

September 24, 2015

Attention: Ms. Lonna Justus
TDEC - Water Pollution Control
711 R.S. Gass Blvd.
Nashville, TN 37243

RE: North Church, LLC S/D Section 4 Phase 3
Rutherford County, TN
SEC Project No. 08144

Ms. Justus:

Transmitted herewith is a Notice of Intent (NOI) Form for the General NPDES Permit to discharge Storm Water Associated with Construction Activity related to the North Church Section 4 Phase 3 site development.

The development will consist of the 1 business lot and related infrastructure, and will disturbed approximately 4.47 acres. The site is located at the intersection of Greshampark Drive and Medical Center Parkway in Murfreesboro, TN.

Attached is Notice of Intent form (NOI), SWPPP, a set of the Stormwater Management Plans and a check for \$250.00 for a site disturbance of between one (1) acre and five (5) acres.

If you have any questions, comments, or if any additional information is required, please contact me. Please send a copy of the Notice of Coverage (NOC) to me via mail or email at mtaylor@sec-civil.com.

Sincerely,

Matt Taylor, P.E.
Vice President
SEC, Inc.

Enclosures: SWPPP (Electronically)
Review Fee Check (via mail)
Notice of Intent (Electronically)
Topographic Map of Site (Electronically)
Scale Set of Construction Plans (Electronically)

**North Church LLC Subdivision
Section 4, Phase 3**

Murfreesboro, TN

**STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)
OPERATION & MAINTENANCE**

ON BEHALF OF

**C.M. Gatton, Trustee
123 N. Church Street
Murfreesboro, TN 37130
c/o Tommy Smith**

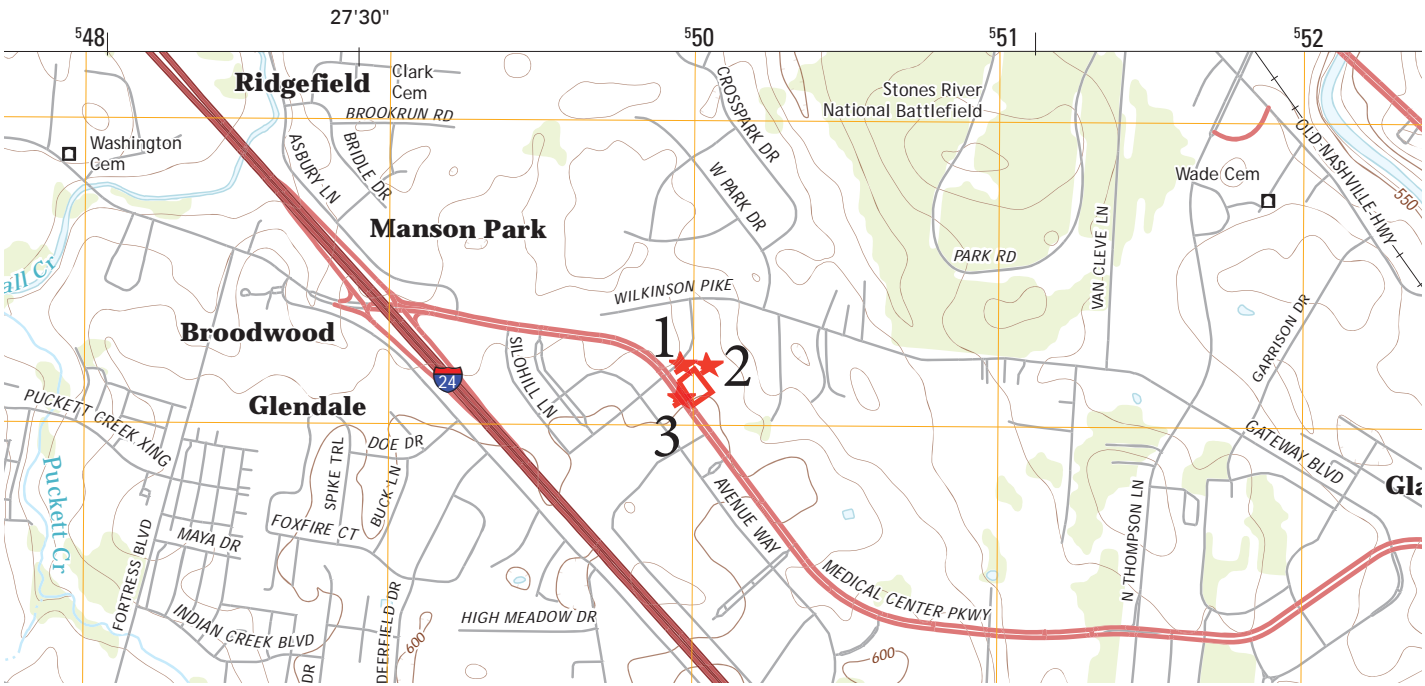
Prepared By:

SEC, Inc.

**Site Engineering Consultants, Inc.
850 Middle Tennessee Boulevard
Murfreesboro, Tennessee 37129
Phone: (615) 890-7901
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SEC Project No. 08144**

USGS TOPO Map

WATER
KEY



Map Scale: 1" = 1050'
Drawing Scale: N.T.S.

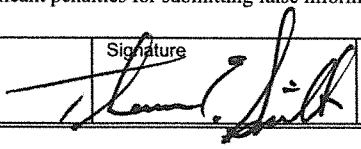


General Information

This Storm Water Pollution Prevention Plan (SWPPP) is developed in accordance with the Tennessee General NPDES Permit (TNR 100000) for Storm Water Discharges Associated with Construction Activity (TNCGP), and is prepared using sound engineering practices. SEC, Inc. personnel involved with the development of this plan have completed the *Design of Vegetative and Structural Measures for Erosion Prevention and Sediment Control* course available from the State of Tennessee.

As instructed by the TNCGP, this plan and all attachments are hereby submitted to the local Environmental Assistance Center (EAC), along with the complete, correctly signed Notice of Intent (NOI). Construction will not be initiated prior to 30 days from the date of submittal of this document, or prior to receipt of a Notice of Coverage (NOC) from the Tennessee Department of Environment and Conservation (TDEC).

Owner/Developer: C.M. Gatton, Trustee
123 N. Church Street
Murfreesboro, TN 37130
Contact Person: Tommy Smith

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		
Representative of owner/developer; print or type	Signature	Date
Tommy Smith		9/16/15

Primary Contractor:
Contact Phone Number:

I certify under penalty of law that I have reviewed this document and any attachments. Based on my inquiry of the construction site owner/developer identified above, and/or my inquiry of the person directly responsible for assembling this Storm Water Pollution Prevention Plan, I believe the information submitted is accurate. I am aware that this Plan, if approved, makes the above described construction activity subject to the NPDES permit number TNR_____, and that certain of my activities on-site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements.		
Company name of primary contractor; print or type	Signature	Date

The individual responsible for installation, maintenance, and inspections of erosion and sediment control measures will be _____. _____ has completed the *Fundamentals of Erosion Prevention and Sediment Control* course offered by the State of Tennessee. _____ mobile telephone number is _____.

It is the intention and goal of the TNCGP and this SWPPP that any discharge from the property described in this document have no objectionable color contrast to the water body that receives it. The construction activity will be carried out in such a manner as will prevent any discharge that would cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of the waters on the property or downstream of the property for fish and aquatic life, livestock watering and wildlife, recreation, irrigation, navigation, or industrial or domestic water supply.

Record Keeping Requirements

Current versions of this SWPPP, the NOI, and the NOC will be kept on the site from the date construction commences to the date of termination of permit coverage. These items will be available for the use of all operators and site personnel involved with the erosion and sediment controls, and will be available to TDEC personnel visiting the site.

A notice will be posted near the construction entrance (accessible to the public) during construction, containing:

- 1.) A copy of the NOC with the tracking number assigned by the EAC,
- 2.) The name, company name, email address, the telephone number and address of a contact person of the project site owner/operator,
- 3.) A brief description of the project, and
- 4.) The location of the SWPPP

The notice must be maintained in a legible condition.

The contractor shall also provide the following items/information in an appropriate location on-site:

- 1.) A rain gauge
- 2.) A copy of the twice weekly inspection reports
- 3.) A copy of the site inspector's Fundamentals of Erosion Prevention and Sediment Control Level 1 certification

The following records shall be maintained on-site:

- 1.) Dates when major grading activities occur
- 2.) Dates when construction activities temporarily or permanently cease on all or a portion of the site
- 3.) Dates when stabilization measures are initiated
- 4.) Daily Rainfall records

The permittee shall retain copies of the SWPPP and all of the inspection reports, and all related reports and documentation for a period of at least three years from the date the notice of termination is submitted.

