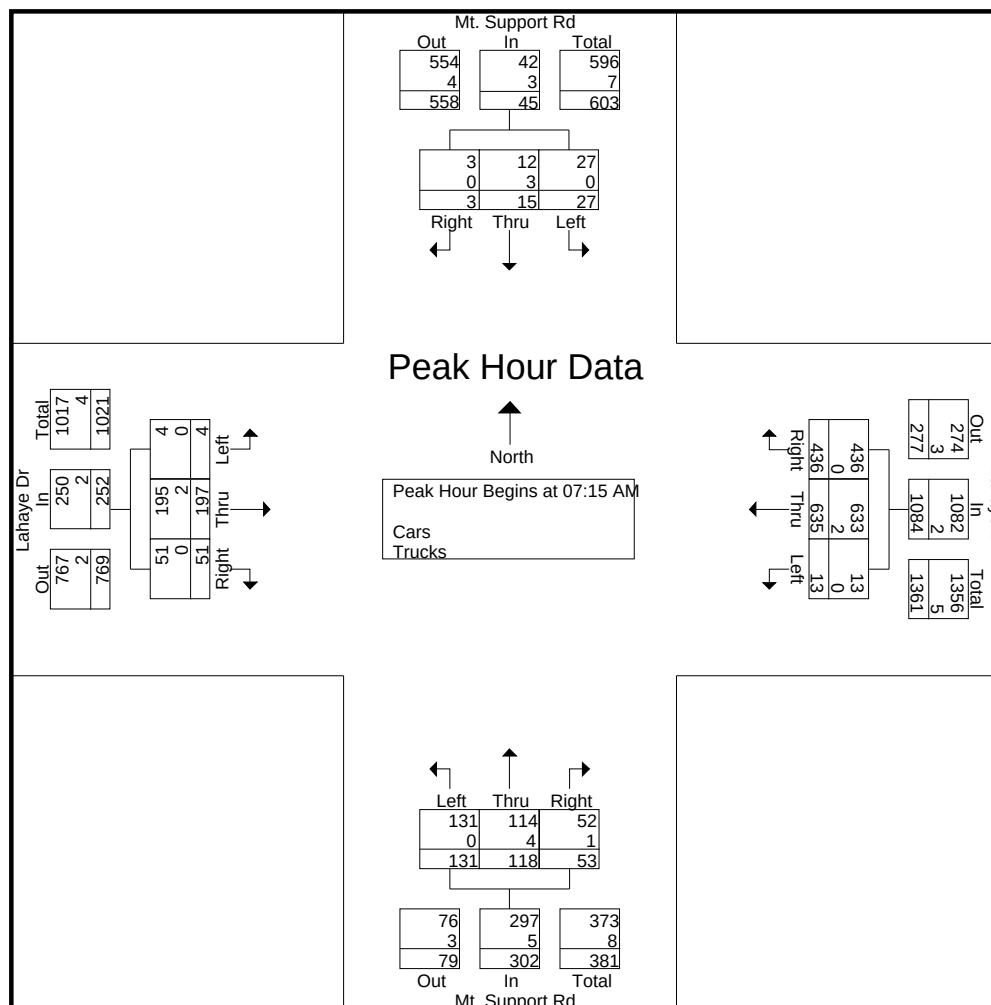
	Mt. Support Rd From North			Lahaye Dr From East			Mt. Support Rd From South			Lahaye Dr From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	1	1	3	142	93	18	12	3	0	21	4	298
07:15 AM	6	4	0	5	160	89	35	24	14	0	33	9	379
07:30 AM	5	3	1	2	158	111	31	34	15	0	69	18	447
07:45 AM	12	4	0	2	153	137	34	35	15	3	63	13	471
Total	23	12	2	12	613	430	118	105	47	3	186	44	1595
08:00 AM	4	4	2	4	164	99	31	25	9	1	32	11	386
08:15 AM	2	2	1	6	147	82	22	15	15	2	40	8	342
08:30 AM	4	1	1	2	154	47	21	12	13	2	33	11	301
08:45 AM	5	1	0	6	108	22	27	11	7	0	36	7	230
Total	15	8	4	18	573	250	101	63	44	5	141	37	1259
Grand Total	38	20	6	30	1186	680	219	168	91	8	327	81	2854
Apprch %	59.4	31.2	9.4	1.6	62.6	35.9	45.8	35.1	19	1.9	78.6	19.5	
Total %	1.3	0.7	0.2	1.1	41.6	23.8	7.7	5.9	3.2	0.3	11.5	2.8	
Cars	38	16	6	30	1183	680	219	163	90	8	324	81	2838
% Cars	100	80	100	100	99.7	100	100	97	98.9	100	99.1	100	99.4
Trucks	0	4	0	0	3	0	0	5	1	0	3	0	16
% Trucks	0	20	0	0	0.3	0	0	3	1.1	0	0.9	0	0.6

N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

	Mt. Support Rd From North				Lahaye Dr From East				Mt. Support Rd From South				Lahaye Dr From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	6	4	0	10	5	160	89	254	35	24	14	73	0	33	9	42	379
07:30 AM	5	3	1	9	2	158	111	271	31	34	15	80	0	69	18	87	447
07:45 AM	12	4	0	16	2	153	137	292	34	35	15	84	3	63	13	79	471
08:00 AM	4	4	2	10	4	164	99	267	31	25	9	65	1	32	11	44	386
Total Volume	27	15	3	45	13	635	436	1084	131	118	53	302	4	197	51	252	1683
% App. Total	60	33.3	6.7		1.2	58.6	40.2		43.4	39.1	17.5		1.6	78.2	20.2		
PHF	.563	.938	.375	.703	.650	.968	.796	.928	.936	.843	.883	.899	.333	.714	.708	.724	.893
Cars	27	12	3	42	13	633	436	1082	131	114	52	297	4	195	51	250	1671
% Cars	100	80.0	100	93.3	100	99.7	100	99.8	100	96.6	98.1	98.3	100	99.0	100	99.2	99.3
Trucks	0	3	0	3	0	2	0	2	0	4	1	5	0	2	0	2	12
% Trucks	0	20.0	0	6.7	0	0.3	0	0.2	0	3.4	1.9	1.7	0	1.0	0	0.8	0.7

N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
Page No : 3

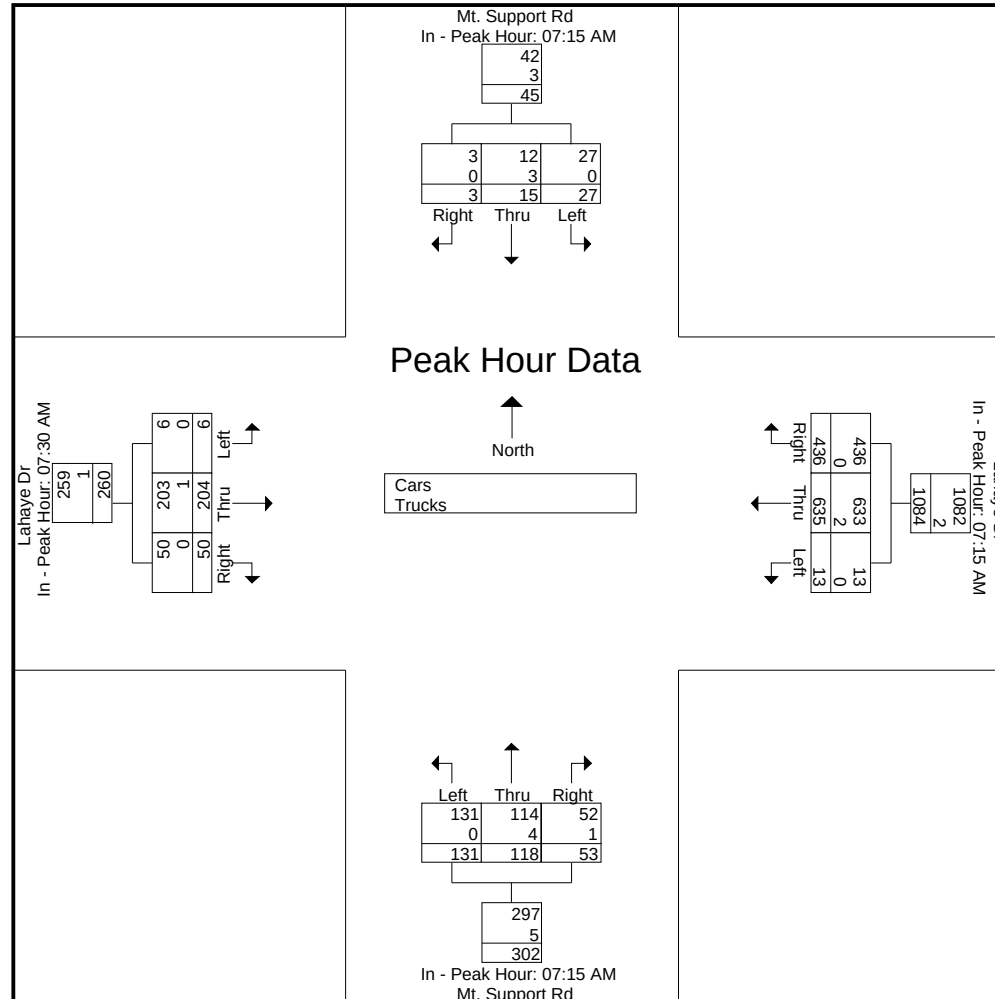


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:15 AM				07:15 AM				07:15 AM				07:30 AM			
+0 mins.	6	4	0	10	5	160	89	254	35	24	14	73	0	69	18	87
+15 mins.	5	3	1	9	2	158	111	271	31	34	15	80	3	63	13	79
+30 mins.	12	4	0	16	2	153	137	292	34	35	15	84	1	32	11	44
+45 mins.	4	4	2	10	4	164	99	267	31	25	9	65	2	40	8	50
Total Volume	27	15	3	45	13	635	436	1084	131	118	53	302	6	204	50	260

% App. Total	60	33.3	6.7		1.2	58.6	40.2		43.4	39.1	17.5		2.3	78.5	19.2	
PHF	.563	.938	.375	.703	.650	.968	.796	.928	.936	.843	.883	.899	.500	.739	.694	.747
Cars	27	12	3	42	13	633	436	1082	131	114	52	297	6	203	50	259
% Cars	100	80	100	93.3	100	99.7	100	99.8	100	96.6	98.1	98.3	100	99.5	100	99.6
Trucks	0	3	0	3	0	2	0	2	0	4	1	5	0	1	0	1
% Trucks	0	20	0	6.7	0	0.3	0	0.2	0	3.4	1.9	1.7	0	0.5	0	0.4



N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
Page No : 9

Groups Printed- Trucks

	Mt. Support Rd From North			Lahaye Dr From East			Mt. Support Rd From South			Lahaye Dr From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	1	0	0	0	0	0	2	1	0	1	0	5
07:30 AM	0	0	0	0	0	0	0	1	0	0	1	0	2
07:45 AM	0	1	0	0	2	0	0	0	0	0	0	0	3
Total	0	2	0	0	2	0	0	3	1	0	2	0	10
08:00 AM	0	1	0	0	0	0	0	1	0	0	0	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	1	0	0	1	0	0	1	0	0	1	0	4
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	1	0	0	2	0	0	1	0	6
Grand Total	0	4	0	0	3	0	0	5	1	0	3	0	16
Apprch %	0	100	0	0	100	0	0	83.3	16.7	0	100	0	
Total %	0	25	0	0	18.8	0	0	31.2	6.2	0	18.8	0	

N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
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Groups Printed- Bikes Peds

Start Time	Mt. Support Rd From North				Lahaye Dr From East				Mt. Support Rd From South				Lahaye Dr From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	2
07:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	3	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	2
Grand Total	0	0	0	1	0	0	0	2	0	0	1	1	0	0	0	0	4	1	5
Apprch %	0	0	0		0	0	0		0	0	100		0	0	0				
Total %	0	0	0		0	0	0		0	0	100		0	0	0		80	20	

N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
Page No : 1

Groups Printed- Cars - Trucks

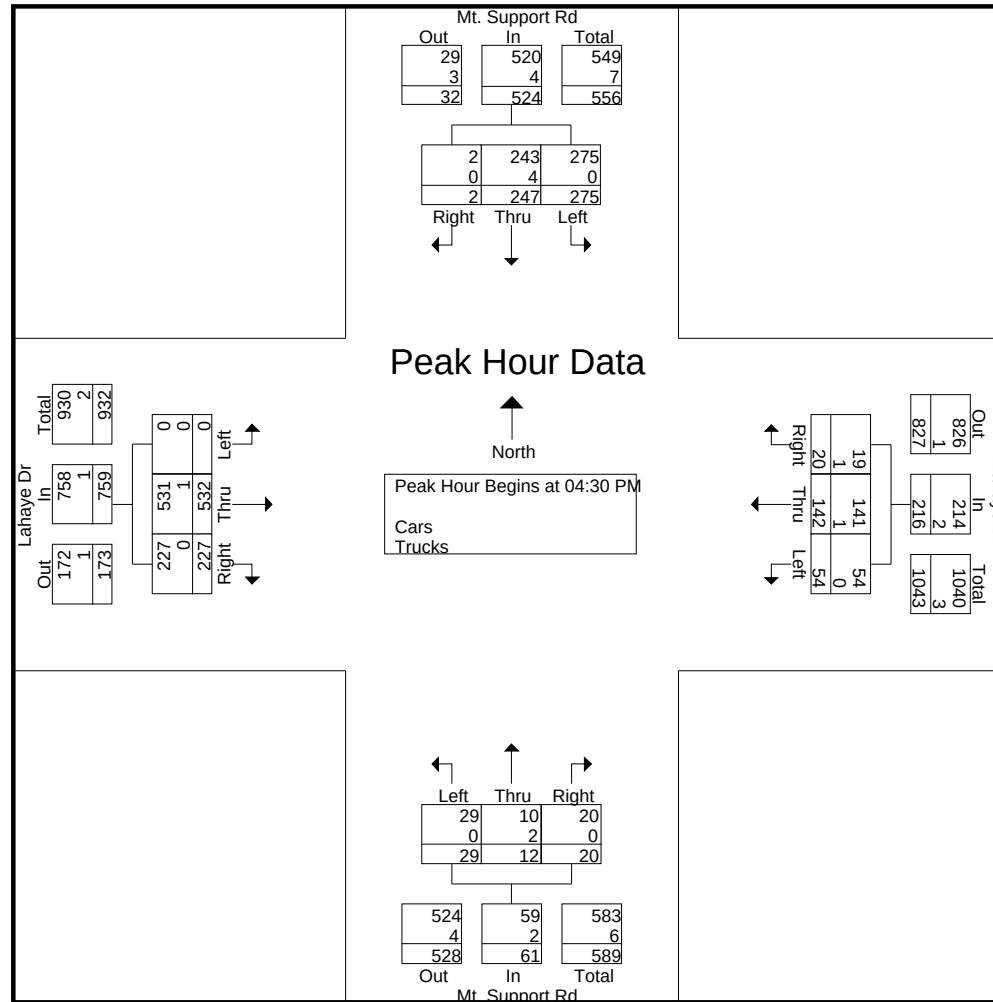
	Mt. Support Rd From North			Lahaye Dr From East			Mt. Support Rd From South			Lahaye Dr From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	14	17	1	9	52	6	8	3	9	1	104	33	257
03:15 PM	21	13	0	9	59	6	3	3	10	0	100	30	254
03:30 PM	28	36	0	11	50	3	11	3	9	0	131	42	324
03:45 PM	28	32	0	4	41	5	13	3	8	1	120	40	295
Total	91	98	1	33	202	20	35	12	36	2	455	145	1130
04:00 PM	57	45	2	13	43	3	8	0	5	1	138	37	352
04:15 PM	42	43	0	8	32	11	5	0	5	2	143	44	335
04:30 PM	59	50	2	8	43	11	8	6	2	0	142	46	377
04:45 PM	46	53	0	11	40	2	6	1	7	0	124	65	355
Total	204	191	4	40	158	27	27	7	19	3	547	192	1419
05:00 PM	99	76	0	12	32	3	6	3	7	0	133	63	434
05:15 PM	71	68	0	23	27	4	9	2	4	0	133	53	394
05:30 PM	50	32	0	17	39	3	7	1	7	0	99	47	302
05:45 PM	38	25	0	14	14	1	2	1	7	0	62	28	192
Total	258	201	0	66	112	11	24	7	25	0	427	191	1322
Grand Total	553	490	5	139	472	58	86	26	80	5	1429	528	3871
Apprch %	52.8	46.8	0.5	20.8	70.6	8.7	44.8	13.5	41.7	0.3	72.8	26.9	
Total %	14.3	12.7	0.1	3.6	12.2	1.5	2.2	0.7	2.1	0.1	36.9	13.6	
Cars	553	481	5	139	471	56	86	20	79	5	1426	528	3849
% Cars	100	98.2	100	100	99.8	96.6	100	76.9	98.8	100	99.8	100	99.4
Trucks	0	9	0	0	1	2	0	6	1	0	3	0	22
% Trucks	0	1.8	0	0	0.2	3.4	0	23.1	1.2	0	0.2	0	0.6

N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
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	Mt. Support Rd From North				Lahaye Dr From East				Mt. Support Rd From South				Lahaye Dr From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	59	50	2	111	8	43	11	62	8	6	2	16	0	142	46	188	377
04:45 PM	46	53	0	99	11	40	2	53	6	1	7	14	0	124	65	189	355
05:00 PM	99	76	0	175	12	32	3	47	6	3	7	16	0	133	63	196	434
05:15 PM	71	68	0	139	23	27	4	54	9	2	4	15	0	133	53	186	394
Total Volume	275	247	2	524	54	142	20	216	29	12	20	61	0	532	227	759	1560
% App. Total	52.5	47.1	0.4		25	65.7	9.3		47.5	19.7	32.8		0	70.1	29.9		
PHF	.694	.813	.250	.749	.587	.826	.455	.871	.806	.500	.714	.953	.000	.937	.873	.968	.899
Cars	275	243	2	520	54	141	19	214	29	10	20	59	0	531	227	758	1551
% Cars	100	98.4	100	99.2	100	99.3	95.0	99.1	100	83.3	100	96.7	0	99.8	100	99.9	99.4
Trucks	0	4	0	4	0	1	1	2	0	2	0	2	0	1	0	1	9
% Trucks	0	1.6	0	0.8	0	0.7	5.0	0.9	0	16.7	0	3.3	0	0.2	0	0.1	0.6

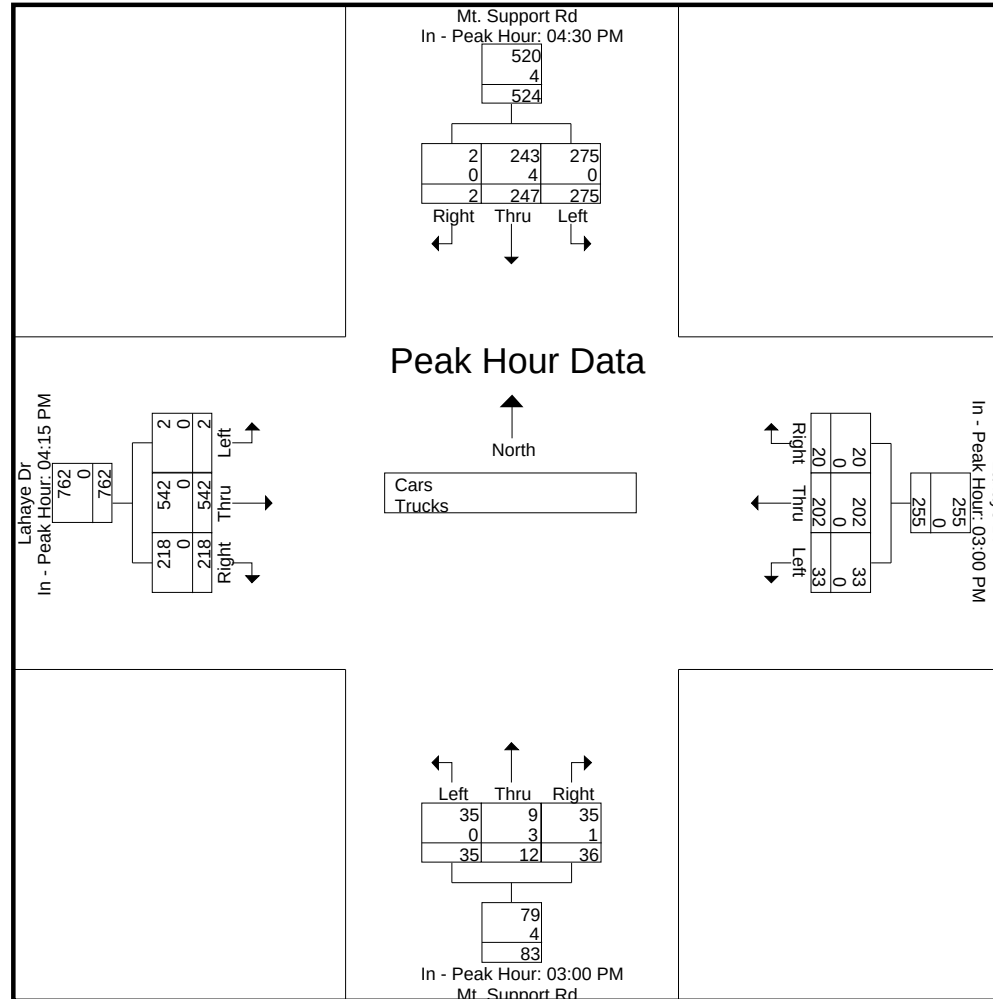
N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				03:00 PM				03:00 PM				04:15 PM			
+0 mins.	59	50	2	111	9	52	6	67	8	3	9	20	2	143	44	189
+15 mins.	46	53	0	99	9	59	6	74	3	3	10	16	0	142	46	188
+30 mins.	99	76	0	175	11	50	3	64	11	3	9	23	0	124	65	189
+45 mins.	71	68	0	139	4	41	5	50	13	3	8	24	0	133	63	196
Total Volume	275	247	2	524	33	202	20	255	35	12	36	83	2	542	218	762
% App. Total	52.5	47.1	0.4		12.9	79.2	7.8		42.2	14.5	43.4		0.3	71.1	28.6	
PHF	.694	.813	.250	.749	.750	.856	.833	.861	.673	1.000	.900	.865	.250	.948	.838	.972

Cars	275	243	2	520	33	202	20	255	35	9	35	79	2	542	218	762
% Cars	100	98.4	100	99.2	100	100	100	100	100	75	97.2	95.2	100	100	100	100
Trucks	0	4	0	4	0	0	0	0	0	3	1	4	0	0	0	0
% Trucks	0	1.6	0	0.8	0	0	0	0	0	25	2.8	4.8	0	0	0	0



N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
Page No : 9

Groups Printed- Trucks

	Mt. Support Rd From North			Lahaye Dr From East			Mt. Support Rd From South			Lahaye Dr From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	1	1	0	0	0	2
03:30 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
03:45 PM	0	1	0	0	0	0	0	1	0	0	1	0	3
Total	0	2	0	0	0	0	0	3	1	0	1	0	7
04:00 PM	0	2	0	0	0	1	0	0	0	0	0	0	3
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	3	0	0	0	1	0	1	0	0	0	0	5
05:00 PM	0	2	0	0	1	1	0	1	0	0	0	0	5
05:15 PM	0	1	0	0	0	0	0	0	0	0	1	0	2
05:30 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	4	0	0	1	1	0	2	0	0	2	0	10
Grand Total	0	9	0	0	1	2	0	6	1	0	3	0	22
Apprch %	0	100	0	0	33.3	66.7	0	85.7	14.3	0	100	0	
Total %	0	40.9	0	0	4.5	9.1	0	27.3	4.5	0	13.6	0	

N/S Street : Mt. Support Road
E/W Street: Lahaye Drive
City/State : Lebanon, NH
Weather : Clear

File Name : 18520001
Site Code : 18520001
Start Date : 1/7/2020
Page No : 13

Groups Printed- Bikes Peds

	Mt. Support Rd From North				Lahaye Dr From East				Mt. Support Rd From South				Lahaye Dr From West				Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
03:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	2
04:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
04:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	2
Total	0	0	0	0	3	0	0	2	0	0	0	0	0	0	0	0	2	3	5
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
05:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	2
Grand Total	0	0	0	0	4	0	0	5	0	0	0	0	0	0	0	0	5	4	9
Apprch %	0	0	0		100	0	0		0	0	0		0	0	0				
Total %	0	0	0		100	0	0		0	0	0		0	0	0		55.6	44.4	

Traffic Impact Assessment: 343 Mount Support Road Apartments

Traffic Volume Adjustment Data

Year 2018 Monthly Data

Town: Lebanon
Station: 02253025
Location: NH 120 1 mile south of Hanover TL (south of Lahaye Dr)
Group: 4

<u>Month</u>	<u>ADT</u>	<u>Adjustment to</u>	
		<u>Average</u>	<u>Peak</u>
January	19,130	1.02	1.10
February	19,481	1.00	1.08
March	19,074	1.03	1.10
April	19,450	1.01	1.08
May	20,320	0.96	1.03
June	20,124	0.97	1.04
July	19,910	0.98	1.06
August	20,072	0.97	1.05
September	19,265	1.01	1.09
October	21,010	0.93	1.00
November	18,904	1.03	1.11
December	17,879	1.09	1.18

AADT: 19,552
Peak Month: 21,010

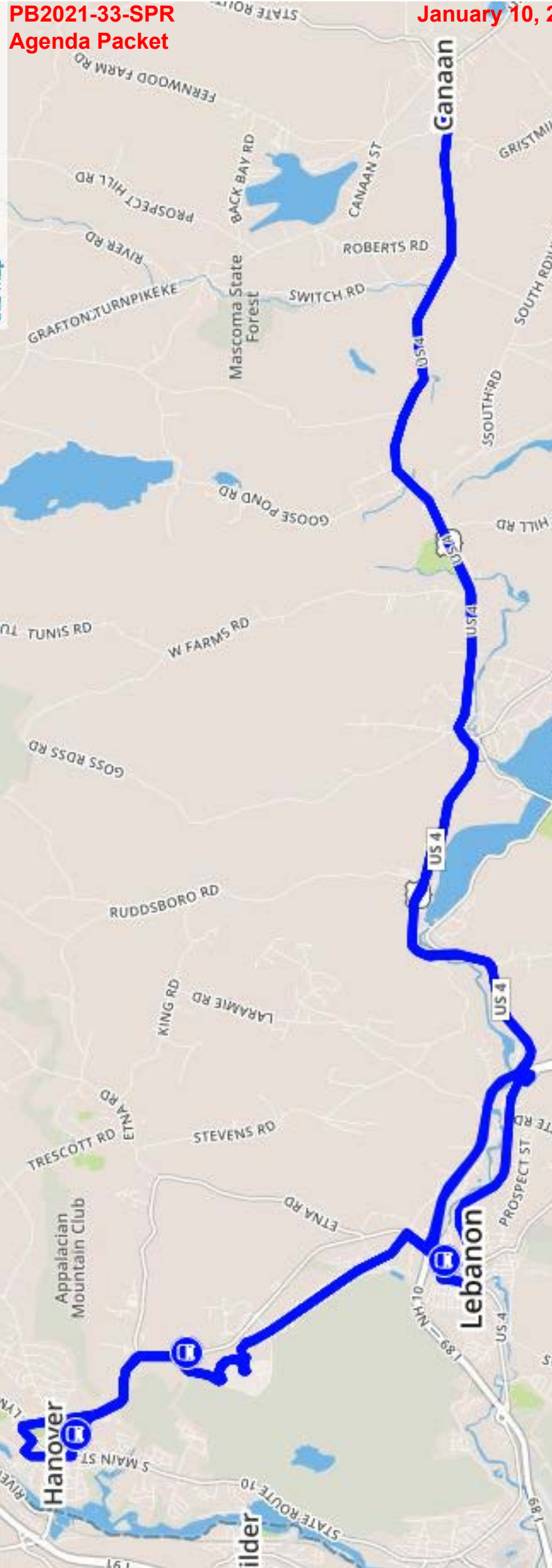
Notes: XX A box around *data* indicates an estimated value. Do not use as data.
NA Data Not Available for consecutive months. Estimates not provided.

Traffic Impact Assessment: 343 Mount Support Road Apartments

Transit Data

ADVANCE TRANSIT

Blue Route



Free Transit for the
Upper Valley

BLUE

Canaan	Enfield	Lebanon	Heater Rd	DHMC	Vail DMS	Bookstore	DHMC	Heater Rd	Lebanon	Enfield	Canaan
									5:15	5:25	5:40
									6:15	6:25	6:40
5:40	5:51	5:45	5:49	6:00	6:10	6:14	6:24	6:29	6:37		
		6:10	6:14	6:25	6:35	6:39	6:49	6:54	7:02		
6:45	6:56	6:40	6:44	6:55	7:05	7:09	7:19	7:24	7:32		
		-	D	7:15	7:25	7:29	7:39	7:44	7:52		
		7:10	7:14	7:27	7:37	7:41	7:51	7:56	8:04		
									8:10	8:20	8:35
		7:32	7:37	7:55	8:05	8:09	8:24	8:29	8:37		
		8:15	8:19	8:30	8:40	8:44	8:54	8:59	9:07		
		8:45	8:49	9:00	9:10	9:14	9:24	9:29	9:37		
8:35	8:46	9:00									
				9:15	9:25	9:29	9:39				
		9:15	9:19	9:30	9:40	9:44	9:54	9:59	10:07		
				9:45	9:55	9:59	10:09				
		9:45	9:49	10:00	10:10	10:14	10:24	10:29	10:37		
				10:15	10:25	10:29	10:39				
		10:15	10:19	10:30	10:40	10:44	10:54	10:59	11:07		
				10:45	10:55	10:59	11:09				
		10:45	10:49	11:00	11:10	11:14	11:24	11:29	11:37		
				11:15	11:25	11:29	11:39				
		11:15	11:19	11:30	11:40	11:44	11:54	11:59	12:07		
				11:45	11:55	11:59	12:09				
		11:45	11:49	12:00	12:10	12:14	12:24	12:29	12:37		
				12:15	12:25	12:29	12:39				
		12:15	12:19	12:30	12:40	12:44	12:54	12:59	1:07		
				12:45	12:55	12:59	1:09				
		12:45	12:49	1:00	1:10	1:14	1:24	1:29	1:37		
				1:15	1:25	1:29	1:39				
		1:15	1:19	1:30	1:40	1:44	1:54	1:59	2:07		
				1:45	1:55	1:59	2:09				
		1:45	1:49	2:00	2:10	2:14	2:24	2:29	2:37		
				2:15	2:25	2:29	2:39				
								Schoolyear only	2:50	3:00	@ H.S. 3:05
		2:15	2:19	2:30	2:40	2:44	2:54	2:59	3:07		
				2:45	2:55	2:59	3:09				
		2:45	2:49	3:00	3:10	3:14	3:24	3:29	3:37		
				3:15	3:25	3:29	3:39				
@ H.S. 3:10	3:15	3:15	3:19	3:30	3:40	3:44	3:54	3:59	4:07		
		3:35									
						4:05	4:10	4:20	4:30	4:45	
				3:45	3:55	3:59	4:09				
		3:45	3:49	4:00	4:10	4:15	4:27	4:32	4:40		
				4:15	4:25	towards Kendal on request					
					4:45	4:50	5:05	5:10	-	5:30	5:45
		4:20	4:24	4:35	4:50	4:54	5:10	5:15	5:23		
		4:50	4:54	5:05	5:15	5:19	5:32	5:37	5:50		
									5:50	6:00	6:15
4:45	4:56	5:15									
		5:20	5:24	5:35	5:45	5:49	5:59	6:04	6:12		
				6:05	6:15	to NORWICH & WILDER on request					
		5:50	5:54	6:05	6:15	6:19	6:29	6:34	6:42		
5:45	5:56	6:10									
		6:15	6:19	6:30	6:38	to NORWICH & WILDER on request					
		6:45	6:49	7:00	7:10	to US5 Dothan Brook School on request					

"D" = DROP ON REQUEST ONLY

AM= light face

PM= bold

Trip Generation Calculations

ITE TRIP GENERATION WORKSHEET
(10th Edition, Updated 2017)

LANDUSE: Mid-Rise Residential (3-10 stories)
LANDUSE CODE: 221
SETTING/LOCATION: General Urban/Suburban
JOB NAME:
JOB NUMBER:

Independent Variable --- Number of Dwelling Units

202 units

WEEKDAY

RATES:		# Studies	R^2	Total Trip Ends			Independent Variable Range			Directional Distribution	
				Average	Low	High	Average	Low	High	Enter	Exit
	DAILY	27	0.77	5.44	1.27	12.50	205	21	494	50%	50%
	AM PEAK OF GENERATOR	48	0.69	0.32	0.06	0.77	225	21	1,168	27%	73%
	PM PEAK OF GENERATOR	47	0.66	0.41	0.09	1.26	211	21	1,168	60%	40%
	AM PEAK (ADJACENT ST)	53	0.67	0.36	0.06	1.61	207	26	703	26%	74%
	PM PEAK (ADJACENT ST)	60	0.72	0.44	0.15	1.11	208	26	703	61%	39%

TRIPS:

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	1,100	550	550	1,100	550	550
AM PEAK OF GENERATOR	65	17	47	63	17	46
PM PEAK OF GENERATOR	83	50	33	78	47	31
AM PEAK (ADJACENT ST)	73	19	54	68	18	50
PM PEAK (ADJACENT ST)	89	54	35	87	53	34

SATURDAY

RATES:		# Studies	R^2	Total Trip Ends			Independent Variable Range			Directional Distribution	
				Average	Low	High	Average	Low	High	Enter	Exit
	DAILY	6	0.73	4.91	4.03	8.51	224	111	336	50%	50%
	PEAK OF GENERATOR	8	0.89	0.44	0.34	0.73	264	111	462	49%	51%

TRIPS:

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	992	496	496	1,032	516	516
PEAK OF GENERATOR	89	44	45	92	45	47

SUNDAY

RATES:		# Studies	R^2	Total Trip Ends			Independent Variable Range			Directional Distribution	
				Average	Low	High	Average	Low	High	Enter	Exit
	DAILY	6	--	4.09	3.06	8.41	224	111	336	50%	50%
	PEAK OF GENERATOR	6	--	0.39	0.26	1.07	224	111	336	62%	38%

TRIPS:

	BY AVERAGE			BY REGRESSION		
	Total	Enter	Exit	Total	Enter	Exit
DAILY	828	414	414	N/A	N/A	N/A
PEAK OF GENERATOR	79	49	30	NA	NA	NA

Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico
Sorted by Residence Geography: 5-Year ACS, 2011-2015

Universe: Workers 16 years and over.

Commuting flows are sorted by residence state, residence county, and residence minor civil division.

Place of Residency: Lebanon, NH - Grafton County

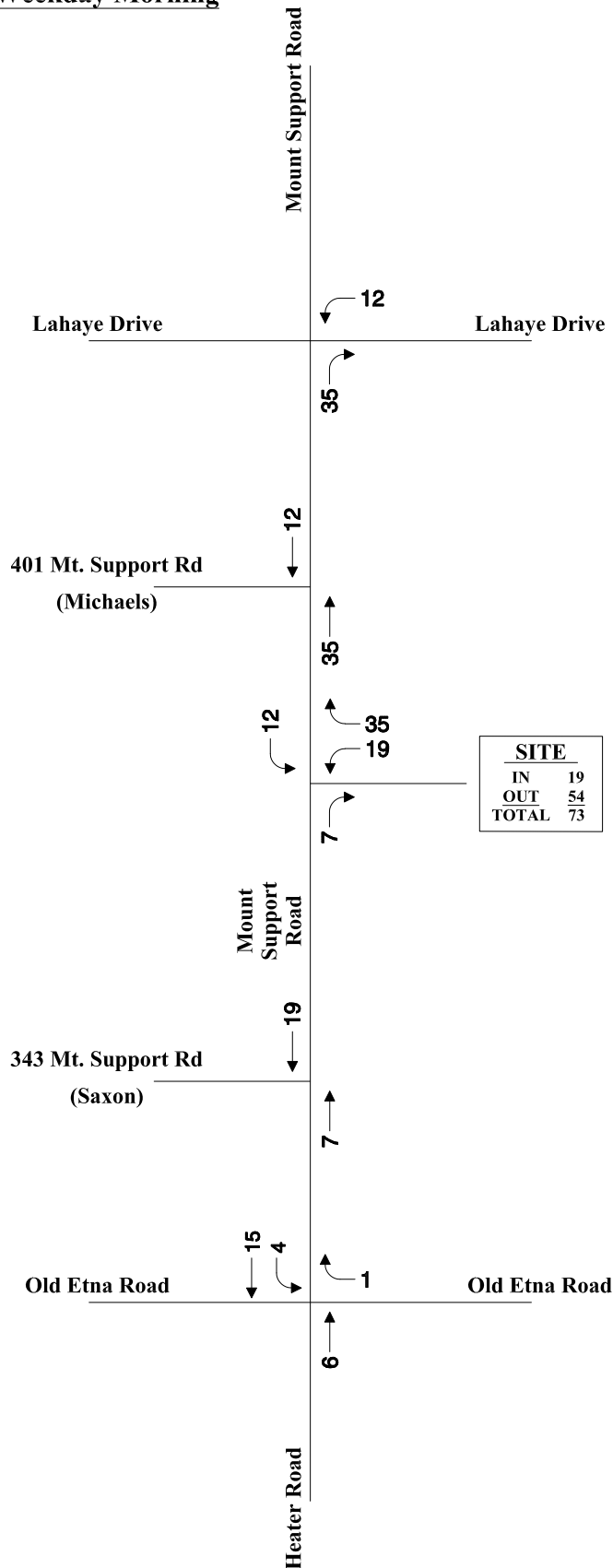
Place of Work		Commuting Flow	Travel Route Factors				Travel Route by # of Commuters				Travel Route by % of Commuters			
State Name	Minor Civil Division Name	Workers in Commuting Flow	I-89 North	I-89 South	NH 120 North	NH 120 South	I-89 North	I-89 South	NH 120 North	NH 120 South	I-89 North	I-89 South	NH 120 North	NH 120 South
MA	Cambridge city	14		1			0	14	0	0	0%	0%	0%	0%
MA	Boston city	21		1			0	21	0	0	0%	0%	0%	0%
NH	Walpole town	17	1				17	0	0	0	0%	0%	0%	0%
NH	Bath town	16			1		0	0	16	0	0%	0%	0%	0%
NH	Bethlehem town	14			1		0	0	14	0	0%	0%	0%	0%
NH	Canaan town	75		1			0	75	0	0	0%	1%	0%	0%
NH	Enfield town	80		1			0	80	0	0	0%	1%	0%	0%
NH	Franconia town	18			1		0	0	18	0	0%	0%	0%	0%
NH	Hanover town	1,220			1		0	0	1,220	0	0%	0%	17%	0%
NH	Lebanon city	4,212	0.1	0.25	0.6	0.05	421	1,053	2,527	211	6%	15%	35%	3%
NH	Littleton town	87			1		0	0	87	0	0%	0%	1%	0%
NH	Lyme town	69			1		0	0	69	0	0%	0%	1%	0%
NH	Piermont town	26			1		0	0	26	0	0%	0%	0%	0%
NH	Plymouth town	89		1			0	89	0	0	0%	1%	0%	0%
NH	Nashua city	14		1			0	14	0	0	0%	0%	0%	0%
NH	Concord city	31		1			0	31	0	0	0%	0%	0%	0%
NH	New London town	53		1			0	53	0	0	0%	1%	0%	0%
NH	Claremont city	78	1				78	0	0	0	1%	0%	0%	0%
NH	Cornish town	18			1		0	0	18	0	0%	0%	0%	0%
NH	Newport town	56		1			0	56	0	0	0%	1%	0%	0%
NH	Plainfield town	79				1	0	0	0	79	0%	0%	0%	1%
VT	Williston town	13	1				13	0	0	0	0%	0%	0%	0%
VT	Fairlee town	14			1		0	0	14	0	0%	0%	0%	0%
VT	Newbury town	16			1		0	0	16	0	0%	0%	0%	0%
VT	Thetford town	18			1		0	0	18	0	0%	0%	0%	0%
VT	Killington town	13	1				13	0	0	0	0%	0%	0%	0%
VT	Rutland city	15	1				15	0	0	0	0%	0%	0%	0%
VT	Montpelier city	45	1				45	0	0	0	1%	0%	0%	0%
VT	Grafton town	13	1				13	0	0	0	0%	0%	0%	0%
VT	Bethel town	13	1				13	0	0	0	0%	0%	0%	0%
VT	Hartford town	380	1				380	0	0	0	5%	0%	0%	0%
VT	Ludlow town	28	1				28	0	0	0	0%	0%	0%	0%
VT	Norwich town	62			1		0	0	62	0	0%	0%	1%	0%
VT	Plymouth town	31	1				31	0	0	0	0%	0%	0%	0%
VT	Royalton town	57	1				57	0	0	0	1%	0%	0%	0%
VT	Sharon town	14	1				14	0	0	0	0%	0%	0%	0%
VT	Springfield town	20	1				20	0	0	0	0%	0%	0%	0%
VT	Windsor town	70	1				70	0	0	0	1%	0%	0%	0%
VT	Woodstock town	18	1				18	0	0	0	0%	0%	0%	0%
		7,127					1,246	1,486	4,105	290	17%	21%	58%	4%
							Rounded:				15%	20%	60%	5%

Data are based on a sample and are subject to sampling variability. A margin of error is a measure of an estimate's variability. The larger the margin of error in relation to the size of the estimates, the less reliable the estimate. When added to and subtracted from the estimate, the margin of error forms the 90 percent confidence interval.

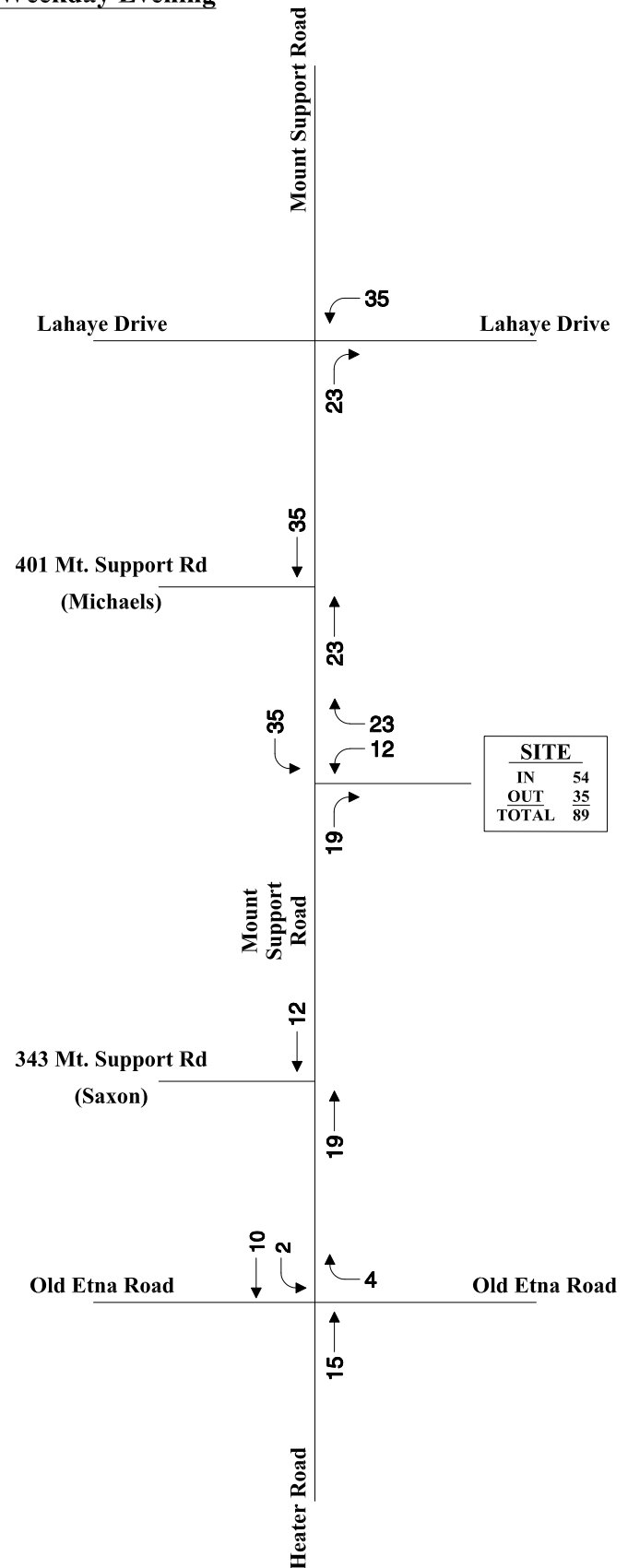
Flows are presented for MCDs for the 12 "strong MCD states" (CT, ME, MA, NH, RI, VT, MI, WI, NJ, NY, MN, and PA), and at the county level for all other states.

Source: U.S. Census Bureau, 2011-2015 American Community Survey.

Weekday Morning



Weekday Evening



Site Generated Peak Hour Traffic Volumes

Page 208 of 399 **Figure A-1**




ARIZONA

NEW MEXICO

OKLAHOMA

ARKANSAS

TENNESSEE

NORTH CAROLINA

SOUTH CAROLINA

QT-P23

Journey to Work: 2000

Census 2000 Summary File 3 (SF 3) - Sample Data

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see <http://www.census.gov/prod/cen2000/doc/sf3.pdf>

Subject	Lebanon city, Grafton County, New Hampshire		Lebanon city, New Hampshire	
	Number	Percent	Number	Percent
MEANS OF TRANSPORTATION AND CARPOOLING				
Workers 16 and over	6,788	100.0	6,788	100.0
Car, truck, or van	6,136	90.4	6,136	90.4
Drove alone	5,257	77.4	5,257	77.4
Carpooled	879	12.9	879	12.9
In 2-person carpool	750	11.0	750	11.0
In 3-person carpool	115	1.7	115	1.7
In 4-person carpool	8	0.1	8	0.1
In 5- or 6-person carpool	6	0.1	6	0.1
In 7-or-more-person carpool	0	0.0	0	0.0
Workers per car, truck, or van	1.08	(X)	1.08	(X)
Public transportation	99	1.5	99	1.5
Bus or trolley bus	56	0.8	56	0.8
Streetcar or trolley car (público in Puerto Rico)	0	0.0	0	0.0
Subway or elevated	9	0.1	9	0.1
Railroad	0	0.0	0	0.0
Ferryboat	0	0.0	0	0.0
Taxicab	34	0.5	34	0.5
Motorcycle	0	0.0	0	0.0
Bicycle	50	0.7	50	0.7
Walked	199	2.9	199	2.9
Other means	9	0.1	9	0.1
Worked at home	295	4.3	295	4.3
TRAVEL TIME TO WORK				
Workers who did not work at home	6,493	100.0	6,493	100.0
Less than 10 minutes	1,596	24.6	1,596	24.6
10 to 14 minutes	1,728	26.6	1,728	26.6
15 to 19 minutes	1,596	24.6	1,596	24.6
20 to 24 minutes	751	11.6	751	11.6
25 to 29 minutes	172	2.6	172	2.6
30 to 34 minutes	224	3.4	224	3.4
35 to 44 minutes	105	1.6	105	1.6
45 to 59 minutes	84	1.3	84	1.3
60 to 89 minutes	162	2.5	162	2.5
90 or more minutes	75	1.2	75	1.2
Mean travel time to work (minutes)	16.2	(X)	16.2	(X)
TIME LEAVING HOME TO GO TO WORK				
Workers who did not work at home	6,493	100.0	6,493	100.0
5:00 to 5:59 a.m.	439	6.8	439	6.8
6:00 to 6:29 a.m.	525	8.1	525	8.1
6:30 to 6:59 a.m.	665	10.2	665	10.2

	Lebanon city, Grafton County, New Hampshire		Lebanon city, New Hampshire	
	Number	Percent	Number	Percent
7:00 to 7:29 a.m.	867	13.4	867	13.4
7:30 to 7:59 a.m.	1,443	22.2	1,443	22.2
8:00 to 8:29 a.m.	559	8.6	559	8.6
8:30 to 8:59 a.m.	308	4.7	308	4.7
9:00 to 11:59 a.m.	656	10.1	656	10.1
12:00 to 3:59 p.m.	447	6.9	447	6.9
All other times	584	9.0	584	9.0

(X) Not applicable.

Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrices P30, P31, P33, P34, and P35.

