Kimley»Horn

MEMORANDUM

To: Town of Littleton Conservation Commission

From: Dean Apostoleris, P.E.

Kimley-Horn and Associates, Inc.

Date: December 20, 2024

Subject: RE: 151 Taylor St – NOI Resubmission

This memorandum shall accompany the applicant re-submission for NOI at 151 Taylor Street, dated December 20, 2024, for the review from the Conservation Commission. The applicant has appeared before the Conservation Commission prior on 08/20/2024 and 10/08/2024. It is requested that we are placed on the January 7, 2024 Conservation Commission agenda for discussion and consideration. The following items are included within this submission:

- Plans entitled "Construction Drawings for DKO1_EV", prepared by Kimley-Horn, dated 12/20/2024
- Landscape Plans, Prepared by Kimley-Horn and dated 12/20/2024
- Aerial Utility Extension Exhibit, Prepared by Kimley-Horn and dated 12/20/2024
- Plants entitled "LELWD ELECTRIC EASEMENT EXHIBIT PLAN", prepared by Beals Associates, dated 10/10/24
- D40x55 S3 Navigator Horizontal Directional Drill Specification Sheet
- Wetland Delineation Review Letter, prepared by Lucas Environmental, dated 12/17/2024
- Previously constructed as-built plans of the causeway titled "Heated Causeway System - As-Built" prepared by ARC

The project scope consists of the installation of 83 Level 2 (L2) charging stations and 2 DC Fast Charging (DCFC) Stations in the existing parking lot to serve as charging infrastructure for the transition of fleet van vehicles to fully electric delivery vans. Associated electrical infrastructure for power delivery is required for the installation of the aforementioned charging stations, as detailed on the Construction Drawings provided within this submission.

The applicant is working in partnership with the Littleton Electric Light and Water Department (LELWD) for power delivery to serve the proposed charging stations via utility-owned underground electrical lines, utility-owned medium-voltage switchgear, and utility-owned 2500KVA medium-voltage transformer tied-in to an existing LELWD electrical manhole at the northeast corner of the property to pull power. See plan within application materials entitled, "LELWD ELECTRIC EASEMENT EHIXIBT PLAN", prepared by Beals Associates, dated 10/10/24, for more detail regarding LELWD scope of work associated with this project. It should be noted that even without the proposed project included with this application, LELWD would be making the required electrical upgrades that impact the

wetland buffers in order to serve the LELWD Water Well project to the south of the subject site. The land for the LELWD project for public benefit of water improvements was previously donated by the landlord under a separate application. This application is intended to also utilize the upgraded utility routing as it provides the amount of power needed for the number of chargers to support the fleet. It is the applicants understanding that between the last appearance (10/08/2024) and time of this submission, members of Conservation Commission have had discussions with LELWD pertaining to this project, specifically with regard to the tie-in location of the proposed electrical power and the overall power delivery routed through the site to the south. The applicant understands this helps provide context to the broader LELWD electrical upgrade project that this application ties into.

Following the applicants last Conservation Commission appearance on 10/08/2024, the applicant has retained environmental professionals (Lucas Environmental, LLC) and surveying professionals (Feldman Geospatial) to perform field verification of existing wetland boundaries. The survey work field located the flags as part of the previous Wetland Delineation completed by Beals Associates in 2020. The environmental professional/wetland scientist inspected the locations of the wetland flags compared to the site conditions to determine accuracy for the purposes of quantifying buffer disturbances occurring as a result of the proposed site improvements. This information is documented in the Wetland Delineation Review Letter referenced above and included with this application. As a result of the wetland verification, resource area buffer disturbances have been confirmed to reflect the following values:

- TOTAL DISTURBANCE TO BBVW: 0 SF (NO DISTURBANCE TO BVW)
- DISTURBANCE WITHIN 50FT BBVW BUFFER: 495 SF
- DISTURBANCE WITHIN 100FT BBVW BUFFER: 3,445 SF

Below responses are intended to provide information in reference to verbal comments raised by Conservation Commission board members at both 8/20/2024 and 10/08/2024 meetings.

1. Stormwater Report Requested

Response: Based on discussions with Town representatives, improvements are de-minimis with respect to stormwater as they would not cause any significant increase in stormwater quantity or have an effect on stormwater quality. There is no increase in impervious area within the buffer zones resulting in no net change in stormwater flow. The proposed area of disturbance is less than one (1) acre. All disturbed areas will be stabilized per the erosion and sediment control design in compliance with local and State standards. Silt fence is proposed throughout the construction areas to provide containment of turbulent runoff into nearby resource areas. Please direct your review to the provided Erosion & Sediment Control Plan and Details for additional information.

2. Tree-replanting that is equivalent to DBH removed must be provided. An aerial exhibit for legibility to be provided.

Response: A landscape plan (with aerial imagery as base) has been provided within the revised construction documents which outlines proposed tree removal and proposed planting. See sheets L1.0 and L1.1, which have been designed and sealed by a Licensed Landscape Architect in the

Commonwealth of Massachusetts. **Tree removal calls for 90" DBH to be removed and 60 trees with 1.5" DBH will be replanted.** Tree-replanting that is equivalent to DBH removed has been met.

3. Provide alternative considerations for providing electrical infrastructure.

Response: At the onset of this project and in the initial discussions between LELWD and the project team, three (3) options were proposed for providing electrical lines to the site for the proposed improvements. A description of each of the three (3) options is included below for the Commissions review. Option #3 was ultimately chosen by LELWD and the project team.

Option #1: Provide a primary service to the site that would energize the proposed EV infrastructure as shown in Figure A. **This options' impacts** and challenges are as follows:

- Removal of trees from parking lot back to the utility riser pole/Point of Intercept (POI) for impacts of ± 1,000 SF
- Technically infeasible trench or bore across the heated causeway to the parking lot.
- As a result disturbance to not only the wetland buffers, but also ± 4,000 SF of impacts to the wetlands surrounding the heated causeway
- LELWD and Kimley-Horn determined in addition to more substantial wetland impacts this route does not meet utility standards or design/installation requirements

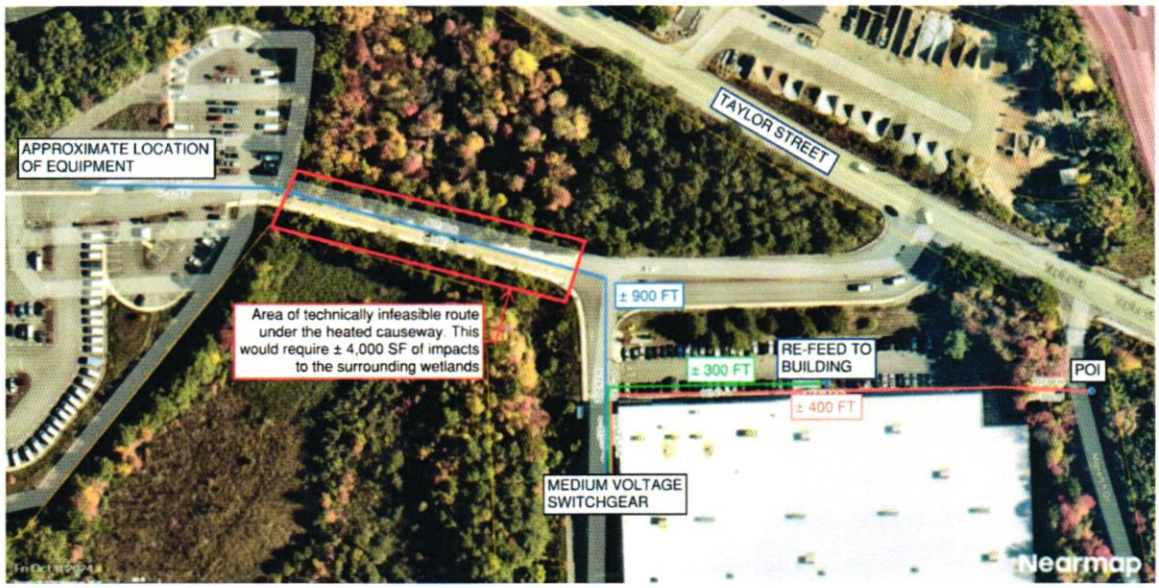


Figure A: Design Option #1 - Primary Service to feed EV Chargers and Building Loads

Option #2: Provide Secondary Service to the site that would energize the proposed EV infrastructure by "daisy chaining" the existing transformer with placement of another utility transformer within the parking lot as shown in Figure B. **This options' impacts and challenges are as follows:**

- Technically infeasible trench or bore across the heated causeway to the parking lot.
- As a result disturbance to not only the wetland buffers, but also ± 4,000 SF of impacts to the wetlands surrounding the heated causeway

- LELWD and Kimley-Horn determined in addition to more substantial wetland impacts this route does not meet utility standards or design/installation requirements
- no impacts to the trees around the Point of Intercept (POI).

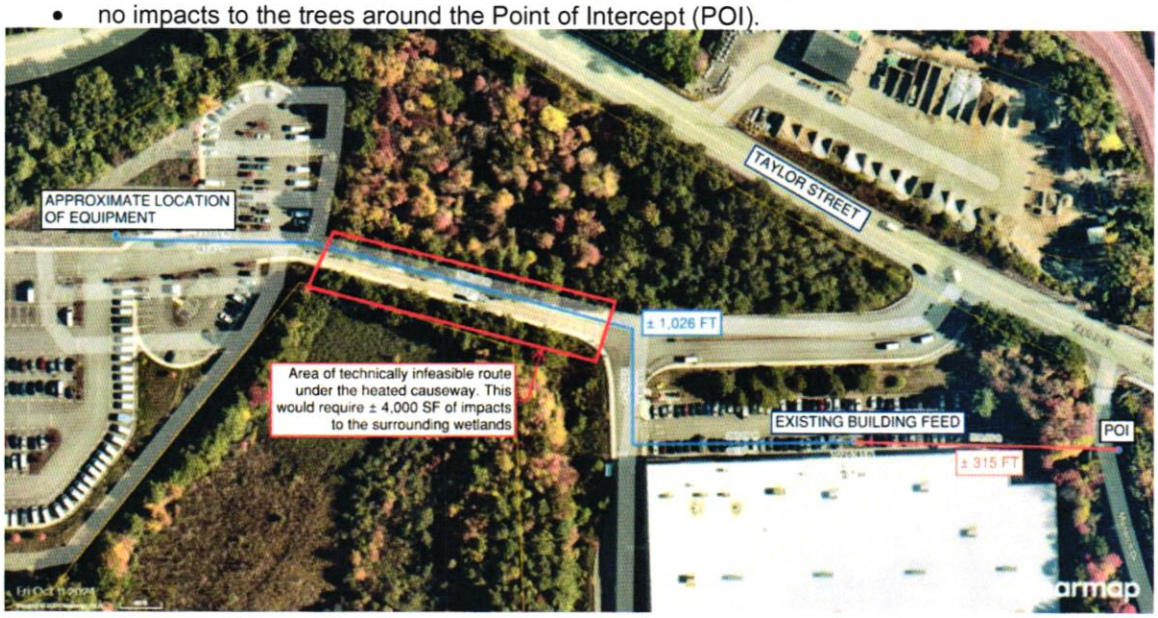
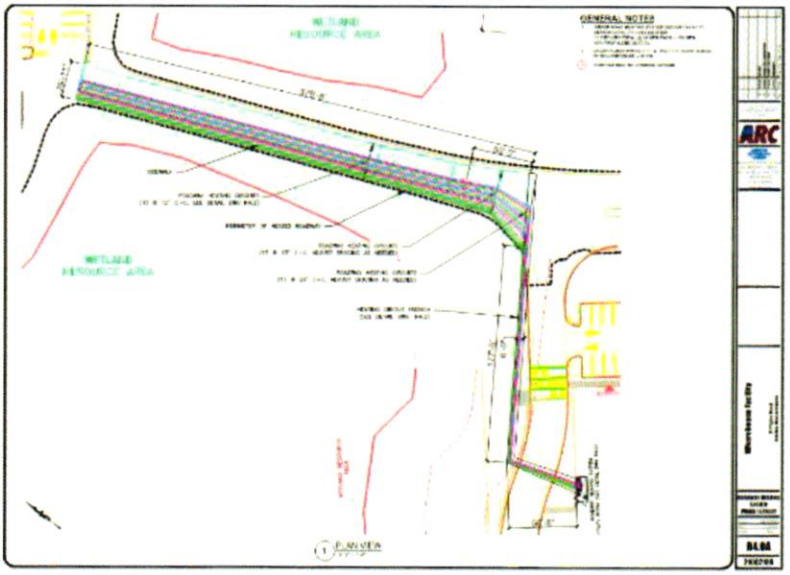