Prior to initiating earthwork on any areas that are not within the scope of the project, additional information will be provided to TDEC in support of this document.

Any new contractor on the project that will have any responsibility to install, inspect, or maintain erosion and sediment control measures will sign the contractor's certification on a copy of the NOI (Appendix A) and will submit it to the local EAC. Any correspondence with TDEC or any EAC will reference the tracking number assigned by TDEC to the project. A Notice of Termination (NOT; Appendix B) will be submitted after construction is completed, and the complete installation and successful establishment of the final stabilization activities at the site.

Existing Site Conditions

North Church LLC Subdivision Section 4, Phase 3 is a commercial development south of the intersection of Medical Center Parkway and Greshampark Drive in Murfreesboro, TN. The site is located on Tax Map 79, as Parcel 95.00, which will disturb approximately \pm 4.47 acres in the jurisdiction of the City of Murfreesboro, TN and is zoned as MU with GDO-1 Overlay. The site will remain continue to flow towards the north detention pond. From the USDA, Natural Resources Conservation Service – Web Soil Survey (web site: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>) the soil consists of approximately 100% Cumberland silt loam and is categorized as type “B” Hydrologic Soil Groups.

The “Pre-Development” ground cover (prior to the current addition) for the subdivision property is best described as row crops in good condition with a weighted SCS Curve Number of 78. The topography can best be described as a plains with small slopes draining south to north. The receiving waters for the project is Overall Creek, which is a fully supporting stream. The surrounding areas to the south and west could best be described as business/commercial. To the north of the site is row crops. East of the site is woods with a residential house, with adjoining row crops.

Project Description

The North Church LLC Section 4 Phase 3 plan is for one commercial development lot disturbing approximately 4.47 acres. Once the site is modified to the proposed expansion or “Post” ground cover, with additional impervious areas and grass / landscaping areas shown on the Grading & Drainage Plan, the developed ground conditions would have a weighted SCS Curve Number of 78.

There are three initial outfalls for discharges from the project. 1.) Outfall 1 located at the construction exit to the west onto Greshampark Drive. 2.) Outfall 2 located at the silt fence along the north side of the property. 3.) Outfall 3 at the silt fence along Medical Center Parkway.

There are three final outfall for discharge from the project. 1.) Outfall 1 located to the west onto Greshampark Drive. 2.) Outfall 2 located at the along north side of the property. 3.) Outfall 3 along Medical Center Parkway.

Initial EPSC Phase

The contractor is responsible for placing EPSC measures before any earth moving begins, and shall remove sediment at or before 50% design capacity. The Initial Phase will have a construction entrance located off Greshampark Drive Drive to the southeast side of the site. A concrete washout area has been shown to be located near this construction entrance as well. Silt fence will be placed around the downstream perimeter of the project as shown to keep any sediment during the first phases of construction from leaving the project site. Excess material from the project will be stored on site until its use is required. If any storage areas exist during the life of the construction, they should have the proper EPSC measures installed such as surface roughening, silt fence, and temporary seeding if stored for longer than 6 months. All silt fences will be removed upon the completion of its use to prevent it from acting as a source of pollution.

Check dams will be placed in existing ditches. Stabilization (temporary or permanent) of disturbed areas must be initiated immediately when construction activities temporarily or permanently cease on a portion of the site and will not resume for at least 14 days. Pre-construction vegetative ground cover shall not be destroyed, removed, or disturbed more than 15 days prior to grading activities are projected to begin for that area unless the area is temporarily stabilized. Clearing and grubbing of the site shall be kept to a minimum and only in areas absolutely required for the construction activities.

Final EPSC Phase

The Final Phase is to consist largely of stabilization measures during the grading process. These will include pavement, building, permanent seed, mulch, and landscaping on all grading or disturbed areas not previously stabilized. The measures shown are to remain in places throughout the life of the project until the final stabilization measures and permanent site features are enacted by the home builders.

No energy dissipation devices are required as the site will remain as sheet flow or enters an existing storm water sewer, therefore no erosion will occur from this site.

Inspection Requirements

Inspections shall be performed at least 2 times per calendar week with at least 72 hours between each inspection. Inspections will cover, at minimum, all disturbed areas that have not undergone final stabilization, sediment control structures, outfall points, and vehicle entrance and exit points. The inspections will be conducted with the purpose of determining whether erosion

prevention and sediment control measures are effective in preventing impacts to receiving waters. If during these inspections it is discovered that repair or maintenance is required of any temporary or permanent control measure, the action should be taken before the next rainfall if possible but no longer than 7 days and will be documented. If any structure is found to be at half capacity, then it should be cleaned out and the removed sediment used elsewhere onsite.

If the controls are installed and maintained correctly but are found to provide an inadequate level of protection, revisions will be made to this plan within 7 days following the inspection. Then the revisions will be implemented by the contractor within 14 days of the inspection. The inspector will certify every 72 hours (on the form found in Appendix C) that the inspection described above has been performed and whether or not all of the erosion and sediment control measures are installed in working order. The record of certifications on the form will be kept on site and made available upon request. The forms must be submitted to the division within 10 days of the request. If the records are requested by the division, the forms must contain the printed name and signature of the trained certified inspector and the permittee.

The inspector shall have completed the *Fundamentals of Erosion Prevention and Sediment Control Level I* course. A copy of the certification or training record for the inspector certification should be kept on site.

Site Assessment

Overall Creek is a fully supporting stream with outfalls less than 5 acres. Therefore, a site assessment does not have to be conducted.

~~Since this project has several outfalls having drainage areas totaling more than 10 acres, those outfalls should have site assessments conducted within 1 month of construction commencing at each portion of the site. The site assessment shall be performed by individuals with any of the following qualifications:~~

- ~~1-) A professional engineer or landscape architect licensed in the State of Tennessee;~~
- ~~2-) A Certified Professional in Erosion and Sediment Control (CPESC), or~~
- ~~3-) A person that successfully completed the Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites course.~~

~~The site assessment shall be performed to verify the installation, functionality, and performance of the EPSC measures that have been designed on the plans and described in the SWPPP. The inspector shall be present at the time of the site assessment. The site assessment shall also include a review and update of the SWPPP, if needed. The documentation for the site assessment must contain the printed name and signature of the individual performing the site assessment, the information included on the inspection form, and the certification as stated in Section 3.1.2 of the TNCGP.~~

Spills and Non-Storm Water Contingencies

All fueling of equipment and vehicles on site should be conducted near the construction entrance/staging areas. Any spillage should be removed immediately. Contaminated soils will be placed on heavy plastic and covered or placed into approved containers to prevent contact with storm water. All fuel tanks will be in the containment area. Oils, other vehicle fluids, paints, and solvents will be stored in the construction trailer. Any spill in excess of two gallons will be reported to a representative of the owner.

If a release containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under either 40 CFR 117 or 40 CFR 302 occurs during a 24-hour period, the contractor will immediately notify the permittee who shall then do the following: notify the National Response Center (NRC) (800-424-8802) and Tennessee Emergency Management Agency (TEMA) (emergencies: 800-262-3300; non-emergencies: 800-262-3400); as well as the local Environmental Assistance Center. Also, a revision of this document will be prepared to identify measures to prevent the reoccurrence of such releases.

Concrete trucks will wash out at the designated area near the construction entrance. Each contractor is responsible to provide litter control for trash generated by his crew and must have a regularly scheduled cleanup time to prevent pollution. A dumpster for garbage will be located near the construction trailer and is limited to garbage and paper trash only. Paint cans, oil cans, used oil, and filters will be contained and disposed of by the contractor by taking them to the Rutherford County Hazardous Waste Disposal Center. Sanitary waste will be handled via portable toilets which will be kept on-site and regular maintenance performed.

The following discharges are prohibited and must be planned for accordingly:

- 1.) Wastewater from concrete washout, unless managed by an appropriate control,
- 2.) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials,
- 3.) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
- 4.) Soaps or solvents used in vehicle and equipment washing.

B. Description of the intended sequence of major activities, which disturb soils for major portions of the site.

1. Establish erosion control devices for area to be disturbed (such as silt fence, construction entrance, and sediment traps).
2. Remove topsoil in proposed lot, detention, and roadway locations.
3. Drill and blast for underground utilities (water, sewer, and storm), if required
4. Grade site to proposed subgrade elevations.

5. Install drainage culverts, and drainage structures following required construction methods.
6. Install inlet and outlet protection for the drainage structures such as filter fabric over curb inlets, turf reinforcement at outfalls, and energy dissipation devices, if required.
7. Finish fine grading of site.
8. Install erosion control to help stabilize disturbed areas such as seeding and mulching.
9. Re-grade and compact roadway areas to proposed subgrade elevations.
10. Install curb, base stone, and asphaltic binder for proposed roadway.
11. Backfill behind curbs and grade to final elevations.
12. Clean any silt from storm drainage structures or culverts.
13. Remove all silt fences once a healthy stand of grass is obtained in all disturbed areas.