Capacity and Queue Analysis Worksheets

Queuing and Blocking Report

2020 Existing
Weekday AM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	96	71	91	76
Average Queue (ft)	43	38	48	29
95th Queue (ft)	74	62	78	56
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & Lahaye Dr

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	T	R	LT	R	L	TR
Maximum Queue (ft)	342	111	483	260	255	126	66	80
Average Queue (ft)	108	12	224	84	118	28	22	21
95th Queue (ft)	254	68	411	174	212	76	52	59
Link Distance (ft)	1462		992	992	1048			1135
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125				100	115	
Storage Blk Time (%)			20		14	0		0
Queuing Penalty (veh)			3		9	0		0

Network Summary

Network wide Queuing Penalty: 12

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2020 Existing
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	80	60	60	30	35	70	120	30	20	75	0
Future Volume (vph)	5	80	60	60	30	35	70	120	30	20	75	0
Peak Hour Factor	0.73	0.73	0.73	0.86	0.86	0.86	0.90	0.90	0.90	0.60	0.60	0.60
Hourly flow rate (vph)	7	110	82	70	35	41	78	133	33	33	125	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	199	146	244	158								
Volume Left (vph)	7	70	78	33								
Volume Right (vph)	82	41	33	0								
Hadj (s)	-0.13	-0.06	0.02	0.10								
Departure Headway (s)	5.1	5.2	5.1	5.3								
Degree Utilization, x	0.28	0.21	0.34	0.23								
Capacity (veh/h)	651	626	655	626								
Control Delay (s)	10.0	9.6	10.7	9.9								
Approach Delay (s)	10.0	9.6	10.7	9.9								
Approach LOS	B	A	B	A								
Intersection Summary												
Delay			10.2									
Level of Service			B									
Intersection Capacity Utilization			45.7%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2020 Existing
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	215	55	15	700	480	145	130	60	30	15	5
Future Volume (vph)	5	215	55	15	700	480	145	130	60	30	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.97		1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected		1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)		1888		1778	1872	1557		1789	1512	1796	1582	
Flt Permitted		0.81		0.43	1.00	1.00		0.82	1.00	0.95	1.00	
Satd. Flow (perm)		1536		811	1872	1557		1505	1512	1796	1582	
Peak-hour factor, PHF	0.72	0.72	0.72	0.93	0.93	0.93	0.90	0.90	0.90	0.70	0.70	0.70
Adj. Flow (vph)	7	299	76	16	753	516	161	144	67	43	21	7
RTOR Reduction (vph)	0	5	0	0	0	154	0	0	50	0	4	0
Lane Group Flow (vph)	0	377	0	16	753	362	0	305	17	43	24	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	3%	2%	0%	20%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		43.1		48.3	47.2	47.2		24.7	24.7	5.0	35.7	
Effective Green, g (s)		45.1		48.3	49.2	49.2		26.7	26.7	7.0	37.7	
Actuated g/C Ratio		0.43		0.46	0.47	0.47		0.26	0.26	0.07	0.36	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		664		386	883	735		385	387	120	572	
v/s Ratio Prot				0.00	c0.40					c0.02	0.01	
v/s Ratio Perm		0.25		0.02		0.23		c0.20	0.01			
v/c Ratio		0.57		0.04	0.85	0.49		0.79	0.04	0.36	0.04	
Uniform Delay, d1		22.2		23.0	24.3	18.9		36.2	29.2	46.5	21.5	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.1		0.0	7.7	0.2		10.7	0.0	1.8	0.0	
Delay (s)		23.3		23.1	32.0	19.1		46.8	29.2	48.3	21.6	
Level of Service		C		C	C	B		D	C	D	C	
Approach Delay (s)		23.3			26.7			43.6			37.7	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.5		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			104.2		Sum of lost time (s)					21.0		
Intersection Capacity Utilization			69.6%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

2: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2020 Existing
Weekday AM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	6	44	31	30	50	28	61
Maximum Split (%)	4.3%	31.7%	22.3%	21.6%	36.0%	20.1%	43.9%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	44	0	50	81	0	111	50
End Time (s)	50	44	81	111	50	0	111
Yield/Force Off (s)	47	38	75	105	44	133	105
Yield/Force Off 170(s)	47	38	75	105	44	119	105
Local Start Time (s)	44	0	50	81	0	111	50
Local Yield (s)	47	38	75	105	44	133	105
Local Yield 170(s)	47	38	75	105	44	119	105

Intersection Summary

Cycle Length	139
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 2: Mount Support Rd & Lahaye Dr

 Ø2	 Ø3	 Ø4	 Ø7
44 s	6 s	31 s	30 s
 Ø6	 Ø8		
50 s	61 s		

Queuing and Blocking Report

2020 Existing
Weekday PM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	85	95	72	198
Average Queue (ft)	33	47	37	84
95th Queue (ft)	64	77	63	156
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & Lahaye Dr

Movement	EB	B29	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	T	L	T	R	LT	R	L	TR
Maximum Queue (ft)	1290	114	100	117	40	95	48	213	359
Average Queue (ft)	764	14	40	47	7	32	15	136	140
95th Queue (ft)	1454	140	82	97	26	74	41	219	270
Link Distance (ft)	1462	519		992	992	1048			1135
Upstream Blk Time (%)	4	0							
Queuing Penalty (veh)	0	0							
Storage Bay Dist (ft)			125				100	115	
Storage Blk Time (%)			0	0		1		15	10
Queuing Penalty (veh)			0	0		0		45	31

Network Summary

Network wide Queuing Penalty: 76

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2020 Existing
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	20	65	95	40	35	45	55	45	15	415	5
Future Volume (vph)	5	20	65	95	40	35	45	55	45	15	415	5
Peak Hour Factor	0.59	0.59	0.59	0.86	0.86	0.86	0.70	0.70	0.70	0.91	0.91	0.91
Hourly flow rate (vph)	8	34	110	110	47	41	64	79	64	16	456	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	152	198	207	477								
Volume Left (vph)	8	110	64	16								
Volume Right (vph)	110	41	64	5								
Hadj (s)	-0.42	0.00	-0.09	0.02								
Departure Headway (s)	5.8	6.1	5.7	5.3								
Degree Utilization, x	0.24	0.34	0.33	0.71								
Capacity (veh/h)	527	524	569	649								
Control Delay (s)	10.7	12.1	11.4	20.3								
Approach Delay (s)	10.7	12.1	11.4	20.3								
Approach LOS	B	B	B	C								
Intersection Summary												
Delay			15.5									
Level of Service			C									
Intersection Capacity Utilization			51.8%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2020 Existing
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	585	250	60	155	20	30	15	20	300	270	5
Future Volume (vph)	0	585	250	60	155	20	30	15	20	300	270	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		0.99		1.00	1.00	1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.96		1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)		1866		1778	1853	1515		1705	1540	1796	1849	
Flt Permitted		1.00		0.09	1.00	1.00		0.60	1.00	0.95	1.00	
Satd. Flow (perm)		1866		166	1853	1515		1052	1540	1796	1849	
Peak-hour factor, PHF	0.97	0.97	0.97	0.87	0.87	0.87	0.95	0.95	0.95	0.75	0.75	0.75
Adj. Flow (vph)	0	603	258	69	178	23	32	16	21	400	360	7
RTOR Reduction (vph)	0	10	0	0	0	13	0	0	20	0	1	0
Lane Group Flow (vph)	0	851	0	69	178	10	0	48	1	400	366	0
Confl. Peds. (#/hr)									1			
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	0%	0%	0%	0%	1%	5%	0%	17%	0%	0%	2%	0%
Turn Type		NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		39.2		48.4	45.4	45.4		5.4	5.4	27.1	38.5	
Effective Green, g (s)		41.2		48.4	47.4	47.4		7.4	7.4	29.1	40.5	
Actuated g/C Ratio		0.39		0.46	0.45	0.45		0.07	0.07	0.28	0.39	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		731		125	835	683		74	108	497	712	
v/s Ratio Prot		c0.46		c0.02	0.10					c0.22	c0.20	
v/s Ratio Perm				0.24		0.01		0.05	0.00			
v/c Ratio		1.16		0.55	0.21	0.02		0.65	0.01	0.80	0.51	
Uniform Delay, d1		31.9		47.3	17.5	15.9		47.6	45.5	35.4	24.8	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		88.6		5.2	0.0	0.0		17.9	0.1	9.2	0.6	
Delay (s)		120.6		52.5	17.6	16.0		65.5	45.5	44.6	25.4	
Level of Service		F		D	B	B		E	D	D	C	
Approach Delay (s)		120.6			26.4			59.4			35.4	
Approach LOS		F			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			72.3				HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			105.1				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			80.6%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

2: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2020 Existing
Weekday PM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	6	44	50	11	50	28	61
Maximum Split (%)	4.3%	31.7%	36.0%	7.9%	36.0%	20.1%	43.9%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	44	0	50	100	0	111	50
End Time (s)	50	44	100	111	50	0	111
Yield/Force Off (s)	47	38	94	105	44	133	105
Yield/Force Off 170(s)	47	38	94	105	44	119	105
Local Start Time (s)	44	0	50	100	0	111	50
Local Yield (s)	47	38	94	105	44	133	105
Local Yield 170(s)	47	38	94	105	44	119	105

Intersection Summary

Cycle Length	139
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 2: Mount Support Rd & Lahaye Dr

 Ø2	 Ø3	 Ø4	 Ø7
44 s	6 s	50 s	11 s
 Ø6	 Ø8		
50 s	61 s		

Queuing and Blocking Report

2021 No-Build
Weekday AM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	100	88	107	75
Average Queue (ft)	48	40	54	35
95th Queue (ft)	82	67	88	62
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	66	24
Average Queue (ft)	30	2
95th Queue (ft)	54	15
Link Distance (ft)	802	277
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	71	36	2
Average Queue (ft)	31	2	0
95th Queue (ft)	55	18	2
Link Distance (ft)	842	152	806
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

2021 No-Build
Weekday AM

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	B29	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	T	L	T	R	LT	R	L	TR
Maximum Queue (ft)	902	64	209	600	392	306	219	68	73
Average Queue (ft)	296	13	47	277	105	148	63	23	18
95th Queue (ft)	854	142	151	511	284	255	151	55	52
Link Distance (ft)	1462	519		989	989	806			1135
Upstream Blk Time (%)	3	1		0	0				
Queuing Penalty (veh)	0	0		0	0				
Storage Bay Dist (ft)			125				100	115	
Storage Blk Time (%)			0	25		22	1		0
Queuing Penalty (veh)			0	12		35	3		0

Network Summary

Network wide Queuing Penalty: 51

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	90	60	60	35	35	75	155	30	25	115	0
Future Volume (vph)	5	90	60	60	35	35	75	155	30	25	115	0
Peak Hour Factor	0.73	0.73	0.73	0.86	0.86	0.86	0.90	0.90	0.90	0.60	0.60	0.60
Hourly flow rate (vph)	7	123	82	70	41	41	83	172	33	42	192	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	212	152	288	234								
Volume Left (vph)	7	70	83	42								
Volume Right (vph)	82	41	33	0								
Hadj (s)	-0.12	-0.05	0.03	0.09								
Departure Headway (s)	5.5	5.7	5.4	5.5								
Degree Utilization, x	0.32	0.24	0.43	0.36								
Capacity (veh/h)	591	561	621	604								
Control Delay (s)	11.1	10.5	12.4	11.6								
Approach Delay (s)	11.1	10.5	12.4	11.6								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.5									
Level of Service			B									
Intersection Capacity Utilization			48.4%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	25	10	375	130	15
Future Volume (Veh/h)	45	25	10	375	130	15
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	27	11	408	141	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	579	149	157			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	579	149	157			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	97	99			
cM capacity (veh/h)	473	898	1423			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	76	419	157			
Volume Left	49	11	0			
Volume Right	27	0	16			
cSH	569	1423	1700			
Volume to Capacity	0.13	0.01	0.09			
Queue Length 95th (ft)	11	1	0			
Control Delay (s)	12.3	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.3	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			38.5%	ICU Level of Service	A	
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	30	10	410	115	20
Future Volume (Veh/h)	55	30	10	410	115	20
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	33	11	446	125	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					907	
pX, platoon unblocked						
vC, conflicting volume	604	136	147			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604	136	147			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	96	99			
cM capacity (veh/h)	458	913	1435			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	93	457	147			
Volume Left	60	11	0			
Volume Right	33	0	22			
cSH	556	1435	1700			
Volume to Capacity	0.17	0.01	0.09			
Queue Length 95th (ft)	15	1	0			
Control Delay (s)	12.8	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.8	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			41.2%	ICU Level of Service	A	
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2021 No-Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	325	70	50	800	485	145	160	160	30	15	5
Future Volume (vph)	5	325	70	50	800	485	145	160	160	30	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)		1894		1778	1872	1557		1791	1512	1796	1582	
Flt Permitted		0.69		0.34	1.00	1.00		0.83	1.00	0.95	1.00	
Satd. Flow (perm)		1300		632	1872	1557		1530	1512	1796	1582	
Peak-hour factor, PHF	0.72	0.72	0.72	0.93	0.93	0.93	0.90	0.90	0.90	0.70	0.70	0.70
Adj. Flow (vph)	7	451	97	54	860	522	161	178	178	43	21	7
RTOR Reduction (vph)	0	6	0	0	0	169	0	0	104	0	5	0
Lane Group Flow (vph)	0	549	0	54	860	353	0	339	74	43	23	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	3%	2%	0%	20%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		43.3		51.1	48.7	48.7		21.5	21.5	3.3	30.8	
Effective Green, g (s)		45.3		51.1	50.7	50.7		23.5	23.5	5.3	32.8	
Actuated g/C Ratio		0.45		0.51	0.50	0.50		0.23	0.23	0.05	0.33	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		583		347	940	782		356	352	94	514	
v/s Ratio Prot				0.00	c0.46					c0.02	0.01	
v/s Ratio Perm		0.42		0.08		0.23		c0.22	0.05			
v/c Ratio		0.94		0.16	0.91	0.45		0.95	0.21	0.46	0.05	
Uniform Delay, d1		26.6		23.6	23.1	16.2		38.1	31.2	46.4	23.3	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		23.8		0.2	12.9	0.2		35.2	0.3	3.5	0.0	
Delay (s)		50.4		23.8	36.0	16.3		73.3	31.5	49.9	23.4	
Level of Service		D		C	D	B		E	C	D	C	
Approach Delay (s)		50.4			28.4			58.9			39.4	
Approach LOS		D			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			39.5				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			100.9				Sum of lost time (s)			21.0		
Intersection Capacity Utilization			78.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2021 No-Build
Weekday AM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	6	47	12	27	53	28	39
Maximum Split (%)	5.0%	39.2%	10.0%	22.5%	44.2%	23.3%	32.5%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	47	0	53	65	0	92	53
End Time (s)	53	47	65	92	53	0	92
Yield/Force Off (s)	50	41	59	86	47	114	86
Yield/Force Off 170(s)	50	41	59	86	47	100	86
Local Start Time (s)	47	0	53	65	0	92	53
Local Yield (s)	50	41	59	86	47	114	86
Local Yield 170(s)	50	41	59	86	47	100	86

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø1	 Ø3	 Ø4	 Ø7
47 s	6 s	12 s	27 s	28 s
 Ø6	 Ø8			
53 s	39 s			

Queuing and Blocking Report

2021 No-Build
Weekday PM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	71	106	102	366
Average Queue (ft)	35	52	48	138
95th Queue (ft)	61	86	82	294
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	57	60
Average Queue (ft)	25	14
95th Queue (ft)	49	47
Link Distance (ft)	802	277
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	79	81	13
Average Queue (ft)	28	17	0
95th Queue (ft)	55	55	6
Link Distance (ft)	842	152	806
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

2021 No-Build

Weekday PM

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	B29	WB	WB	WB	NB	NB	SB	SB	B28
Directions Served	LTR	T	L	T	R	LT	R	L	TR	T
Maximum Queue (ft)	1504	303	225	1010	1016	148	99	215	957	133
Average Queue (ft)	1151	154	224	938	801	62	47	192	477	35
95th Queue (ft)	1821	526	229	1227	1425	127	84	254	1104	212
Link Distance (ft)	1462	519		989	989	806			1135	411
Upstream Blk Time (%)	25	18		81	42				9	3
Queuing Penalty (veh)	0	0		0	0				0	0
Storage Bay Dist (ft)			125				100	115		
Storage Blk Time (%)			99	11		7	1	54	26	
Queuing Penalty (veh)			251	18		6	0	153	84	

Network Summary

Network wide Queuing Penalty: 512

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	20	70	95	50	50	45	115	45	30	470	5
Future Volume (vph)	5	20	70	95	50	50	45	115	45	30	470	5
Peak Hour Factor	0.59	0.59	0.59	0.86	0.86	0.86	0.70	0.70	0.70	0.91	0.91	0.91
Hourly flow rate (vph)	8	34	119	110	58	58	64	164	64	33	516	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	161	226	292	554								
Volume Left (vph)	8	110	64	33								
Volume Right (vph)	119	58	64	5								
Hadj (s)	-0.43	-0.04	-0.04	0.02								
Departure Headway (s)	6.7	6.8	6.3	5.9								
Degree Utilization, x	0.30	0.43	0.51	0.91								
Capacity (veh/h)	482	492	534	595								
Control Delay (s)	12.5	14.9	15.8	40.9								
Approach Delay (s)	12.5	14.9	15.8	40.9								
Approach LOS	B	B	C	E								
Intersection Summary												
Delay			26.5									
Level of Service			D									
Intersection Capacity Utilization			52.8%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	15	25	105	635	45
Future Volume (Veh/h)	30	15	25	105	635	45
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	16	27	114	690	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	882	714	739			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	882	714	739			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	96	97			
cM capacity (veh/h)	307	431	867			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	49	141	739			
Volume Left	33	27	0			
Volume Right	16	0	49			
cSH	339	867	1700			
Volume to Capacity	0.14	0.03	0.43			
Queue Length 95th (ft)	13	2	0			
Control Delay (s)	17.4	2.0	0.0			
Lane LOS	C	A				
Approach Delay (s)	17.4	2.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			46.1%	ICU Level of Service	A	
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	20	30	105	660	55
Future Volume (Veh/h)	35	20	30	105	660	55
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	22	33	114	717	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					907	
pX, platoon unblocked	0.84	0.84	0.84			
vC, conflicting volume	927	747	777			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	817	603	638			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	95	96			
cM capacity (veh/h)	278	419	793			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	60	147	777			
Volume Left	38	33	0			
Volume Right	22	0	60			
cSH	317	793	1700			
Volume to Capacity	0.19	0.04	0.46			
Queue Length 95th (ft)	17	3	0			
Control Delay (s)	19.0	2.5	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.0	2.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			48.1%	ICU Level of Service		A
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	690	280	160	255	20	30	25	85	305	275	5
Future Volume (vph)	0	690	280	160	255	20	30	25	85	305	275	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.96		1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)		1881		1778	1853	1483		1684	1515	1796	1849	
Flt Permitted		1.00		0.06	1.00	1.00		0.64	1.00	0.95	1.00	
Satd. Flow (perm)		1881		114	1853	1483		1104	1515	1796	1849	
Peak-hour factor, PHF	0.97	0.97	0.97	0.87	0.87	0.87	0.95	0.95	0.95	0.75	0.75	0.75
Adj. Flow (vph)	0	711	289	184	293	23	32	26	89	407	367	7
RTOR Reduction (vph)	0	9	0	0	0	10	0	0	84	0	1	0
Lane Group Flow (vph)	0	991	0	184	293	13	0	58	5	407	373	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	1%	5%	0%	17%	0%	0%	2%	0%
Turn Type		NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		59.5		68.5	65.5	65.5		5.1	5.1	23.2	34.3	
Effective Green, g (s)		61.5		68.5	67.5	67.5		7.1	7.1	25.2	36.3	
Actuated g/C Ratio		0.51		0.56	0.56	0.56		0.06	0.06	0.21	0.30	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		952		105	1029	823		64	88	372	552	
v/s Ratio Prot		0.53		c0.04	0.16					c0.23	c0.20	
v/s Ratio Perm				c0.94		0.01		0.05	0.00			
v/c Ratio		1.04		1.75	0.28	0.02		0.91	0.06	1.09	0.68	
Uniform Delay, d1		30.0		56.4	14.3	12.1		56.9	54.0	48.1	37.4	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		40.3		374.7	0.1	0.0		79.3	0.3	74.4	3.3	
Delay (s)		70.3		431.1	14.3	12.1		136.2	54.3	122.5	40.7	
Level of Service		E		F	B	B		F	D	F	D	
Approach Delay (s)		70.3			167.6			86.6			83.3	
Approach LOS		E			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			95.5				HCM 2000 Level of Service		F			
HCM 2000 Volume to Capacity ratio			1.49									
Actuated Cycle Length (s)			121.5				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			101.2%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2021 No-Build
Weekday PM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	6	65	29	11	71	28	40
Maximum Split (%)	4.3%	46.8%	20.9%	7.9%	51.1%	20.1%	28.8%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	65	0	71	100	0	111	71
End Time (s)	71	65	100	111	71	0	111
Yield/Force Off (s)	68	59	94	105	65	133	105
Yield/Force Off 170(s)	68	59	94	105	65	119	105
Local Start Time (s)	65	0	71	100	0	111	71
Local Yield (s)	68	59	94	105	65	133	105
Local Yield 170(s)	68	59	94	105	65	119	105

Intersection Summary

Cycle Length	139
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø	 Ø3	 Ø4	 Ø7
65 s	6 s	29 s	11 s	28 s
 Ø6	 Ø	 Ø8		
71 s		40 s		

Queuing and Blocking Report

2021 Build
Weekday AM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	101	76	125	115
Average Queue (ft)	47	38	56	44
95th Queue (ft)	82	63	98	86
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	65	27
Average Queue (ft)	29	2
95th Queue (ft)	54	17
Link Distance (ft)	802	277
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Mount Support Rd & Site Driveway

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	57	50
Average Queue (ft)	29	5
95th Queue (ft)	52	27
Link Distance (ft)	419	196
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2021 Build
Weekday AM

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	61	41
Average Queue (ft)	30	3
95th Queue (ft)	53	20
Link Distance (ft)	842	152
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	T	R	LT	R	L	TR
Maximum Queue (ft)	795	224	599	347	378	249	80	81
Average Queue (ft)	232	57	273	92	158	82	25	18
95th Queue (ft)	641	171	479	209	290	194	61	54
Link Distance (ft)	1462		989	989	806			1135
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		125				100	115	
Storage Blk Time (%)		0	25		22	2	0	0
Queuing Penalty (veh)		1	15		44	6	0	0

Network Summary

Network wide Queuing Penalty: 66

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2021 Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	90	60	60	35	35	75	165	30	35	150	0
Future Volume (vph)	5	90	60	60	35	35	75	165	30	35	150	0
Peak Hour Factor	0.73	0.73	0.73	0.86	0.86	0.86	0.90	0.90	0.90	0.60	0.60	0.60
Hourly flow rate (vph)	7	123	82	70	41	41	83	183	33	58	250	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	212	152	299	308								
Volume Left (vph)	7	70	83	58								
Volume Right (vph)	82	41	33	0								
Hadj (s)	-0.12	-0.05	0.03	0.09								
Departure Headway (s)	5.8	6.0	5.6	5.6								
Degree Utilization, x	0.34	0.25	0.46	0.48								
Capacity (veh/h)	545	511	599	601								
Control Delay (s)	11.8	11.0	13.3	13.7								
Approach Delay (s)	11.8	11.0	13.3	13.7								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			12.7									
Level of Service			B									
Intersection Capacity Utilization			50.5%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	25	10	380	150	15
Future Volume (Veh/h)	45	25	10	380	150	15
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	27	11	413	163	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	606	171	179			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606	171	179			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	97	99			
cM capacity (veh/h)	457	873	1397			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	76	424	179			
Volume Left	49	11	0			
Volume Right	27	0	16			
cSH	550	1397	1700			
Volume to Capacity	0.14	0.01	0.11			
Queue Length 95th (ft)	12	1	0			
Control Delay (s)	12.6	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.6	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			38.7%	ICU Level of Service	A	
Analysis Period (min)			15			

3: Mount Support Rd & Site Driveway
HCM Unsignalized Intersection Capacity Analysis

2021 Build
Weekday AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	35	420	5	10	145
Future Volume (Veh/h)	20	35	420	5	10	145
Sign Control	Stop		Free			Free
Grade	0%		-1%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	38	457	5	11	158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	640	460			462	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640	460			462	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	94			99	
cM capacity (veh/h)	436	602			1099	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	60	462	169			
Volume Left	22	0	11			
Volume Right	38	5	0			
cSH	528	1700	1099			
Volume to Capacity	0.11	0.27	0.01			
Queue Length 95th (ft)	10	0	1			
Control Delay (s)	12.7	0.0	0.6			
Lane LOS	B		A			
Approach Delay (s)	12.7	0.0	0.6			
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			32.4%	ICU Level of Service		A
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	30	10	445	125	20
Future Volume (Veh/h)	55	30	10	445	125	20
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	33	11	484	136	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					907	
pX, platoon unblocked						
vC, conflicting volume	653	147	158			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	653	147	158			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	96	99			
cM capacity (veh/h)	429	900	1422			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	93	495	158			
Volume Left	60	11	0			
Volume Right	33	0	22			
cSH	526	1422	1700			
Volume to Capacity	0.18	0.01	0.09			
Queue Length 95th (ft)	16	1	0			
Control Delay (s)	13.3	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.3	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			43.0%	ICU Level of Service	A	
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2021 Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	325	70	60	800	485	145	160	195	30	15	5
Future Volume (vph)	5	325	70	60	800	485	145	160	195	30	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)		1894		1778	1872	1557		1791	1512	1796	1582	
Flt Permitted		0.69		0.34	1.00	1.00		0.83	1.00	0.95	1.00	
Satd. Flow (perm)		1300		632	1872	1557		1530	1512	1796	1582	
Peak-hour factor, PHF	0.72	0.72	0.72	0.93	0.93	0.93	0.90	0.90	0.90	0.70	0.70	0.70
Adj. Flow (vph)	7	451	97	65	860	522	161	178	217	43	21	7
RTOR Reduction (vph)	0	6	0	0	0	169	0	0	104	0	5	0
Lane Group Flow (vph)	0	549	0	65	860	353	0	339	113	43	23	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	3%	2%	0%	20%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		43.3		51.1	48.7	48.7		21.5	21.5	3.3	30.8	
Effective Green, g (s)		45.3		51.1	50.7	50.7		23.5	23.5	5.3	32.8	
Actuated g/C Ratio		0.45		0.51	0.50	0.50		0.23	0.23	0.05	0.33	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		583		347	940	782		356	352	94	514	
v/s Ratio Prot				0.00	c0.46					c0.02	0.01	
v/s Ratio Perm		0.42		0.09		0.23		c0.22	0.07			
v/c Ratio		0.94		0.19	0.91	0.45		0.95	0.32	0.46	0.05	
Uniform Delay, d1		26.6		23.9	23.1	16.2		38.1	32.1	46.4	23.3	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		23.8		0.3	12.9	0.2		35.2	0.5	3.5	0.0	
Delay (s)		50.4		24.1	36.0	16.3		73.3	32.6	49.9	23.4	
Level of Service		D		C	D	B		E	C	D	C	
Approach Delay (s)		50.4			28.4			57.4			39.4	
Approach LOS		D			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			39.5				HCM 2000 Level of Service		D			
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			100.9				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			78.2%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2021 Build
Weekday AM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	6	47	12	27	53	28	39
Maximum Split (%)	5.0%	39.2%	10.0%	22.5%	44.2%	23.3%	32.5%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	47	0	53	65	0	92	53
End Time (s)	53	47	65	92	53	0	92
Yield/Force Off (s)	50	41	59	86	47	114	86
Yield/Force Off 170(s)	50	41	59	86	47	100	86
Local Start Time (s)	47	0	53	65	0	92	53
Local Yield (s)	50	41	59	86	47	114	86
Local Yield 170(s)	50	41	59	86	47	100	86

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø1	 Ø3	 Ø4	 Ø7
47 s	6 s	12 s	27 s	28 s
 Ø6	 Ø8			
53 s	39 s			

Queuing and Blocking Report

2021 No-Build
Weekday PM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	85	110	119	330
Average Queue (ft)	35	51	52	128
95th Queue (ft)	68	87	94	277
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	61	69	7
Average Queue (ft)	25	15	0
95th Queue (ft)	51	50	4
Link Distance (ft)	802	277	1462
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Mount Support Rd & Site Driveway

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	51	71
Average Queue (ft)	19	6
95th Queue (ft)	42	35
Link Distance (ft)	396	248
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2021 No-Build
Weekday PM

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	76	86	16
Average Queue (ft)	27	19	1
95th Queue (ft)	54	60	7
Link Distance (ft)	842	152	806
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	B29	WB	WB	WB	NB	NB	SB	SB	B28
Directions Served	LTR	T	L	T	R	LT	R	L	TR	T
Maximum Queue (ft)	1533	534	225	1014	1014	208	166	215	860	97
Average Queue (ft)	1521	458	223	919	719	80	69	184	370	10
95th Queue (ft)	1614	721	237	1246	1435	190	147	255	883	96
Link Distance (ft)	1462	519		989	989	806			1135	411
Upstream Blk Time (%)	68	64		66	30				4	
Queuing Penalty (veh)	0	0		0	0				0	
Storage Bay Dist (ft)			125				100	115		
Storage Blk Time (%)			94	15		16	2	49	25	
Queuing Penalty (veh)			240	28		18	1	141	81	

Network Summary

Network wide Queuing Penalty: 510

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	20	70	95	50	55	45	130	45	30	480	5
Future Volume (vph)	5	20	70	95	50	55	45	130	45	30	480	5
Peak Hour Factor	0.59	0.59	0.59	0.86	0.86	0.86	0.70	0.70	0.70	0.91	0.91	0.91
Hourly flow rate (vph)	8	34	119	110	58	64	64	186	64	33	527	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	161	232	314	565								
Volume Left (vph)	8	110	64	33								
Volume Right (vph)	119	64	64	5								
Hadj (s)	-0.43	-0.06	-0.03	0.02								
Departure Headway (s)	6.9	7.0	6.4	6.0								
Degree Utilization, x	0.31	0.45	0.56	0.94								
Capacity (veh/h)	473	486	531	587								
Control Delay (s)	12.9	15.6	17.4	48.1								
Approach Delay (s)	12.9	15.6	17.4	48.1								
Approach LOS	B	C	C	E								
Intersection Summary												
Delay			30.1									
Level of Service			D									
Intersection Capacity Utilization			53.8%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	15	25	125	645	45
Future Volume (Veh/h)	30	15	25	125	645	45
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	16	27	136	701	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	916	726	750			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	916	726	750			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	96	97			
cM capacity (veh/h)	293	425	859			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	49	163	750			
Volume Left	33	27	0			
Volume Right	16	0	49			
cSH	326	859	1700			
Volume to Capacity	0.15	0.03	0.44			
Queue Length 95th (ft)	13	2	0			
Control Delay (s)	18.0	1.8	0.0			
Lane LOS	C	A				
Approach Delay (s)	18.0	1.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			46.7%	ICU Level of Service	A	
Analysis Period (min)			15			

3: Mount Support Rd & Site Driveway
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	25	135	20	35	680
Future Volume (Veh/h)	10	25	135	20	35	680
Sign Control	Stop		Free			Free
Grade	0%		-1%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	27	147	22	38	739
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	973	158			169	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	973	158			169	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	97			97	
cM capacity (veh/h)	272	887			1409	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	169	777			
Volume Left	11	0	38			
Volume Right	27	22	0			
cSH	536	1700	1409			
Volume to Capacity	0.07	0.10	0.03			
Queue Length 95th (ft)	6	0	2			
Control Delay (s)	12.2	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	12.2	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			59.4%	ICU Level of Service		B
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	20	30	130	695	55
Future Volume (Veh/h)	35	20	30	130	695	55
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	22	33	141	755	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					907	
pX, platoon unblocked	0.82	0.82	0.82			
vC, conflicting volume	992	785	815			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	884	633	669			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	94	96			
cM capacity (veh/h)	249	396	759			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	60	174	815			
Volume Left	38	33	0			
Volume Right	22	0	60			
cSH	288	759	1700			
Volume to Capacity	0.21	0.04	0.48			
Queue Length 95th (ft)	19	3	0			
Control Delay (s)	20.7	2.3	0.0			
Lane LOS	C	A				
Approach Delay (s)	20.7	2.3	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			49.9%	ICU Level of Service	A	
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2021 No-Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	690	280	195	255	20	30	25	110	305	275	5
Future Volume (vph)	0	690	280	195	255	20	30	25	110	305	275	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.96		1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)		1881		1778	1853	1483		1684	1515	1796	1849	
Flt Permitted		1.00		0.07	1.00	1.00		0.64	1.00	0.95	1.00	
Satd. Flow (perm)		1881		122	1853	1483		1104	1515	1796	1849	
Peak-hour factor, PHF	0.97	0.97	0.97	0.87	0.87	0.87	0.95	0.95	0.95	0.75	0.75	0.75
Adj. Flow (vph)	0	711	289	224	293	23	32	26	116	407	367	7
RTOR Reduction (vph)	0	9	0	0	0	10	0	0	109	0	1	0
Lane Group Flow (vph)	0	991	0	224	293	13	0	58	7	407	373	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	1%	5%	0%	17%	0%	0%	2%	0%
Turn Type		NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		55.4		68.5	65.5	65.5		5.1	5.1	23.2	34.3	
Effective Green, g (s)		57.4		68.5	67.5	67.5		7.1	7.1	25.2	36.3	
Actuated g/C Ratio		0.47		0.56	0.56	0.56		0.06	0.06	0.21	0.30	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		888		165	1029	823		64	88	372	552	
v/s Ratio Prot		0.53		c0.08	0.16					c0.23	c0.20	
v/s Ratio Perm				c0.68		0.01		0.05	0.00			
v/c Ratio		1.12		1.36	0.28	0.02		0.91	0.08	1.09	0.68	
Uniform Delay, d1		32.0		54.0	14.3	12.1		56.9	54.1	48.1	37.4	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		67.1		195.1	0.1	0.0		79.3	0.4	74.4	3.3	
Delay (s)		99.2		249.1	14.3	12.1		136.2	54.5	122.5	40.7	
Level of Service		F		F	B	B		F	D	F	D	
Approach Delay (s)		99.2			111.6			81.7			83.3	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			95.7				HCM 2000 Level of Service		F			
HCM 2000 Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			121.5				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			101.2%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2021 No-Build
Weekday PM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	10	61	29	11	71	28	40
Maximum Split (%)	7.2%	43.9%	20.9%	7.9%	51.1%	20.1%	28.8%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	61	0	71	100	0	111	71
End Time (s)	71	61	100	111	71	0	111
Yield/Force Off (s)	68	55	94	105	65	133	105
Yield/Force Off 170(s)	68	55	94	105	65	119	105
Local Start Time (s)	61	0	71	100	0	111	71
Local Yield (s)	68	55	94	105	65	133	105
Local Yield 170(s)	68	55	94	105	65	119	105

Intersection Summary

Cycle Length	139
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø1	 Ø3	 Ø4	 Ø7
61 s	10 s	29 s	11 s	28 s
 Ø6	 Ø8			
71 s	40 s			

Queuing and Blocking Report

2031 No-Build

Weekday AM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	101	79	122	86
Average Queue (ft)	48	41	59	40
95th Queue (ft)	81	67	96	71
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	54	29
Average Queue (ft)	28	1
95th Queue (ft)	49	13
Link Distance (ft)	802	277
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	74	37
Average Queue (ft)	32	2
95th Queue (ft)	57	19
Link Distance (ft)	842	152
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2031 No-Build

Weekday AM

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	T	R	LT	R	L	TR
Maximum Queue (ft)	669	224	752	618	422	250	65	94
Average Queue (ft)	223	50	362	157	201	88	26	25
95th Queue (ft)	568	167	715	485	393	217	62	66
Link Distance (ft)	1462		989	989	806			1135
Upstream Blk Time (%)			1	0	0			
Queuing Penalty (veh)			0	0	0			
Storage Bay Dist (ft)		125				100	115	
Storage Blk Time (%)		0	28		36	2		0
Queuing Penalty (veh)		0	14		60	7		0

Network Summary

Network wide Queuing Penalty: 82

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2031 No-Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	100	65	70	35	40	80	170	35	30	145	0
Future Volume (vph)	5	100	65	70	35	40	80	170	35	30	145	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	111	72	78	39	44	89	189	39	33	161	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	189	161	317	194								
Volume Left (vph)	6	78	89	33								
Volume Right (vph)	72	44	39	0								
Hadj (s)	-0.12	-0.05	0.02	0.09								
Departure Headway (s)	5.5	5.6	5.2	5.5								
Degree Utilization, x	0.29	0.25	0.46	0.30								
Capacity (veh/h)	595	576	641	602								
Control Delay (s)	10.7	10.4	12.7	10.8								
Approach Delay (s)	10.7	10.4	12.7	10.8								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.4									
Level of Service			B									
Intersection Capacity Utilization			54.4%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 No-Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	25	10	405	140	15
Future Volume (Veh/h)	45	25	10	405	140	15
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	27	11	440	152	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	622	160	168			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	622	160	168			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	97	99			
cM capacity (veh/h)	447	885	1410			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	76	451	168			
Volume Left	49	11	0			
Volume Right	27	0	16			
cSH	542	1410	1700			
Volume to Capacity	0.14	0.01	0.10			
Queue Length 95th (ft)	12	1	0			
Control Delay (s)	12.7	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.7	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			40.0%	ICU Level of Service	A	
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 No-Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	30	10	440	125	20
Future Volume (Veh/h)	55	30	10	440	125	20
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	33	11	478	136	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					907	
pX, platoon unblocked						
vC, conflicting volume	647	147	158			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	647	147	158			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	96	99			
cM capacity (veh/h)	432	900	1422			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	93	489	158			
Volume Left	60	11	0			
Volume Right	33	0	22			
cSH	530	1422	1700			
Volume to Capacity	0.18	0.01	0.09			
Queue Length 95th (ft)	16	1	0			
Control Delay (s)	13.2	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.2	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			42.7%	ICU Level of Service	A	
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2031 No-Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	350	70	50	875	535	160	170	165	35	20	5
Future Volume (vph)	5	350	70	50	875	535	160	170	165	35	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.97	
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)		1897		1778	1872	1557		1790	1511	1796	1581	
Flt Permitted		0.64		0.40	1.00	1.00		0.83	1.00	0.95	1.00	
Satd. Flow (perm)		1222		749	1872	1557		1525	1511	1796	1581	
Peak-hour factor, PHF	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	389	78	54	941	575	178	189	183	39	22	6
RTOR Reduction (vph)	0	5	0	0	0	167	0	0	107	0	4	0
Lane Group Flow (vph)	0	468	0	54	941	408	0	367	76	39	24	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	3%	2%	0%	20%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		46.3		54.1	51.7	51.7		19.4	19.4	2.8	28.2	
Effective Green, g (s)		48.3		54.1	53.7	53.7		21.4	21.4	4.8	30.2	
Actuated g/C Ratio		0.48		0.53	0.53	0.53		0.21	0.21	0.05	0.30	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		582		424	992	825		322	319	85	471	
v/s Ratio Prot				0.00	c0.50					c0.02	0.02	
v/s Ratio Perm		0.38		0.06		0.26		c0.24	0.05			
v/c Ratio		0.80		0.13	0.95	0.49		1.14	0.24	0.46	0.05	
Uniform Delay, d1		22.5		19.4	22.5	15.2		40.0	33.2	47.0	25.3	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		7.9		0.1	17.2	0.2		93.5	0.4	3.9	0.0	
Delay (s)		30.4		19.6	39.6	15.3		133.5	33.6	50.9	25.4	
Level of Service		C		B	D	B		F	C	D	C	
Approach Delay (s)		30.4			30.0			100.2			40.2	
Approach LOS		C			C			F			D	
Intersection Summary												
HCM 2000 Control Delay			44.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			101.3				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			84.0%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2031 No-Build
Weekday AM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	6	50	11	25	56	28	36
Maximum Split (%)	5.0%	41.7%	9.2%	20.8%	46.7%	23.3%	30.0%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	50	0	56	67	0	92	56
End Time (s)	56	50	67	92	56	0	92
Yield/Force Off (s)	53	44	61	86	50	114	86
Yield/Force Off 170(s)	53	44	61	86	50	100	86
Local Start Time (s)	50	0	56	67	0	92	56
Local Yield (s)	53	44	61	86	50	114	86
Local Yield 170(s)	53	44	61	86	50	100	86

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø1	 Ø3	 Ø4	 Ø7
50 s	6 s	11 s	25 s	28 s
 Ø6	 Ø8			
56 s	36 s			

Queuing and Blocking Report

2031 No-Build
Weekday PM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	73	115	119	568
Average Queue (ft)	37	56	54	210
95th Queue (ft)	62	94	92	466
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	61	61	2
Average Queue (ft)	23	12	0
95th Queue (ft)	49	43	2
Link Distance (ft)	802	277	1769
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	72	84	15
Average Queue (ft)	29	19	1
95th Queue (ft)	58	59	7
Link Distance (ft)	842	152	806
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

2031 No-Build
Weekday PM

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	B29	WB	WB	WB	NB	NB	SB	SB	B28
Directions Served	LTR	T	L	T	R	LT	R	L	TR	T
Maximum Queue (ft)	1533	534	225	855	718	192	170	215	1161	333
Average Queue (ft)	1533	529	200	578	246	82	53	210	925	202
95th Queue (ft)	1548	601	277	1169	910	182	117	237	1549	545
Link Distance (ft)	1462	519		989	989	806			1135	411
Upstream Blk Time (%)	71	81		19	6				44	39
Queuing Penalty (veh)	0	0		0	0				0	0
Storage Bay Dist (ft)			125				100	115		
Storage Blk Time (%)			78	13		19	1	72	35	
Queuing Penalty (veh)			211	21		17	1	225	116	

Network Summary

Network wide Queuing Penalty: 590

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2031 No-Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	20	75	105	55	55	50	120	50	30	515	5
Future Volume (vph)	5	20	75	105	55	55	50	120	50	30	515	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Hourly flow rate (vph)	6	22	83	117	61	61	56	133	56	33	566	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	111	239	245	604								
Volume Left (vph)	6	117	56	33								
Volume Right (vph)	83	61	56	5								
Hadj (s)	-0.44	-0.04	-0.05	0.02								
Departure Headway (s)	6.6	6.6	6.1	5.6								
Degree Utilization, x	0.20	0.44	0.42	0.94								
Capacity (veh/h)	493	522	551	638								
Control Delay (s)	11.3	14.6	13.5	45.2								
Approach Delay (s)	11.3	14.6	13.5	45.2								
Approach LOS	B	B	B	E								
Intersection Summary												
Delay			29.5									
Level of Service			D									
Intersection Capacity Utilization			56.2%		ICU Level of Service					B		
Analysis Period (min)			15									

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 No-Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	15	25	115	700	45
Future Volume (Veh/h)	30	15	25	115	700	45
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	16	27	125	761	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	964	786	810			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	964	786	810			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	96	97			
cM capacity (veh/h)	274	392	816			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	49	152	810			
Volume Left	33	27	0			
Volume Right	16	0	49			
cSH	304	816	1700			
Volume to Capacity	0.16	0.03	0.48			
Queue Length 95th (ft)	14	3	0			
Control Delay (s)	19.1	2.0	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.1	2.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			49.6%	ICU Level of Service		A
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 No-Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	25	30	115	720	55
Future Volume (Veh/h)	35	25	30	115	720	55
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	27	33	125	783	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					907	
pX, platoon unblocked	0.84	0.84	0.84			
vC, conflicting volume	1004	813	843			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	910	683	718			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	93	96			
cM capacity (veh/h)	245	378	742			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	65	158	843			
Volume Left	38	33	0			
Volume Right	27	0	60			
cSH	287	742	1700			
Volume to Capacity	0.23	0.04	0.50			
Queue Length 95th (ft)	21	3	0			
Control Delay (s)	21.2	2.5	0.0			
Lane LOS	C	A				
Approach Delay (s)	21.2	2.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			51.4%	ICU Level of Service	A	
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2031 No-Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	750	305	165	270	25	35	25	90	335	305	5
Future Volume (vph)	0	750	305	165	270	25	35	25	90	335	305	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.96		1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)		1881		1778	1853	1483		1690	1515	1796	1849	
Flt Permitted		1.00		0.06	1.00	1.00		0.64	1.00	0.95	1.00	
Satd. Flow (perm)		1881		118	1853	1483		1109	1515	1796	1849	
Peak-hour factor, PHF	0.97	0.97	0.97	0.90	0.90	0.90	0.95	0.95	0.95	0.90	0.90	0.90
Adj. Flow (vph)	0	773	314	183	300	28	37	26	95	372	339	6
RTOR Reduction (vph)	0	9	0	0	0	12	0	0	89	0	1	0
Lane Group Flow (vph)	0	1078	0	183	300	16	0	63	6	372	344	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	1%	5%	0%	17%	0%	0%	2%	0%
Turn Type		NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		57.5		70.6	67.6	67.6		5.1	5.1	21.2	32.3	
Effective Green, g (s)		59.5		70.6	69.6	69.6		7.1	7.1	23.2	34.3	
Actuated g/C Ratio		0.49		0.58	0.57	0.57		0.06	0.06	0.19	0.28	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		920		165	1060	848		64	88	342	521	
v/s Ratio Prot		c0.57		c0.06	0.16					c0.21	0.19	
v/s Ratio Perm				0.58		0.01		c0.06	0.00			
v/c Ratio		1.17		1.11	0.28	0.02		0.98	0.06	1.09	0.66	
Uniform Delay, d1		31.0		54.1	13.3	11.2		57.2	54.1	49.2	38.5	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		88.8		102.3	0.1	0.0		106.4	0.3	74.2	3.1	
Delay (s)		119.9		156.4	13.3	11.2		163.6	54.4	123.4	41.7	
Level of Service		F		F	B	B		F	D	F	D	
Approach Delay (s)		119.9			64.4			97.9			84.1	
Approach LOS		F			E			F			F	
Intersection Summary												
HCM 2000 Control Delay			96.6		HCM 2000 Level of Service				F			
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			121.6		Sum of lost time (s)				21.0			
Intersection Capacity Utilization			108.3%		ICU Level of Service				G			
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2031 No-Build
Weekday PM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	10	63	27	11	73	28	38
Maximum Split (%)	7.2%	45.3%	19.4%	7.9%	52.5%	20.1%	27.3%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	63	0	73	100	0	111	73
End Time (s)	73	63	100	111	73	0	111
Yield/Force Off (s)	70	57	94	105	67	133	105
Yield/Force Off 170(s)	70	57	94	105	67	119	105
Local Start Time (s)	63	0	73	100	0	111	73
Local Yield (s)	70	57	94	105	67	133	105
Local Yield 170(s)	70	57	94	105	67	119	105

Intersection Summary

Cycle Length	139
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø1	 Ø3	 Ø4	 Ø7
63 s	10 s	27 s	11 s	28 s
 Ø6		 Ø8		
73 s		38 s		

Queuing and Blocking Report

2031 Build
Weekday AM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	102	78	131	85
Average Queue (ft)	49	39	59	41
95th Queue (ft)	83	65	99	69
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	58	35
Average Queue (ft)	30	2
95th Queue (ft)	52	14
Link Distance (ft)	803	277
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Mount Support Rd & Site Driveway

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	62	39
Average Queue (ft)	26	3
95th Queue (ft)	49	22
Link Distance (ft)	527	568
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2031 Build
Weekday AM

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	72	40	3
Average Queue (ft)	30	2	0
95th Queue (ft)	55	22	3
Link Distance (ft)	842	152	806
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	B29	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	T	L	T	R	LT	R	L	TR
Maximum Queue (ft)	908	53	225	696	610	480	250	67	72
Average Queue (ft)	339	18	69	349	158	210	105	24	23
95th Queue (ft)	984	174	198	666	471	407	240	56	59
Link Distance (ft)	1462	519		989	989	806			1135
Upstream Blk Time (%)	4	2		1	0				
Queuing Penalty (veh)	0	0		0	0				
Storage Bay Dist (ft)			125				100	115	
Storage Blk Time (%)			0	29		39	3		0
Queuing Penalty (veh)			0	17		79	9		0

Network Summary

Network wide Queuing Penalty: 106

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	100	65	70	35	40	80	175	35	35	160	0
Future Volume (vph)	5	100	65	70	35	40	80	175	35	35	160	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	111	72	78	39	44	89	194	39	39	178	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	189	161	322	217								
Volume Left (vph)	6	78	89	39								
Volume Right (vph)	72	44	39	0								
Hadj (s)	-0.12	-0.05	0.02	0.09								
Departure Headway (s)	5.6	5.7	5.3	5.5								
Degree Utilization, x	0.29	0.25	0.47	0.33								
Capacity (veh/h)	580	563	634	600								
Control Delay (s)	10.9	10.6	13.0	11.3								
Approach Delay (s)	10.9	10.6	13.0	11.3								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.7									
Level of Service			B									
Intersection Capacity Utilization			54.1%		ICU Level of Service					A		
Analysis Period (min)			15									

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	25	10	410	160	15
Future Volume (Veh/h)	45	25	10	410	160	15
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	27	11	446	174	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	650	182	190			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	650	182	190			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	97	99			
cM capacity (veh/h)	430	861	1384			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	76	457	190			
Volume Left	49	11	0			
Volume Right	27	0	16			
cSH	523	1384	1700			
Volume to Capacity	0.15	0.01	0.11			
Queue Length 95th (ft)	13	1	0			
Control Delay (s)	13.0	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.0	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			40.3%	ICU Level of Service		A
Analysis Period (min)			15			

3: Mount Support Rd & Site Driveway
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	20	35	450	5	10	155
Future Volume (Veh/h)	20	35	450	5	10	155
Sign Control	Stop		Free			Free
Grade	0%		-1%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	38	489	5	11	168
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	682	492			494	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	682	492			494	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	93			99	
cM capacity (veh/h)	411	577			1070	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	60	494	179			
Volume Left	22	0	11			
Volume Right	38	5	0			
cSH	503	1700	1070			
Volume to Capacity	0.12	0.29	0.01			
Queue Length 95th (ft)	10	0	1			
Control Delay (s)	13.1	0.0	0.6			
Lane LOS	B		A			
Approach Delay (s)	13.1	0.0	0.6			
Approach LOS	B					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			34.0%	ICU Level of Service		A
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	30	10	475	135	20
Future Volume (Veh/h)	55	30	10	475	135	20
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	33	11	516	147	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)					907	
pX, platoon unblocked						
vC, conflicting volume	696	158	169			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	696	158	169			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	96	99			
cM capacity (veh/h)	404	887	1409			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	93	527	169			
Volume Left	60	11	0			
Volume Right	33	0	22			
cSH	501	1409	1700			
Volume to Capacity	0.19	0.01	0.10			
Queue Length 95th (ft)	17	1	0			
Control Delay (s)	13.8	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.8	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			44.6%	ICU Level of Service	A	
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2031 Build
Weekday AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	350	70	60	875	535	160	170	200	35	20	5
Future Volume (vph)	5	350	70	60	875	535	160	170	200	35	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.97	
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)		1897		1778	1872	1557		1790	1511	1796	1581	
Flt Permitted		0.64		0.40	1.00	1.00		0.83	1.00	0.95	1.00	
Satd. Flow (perm)		1222		749	1872	1557		1525	1511	1796	1581	
Peak-hour factor, PHF	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	389	78	65	941	575	178	189	222	39	22	6
RTOR Reduction (vph)	0	5	0	0	0	167	0	0	107	0	4	0
Lane Group Flow (vph)	0	468	0	65	941	408	0	367	115	39	24	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	3%	2%	0%	20%	0%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		46.3		54.1	51.7	51.7		19.4	19.4	2.8	28.2	
Effective Green, g (s)		48.3		54.1	53.7	53.7		21.4	21.4	4.8	30.2	
Actuated g/C Ratio		0.48		0.53	0.53	0.53		0.21	0.21	0.05	0.30	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		582		424	992	825		322	319	85	471	
v/s Ratio Prot				0.00	c0.50					c0.02	0.02	
v/s Ratio Perm		0.38		0.08		0.26		c0.24	0.08			
v/c Ratio		0.80		0.15	0.95	0.49		1.14	0.36	0.46	0.05	
Uniform Delay, d1		22.5		19.7	22.5	15.2		40.0	34.1	47.0	25.3	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		7.9		0.2	17.2	0.2		93.5	0.7	3.9	0.0	
Delay (s)		30.4		19.8	39.6	15.3		133.5	34.8	50.9	25.4	
Level of Service		C		B	D	B		F	C	D	C	
Approach Delay (s)		30.4			30.0			96.3			40.2	
Approach LOS		C			C			F			D	
Intersection Summary												
HCM 2000 Control Delay			44.7				HCM 2000 Level of Service		D			
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			101.3				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			84.0%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2031 Build
Weekday AM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	6	50	11	25	56	28	36
Maximum Split (%)	5.0%	41.7%	9.2%	20.8%	46.7%	23.3%	30.0%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	50	0	56	67	0	92	56
End Time (s)	56	50	67	92	56	0	92
Yield/Force Off (s)	53	44	61	86	50	114	86
Yield/Force Off 170(s)	53	44	61	86	50	100	86
Local Start Time (s)	50	0	56	67	0	92	56
Local Yield (s)	53	44	61	86	50	114	86
Local Yield 170(s)	53	44	61	86	50	100	86

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø1	 Ø3	 Ø4	 Ø7
50 s	6 s	11 s	25 s	28 s
 Ø6	 Ø8			
56 s	36 s			

Queuing and Blocking Report

2031 Build
Weekday PM

Intersection: 1: Heater Rd/Mount Support Rd & Old Etna Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	76	138	150	456
Average Queue (ft)	36	60	57	204
95th Queue (ft)	62	105	103	480
Link Distance (ft)	595	857	1914	917
Upstream Blk Time (%)				1
Queuing Penalty (veh)				0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Mount Support Rd & 343 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	68	72	2
Average Queue (ft)	26	14	0
95th Queue (ft)	54	48	2
Link Distance (ft)	802	277	1239
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Mount Support Rd & Site Driveway

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	47	81
Average Queue (ft)	21	7
95th Queue (ft)	46	40
Link Distance (ft)	434	474
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2031 Build
Weekday PM

Intersection: 4: Mount Support Rd & 401 Mt Support Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	73	83	14
Average Queue (ft)	27	18	1
95th Queue (ft)	54	59	7
Link Distance (ft)	842	152	806
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Mount Support Rd & Lahaye Dr

Movement	EB	B29	WB	WB	WB	NB	NB	SB	SB	B28
Directions Served	LTR	T	L	T	R	LT	R	L	TR	T
Maximum Queue (ft)	1533	534	225	1002	965	180	137	215	1164	288
Average Queue (ft)	1533	523	221	896	718	72	58	210	875	151
95th Queue (ft)	1543	631	248	1290	1435	148	107	237	1486	470
Link Distance (ft)	1462	519		989	989	806			1135	411
Upstream Blk Time (%)	71	82		72	31				36	23
Queuing Penalty (veh)	0	0		0	0				0	0
Storage Bay Dist (ft)			125				100	115		
Storage Blk Time (%)			93	14		11	3	72	34	
Queuing Penalty (veh)			250	28		13	2	225	115	

Network Summary

Network wide Queuing Penalty: 634

1: Heater Rd/Mount Support Rd & Old Etna Rd
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	20	75	105	55	60	50	135	50	30	525	5
Future Volume (vph)	5	20	75	105	55	60	50	135	50	30	525	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Hourly flow rate (vph)	6	22	83	117	61	67	56	150	56	33	577	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	111	245	262	615								
Volume Left (vph)	6	117	56	33								
Volume Right (vph)	83	67	56	5								
Hadj (s)	-0.44	-0.05	-0.04	0.02								
Departure Headway (s)	6.8	6.7	6.2	5.7								
Degree Utilization, x	0.21	0.46	0.45	0.97								
Capacity (veh/h)	484	519	558	621								
Control Delay (s)	11.5	15.2	14.3	52.3								
Approach Delay (s)	11.5	15.2	14.3	52.3								
Approach LOS	B	C	B	F								
Intersection Summary												
Delay				33.2								
Level of Service				D								
Intersection Capacity Utilization				57.2%	ICU Level of Service				B			
Analysis Period (min)				15								

2: Mount Support Rd & 343 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	15	25	135	710	45
Future Volume (Veh/h)	30	15	25	135	710	45
Sign Control	Stop			Free	Free	
Grade	0%			-1%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	16	27	147	772	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	998	796	821			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	998	796	821			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	96	97			
cM capacity (veh/h)	261	387	808			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	49	174	821			
Volume Left	33	27	0			
Volume Right	16	0	49			
cSH	292	808	1700			
Volume to Capacity	0.17	0.03	0.48			
Queue Length 95th (ft)	15	3	0			
Control Delay (s)	19.8	1.8	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.8	1.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			50.1%	ICU Level of Service	A	
Analysis Period (min)			15			

3: Mount Support Rd & Site Driveway
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	25	145	20	35	745
Future Volume (Veh/h)	10	25	145	20	35	745
Sign Control	Stop		Free			Free
Grade	0%		-1%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	27	158	22	38	810
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1055	169			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1055	169			180	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	97			97	
cM capacity (veh/h)	243	875			1396	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	38	180	848			
Volume Left	11	0	38			
Volume Right	27	22	0			
cSH	499	1700	1396			
Volume to Capacity	0.08	0.11	0.03			
Queue Length 95th (ft)	6	0	2			
Control Delay (s)	12.8	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	12.8	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			63.3%	ICU Level of Service		B
Analysis Period (min)			15			

4: Mount Support Rd & 401 Mt Support Rd
HCM Unsignalized Intersection Capacity Analysis