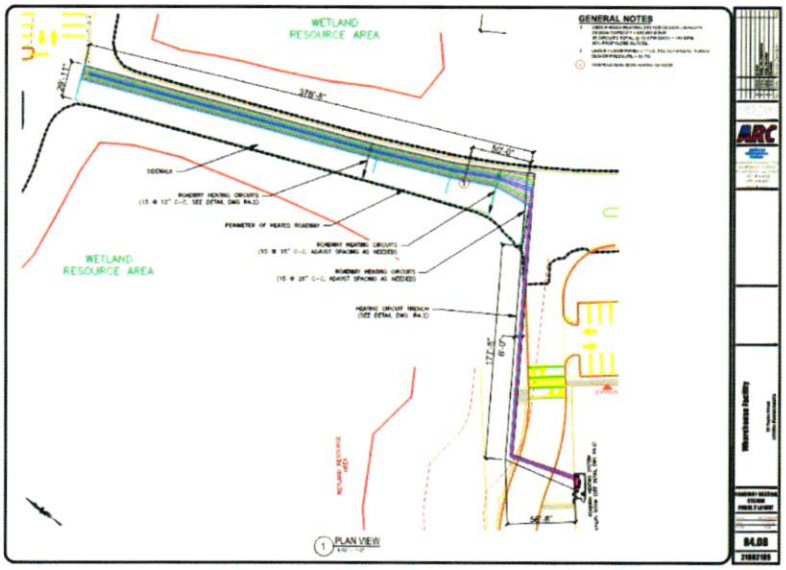
Figure B: Design Option #2 – Daisy-Chained Utility Transformers

Design Options #1 and #2 are substantially impacted by the existing Heated Causeway System, which is a critical system to protect the wetlands on-site. Systems accelerates snow melt which limits the need for major roadway chemical or salt treatments immediately adjacent to the sensitive wetland and buffer area. The system as-builts included in this submittal and the excerpts shown in Figures C and D below confirm that the electrical route across the heated causeway is technically infeasible. This is true whether bored or trenched.

Horizontally, the entire paved causeway is filled with heating circuits and associated infrastructure. Vertically, the heating circuits are buried to a minimum depth of 42" below grade throughout the entirety of the causeway (details 4 and 5 on Sheet R4.2). The heated roadway itself is 7" thick and has circuits connect from the roadway itself to the heating circuits trench leaving conflicts from 0" to 42" deep below the approximate top of roadway elevation of 236'. This places the bottom of the heating circuits at elevation 232.5'. Deeper below the heating circuits is a 24" stormwater culvert with an approximate invert of 230' which makes the top of the culvert at elevation 232'. That leaves a maximum of 6" of cover between the top of culvert crossing perpendicular to the causeway and the bottom heating circuits traveling parallel to the heated cause way. The required 6" utility conduit would not fit with any required clearances between these two conflicts and cannot structurally hold that load without a minimum 12" or more concrete encasement around it. Further, a minimum bore reamer of 12" would be required to lead this route which would conflict either the culvert or the heating circuits.

In addition, if access to the conduit is needed for repairs, the entire heating circuit would need to be removed/replaced and access to the parking lot would be suspended during that time of repair impacting business operations and increasing runoff to the sensitive wetland area. LELWD (and most other public utilities) also do not allow impacts between public infrastructure (utility owned electrical) and private infrastructure (heated causeway heat elements) or allow private infrastructure within their easements, further causing this option to be infeasible.





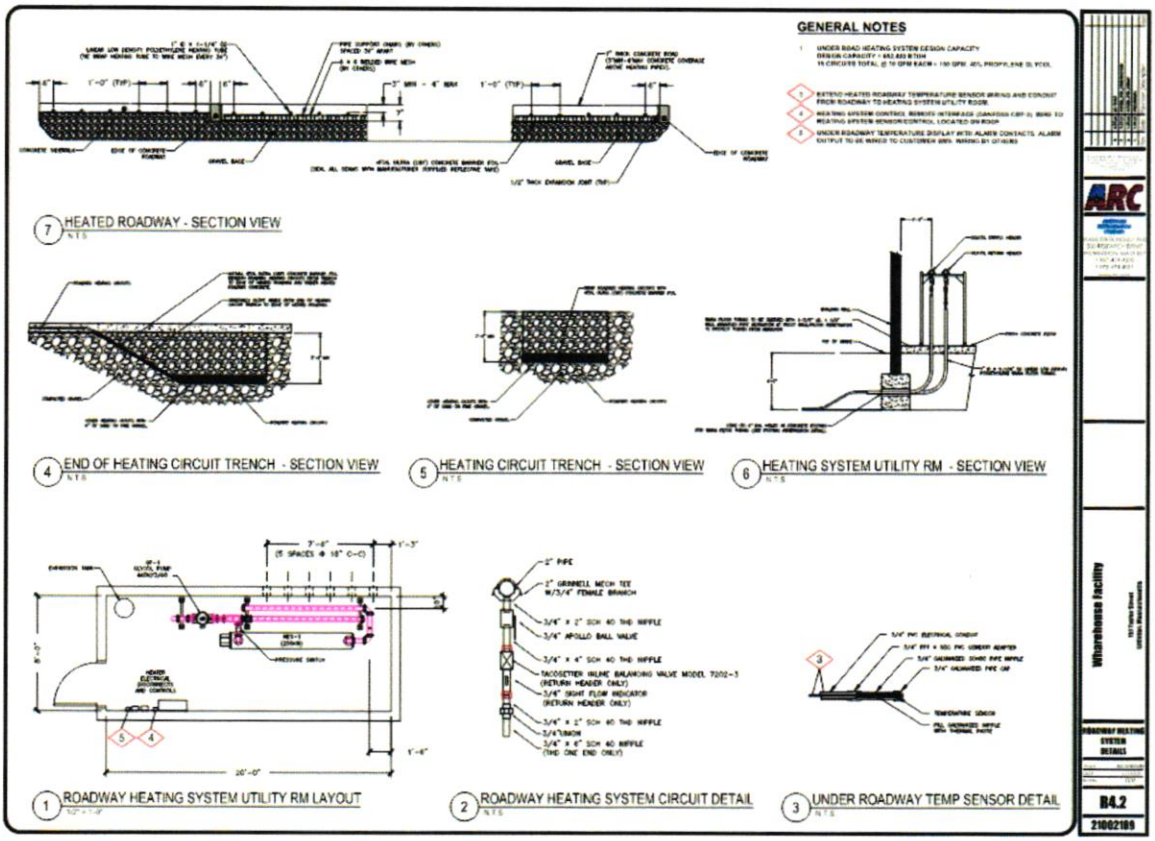


Figure C: Heated Elevated Driveway Plan and Section Views

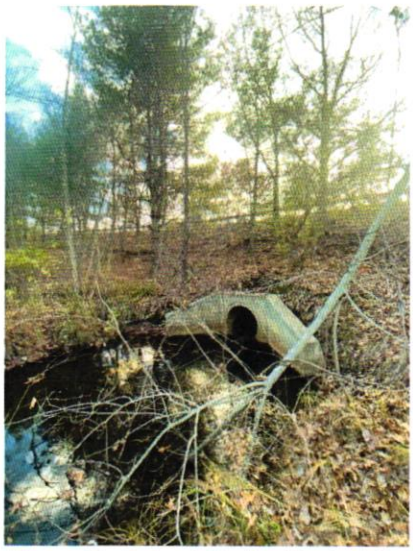


Figure D: Culvert Under Heated Causeway

Option #3: Provide a primary service to the site that would energize the proposed EV infrastructure as shown in Figure E. This options' impacts and challenges are as follows:

- Removal of trees from existing utility manhole to the parking lot for impacts of ± 2,372 SF within the 100-ft buffer. No trees with a greater DBH than 6" will be removed in the 50-ft buffer
- No impacts to wetlands
- 495 SF of impacts to 50' no disturb buffer
- 3,445 SF of impacts to 100' wetland buffer

After thorough review by the Kimley-Horn and LELWD teams Option 3 was selected as the best design alternative to provide a feasible utility route and to limit the impacts to the sensitive areas on-site. This is the routing shown in the submitted construction drawings.

To further limit impacts, this option carefully trenches through the landscaped from the existing manhole to the parking lot. This choice limits tree impacts compared to utilizing larger boring equipment and the required grading for access of the equipment. From there a direct bore is utilized directly from the edge of the parking lot to the utility medium voltage switch location. This choice limits the impacts to the wetland buffer. The bore machine needed to complete this bore of (2) 5" conduits and (2) 4" conduits to the utility medium voltage switch location will be a D40x55 S3 Navigator or an equivalent piece of equipment as chosen by the General Contractor. This is due to the required bore size and length of bore to install the desired conduits.