C. Estimates of total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities.

Total area of Site: 4.47± acres

Total area to be disturbed: 4.47± acres

D. Data describing the soil

From the USDA, Natural Resources Conservation Service – Web Soil Survey (web site: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>) the soil consists of approximately 100% Cumberland silt loam and is categorized as type “B” Hydrologic Soil Groups.

The “Pre-Development” ground cover (prior to the current addition) for the subdivision property is best described as row crops in good condition with a weighted SCS Curve Number of 78.

E. Estimate of the runoff coefficient of the site before and after construction activities are completed.

The existing ground conditions in the project area are best described as row crops in good condition with a weighted SCS Curve Number of 78.

The developed ground conditions in the project area would change to commercial with a SCS curve number of 92.

F. Maps (See Attached and Construction Plans)

G. Outfall points for storm water discharges from site

The site drains to the Overall Creek after being collected in the storm drainage system within the development. There are 3 initial on-site outfall points and 3 final on-site outfall points. A total of 6 on-site outfall points are to be monitored during construction and they are identified and labeled on the erosion control plan and labeled on topo map.

H. Description of any discharge associated with industrial activity other than construction storm water that originates on site.

No industrial discharge is associated with this development.

I. Name of receiving waters.

The site drains to Overall Creek, which is a fully supporting stream. There are no wetlands on or adjacent to the site.

Storm Water Runoff Controls

This site disturbance is less than 5 acres therefore 2 separate EPSC phases have been developed. These sheets are shown in the civil plan set as Initial EPSC Plan, and Final EPSC Plan. Supporting details are included in the rest of the civil plan set. Vegetative methods are described in the construction documents and will range from sod to plantings to mulch. A copy of these civil plan sets has been included with this SWPPP. The measures shown on the Initial EPSC measures plan are to remain in place throughout the life of the project until the final stabilization measures and permanent site features are to be enacted. The Final EPSC measures plan is to be enacted as the grading activities provide for the ability to stabilize areas.

The ultimate goal of the storm water pollution prevention plan is to limit the release of sediment from the construction site. This information is provided as a guide for the developer and contractors, for installation, inspection, follow-up, and periodic maintenance of the items used to prevent and control erosion on this project. The design shown on the construction plans includes multiple measures taken from TDEC's Erosion and Sediment Control Handbook and have been designed for the 2-year, 24-hour storm event since the receiving waters are not impaired or high quality. The details for construction of these items are shown on the Detail Sheets of the construction plans.

Listed below are several general rules of thumb for grading work, along with stormwater rules from the Construction General Permit. These are in addition to the physical controls shown on the plans.

- Minimize clearing to reduce area of exposed soil. This can also be accomplished during construction by phasing work to minimize the exposed soil areas.
- The Contractor shall keep records of activities on-site including dates of installation, grading work, maintenance, and completion.
- Any off-site storage areas are also considered part of the project and must be protected from erosion.
- Seeding should be done as soon as work in an area is complete to minimize the area of exposed soil.
- A Notice of Termination (NOT) shall be completed when work on the project is complete. This will inform TDEC that the developer, contractor, and sub-contractors are no longer responsible for erosion control on the site.

The owner/developer should appoint responsible personnel to cover all aspects of the site operation. It is ideal that there be a pollution prevention team to accomplish the goals of the Storm Water Pollution Prevention Plan (SWPPP). The team members should perform routine inspections and inform the team coordinator of any changes in operations that may affect the SWPPP. More specific inspection recommendations are listed with each item below.

For a construction site, the pollution prevention team should include the site foreman, vehicle maintenance and fueling personnel, heavy equipment operators (grading and buffer issues), etc. SWPPP review and discussion should be a part of new employee training/certification programs.

Maintenance issues identified by inspections should be resolved as soon as possible, but definitely within 7 days or less. Best Management Practices (BMPs) that are found to be insufficient should be augmented or replaced with other BMPs that can more effectively manage the pollutant concern. On-site personnel should contact the design engineer at 890-7901 if they observe that the current erosion control plan is not adequate to control sediment transport. This of course does not include regular maintenance of the controls after rain events.

This plan uses both Temporary Construction Site Management Practices (TCPs) and Permanent Erosion Prevention and Sediment Control (PESC) items. Included are TDEC's BMP's that are used. As well an additional reference for erosion control is the Nashville Stormwater Management Manual (NSMM) Volume 4, "Best Management Practices."

**TENNESSEE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**

**EROSION PREVENTION AND SEDIMENT
CONTROL**

BEST MANAGEMENT PRACTICES

- Identifying Sensitive Areas
- Construction Sequencing
- Topsoiling
- Surface Roughening
- Disturbed Area Stabilization (with Mulch)
- Disturbed Area Stabilization (with Temporary Vegetation)
- Disturbed Area Stabilization (with Permanent Vegetation)
- Erosion Control Blanket/Matting
- Concrete Washout
- Check Dam
- Construction Exit
- Silt Fence
- Inlet Protection

7.1 IDENTIFYING SENSITIVE AREAS OR CRITICAL AREAS



Definition	Marking, flagging, or fencing areas in the field that should be protected from construction activities such as clearing, grading, mowing, staging activities, materials storage, and/or other related activities.
Purpose	To protect sensitive areas from being disturbed or encroached upon by construction or construction-related activities.
Conditions Where Practice Applies	Any site containing features considered to be sensitive to the impacts from construction, regardless of the project size. Areas that should be protected include tree preservation areas, Aquatic Resources Alteration Permit (ARAP) boundaries, streams, wetlands, endangered or protected species habitat, water quality buffers, mitigation or stream relocation boundaries, sinkholes, stormwater treatment areas, caves, and historic preservation areas. There may also be special cases in which the land owner or design professionals deem an area critical for preservation that should be clearly marked to prevent disturbance.
Planning Considerations	Any sensitive or critical areas within the project boundaries should be identified in the SWPPP and on the EPSC plans. The design professional should clearly label all areas on construction plans and specify the type of marking materials to be used.
Design Criteria	<p>When a construction project contains wetlands or streams, additional permits are typically required (see Section 2 for more information on other permits that may be needed). Before any construction activity begins on a project in the vicinity of streams and wetlands, all permit boundaries should be identified on the project and marked in the field.</p> <p>Temporary and permanent water quality buffers should also be identified. Maintenance and disturbance restrictions can vary, depending on the regulatory</p>

agency's requirements. For example, some portions of buffers can be disturbed and revegetated, while other buffers must remain completely undisturbed. Before staking the outer limits of the buffer, understand the local and state requirements relative to temporary and permanent water quality buffer zone disturbance and long term vegetation management. The SWPPP must clearly document these for the site.

In addition to streams and wetlands, other sensitive areas should be protected during construction. Any portions of the development that are designed as undisturbed natural areas should be clearly marked in the field to prevent disturbance. If these areas are disturbed, additional site design components may be needed to meet local or state requirements.

Areas that should be identified and clearly marked as sensitive areas in the field include the following:

- **Streams and wetland buffers.** Note that the buffer requirements in the Construction General Permit (See Appendix A) may not be the same as the locally required stream and wetland buffers. The more restrictive of the two must be followed.
- **ARAP boundaries.** If the ARAP allows a specific footage or acreage of stream or wetland encroachment, going beyond these boundaries can result in a violation. Clearly marking these boundaries in the field aids in maintaining compliance with the ARAP conditions.
- **Stream mitigation or relocation boundaries.** It is likely that a two step field marking process is necessary for stream relocations and/or mitigation. The first boundaries should identify the permitted impacts to the natural resource and should occur prior to work in the area. Once the relocation or mitigation has been installed and stabilized, these areas should be marked to show the outer limits and prevent disturbance or damage to plants.
- **Sinkholes.** Depending on the drainage patterns of the site, the only discharge point from a site may be a sinkhole. Sinkholes are a vital component of the drainage network and are subject to clogging by sediment and debris. Sinkhole basins should be protected from sediment from construction sites by using appropriate erosion prevention and sediment controls upgradient from the basin. Leaving sinkhole basins undisturbed provides an additional measure of protection. It should be noted that discharges to sinkholes may require a underground injection well permit from the TDEC Division of Water Supply.
- **Undisturbed areas.** Often, undisturbed open space requirements are established and enforced by the local jurisdiction. The amount of undisturbed open space per development is typically a percentage of the development. Disturbing these areas can lead to additional development restrictions or mitigation requirements. In addition, undisturbed areas of a site affect sediment control design. The less disturbed area on a site, the smaller the sediment storage required. If an area is shown on the SWPPP as undisturbed and is disturbed during construction, the sediment control measures can easily be overwhelmed, causing a failure and potential violation.
- **Threatened and/or Endangered species habitat.** Critical habitat for threatened or endangered species should be protected from land disturbing activities and

to avoid a potential “taking.” These areas should be clearly identified on the plans and in the field to prevent inadvertent disturbance or encroachment.