2031 Build
Weekday PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	25	30	140	755	55
Future Volume (Veh/h)	35	25	30	140	755	55
Sign Control	Stop			Free	Free	
Grade	0%			4%	2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	27	33	152	821	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					907	
pX, platoon unblocked	0.82	0.82	0.82			
vC, conflicting volume	1069	851	881			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	973	707	744			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	92	95			
cM capacity (veh/h)	218	356	707			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	65	185	881			
Volume Left	38	33	0			
Volume Right	27	0	60			
cSH	260	707	1700			
Volume to Capacity	0.25	0.05	0.52			
Queue Length 95th (ft)	24	4	0			
Control Delay (s)	23.4	2.3	0.0			
Lane LOS	C	A				
Approach Delay (s)	23.4	2.3	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			53.2%	ICU Level of Service	A	
Analysis Period (min)			15			

5: Mount Support Rd & Lahaye Dr
HCM Signalized Intersection Capacity Analysis

2031 Build
Weekday PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	750	305	200	270	25	35	25	115	335	305	5
Future Volume (vph)	0	750	305	200	270	25	35	25	115	335	305	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-6%			3%			4%			1%	
Total Lost time (s)		4.0		3.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	0.98		1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		0.96		1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)		1881		1778	1853	1483		1690	1515	1796	1849	
Flt Permitted		1.00		0.06	1.00	1.00		0.64	1.00	0.95	1.00	
Satd. Flow (perm)		1881		118	1853	1483		1109	1515	1796	1849	
Peak-hour factor, PHF	0.97	0.97	0.97	0.90	0.90	0.90	0.95	0.95	0.95	0.90	0.90	0.90
Adj. Flow (vph)	0	773	314	222	300	28	37	26	121	372	339	6
RTOR Reduction (vph)	0	9	0	0	0	12	0	0	114	0	1	0
Lane Group Flow (vph)	0	1078	0	222	300	16	0	63	7	372	344	0
Confl. Peds. (#/hr)						1			2			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	1%	5%	0%	17%	0%	0%	2%	0%
Turn Type		NA		pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	
Protected Phases		2		1	6			4		3	8	
Permitted Phases	2			6		6	4		4			
Actuated Green, G (s)		57.5		70.6	67.6	67.6		5.1	5.1	21.2	32.3	
Effective Green, g (s)		59.5		70.6	69.6	69.6		7.1	7.1	23.2	34.3	
Actuated g/C Ratio		0.49		0.58	0.57	0.57		0.06	0.06	0.19	0.28	
Clearance Time (s)		6.0		3.0	6.0	6.0		6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0		3.0	1.0	1.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		920		165	1060	848		64	88	342	521	
v/s Ratio Prot		0.57		c0.08	0.16					c0.21	0.19	
v/s Ratio Perm				c0.70		0.01		c0.06	0.00			
v/c Ratio		1.17		1.35	0.28	0.02		0.98	0.08	1.09	0.66	
Uniform Delay, d1		31.0		54.1	13.3	11.2		57.2	54.2	49.2	38.5	
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		88.8		190.2	0.1	0.0		106.4	0.4	74.2	3.1	
Delay (s)		119.9		244.2	13.3	11.2		163.6	54.6	123.4	41.7	
Level of Service		F		F	B	B		F	D	F	D	
Approach Delay (s)		119.9			106.4			91.9			84.1	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			104.8				HCM 2000 Level of Service		F			
HCM 2000 Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			121.6				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			108.3%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

5: Mount Support Rd & Lahaye Dr
Timing Report, Sorted By Phase

2031 Build
Weekday PM

							
Phase Number	1	2	3	4	6	7	8
Movement	WBL	EBTL	SBL	NBTL	WBTL	Ped	SBT
Lead/Lag	Lag	Lead	Lead	Lag			
Lead-Lag Optimize							
Recall Mode	None	Min	None	None	Min	None	None
Maximum Split (s)	10	63	27	11	73	28	38
Maximum Split (%)	7.2%	45.3%	19.4%	7.9%	52.5%	20.1%	27.3%
Minimum Split (s)	6	11	11	11	11	28	11
Yellow Time (s)	3	4	4	4	4	4	4
All-Red Time (s)	0	2	2	2	2	2	2
Minimum Initial (s)	1	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	1	3	3
Minimum Gap (s)	3	3	3	3	1	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)						8	
Flash Dont Walk (s)						14	
Dual Entry	No	Yes	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	63	0	73	100	0	111	73
End Time (s)	73	63	100	111	73	0	111
Yield/Force Off (s)	70	57	94	105	67	133	105
Yield/Force Off 170(s)	70	57	94	105	67	119	105
Local Start Time (s)	63	0	73	100	0	111	73
Local Yield (s)	70	57	94	105	67	133	105
Local Yield 170(s)	70	57	94	105	67	119	105

Intersection Summary

Cycle Length	139
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 5: Mount Support Rd & Lahaye Dr

 Ø2	 Ø1	 Ø3	 Ø4	 Ø7
63 s	10 s	27 s	11 s	28 s
 Ø6	 Ø8			
73 s	38 s			

Auxiliary Turn Lane Evaluation Worksheets

2031 Build Weekday AM

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

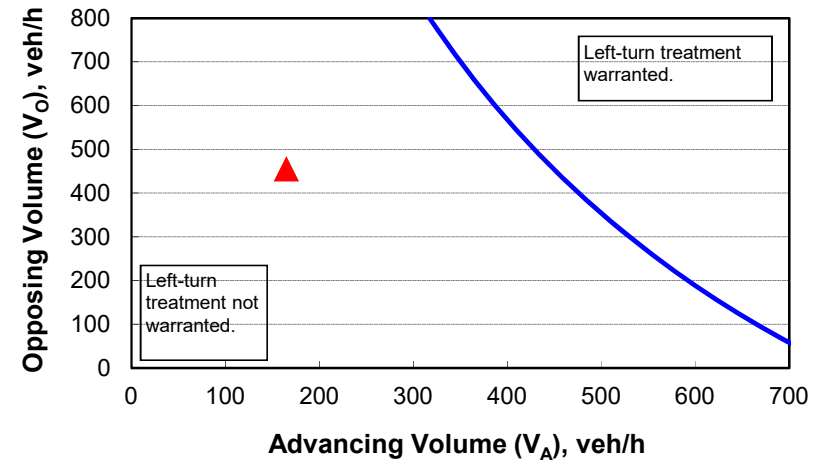
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	38
Percent of left-turns in advancing volume (V_A), %:	6%
Advancing volume (V_A), veh/h:	165
Opposing volume (V_O), veh/h:	455

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	449
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

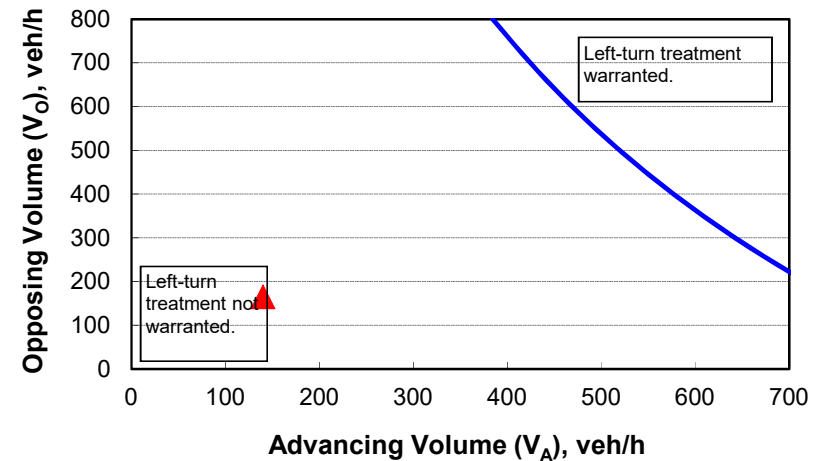
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	38
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	140
Opposing volume (V_O), veh/h:	165

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	747
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway
Variable	Value
Major-road speed, mph:	25
Major-road volume (one direction), veh/h:	455
Right-turn volume, veh/h:	5

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	3046
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

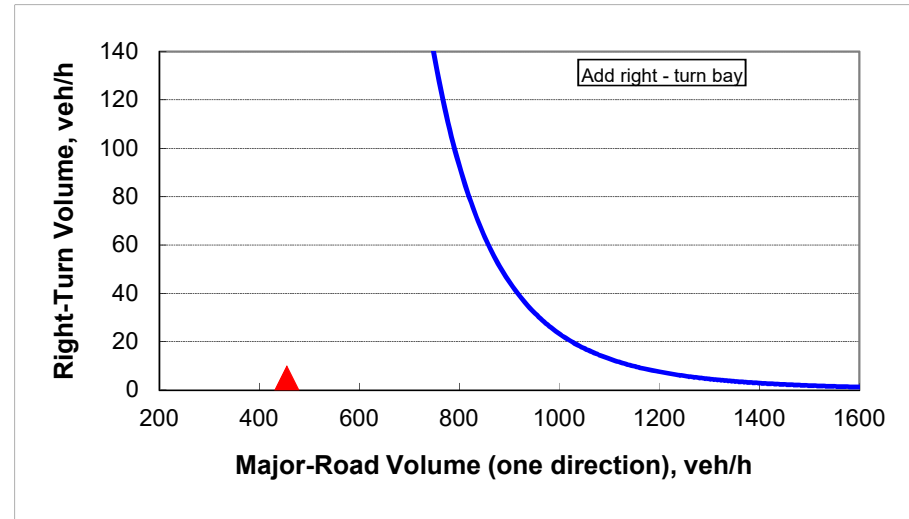


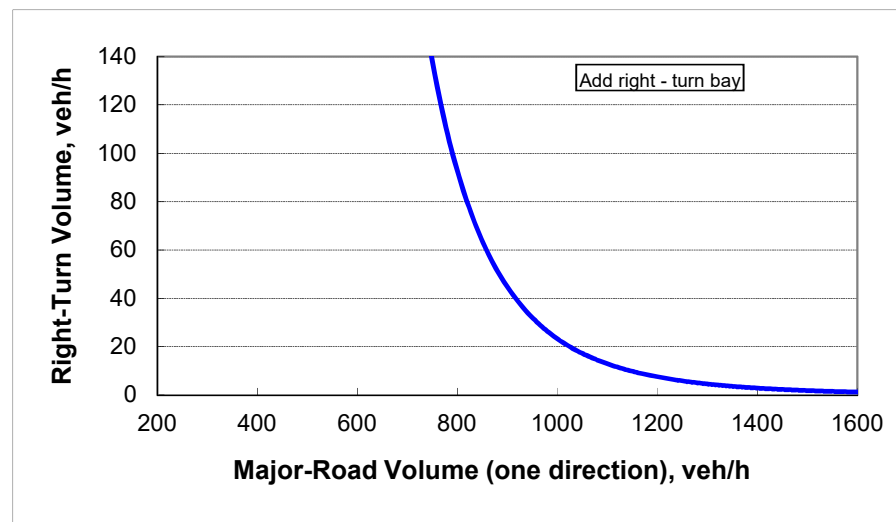
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway
Variable	Value
Major-road speed, mph:	25
Major-road volume (one direction), veh/h:	165
Right-turn volume, veh/h:	20

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	1622324
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



402 Mount Support

EV Project #: 19324

Date: 12/14/2021

Pipe Capacity Analysis

Item	Pipe Name	Dia (in.)	n	s	Q25	Qmax	%Qmax
1	D9-D8	12	0.020	0.038	1.92	4.86	39.40
2	D8-D7	15	0.020	0.043	2.93	9.37	31.32
2	D7-D6	15	0.020	0.068	3.51	11.78	29.80
3	D6-D5	18	0.020	0.040	3.92	14.69	26.72
4	D5-3P	24	0.020	0.012	6.89	17.33	39.78
5	D15-D14	12	0.020	0.012	2.15	2.73	78.89
6	D14-D13	15	0.020	0.022	4.15	6.7	61.89
7	D13-D10	24	0.020	0.010	6.74	15.82	42.62
8	D10-3P	24	0.020	0.019	8.95	21.8	41.05
9	D4-3P	24	0.020	0.012	1.82	17.33	10.50
10	D19-D20	12	0.020	0.012	2.14	2.73	78.40
11	D22-D21	12	0.020	0.015	2.17	3.05	71.05
12	D18-D24	15	0.020	0.064	4.31	11.43	37.69
13	D17-1P	15	0.020	0.201	7.44	20.25	36.73
14	1P-D46	24	0.020	0.095	25.45	48.75	52.20

Qmax: <http://www.hawsedc.com/engcalcs/Manning-Pipe-Flow.php>

Inlet Grate Capacity of EJCO 5520M5 (weir flow)

WATER DEPTH (IN):	FLOW CAPACITY (CFS):
1	0.6
2	1.8
3	3.3

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D9-D8

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.574 acres

Runoff Coefficient, **C** = 0.544

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in
<u>6.18</u>	<u>5</u>	0.16
<u>4.7</u>	<u>10</u>	0.21
<u>3.9</u>	<u>15</u>	0.26

slope = 0.009460 = 1/a

a = 1/slope = 106

intercept = 0.1157 = **b/a**

b = **a***intercept = 12.2

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 1.92 cfs

	sf	ac	C
A-total	<u>25,000</u>	0.574	
A-imperv	<u>10,500</u>	0.241	0.95
A-pervious	<u>14,500</u>	0.333	0.25
Weighted C =		0.544	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D8-D7

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.253 acres

Runoff Coefficient, **C** = 0.658

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in
<u>6.18</u>	<u>5</u>	0.16
<u>4.7</u>	<u>10</u>	0.21
<u>3.9</u>	<u>15</u>	0.26

slope = 0.009460 = 1/a

a = 1/slope = 106

intercept = 0.1157 = **b/a**

b = **a***intercept = 12.2

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 1.02 cfs

	sf	ac	C
A-total	<u>11,000</u>	0.253	
A-imperv	<u>7,000</u>	0.161	0.95
A-pervious	<u>5,000</u>	0.115	0.25
Weighted C =		0.658	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D7-D6

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.099 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 0.58 cfs

	sf	ac	C
A-total	<u>4,300</u>	0.099	
A-imperv	<u>4,300</u>	0.099	0.95
A-pervious	-	0.000	0.25
		Weighted C =	0.950

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D6-D5

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.071 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in
<u>6.18</u>	<u>5</u>	0.16
<u>4.7</u>	<u>10</u>	0.21
<u>3.9</u>	<u>15</u>	0.26

slope = 0.009460 = 1/a

a = 1/slope = 106

intercept = 0.1157 = **b/a**

b = **a***intercept = 12.2

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 0.41 cfs

	sf	ac	C
A-total	<u>3,100</u>	0.071	
A-imperv	<u>3,100</u>	0.071	0.95
A-pervious	-	0.000	0.25
Weighted C =		0.950	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D5-3P

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.510 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 2.97 cfs

	sf	ac	C
A-total	<u>22,200</u>	0.510	
A-imperv	<u>22,200</u>	0.510	0.95
A-pervious	<u>-</u>	0.000	0.25
Weighted C =		0.950	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D15-D14

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.370 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 2.15 cfs

	sf	ac	C
A-total	<u>16,100</u>	0.370	
A-imperv	<u>16,100</u>	0.370	0.95
A-pervious	-	0.000	0.25
Weighted C =		0.950	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D14-D13

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.342 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 1.99 cfs

	sf	ac	C
A-total	<u>14,900</u>	0.342	
A-imperv	<u>14,900</u>	0.342	0.95
A-pervious	-	0.000	0.25
		Weighted C =	0.950

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D13-D10

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.445 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in
<u>6.18</u>	<u>5</u>	0.16
<u>4.7</u>	<u>10</u>	0.21
<u>3.9</u>	<u>15</u>	0.26

slope = 0.009460 = 1/a

a = 1/slope = 106

intercept = 0.1157 = **b/a**

b = **a***intercept = 12.2

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 2.60 cfs

	sf	ac	C
A-total	<u>19,400</u>	0.445	
A-imperv	<u>19,400</u>	0.445	0.95
A-pervious	-	0.000	0.25
Weighted C =		0.950	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D10-3P

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.379 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 2.21 cfs

	sf	ac	C
A-total	<u>16,500</u>	0.379	
A-imperv	<u>16,500</u>	0.379	0.95
A-pervious	-	0.000	0.25
Weighted C =		0.950	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D4-3P

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.312 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in
<u>6.18</u>	<u>5</u>	0.16
<u>4.7</u>	<u>10</u>	0.21
<u>3.9</u>	<u>15</u>	0.26

slope = 0.009460 = 1/a

a = 1/slope = 106

intercept = 0.1157 = **b/a**

b = **a***intercept = 12.2

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 1.82 cfs

	sf	ac	C
A-total	<u>13,600</u>	0.312	
A-imperv	<u>13,600</u>	0.312	0.95
A-pervious	-	0.000	0.25
Weighted C =		0.950	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D20-D19

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.592 acres

Runoff Coefficient, **C** = 0.589

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 2.14 cfs

	sf	ac	C
A-total	<u>25,800</u>	0.592	
A-imperv	<u>12,500</u>	0.287	0.95
A-pervious	<u>13,300</u>	0.305	0.25
Weighted C =		0.589	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D22-D21

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.372 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 2.17 cfs

	sf	ac	C
A-total	<u>16,200</u>	0.372	
A-imperv	<u>16,200</u>	0.372	0.95
A-pervious	-	0.000	0.25
		Weighted C =	0.950

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D18-D24

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.680 acres

Runoff Coefficient, **C** = 0.891

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	slope = <u>0.009460</u> = 1/a
<u>4.7</u>	<u>10</u>	0.21	a = 1/slope = <u>106</u>
<u>3.9</u>	<u>15</u>	0.26	intercept = <u>0.1157</u> = b/a
			b = a *intercept = <u>12.2</u>

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 3.71 cfs

	sf	ac	C
A-total	<u>29,600</u>	0.680	
A-imperv	<u>27,100</u>	0.622	0.95
A-pervious	<u>2,500</u>	0.057	0.25
Weighted C =		0.891	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

D17-1P

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 0.165 acres

Runoff Coefficient, **C** = 0.950

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in	
<u>6.18</u>	<u>5</u>	0.16	
<u>4.7</u>	<u>10</u>	0.21	
<u>3.9</u>	<u>15</u>	0.26	

slope = <u>0.009460</u> = 1/a	
a = 1/slope = <u>106</u>	
intercept = <u>0.1157</u> = b/a	
b = a*intercept = <u>12.2</u>	

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 0.96 cfs

	sf	ac	C
A-total	<u>7,200</u>	0.165	
A-imperv	<u>7,200</u>	0.165	0.95
A-pervious	-	0.000	0.25
Weighted C =		0.950	

Design Rainfall Intensity and Peak Storm Water Runoff Rate

1P-46

(for specified return period and storm duration)

Inputs

Drainage Area, **A** = 1.411 acres

Runoff Coefficient, **C** = 0.250

Design Return Period = 25 yrs

Design Storm Duration, **d** = 5 min
(= time of concentration)

IDF (intensity-duration-frequency) data from
<http://precip.eas.cornell.edu/> for the design location

Calculation of equation constants (**a** &
b) using linear regression:

Input i, in/hr	Input d, min	Calculated 1/i, hr/in
<u>6.18</u>	<u>5</u>	0.16
<u>4.7</u>	<u>10</u>	0.21
<u>3.9</u>	<u>15</u>	0.26

slope = 0.009460 = 1/a

a = 1/slope = 106

intercept = 0.1157 = **b/a**

b = **a***intercept = 12.2

Calculation of Design Rainfall Intensity, **i**, using the equation: **i = a/(d + b)**:

(using the value for storm duration, **d**, specified above)

Design Rainfall Intensity, **i** = 6.13 in/hr

Calculation of Design Peak Storm Water Runoff Rate, **Q**, using the equation: **Q = CiA**

Design Peak Storm Water Runoff Rate, **Q** = 2.16 cfs

	sf	ac	C
A-total	<u>61,483</u>	1.411	
A-imperv		0.000	0.95
A-pervious	<u>61,483</u>	1.411	0.25
Weighted C =		0.250	

402 Mount Support Road

Stormwater Appurtenance Inspection and Maintenance Manual

Introduction

The 402 Mount Support Rd. project contains stormwater appurtenances which must be inspected and maintained on a regular basis. These systems include Ponds/Detention Systems, storm drainage piping and catch basins. In order to ensure the long-term effectiveness of approved stormwater practices, The Owner shall provide for on-going inspections and maintenance (I&M) for so long as the practices are reasonably expected to be used.

This text outlines the inspection and maintenance requirements of each system.

- (1) The party responsible for implementing the required reporting, inspection, and maintenance activities identified in this I&M Manual shall be:

Mount Support Development, LLC
Ken Braverman
214 Barnes Hill Rd.
Stowe, VT 05672

- (2) The frequency of inspections shall be as follows:

Gravel Wetland System:

- At least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- At least once annually, system should be inspected for drawdown time. If system does not drain to the level of the outlet invert within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to unclog underdrain systems (as applicable), including but not limited to removal of accumulated sediments and or reconstruction of system as appropriate.

Catch Basins:

- At a minimum, it is recommended that catch basins be inspected at least twice annually, once following snow-melt and once following leafdrop, and cleaned as indicated by inspection.

Cultec System:

- At least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- At least once annually, system should be inspected for drawdown time. If system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function or infiltration function (as applicable),

402 Mount Support Rd.

Stormwater Appurtenance Inspection and Maintenance Manual

including but not limited to removal of accumulated sediments and or reconstruction of system as appropriate.

Drip Edge

- At a minimum, it is recommended that drip edges be inspected at least twice annually, once following snow-melt and once following leafdrop, and cleaned as indicated by inspection. At this time they should be inspected for siltation, and if siltation is visible from the surface, the drip edge stone shall be replaced.

- (3) An inspection checklist to be used during each inspection Log can be found starting on Pages 3-5 of this manual.
- (4) An I&M Log shall be used to document each inspection and maintenance activity. A blank I&M Log can be found on Page 6 of this manual.
- (5) A Deicing Log shall be used to track the amount and type of deicing materials applied to surfaces within the PBP site that drain to the gravel wetland. A blank Deicing Log can be found on Page 7 of this manual.
- (6) A plan showing the locations of the site and the stormwater appurtenances is included with this manual. The Infiltration Basin and appurtenances are shown on the Site, Grading, Drainage and Utility Plan.
- (7) If any invasive species begin to grow in the stormwater ponds they shall be manually removed immediately and disposed properly. Herbicides are not recommended.

This I&M Manual and adherence to it are requirements of the City's stormwater permit.

All record keeping required by the I&M manual shall be maintained by the responsible party(ies) and be made available to the department upon request.

The Owner shall initiate the I&M activities upon the completion of all terrain alteration activities that direct stormwater to each appurtenance.

The Owner may contract with one or more third parties to conduct the I&M activities, but shall remain responsible for ensuring the long-term effectiveness of the stormwater practices.

If ownership of the property is transferred, the new owner(s) shall become the responsible party(ies).

402 Mount Support Rd.**Stormwater Appurtenance Inspection and Maintenance Manual****I&M Checklist**

Inspector:	Date:
Current Weather:	Time:
Rainfall in the Last 24 Hours (in): Can be checked here: http://www.nrcc.cornell.edu/page_nowdata.html	

Infiltration Basin Components

Items Inspected (Frequency)	Checked		Maintenance Needed		Maintenance Performed	
	Y	N	Y	N	Y	N
DEBRIS CLEANOUT (M)						
1. Ponds, Infiltration basin system and contributing areas clean of debris						
2. No dumping of yard wastes into ponds						
3. Litter (trash, debris, etc.) have been removed						
VEGETATION (M)						
4. No evidence of erosion.						
5. Is plant composition still according to plans						
6. No placement of inappropriate plants.						
7. No evidence of invasive species.						
DEWATERING AND SEDIMENTATION (A, AMS)						
8. Surface ponds dewater between storms.						
9. No evidence of standing water.						
10. No evidence of surface clogging.						
OUTLETS/OVERFLOW SPILLWAY (2A, AMS)						
11. Good condition, no need for repair						
12. No evidence of erosion.						
13. No evidence of any blockages.						
INTEGRITY OF Infiltration Basin System and Appurtenances (2A, AMS)						
14. System has not been blocked or filled inappropriately.						
15. Mulch layer is still in place (depth of at least 3").						
16. Noxious plants or weeds removed.						

Inspection Frequency Key: A= Annual, 2A=Twice Annually, M=Monthly, AMS=After Major Storm (2.5")

402 Mount Support Rd.**Stormwater Appurtenance Inspection and Maintenance Manual**

(cont.)

I&M Checklist (cont.)

Inspector:	Date:
Current Weather:	Time:
Rainfall in the Last 24 Hours (in): Can be checked here: http://www.nrcc.cornell.edu/page_nowdata.html	

Gravel Wetland Components

Items Inspected (Frequency)	Checked		Maintenance Needed		Maintenance Performed	
	Y	N	Y	N	Y	N
DEBRIS CLEANOUT (M)						
17. Gravel wetland and contributing areas clean of debris						
18. No dumping of yard wastes into gravel wetland						
19. Litter (trash, debris, etc.) have been removed						
VEGETATION (M)						
20. No evidence of erosion.						
21. Is plant composition still according to plans						
22. No placement of inappropriate plants.						
23. No evidence of invasive species.						
DEWATERING AND SEDIMENTATION (A, AMS)						
24. Gravel wetland surface dewaterers between storms.						
25. No evidence of standing water.						
26. No evidence of surface clogging.						
OUTLETS/OVERFLOW SPILLWAY (2A, AMS)						
27. Good condition, no need for repair						
28. No evidence of erosion.						
29. No evidence of any blockages.						
INTEGRITY OF SYSTEM						
30. Chambers have not been blocked or filled inappropriately.						
31. Gravel bed cleaned of accumulated sediment.						
32. Noxious plants or weeds removed.						

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402 Mount Support Rd.

Stormwater Appurtenance Inspection and Maintenance Manual

Inspection Frequency Key
(cont.)

A= Annual, 2A=Twice Annually, M= Monthly, AMS= After Major Storm (2.5")

I&M Checklist (cont.)

Inspector:	Date:
Current Weather:	Time:
Rainfall in the Last 24 Hours (in): Can be checked here: http://www.nrcc.cornell.edu/page_nowdata.html	

Catch Basins

Items Inspected (Frequency)	Checked		Maintenance Needed		Maintenance Performed	
DEBRIS CLEANOUT (2A)	Y	N	Y	N	Y	N
33. Contributing areas clean of debris						
34. Litter (trash, debris, etc.) have been removed						
35. Sediment removed if approaching half the sump depth.						
36. Floating hydrocarbons removed immediately by skimming, absorbent materials, or other method and disposed in conformance with applicable state and federal regulations.						

Inspection Frequency Key

A= Annual, 2A=Twice Annually, M= Monthly, AMS= After Major Storm (2.5")

Comments:

Date by which outstanding maintenance must be completed: _____

Inspector's Signature: _____

402 Mount Support Rd.

Stormwater Appurtenance Inspection and Maintenance Manual

I&M Log

Date	Appurtenances Inspected	Maintenance Performed	Inspector's Signature

402 Mount Support Rd.

Stormwater Appurtenance Inspection and Maintenance Manual

Deicing Log

Date	Area Deiced	Deicing Material	Amount Used	Deicer's Signature

**402 MT SUPPORT RD
RESIDENTIAL DEVELOPMENT
GRAFTON COUNTY, CITY OF LEBANON, NH**

**DRAINAGE ANALYSIS
NOVEMBER 8, 2021**

Prepared For:

MOUNT SUPPORT DEVELOPMENT LLC

Anagnost Investments

1662 Elm Street

Manchester, NH 03101

&

Braverman Company

214 Barnes Hill Road

Stowe, VT 05672

Prepared By:



Adam Morse, PE

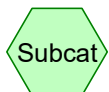
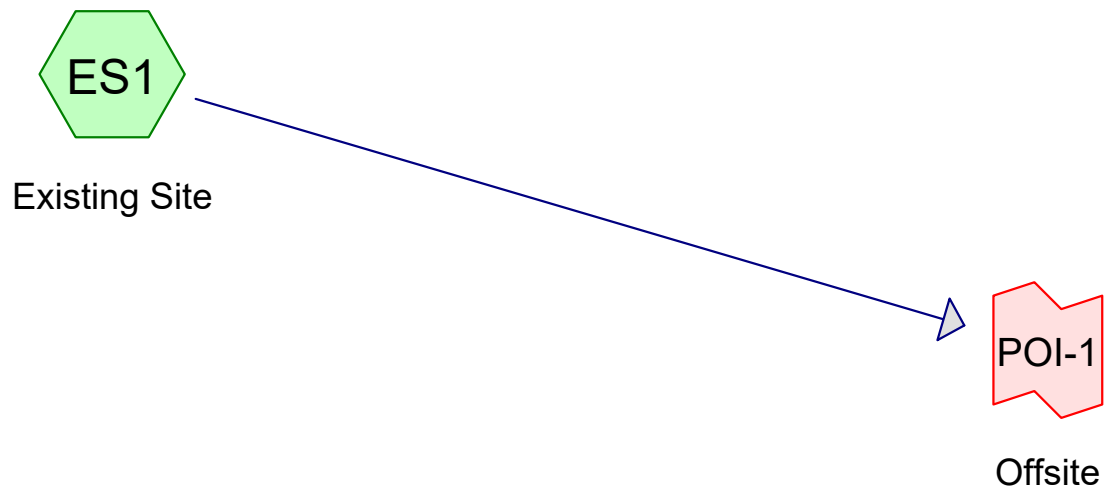
85 Mechanic Street, Suite E2-3

Lebanon, NH 03766

Tel: 603-442-9333

EV Project # 19324

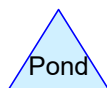
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Subcat



Reach



Pond



Link

Routing Diagram for 19324 Pre
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19324 Pre

Prepared by BEK

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type II 24-hr		Default	24.00	1	2.50	2
2	10-YR	Type II 24-hr		Default	24.00	1	3.58	2
3	25-YR	Type II 24-hr		Default	24.00	1	4.40	2
4	50-YR	Type II 24-hr		Default	24.00	1	5.15	2
5	100-YR	Type II 24-hr		Default	24.00	1	6.02	2

19324 Pre

Prepared by BEK

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
131,578	71	Meadow, non-grazed, HSG C (ES1)
1,526	78	Meadow, non-grazed, HSG D (ES1)
10,037	98	Paved parking, HSG C (ES1)
1,206	98	Paved parking, HSG D (ES1)
81,263	70	Woods, Good, HSG C (ES1)
65,384	77	Woods, Good, HSG D (ES1)
290,994	73	TOTAL AREA

19324 Pre

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
222,878	HSG C	ES1
68,116	HSG D	ES1
0	Other	
290,994		TOTAL AREA

19324 Pre

Type II 24-hr 2-YR Rainfall=2.50"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=0.57"
Flow Length=465' Tc=19.3 min CN=73 Runoff=3.70 cfs 13,764 cf

Link POI-1: Offsite

Inflow=3.70 cfs 13,764 cf
Primary=3.70 cfs 13,764 cf

Total Runoff Area = 290,994 sf Runoff Volume = 13,764 cf Average Runoff Depth = 0.57"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 10-YR Rainfall=3.58"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=1.23"
Flow Length=465' Tc=19.3 min CN=73 Runoff=8.97 cfs 29,917 cf

Link POI-1: Offsite

Inflow=8.97 cfs 29,917 cf
Primary=8.97 cfs 29,917 cf

Total Runoff Area = 290,994 sf Runoff Volume = 29,917 cf Average Runoff Depth = 1.23"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 25-YR Rainfall=4.40"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=1.82"
Flow Length=465' Tc=19.3 min CN=73 Runoff=13.60 cfs 44,149 cf

Link POI-1: Offsite

Inflow=13.60 cfs 44,149 cf
Primary=13.60 cfs 44,149 cf

Total Runoff Area = 290,994 sf Runoff Volume = 44,149 cf Average Runoff Depth = 1.82"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 50-YR Rainfall=5.15"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=2.40"
Flow Length=465' Tc=19.3 min CN=73 Runoff=18.11 cfs 58,166 cf

Link POI-1: Offsite

Inflow=18.11 cfs 58,166 cf
Primary=18.11 cfs 58,166 cf

Total Runoff Area = 290,994 sf Runoff Volume = 58,166 cf Average Runoff Depth = 2.40"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 100-YR Rainfall=6.02"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=3.11"
Flow Length=465' Tc=19.3 min CN=73 Runoff=23.56 cfs 75,300 cf

Link POI-1: Offsite

Inflow=23.56 cfs 75,300 cf
Primary=23.56 cfs 75,300 cf

Total Runoff Area = 290,994 sf Runoff Volume = 75,300 cf Average Runoff Depth = 3.11"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

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Type II 24-hr 100-YR Rainfall=6.02"

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Summary for Subcatchment ES1: Existing Site

Runoff = 23.56 cfs @ 12.12 hrs, Volume= 75,300 cf, Depth= 3.11"
Routed to Link POI-1 : Offsite

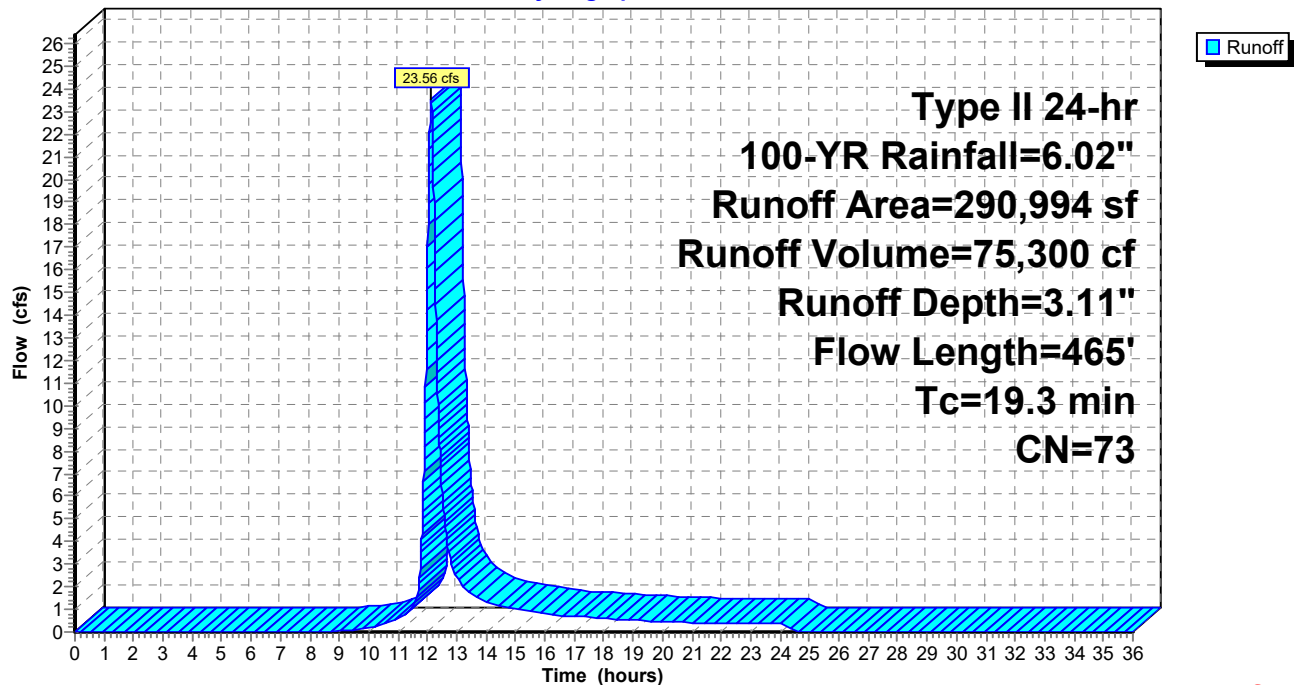
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=6.02"

Area (sf)	CN	Description
131,578	71	Meadow, non-grazed, HSG C
81,263	70	Woods, Good, HSG C
10,037	98	Paved parking, HSG C
1,526	78	Meadow, non-grazed, HSG D
65,384	77	Woods, Good, HSG D
1,206	98	Paved parking, HSG D
290,994	73	Weighted Average
279,751		96.14% Pervious Area
11,243		3.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.0800	0.29		Sheet Flow, Range n= 0.130 P2= 2.50"
13.6	365	0.0080	0.45		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
19.3	465	Total			

Subcatchment ES1: Existing Site

Hydrograph



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Type II 24-hr 100-YR Rainfall=6.02"

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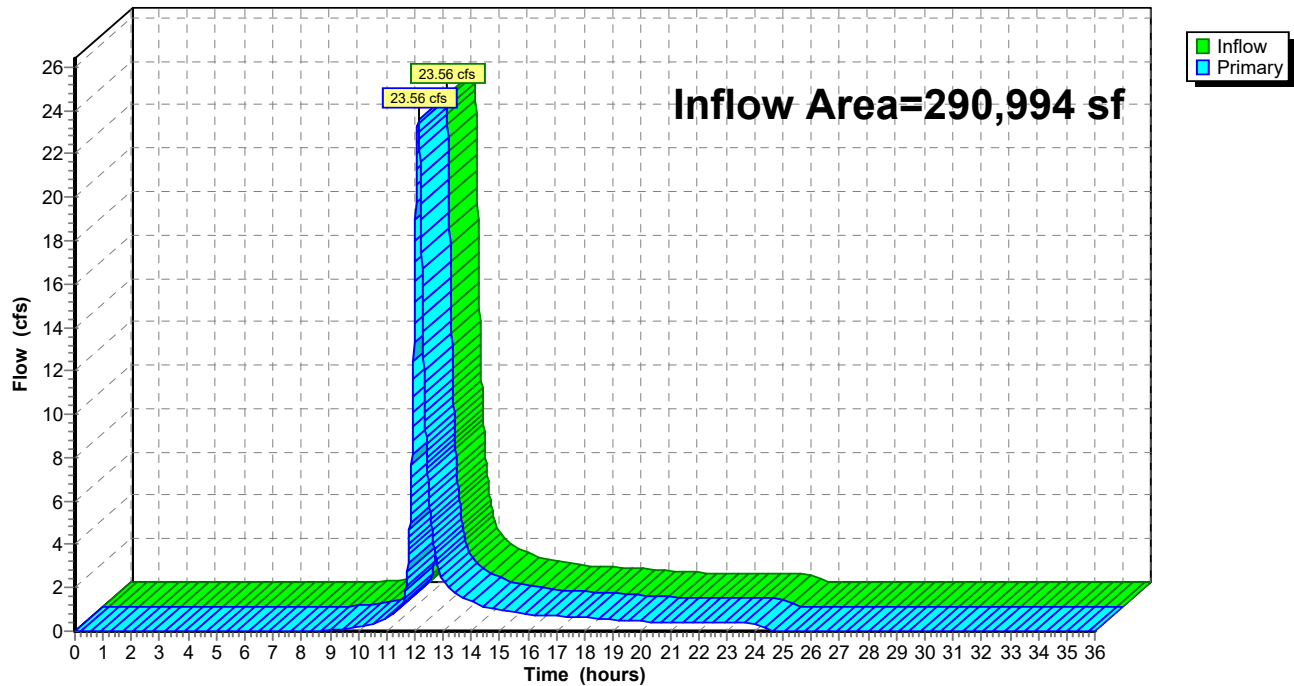
Summary for Link POI-1: Offsite

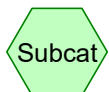
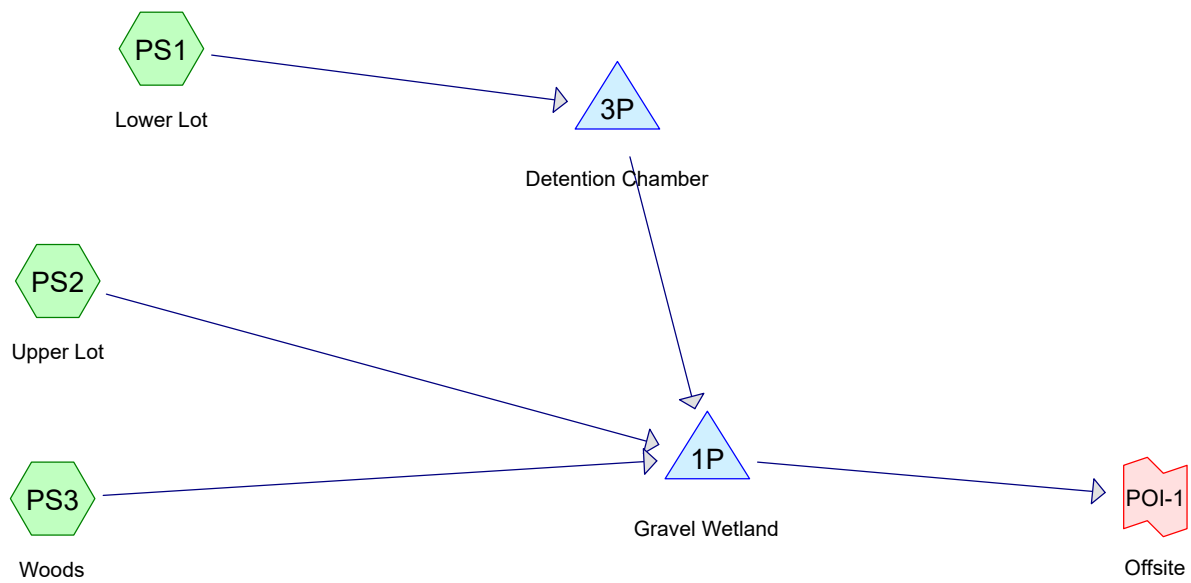
Inflow Area = 290,994 sf, 3.86% Impervious, Inflow Depth = 3.11" for 100-YR event
Inflow = 23.56 cfs @ 12.12 hrs, Volume= 75,300 cf
Primary = 23.56 cfs @ 12.12 hrs, Volume= 75,300 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link POI-1: Offsite

Hydrograph

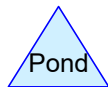




Subcat



Reach



Pond



Link

Routing Diagram for 19324 Post gravel wetland

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19324 Post gravel wetland

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type II 24-hr		Default	24.00	1	2.50	2
2	10-YR	Type II 24-hr		Default	24.00	1	3.58	2
3	25-YR	Type II 24-hr		Default	24.00	1	4.40	2
4	50-YR	Type II 24-hr		Default	24.00	1	5.15	2
5	100-YR	Type II 24-hr		Default	24.00	1	6.02	2

19324 Post gravel wetland

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
71,314	71	Meadow, non-grazed, HSG C (PS1, PS2, PS3)
8,223	78	Meadow, non-grazed, HSG D (PS1, PS2)
151,567	98	Paved parking, HSG C (PS1, PS2, PS3)
34,544	98	Paved parking, HSG D (PS2)
25,349	77	Woods, Good, HSG D (PS3)
290,997	89	TOTAL AREA

19324 Post gravel wetland

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
222,881	HSG C	PS1, PS2, PS3
68,116	HSG D	PS1, PS2, PS3
0	Other	
290,997		TOTAL AREA

19324 Post gravel wetland

Type II 24-hr 2-YR Rainfall=2.50"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=1.78"
Tc=5.0 min CN=93 Runoff=10.92 cfs 22,473 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=1.61"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=3.19 cfs 10,462 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=0.74"
Tc=5.0 min CN=77 Runoff=1.92 cfs 3,793 cf

Pond 1P: Gravel Wetland

Peak Elev=740.25' Storage=17,389 cf Inflow=8.85 cfs 34,852 cf
Outflow=1.87 cfs 19,692 cf

Pond 3P: Detention Chamber

Peak Elev=752.10' Storage=8,690 cf Inflow=10.92 cfs 22,473 cf
Outflow=5.03 cfs 20,597 cf

Link POI-1: Offsite

Inflow=1.87 cfs 19,692 cf
Primary=1.87 cfs 19,692 cf

Total Runoff Area = 290,997 sf Runoff Volume = 36,728 cf Average Runoff Depth = 1.51"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 10-YR Rainfall=3.58"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=2.81"
Tc=5.0 min CN=93 Runoff=16.76 cfs 35,517 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=2.62"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=5.11 cfs 17,001 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=1.49"
Tc=5.0 min CN=77 Runoff=3.92 cfs 7,635 cf

Pond 1P: Gravel Wetland

Peak Elev=740.60' Storage=20,762 cf Inflow=14.00 cfs 58,273 cf
Outflow=8.95 cfs 43,111 cf

Pond 3P: Detention Chamber

Peak Elev=752.86' Storage=12,410 cf Inflow=16.76 cfs 35,517 cf
Outflow=7.21 cfs 33,637 cf

Link POI-1: Offsite

Inflow=8.95 cfs 43,111 cf
Primary=8.95 cfs 43,111 cf

Total Runoff Area = 290,997 sf Runoff Volume = 60,154 cf Average Runoff Depth = 2.48"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 25-YR Rainfall=4.40"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=3.61"
Tc=5.0 min CN=93 Runoff=21.15 cfs 45,593 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=3.40"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=6.57 cfs 22,099 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=2.13"
Tc=5.0 min CN=77 Runoff=5.58 cfs 10,912 cf

Pond 1P: Gravel Wetland

Peak Elev=740.82' Storage=22,889 cf Inflow=17.76 cfs 76,721 cf
Outflow=13.35 cfs 61,558 cf

Pond 3P: Detention Chamber

Peak Elev=753.48' Storage=15,272 cf Inflow=21.15 cfs 45,593 cf
Outflow=8.58 cfs 43,711 cf

Link POI-1: Offsite

Inflow=13.35 cfs 61,558 cf
Primary=13.35 cfs 61,558 cf

Total Runoff Area = 290,997 sf Runoff Volume = 78,604 cf Average Runoff Depth = 3.24"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=4.35"
Tc=5.0 min CN=93 Runoff=25.13 cfs 54,879 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=4.13"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=7.90 cfs 26,817 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=2.75"
Tc=5.0 min CN=77 Runoff=7.16 cfs 14,085 cf

Pond 1P: Gravel Wetland

Peak Elev=741.03' Storage=25,027 cf Inflow=21.18 cfs 93,896 cf
Outflow=16.56 cfs 78,732 cf

Pond 3P: Detention Chamber

Peak Elev=754.12' Storage=17,940 cf Inflow=25.13 cfs 54,879 cf
Outflow=9.79 cfs 52,995 cf

Link POI-1: Offsite

Inflow=16.56 cfs 78,732 cf
Primary=16.56 cfs 78,732 cf

Total Runoff Area = 290,997 sf Runoff Volume = 95,780 cf Average Runoff Depth = 3.95"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 100-YR Rainfall=6.02"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=5.20"
Tc=5.0 min CN=93 Runoff=29.73 cfs 65,703 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=4.98"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=9.43 cfs 32,332 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=3.50"
Tc=5.0 min CN=77 Runoff=9.03 cfs 17,915 cf

Pond 1P: Gravel Wetland

Peak Elev=741.20' Storage=26,835 cf Inflow=25.80 cfs 114,065 cf
Outflow=21.26 cfs 98,900 cf

Pond 3P: Detention Chamber

Peak Elev=755.14' Storage=20,903 cf Inflow=29.73 cfs 65,703 cf
Outflow=13.08 cfs 63,818 cf

Link POI-1: Offsite

Inflow=21.26 cfs 98,900 cf
Primary=21.26 cfs 98,900 cf

Total Runoff Area = 290,997 sf Runoff Volume = 115,950 cf Average Runoff Depth = 4.78"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 100-YR Rainfall=6.02"

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Summary for Subcatchment PS1: Lower Lot

Runoff = 29.73 cfs @ 11.96 hrs, Volume= 65,703 cf, Depth= 5.20"
Routed to Pond 3P : Detention Chamber

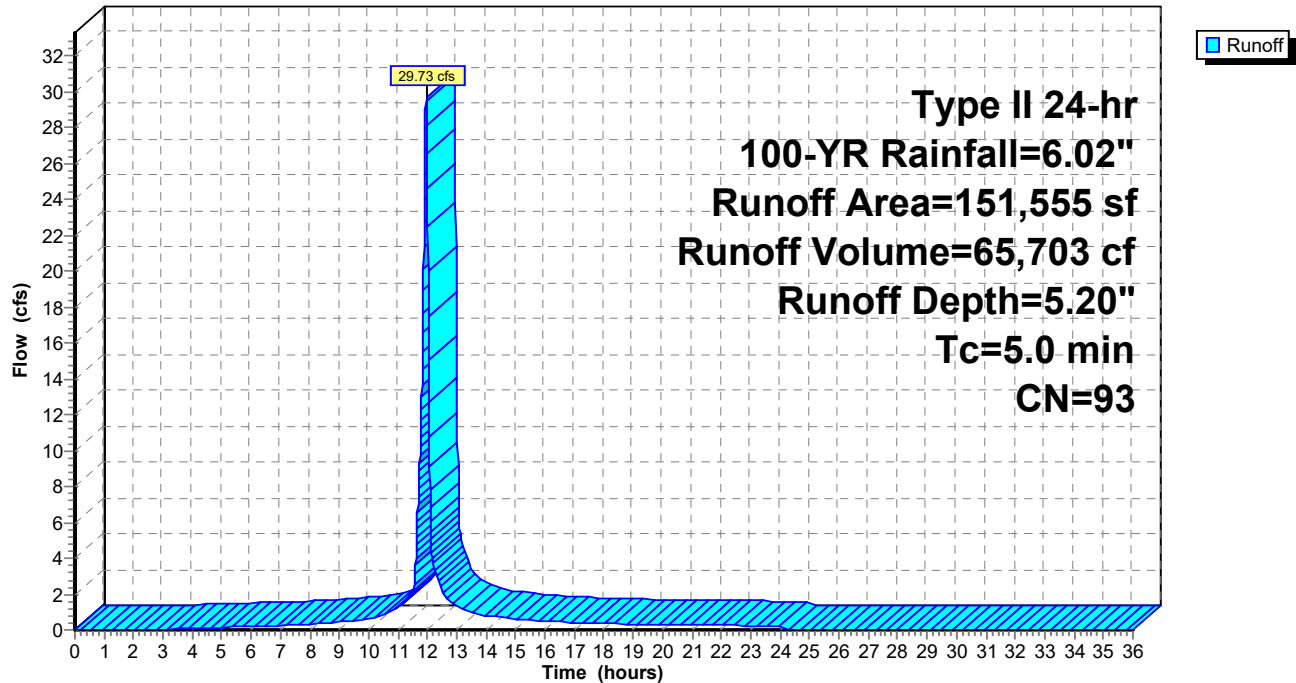
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=6.02"

Area (sf)	CN	Description
30,114	71	Meadow, non-grazed, HSG C
0	70	Woods, Good, HSG C
121,275	98	Paved parking, HSG C
166	78	Meadow, non-grazed, HSG D
0	77	Woods, Good, HSG D
0	98	Paved parking, HSG D
151,555	93	Weighted Average
30,280		19.98% Pervious Area
121,275		80.02% Impervious Area

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

Subcatchment PS1: Lower Lot

Hydrograph



19324 Post gravel wetland

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Type II 24-hr 100-YR Rainfall=6.02"

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Summary for Subcatchment PS2: Upper Lot

Runoff = 9.43 cfs @ 12.11 hrs, Volume= 32,332 cf, Depth= 4.98"
Routed to Pond 1P : Gravel Wetland

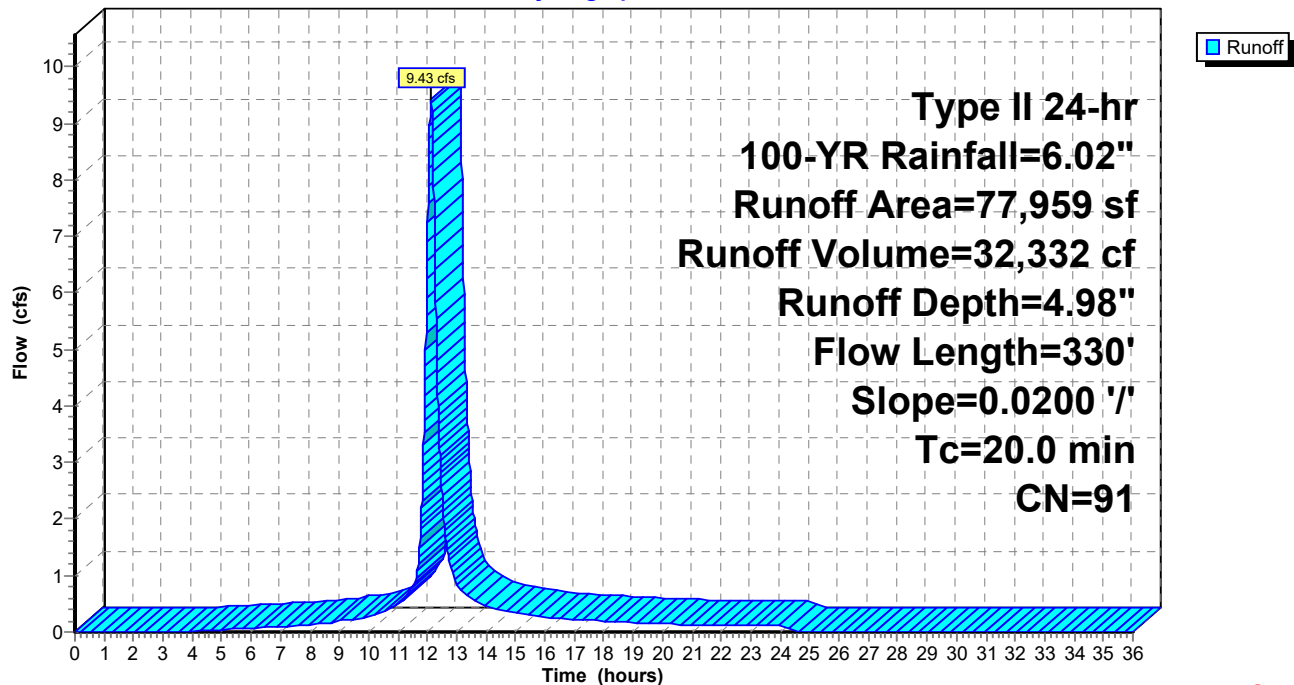
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=6.02"

