Town of Fort Mill

Road and Stormwater

Specifications

Adopted

October 23, 2017

ROAD AND DRAINAGE DESIGN STANDARDS

1.0 General: The Town of Fort Mill Engineer and Public Works Director will approve all plans for construction or upgrading of streets or roads in the Town Road System to include:

1. New construction
2. Staged development of roadways (overlays)
3. Roadway widening
4. Appurtenant roadway improvements such as storm drains and curb and gutter
5. Encroachments

To be eligible for acceptance into the Town Road System, a street or road must be designed and constructed in accordance with these standards and approved by the Town Engineer. Acceptance into the Town Road System shall be in accordance with the Street Acceptance Policy latest edition.

1.0.1 Drainage: Stormwater drainage systems constructed to drain streets accepted into the Town Road System are eligible for acceptance by the Town if designed and constructed in accordance with the Town of Fort Mill Stormwater Management Ordinance. Only those structure, appurtenances, and piping located within the rights-of-way of Town Road System roads are eligible for acceptance by the Town.

1.0.2 Plans: Complete construction plans and specifications together with all appropriate design calculations are to be submitted and approved prior to the commencement of construction. Plans are to be provided in digital format on computer disc as well as on 24" x 36" sheets. Plans are to be on state plane coordinates in accordance with the Town of Fort Mill's submission standard and to contain the following information:

1. Plan
2. Profile
3. Horizontal curve data
4. Vertical curve data
5. Grades
6. Stations of all PI's, PC's, PT's and intersections
7. Existing and proposed grades at half station
8. Typical cross section
9. Drainage Structures
10. Utilities - all known or proposed (gas, phone, cable, electric, sewer and water)
11. Signing Plan
12. Pavement Marking Plan
13. Length of Proposed Roadways rounded to 0.01 Mile

1.0.3 Record Drawings: Record drawings on computer disc are to be provided before final approval will be issued. Record drawings will consist of 2 sets of drawings and digital copies in PDF, DWG, and Shapefile formats.

1.0.4 Dedication: Roadways designed and constructed in accordance with these standards and approved by the Town Engineer and Public Works Director in accordance with the Street Acceptance Policy may be dedicated to the Town of Fort Mill for maintenance. This is accomplished through the submittal and acceptance of a deed for the right-of-way.

1.0.5 Constructions Zones: Within the Town Easements/ROW's.

1. **Structural Zones** Any area that will or may receive an additional loading of weight or energy. To include all roads, road easements, detention or retention ponds.

2. **Non Structural Zones** Landscaped storm drain easements.

1.0.6 Inspection: All elements of roadway and storm drain system construction, in both Structural and Non Structural Zones must be inspected and approved by the Town Engineer's office as a prerequisite for acceptance by the Town of Fort Mill. This will include:

1. Sub grade Surface
2. Storm Drain System and all related structures
3. Detention/Retention Ponds
4. Embankments
5. Utilities within the structural zone
6. Utilities in Landscaped zones
7. Sub grade for roads
8. Finished grade of road easements/ROW
9. Sub base
10. Base Course
11. Asphalt Paving

It is the contractor's responsibility to insure the Town Engineer's office is notified upon completion of each phase of construction and has the opportunity to make their inspections before proceeding to the next phase.

It should be understood that the inspections conducted by the Town Engineer's office are for the protection of the Town of Fort Mill only. They are not intended to certify the contractor's satisfactory discharge of his contractual obligation to the owner, nor do they relieve the project engineer from any of his responsibilities with regard to inspection and contract administration.

1.0.7 General Instructions to Contractors: The following procedures for implementation of the Town's inspections and final approval shall be followed. It is recommended that these instructions be included in the contract documents for the construction contract.

Applicability: As a prerequisite to Town approval and acceptance of new streets, all phases of construction must be inspected and approved by the Town Engineer's office.

Specifications: All construction and materials shall comply with the latest edition of the SCDOT Standard Specifications for Highway Construction unless specifically noted otherwise herein. These requirements and SCDOT specifications shall supersede the engineer's specifications in the event of a discrepancy.

Testing: The contractor is responsible for providing all geotechnical and materials testing and the accompanying documentation at no cost to the Town. All testing is to be performed by a licensed certified agency and signed off on by the engineer. All testing is to be identified on forms as to the exact location (SD No.'s, Street name, Sta. No.'s, and elevation in regards to finished grade.) The Town will be responsible for providing its own quality assurance testing. Unless otherwise stated herein, the proctor densities required under these procedures are standard proctor densities.