- **Stormwater management areas.** Land disturbing activities destroy the infiltration capacity of soils by changing the soil structure, compacting the soils, and subjecting soil organic matter to a more rapid decay process. Many stormwater management practices, such as bioretention areas and water quality swales rely on the soil infiltration capacity. When the infiltration capacity of the in situ soils is substantially altered, the area may no longer be suitable for permanent stormwater management controls.

Construction Specifications

Many types of boundary markers are available. Flags, stakes, posts or fencing can be used as field boundary markers. Whatever type is used, it should be highly visible and installed along the outer perimeter of the feature’s boundaries. Bright colors and highly distinguishable marking materials should be specified, such as orange fencing, neon or brightly colored flags, or highly visible signage. Some markers will be temporary (such as ARAP permit boundaries) while others may be more permanent (such as permanent water quality buffer boundaries). The decision about the type of marker to be used at the site may in part be dictated by the lifespan of the feature being marked.

Maintenance and Inspection Points

- Boundary markers should be maintained throughout the lifespan for the feature.
- Boundary markers should be inspected during each inspection, with inspections being performed as required by the CGP.
- Any markers that have been damaged, removed or degraded to the point that they are no longer visible should be replaced.
- Boundary markers should be removed at the end of construction, unless required by an agency or local government to be left in place.

References

TDOT Manual for Management of Stormwater Discharges Associated with Construction Activities

North Carolina Erosion and Sediment Control Planning and Design Manual

7.3 TOPSOILING



Definition The act of scraping topsoil from a construction site and reserving it for use to aid final stabilization.

Purpose To provide a suitable soil medium to support vegetation growth.

Conditions Where Practice Applies Topsoiling should be utilized on all construction sites where topsoil is available at the surface of the soil. Preserving topsoil for use at final stabilization ensures a healthy stand of vegetation. Topsoil storage areas should have EPSC measures applied, such as stockpile perimeter controls and temporary cover. Topsoil should only be placed on slopes less than 2:1 unless additional engineered slope stabilization is applied to prevent slippage.

Planning Considerations Topsoil is the major zone of root development and biological activity. It is generally darker than the subsoils due to enrichment with organic matter, but not all darker soils are topsoils. Questionable soils available for topsoiling should be analyzed by a soils specialist or soil scientist to insure that the soils can in fact support vegetation growth.

Although topsoil may improve growth capabilities for vegetation, there are some disadvantages to topsoiling. Stripping, stockpiling, hauling, and spreading topsoil, or importing topsoil, may not be cost-effective for some projects. In addition, some topsoil contains weed seeds which compete with desirable vegetation species.

In planning for the final grading and vegetation of a site, the designer should compare the options of topsoiling with preparing a seedbed in the available subsoils.

Subgrade elevations and finished grade elevations should be considered when planning for topsoil thickness.

Topsoil stockpiling should be conducted early in the project as large disturbed areas are scheduled. Placement of topsoil should be completed at the end of construction just before permanent vegetation is to be installed.

Design Criteria Topsoil should be stripped and stockpiled onsite before grading activities are commenced in any new area of the site. Stockpiled topsoil should be stabilized utilizing temporary vegetation practices (*refer to Sections 7.8 and 7.10 for more information*). Include a topsoil stockpile area on the EPSC Plan and in the construction sequence. Stockpile areas should be located where topsoil is less likely to discharge into streams and other sensitive areas if measures failed; where it does not block natural or artificial drainage ways; and where it does not interfere with work on the site.

Construction Specifications The topsoil stockpile must be protected against erosion. Stabilize the stockpile with a temporary or permanent groundcover. In addition, perimeter measures should be provided around the stockpile area to prevent sediment migration.

Once grading on any portion of the site has reached final grade, topsoil should be spread prior to final stabilization. Topsoil placement should not be specified in areas where slopes are steeper than 2:1.

Good quality topsoil has the following characteristics:

General Characteristics – Topsoil should be friable and loamy, free of debris, objectionable weeds and stones, and contain no toxic substances that may be harmful to plant growth. Topsoil should be handled only when it is dry enough to work without damaging the soil structure.

Texture – Loam, sandy loam, and silt loam are best; sandy clay loam, silty clay loam, clay loam, and loamy sand are fair. Heavy clay and organics such as peat or muck should not be used as topsoil.

Organic Matter Content – Organic materials should be greater than 2% by weight.

Fertility and nutrients – pH range should be 5.5 to 7.0; liming may be specified if pH is less than 5.5. Soil test for nutrients as well, based upon the type of vegetation to be established.

Organic and inorganic soil amendments (see Chapter 7) may be applied to topsoil to achieve the desired characteristics.

The depth of topsoil to be applied should be 5 inches (unsettled).

STRIPPING

Strip topsoil only from areas that will be disturbed by excavation, filling, paving, or compaction by equipment. Stripping depth varies and should be site-specific.

STOCKPILING

Topsoil stockpiles should be located to avoid slopes, natural and artificial drainage ways, and construction traffic. Multiple stockpiles near areas to be stripped may be specified on large sites so that re-spreading topsoil is more efficient and economical.

Sediment controls should be specified where necessary around stockpiles to prevent eroded topsoils from leaving the stockpile area. Temporary seeding practices should be performed no more than 15 days after the formation of the stockpile. Permanent groundcovers should be considered where topsoil stockpiles are to be inactive for longer periods of time.

TOPSOIL SPREADING

Topsoil should be spread only when grading activities have been completed and permanent vegetation is to be applied. Grades should be maintained according to the approved plan, and final grades should not be altered by adding topsoil. The subgrade surface should be roughened by disking or scarifying to a minimum depth of 4 inches prior to spreading topsoil to ensure bonding of the topsoil and subsoils. Apply lime or fertilizer to subgrade before roughening.

Topsoil should be uniformly distributed to a minimum depth of 5 inches and compacted. Do not spread topsoil while it is excessively wet or frozen. Uniformly moisten excessively dry soil that is not workable or too dusty. Correct any irregularities in the surface to prevent the formation of depressions or water pockets. After topsoil application, follow procedures for permanent vegetation.

Maintenance and Inspection Points

Topsoiled areas should be inspected for erosion, depressions or ridges, rocks, and other foreign materials prior to beginning permanent vegetation applications. These areas are subject to ongoing inspections and maintenance until final permanent stabilization has been achieved and a Notice of Termination has been submitted.

References

TDOT Design Division Drainage Manual

North Carolina Erosion and Sediment Control Planning and Design Manual

AIA Masterspec 95 Format, section 02920

7.5 SURFACE ROUGHENING AND TRACKING



Definition	Roughening a bare soil surface with horizontal grooves running across the slope, stair stepping, or tracking with construction equipment.
Purpose	To aid the establishment of vegetative cover from seed, to reduce runoff velocity and increase infiltration, and to reduce erosion and provide for sediment trapping.
Conditions Where Practice Applies	All construction slopes require surface roughening to facilitate stabilization with vegetation, particularly slopes steeper than 3:1. Slopes to be covered with rolled erosion control products need not be roughened.
Planning Considerations	<p>Rough slope surfaces are preferred because they aid the establishment of vegetation, improve water infiltration, and decrease runoff velocity. Graded areas with smooth, hard surfaces may be initially attractive, but such surfaces increase the potential for erosion. A rough, loose soil surface gives a mulching effect that protects lime, fertilizer, and seed. Nicks in the surface are cooler and provide more favorable moisture conditions than hard, smooth surfaces; this aids seed germination.</p> <p>There are different methods for achieving a roughened soil surface on a slope, and the selection of an appropriate method depends upon the type of slope. Roughening methods include stair-step grading and tracking. Factors to be considered in choosing a method are slope steepness, mowing requirements, and whether the slope is formed by cutting or filling.</p>
Design Criteria	No formal design is required.

Construction Specifications**CUT SLOPE ROUGHENING FOR AREAS NOT TO BE MOWED**

- Stair-step grade slopes with a gradient steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the “step” in toward the vertical wall.
- Do not make individual vertical cuts more than 2 feet in soft materials or more than 3 feet in rocky materials.

FILL SLOPE ROUGHENING FOR AREAS NOT TO BE MOWED

- Place fill slopes with a gradient steeper than 3:1 in lifts not to exceed 9 inches, and make sure each lift is properly compacted. Ensure that the face of the slope consists of loose, uncompacted fill 4 to 6 inches deep.
- Do not blade or scrape the final slope.