Area (sf)	CN	Description
12,817	71	Meadow, non-grazed, HSG C
0	70	Woods, Good, HSG C
22,541	98	Paved parking, HSG C
8,057	78	Meadow, non-grazed, HSG D
0	77	Woods, Good, HSG D
34,544	98	Paved parking, HSG D
77,959	91	Weighted Average
20,874		26.78% Pervious Area
57,085		73.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
3.9	230	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
20.0	330	Total			

Subcatchment PS2: Upper Lot

Hydrograph



19324 Post gravel wetland

Type II 24-hr 100-YR Rainfall=6.02"

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Summary for Subcatchment PS3: Woods

Runoff = 9.03 cfs @ 11.96 hrs, Volume= 17,915 cf, Depth= 3.50"
Routed to Pond 1P : Gravel Wetland

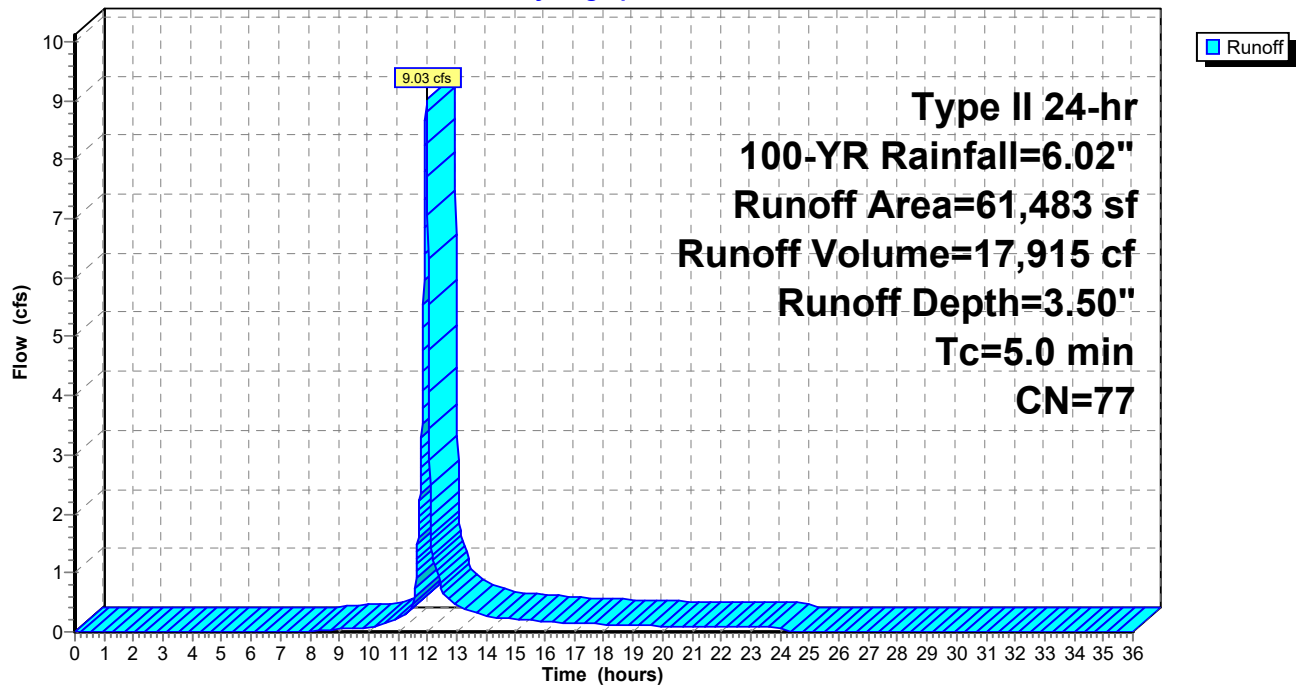
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=6.02"

Area (sf)	CN	Description
28,383	71	Meadow, non-grazed, HSG C
0	70	Woods, Good, HSG C
7,751	98	Paved parking, HSG C
0	78	Meadow, non-grazed, HSG D
25,349	77	Woods, Good, HSG D
0	98	Paved parking, HSG D
61,483	77	Weighted Average
53,732		87.39% Pervious Area
7,751		12.61% Impervious Area

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

Subcatchment PS3: Woods

Hydrograph



19324 Post gravel wetland

Type II 24-hr 100-YR Rainfall=6.02"

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Summary for Pond 1P: Gravel Wetland

Inflow Area = 290,997 sf, 63.96% Impervious, Inflow Depth > 4.70" for 100-YR event
Inflow = 25.80 cfs @ 12.04 hrs, Volume= 114,065 cf
Outflow = 21.26 cfs @ 12.14 hrs, Volume= 98,900 cf, Atten= 18%, Lag= 6.0 min
Primary = 21.26 cfs @ 12.14 hrs, Volume= 98,900 cf
Routed to Link POI-1 : Offsite

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 741.20' @ 12.14 hrs Surf.Area= 10,696 sf Storage= 26,835 cf

Plug-Flow detention time= 114.6 min calculated for 98,872 cf (87% of inflow)
Center-of-Mass det. time= 48.8 min (860.2 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1	738.00'	21,223 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#2	738.00'	14,725 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		35,947 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
738.00	3,717	0	0
739.00	4,474	4,096	4,096
740.00	5,274	4,874	8,970
741.00	6,116	5,695	14,665
742.00	7,000	6,558	21,223

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
738.00	2,598	0	0
739.00	3,056	2,827	2,827
740.00	3,609	3,333	6,160
741.00	4,259	3,934	10,094
742.00	5,003	4,631	14,725

Device	Routing	Invert	Outlet Devices
#1	Primary	738.00'	36.0" Round Culvert L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 738.00' / 733.00' S= 0.1250 ' S= 0.1250 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	741.00'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	740.00'	10.0" Vert. Orifice/Grate X 8.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=21.25 cfs @ 12.14 hrs HW=741.20' (Free Discharge)

1=Culvert (Passes 2.70 cfs of 44.34 cfs potential flow)
2=Orifice/Grate (Weir Controls 2.70 cfs @ 1.45 fps)
3=Orifice/Grate (Orifice Controls 18.56 cfs @ 4.25 fps)

19324 Post gravel wetland

Prepared by BEK

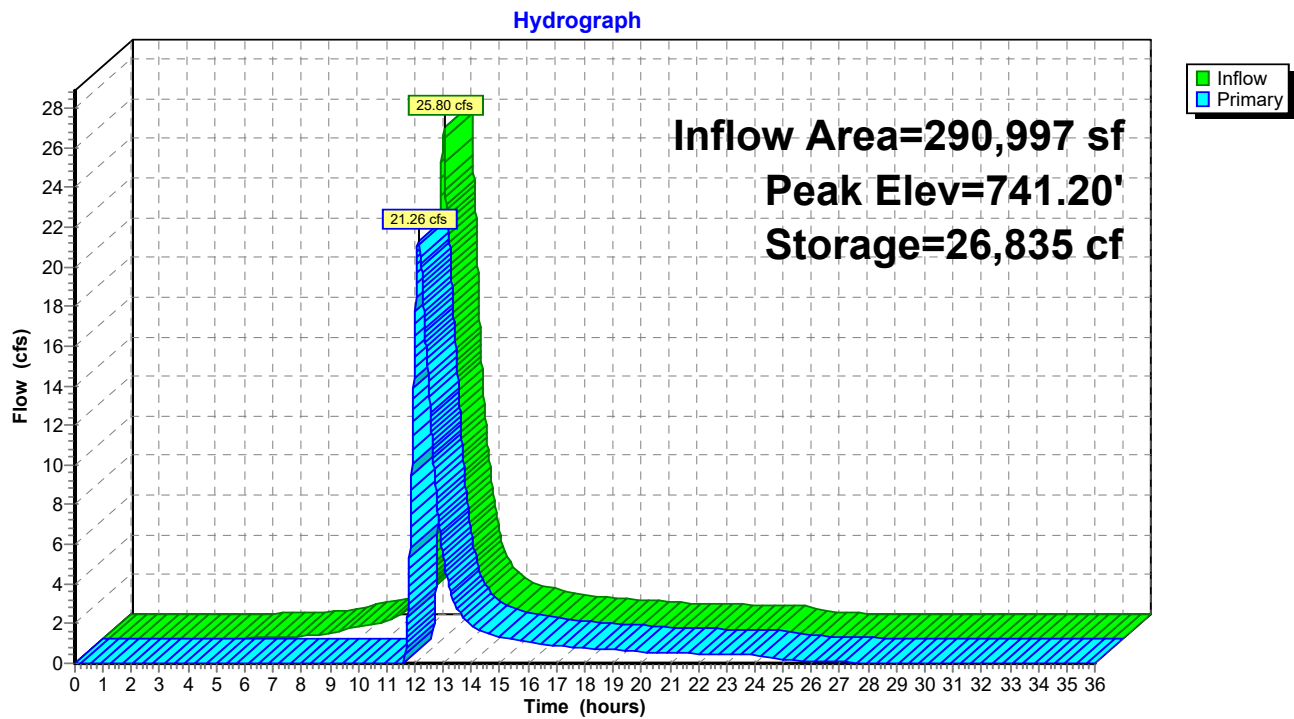
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Type II 24-hr 100-YR Rainfall=6.02"

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Pond 1P: Gravel Wetland



19324 Post gravel wetland

Type II 24-hr 100-YR Rainfall=6.02"

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Summary for Pond 3P: Detention Chamber

Inflow Area = 151,555 sf, 80.02% Impervious, Inflow Depth = 5.20" for 100-YR event
 Inflow = 29.73 cfs @ 11.96 hrs, Volume= 65,703 cf
 Outflow = 13.08 cfs @ 12.05 hrs, Volume= 63,818 cf, Atten= 56%, Lag= 5.6 min
 Primary = 13.08 cfs @ 12.05 hrs, Volume= 63,818 cf
 Routed to Pond 1P : Gravel Wetland

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 755.14' @ 12.05 hrs Surf.Area= 6,081 sf Storage= 20,903 cf

Plug-Flow detention time= 69.7 min calculated for 63,800 cf (97% of inflow)
 Center-of-Mass det. time= 51.9 min (820.4 - 768.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	750.00'	8,385 cf	30.25'W x 201.03'L x 5.75'H Field A 34,967 cf Overall - 14,005 cf Embedded = 20,962 cf x 40.0% Voids
#2A	750.75'	14,005 cf	Cultec R-902HD x 216 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 216 Chambers in 4 Rows Cap Storage= 2.8 cf x 2 x 4 rows = 22.1 cf
		22,390 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	750.75'	36.0" Round Culvert L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 750.75' / 745.00' S= 0.0261 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	755.00'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	750.75'	15.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=13.04 cfs @ 12.05 hrs HW=755.14' (Free Discharge)

- 1=Culvert (Passes 13.04 cfs of 57.84 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 1.58 cfs @ 1.21 fps)
- 3=Orifice/Grate (Orifice Controls 11.46 cfs @ 9.34 fps)

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Pond 3P: Detention Chamber - Chamber Wizard Field A

Chamber Model = Cultec R-902HD (Cultec Recharger®902HD)

Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf

Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap

Cap Storage= 2.8 cf x 2 x 4 rows = 22.1 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

54 Chambers/Row x 3.67' Long +0.52' Cap Length x 2 = 199.03' Row Length +12.0" End Stone x 2 =
201.03' Base Length

4 Rows x 78.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 30.25' Base Width

9.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 5.75' Field Height

216 Chambers x 64.7 cf + 2.8 cf Cap Volume x 2 x 4 Rows = 14,004.8 cf Chamber Storage

34,967.2 cf Field - 14,004.8 cf Chambers = 20,962.4 cf Stone x 40.0% Voids = 8,385.0 cf Stone Storage

Chamber Storage + Stone Storage = 22,389.8 cf = 0.514 af

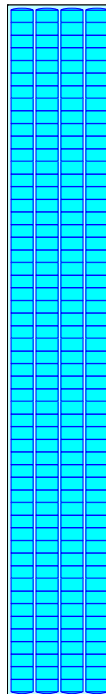
Overall Storage Efficiency = 64.0%

Overall System Size = 201.03' x 30.25' x 5.75'

216 Chambers

1,295.1 cy Field

776.4 cy Stone



19324 Post gravel wetland

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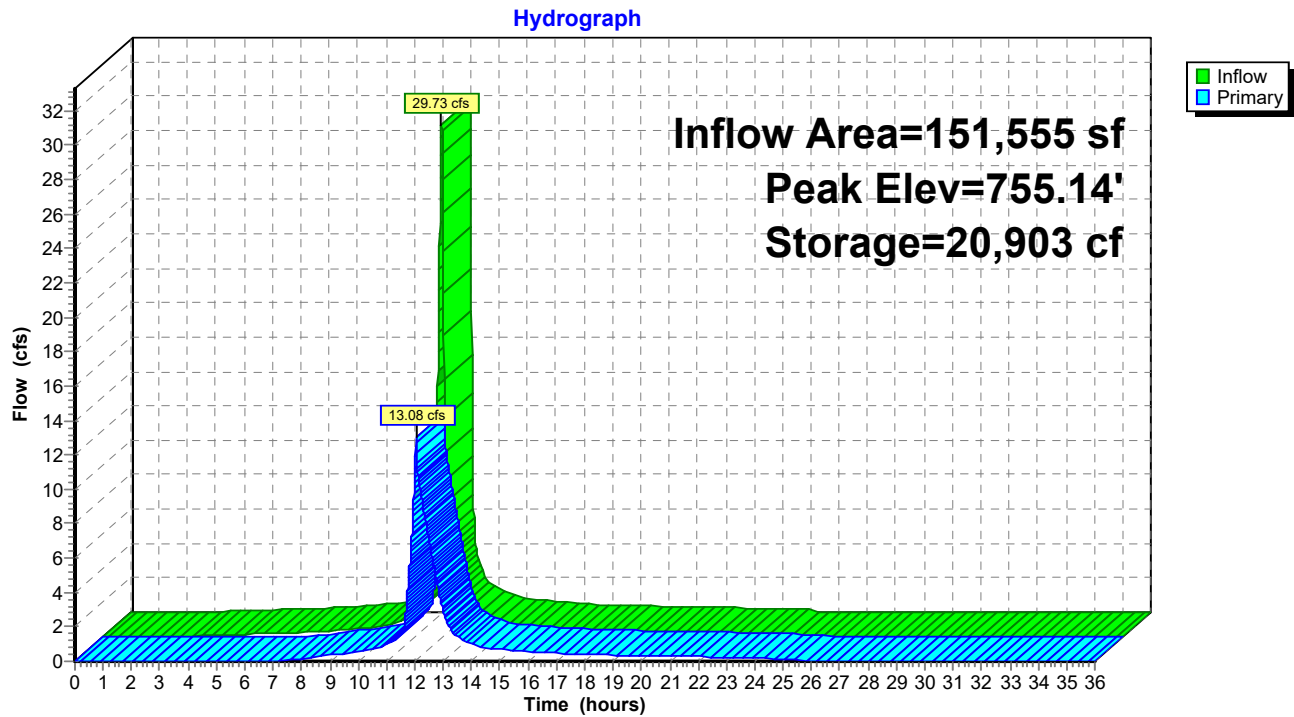
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Type II 24-hr 100-YR Rainfall=6.02"

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Pond 3P: Detention Chamber



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Type II 24-hr 100-YR Rainfall=6.02"

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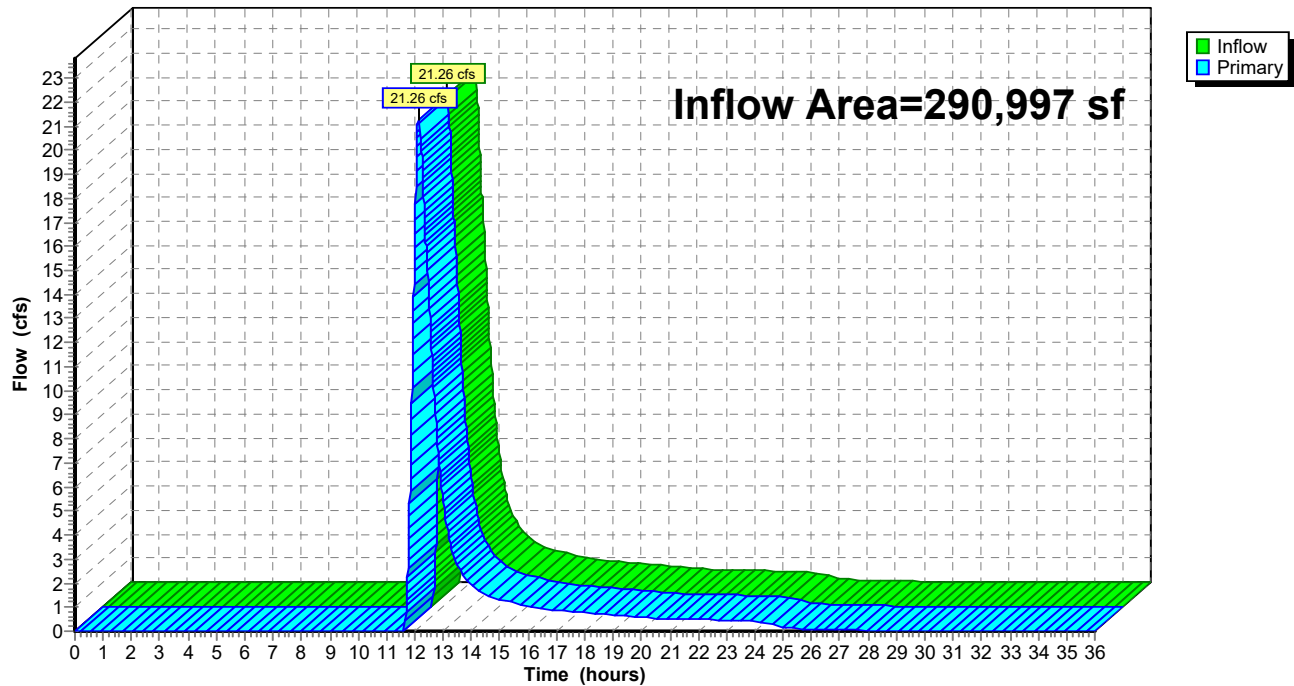
Summary for Link POI-1: Offsite

Inflow Area = 290,997 sf, 63.96% Impervious, Inflow Depth > 4.08" for 100-YR event
Inflow = 21.26 cfs @ 12.14 hrs, Volume= 98,900 cf
Primary = 21.26 cfs @ 12.14 hrs, Volume= 98,900 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link POI-1: Offsite

Hydrograph



Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	72.262 degrees West
Latitude	43.670 degrees North
Elevation	0 feet
Date/Time	Thu, 30 Sep 2021 14:44:24 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.66	0.82	1.02	1yr	0.71	0.93	1.17	1.44	1.76	2.15	2.41	1yr	1.90	2.32	2.69	3.30	3.79	1yr
2yr	0.31	0.48	0.59	0.78	0.98	1.22	2yr	0.85	1.11	1.40	1.71	2.07	2.50	2.81	2yr	2.21	2.70	3.15	3.77	4.31	2yr
5yr	0.37	0.57	0.72	0.96	1.23	1.54	5yr	1.06	1.41	1.76	2.14	2.57	3.07	3.47	5yr	2.71	3.34	3.86	4.55	5.18	5yr
10yr	0.41	0.65	0.82	1.12	1.46	1.84	10yr	1.26	1.68	2.11	2.55	3.04	3.58	4.08	10yr	3.17	3.92	4.51	5.25	5.95	10yr
25yr	0.50	0.79	1.00	1.38	1.83	2.32	25yr	1.58	2.12	2.65	3.19	3.78	4.40	5.04	25yr	3.90	4.85	5.55	6.35	7.16	25yr
50yr	0.57	0.91	1.16	1.63	2.18	2.77	50yr	1.88	2.53	3.17	3.80	4.45	5.15	5.93	50yr	4.56	5.70	6.48	7.33	8.24	50yr
100yr	0.64	1.04	1.34	1.90	2.60	3.30	100yr	2.24	3.02	3.78	4.51	5.26	6.02	6.97	100yr	5.33	6.70	7.58	8.48	9.48	100yr
200yr	0.74	1.21	1.57	2.24	3.09	3.94	200yr	2.67	3.61	4.51	5.35	6.20	7.05	8.20	200yr	6.24	7.88	8.87	9.80	10.91	200yr
500yr	0.90	1.47	1.92	2.78	3.90	4.98	500yr	3.36	4.58	5.68	6.71	7.71	8.68	10.17	500yr	7.68	9.78	10.92	11.88	13.14	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.61	0.75	0.83	1yr	0.65	0.81	1.00	1.19	1.58	1.98	2.23	1yr	1.76	2.15	2.50	3.03	3.55	1yr
2yr	0.30	0.46	0.57	0.77	0.94	1.11	2yr	0.82	1.08	1.24	1.62	2.06	2.45	2.75	2yr	2.17	2.65	3.09	3.71	4.23	2yr
5yr	0.34	0.53	0.65	0.89	1.14	1.32	5yr	0.98	1.30	1.49	1.90	2.41	2.92	3.28	5yr	2.59	3.16	3.66	4.31	4.93	5yr
10yr	0.38	0.58	0.72	1.00	1.30	1.51	10yr	1.12	1.47	1.69	2.16	2.70	3.33	3.76	10yr	2.95	3.61	4.17	4.83	5.54	10yr
25yr	0.43	0.66	0.82	1.18	1.55	1.78	25yr	1.33	1.74	1.98	2.52	3.13	3.97	4.49	25yr	3.51	4.32	4.94	5.61	6.45	25yr
50yr	0.48	0.73	0.90	1.30	1.75	2.03	50yr	1.51	1.98	2.23	2.85	3.52	4.53	5.14	50yr	4.01	4.95	5.62	6.27	7.24	50yr
100yr	0.53	0.80	1.01	1.45	1.99	2.29	100yr	1.72	2.24	2.49	3.19	3.95	5.17	5.88	100yr	4.58	5.66	6.40	7.01	8.12	100yr
200yr	0.59	0.89	1.12	1.63	2.27	2.60	200yr	1.96	2.54	2.80	3.60	4.48	5.91	6.73	200yr	5.23	6.47	7.30	7.84	9.11	200yr
500yr	0.68	1.01	1.30	1.89	2.69	3.05	500yr	2.32	2.98	3.23	4.19	5.26	7.06	8.06	500yr	6.25	7.75	8.70	9.08	10.62	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.73	0.90	1.03	1yr	0.77	1.01	1.19	1.51	1.89	2.29	2.59	1yr	2.03	2.50	2.86	3.49	3.99	1yr
2yr	0.32	0.49	0.61	0.82	1.01	1.19	2yr	0.87	1.17	1.36	1.73	2.17	2.56	2.87	2yr	2.27	2.76	3.22	3.87	4.40	2yr
5yr	0.40	0.62	0.76	1.05	1.34	1.57	5yr	1.15	1.53	1.74	2.16	2.70	3.22	3.65	5yr	2.85	3.51	4.06	4.77	5.42	5yr
10yr	0.48	0.74	0.92	1.28	1.66	1.96	10yr	1.43	1.91	2.15	2.60	3.20	3.85	4.39	10yr	3.41	4.22	4.86	5.62	6.36	10yr
25yr	0.62	0.94	1.17	1.67	2.19	2.63	25yr	1.89	2.57	2.86	3.33	4.01	4.87	5.62	25yr	4.31	5.40	6.14	6.98	7.86	25yr
50yr	0.74	1.13	1.40	2.02	2.72	3.29	50yr	2.35	3.21	3.57	4.00	4.77	5.81	6.77	50yr	5.14	6.51	7.34	8.25	9.25	50yr
100yr	0.90	1.36	1.70	2.45	3.37	4.13	100yr	2.91	4.03	4.47	4.83	5.67	6.94	8.17	100yr	6.14	7.86	8.78	9.75	10.88	100yr
200yr	1.09	1.63	2.07	3.00	4.18	5.18	200yr	3.61	5.06	5.59	5.83	6.76	8.28	9.85	200yr	7.33	9.47	10.51	11.54	12.80	200yr
500yr	1.41	2.10	2.70	3.92	5.57	7.02	500yr	4.81	6.86	7.53	7.46	8.47	10.49	12.63	500yr	9.29	12.15	13.33	14.44	15.90	500yr



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

Custom Soil Resource Report for Grafton County, New Hampshire



Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

Custom Soil Resource Report

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

Soil Map

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

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Soil Map



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grafton County, New Hampshire
Survey Area Data: Version 23, May 29, 2020

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

Date(s) aerial images were photographed: Jul 10, 2011—Oct 8, 2011

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

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Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
114	Walpole-Binghamville complex	1.3	2.1%
330C	Bernardston silt loam, 8 to 15 percent slopes	0.6	1.0%
331D	Bernardston silt loam, 15 to 25 percent slopes, very stony	2.9	4.7%
334B	Pittstown loam, 3 to 8 percent slopes	0.7	1.1%
334C	Pittstown loam, 8 to 15 percent slopes	5.3	8.6%
336B	Pittstown loam, 3 to 8 percent slopes, very stony	32.7	53.4%
341A	Stissing silt loam, 0 to 3 percent slopes, very stony	6.4	10.4%
341B	Stissing silt loam, 3 to 8 percent slopes, very stony	1.4	2.3%
361D	Cardigan-Kearsarge-Rock outcrop complex, 15 to 25 percent slopes	9.9	16.2%
534	Binghamville silt loam	0.2	0.3%
Totals for Area of Interest		61.3	100.0%

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different

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

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

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

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

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

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

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

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

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

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

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Grafton County, New Hampshire

114—Walpole-Binghamville complex

Map Unit Setting

National map unit symbol: 9ffy
Elevation: 0 to 1,180 feet
Mean annual precipitation: 28 to 71 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: Farmland of local importance

Map Unit Composition

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

Description of Walpole

Setting

Landform: Lake terraces

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 21 inches: fine sandy loam
H3 - 21 to 65 inches: loamy sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

Description of Binghamville

Setting

Landform: Lake terraces
Parent material: Glaciolacustrine

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 18 inches: very fine sandy loam

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H3 - 18 to 65 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F145XY004CT - Wet Lake Plain

Hydric soil rating: Yes

Minor Components

Not named wet

Percent of map unit: 4 percent

Landform: Depressions

Hydric soil rating: Yes

Not named

Percent of map unit: 4 percent

Hydric soil rating: No

Dartmouth

Percent of map unit: 4 percent

Hydric soil rating: No

Deerfield

Percent of map unit: 3 percent

Hydric soil rating: No

330C—Bernardston silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9fhg

Elevation: 0 to 1,000 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 36 to 55 degrees F

Frost-free period: 90 to 250 days

Farmland classification: Farmland of statewide importance

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Map Unit Composition

Bernardston and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bernardston

Setting

Parent material: Basal till

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 16 inches: silt loam

H3 - 16 to 65 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 14 to 39 inches to densic material

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Ecological site: F144AY007CT - Well Drained Dense Till Uplands

Hydric soil rating: No

Minor Components

Pittstown

Percent of map unit: 3 percent

Hydric soil rating: No

Kearsarge

Percent of map unit: 3 percent

Hydric soil rating: No

Not named

Percent of map unit: 3 percent

Hydric soil rating: No

Stissing

Percent of map unit: 3 percent

Landform: Depressions

Hydric soil rating: Yes

Cardigan

Percent of map unit: 3 percent

Hydric soil rating: No

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331D—Bernardston silt loam, 15 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9fhl
Elevation: 390 to 1,740 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Bernardston and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bernardston

Setting

Parent material: Basal till

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 16 inches: silt loam
H3 - 16 to 65 inches: silt loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 14 to 39 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Kearsarge

Percent of map unit: 3 percent
Hydric soil rating: No

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Cardigan

Percent of map unit: 3 percent
Hydric soil rating: No

Pittstown

Percent of map unit: 3 percent
Hydric soil rating: No

Stissing

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Not named

Percent of map unit: 3 percent
Hydric soil rating: No

334B—Pittstown loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9fhn
Elevation: 0 to 1,560 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Pittstown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittstown

Setting

Parent material: Till

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 25 inches: loam
H3 - 25 to 65 inches: channery loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None

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Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Bernardston

Percent of map unit: 3 percent
Hydric soil rating: No

Cardigan

Percent of map unit: 3 percent
Hydric soil rating: No

Stissing

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Not named

Percent of map unit: 3 percent
Hydric soil rating: No

Kearsarge

Percent of map unit: 3 percent
Hydric soil rating: No

334C—Pittstown loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9fhp
Elevation: 0 to 1,670 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Pittstown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittstown

Setting

Parent material: Till

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Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 25 inches: loam
H3 - 25 to 65 inches: channery loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 3 percent
Hydric soil rating: No

Cardigan

Percent of map unit: 3 percent
Hydric soil rating: No

Bernardston

Percent of map unit: 3 percent
Hydric soil rating: No

Stissing

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Kearsarge

Percent of map unit: 3 percent
Hydric soil rating: No

336B—Pittstown loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9fhq
Elevation: 480 to 1,640 feet

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Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: Farmland of local importance

Map Unit Composition

Pittstown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittstown

Setting

Parent material: Till

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 25 inches: loam
H3 - 25 to 65 inches: channery loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Stissing

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Kearsarge

Percent of map unit: 3 percent
Hydric soil rating: No

Bernardston

Percent of map unit: 3 percent
Hydric soil rating: No

Cardigan

Percent of map unit: 3 percent
Hydric soil rating: No

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Not named

Percent of map unit: 3 percent
Hydric soil rating: No

341A—Stissing silt loam, 0 to 3 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9fht
Elevation: 510 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: Farmland of local importance

Map Unit Composition

Stissing and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stissing

Setting

Landform: Ground moraines

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 20 inches: gravelly loam
H3 - 20 to 65 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

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Minor Components

Not named

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

Pittstown

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

Not named wet

Percent of map unit: 5 percent
Landform: Swamps
Hydric soil rating: Yes

341B—Stissing silt loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9fhv
Elevation: 440 to 1,740 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Stissing and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stissing

Setting

Landform: Ground moraines

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 20 inches: gravelly loam
H3 - 20 to 65 inches: loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None

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Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C/D

Ecological site: F144AY009CT - Wet Till Depressions

Hydric soil rating: Yes

Minor Components

Pittstown

Percent of map unit: 5 percent

Hydric soil rating: No

Not named wet

Percent of map unit: 5 percent

Landform: Swamps

Hydric soil rating: Yes

Not named

Percent of map unit: 5 percent

Hydric soil rating: No

361D—Cardigan-Kearsarge-Rock outcrop complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9fj6

Elevation: 340 to 2,000 feet

Mean annual precipitation: 31 to 71 inches

Mean annual air temperature: 36 to 55 degrees F

Frost-free period: 60 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Cardigan and similar soils: 40 percent

Kearsarge and similar soils: 30 percent

Rock outcrop: 15 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cardigan

Setting

Parent material: Till

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 23 inches: loam

H3 - 23 to 27 inches: unweathered bedrock

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Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Kearsarge

Setting

Parent material: Till

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 15 inches: silt loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Properties and qualities

Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

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Minor Components

Not named

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

Not named wet

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Bernardston

Percent of map unit: 3 percent
Hydric soil rating: No

Pittstown

Percent of map unit: 2 percent
Hydric soil rating: No

534—Binghamville silt loam

Map Unit Setting

National map unit symbol: 9fjl
Elevation: 90 to 1,000 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 36 to 55 degrees F
Frost-free period: 90 to 250 days
Farmland classification: Farmland of local importance

Map Unit Composition

Binghamville and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Binghamville

Setting

Landform: Lake terraces
Parent material: Glaciolacustrine

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 18 inches: very fine sandy loam
H3 - 18 to 65 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained

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Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F145XY004CT - Wet Lake Plain

Hydric soil rating: Yes

Minor Components

Dartmouth

Percent of map unit: 4 percent

Hydric soil rating: No

Not named wet

Percent of map unit: 3 percent

Landform: Depressions

Hydric soil rating: Yes

Not named

Percent of map unit: 3 percent

Hydric soil rating: No

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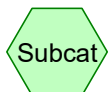
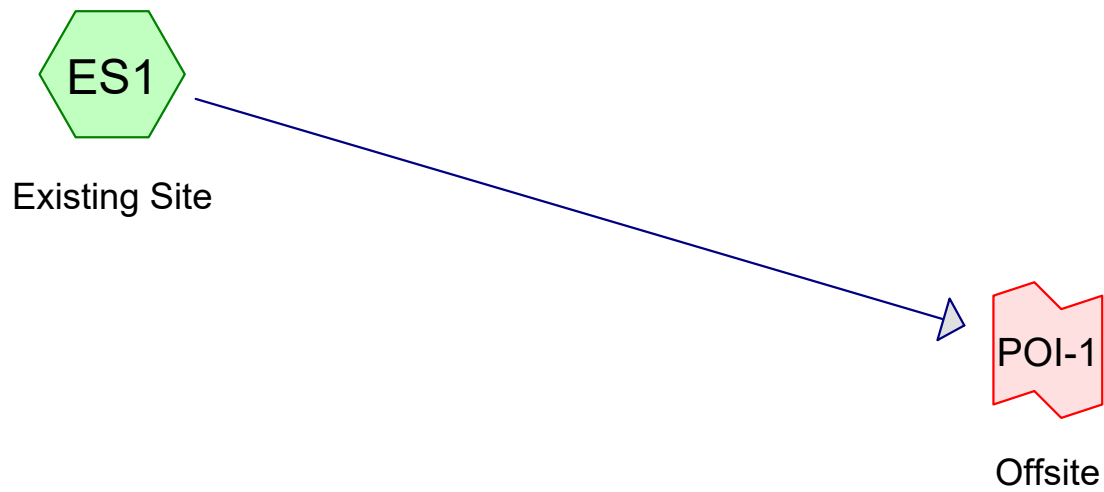
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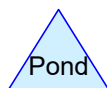
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Subcat



Reach



Pond



Link

Routing Diagram for 19324 Pre
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19324 Pre

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-IN	Type II 24-hr		Default	24.00	1	1.00	2
2	2-YR	Type II 24-hr		Default	24.00	1	2.50	2
3	10-YR	Type II 24-hr		Default	24.00	1	3.58	2
4	25-YR	Type II 24-hr		Default	24.00	1	4.40	2
5	50-YR	Type II 24-hr		Default	24.00	1	5.15	2
6	100-YR	Type II 24-hr		Default	24.00	1	6.02	2

19324 Pre

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
131,578	71	Meadow, non-grazed, HSG C (ES1)
1,526	78	Meadow, non-grazed, HSG D (ES1)
10,037	98	Paved parking, HSG C (ES1)
1,206	98	Paved parking, HSG D (ES1)
81,263	70	Woods, Good, HSG C (ES1)
65,384	77	Woods, Good, HSG D (ES1)
290,994	73	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
222,878	HSG C	ES1
68,116	HSG D	ES1
0	Other	
290,994		TOTAL AREA

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Type II 24-hr 1-IN Rainfall=1.00"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=0.02"

Flow Length=465' Tc=19.3 min CN=73 Runoff=0.01 cfs 415 cf

Link POI-1: Offsite

Inflow=0.01 cfs 415 cf

Primary=0.01 cfs 415 cf

Total Runoff Area = 290,994 sf Runoff Volume = 415 cf Average Runoff Depth = 0.02"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 2-YR Rainfall=2.50"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=0.57"
Flow Length=465' Tc=19.3 min CN=73 Runoff=3.70 cfs 13,764 cf

Link POI-1: Offsite

Inflow=3.70 cfs 13,764 cf
Primary=3.70 cfs 13,764 cf

Total Runoff Area = 290,994 sf Runoff Volume = 13,764 cf Average Runoff Depth = 0.57"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 10-YR Rainfall=3.58"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=1.23"
Flow Length=465' Tc=19.3 min CN=73 Runoff=8.97 cfs 29,917 cf

Link POI-1: Offsite

Inflow=8.97 cfs 29,917 cf
Primary=8.97 cfs 29,917 cf

Total Runoff Area = 290,994 sf Runoff Volume = 29,917 cf Average Runoff Depth = 1.23"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 25-YR Rainfall=4.40"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=1.82"
Flow Length=465' Tc=19.3 min CN=73 Runoff=13.60 cfs 44,149 cf

Link POI-1: Offsite

Inflow=13.60 cfs 44,149 cf
Primary=13.60 cfs 44,149 cf

Total Runoff Area = 290,994 sf Runoff Volume = 44,149 cf Average Runoff Depth = 1.82"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 50-YR Rainfall=5.15"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=2.40"
Flow Length=465' Tc=19.3 min CN=73 Runoff=18.11 cfs 58,166 cf

Link POI-1: Offsite

Inflow=18.11 cfs 58,166 cf
Primary=18.11 cfs 58,166 cf

Total Runoff Area = 290,994 sf Runoff Volume = 58,166 cf Average Runoff Depth = 2.40"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

19324 Pre

Type II 24-hr 100-YR Rainfall=6.02"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentES1: Existing Site

Runoff Area=290,994 sf 3.86% Impervious Runoff Depth=3.11"
Flow Length=465' Tc=19.3 min CN=73 Runoff=23.56 cfs 75,300 cf

Link POI-1: Offsite

Inflow=23.56 cfs 75,300 cf
Primary=23.56 cfs 75,300 cf

Total Runoff Area = 290,994 sf Runoff Volume = 75,300 cf Average Runoff Depth = 3.11"
96.14% Pervious = 279,751 sf 3.86% Impervious = 11,243 sf

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Type II 24-hr 50-YR Rainfall=5.15"

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Summary for Subcatchment ES1: Existing Site

Runoff = 18.11 cfs @ 12.12 hrs, Volume= 58,166 cf, Depth= 2.40"
Routed to Link POI-1 : Offsite

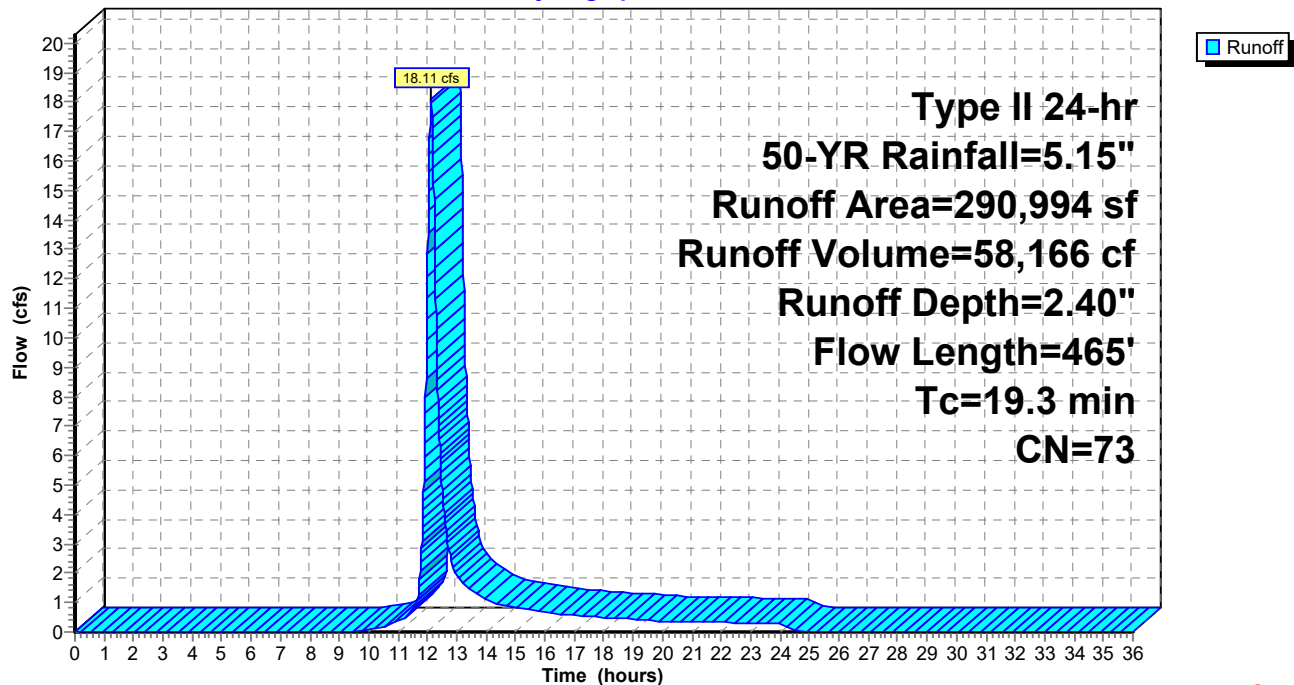
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=5.15"

Area (sf)	CN	Description
131,578	71	Meadow, non-grazed, HSG C
81,263	70	Woods, Good, HSG C
10,037	98	Paved parking, HSG C
1,526	78	Meadow, non-grazed, HSG D
65,384	77	Woods, Good, HSG D
1,206	98	Paved parking, HSG D
290,994	73	Weighted Average
279,751		96.14% Pervious Area
11,243		3.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.0800	0.29		Sheet Flow, Range n= 0.130 P2= 2.50"
13.6	365	0.0080	0.45		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
19.3	465	Total			

Subcatchment ES1: Existing Site

Hydrograph



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Type II 24-hr 50-YR Rainfall=5.15"

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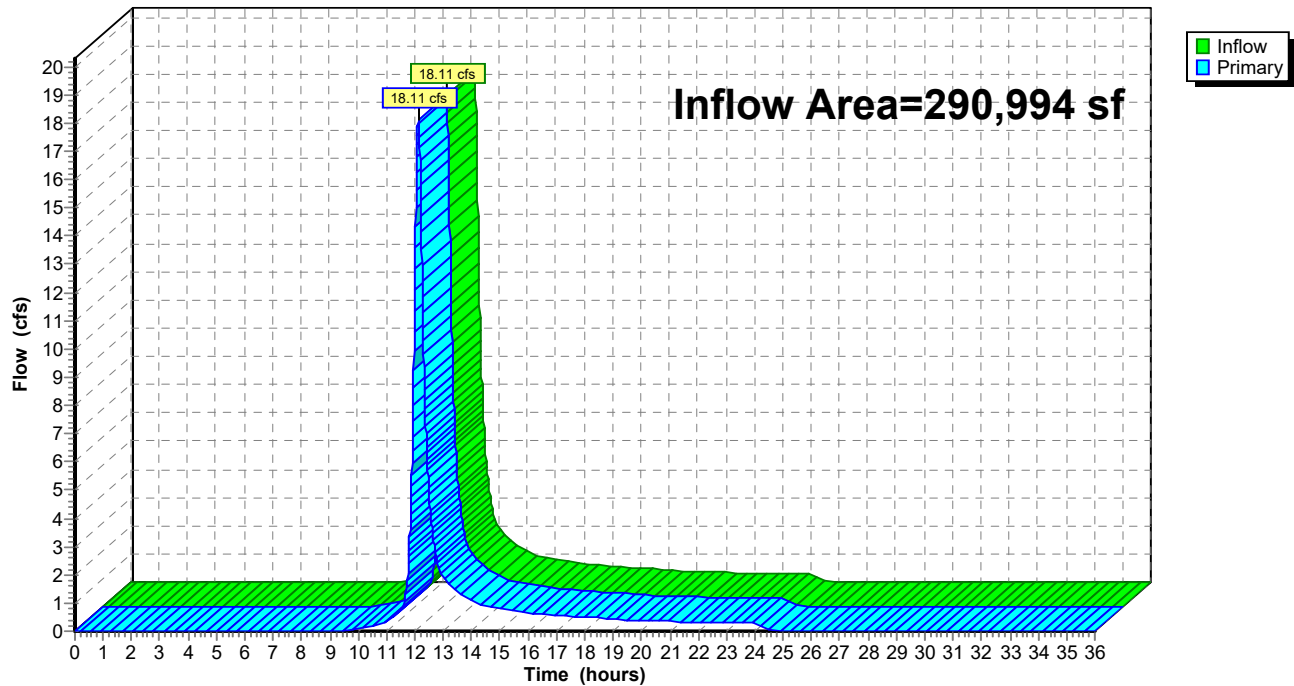
Summary for Link POI-1: Offsite

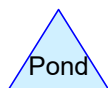
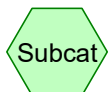
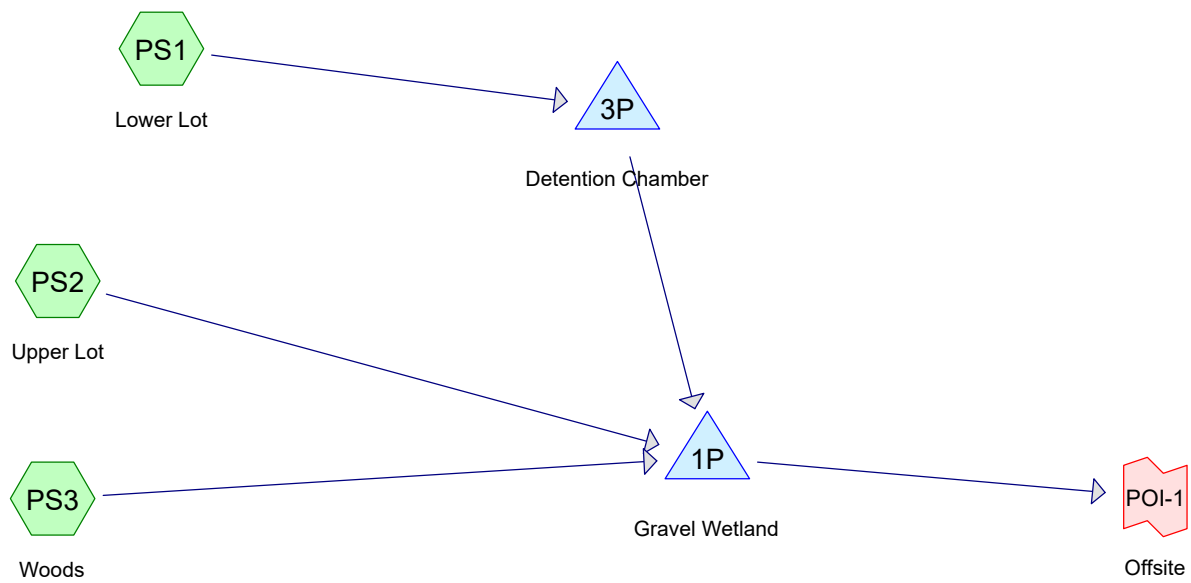
Inflow Area = 290,994 sf, 3.86% Impervious, Inflow Depth = 2.40" for 50-YR event
Inflow = 18.11 cfs @ 12.12 hrs, Volume= 58,166 cf
Primary = 18.11 cfs @ 12.12 hrs, Volume= 58,166 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link POI-1: Offsite

Hydrograph





Routing Diagram for 19324 Post gravel wetland
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19324 Post gravel wetland

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-IN	Type II 24-hr		Default	24.00	1	1.00	2
2	2-YR	Type II 24-hr		Default	24.00	1	2.50	2
3	10-YR	Type II 24-hr		Default	24.00	1	3.58	2
4	25-YR	Type II 24-hr		Default	24.00	1	4.40	2
5	50-YR	Type II 24-hr		Default	24.00	1	5.15	2
6	100-YR	Type II 24-hr		Default	24.00	1	6.02	2

19324 Post gravel wetland

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
71,314	71	Meadow, non-grazed, HSG C (PS1, PS2, PS3)
8,223	78	Meadow, non-grazed, HSG D (PS1, PS2)
151,567	98	Paved parking, HSG C (PS1, PS2, PS3)
34,544	98	Paved parking, HSG D (PS2)
25,349	77	Woods, Good, HSG D (PS3)
290,997	89	TOTAL AREA

19324 Post gravel wetland

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
222,881	HSG C	PS1, PS2, PS3
68,116	HSG D	PS1, PS2, PS3
0	Other	
290,997		TOTAL AREA

19324 Post gravel wetland

Type II 24-hr 1-IN Rainfall=1.00"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=0.45"
Tc=5.0 min CN=93 Runoff=2.92 cfs 5,688 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=0.36"
Flow Length=330' Slope=0.0200 ' ' Tc=20.0 min CN=91 Runoff=0.69 cfs 2,334 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=0.05"
Tc=5.0 min CN=77 Runoff=0.02 cfs 245 cf

Pond 1P: Gravel Wetland

Peak Elev=738.93' Storage=6,403 cf Inflow=0.84 cfs 6,403 cf
Outflow=0.00 cfs 0 cf

Pond 3P: Detention Chamber

Peak Elev=750.96' Storage=2,894 cf Inflow=2.92 cfs 5,688 cf
Outflow=0.21 cfs 3,824 cf

Link POI-1: Offsite

Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 290,997 sf Runoff Volume = 8,267 cf Average Runoff Depth = 0.34"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 2-YR Rainfall=2.50"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=1.78"
Tc=5.0 min CN=93 Runoff=10.92 cfs 22,473 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=1.61"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=3.19 cfs 10,462 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=0.74"
Tc=5.0 min CN=77 Runoff=1.92 cfs 3,793 cf

Pond 1P: Gravel Wetland

Peak Elev=740.25' Storage=17,389 cf Inflow=8.85 cfs 34,852 cf
Outflow=1.87 cfs 19,692 cf

Pond 3P: Detention Chamber

Peak Elev=752.10' Storage=8,690 cf Inflow=10.92 cfs 22,473 cf
Outflow=5.03 cfs 20,597 cf

Link POI-1: Offsite

Inflow=1.87 cfs 19,692 cf
Primary=1.87 cfs 19,692 cf

Total Runoff Area = 290,997 sf Runoff Volume = 36,728 cf Average Runoff Depth = 1.51"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 10-YR Rainfall=3.58"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=2.81"
Tc=5.0 min CN=93 Runoff=16.76 cfs 35,517 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=2.62"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=5.11 cfs 17,001 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=1.49"
Tc=5.0 min CN=77 Runoff=3.92 cfs 7,635 cf

Pond 1P: Gravel Wetland

Peak Elev=740.60' Storage=20,762 cf Inflow=14.00 cfs 58,273 cf
Outflow=8.95 cfs 43,111 cf

Pond 3P: Detention Chamber

Peak Elev=752.86' Storage=12,410 cf Inflow=16.76 cfs 35,517 cf
Outflow=7.21 cfs 33,637 cf

Link POI-1: Offsite

Inflow=8.95 cfs 43,111 cf
Primary=8.95 cfs 43,111 cf

Total Runoff Area = 290,997 sf Runoff Volume = 60,154 cf Average Runoff Depth = 2.48"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 25-YR Rainfall=4.40"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=3.61"
Tc=5.0 min CN=93 Runoff=21.15 cfs 45,593 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=3.40"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=6.57 cfs 22,099 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=2.13"
Tc=5.0 min CN=77 Runoff=5.58 cfs 10,912 cf

Pond 1P: Gravel Wetland

Peak Elev=740.82' Storage=22,889 cf Inflow=17.76 cfs 76,721 cf
Outflow=13.35 cfs 61,558 cf

Pond 3P: Detention Chamber

Peak Elev=753.48' Storage=15,272 cf Inflow=21.15 cfs 45,593 cf
Outflow=8.58 cfs 43,711 cf

Link POI-1: Offsite

Inflow=13.35 cfs 61,558 cf
Primary=13.35 cfs 61,558 cf

Total Runoff Area = 290,997 sf Runoff Volume = 78,604 cf Average Runoff Depth = 3.24"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=4.35"
Tc=5.0 min CN=93 Runoff=25.13 cfs 54,879 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=4.13"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=7.90 cfs 26,817 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=2.75"
Tc=5.0 min CN=77 Runoff=7.16 cfs 14,085 cf

Pond 1P: Gravel Wetland

Peak Elev=741.03' Storage=25,027 cf Inflow=21.18 cfs 93,896 cf
Outflow=16.56 cfs 78,732 cf

Pond 3P: Detention Chamber

Peak Elev=754.12' Storage=17,940 cf Inflow=25.13 cfs 54,879 cf
Outflow=9.79 cfs 52,995 cf

Link POI-1: Offsite

Inflow=16.56 cfs 78,732 cf
Primary=16.56 cfs 78,732 cf

Total Runoff Area = 290,997 sf Runoff Volume = 95,780 cf Average Runoff Depth = 3.95"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 100-YR Rainfall=6.02"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPS1: Lower Lot

Runoff Area=151,555 sf 80.02% Impervious Runoff Depth=5.20"
Tc=5.0 min CN=93 Runoff=29.73 cfs 65,703 cf

