

**TOWN OF LANSING**  
**SPECIFICATIONS FOR TOWN HIGHWAYS**

August 10, 2015

**DESIGN SPECIFICATIONS**

**General:** Any variation of, or deviation from, these minimum Specifications must be approved by the Town Board and Town Highway Superintendent in writing prior to taking any action.

1. Road right-of-way shall be a minimum of 60 feet in level terrain. The radius for intersecting right-of-ways shall be 25 feet. Additional right-of-way may be required where deep cuts and fills exist or adjacent to drainage structures.
2. Total roadway width shall be a minimum of 32 feet. Total driving lane width shall be 20 feet centered within the R.O.W. and shoulder width shall be 6 feet. Refer to Typical and Alternative Roadway Cross-Sections attached. (Detail 1 and 2)
3. Geometric design features should be consistent with a minimum design speed of 30 mph.
4. Stopping sight distance shall be at least 300 feet (back from the intersection).
5. The minimum radius for horizontal and vertical curves shall be 150 feet and 100 feet, respectively. The minimum radius for intersecting edges of shoulder and driving lane shall be 40 feet.
6. All design plans submitted for review shall be at a minimum scale of 1" = 50'.
7. Town Highway Superintendent or Town Engineer may request a roadside clear zone analysis to determine if guide rail is necessary where one on three slopes along roadways is not practical or obstructions within the right-of-way are of a safety concern. Box Beam Guide rail shall be used where required in accordance with the NYSDOT Guiderail Standards.
8. The design storm frequencies for different drainageways have been outlined below in Table 1. The objective of the design storm is to design a culvert crossing, storm sewer or roadside drainage ditch to adequately to pass most rainfall events, yet allow flooding to occur during heavy rainfall events. All design storms are based on a 24-hour duration storm event.

**Table 1.**

DRAINAGEWAY	RECURRENCE INTERVAL (YEARS)
Perennial Streams (Existing Watercourse Channels)	50 <sup>a,f</sup>
Road Cross Culvert	25 <sup>b</sup>
Roadside Ditch	25 <sup>c,f</sup>
Driveway Cross Culvert	25 <sup>d</sup>
Storm Sewer with Drain Inlets	5 <sup>e</sup>

- a. Relocated natural channel should have the same flow characteristics (geometrics and slope) as the existing channel and should be provided with a lining having roughness characteristics similar to the existing channel.
  - b. Detail analysis must be provided to safely show the overflow conveyance of the 100 year design storm.
  - c. Unless hydraulic calculations indicate otherwise, all ditches shall be designed to the minimum dimension shown on Detail 1 and have a minimum grade of 0.5%.
  - d. Unless hydraulic calculations indicate otherwise, the minimum culvert diameter is 15 inches.
  - e. Unless hydraulic calculations indicate otherwise, the storm sewer systems shall have a minimum size of 15” and a minimum slope of 0.5%. Use a 25-year design storm at the following locations where no overflow relief is available:
    1. Sag vertical curves connection negative and positive grades.
    2. Other locations such as depressed roadways, etc.
  - f. Based upon hydraulic and hydrologic calculations, dry rip rap, of the weight and diameter required, shall be designed in all drainageways with grades exceeding 5 percent and shall extend up the slopes of the drainageway to the height of the 10 year rainfall event.
9. Perforated underdrain pipe, wrapped in geotextile fabric, may be required by the Highway Superintendent for low wet areas, where side hill seepage is encountered or in any other area where groundwater will impair the integrity of the roadway.
10. Dead-end road designs will terminate with tee turn-around designed in accordance with Detail 3.
11. In rock cut sections, the backslope beyond the right-of-way shall be a minimum of 1:1.

**MATERIAL SPECIFICATIONS**

**CULVERT MATERIAL** –Provide either reinforced concrete pipe (RCP) or high-density polyethylene (HDPE) double walled with smooth interior. Aluminized steel corrugated pipe may be used with the approval of the Highway Superintendent for driveway crossing ditch lines if there is insufficient cover for HDPE pipe or limited availability of manufactured sizes (e.g. arch pipes or box culverts).