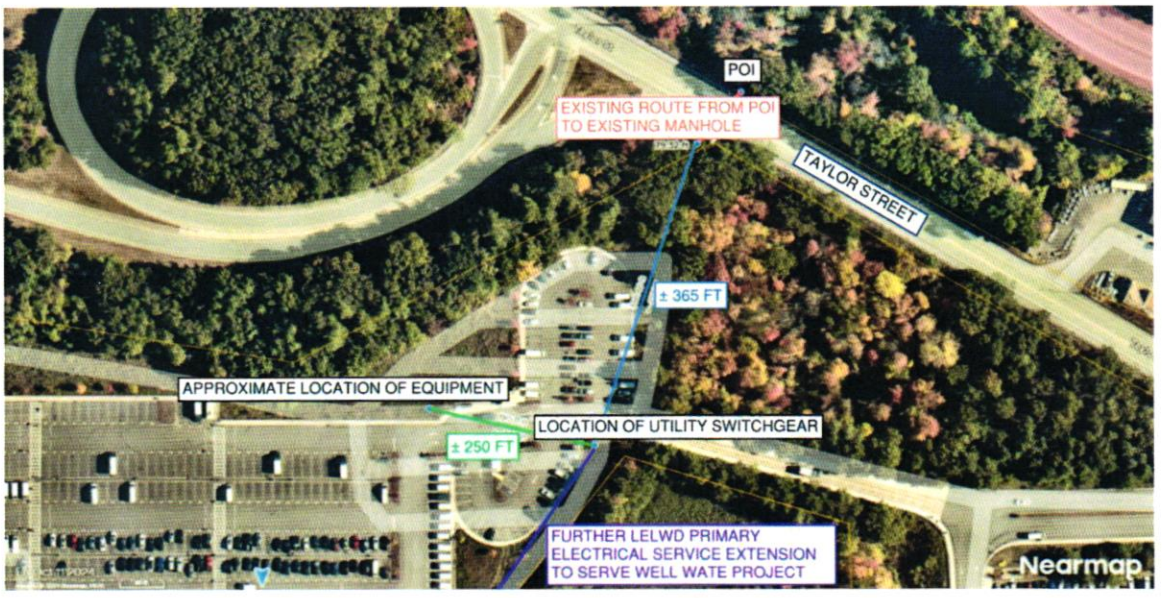


Figure E: Design Option #3 – Primary Service to feed EV Chargers from POI as part of Overall LELWD Primary Electrical Service Upgrade Project

In further support of Option 3, a proposed Well Pump Building Project is being proposed by LELWD south of the subject site. This well project will draw power from the same utility medium voltage switch included in and the proposed application which limits impacts by combining two projects on a single electrical upgrade route. The routing in red shown below in Figure F shows the route of electrical upgrades included in this application and the routing in orange shows the future additional routing associated with the Well project.

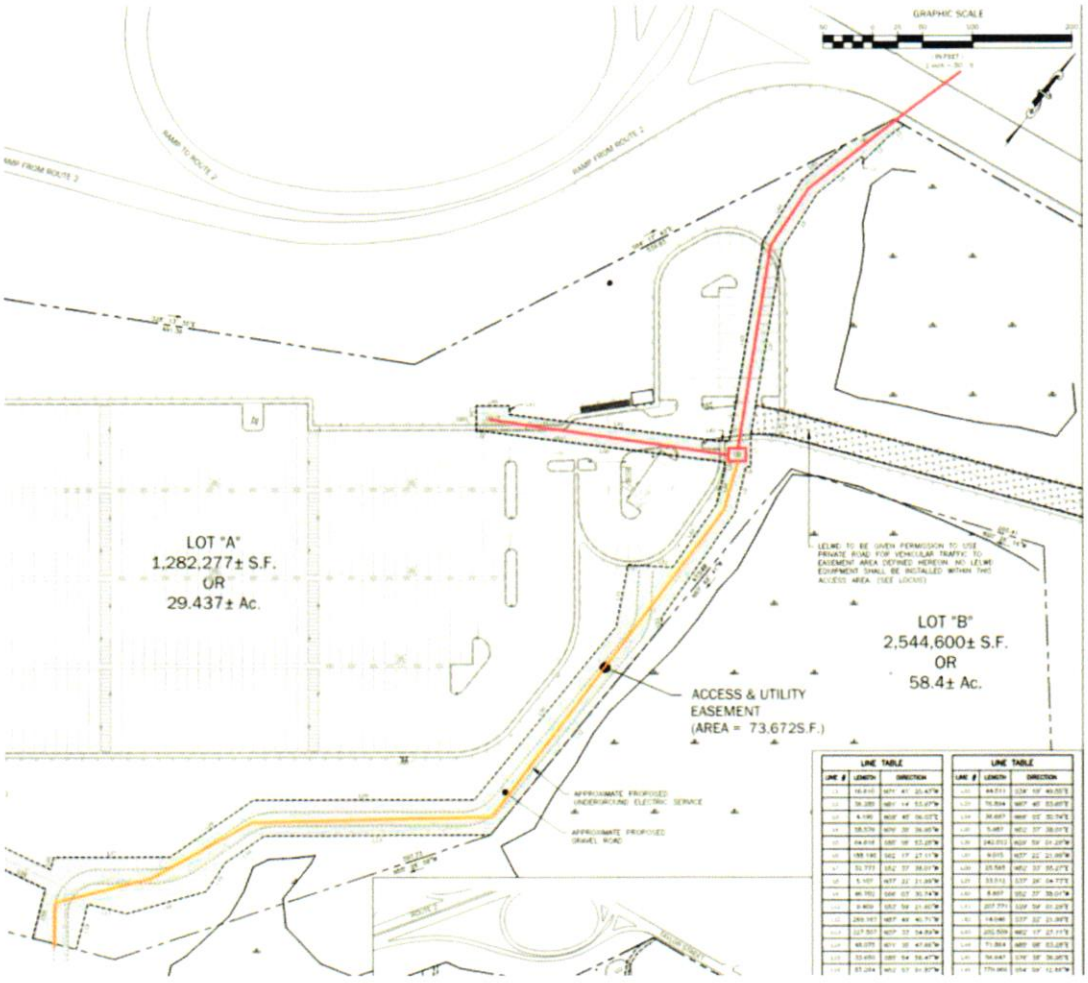


Figure F: LELWD Well Pump Building Project Tie-in

4. Confirm that the 60 proposed trees can be installed in the proposed area or if there is a septic system that would impact that

Response: Proposed trees have been shown to avoid impacts to existing septic system and other potential encumbrances. See revised Landscape Plans, sheets L1.0 and L1.1.

5. Provide more detail on what it would take to do the connection across the heated causeway and/or why its infeasible. If that route would require direct impacts in the wetlands or immediate buffer zone, provide an estimate on square feet of impacts for comparison to your preferred route

Response: The infeasibility of boring or trenching across the heated causeway is described in the response to Comment #3 above. This is explained in the alternatives analysis and specifically under Options #1 and #2 and in Figures C and D.

6. Provide information on what, if any, lighting there will be at the charging stations, with the concern being it could impact wildlife movement

Response: Each charger has a small charging indicator light which will show a dim green, red, or blue depending on charging status. This light is minimal and is not anticipated to impact wildlife as the lighting levels are substantially less impactful than the existing site lighting.

7. Describe the machinery being used to dig the easement, including where stockpiling might occur and control of runoff down the steep slope [usually accomplished with a Construction Sequence

Response: Please see Figure G "**Bore Machine Specifications**" below for a description of the machinery to be used for boring operations. Smaller trenching machinery, in addition to hand digging will be utilized for proposed trenching. Stockpiling will occur on the upstream side of the trench so that any runoff is controlled by the trench itself as well as the silt fence, filter sock and other measures as shown in the Erosion and Sediment Control Plan.

Overall, we believe boring would incur more substantial impacts to more trees and wetland buffers in this specific area. However, boring is utilized through the parking lot in order to reduce impacts to the buffers in areas that are not heavily wooded or with steep slopes.

9. Include a colored plan that clearly shows wetlands, 50-foot and 100-foot buffers

Response: A plan shown on aerial background clearly showing the wetlands and associated 50- and 100-foot buffers is included with this submittal.

10. There is concern over the existing salt shed on-site **and it's impacts to runoff into the** sensitive wetlands.

Response: As of mid-November, the salt shed has been removed. **There's a new snow/ice removal** provider in place and they are aware of the current situation and the proximity of the treatment area to the wetlands. The new provider is switching to brine-based de-icing liquid treatment program – this demonstrates how important the issue is to the owner and what lengths are being taken to address the issue. The brine-based deicer is in liquid form and will require airtight storage (no leaks or seepage to deal with).

Conclusion

The comments provided by the Littleton Conservation Commission board members on 08/20/2024 and 10/08/2024 have been acknowledged and addressed above with responses and revised deliverables.

Sincerely,

Dean A. Apostoleris, P.E.
Direct: 914 368 9199
Emai: dean.apostoleris@kimley-horn.com

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LEGEND

- PROPOSED UNDERGROUND CONDUIT LINE
- EASEMENT BOUNDARY LINE
- 50' WETLAND BUFFER
- 100' WETLAND BUFFER
- NHESP BOUNDARY LINE
- WETLAND RESOURCE BOUNDARY
- WETLAND RESOURCE BOUNDARY HATCH
- LEVEL OF WORK
- TREE CLEARING AREA
- 8" DIA. BETULA LENTA
- 10" DIA. QUERCAS RUBRA
- 18" DIA. QUERCUS RUBRA

NOTES

- PROPOSED LEVEL OF DISTURBANCE WITHIN THE 50' WETLAND BUFFER = 495 SF
- PROPOSED LEVEL OF DISTURBANCE WITHIN THE 100' WETLAND BUFFER = 3,445 SF
- TREE CLEARING WITHIN THE 50' WETLAND BUFFER = 0 SF
- TREE CLEARING WITHIN THE 100' WETLAND BUFFER = 2,372 SF
- AS PART OF THE PROPOSED TREE CLEARING, A REMOVAL OF SIX (6) TREES GREATER THAN 6" DIA. WITHIN 50' WETLAND BUFFER IS PROPOSED
- WETLAND DELINEATION WAS VERIFIED BY A PROFESSIONAL WETLAND SCIENTIST FROM LUCAS ENVIRONMENTAL, LLC, ON 12/12/2024

PARKING CALCULATION

- 450 EXISTING VAN PARKING STALLS
- 165 EXISTING VAN PARKING STALLS TO BE CONVERTED TO CHARGING-CAPABLE PARKING STALLS
- 4 EXISTING STALLS WILL BE REMOVED FOR INSTALLATION OF REQUIRED ELECTRICAL EQUIPMENT
- TOTAL PROPOSED PARKING = 446 VAN PARKING STALLS (INCLUDING 165 CHARGING-CAPABLE)

NORTH

GRAPHIC SCALE IN FEET
0 5 10 20

NO.	REVISIONS	DATE	BY

Kimley»Horn

271 WAVERLEY OAKS ROAD, SUITE 302
WALTHAM, MA 02452
PHONE: 781-439-0979
WWW.KIMLEY-HORN.COM

KHA PROJECT	115319987
DATE	12/19/2024
SCALE:	AS SHOWN
DESIGNED BY:	MA
DRAWN BY:	KN
CHECKED BY:	DAA

AERIAL UTILITY EXTENSION EXHIBIT

DK01_EV
EV INFRASTRUCTURE PLAN
151 TAYLOR STREET
LITTLETON, MA 01460
TOWN OF LITTLETON MASSACHUSETTS

EXHIBIT 1

Saved Friday, December 20, 2024 10:22:18 AM KEVIN.NASKA Plotted Friday, December 20, 2024 10:23:05 AM Naska, Kevin

NOTES:

1. WELL LOCATIONS DIGITIZED FROM A PLAN ENTITLED "153 TAYLOR STREET MONITORING WELL LOCATION PLAN" BY LITTLETON WATER DEPARTMENT INCLUDING AN APPROXIMATE LOCATION OF THE SUBJECT WELL TRANSMITTED VIA EMAIL ON JULY 21, 2021.
2. PROPERTY LINE DATA & EXISTING EASEMENTS OBTAINED FROM A PLAN ENTITLED *"#151 TAYLOR STREET; PLAN OF LAND IN LITTLETON, MA"* BY PRECISION LAND SURVEYING, INC. DATED JUNE 28, 2021.
3. EXISTING CONDITIONS INFORMATION OBTAINED FROM A SET OF PLANS ENTITLED *"LAST MILE DISTRIBUTION FACILITY, 153 TAYLOR STREET LITTLETON, MA; AS BUILT PLANS"* BY BEALS ASSOCIATES, INC. DATED JULY 14, 2024.