SubcatchmentPS2: Upper Lot

Runoff Area=77,959 sf 73.22% Impervious Runoff Depth=4.98"
Flow Length=330' Slope=0.0200 '/' Tc=20.0 min CN=91 Runoff=9.43 cfs 32,332 cf

SubcatchmentPS3: Woods

Runoff Area=61,483 sf 12.61% Impervious Runoff Depth=3.50"
Tc=5.0 min CN=77 Runoff=9.03 cfs 17,915 cf

Pond 1P: Gravel Wetland

Peak Elev=741.20' Storage=26,835 cf Inflow=25.80 cfs 114,065 cf
Outflow=21.26 cfs 98,900 cf

Pond 3P: Detention Chamber

Peak Elev=755.14' Storage=20,903 cf Inflow=29.73 cfs 65,703 cf
Outflow=13.08 cfs 63,818 cf

Link POI-1: Offsite

Inflow=21.26 cfs 98,900 cf
Primary=21.26 cfs 98,900 cf

Total Runoff Area = 290,997 sf Runoff Volume = 115,950 cf Average Runoff Depth = 4.78"
36.04% Pervious = 104,886 sf 63.96% Impervious = 186,111 sf

19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

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Summary for Subcatchment PS1: Lower Lot

Runoff = 25.13 cfs @ 11.96 hrs, Volume= 54,879 cf, Depth= 4.35"
Routed to Pond 3P : Detention Chamber

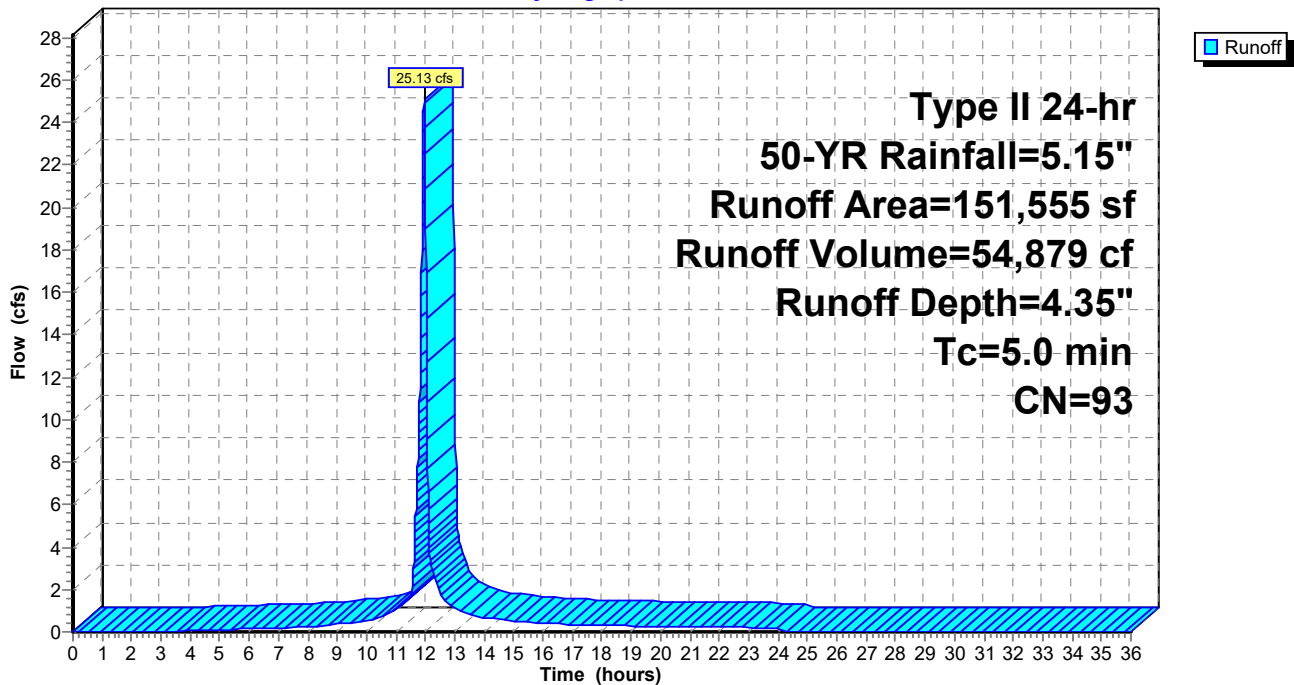
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=5.15"

Area (sf)	CN	Description
30,114	71	Meadow, non-grazed, HSG C
0	70	Woods, Good, HSG C
121,275	98	Paved parking, HSG C
166	78	Meadow, non-grazed, HSG D
0	77	Woods, Good, HSG D
0	98	Paved parking, HSG D
151,555	93	Weighted Average
30,280		19.98% Pervious Area
121,275		80.02% Impervious Area

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

Subcatchment PS1: Lower Lot

Hydrograph



19324 Post gravel wetland

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Type II 24-hr 50-YR Rainfall=5.15"

Printed 12/15/2021

Page 12

Summary for Subcatchment PS2: Upper Lot

Runoff = 7.90 cfs @ 12.11 hrs, Volume= 26,817 cf, Depth= 4.13"
Routed to Pond 1P : Gravel Wetland

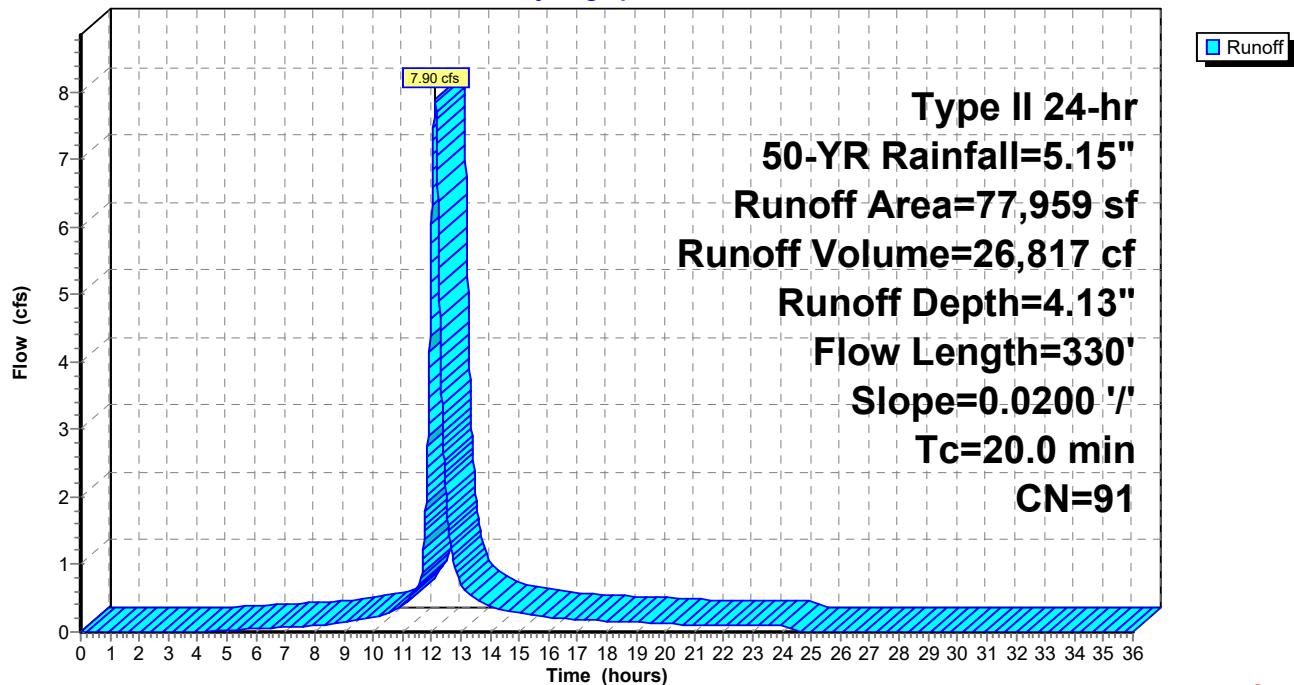
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=5.15"

Area (sf)	CN	Description
12,817	71	Meadow, non-grazed, HSG C
0	70	Woods, Good, HSG C
22,541	98	Paved parking, HSG C
8,057	78	Meadow, non-grazed, HSG D
0	77	Woods, Good, HSG D
34,544	98	Paved parking, HSG D
77,959	91	Weighted Average
20,874		26.78% Pervious Area
57,085		73.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"
3.9	230	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
20.0	330	Total			

Subcatchment PS2: Upper Lot

Hydrograph



19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

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Summary for Subcatchment PS3: Woods

Runoff = 7.16 cfs @ 11.96 hrs, Volume= 14,085 cf, Depth= 2.75"
Routed to Pond 1P : Gravel Wetland

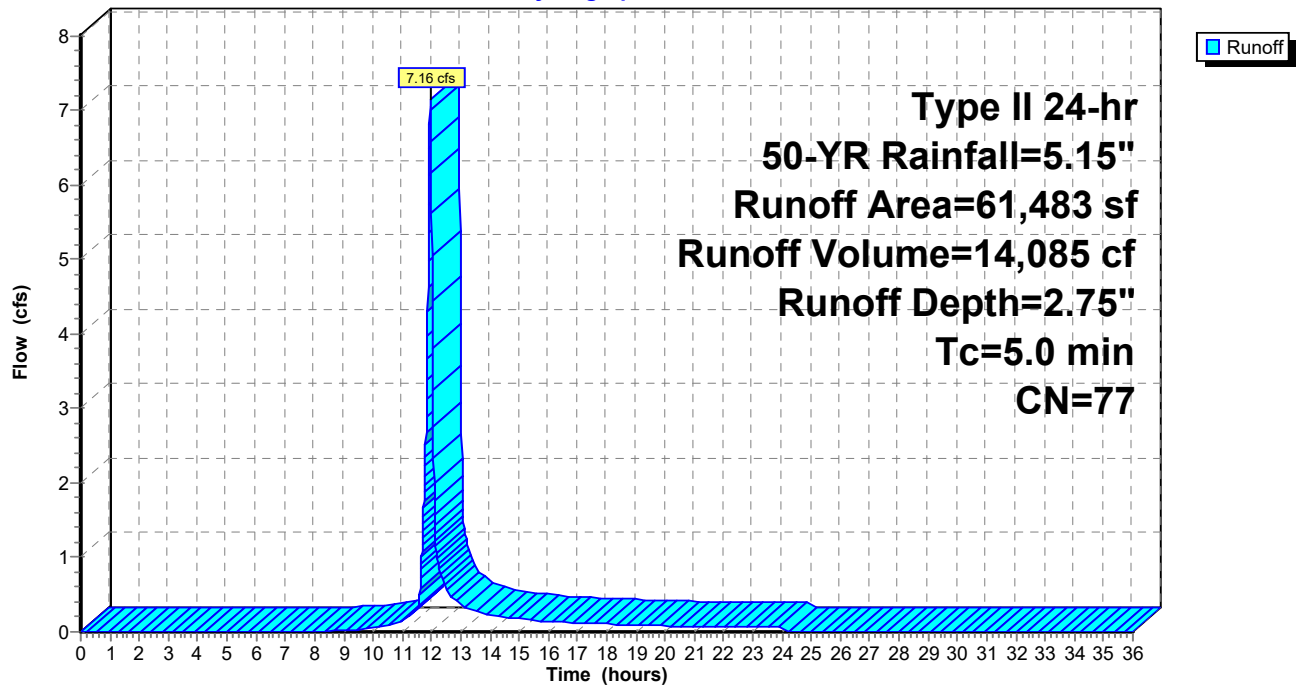
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=5.15"

Area (sf)	CN	Description
28,383	71	Meadow, non-grazed, HSG C
0	70	Woods, Good, HSG C
7,751	98	Paved parking, HSG C
0	78	Meadow, non-grazed, HSG D
25,349	77	Woods, Good, HSG D
0	98	Paved parking, HSG D
61,483	77	Weighted Average
53,732		87.39% Pervious Area
7,751		12.61% Impervious Area

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

Subcatchment PS3: Woods

Hydrograph



19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

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Summary for Pond 1P: Gravel Wetland

Inflow Area = 290,997 sf, 63.96% Impervious, Inflow Depth > 3.87" for 50-YR event
 Inflow = 21.18 cfs @ 12.00 hrs, Volume= 93,896 cf
 Outflow = 16.56 cfs @ 12.20 hrs, Volume= 78,732 cf, Atten= 22%, Lag= 12.0 min
 Primary = 16.56 cfs @ 12.20 hrs, Volume= 78,732 cf
 Routed to Link POI-1 : Offsite

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 741.03' @ 12.20 hrs Surf.Area= 10,417 sf Storage= 25,027 cf

Plug-Flow detention time= 128.6 min calculated for 78,732 cf (84% of inflow)
 Center-of-Mass det. time= 53.2 min (871.4 - 818.2)

Volume	Invert	Avail.Storage	Storage Description
#1	738.00'	21,223 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#2	738.00'	14,725 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		35,947 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
738.00	3,717	0	0
739.00	4,474	4,096	4,096
740.00	5,274	4,874	8,970
741.00	6,116	5,695	14,665
742.00	7,000	6,558	21,223

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
738.00	2,598	0	0
739.00	3,056	2,827	2,827
740.00	3,609	3,333	6,160
741.00	4,259	3,934	10,094
742.00	5,003	4,631	14,725

Device	Routing	Invert	Outlet Devices
#1	Primary	738.00'	36.0" Round Culvert L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 738.00' / 733.00' S= 0.1250 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	741.00'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	740.00'	10.0" Vert. Orifice/Grate X 8.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=16.53 cfs @ 12.20 hrs HW=741.03' (Free Discharge)

1=Culvert (Passes 0.13 cfs of 42.04 cfs potential flow)
 2=Orifice/Grate (Weir Controls 0.13 cfs @ 0.53 fps)
 3=Orifice/Grate (Orifice Controls 16.40 cfs @ 3.76 fps)

19324 Post gravel wetland

Prepared by BEK

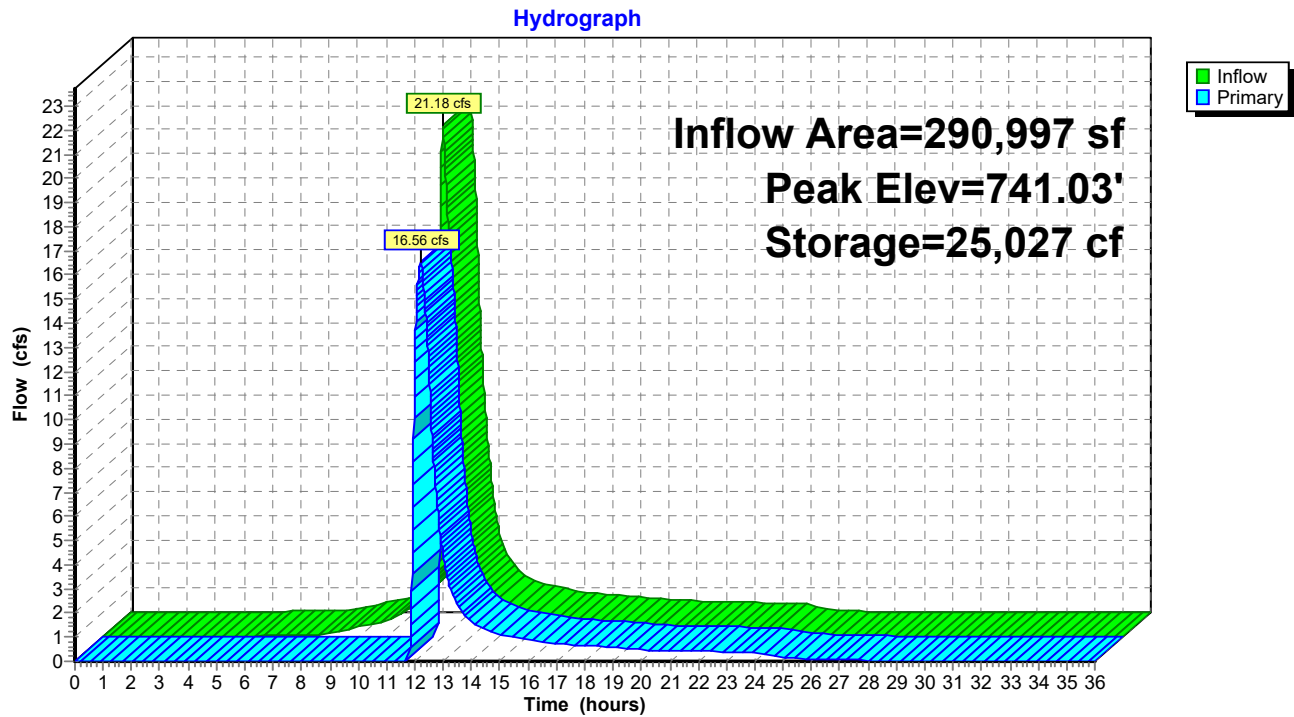
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Type II 24-hr 50-YR Rainfall=5.15"

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Pond 1P: Gravel Wetland



19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

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Summary for Pond 3P: Detention Chamber

Inflow Area = 151,555 sf, 80.02% Impervious, Inflow Depth = 4.35" for 50-YR event
 Inflow = 25.13 cfs @ 11.96 hrs, Volume= 54,879 cf
 Outflow = 9.79 cfs @ 12.06 hrs, Volume= 52,995 cf, Atten= 61%, Lag= 5.9 min
 Primary = 9.79 cfs @ 12.06 hrs, Volume= 52,995 cf
 Routed to Pond 1P : Gravel Wetland

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 754.12' @ 12.06 hrs Surf.Area= 6,081 sf Storage= 17,940 cf

Plug-Flow detention time= 76.0 min calculated for 52,995 cf (97% of inflow)
 Center-of-Mass det. time= 55.0 min (828.0 - 773.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	750.00'	8,385 cf	30.25'W x 201.03'L x 5.75'H Field A 34,967 cf Overall - 14,005 cf Embedded = 20,962 cf x 40.0% Voids
#2A	750.75'	14,005 cf	Cultec R-902HD x 216 Inside #1 Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap 216 Chambers in 4 Rows Cap Storage= 2.8 cf x 2 x 4 rows = 22.1 cf
		22,390 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	750.75'	36.0" Round Culvert L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 750.75' / 745.00' S= 0.0261 ' S= 0.0261 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	755.00'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	750.75'	15.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.79 cfs @ 12.06 hrs HW=754.12' (Free Discharge)

- 1=Culvert (Passes 9.79 cfs of 46.52 cfs potential flow)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Orifice/Grate (Orifice Controls 9.79 cfs @ 7.97 fps)

19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

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Pond 3P: Detention Chamber - Chamber Wizard Field A

Chamber Model = Cultec R-902HD (Cultec Recharger®902HD)

Effective Size= 69.8"W x 48.0"H => 17.65 sf x 3.67'L = 64.7 cf

Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap

Cap Storage= 2.8 cf x 2 x 4 rows = 22.1 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

54 Chambers/Row x 3.67' Long +0.52' Cap Length x 2 = 199.03' Row Length +12.0" End Stone x 2 =
201.03' Base Length

4 Rows x 78.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 30.25' Base Width

9.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 5.75' Field Height

216 Chambers x 64.7 cf + 2.8 cf Cap Volume x 2 x 4 Rows = 14,004.8 cf Chamber Storage

34,967.2 cf Field - 14,004.8 cf Chambers = 20,962.4 cf Stone x 40.0% Voids = 8,385.0 cf Stone Storage

Chamber Storage + Stone Storage = 22,389.8 cf = 0.514 af

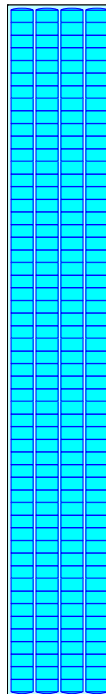
Overall Storage Efficiency = 64.0%

Overall System Size = 201.03' x 30.25' x 5.75'

216 Chambers

1,295.1 cy Field

776.4 cy Stone



19324 Post gravel wetland

Prepared by BEK

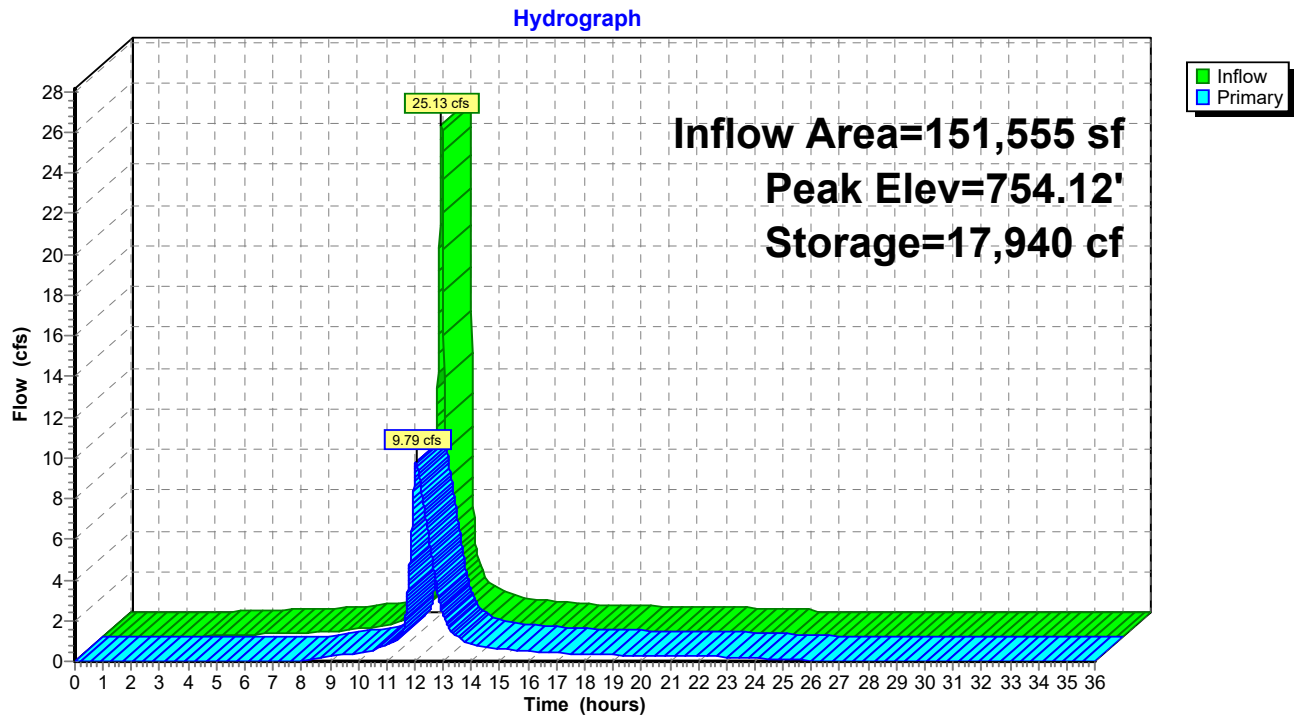
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Type II 24-hr 50-YR Rainfall=5.15"

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Pond 3P: Detention Chamber



19324 Post gravel wetland

Type II 24-hr 50-YR Rainfall=5.15"

Prepared by BEK

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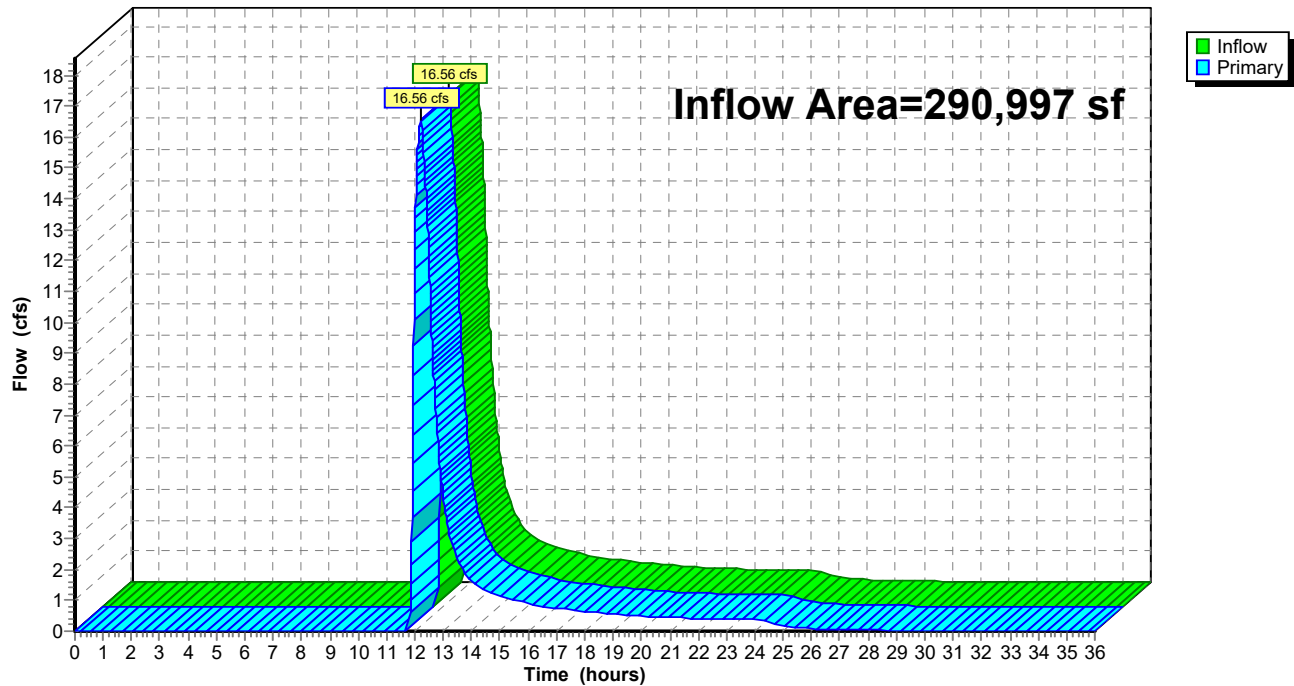
Summary for Link POI-1: Offsite

Inflow Area = 290,997 sf, 63.96% Impervious, Inflow Depth > 3.25" for 50-YR event
Inflow = 16.56 cfs @ 12.20 hrs, Volume= 78,732 cf
Primary = 16.56 cfs @ 12.20 hrs, Volume= 78,732 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link POI-1: Offsite

Hydrograph



**Agenda
Planning Board
January 10, 2022**

**Agenda Item #3B
Public Hearing Items**

**Trustees of Dartmouth College, 56
Etna Road (Tax Map 50, Lot 28),
zoned IND-L
PB2022-03-SPR**



CITY OF LEBANON ~ PLANNING & DEVELOPMENT

PLANNING BOARD

January 10, 2022 Meeting

Staff Memorandum – PB2022-03-SPR

APPLICATION INFORMATION

Agenda Item: 3.B

Application Type:

Site Plan Review to construct a +/- 19,672 sq. ft. library storage building

Property Location & Tax Map:

56 Etna Road (Tax Map 50, Lot 28)

Applicant/Property Owner:

Trustees of Dartmouth College

Zoning District: Light Residential (IND-L)

Overlay Districts:

Wetlands Conservation District

Future Land Use Map:

Mixed Use

LEGAL NOTICE

Trustees of Dartmouth College, 56 Etna Road (Tax Map 50, Lot 28), zoned IND-L: Request for Site Plan Review to construct a +/-19,672 sq. ft. library storage building and related site improvements. PB2022-03-SPR

PLANS AND APPLICATION MATERIALS

- ▶ Application form (1 page)
- ▶ Letter dated December 8, 2021, from Jason A Rouillard, of Dartmouth College (project description; 3 pages)
- ▶ Application for Waivers (4 pages)
- ▶ Site Plan Review Regulations Technical Checklist (10 pages)
- ▶ Excerpt from plan set titled "Dartmouth College Library Depository & Records Management," dated November 5, 2021 (Cover Sheet and Site Layout and Materials Plan)

On file at the Planning and Development Department and available for review upon request:

- ▶ Plan set titled "Dartmouth College Library Depository & Records Management," dated November 5, 2021 (28 sheets)
- ▶ Drainage Design Report for Dartmouth Library Storage Facility Project, dated December 2, 2021, prepared by Rist-Frost-Shumway Engineering, RFS 18-8750 (22 pages)
- ▶ Stormwater Management System Inspection & Maintenance Manual, dated December 2021 (8 pages)

COMPLETENESS REVIEW & STAFF COMMENTS

In order to accept jurisdiction and commence review of the applicant's proposal, the Planning Board must first determine that the application is complete. NH RSA 676:4, I(c)(1). Section 4.7.C.2 ("Initial Completeness Determination") of the Site Plan Review Regulations provides as follows:

- a. The Planning & Development Department shall review the application for completeness pursuant to the requirements of Section 4.7.A and Section 5.1. If the Planning & Development Department finds that the application is complete, or lacks only those items or documents for which waiver requests have been submitted, then the Planning & Development Department shall make a preliminary determination of whether the waiver requests meet the standards of Section 7.2 of these Regulations, and if so, then the Planning & Development Department shall recommend to the Board acceptance of the application for review.

- b. If the Planning & Development Department finds that the application is not complete or that one or more of the waiver requests do not meet the standards of Section 7.2, the Planning & Development Department shall so advise the Applicant, who can elect to complete the missing submission requirements. [...]

At the time of the writing of this memo, the Planning and Development Department is still reviewing the application in accordance with the Lebanon Site Plan Review Regulations. A recommendation on completeness will be made at the January 10th meeting. If the Board deems the application complete, the public hearing should be opened and continued to the next regular meeting of the Planning Board scheduled for **February 14, 2022**.

Attachments

cc: Jason A. Rouillard, Dartmouth College (via e-mail)
File

**CITY OF LEBANON
APPLICATION FOR**

SPECIAL EXCEPTION	☐	☒ SITE PLAN REVIEW
VARIANCE	☐	☐ SUBDIVISION
MOTION FOR REHEARING	☐	☐ LOT LINE ADJUSTMENT
APPEAL OF AN ADMIN. DECISION	☐	☐ CONDITIONAL USE PERMIT

☐ OTHER _____

PROPERTY OWNER (APPLICANT):

NAME: Trustees of Dartmouth College c/o Jason Rouillard TEL.# 603.646.2431

MAILING ADDRESS: 4 Currier Place, Suite 306, Hanover NH 03755

E-MAIL ADDRESS: Jason.a.rouillard@dartmouth.edu

CO-APPLICANT, AGENT, OR LESSEE:

NAME: _____ TEL.#: _____

MAILING ADDRESS: _____

E-MAIL ADDRESS: _____

PROJECT LOCATION:

TAX MAP #: 50 LOT#: 28 PLOT #: _____ ZONE: IND-L

STREET ADDRESS OF PROJECT: 56 Etna Road

IS THIS PROPERTY LOCATED IN THE: **WETLANDS** ☒ YES ☐ NO **HISTORIC DISTRICT** ☐ YES ☒ NO
FLOOD PLAIN ☐ YES ☒ NO

SCOPE OF PROJECT:

New 19,672 SF building to serve as the central storage for library books and records management.

TYPE OF OCCUPANCY:

EXISTING ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☐ COMMERCIAL ☐ INDUSTRIAL
PROPOSED ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☒ COMMERCIAL ☐ INDUSTRIAL
IF USE IS COMMERCIAL OR INDUSTRIAL, PLEASE NOTE SPECIFIC
USE: _____

SIGNATURE BLOCK:

FOR PLANNING BOARD APPLICATIONS ONLY: I, the undersigned, hereby submit this application on the date noted below with the knowledge and understanding that the Planning Board shall determine if the submitted application is complete according to its regulations at its next regularly scheduled meeting on January 10, 2022, unless I personally request, in writing, that the Board delay its determination of completeness to a later date.

PROPERTY OWNER: [Signature] DATE: 12/08/2021

NOTE: IF, AS OWNER, YOU WISH TO DESIGNATE AN AGENT TO ACT ON YOUR BEHALF, PLEASE READ THE FOLLOWING AND SIGN BELOW: I hereby designate the person listed above as my agent for the purpose of procuring the necessary local permits for the proposed work as described herein. Representations made by my agent may be accepted as though made by me personally, and I understand that I am bound by any official decision made on the basis of such representation.

PROPERTY OWNER: _____ DATE: _____

DATE RECEIVED	FILE # (MAP/LOT)	APPLICATION #	FEE - \$ AMOUNT	DATE PAID	VOUCHER #
12-8-21	50/28	PB2022-03	1891.04	12-8-21	18566

SPR

(Last Revised 4/04/18)

DARTMOUTH

Project Management Services

December 8, 2021

David Brooks
Lebanon Director of Planning & Development
51 N. Park Street
5th Floor
Lebanon, NH 03766

Re: New building at 56 Etna Road, Lebanon N.H.

Dear Mr. Brooks,
Dartmouth College is proposing to build a new library collection storage facility on the 56 Etna Road lot (Tax Map 50; Lot #28). The new structure will be the central storage facility for all library books that are not regularly used on the College's Hanover campus and for our Records Management Department.

The new building is designed to have two separate sections: A high section nearly 41 feet tall that will serve as high bay storage and mechanical space, consisting of roughly 12,420 SF. The second part of the building will be almost 20 feet tall and will serve as office space, a loading dock, and a processing area, roughly 7,252 SF. The total size of the building is proposed to be 19,672 SF.

The building will be constructed of precast concrete structural walls on the exterior and well-insulated interior partitions for a R30 assembly. The rubber roof will have the appearance to be flat although it will have a slight pitch and also will be well-insulated for a R56 rating. The exterior south façade will have a decorative metal scrim of multiple colors simulating the appearance of books on a shelf.

The new facility's footprint will share the 11.54 acre lot with an existing building. This existing building is owned by Dartmouth College and has various Dartmouth and non-Dartmouth tenants. The new building will be positioned primarily on the existing parking lot, resulting in a zero increase in the impervious surface. All new utilities are proposed for the building. Coming from Etna Road, new 6" fire and 4" domestic water services are proposed along with a 6" sewer line to be gravity-fed back to Etna Road. Underground propane will be installed for the mechanical systems and backup generator.

Currently, the existing power and telecommunications pole that feed the existing building is in the way of the new building footprint. These services will need to be relocated before the construction can commence. New power and telecommunication will be provided overhead to the edge of Etna Road, then underground to the building.

Due to the type of soil conditions on the lot, the area where the new building will be located will have to be "pre-charged" prior to the start of construction. Pre-charging the soil means that we will pile additional soil on top of the ground, roughly 5-7 feet high, to compress the existing soil. This process will make it suitable for constructing a building on it.

The parking lot will be reconfigured to meet the parking requirements for the existing building and the

DARTMOUTH

Project Management Services

new. 146 parking spaces are required for the existing building and 20 spaces for the new. We will provide 168 total parking spaces for both buildings. There will be new lighting for the parking lot and a very much improved landscape design.

Per request of the Fire/Rescue department, we will include an emergency parking space for an ambulance to accommodate a dialysis company located in the existing building.

Attached are two waiver requests for the project. One waiver request is for the 6 pre-existing parking spaces to remain that will be in the front of the new building. The second waiver request is to provide the minimum number of bike rack locations.

Pre-existing Parking: There are currently 6 pre-existing parking spaces in the front of the new building location that we would like to remain. Although slightly reconfigured, these parking spaces are the most obvious accessible parking spaces closest to the front door of the building. Placing the accessible parking in any other location on the site creates a longer accessible route and poses a bigger safety risk.

Minimum Bike Racks: Section 6.5.1.3.a requires short-term bicycle parking for at least ten (10) percent of the number of automobile parking stalls approved by the planning board. Alternatively, provide spaces for at least 5 percent of building occupants (measured at average daily peak). Whichever is greater, but in no case may the total be less than two (2) rack spaces. This project includes renovating the parking area and restriping a large number of spaces that serve the existing building North of the proposed project area. There are approximately 119 re-designed and restriped spaces within the project area. 119 project parking spaces requires 12 bike rack spaces; However, the project is a "Library Storage Facility" with only 4 FTE's and approximately 3 visitors per day = 7 building occupants maximum for the project. It is important to note that the "Alternative bike rack space requirements" are met for at least 5 percent of the building occupants and we are providing the required minimum 2 spaces (see sheet L1.7). Because this is a partial-development project, we hereby request relief from section 6.5.1.3.a to provide the alternative required spaces at 5% of building occupants in lieu of the 10% of the total number of parking spaces approved with the project.

Dartmouth anticipates starting the project in early Spring of 2022 and will be completed in late summer of 2023

We look forward to working with you on this project and we are available to provide more information or answer questions as needed.

Thank you for your time.

Sincerely,

DARTMOUTH

Project Management Services

A handwritten signature in blue ink, appearing to read "J. Rouillard", is positioned above the printed name.

Jason A. Rouillard



City of Lebanon, New Hampshire APPLICATION FOR WAIVERS

Office Use Only

Date Received: _____

File No.: _____

PROJECT INFORMATION

Name of Applicant: Dartmouth College

Project Name: Library Depository and Records Management

Project Address: 56 Etna Road, Lebanon, NH 03766

WAIVER REGULATIONS

In order to grant a Waiver from a requirement of the City of Lebanon Site Plan Review or Subdivision Regulations, the Planning Board must find that the Waiver is justified under one of the following criteria (See Article VII of the Site Plan Review Regulations and Section 7.15 of the Subdivision Regulations):

Criteria A. Strict conformity would pose an unnecessary hardship to the Applicant and waiver would not be contrary to the spirit and intent of the regulations;

OR

Criteria B. Specific circumstances relative to the site plan, or conditions of the land in such site plan, indicate that the waiver will properly carry out the spirit and intent of the regulations.

WAIVER REQUEST(S)

I (we) hereby request a Waiver from:

[You can respond in the space provided, or attach a separate statement. Please be prepared to address each request during your public hearing. You must show that you have justified granting the Waiver(s).]

- 1. Section 6.5.I.3.a of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because Section 6.5.I.3.a requires short-term bicycle parking for at least ten (10) percent of the number of automobile parking stalls approved by the planning board. Alternatively, provide spaces for at least 5 percent of building occupants (measured at average daily peak). Whichever is greater, but in no case may the total be less than two (2) rack spaces.**

This project includes renovating the parking area and restriping a large number of spaces that serve the existing building North of the proposed project area. There are approximately 119 re-designed and restriped spaces within the project area. 119 project parking spaces requires 12 bike rack spaces; However, the project is a "Library Storage Facility" with only 4 FTE's and approximately 3 visitors per day = 7 building occupants maximum for the project. It is important to note that the "Alternative bike rack space requirements" are met for at least 5 percent of the building occupants and we are providing the required minimum 2 spaces (see sheet L1.7). Because this is a partial-development project, we hereby request relief from section 6.5.I.3.a to provide the alternative required spaces at 5% of building occupants in lieu of the 10% of the total number of parking spaces approved with the project.

SIGNATURE

I (we) hereby submit this application to the Planning Board and attest that to the best of my (our) knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As the applicant or as the agent of the applicant, I attest that I am duly authorized to act in this capacity.

Signature of Applicant: _____

Date: _____

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City of Lebanon, New Hampshire APPLICATION FOR WAIVERS

Office Use Only

Date Received: _____

File No.: _____

PROJECT INFORMATION

Name of Applicant: Trustees of Dartmouth College

Project Name: Dartmouth College Library Storage

Project Address: 56 Etna Road

WAIVER REGULATIONS

In order to grant a Waiver from a requirement of the City of Lebanon Site Plan Review or Subdivision Regulations, the Planning Board must find that the Waiver is justified under one of the following criteria (See Article VII of the Site Plan Review Regulations and Section 7.15 of the Subdivision Regulations):

Criteria A. Strict conformity would pose an unnecessary hardship to the Applicant and waiver would not be contrary to the spirit and intent of the regulations;

OR

Criteria B. Specific circumstances relative to the site plan, or conditions of the land in such site plan, indicate that the waiver will properly carry out the spirit and intent of the regulations.

WAIVER REQUEST(S)

I (we) hereby request a Waiver from:

[You can respond in the space provided, or attach a separate statement. Please be prepared to address each request during your public hearing. You must show that you have justified granting the Waiver(s).]

- 6.5E7
1. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

There are currently 6 pre-existing parking spaces in the front of the new building location that we would like to remain. Although slightly reconfigured, these parking spaces are the most obvious accessible parking spaces closest to the front door of the building. Placing the accessible parking in any other location on the site creates a longer accessible route and poses a bigger safety risk.

2. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

3. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

4. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

5. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

6. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

7. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

8. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

SIGNATURE

I (we) hereby submit this application to the Planning Board and attest that to the best of my (our) knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As the applicant or as the agent of the applicant, I attest that I am duly authorized to act in this capacity.

Signature of Applicant: _____

Date: _____

12/8/2021

CITY OF LEBANON, NH SITE PLAN REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: Dartmouth Library Storage	
APPLICANT: Dartmouth College	DATE: 12-03-2021
GENERAL SUBMISSION REQUIREMENTS:	

All applications to the Planning Board for Site Plan Review must be submitted by 12:00 Noon on the day of the filing cutoff. [§4.7.B] Submissions must be accompanied by the following information or review of the application may be delayed:

A properly completed and signed Application Form (*available at www.lebanonnh.gov*). [§5.1.A]

The appropriate filing fees. [§5.1.B]

A written project description. [§5.1.C]

A list of the names and mailing addresses of all persons to be notified, by certified mail, of the public hearing. [§5.1.D]

A completed and signed Application for Waivers (*available at www.lebanonnh.gov*) [§5.1.G.3]

A completed and signed Technical Checklist (*available at www.lebanonnh.gov*). [§4.7.B]
[Applicants must complete the entire checklist to ensure that all necessary information and materials have been provided with the application or that written requests for waivers have been properly provided in accordance with Article VII of the Site Plan Review Regulations, as appropriate.]

Two (2) full-size sets of the Site Plan set. [§5.1.E]

A digital copy of the Site Plan set in .PDF format. [§5.1.F]

NOTE: Applications shall contain sufficient information to enable the City Staff and the Planning Board to evaluate the proposed development for compliance with the Zoning Ordinance, the Planning Board's Regulations, and other applicable City Codes, and for the Planning Board to make an informed decision.

All required application materials shall be submitted as a single inclusive package, including any appropriate waiver requests as permitted by the Regulations. Submission of a complete application package ensures that the review process by City Staff is as efficient and effective as possible.

The purpose of the filing deadline is to provide adequate time for City review of the proposal. Submission of any altered, additional, or substitute application materials required by Article V of these Regulations, subsequent to the filing deadline, other than as directed by City Staff, shall cause the application to be deemed untimely filed, and such application shall not be heard until a subsequent month.

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

PLAN SUBMITTAL TECHNICAL CHECKLIST:
--

NOTE: Site plan drawings shall include the information described below pursuant to Article V of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted for Site Plan Review shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning & Development Department.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§5.1.G(4)] NOTE: The submission requirements described in paragraphs 5.1.E(1) through 5.1.E(4) shall not be waivable under the procedures of Article VII of the Site Plan Review Regulations. [§5.1.E]

[Checklist begins on following page]

[illegible]

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(6) - Existing and proposed grades, including topographic contours with spot elevations, (referenced to USGS or FEMA Flood Insurance Rate Map datums, as appropriate) prepared by a professional engineer or land surveyor licensed in NH. (Where grades are less than 20%, contours shall be at 2 ft. intervals; otherwise they shall be at 5 ft. intervals.)	☒	☐
5.1.E(7) - Shape, size, height, and location of all existing structures located on site and within 200 feet of site.	☒	☐
5.1.E(7) - Elevation views indicating shape, size, height, and location of all proposed structures, including expansions of or additions to existing buildings. Such elevation views shall provide sufficient detail to allow for review by the Board and City staff of the adequacy of proposed access and egress points, walkways, lighting, and other site-related improvements.	☒	☐
5.1.E(8) - Location of existing natural features such as streams, marshes, lakes, ponds, wetlands, rock outcrops, or wooded areas, and existing man-made features such as roads and structures. Indicate those natural and man-made features that are to be removed, retained, or altered.	☒	☐
5.1.E(8) - Wetlands on the property, if any, shall be delineated by a NH Certified Wetlands Scientist, whose seal and signature shall appear on the plan. Documentation in the form of U.S. Army Corps of Engineers New England District Wetlands Delineation Data Sheets and/or other field notes and materials concerning the delineation shall be submitted.	☒	☐
5.1.E(9) - Zoning District, Tax Map and Lot number, and use of abutting properties within 200 feet of property.	☒	☐
5.1.E(9) - Location of streets, pedestrian paths/trails, and bicycle routes within 200 feet of the site boundary; and the location of curb cuts and vehicle accesses within 200 feet of the site boundary.	☒	☐
5.1.E(10) - Proposed streets, driveways, emergency vehicle accesses, parking spaces, and sidewalks, with indication of dimensions and direction of travel. Show required sight distances at curb cuts and dimensions for the inside radii of all curves.	☒	☐
5.1.E(10) - Vehicle and bicycle parking spaces shall be numbered.	☒	☐
5.1.E(10) - Loading spaces and facilities used in connection with any structures on the site shall be shown	☒	☐
5.1.E(10) - Total square footage and percentage of the lot covered by impervious cover shall be shown.	☒	☐
5.1.E(11) - Parking area safety measures including raised crosswalks/speed tables, signage, walkway lighting, striping and similar markings such as dedicated pedestrian/bicycle crossings and lanes through parking areas, fire lanes, compact and/or electric vehicle parking/charging, parking wayfinding, ADA signage and access aisles.	☒	☐
5.1.E(12) - Size and location of all existing and proposed public and private utilities. (Note: the applicant is encouraged to submit a Sewer Use Permit Application and obtain a Notice of Permitted Allocation, and to obtain a Water Use Permit prior to submission of the Site Plan Review application.)	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(13) - Plan for outdoor lighting showing proposed location, mounting height, fixture type, lamp type, color correlated temperature (CCT), and wattage of all exterior free-standing lighting or building-mounted fixtures.	☒	☐
5.1.E(13) - Analyses and illuminance-level diagrams, to include average and minimum foot-candle measurements, showing that proposed installation conforms to the lighting-level standards in Site Plan Review Regulations.	☒	☐
5.1.E(13) - Manufacturer's specification information for each proposed light fixture and lamp (NOTE: This information may be provided on the plan or as a separate attachment).	☒	☐
5.1.E(13) - Drawings of all relevant building elevations showing location and height of all building-mounted fixtures, illumination levels of walls or architectural features, and aiming points for any remote light fixtures.	☒	☐
5.1.E(14) - Plan for location of free-standing or building-mounted signs, including location, mounting, aiming, and shielding of any remote light fixtures for externally-lit signs.	☒	☐
5.1.E(14) - For internally-lit signs, relevant information concerning the method of illumination and the opacity of the sign background, showing that the proposed installation conforms to the requirements of the Regulations.	☒	☐
5.1.E(15) - 100-yr flood elevation, floodway, and floodplain limits, where relevant.	☒	☐
5.1.E(16) - Landscaping plan showing proposed new plantings to be installed and existing natural vegetation to be retained. Plan shall show in detail the number, size (height and/or caliper), and species (botanical and common names) of all proposed shrubs and trees.	☒	☐
5.1.E(16) - Existing trees over 12 inches in diameter (measured 4.5 feet above ground surface) within 25 feet of the disturbed area, must be counted and shown on the plan, if included towards fulfilling landscaping requirements.	☒	☐
5.1.E(16) - Calculations for square footage of perimeter landscaping.	☒	☐
5.1.E(16) - Parking lot shading calculations shall be provided by depicting new trees and shrubs at 10-year crown size.	☒	☐
5.1.E(17) - Existing and proposed surface and subsurface storm drainage facilities, including City storm drainage facilities located within 200' of site.	☒	☐
5.1.E(17) - Plans for retention, detention, slow release, and treatment of storm water shall be provided, where necessary.	☒	☐
5.1.E(17) - Drainage plans prepared by a professional engineer registered in NH, whose seal and signature shall appear on plan(s).	☒	☐
5.1.E(18) - Section 6.6. Stormwater Management submission requirements.	See Stormwater Checklist	
5.1.E(19) - Plans for snow removal and storage.	☒	☐
5.1.E(20) - A plan for the development showing provisions for automobile, transit, bicyclist, and pedestrian access and circulation. Such plan shall show both existing and proposed means of access to the site including connections with, public streets, sidewalks, transit stops, and formal paths/trails. Plans shall include any traffic calming and traffic control devices necessary in conjunction with the site development, as well as the location of all existing transit routes and transit stops located or passing within 1/4 mile (1,320 feet) of the property.	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(21) - Construction detail drawings including, but not limited to, pavements, walks, steps, curbing, drainage structures, water and/or sewer utilities, ground-mounted signage (e.g., fire lanes, ADA parking, commercial), surface treatments, transit shelters, energy generation units (e.g., solar), bike rack style, electric vehicle charging, outdoor lighting, outdoor furniture, retaining walls, tree boxes and other site systems or structures. Accompanying specifications and cutsheets may be required.	☒	☐
5.1.E(21) - Where applicable, roadway, drainage, water and sewer utility profile drawings shall be provided at a scale of 1"=40 feet (horizontal) and 1"=4 feet (vertical) and typical cross-section drawings shall be provided at a scale of 1"=5 feet (horizontal and vertical), unless prior approval is granted by the City Engineer.	☐ N/A	☐
5.1.E(22) - Depict any current and proposed easements, rights-of-way, and deed restrictions including those related to sewer, electrical utility, shared access, etc.	☐ N/A	☐
5.1.E(23) - For multi-family structures, plans for on-site recreational facilities.	☐ N/A	☐
5.1.E(24) - Plans for fire protection including emergency vehicle turn radius diagrams, if requested by the Lebanon Fire Department.	☒	☐
Supporting Documents and Information, Where Applicable	Info. Provided	Not Applicable
5.1.G(1) - An estimated timetable, to include phasing schedules, for construction and completion of buildings, parking, facilities, landscaping, and other required improvements.	☒	☐
5.1.G(2) - Any development estimated to generate a net increase of 100 peak hour trips or 1,000 average daily trips (based upon the most current edition of the ITE Trip Generation Manual) shall prepare and submit a Traffic Impact Study in accordance with standard traffic analysis conventions as set forth by the NHDOT. The Board may, at its discretion, require the submission of a Traffic Impact Study for developments estimated to generate less than 100 peak hour trips or 1,000 average daily trips if the Board has reason to believe such development could adversely affect levels of service or have other adverse impacts.	☐ N/A	☐
5.1.G(3) - Written requests for waivers from all applicable provisions of these Regulations shall be provided pursuant to Article VII - "Waiver Procedure". (note: use Application for Waivers form).	☒	☐
5.1.G(4) - For multi-family dwelling developments and mixed-use developments resulting in a net increase of 50 dwelling units or more, the application shall include the information and impact statements identified in Section 6.9.B.	☐ N/A	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE V OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: _____



Jason Rouillard
Dartmouth College

(Last Revised 4/19/2021)

**CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST**

CITY OF LEBANON, NH STORMWATER REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: Dartmouth Library Storage	
APPLICANT: Dartmouth College	DATE: 12-03-2021

NOTE: Stormwater plans shall include the information described below pursuant to Article VI of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning Office.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§6.6.I]

[Stormwater checklist begins on following page]

—> Note: This is a fairly unique project in that this project results in a decrease in impervious surfaces from pre- to post- development conditions of 7300 square feet, with a corresponding decrease in stormwater runoff rate and volume. Additionally, a large swath of parking area (source of pollutants) is being replaced by a clean roof. Therefore, some of the items on this checklist are not applicable and these have been indicated as such on the checklist. Some of the information on this checklist is only shown on the plan set or other documents submitted for site plan review.