**GEOTEXTILE FABRIC** – Provide a woven or nonwoven fabric consisting of continuous chain polymeric filaments or yarns of polyester; similar to Mirafi 500X and subject to the acceptance of the Highway Superintendent with the following certifiable property values:

Property	Minimum Value	Test Method
Puncture Strength	90 lbs.	ASTM D 6241
Mullen Burst Strength	400 psi	ASTM D 3786
Grab Tensile Strength	200 lbs.	ASTM D 4632
Equivalent Opening Size (sieve)	40	US Std. Sieve

**SUBBASE COURSE MATERIAL** – Provide an evenly graded bank-run gravel which is sound, durable, free of other deleterious materials and free of boulders in excess of 3 inches along the longest dimension with no more than 8 percent by weight finer than the No. 200 sieve.

**BASE COURSE MATERIAL** – Provide a naturally or artificially graded crusher-run stone, which is sound, durable and free of organic and other deleterious material. Material shall have a Plasticity Index of 5 or less for material passing No. 40 sieve, shall have less than 20 percent loss based on the NYSDOT Magnesium Sulfate Soundness Test (STM II) and gradation conforming to the following limits:

<u>Percent Passing by Weight</u>	<u>Sieve Size</u>
100	2”
30-65	1/4”
5-40	No. 40
0-8	No. 200

**PRIME COAT** – Provide a slow setting asphalt emulsion meeting the requirements specified for NYSDOT Material Designation 702-3501 or 702-3601.

**BITUMINOUS MATERIALS** – Provide the following bituminous materials, subject to the acceptance of the Highway Superintendent, for pavement and conforming to the latest edition of NYSDOT Standard Specifications, Section 402:

- 702-90 -Tack Coat
- 702-0700 Miscellaneous Asphalt Cements- Bituminous Joint and Crack Filler
- Type 3 Binder Course
- Type 7 Top Course

Submit to Highway Superintendent certifications from supplier for all bituminous materials.

Provide Superpave mix design system with performance grade binder PG 64-22.

Provide coarse aggregate sizes as specified. Aggregate shall be crushed limestone or dolomite that have an acid insoluble content of not less than 10%. Coarse aggregate shall not contain more than 5% chert and no more than 1.0% dust.

## **CONSTRUCTION SPECIFICATIONS**

### **ROADWAY EXCAVATION**

1. Excavate subsoil to the depth required to provide a uniform surface of solid and undisturbed ground for the placement of aggregate subbase course.
2. Excavate ditches, if applicable, to the minimum depth shown below the centerline finish grade elevation.

3. Where the bottom of the roadway excavation is found to be unstable or to include deleterious material, which in the judgment of the Highway Superintendent should be removed, excavate and remove and backfill the over-excavation with compacted bank-run gravel.
4. Compact the subgrade to or above 95 percent 'Modified Proctor' density with a smooth drum roller, or other sufficient compaction equipment, weighing at least 7 tons. Operate compactor in the static mode for compaction of silty soils and in the vibratory mode for soils containing larger fractions of sand and gravel.
5. Slope the subgrade as shown on Detail 1. Proof roll the final subgrade to provide drainage of groundwater and surface water to ditches.
6. Install underdrains wherever groundwater seepage is encountered or in low, wet areas.

#### ROADWAY EMBANKMENT

1. Obtain subgrade elevation by compacting on-site soils in maximum 8 inch horizontal lifts. Use on-site soils as embankment fill that do not contain organic or deleterious materials, excessively wet or frozen, or cobbles in excess of 6 inches along the longest dimension.
2. If on-site soils are unsuitable or not available, a well-graded bank-run gravel shall be imported. Bank-run gravel shall be approved by the Highway Superintendent subject to a sieve analysis from the source of supply. Bank-run gravel shall be sound, durable, free of organic or other deleterious material with no more than 10 percent by weight finer than the No. 200 sieve.
3. Adjust the moisture content of embankment fill to within 2 percent of optimum by either air drying or addition of water prior to compaction. Spread wet fill in an 8 inch loose lift and disc to expedite air drying.
4. Compact the subgrade to or above 95 percent 'Modified Proctor' density with a smooth drum roller, or other sufficient compaction equipment, weighing at least 7 tons. Operate compactor in the static mode for compaction of silty soils and in the vibratory mode for soils containing larger fractions of sand and gravel.
5. Slope the subgrade as shown on Detail 1. Proof roll the final subgrade to avoid ponding of surface water.

