



MERIDIAN

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CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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Nic Strong
Community Development Director
Town of Amherst Planning Department
2 Main Street,
Amherst NH 03031

November 4th, 2024

**Re: Jacobson Farm Subdivision
FKA: TransFormation 33 Single Family Lots and 4 Unit Barn (CUP III)
Christian Hill Road
Tax Map 5 Lot(s) 100 & 148
Amherst, NH 03031**

Subdivision – Final Review Application

Waiver Request

As part of the Final Subdivision Application review process for the above referenced project, the following waiver is being requested from Part 3 -- Roads and Utilities Standards. These requests are to allow the applicant to construct a better project.

The following is a list of the waivers requested and justification.

Waiver Request #1 – Table 3-1 Table of Geometric Roadway Design Standards for Streets & the “Two-way Cul De Sac” Detail

The applicant request relief from Table 3-1 Table of Geometric Roadway Design Standards for Streets and the “Two-way Cul De Sac” Detail, to allow a more reasonable design that the that provides an increased level of safety, more consistent with the Town Master Plan, consistent with industry standards, and meeting DPW and Emergency Services needs. This cul-de-sac design is shown in **Attachment A**.

Justification

During our review of the current town cul-de-sac standards, we found that there were inconsistencies between Table 3-1 Table of Geometric Roadway Design Standards for Streets and the “Two-Way Cul De Sac” general detail on page 3-10. The inconsistencies mostly relate to the rights-of-way and pavement width standards being increased over time and the detail not being updated along with it. The ROW width for Residential 1 and 2 roads are identified as a minimum of 50’ and the detail identifies a 45’ ROW entering the Cul-De-Sac. The pavement width for Residential 1 and 2 is 22’ and 26’ respectively which does not relate correctly to the 24’ wide pavement. While both of these inconsistencies are minor in nature, to be fully compliant with all regulations a waiver will be required to deviate from the 45’ ROW and the 24’ pavement width shown on the cul-de-sac detail. The major issue with the current standard is the internal ROW and the lot it creates. The detail shows a ROW line in the center of the cul-de-sac pavement. This ROW has a radius of 75’ which is consistent with Table 3-1. The issue this causes is the



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area within the cul-de-sac would be a lot, but the a none conforming lot. The lot is none conforming because the lot area would be 0.41 ac +/- which is much less than the minimum 2 net acres. For the town cul-de-sac detail to be utilized a variance would always be required.

Based off the current regulations being in contradiction with themselves we looked at the existing roadways in the town of Amherst that had cul-de-sacs. From this we determined that very few appear to be even close to the size of the 120' external radius. The list of cul-de-sac roadways is provided as **Attachment E**. In fact, only 2 or 3 are to the dimensional requirements outlined on page 3-10 of the Roads and Utilities Standards, the most recent constructed cul-de-sac meeting the dimensional requirements is Whiting Farm Road. The Whiting Farm Road cul-de-sac may meet the dimensional requirements but has been expanded upon to include a "one-way" sign making the cul-de-sac no longer two ways. The Whiting Farm Road "one-way" cul-de-sac is shown in **Attachment C**.

There are safety concerns related to the current standard being titled as "two-way". Drivers have been conditioned to travel though a cul-de-sac by entering on the right and travel counterclockwise around the circle. By having a standard that deviates from common practices it has the potential for conflicts in traffic and pedestrian patterns. The cul-de-sac should be delineated as one-way for that reason. That is likely why the Whiting Farm Road cul-de-sac has been signed as one way. The size of the cul-de-sac also provides a safety concern. The size will encourage vehicle to maintain a higher speed not typically associated with cul-de-sacs. When comparing the size of the cul-de-sac to other traffic features it is sized more similar to be round-a-bout. An example of this is the Caldwell Drive round-a-bout which has an external ROW radius of 120'. It is safe to assume that vehicles would treat the standard cul-de-sac the same way as a round-a-bout, supporting that higher travel speeds will be utilized in the cul-de-sac and it is likely to be used as a one-way counterclockwise direction. This has potential for pedestrians to expect vehicles to have a lower speed and not look appropriately for oncoming traffic before entering the paved area.

To develop a cul-de-sac design and standard that would be better suited for this development and the Town, the surround town cul-de-sac standards were researched. A list of surround town standard is shown in **Attachment F**. We found that the external radii range from 50' to 75' with internal pavement radii varying from 28.5' to 40'. It should be noted that all the standards were one way in the counterclockwise direction. Before we developed our design, we met with Town DPW staff and emergency services to determine what were their requirements. The requirements where the 10 wheeled plow and the Towns largest emergency vehicle (Tower Fire Truck) need to be about to travel around the cul-de-sac. We then found a large cul-de-sac (Standish Way) that was paved in the middle to test different internal radius. We did three test starting at 40', then working our way in to 35', and finally 30'. Both vehicles were able to travel around all the radii. With a tighter radius being the easiest to travel around. The results of this test can be found in **Attachment G**. It was observed that a small internal radius of 30' allows the tower truck to traverse the cul-de-sac but not tight to internal radius the entire way around the circle. This led us to the conclusion that a 33' internal radius with a pavement width of 20' would



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allow the driver of the tower truck room to adjust the travel path as the vehicle moves around the cul-de-sac. The 3' shoulders allow for the truck to track down to a 30' if needed and forces obstructions way from the edges of pavement. The proposed cul-de-sac is a product of these findings.

When evaluating the proposed cul-de-sac against the goals of the Town Master Plan it was found to meet the goals better than the existing standard. Land Use Goal #2: Encourage Sustainable Development and Natural Resources Goal 3: Protect Water Resources both have to do with reducing impervious coverage where possible. By reducing the cul-de-sac size to only what is needed to provided access and safety the impervious land coverage is minimized. By minimizing impervious area, the generated runoff is minimized. When comparing the proposed cul-de-sac the standard cul-de-sac the impervious area is reduced by almost 60%. See Attachment This reduction reduced the required stormwater impoundment, which reduces the area of disturbance which, in turn, allows for lands to remain natural. The reduced pavement also requires less salt and sand, further providing an environmental benefit. Lastly having less pavement is a reduction in maintenance and replacement cost for the Town.

Acceptance of this cul-de-sac design is supported by the Town Master Plan, consistency with the overwhelming majority cul-de-sacs currently constructed within the town, consistency with surrounding town's standards, theoretical and real-world circulation testing and is safer than the current standards. This cul-de-sac design is better for future residents, the Town and the environment. Due to our findings, we have provided two residential cul-de-sac designs and an update of the current cul-de-sac that are ready for the Town planning board to adopt into the roadway standards. These designs are attached under **Attachment H**



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Table of Attachments

Attachment A - Proposed Cul-De-Sac

Attachment B - Marked up Current Town Cul-De-Sac

Attachment C - Whiting Farm Road

Attachment D - Caldwell Drive

Attachment E - List of Town Cul-de-Sac Roads

Attachment F - Surrounding Towns Cul-de-sac Regulations

Attachment G – Cul-De-Sac Testing

Attachment H – Cul-de-sac Overlay

Attachment I - Suggested Cul-De-Sac



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Attachment A - Proposed Cul-De-Sac



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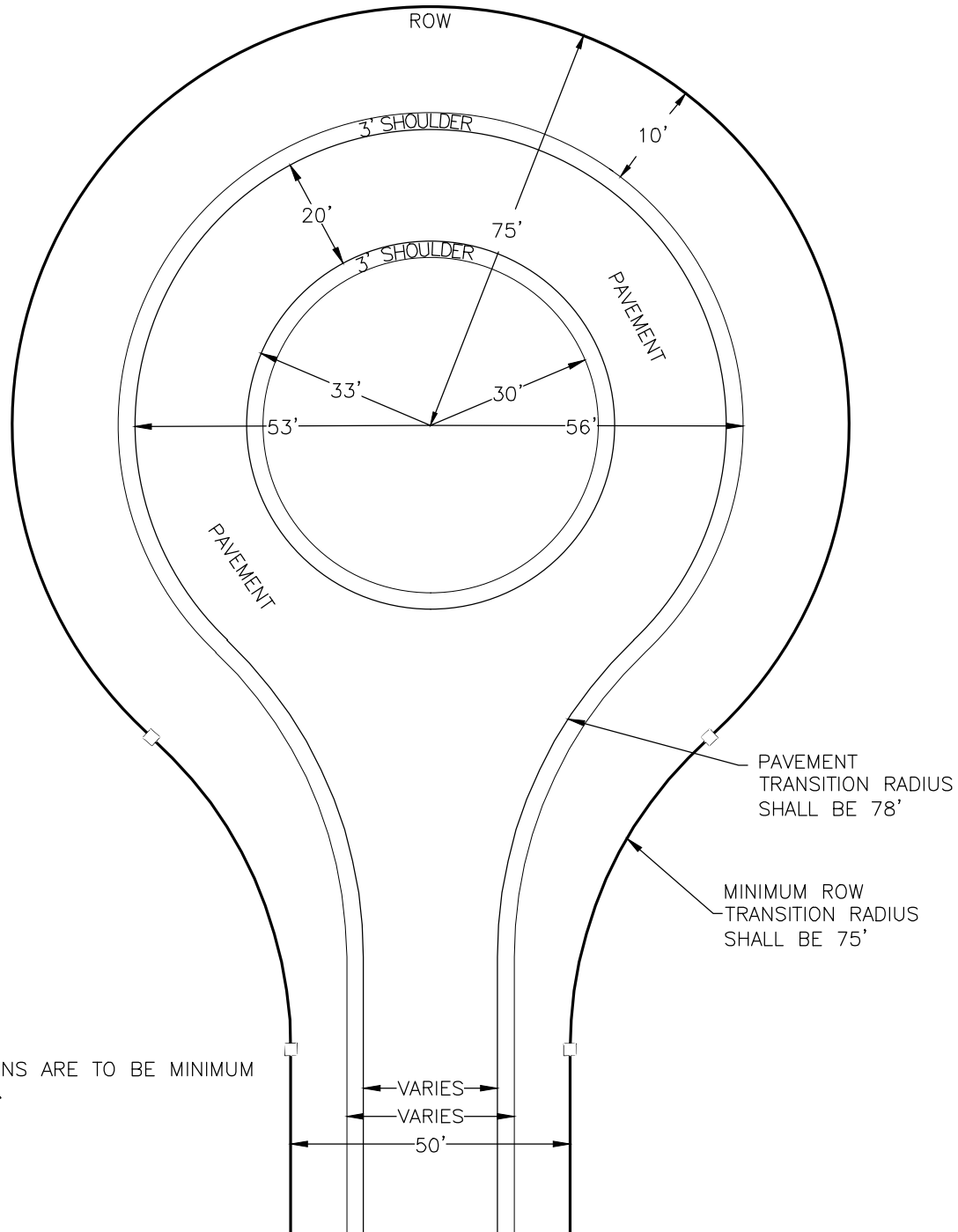
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1. ALL DIMENASIONS ARE TO BE MINIMUM REQUIREMENTS.