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements	Info. Provided	Waiver Sought
6.6.C.1 (1) - An Existing Conditions S.M.P showing all pre-development:		
a. Surface water bodies and wetlands	☒	☐
b. Drainage patterns	☒	☐
c. Flood plains and floodways (with elevations)	N/A ☐	☐
d. Watershed boundaries	N/A ☐	☐
e. Buffer zones	N/A ☐	☐
f. Topographic contours with minimum 2-foot intervals	☒	☐
g. Buildings / structures	X ☒	☐
h. Pavement	☒	☐
i. Utilities	☒	☐
j. Soils information with coding as HSG-A, B, C, or D (High Intensity Soil Survey (HISS) mapping may be required per request of the City Engineer).	N/A ☐	☐
1. The plan shall also include the following elements:		
a. scale bar	☒	☐
b. north arrow	☒	☐
c. title block with project name	☒	☐
d. applicant's name	☒	☐
e. map and parcel number	☒	☐
f. designer's stamp	☒	☐
g. soil and/or wetland scientist's stamp (if applicable)	☒	☐
h. legend	☒	☐
i. locus plan	☒	☐
j. benchmarks	☒	☐
k. notes with datum and other plan references	☒	☐
l. instructions	☒	☐
m. detail descriptions	☒	☐
6.6.C.1 (2) - A Proposed Conditions SMP showing all proposed post-development temporary and permanent stormwater management system elements, erosion and sediment control Best Management Practices (BMP), and all important hydrologic features. The Proposed Conditions S.M.P must be at the same scale as the Existing Conditions SMP, with consistent title block, plan features, and descriptors including but not limited to the following:		
a. Existing and proposed topographic contours (2-foot minimum contour interval; 1-foot contour intervals may be required for sites with limited relief and/or where proposed stormwater outfalls are located adjacent to buffer zones.	☒	☐
b. Proposed areas of disturbance with total area of disturbance clearly labeled in square feet	☒	☐
c. Existing and proposed buildings and structures	☒	☐
d. Stormwater discharge locations labeled and matched to the drainage analyses	☒	☐
e. Wells and sanitary protective radii, if applicable	N/A ☐	☐
f. Septic systems, if applicable	N/A ☐	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
g. Plan references and notes (including sequence of soil disturbance)	☒	☐
h. Proposed and existing public and private utilities	☒	☐
i. Proposed project components to become property of or the responsibility of the City shall be labeled as such	☒	☐
j. Existing and proposed impervious cover, with areas used to calculate effective impervious cover (EIC, as defined herein) clearly identified and the square footage of each type identified and labeled.	☒	☐
k. Test Pit(s) locations and data where stormwater practices are proposed, as appropriate.	N/A ☐	☐
l. Details of individual design elements shown on separate plan sheets following the Proposed Conditions SMP.	☒	☐
The Existing Conditions SMP & the Proposed Conditions SMP shall be provided on sheets no larger than 24" x 36", at a scale of one (1) inch = 20 feet for urban areas, and one (1) inch = 40 feet for non-urban areas. The City Engineer will make the final determination as to the appropriate scale, ensuring that all important site and hydrologic features are easily recognized. If plan shall encompass more than two (2) sheets, at the required 1:40 or 1:20 scale, a separate large scale representation plan sheet (e.g. 1:100) is required to be provided, so as to show entirety of site, as well as off-site contributing areas.		
6.6.C.2 - In addition to the above described SMP plan sheets, the following SMP supplemental information is required: 1. A drainage analysis that includes calculations comparing pre- and post-development stormwater runoff rates (cubic feet per minute) and volumes (cubic feet) based on a 1-inch rainstorm, and the 2-year, 25-year, 50-year, and 100-year, 24-hour frequency storms. Calculations shall include, but not be limited to, the sizing of all structures and BMPs, including sizing of emergency overflow structures based on the 50-year 24-hour frequency storm discharge rate, with 1-foot of free-board. Storm rates shall be based on current design depths from the Northeast Regional Climate Center - http://precip.eas.cornell.edu . <i>Any site that was primarily wooded in the last five years shall be considered undisturbed woods Any site from which wooded vegetation has been removed within 5 years prior to the first submission to the planning board with respect to a proposed development, or upon which, at some earlier time, clearing has occurred in anticipation of development, shall be treated as undisturbed woodland for purposes of calculating pre-development runoff volumes. For purposes of this paragraph any tree cutting which occurred without leaving stands of healthy, growing trees within areas near waters and highways, as required by RSA 227-J:9, I, shall be presumed to have occurred in anticipation of development</i>	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
2. A drainage analysis results summary tabulated (pre & post) for each proposed outfall or catchment outlet point including runoff rates and volumes for each storm event analyzed above.	☒	☐
3. An Erosion and Sediment Control Plan for all proposed construction activities in accordance with the NH Stormwater Management Manual Volume 3, (December 2008 or current revision; downloadable from the website)	☒	☐
4. A comprehensive Operation and Maintenance Plan for long-term maintenance of all proposed stormwater management elements and BMPs including the proposed schedule of inspections and anticipated maintenance (see section H.2 Operations & Maintenance Plan for detailed requirements).	☒	☐
6.6.D - Phased Development: For phased developments, the plans and calculation requirements under this section (6.6) shall apply as though the development of the entire parcel were being proposed in one single application. The review and approval process for phased development applications is provided in section 4.9 of the Lebanon Site Plan Regulations.	☒	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE VI OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: Joanne Coppinger Joanne Coppinger, P.E.
 RFS Engineering, P.C.

(Last Revised 04/19/2021)

Planning office Use Only:

Date Received ___/___/___ Checklist Complete YES or NO Checked by: _____

**Agenda
Planning Board
January 10, 2022**

**Agenda Item #3D
Public Hearing Items**

**Noah Lynd & Josh Garrison
(applicants) and Chaloux, LLC
(property owner), 25 & 0
Labombard Road (Tax Map 64, Lot
25 & Tax Map 51, Lot 15), zoned
IND-L
PB2022-05-SPR**



CITY OF LEBANON ~ PLANNING & DEVELOPMENT

PLANNING BOARD

January 10, 2022 Meeting

Staff Memorandum – PB2022-05-SPR

APPLICATION INFORMATION

Agenda Item: 3.D

Application Type:

Site Plan Review to develop property for a +/-12,250 sq. ft. health club use

Property Location & Tax Map:

0 Labombard Road (Tax Map 51, Lot 15) and 25 Labombard Road (Tax Map 64, Lot 25)

Applicants:

Noah Lynd & Josh Garrison

Property Owner:

Chaloux, LLC

Existing Use & Improvements:

vacant

Proposed Use & Improvements:

+/-12,250 sq. ft. building for a proposed health club and associated site improvements

Zoning District: Light Residential (IND-L)

Overlay Districts:

Wetlands Conservation District

Future Land Use Map:

Mixed Use

LEGAL NOTICE

Noah Lynd & Josh Garrison (applicants) and Chaloux, LLC (property owner), 25 & 0 Labombard Road (Tax Map 64, Lot 25 & Tax Map 51, Lot 15), zoned IND-L: Request for Site Plan Review to construct a +/-12,250 sq. ft. building for a health club to include a climbing gym, yoga studio and accessory retail space, together with site improvements consisting of a new parking lot, sidewalks, patio, sewer and water utility connections, and stormwater improvements. PB2022-05-SPR

PLANS AND APPLICATION MATERIALS

- ▶ Application form (1 page)
- ▶ Letter dated December 13, 2021, from Adam Morse, PE, of Engineering Ventures, PC (project description; 2 pages)
- ▶ Application for Waivers (2 pages)
- ▶ Site Plan Review Regulations Technical Checklist (10 pages)
- ▶ Excerpt from plan set titled "The Notch Climbing Gym – Labombard Rd," dated December 13, 2021, prepared by Engineering Ventures, PC, EV Project #21580 (Cover Sheet and Site Plan)

On file at the Planning and Development Department and available for review upon request:

- ▶ Plan set titled "The Notch Climbing Gym – Labombard Rd," dated December 13, 2021, prepared by Engineering Ventures, PC, EV Project #21580 (14 Sheets)
- ▶ Lithonia Lighting specifications for D-Series Size 0 LED Area Luminaire fixture and WDGE1 LED Architectural Wall Sconce fixture (12 pages)
- ▶ Drainage Analysis titled, "The Notch Climbing Gym – Labombard Road," dated December 13, 2021, prepared by Engineering Ventures, PC, EV Project #21580 (41 pages)

COMPLETENESS REVIEW & STAFF COMMENTS

In order to accept jurisdiction and commence review of the applicant's proposal, the Planning Board must first determine that the application is complete. NH RSA 676:4, I(c)(1). Section 4.7.C.2 ("Initial Completeness Determination") of the Site Plan Review Regulations provides as follows:

- a. The Planning & Development Department shall review the application for completeness pursuant to the requirements of Section 4.7.A and Section 5.1. If the Planning & Development Department finds that the application is complete, or lacks only those items or documents for which waiver requests have been submitted, then the Planning & Development Department shall make a preliminary determination of whether the waiver requests meet the standards of Section 7.2 of these Regulations, and if so, then the Planning & Development Department shall recommend to the Board acceptance of the application for review.
- b. If the Planning & Development Department finds that the application is not complete or that one or more of the waiver requests do not meet the standards of Section 7.2, the Planning & Development Department shall so advise the Applicant, who can elect to complete the missing submission requirements. [...]

At the time of the writing of this memo, the Planning and Development Department is still reviewing the application in accordance with the Lebanon Site Plan Review Regulations. A recommendation on completeness will be made at the January 10th meeting. If the Board deems the application complete, the public hearing should be opened and continued to the next regular meeting of the Planning Board scheduled for **February 14, 2022**.

Attachments

cc: Noah Lynd (via e-mail)
Josh Garrison (via e-mail)
Jay Campion, Chaloux, LLC (via e-mail)
Adam Morse, PE, Engineering Ventures, PC (via e-mail)
File

CITY OF LEDARON APPLICATION FOR

SPECIAL EXCEPTION ☐	☒ SITE PLAN REVIEW
VARIANCE ☐	☐ SUBDIVISION
MOTION FOR REHEARING ☐	☐ LOT LINE ADJUSTMENT
APPEAL OF AN ADMIN. DECISION ☐	☐ CONDITIONAL USE PERMIT

☐ OTHER _____

PROPERTY OWNER (APPLICANT):

NAME: Chaloux, LLC (Jay Champion) TEL.#: 603-643-6607
 MAILING ADDRESS: PO Box 4430, Manchester, NH 03108
 E-MAIL ADDRESS: jay.champion@gmail.com

CO-APPLICANT, AGENT, OR LESSEE:

NAME: Noah Lynd and Josh Garrison TEL.#: 914-844-8162
 MAILING ADDRESS: PO Box 302 Meriden, NH 03770
 E-MAIL ADDRESS: noah.lynd40@gmail.com & joshrgarrison@gmail.com

PROJECT LOCATION:

TAX MAP #: 64-25 and 51-15 LOT#: _____ PLOT #: _____ ZONE: IND-L
 STREET ADDRESS OF PROJECT: Labombard Rd.
 IS THIS PROPERTY LOCATED IN THE: **WETLANDS** ☒ YES ☐ NO **HISTORIC DISTRICT** ☐ YES ☐ NO
FLOOD PLAIN ☐ YES ☐ NO

SCOPE OF PROJECT:

Construction of a 10,000 sf indoor climbing gym building, with 540 sf yoga studio and 235 sf retail space, including site improvements consisting of new parking lot, sidewalks, patio, sewer and water utility connections and stormwater improvements and boundary line adjustment.

TYPE OF OCCUPANCY:

EXISTING ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☐ COMMERCIAL ☐ INDUSTRIAL
 PROPOSED ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☐ COMMERCIAL ☒ INDUSTRIAL
 IF USE IS **COMMERCIAL** OR **INDUSTRIAL**, PLEASE NOTE **SPECIFIC**
 USE: Climbing Gym

SIGNATURE BLOCK:

FOR PLANNING BOARD APPLICATIONS ONLY: I, the undersigned, hereby submit this application on the date noted below with the knowledge and understanding that the Planning Board shall determine if the submitted application is complete according to its regulations at its next regularly scheduled meeting on _____, 20____, unless I personally request, in writing, that the Board delay its determination of completeness to a later date.

PROPERTY

OWNER: _____ DATE: _____

NOTE: IF, AS OWNER, YOU WISH TO DESIGNATE AN AGENT TO ACT ON YOUR BEHALF, PLEASE READ THE FOLLOWING AND SIGN BELOW: I hereby designate the person listed above as my agent for the purpose of procuring the necessary local permits for the proposed work as described herein. Representations made by my agent may be accepted as though made by me personally, and I understand that I am bound by any official decision made on the basis of such representation.

PROPERTY

OWNER: _____ DATE: 12/7/21

DATE RECEIVED	FILE # (MAP/LOT)	APPLICATION #	FEE - \$ AMOUNT	DATE PAID	VOUCHER #

December 13, 2021

Lebanon Planning Board
City of Lebanon
51 North Park Street
Lebanon, NH 03766

**Re: The Notch Climbing Gym
Labombard Road
Subject parcel 51-15
IND-L Zone
Site Plan Review Request**

Dear Lebanon Planning Board,

On behalf of Noah Lynd and Josh Garrison, we are pleased to submit the enclosed materials and request Site Plan Review at the January 10, 2022 hearing for the above referenced project. The Owner/Applicant proposes to construct a new 10,000 sq. ft. climbing gym located on Lot B of the Rte. 120 Hotel, LLC Subdivision. The existing lot is located in the Light Industrial Zone. The new building will contain a 10,000-sf main level and a 2,250-sf mezzanine.

The subject property, Lot 51-15, is a 3.4-acre lot. The existing property is vacant with a small area of wetlands in the southeast corner of the lot extending on the neighboring lot to the south. The lot is primarily meadow and there are some piles of fill and boulders adjacent to the west and south boundary. The lot slopes from a high point in the northeast corner down towards the south end of the lot. With steeper slopes immediately south of the northeast corner with slopes leveling out towards the south and west. The north end of the site appears to be primarily fill that was placed in that location during construction of the hotel access drive. There are currently two culverts that cross under Labombard Rd. and drain to the wetlands on the subject property. A wetland delineation was completed by ADK Environmental on 11/1/21. The site is bordered by a public sidewalk along its frontage with Labombard Rd.

The lot is served by municipal water and sewer line stubs put in with the original subdivision construction. The sewer connection for the lot is connected to a privately operated sewer lift station that discharges to the sewer main in Route 120. An 8" sewer line is stubbed into the lot near the northeast corner. An 8" water line is also stubbed into the lot roughly centered on the north boundary line.

The new building includes a mezzanine, climbing area, yoga studio and small retail space. Site work will consist of new sidewalks to provide connectivity between the public sidewalk main entrance and various egress locations. A parking lot designed to accommodate 49 cars is provided to the southwest of the building. The building is laid out in an "L" shape with its front facing towards the southeast. Space along the west end of the building has been provided for a future 2,000 sf addition. The drive access is to be centered on the west boundary line and the existing boundary line will be moved to the center of the drive access as shown on the plans. At the outcome of the boundary line adjustment, the subject lot will encompass 2.55 acres. A maintenance and access easement will be dedicated from the subject lot to lot 64-25 for the shared drive access. The owner of lot 64-25 will also provide an easement to the subject lot for shared access and maintenance. A new electrical transformer will be connected to existing power located along the Hilton Garden access drive. The transformer is planned to be located just east of the shared drive access.

Stormwater management will be achieved through construction of a series of grass swales, culverts, catch basins, piping, underdrains, curbing and a stormwater treatment practice consisting of a gravel wetland and sediment forebay system. The sediment forebay will provide pretreatment for the system. An underdrain and swale will be around the building to route drainage from the shed roof to the culvert and swale system so that it can be discharged to the gravel wetlands. Parking lot drainage and drainage from the west side of the building will be routed to a series of catch basins and a swale which flows south into the gravel wetland along the west proposed boundary. The lot is subject to an Alteration of Terrain Permit since it is part of an existing subdivision which has a recent permit on file.

Based on our review of the 8th Edition of the ITE Trip Generation Rates we determined that based on ITE Code 492 Health/Fitness Club with 12.3 units equates to 405 daily trips with 17 peak AM trips and 43 peak PM trips.

We look forward to presenting this project to you at the January 10th hearing. If you have any questions or comments or require any additional information prior to the hearing, please give our office a call.

Sincerely,
ENGINEERING VENTURES, PC



Adam Morse, PE
Project Manager

cc: (via email): Noah Lynd, Josh Garrison, Carl Lavalley, Ingrid Nichols, Mara Robinson



City of Lebanon, New Hampshire APPLICATION FOR WAIVERS

Office Use Only

Date Received: _____

File No.: _____

PROJECT INFORMATION

Name of Applicant: Noah Lynd and Josh Garrison

Project Name: The Notch Climbing Gym

Project Address: Labombard Road, Lebanon, NH 03766

WAIVER REGULATIONS

In order to grant a Waiver from a requirement of the City of Lebanon Site Plan Review or Subdivision Regulations, the Planning Board must find that the Waiver is justified under one of the following criteria (See Article VII of the Site Plan Review Regulations and Section 7.15 of the Subdivision Regulations):

Criteria A. Strict conformity would pose an unnecessary hardship to the Applicant and waiver would not be contrary to the spirit and intent of the regulations;

OR

Criteria B. Specific circumstances relative to the site plan, or conditions of the land in such site plan, indicate that the waiver will properly carry out the spirit and intent of the regulations.

WAIVER REQUEST(S)

I (we) hereby request a Waiver from:

[You can respond in the space provided, or attach a separate statement. Please be prepared to address each request during your public hearing. You must show that you have justified granting the Waiver(s).]

1. Section 6.2.L of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A** / **Criteria B** because _____

Wheel stops are included in all locations with the exception of the center landscape strip. This is due to its intended use as a stormwater collection feature. Grades are relatively gradual in this stormwater swale and therefore curbing is not needed for safety.

2. Section 6.5.C.2 of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A** / **Criteria B** because _____

There is an egress entrance facing the public way. The entrance is not intended for a primary use. ~~Access from the public sidewalk has been provided to the main entrance at the parking lot on the~~ southeast side of the building. This entryway has been made to appear more like a main entrance with the addition of architectural features as well as including the main signage feature for the building.

3. Section 6.2.E.4 of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A / ~~Criteria B~~** because _____
The east row of parking contains 16 parking spaces including 3 ADA spaces. A bump out was not provided since the entire row of parking abuts landscaping.

4. Section 6.2.D.1 of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A / ~~Criteria B~~** because _____
Due to the need for public access and the proximity of the wetlands, in order to avoid wetlands near the southeast corner a 5' buffer was achieved. Landscaping along the west end of the building was moved out of the future building footprint to avoid having to reconstruct the landscaping in a future phase of the project.

5. Section ____ of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A / Criteria B** because _____

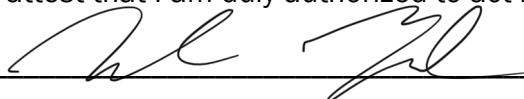
6. Section ____ of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A / Criteria B** because _____

7. Section ____ of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A / Criteria B** because _____

8. Section ____ of the (circle one) **Site Plan Review / Subdivision Regulations**. A Waiver of this Section meets (circle one) **Criteria A / Criteria B** because _____

SIGNATURE

I (we) hereby submit this application to the Planning Board and attest that to the best of my (our) knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As the applicant or as the agent of the applicant, I attest that I am duly authorized to act in this capacity.

Signature of Applicant:  Date: 12/10/2021

CITY OF LEBANON, NH SITE PLAN REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: The Notch Climbing Gym	
APPLICANT: Noah Lynd & Josh Garrison	DATE: 12/13/2021
GENERAL SUBMISSION REQUIREMENTS:	

All applications to the Planning Board for Site Plan Review must be submitted by 12:00 Noon on the day of the filing cutoff. [§4.7.B] Submissions must be accompanied by the following information or review of the application may be delayed:

A properly completed and signed Application Form *(available at www.lebanonnh.gov)*. [§5.1.A]

The appropriate filing fees. [§5.1.B]

A written project description. [§5.1.C]

A list of the names and mailing addresses of all persons to be notified, by certified mail, of the public hearing. [§5.1.D]

A completed and signed Application for Waivers *(available at www.lebanonnh.gov)* [§5.1.G.3]

A completed and signed Technical Checklist *(available at www.lebanonnh.gov)*. [§4.7.B]
[Applicants must complete the entire checklist to ensure that all necessary information and materials have been provided with the application or that written requests for waivers have been properly provided in accordance with Article VII of the Site Plan Review Regulations, as appropriate.]

Two (2) full-size sets of the Site Plan set. [§5.1.E]

A digital copy of the Site Plan set in .PDF format. [§5.1.F]

NOTE: Applications shall contain sufficient information to enable the City Staff and the Planning Board to evaluate the proposed development for compliance with the Zoning Ordinance, the Planning Board's Regulations, and other applicable City Codes, and for the Planning Board to make an informed decision.

All required application materials shall be submitted as a single inclusive package, including any appropriate waiver requests as permitted by the Regulations. Submission of a complete application package ensures that the review process by City Staff is as efficient and effective as possible.

The purpose of the filing deadline is to provide adequate time for City review of the proposal. Submission of any altered, additional, or substitute application materials required by Article V of these Regulations, subsequent to the filing deadline, other than as directed by City Staff, shall cause the application to be deemed untimely filed, and such application shall not be heard until a subsequent month.

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

PLAN SUBMITTAL TECHNICAL CHECKLIST:

NOTE: Site plan drawings shall include the information described below pursuant to Article V of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted for Site Plan Review shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning & Development Department.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§5.1.G(4)] NOTE: The submission requirements described in paragraphs 5.1.E(1) through 5.1.E(4) shall not be waivable under the procedures of Article VII of the Site Plan Review Regulations. [§5.1.E]

[Checklist begins on following page]

**CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST**

[illegible]

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(6) - Existing and proposed grades, including topographic contours with spot elevations, (referenced to USGS or FEMA Flood Insurance Rate Map datums, as appropriate) prepared by a professional engineer or land surveyor licensed in NH. (Where grades are less than 20%, contours shall be at 2 ft. intervals; otherwise they shall be at 5 ft. intervals.)	☒	☐
5.1.E(7) - Shape, size, height, and location of all existing structures located on site and within 200 feet of site.	☒	☐
5.1.E(7) - Elevation views indicating shape, size, height, and location of all proposed structures, including expansions of or additions to existing buildings. Such elevation views shall provide sufficient detail to allow for review by the Board and City staff of the adequacy of proposed access and egress points, walkways, lighting, and other site-related improvements.	☒	☐
5.1.E(8) - Location of existing natural features such as streams, marshes, lakes, ponds, wetlands, rock outcrops, or wooded areas, and existing man-made features such as roads and structures. Indicate those natural and man-made features that are to be removed, retained, or altered.	☒	☐
5.1.E(8) - Wetlands on the property, if any, shall be delineated by a NH Certified Wetlands Scientist, whose seal and signature shall appear on the plan. Documentation in the form of U.S. Army Corps of Engineers New England District Wetlands Delineation Data Sheets and/or other field notes and materials concerning the delineation shall be submitted.	☒	☐
5.1.E(9) - Zoning District, Tax Map and Lot number, and use of abutting properties within 200 feet of property.	☒	☐
5.1.E(9) - Location of streets, pedestrian paths/trails, and bicycle routes within 200 feet of the site boundary; and the location of curb cuts and vehicle accesses within 200 feet of the site boundary.	☒	☐
5.1.E(10) - Proposed streets, driveways, emergency vehicle accesses, parking spaces, and sidewalks, with indication of dimensions and direction of travel. Show required sight distances at curb cuts and dimensions for the inside radii of all curves.	☒	☐
5.1.E(10) - Vehicle and bicycle parking spaces shall be numbered.	☒	☐
5.1.E(10) - Loading spaces and facilities used in connection with any structures on the site shall be shown	☒	☐
5.1.E(10) - Total square footage and percentage of the lot covered by impervious cover shall be shown.	☒	☐
5.1.E(11) - Parking area safety measures including raised crosswalks/speed tables, signage, walkway lighting, striping and similar markings such as dedicated pedestrian/bicycle crossings and lanes through parking areas, fire lanes, compact and/or electric vehicle parking/charging, parking wayfinding, ADA signage and access aisles.	☒	☐
5.1.E(12) - Size and location of all existing and proposed public and private utilities. <i>(Note: the applicant is encouraged to submit a Sewer Use Permit Application and obtain a Notice of Permitted Allocation, and to obtain a Water Use Permit prior to submission of the Site Plan Review application.)</i>	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(13) - Plan for outdoor lighting showing proposed location, mounting height, fixture type, lamp type, color correlated temperature (CCT), and wattage of all exterior free-standing lighting or building-mounted fixtures.	☒	☐
5.1.E(13) - Analyses and illuminance-level diagrams, to include average and minimum foot-candle measurements, showing that proposed installation conforms to the lighting-level standards in Site Plan Review Regulations.	☒	☐
5.1.E(13) - Manufacturer's specification information for each proposed light fixture and lamp (NOTE: This information may be provided on the plan or as a separate attachment).	☒	☐
5.1.E(13) - Drawings of all relevant building elevations showing location and height of all building-mounted fixtures, illumination levels of walls or architectural features, and aiming points for any remote light fixtures.	☒	☐
5.1.E(14) - Plan for location of free-standing or building-mounted signs, including location, mounting, aiming, and shielding of any remote light fixtures for externally-lit signs.	☒	☐
5.1.E(14) - For internally-lit signs, relevant information concerning the method of illumination and the opacity of the sign background, showing that the proposed installation conforms to the requirements of the Regulations.	☒	☐
5.1.E(15) - 100-yr flood elevation, floodway, and floodplain limits, where relevant.	N/A ☐	☐
5.1.E(16) - Landscaping plan showing proposed new plantings to be installed and existing natural vegetation to be retained. Plan shall show in detail the number, size (height and/or caliper), and species (botanical and common names) of all proposed shrubs and trees.	☒	☐
5.1.E(16) - Existing trees over 12 inches in diameter (measured 4.5 feet above ground surface) within 25 feet of the disturbed area, must be counted and shown on the plan, if included towards fulfilling landscaping requirements.	☒	☐
5.1.E(16) - Calculations for square footage of perimeter landscaping.	☒	☐
5.1.E(16) - Parking lot shading calculations shall be provided by depicting new trees and shrubs at 10-year crown size.	☒	☐
5.1.E(17) - Existing and proposed surface and subsurface storm drainage facilities, including City storm drainage facilities located within 200' of site.	☒	☐
5.1.E(17) - Plans for retention, detention, slow release, and treatment of storm water shall be provided, where necessary.	☒	☐
5.1.E(17) - Drainage plans prepared by a professional engineer registered in NH, whose seal and signature shall appear on plan(s).	☒	☐
5.1.E(18) - Section 6.6. Stormwater Management submission requirements.	See Stormwater Checklist	
5.1.E(19) - Plans for snow removal and storage.	☒	☐
5.1.E(20) - A plan for the development showing provisions for automobile, transit, bicyclist, and pedestrian access and circulation. Such plan shall show both existing and proposed means of access to the site including connections with, public streets, sidewalks, transit stops, and formal paths/trails. Plans shall include any traffic calming and traffic control devices necessary in conjunction with the site development, as well as the location of all existing transit routes and transit stops located or passing within 1/4 mile (1,320 feet) of the property.	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(21) - Construction detail drawings including, but not limited to, pavements, walks, steps, curbing, drainage structures, water and/or sewer utilities, ground-mounted signage (e.g., fire lanes, ADA parking, commercial), surface treatments, transit shelters, energy generation units (e.g., solar), bike rack style, electric vehicle charging, outdoor lighting, outdoor furniture, retaining walls, tree boxes and other site systems or structures. Accompanying specifications and cutsheets may be required.	☒	☐
5.1.E(21) - Where applicable, roadway, drainage, water and sewer utility profile drawings shall be provided at a scale of 1"=40 feet (horizontal) and 1"=4 feet (vertical) and typical cross-section drawings shall be provided at a scale of 1"=5 feet (horizontal and vertical), unless prior approval is granted by the City Engineer.	☒	☐
5.1.E(22) - Depict any current and proposed easements, rights-of-way, and deed restrictions including those related to sewer, electrical utility, shared access, etc.	☒	☐
5.1.E(23) - For multi-family structures, plans for on-site recreational facilities.	N/A ☐	☐
5.1.E(24) - Plans for fire protection including emergency vehicle turn radius diagrams, if requested by the Lebanon Fire Department.	☒	☐
Supporting Documents and Information, Where Applicable	Info. Provided	Not Applicable
5.1.G(1) - An estimated timetable, to include phasing schedules, for construction and completion of buildings, parking, facilities, landscaping, and other required improvements.	☒	☐
5.1.G(2) - Any development estimated to generate a net increase of 100 peak hour trips or 1,000 average daily trips (based upon the most current edition of the ITE Trip Generation Manual) shall prepare and submit a Traffic Impact Study in accordance with standard traffic analysis conventions as set forth by the NHDOT. The Board may, at its discretion, require the submission of a Traffic Impact Study for developments estimated to generate less than 100 peak hour trips or 1,000 average daily trips if the Board has reason to believe such development could adversely affect levels of service or have other adverse impacts.	N/A ☐	☐
5.1.G(3) - Written requests for waivers from all applicable provisions of these Regulations shall be provided pursuant to Article VII - "Waiver Procedure". (note: use <i>Application for Waivers</i> form).	☐	☒
5.1.G(4) - For multi-family dwelling developments and mixed-use developments resulting in a net increase of 50 dwelling units or more, the application shall include the information and impact statements identified in Section 6.9.B.	N/A ☐	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE V OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: _____

(Last Revised 4/19/2021)

**CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST**

CITY OF LEBANON, NH STORMWATER REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: The Notch Climbing Gym	
APPLICANT: Noah Lynd & Josh Garrison	DATE: 12/13/2021

NOTE: Stormwater plans shall include the information described below pursuant to Article VI of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning Office.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§6.6.I]

[Stormwater checklist begins on following page]

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements	Info. Provided	Waiver Sought
6.6.C.1 (1) - An Existing Conditions S.M.P showing all pre-development: a. Surface water bodies and wetlands b. Drainage patterns c. Flood plains and floodways (with elevations) d. Watershed boundaries e. Buffer zones f. Topographic contours with minimum 2-foot intervals g. Buildings / structures h. Pavement i. Utilities j. Soils information with coding as HSG-A, B, C, or D (High Intensity Soil Survey (HISS) mapping may be required per request of the City Engineer). 1. The plan shall also include the following elements: a. scale bar b. north arrow c. title block with project name d. applicant's name e. map and parcel number f. designer's stamp g. soil and/or wetland scientist's stamp (if applicable) h. legend i. locus plan j. benchmarks k. notes with datum and other plan references l. instructions m. detail descriptions	☒ ☒ N/A ☐ N/A ☐ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
6.6.C.1 (2) - A Proposed Conditions SMP showing all proposed post-development temporary and permanent stormwater management system elements, erosion and sediment control Best Management Practices (BMP), and all important hydrologic features. The Proposed Conditions S.M.P must be at the same scale as the Existing Conditions SMP, with consistent title block, plan features, and descriptors including but not limited to the following: a. Existing and proposed topographic contours (2-foot minimum contour interval; 1-foot contour intervals may be required for sites with limited relief and/or where proposed stormwater outfalls are located adjacent to buffer zones. b. Proposed areas of disturbance with total area of disturbance clearly labeled in square feet c. Existing and proposed buildings and structures d. Stormwater discharge locations labeled and matched to the drainage analyses e. Wells and sanitary protective radii, if applicable f. Septic systems, if applicable	☒ ☒ ☒ ☒ N/A ☐ N/A ☐	☐ ☐ ☐ ☐ ☐ ☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
g. Plan references and notes (including sequence of soil disturbance) h. Proposed and existing public and private utilities i. Proposed project components to become property of or the responsibility of the City shall be labeled as such j. Existing and proposed impervious cover, with areas used to calculate effective impervious cover (EIC, as defined herein) clearly identified and the square footage of each type identified and labeled. k. Test Pit(s) locations and data where stormwater practices are proposed, as appropriate. l. Details of individual design elements shown on separate plan sheets following the Proposed Conditions SMP. The Existing Conditions SMP & the Proposed Conditions SMP shall be provided on sheets no larger than 24" x 36", at a scale of one (1) inch = 20 feet for urban areas, and one (1) inch = 40 feet for non-urban areas. The City Engineer will make the final determination as to the appropriate scale, ensuring that all important site and hydrologic features are easily recognized. If plan shall encompass more than two (2) sheets, at the required 1:40 or 1:20 scale, a separate large scale representation plan sheet (e.g. 1:100) is required to be provided, so as to show entirety of site, as well as off-site contributing areas.	☒ ☒ N/A ☐ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐ ☐
6.6.C.2 - In addition to the above described SMP plan sheets, the following SMP supplemental information is required: 1. A drainage analysis that includes calculations comparing pre- and post-development stormwater runoff rates (cubic feet per minute) and volumes (cubic feet) based on a 1-inch rainstorm, and the 2-year, 25-year, 50-year, and 100-year, 24-hour frequency storms. Calculations shall include, but not be limited to, the sizing of all structures and BMPs, including sizing of emergency overflow structures based on the 50-year 24-hour frequency storm discharge rate, with 1-foot of free-board. Storm rates shall be based on current design depths from the Northeast Regional Climate Center - http://precip.eas.cornell.edu. <i>Any site that was primarily wooded in the last five years shall be considered undisturbed woods Any site from which wooded vegetation has been removed within 5 years prior to the first submission to the planning board with respect to a proposed development, or upon which, at some earlier time, clearing has occurred in anticipation of development, shall be treated as undisturbed woodland for purposes of calculating pre-development runoff volumes. For purposes of this paragraph any tree cutting which occurred without leaving stands of healthy, growing trees within areas near waters and highways, as required by RSA 227-J:9, I, shall be presumed to have occurred in anticipation of development</i>	☒	☐

**CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST**

Plan Requirements (cont.)	Info. Provided	Waiver Sought
2. A drainage analysis results summary tabulated (pre & post) for each proposed outfall or catchment outlet point including runoff rates and volumes for each storm event analyzed above.	☒	☐
3. An Erosion and Sediment Control Plan for all proposed construction activities in accordance with the NH Stormwater Management Manual Volume 3, (December 2008 or current revision; downloadable from the website)	☒	☐
4. A comprehensive Operation and Maintenance Plan for long-term maintenance of all proposed stormwater management elements and BMPs including the proposed schedule of inspections and anticipated maintenance (see section H.2 Operations & Maintenance Plan for detailed requirements).	☒	☐
<u>6.6.D</u> - Phased Development: For phased developments, the plans and calculation requirements under this section (6.6) shall apply as though the development of the entire parcel were being proposed in one single application. The review and approval process for phased development applications is provided in section 4.9 of the Lebanon Site Plan Regulations.	☒	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE VI OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: Engineering Ventures (Adam Morse)

(Last Revised 04/19/2021)

Planning office Use Only:

Date Received ___/___/___ Checklist Complete YES or NO Checked by: _____

THE NOTCH CLIMBING GYM

LABOMBARD RD.

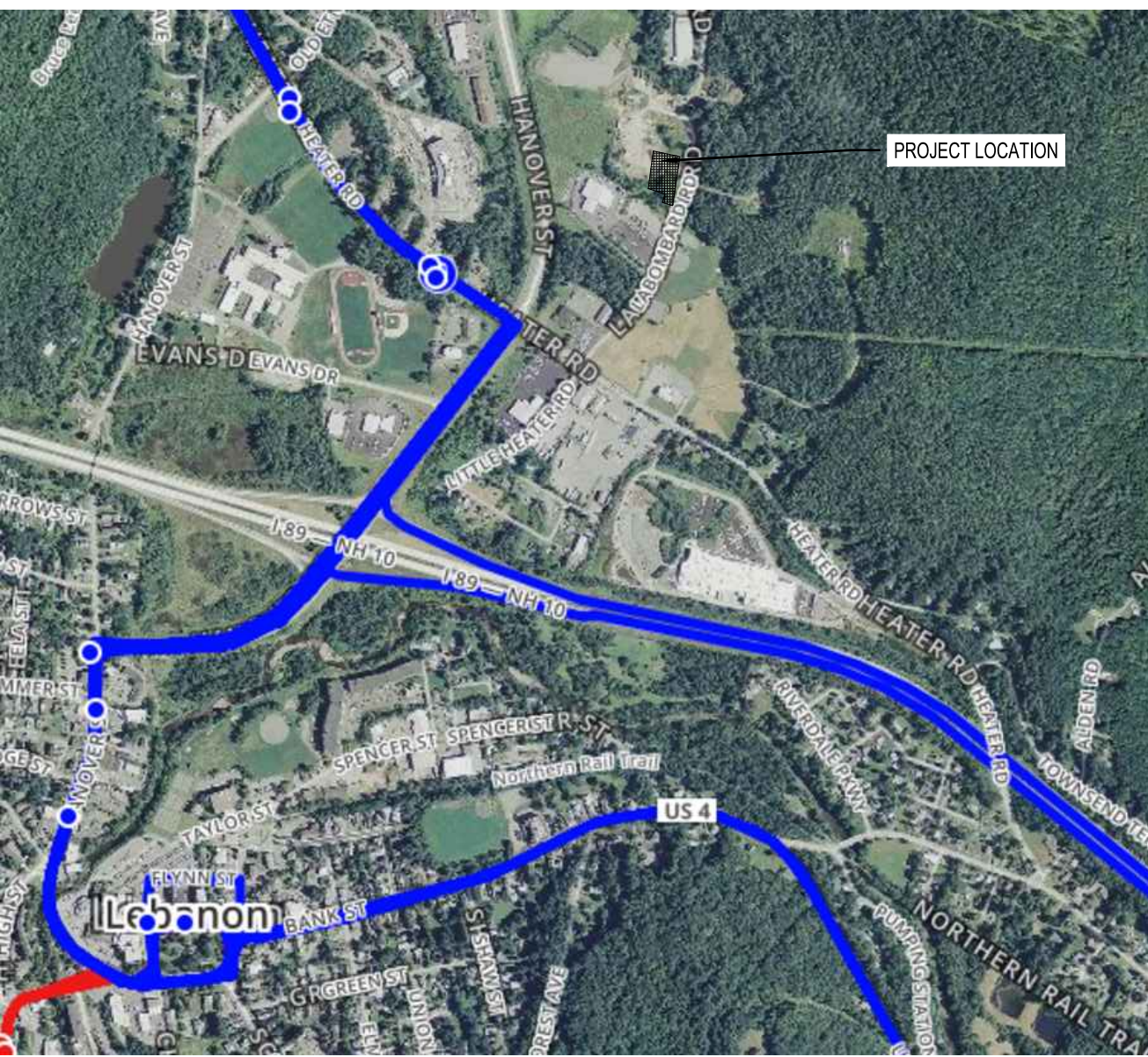
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE



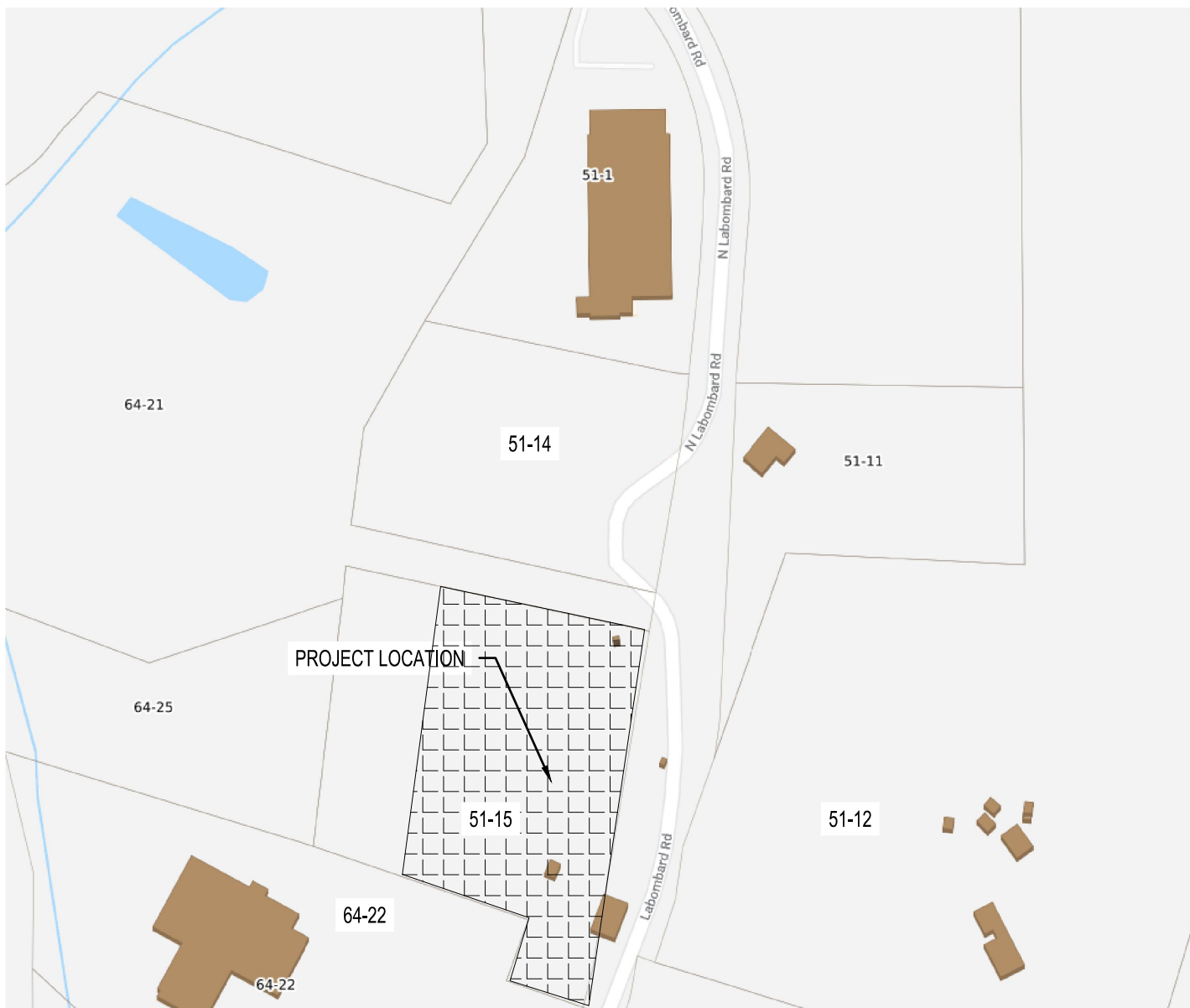
ORTHO MAP
1" = 500'



ZONING MAP
1" = 200'



BUS ROUTES
NTS



TAX MAP
1" = 200'

ZONING CHART

12/13/2021

The Notch Climbing Gym
Noah Lynd and Josh Garrison

Lebanon Zoning Regulations

	Existing	Required	Proposed
Zoning District	IND-L		IND-L
Tax Lot #	51-15		
Area of Lot	3.4 Acres	2 Acres (min.)	2.55 Acres
# of stories	n/a		2
Impervious Area	n/a		37,000 sq. ft.
Short/Long Term Bicycle Storage	n/a		6
Gross Floor Area Main Floor	n/a		10,000 sq. ft.
Gross Floor Area Mezzanine	n/a		2,250 sq. ft.
Impervious Area (% of lot)	n/a		33%
Overlay Districts	Wetlands	Wetlands	Wetlands
Proposed Use	n/a		Climbing Gym
Building (Footprint)	n/a	43,560 sq. ft. (maximum)	10,000 sq. ft.
Parking/Use			
-employee/customer	49	1 per 300 sq. ft. FA	
# of stories			
Impervious Area	TBD		
Impervious Area (% of lot)	TBD		
Setbacks			
Front	n/a	40'	61'
Rear	n/a	20'	131'
Side	n/a	20'	32'
Max building coverage	n/a	50%	
Building Height	n/a	65' (max.)	47'

PARKING SUMMARY:

GROSS FLOOR AREA = 12,250 SF / 300 SF / PARKING SPACE = 41 PARKING SPACES
41 PARKING SPACES X 120% = 49 PARKING SPACES (MAXIMUM ALLOWED PER 607.3A)

DRAWING LIST

SHEET	TITLE	CONSULTANT
C0.0	COVER SHEET	ENGINEERING VENTURES
C0.1	EXISTING CONDITIONS PLAN	ENGINEERING VENTURES
C0.2	SITE LEGEND AND NOTES	ENGINEERING VENTURES
C1.0	EROSION PREVENTION AND SEDIMENT CONTROL PLAN	
C1.1	VEHICLE TURNING PLAN	ENGINEERING VENTURES
C2.0	SITE PLAN	ENGINEERING VENTURES
C2.1	GRADING AND DRAINAGE PLAN	ENGINEERING VENTURES
C3.0	SITE DETAILS	ENGINEERING VENTURES
C3.1	SITE DETAILS	ENGINEERING VENTURES
C3.2	WATER AND SEWER DETAILS	ENGINEERING VENTURES
C3.3	STORMWATER DETAILS	ENGINEERING VENTURES
C3.4	EROSION PREVENTION AND SEDIMENT CONTROL DETAILS	ENGINEERING VENTURES
L1.0	SITE LANDSCAPE PLAN	MARA LANDSCAPE DESIGN
L2.0	SITE LIGHTING PLAN	VISIBLE LIGHT

ABUTTERS LIST

ID	Site Address	Owner Name	Owner Address	Owner City	Owner State	Owner Zip
51-11	33 LABOMBARD RD	CHALOUX PROP LLC	PO BOX 4430	MANCHESTER	NH	03108
64-22	13 LABOMBARD RD	DARTMOUTH TRANSP CO INC	7 LANGDON ST	CONCORD	NH	03301
51-12	24 LABOMBARD RD	HATCH, FREDERIC & MARGARET	24 LABOMBARD RD	LEBANON	NH	03766
51-2	52 N LABOMBARD RD	MARY HITCHCOCK MEM HOSPITAL	ONE MEDICAL CENTER DR	LEBANON	NH	03756
64-21	35 LABOMBARD RD	ROUTE 120 HOTEL LLC	1359 HOOKSET RD	HOOKSET	NH	3106

SUBJECT PROPERTY

LOT 51-15
LABOMBARD RD.
LEBANON, NH 03766

OWNER APPLICANT

CURRENT OWNER
CHALOUX PROPERTIES, LLC
PO BOX 4430
MANCHESTER, NH 03108

APPLICANT
NOAH LYND & JOSH GARRISON
PO BOX 302
MERIDAN, NH 03770

PROJECT CONSULTANTS

CIVIL ENGINEERING
ENGINEERING VENTURES, PC
85 MECHANIC STREET, SUITE E2-3
LEBANON, NH 03766
(603) 442-9333

LAND SURVEYOR
LATITUDES LAND SURVEYING
1 MILL ST.
BURLINGTON, VT 05401
(802) 825-6545

LANDSCAPE ARCHITECT
MARA LANDSCAPE DESIGN, LLC
16 MYRTLE AVE.
NEWBURYPORT, MA 01950

ARCHITECT
BANWELL ARCHITECTS
6 SOUTH PARK ST.
LEBANON, NH 03766
(603) 448-3778

LIGHTING
VISIBLE LIGHT
24 STICKNEY TERRACE # 6,
HAMPTON, NH 03842
(603) 926-6049

GENERAL CONTRACTOR
WRIGHT CONSTRUCTION
31 STATION RD.
MOUNT HOLLY, VT
802-747-8234

WETLANDS CONSULTANT
ADK ENVIRONMENTAL
31 CENTENNIAL DRIVE
WEBSTER, NH 03303

Stamp

Date

Description

No.

ENGINEERING VENTURES PC

208 Flynn Avenue, Suite 2A, Burlington, VT 05401 • 802-863-6225
85 Mechanic Street, Suite E2-3, Lebanon, NH 03766 • 603-442-9333
414 Union Street, Schenectady, NY 12305 • 518-630-9614
www.engineeringventures.com

WRIGHT CONSTRUCTION COMPANY

31 STATION ROAD
MOUNT HOLLY, VT 05768
802-747-8234

Cover Sheet

LABOMBARD ROAD
THE NOTCH CLIMBING GYM
CITY OF LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

EV Project #

21580

Drawn By:

AM

Checked By:

KW

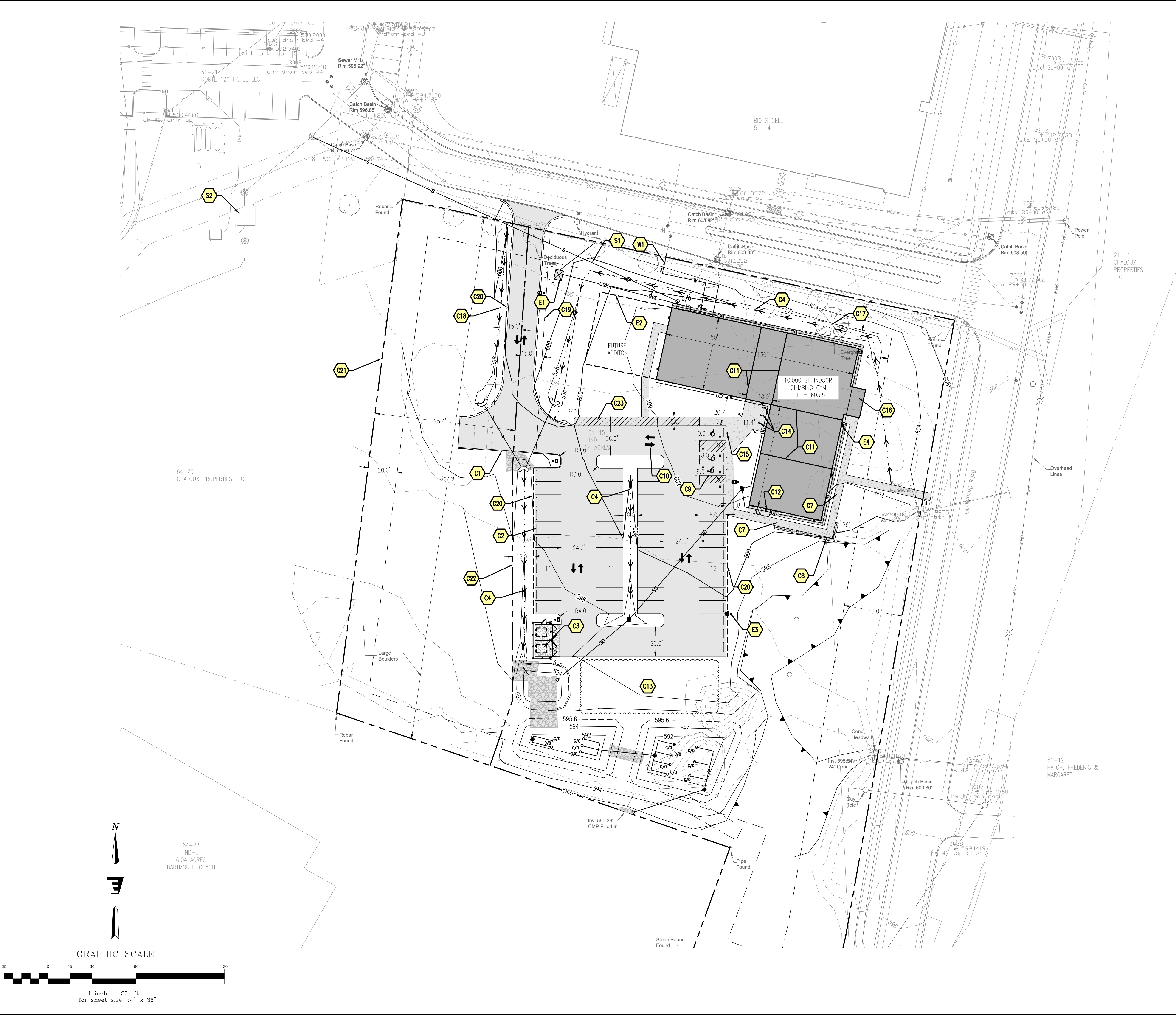
Scale:

-

Date:

12/13/2021

C0.0



ELECTRICAL NOTES

- E1 ELECTRICAL TRANSFORMER
- E2 UNDERGROUND ELECTRICAL CONDUIT
- E3 PARKING LOT LUMINARY (TYP.)
- E4 BUILDING WALL PACK (TYP.)