#### ROADWAY SUBBASE COURSE

1. Prior to placing the geotextile fabric and aggregate subbase course, verify that the Highway Superintendent has observed proof rolling of the subgrade. Proof rolling shall be accomplished with a smooth drum roller weighing at least 7 tons and operating in the vibratory mode. Alternatively a loaded 10-wheel dump truck can be used as directed by

- the Highway Superintendent. Any settlement or movement of the subgrade ahead of or under the roller/dump truck that indicates a potential soft area will require removal and replacement with suitable compacted well-graded bank-run gravel as outlined previously.
2. Place the geotextile fabric across the width of the roadway and lap in accordance with manufacturer's instructions. Remove any rocks or debris from subgrade surface that could puncture the fabric.
  3. Lap underdrain fabric with subgrade fabric where subdrains are indicated to be installed.
  4. Place subbase course material in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compaction. When a compacted subbase course is indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.
  5. Compact subbase course to 95 percent 'Modified Proctor' maximum density.
  6. Slope the subbase as shown on Detail 1 and 2. Proof roll the final subbase to provide drainage of surface water to ditches.

#### ROADWAY BASE COURSE

1. Prior to placing the aggregate base course, verify that the Highway Superintendent has observed proof rolling of the subbase course. Proof rolling shall be conducted in the same manner as for the subgrade.
2. Place base course material in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compaction. When a compacted subbase course is indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches thickness when compacted.
3. Provide a compacted base course at 95 percent maximum dry density.
4. Slope the base as shown on Detail 1 and 2. Proof rolling the final base to provide drainage of surface water to ditches or drainage system.

#### ROADWAY PAVEMENT

1. Prior to applying hot-mix asphalt concrete, verify that the Highway Superintendent has observed proof rolling of the base course. Proof rolling shall be conducted in the same manner as for the subgrade. The surface shall be free from voids, settlement, or irregularities to provide a reasonably smooth and uniform surface to receive the hot mix asphalt. Unstable corrugated areas shall be removed and replaced. Areas requiring replacing, patching or shaping in excess of one inch in thickness shall be constructed with

- base materials. Manhole covers, valve boxes and any other structures with the roadway shall be adjusted to the proper grade to meet the crown and slope for the finished pavement.
2. Apply tack coat to contact surfaces of previously constructed asphalt and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.03 to 0.07 gallons per square yard of surface. Allow to dry until at proper conditions to receive paving. Manhole covers, drop inlets, catch basins, curb and any other structure within the roadway area shall be protected against the application of bituminous material.
  3. The asphalt shall be applied in two (2) courses consisting of Type 3 binder course and type 7 top course at the compacted thickness as indicated on Detail 1 and 2. Top course shall be applied immediately after the base course during one paving operation. Base course should not be left exposed for any extended period of time.
  4. Bituminous material shall not be applied on a wet surface, when the ambient temperature is below 50 degrees F in the shade or greater than 95 degrees F or when weather conditions would prevent the proper construction of the surface treatment.
  5. The following equipment shall be required: a self-propelled asphalt spreader, a tandem vibratory roller weighing at least 8 tons and shall be capable of maintaining set frequency and amplitude, all of which shall conform to NYSDOT specifications.
  6. Pavement density shall be monitored with either a nuclear gauge or measured by the number of roller passes in conformance to NYSDOT specifications.
  7. Saw-cut existing pavements in straight lines and tack coat the edge where connecting to existing pavements. Provide minimum of a 2 feet wide mill and "T" patch at joint. Mill existing asphalt to a minimum depth of 2 inches.
  8. Hot-mix asphalt material shall be applied by means of a self-propelled asphalt spreader to the compacted thickness shown on the plan and on the typical details.