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

CONCORD–WESTMINSTER HIGHWAY
(PUBLIC – STATE HIGHWAY)
(ROUTE 2)

TAYLOR STREET
(PUBLIC – VARIABLE WIDTH)

Scope of our application to the Conservation Commission highlighted in yellow

LELWD Scope highlighted in orange

LOT "A"
29.437± Ac.

LOT "B"
58.4± Ac.

PARCEL R–3 & R–4
20' RIGHT OF WAY
7633/166 & 7739/377

APPROXIMATE PROPOSED UNDERGROUND ELECTRIC SERVICE

AREA TO BE UTILIZED BY LEWLD FOR ACCESS TO EASEMENT AREA DEFINED HERON. NO LEWLD ELECTRIC EQUIPMENT SHALL BE INSTALLED WITHIN THIS ACCESS AREA.

PROPOSED
ACCESS & UTILITY EASEMENT
(AREA = 116,761 S.F.)

APPROXIMATE PROPOSED
LEWLD WATER MAIN

APPROXIMATE PROPOSED
GRAVEL ROAD

SIGN EASEMENT
1,600 S.F.
53640 / 434

DRIVEWAY & UTILITY EASEMENT
100' WIDE – 9418 / 198

24' EMERGENCY ACCESS EASEMENT

NO ACCESS

LEGEND

- UTILITY EASEMENT AREA
- ACCESS EASEMENT AREA

LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	83.432	N67° 13' 04.65"E
L2	118.310	S37° 21' 05.09"E
L3	101.370	S71° 35' 47.66"E
L4	222.223	S37° 21' 05.09"E
L5	223.711	S87° 49' 40.71"E
L6	61.752	N63° 35' 33.59"E
L7	22.775	N55° 41' 09.77"E
L10	52.587	N52° 05' 31.04"E
L11	120.081	N37° 20' 31.62"W
L12	54.825	N52° 24' 03.11"E
L13	33.512	S37° 26' 04.73"E
L14	8.607	S52° 37' 38.01"W
L15	96.333	S29° 59' 01.29"E
L16	87.288	S47° 11' 36.54"E
L18	28.910	S42° 41' 35.44"E
L19	168.054	N62° 17' 27.11"E
L20	71.864	N85° 08' 53.28"E
L21	41.788	S81° 08' 50.20"E
L22	70.641	S64° 17' 43.00"E
L23	107.771	N80° 59' 37.02"W

LINE TABLE		
LINE #	LENGTH	DIRECTION
L24	64.616	S65° 08' 53.28"W
L25	154.000	S62° 17' 27.11"W
L26	66.260	S35° 18' 32.00"E
L27	209.680	S22° 17' 30.00"E
L29	193.767	S39° 20' 19.00"E
L30	39.086	S79° 07' 49.80"E
L31	12.939	S81° 37' 55.10"W
L33	282.819	N39° 25' 03.20"W
L35	411.786	N22° 17' 30.00"W
L37	22.610	S67° 28' 50.00"W
L39	105.846	S89° 09' 08.75"W
L40	9.409	S53° 59' 21.60"W
L41	269.183	S87° 49' 40.71"E
L42	227.507	N37° 33' 54.89"W
L43	48.075	N71° 35' 47.66"W
L44	33.650	S85° 54' 56.47"W
L45	83.264	N52° 53' 01.87"W
L46	39.757	N22° 59' 22.05"W
L47	46.868	S67° 05' 26.25"W
L48	44.979	N22° 54' 33.75"W

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C1	8.315	33.701	014.1367
C2	39.121	34.174	065.5911
C3	15.709	200.000	004.5003
C4	232.070	780.000	017.0469
C5	102.270	3854.720	001.5201
C6	82.310	80.000	058.9505
C7	29.890	100.000	017.1259
C8	47.243	30.000	090.2278
C9	46.694	110.000	024.3214

Prepared By:
BEALS ASSOCIATES, INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PH: (617) 367-2525
•PLANNING• •ENGINEERING• •PERMITTING• •MANAGEMENT•

Prepared For:
LITTLETON LELWD
39 Ayer Road, P.O. Box 2405, Littleton, MA 01460

153 Taylor Street
Littleton, Massachusetts
(Middlesex County)

No.	Revision	Date

EXHIBIT PLAN
NOT FOR CONSTRUCTION

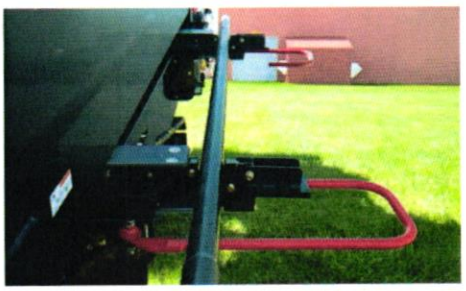
Designed by: MEC | Checked by: TPM
Proj. No.: C-1127.02 | Issue Date: 10.10.24
Drawing Scale: 1"=80'

Sheet Title
LELWD ELECTRIC EASEMENT EXHIBIT PLAN

Sheet Number
EX-1

D40x55 S3 NAVIGATOR®
HORIZONTAL DIRECTIONAL DRILL

PREMIUM PERFORMANCE. With 40,000 lb (177.9 kN) of thrust/pullback and 5,500 ft-lb (7,457 Nm) of rotational torque, the D40x55 S3 offers a 10% increase in thrust and rotation over its predecessor, the D36x50 Series II – helping to maximize productivity.



VARIETY OF ROD OPTIONS. The D40x55 S3 is available with a range of drill rod options, including a 10 ft (3 m) length in 2.38 in (6 cm) or a 2.63 in (6.7 cm) diameter, and a 15 ft (4.6 m) length in a 2.63 in (6.7 cm) diameter. A variety of rod options allows the drill to be configured to the specific needs of the contractor.

CLASS-LEADING CYCLE TIMES. The D40x55 S3 features a carriage speed of 188 fpm (57.3 m/min) – which is 7% faster than its predecessor, the D36x50 Series II – helping contractors install more linear feet per day.

SIGNIFICANT SOUND REDUCTION. With a 104 dB(A) guaranteed sound power level and an operator ear rating of 82.9 dB(A) [in-cab rating of 75.7 dB(A)], the D40x55 S3 is significantly quieter than its predecessor – contributing to a quieter working environment with less neighborhood disturbance and easier communication among the crew.

COMFORTABLE CAB. The excavator-style cab provides operators more legroom and greater comfort.

AURORA™ TOUCHSCREEN DISPLAY. Interactive full-color touchscreen display delivers real-time, easy-to-view locate information, bore plans and more that can help increase productivity.

VERMEER.COM

Vermeer

EQUIPPED TO DO MORE.

D40x55 S3 NAVIGATOR® HORIZONTAL DIRECTIONAL DRILL

GENERAL WEIGHTS AND DIMENSIONS

Min transport length: 20.1 ft (6.1 m)
Min transport width: 89 in (226.1 cm)
Min transport height: 76 in (193 cm)
Height (with cab): 94.5 in (240 cm)
Min weight: 22,380 lb (10,151.4 kg)
Max weight: 26,110 lb (11,843.3 kg)

ENGINE OPTION ONE

Make and model: John Deere Series 4045
Fuel type: Ultra low sulfur diesel
Max engine rpm: 2,400 rpm
Gross horsepower: 140 hp (104 kW)
Emissions rating: Tier 4 Final (EU Stage V)

ENGINE OPTION TWO

Make and model: John Deere Series 4045
Fuel type: Diesel
Max engine rpm: 2,400 rpm
Gross horsepower: 140 hp (104 kW)
Emissions rating: Tier 3 (EU Stage IIIA)

OPERATIONAL

Thrust/Pullback: 40,000 lb (177.9 kN)
Max carriage speed at max engine rpm: 188 ft/min (57.3 m/min)
Max spindle torque (low at max engine rpm): 5,500 ft-lb (7457 Nm)
Max spindle speed at max engine rpm: 227 rpm
Min bore diameter: 4 in (10.2 cm)
Max ground drive speed at max engine rpm (fwd): 3.3 mph (5.3 km/h)
Noise level at operator's ear: 82.9 dB(A)
Noise level at operator's ear (cab) : 75.7 dB(A)
Drill rack angle [10 ft (3 m) rod]: 15.5-20.5° (27.7-37.4%)
Drill rack angle [15 ft (4.6 m) rod]: 12.5-17.5° (22.2-31.5%)

FLUID CAPACITIES

Fuel tank: 44 gal (166.6 L)
Antifreeze tank capacity: 1.6 gal (6 L)

DRILLING FLUID SYSTEM OPTION ONE

Max flow: 50 gpm (189.3 L/min)
Max pressure: 1,050 psi (7.2 MPa)

DRILLING FLUID SYSTEM OPTION TWO

Max flow: 70 gpm (265 L/min)
Max pressure: 1,100 psi (7.6 MPa)

FEATURES

Breakout system: Standard hydraulic vise
Drilling lights: Standard
Flow indicator: Standard
Stakedown system: Standard
Strike alert: Standard
Remote lockout: Standard

DRILL PIPE OPTION ONE

Type: Firestick® drill rod
Length: 10 ft (3 m)
Rod diameter: 2.38 in (6 cm)
Weight: 80 lb (36.3 kg)
Bend radius: 108 ft (32.9 m)
Carrying capacity: 500 ft (152.4 m)

DRILL PIPE OPTION TWO

Type: Firestick drill rod
Length: 10 ft (3 m)
Rod diameter: 2.63 in (6.7 cm)
Weight: 131 lb (59.4 kg)
Bend radius: 145 ft (44.2 m)
Carrying capacity: 450 ft (137.2 m)

DRILL PIPE OPTION THREE

Type: Firestick drill rod
Length: 15 ft (4.6 m)
Rod diameter: 2.63 in (6.7 cm)
Weight: 165 lb (74.9 kg)
Bend radius: 145 ft (44.2 m)
Carrying capacity: 525 ft (160 m)

Vermeer

EQUIPPED TO DO MORE.