SEWER NOTES

- S1 8" SANITARY SEWER SERVICE LINE
- S2 LIFT STATION CAPACITY UPGRADES TBD

WATER NOTES

- W1 8" COMBINED DOMESTIC WATER AND FIRE SPRINKLER LINE

SITE NOTES

- C1 GRANITE CURBING (TYP.)
- C2 PRECAST PIN DOWN CURB WHEEL STOP (TYP.)
- C3 DUMPSTER ENCLOSURE
- C4 GRASS SWALE
- C7 5' WIDE CONCRETE SIDEWALK OR AS NOTED (TYP.)
- C8 3' HIGH RETAINING WALL WITH PEDESTRIAN RAILING (CONTRACTOR TO PROVIDE SHOP DRAWING FOR REVIEW BY ENGINEER)
- C9 ADA PARKING SPACES (1 VAN ACCESSIBLE AND 2 REGULAR)
- C10 DIRECTION OF TRAVEL
- C11 ROOF ELEVATION CHANGE (SEE ARCHITECTURAL ELEVATIONS)
- C12 CONCRETE LANDING AND STEPS DOWN TO SIDEWALK FROM EGRESS
- C13 SNOW STORAGE
- C14 STAPLE BIKE RACK
- C15 ADA SIGN (TYP.)
- C16 EGRESS STAIRS FROM MEZZANINE (SEE ARCHITECTURAL PLANS)
- C17 REMOVE TREE
- C18 15' WIDE ACCESS EASEMENT FOR THE BENEFIT OF LOT 51-15
- C19 15' WIDE ACCESS EASEMENT FOR THE BENEFIT OF LOT 64-25
- C20 1' GRAVEL SHOULDER (TYP.)
- C21 LOT LINE TO BE ADJUSTED TO NEW LOCATION
- C22 LOCATION OF NEW LOT LINE
- C23 ASPHALT PAVING WITH STRIPING

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**Agenda
Planning Board
January 10, 2022**

**Agenda Item #3E
Public Hearing Items**

**Robert & John Oakes, 92 Riverside
Drive (Tax Map 111, Lot 16),
zoned RL-1
PB2022-06-SPR**



CITY OF LEBANON ~ PLANNING & DEVELOPMENT

PLANNING BOARD

January 10, 2022 Meeting

Staff Memorandum – PB2022-06-SPR

APPLICATION INFORMATION

Agenda Item: 3.E

Application ID: PB2022-06-SPR

Application Type:

Site Plan Review to construct a +/- 26,176 sq. ft. commercial self-storage unit facility

Property Location & Tax Map:

92 Riverside Drive (Tax Map 111, Lot 16)

Applicant/Property Owner:

Robert & John Oakes

Zoning District:

Light Residential (IND-L)

Overlay Districts:

Wetlands Conservation District

Future Land Use Map:

Residential - Low

LEGAL NOTICE

Robert & John Oakes, 92 Riverside Drive (Tax Map 111, Lot 16), zoned RL-1: Request for Site Plan Review to construct a +/-26,176 sq. ft. commercial self-storage unit facility together with related site improvements. PB2022-06-SPR

PLANS AND APPLICATION MATERIALS

- ▶ Application form (1 page)
- ▶ Letter dated December 13, 2021, from Daniel Nash, of Advanced Geomatics & Design (project description; 2 pages)
- ▶ Application for Waivers (2 pages)
- ▶ Site Plan Review Regulations Technical Checklist (10 pages)
- ▶ Letter dated December 13, 2021, from Daniel Nash, of Advanced Geomatics & Design (support statement; 1 page)
- ▶ Excerpt from plan set titled "Oakes Storage, LLC," dated December 13, 2021, prepared by Advanced Geomatics and Design, PN: 20-001 (Cover Sheet and Site Plan)

On file at the Planning and Development Department and available for review upon request:

- ▶ Plan set titled "Oakes Storage, LLC," dated December 13, 2021, prepared by Advanced Geomatics and Design, PN: 20-001 (16 sheets)
- ▶ Lighting specifications by RAB for W17-30LY/PCU wall pack fixtures and IVAT3-45LPA730KU/WS2 pole-mounted fixtures (5 pages)
- ▶ Letter dated December 13, 2021, from Daniel Nash, of Advanced Geomatics & Design (drainage report; 1 page plus 16 pages of attachments)
- ▶ Oakes Storage, LLC, Stormwater Operation and Maintenance Plan, dated December 23, 2021 (6 pages)

COMPLETENESS REVIEW & STAFF COMMENTS

In order to accept jurisdiction and commence review of the applicant's proposal, the Planning Board must first determine that the application is complete. NH RSA 676:4, I(c)(1). Section 4.7.C.2 ("Initial Completeness Determination") of the Site Plan Review Regulations provides as follows:

- a. The Planning & Development Department shall review the application for completeness pursuant to the requirements of Section 4.7.A and Section 5.1. If the Planning & Development Department finds that the application is complete, or lacks only those items or documents for which waiver requests have been submitted, then the Planning & Development Department shall make a preliminary determination of whether the waiver requests meet the standards of Section 7.2 of these Regulations, and if so, then the Planning & Development Department shall recommend to the Board acceptance of the application for review.
- b. If the Planning & Development Department finds that the application is not complete or that one or more of the waiver requests do not meet the standards of Section 7.2, the Planning & Development Department shall so advise the Applicant, who can elect to complete the missing submission requirements. [...]

At the time of the writing of this memo, the Planning and Development Department is still reviewing the application in accordance with the Lebanon Site Plan Review Regulations. A recommendation on completeness will be made at the January 10th meeting. If the Board deems the application complete, the public hearing should be opened and continued to the next regular meeting of the Planning Board scheduled for **February 14, 2022**.

Attachments

cc: Robert & John Oakes (via e-mail)
Dan Nash, PE, Advanced Geomatics and Design (via e-mail)
File

CITY OF LEBANON APPLICATION FOR

SPECIAL EXCEPTION	☐	☒	SITE PLAN REVIEW
VARIANCE	☐	☐	SUBDIVISION
MOTION FOR REHEARING	☐	☐	LOT LINE ADJUSTMENT
APPEAL OF AN ADMIN. DECISION	☐	☐	CONDITIONAL USE PERMIT

☐ OTHER _____

PROPERTY OWNER (APPLICANT):

NAME: **ROBERT & JOHN OAKES** TEL.#: **603-727-8405**

MAILING ADDRESS: **209 Dartmouth College Highway, Lebanon, NH 03766**

E-MAIL ADDRESS: **bobbyoakes14@hotmail.com**

CO-APPLICANT, AGENT, OR LESSEE:

NAME: **Dan Nash** TEL.#: **802-356-4928**

MAILING ADDRESS: **105 Bank St, Lebanon, NH 03766**

E-MAIL ADDRESS: **AdvancedGeomatics@comcast.net**

PROJECT LOCATION:

TAX MAP #: **111** LOT#: **16** PLOT #: _____ ZONE: **RL-1**

STREET ADDRESS OF PROJECT: **FELLOWS HILL ROAD**

(92 Riverside Drive)

IS THIS PROPERTY LOCATED IN THE: **WETLANDS** ☐ YES ☒ NO **HISTORIC DISTRICT** ☐ YES ☒ NO
FLOOD PLAIN ☐ YES ☒ NO

SCOPE OF PROJECT:

Construct 26,176sf of mini-storage warehouse with attendant pavement and access.

TYPE OF OCCUPANCY:

EXISTING ☐ VACANT ☒ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☐ COMMERCIAL ☐ INDUSTRIAL
 PROPOSED ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☒ COMMERCIAL ☐ INDUSTRIAL

IF USE IS **COMMERCIAL** OR **INDUSTRIAL**, PLEASE NOTE **SPECIFIC**

USE: **MINI-STORAGE WAREHOUSE**

SIGNATURE BLOCK:

FOR PLANNING BOARD APPLICATIONS ONLY: I, the undersigned, hereby submit this application on the date noted below with the knowledge and understanding that the Planning Board shall determine if the submitted application is complete according to its regulations at its next regularly scheduled meeting on _____, 20____, unless I personally request, in writing, that the Board delay its determination of completeness to a later date.

PROPERTY OWNER: _____ DATE: **12-10-2021**

NOTE: IF AS OWNER, YOU WISH TO DESIGNATE AN AGENT TO ACT ON YOUR BEHALF, PLEASE READ THE FOLLOWING AND SIGN BELOW: I hereby designate the person listed above as my agent for the purpose of procuring the necessary local permits for the proposed work as described herein. Representations made by my agent may be accepted as though made by me personally, and I understand that I am bound by any official decision made on the basis of such representation.

PROPERTY OWNER: _____ DATE: **12/10/21**

DATE RECEIVED	FILE # (MAP/LOT)	APPLICATION #	FEE - \$ AMOUNT	DATE PAID	VOUCHER #
12-13-21	111/16	2022-06-SPR	2373.84	12-13-21	18573



13 December 2021

Tim Corwin, Planning Office
City of Lebanon
51 North Park Street
Lebanon, NH 03766

Re: Site Plan Lot 111-16
Fellows Hill Road

Dear Mr. Corwin:

Oakes brothers, John and Robert, own the project parcel on Fellows Hill Road. The ownership will transfer to Oakes Storage, LLC, once approvals are obtained. The existing site was formerly the site of a single family residence. The structure was used for fire department training and demolished in the Spring of 2021.

The use proposed, storage/warehouse, is a non-conforming use in the RL-1 zone. Applicant sought and obtained variances for the use and the site coverage from the ZBA on 1 March 2021. A table of the types and sizes of units is on Sheet C-1. The proposal includes a 2 car garage, 576sf (24x24). The garage is intended for storage of supplies and equipment to maintain the site.

The project parcel is comprised of 3 lots. The primary parcel is Lot 111-16. The city discontinued a portion of Fellows Hill Road. The city also sold Lot 111-3-1 to the Oakes. These 3 parcels will be merged, if they have not been already.

Attached are elevation views of the proposed building. The storage units will be steel, pre-engineered units. The access is via garage type doors on each unit. This arrangement prohibits a 10' landscape strip, except on the units that have a closed rear or side.

Lighting is proposed to be minimal. Lighting for customer access will be motion activated. Some low level lighting will be provided for security. All lighting will be down lit LED.

Landscaping will be provided around the units to restore disturbed areas and to provide some buffering from the residential uses. Lot 111-3-1 is well wooded and will remain in a natural state.

The snow storage will be on several corners of the site. Excess snow will be hauled off.

Fellows Hill Road
City of Lebanon
13Dec2021

The site is not intended to be occupied on a business hour basis. The only presence at the site will be maintenance personnel performing occasional activities and customers access their units.

We anticipate and extremely low trip generation from this site.

Please let us know if you need any additional materials to support this request.

Sincerely,

A handwritten signature in black ink, appearing to read 'Daniel A. Nash', with a long horizontal flourish extending to the right.

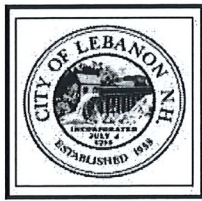
Daniel A. Nash, PE
Principal

Attached:

- Support Statement
- Application
- Fee calc
- Fee check
- Abutters
- Checklist
- Waivers
- Drain Report (separate)
- OMP (separate)

CC: Bobby Oakes

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City of Lebanon, New Hampshire APPLICATION FOR WAIVERS

Office Use Only

Date Received: _____

File No.: _____

PROJECT INFORMATION

Name of Applicant: JOHN&ROBERT OAKES

Project Name: OAKES STORAGE

Project Address: FELLOWS HILL ROAD

WAIVER REGULATIONS

In order to grant a Waiver from a requirement of the City of Lebanon Site Plan Review or Subdivision Regulations, the Planning Board must find that the Waiver is justified under one of the following criteria (See Article VII of the Site Plan Review Regulations and Section 7.15 of the Subdivision Regulations):

Criteria A. Strict conformity would pose an unnecessary hardship to the Applicant and waiver would not be contrary to the spirit and intent of the regulations;

OR

Criteria B. Specific circumstances relative to the site plan, or conditions of the land in such site plan, indicate that the waiver will properly carry out the spirit and intent of the regulations.

WAIVER REQUEST(S)

I (we) hereby request a Waiver from:

[You can respond in the space provided, or attach a separate statement. Please be prepared to address each request during your public hearing. You must show that you have justified granting the Waiver(s).]

1. Section 6.2.D.1 circle one Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

As a mini-storage building, the front and sides are made to fully accessible to place and remove goods from storage. the single sided units on the north and south sides of the site comply with this requirement for the sides and rear of those buildings.

2. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

3. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

4. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

5. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

6. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

7. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

8. Section ____ of the (circle one) Site Plan Review / Subdivision Regulations. A Waiver of this Section meets (circle one) Criteria A / Criteria B because _____

SIGNATURE

I (we) hereby submit this application to the Planning Board and attest that to the best of my (our) knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As the applicant or as the agent of the applicant, I attest that I am duly authorized to act in this capacity.

Signature of Applicant: _____ Date: 12-10-2021

CITY OF LEBANON, NH SITE PLAN REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: OAKES STORAGE	
APPLICANT: JOHN&ROBERT OAKES	DATE: 13DEC2021
GENERAL SUBMISSION REQUIREMENTS:	

All applications to the Planning Board for Site Plan Review must be submitted by 12:00 Noon on the day of the filing cutoff. [§4.7.B] Submissions must be accompanied by the following information or review of the application may be delayed:

A properly completed and signed Application Form (*available at www.lebanonnh.gov*). [§5.1.A]

The appropriate filing fees. [§5.1.B]

A written project description. [§5.1.C]

A list of the names and mailing addresses of all persons to be notified, by certified mail, of the public hearing. [§5.1.D]

A completed and signed Application for Waivers (*available at www.lebanonnh.gov*) [§5.1.G.3]

A completed and signed Technical Checklist (*available at www.lebanonnh.gov*). [§4.7.B]
[Applicants must complete the entire checklist to ensure that all necessary information and materials have been provided with the application or that written requests for waivers have been properly provided in accordance with Article VII of the Site Plan Review Regulations, as appropriate.]

Two (2) full-size sets of the Site Plan set. [§5.1.E]

A digital copy of the Site Plan set in .PDF format. [§5.1.F]

NOTE: Applications shall contain sufficient information to enable the City Staff and the Planning Board to evaluate the proposed development for compliance with the Zoning Ordinance, the Planning Board's Regulations, and other applicable City Codes, and for the Planning Board to make an informed decision.

All required application materials shall be submitted as a single inclusive package, including any appropriate waiver requests as permitted by the Regulations. Submission of a complete application package ensures that the review process by City Staff is as efficient and effective as possible.

The purpose of the filing deadline is to provide adequate time for City review of the proposal. Submission of any altered, additional, or substitute application materials required by Article V of these Regulations, subsequent to the filing deadline, other than as directed by City Staff, shall cause the application to be deemed untimely filed, and such application shall not be heard until a subsequent month.

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

PLAN SUBMITTAL TECHNICAL CHECKLIST:

NOTE: Site plan drawings shall include the information described below pursuant to Article V of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted for Site Plan Review shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning & Development Department.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§5.1.G(4)] NOTE: The submission requirements described in paragraphs 5.1.E(1) through 5.1.E(4) shall not be waivable under the procedures of Article VII of the Site Plan Review Regulations. [§5.1.E]

[Checklist begins on following page]

CITY OF LEBANON, NH SITE PLAN REVIEW REGULATIONS

Plan Requirements	Info. Provided	Waiver Sought
5.1.E(1) - Vicinity sketch (suggested scale: 1" = 500').	☒	N/A
5.1.E(2) - Names and mailing addresses of Applicant; Owner(s) of Record of site; Owners of abutting properties; and Holders of any easements, rights-of-way, or other restrictions.	☒	N/A
5.1.E(3) - Names and business addresses of preparer(s) of the plan, and every surveyor, engineer, architect, soil scientist, or wetlands scientist whose professional seal appears on any plan or document submitted to the Board.	☒	N/A
5.1.E(4) - The following information shall be provided on the first page (or cover page, if applicable) of the Site Plan: a. Name of the City and County in which the development is proposed; b. North arrow; c. Scale of the plan; d. Date of the plan and of any revisions to the plan; (NOTE: The date on the plan at the time of initial submission for application review shall be included on all subsequent submissions to the City. Any subsequent change(s) to the plan shall include a revision date and description of the revision(s).) e. The following basic site information in <u>TABLE FORM</u> : 1. Zoning designation for subject property; 2. Tax Map and Lot number(s) for subject property; 3. Area of lot; 4. Gross floor area of existing and proposed buildings/additions; 5. Number of existing and proposed on- and off-street parking spaces as a table. The table must identify (i) the number of required (minimum) parking spaces and the permitted (maximum) number of parking spaces and the calculations for each, (ii) future proposed, and (iii) existing parking capacity. If the site is part of an existing development or subdivision, the master table must provide such information for all related sites and phases, individually and as a project total; 6. Number of existing and proposed short- and long-term bicycle storage spaces; 7. Number of existing and proposed loading spaces; 8. Height of existing and proposed buildings/additions; 9. Number of stories and gross square footage of each; 10. Proposed use; 11. Required and proposed front, side, and rear yard setbacks 12. Maximum allowable lot coverage with existing and proposed calculations; 13. Indication of whether or not the property is subject to any City Overlay districts (for example, the Wetlands Conservation District or Flood Plain District) or to NHDES Shoreland Water Quality Protection jurisdiction.	☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ N/A N/A ☒ ☒ ☒ ☒ ☒	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
5.1.E(5) - Current survey certified by a land surveyor licensed in NH, depicting perimeter boundaries of the lot(s), with compass bearings, distances, and lot areas, and depicting the location of existing improvements on property.	☒	☐
5.1.E(5) - Width and location of rights-of-way and/or easements on property.	N/A ☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(6) - Existing and proposed grades, including topographic contours with spot elevations, (referenced to USGS or FEMA Flood Insurance Rate Map datums, as appropriate) prepared by a professional engineer or land surveyor licensed in NH. (Where grades are less than 20%, contours shall be at 2 ft. intervals; otherwise they shall be at 5 ft. intervals.)	☒	☐
5.1.E(7) - Shape, size, height, and location of all existing structures located on site and within 200 feet of site.	☒	☐
5.1.E(7) - Elevation views indicating shape, size, height, and location of all proposed structures, including expansions of or additions to existing buildings. Such elevation views shall provide sufficient detail to allow for review by the Board and City staff of the adequacy of proposed access and egress points, walkways, lighting, and other site-related improvements.	☒	☐
5.1.E(8) - Location of existing natural features such as streams, marshes, lakes, ponds, wetlands, rock outcrops, or wooded areas, and existing man-made features such as roads and structures. Indicate those natural and man-made features that are to be removed, retained, or altered.	☒	☐
5.1.E(8) - Wetlands on the property, if any, shall be delineated by a NH Certified Wetlands Scientist, whose seal and signature shall appear on the plan. Documentation in the form of U.S. Army Corps of Engineers New England District Wetlands Delineation Data Sheets and/or other field notes and materials concerning the delineation shall be submitted.	N/A ☒	☐
5.1.E(9) - Zoning District, Tax Map and Lot number, and use of abutting properties within 200 feet of property.	☒	☐
5.1.E(9) - Location of streets, pedestrian paths/trails, and bicycle routes within 200 feet of the site boundary; and the location of curb cuts and vehicle accesses within 200 feet of the site boundary.	☒	☐
5.1.E(10) - Proposed streets, driveways, emergency vehicle accesses, parking spaces, and sidewalks, with indication of dimensions and direction of travel. Show required sight distances at curb cuts and dimensions for the inside radii of all curves.	☒	☐
5.1.E(10) - Vehicle and bicycle parking spaces shall be numbered.	N/A ☒	☐
5.1.E(10) - Loading spaces and facilities used in connection with any structures on the site shall be shown	N/A ☒	☐
5.1.E(10) - Total square footage and percentage of the lot covered by impervious cover shall be shown.	☒	☐
5.1.E(11) - Parking area safety measures including raised crosswalks/speed tables, signage, walkway lighting, striping and similar markings such as dedicated pedestrian/bicycle crossings and lanes through parking areas, fire lanes, compact and/or electric vehicle parking/charging, parking wayfinding, ADA signage and access aisles.	N/A ☒	☐
5.1.E(12) - Size and location of all existing and proposed public and private utilities. (Note: the applicant is encouraged to submit a Sewer Use Permit Application and obtain a Notice of Permitted Allocation, and to obtain a Water Use Permit prior to submission of the Site Plan Review application.)	N/A ☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(13) - Plan for outdoor lighting showing proposed location, mounting height, fixture type, lamp type, color correlated temperature (CCT), and wattage of all exterior free-standing lighting or building-mounted fixtures.	☒	☐
5.1.E(13) - Analyses and illuminance-level diagrams, to include average and minimum foot-candle measurements, showing that proposed installation conforms to the lighting-level standards in Site Plan Review Regulations.	☒	☐
5.1.E(13) - Manufacturer's specification information for each proposed light fixture and lamp (NOTE: This information may be provided on the plan or as a separate attachment).	☒	☐
5.1.E(13) - Drawings of all relevant building elevations showing location and height of all building-mounted fixtures, illumination levels of walls or architectural features, and aiming points for any remote light fixtures.	☒	☐
5.1.E(14) - Plan for location of free-standing or building-mounted signs, including location, mounting, aiming, and shielding of any remote light fixtures for externally-lit signs.	N/A	☐
5.1.E(14) - For internally-lit signs, relevant information concerning the method of illumination and the opacity of the sign background, showing that the proposed installation conforms to the requirements of the Regulations.	N/A	☐
5.1.E(15) - 100-yr flood elevation, floodway, and floodplain limits, where relevant.	N/A	☐
5.1.E(16) - Landscaping plan showing proposed new plantings to be installed and existing natural vegetation to be retained. Plan shall show in detail the number, size (height and/or caliper), and species (botanical and common names) of all proposed shrubs and trees.	☒	☐
5.1.E(16) - Existing trees over 12 inches in diameter (measured 4.5 feet above ground surface) within 25 feet of the disturbed area, must be counted and shown on the plan, if included towards fulfilling landscaping requirements.	☐	☐
5.1.E(16) - Calculations for square footage of perimeter landscaping.	☒	☐
5.1.E(16) - Parking lot shading calculations shall be provided by depicting new trees and shrubs at 10-year crown size.	N/A	☐
5.1.E(17) - Existing and proposed surface and subsurface storm drainage facilities, including City storm drainage facilities located within 200' of site.	☒	☐
5.1.E(17) - Plans for retention, detention, slow release, and treatment of storm water shall be provided, where necessary.	☒	☐
5.1.E(17) - Drainage plans prepared by a professional engineer registered in NH, whose seal and signature shall appear on plan(s).	☒	☐
5.1.E(18) - Section 6.6. Stormwater Management submission requirements.	See Stormwater Checklist	
5.1.E(19) - Plans for snow removal and storage.	☒	☐
5.1.E(20) - A plan for the development showing provisions for automobile, transit, bicyclist, and pedestrian access and circulation. Such plan shall show both existing and proposed means of access to the site including connections with, public streets, sidewalks, transit stops, and formal paths/trails. Plans shall include any traffic calming and traffic control devices necessary in conjunction with the site development, as well as the location of all existing transit routes and transit stops located or passing within 1/4 mile (1,320 feet) of the property.	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
5.1.E(21) - Construction detail drawings including, but not limited to, pavements, walks, steps, curbing, drainage structures, water and/or sewer utilities, ground-mounted signage (e.g., fire lanes, ADA parking, commercial), surface treatments, transit shelters, energy generation units (e.g., solar), bike rack style, electric vehicle charging, outdoor lighting, outdoor furniture, retaining walls, tree boxes and other site systems or structures. Accompanying specifications and cutsheets may be required.	☒	☐
5.1.E(21) - Where applicable, roadway, drainage, water and sewer utility profile drawings shall be provided at a scale of 1"=40 feet (horizontal) and 1"=4 feet (vertical) and typical cross-section drawings shall be provided at a scale of 1"=5 feet (horizontal and vertical), unless prior approval is granted by the City Engineer.	N/A	☐
5.1.E(22) - Depict any current and proposed easements, rights-of-way, and deed restrictions including those related to sewer, electrical utility, shared access, etc.	N/A	☐
5.1.E(23) - For multi-family structures, plans for on-site recreational facilities.	N/A	☐
5.1.E(24) - Plans for fire protection including emergency vehicle turn radius diagrams, if requested by the Lebanon Fire Department.	☒	☐
Supporting Documents and Information, Where Applicable	Info. Provided	Not Applicable
5.1.G(1) - An estimated timetable, to include phasing schedules, for construction and completion of buildings, parking, facilities, landscaping, and other required improvements.	☒	☐
5.1.G(2) - Any development estimated to generate a net increase of 100 peak hour trips or 1,000 average daily trips (based upon the most current edition of the ITE Trip Generation Manual) shall prepare and submit a Traffic Impact Study in accordance with standard traffic analysis conventions as set forth by the NHDOT. The Board may, at its discretion, require the submission of a Traffic Impact Study for developments estimated to generate less than 100 peak hour trips or 1,000 average daily trips if the Board has reason to believe such development could adversely affect levels of service or have other adverse impacts.	N/A	☐
5.1.G(3) - Written requests for waivers from all applicable provisions of these Regulations shall be provided pursuant to Article VII - "Waiver Procedure". (note: use Application for Waivers form).	☒	☐
5.1.G(4) - For multi-family dwelling developments and mixed-use developments resulting in a net increase of 50 dwelling units or more, the application shall include the information and impact statements identified in Section 6.9.B.	N/A	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE V OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: Dan Nash 13 Dec 21
 DAN NASH, PE

(Last Revised 4/19/2021)

**CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST**

CITY OF LEBANON, NH STORMWATER REVIEW REGULATIONS TECHNICAL CHECKLIST	
PROJECT NAME: OAKES STORAGE	
APPLICANT: JOHN&ROBERT OAKES	DATE: 13DEC2021

NOTE: Stormwater plans shall include the information described below pursuant to Article VI of the Lebanon Site Plan Review Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. A scale of not smaller than one (1) inch equals 40 feet is suggested. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning Office.

A written request for waiver shall be required, pursuant to Article VII of the Site Plan Review Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§6.6.I]

[Stormwater checklist begins on following page]

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements	Info. Provided	Waiver Sought
6.6.C.1 (1) - An Existing Conditions S.M.P showing all pre-development:		
a. Surface water bodies and wetlands	☒	☐
b. Drainage patterns	☒	☐
c. Flood plains and floodways (with elevations)	☒	☐
d. Watershed boundaries	☒	☐
e. Buffer zones	☒	☐
f. Topographic contours with minimum 2-foot intervals	☒	☐
g. Buildings / structures	☒	☐
h. Pavement	☒	☐
i. Utilities	☒	☐
j. Soils information with coding as HSG-A, B, C, or D (High Intensity Soil Survey (HISS) mapping may be required per request of the City Engineer).	☒	☐
1. The plan shall also include the following elements:		
a. scale bar	☒	☐
b. north arrow	☒	☐
c. title block with project name	☒	☐
d. applicant's name	☒	☐
e. map and parcel number	☒	☐
f. designer's stamp	☒	☐
g. soil and/or wetland scientist's stamp (if applicable)	☒	☐
h. legend	☒	☐
i. locus plan	☒	☐
j. benchmarks	☒	☐
k. notes with datum and other plan references	☒	☐
l. instructions	☒	☐
m. detail descriptions	☒	☐
6.6.C.1 (2) - A Proposed Conditions SMP showing all proposed post-development temporary and permanent stormwater management system elements, erosion and sediment control Best Management Practices (BMP), and all important hydrologic features. The Proposed Conditions S.M.P must be at the same scale as the Existing Conditions SMP, with consistent title block, plan features, and descriptors including but not limited to the following:		
a. Existing and proposed topographic contours (2-foot minimum contour interval; 1-foot contour intervals may be required for sites with limited relief and/or where proposed stormwater outfalls are located adjacent to buffer zones.	☒	☐
b. Proposed areas of disturbance with total area of disturbance clearly labeled in square feet	☒	☐
c. Existing and proposed buildings and structures	☒	☐
d. Stormwater discharge locations labeled and matched to the drainage analyses	☒	☐
e. Wells and sanitary protective radii, if applicable	☒	☐
f. Septic systems, if applicable	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
g. Plan references and notes (including sequence of soil disturbance) h. Proposed and existing public and private utilities i. Proposed project components to become property of or the responsibility of the City shall be labeled as such j. Existing and proposed impervious cover, with areas used to calculate effective impervious cover (EIC, as defined herein) clearly identified and the square footage of each type identified and labeled. k. Test Pit(s) locations and data where stormwater practices are proposed, as appropriate. l. Details of individual design elements shown on separate plan sheets following the Proposed Conditions SMP. The Existing Conditions SMP & the Proposed Conditions SMP shall be provided on sheets no larger than 24" x 36", at a scale of one (1) inch = 20 feet for urban areas, and one (1) inch = 40 feet for non-urban areas. The City Engineer will make the final determination as to the appropriate scale, ensuring that all important site and hydrologic features are easily recognized. If plan shall encompass more than two (2) sheets, at the required 1:40 or 1:20 scale, a separate large scale representation plan sheet (e.g. 1:100) is required to be provided, so as to show entirety of site, as well as off-site contributing areas.	☒ N/A ☐ N/A ☐ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐ ☐
6.6.C.2 - In addition to the above described SMP plan sheets, the following SMP supplemental information is required: 1. A drainage analysis that includes calculations comparing pre- and post-development stormwater runoff rates (cubic feet per minute) and volumes (cubic feet) based on a 1-inch rainstorm, and the 2-year, 25-year, 50-year, and 100-year, 24-hour frequency storms. Calculations shall include, but not be limited to, the sizing of all structures and BMPs, including sizing of emergency overflow structures based on the 50-year 24-hour frequency storm discharge rate, with 1-foot of free-board. Storm rates shall be based on current design depths from the Northeast Regional Climate Center - http://precip.eas.cornell.edu. <i>Any site that was primarily wooded in the last five years shall be considered undisturbed woods Any site from which wooded vegetation has been removed within 5 years prior to the first submission to the planning board with respect to a proposed development, or upon which, at some earlier time, clearing has occurred in anticipation of development, shall be treated as undisturbed woodland for purposes of calculating pre-development runoff volumes. For purposes of this paragraph any tree cutting which occurred without leaving stands of healthy, growing trees within areas near waters and highways, as required by RSA 227-J:9, I, shall be presumed to have occurred in anticipation of development</i>	☒	☐

CITY OF LEBANON, NH
SITE PLAN REVIEW REGULATIONS
TECHNICAL CHECKLIST & STORMWATER CHECKLIST

Plan Requirements (cont.)	Info. Provided	Waiver Sought
2. A drainage analysis results summary tabulated (pre & post) for each proposed outfall or catchment outlet point including runoff rates and volumes for each storm event analyzed above.	☒	☐
3. An Erosion and Sediment Control Plan for all proposed construction activities in accordance with the NH Stormwater Management Manual Volume 3, (December 2008 or current revision; downloadable from the website)	☒	☐
4. A comprehensive Operation and Maintenance Plan for long-term maintenance of all proposed stormwater management elements and BMPs including the proposed schedule of inspections and anticipated maintenance (see section H.2 Operations & Maintenance Plan for detailed requirements).	☒	☐
6.6.D - Phased Development: For phased developments, the plans and calculation requirements under this section (6.6) shall apply as though the development of the entire parcel were being proposed in one single application. The review and approval process for phased development applications is provided in section 4.9 of the Lebanon Site Plan Regulations.	N/A	☐

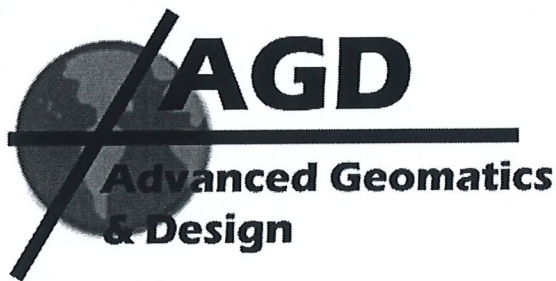
NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO ARTICLE VI OF THE SITE PLAN REVIEW REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By:  13 Dec 21
 DAN NASH, PE

(Last Revised 04/19/2021)

Planning office Use Only:

Date Received ___/___/___ Checklist Complete YES or NO Checked by: _____



13 December 2021

Tim Corwin, Planning Office
City of Lebanon
51 North Park Street
Lebanon, NH 03766

Re: Support Statement
Site Plan Lot 111-16
Fellows Hill Road

Dear Mr. Corwin:

We provide the following support statement information:

1. Consultants. The team members are listed in the abutters list.
2. Restrictions. We are not aware of any conservation, preservation, or agricultural preservation restrictions on the subject parcel.
3. Utilities. The site is currently served by electric, telephone, and cable services.
4. Zoning. The proposed use and allowance of increased coverage was by variance on 1Mar2021.
5. Drainage. The site includes a drainage recharge facility that reduces overall site runoff.
6. Timetable. We anticipate a Spring'22 construction start. The building is scheduled to be complete by Fall'22.
7. Fire Protection. The site is a low hazard use.
8. Waivers. Waiver requests will be provided under separate cover.

Sincerely,

A handwritten signature in black ink, appearing to read "Daniel A. Nash". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

Daniel A. Nash, PE
Principal

CC: Bobby Oakes

M:\2020_projeccts\20-001\planning_board\col_oakes_spt_13dec2021.docx

OAKES STORAGE, LLC

LEBANON, GRAFTON COUNTY, NEW HAMPSHIRE

SITE PLAN

OWNER/APPLICANT
OAKES STORAGE, LLC
209 DARTMOUTH COLLEGE HIGHWAY
LEBANON, NH 03766

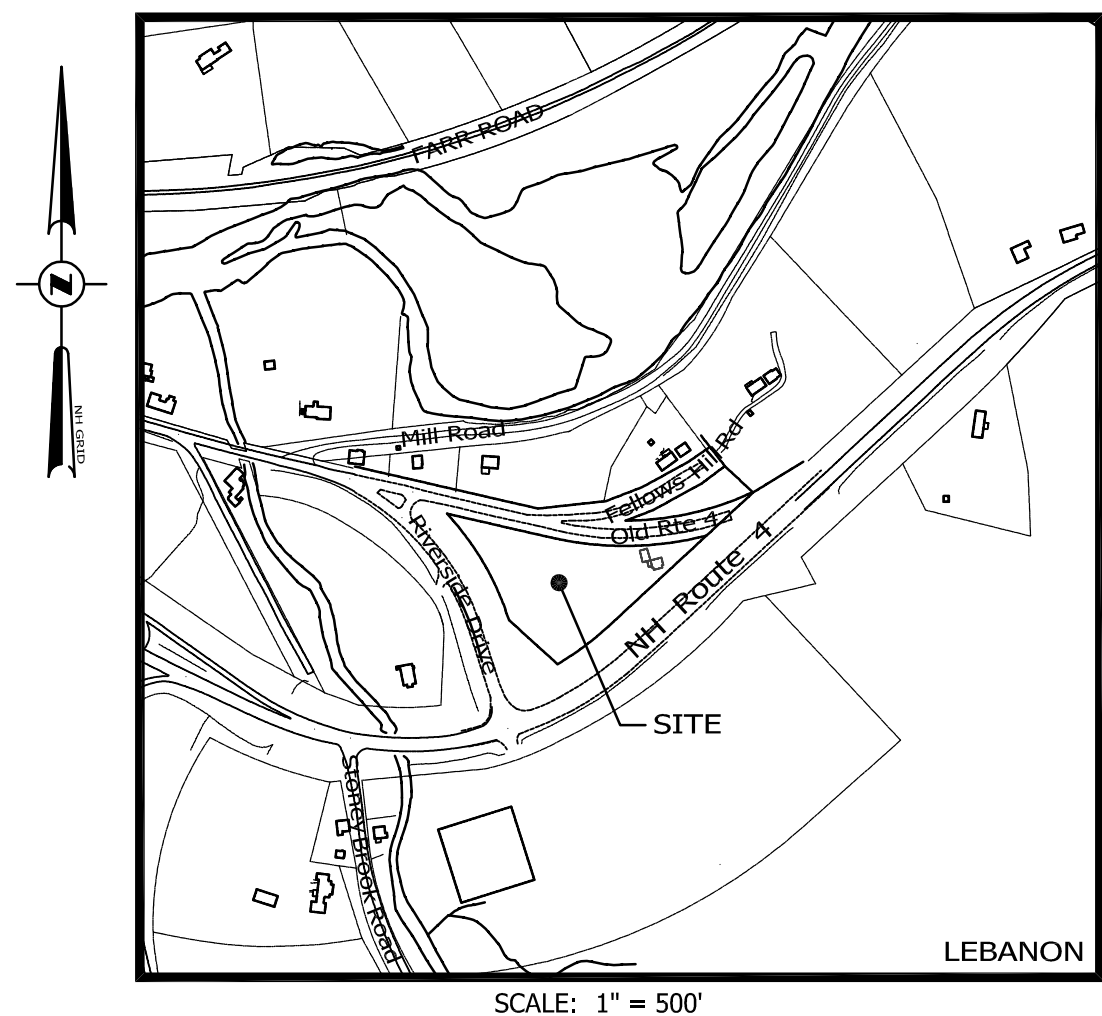
CONSULTANTS

CIVIL ENGINEER
DANIEL A. NASH, PE
ADVANCED GEOMATICS AND DESIGN
PO BOX 512
105 BANK STREET
LEBANON, NH 03766
advancedgeomatrics@comcast.net

LANDSCAPE DESIGNER
MARA LANDSCAPE DESIGN
19 MYRTLE AVENUE
NEWBURYPORT, MA 01950

LIGHTING DESIGN
DEFIANCE ELECTRIC
78 CHOSEN VALE LANE
ENFIELD, NH 03748

SURVEYOR
PATON LAND SURVEYING
150 SOUTHRIDGE STREET
SPRINGFIELD, VT 05156



**SHEET
NUMBER**

2	LEGEND
3	OVERALL EXISTING CONDITIONS PLAN
4	EXISTING CONDITIONS PLAN
5	BOUNDARY SURVEY
6	BUILDING ELEVATIONS
7	LANDSCAPE PLAN
8	LIGHTING PLAN
9	SITE PLAN
10	DETAILED GRADING PLAN
11	RECHARGE SYSTEM
12	RETAINING WALL PLAN/PROFILES
13	EROSION CONTROL PLAN
14	SITE DETAILS
15	DRAINAGE DETAILS
16	EROSION CONTROL DETAILS

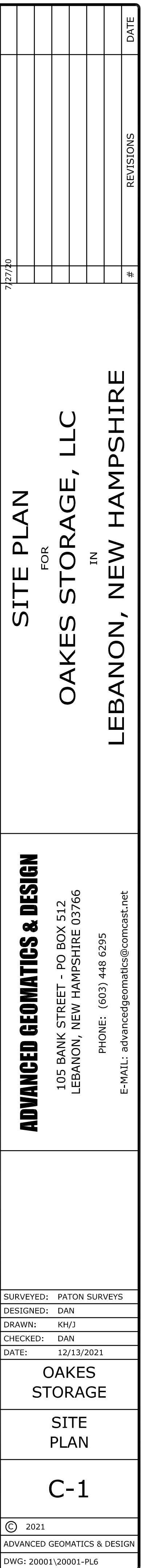
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D-5

ZONING COMPARISON - RL1 DISTRICT			
	EXISTING	PROPOSED	REQUIRED
LOT SIZE	2.57 Acres	3.53 Acres	3 Acres
FRONTAGE: (RIVERSIDE DRIVE)	494'	494'	150'
FRONT YARD: (RIVERSIDE DR)	340'	40'	40'
FRONT YARD: (US ROUTE 4)	16'	40'	40'
REAR YARD: (FELLOWS HILL RD)	10'	30'	30'
SIDE YARD: (TO EAST)	-	25'	25'
BUILDING FOOTPRINT (s.f.):	0 s.f.	26,176 s.f.	
% BLDG. COVERAGE	1.4%	17%	15%
% IMPERVIOUS COV.	2.5%	34%	N/A
HEIGHT	22'	18'	35'
USE:	STORAGE UNITS		
PARKING (REG./HC.)	2	N/A	N/A

NOTES:

1. THIS PARCEL IS SHOWN AS LOT 111-16 ON THE LEBANON TAX MAPS.
2. THIS PARCEL IS NOT SERVED BY MUNICIPAL WATER AND SEWER.
3. THIS PARCEL IS NOT SUBJECT TO THE WETLANDS OVERLAY DISTRICT.
4. THIS PARCEL IS NOT SUBJECT TO THE FLOOD OVERLAY DISTRICT.
5. SUBJECT PARCEL IS ZONED IND-L.
6. THE PROJECT PARCEL IS COMPRISED OF LOT 111-16, A DISCONTINUED PORTION OF FELLOWS HILL ROAD, & LOT 111-3-1.



**Agenda
Planning Board
January 10, 2022**

**Agenda Item #3F
Public Hearing Items**

**Cicotte Properties, LLC and
Johanna Cicotte, 175 Heater Road
(Tax Map 64, Lot 30) and 30 Little
Heater Road (Tax Map 78, Lot 61),
zoned IND-L
PB2022-01-BLA**



CITY OF LEBANON ~ PLANNING & DEVELOPMENT

PLANNING BOARD

January 10, 2022 Meeting

Staff Memorandum – PB2022-01-BLA

APPLICATION INFORMATION

Agenda Item: 3.F

Application ID: PB2022-01-BLA

Application Type:
Boundary Line Adjustment

Property Location & Tax Map:

- 175 Heater Road (Tax Map 64, Lot 30)
- 30 Little Heater Road (Tax Map 78, Lot 61)

Property Owners/Applicants:

Cicotte Properties, LLC and
Johanna Cicotte

Property Sizes (existing):

- 175 Heater Road (Tax Map 64, Lot 30): +/-5.4 acres *per boundary line adjustment plat*
- 30 Little Heater Road (Tax Map 78, Lot 61): +/-1.01 acres *per boundary line adjustment plat*

Property Sizes (proposed):

- 175 Heater Road (Tax Map 64, Lot 30): +/-4.71 acres *per boundary line adjustment plat*
- 30 Little Heater Road (Tax Map 78, Lot 61): +/-1.71 acres *per boundary line adjustment plat*

Zoning District:

Light Industrial (IND-L)

Zoning Overlay District(s):

- Wetlands Conservation District
- Floodplain District

LEGAL NOTICE

Cicotte Properties, LLC and Johanna Cicotte, 175 Heater Road (Tax Map 64, Lot 30) and 30 Little Heater Road (Tax Map 78, Lot 61), zoned IND-L: Request for approval of a Boundary Line Adjustment between lands located at 175 Heater Road and 30 Little Heater Road. PB2022-01-BLA

PLANS AND APPLICATION MATERIALS

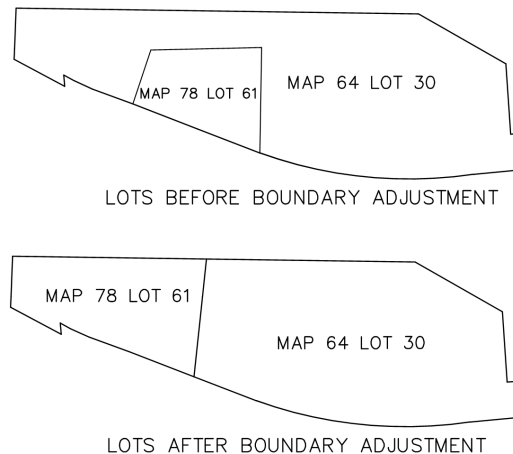
- ▶ Application form (1 page)
- ▶ Letter dated December 2, 2021, from Daniel Nash, PE, of Advanced Geomatics & Design (project description; 1 page)
- ▶ Subdivision Regulations - Technical Checklist (2 pages)
- ▶ Plat titled "Boundary Line Adjustment Plan Prepared for Cicotte Properties, LLC & Johanna Marie Cicotte", prepared by Paton Land Surveying, LLC, dated November 23, 2021, revised December 22, 2021, Project No. 2021-282-60

COMPLETENESS REVIEW

This application has been reviewed in accordance with the Lebanon Subdivision Regulations. The Planning and Development Department recommends that the Board find that the application is complete enough to accept jurisdiction and to commence review.

APPLICATION OVERVIEW

This is a request for a Boundary Line Adjustment between lands located at 175 Heater Road (Tax Map 64, Lot 30), currently improved with a non-conforming vehicular sales use, and 30 Little Heater Road (Tax Map 78, Lot 61), currently vacant. The reconfigured lots are illustrated on the attached plat as follows:



STAFF MEMORANDUM

PB2022-01-BLA
175 Heater Rd and 30 Little Heater Rd
January 10, 2022 PB Mtg
Agenda Item 3.F
Page 2 of 3

As proposed, the changes resulting from the Boundary Line Adjustment are as follows:

- ▶ Map/Lot 64-30 will decrease by a net of +/-0.69 acres, from +/-5.4 acres to +/-4.71 acres.
- ▶ Map/Lot 78-61 will increase by a net of +/-0.69 acres, from +/-1.01 acres to +/-1.71 acres.

Figure 1. Bird's Eye View of Subject Properties (looking south).



©2021 Eagleview (image taken 4/4/2021)

STAFF COMMENTS

ASSESSING

No comment.

BUILDING INSPECTION

No comment.

FIRE

No comment.

POLICE

No comment.

PUBLIC WORKS/CITY ENGINEER

No comment.

PLANNING & ZONING

175 Heater Road currently conforms to the applicable minimum lot sizes and dimensional requirements as set forth in the Zoning Ordinance and will continue to after reconfiguration. 30 Little Heater Road is currently non-conforming to the minimum required 2.0 acre lot size in the IND-L District, but is proposed to increase in size to 1.71 acres. The lot otherwise conforms and will continue to conform to the applicable minimum lot sizes and dimensional requirements as set forth in the Zoning Ordinance.

STAFF RECOMMENDATIONS

If the Board moves to approve this application, then based on the information reviewed by City staff, the Planning and Development Department recommends that the Board approve the application with the following conditions prior to the signing and recording of the plat:

1. The applicant shall provide to the Planning and Development Department a digital record drawing (Cad .dwg Format using NH State Plane Coordinate system).
2. Within 30 days of the recording of the subdivision plat, the property owner shall provide the Assessing Department with an updated current use plan/map for the subject properties, as applicable.

Attachments

cc: Johanna Cicotte (jjcicotte1@aol.com)
Dan Nash (advancedgeomatrics@comcast.net)
File

APPLICATION FOR

SPECIAL EXCEPTION ☐	☐ SITE PLAN REVIEW
VARIANCE ☐	☐ SUBDIVISION
MOTION FOR REHEARING ☐	☒ LOT LINE ADJUSTMENT
APPEAL OF AN ADMIN. DECISION ☐	☐ CONDITIONAL USE PERMIT

☐ OTHER _____

PROPERTY OWNER (APPLICANT):

NAME: J.M. Cicotte, PO Box 1010, Lebanon, NH 03766 (Lot 78-61) Tel#: 603-448-6363

MAILING ADDRESS: Cicotte Properties, LLC, PO Box 600, Lebanon, NH 03766 (Lot 64-30)

E-MAIL ADDRESS: jcicotte1@aol.com

CO-APPLICANT, AGENT, OR LESSEE:

NAME: Dan Nash TEL.#: 802-356-4928

MAILING ADDRESS: 105 Bank St, Lebanon, NH 03766

E-MAIL ADDRESS: AdvancedGeomatics@comcast.net

PROJECT LOCATION:

TAX MAP #: 78 LOT#: 48 PLOT #: ZONE: IND-L

STREET ADDRESS OF PROJECT: 175 Heater Road (Lot 64-30), 30 Little Heater Road (Lot 78-61)

IS THIS PROPERTY LOCATED IN THE: **WETLANDS** ☒ YES ☐ NO **HISTORIC DISTRICT** ☐ YES ☒ NO
FLOOD PLAIN ☒ YES ☐ NO

SCOPE OF PROJECT:

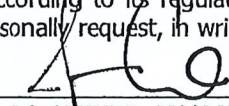
Perform a boundary line adjustment to increase vehicle storage area for dealership and create a vacant lot for future use.

TYPE OF OCCUPANCY:

EXISTING ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☒ COMMERCIAL ☐ INDUSTRIAL
 PROPOSED ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☒ COMMERCIAL ☐ INDUSTRIAL
 IF USE IS **COMMERCIAL** OR **INDUSTRIAL**, PLEASE NOTE **SPECIFIC**
 USE: Auto Dealership

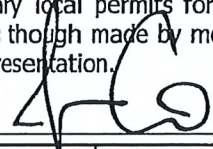
SIGNATURE BLOCK:

FOR PLANNING BOARD APPLICATIONS ONLY: I, the undersigned, hereby submit this application on the date noted below with the knowledge and understanding that the Planning Board shall determine if the submitted application is complete according to its regulations at its next regularly scheduled meeting on _____, 20____, unless I personally request, in writing, that the Board delay its determination of completeness to a later date.

PROPERTY OWNER: 

DATE: 12/21/2021

NOTE: IF, AS OWNER, YOU WISH TO DESIGNATE AN AGENT TO ACT ON YOUR BEHALF, PLEASE READ THE FOLLOWING AND SIGN BELOW: I hereby designate the person listed above as my agent for the purpose of procuring the necessary local permits for the proposed work as described herein. Representations made by my agent may be accepted as though made by me personally, and I understand that I am bound by any official decision made on the basis of such representation.

PROPERTY OWNER: 

DATE: 12/21/2021

DATE RECEIVED	FILE # (MAP/LOT)	APPLICATION #	FEE - \$ AMOUNT	DATE PAID	VOUCHER #
12/6/21	64/30 & 78/61	PB2022-01	\$85.04	12/6/21	18535

BLA



2 December 2021

Tim Corwin, Planning Office
City of Lebanon
51 North Park Street
Lebanon, NH 03766

Re: Support Statement
Boundary Line adjustment Plan Lots 64-30 & 78-61
Little Heater Road

Dear Mr. Corwin:

We provide the following support statement information:

1. Consultants. The team members are listed in the abutters list.
2. Restrictions. We are not aware of any conservation, preservation, or agricultural preservation restrictions on the subject parcel.
3. Utilities. The site is currently served by electric, telephone, and cable services.
4. Zoning. The zoning is IND-L.
5. Project Description. The owner removed the residential structure on Lot 78-61. The owner then added some pavement to increase vehicle storage. The lot line adjustment provides additional land area to Lot 64-30 to keep the paving on the same parcel as the dealership. The adjustment also removes the irregularity of Lot 64-30 wrapping around Lot 78-61. While Lot 78-61 is slightly less than the minimum lot size, this adjustment makes it more nearly conforming.

Please let me know if you need further information to support this application

Sincerely,

A handwritten signature in black ink, appearing to read "Daniel A. Nash". The signature is fluid and cursive, with a large, sweeping "D" and "N".

Daniel A. Nash, PE
Principal

CC: Johanna Cicotte
Barry Schuster

M:\2020_projects\20-011\planning_board\BLA\col_littleheater_BLA_2Dec2021.doc

CITY OF LEBANON, NH	
SUBDIVISION REGULATIONS – TECHNICAL CHECKLIST	
MINOR LOT LINE ADJUSTMENT / BOUNDARY LINE AGREEMENT	
PROJECT NAME: <i>Little Heater Road Lot Line Adjustment</i>	
APPLICANT: <i>Johanna Cicotte / Cicotte Holdings</i>	DATE: <i>2 Dec 2021</i>
GENERAL SUBMISSION REQUIREMENTS:	

All applications to the Planning Board for Subdivision Review must be submitted by 12:00 Noon on the day of the filing cutoff. [§7.7.C] Submissions must be accompanied by the following information or review of the application may be delayed:

- ☒ A properly completed and signed Application Form. [§7.7.A(1)]
- ☒ The appropriate filing fees. [§7.7.A(2)]
- ☒ A written project description. [§7.7.A(3)]
- ☐ A list of the names and mailing addresses of all persons to be notified, by certified mail, of the public hearing. [§7.7.A(4)]
- ☒ A completed and signed Technical Checklist. [§7.7.B]
[Applicants must complete the entire checklist to ensure that all necessary information and materials have been provided with the application or that written requests for waivers have been properly provided in accordance with Section 7.15 of the Subdivision Regulations, as appropriate.]
- ☒ Eight (8) sets of project plans to be distributed for Staff Review. [§8.2.A]
[A Staff Review meeting is held at City Hall one (1) week following the cutoff date. Staff Review meetings begin at 2:00PM, unless otherwise noted. All revised and/or additional information or materials must be submitted within one (1) week following the Staff Review meeting.]
- ☒ A digital copy of Subdivision plan in .PDF format. [§8.2.B]

NOTE: Applications shall contain sufficient information to enable the City Staff and the Planning Board to evaluate the proposed development for compliance with the Zoning Ordinance, the Planning Board's Regulations, and other applicable City Codes, and for the Planning Board to make an informed decision.

All required application materials shall be submitted as a single inclusive package, including any appropriate waiver requests as permitted by the Regulations. Submission of a complete application package ensures that the review process by City Staff is as efficient and effective as possible.

The purpose of the filing deadline is to provide adequate time for City review of the proposal. Submission of any altered, additional, or substitute application materials required by the Regulations, subsequent to the filing deadline, other than as directed by City Staff, shall cause the application to be deemed untimely filed, and such application shall not be heard until a subsequent month.

CITY OF LEBANON, NH
SUBDIVISION REGULATIONS - TECHNICAL CHECKLIST
MINOR LOT LINE ADJUSTMENT / BOUNDARY LINE AGREEMENT

PLAN SUBMITTAL TECHNICAL CHECKLIST:

NOTE: Minor Lot Line Adjustment / Boundary Line Agreement plans shall include the information described below pursuant to Section 8 of the Lebanon Subdivision Regulations. Plans shall be submitted on sheets no larger than 24" x 36". Plan sets with multiple sheets shall include sheets of uniform size and be bound on the left edge. When more than three (3) sheets are required, an additional cover sheet shall be attached including a table of contents. The scale of the plans shall be appropriate to the size of the overall development. All lettering shall be of a size and type that is legible.

In order to facilitate the use of the City's Geographic Information System (GIS) for planning purposes, all surveys and engineered plans submitted for Subdivision Review shall utilize the NH State Plane Coordinate system and shall reference the North American Vertical Datum of 1988 (NAVD 88), unless prior approval to use an alternate coordinate system and/or vertical datum is granted by the Planning Office.