RESIDENTIAL CUL DE SAC: ON CENTER

GRAPHIC SCALE





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Attachment B - Marked up Current Town Cul-De-Sac

Town of Amherst Development Regulations
Roadway & Utility Standards

3-10

Table 3-1

Table of Geometric Roadway Design Standards for Streets

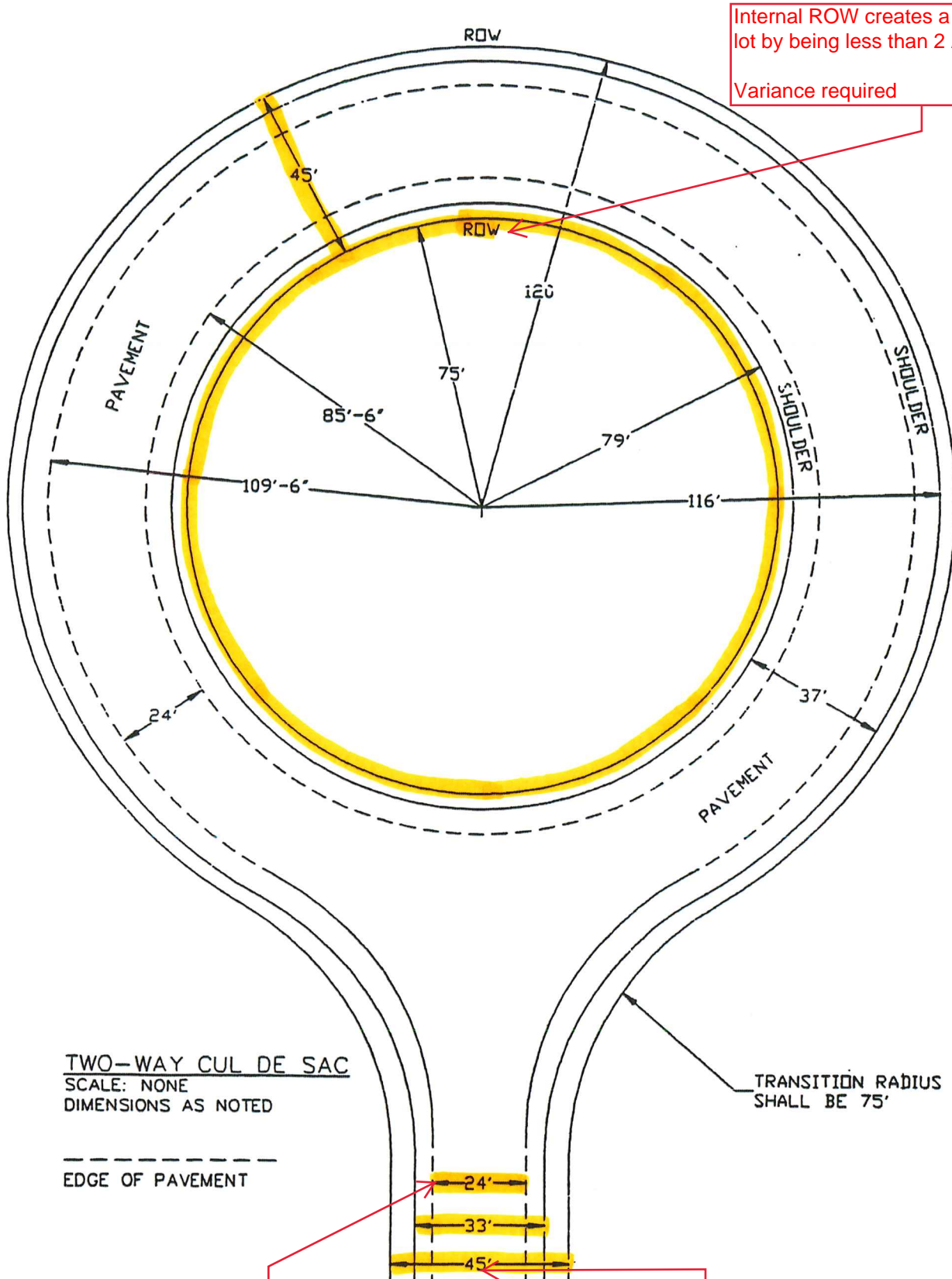
Item	Collector	Non-Residential	Residential 2	Residential 1
Average Daily Traffic (VPD)	1,001 - 5,000	--	401 - 1,000	0 - 400
Design Speed	40MPH	30 MPH	30 MPH	30 MPH
Minimum Right of Way	60'	60'	50'	50'
Minimum Pavement Width	30'	30'	26'	22'
Minimum Grade	1.00%	1.00%	1.00%	1.00%
Maximum Grade	6.00%	6.00%	8.00%	8.00%
Minimum Angle of Intersections	90 ⁰	90 ⁰	90 ⁰	80 ⁰
Minimum Centerline Radius of Curves	600'	300'	300'	150'
Minimum Tangent Length between Reverse Curves	300'	200'	200'	100'
Road Base (Minimum)				
Crushed Gravel (NHDOT 304.3) Thickness	8"	8"	8"	8"
Gravel (NHDOT 304.2) Thickness	16"	16"	16"	12"
Sand (NHDOT 304.1) Thickness	12"	12"	12"	12"
Bituminous Concrete Paving (NHDOT 403.11)				
Min. Binder Course Thickness	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Min. Wearing Course Thickness	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Minimum Road Crown	0.025	0.025	0.025	0.025
Cul-de-Sac Streets				
Min. R.O.W. Radius	--	75'	--	75'
Centerline Radius	--	55'	--	55'

Does not match Cul-de-sac detail on next page

3-10

Town of Amherst Development Regulations
Roadway & Utility Standards

3-11



Internal ROW creates a non compliant lot by being less than 2 Acres
Variance required

TWO-WAY CUL DE SAC
SCALE: NONE
DIMENSIONS AS NOTED

EDGE OF PAVEMENT

Inconsistent with current
pavement widths
Needs to be Varies

Inconsistent with
current ROW width
Needs to be 50'

3-11



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Attachment C - Whiting Farm Road



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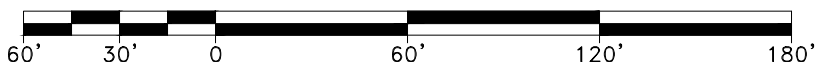
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WHITING FARM DRIVE RESIDENTIAL CUL DE SAC

GRAPHIC SCALE





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Attachment D - Caldwell Drive



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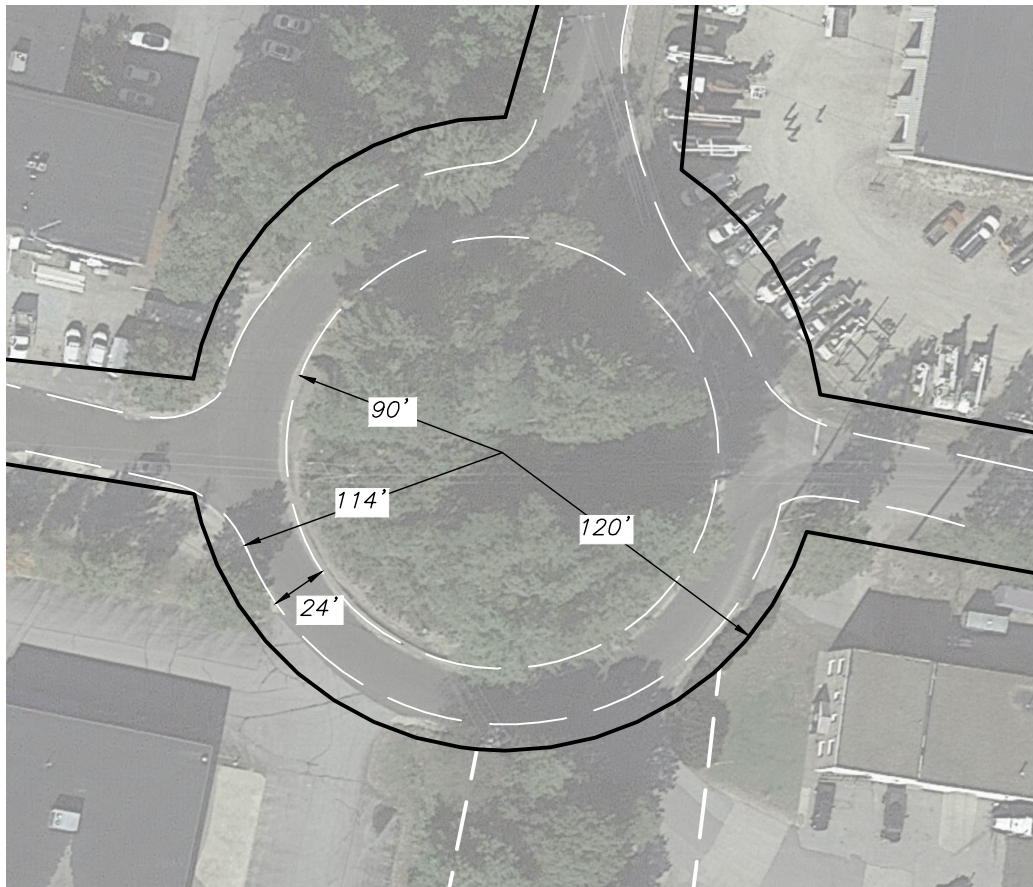
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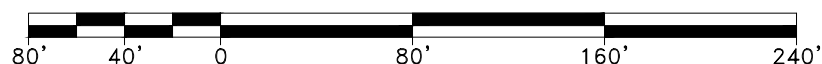
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WHITING FARM DRIVE RESIDENTIAL CUL DE SAC

GRAPHIC SCALE





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Attachment E - List of Town Cul-de-Sac Roads



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Amherst Roads with Cul-De-Sacs

Road Name	Compliant (yes/no)	ROW Radius	Internal Radius	External Radius	Fully paved	Notes
Ridgewood Dr	Yes	200	166	190	No	Internal Radius increased so internal lot is 2 acers
Chatham Ct	Yes	120	86	110	No	No Internal Lot on GIS
Manhattan Dr	No	70	35	60	No	
Willow Ln	No	70	30	50	No	
Tech Circle	No	75	40	65	No	
Paul's Way	No	70	35	60	No	
Skyline Dr	No	55	30	50	No	
Cub Circle	No	60	30	50	No	
Rhodura Dr	No	75	40	65	No	
Tamarack Ln	No	75	40	65	No	
Melody Ln	No	70	60	36	No	
Wildwood Ln	No	70	60	50	No	
Arrow Ln	No	80	40	65	No	
Flint Dr	No	80	40	65	No	
Foxglove Ln	No	80	40	65	No	
Stillwater Dr	No	75	40	62	No	
Brander Ct	No	75	40	65	No	
Timber Chase Dr	No	75	40	65	No	
Edgewood Dr	No	75	40	65	No	



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Amherst Roads with Cul-De-Sacs