02/23

PN 296431556

D40x55 S3 NAVIGATOR® HORIZONTAL DIRECTIONAL DRILL

GENERAL WEIGHTS AND DIMENSIONS
Min transport length: 20.1 ft (6.1 m)
Min transport width: 89 in (226.1 cm)
Min transport height: 76 in (193 cm)
Height (with cab): 94.5 in (240 cm)
Min weight: 22,380 lb (10,151.4 kg)
Max weight: 26,110 lb (11,843.3 kg)

ENGINE OPTION ONE
Make and model: John Deere Series 4045
Fuel type: Ultra low sulfur diesel
Max engine rpm: 2,400 rpm
Gross horsepower: 140 hp (104 kW)
Emissions rating: Tier 4 Final (EU Stage V)

ENGINE OPTION TWO
Make and model: John Deere Series 4045
Fuel type: Diesel
Max engine rpm: 2,400 rpm
Gross horsepower: 140 hp (104 kW)
Emissions rating: Tier 3 (EU Stage IIIA)

OPERATIONAL
Thrust/Pullback: 40,000 lb (177.9 kN)
Max carriage speed at max engine rpm: 188 ft/min (57.3 m/min)
Max spindle torque (low at max engine rpm): 5,500 ft-lb (7457 Nm)
Max spindle speed at max engine rpm: 227 rpm
Min bore diameter: 4 in (10.2 cm)
Max ground drive speed at max engine rpm (fwd): 3.3 mph (5.3 km/h)
Noise level at operator's ear: 82.9 dB(A)
Noise level at operator's ear (cab) : 75.7 dB(A)
Drill rack angle [10 ft (3 m) rod]: 15.5-20.5° (27.7-37.4%)
Drill rack angle [15 ft (4.6 m) rod]: 12.5-17.5° (22.2-31.5%)

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Remote lockout: Standard

DRILL PIPE OPTION ONE
Type: Firestick® drill rod
Length: 10 ft (3 m)
Rod diameter: 2.38 in (6 cm)
Weight: 80 lb (36.3 kg)
Bend radius: 108 ft (32.9 m)
Carrying capacity: 500 ft (152.4 m)

DRILL PIPE OPTION TWO
Type: Firestick drill rod
Length: 10 ft (3 m)
Rod diameter: 2.63 in (6.7 cm)
Weight: 131 lb (59.4 kg)
Bend radius: 145 ft (44.2 m)
Carrying capacity: 450 ft (137.2 m)

DRILL PIPE OPTION THREE
Type: Firestick drill rod
Length: 15 ft (4.6 m)
Rod diameter: 2.63 in (6.7 cm)
Weight: 165 lb (74.9 kg)
Bend radius: 145 ft (44.2 m)
Carrying capacity: 525 ft (160 m)

Figure G: Bore Machine Specifications

8. Look at boring from the existing electrical manhole to the switch

Response: Boring from the existing manhole to the switch is certainly possible. However, it should be noted that this area is heavily wooded and includes steep slopes. In order to safely operate the boring machine in this area, additional clearing and grading would be required to provide sufficient access and working space. Further, boring under the existing trees with a 12" reamer would impact the root zones likely leading to tree kill in a similar manner to trenching. Trenching was chosen to minimize the amount of disturbance and to recognize the true impacts to trees and grading in the buffers,

D40x55 S3 NAVIGATOR® HORIZONTAL DIRECTIONAL DRILL

GENERAL WEIGHTS AND DIMENSIONS

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Strike alert: Standard

Remote lockout: Standard

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Type: Firestick drill rod

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Rod diameter: 2.63 in (6.7 cm)

Weight: 131 lb (59.4 kg)

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DRILL PIPE OPTION THREE

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Length: 15 ft (4.6 m)

Rod diameter: 2.63 in (6.7 cm)

Weight: 165 lb (74.9 kg)

Bend radius: 145 ft (44.2 m)

Carrying capacity: 525 ft (160 m)

LUCAS
ENVIRONMENTAL, LLC

500A Washington Street, Quincy, MA 02169

December 17, 2024

Kimley-Horn
Attn: Ryan Gram
1 North Lexington Avenue, Suite 505
White Plains, NY 10601

Re: Wetland Delineation Review Letter
151 Taylor Street
Littleton, MA

Dear Mr. Gram,

A Professional Wetland Scientist (PWS) from Lucas Environmental, LLC (LE) conducted a site investigation on December 12, 2024, to verify a previously delineated (by others) boundary of Bordering Vegetated Wetlands (BVW) present at 151 and 153 Taylor Street in Littleton, Massachusetts. The site investigation was limited to reviewing previously delineated BVW flags labeled A8 through A10 and C2 through C10 located southeast of the visitors parking lot (i.e., Study Area). Prior to LE's investigation, Feldman Geospatial had recently reestablished the delineation flag locations by survey. The purpose of the wetland investigation was to verify the delineated boundary of the BVW.

Please note that this effort is specific to wetland resources; it does not evaluate constraints related to local planning or zoning requirements, historical or cultural significance, nor does it evaluate the potential for soil, air, or water contamination. Note that the site was reviewed under appropriate field conditions, i.e., no snow cover or frozen ground.

The wetland investigation was performed in accordance with the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, § 40) and regulations (310 CMR 10.00 *et seq.*); Section 404 of the Clean Water Act (33 U.S.C. 1344); Massachusetts Department of Environmental Protection (MassDEP) publication "Massachusetts Handbook for Delineation of Bordering Vegetated Wetlands" (2022); the U.S. Army Corp of Engineers (USACE) Wetland Delineation Manual (1987) and the Northcentral and Northeast Regional Supplement (2012); and the Town of Littleton Wetlands Protection Bylaw (Chapter 171) and Regulations. The Bylaw regulates wetland resource areas as per the WPA.

Based on a review of online data sources and a field investigation, LE offers the following conclusions:

1. Wetland resource areas present at or near the Study Area include: BVW, Inland Bank, and Bordering Land Subject to Flooding.

2. LE reviewed the BVW boundary delineation flags numbered A8 through A10 and C2 through C10 and found these flags to accurately delineate the BVW boundary.

3. A Potential Vernal Pool (PVP) is located just downgradient of wetland flags C3 to C6. This PVP is mapped by NHESP as PVP #12848. A surface water gauge is installed within this PVP and at the time of the inspection the gauge depth reading was 0.66 feet, although it appeared that other areas of the PVP contained somewhat deeper water.

If you have any questions, please do not hesitate to contact me at 617.405.4118 or jho@lucasenviro.com. Thank you for your consideration in this matter.

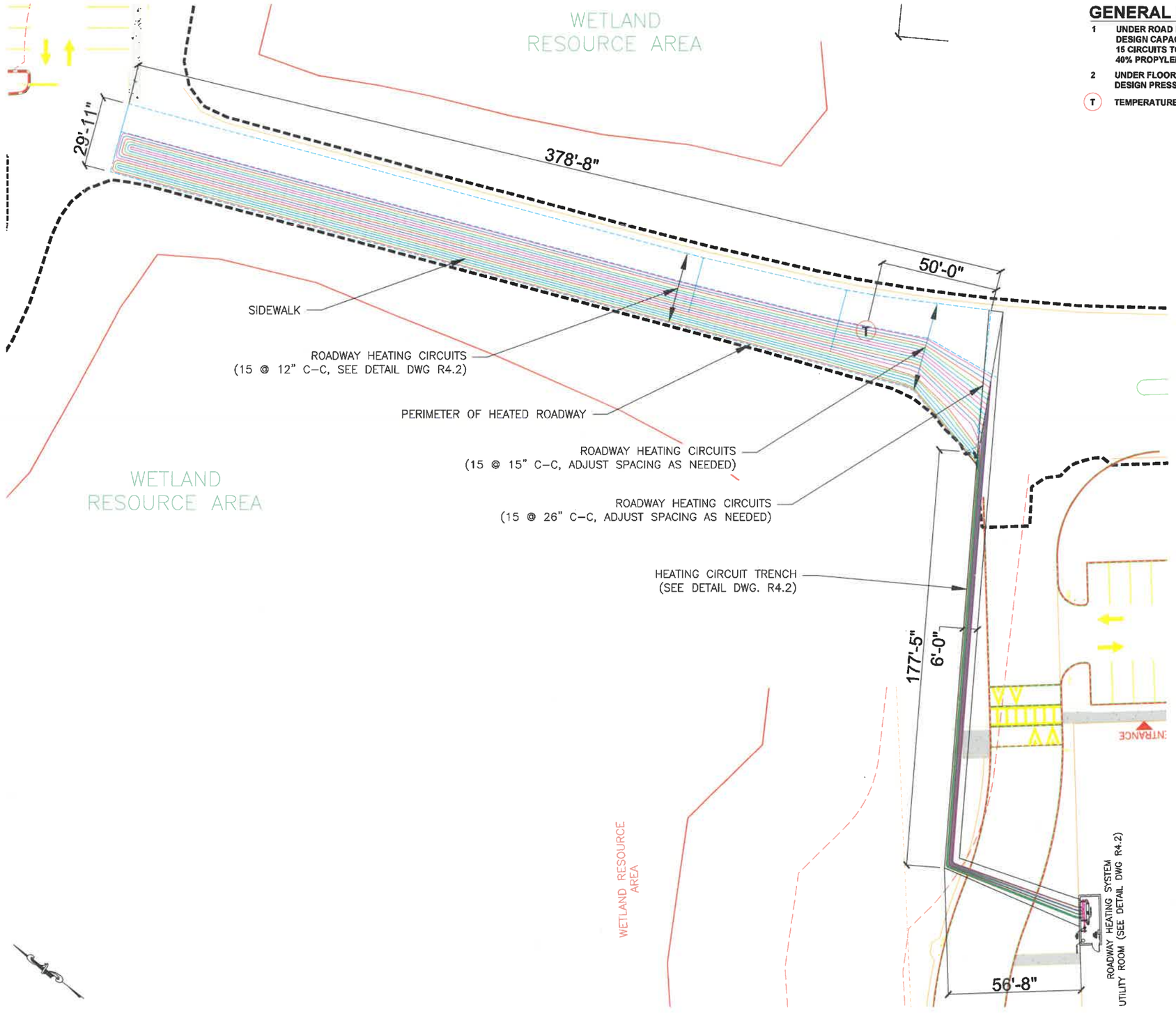
Sincerely,
LUCAS ENVIRONMENTAL, LLC

Joseph H. Orzel, PWS, CWS
Project Manager/Wetland Scientist

GENERAL NOTES

1. UNDER ROAD HEATING SYSTEM DESIGN CAPACITY:
   DESIGN CAPACITY = 682,400 BTUH
   15 CIRCUITS TOTAL @ 10 GPM EACH = 150 GPM,
   40% PROPYLENE GLYCOL.
2. UNDER FLOOR PIPING = 1" I.D. POLYETHYLENE TUBING
   DESIGN PRESSURE = 50 PSI

(T) TEMPERATURE MONITORING SENSOR



1 PLAN VIEW
1/16" = 1'-0"

Rev.	Date	Revision Description	Appd
4	6.30.21	AS-BUILT	
3	3.19.21	ISSUED_FOR_CONSTRUCTION	
2	1.29.21	ISSUED_FOR_PERMIT	
1	11.13.20	PROGRESS	

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Wharehouse Facility
151 Taylor Street
Littleton, Massachusetts

