646 West Ridge Pike, Limerick, PA 19468
Montgomery County, Pennsylvania

IMPROVEMENTS CONSTRUCTION MANUAL

PROCEDURES, MATERIALS AND SPECIFICATIONS

DECEMBER, 1991
REVISED APRIL 2008
REVISED MAY 23, 2008
LAST REVISED JULY 18,2023

Print Date: July 14, 2023

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LIMERICK TOWNSHIP
IMPROVEMENT CONSTRUCTION PROCEDURES,
MATERIALS AND SPECIFICATIONS

THE FOLLOWING SPECIFICATIONS SHALL SUPPLEMENT THE LIMERICK TOWNSHIP ZONING ORDINANCE, SUBDIVISION AND LAND DEVELOPMENT ORDINANCE, STREETS AND SIDEWALK ORDINANCE, AND ALL OTHER ORDINANCES AND REGULATIONS OF LIMERICK TOWNSHIP WHICH PERTAIN TO THE CONSTRUCTION OF THE TYPES OF IMPROVEMENTS REGULATED BY THESE SPECIFICATIONS

PROCEDURES

GENERAL

A General Procedure for subdivision and land development projects, preconstruction and construction phase are included in the exhibits.

NOTIFICATION

The Limerick Township Engineer, Public Works Superintendent or duly assigned representative shall be notified prior to the start of any construction and/or excavation, including removal of topsoil, grubbing of shrubs, bushes, trees and vegetation of any kind, or the performance of any work in a street, right-of-way, utility easement, storm drainage easement, waterways, and approved subdivision or land development project in Limerick Township.

PRECONSTRUCTION CONFERENCE

A preconstruction conference will be required for all subdivision and land development projects where an escrow has been developed for improvements cost, and for any other construction or earthmoving activities when deemed necessary by the Township Engineer. The developer or his representative and the contractor or contractors who will be performing the work are to attend along with the Township Engineer and Township Department Heads as well as any other interested reviewing agencies and/or utilities. A preconstruction conference agenda and check list is included at end of this section.

PERMITS AND CERTIFICATES

Proof of all required permits, certifications and approvals shall be provided at the preconstruction meeting as well as compliance with PA One Call System, in accordance with PA ACT 287 of 1974 as amended by PA ACT 187 of 1996, PA ACT 181 of 2006 and PA ACT 50 of 2017. Construction may not commence until all permits and approvals are obtained. All permit applications shall be made by the property owner, contractor or public utility company under his signature.

Any and all applications and/or permit fees shall be paid at the time of application and shall be in the amount as established by resolution of the Board of Supervisors as in effect at the time of application.

A general list of permits and/or approvals which is not all inclusive or limited is as follows:

Permits or Approvals	Agency
Stream Encroachment Pa. Fish Commission	PA D.E.P., Army Corps of Engineers, and
Wetlands and/or Flood Plain Encroachments	PA D.E.P. Army Corps of Engineers
Water Quality	PA D.E.P. Delaware River Basin Commission
State Highway Access	PennDOT
County Highway (Swamp Pike)	Montgomery County
Township Street Opening	Limerick Township
Township Street Access (Driveways & Roads)	Limerick Township
Grading, Soil Erosion & Sediment Control	Montgomery County Conservation, Limerick Township
Sanitary Sewer Connections and Installations	AQUA Pennsylvania (Inside ROW & Connection to Main) Limerick Township (Lateral Outside ROW)
Water Connections and/or Installations	Pennsylvania American Water Company

TRAFFIC CONTROL AND SAFETY

Work being performed on any and all existing public highways, streets, rights-of-ways and easements, shall require Road Occupancy Permit and posting of a performance bond as may be required from the proper authority, and all required safety protection, including flag persons, signing, barricades, flashing warning devices and other required devices. All safety protection methods and devices and procedures shall be in conformance with Pennsylvania Department of Transportation Publication 213 – Temporary Traffic Control Guidelines, current edition, and will be furnished and maintained solely by the applicant.

All work being performed shall be in compliance with Federal, State and local safety regulations and shall provide for public safety and the safety of all personnel involved directly or indirectly in the construction of all improvements, including, but not limited to trench shoring, protective clothing, safety shields and switches on power equipment, and vehicle alarms.

INSPECTIONS

Inspections shall be performed by the Township or his duly representative unless stated otherwise herein, to guarantee the proper procedures and methods of installation of all approved structure and approved materials required to be installed.

Inspections shall be required prior to starting construction, during the installation of materials and structures, and upon the completion of all improvements. All improvements shall be installed in accordance with all required approved regulations and specifications.

Any and all unsatisfactory work, faulty procedures and methods, and defective materials that have been installed shall be rejected and noted for the record on the inspection standards punch list and shall be corrected before final acceptance.

The placement of all required improvements shall be in accordance with the controls set by a surveyor registered by the state of Pennsylvania, to ensure installation of improvements to proper location, elevation, alignment and profile.

The following is intended to describe the format of inspection and notification procedures. Scheduling of required inspections shall be the responsibility of the Owner, and/or his contractor at least 48 hours before commencing any work on any item requiring inspection.

Water Distribution System (Community System)
Inspection of all improvements having been installed complete by section, requiring section by section pressure test and bacteria test to required standards, which shall be in accordance with standards utilized by the water utility company servicing the Township.

Water Distribution System (Municipal or Public)
Inspection of all improvements is the responsibility of the local utility company serving the area. The Owner and/or his contractor shall make all arrangements with the Utility Co. to adhere to their policies, procedures and standards.

Storm Drainage System
Shall require visual inspection, section by section, upon completion of that section, prior to backfilling any section including pipes, inlets, manholes, endwalls, detention and retention basins, culverts and bridges, and all items being installed as part of the storm drainage system. Cast in place concrete structures and bridge structures shall require material samples, in compliance with the latest ASTM standards. Test samples must be taken in the presence of the inspector

Subsoil System
Inspections to determine type of subsoil structure for compaction compatibility for use as a subgrade.

Subgrade Structure and Underdrain Pipe
Inspection and testing of subgrade type and required density and visual inspection of underdrain pipe installation including all connections to the storm drainage system and service laterals as required.

Concrete Curb Structure
Inspection of subgrade, general alignment and any forms to be used. String line shall be set prior to any concrete pour to show line and grade, profile and alignment. Material inspection, including the submittal of all certified material delivery slips.

Subbase Course
Inspection of materials placed as subbase prior to installation of base course, including the submittal of all certified material delivery slips.

Superpave Asphalt Mixture Design shall be inspected in accordance with the following:
HMA Base Course – Mix Design 25mm. Inspection of materials placed as base, including the submittal of all certified material weight slips.

HMA Binder (19 mm) and Wearing Course (9.5 mm).
Re-inspection of previously installed base course.

Inspection of materials placed as wearing surface, including the submittal of all certified material weight slips.

Sidewalk Structures
Inspection of subbase grade, form, and alignment prior to any pour.

Right-of-way Profile
Inspection of required finish grade elevations to limits of street right-of-way.

Seeding, Sodding and Erosion Controls
Inspection as required to assure compliance with approved plans, regulations and general acceptable methods and practice.

GENERAL PROCEDURES FOR SUBDIVISION AND LAND DEVELOPMENT PROJECT PRECONSTRUCTION & CONSTRUCTION PHASE

1. Supervisors approve, but don't sign plan – subject to escrow.
    a. Engineer gets copy of final plan

2. Developer's engineer or contractor submits improvements construction cost estimate to Township Engineer for review. Township engineer prepares escrow approval on letterhead and forwards copy to:
    a. Township
    b. Solicitor
    c. Developer

3. Solicitor generates a Land Development and Financial Security agreement and attaches escrow.

4. Supervisors sign plan and agreement.
   Copy to:
    a. Developer (Plan and LD agreement)
    b. Township (Plan and LD agreement)
    c. Township Engineer (Plan and LD agreement)
    d. Montgomery County Planning Commission (Plan)
    e. Recorder of Deeds (Plan)

5. Preconstruction meeting requested by Developer's Engineer or Township. The following shall be in attendance at the preconstruction meeting:
    a. Developer and contractors
    b. Township Department Heads
    c. Township engineer

6. Preconstruction meeting – developer presents:
    a. 2 sets of construction plans & schedule of milestones
    b. 2 sets of Erosion & Sediment Control Plan
    c. Copies of necessary permits and approvals
    d. Materials and Equipment Shop Drawings as requested by the Township Engineer. All shop drawings shall be reviewed and signed by the Developer's Engineer.

7. Begin Construction

8. Inspections – See Page 10000-3.

9. Periodic reimbursements:
    a. Developer request release from Township Finance Director
    b. Township submits request to Township Engineer for approval
    c. Township Engineer approves or adjusts amount of request
    d. Township authorizes release by bank or controlling agency

10. Developer/Contractor shall request a final inspection once all work has been completed.

11. Township Engineer's field engineer shall complete a final inspection and prepare a punchlist item of site improvement issues and submit to the Developer/Contractor and to the Township.

12. Township Engineer shall recommend Board of Supervisors release remaining construction cost and contingency when all punchlist items have been adequately addressed.

13. Developer shall submit a maintenance escrow covering all public improvements. The maintenance escrow shall be 15% of all public improvement costs.

14. Board of Supervisors authorize final Escrow release of project and accept maintenance Escrow.

15. After 18 months release maintenance escrow.

LIMERICK TOWNSHIP
IMPROVEMENT CONSTRUCTION PROCEDURES,
MATERIALS AND SPECIFICATIONS

PRE CONSTRUCTION CONFERENCE AGENDA

I. Introductions

II. General Discussion of the Project

III. Tentative Work Schedule

IV. Tentative Inspection Schedule

V. Developer / Contractor Responsibilities (submittals, construction changes, etc.)

VI. Defective Work and Quality Control Procedures

VII. Escrow Disbursement Request Procedures

LIMERICK TOWNSHIP
IMPROVEMENT CONSTRUCTION PROCEDURES,
MATERIALS AND SPECIFICATIONS

PRECONSTRUCTION CONFERENCE CHECK LIST

I. Introductions

II. List of developers / contractors

_____ contact names

_____ phone numbers

III. Tentative work schedule

_____ construction start date / Schedule of milestones
_____ construction phases organized correctly

a. Erosion & Sediment Control
b. Storm Water Runoff Control
c. Site grading
d. Road construction
e. Utilities
f. Curb & Sidewalk

_____ Inspection Schedule

IV. Developer / Contractor responsibilities

V. Defective work and quality control procedures.

VI. Escrow Account disbursement request procedures.

_____ Proper request submittal

a. Request submitted to Township
b. Inspected and approved by Engineer

_____ Submittal Form

a. All request reference item no.
b. All request include quantity

_____ Final inspection

a. Release any of remaining construction funds
b. Release of contingency funds

SPECIFICATIONS

STREET

a. **General Requirements**:

1. The construction of streets in Limerick Township shall comply with the specifications, regulations and provisions set forth in this manual, together with the detail/ cross section provided under the details section.

2. In the case of new roads within subdivisions and land developments, all roads and streets shall be designed and constructed in accordance with the provisions of the current Limerick Township Subdivision and Land Development and Zoning Ordinances and the requirements of this manual.

3. All work done pursuant to the provisions of the Limerick Ordinances shall be inspected by the Township Engineer, or Township Representative.

   The Design of all streets constructed shall be in accordance with the guidelines and requirements for Design of Local Road and street contained in PennDOT Publication 13M - Design Manual, Part 2, Highway Design, latest revision, the Township Zoning and Subdivision Ordinances, and this Manual.

4. Lines and grades shall be constructed as shown on the final approved plans. Any proposed modifications and changes, shall be reviewed and approved by the Township Engineer prior to field implementation.

5. All Superpave asphalt mixture shall be in accordance with PaDot Publication 408, latest edition.

6. All work shall remain within the area of disturbance. All disturbed areas by the developer shall be properly repaired, restored or replaced to the satisfaction of the Township Engineer.

7. In the case where the Township Engineer finds that the ground condition and/or rock condition beneath a street provides sufficient stability so that part or all of the subbase requirements may be waived, modified or changed and still comply with generally recognized, sound engineering principles after appropriate tests have been taken, subbase requirements may be waived, modified or changed as recommended by the Township Engineer.

8. Clearing and grubbing – All trees, roots, stumps, brush, down timber, wood, rubbish and any other objectionable material shall be removed from the site and shall include the removal of any objectionable material from the site and shall include the removal of any

obstruction interfering with the proposed road construction for the full legal right-of-way width, or as approved by the Township Engineer.

b. Subgrade:

1. Subgrade shall be prepared to accommodate the placement of the pavement structure and shoulders or gutters in accordance with PaDot specifications and within reasonably close conformity to the lines, grades and widths shown on the drawings and cross-sections or otherwise directed.

2. Subgrade shall be graded to the elevation and cross-section required with suitable soil or granular material, compacted to the required density.

3. In cases where the required density or stability cannot be obtained, the material in the area shall be excavated to a depth that when replaced and recompacted at a moisture content not exceeding optimum, the Subgrade will have the required stability where the Subgrade cannot be compacted or which moist and flow under the weight of a ten (10) ton roller.

4. The Subgrade shall be properly prepared to receive the subbase.

5. Where the surface of an existing non-skid roadway conforms approximately to the proposed Subgrade elevation, or where an embankment less than nine inches (9”) in depth is to be made over such roadway, the surface of the old roadway shall be scarified to a depth of not less than four inches (4”), to permit satisfactory reshaping, binding and compaction of the subgrade.

c. Sub-base:

1. This work shall consist of constructing a layer or layers of aggregate on a prepared surface in accordance with PennDOT Publication 408, latest revisions.

2. The aggregate shall be stone or gravel meeting the requirements of PennDOT Type C or better, No. 2A stone or approval equal.

3. If at the time of construction, local unstable subgrade conditions are encountered, the Township Engineer may require that all areas of unstable subgrade be excavated to sufficient depth, replaced with approved material and compacted to a density and stability equal to or greater than the surrounding subgrade, and/or require the use of a Geotextile.

d. Superpave Asphalt Mixture Design, HMA Base Course:

Description: This work shall consist of installing a certified plant-mixed HMA base course on a prepared surface within reasonably close conformity to the lines, grades and limits shown on the construction documents. The base course shall be constructed to the minimum compacted depth and density and to the distances below the finished grade, as indicated in the construction documents.

Design Standards: Unless otherwise indicated, the following design standards shall be used:

1. Mix Design – 25mm.
2. Equivalent Single Axle Load – 3.0 to 10.0 million.
3. Performance Grade – PG 64-22.
4. Mat Thickness – 150mm (6-inches) State Highways
   200 mm (8-inches) Township Roads.

All standards shall be in accordance with PennDOT Publication 408, latest edition.

Mixture Acceptance:

A. For Township Roads, Certification Acceptance level will be used. Criteria for acceptance shall be as specified in PennDOT Publication 408, Section 409.2(f).

B. Provide PennDOT Form CS-4171 from a plant approved in Bulletin 15. Attach all QC test results to the form. Certify mixture as specified in PennDOT Publication 408, latest edition.

C. Provide all forms and supporting certifications to the Engineer a minimum of 10-days prior to the commencement of work.

D. For State Highways, mixture acceptance may be by other methods, as specified in PaDot Publication 408. It is incumbent upon the contractor to contact the PaDot representative to determine which criteria for acceptance will be used for the specific project.

Material: All material shall be in accordance with PennDOT Publication 408, latest edition.

Equipment:

- Hauling Equipment

1. Haul the mixtures in tightly sealed vehicles that do not contain petroleum oils, solvents, or other materials that adversely affect the mix.
2. Provide covers of sufficient size and quality to protect the entire load under all conditions.
3. Maintain the proper and uniform temperature specified in PennDOT Publication 408, latest edition.
4. Provide insulation on all sides of the truck body, a double-walled body, or a heated body when the air temperature is below 50°F.

- Bituminous Pavers

1. Use self-contained, power-propelled units with activated screeds or activated strike-off assemblies and with automatic screed controls capable of producing a finished surface of the specified evenness and texture.
2. Provide heated units capable of spreading and finishing the mixture to the widths and depths indicated.
3. Provide units capable of being operated at forward speeds consistent with the satisfactory laying of the mixture and equipped with receiving hoppers having sufficient capacity for uniform spreading and equipped with distribution systems that place the mixture uniformly in front of the screeds.
4. Do not use any equipment that tears, shoves, or gouges the mixture or that causes tracks, indented areas, flushing segregation or other permanent blemishes. Do not use blade graders or other earthmoving equipment.

- Rollers

1. Use steel-wheel, pneumatic-tire or vibratory rollers as specified in PennDOT Publication 408, latest edition. Operate rollers according to manufacturer's recommendations.

Construction Methods:

- Time Restrictions

1. Do not place paving mixtures from November 1 to March 31 unless written permission is obtained from Township or State Officials.

- Weather Limitations

1. Do not place base course when the air or prepared surface temperature is 35°F or lower.
2. If work is halted because of weather conditions, the Contractor may be permitted to place limited quantities of the base course that is en route to the project provided the placement is approved by the Project Representative on site.
3. Should the conditions not permit the material to be placed, the Contractor shall have no recourse for payment of any unused material.

- Preparation of Existing Surface.

1. Thoroughly roll all subgrade with a minimum 10-ton vibratory roller such that the finished product is properly compacted, stable at a uniform elevation and all aggregate is firmly embedded. For areas inaccessible to a roller, use a vibratory plate tamper or jumping jack to achieve the same criteria.
2. Compact subgrade to a minimum percentage specified of the materials maximum dry density as determined by ASTM D-698-70.

   For State Highways: minimum 100%
   For Township Roads: minimum 95%

3. If soft areas are encountered, the Engineer may direct the Contractor to allow sufficient time for the subgrade to dry out. If the area cannot be suitably compacted, the Engineer can order it removed and backfilled with suitable material. If soft areas are caused by the Contractor, those areas will be removed and backfilled at the Contractor's expense.
4. Do not allow equipment on the prepared subbase after final rolling and conditioning.

5. Paint all vertical surfaces of curbs, structures, gutter and pavements that will be in contact with bituminous mixtures with a uniform coating of bituminous material, Class E6 or E8.

- Spreading and Finishing.

1. Unless otherwise directed, deliver, place and compact pawns, mixtures during daylight hours.
2. Ensure that mixtures are delivered and placed at the following laying temperatures. Ensure mixture does not contain lumps of cold material

	Temperature of Mixture	
Class of Material	Min (°F)	Max (°F)
PG 64-22	265	320

For other classes of material, refer to PennDOT Publication 408 for temperature ranges.

3. Spread and strike off the mixture for the entire lane width or as much lane width as practical. Adjust screed assemblies to provide the required cross section and depth. After spreading, do not add any mixture to the mat that is segregated, below the minimum temperature, contains either a deficiency or excess of asphalt, or is otherwise unsuitable.
4. In areas where mechanical spreaders cannot be used, place and screed the mixture with suitable hand tools. Do not use rakes.
5. If the base course is more than 150 mm (6-inches), place the course in two or more layers of approximately equal depth, with no layer less than 80 mm (3-inches) or more than 150 mm (6-inches). If the compacted depth of the base course is more than 200 mm (8-inches), please the course in two or more layers of approximately equal depth with no layer less than 100 mm (4-inches) or more than 200 mm (8-inches).
6. Install the base course to within 6 mm (1/4-inch) of final elevations. Remove and replace any irregularities more than 6 mm (1/4-inch).

Joints:

a. Longitudinal.

1. Plan joint locations to ensure that the joint in the top layer is at the approximate pavement centerline for two-lane roadways and within

300 mm (12-inches) of the lane lines for roadways with more than two lanes. Offset joints in a layer from the joint in the layer immediately below by approximately 150 mm (6-inches).

2. If traffic or other causes distort the lane edge, restore it to its original shape using either a vertical or notched wedged joint per Publication 408, latest edition.

b. Transverse.

1. Construct joints perpendicular to the pavement centerline.
2. Provide a true vertical surface and cross section throughout the entire joint.
3. Paint the joint face with a thin coating of bituminous material before placing fresh mixture against the joint face.

Compaction:

1. Compact the mixture to achieve the density acceptance requirements and to eliminate all roller marks.
2. Compact the mixture while it is in the proper condition. Adjust roller speed, amplitude, frequency pattern and roller size to eliminate displacement, shoving, cracking and aggregate breakage. Satisfactorily correct all displacement.
3. Maintain wheels of the steel-wheel rollers moist and clean to prevent the mixture from adhering to the wheels.
4. For areas inaccessible to rollers, compact with mechanical vibrating hand tampers.

Mat Density Acceptance:

1. Density acceptance level will be either by Non-Movement or Optimum – Rolling Pattern as outlined in PennDOT Publication 408.
2. Density limits shall comply with Table E PennDOT Publication 408, latest edition.

Field Technician:

1. Provide a certified HMA field technician in accordance with the qualifications outlined in Publication 351 to control placement of the

bituminous mixtures. The certified HMA field technician must be onsite and carry a valid certification card during placement of all HMA mixtures.

Protection of Courses:

1. Do not allow vehicular traffic or loading on newly compacted courses until adequate stability and adhesion is obtained and the material has cooled to 140°F or less.

Defective Work.

1. Remove and replace all work determined to be defective by the Engineer. Defective work will be as defined in PennDOT Publication 408, latest edition.
2. Defective work will not be measured for payment until it is satisfactorily corrected.

e. Superpave Asphalt Mixture Design, HMA Binder and Wearing Course:

Description:. This work shall consist of installing a certified plant-mixed HMA Binder or Wearing course on a prepared surface within reasonably close conformity to the lines, grades and limits shown on the construction documents. The base course shall be constructed to the minimum compacted depth and density and to the distances below the finished grade, as indicated in the construction documents.

Design Standards: Unless otherwise indicated, the following design standards shall be used:

- Mix Design – 19mm. - Binder
  9.5mm - Wearing
- Equivalent Single Axle Load – 3.0 to 10.0 million.
- Performance Grade – PG 64-22.
- Mat Thickness – (2.5") 60mm Binder Course
  (1.5") 40mm Wearing Course
- Skid Resistance Level (SRL) – Level H

All standards shall be in accordance with PennDOT Publication 408, latest edition.

Mixture Acceptance:

A. For Township Roads, Certification Acceptance level will be used. Criteria for acceptance shall be as specified in PennDOT Publication 408.

B. Provide PaDot Form CS-4171 from a plant approved in Bulletin 15. Attach all QC test results to the form. Certify mixture as specified in PennDOT Publication 408.

C. Provide all forms and supporting certifications to the Engineer a minimum of 10-days prior to the commencement of work.

D. For State Highways, mixture acceptance may be by other methods, as specified in PaDot Publication 408. It is incumbent upon the contractor to contact the PaDot representative to determine which criteria for acceptance will be used for the specific project.

Material: All material shall be in accordance with of PaDot Publication 408, latest edition.

Equipment:

- Hauling Equipment.