Road Name	Compliant (yes/no)	ROW Radius	Internal Radius	External Radius	Fully paved	Notes
Briarwood Ln	No	75	35	60	No	
Fernwood Ln	No	75	40	60	No	
Crestwood Ct	No	75	35	60	No	
Newbury Dr	No	65	40	60	No	
Mayhew Dr	No	90	50	65	No	
Sawmill Ln	No	110	75	100	No	
Parker Farm Ln	No	70	40	60	No	
Williamsburg Dr	No	60	30	50	No	
Honey Brook Ln	No	65	20	55	No	
Georgetown Dr	No	65	40	55	No	
Upper Flanders Rd	No	70	36	65	No	
Roberge Dr	No	70	50	65	No	
Hubbard Rd	No	100	65	90	No	
Nathaniel Dr	No	65	35	50	No	
Parkhurst Dr	No	60	30	50	No	
The Flume	No	95	65	85	No	
Heather Ln	No	70	35	60	No	
Center Rd	No	80	50	70	No	
Terrace Ln	No	75	50	70	No	



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Amherst Roads with Cul-De-Sacs

Road Name	Compliant (yes/no)	ROW Radius	Internal Radius	External Radius	Fully paved	Notes
River Rd	No	70	40	60	No	
Monticello DR	No	110	70	100	No	
Hemlock Hill Rd	No	70	40	60	No	
Story Brook Ln	No	70	40	60	No	
Martingale Rd	No	70	40	60	No	
North Meadow Rd	No	70	40	50	No	
Roberts Rd	No	70	35	60	No	
Bloody Brook Rd	No	75	30	55	No	
Tanglewood Way	No	70	60	35	No	
Fieldstone Dr	No	70	35	60	No	
Olde Lantern Way	No	70	35	60	No	
Orchard View Dr	No	70	35	55	No	
Whiting Farm Dr	No	110	100	80	No	
Ralmer Rd	No	65	30	55	No	
Pettingale Rd	No	70	40	65	No	
Village Woods Dr	No	70	30	60	No	
Cobbler Ln	No	5	30	50	No	
Thatcher Dr	No	70	35	60	No	
Village Common Ct	No	65	25	60	No	



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Road Name	Compliant (yes/no)	ROW Radius	Internal Radius	External Radius	Fully paved	Notes
Governor Wentworth Rd	No	65	35	60	No	
Whittemore Ln	No	70	35	65	No	
Northern BLVD	No	65	N/A	55	Yes	
Farmington Rd	No	70	N/A	60	Yes	
Thoreau Ln	No	70	N/A	60	Yes	
Golden Pond Ln	No	70	N/A	60	Yes	
Homestead Road	No	70	N/A	60	Yes	
Pine Top Rd	No	65	N/A	50	Yes	
Carol Ann Ln	No	60	N/A	50	Yes	
Standish Way	No	60	N/A	59	Yes	
Indian Pond Ln	No	65	N/A	60	Yes	

Notes

1. Dimension were measured from Nashua Regional Planning Commission GIS viewer using the ROW linework and aerial. Dimension are rounded to reasonable values.



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Attachment F - Surrounding Towns Cul-de-sac Regulations



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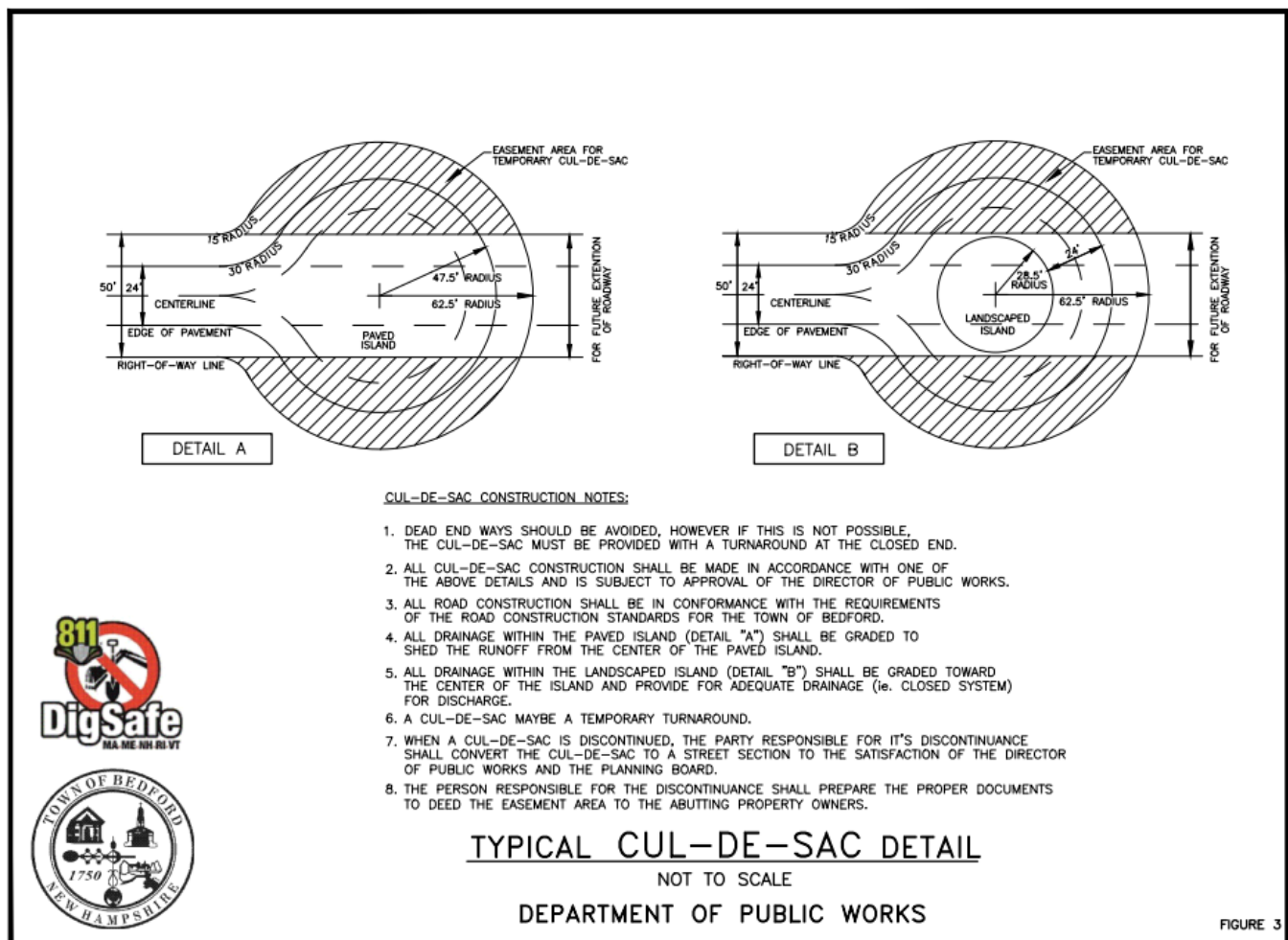
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Bedford, NH

According to the Bedford, NH Land Development Control Regulations cul-de-sacs shall be constructed in accordance with the requirements from Figure 3 below. In detail A there is no inner landscaped island and the outside edge of pavement required is 47.5' and the radius for the right of way is 62.5'. For detail B there is an inner island that has a radius of 28.5', the pavement is then 24' wide, and the right of way radius is 62.5'.





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Merrimack, NH

Located in the subdivision regulations for the town of Merrimack, NH under the Road and Utility Standards section 4.12 Street Design it gives the dimensions required of a cul-de-sac street. The turnaround at the end of the street is required to have a minimum radius to the outside of right-of-way to be 50 feet. The minimum radius to the outside edge of pavement must be 42 feet. The turnaround may be tangent to the roadway or centered. In both of these cases the radius return for the outside edge of pavement must be greater than 20 feet and the right-of-way shall be 11 feet greater than the outside edge of pavement.



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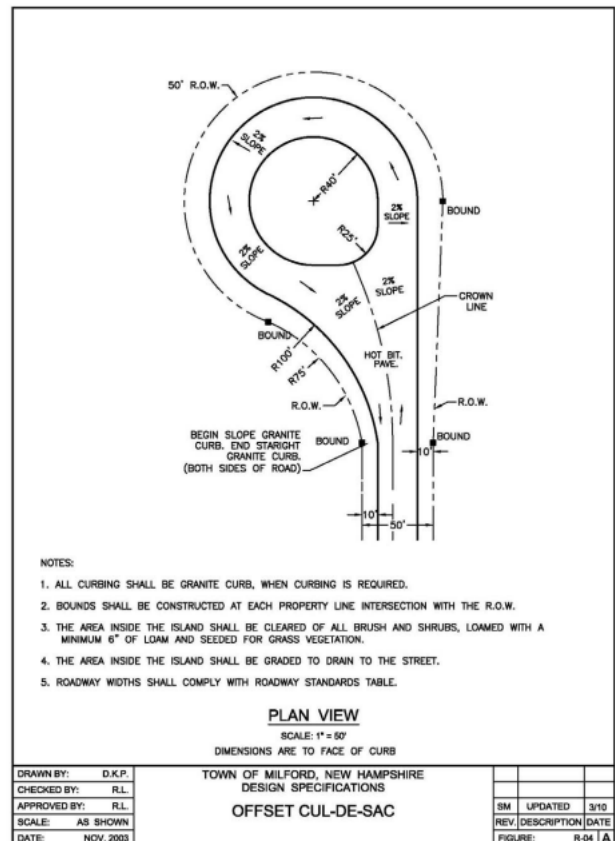
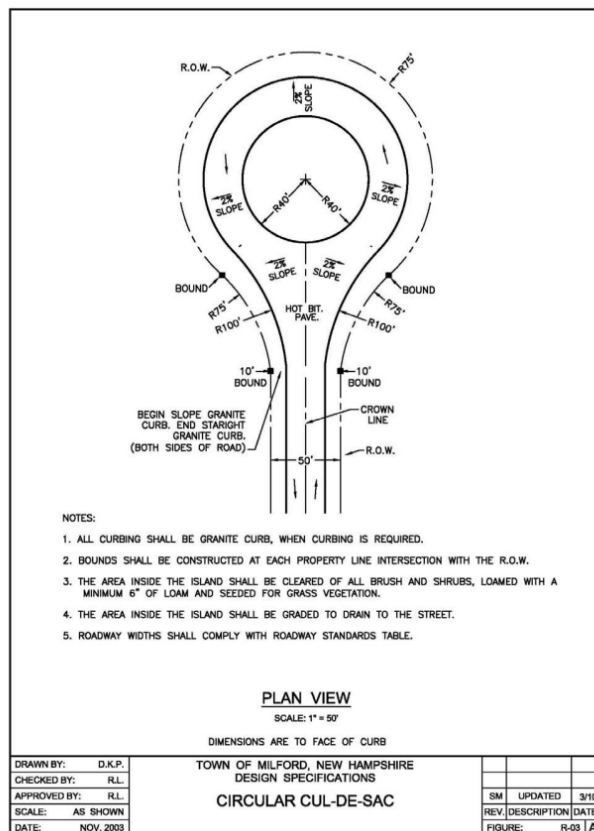
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Milford, NH

Located in Appendix II: Construction Design Details of the Town of Milford Department of Public Works Standards there are two options for a cul-de-sacs given in Figure K and Figure L (Both below). Figure K gives the option of doing a standard circular cul-de-sac that is straight off the centerline of the road. This option requires that the minimum right-of-way has a radius of 75' and the inner island has a radius of 40 feet while the roadway must still comply with the town of Milford Roadway Standards. Figure L provides the option of doing an offset cul-de-sac from the centerline of the roadway. The offset cul-de-sac requires a minimum right-of-way to have a 50 foot radius and the inner island to have a radius of 40 feet.