### DRAINAGE

1. Culverts shall be placed in natural waterways and low points in the roadway grade. Where culverts cross the roadway, the top of culvert should not extend above the elevation of the roadway subgrade.
2. Install culverts beginning at the low point of the drainage system, true to grades and alignment with unbroken continuity of the invert. Join and install pipe and couplings in accordance with manufacturer's instructions.
3. All culverts, including driveway culverts, shall be installed with galvanized flared end sections (FES) at the inlet and outlet. Where FES are not practical, other materials or techniques may be submitted for approval by the Highway Superintendent.

4. Driveways shall be graded so that runoff from the driveways will not sheet across the road surface. See Detail 4 for typical driveway culvert installation.
5. Provide temporary soil erosion control devices in accordance with standards of the New York "Guidelines for Urban Erosion and Sediment Control." Remove any silt or debris periodically from drainageways to avoid a backup of storm water. Maintain devices until drainageways are firmly established with vegetation or lined.

#### TOPSOILING AND SEEDING

1. All disturbed natural areas within the road right-of-way or proposed drainage easements shall be restored with a minimum 4 inches of topsoil and reseeded with a grass mixture compatible with the surrounding environment.
2. For late fall construction and prior to winter, seed rough graded areas with a temporary conservation mix of winter rye, winter wheat and annual ryegrass.

#### QUALITY ASSURANCE

1. Materials Source for Roadway Subbase Course: Submit name and address of imported aggregate materials suppliers. Provide materials from the same source throughout the construction. Change of source requires approval by the Highway Superintendent. Submit test reports directly to the Highway Superintendent. Analysis of aggregate materials performed in accordance with ASTM C136 and within past three months along with a Standard Proctor compaction test.
2. Schedule inspections of the road construction in accordance with Exhibit A. Notify the Highway Superintendent a minimum of 24 hours in advance of each inspection. Such inspection by the Town Highway Superintendent, or designated representative, does not obligate the Town to accept the road upon offering for dedication nor relieves the builder and/or Developer from complying with the requirements of these specifications.
3. All road right-of-ways, easements, and above and below grade improvements therein shall be guaranteed against defects and poor workmanship for a period of two years from the time of acceptance by the Town.
4. Prior to acceptance by the Town, the Developer shall deliver to the Town a complete release of all liens arising out of the construction of the dedicated improvements, or receipts in full in lieu thereof, and if required in either case, an affidavit that so far as the Developer has personal knowledge or information, the releases and receipts include all labor and materials for which a lien could be filed.

**EXHIBIT A - INSPECTION SCHEDULE FOR PROPOSED TOWN ROADS**

Each phase of the road construction listed below must be inspected by the Highway Superintendent, or designated representative, prior to commencing the next phase. All information must be provided and the inspection sheet signed. The original will be retained by the Developer, or assigned agent, with a copy of each inspection submitted to the Town Highway Superintendent. A minimum of twenty-four (24) hours' notice of inspection must be given.

SUB-GRADE:                      Inspection by: \_\_\_\_\_ Date \_\_\_\_\_  
Location: \_\_\_\_\_  
Section: \_\_\_\_\_  
Weather (conditions): \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SUB-BASE COURSE:              Inspection by: \_\_\_\_\_ Date \_\_\_\_\_  
Location: \_\_\_\_\_  
Section: \_\_\_\_\_  
Weather (conditions): \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Sieve Analysis Received: \_\_\_\_\_ Date \_\_\_\_\_

BASE-COURSE:                      Inspection by: \_\_\_\_\_ Date \_\_\_\_\_  
Location: \_\_\_\_\_  
Section: \_\_\_\_\_  
Weather (conditions): \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Sieve Analysis Received: \_\_\_\_\_ Date \_\_\_\_\_