ROADWAY HEATING SYSTEM PHASE 1 LAYOUT

SCALE: AS SHOWN
DATE: 11/13/2020
DR./CHK.: TCM

R4.0A

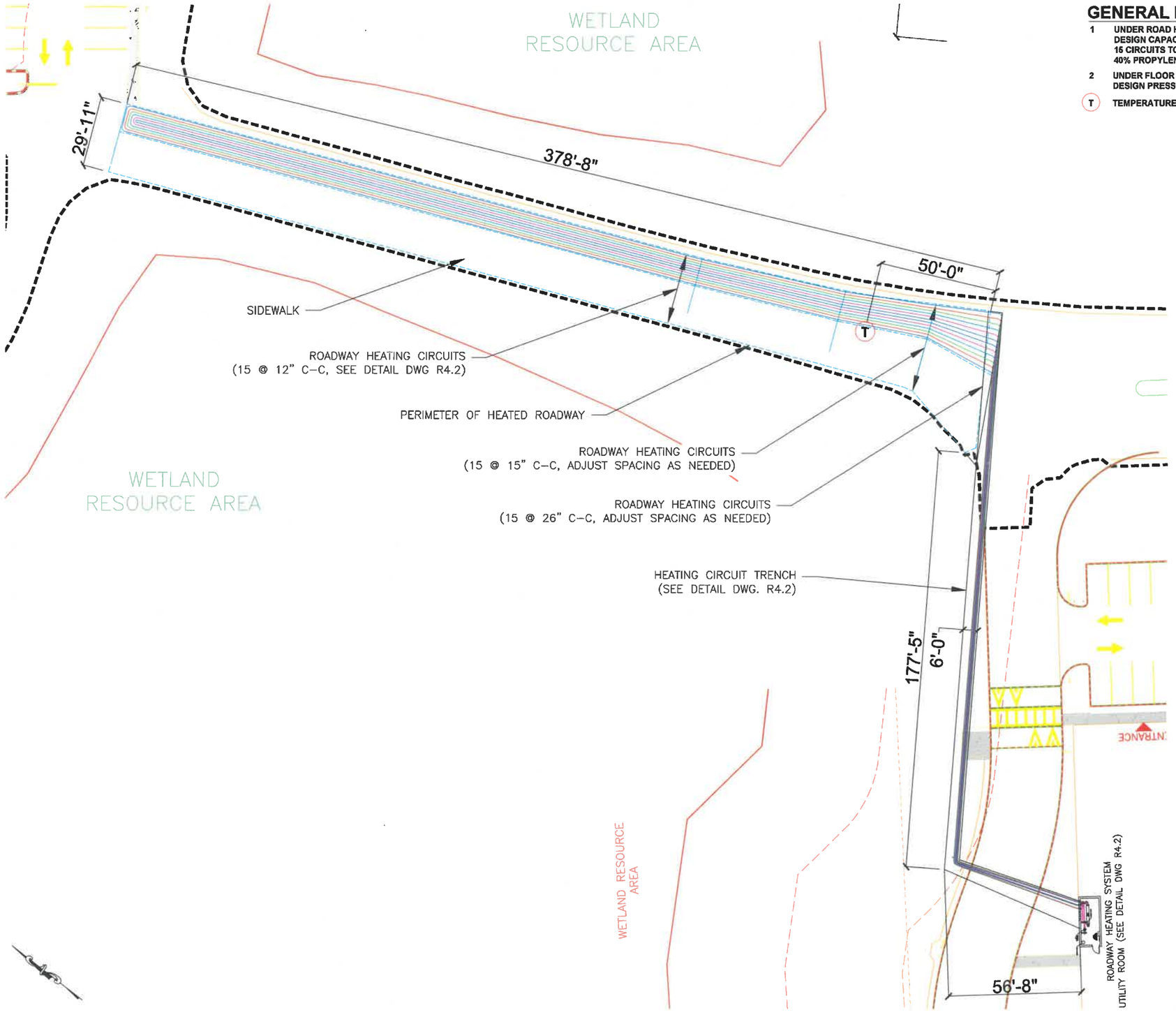
21002189

GENERAL NOTES

1 UNDER ROAD HEATING SYSTEM DESIGN CAPACITY:
DESIGN CAPACITY = 682,400 BTUH
15 CIRCUITS TOTAL @ 10 GPM EACH = 150 GPM,
40% PROPYLENE GLYCOL.

2 UNDER FLOOR PIPING = 1" I.D. POLYETHYLENE TUBING
DESIGN PRESSURE = 50 PSI

(T) TEMPERATURE MONITORING SENSOR



1 PLAN VIEW
1/16" = 1'-0"

Rev.	Date	Revision Description	Appd
4	6.30.21	AS-BUILT	
3	3.15.21	ISSUED_FOR_CONSTRUCTION	
2	1.20.21	ISSUED_FOR_PERMIT	
1	1.15.21	PRELIMINARY	

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151 Taylor Street
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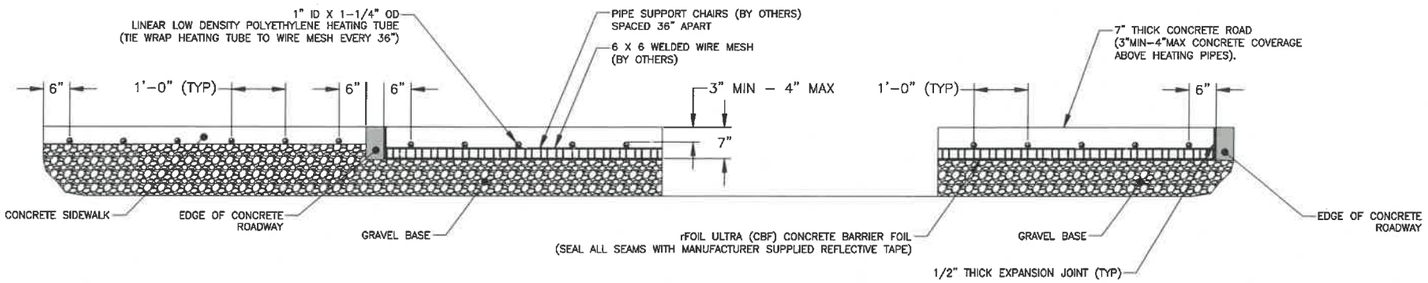
ROADWAY HEATING SYSTEM PHASE 2 LAYOUT

SCALE:	AS SHOWN
DATE:	11/13/2020
DR./CHK.:	TCM

R4.0B

21002189



7 HEATED ROADWAY - SECTION VIEW
N.T.S.

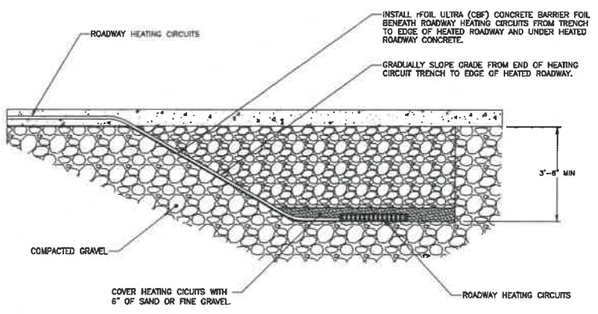
GENERAL NOTES

1 **UNDER ROAD HEATING SYSTEM DESIGN CAPACITY:**
DESIGN CAPACITY = 682,400 BTUH
15 CIRCUITS TOTAL @ 10 GPM EACH = 150 GPM, 40% PROPYLENE GLYCOL.

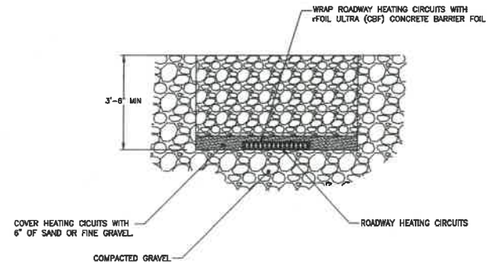
3 **EXTEND HEATED ROADWAY TEMPERATURE SENSOR WIRING AND CONDUIT FROM ROADWAY TO HEATING SYSTEM UTILITY ROOM.**

4 **HEATING SYSTEM CONTROL REMOTE INTERFACE (DANFOSS CDP-2). WIRE TO HEATING SYSTEM SENSOR/CONTROL LOCATED ON ROOF.**

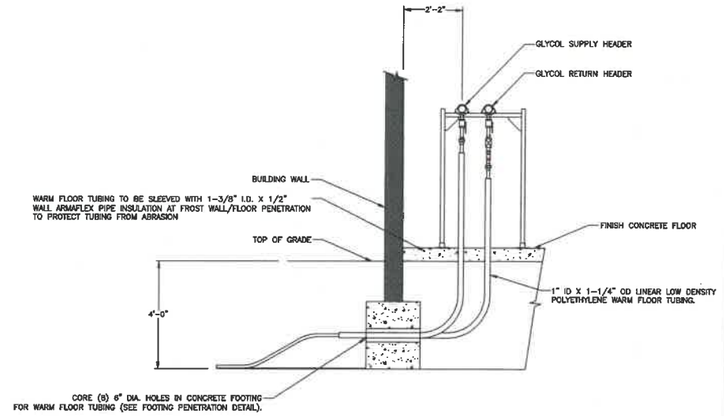
5 **UNDER ROADWAY TEMPERATURE DISPLAY WITH ALARM CONTACTS. ALARM OUTPUT TO BE WIRED TO CUSTOMER BMS. WIRING BY OTHERS**



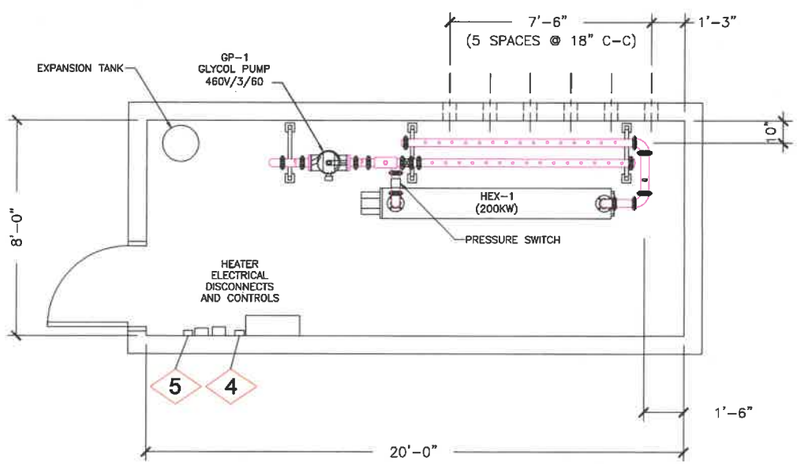
4 END OF HEATING CIRCUIT TRENCH - SECTION VIEW
N.T.S.



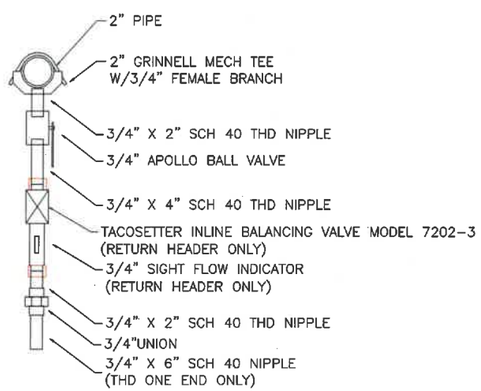
5 HEATING CIRCUIT TRENCH - SECTION VIEW
N.T.S.