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November 4th, 2024

Page 14 of 16

Attachment G – Cul-De-Sac Testing

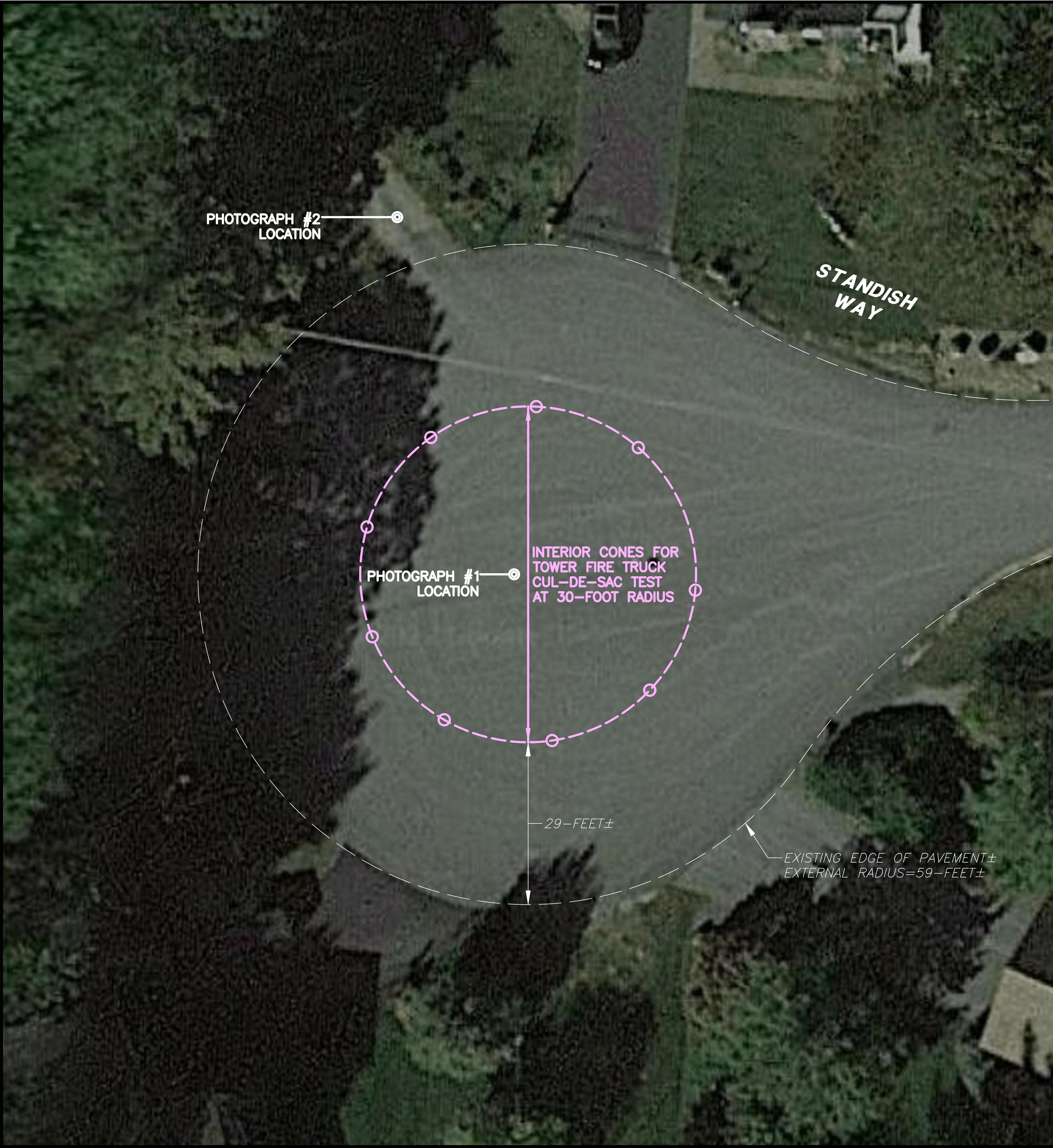
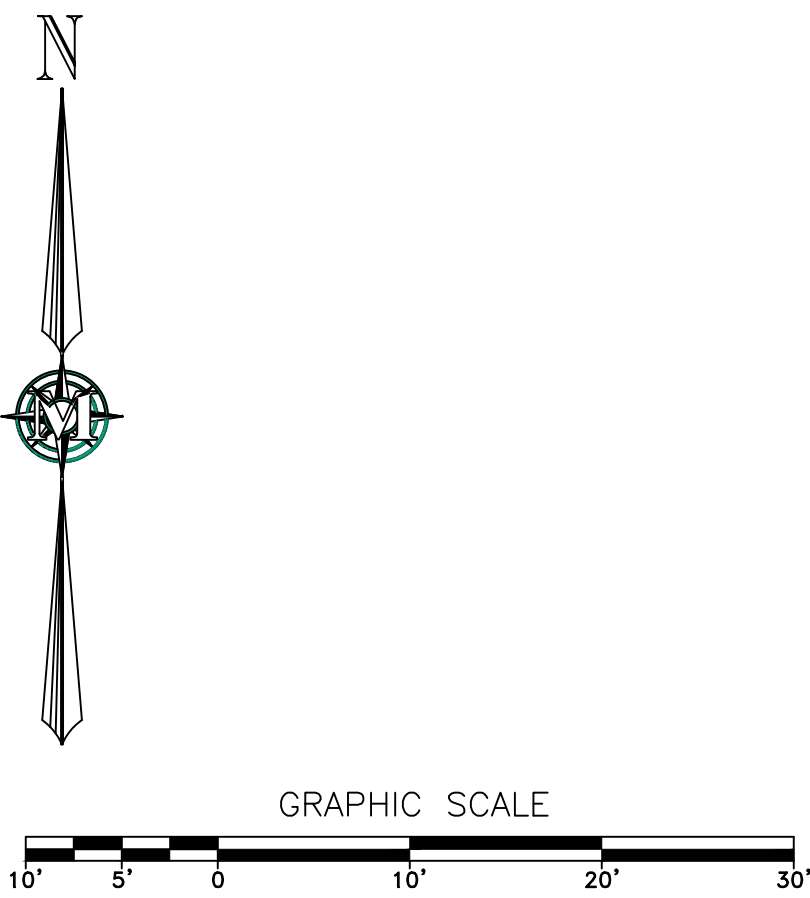
CUL-DE-SAC TEST PHOTOGRAPH #1



CUL-DE-SAC TEST PHOTOGRAPH #2



NOTE: THE PURPOSE OF THIS EXHIBIT IS TO DEPICT THE APPROXIMATE LOCATION OF CONES THAT WERE PLACED AT A 30-FOOT INTERIOR RADIUS FOR THE PURPOSE OF TOWER FIRE TRUCK CUL-DE-SAC TESTING THAT WAS PERFORMED ON OCTOBER 13, 2022 AT STANDISH WAY. THE PHOTOGRAPHS ABOVE WERE TAKEN AT THE TIME OF FIRE TRUCK CUL-DE-SAC TESTING.



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ISSUED FOR MUNICIPAL AND/OR STATE REVIEW ONLY

REV.	DATE	DESCRIPTION	DR	CK
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	D			
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CUL-DE-SAC TESTING LOCATION
STANDISH WAY
AMHERST, NEW HAMPSHIRE

TOWER FIRE TRUCK CUL-DE-SAC TEST EXHIBIT
30-FOOT INTERIOR RADIUS

DECEMBER 20, 2022

SCALE: 1" = 10'

E-1

SHEET

FILE: EXHIBIT.dwg
PROJECT: TOWN OF AMHERST
SHEET NO. 1 OF 3

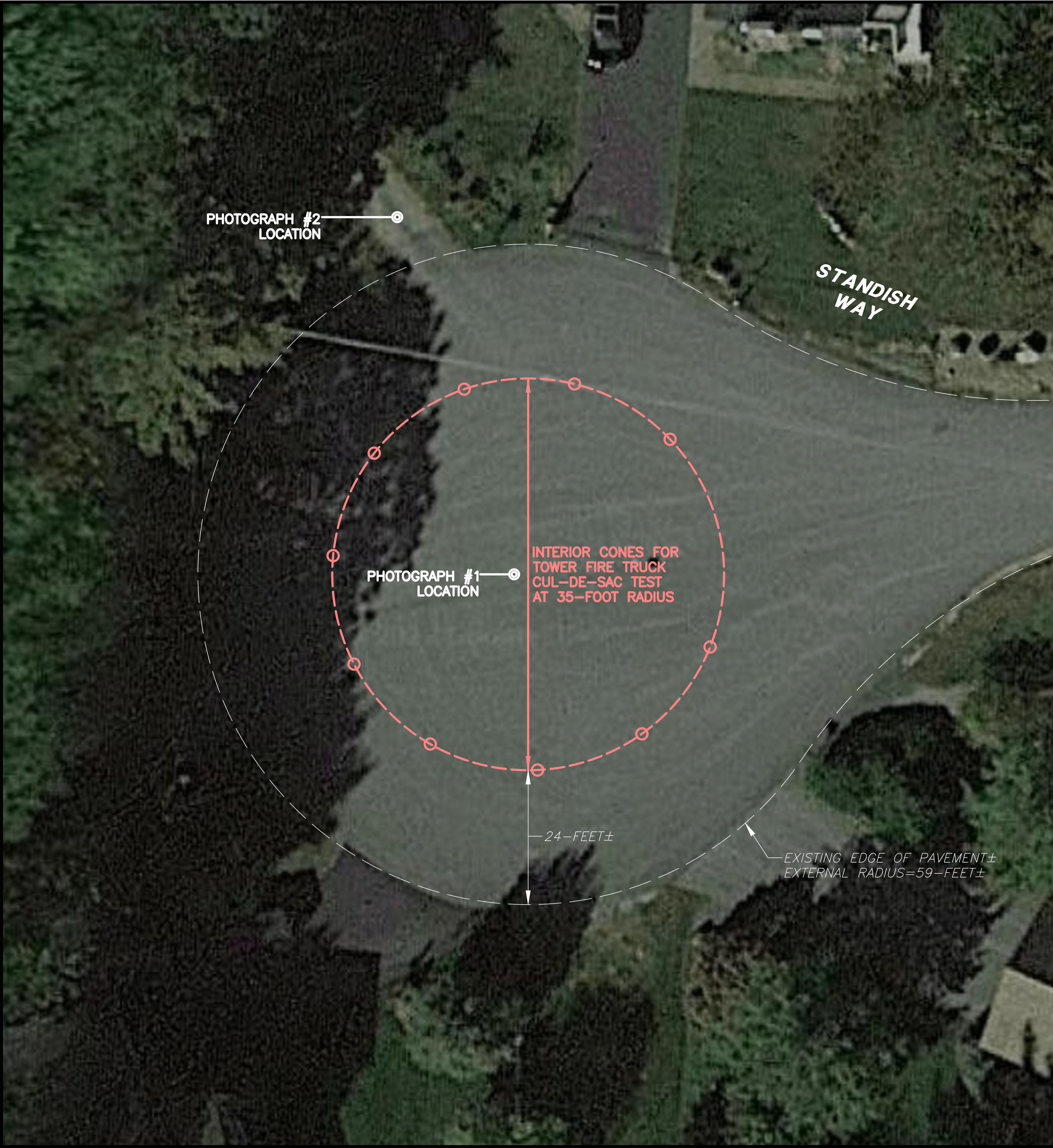
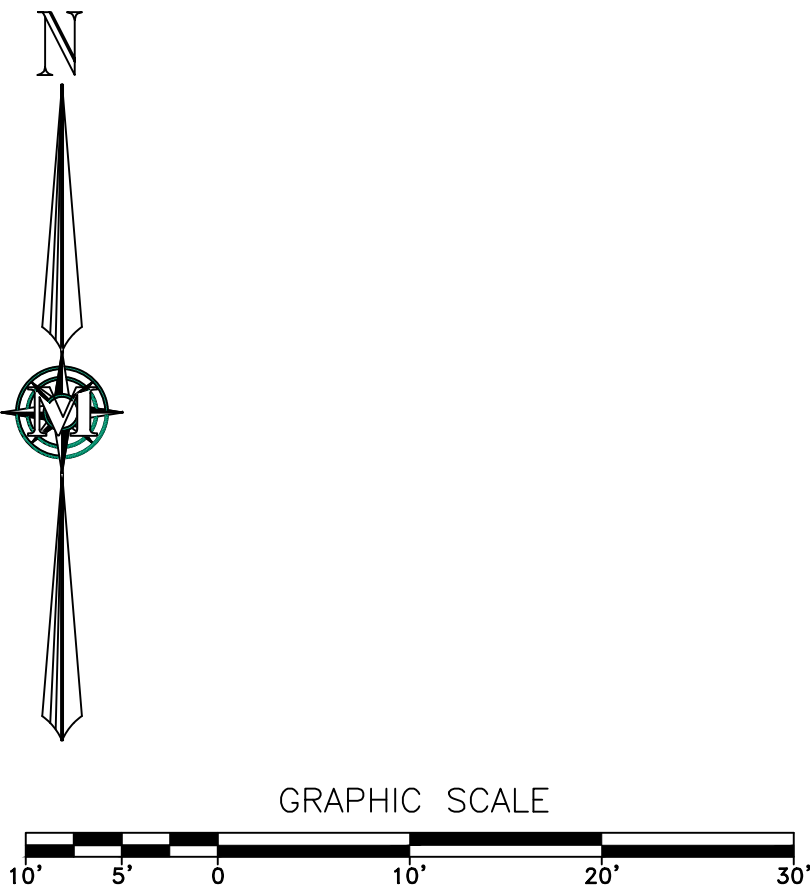
CUL-DE-SAC TEST PHOTOGRAPH #1