1. Haul the mixtures in tightly sealed vehicles that do not contain petroleum oils, solvents, or other materials that adversely affect the mix.
2. Provide covers of sufficient size and quality to protect the entire load under all conditions.
3. Maintain the proper and uniform temperature specified in PennDOT Publication 408, latest edition.
4. Provide insulation on all sides of the truck body, a double-walled body, or a heated body when the air temperature is below 50°F.

- Bituminous Pavers

1. Use self-contained, power-propelled units with activated screeds or activated strike-off assemblies and with automatic screed controls capable of producing a finished surface of the specified evenness and texture.
2. Provide heated units capable of spreading and finishing the mixture to the widths and depths indicated.
3. Provide units capable of being operated at forward speeds consistent with the satisfactory laying of the mixture and equipped with receiving hoppers having sufficient capacity for uniform spreading and equipped with distribution systems that place the mixture uniformly in front of the screeds.
4. Do not use any equipment that tears, shoves, or gouges the mixture or that causes tracks, indented areas, flushing segregation or other permanent blemishes. Do not use blade graders or other earthmoving equipment.

- Rollers

    1. Use steel-wheel, pneumatic-tire or vibratory rollers weighing not less than ten (10) tons, as specified in PennDOT Publication 408, latest edition. Operate rollers according to manufacturer's recommendations.

Construction Methods:

- Time Restrictions

    1. Do not place paving mixtures from November 1 to March 31 unless written permission is obtained from Township or State Officials.

- Weather Limitations

    1. Do not place base course when the air or prepared surface temperature is 40°F or lower.
    2. If work is halted because of weather conditions, the Contractor may be permitted to place limited quantities of material that is en route to the project provided the placement is approved by the Project Representative on site.
    3. Should the conditions not permit the material to be placed, the Contractor shall have no recourse for payment of any unused material.

- Preparation of Existing Surface.

    1. Remove and dispose of all loose and foreign material including, dirt, dust, mud, excess joint and crack sealer and all other foreign material. Employ a power or portable truck broom for large areas.
    2. Should excessive amounts of dirt and/or dust be embedded within the base course, the Engineer may order the surface to be blown off with compressed air to remove this material.
    3. Fill cracks where directed by the Engineer prior to paving. Any broken or faulty road surface, holes, or depressions are to be excavated to a firm foundation, dried, tack or prime coated and leveled with suitable bituminous patching material prior to overlay.
    4. All surfaces to receive either binder or wearing course must be dry.
    5. Before overlaying any surfaces, apply specified tack coat at an average rate of 0.05 gal/sq.yd. in accordance with PennDOT Publication 408 or as directed by the Engineer. Tack coat shall be applied no more than three (3) hours before the street is paved. Dripping or pouring the tack coat even from a distributor truck will be cause for suspension of work until proper equipment is brought to the job.

6. Paint all vertical surfaces of curbs, structures, gutter and pavements that will be in contact with bituminous mixtures with a uniform coating of bituminous material, Class E6 or E8.
7. All necessary start and stop cuts and cuts around inlets and at the end of paving for each limit of paving are to be made by the Contractor.

- Spreading and Finishing.

1. Unless otherwise directed, deliver, place and compact pawns, mixtures during daylight hours.
2. Ensure that mixtures are delivered and placed at the following laying temperatures. Ensure mixture does not contain lumps of cold material

	Temperature of Mixture	
Class of Material	Min (°F)	Max (°F)
PG 64-22	265	320

For other classes of material, refer to PennDOT Publication 408 for temperature ranges.

3. Spread and strike off the mixture for the entire lane width or as much lane width as practical. Adjust screed assemblies to provide the required cross section and depth. After spreading, do not add any mixture to the mat that is segregated, below the minimum temperature, contains either a deficiency or excess of asphalt, or is otherwise unsuitable.
4. In areas where mechanical spreaders cannot be used, place and screed the mixture with suitable hand tools. Do not use rakes.
5. Install the binder or wearing course to within 6 mm (1/4-inch) of final elevations. Remove and replace any irregularities more than 6 mm (1/4-inch).
6. Sealing of each overlaid road shall be performed within fourteen (14) days of paving.
7. All curbs, edges, inlets, manholes, water boxes, driveways, etc. Must be sealed with AC-20 or equal (not tack coat) after resurfacing. All driveways shall have screenings placed over the AC-20 while it is still hot.

Joints:

a. Longitudinal.

1. Plan joint locations to ensure that the joint in the top layer is at the approximate pavement centerline for two-lane roadways and within 300 mm (12-inches) of the lane lines for roadways with more than two lanes. Offset joints in a layer from the joint in the layer immediately below by approximately 150 mm (6-inches).

2. If traffic or other causes distort the lane edge, restore it to its original shape using either a vertical or notched wedged joint per PennDOT Publication 408, latest edition.

b. Transverse.

1. Construct joints perpendicular to the pavement centerline.
2. Provide a true vertical surface and cross section throughout the entire joint. All joints within the wearing course shall be saw joints.
3. Paint the joint face with a thin coating of bituminous material before placing fresh mixture against the joint face.

Compaction:

1. Compact the mixture to achieve the density acceptance requirements and to eliminate all roller marks.
2. Compact the mixture while it is in the proper condition. Adjust roller speed, amplitude, frequency pattern and roller size to eliminate displacement, shoving, cracking and aggregate breakage. Satisfactorily correct all displacement.
3. Maintain wheels of the steel-wheel rollers moist and clean to prevent the mixture from adhering to the wheels.
4. For areas inaccessible to rollers, compact with mechanical vibrating hand tampers.

Mat Density Acceptance:

1. Density acceptance level will be either by Non-Movement or Optimum – Rolling Pattern as outlined in PennDOT Publication 408.
2. Density limits shall comply with PennDOT Publication 408, latest edition.

Field Technician:

1. Provide a certified HMA field technician in accordance with the qualifications outlined in Publication 351 to control placement of the bituminous mixtures. The certified HMA field technician must be onsite and carry a valid certification card during placement of all HMA mixtures.

Protection of Courses:

1. Do not allow vehicular traffic or loading on newly compacted courses for a minimum of three (3) hours and until adequate stability and adhesion is obtained and the material has cooled to 140°F or less.

Surface Tolerance:

1. Extreme care shall be exercised by the contractor to insure that a continuous grade exists along the new paving and that no pockets exist for water to collect and remain dormant. If any such pockets do occur, the contractor at his expense shall be required to correct the problem to the satisfaction of the Township Engineer.
2. Surface tolerance shall be as defined by PennDOT Publication 408. The pavement will be considered defective if irregularities are more than 3/16-inch over a 10-foot length.

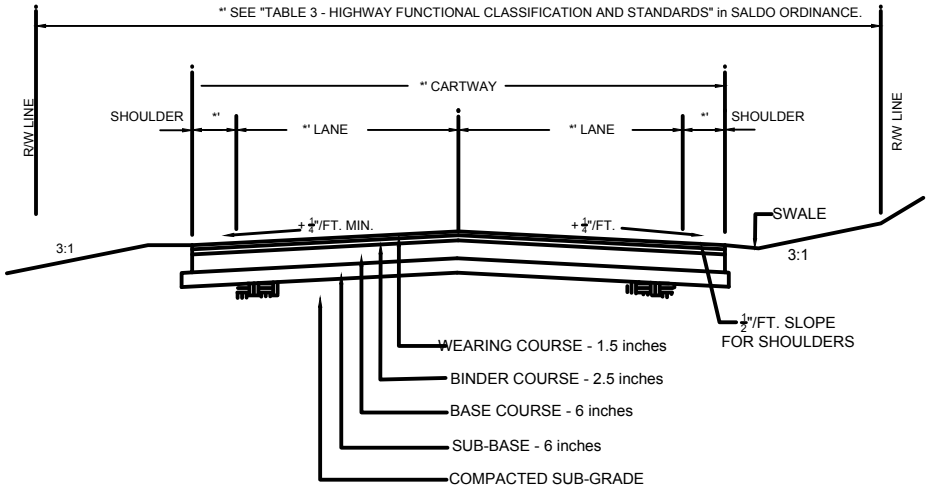
Defective Work:

1. Remove and replace all work determined to be defective by the Engineer. Defective work will be as defined in PennDOT Publication 408, latest edition.
2. Defective work will not be measured for payment until it is satisfactorily corrected.
3. All cutting of test holes, checking of depth, refilling, and compacting shall be done by the contractor at his expense and as directed by the Engineer.

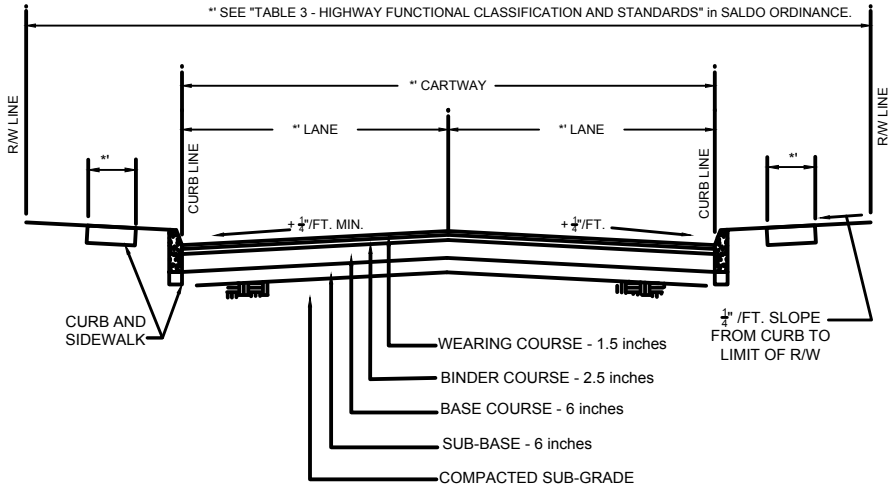
f. Shoulders:

1. Supporting shoulders shall be constructed on the sides of all roads and streets within the Township where curbing shall not otherwise be required.

2. Shoulders shall be constructed as required and shall be Penn DOT Type 1-I paved shoulders as in PennDOT Publication 408, latest revision. Additional shoulder designs may be approved by the Township and Township Engineer where deemed necessary.



+ INCREASE SLOPE FOR ½"/FT. WHEN DEEMED NECESSARY .

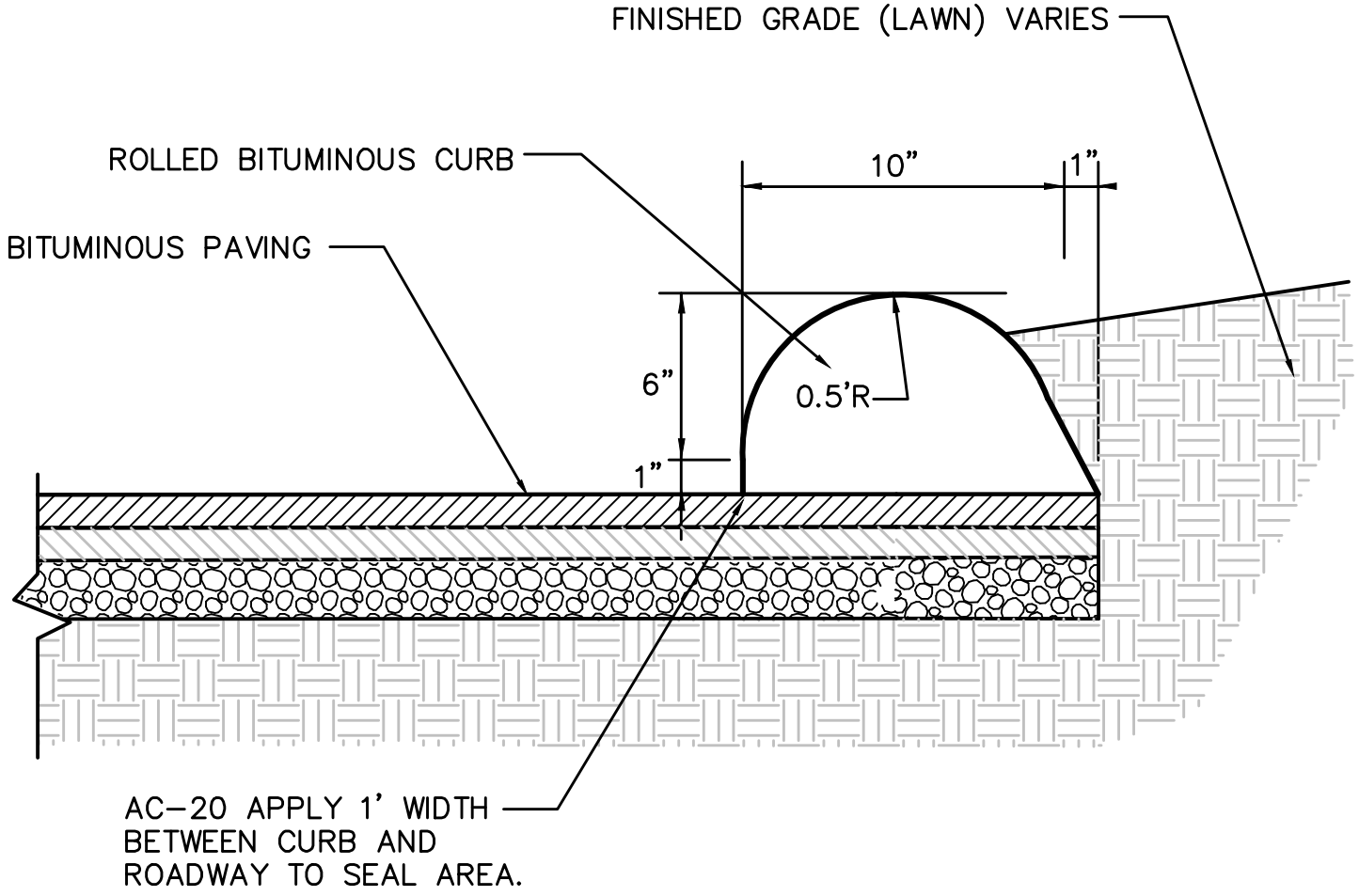


LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

ROADWAY CROSS SECTION

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-1



LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

BITUMINOUS ROLLED CURB

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-2

LIMERICK TOWNSHIP
IMPROVEMENT CONSTRUCTION PROCEDURES,
MATERIALS AND SPECIFICATIONS

SPECIFICATIONS

CURB and SIDEWALK

a. Curb:

1. Standard straight curb (machine slip form) shall be minimum 18" structure height, installed on a minimum 4-inch layer of AASHTO 57. Curb within the right-of-way shall have a minimum 8-inch curb reveal and curb located outside the right-of-way shall have a minimum 6-inch curb reveal. Expansion joints shall be every 60 feet, at structures, and at the end of a day's work. Contraction joints shall be saw cut every 10 feet a minimum of 2 inches in depth. Minimum 4,500 psi compressive strength. All depressed curb ramps shall be ADA compliant and in accordance with PennDOT Publication 72M.

2. Standard straight curb (type hand form) shall be minimum 18" structure height and installed on a minimum 4" layer of AASHTO 57. Expansion joints shall be every 30 feet, at structures, and at the end of a day's work. Minimum 4,500 psi compressive strength.

3. Shall be air entrained (6%), 4,500 p.s.i. In accordance with the American Concrete Institute ACI 318-05 or latest edition. Maximum water-cement ratio shall not exceed 0.45.

   All work within PENNDOT R.O.W. areas shall comply with PENNDOT 408. All 4,500 PSI air entrained concrete exceeds specifications set forth for PennDOT Class AA concrete. (AA concrete = 3,750 PSI after 28 days.)

4. Protection and curing shall be as follows:

   - Curb shall be protected and cured for a period of not less than 72 hours after completion.
   - If polyethylene sheets or burlap are used for curing they shall be properly weighted down and the concrete shall be kept moist through the curing period.
   - Concrete curb shall not be placed when the air temperature is below 40°F unless approved precautions are taken to prevent freezing.
   - Temps below 40 degrees F require proper add mixtures (reducer) as specified in ACI 318-05.
   - All concrete and form work must be insulated and covered prior to, and immediately after placement of fresh concrete. All insulated blankets must be in accordance with ACI 318-05 Sections 19-19.5 specifications.

b.Sidewalk:

1. Sidewalk shall be 4 foot wide, 4 inch thick placed on a minimum 4 inch layer of 2A crushed aggregate bedding. Expansion joints shall be every 30 feet, with contraction joints cut every 5 feet a minimum of 1 inch in depth. Additional expansion materials shall be placed between any curb and driveway aprons and in the sidewalk at the driveway limits. All sidewalks shall receive a broom finish unless approved otherwise by the Township. Minimum 4,500 psi compressive strength.

2. Shall be air entrained (6%), 4,500 p.s.i. American Concrete Institute ACI 318-05 or latest edition. Maximum water-cement ratio shall not exceed 0.45.

3. Aggregate Subbase: Shall be AASHTO No. 57 material meeting the requirements of, PennDOT Specifications, Publication 408, latest edition.

4. Subgrade Preparation:

    - The sidewalk area shall be excavated to the proposed subgrade line. The excavation shall include the removal of existing paving or sidewalk, if necessary and the disposal of all excess material.

    - The subgrade line shall be 8-inches below and parallel to the finished grade. When directed, remove and replace unsuitable material with acceptable material, as approved by the Township Engineer.

    - The subgrade shall be compacted to a firm, even surface and moistened as necessary to prevent absorption of water from the concrete.

    - All sewer vent boxes, gas, and water service valve boxes shall be reset to be flush with finished grade.

4. Protection and Curing:

    - Traffic shall be excluded and the sidewalk shall be protected and cured for a period of not less than 72 hours after completion.

    - If polyethylene sheets or burlap are used for curing they shall be properly weighted down and the concrete shall be kept moist through the curing period.

    - Concrete sidewalk shall not be placed when the air temperature is below 40°F unless approved precautions are taken to prevent freezing.

DRIVEWAY APRON:

1. Driveways over sidewalks shall be at least 6 inches thick or as a minimum, welded wire fabric, 6" x 6" by 10 gauge, shall be installed in all driveway apron/sidewalk areas. Minimum 4,500 psi compression strength.

2. All depressed curb for driveway entrances is permitted rather than a horizontal radius. The curb shall be depressed by rounding the edge from the top of the curb to the gutter line. The bottom line of the curb shall be maintained. The sloped portion of the driveway on all new construction shall terminate at the closest edge of sidewalk and at the gutter line. A lip of 1-1/2" inches in height shall be constructed at the gutter line.

3. Any and all driveways constructed within Township right-of-way shall be paved at a minimum from the edge of the existing Township paved cartway to the existing right-of-way line as may be determined by the Township. The length of paving may be required to be extended by the permittee at the request if the Township depending on driveway lengths, slopes and areas of drainage problems.

4. The paved portions of driveways within the right-of-way shall consist of four inches (4") minimum depth (19 mm) on four inch (4") minimum depth of crushed stone. The edge between the driveway and street cartway shall be sealed with AC20 asphalt cement 12 inch width.

5. The Township, upon field inspection, shall determine whether a pipe shall be used under the drive. The pipe, when required, shall be determined by drainage computations using a ten (10) year storm frequency. The minimum pipe size shall be fifteen (15) inches unless approved otherwise. The pipe shall be located at least six (6) feet from the edge of cartway unless field conditions, upon Township inspection, indicate modification of this criteria. The minimum length of pipe shall be twenty (20) feet or extend at least two (2) feet minimum on each end beyond the edges of the driveway pavement. Flared end sections shall be required, other methods of outlet and inlet protection may be approved by the Township.

   When swales are used the gutter shall be at least six (6) inches lower than the edge of cartway and six (6) feet from the edge of cartway. This criteria may be modified by the Township if field conditions dictate such.

STREETS and DRIVEWAYS;

1. The general design criteria for the access of all driveways and new streets to a Township road with respect to locations, sight distances, angle of approach, maintenance, restoration of damaged areas and general conditions shall be in conformance with attached exhibit Penn DOT Title 67, Chapter 441 Access to and Occupancy of Highways by Driveways and Local Roads.

a. Sealer:

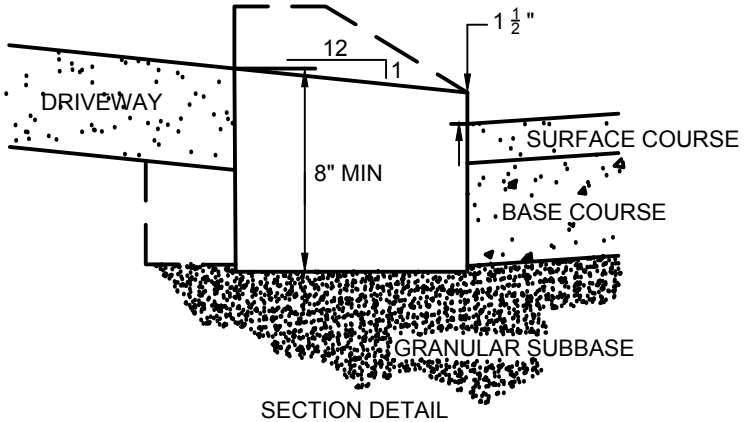
1. All areas adjacent to straight curbs, inlets, utility covers, and trench repair areas shall be sealed with AC-20

b. Township Road Occupancy Permit Application:

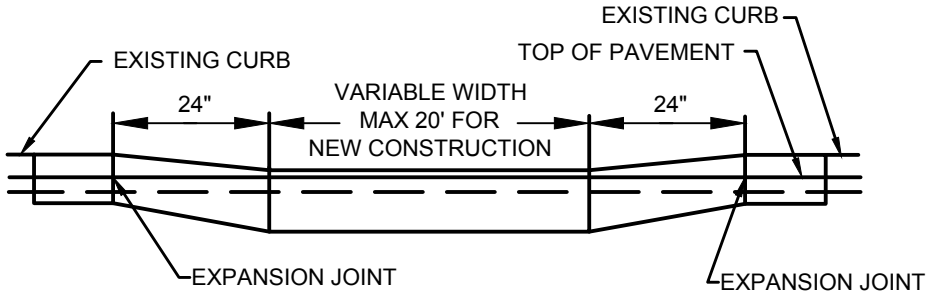
1. Any street or driveway proposed to intersect a Township Road, the developer shall submit a Township Road Occupancy Permit Application. A copy of the Township Road Occupancy Permit Application can be obtained from the Township website or from the Township office.
2. Work Descriptions/Conditions:
    a. All work shall conform to Limerick Township Chapter 153. Streets and Sidewalks, Limerick Township Construction Manual for Improvements, Procedures and Specifications, and Pa Code Title 67, Chapter 441.
    b. Permittee/Contractor shall comply with the Pennsylvania Underground Utility Protection Act (Act 287 of 1974 as amended by Act 121 of 2008, or most recent amendment).
    c. Tire scrubber shall be installed and maintained at all times during all phases of construction. Permittee/Contractor shall keep all dirt, mud, stone and other debris cleaned off of the road on a daily basis or as needed, whichever occurs first.
    d. Roadway: Permittee/Contractor shall be responsible for repairing any/all road surface and/or shoulder area damaged during construction.
        i. No “track equipment” shall be loaded/unloaded on Township paved roadways. If conditions require same, street pads MUST be used.
        ii. Existing road conditions have been field inspected on and found to be in condition.
    e. Drainage: All driveways shall be located, designed, constructed and maintained in such a manner as not to interfere or be inconsistent with the design, maintenance and drainage of the roadway. A driveway pipe required. If pipe is required, minimum diameter shall be minimum length shall be with flared end sections on inlet and discharge end of pipe. If pipe is not required, finish grade of driveway shall meet existing grades of shoulder as not to obstruct drainage. Owner shall maintain at all times.
    f. Sight Distance: A minimum safe sight distance shall be provided and maintained at all times pursuant to PA Code Title 67, Chapter 441 (h)(1).
    g. Permittee/Contractor shall notify Public Works Department at minimum 48-hours prior to installation of blacktop for inspection of stone grade and cross section. Note: Failure to notify may require removal and replacement of bituminous materials.