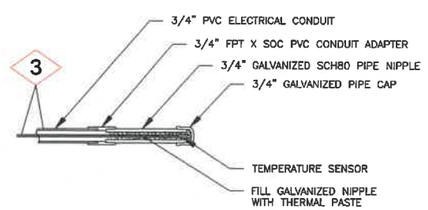
6 HEATING SYSTEM UTILITY RM - SECTION VIEW
N.T.S.



1 ROADWAY HEATING SYSTEM UTILITY RM LAYOUT
1/2" = 1'-0"



2 ROADWAY HEATING SYSTEM CIRCUIT DETAIL
N.T.S.



3 UNDER ROADWAY TEMP SENSOR DETAIL
N.T.S.

Rev.	Date	Revision Description	Appd
4	4.30.21	AS-BUILT	
3	1.20.21	ISSUED FOR CONSTRUCTION	
2	1.12.21	ISSUED FOR PERMIT	
1	1.15.21	PRELIMINARY	

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Wharehouse Facility
151 Taylor Street
Lindsen, Massachusetts

ROADWAY HEATING SYSTEM DETAILS

SCALE: AS SHOWN
DATE: 11/13/2020
DRAWN: TCM

R4.2

21002189

UNDER ROAD HEATING SYSTEM

151 TAYLOR STREET
LITTLETON, MASSACHUSETTS

GENERAL NOTES:

1. PIPING DESIGN, MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH ASME B31.5-2016 REFRIGERATION PIPING AND HEAT TRANSFER COMPONENTS AND ANSI/ASHRAE STANDARD 15-2019 SAFETY STANDARD FOR REFRIGERATION SYSTEMS.

LIST OF DRAWINGS

INSULATION NOTES

1. INSULATE HEATING SYSTEM GLYCOL SUPPLY/RETURN HEADERS WITH 1-1/2" RIGID FIBERGLASS PIPE INSULATION WITH ALL SERVICE JACKET AND PVC COVERING.
2. INSTALL ALL INSULATING MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
3. SEAL ALL INSULATION JOINTS WITH VAPOR RETARDING JOINT SEALANT APPLIED PER MANUFACTURERS RECOMMENDATION.
4. SEAL ALL ROOF AND WALL PENETRATIONS WITH NON-FLAMMABLE SPRAY FOAM INSULATION.
5. PAINT ALL PIPE WELDS WITH RUST INHIBITIVE PRIMER PRIOR TO APPLYING PIPE INSULATION.

PIPING MATERIAL SPECIFICATION:

1. PIPE 1-1/2" IN DIAMETER AND SMALLER SHALL BE ASTM A106, GRADE B, SCHEDULE 80, SEAMLESS.
2. PIPE 2" IN DIAMETER THROUGH 10" SHALL BE ASTM A53, GRADE B, SCHEDULE 40, ERW OR ASTM A106, GRADE B, SCHEDULE 40, SEAMLESS.
3. PIPE 12" IN DIAMETER AND LARGER SHALL BE ASTM A53, GRADE B, SCHEDULE 40, ERW OR ASTM A106, GRADE B, SCHEDULE 40, SEAMLESS
4. ALL PIPING 2" IN DIAMETER AND LARGER SHALL BE WELDED.
5. ALL PIPING 1-1/2" IN DIAMETER AND SMALLER MAY BE THREADED OR WELDED
6. ALL PIPE FITTINGS 1-1/2" IN DIAMETER AND SMALLER MAY BE 2,000# FORGED STEEL THREADED FITTINGS PER ASTM A105 OR 3,000# FORGED STEEL SOCKET WELD FITTINGS PER ASTM A105.
7. ALL 2" PIPE FITTINGS MAY BE 3,000# FORGED STEEL SOCKET WELD FITTINGS PER ASTM A105 OR BUTT WELD FITTINGS PER ASTM A234.
8. ALL PIPE FITTINGS 2-1/2" IN DIAMETER AND LARGER SHALL BE BUTT WELD FITTINGS PER ASTM A234.
9. ALL PIPE NIPPLES SHALL BE ASTM A106, GRADE B, SCHEDULE 80 SEAMLESS.

EQUIPMENT SCHEDULE:

HEAT EXCHANGERS

TAG	MFG.	MODEL #	POWER	CAPACITY	LOCATION
HEX-1	ACUTHERM	SERIES 1350	*480V/3PH/60	200 KW	HEATING SYSTEM UTILITY RM
			*480V/3PH/60		

* HEATER PROVIDED WITH 120V T-STAT

PUMPS

TAG	MFG.	MODEL #	DESCRIPTION	CAPACITY	POWER	HP	LOCATION
P-1	GRUNDFOS	VL 25709	GLYCOL CIRCULATING PUMP	150 GPM @ 94' TDH	460V/3 PH/60	7.5 HP	UTILITY ROOM

CONTROLS

TAG	MFG.	DESCRIPTION	POWER	CAPACITY	LOCATION
DS-2C	DANFOSS	HTG SYS SENSOR/CONTROL	120VAC	30A MAX	HEATING SYSTEM UTILITY RM
CDP-2	DANFOSS	REMOTE CONTROL/DISPLAY	NA	NA	HEATING SYSTEM UTILITY RM
T775	HONEYWELL	UNDER ROAD TEMP DISPLAY	120VAC		HEATING SYSTEM UTILITY RM

HEATING CIRCUIT SCHEDULE

CIRCUIT #	I.D. (INCHES)	MATERIAL	WORKING PRESSURE	LENGTH (FT)	LOCATION
1	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,296	WALKWAY
2	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,292	WALKWAY
3	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,288	WALKWAY
4	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,322	WEST SIDE OF ROADWAY
5	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,319	WEST SIDE OF ROADWAY
6	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,316	WEST SIDE OF ROADWAY
7	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,312	WEST SIDE OF ROADWAY
8	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,307	WEST SIDE OF ROADWAY
9	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,304	WEST SIDE OF ROADWAY
10	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,359	EAST SIDE OF ROADWAY
11	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,354	EAST SIDE OF ROADWAY
12	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,350	EAST SIDE OF ROADWAY
13	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,346	EAST SIDE OF ROADWAY
14	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,342	EAST SIDE OF ROADWAY
15	1.049	TYPE 1 PE 1404 LLD	80 PSI @ 73.4F	1,339	EAST SIDE OF ROADWAY

1 COVER SHEET - NOTES
N.T.S.

Rev.	Date	Revision Description	Appd
4	6.30.21	AS-BUILT	
3	3.15.21	PERMIT_CONSTRUCTION	
2	1.20.21	ESTIMATE_PERMIT	
1	1.15.21	PRELIMINARY	

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www.arc.cool

Wharehouse Facility
151 Taylor Street
Littleton, Massachusetts

ROADWAY HEATING SYSTEM
COVER SHEET

SCALE: AS SHOWN
DATE: 11/13/2020
DrI./Chk.: TCM

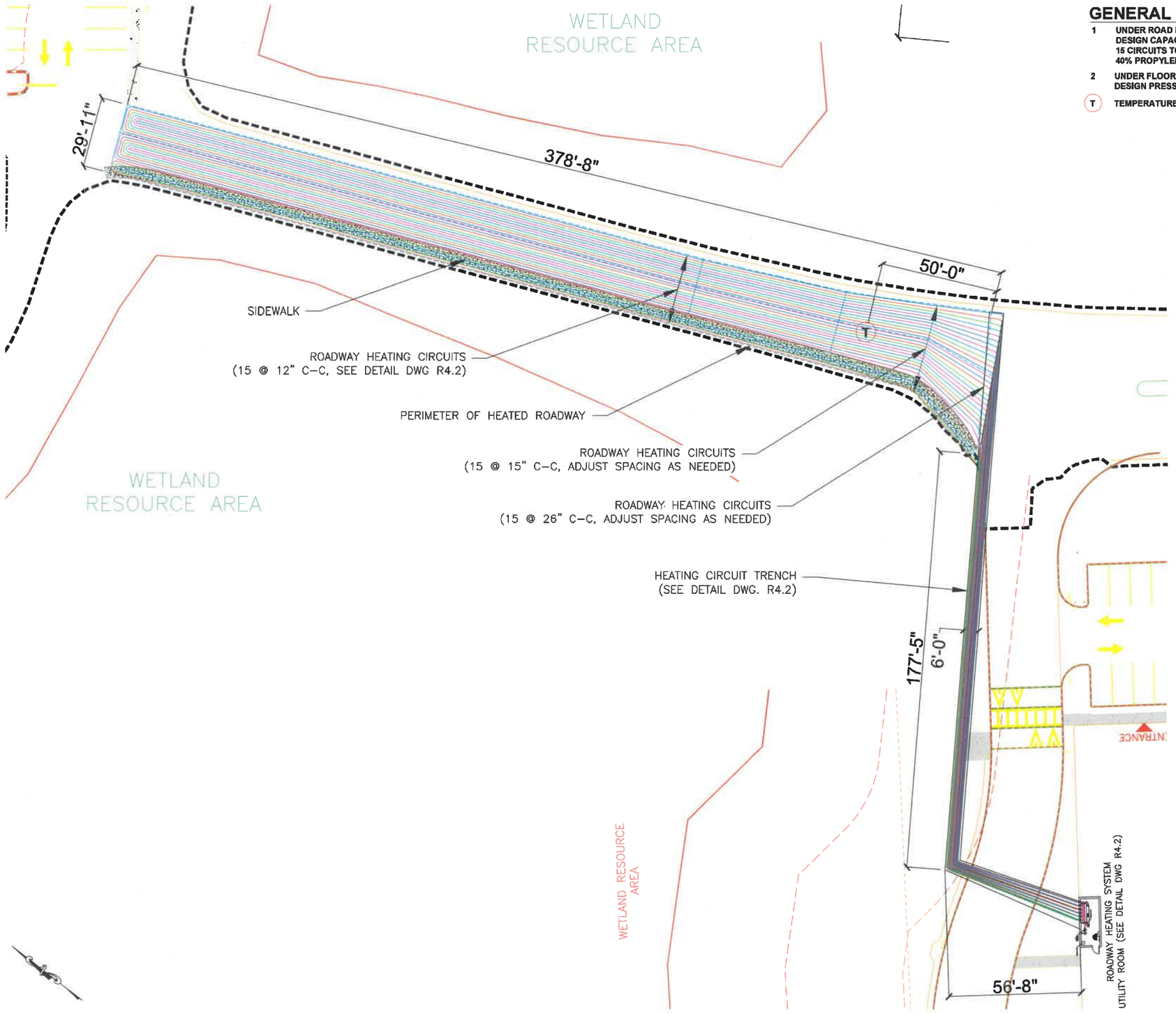
R0.0

21002189

GENERAL NOTES

1. UNDER ROAD HEATING SYSTEM DESIGN CAPACITY:
   DESIGN CAPACITY = 682,400 BTUH
   15 CIRCUITS TOTAL @ 10 GPM EACH = 150 GPM,
   40% PROPYLENE GLYCOL.
2. UNDER FLOOR PIPING = 1" I.D. POLYETHYLENE TUBING
   DESIGN PRESSURE = 50 PSI