CUL-DE-SAC TEST PHOTOGRAPH #2



NOTE: THE PURPOSE OF THIS EXHIBIT IS TO DEPICT THE APPROXIMATE LOCATION OF CONES THAT WERE PLACED AT A 35-FOOT INTERIOR RADIUS FOR THE PURPOSE OF TOWER FIRE TRUCK CUL-DE-SAC TESTING THAT WAS PERFORMED ON OCTOBER 13, 2022 AT STANDISH WAY. THE PHOTOGRAPHS ABOVE WERE TAKEN AT THE TIME OF FIRE TRUCK CUL-DE-SAC TESTING.



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CUL-DE-SAC TESTING
LOCATION
STANDISH WAY
AMHERST, NEW HAMPSHIRE

TOWER FIRE TRUCK
CUL-DE-SAC TEST EXHIBIT
35-FOOT INTERIOR RADIUS

DECEMBER 20, 2022

E-2
SHEET

FILE: EXHIBIT.dwg
PROJECT: TOWN OF AMHERST
SHEET NO. 2 OF 3

Plotted: 1/10/2023 11:27 AM By: NGG
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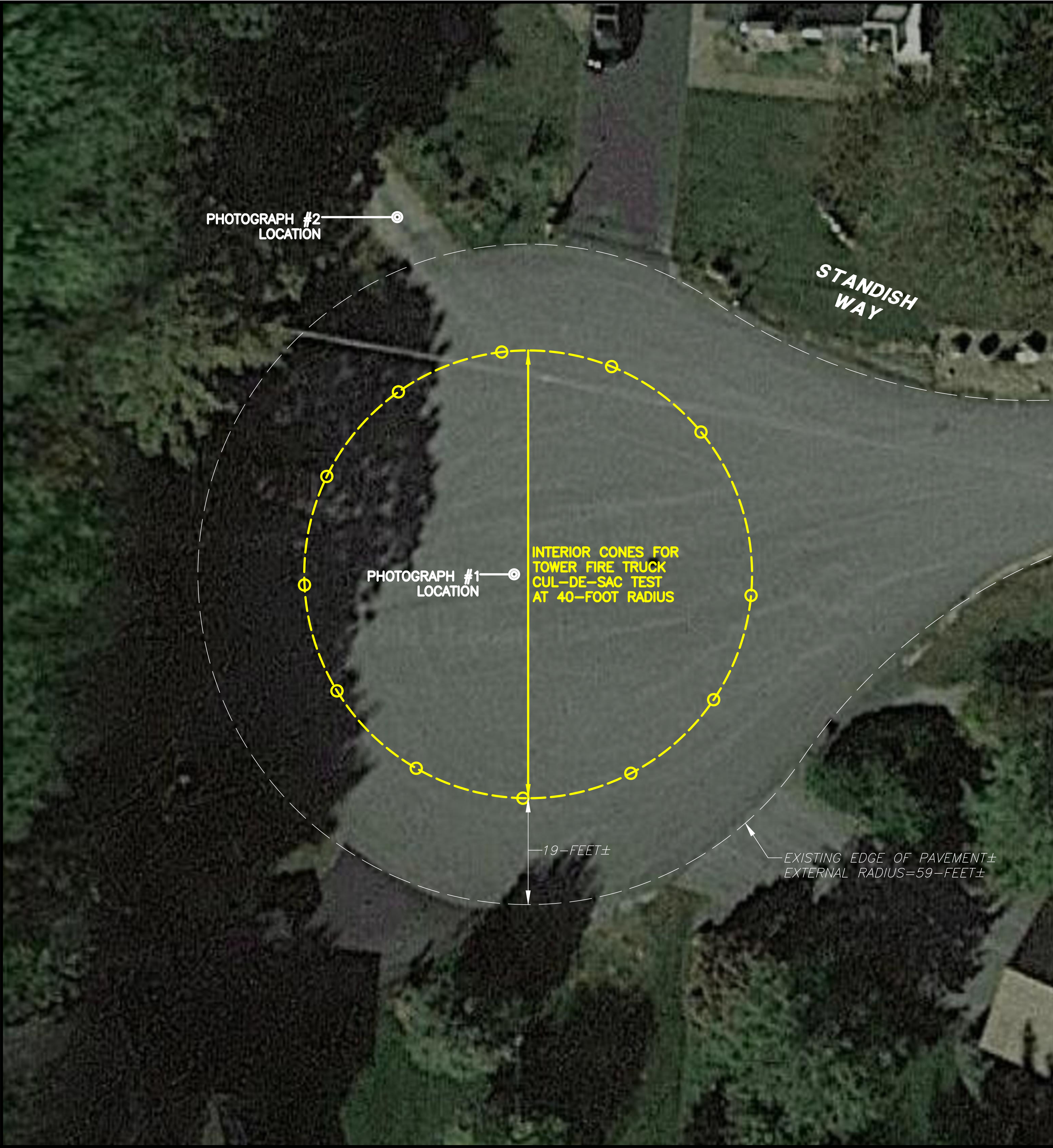
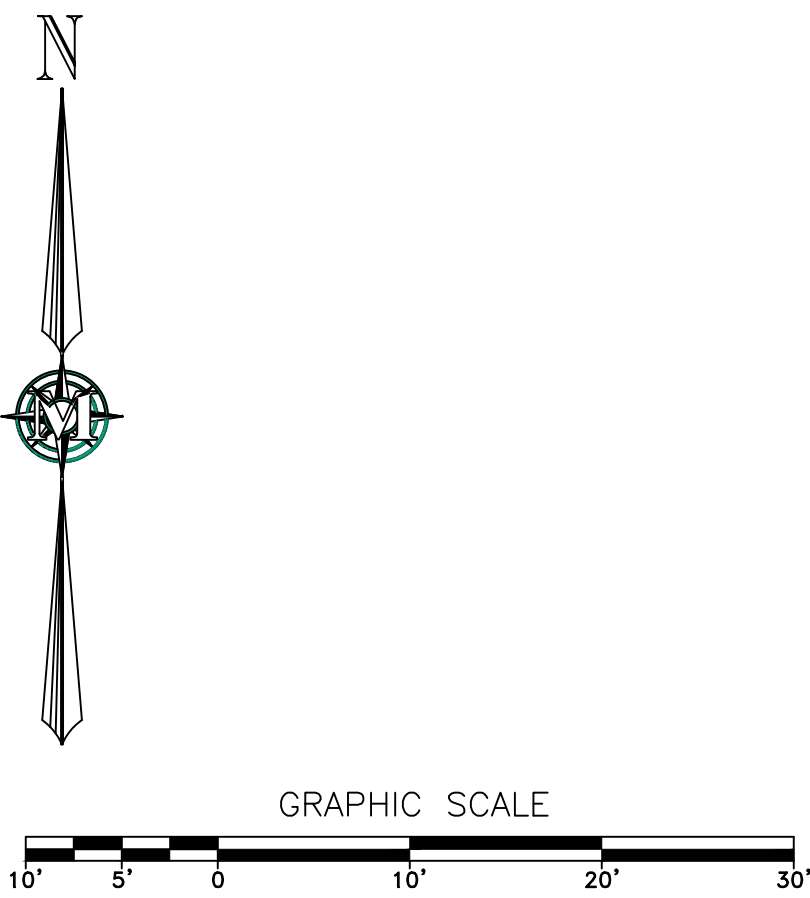
CUL-DE-SAC TEST PHOTOGRAPH #1



CUL-DE-SAC TEST PHOTOGRAPH #2



NOTE: THE PURPOSE OF THIS EXHIBIT IS TO DEPICT THE APPROXIMATE LOCATION OF CONES THAT WERE PLACED AT A 40-FOOT INTERIOR RADIUS FOR THE PURPOSE OF TOWER FIRE TRUCK CUL-DE-SAC TESTING THAT WAS PERFORMED ON OCTOBER 13, 2022 AT STANDISH WAY. THE PHOTOGRAPHS ABOVE WERE TAKEN AT THE TIME OF FIRE TRUCK CUL-DE-SAC TESTING.