3. Where permittee fails to comply with the condition as to completion of work by the time specified, the following rules will govern:
    a. Failure to start work by date specified for completion. Permit will be cancelled unless permittee desires an extension of time, in which case a supplemental permit may be issued.

b. Work started and not completed by specified date. Permittee will notify Township, prior to expiration of allotted time, of inability to complete the work on or before the date specified and request an extension of time. Such request shall be accompanied by the prescribed fee.
c. Permittee not desirous of carrying out proposed work on account of change in conditions affecting it. Permittee will notify the Township prior to the date specified for completion that work will not be carried forward, returning the permit with such notice. The fee for inspection of the work will be refunded by the Township, provided that they have been notified of cancellation prior to the expiration date.

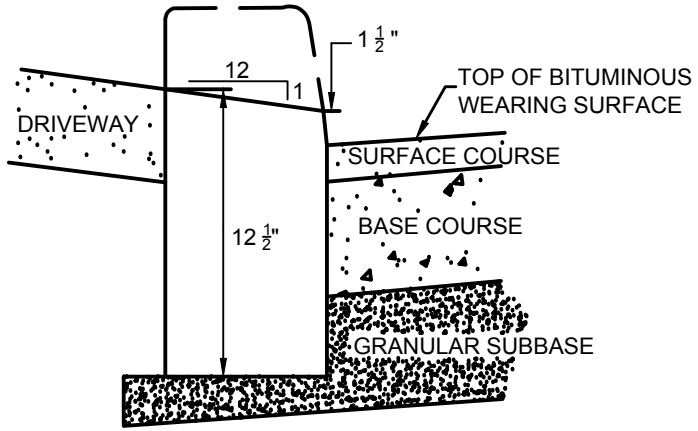


SECTION DETAIL



ELEVATION VIEW

DRIVEWAY CURB CUT DETAIL FOR
EXTRUDED CURBS



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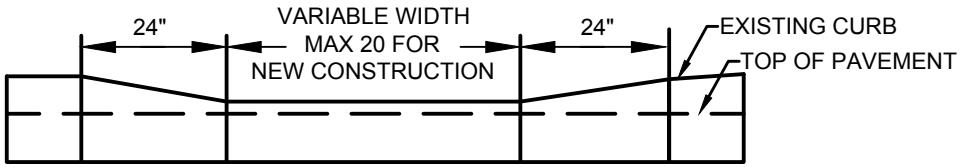


ELEVATION VIEW

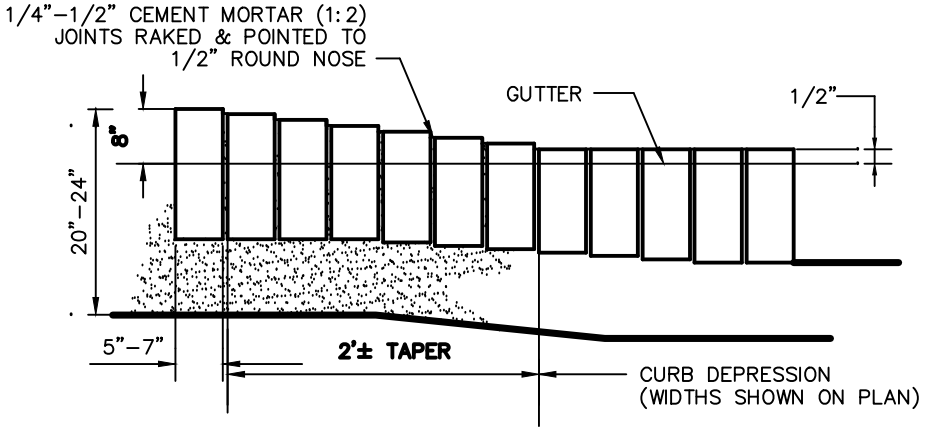
DRIVEWAY CURB CUT DETAIL FOR FULL
DEPTH VERTICAL FREE CURB

LIMERICK TOWNSHIP

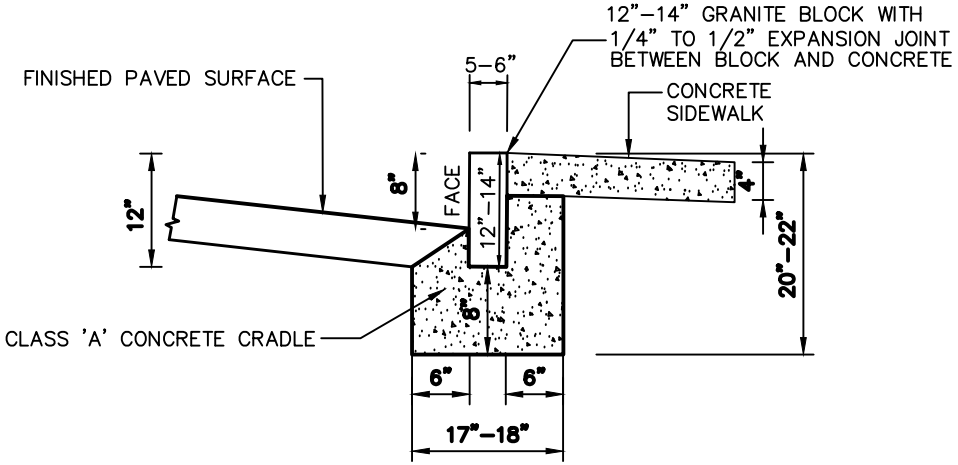
646 WEST RIDGE PIKE
LIMERICK, PA 19468

DRIVEWAY CURB–CUT

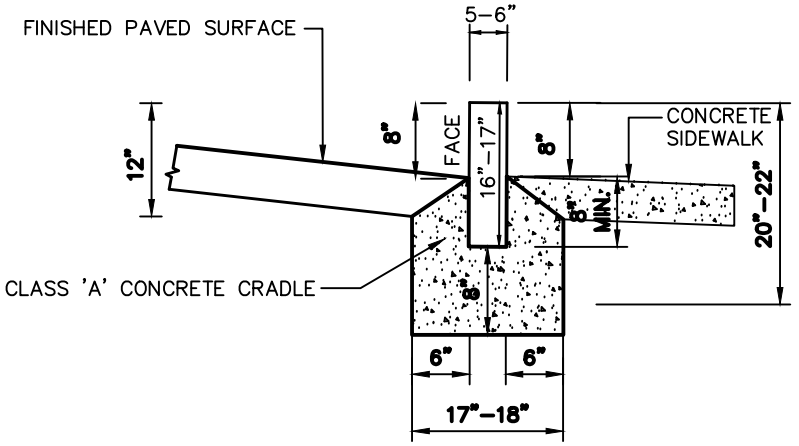
SCALE:	NTS
DATE:	2022–02–08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-3



TYPICAL ELEVATION AT CROSSWALK



TYPICAL SECTION AT SIDEWALK



TYPICAL SECTION AT CIRCLE PLAZA

NOTES:

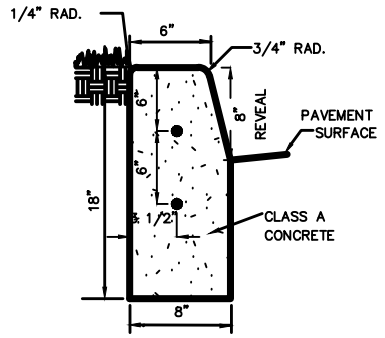
1. GRANITE CURBS TO HAVE 8" REVEAL UNLESS OTHERWISE NOTED.
2. PROVIDE 1/2" PREFORMED BITUMINOUS FIBER EXPANSION JOINTS, TRIMMED TO CONFORM TO CURB AND CRADLE SECTIONS, AT P.C. AND P.T. OF CURB RETURNS AT 50' INTERVALS ELSEWHERE.
3. USE ONLY 12" TO 14" LONG BLOCKS FOR ALL 8" CURBS.
4. TRANSITION BETWEEN DEPRESSED GRANITE CURB AND ASPHALT TO BE FLUSH (1/4" TOLERANCE, MAX.).
5. 6" 2B STONE SUBBASE REQUIRED BENEATH ALL GRANITE BLOCK CURB

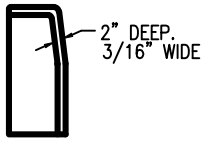
LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

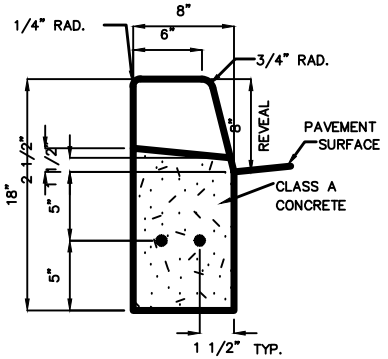
GRANITE CURB

SCALE:	NTS
DATE:	2022–02–08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-4

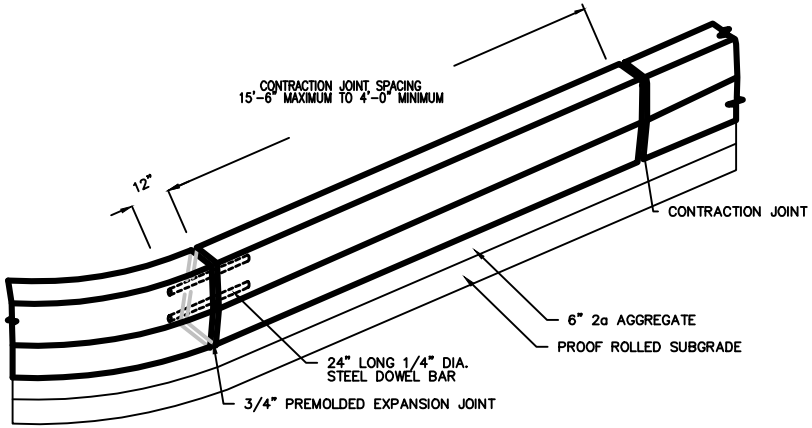




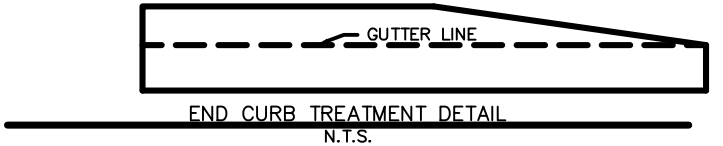
CONTRACTION JOINT



SECTION A–A

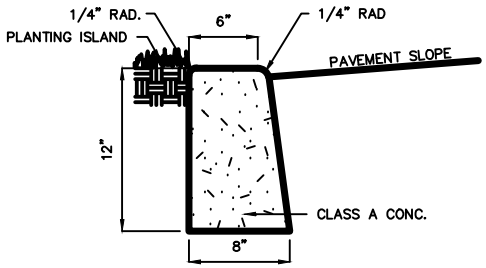


CONCRETE CURB
N.T.S.



DEPRESSED CURB
N.T.S.

END CURB TREATMENT DETAIL
N.T.S.



FLUSH VERTICAL CURB/PLANTING ISLAND INTERFACE
N.T.S.

NOTE:

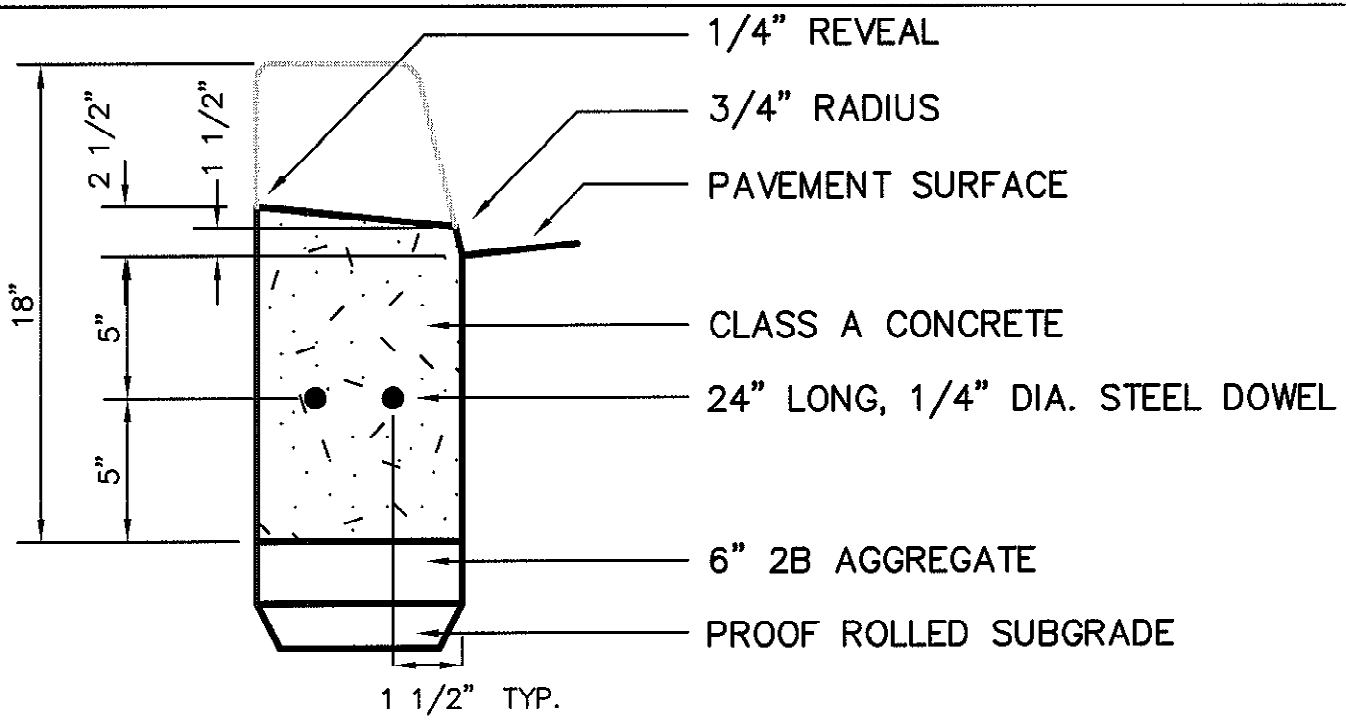
1. CURBS SHALL BE PROVIDED ON BOTH SIDES OF THE STREET AND SHALL BE CONSTRUCTED IN ACCORDANCE WITH PENNDOT'S FORM 408, SECTION 630 AND THE FOLLOWING LIMERICK TOWNSHIP SUBDIVISION AND LAND DEVELOPMENT ORDINANCE.
2. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS.
3. PLACE 3/4" PREMOLDED EXPANSION JOINTS AT ENDS OF SECTIONS OF CURVED CURBS AND STRUCTURES AT INTERVALS OF NOT MORE THAN FORTY–FIVE (45) FEET OF STRAIGHT CURB, AND AT THE END OF THE WORK DAY. CUT PREMOLDED EXPANSION MATERIAL TO CONFORM TO AREA ADJACENT TO CURB OR TO CONFORM TO CROSS SECTIONAL AREA OF CURB.
4. INSTALL STEEL DOWEL BARS WHEN CURVED CURB JOINS WITH TANGENT CURBS AT CURB RETURNS AND ON SHARP CURVES WHERE DIRECTED BY THE TOWNSHIP ENGINEER. THE PORTION OF THE BAR EXTENDING INTO THE TANGENT CURB SHALL BE RENDERED BONDLESS BY A COATING OF APPROVED MATERIAL, AND ENCLOSED IN PART IN APPROVED TUBES OR CAPS.
5. 4,500 PSI, A/E CONCRETE (AIR – ENTRAINED)
5. ASPHALT / TAR EXPANSION JOINT TO BE SEALED WITH EMULSION MIXTURE.

LIMERICK TOWNSHIP

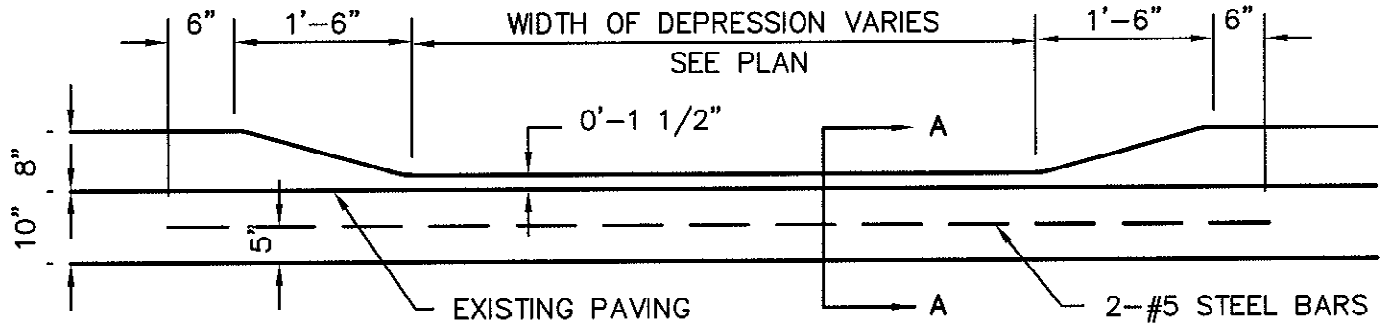
646 WEST RIDGE PIKE
LIMERICK, PA 19468

CURB DETAILS

SCALE:	NTS
DATE:	2022–02–08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-5



SECTION A–A



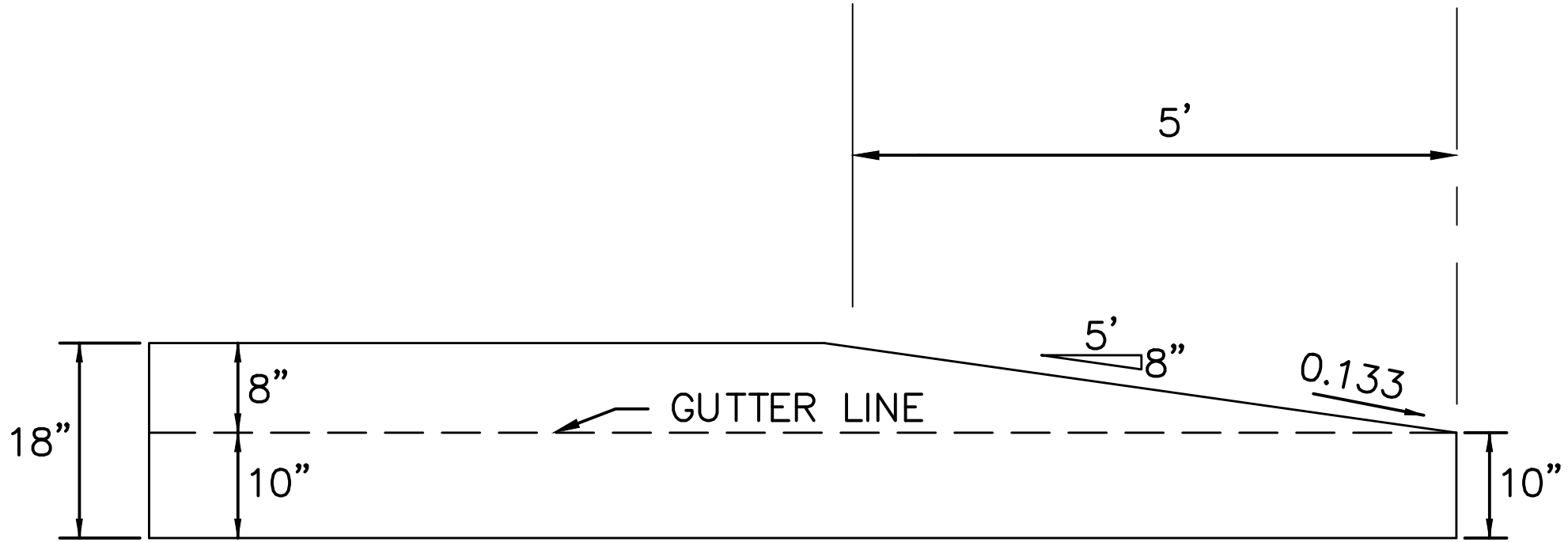
NOTE: MUST COMPLY WITH ADA STANDARDS ANSI 117.1 – 2003 OR LATEST EDITION.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

DEPRESSED CURB

SCALE:	NTS
DATE:	2/18/08
DWN BY:	
REV:	
REV BY:	KRH
DWG #:	CD-6
JOB #:	
SHEET:	