CUTS, FILLS AND GRADED AREAS THAT WILL BE MOWED

- Make mowed slopes **no steeper than 3:1**.
- Roughen these areas to shallow grooves by normal tilling, disking, harrowing, or use of cultipacker-seeder. Make the final pass of any such tillage implement on the contour.
- Make grooves, formed by such implements, close together (less than 10 inches) and not less than 1 inch deep.
- Excessive roughness is undesirable where mowing is planned.

ROUGHENING WITH TRACKED MACHINERY

- Limit roughening with tracked machinery to sandy soils to avoid undue compaction of the soil surface. Tracking is generally not as effective as the other roughening methods described.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- **Seeding** – Immediately seed and mulch roughened areas to obtain optimum seed germination and growth.

Maintenance and Inspection Points

Periodically check the seeded slopes for rills and washes. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.

If a storm event occurs, it is likely that the surface roughening will have to be redone. Surface roughening is a temporary measure. If roughening is washed away in a heavy storm, the surface will have to be re-roughened and new seed laid.

References

North Carolina Erosion and Sediment Control Planning and Design Manual

STABILIZATION PRACTICES

7.6 STABILIZATION WITH STRAW MULCH



STABILIZATION WITH STRAW MULCH

Definition	Application of a temporary protective blanket of straw to the soil surface.
Purpose	To protect the soil surface from the forces of raindrop impact and overland flow. Mulch reduces runoff and erosion, conserves soil moisture, promotes seed germination, insulates soil, suppresses weed growth, and prevents surface crusting.
Conditions Where Practice Applies	Mulch seeded areas immediately. Areas that cannot be seeded because of the season should be mulched to provide temporary protection of the soil surface.
Planning Considerations	<p>A surface mulch is considered the most effective, practical means of controlling runoff and erosion on disturbed land prior to vegetative establishment. Mulch reduces soil moisture loss by evaporation, prevents crusting and sealing of the soil surface, moderates soil temperatures, provides a suitable microclimate for seed germination, and may increase the infiltration rate of soil.</p> <p>Straw mulch is the most common type of mulch used in conjunction with seeding or providing a temporary groundcover. The straw should come from wheat or oats (“small grains”), and may be spread by hand or with a mulch blower. Note that straw may be lost to wind and must be tacked down. The recommended application rate for straw mulch is 2 tons per acre, dry unchopped, unweathered.</p> <p>Note that the goal is 70% uniform coverage over 100% of the site. Straw mulch is often used in conjunction with some channel liners.</p>
Design Criteria	No formal design is required.

Construction Specifications

Before applying mulch, complete the required grading, install sediment control practices, and, if applying seed, prepare the seed bed. When applying seed in combination with mulch, apply the seed before mulch except in the following cases:

- Seed is applied as a part of a hydroseeder slurry containing mulch.
- A hydroseeder slurry is applied over straw.

Application:

Spread mulch uniformly by hand or with a mulch blower. When spreading mulch by hand, divide the area to be mulched into sections of approximately 1000 ft² and place 70-90 lbs of straw (1.5 to 2 bales) in each section to facilitate uniform distribution. After spreading mulch, no more than 25% of the soil surface should be visible. In hydroseeding applications a green dye added to the slurry assures a uniform application.

Anchoring:

Straw mulch must be anchored immediately after spreading. The following methods may be used.

Mulch Anchoring Tool: Straw mulch may be pressed into the soil immediately after the mulch is spread. A special crimper or disk harrow with the discs set straight may be used. Serrated discs are preferred and should be 20 inches or more in diameter and 8 to 12 inches apart. The edges of the discs shall be dull enough to press the mulch into the ground without cutting it. Mulch should not be plowed into the soil. This method is limited on slopes no steeper than 3:1, where equipment can operate safely. Operate machinery on the contour.

Liquid Mulch Binders: Application of liquid mulch binders and tackifiers should be heaviest at the edges, crests of ridges, and banks to resist wind. Binders should be applied uniformly to the remaining area. Binders must be applied after the mulch is spread, or may be sprayed into the mulch as it is being applied. Applying the straw and binder together is the most effective method. Liquid binders include emulsified asphalt and an array of commercially available synthetic binders.

Emulsified asphalt is the most commonly used mulch binder. Any type thin enough to be blown from spray equipment is satisfactory. Asphalt is classified according to the time it takes to cure. Rapid setting (RS or CRS designation) is formulated for curing in less than 24 hours, even during periods of high humidity. It is best used in fall and spring. Medium setting (MS or CMS) is formulated for curing in 24 to 48 hours, and slow setting (SS or CSS) is formulated for use during hot, dry weather, requiring 48 hours or more curing time.

Apply asphalt at 0.10 gallons per square yard (10 gal/1000 ft²). Heavier applications cause straw to “perch” over rills.

In traffic areas, uncured asphalt can be picked up on shoes and cause damage to rugs, clothing, etc. Use types RS or CRS to minimize such problems. Synthetic binders may be used to anchor mulch. Follow the manufacturer’s recommended application method and rate. Most synthetic binders are expensive and are therefore used mostly in small areas or in residential areas where asphalt may be a problem.

Mulch Nettings: Lightweight plastic, cotton, jute, wire, or paper nets may be stapled over the mulch according to manufacturer's recommendations. Note that single net RECPs with integrated mulch may be used instead of separate mulch with netting.

Maintenance and Inspection Points Inspect all mulches periodically, and after rainstorms to check for rill erosion, dislocation or failure. Where erosion is observed, apply additional mulch. If washout occurs, repair the slope grade, reseed and reinstall mulch. Continue inspecting mulched areas until vegetation has firmly established or until construction activities resume in the area.

References *North Carolina Erosion and Sediment Control Planning and Design Manual*

STABILIZATION PRACTICES

7.8 TEMPORARY VEGETATION

**TS**STABILIZATION WITH TEMPORARY
VEGETATION

Definition	The establishment of temporary vegetative cover with fast growing species for seasonal protection on disturbed or denuded areas.
Purpose	<p>To temporarily stabilize denuded areas that will not be brought to final grade for a period of more than 14 days.</p> <p>Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established. Seeding with a temporary groundcover provides temporary stabilization until permanent stabilization can be achieved. In addition, it provides residue for soil protection and seedbed preparation, and reduces problems of mud and dust production from bare soil surfaces during construction.</p>
Conditions Where Practice Applies	<p>On any cleared, unvegetated, or sparsely vegetated soil surface where vegetative cover is needed for less than 1 year.</p> <p>For permanent seeding specifications, see Section 7.9.</p>
Planning Considerations	<p>Annual plants that sprout and grow rapidly and survive for only one season are suitable for establishing initial or temporary vegetative cover. Temporary seeding preserves the integrity of earthen sediment control structures such as dikes, diversions, and the banks of dams and sediment basins. It can also reduce the amount of maintenance associated with these devices. For example, the frequency of sediment basin cleanouts will be reduced if the watershed areas outside the active construction zone are stabilized.</p> <p>Proper seedbed preparation, selection of appropriate species, and the use of quality seed are important. Failure to follow established guidelines and recommendations carefully may result in an inadequate or short-lived stand of vegetation that will not control erosion. Temporary seeding provides protection for no more than 1 year, during which time permanent stabilization should be initiated.</p>

Design Criteria Complete grading before preparing seedbeds, and install all necessary erosion control practices such as dikes, waterways, and basins. Minimize steep slopes because they make seedbed preparation difficult and increase the erosion hazard. If soils become compacted during grading, loosen them to a depth of 6-8 inches using a ripper, harrow, or chisel plow.

Construction Specifications **Grading and Shaping:** Excessive water runoff shall be reduced by properly designed and installed erosion control practices such as ditches, dikes, diversions, and sediment basins. No shaping or grading is required if slopes can be stabilized by hand-seeded vegetation or if hydraulic seeding equipment is to be used.

Seedbed Preparation: Good seedbed preparation is essential to successful plant establishment. A good seedbed is well pulverized, loose and uniform. Where hydroseeding methods are used, the surface may be left with a more irregular surface of large clods and stones.

Liming: Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1 to 1½ tons/acre on coarse textured soils and 2-3 tons/acre on fine textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher do not need to be limed.

Fertilizer: Base application rates on soil tests. When soil tests are not possible, apply a 10-10-10 grade fertilizer at 700-1000lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before the application.

Surface Roughening: If recent tillage operations have resulted in a loose surface, additional roughening may not be necessary, except to break up large clods. If rainfall caused the surface to become sealed or crusted, loosen it just prior to seeding by disking, raking, harrowing, or other suitable methods. Groove or furrow slopes steeper than 3:1 on the contour before seeding.