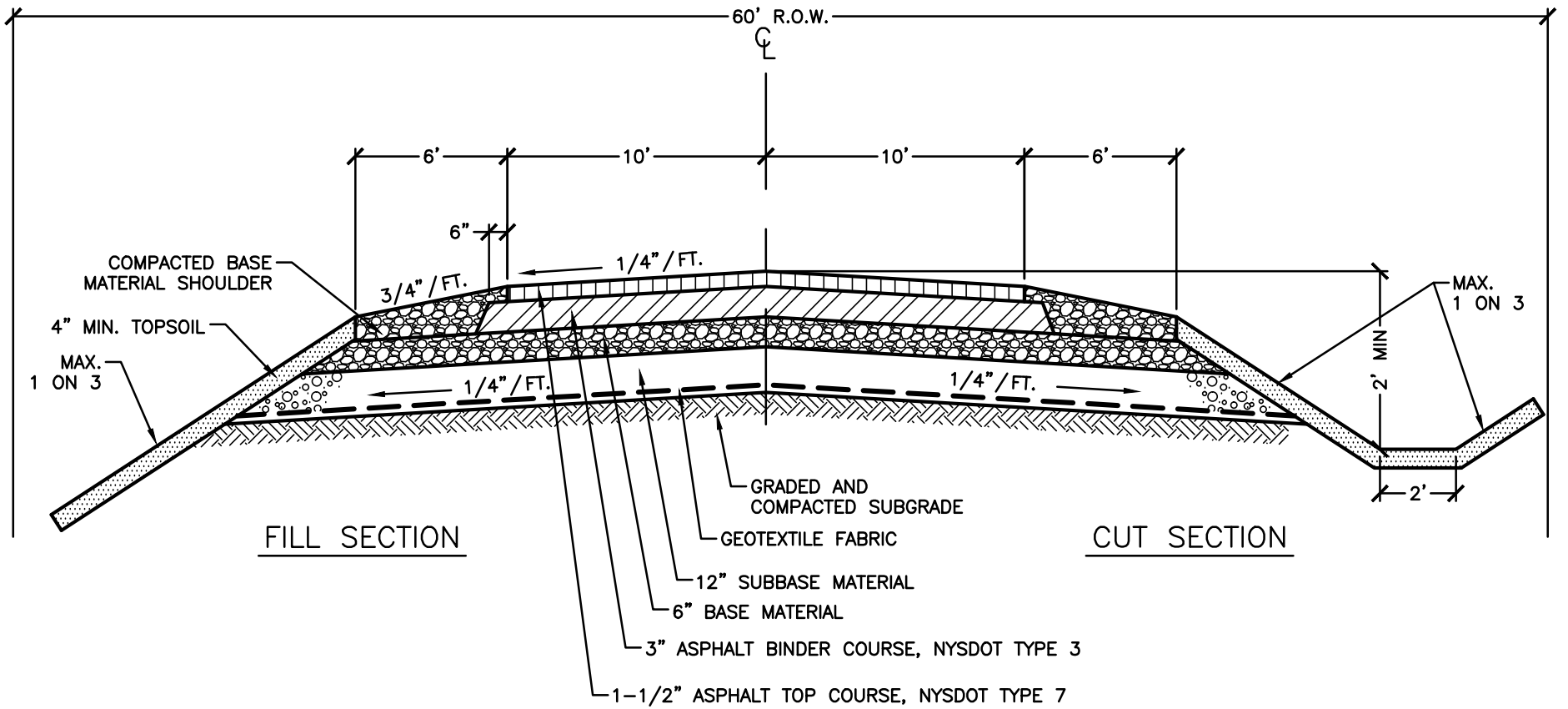
HOT-MIX ASPHALT:

BINDER COURSE:                      Inspection by: \_\_\_\_\_ Date \_\_\_\_\_  
Location: \_\_\_\_\_  
Section: \_\_\_\_\_  
Weather (conditions): \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_  
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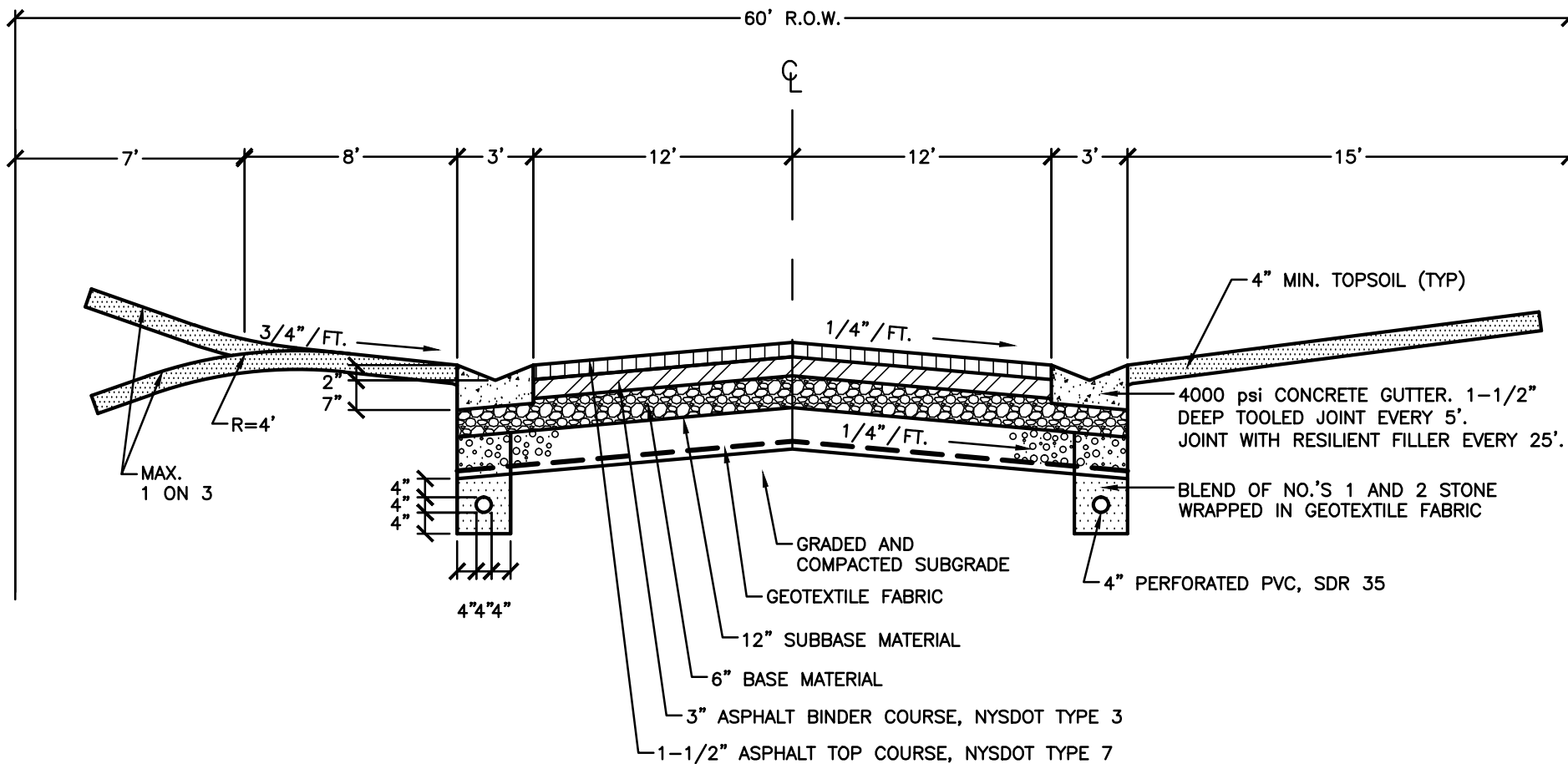