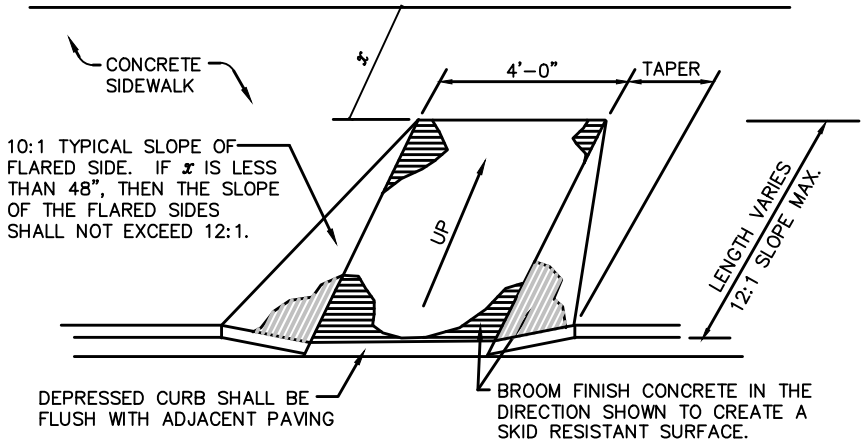


LIMERICK TOWNSHIP

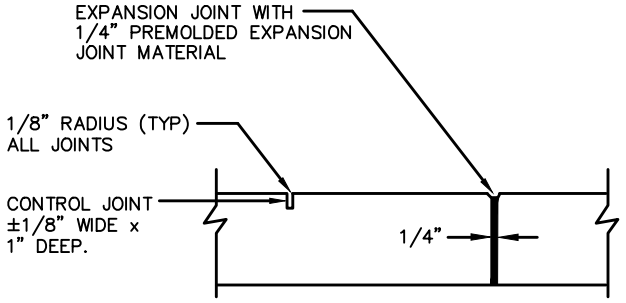
646 WEST RIDGE PIKE
LIMERICK, PA 19468

END CURB TREATMENT

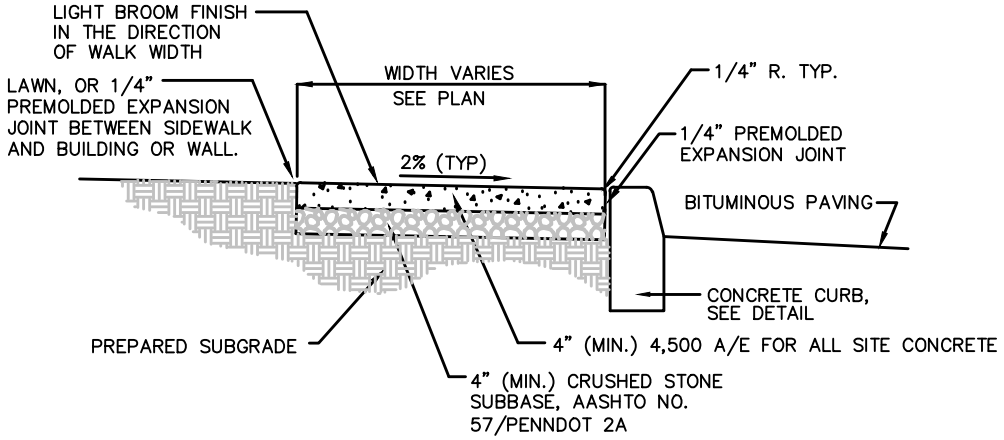
SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-7



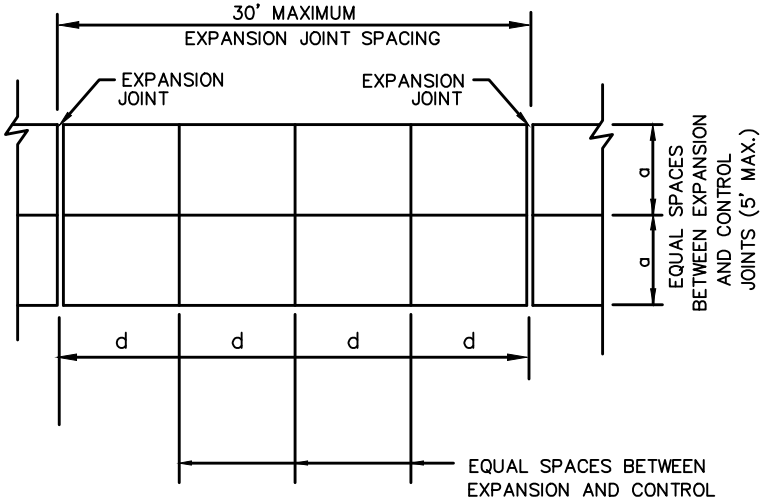
CURB RAMP



JOINTS



SECTION



JOINT SPACING

SIDEWALK CONSTRUCTION NOTES:

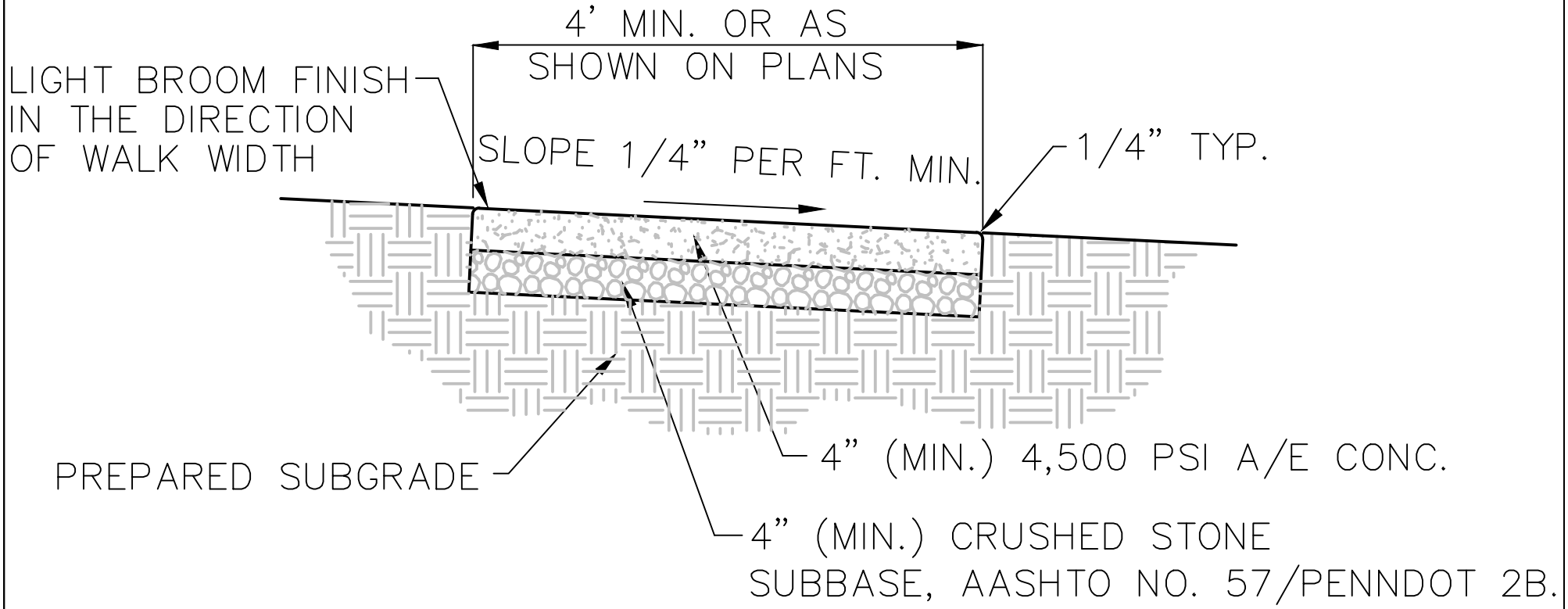
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PADOT PUB. 408.
2. COORDINATE JOINT LOCATIONS WITH ENGINEERING DRAWINGS.
3. FINAL LOCATIONS OF CURB RAMPS TO BE APPROVED IN FIELD BY ENGINEER.
4. MUST COMPLY WITH ADA STANDARDS ANSI 117.1 – 2003 OR LATEST EDITION.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

CONCRETE SIDEWALK AND CURB RAMP

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-8



LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

SIDEWALK SECTION (TYP.)

SCALE:	NTS
DATE:	2022-02-08
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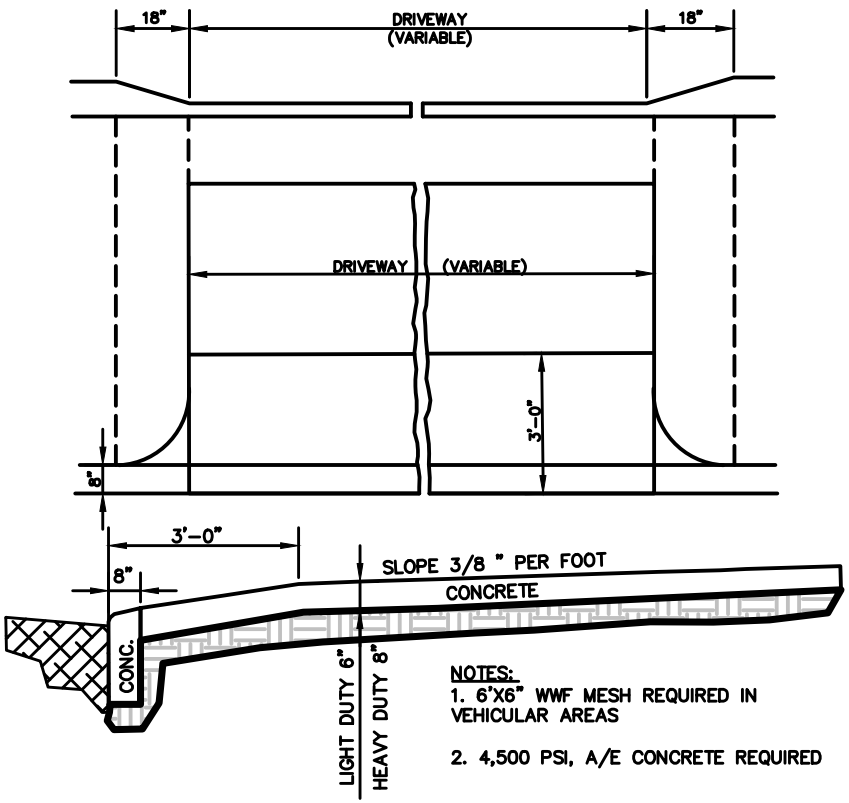
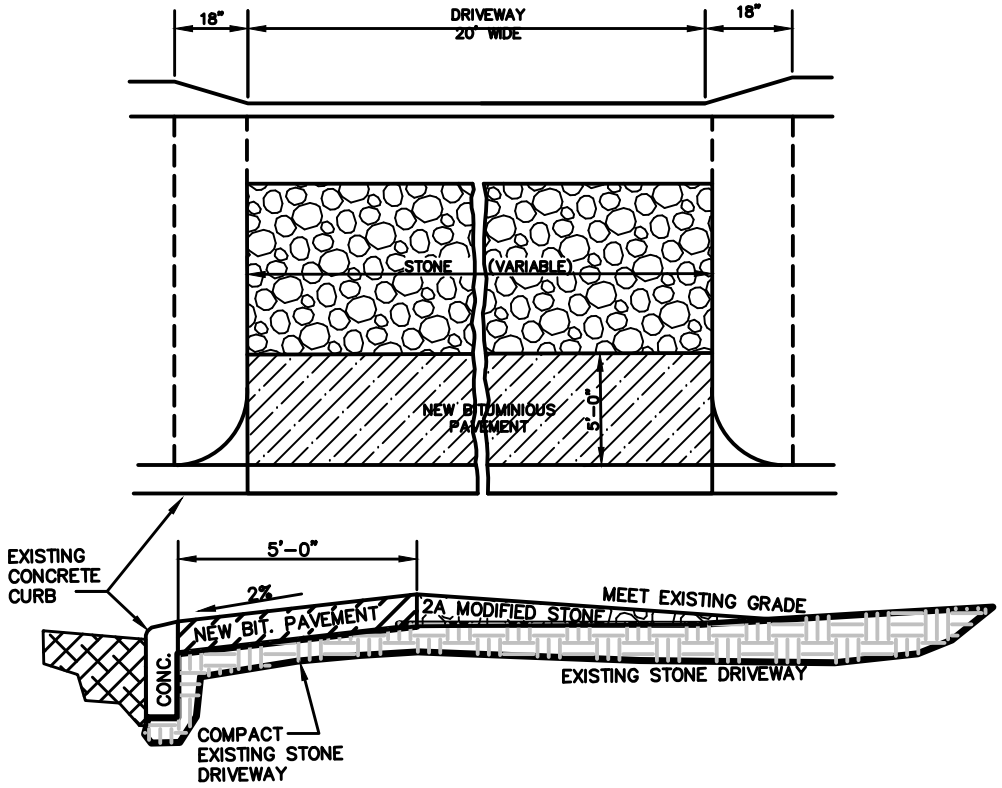


DRIVEWAY APRON



CURB CUT "A"

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

DRIVEWAY APRON

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
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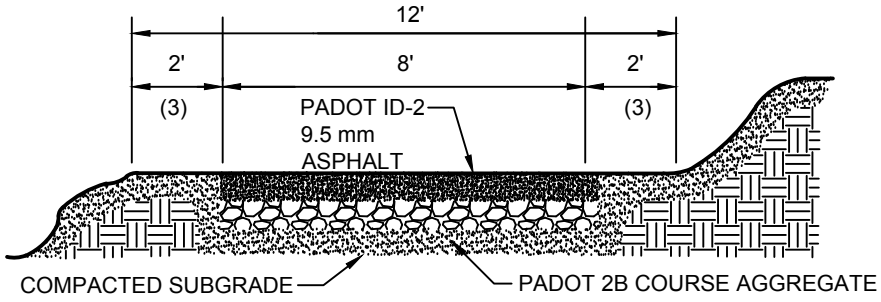
DWG #:	CD-10



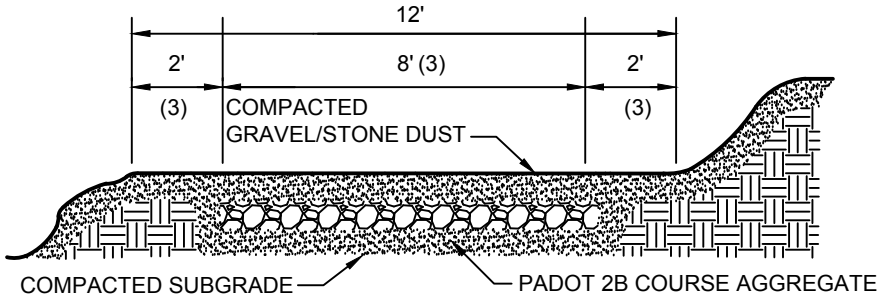
(NOT TO SCALE)

NOTES:

1) STANDARD WIDTH 8'. IF HEAVY USAGE IS ANTICIPATED THEN GREATER WIDTH MAY BE REQUIRED. FOR LIMITED USE TRAILS, NARROW WIDTH MAY BE ACCEPTABLE.

2) SUITABLE FOR BIKE AND PEDESTRIAN USE.

3) PROVIDE 2' GRADED SHOULDER.



(NOT TO SCALE)

NOTES:

1)SUITABLE FOR EQUESTRIAN USE; ALL-TERRAIN (MOUNTAIN) BICYCLE USE AND HIKING.

2) SUSCEPTIBLE TO WASH-OUT ON SLOPES GREATER THAN 5%.

3) STABILIZED SURFACE WIDTH TO BE BASED ON ANTICIPATED USAGE.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

WALKING TRAIL DETAIL

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
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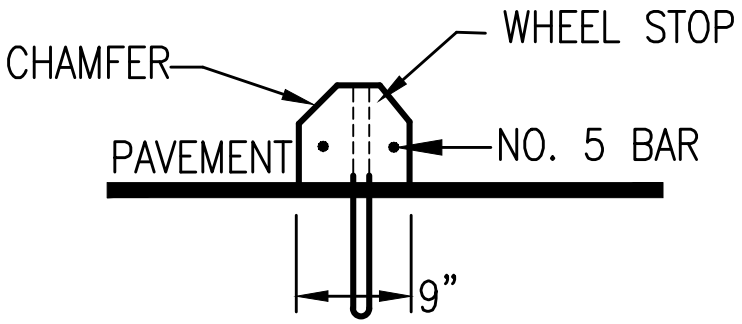

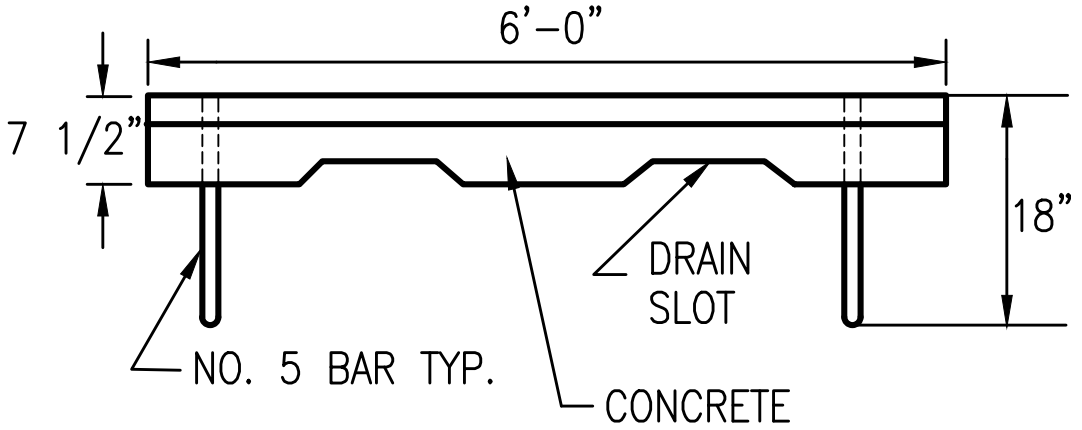

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

CONCRETE BUMPER BLOCK

SCALE:	NTS
DATE:	2022–02–08
DWN BY:	
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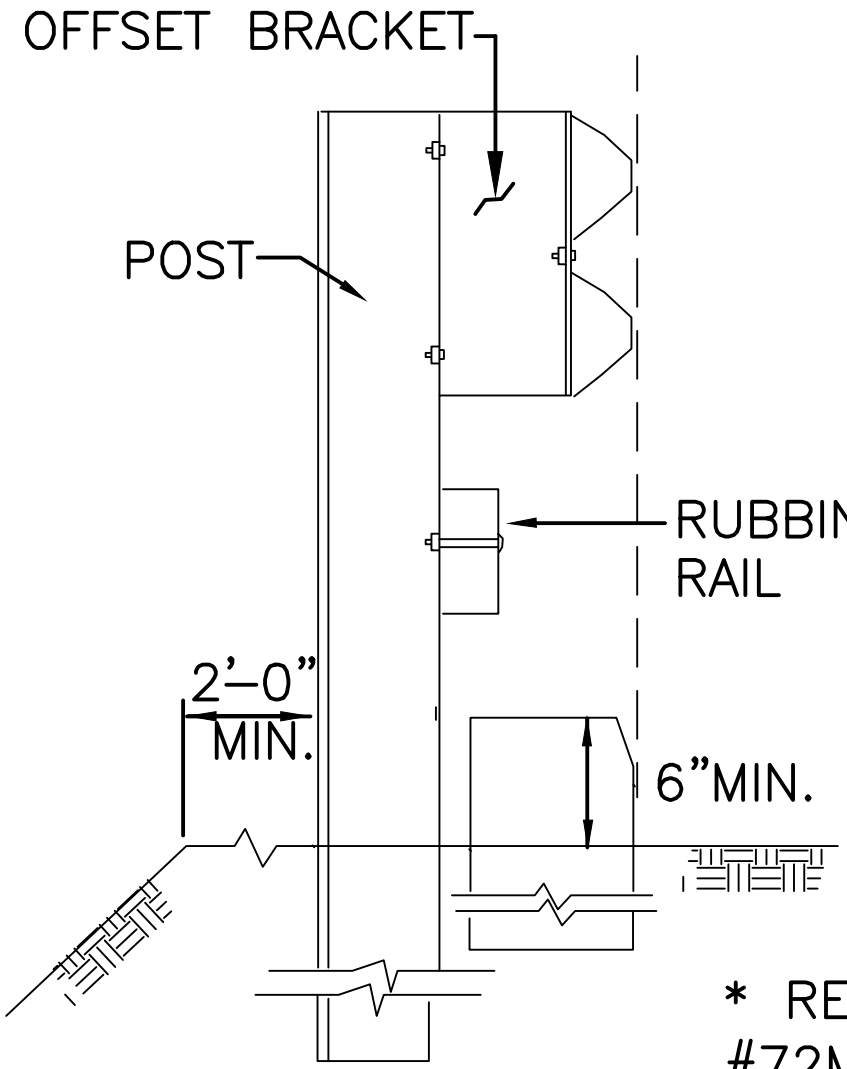
REV BY:	TD
DWG #:	CD-12



* REFER TO PENNDOT PUBLICATION #72M LATEST EDITION FOR 6' WIDE RAIL STANDARDS.

LIMERICK TOWNSHIP
646 WEST RIDGE PIKE
LIMERICK, PA 19468

GUIDE RAIL WITH CURB OR RUBBING RAIL

SCALE:	NTS
DATE:	2022–02–08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-13

SPECIFICATIONS

STORM DRAINAGE PIPE MATERIALS:

A) All storm drainage pipes up to, but not including, 42 inches in equivalent diameter shall be constructed of either of the following materials:

1. Reinforced concrete, rubber gasketed conforming to AASHTO M170, M198 and M207

2. Reinforced, tongue and groove conforming to AASHTO M170 and M207.

3. Corrugated polyethylene (PE) smooth bore interior only conforming to ASTM D 1248, ASTM D 2412, AASHTO M 252 and 294. All PE pipe shall be placed on a minimum of six inches (6") of AASHTO #57 stone and backfilled with same to a foot above the crown of the pipe.

4. Corrugated polyethylene (PE) perforated underdrain shall conform to AASHTO M252.

B) All storm drainage pipe and/or culverts 42 inches in equivalent diameter and above shall be constructed of either of the following material:

1. Reinforced concrete tongue and grove conforming to AASHTO M170 and M207

2. Reinforced concrete piping, rubber gasketed, shall conform to AASHTO M170, M198, and M207.

3. Precast reinforced concrete box sections in accordance with AASHTO M259.

4. Cement concrete cast in place, mix design strength 4,500 psi

C) General:

1. All pipe and/or culverts (cross drains) discharge and inlet ends shall have reinforced concrete precast or cast in place full flow inverts to limits of required endwall section, with invert base end cutoff walls extending three feet (3') below channel flow line, or to rock, whichever occurs first.

2. All culverts with continuous or intermittent water flow other than rainfall events shall have type "DW" headwalls/endwalls installed.

3. Installation having a maximum five feet (5') vertical rise from flow channel invert to crown of street, with the required maximum 3 to 1 embankment slope from limit of right-of-way to elevation of flow channel invert, shall not require protective parapets.

All other installations shall require protective concrete parapets and approach guide rail in accordance with PaDot Standards.

4. All culvert structures shall require submission of complete design drawings and shop drawings, for review by Limerick Township, to assure compliance to H-25 loading, flow design capacity and calculated life cycle of proposed structures.

D) Bridge:

1. An enclosed water carrying structure of one or more barrels having a combined span of 8 feet or greater.

2. All bridge designs shall be in accordance with PennDOT Publication 15M Design Manual, Part IV (latest revisions) and shall be submitted to Limerick Township for approval of materials, structural design, compliance to H-25 loading, flow design capacity and calculated life cycle of proposed structures. All bridges shall have approach guide rail in accordance with Pa Dot.

E) Trench Excavation and Backfill:

1. General:

   a. The Contractor shall excavate, protect, and backfill all trenches that may be necessary for completing the Work. All excavation shall be in open trenches, unless the Townhip Engineer authorizes and directs otherwise
   b. The use of excavation machinery will be permitted except in places where operation of same will cause damage to trees, buildings, or existing structures above or below ground; in which case, hand methods shall be employed. No tunneling, boring, or forcing will be allowed without permission from the Township Engineer. All existing pipes, poles, wires, fences, curbing, property line markers, and other structures which must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the Contractor. Trenches may be, in general, excavated and backfilled either by machinery, or by hand as the Contractor may elect, provided however, that the Township Engineer shall be empowered, wherever he shall decide that such necessity exists, to direct that hand excavation shall be done to the extent hereinafter specified.