Notification: After receiving approval of street, storm drainage and sediment and erosion control plans, the contractor or engineer must contact the Town Engineer's office with a start date for construction at least 48 hours in advance. Upon completion of site clearing and grubbing and erosion control installation a mandatory site meeting will be held. Meeting is to be arranged by the contactor or project engineer. Meeting shall be attended by project engineer, contractor, developer, geotechnical engineer, town engineer, and any utilities that will or may encroach on/into a Structural Zone. (Attendee must be a responsible representative, meeting should be timely planned and the Town notified at least 48 hours in advance.)

Erosion Control: Before starting any grading work, install sediment and erosion control measures per the approved plans to protect any downstream water bodies. The contractor is responsible for implementation and weekly or bi-weekly monitoring of the sediment and erosion control plan in accordance with the Town of Fort Mill MS4 and SC DHEC Regulations, insuring inspection logs are available on site at all times, and for insuring that silt and sediment do not leave the site.

Inspections: Requests for any inspection must be arranged with the Town Engineer's office 24 hours in advance.

Other Regulations: The developer and contractor are also responsible for compliance with all applicable regulations administered by other agencies such as:

- SCDHEC
- Corps of Engineers
- SCDOT
- Town Planning and Zoning

The Town Engineer's office may withhold approval at any stage of construction, including final approval, for failure to comply with these regulations.

1.0.8 Required Geotechnical Testing and Town Inspections:

Mandatory Initial Sub grade Surface Inspection: After clearing and rough grading of streets but prior to placement of any storm drain or fill for road way embankments, a mandatory sub grade surface inspection is required.

The developer, contractor, project engineer, geotechnical engineer, any utilities that may be working within a structural zone and the Town Engineer's office should be present. This inspection shall be set up by the contractor or the project engineer.

A rubber tired backhoe or motor grader are needed for this inspection in order to confirm that all stumps, roots and unacceptable soils have been removed. A proof-roll may be conducted during this inspection at the discretion of the Town Engineer's office or geotechnical engineer. Underdrain requirements may also be identified at this point. All deficiencies identified during this inspection must be corrected by the contractor before the next inspection is requested. The consulting engineer or geotechnical engineer as well as the Town Engineer's office and contractor should be represented. This inspection shall be set up by the contractor or the consulting engineer.

Trenching and Backfilling: Storm drain trench bedding and backfill must be a SCDOT approved material, be visually inspected, and signed off on by the geotechnical inspector and a copy of the inspection must be sent to the Town.

The contractor shall notify the Town Engineer's office when backfilling of storm drainage or utility excavations within a Structural Zone is to take place. Backfill in these excavations shall be compacted at the proper moisture content in lifts not exceeding 6 inches. The contractor shall provide geotechnical testing and documentation, at no cost to the Town, confirming that all backfill has been compacted to at least 95% of maximum proctor density.

Trenches in the Structural Zone: Such trenches are to have density testing beginning at the pipe haunches, both sides, every 100 ft. or any portion of that, testing to be performed every 1 ft. of fill every 100 ft. until sub grade elevation is met.

Trenches in a Non Structural Zone: Such trenches are to have a density testing beginning at pipe haunches both sides every 200 ft., or any portion of that, testing to be performed every 2 ft. of fill every 200 ft. until sub grade elevation is achieved. Density Requirement in a Non Structural Zone to be 95% of maximum proctor density within the pipe zone and 85% from top of pipe zone to finished grade.

Town Engineer is to be copied on all testing. If not properly notified, or if the test results are unsatisfactory, the Town Engineer's office may require excavation and re-compaction of the backfill. No proof-roll of the sub grade will be scheduled until the backfill compaction has been documented.

Erosion Control: Install sediment and erosion control measures in accordance with the approved Stormwater Pollution Prevention Plan.

Storm Drain Boxes:

1. **Boxes inside a Structural Zone -** fill around boxes to have 1 density test for every 2 ft. of fill placed. Density test must meet 95% of maximum proctor density.
2. **Boxes inside a Non Structural Zone -** fill around boxes to have 1 density test for every 3 ft. of fill placed. Density test must meet 85% of maximum proctor density. Town Engineer is to be copied on all testing.

Embankments: All stumps and large roots must be removed from the roadbed prior to placement of fill for embankments regardless of fill height. All roadway embankment and embankment fill must be approved by and signed off on by the geotechnical engineer. Roadway embankments fill to be placed and compacted in lifts not exceeding 8". The contractor is responsible for providing geotechnical testing and documentation that the embankment material has been compacted to 95% of maximum proctor density. Density testing of embankment fills to be performed every 1ft. of fill every 250 ft. alternating lanes with a minimum of 2 tests per road, per 1ft. of fill. Town Engineer's office is to be copied on all testing. No proof-roll of the sub grade will be scheduled until the compaction has been documented.