TOP COURSE:                    Inspection by: \_\_\_\_\_ Date \_\_\_\_\_  
    Location: \_\_\_\_\_  
    Section: \_\_\_\_\_  
    Weather (conditions): \_\_\_\_\_  
    Notes: \_\_\_\_\_  
    \_\_\_\_\_  
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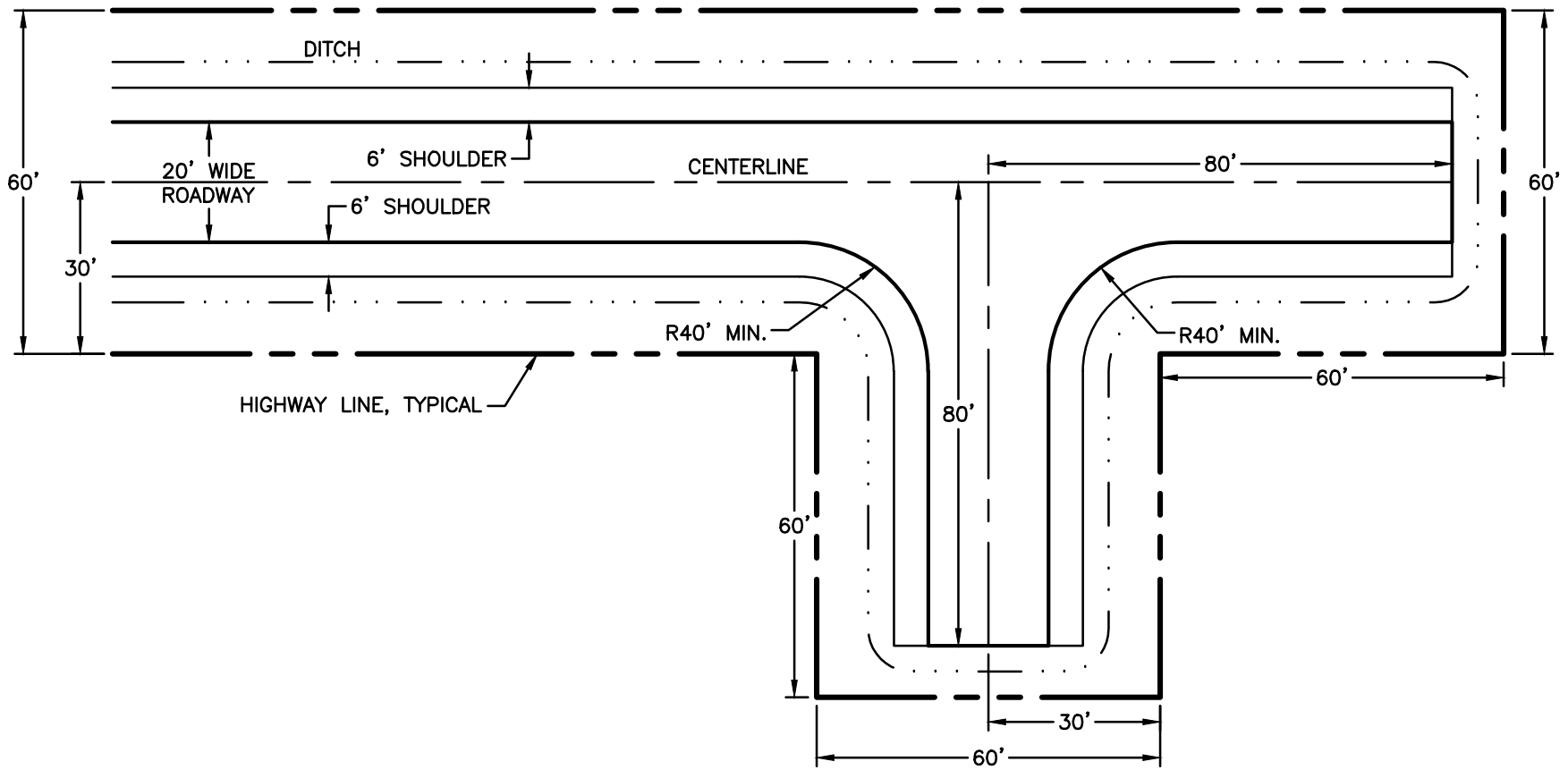
RECOMMENDED APPROVAL: \_\_\_\_\_ Date \_\_\_\_\_  
    HIGHWAY SUPERINTENDENT