2. Excavation:

   a. All excavation, unless otherwise authorized by the Township Engineer, shall be made by open cut.
   b. Where damage is liable to result from withdrawing sheathing, the sheathing shall be left in place.

c. Care shall be taken not to excavate below the depth specified. Where the bottom of the trench, by mistake of the Contractor, is taken out to a greater depth than specified for a given pipe bedding, the trench shall be brought back to grade by filling with coarse aggregate as to comply with the bedding requirements. Refilling with earth to bring the bottom of the trench to the proper grade will not be permitted.

d. During installation, upon encountering quicksand or a wet spongy material, the Contractor shall determine the actual depth of the soft material. Once the depth of the soft material has been determined, one of the following methods of construction work shall be used as approved by the Engineer:

    i. Excavation of the soft material and replacement with a coarse aggregate foundation.

    ii. Concrete cradle or encasement.

    iii. Other method proposed by the Contractor and approved by the Engineer.

e. The trench for the pipe line installation shall not be opened for a distance of more than 100 feet at any one time. At no time will the Contractor be permitted to leave the trench open at the end of a working day.

f. If concrete is to be installed for a pipe cradle or encasement, the required length of trench may be left open with the Engineer's approval, provided that all trenches are properly secured and protected.

3. Accommodation of Drainage

a. The pipe trench must in all cases be kept substantially free from storm, surface and subsoil water or sewage, so that all concrete, masonry and joint materials may have ample time to set and harden. No joints shall be made under water.

4. Pumping

a. The Contractor shall keep all excavation free from water while pipe installation is in progress, and to such extent as may be necessary while excavation alone is being carried on. The Contractor shall build all dams and other devices necessary for this purpose, including lowering the water table below trench bottom by well points and pumping, and provide and operate pumps of sufficient capacity for dewatering the excavations. The Contractor shall provide for the disposal of the water removed from excavations in such manner as shall not cause injury to the public health, to public or private property, to the work of other contractors, to any portion of the Work completed or in progress, or produce any impediment to the use of highways, roads, lanes, and streets by the public. Silt laden water shall be passed through sediment traps, filters or other methods acceptable to the Engineer.

5. Tunneling

    a. Prior to undertaking any tunneling, the Contractor shall have a professional engineer, licensed to practice in Pennsylvania, prepare a design and outline the proposed tunneling methods, procedures, and shoring requirements to be followed. An informational copy of these data shall be furnished to the Township Engineer for review before beginning the tunneling operation. Approvals from all appropriate agencies must be obtained before beginning tunneling.
    b. Tunneling shall be limited to approved locations shown on the Developer's Construction Drawings.

6. Embankment

    a. Where embankment is necessary to support the foundations of pipelines, it shall be made to the height, width, and slopes shown on the Developer's Construction Drawings or as directed. The entire embankment shall be made prior to the construction of the pipeline or the foundation thereof.

7. Pipe Bedding

    a. General
        i. Take care to avoid contact between the pipe and compaction equipment. All tamping and vibration shall be done by hand between the trench wall and pipe in order to consolidate the coarse aggregate particularly the haunch material below the spring line of the pipe.
        ii. Do not use compaction equipment directly over the pipe while placing the pipe bedding to insure that such equipment will not damage or disturb the pipe.
        iii. Pipe bedding shall, in all cases, extend up until one (1) foot of cover has been built up over the pipe.
    b. Coarse Aggregate Cradle
        i. Ductile iron pipe shall be supported on a coarse aggregate cradle. This cradle shall be constructed in accordance with the Construction Details. The coarse aggregate shall be placed in the trench for its full width to uniformly support the pipe at the required line and grade. Suitable recesses shall be provided in the coarse aggregate to permit adequate clearance for bells, couplings, or similar projections.
        ii. Cradle material shall be spread and compacted with tampers until the bedding has reached the spring line of the pipe.
    c. Coarse Aggregate Encasement

i. All RCP and HDPE pipe shall be encased in coarse aggregate. The coarse aggregate shall be placed in the trench for its full width to uniformly support the pipe at the required line and grade. Suitable recesses shall be provided in the coarse aggregate to permit adequate clearance for bells, couplings, or similar projections.

ii. Encasement material shall be leveled over the width of the trench prior to backfilling.

d. Concrete Encasement

i. Where specified or required in the field, the pipe shall be supported by a concrete encasement. All concrete encasement across open channel waterways shall consist of 4,500 psi fiber reinforced concrete.

ii. The trench shall be excavated to a minimum depth of six (6) inches below the bottom of the pipe or as shown on the Construction Details. The excavated space shall then be completely filled with, and the entire pipe encased in, concrete such that the concrete encasement measures a minimum six (6) inches on all sides of the pipe. The total minimum width of the concrete encasement shall equal the width of trench excavation. Concrete shall be in accordance with the requirements in these Specifications. No backfilling of the trench shall begin until a minimum time period of 24 hours has elapsed after the encasement has been poured unless high early strength concrete has been used. Steel reinforcing, if required, shall be as shown on the Developer's Construction Drawings.

e. Concrete Cradle

i. Where unstable conditions are encountered, the pipe shall be supported by a concrete cradle. Concrete cradles shall be installed where no suitable supporting solid or rock stratum exists within two (2) feet of the bottom of the pipe.

ii. The concrete cradle shall be furnished and installed equal to the "Concrete Encasement", except that only that portion of the encasement at and below the springline of the pipe shall be poured, forming a true cradle under the bottom half of the pipe.

f. Backfilling

i. No backfilling shall be done before the Township Engineer gives permission. After pipes have been checked for alignment and bedding, the backfilling may be started. Backfill material may be deposited in trench either by hand or machine. Sufficient number of men shall be available to spread the backfill in uniform layers.

ii. At least 36 inches of cover over the pipe shall be provided before using a trench roller or hydraulic plate tamper (i.e., hoepack) .

g. Sheeting, Bracing, and Shoring

i. All timber plank used for sheeting and sheet piling and all timber used for braces, shores, and stringers or waling-strips shall be sound, straight, free from cracks, shakes, and large or loose knots, and of the required dimensions throughout.

ii. Plank shall be tongue and groove or groove and spline, if so required.

F. Storm Sewer Installation

a. General

i. The requirements apply to the installation of all storm sewer facilities to be constructed, of whatever size, material, or type required as designated on the approved Developer's Construction Drawings.

b. Materials

i. The same material type and class shall be utilized for the entire sewer segment between manholes.

c. Construction Methods

i. Lines and Grades

1. Pipes shall be laid true to the lines and grades shown on the Developer's Construction Drawings. The grade shown on the profile is the invert to which the Work must conform. Work not conforming to the grade shall be corrected.
2. The grade and alignment of the pipe shall be done by laser method or another method acceptable to the Township Engineer.
3. The Contractor is responsible for maintaining the line and grade. The pipe shall be checked at each inlet or manhole to assure that it is on the correct line and grade.
4. The locations of the proposed lines must be shown on the Developer's Construction Drawings.
5. Approximate depths must be shown on the Developer's Construction Drawings.
6. The Township Engineer reserves the right to make changes in lines and grades of pipe lines and in locations of pipes, inlets and manholes when such changes may be necessary or advantageous.

ii. Laying Pipe

1. After the trench has been brought to the proper grade as heretofore specified, the pipe and specials shall be laid.
2. Each section of pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and-joints. The interior of all pipe shall be thoroughly cleaned of all foreign matter, before being lowered in the trench, and shall be kept clean during laying operations by means of plugs or other approved

methods. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions, or the weather, is unsuitable for such work. In all cases, water shall be kept out of the trench until the concrete cradle or encasement, where used, has properly set. The spigot shall be centered in the bell and the pipe pushed into position and brought into true and specified alignment. Except where necessary in making connections with other lines, pipe shall be laid with the bells facing in the direction of laying and for lines on an appreciable slope, bells shall face upgrade.

3. Care must be taken to fit the joints together properly so that the centers of the pipes shall be in one and the same straight line, and so as to give an annular opening of even thickness, all around between spigot end of pipe and the socket end of specials and fittings. Every precaution necessary to obtain watertight construction for all joints must be taken. This same precaution must be taken for all connections with manholes.

iii. Handling of HDPE Pipe

1. HDPE storm sewer pipe and fittings may be stored either inside or outside. If it is stored outdoors for long periods, it shall be protected from direct exposure to sunlight.
2. HDPE storm sewer pipe and fittings shall -be stored in such a way so that the surfaces to be mated are protected from physical damage and are kept as clean as possible.
3. The pipe shall be stored by providing support at each end and intermediate support at five (5)-foot intervals along the length of the pipe. The pipe shall be stored in such in such a way as to prevent sagging or bending.

iv. Protection and Keeping Pipe Clean

1. The Contractor shall also take any and all measures to keep the interior of the pipe clean and free from deposits and protect the pipe from damage.
2. If the pipe is damaged from any cause or becomes either partly or completely filled with dirt, stones, sand, or other debris, the Contractor shall make all necessary repairs and remove, at his own expense, all such material.

v. Installing HDPE Pipe

1. Joints

a. The joints shall be assembled in accordance with the manufacturer's recommended procedure.

Lubricants, if necessary for the assembly of the elastomeric gasket joint, shall not support bacterial growth nor have any deteriorating

effect on pipe, fitting, or gasket materials and shall be the type recommended by the pipe manufacturer.

2. Pipe Installation
    a. Installation shall be made in accordance with the ASTM D2321.
    b. Any field cutting and fitting of the HDPE storm pipe shall be done in accordance with procedures and techniques specified by the pipe manufacturer.
    c. The pipe and fittings shall be installed in a coarse aggregate bedding all as specified in the section for earthwork.
    d. During the installation and backfill of the pipe, care must be taken to prevent movement of the pipe.

G. Storm Drainage Appurtenances

1. Headwalls, endwalls, inlets, manholes and energy flow dissipaters shall be in accordance with Penn DOT Publication 72M, Latest Edition. All manhole covers shall have the words "Storm Sewer" cast in them. Channels shall be poured in inlets and manholes using 3,330 psi compressive strength concrete. (See details)

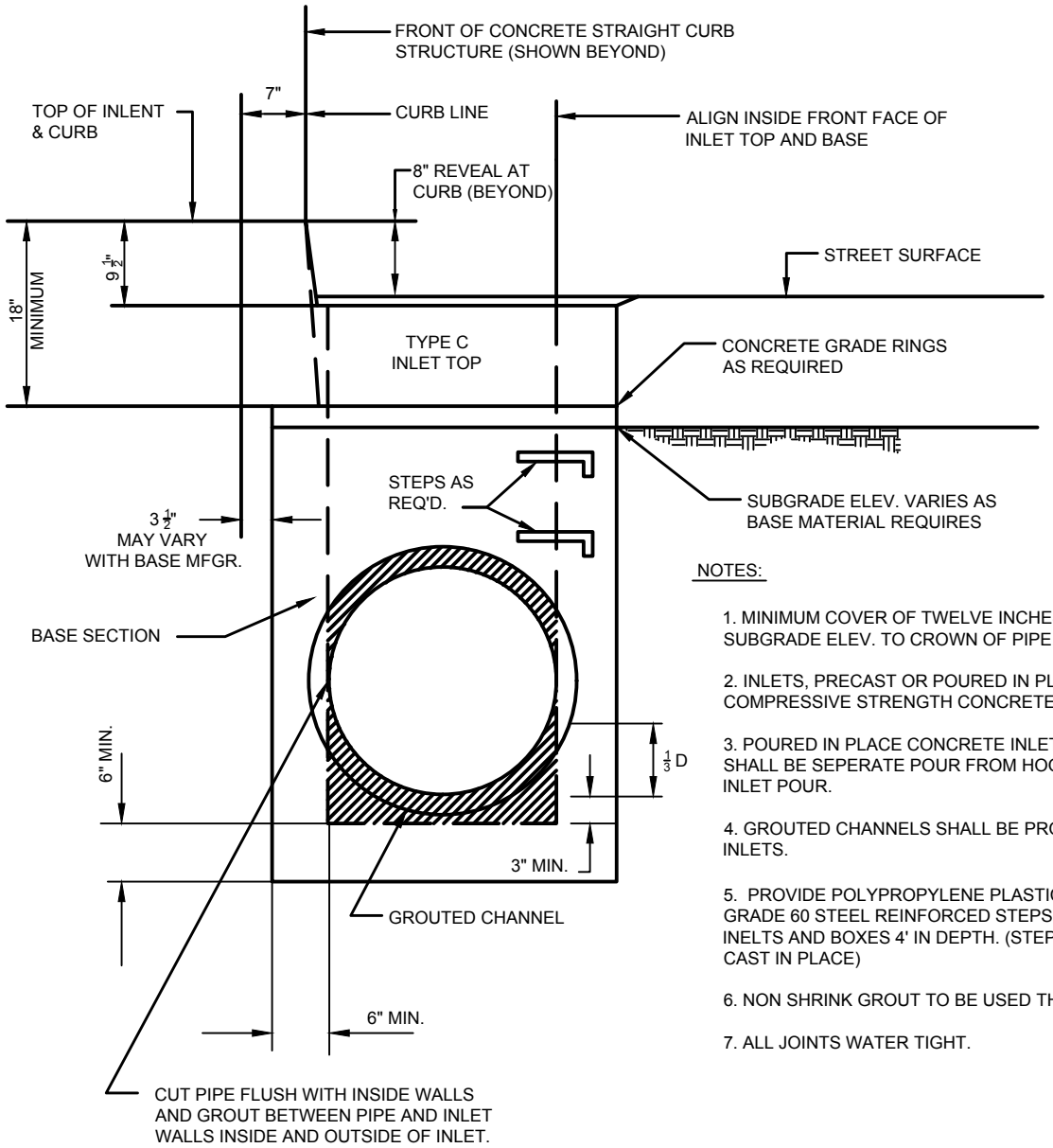
H. Suitable Materials for Trench Backfill

1. General: Suitable material, when used as backfill shall be capable of being compacted to at least ninety-five percent (95%) of maximum density at optimum moisture content.

2. Type 1 Material: Excavated material from the trench or materials from other sources which are free from large clods, roots, or stones larger than two inches may be used from top of bedding material to one foot above crown of pipe in lawn areas where polyethylene (PE) pipe is not used.

3. Type 2 Material: Excavated material from the trench or materials from other sources which are free from large clods, roots, or stones larger than eight inches may be used from one foot above top of pipe to subgrade in lawn areas or where 2A coarse aggregate is not required.

4. Select Backfill: Select backfill shall be "Selected Granular Material" in accordance with section 703.3 of the Pennsylvania Department of Transportation Standard Specifications, Form 408 (latest edition), excepting the use of slag



NOTES:

1. MINIMUM COVER OF TWELVE INCHES (12") FROM SUBGRADE ELEV. TO CROWN OF PIPE.

2. INLETS, PRECAST OR POURED IN PLACE, 4000 PSI COMPRESSIVE STRENGTH CONCRETE.

3. POURED IN PLACE CONCRETE INLET BASE SECTION SHALL BE SEPERATE POUR FROM HOOD SECTION INLET POUR.

4. GROUTED CHANNELS SHALL BE PROVIDED IN ALL INLETS.

5. PROVIDE POLYPROPYLENE PLASTIC COATED 1/2" DIA. GRADE 60 STEEL REINFORCED STEPS AT 12" c.c. IN ALL INELTS AND BOXES 4' IN DEPTH. (STEPS SHALL BE CAST IN PLACE)

6. NON SHRINK GROUT TO BE USED THROUGHOUT.

7. ALL JOINTS WATER TIGHT.

LIMERICK TOWNSHIP

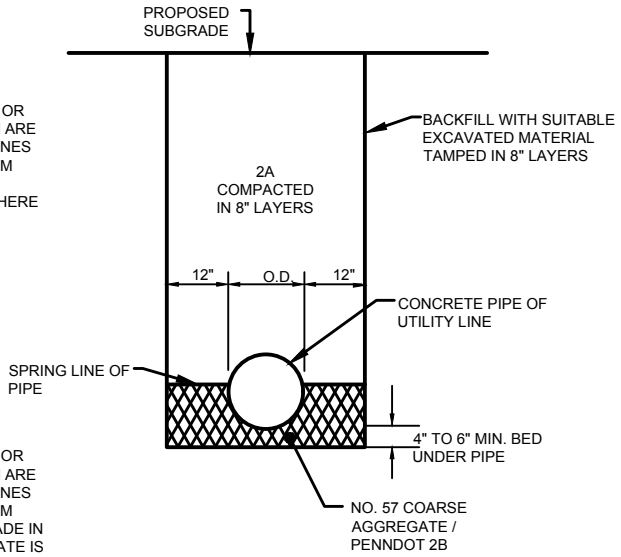
646 WEST RIDGE PIKE
LIMERICK, PA 19468

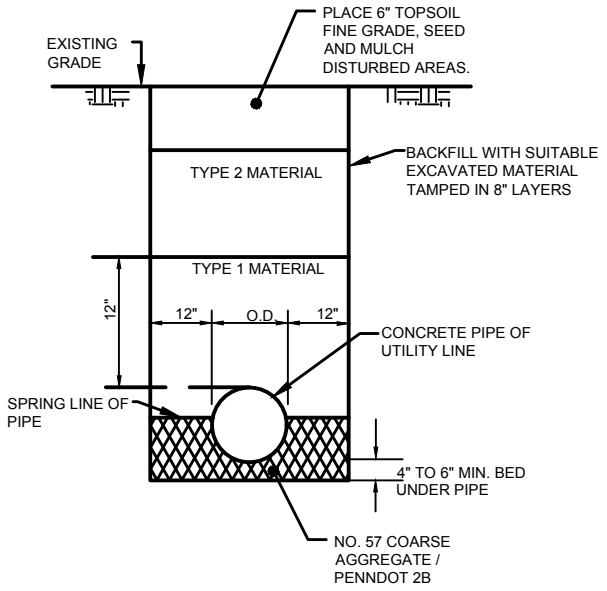
INLET CONSTRUCTION ALONG STREETS WITH STRAIGHT CURB

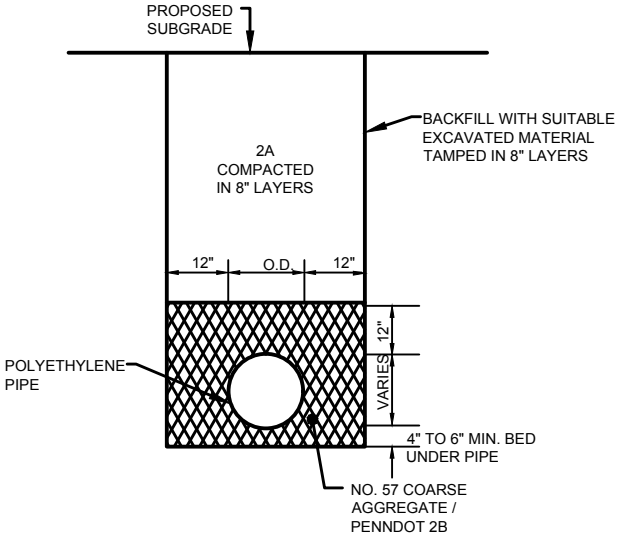
SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-14

TYPE 1 MATERIAL:
RXCAVATED MATERIAL FROM THE TRENCH OR MATERIALS FROM OTHER SOURCES WHICH ARE FREE FROM LARGE CLODS ROOTS, OR STONES LARGER THAN 2 INCHES MAY BE USED FROM TOP OF BEDDING MATERIAL TO ONE FOOT ABOVE CROWN OF PIPE IN LAWN AREAS WHERE POLYETHYLENE (PE) PIPE IS NOT USED.

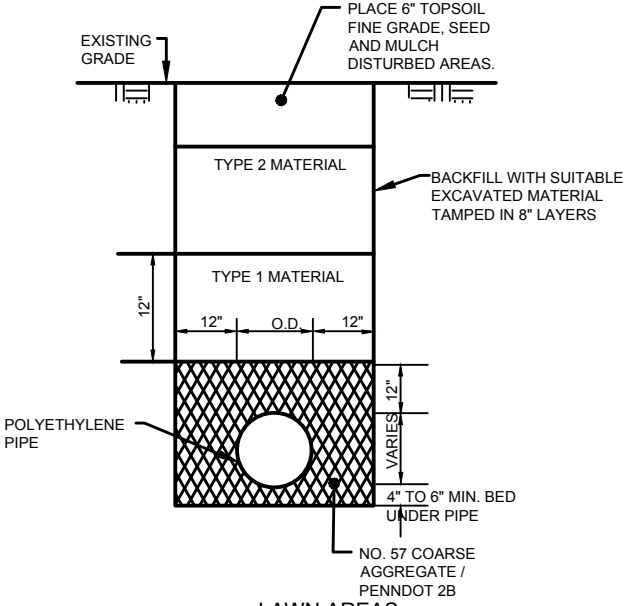
TYPE 2 MATERIAL:
EXCAVATED MATERIAL FROM THE TRENCH OR MATERIALS FROM OTHER SOURCES WHICH ARE FREE FROM LARGE CLODS ROOTS, OR STONES LARGER THAN 8 INCHES MAY BE USED FROM ONE FOOT ABOVE TOP OF PIPE TO SUBGRADE IN LAWN AREAS WHERE 2A COARSE AGGREGATE IS NOT REQUIRED.