Curb and Gutter Proof-Roll: Curb and gutter must be placed on compacted and approved sub grade or base material. Prior to scheduling a curb and gutter proof-roll the Town Engineer's office must be in receipt of all density testing data required to be completed at this stage of construction. The geotechnical inspector, contractor, project engineer and Town Engineer shall be present for this proof-roll.

NOTE: Upon completion of a passing curb and gutter proof-roll, absolutely no excavation or trenching is to be done in a Structural Zone (Roadway or Roadway Easement) without the approval of the Town Engineer's office.

Sub Grade Proof-Roll: Prior to scheduling a sub grade proof-roll, the Town Engineer's office must be in receipt of all density testing data (sub grade should have been tested every 250 ft., alternating lanes testing to be completed on cut or fill), required to be completed at this stage of construction. It is the responsibility of the contractor to provide independent density verification prior to proof-rolling and at no cost to the Town.

After fine grading of sub grade, but prior to placing base material, the sub grade must be proof-rolled with a loaded tandem axle dump truck or pan. The contractor shall schedule this inspection. The geotechnical engineer, Town Engineer's office and contractor shall be represented. The Town Engineer's office reserves the right to conduct or require additional testing at any time. The minimum acceptable sub grade density is 95% of maximum proctor density.

No base course material or curbs should be placed prior to written approval of the sub grade from the Town Engineer's office.

NOTE: Any completed and approved sub grade left exposed for over two weeks or damaged by inclement weather must be re-inspected and approved by the Town Engineer's office. This may include another proof-roll if necessary in the judgment of the Town Engineer's office.

Any excavation within a tested and Town approved sub grade shall be treated as new excavation and complete density testing and proof-rolling requirements must be met.

Catch Basins: The location and orientation of the catch basins relative to the curb and gutter, as well as the roadway width, should be confirmed at this time. Catch basins improperly placed must be relocated and/or reconstructed. All catch basins must have a temporary drain by which standing water can be drained from the surface of the sub grade and base during construction. These drains must be properly plugged before the final inspection is requested.

Base Course: Placement of base course material is only permitted on a Town approved sub grade. All base course materials are to be density tested every 250 feet in alternating lanes with a minimum of 2 tests on any road no matter the length. Thickness of base course material must be verified at each density test location.

The following compaction requirements must be met:

- Graded Aggregate Base Course (98% of modified proctor density)

It is the responsibility of the contactor to provide independent density verification at no cost to the Town.

Graded Aggregate Base Course: If base course is thicker than 8 inches it shall be placed and compacted in equal lifts, if base course is less than 12 inches it can be tested as 1 lift. If base course is 12 inches or greater it must be placed compacted and density tested in equal lifts (12 inches, compact and test at 6 inches and 12 inches).

Base Course Proof-roll: Prior to scheduling a Base Course Proof-Roll the Town must be in receipt of all base course density testing and thickness verification reports. If the average base course thickness is found to be deficient by more than ½ inch or any individual measurement deficient by more than 1 inch, the deficiency will be corrected by scarifying, adding base material, re-compacting and density testing. Upon completion of the curbing and base course, the contractor shall schedule an inspection to proof-roll the base with a loaded tandem axle dump truck or pan. The geotechnical engineer, Town Engineer and contractor shall be represented. The contractor will provide proctor and gradation information on the base material from an independent testing firm as well as verification that all applicable compaction and depth requirements have been satisfied.

NOTE: Any completed and approved stone base left exposed for over one week or damage by inclement weather must be re-inspected and approved by the Town Engineer's office. This may include another proof-roll if necessary in the judgment of the Town Engineer's office.

1.0.9 Paving:

Asphalt Requirements: Unless another type has been approved in advance by the Town Engineer's office for a specific project, hot mix asphalt pavements will be:

Binder Type 1 or 2 (Intermediate Type B or C) for binder (Intermediate) courses Surface Type 1 (Surface Type C) for surfaces courses

All hot mix asphalt will contain hydrated lime as an anti-stripping agent. A roadway will not be approved and accepted by the Town without this additive in the asphalt

Coordination: After approval of the base or sub grade, there must be coordination between the paving contractor and the Town Engineer's office with regard to the schedule for paving. If possible, a Town inspector will be present during paving operations but it is not mandatory unless so designate by the Town Engineer.

1. Asphalt is only to be placed on a Town approved base.

2. If more than one week passes or there is 1/4 in or more rain prior to paving an approved base, the base must be re-inspected by the Town visually, and possibly proof-rolled at the discretion of the Town.

3. Minimum Asphalt thickness for initial/ first lift is 2 in.

4. Asphalt concrete surface course may not be placed during the months of December, January and February except with the written permission of the Town Engineer. Placement of hot mix Asphalt will not be authorized when surface temperatures are less than 45 degrees F.