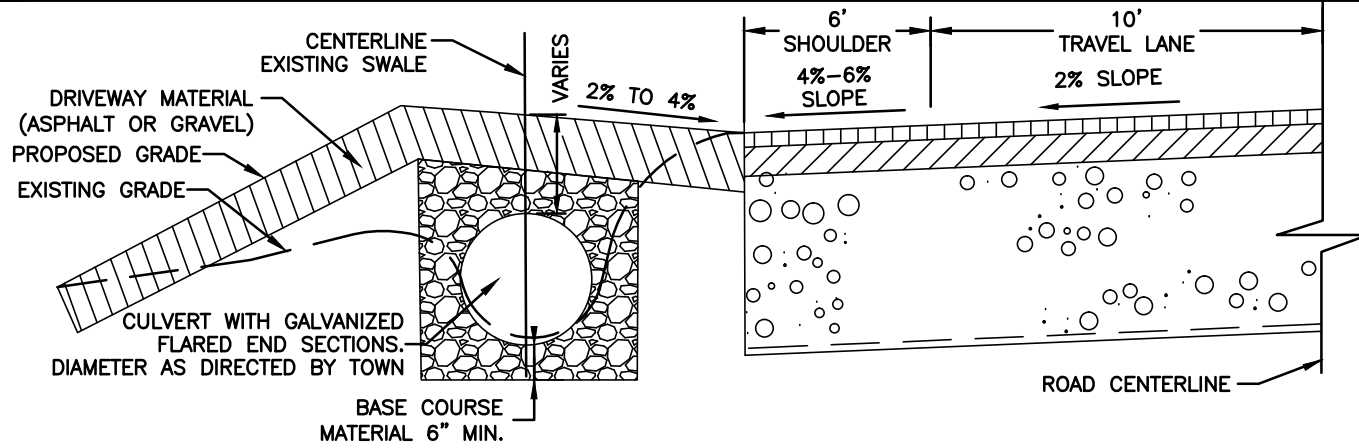
① TYPICAL ROADWAY CROSS-SECTION  
NOT TO SCALE



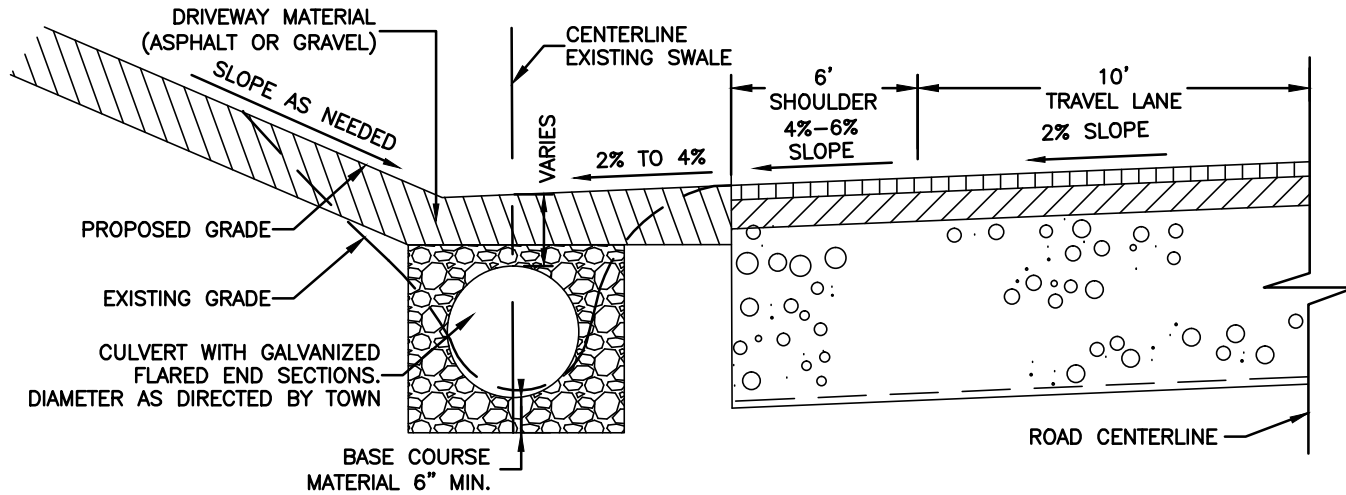
② ALTERNATIVE ROADWAY CROSS-SECTION  
NOT TO SCALE



③ TYPICAL TURN-AROUND  
NOT TO SCALE



DRIVEWAY SLOPING AWAY FROM HIGHWAY



DRIVEWAY SLOPING TOWARDS HIGHWAY

4

TYPICAL DRIVEWAY CULVERT  
NOT TO SCALE