PROPOSED STREETS



LAWN AREAS

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

TRENCH RESTORATION FOR PROPOSED STREETS AND LAWN AREAS

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
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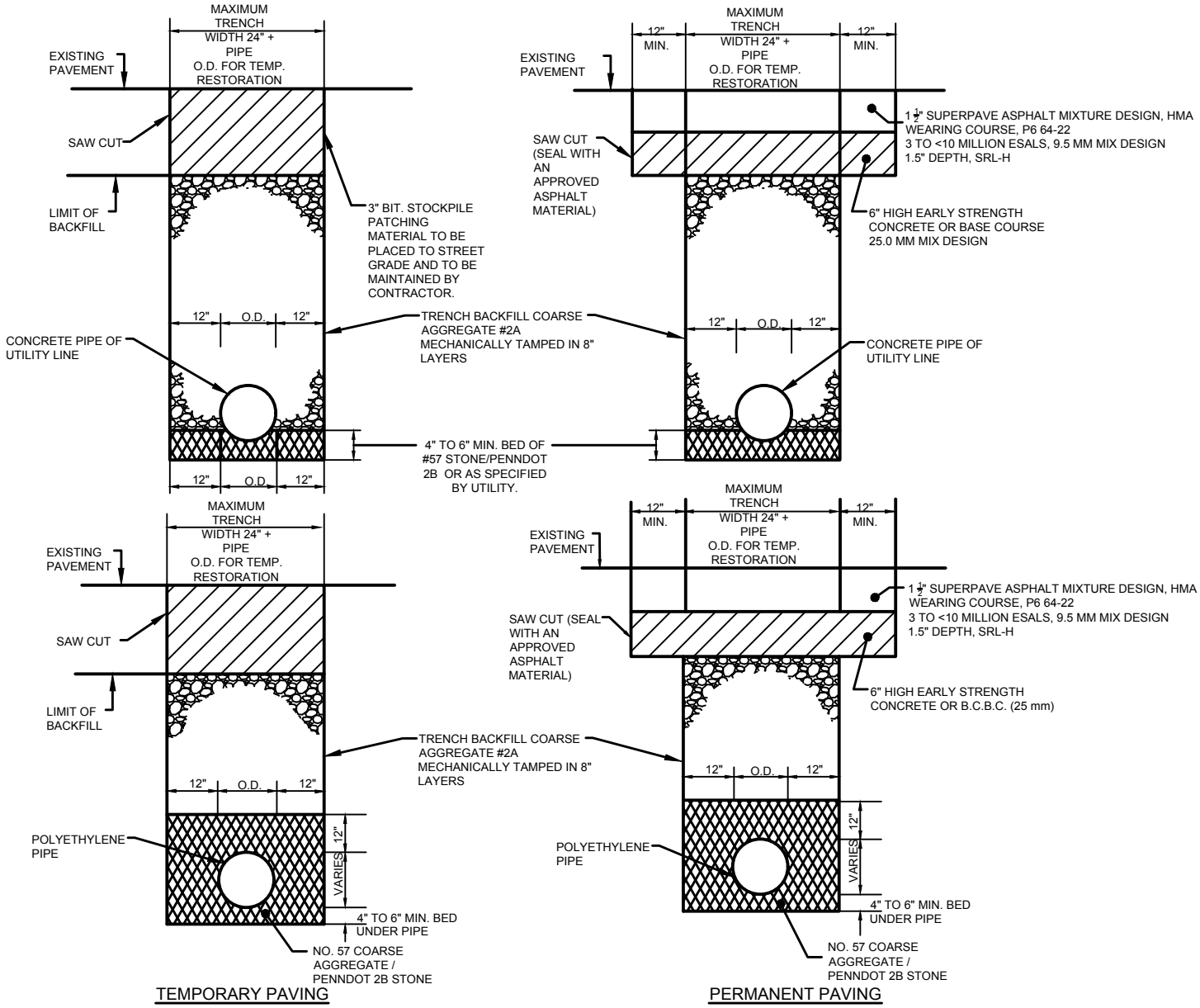
REV BY:	TD
DWG #:	CD-15



TEMPORARY PAVING

PERMANENT PAVING

NOTE:

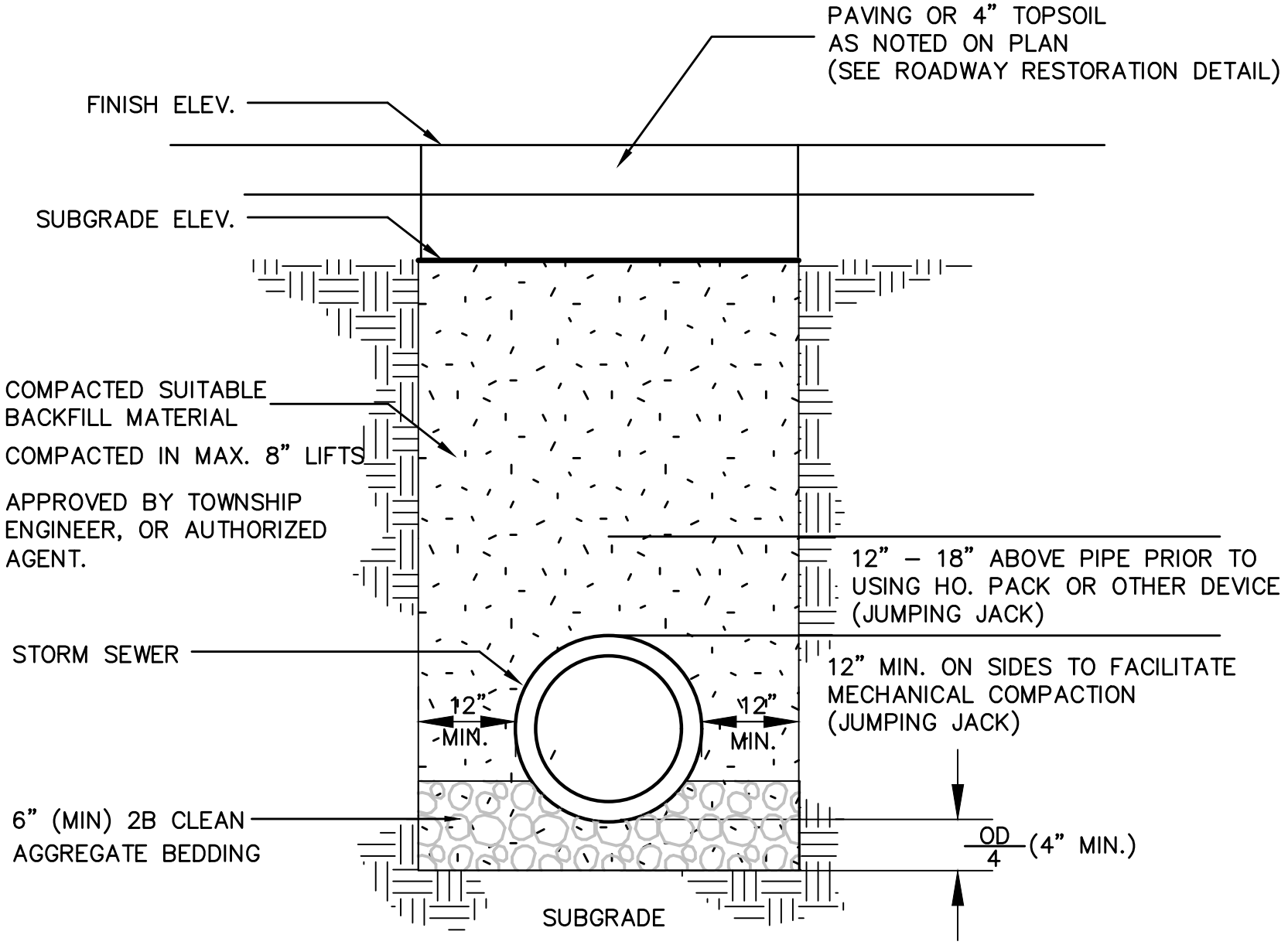
TEMPORARY TRENCH SHALL BE MAINTAINED A MINIMUM OF 90 DAYS OR AS SPECIFIED BY THE TOWNSHIP ENGINEER TO ACCOUNT FOR SETTLING.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

TRENCH RESTORATION FOR EXISTING STREETS

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-16



LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

STORM SEWER TRENCH BACKFILL

SCALE:	NTS
DATE:	2022-02-08
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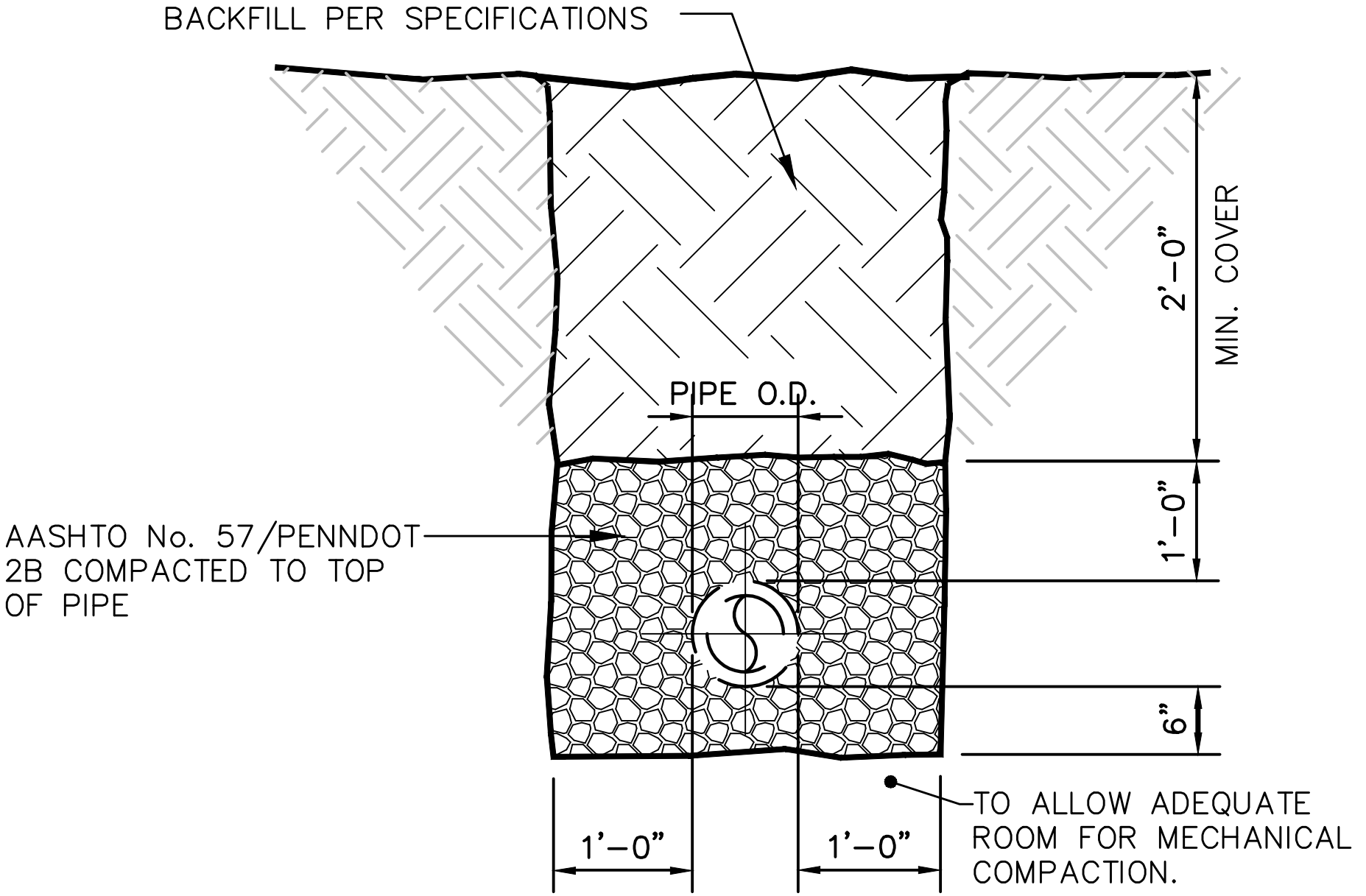
REV BY:	TD
DWG #:	CD-17



LIMERICK TOWNSHIP

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P.V.C. PIPE TRENCH

SCALE:	NTS
DATE:	2022–02–08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-18

SPECIFICATIONS

STORM DRAINAGE DETENTION/RETENTION BASINS

General:

Detention or retention basins for the control of storm water peak discharge shall meet the following requirements:

1. Basins shall be installed prior to any earthmoving or land disturbances which they will serve. The phasing of their construction shall be noted in the narrative and on the plan.

2. Whenever a basin will be located in an area underlain by limestone, a geological evaluation of the proposed location will be conducted to determine susceptibility to sinkhole formations. The design of all facilities over limestone formations shall include measures to prevent groundwater contamination and, where necessary, sinkhole formation. Soils used for the construction of basin shall have low-erodibility factors ("K" factors). Basin shall be kept as shallow and wide as possible. It shall be located four (4) feet above carbonated geology and the bed lined to limit the outfall of water.

3. Energy dissipaters and/or level spreaders shall be installed at points where pipes or drainage ways discharge to or from basins. Generally, outlet pipes designed to carry the predevelopment two (2) year storm flow will be permitted to discharge to a stream with only an energy dissipater. Storms of ten (10) year or greater intensity shall be spread across flood plains by level spreaders; rock material found on the site is suggested for their construction.

Primary Outlet Structures:

1. Pipe – reinforced concrete, rubber gasketed, shall conform to AASHTO M170, M198 and M207.

2. Poured-in-Place Outlet Structure – Reinforced concrete, minimum 4,000 psi compressive strength in accordance with Penn DOT Publication 408, Latest Edition.

3. Precast Outlet Structure – Reinforced concrete, minimum 4,000 psi compressive strength in accordance with Penn DOT Publication 408, Latest Edition. Submit design for Township review and approval.

4. Precast Reinforced Concrete Box Sections in accordance with AASHTO M259

5. Orifice Plates – Stainless steel, type 204, with stainless steel mounting hardware. Use ¼ inch thick up to 24 inch span and 3/8 inch thick over 24 inch spans.

6. Headwalls/Endwalls – Reinforced concrete, minimum 4,000 psi. Compressive strength in accordance with Penn DOT Publication 408, Latest Edition.

7. Cutoff (Anti-Seep) Collars – Reinforced concrete, minimum 4,000 psi compressive strength.

8. Concrete Pipe End Sections – Reinforced concrete in accordance with Penn DOT Publication 408.

9. Steel Grates – In accordance with Penn DOT Publication 408, Latest Edition.

Emergency Spillway Structure:

1. On Fill – Gabion mattresses minimum 9 inches thick with grouted weir are all placed on geotextile Class 4. Gabion materials including aggregate and grout shall be in accordance with Penn DOT Publication 408. Installation shall be in accordance with manufacturer's recommendation. Other types acceptable as approved by Township Engineer. The construction material of the spillway shall extend along the upstream and downstream berm embankment slopes. The upstream edge of the emergency spillway shall be a minimum of three (3) feet below the spillway crest elevation. The downstream slope of the spillway shall as a minimum extend to the toe of the berm embankment. The emergency spillway shall not discharge over the earthen fill or other easily erodible material.

2. On Natural Ground – Methods to be approved by the Township Engineer.

Embankment:

1. Embankment Structure - Materials suitable, including an impervious core and cutoff trench if required, to limit the seepage through the embankment so that no internal erosion takes place.

2. Exterior slopes of compacted soil shall not exceed one foot (1') vertical for three feet (3') horizontal if crown vetch or similar material not requiring mowing is utilized, and shall be 1 foot (1') vertical for four feet (4') horizontal when vegetation requiring mowing is utilized. The slopes shall be further reduced if the soil has unstable characteristics.

3. Embankment shall be installed in 8-inch lifts (max) and shall meet 95%.

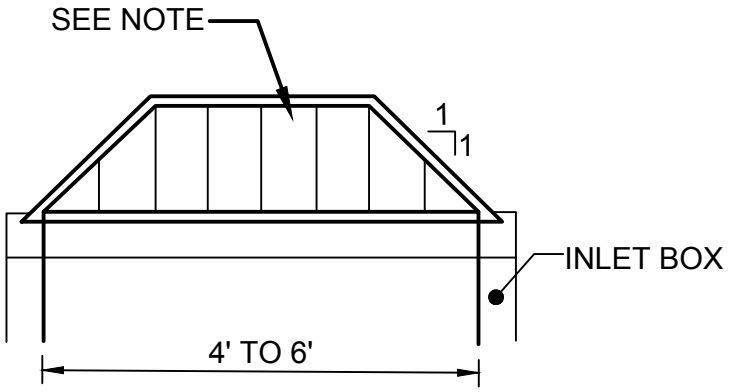
4. Interior slopes of the basin shall not exceed one foot (1') vertical in five feet (5') horizontal except with approval of the Township:

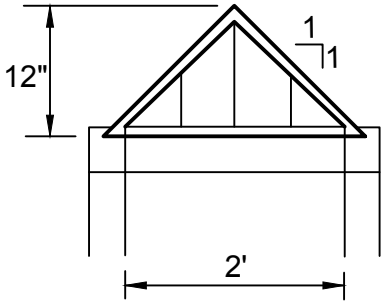
   (a) Where maximum water depth will not exceed three feet (3'); or

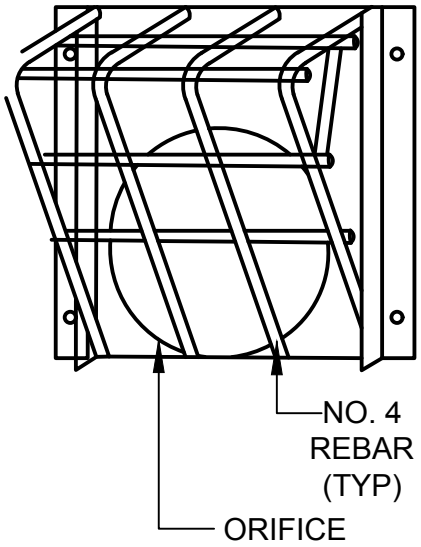
(b) When a two inch (2") rainfall in one (1) hour will not fill the basin in one (1) hour; or
(c) Where concrete, stone or brick walls are used with side slopes proposed to be steeper than one foot (1') vertical in three feet (3') horizontal, in which case the basin shall be fenced with a permanent non corrosive chain link wire fence or other material as approved by the Township. The fence shall be forty two inches (42") in height and a ramp of durable, non-slip materials for maintenance vehicles shall be provided for access into the basin.

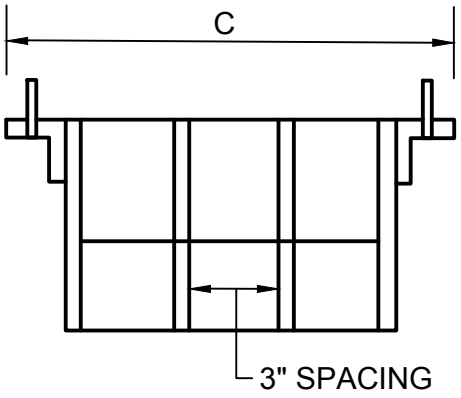
Underground Detention:

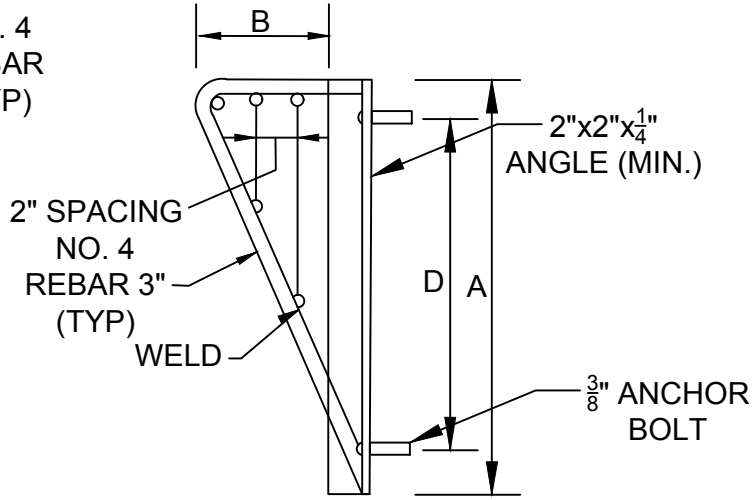
1. Structure – Materials as approved under pipes. Submit design for Township review and approval.











BASIN ID.	A	B	C	D
A (12" Ø ORF.)	16"	5"	16"	14"
B (3" Ø ORF.)	7"	3"	7"	5"
C (4" Ø ORF.)	8"	3"	8"	6"

NOTE:

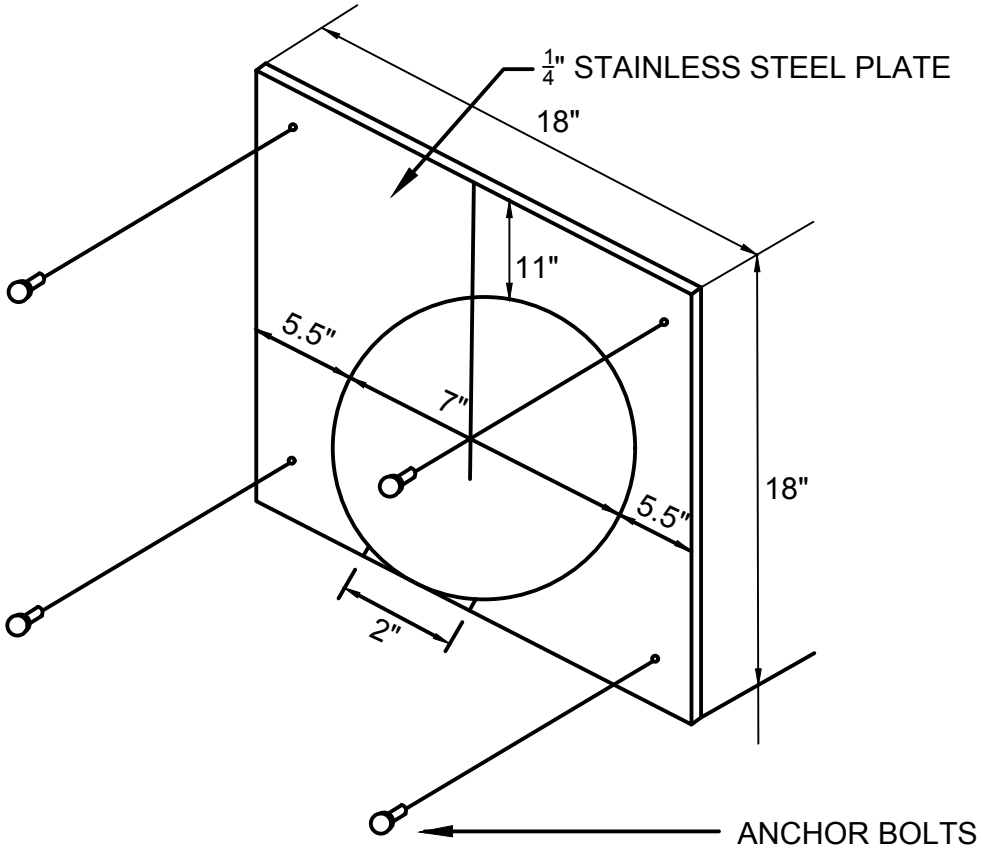
TEMPORARY TRASH GATE - $\frac{3}{8}$ " X 2" STEEL FRAME WITH $\frac{3}{4}$" DIA. GRATE BARS 8" O/C. USE ANTI-RUST COMPOUNDS. TEMPORARY TRASH RACK TO BE REPLACED WITH PERMANANT GRATE WHEN BASIN IS CONVERTED FROM SEDIMENT BASIN TO 4'x6' INLET BOX.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

TRASH RACK

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-19



NOTES:

1. TO BE ATTACHED TO ENDWALL WITH (4) 3/8" STAINLESS STEEL ANCHOR BOLTS.
2. PLATE TO BE COMPOSED OF 1/4" STAINLESS STEEL.
3. DIMENSIONS & SIZE OF ORIFICE PLATE WILL VARY BETWEEN PROJECTS.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

ORIFICE PLATE

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-20

SPECIFICATIONS

GEOTEXTILES

Geotextile Materials shall be used for but not limited to the following uses:

1. Class 1 – Subsurface drainage.

2. Class 2 – Erosion Control.

3. Class 3 – Sedimentation Control.

4. Class 4 – Layer separation.

During any project review phase, construction phase, and inspection phase the Township of Limerick and/or the Township Engineer can require the use of Geotextile fabrics for any of the above noted Classes.