(T) TEMPERATURE MONITORING SENSOR



1 PLAN VIEW
1/16" = 1'-0"

Rev.	Date	Revision Description	Appd
4	4.30.21	AS-BUILT	
3	3.15.21	ISSUED FOR CONSTRUCTION	
2	1.20.21	ISSUED - 2PR_PERMIT	
1	1.15.21	PRELIMINARY	

AMERICAN REFRIGERATION COMPANY
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Wharehouse Facility
1617 Ryder Street
Lindsay, Massachusetts

ROADWAY HEATING SYSTEM CIRCUIT LAYOUT

SCALE:	AS SHOWN
DATE:	11/13/2020
Drf./Chk.:	TCM

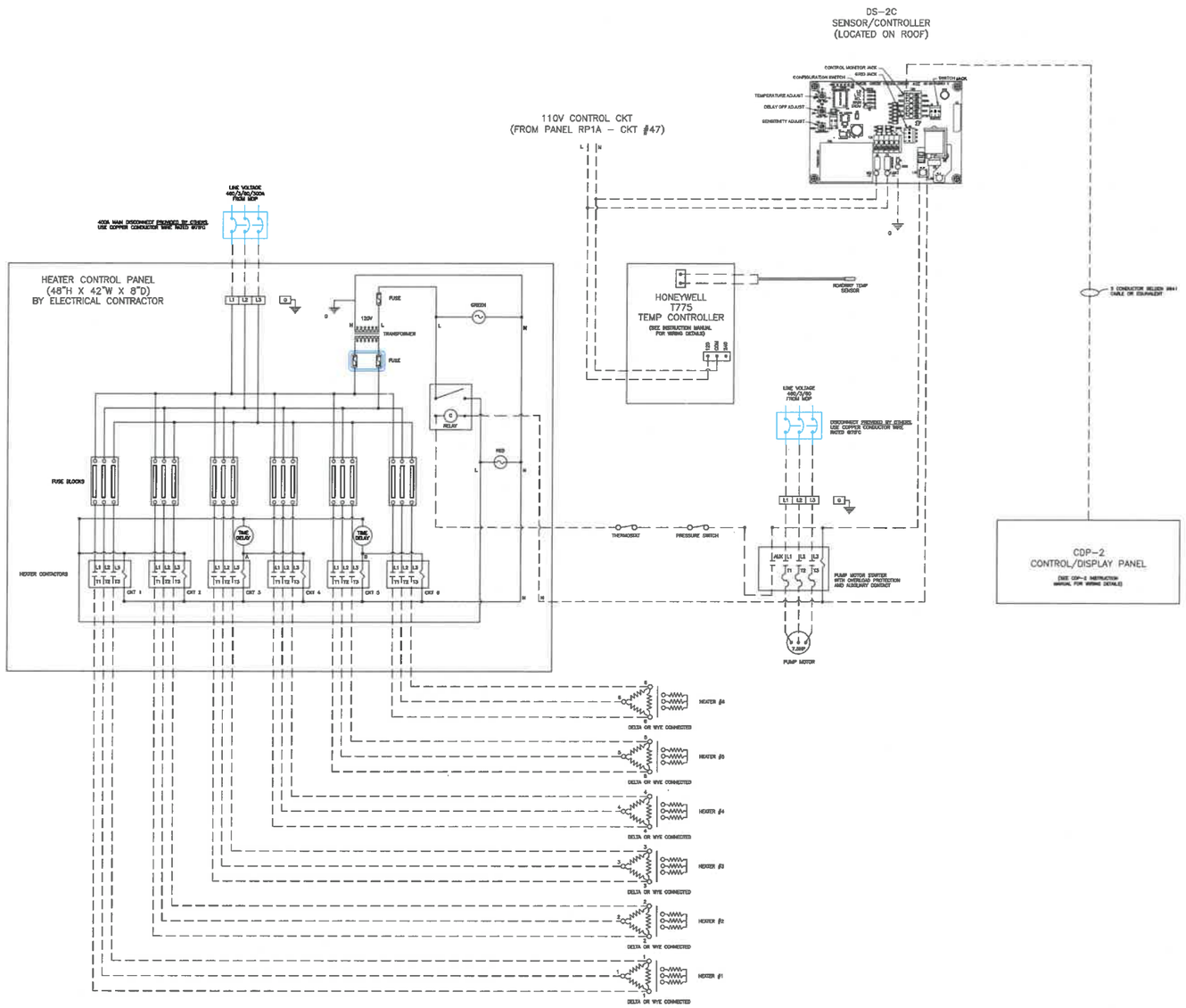
R4.0

21002189

GENERAL NOTES

1. REF N.E.C. TABLE 310-15 AND/OR C.E.C. TABLES 2 & 5C.
2. THE EXTERNAL OVER CURRENT PROTECTION MUST BE IN ACCORDANCE WITH N.E.C. AND/OR C.E.C. PART 1.
3. USE SUPPLY WIRE SUITABLE FOR 75°C.
4. WIRE CONTROL CIRCUIT PER CLASS 2, ARTICLE 725 OF THE N.E.C. AND/OR SECTION 16 OF C.E.C.

□ INDICATES TERMINAL BLOCK
FIELD WIRING - - - - - - - - - (BY OTHERS)



1 ROADWAY HEATING SYSTEM WIRING DIAGRAM
N.T.S.

Rev.	Date	Revision Description	Appd
3	8.30.21	AS-BUILT	
2	6.17.21	REVISED_PUMP_STARTER	
1	6.11.21	ORIGINAL_ISSUE	

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Warehouse Facility
151 Tyler Street
Littleton, Massachusetts

ROADWAY HEATING SYSTEM WIRING DIAGRAM

SCALE:	AS SHOWN
DATE:	11/13/2020
DR./CHK.:	TCM

R4.3

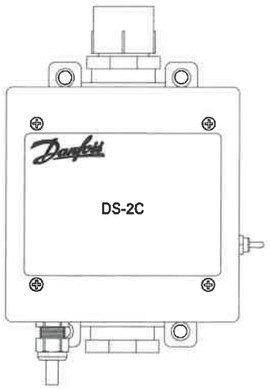
21002189

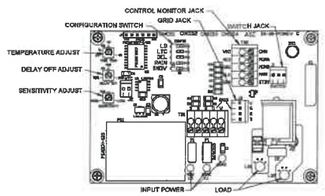
GENERAL NOTES

1 UNDER ROAD HEATING SYSTEM DESIGN CAPACITY:
DESIGN CAPACITY = 682,400 BTUH
15 CIRCUITS TOTAL @ 10 GPM EACH = 150 GPM,
40% PROPYLENE GLYCOL.

2 PRESSURE SWITCH UE TYPE H100 MODEL 701 (1.5 TO 30 PSIG ADJUSTABLE). HEATER THERMOSTAT TO BE WIRED IN SERIES WITH PRESSURE SWITCH TO PROTECT HEATER WHEN SYSTEM IS NOT FLOWING.

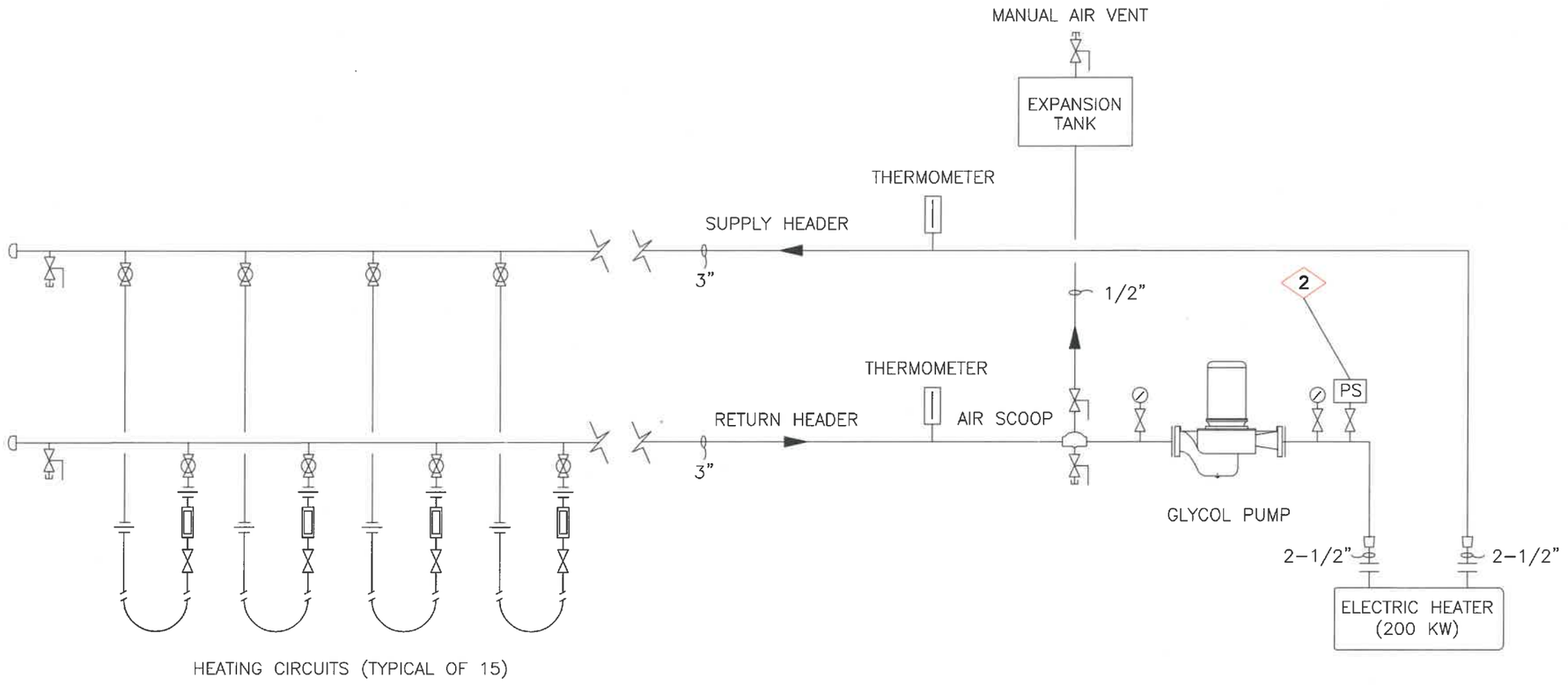
3 ROADWAY HEATING SYSTEM SENSOR/CONTROL (DANFOSS DS-2C) LOCATED ON ROOF ABOVE HEATING SYSTEM UTILITY ROOM.





3

2 ROADWAY HEATING SENSOR/CONTROL
N.T.S.



1 ROADWAY HEATING SYSTEM P & ID
N.T.S.

Rev.	Date	Revision Description	Appd
6	4.30.21	AS-BUILT	
5	3.30.21	REVISED_NOTES_ADDED	
4	3.15.21	ISSUED_FOR_CONSTRUCTION	
3	3.05.21	ISSUED_FOR_PERMIT	
2	1.20.21	PRELIMINARY	
1	1.15.21		

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ROADWAY HEATING SYSTEM P&ID

SCALE: AS SHOWN
DATE: 11/13/2020
Drf./Chk.: TCM

R4.1

21002189