5. Town Engineer's office to visually inspect pavement and review Asphalt core test data at all phases of paving, binder, intermediate and surface course.

6. Asphalt tack coat to be placed between all course, no exceptions.

Final Surface Course: An existing asphalt concrete binder or base course must be inspected and approved prior to placement of the asphalt surface course. Verification of in-place density and thickness of the binder or base course must be provided as a prerequisite to this approval. Failure to obtain this approval will make the street ineligible for final approval and acceptance by the Town.

Asphalt Requirements: Asphalt verification testing will be conducted in accordance with Section 401.30 of the SCDOT Standard Specifications for Highway Construction, Newest Edition. The contractor shall be responsible for providing verification of the asphalt type, asphalt binder content, gradation and the average laboratory bulk specific gravity (BSG) for all asphalt mixes used on Town projects as well as the in-place asphalt density and thickness. The asphalt contractor must have an asphalt laboratory certified by the SCDOT for state highway projects.

For each day's production, the contractor's asphalt lab must provide:

- Average laboratory BSG
- Asphalt binder content
- Gradation
- Mix type

The in-place density and thickness determination of asphalt surface and binder courses will be based on the core data for each day's production. Cores will be obtained every 500 ft. in alternating lanes with a minimum of one core on any road no matter the length, immediately after completion and the holes patched with hot asphalt from the same day's production. The cores will be taken and evaluated by either the asphalt contractor or an independent materials testing firm certified by the SCDOT for state highway projects.
The pavement will be rejected, removed and replaced if the average in-place core density is less than 96% of the average laboratory BSG with all cores exceeding 95%.
The average pavement thickness must be equal to or greater than the plan thickness with no individual core thin by more than 0.25". Pavements that are deficient with regard to thickness will either be removed and replaced or overlaid at the discretion of the Town Engineer. Each core will be tested for the presence of hydrated lime in the mix.

Documentation of the asphalt verification testing must be provided prior to requesting a final inspection. The Town Engineer's office reserves the right to conduct or require additional verification testing at any time.

Proof-Roll of Road Easement: Easements should be properly graded and compacted according to plans. Fill along curb line is to be a minimum of ½ inch above curb line and compacted. No water should be allowed to stand behind the curbing once it is completed. All water is either to drain away from or over the curb. In lieu of density testing in Roadway Easements, a proof-roll will be conducted by the Town Engineer's office. Proof-Roll is to be scheduled by the contractor prior to grassing. A rubber tire backhoe pick-up truck, rubber tire skid loader is preferred for this proof-roll. A maximum of 1 inch deflection is permitted during this proof-roll.

1.0.10 Signs: Traffic control signs and name signs on new streets are to be installed by the developer in accordance with an approved signing plan as a prerequisite for acceptance by Town.

1.0.11 Final Approval:

Final Inspection: After the paving is completed and all utility, storm drainage and associated work is complete, a final inspection can be scheduled. The following items should all be completed before a final inspection is requested:

- Permanent grass on road shoulders; cut and fill slopes and easements
- Fence around detention ponds
- Street name signs (Town Standard or an approved alternate)
- Traffic control signs (per SC MUTCD)
- Pavement marking (Thermoplastic)
- As-built Drawings

Documentation: As a prerequisite to conducting the final inspection, the following must be provided:

- Digital submission of as-built plans
- 12"x18" hard copy of as-built plans
- Right-of-way deeds for roads and drainage system
- One year warranty bond for road and drainage systems
- Documentation of asphalt verification testing

Punch List: A written punch list of deficiencies found during the final inspection will be provided. All items should be completed before requesting a re-inspection.

Final Approval: Final approval and acceptance shall comply with the Town Street Acceptance Policy.

Failure to comply with any of the above listed requirements could render the streets and storm drainage systems ineligible for acceptance by Town.

1.0.12 Encroachment Permits:

An encroachment permit, approved by the Town Engineer's office, is required for all construction, undertaken by parties other than the Town Public Works Department or its authorized contractor, within or affecting the right-of-way of any Town maintained road. This requirement applies, but is not be limited, to: • Driveway connections involving a curb cut or pipe installation

- Curb cuts
- Utility taps
- Utility crossings
- Storm drainage installation
- Storm drainage discharge
- Subdivision entrance signs or gateways

The permittee is required to indemnify the Town for any liability incurred or damages sustained as a result of the encroachment.

The permittee is responsible for:

- Notifying the Town Engineer's office when construction begins on an encroachment
- Ensuring that a copy of the encroachment permit is on the construction site
- Ensuring that the construction and the restoration of the roadway have been approved by the Town Engineer's office
- All construction

The encroachment permit application form may be obtained from the Town Engineer's office.