Geotextile fabric placement, securing pin spacing and Geotextile physical property requirements shall meet the standards of PennDOT Publication 408, latest revision.

SPECIFICATIONS

LIMERICK TOWNSHIP
ENGINEERING AND CONSTRUCTION STANDARDS
AND IMPROVEMENTS PROCEDURES

STANDARDS

SIGNS AND MARKINGS:

1. Street Signs:

   (a) Street sign post — green steel channel post. (10') one piece section mm. 2.5 lb

   (b) All sign post must be erected on a breakaway made of steel green channel post a minimum of 2.5 lb/ft 3 feet in length. Breakaway shall be placed in ground except for the top 6 inches. Mount breakaway to post. An eze-erect breakaway strip must be used.

   (c) All fittings shall be aluminum or stainless steel and anti-theft.

   (d) All street signs shall be extruded aluminum minimum 0.08 gauge thickness at 9" height blade. Sign facing shall be H.I. color green

   (e) Letters shall be 3M Series 605-B, HA color white reflective (6") with 4" suffix.

   (f) All street signs and posts shall be designed in accordance with MUTCD, PennDOT Publication 111M and PennDOT Publication 236M.

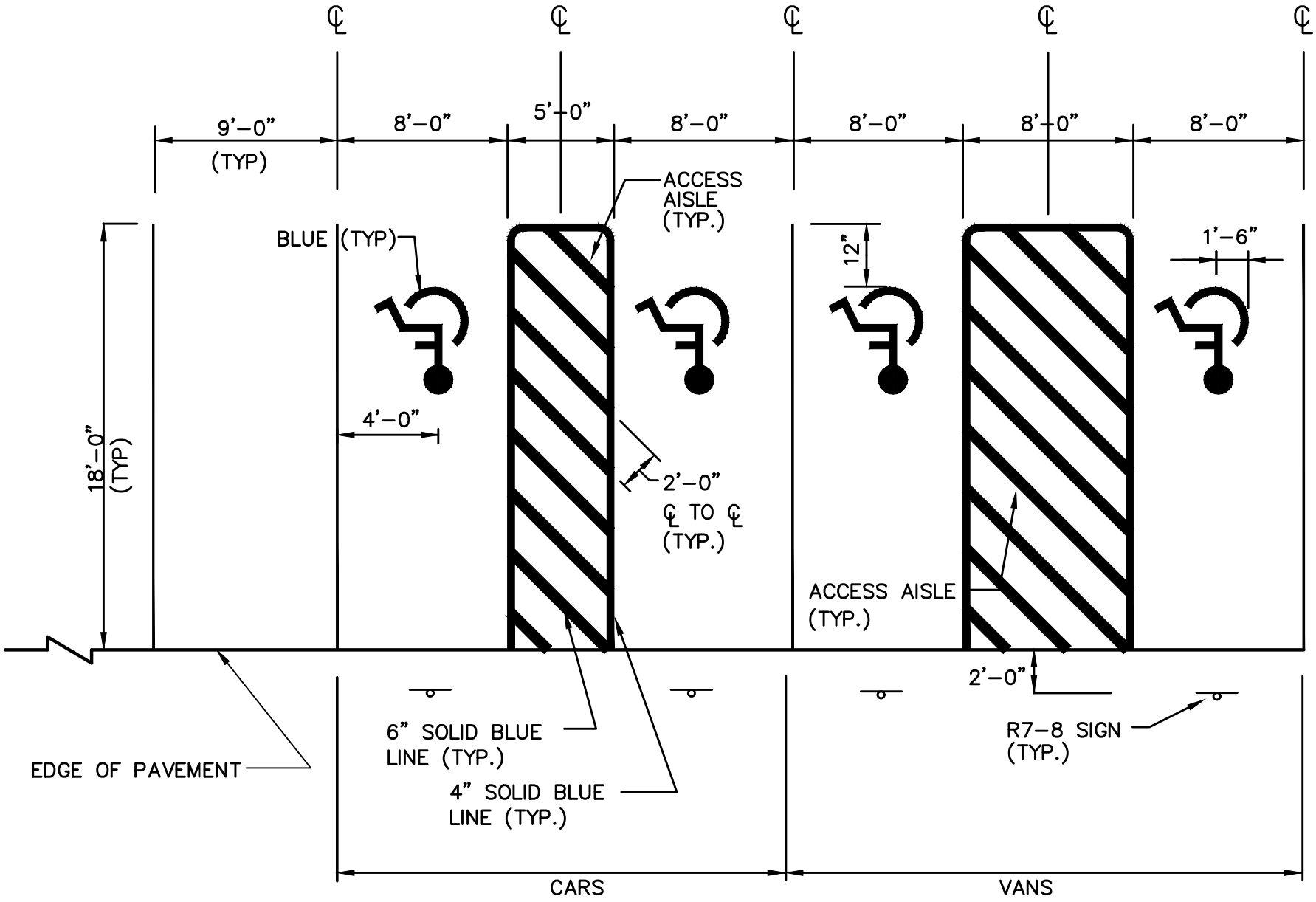
2. End of Street Permanent Barricade:

   Barriers shall be pressure treated lumber, full depth to 60 p.s.i., type equal to wolmanized process.

   Barrier structure shall be post and beam type construction, 6" x 8" posts installed 36" below finish grade, by mechanical driving or setting in concrete; posts maximum 10' centers, three (3) 2" x 10" cross members fit into framing structure as self supporting.

   Barrier length shall be full width of cartway, Barrier height shall be 60", as measured from adjacent street surface.

   Barrier shall have Penn DOT Class I or Class 1-A or Class II reflective sheeting applied aluminum blank and fastened to wood planks on barrier facing direction of traffic approach.



LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

ACCESSIBLE AND TYPICAL PARKING STALL DELINEATION

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	CD-21

LIMERICK TOWNSHIP
IMPROVEMENT CONSTRUCTION PROCEDURES,
MATERIALS AND SPECIFICATIONS

STANDARD OPERATING GUIDELINE (SOG) #010

FIRE HYDRANT STANDARD SPECIFICATIONS

*All fire hydrants, unless otherwise identified, shall be installed in accordance with PA American Water Royersford for the Limerick Township System **AND** operated as public devices.*

A) Fire Hydrant Devices

1. Manufacturers: Mueller Centurion (fire hydrants can be painted to the Township color specification at the time an order is placed), Kennedy Guardian (K-81), American Darling (B-84-B), or approved alternate.
2. Equipped with a 6" Mechanical Shoe
3. 5 ¼" Hydrant Valve Opening
4. (1) ½" Pent, Open Left

B) Outlet Sizes

1. (1) 4 ½" Pumper (aka Steamer) Connection, National Standard Thread (NST)
2. (2) 2 ½" Hose Connections, National Standard Threads (NST)

C) Hydrant Depth: Hydrant Barrel shall be 4' to 4 ½'

D) Hydrant Height: 18" (measured from final grade to center of the pumper nozzle)

E) Color Specifications for Public Fire Hydrants: Forrest Green Body with White Bonnet & Caps

1. Rust Oleum Paint Numbers:
   Forrest Green – V7400 Alkyd Enamel
   White – 3700 Acrylic Enamel White

2. Sherman Williams Paint Numbers:
   Forrest Green – SW7458
   White – SW7006

F) Private Fire Hydrants shall be painted Red in color.

G) Hydrant Marker: (1) 5’ reinforced fiberglass whip with red and white reflective bands is required per fire hydrant. The pole shall have a flexible shaft, a heavy-duty spring, and integral mounting bracket.

H) General Notes:

1. The location of new fire hydrants shall be installed pursuant to the approved Land Development Plans OR approved as a field change by the Township Engineer and Fire Marshal.

2. The proposed locations of fire hydrants shall commence at the development entrance, with hydrants spaced so that they do not exceed 400’ to each structure, positioned on the street for the passenger side (aka Officer) of the fire apparatus based off of the Host Fire Company’s primary approach. Approved exceptions allow the spacing distance to extend to a maximum of 600’.

3. As built GIS coordinates for all fire hydrants shall be verified by the Township Engineer.

4. Fire hydrants are for fire protection and public utility use only.

5. Design fire flow calculations and as built fire flow calculations shall be provided to the Township Engineer and Fire Marshal.

EMERGENCY SERVICE NOTES

These are standard notes that are consistent for all our reviews. All notes shall be added to the plan to maintain adherence to general safety and construction regulations, which include, but are not limited to:

1. The design and construction of all building systems that may affect emergency services shall be coordinated with the Limerick Township Department of Emergency Services. (i.e., Fire Department Connections, Fencing or other barriers, Internal evac plans).

2. The property and all lots shall always be marked and readily identifiable for public safety and inspection purposes.

3. The marketing name of any development shall be submitted and approved by the Limerick Township Department of Emergency Services.

4. Burning of refuse and construction debris is prohibited.

5. Please furnish the name and contact information of the owner's representative who will assume the role of Fire Prevention Program Superintendent; subsequently, please contact the office so we can meet with them and review their Emergency Plan.

6. If there are any chains and/or gates utilized for security or other purposes, during construction, they shall be secured in an approved fashion and shall be approved by the Township Department of Emergency Services.

7. If smoking is permitted on the grounds, designated smoking areas shall be established and posted.

8. A means of contacting 9-1-1, in the event of an emergency, shall be provided and maintained.

9. All procedures for fire protection during construction shall be in accordance with the 2018 International Fire Code, Chapter 33 (Fire Safety During Construction and Demolition).

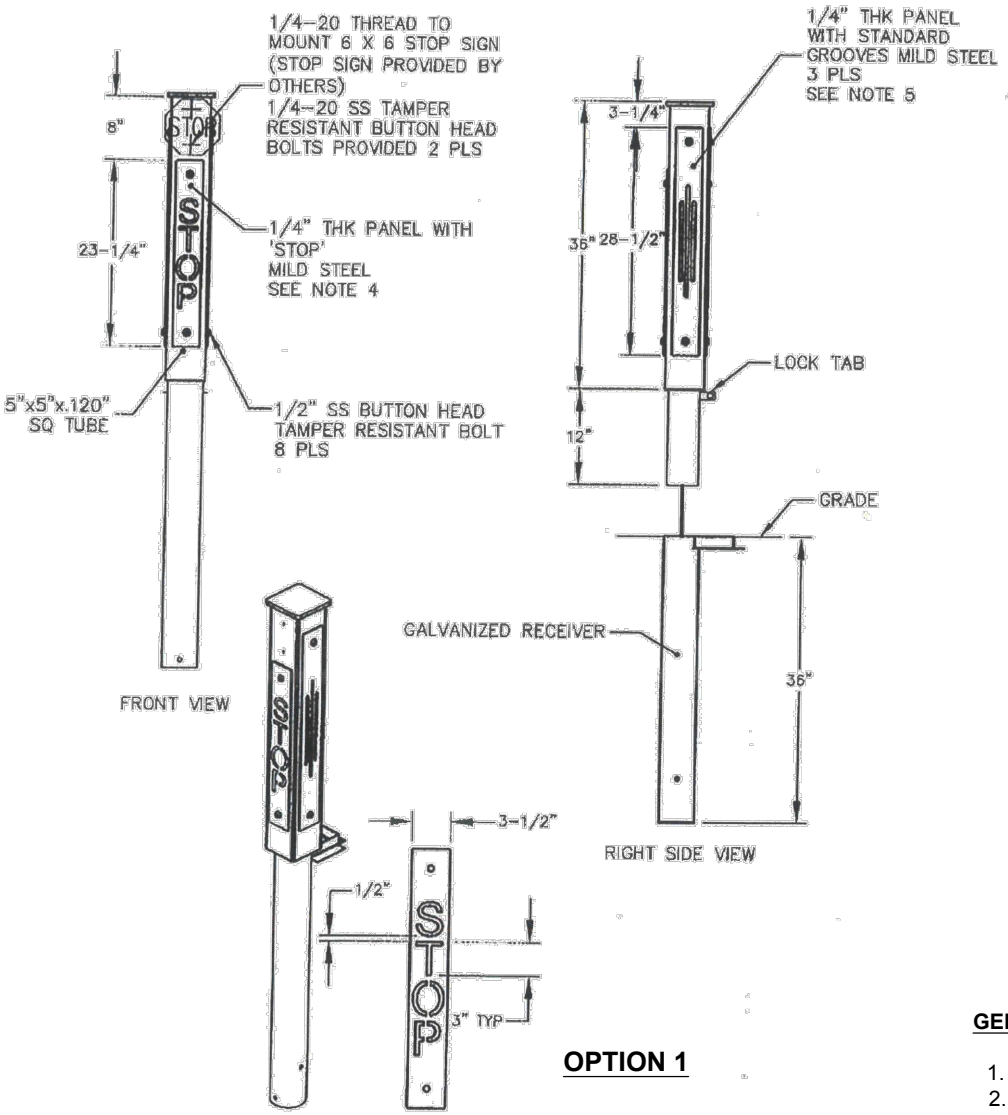
10. Submit a completed Emergency Contact Information Form.

11. Alerting, Notification, and Suppression Permits shall be submitted, as applicable, in addition to any requirements established by the Code Services Department.

12. Where required a Knox Box shall be installed. The location will be determined in conjunction with the Department of Emergency Services.

13. Any exterior security gates and/or emergency access gates or chains that are part of the finished project shall be fitted with a Knox Box Pad Lock.

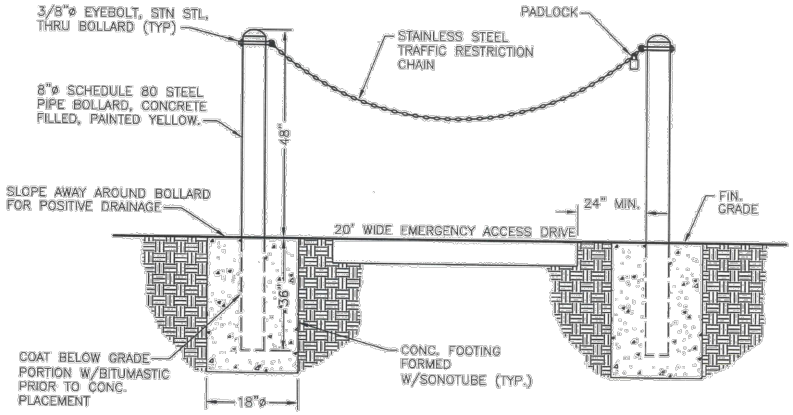
14. If there will be an Emergency Access Road or a trail that doubles as an Emergency Access Road that is part of the finished project, there shall be bollards installed at each end of the access road. These bollards shall meet Limerick Township's specifications, which can be found on the Township's website, or a copy can be provided to you from the Township.



OPTION 1

SPECIFICATIONS:

1. BOLLARD TO BE POWDER COATED SEMI-GLOSS BLACK.
2. DEPTH AND DIAMETER OF INSTALLATION HOLE WILL VARY WITH SOIL CONDITIONS. CONSULT PROJECT ENGINEER FOR CORRECT SPECIFICATIONS.
3. SEE FAIRWEATHER B-6 BOLLARD CUT SHEET FOR STANDARD SPECS.
4. POWDER COATED CARDINAL RED, BCKED WITH WHITE REFLECTIVE TAPE.
5. POWDER COATED SARGASSO GREEN
6. BOLLARDS SHALL BE PLACED TO MAINTAIN 3' CLEAR AREA TO ALLOW BICYCLE AND PEDESTRIAN ACCESSIBILITY, WHILE RESTRICTING MOTOR VEHICLE ACCESS.



OPTION 2

GENERAL NOTES:

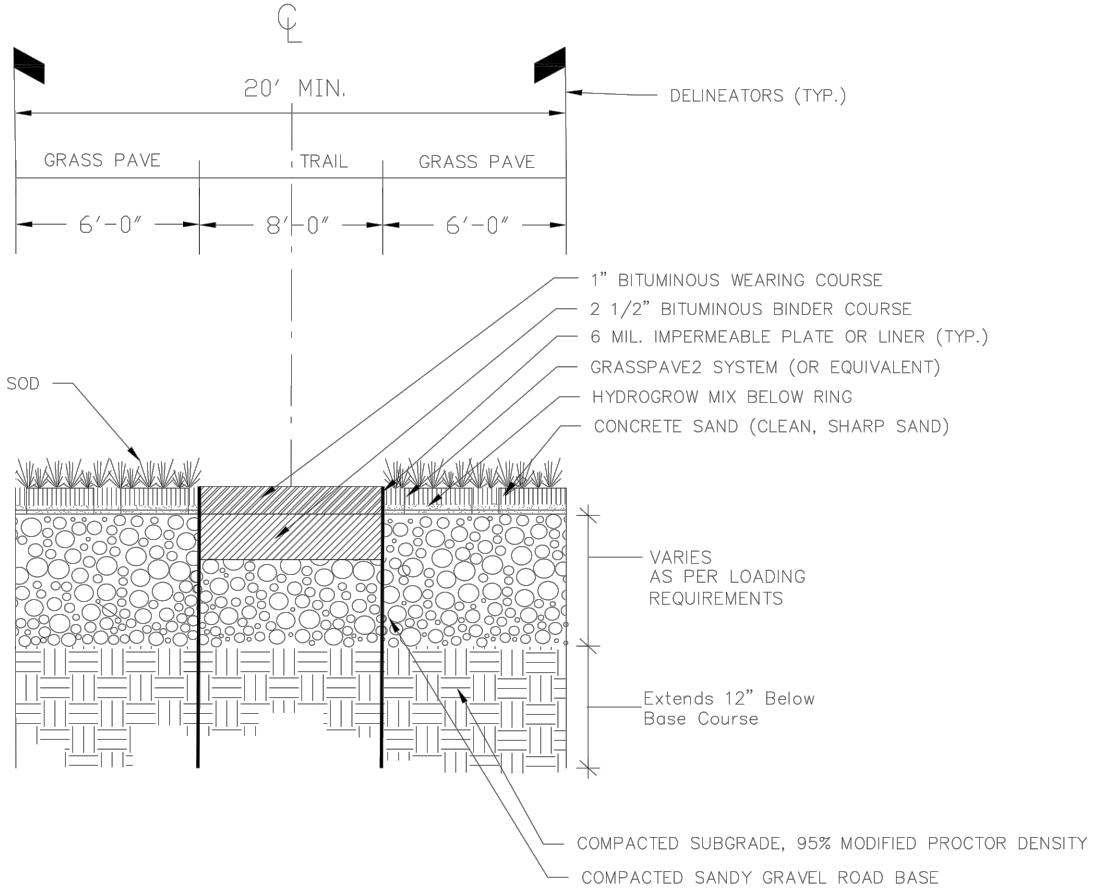
1. OPTION 1 IS STANDARD.
2. OPTION 1 IS PERMITTED ONLY UPON APPROVAL OF FIRE MARSHAL.
3. PADLOCK SHOWN IN OPTION 2 SHALL BE PURCHASED FROM KNOX BOX BY EITHER THE CONTRACTOR OR HOA.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

EMERGENCY ACCESS BOLLARD

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	**CD-22**



NOTES:

1. ACCESS DRIVE MUST BE ABLE TO SUPPORT 80,000 LB VEHICLES.
2. DELINEATORS TO BE SPECIFIED ON THE PLAN TO THE SATISFACTION OF THE FIRE MARSHAL.
3. SIGNAGE AS DIRECTED BY THE TOWNSHIP.
4. MAXIMUM LONGITUDINAL GRADE SHALL BE 10%, MAXIMUM CROSS-SLOPE SHALL BE 2%.
5. TRAIL WIDTH TO BE DETERMINED BY THE TOWNSHIP.
6. ACCESS DRIVE SHALL BE MAINTAINED TO ALLOW FOR CLEAR PASSAGE AT ALL TIMES AND REMAIN FREE OF OBSTRUCTIONS.
7. A TRUCK TURNING TEMPLATE SHALL BE PROVIDED FOR THE 3-AXLE LADDER TRUCK (OR AS PROVIDED BY THE TOWNSHIP FIRE MARSHAL) ON A LAYOUT PLAN FOR PRIMARY ROUTES AND EMERGENCY ACCESS ROUTES FOR REVIEW AND APPROVAL BY THE TOWNSHIP.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
LIMERICK, PA 19468

EMERGENCY ACCESS DETAIL

SCALE:	NTS
DATE:	2022-02-08
DWN BY:	
REV:	
REV BY:	TD
DWG #:	**CD-23**

LIMERICK FIRE COMPANY
LIMERICK, PA.

SO141003/Q81188

AERIAL BODY

CYCLONE II X CHASSIS

HP95' AERIAL PLATFORM

THIS DRAWING IS FOR REFERENCE PURPOSES. ALL DIMENSIONS ARE SUBJECT TO MINOR VARIATIONS DUE TO MANUFACTURING PROCESSES.