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CUL-DE-SAC TESTING
LOCATION
STANDISH WAY
AMHERST, NEW HAMPSHIRE

TOWER FIRE TRUCK
CUL-DE-SAC TEST EXHIBIT
40-FOOT INTERIOR RADIUS

DECEMBER 20, 2022

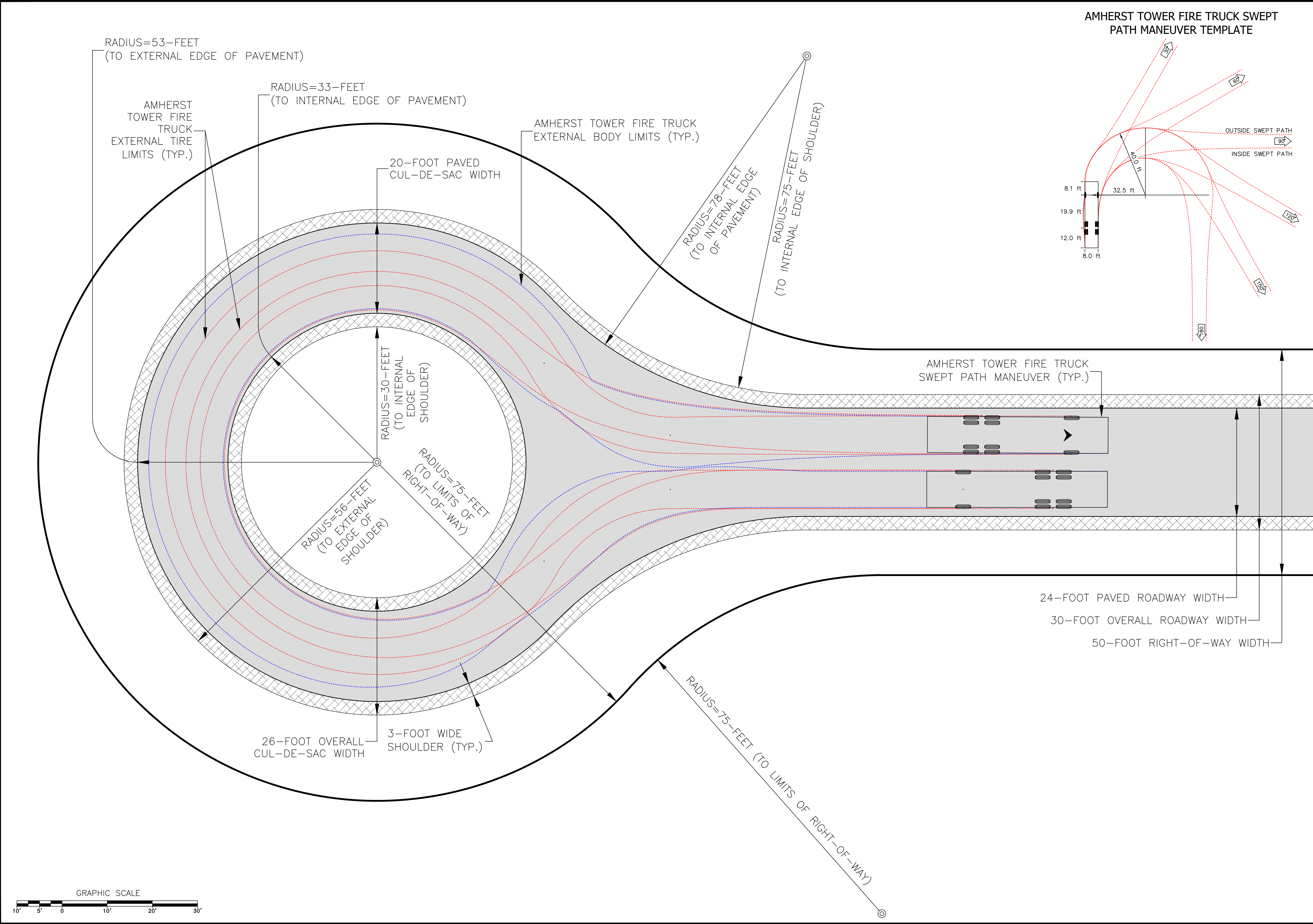
SCALE: 1" = 10'

E-3

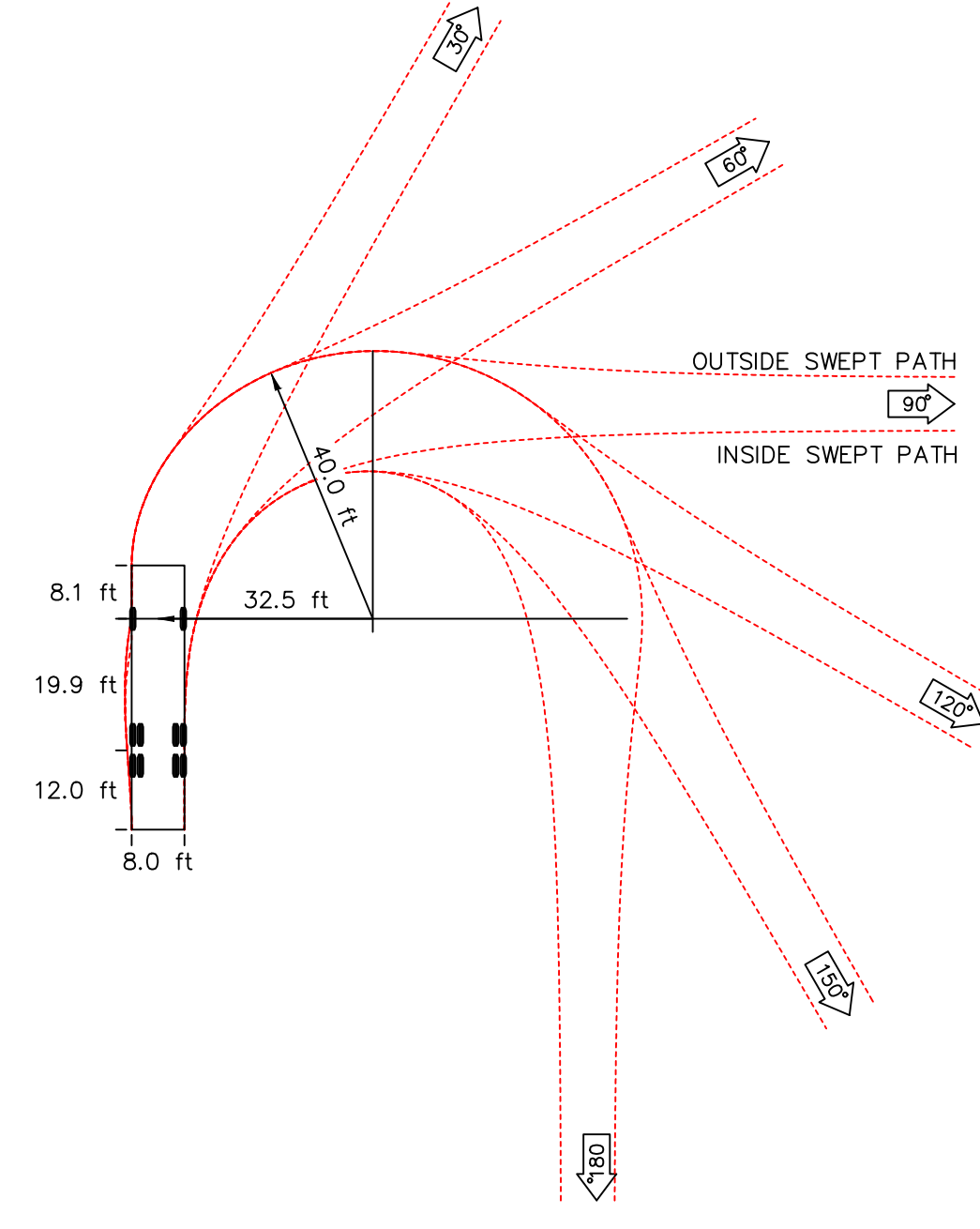
SHEET

FILE: EXHIBIT.dwg
PROJECT: TOWN OF AMHERST
SHEET NO. 3 OF 3

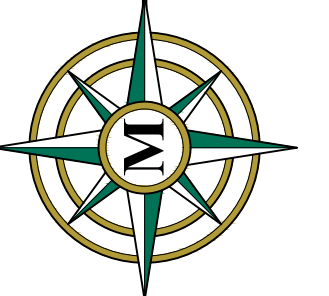
Plotted: 1/10/2023 11:27 AM By: NGG
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AMHERST TOWER FIRE TRUCK SWEEP
PATH MANEUVER TEMPLATE