Seeding: Select a non-invasive grass or grass-legume mixture suitable to the area and season of the year. See Figures 7.8-1 to 7.8-3 for suggestions of temporary seeding species. Although native plants are preferred, there are currently no available native species that are not cost prohibitive. Non-invasive annual plants are preferred. Seed shall be applied uniformly by hand, cyclone seeder, drill, cultipacker seeder, or hydraulic seeder. Drill or cultipacker seeders should normally place seed ¼ to ½ inches deep. Appropriate depth of planting is 10 times the seed diameter. Soil should be raked lightly to cover seed with soil if seeded by hand.

Mulching: The use of mulch will help ensure establishment under normal conditions, and is essential to seeding success under harsh site conditions. Harsh site conditions include:

- Seeding in fall for winter cover
- Slopes steeper than 3:1
- Excessively hot or dry weather
- Adverse soils (shallow, rocky, or high in clay or sand), and
- Areas receiving concentrated flow.

Irrigation: During times of drought, water shall be applied at a rate not causing runoff and erosion. The soil shall be thoroughly wetted to a depth that will ensure germination of the seed. Subsequent applications should be made as needed. Newly seeded areas require more water than more mature plants.

Species	Rate (lb/acre)
Rye	120
Seeding dates	
East	Above 2500 feet: Feb. 15 - May 15
	Below 2500 feet: Feb. 1 - May 1
Middle	Jan. 1 - May 1
West	Dec. 1 - Apr. 15
Soil amendments	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.	

Figure 7.8-1 Temporary Seeding Recommendation for Late Winter and Early Spring

Species	Rate (lb/acre)
Oats	60
Brown top millet	30
Seeding dates	
East	May 15 - Aug. 15
Middle	May 1 - Aug. 15
West	Apr. 15 - Aug. 15
Soil amendments	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.	

Figure 7.8-2 Temporary Seeding Recommendation for Summer

Species	Rate (lb/acre)
Oats	30
Winter wheat	30
Seeding dates	
East	Aug 15 – Dec 15
Middle	Aug. 15 – Dec 30
West	Aug. 15 – Dec 30
Soil amendments	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage. If necessary to extend temporary cover beyond June 15, overseed with 50 lb/ac crimson clover in late February or early March.	

Figure 7.8-3 Temporary Seeding Recommendations for Fall

Maintenance and Inspection Points Reseed and mulch areas where seedling emergence is poor or where erosion occurs, as soon as possible. Do not mow.

References *North Carolina Erosion and Sediment Control Planning and Design Manual*

STABILIZATION PRACTICES

7.9 PERMANENT VEGETATION



STABILIZATION WITH PERMANENT
VEGETATION

Definition The planting of native perennial vegetation such as ground covers, shrubs, vines, trees, and/or flowering plants (forbs) on exposed areas for erosion control and final stabilization. Permanent perennial vegetation is required to achieve final stabilization. Native perennial plants are preferred for erosion control because of the following reasons:

- In appropriate habitats, native plants are better adapted to environmental and site conditions, resulting in lower maintenance costs
- Natives are not typically aggressive and do not allow the site to become a source of exotic invasive plants that can spread to other locations and become costly to remove
- Unlike most non-natives, native plants support native insect, bird, and other wildlife for pollinations, food sources, and nesting
- Using native plants provides opportunities to educate and demonstrate various sustainable approaches for the public
- The Tennessee Exotic Pest Plant (TNEPPC) council has ranked non-native plants in Tennessee based on their invasiveness and threats to the natural environment. The following plants that have been used for erosion control by TDEC and TDOT are listed in TNEPPC's publication **"Invasive Exotic Pest Plants in Tennessee – 2009"**:
 - Korean (and Kobe) lespedeza – "Severe Threat" Category (Kobe is not ranked but has same invasive characteristics as Korean)
 - Tall fescue – "Significant Threat" Category

- Foxtail millet – “Significant Threat” Category
- Crown vetch – “Alert” Category

We are providing native and non-invasive alternative species as the preferred choice for erosion control and soil stabilization for TDEC projects. (Table 7.9-1)

Purpose	To reduce stormwater runoff velocity, maintain sheet flow, protect the soil surface from erosion, promote infiltration of runoff into the soil, and improve aesthetics and provide diversity. Many native grasses have very deep and fibrous roots, a minimum of one foot and up to fifteen feet, and provide long-term erosion control.
Conditions Where Practice Applies	Apply to fine-graded areas on which permanent, long-lived vegetative cover is the most practical or most effective method of stabilizing the soil. Permanent seeding may also be used on rough-graded areas that will not be brought to final grade for a year or more. Areas to be seeded with permanent vegetation must be seeded or planted within 14 days after the construction activity in that portion of the site has permanently ceased.
Planning Considerations	<p>The most common and economical means of stabilizing disturbed soils is by seeding a mixture of grasses and forbs. The advantages of seeding over other means of establishing plants include the smaller initial cost, lower labor input, and greater flexibility of method. The disadvantages of seeding include the potential for erosion during the establishment stage, the need to reseed areas that fail to establish, seasonal limitations on suitable seeding dates, and a need for water and appropriate temperatures during germination and early growth. The probability of successful plant establishment can be maximized through good planning, knowledge of the soil characteristics, selection of suitable plant materials for the site, good seedbed preparation, adequate liming and fertilization, and timely planting and maintenance.</p> <p>Native grasses can be planted by drilling or seeding. The ground should be prepared by disking or rotovating prior to seeding in the spring or summer. Annual grains such as rye or oats can be planted prior to sowing the grass seed for erosion control. Grass seed can be planted in the dormant season as well.</p> <p>Permanent perennial vegetation is used to provide a protective cover for exposed areas including cuts, fill, and other denuded areas that will not be regraded. Permanent stabilization should be applied where topsoil was never stripped, or has been returned and incorporated into the soil surface.</p> <ul style="list-style-type: none"> • When stripping a site, topsoil should be stockpiled for later use. • Stockpiled topsoil should be stabilized using temporary vegetation. • Where a suitable planting medium is not present, topsoil shall be imported and incorporated into the site. • Block sod provides immediate cover; it is especially effective in controlling erosion adjacent to concrete flumes and other structures. . • When mixed plantings are done during marginal planting periods, companion crops shall be used. • No-till planting can be effective when planting is done following a summer or winter annual cover crop. • Irrigation should be used when the soil is dry or when summer plantings are done.

- Native species are low maintenance plants and are preferred to ensure long-lasting erosion control.
- Wildlife plantings of native species should be included when applicable.

Wildlife Plantings: Commercially available plants beneficial to wildlife species include the following:

- Mast Bearing Trees: Beech, Black Cherry, Blackgum, Chestnut, Oak, Hackberry, Hickory, Honey Locust, Black Locust, and Persimmon.
- Shrubs and Small Trees: Serviceberry, Crabapple, Pawpaw, Spicebush, Hazelnut, Dogwood, Highbush and Lowbush Blueberries, native Holly, Red Cedar, Red Mulberry, Sumac, Wild Plum, Blackhaw and Blackberry. Plant shrubs in patches without tall trees to develop stable shrub communities. All produce fruit used by many kinds of wildlife.

Design Criteria The state is divided into three planting regions designated I, II and III as shown in the figure below. Native seed mixes are preferred and the recommendations are shown in Table 7-9.1. Note that the rates are based upon Pure Live Seed (PLS).