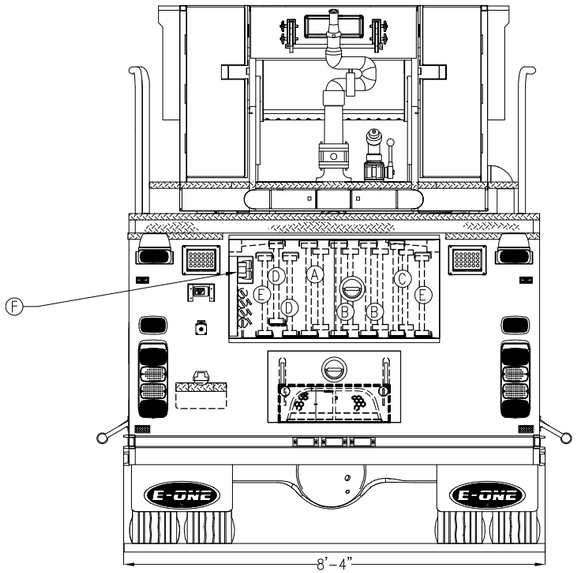
APPROVED FOR PRODUCTION

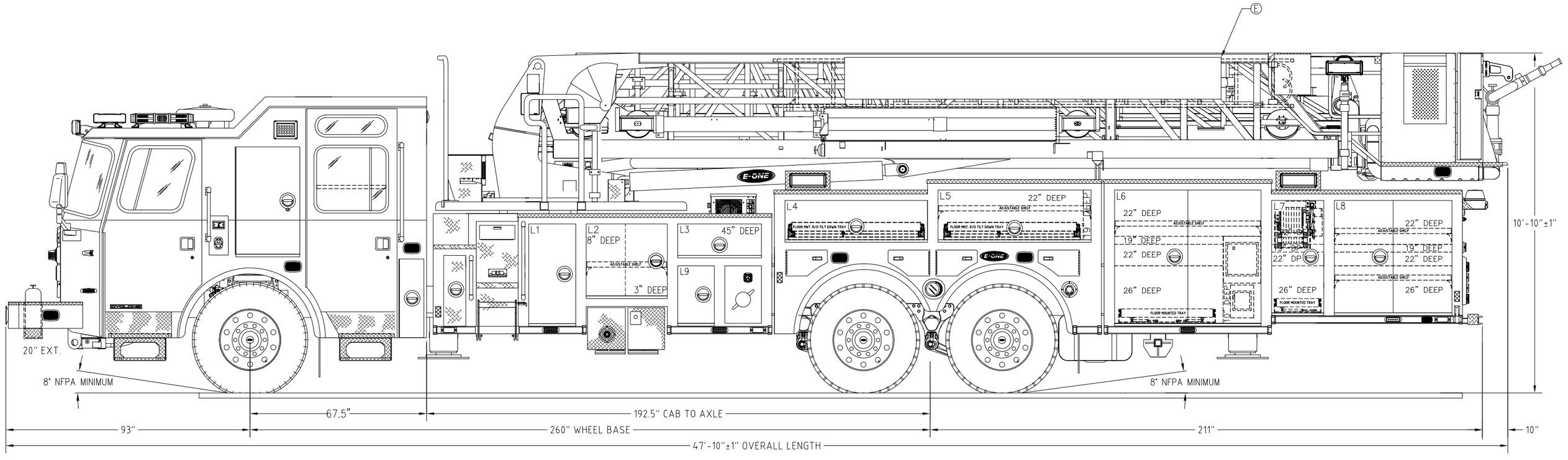
DESIGNER:_____ DATE:_____

COMPT.	OPENING	INTERIOR DIMENSION
L1	18W 38H	OIL RESEVOIR
R1	18W 38H	18W 38H 11D
L2/R2	31W 27H	15W 27H NOTED FORWARD 16W 27H NOTED REARWARD
L3/R3	32W 12H	32W 12H NOTED
L4/R4	54W 15H	54W 15H 25D
L5/R5	58W 19H	58W 19H NOTED
L6/R6	56W 51H	56W 21H NOTED UPPER 56W 30H NOTED LOWER
L7/R7	20W 43H	20W 20H NOTED UPPER 20W 23H NOTED LOWER
L8/R8	45W 43H	45W 20H NOTED UPPER 45W 23H NOTED LOWER
L9/R9	14W 22H	14W 22H 22D

GROUND LADDERS

ITEM	LADDER LENGTH	MODEL NUMBER	QTY	
A	35' 2-SECT.	1200-A 35	1	
B	28' 2-SECT.	1200-A 28	2	
C	24' 2-SECT.	900-A 24	1	
D	18' ROOF	875-A 18	2	
E	16' ROOF	875-A 16	3	(1) ON AERIAL
F	10' ATTIC	545-A 10	1	
G	12' ROOF	775-A 12	1	ON AERIAL





GACRET	C	RFP	2017-JAN-27	BMASON
GACRET	B	RFC	2016-NOV-28	BMASON
GACRET	A	INITIAL RELEASE	2016-OCT-27	BMASON
DRAWN BY	REV	DESCRIPTION	DATE	APPROVED
APPROVAL REVISIONS				SHEET 1 OF 2

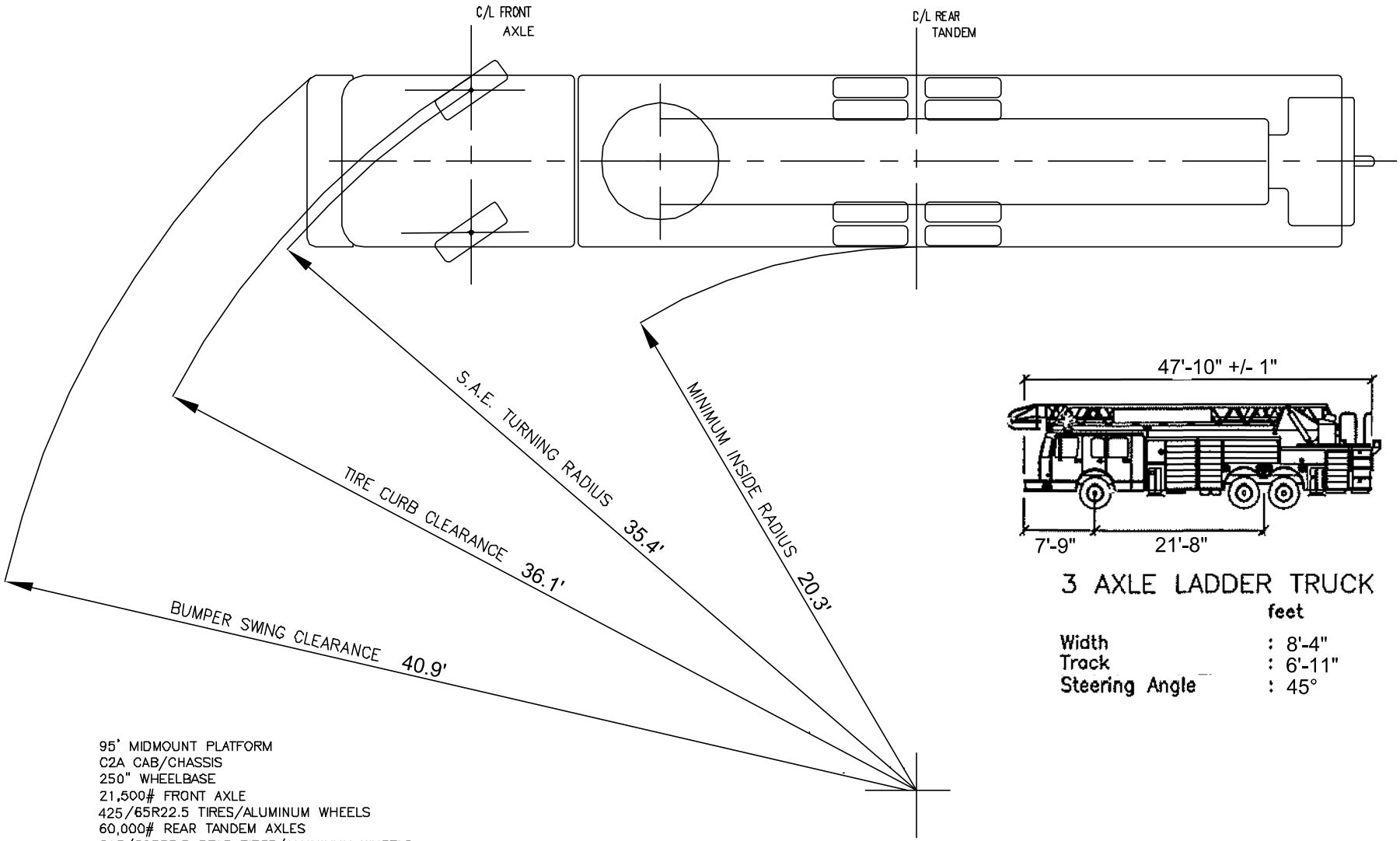
CD-24
SHEET 1 OF 6

SAE Turning Radius Calculations for Quote No. 81188				
Wheelbase:	260"	Front Bumper Size:	10"	
Body Width:	100"	Front Bumper Extension:	20"	
Front Axle Kingpin Center:	65.06"	Front Wheel Type:	ALUMINUM	
Front Axle Track:	83"	Rear Wheel Type:	ALUMINUM	
Front Axle Tire Width:	16.2"	Tire Brand:	MICHELIN	
Dimension Over Rear Tires:	98.59"			
Body Front Overhang:	92"			

Inside Cramp Angle	S. A. E. Turning Radius	Tire Curb Clearance	Bumper Swing Clearance	Minimum Inside Radius
35	43.1'	43.8'	47.9'	29.5'
36	42.1'	42.8'	47'	28.4'
37	41.2'	41.9'	46.2'	27.4'
38	40.4'	41'	45.4'	26.3'
39	39.5'	40.2'	44.6'	25.4'
40	38.8'	39.4'	43.9'	24.4'
41	38'	38.7'	43.3'	23.5'
42	37.3'	38'	42.6'	22.7'
43	36.7'	37.3'	42'	21.8'
44	36'	36.7'	41.5'	21'
45	35.4'	36.1'	40.9'	20.3'
46	34.9'	35.5'	40.4'	19.5'
47	34.3'	35'	39.9'	18.8'
48	33.8'	34.5'	39.5'	18.1'
49	33.3'	33.9'	39'	17.4'
50	32.8'	33.5'	38.6'	16.8'

Nominal Cramp Angles:	
Leaf spring suspension: up to and including 425/65R22.5 tires	45 degrees
Leaf spring suspension: 445/65R22.5 tires	38 degrees
Reyco IFS: up to and including 385/65R22.5 tires	48 degrees
Reyco IFS: 425/65R22.5 tires	45 degrees
Reyco IFS: 445/65R22.5 tires without front intake	42 degrees
Timoney Independent Front Suspension (IFS): up to and including 425/65R22.5 tires	44 degrees
Timoney Independent Front Suspension (IFS): 445/65R22.5 tires	42 degrees
Front Drive Axle: up to and including 425/65R22.5 tires	35 degrees

This Turning Radius report reflects how the quote was configured. Any succeeding changes may slightly alter the turning radius of the vehicle and the data in this report.

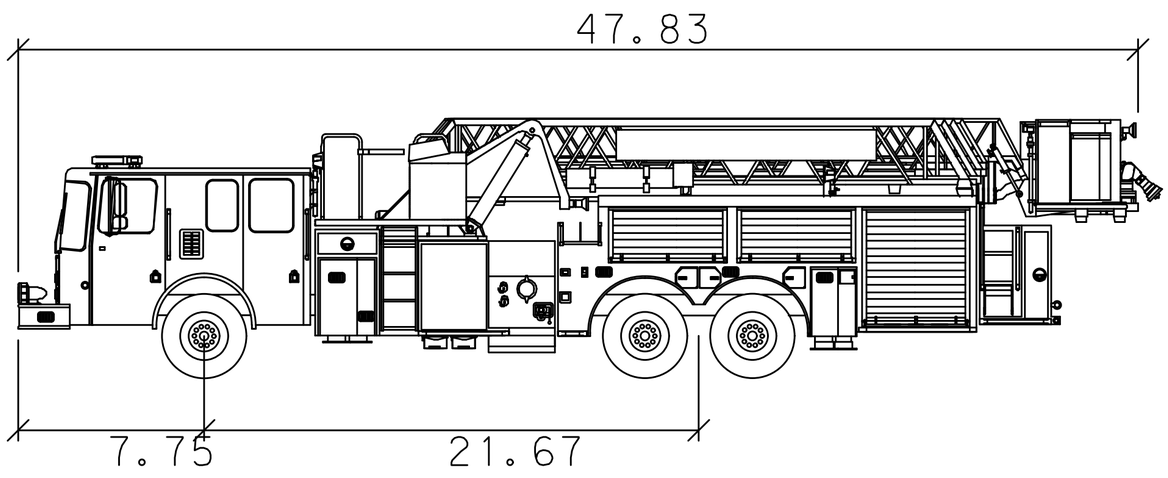


3 AXLE LADDER TRUCK

	feet
Width	: 8'-4"
Track	: 6'-11"
Steering Angle	: 45°

95' MIDMOUNT PLATFORM
C2A CAB/CHASSIS
250" WHEELBASE
21,500# FRONT AXLE
425/65R22.5 TIRES/ALUMINUM WHEELS
60,000# REAR TANDEM AXLES
315/80R22.5 REAR TIRES/ALUMINUM WHEELS
10" BUMPER/20" EXTENSION

VALUES BASED ON 45° AXLE CRAMP ANGLE



Limerick Fire-47-10

	feet
Width	: 8.33
Track	: 8.33
Lock to Lock Time	: 6.0
Steering Angle	: 40.4

30 °
60 °
90 °
120 °
150 °
180 °

OUTSIDE SWEPT PATH
PATH OF FRONT WHEEL
INSIDE SWEPT PATH

37.3 ft
37.3 ft
21.6 ft
33.5 ft
7.8 ft
21.7 ft
18.4 ft
8.3 ft

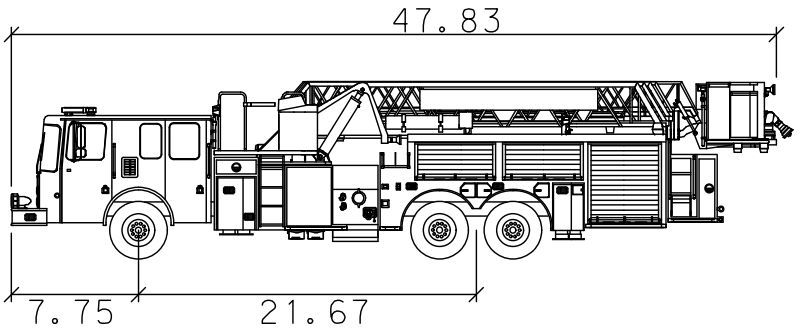
STEERING LOCK ANGLE = 40.4 deg.

ACHIEVED STEERING ANGLE:

30 deg. SWEEP ANGLE: 20.7 deg.
60 deg. SWEEP ANGLE: 30.4 deg.
90 deg. SWEEP ANGLE: 35.2 deg.
120 deg. SWEEP ANGLE: 37.6 deg.
150 deg. SWEEP ANGLE: 38.9 deg.
180 deg. SWEEP ANGLE: 39.6 deg.

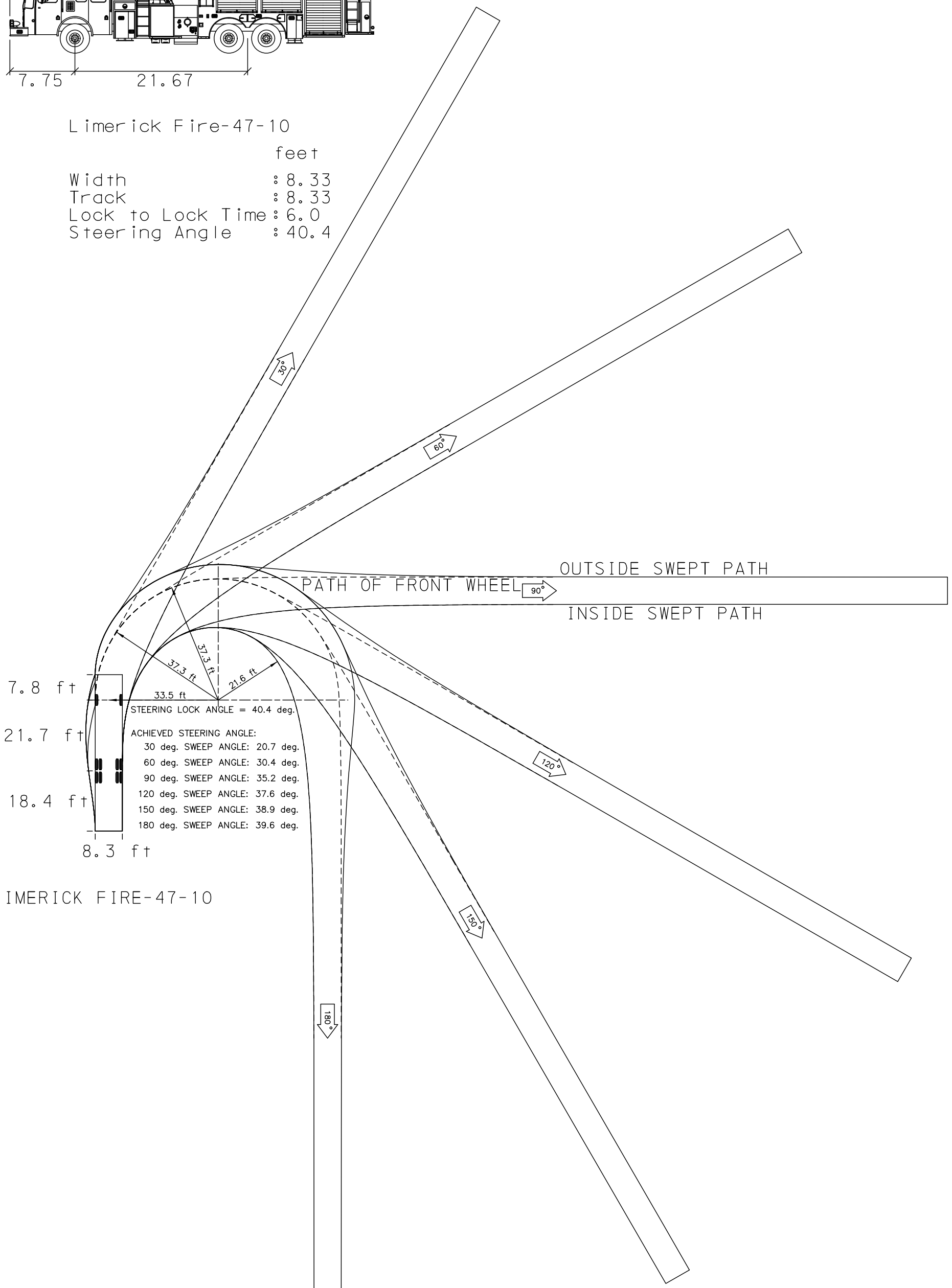
0 20 40 FEET

LIMERICK FIRE-47-10



Limerick Fire-47-10

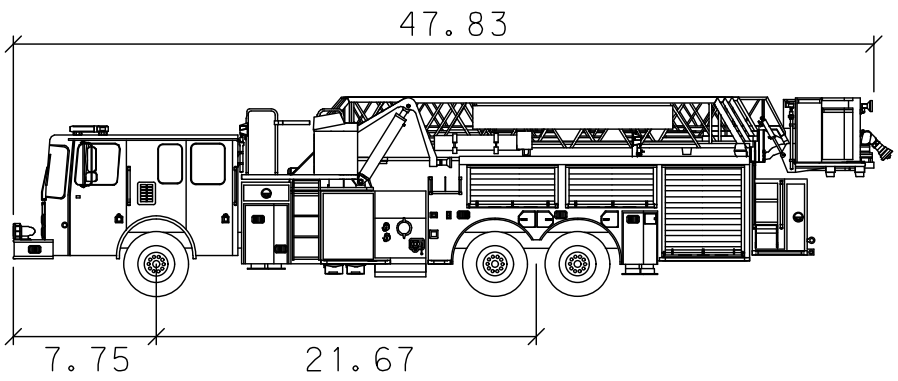
	feet
Width	: 8.33
Track	: 8.33
Lock to Lock Time	: 6.0
Steering Angle	: 40.4



LIMERICK FIRE-47-10

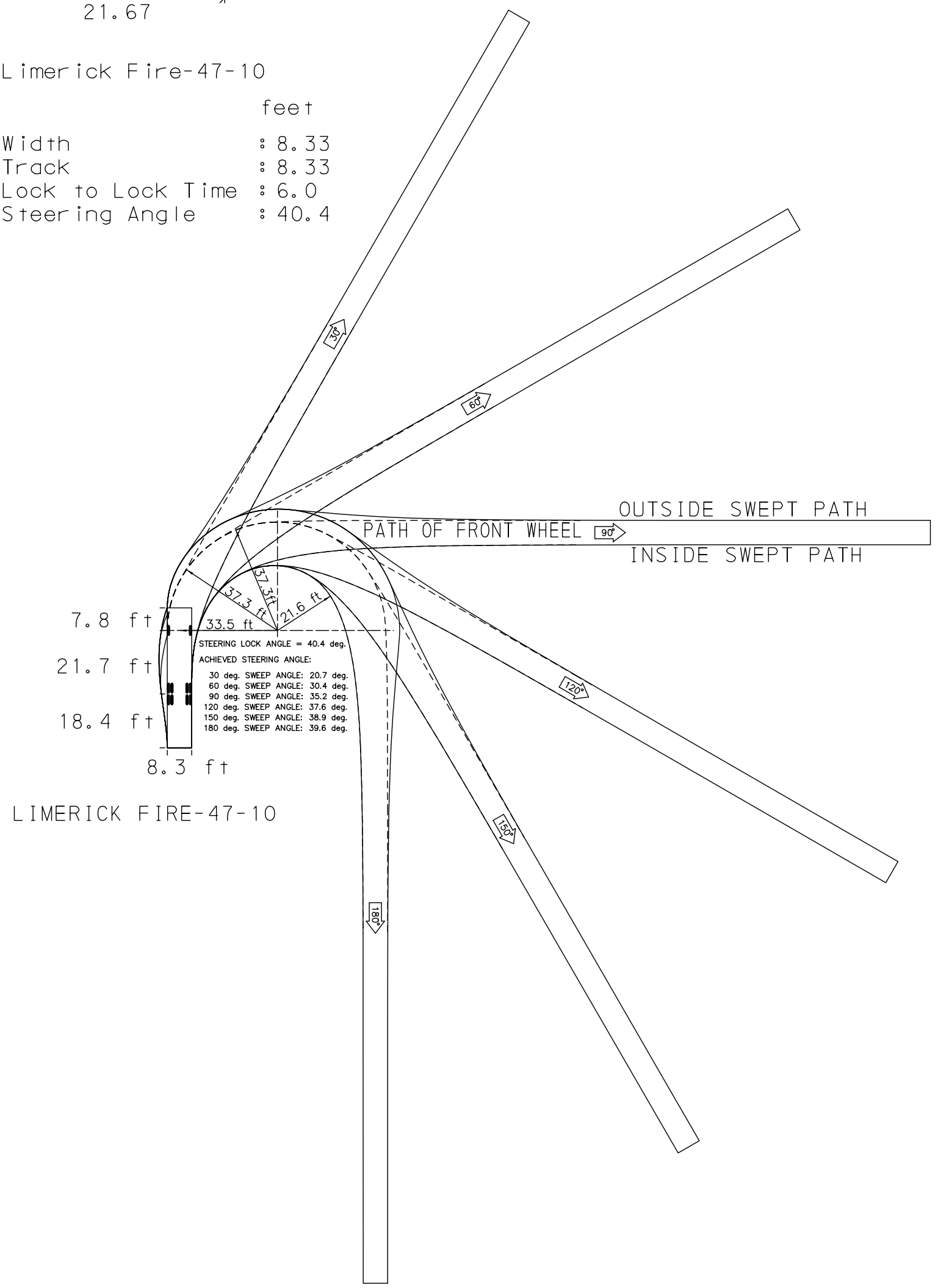
CD-24
SHEET 5 OF 6

0 30 60 FEET



Limerick Fire-47-10

	feet
Width	: 8.33
Track	: 8.33
Lock to Lock Time	: 6.0
Steering Angle	: 40.4



LIMERICK FIRE-47-10

CD-24
SHEET 6 OF 6

0 40 80 FEET