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PROPOSED CUL-DE-SAC
EXHIBIT

KEVIN CURRAN
TAX MAP 6 LOTS 2, 7 & 9
AMHERST, NEW HAMPSHIRE

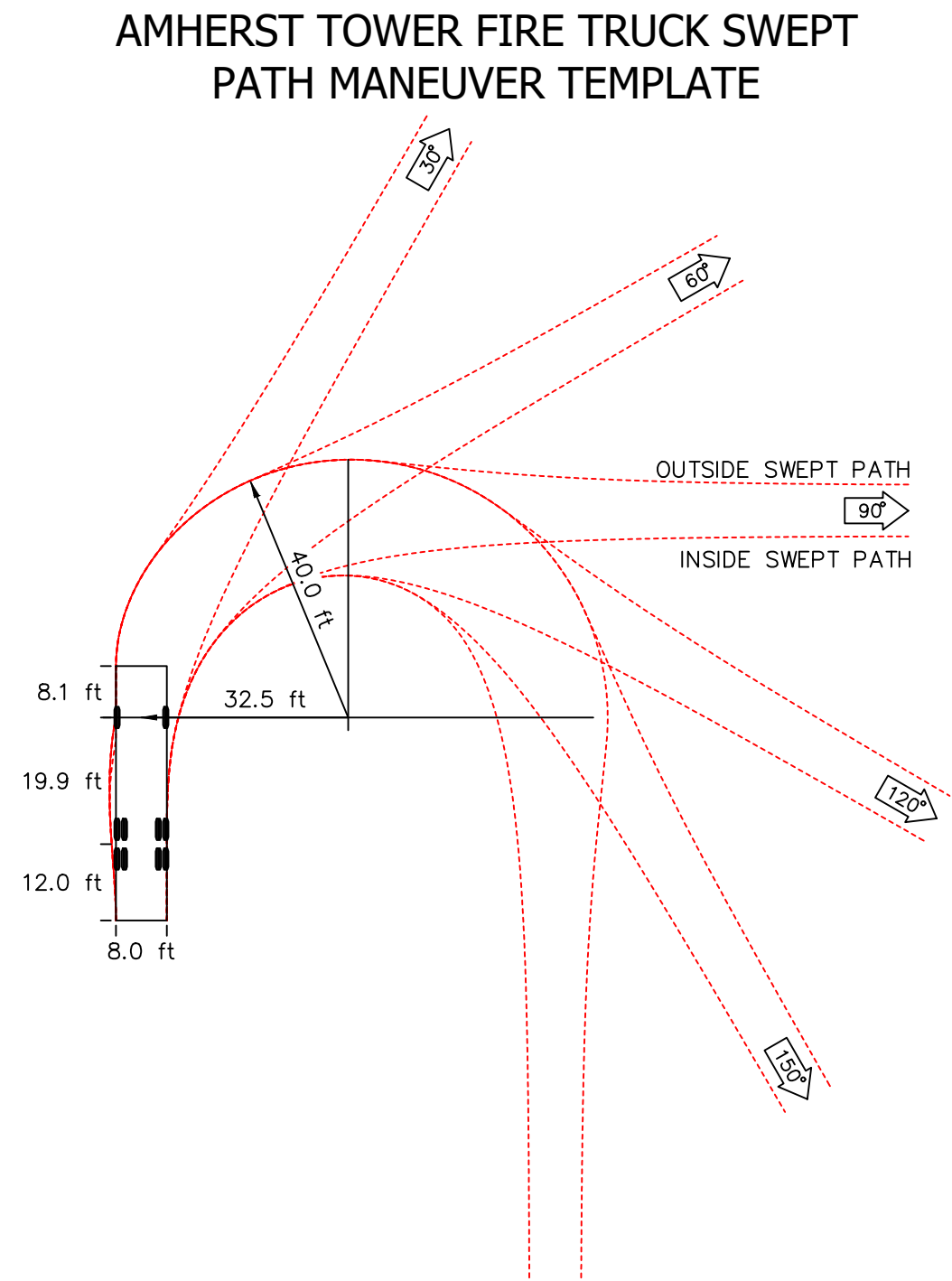
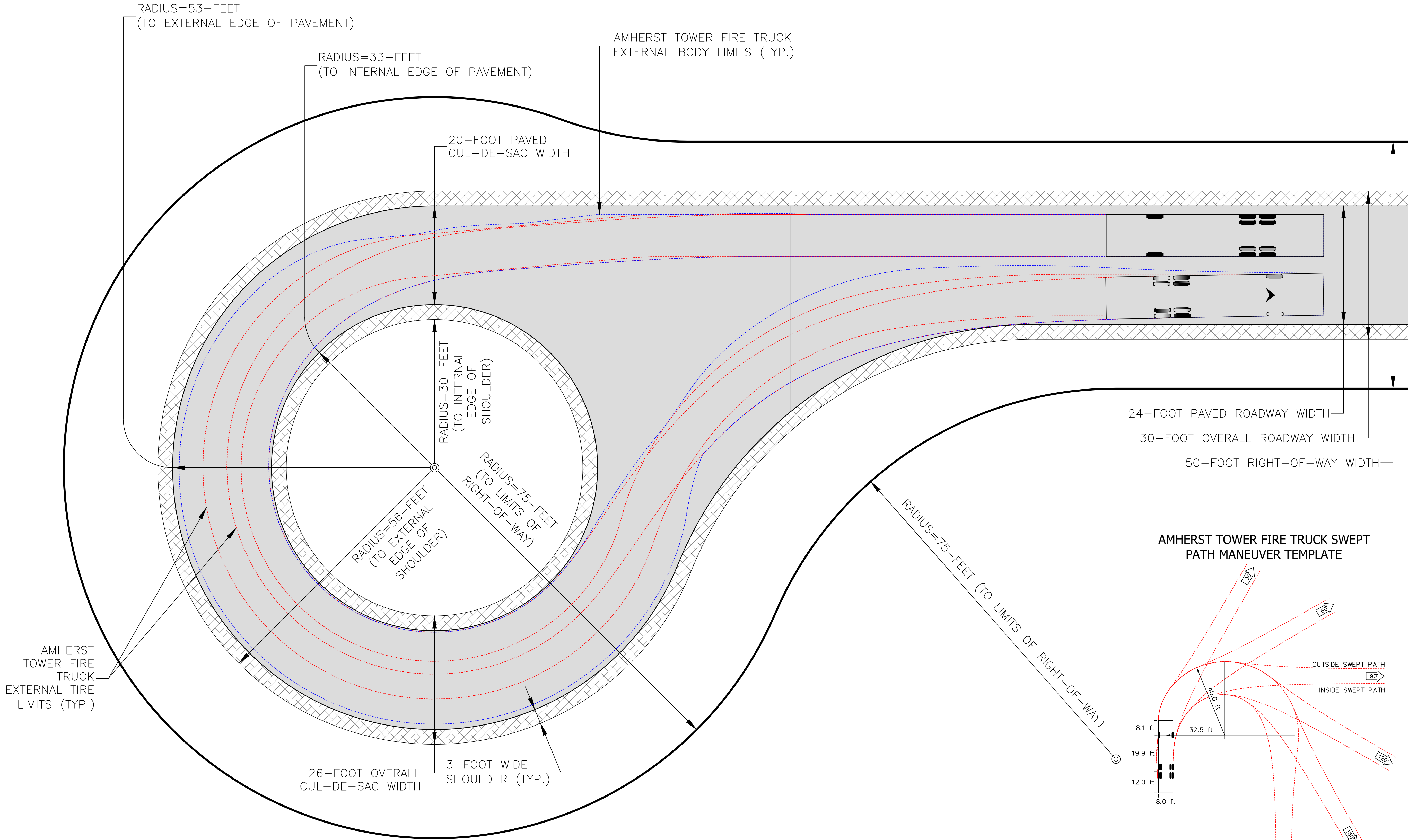
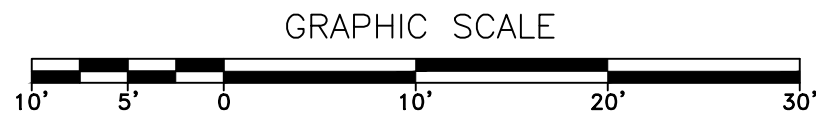
SCALE: 1" = 10'

DECEMBER 20, 2022

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SHEET

FILE: EXHIBIT.dwg
PROJECT: 2605.12
SHEET NO. 1 OF 1

Plotted: 1/10/2023 11:27 AM By: NCG
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PROPOSED CUL-DE-SAC
EXHIBIT

KEVIN CURRAN
TAX MAP 6 LOTS 2, 7 & 9
AMHERST, NEW HAMPSHIRE



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Jacobson Farm Subdivision

FKA: TransFormation 33 Single Family Lots and 4 Unit Barn (CUP III)

November 4th, 2024

Page 15 of 16

Attachment H – Cul-de-sac Overlay



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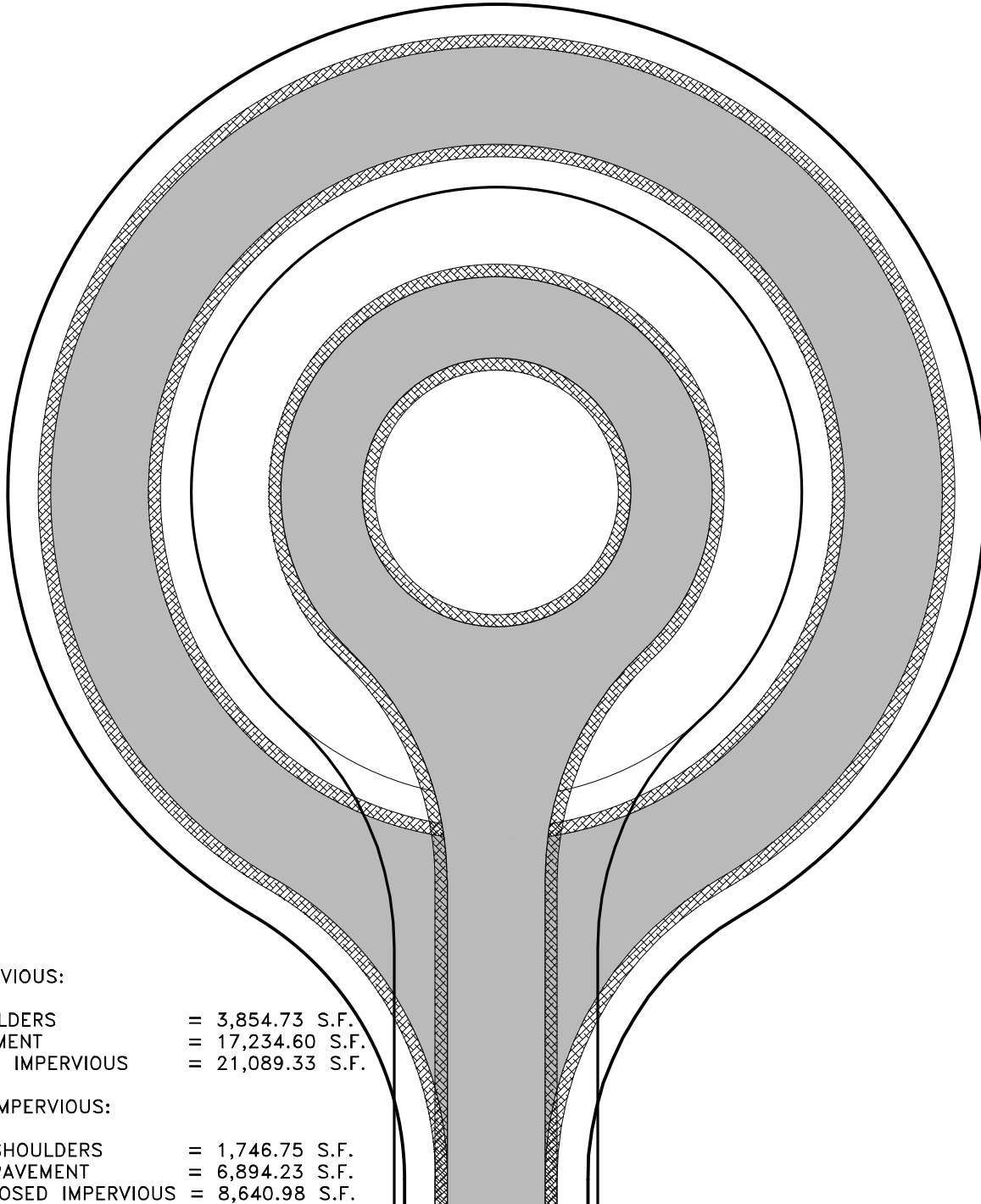
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TOWN IMPERVIOUS:

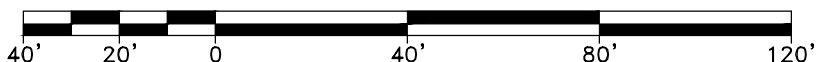
TOWN SHOULDERS	= 3,854.73 S.F.
TOWN PAVEMENT	= 17,234.60 S.F.
TOTAL TOWN IMPERVIOUS	= 21,089.33 S.F.

PROPOSED IMPERVIOUS:

PROPOSED SHOULDERS	= 1,746.75 S.F.
PROPOSED PAVEMENT	= 6,894.23 S.F.
TOTAL PROPOSED IMPERVIOUS	= 8,640.98 S.F.