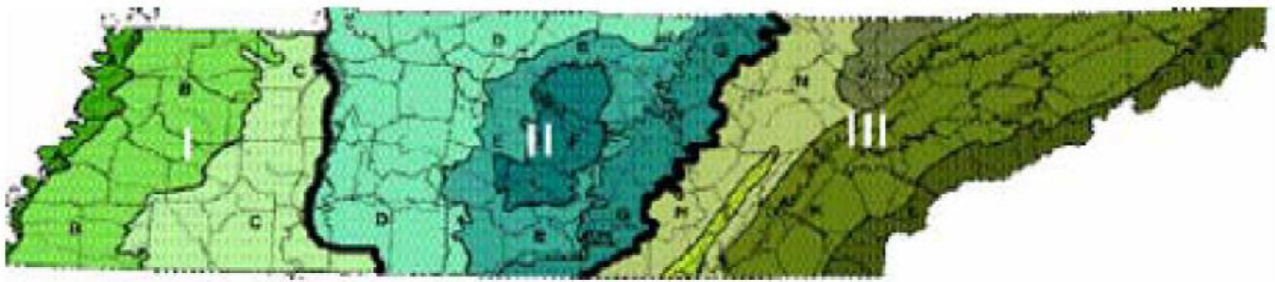


Figure 7.9-1: TN Planting Regions

Table 7.9-1 Preferred seed mixes using natives or naturalized plants and planting dates.**non-native but do not spread.*

Zone		Best	Marginal	Preferred Rate/Mix (lb/ac PLS)
Region I	Poorly drained soils	Feb 1 – Mar 20 Sept 1 – Sept 30	Mar 20 – Apr 30 Sept 30 – Oct 31	15 Browntop millet* (nurse crop) 2 switch grass 4 little bluestem 4 Virginia wild rye 4 purpletop 2 partridge pea 2 black-eyed susan
	Well drained soils	Apr 1 – July 15		15 Browntop millet* (nurse crop) 4 little blue stem 4 purpletop 2 sideoats gramma 2 partridge pea 2 black-eyed susan
	High maintenance	Apr 1 – July 15		15 Browntop millet* (nurse crop) 2 partridge pea 45 Red fescue* 45 hard fescue* 25 chewing fescue*
Region II	Low maintenance; Slopes and Poor, shallow soils	Aug 25 – Sept 15 Feb 15 – May 30	Sept 15 – Oct 25 Mar 21 – May 30	15 Browntop millet* (nurse crop) 5 little bluestem 2 switch grass 2 tall dropseed 5 sideoats gramma 2 black-eyed susan 2 partridge pea 1 greyheaded coneflower
	Low maintenance; Moderate slopes; soils >6 in. depth	Aug 25 – Sept 15 Feb 15 – May 30	Sept 15 – Oct 25 Mar 21 – Apr 15	15 Browntop millet* (nurse crop) 5 purpletop 5 little bluestem 5 Virginia wild rye 2 black-eyed susan 2 partridge pea 1 greyheaded coneflower
	High maintenance	Aug 30 – Oct 15	Feb 15 – Apr 15	15 Browntop millet* (nurse crop) 2 partridge pea 45 Red fescue* 45 hard fescue* 25 chewing fescue*
Region III	>2500 ft elevation; steep slopes	Mar 20 – Apr 30	Aug 15 – Aug 30 Mar 1 – Mar 20 Apr 20 – June 15	15 Browntop millet* (nurse crop) 5 purpletop 10 little bluestem 10 Indian grass
	<2500 ft elevation; steep slopes	Aug 15 – Sept 1 Mar 1 – Apr 1	Sept 1 – Sept 15 Apr 1 – June 10	2 black-eyed susan 0.5 monarda (bergamot) 4 Maryland senna

Region III <i>cont'd</i>	>2500 ft elev.; Shallow soils	Mar 20 – Apr 20	Aug 15 – Aug 30 Mar 5 – Mar 20 April 20 – June 15	15 Browntop millet* (nurse crop) 4 purpletop 10 little bluestem 10 broomsedge 2 partridge pea 2 black-eyed susan 0.5 monarda (bergamot)
	<2500 ft elev.; Shallow soils	Aug 15 – Sept 1 Mar 1 – Apr 1	Sept 1 – Sept 15 Apr 1 – June 10	
	>2500 ft. elev.; Moderate slopes	Mar 20 – Apr 20	Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – June 15	15 Browntop millet* (nurse crop) 4 purpletop 10 little bluestem 10 Indian grass 2 black-eyed susan 0.5 monarda (bergamot) 4 Maryland senna
	<2500 ft. elev.; Moderate slopes	Aug 15 – Sept 1 Mar 1 – Apr 1	Sept 1 – Sept 15 Apr 1 – June 10	
	>2500 ft elev.; High maintenance	Mar 20 – Apr 20	Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – June 15	15 Browntop millet* (nurse crop) 45 Red fescue* 45 hard fescue* 25 chewing fescue*
	<2500 ft elev.; High maintenance	Aug 15 – Sept 1 Mar 1 – Apr 1	Sept 1 – Sept 15 Apr 1 – June 10	

In Table 7.9-1, the bold dates are the preferred dates for seeding. Also, high maintenance areas include lawns and other grassed areas that will be maintained for aesthetics.

Table 7.9-2 Allowable seed mixes and planting dates.

	Zone	Best	Marginal	Rate/Mix (lb/ac PLS)
Region I	Poorly drained soils	Feb 1 – Mar 20 Sept 1 – Sept 30	Mar 20 – Apr 30 Sept 30 – Oct 31	80 Pensacola bahiagrass 30 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	Well drained soils	Apr 1 – July 15		50 Pensacola bahiagrass 15 Bermudagrass (hulled) 30 Korean lespedeza** 15 Foxtail millet**
	High maintenance	Apr 1 – July 15		40 Bermudagrass (hulled)
Region II	Low maintenance; Slopes and Poor, shallow soils	Aug 25 – Sept 15 Feb 15 – Mar 21	Sept 15 – Oct 25 Mar 21 – Apr 15	100 Pensacola bahiagrass 40 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	Low maintenance; Moderate slopes; soils >6 in. depth	Aug 25 – Sept 15 Feb 15 – Mar 21	Sept 15 – Oct 25 Mar 21 – Apr 15	80 Pensacola bahiagrass 30 Bermudagrass (hulled) 20 Korean lespedeza** 10 Kobe lespedeza**
	High maintenance	Aug 15 – Oct 15	Feb 15 – Apr 15	200 KY 31 fescue**

Region III	>2500 ft elevation; steep slopes	July 25 - Aug 15 Mar 20 – Apr 20	July 15 – July 25 Aug 15 – Aug 30 Mar 1 - Mar 20 Apr 20 – May 15	100 KY 31 fescue** 20 Kobe lespedeza** 10 Korean lespedeza** 5 Redtop
	<2500 ft elevation; steep slopes	Aug 15 – Sept 1 Mar 1 – Apr 1	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	
	>2500 ft elev.; Shallow soils	July 25 - Aug 15 Mar 20 – Apr 20	July 15 – July 25 Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – May 15	40 KY 31 Fescue** 10 Korean lespedeza** 10 Redtop 10 Crown vetch**
	<2500 ft elev.; Shallow soils	Aug 15 – Sept 1 Mar 1 – Apr 1	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	
	>2500 ft. elev.; Moderate slopes	July 25- Aug 15 Mar 20 – Apr 20	July 15 – July 25 Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – May 15	60 KY 31 fescue** 15 Korean lespedeza** 15 Kobe lespedeza**
	<2500 ft. elev.; Moderate slopes	Aug 15 – Sept 1 Mar 1 – Apr 1	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	
	>2500 ft elev.; High maintenance	July 25 - Aug 15 Mar 20 – Apr 20	July 15 – July 25 Aug 15 – Aug 30 Mar 5 – Mar 20 Apr 20 – May 15	200 KY 31 fescue**
	<2500 ft elev.; High maintenance	Aug 15 – Sept 1 Mar 1 – Apr 1	July 25 – Aug 15 Sept 1 – Sept 15 Apr 1 – May 10	



Figure 7.9-2 Typical Seed

Roundstone Native Seed, LLC
9764 Raider Hollow Road, Upton, KY 42784

Kind: Switchgrass		Lot No: 11074	
Variety:	Cave-in-Rock	Inert Matter:	1.78
Origin:	KY	Weed Seeds:	0.00
Test Date:	02/12	Crop Seeds:	0.00
Pure Seed:	98.22	Hard Seed:	0.00
Total Germ:	95.32	Germ:	95.32
Pure Live Seed:	93.62	Noxious:	0.00

Seeding rates: Seed rates in Table 7.9-1 are based upon Pure Live Seed (PLS), which is the product of the purity shown on the seed tag multiplied by the germination. The PLS for the seed tag shown in Figure 7.9-2 would be $0.9362 \times 0.95 = 0.89$. Thus only 89% of the seed are considered live. If the plan calls for a seed rate of 2 lb/acre of switchgrass find the actual seed rate for the conditions shown on the tag. Actual seed rate required is $2 \text{ lb/ac} / 0.95 \text{ PLS} = 2.15 \text{ lb/acre}$. In other words, to get an actual rate of 2 lb. per acre it will require 2.15 lb. of seed.

Temporary seed may be required when seeding outside of the preferred seeding dates. See Section 7.8 for more information on temporary seeding.

Construction Specifications

Grading and Shaping: Grading and shaping may not be required where hydraulic seeding and fertilizing equipment is to be used. Vertical banks shall be sloped to enable plant establishment.

When conventional seeding and fertilizing are to be done, grade and shape the slope, where feasible and practical, so that equipment can be used safely and efficiently during seedbed preparation, seeding, mulching, and maintenance of vegetation.

Concentrations of water that could cause excessive soil erosion should be diverted to a safe outlet. Diversions and other treatment practices must conform to the appropriate standards and specifications.