A written request for waiver shall be required, pursuant to Section 7.15 of the Subdivision Regulations, for any submission requirement for which the information or data is not provided by the applicant. [§8.2.C]

Plan Requirements	Info. Provided	Waiver Sought
8.2.A(1) - - Name of the City and County in which the subdivision is proposed; - A Locus map; - North arrow; - Scale of the plat; - Date of the plat and of any revisions to the plat; (NOTE: The date on the plat at the time of initial submission for application review shall be included on all subsequent submissions to the City. Any subsequent change(s) to the plat shall include a revision date and description of the revision(s).)	☒ ☒ ☒ ☒ ☒	☐ ☐ ☐ ☐ ☐
8.2.A(2) - Names and mailing addresses of Applicant(s); Owner(s) of Record of subject properties; Owners of abutting properties, including tax map and lot references; and Holders of any easements, rights-of-way, or other restrictions.	☒	☐
8.2.A(3) - Names and business addresses of the surveyor, including license number and seal, and of every engineer, architect, soil scientist, or wetlands scientist whose professional seal appears on any plan or document submitted to the Board.	☒	☐
8.2.A(4) - Zoning District in which the subject lots are located, including district boundaries if in more than one district.	☒	☐
8.2.A(5) - Location of all existing structures on the subject lots.	☒	☐
8.2.A(6) - Site location map showing the original boundaries of the subject lots and adjacent lots.	☒	☐
8.2.A(7) - The new surveyed property line(s) as a result of the application, including bearings and distances, as determined by an actual field survey by a licensed land surveyor, including the date of the completion of the survey. All dimensions shall be shown in feet and decimals, and the area of the altered lots shall be shown in square feet and acres.	☒	☐

CITY OF LEBANON, NH
SUBDIVISION REGULATIONS - TECHNICAL CHECKLIST
MINOR LOT LINE ADJUSTMENT / BOUNDARY LINE AGREEMENT

Plan Requirements (cont.)	Info. Provided	Waiver Sought
8.2.A(8) - The plat shall be titled to include the names of the owners of all lots altered by the application.	☒	☐
8.2.A(9) - A statement shall be placed on the plat as follows: "This plan shows Minor Lot Line Adjustments / Boundary Line Agreements and does not require the approval of the Lebanon Planning Board as a subdivision."	☒	☐

NOTE: THE APPLICANT IS RESPONSIBLE FOR PROVIDING THE REQUIRED INFORMATION PURSUANT TO SECTION 8 OF THE SUBDIVISION REGULATIONS. PLEASE BE AWARE THAT THIS CHECKLIST IS FOR INFORMATION AND GUIDANCE ONLY AND DOES NOT REPRESENT THE LAW DICTATING SUBMITTAL REQUIREMENTS NOR IS IT COMPLETE AND INCLUSIVE THEREOF.

Completed By: _____

[Signature]
 2 Dec 21

Planning office Use Only:

Date Received ___/___/___ Checklist Complete YES or NO Checked by: _____

(Last Revised 05/22/13)

FOR REGISTRY USE

ROUTE 120

LOT LINE TO BE ELIMINATED-

N36°39'18"E

8

IKI OLD GATE LLC	DARTMOUTH TRANSPORTATION CO., INC.
P.O. BOX 734	7 LANGDON ST.
LEBANON, NH 03766	CONCORD, NH 03301
MAP 64 LOT 32-100	MAP 64 LOT 34

UPPER VALLEY COMM. CREDIT
P.O. BOX 1240
PORTSMOUTH, NH 03802
MAP 64 LOT 32

LIBERTY UTILITIES
407 MIRACLE MILE
LEBANON, NH 03766

CORLEY/FLETCHER TTEES
P.O. BOX 738
LEBANON, NH 03766
MAP 78 LOT 55

LEBANON SCHOOL DISTRICT
20 SEMINARY HILL ROAD
WEST LEBANON, NH 03784
MAP 64 LOT 33

EDWARDS PROPERTIES LLC
P.O. BOX 600
LEBANON, NH 03766
MAP 78 LOT 58

EDWARDS PROPERTIES LLC
P.O. BOX 600
LEBANON, NH 03766
MAP 78 LOT 47

MAP 78 LOT 61	MAP 64 LOT 30
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LOTS BEFORE BOUNDARY ADJUSTMENT

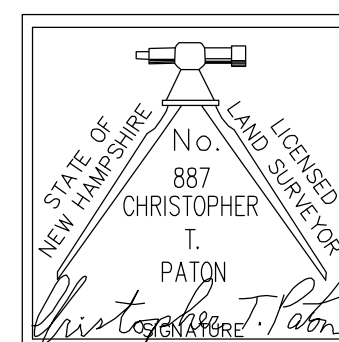
MAP 78 LOT 61

MAP 64 LOT 30

LOTS AFTER BOUNDARY ADJUSTMENT

1. OWNER OF RECORD OF MAP 64 LOT 30: CICCOTTE PROPERTIES, LLC,
P.O. BOX 600, LEBANON, NH 03766.
DEED REFERENCE: VOL. 2657 PAGE 368.
OWNER OF RECORD OF MAP 78 LOT 61: JOHANNA MARIE CICCOTTE,
P.O. BOX 1010, LEBANON, NH 03766.
DEED REFERENCE: VOL. 3256 PAGE 650.
2. BEARINGS SHOWN HEREON ARE REFERENCED TO THE NEW HAMPSHIRE GRID SYSTEM.
VERTICAL DATUM IS BASED ON NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).
3. THE SUBJECT PARCELS ARE IN THE INDL ZONING DISTRICT.
4. THE SURVEY WAS COMPLETED NOVEMBER 19, 2021.

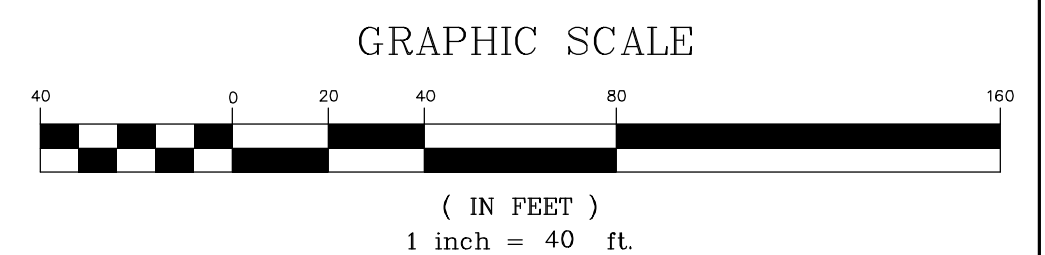
I CERTIFY THAT THIS PLAN IS THE RESULT OF AN ACTUAL FIELD SURVEY MADE ON THE GROUND AND HAS A MAXIMUM ERROR OF CLOSURE OF ONE PART IN TEN THOUSAND ON ALL PROPERTY LINES WITHIN AND BORDERING THE SUBJECT PROPERTY.



1. " ZEE-BAR INC. OF VT., ROUTE 120. HEATER ROAD & LITTLE
HEATER ROAD, LEBANON, NH"; DATED 11/5/1984; PREPARED BY
K.A. LECLAIR ASSOC.; AND RECORDED AS PLAN 2520 G.C.R.D.

- CONCRETE BOUND FOUND
- IRON PIPE OR PIN FOUND
- REBAR TO BE SET
- BOUNDARY CORNER – UNMARKED
- UTILITY POLE
- OVERHEAD ELECTRIC
- ⊙ SEWER MANHOLE
- ⚡ HYDRANT
- WATER GATE VALVE
- EDGE OF BROOK
- · · — EDGE OF WETLAND

REVISION: DEC. 22, 2021



BOUNDARY LINE ADJUSTMENT PLAN PREPARED FOR
CICOTTE PROPERTIES, LLC &
JOHANNA MARIE CICOTTE
LITTLE HEATER ROAD, HEATER ROAD & ROUTE 120
GRAFTON COUNTY, LEBANON, NEW HAMPSHIRE

PREPARED BY

PATON LAND SURVEYING, LLC

150 SOUTHRIDGE ST., SPRINGFIELD, VT 05156

DATED: NOV. 23, 2021	SCALE: 1"=40'
DRAWN BY: CP	CK'D BY CTP

SURVEYED BY CTP, TR
PROJ. NO. 2021-282-60

**Agenda
Planning Board
January 10, 2022**

**Agenda Item #3G
Public Hearing Items**

**Edwards Properties, LLC, 9
Pershing Street (Tax Map 78, Lot
48), zoned IND-L
PB2022-02-CUP**



CITY OF LEBANON ~ PLANNING & DEVELOPMENT

PLANNING BOARD

January 10, 2022 Meeting

Staff Memorandum – PB2022-02-CUP

APPLICATION INFORMATION

Agenda Item: 3.G

Application Type:

Conditional Use Permit for a car wash

Location:

9 Pershing Street (Tax Map 78, Lot 48)

Applicant/Property Owner:

Edwards Properties, LLC

Zoning District:

Light Industrial (IND-L)

Future Land Use Map:

Mixed Use

Property Size: +/-0.61 acres, per the City's assessing records (the property is non-conforming to the minimum required 2 acre lot size required for lots in the IND-L District per §303.3 of the Zoning Ordinance)

Overlay Districts:

Floodplain District

Other Approvals Required:

- Site Plan Review
- Floodplain Permit

Attachments:

- Application (7 pages total)

HEARING NOTICE

Edwards Properties, LLC, 9 Pershing Street (Tax Map 78, Lot 48), zoned IND-L: Request for a Conditional Use Permit to convert a previously approved contractor's yard to a car wash. PB2022-02-CUP

BACKGROUND

The property (outlined in red in Figure 1 below) is a +/-0.61 acre lot located at the corner of Little Heater Road and Pershing Street. The current property configuration was recently created by the voluntary merger of 25 Little Heater Road and 9 Pershing Street (PB2021-22-VLM).

The portion of the property consisting of what was formerly 25 Little Heater Road (outlined in yellow in Figure 2) was occupied by a one-family dwelling which has since been removed. The remainder of the property (outlined in blue in Figure 2), is improved with a 3,420 sq. ft. commercial building and is currently permitted to be used as a contractor's yard, which is a use allowed by Special Exception from the Zoning Board of Adjustment per Section 303.2 of the Zoning Ordinance. A Special Exception for the contractor's yard was granted to a predecessor in title by the Zoning Board on October 17, 2016 (ZB2016-24-SE). Subsequently, the Planning Board granted Site Plan approval for the contractor's yard on May 8, 2017 (PB2017-12-SPR).

On October 4 and October 5, 2021, Planning and Development Department staff observed that a newly paved surface had been installed on the portion of the property consisting of what was formerly 25 Little Heater Road. Judging by observation and subsequently measuring the area using the City's online GIS tool, it appears that the new surface (depicted in the photo in Figure 3 below, taken on October 5, 2021) is approximately 9,000 sq. ft. or more in size.

The paved surface was installed in violation of the City's land use ordinances and without the required approvals. Consequently, on October 14, 2021, the Planning and Development Department issued a Notice of Violation identifying violations of Zoning Ordinance §§303.2 and 901.1.D, and of Site Plan Review Regulations §§1.6.A and 3.1.D.

Following the issuance of the Notice of Violation, it came to the attention of the Planning and Development Department that the building at 9 Pershing Street is now being used as a car wash. Although a "car wash"

is allowed in the IND-L District by Conditional Use Permit issued by the Planning Board, no such approval has been granted for the property. Consequently, the Planning and Development Department issued a second Notice of Violation on December 6, 2021, identifying violations of Zoning Ordinance §§303.2, 402.2, and 901.1.D, and of City Code Chapter 74, Sections 74-9 and 74-14. These violations are in addition to those outlined in the October 14th Notice of Violation.

In response to the December 6th Notice of Violation, the applicant submitted the attached application for a Conditional Use Permit to operate a car wash at the subject property.

Figure 1. Bird's Eye View of subject property (looking east).



©2021 Eagleview (image taken 4/4/2021)

Figure 2. Aerial View of Subject Property.



Figure 3. Newly installed pavement at the subject property.



SUMMARY OF REQUEST

The applicant requests approval to utilize the property as a “car wash” which is a use allowed by Conditional Use Permit in the IND-L District. The application materials do not identify any proposed site changes associated with the proposed car wash use, nor has the applicant identified the proposed use of the newly paved area over the former 25 Little Heater Road portion of the property.

ZONING ORDINANCE REQUIREMENTS

“Car wash” is a use is allowed in the IND-L District by Conditional Use Permit pursuant to §303.2. Per §302.4.B of the Zoning Ordinance, the Planning Board may grant a Conditional Use Permit if it finds that the proposal meets the Enhanced Performance Standards set forth in §302.4.D as follows:

1. The site is suitable for the proposal. This includes:
 - a. Adequate vehicular and pedestrian access for the intended use.
 - b. The availability of adequate public services to serve the intended use including emergency services, pedestrian facilities, safe access, and other municipal services.
 - c. The absence of environmental constraints (floodplain, steep slope, etc.) proposed to be impacted by the intended use.

- d. The availability of appropriate utilities to serve the intended use including water, sewage disposal, stormwater treatment, electricity, and similar utilities.
2. External impacts: The external impacts of the proposed use on abutting properties and the neighborhood shall be commensurate with the impacts of adjacent existing uses or other uses permitted in the zoning district. This shall include, but not be limited to, water runoff, drainage, traffic, noise, odors, vibrations, dust, fumes, hours of operation, and exterior lighting and glare. In addition, the location, nature, design, and height of the structure and its appurtenances, its scale with reference to its surroundings, and the nature and intensity of the use, shall not have an adverse effect on the surrounding environment nor discourage the appropriate and orderly development and use of land and buildings in the neighborhood. The proportion of the site proposed to be occupied by impervious surfaces shall be minimized to the extent necessary to preclude unreasonable risk of runoff, erosion, sedimentation, and other potentially adverse on-site or off-site effects.
3. Character of the site development: The proposed layout and design of the site shall not be incompatible with the established character of the neighborhood and shall mitigate any external impacts on abutters, the neighborhood, and nearby public ways and infrastructure. This shall include, but not be limited to, the relationship of the building(s) to the street, the amount, location, and screening of off-street parking, the treatment of yards and setbacks, the buffering of adjacent properties, and provisions for vehicular and pedestrian access to and within the site.
4. Character of the buildings and structures: The design of any new buildings or structures and the modification of existing buildings or structures on the site shall not be incompatible with the established character of the neighborhood. This shall include, but not be limited to, the scale, height, and massing of the building or structure, the roof line, locations of access, and visual compatibility with the area.
5. Preservation of natural, cultural, historic, and scenic resources: The proposed use and layout of the site, including all related development activities, shall to the greatest extent practicable preserve identified natural, cultural, historic, and scenic resources on the site and shall not degrade such identified resources on abutting properties. This shall include, but not be limited to, identified wetlands, floodplains, significant wildlife habitat and documented wildlife corridors, stonewalls, mature tree lines, identified historic buildings or sites, scenic views, and viewsheds.

STAFF COMMENTS

Per Section 302.4.E of the Zoning Ordinance, the Planning Board “may impose conditions as it finds reasonably appropriate to safeguard the neighborhood and the general public or otherwise serve the purposes of this Ordinance, including such measures as set forth in Section 802.4 (“Special Conditions”).” Section 802.4.B of the Zoning Ordinance provides as follows:

[T]he Board may attach whatever conditions it deems necessary to the approval decision in order to assure compliance with the purposes of this Ordinance. Such conditions may

include but are not necessarily limited to:

1. Increasing the required lot size or yard dimensions in order to protect the adjacent properties.
2. Limiting the coverage or height of building because of obstruction to view and reduction of light and air to adjacent properties.
3. Controlling the location and number of vehicular access points to the property.
4. Increasing the street width adjacent to the property.
5. Increasing the number of on-site off street parking or loading spaces required.
6. Requiring suitable on-site landscaping and screening where necessary to reduce noise and glare and to maintain the property in character and keeping with the surrounding area.
7. Specifying a time limit for initiation of construction, alteration, or enlargement of a structure to house an exception.
8. Providing for specific layout of facilities on the property such as location of the building, parking areas, access to the building so as to minimize effect on adjoining property.
9. Specifying standards for operation of this [conditional use] so that it will be no more objectionable to the neighborhood by reasons of noise, odors, vibrations, flashing lights or hours of operation than will be the operation of a permitted use at that site.
10. Specifying the length of time of the [conditional use] and time of occupancy during the year, or hours of operation.

The Zoning Ordinance does not specifically identify “car wash” in the Section 607 Table of Minimum Off-Street Parking Requirements. Therefore, the required parking defaults to the “other commercial” category which requires one (1) parking space per 600 sq. ft. of gross floor area. Utilizing this standard, a minimum of six (6) parking spaces are required for the proposed car wash use (3,420 sq. ft. building / 600 sq. ft. = 5.7 required parking spaces). Pursuant to Section 607.3, the maximum parking allowed for the use would be seven (7) spaces (minimum requirement of $5.7 \times 120\% = 6.8$ spaces). Staff recommends that as a condition of approval, at least 6 parking spaces, but not more than 7 spaces should be identified on the site plan that must be submitted in connection with the unpermitted installation of the new paved area.

During a conceptual review of the proposed site plan application at the Planning Board meeting on December 13, 2021, the applicant’s representative stated that the car wash is being utilized to wash cars for the non-conforming vehicular sales use at 175 Heater Road. Although the car wash use is permitted by Conditional Use Permit in the IND-L district, the utilization of the subject property as an expansion of the off-site non-conforming car dealership is not permitted by the Zoning Ordinance and cannot be approved by the Planning Board. Consequently, staff also recommends that the Planning Board, pursuant to its authority set forth in Sections 302.4.E and 801.4.B, should limit the number of parking spaces on site to what is required or allowed for the car wash use and should prohibit the parking and/or storage of vehicles on the subject property except within the approved parking spaces.

Finally, if the Board moves to approve the application, staff also recommends that the granting of the Conditional Use Permit should be conditioned on the applicant obtaining site plan approval as required by the October 14th Notice of Violation, and that the car wash use should not commence or continue until after Site Plan approval is obtained from the Board.

Attachment

cc: Johanna Cicotte (jcicotte1@aol.com)
Dan Nash (advancedgeomatrics@comcast.net)
File

CITY OF LEBANON APPLICATION FOR

SPECIAL EXCEPTION ☐	☐ SITE PLAN REVIEW
VARIANCE ☐	☐ SUBDIVISION
MOTION FOR REHEARING ☐	☐ LOT LINE ADJUSTMENT
APPEAL OF AN ADMIN. DECISION ☐	☒ CONDITIONAL USE PERMIT

☐ OTHER _____

PROPERTY OWNER (APPLICANT):

NAME: Johanna M. Cicotte Edwards Prop, LLC TEL.#: 603-448-6363

MAILING ADDRESS: Edwards Properties, LLC, PO Box 600, Lebanon, NH 03766

E-MAIL ADDRESS: jcicotte1@aol.com

CO-APPLICANT, AGENT, OR LESSEE:

NAME: Dan Nash TEL.#: 802-356-4928

MAILING ADDRESS: 105 Bank St, Lebanon, NH 03766

E-MAIL ADDRESS: AdvancedGeomatics@comcast.net

PROJECT LOCATION:

TAX MAP #: 78 LOT#: 48 PLOT #: _____ ZONE: IND-L

STREET ADDRESS OF PROJECT: 9 Pershing Street

IS THIS PROPERTY LOCATED IN THE: **WETLANDS** ☐ YES ☒ NO **HISTORIC DISTRICT** ☐ YES ☒ NO
FLOOD PLAIN ☒ YES ☐ NO

SCOPE OF PROJECT:

Convert existing contractor's yard use to a car wash.

TYPE OF OCCUPANCY:

EXISTING ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☒ COMMERCIAL ☐ INDUSTRIAL
 PROPOSED ☐ VACANT ☐ ONE FAMILY ☐ TWO FAMILY ☐ MULTI-FAMILY ☒ COMMERCIAL ☐ INDUSTRIAL

IF USE IS **COMMERCIAL** OR **INDUSTRIAL**, PLEASE NOTE **SPECIFIC**

USE: Contractor's Yard-existing; car wash-proposed

SIGNATURE BLOCK:

FOR PLANNING BOARD APPLICATIONS ONLY: I, the undersigned, hereby submit this application on the date noted below with the knowledge and understanding that the Planning Board shall determine if the submitted application is complete according to its regulations at its next regularly scheduled meeting on _____, 20____, unless I personally request, in writing, that the Board delay its determination of completeness to a later date.

PROPERTY OWNER: [Signature]

DATE: 12/17/21

NOTE: IF, AS OWNER, YOU WISH TO DESIGNATE AN AGENT TO ACT ON YOUR BEHALF, PLEASE READ THE FOLLOWING AND SIGN BELOW: I hereby designate the person listed above as my agent for the purpose of procuring the necessary local permits for the proposed work as described herein. Representations made by my agent may be accepted as though made by me personally, and I understand that I am bound by any official decision made on the basis of such representation.

PROPERTY OWNER: [Signature]

DATE: 12/17/21

DATE RECEIVED	FILE # (MAP/LOT)	APPLICATION #	FEE - \$ AMOUNT	DATE PAID	VOUCHER #
12/18/21	78/48	PB2022-02- CUP	384.90	12/18/21	18565



Tim Corwin, Planning Office
City of Lebanon
51 North Park Street
Lebanon, NH 03766

7 December 2021

Re: Support Statement
Conditional Use Application; Lot 78-48
Pershing Street

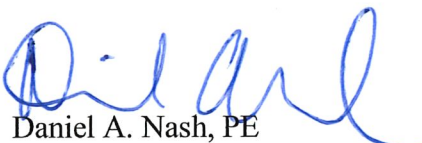
Dear Mr. Corwin:

We provide the following support statement information:

1. Consultants. The team members are listed in the abutters list.
2. Restrictions. We are not aware of any conservation, preservation, or agricultural preservation restrictions on the subject parcel.
3. Utilities. The site is currently served by electric, telephone, and cable services.
4. Zoning. The zoning is IND-L.
5. Project Description. The owner has converted the previous use of contractor's yard to a car wash. We are requesting approval for this use as a conditional use.

Please let me know if you need further information to support this application

Sincerely,



Daniel A. Nash, PE
Principal

CC: Johanna Cicotte
Barry Schuster

Attachments:

- Application for CU
- Calculation of Fee, check for fee
- Abutters List
- CU Application Support form
- Site Sketch
- GIS Aerial Photo
- photos

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City of Lebanon, New Hampshire

APPLICATION FOR CONDITIONAL USE PERMIT

SUPPORT STATEMENT

Office Use Only

Date Received: _____

Application No.: _____

I. APPLICATION CHECKLIST

- [Application form](#)
- [Public Hearing Notification List](#)
- [Filing fee](#)
- This form, including written responses to the Section 302.4.D requirements, outlined below
- A site plan
- Optional: photos and any other materials in support of your application

Edwards Properties
Lot 78-48
9 Pershing Street

II. PROJECT DESCRIPTION

I (we) hereby request a Conditional Use Permit as provided for in Article(s) 3,
Section(s) 303.2, of the Lebanon Zoning Ordinance.

Please describe your proposed project with as much detail as possible. You can respond in the space provided below or on a separate sheet of paper.

The proposed project seeks to convert an existing contractor's yard to a car wash.

III. CONDITIONAL USE PERMIT CRITERIA

In order to obtain a Conditional Use Permit, you must demonstrate to the Planning Board that the proposal satisfies the applicable criteria set forth in Sections A and B below. You must address each criteria in the space provided or on a separate sheet of paper.

A. Specific Criteria

The Conditional Use Permit is authorized by Article 3, Section 303.2 of the Zoning Ordinance which requires the applicant to demonstrate that (please address any criteria set forth in the Zoning Ordinance that specifically apply to your proposed use or project):

This Section of the zoning ordinance allows a car wash use in the Industrial-Light zone.

B. General Criteria per Section 302.4.D (only for CUPs per Article III**)**

A conditional use permit shall be granted only if the Planning Board determines that the proposal conforms to all of the following standards:

1. The site is suitable for the proposal. This includes:

- a. Adequate vehicular and pedestrian access for the intended use.

The site is existing and has been in use as a contractor's yard since 2017. Pershing Street provided adequate vehicular access. There is currently no need for pedestrian access to the site.

- b. The availability of adequate public services to serve the intended use including emergency services, pedestrian facilities, safe access, and other municipal services.

The site is adequately served by emergency services. In October 2021, a grit/oil separator was installed to protect the city's wastewater system from potentially harmful quantities of grit and oil or grease.

- c. The absence of environmental constraints (floodplain, steep slope, etc.) proposed to be impacted by the intended use.

The site is existing and has no environmental constraints. The existing building is elevated above the 100 year flood plain.

- d. The availability of appropriate utilities to serve the intended use including water, sewage disposal, stormwater treatment, electricity, and similar utilities.

The site is existing and has existing water, sewer and power service. The applicant recently coordinated with city public works department and improved the Pershing Street ditch and replaced the culvert to the east.

2. External impacts: The external impacts of the proposed use on abutting properties and the neighborhood shall be commensurate with the impacts of adjacent existing uses or other uses permitted in the zoning district. This shall include, but not be limited to, water runoff, drainage, traffic, noise, odors, vibrations, dust, fumes, hours of operation, and exterior lighting and glare. In addition, the location, nature, design, and height of the structure and its appurtenances, its scale with reference to its surroundings, and the nature and intensity of the use, shall not have an adverse effect on the surrounding environment nor discourage the appropriate and orderly development and use of land and buildings in the neighborhood. The proportion of the site proposed to be occupied by impervious surfaces shall be minimized to the extent necessary to preclude unreasonable risk of runoff, erosion, sedimentation, and other potentially adverse on-site or off-site effects.

The site is existing and has no adverse external impacts. The site is abutted by a truck repair facility, and busy truck stop with 24 hour operations, and vacant industrial lots.

CONDITIONAL USE PERMIT APPLICATION

Checklist and Support Statement

Last Revised 2/4/2020

Page 3 of 3

-
-
-
-
3. Character of the site development: The proposed layout and design of the site shall not be incompatible with the established character of the neighborhood and shall mitigate any external impacts on abutters, the neighborhood, and nearby public ways and infrastructure. This shall include, but not be limited to, the relationship of the building(s) to the street, the amount, location, and screening of off-street parking, the treatment of yards and setbacks, the buffering of adjacent properties, and provisions for vehicular and pedestrian access to and within the site.

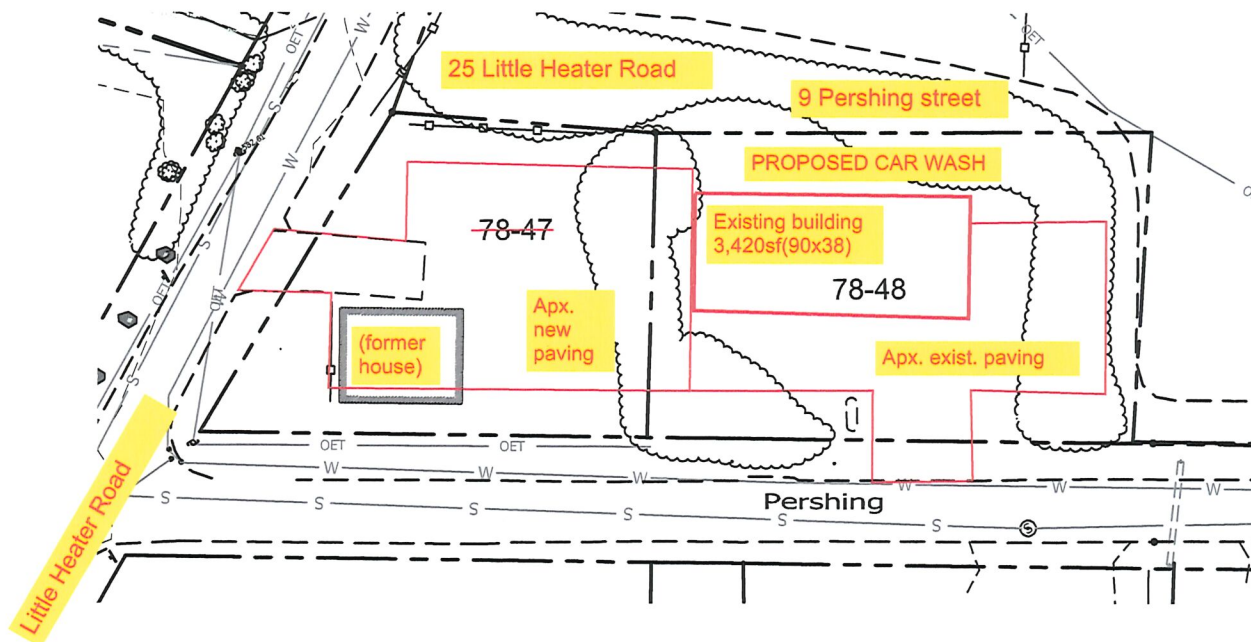
The site is existing and has been in use as a contractor's yard for at least 4 years. Upon completion of the site boundary and topographic survey, the owner intends to prepare a site plan, with landscaping and lighting, meeting current standards, and submit for review.

-
-
4. Character of the buildings and structures: The design of any new buildings or structures and the modification of existing buildings or structures on the site shall not be incompatible with the established character of the neighborhood. This shall include, but not be limited to, the scale, height, and massing of the building or structure, the roof line, locations of access, and visual compatibility with the area.

The site has an existing building; no new structures are proposed.

-
-
5. Preservation of natural, cultural, historic, and scenic resources: The proposed use and layout of the site, including all related development activities, shall to the greatest extent practicable preserve identified natural, cultural, historic, and scenic resources on the site and shall not degrade such identified resources on abutting properties. This shall include, but not be limited to, identified wetlands, floodplains, significant wildlife habitat and documented wildlife corridors, stonewalls, mature tree lines, identified historic buildings or sites, scenic views, and viewsheds.

The site is existing. We are not aware of potential adverse impacts of the proposed car wash use to natural, cultural, historic, or scenic resources on the property or adjacent parcels.



SITE SKETCH
 25 Little Heater Road/9 Pershing street
 AGD/DAN
 20Oct2021
 Scale: 1"=40' (11x17)



**MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT**

City of Lebanon, NH makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 10/18/2021
Data updated 11/18/2018

Print map scale is approximate.
Critical layout or measurement activities should not be done using this resource.



Photo 1

Looking northerly, from intersection
of Edwards St and Foch Avenue



Photo 2

Looking easterly, from Little Heater
Road

**Agenda
Planning Board
January 10, 2022**

**Agenda Item #5A
Approval of Minutes**

December 13, 2021

DRAFT

LEBANON PLANNING BOARD
Regular Session
Monday, December 13, 2021, 6:30 PM
City Council Chambers, City Hall
or Remote Via Microsoft Teams
LebanonNH.gov/Live

MEMBERS PRESENT: Bruce Garland (Chair), Matthew Hall (Vice-Chair), Karen Zook (Council Representative), Kim Chewning, Joan Monroe, Jeremy Rutter, Laurel Stavis

MEMBERS ABSENT: Gregorio Amaro, Kathie Romano, Michael Smith (Alternate)

STAFF PRESENT: David Brooks (Planning Director), Tim Corwin (Senior Planner), Brian Vincent (City Engineer)

1. Call to Order

Chair Garland called the meeting to order at 6:30 PM.

2. Notice of Regional Impact

The following applications were received by the Planning and Development Department on or before December 13, 2021:

Brady Sullivan Prospect Hills, LLC, 0 Prospect Street (Tax Map 108, Lot 2), zoned R-3: A request to amend the approved plan for Phase II of the Prospect Hills planned unit residential development, to allow construction to proceed in phases per Section 7.13 of the Subdivision Regulations. PB2021-37-FMAJA

Cicotte Properties, LLC & J.M. Cicotte, 175 Heater Road & 30 Little Heater Road (Tax Map 64, Lot 30 & Tax Map 78, Lot 61), zoned IND-L: Request for approval of a Boundary Line Adjustment between lands located at 175 Heater Road & 30 Little Heater Road. PB2022-01-BLA

Edwards Properties, LLC, 9 Pershing Street (Tax Map 78, Lot 48), zoned IND-L: Request for a Conditional Use Permit to convert a previously approved contractor's yard to a car wash. PB2022-02-CUP

Trustees of Dartmouth College, 56 Etna Road (Tax Map 50, Lot 28), zoned IND-L: Request for Site Plan Review to construct a 19,672 SF building to serve as the central storage for library books and records management. PB2022-03-SPR

Chaloux, LLC, 25 & 0 Labombard Road (Tax Map 61, Lot 25 & Tax Map 51, Lot 15), zoned IND-L: Request for approval of a Boundary Line Adjustment between lands located at 25 & 0 Labombard Road. PB2022-04-BLA

Chaloux, LLC, 25 & 0 Labombard Road (Tax Map 61, Lot 25 & Tax 51, Lot 15), zoned IND-L: Request for Site Plan Review to construct a 10,000 SF climbing gym building, with 540 SF yoga studio and 235 SF retail space, including site improvements consisting of a new parking lot, sidewalks, patio, sewer and water utility connections, and stormwater improvements. PB2022-05-SPR

1 **Robert & John Oakes, 92 Riverside Drive (Tax Map 111, Lot 16), zoned RL-1:** Request for a Site Plan
2 Review to construct 26,176 SF of mini-storage warehouse with attendant pavement and access. PB2022-
3 06-SPR

4
5 Mr. Brooks stated that the Planning Department has reviewed the applications and recommended that
6 none of them has the potential for regional impact.

7
8 ***A MOTION by Matthew Hall that none of the above applications has the potential for regional impact.***
9 ***The motion was seconded by Laurel Stavis.***

10
11 ****The MOTION was approved (7-0).***

12
13 **3. Public Hearing Items**

- 14
15 A. **Mount Support Development, LLC (applicant) and Sylvia D. Lahaye Revocable**
16 **Trust & Pat Lumber Jack, Inc. (property owners), 402 & 392 Mount Support Road**
17 **(Tax Map 24, Lots 9 & 10), zoned R-1:** Request for Site Plan Review to construct a
18 proposed 4-building multi-family development consisting of 204 dwelling units, together
19 with parking, utilities, landscaping, access, and other related site improvements. PB2021-
20 33-SPR - ***Completeness review only on 12/13/2021, public hearing to commence on***
21 ***1/10/2022***

22
23 Mr. Corwin stated that the Planning Staff recommends the application is complete enough for the
24 Planning Board to accept jurisdiction and commence review.

25
26
27 ***A MOTION by Jeremy Rutter that the application of Mount Support Development, LLC (applicant)***
28 ***and Sylvia D. Lahaye Revocable Trust & Pat Lumber Jack, Inc. (property owners), 402 & 392 Mount***
29 ***Support Road (Tax Map 24, Lots 9 & 10), zoned R-1 is complete enough for the Planning Board to***
30 ***accept jurisdiction and commence review.***

31
32 ***The motion was seconded by Kim Chewning.***

33
34 ****The MOTION was approved (7-0).***

35
36 ***A MOTION by Matthew Hall to open the Public Hearing and continue it to January 10, 2022, at 6:30***
37 ***PM.***

38 ***The motion was seconded by Jeremy Rutter.***

39 ***The MOTION was approved (7-0).***

40
41 Chair Garland brought up the issue of a site visit. The applicant stated that the property lines are generally
42 defined, but the building locations have not been defined. The Chair asked that the applicant consider
43 staking out the building locations, driveways, and other features.

- 44
45
46 B. **SPNH Mount Support, LLC, 343 Mount Support Road (Tax Map 24, Lot 1), zoned**
47 **R-1 & RL-3:** Request for a Minor Subdivision to create two parcels. PB2021-36-MIN

48 Planning Staff recommends that the application is complete enough for the Planning Board to accept
49 jurisdiction and commence review.

1
2 ***A MOTION by Jeremy Rutter that the Lebanon Planning Board finds the application of SPNH Mount***
3 ***Support, LLC, for a proposed two (2)-lot Minor Subdivision of 343 Mount Support Road (Tax Map 24,***
4 ***Lot 1), PB2021-36-MIN, IS complete enough to accept jurisdiction and commence review.***

5 ***The motion was seconded by Kim Chewning.***

6 ****The MOTION was approved (7-0).***

7
8 Dave Fenstermacher of VHB and Don Smith attended in support of the application.

9
10 Mr. Fenstermacher stated that SPNH Mount Support is ready to move forward. Mr. Smith noted that they
11 would be focusing on the front parcel for the apartment complex. There are no plans or drawings for the
12 back property.

13
14 Mr. Fenstermacher described the map of the property with wildlife corridors and the location of the
15 approved apartment complex. There is no planned access to the back of the property.

16
17 Mr. Corwin noted that Staff received comments from the Lebanon Fire Department giving approval of
18 acceptable access to the proposed complex. A proposed additional condition of approval was described.

19
20 Ms. Monroe inquired about the location of the driveway. Mr. Fenstermacher described the driveway
21 access to the complex. Ms. Monroe expressed concern over the location of wetlands and stressed the need
22 for a site walk for any future development.

23
24 Chair Garland noted the Conservation Commission's discussion of the intent of the property for public
25 use of the trails as an asset to the City. The Conservation Commission had recommended setting the
26 remaining acres aside for conservation. Mr. Smith stated that the trail system is indicated, and a parking
27 area would be provided.

28 Ms. Monroe recommended inviting the members of the Conservation Commission to join the Planning
29 Board for the site walk. She added that biking often does not have a positive impact on the trails.

30
31 Chair Garland invited public comment. There was none.

32 Ms. Monroe inquired if the number of units was still appropriate after dividing the property, noting that it
33 is a very large piece of land. Mr. Corwin confirmed that the parcel is sized to accommodate the density of
34 the approved complex. It is important to be very cautious when affecting the border of such a natural
35 setting.

36
37 Chair Garland closed the Public Hearing.

38
39
40 ***A MOTION by Matthew Hall that the Lebanon Planning Board APPROVE the application of SPNH***
41 ***Mount Support, LLC, for a proposed two (2)-lot Minor Subdivision of 343 Mount Support Road (Tax Map***
42 ***24, Lot 1), PB2021-36-MIN, as shown on a plat titled "Subdivision Plan, Map 24, Lot 1," prepared by***
43 ***Vanasse Hangen Brustlin, Inc. (VHB), dated August 26, 2021, last revised November 22, 2021, including***
44 ***any and all supplemental submissions and testimony provided during the public hearing, with the following***
45 ***conditions to be satisfied prior to the signing and recording of the plat:***

46
47 **Conditions to be Satisfied Prior to the Signing and Recording of the Plat**
48

1. The applicant shall provide a revised plat depicting the following changes to the satisfaction of the Planning and Development Department:
 - a. Add a note to the effect that if and when constructed, the driveway for Lot 24-1-100 must be constructed within the easement area, that no other access drives or curb cuts are permissible, that prior to construction all required state and local permits are obtained, and that the driveway design and construction meet all applicable local regulations at the time of construction.
 - b. Add a note to the effect that approval of this subdivision by the Planning Board does not imply that required development permits will be granted by other reviewing agencies.
 - c. Add a note indicating that the plat was approved pursuant to the City of Lebanon Subdivision Regulations last revised June 28, 2021.
2. The applicant shall provide one hard copy of the revised plat and a digital record drawing (Cad .dwg format using NH State Plane Coordinate system or an alternative approved by the City's GIS Coordinator).

General Conditions

3. Future development on the new lots shall be subject to City of Lebanon Impact Fees, pursuant to Section 213 of the Zoning Ordinance. The Impact Fee shall be calculated at the time of Building Permit issuance based on the Impact Fee Schedule adopted on October 12, 2021, and such fees shall be due and payable at the time of issuance of a Certificate of Occupancy. In accordance with RSA 674:39, any building permits which are issued after five years from the date of approval shall be fully subject to whatever impact fees and methodology are in effect at the time of building permit issuance.
4. All future construction shall substantially conform with and shall be subject to the requirements and specifications of the recorded plat. (Section 7.9.A.2)

The motion was seconded by Jeremy Rutter.

**The vote on the motion was (6-1). Joan Monroe voted against.*

A MOTION by Matthew Hall that the Lebanon Planning Board authorizes the Chair to sign the Minor Subdivision plat for SPNH Mount Support, LLC, PB2021-36-MIN, titled "Subdivision Plan, Map 24, Lot 1," prepared by Vanasse Hangen Brustlin, Inc. (VHB), dated August 26, 2021, last revised November 22, 2021, as such plat may be amended in accordance with the Planning Board's approval.

The motion was seconded by Jeremy Rutter.

The MOTION was approved (7-0).

C. Brady Sullivan Prospect Hills, LLC, 0 Prospect Street (Tax Map 108, Lot 2), zoned R-3: Pursuant to Section 14.1.B.1.c of the Subdivision Regulations, a request for an extension of time to achieve active and substantial development of Phase II of a project identified as Prospect Hills, a 171 unit Planned Unit Residential Development located off Moulton Drive and Prospect

1 Street, Tax Map 108 Lot 2 (phase 2) and Lot 14 (phase 1). PB2021-02-EXT - Continued from
2 November 22, 2021
3

4 Attorney John Cronin and John Rokeh of Rokeh Consulting attended in support of the application.
5

6 Mr. Corwin stated that the application for the phasing plan is complete enough for the Planning Board to
7 accept jurisdiction and commence review.
8

9 ***A MOTION by Laurel Stavis that the phasing plan application is complete enough for the Planning***
10 ***Board to accept jurisdiction and commence review.***
11

12 ***The motion was seconded by Matthew Hall.***
13

14 ****The MOTION was approved (7-0).***
15

16 Mr. Rokeh spoke in favor of a phasing plan as the best way to continue the project and noted that they are
17 still asking for an extension. He presented the details of the phases to begin in April of 2022, which
18 includes the new sewer and water connections from Phase One. The proposed improvements for each
19 phase were described in detail.
20

21 Chair Garland inquired about the number of units in each phase. Mr. Rokeh provided the unit counts and
22 noted that the timeline could be accelerated if work is completed ahead of schedule. The active and
23 substantial dates for each phase were discussed.
24

25 Ms. Monroe suggested clarification of the phase designations.
26

27 Mr. Hall inquired about the Staff's opinion of the phasing plan. Mr. Corwin stated that it provides some
28 flexibility within the conditions. Mr. Hall noted that dates for security need to be provided for each phase.
29 Mr. Brooks stated that the bond should be posted before the start of work. Mr. Hall also discussed the
30 dates related to each phase with Mr. Rokeh.
31

32 Ms. Stavis inquired about the detail of the plan. Chair Garland stated that it is still the same plan that was
33 approved in 2014. Ms. Stavis inquired about the life of a detention pond. Mr. Rokeh stated that the life
34 should be fifty years and noted that the State DES is more vigilant regarding maintenance of detention
35 ponds. Ms. Stavis also inquired if there are any requirements for detention ponds. Mr. Vincent stated there
36 are specifications for detention basins as approved in 2014, and all were reviewed and approved at that
37 time. Operation and maintenance were also approved, and stormwater management applies. The detention
38 system must be maintained to avoid problems.
39

40 Mr. Brooks stated that each phase would require a performance security for each pod of units.
41

42 Ms. Monroe noted that ponds have been used for about 20 years, and design confirmation and
43 maintenance are very important.
44

45 Mr. Rutter questioned the lack of an item "D". Mr. Brooks stated that the phases could be labeled on the
46 plan and a condition could be added stating that there is no "D".
47

48 Mr. Brooks inquired about the need for a retaining wall near any of the stormwater ponds. Mr. Rokeh
49 stated that they would not need them.
50

51 Chair Garland invited public comment.

1
2 Cori Hirai of Ward 1 noted that multiple community members had concerns about the project overall and
3 asked if those are being considered. Chair Garland stated that members of the homeowners' association
4 had been present at a prior meeting, and the application was approved in 2014.

5
6 Ms. Monroe noted that adjustments may need to be made due to environmental changes in the future.

7
8 Chair Garland inquired about the applicant's plans for permits and discussion with contractors. Mr.
9 Rokeh stated that they are ready with permits, and phasing gives more flexibility. They can use Lebanon
10 contractors when dealing with the smaller phases and are confident that they can begin work.
11 Mr. Cronin noted the need for the extension before they can finalize a contractor.

12
13 Mr. Corwin shared the city attorney's opinion that the Board needs to find that there is good cause to
14 grant the extension but doesn't have to specifically identify or agree on the details of the good cause. The
15 prepared draft motion includes a generic statement regarding good cause.

16
17 There was a general discussion of the issue of good cause. Mr. Cronin stated that the detail of good cause
18 for an extension doesn't need to be there. Mr. Brooks suggested that the Board should include a statement
19 regarding good cause because that is the standard in the Board's own regulations and that was the
20 directive of the Housing Appeals Board. He noted that the Planning Board didn't specify why it denied
21 the application last March, and the Housing Appeals Board asked the Planning Board to hold a new
22 hearing to focus on good cause. If the Planning Board denies the application again, it must specify why. If
23 the Planning Board finds there has been good cause, it doesn't need to specify the details but rather
24 indicate that it finds good cause based on the totality of circumstances. The combined motion would be
25 simpler if there are 4 favorable votes.

26
27 Chair Garland conducted a straw poll of the Board members regarding moving forward with the project in
28 a combined motion.

29
30 Results of the straw poll:

31 In favor - 4

32 Against - 3

33
34 Chair Garland invited public comment. There was none, and the public hearing was closed.

35
36
37 **A MOTION by Matthew Hall** that the Lebanon Planning Board, having considered the evidence presented
38 by the Applicant, and in light of the instructions in the Housing Appeals Board's Interim Order in this
39 matter, finds that the totality of the circumstances warrants a conclusion that there is good cause to grant an
40 extension for Phase II of the Prospect Hills development (Tax Map 108, Lot 2), originally approved as
41 PB2016-22-EXP-FMAJ, and therefore hereby **APPROVES** the application of Brady Sullivan Prospect
42 Hills, LLC, for an extension of time pursuant to Section 14.1.B.1.c of the Subdivision Regulations to
43 achieve active and substantial development, PB2021-02-EXT, and also **APPROVES** the application to
44 amend the approved plan to allow construction to proceed in phases per Section 7.13 of the Subdivision
45 Regulations as shown on the plan sheet titled, "Overall Development Phasing Plan, Prospect Hill – Phase
46 2," dated October 5, 2011, last revised December 1, 2021, prepared by Rokeh Consulting, LLC, Job No.
47 2010.0023 (attached hereto as Exhibit A) and as set forth in the phasing schedule titled, "Prospect Hill
48 Phase 2 – Construction schedule for Phasing Plan 2021," (attached hereto as Exhibit B), PB2021-37-
49 FMAJA, including any and all supplemental submissions and testimony provided during the public hearing,
50 with the following conditions:

- 1
- 2 1. The phasing plan shall be revised to change the label of Phase 2 “C-F” to Phase 2 “C, E, and F”.
- 3
- 4 2. The applicant shall comply with all applicable conditions of the Planning Board’s prior Notices of
- 5 Action for the Prospect Hills development, including but not limited to, the Notice of Action dated
- 6 November 14, 2016, PB2016-22-EXT-FMAJ.
- 7
- 8 3. With respect to the **Phase 2A** site improvements, the applicant shall be required to (a) achieve Active
- 9 and Substantial Development or Building, as defined in Section 14.1.B.1 of the Subdivision
- 10 Regulations, by *November 15, 2023*; and (b) achieve Substantial Completion, as defined in Section
- 11 14.1.B.2, by *November 15, 2026*.
- 12
- 13 4. With respect to the **Phase 2B** site improvements, the applicant shall be required to (a) achieve Active
- 14 and Substantial Development or Building, as defined in Section 14.1.B.1 of the Subdivision
- 15 Regulations, by *November 15, 2025*; and (b) achieve Substantial Completion, as defined in Section
- 16 14.1.B.2, by *November 15, 2028*.
- 17
- 18 5. With respect to the **Phases 2C, 2E, and 2F** site improvements, the applicant shall be required to achieve
- 19 Substantial Completion, as defined in Section 14.1.B.2, by *November 15, 2029*.
- 20
- 21 6. The applicant shall work with the City Engineer to ensure that there are no dead-end water mains
- 22 because of the proposed phasing and that drainage and wastewater are properly accommodated for each
- 23 phase.
- 24
- 25 7. Within 60 days of this approval, the applicant shall update all Subdivision Agreements, Security
- 26 Agreements, and other documents, as necessary, to reflect the dates of the extended and phased
- 27 approval (per Section 14.1.B.1.c of the Subdivision Regulations).
- 28
- 29 8. Within 60 days of this approval and prior to the issuance of any permits and prior to the start of any
- 30 construction activities or site work on the property, the applicant shall, pursuant to Sections 7.10 and
- 31 14.5 of the Subdivision Regulations, enter into a new Performance Security Agreement and provide
- 32 security necessary for the completion of all Phase 2A required improvements and utilities. The
- 33 Agreement shall specify that security for Phase 2B shall be posted by no later than *February 1, 2024*,
- 34 and security for Phases 2C, 2E, and 2F shall be posted by no later than *February 1, 2026*.

35 ***The motion was seconded by Jeremy Rutter.***

36 ****The MOTION was approved (5-2). Kim Chewning and Joan Monroe voting against.***

37

38

39 **4. Other Business**

- 40
- 41 A. **SPNH Mount Support, LLC, 343 Mount Support Road (Tax Map 24, Lot 1), zoned**
- 42 **R-1 & RL-3:** Review of a minor alteration to an approved site plan (PB2020-11-SPR) per
- 43 Section 9.2 of the Site Plan Review Regulations.
- 44

45 Dave Fenstermacher of VHB and Don Smith appeared on behalf of the application.

46

1 Mr. Corwin stated that there are changes in density and lot lines but no design changes to what was
2 approved a year ago. The driveway is now a shared driveway. The changes are primarily in calculations
3 and do require approval. A motion is not required. The Board members agreed that the changes were
4 acceptable.

5
6
7
8 **B. Execusuite, LLC, 2 Mascoma Street (Tax Map 91, Lot 254), zoned LD:** Conceptual
9 review per Section 4.3 of the Site Plan Review Regulations for a proposed phased
10 redevelopment of 2-acre parcel. Phase I: construction of a 6 story, 72 unit apartment building &
11 17 car garage below. Phase II: Construction of a 6 story, 75 unit apartment building. Existing
12 market to be renovated for restaurant/retail. Phase III: demo of existing market & replace with
13 70,000 SF of residential & 21,000 SF of restaurant/retail. PB2021-38-CON

14
15 Tim Sidore of Execusuite LLC, Jim Wasser of Studio Nexus Architects, and Will Davis of Execusuite,
16 LLC attended in support of the application.

17
18 Mr. Sidore stated that Execusuite purchased the Lebanon Village Market property, which they view as
19 ideal site for a mix of housing and retail. It is designed to maximize density to achieve Lebanon's
20 downtown goals.

21
22 Mr. Wasser described the three phases, with one and two being interchangeable; phase one is easier to
23 construct, with two being constructed shortly thereafter. The buildings are oriented toward Colburn Park
24 and provide an underground parking option.

25
26 Mr. Sidore stated that they want to bring a market back to downtown.

27
28 The Board members provided feedback on the issues of parking, the type of grocery options, green
29 aspects of development, the character of downtown, and the need for affordable housing.

30
31 Mr. Brooks confirmed the capability to do a phased process, which requires knowing what the dates will
32 be. If Phase Three is speculative, it may need an extension. If Phases One and Two are straightforward,
33 then it makes sense to do a single approval or a phased approval. It is important to understand what the
34 larger picture is that includes a Phase Three. The future of the fire station could create another phase
35 beyond Phase Three

36
37 Mr. Sidore stated that they are looking for feedback to see if this development is what Lebanon wants and
38 if it is in the spirit of downtown. He noted their success in White River Junction and the goal of bringing
39 a successful project to downtown Lebanon.

40
41 Chair Garland noted that this particular property was cited when the Board reviewed the new regulations
42 with density like this in downtown Lebanon.

43
44 The Board members noted that the project was commendable, and the brick would tie in with downtown.
45 The topics of balconies and communal space were discussed. Mr. Sidore noted that balconies were useful
46 for fresh air and there would be some communal space.

47
48
49 **A MOTION by Matthew Hall to extend the meeting to 9:45PM.**

50 **The motion was seconded by Joan Monroe.**
51

***The MOTION was approved (6-1). Laurel Stavis voted against.**

B. **Edwards Properties, LLC, 9 Pershing Street (Tax Map 78, Lot 48), zoned IND-L:**
Conceptual review per Section 4.3 of the Site Plan Review Regulations for a proposed
car wash. PB2021-39-CON

Dan Nash of Advanced Geomatics appeared on behalf of the application.

Mr. Nash acknowledged the enforcement action, and described the area as being commercial/industrial mixed with houses. The houses were being removed, and the entire site was refreshed. Some items should have gone through Site Plan Review. A Conditional Use Permit application has been submitted. The owner's goal is to change one building to a car wash, which would be for private use. Mr. Nash stated that it is a commercial transaction with the Volvo/Volkswagen dealership, and Joanna Cicotte owns both Edwards and the car dealership.

Chair Garland noted that the building looks bigger than a car wash. Mr. Nash stated that it is more of a detailing space with three bays for the dealerships. Previously they were using a maintenance bay.

Ms. Monroe suggested an electric vehicle charging station.

5. Approval of Minutes

A. November 8, 2021

A MOTION by Matthew Hall to approve the Planning Board Minutes of November 8, 2021, as presented.

The motion was seconded by Laure Stavis.

***The MOTION was approved (7-0).**

B. November 22, 2021

A MOTION by Matthew Hall to approve the Planning Board Minutes of November 8, 2021, as presented.

The motion was seconded by Joan Monroe.

***The MOTION was approved (7-0).**

Mr. Brooks thanked the Board members for the time they put in attending and doing homework, which is a tremendous task for them as volunteers. It is very important to the community.

Mr. Hall expressed thanks to the Staff. Having their support and advice is very helpful.

Ms. Monroe stated that she is not going to reapply for another term on the Planning Board.

6. Adjournment

A MOTION by Joan Monroe to adjourn the meeting.

1 ***The motion was seconded by Matthew Hall.***

2

3 ****The MOTION was approved (7-0).***

4

5 The meeting was adjourned at 9:37 PM.

6

7 Respectfully Submitted,

8

9 Holly Howes

10 Recording Secretary