TOWN OF AMHERST CUL DE SAC OVERLAY

GRAPHIC SCALE





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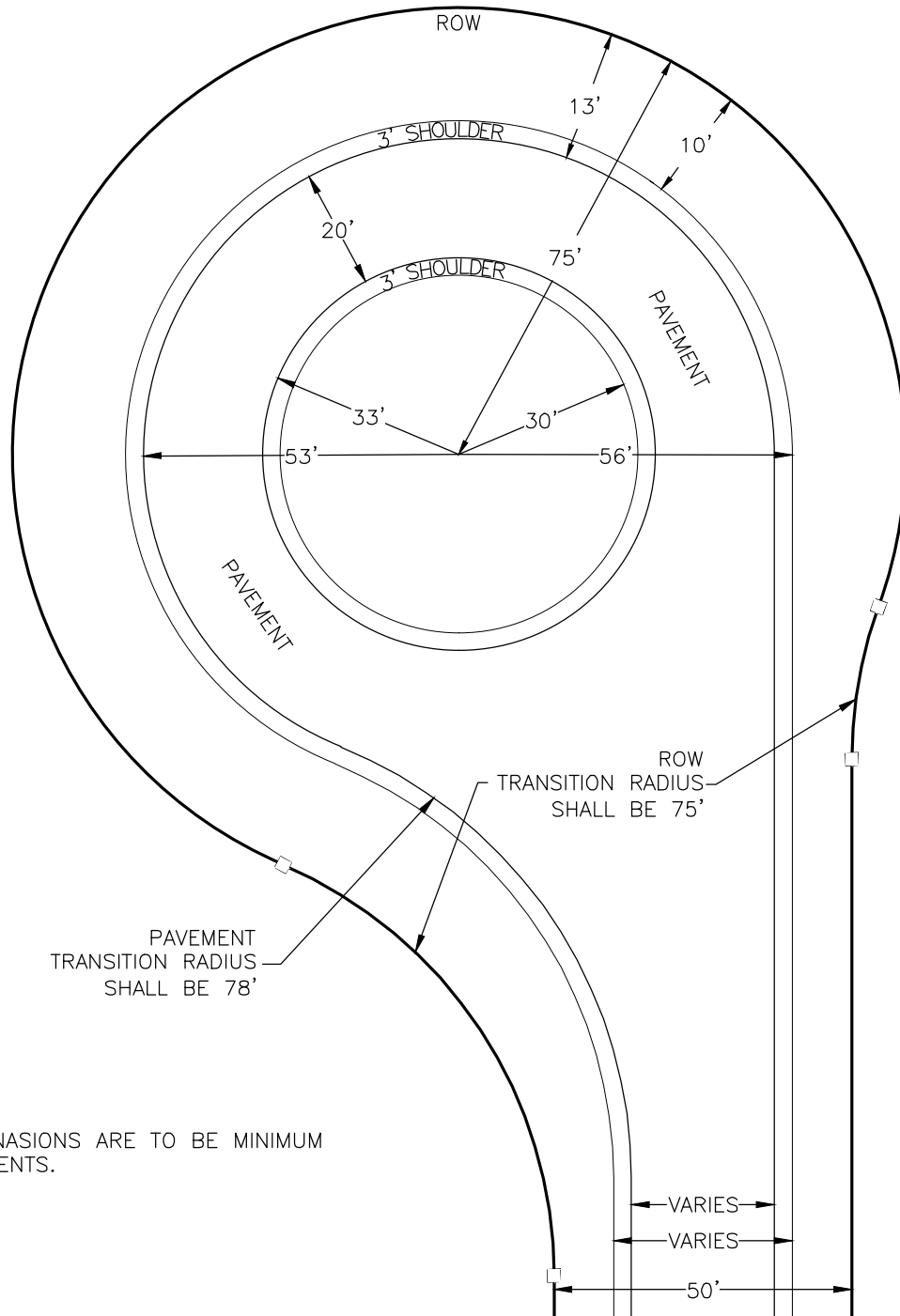
Jacobson Farm Subdivision

FKA: TransFormation 33 Single Family Lots and 4 Unit Barn (CUP III)

November 4th, 2024

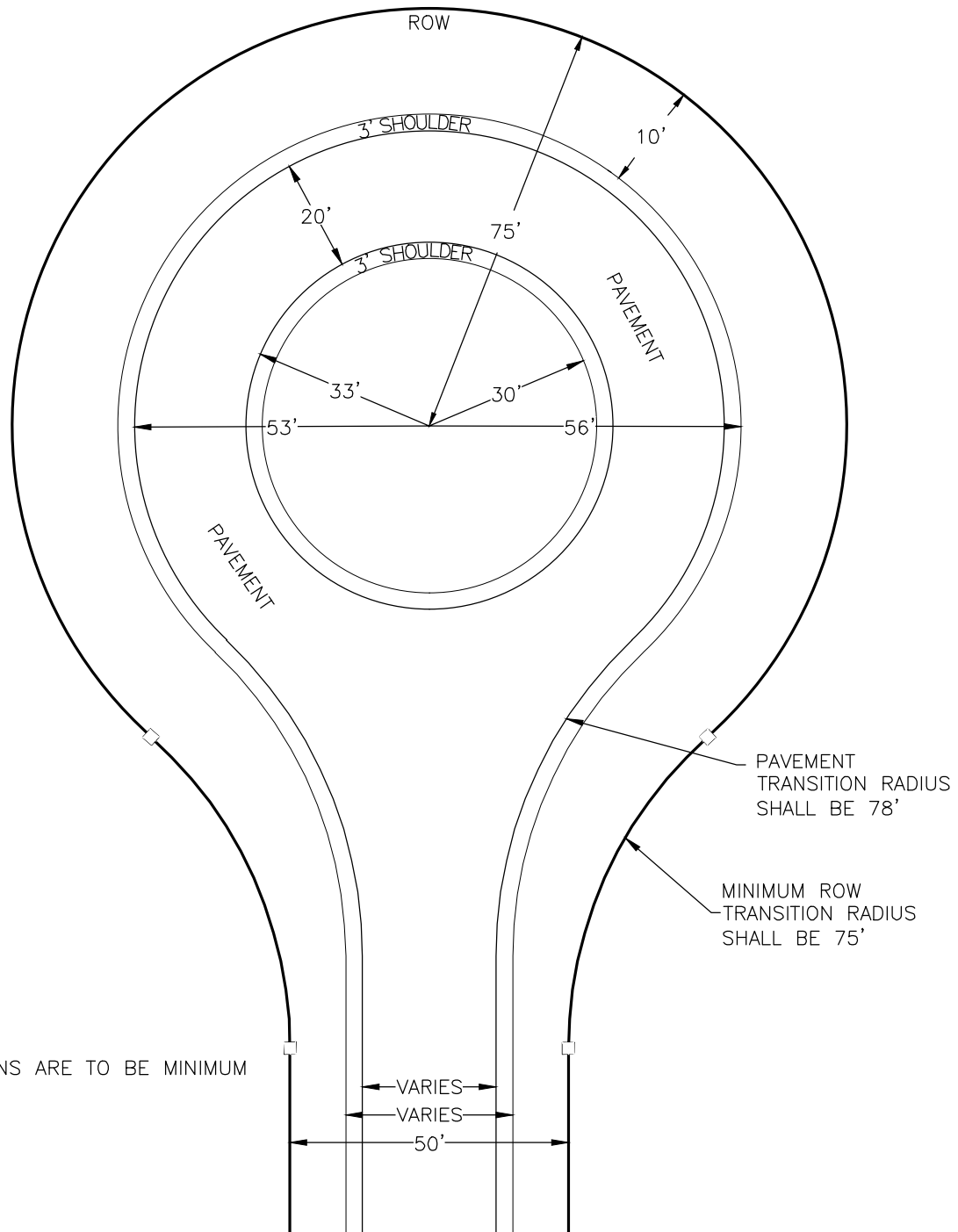
Page 16 of 16

Attachment I - Suggested Cul-De-Sac



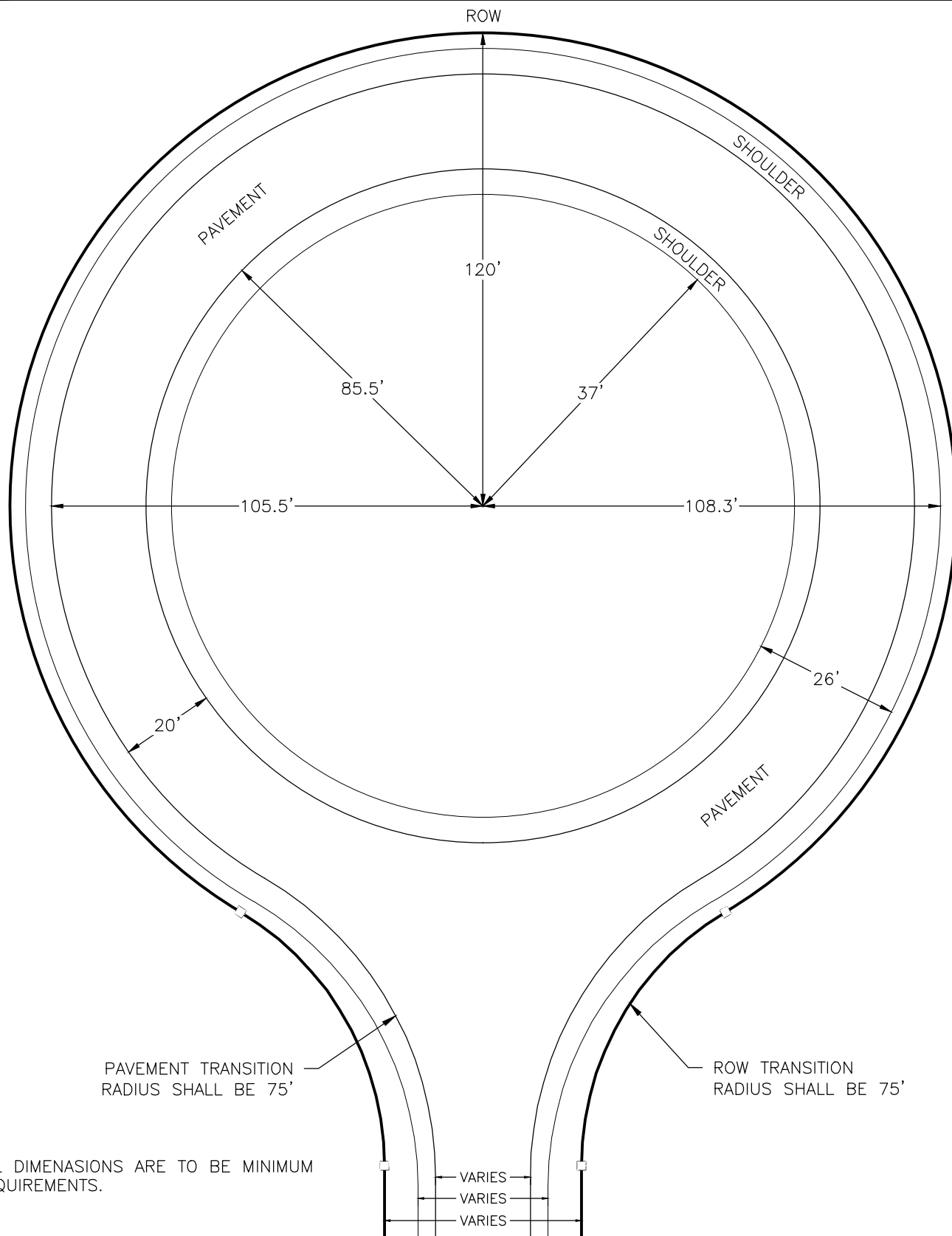
1. ALL DIMENASIONS ARE TO BE MINIMUM REQUIREMENTS.

RESIDENTIAL CUL DE SAC: OFFSET LEFT



1. ALL DIMENASIONS ARE TO BE MINIMUM REQUIREMENTS.

RESIDENTIAL CUL DE SAC: ON CENTER



NON-RESIDENTIAL ONE-WAY CUL DE SAC