Plant Selection: Only certified seed shall be used. Refer to Table 7.9-1 for suggested species. Grass type should be selected on the basis of species characteristics; site and soil conditions; planned use and maintenance of the area; time of year of planting, method of planting; and the needs and desires of the land user.

Plant selection may also include annual companion crops. Annual companion crops should be used only when the perennial species are not planted during their optimum planting period. Care should be taken in selecting companion crop species and seeding rates because annual crops will compete with perennial species for water, nutrients, and growing space. A high seeding rate of the companion crop may prevent the establishment of perennial species.

Ryegrass shall not be used in any seeding mixtures containing permanent, perennial species due to its ability to out-compete desired species chosen for permanent perennial cover. However, crimson, clover, oats and winter wheat can be planted any time of the year and are recommended as a cover crop with native perennial species.

Topsoil: Topsoil should be replaced on all areas to be seeded. See Practice 7.3 for more information on the removal, storage and reapplication of topsoil.

Seedbed Preparation: When conventional seeding is to be used, topsoil should be applied to any area where the disturbance results in subsoil at the final grade surface. Figure 7.9-3 provides guidance on the volume of topsoil required to provide specific topsoil depths. Soil pH should be above 5 – preferably between 6.0 and 6.5. Soil on the site should be tested to determine lime and fertilizer rates. Soil should be submitted to a soils specialist or County Agricultural Extension agent for testing and soil amendment recommendations. In the absence of soil test results, the following application rates can be used:

- **Ground agricultural limestone:**

- Light-textured, sandy soils: 1- 1 1/2 tons/acre

- Heavy-textured, clayey soils: 2-3 tons/acre

- **Fertilizer:**

- Grasses: 800-1200 lb/acre of 10-10-10 (or the equivalent)

- Grass-legume mixtures: 800-1200 lb/acre of 5-10-10 (or the equivalent)

Broadcast Seeding:

- Seedbed preparation may not be required where hydraulic seeding equipment is to be used.
- Tillage, at a minimum, shall adequately loosen the soil to a depth of 4 to 6 inches; alleviate compaction; incorporate topsoil, lime, and fertilizer; smooth and firm the soil; allow for the proper placement of seed, sprigs, or plants; and allow for the anchoring of straw or hay mulch if a crimper is to be used.
- Tillage may be done with any suitable equipment.
- Tillage should be done parallel to the contour where feasible.
- On slopes too steep for the safe operation of tillage equipment, the soil surface shall be pitted or trenched across the slope with appropriate hand tools to provide consecutive beds, 6 to 8 inches apart, in which seed may lodge and germinate. Hydraulic seeding may also be used.

Depth (Inches)	Per 1,000 Square Feet	Per Acre
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	537
5	15.5	672
6	18.6	806

7.9-3 Cubic yards of topsoil required to attain various soil depths

Inoculants: Native legume seeds do not need to be inoculated. All non-native legume seed shall be inoculated with appropriate nitrogen fixing bacteria. The inoculants shall be pure culture prepared specifically for the seed species and used within the dates on the container. A mixing medium recommended by the manufacturer shall be used to bond the inoculants to the seed. For conventional seeding, use twice the amount of inoculants recommended by the manufacturer.

No-Till Seeding: No-till seeding is permissible into annual cover crops when planting is done following maturity of the cover crop or if the temporary cover stand is sparse enough to allow adequate growth of the permanent (perennial) species. No-till seeding shall be done with appropriate no-till seeding equipment. The seed must be uniformly distributed and planted at the proper depth. Native grasses respond very well to drill seeding at a depth of one-fourth inch.

Mulch: Straw mulch is required for all permanent vegetation applications and must be applied immediately after the application of seed. The application rate for mulch is 2 tons per acre with overall uniform soil coverage of 70%. All mulch must be anchored. See Practice 7.6 for more information on straw mulch.

**Maintenance
and Inspection
Points**

Any areas that have washed out due to high stormwater flows, areas that have been disturbed by blowing wind, and areas that do not show good germination should be retreated.

Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

Reseeding: If a stand has inadequate cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed preparation or over-seed the stand. Consider seeding temporary, annual species if the time of year is not appropriate for permanent seeding.

References

North Carolina Erosion and Sediment Control Planning and Design Manual

STABILIZATION PRACTICES

7.10 SOD



STABILIZATION WITH SOD

Definition Permanently stabilizing areas by laying a continuous cover of grass sod.

Purpose To prevent erosion and damage from sediment and runoff by stabilizing the soil surface with permanent vegetation where specific goals might be:

- to establish immediate ground cover,
- protect the soil surface from erosion,
- reduce stormwater runoff,
- to stabilize disturbed areas with a suitable plant material that cannot be established by seed, or
- to stabilize drainageways, channels, and other areas of concentrated flow where flow velocities will not exceed that specified for a grass lining.

Conditions Where Practice Applies This practice is applicable for areas that require immediate and permanent vegetative cover, or where sodding is preferred over other means of grass establishment. Specific applications include:

- Grass swales or waterways carrying intermittent flow.
- Areas around drop inlets.
- Steep critical areas where vegetative cover may be hard to establish.

Planning Considerations Quality turf can be established with either seed or sod; site preparation for the two methods is similar. The practice of sodding for soil stabilization eliminates both the seeding and mulching operations, and is a much more reliable method of producing adequate cover and sediment control. However, compared to seed, sod is more expensive, difficult to obtain, transport, and store.

Advantages of properly installed sod include:

- immediate erosion and dust control,

- nearly year-round establishment capability,
- less chance of failure than with seedings,
- less weeds, and
- rapid stabilization of surfaces for traffic areas, channel linings, or critical areas.

Sod can be laid during times of the year when seeded grasses may fail, provided there is adequate water available for irrigation in the early weeks. Irrigation is essential, at all times of the year, to install sod. It is initially more costly to install sod than to plant seed. However, the higher cost may be justified for specific applications where sod performs better than seed.

In waterways and channels that carry concentrated flow, properly pinned sod is preferable to seed because it provides immediate protection. For channel design, refer to Section 7.27. Drop inlets placed in areas to be grassed can be protected from sediment by placing permanent sod strips around the inlet. Sod also maintains the necessary grade around the inlet.

Because sod is composed of living plants that must receive adequate care, final grading and soil preparation should be completed before sod is delivered. If left rolled or stacked, heat can build up inside the sod, causing severe damage and loss of costly plant material.

Design Criteria

Choosing appropriate types of sod: The type of sod selected should be composed of plants adapted to both the site and the intended purpose. A complete and current listing of sod recommendations can be obtained from suppliers or the State Agricultural Extension office. Sod composed of a mixture of varieties may be preferred because of its broader range of adaptability. Sod that consists of native species is preferred if available.

In general, warm season grasses such as bermudagrass sod should be used in West TN and cool season grasses such as fescue sod should be used in East TN. Both can be used in Middle TN, with warmer season grasses in southern Middle TN and cooler season grasses in northern Middle TN.

Construction Specifications

Quality of sod: Use only high-quality sod of known genetic origin, free of noxious weeds, disease, and insect problems. It should appear healthy and vigorous, and conform to the following specifications:

- Sod should be machine cut and contain $\frac{3}{4}$ " of soil, not including shoots or thatch.
- Sod should not have been cut in excessively wet or dry weather.
- Sod should be cut to the desired size. Torn or uneven pads should be rejected.
- Harvest, delivery, and installation of sod should take place within a period 36 hours.
- Sections of sod should be strong enough to support their own weight and retain their size and shape when lifted by one end.
- Avoid planting when subject to frost heave or hot weather if irrigation is not available.

Soil Preparation: Bring the soil surface to final grade. Clear surface of trash, woody debris, stones and clods larger than 1". Fill or level low spots in order to avoid standing water. Mix fertilizer and/or lime into soil surface where necessary. See Section 7.9 for more information on soil amendments.

Installation:

- Moistening the sod after it is unrolled helps maintain its viability. Store it in the shade during installation.
- Rake the soil surface to break the crust just before laying sod. During the summer, lightly irrigate the soil, immediately to cool the soil, reduce root burning, and dieback.
- Ensure that the sod is in good contact with the prepared soil surface.
- Do not stretch the sod strips. Instead, maintain the shape of the sod and cut pieces to fit rather than stretching sections.
- Do not install sod on gravel, frozen soils, or soils that have been treated recently with sterilants or herbicides.
- Lay the first row of sod in a straight line with subsequent rows placed parallel to and butting tightly against each other. Stagger strips in a brick-like pattern (see Figure 7-7.10-1). Be sure that the sod is not stretched or overlapped and that all joints are butted tightly to prevent voids.
- Install strips of sod with their longest dimension perpendicular to the slope. On slopes 3:1 or steeper, or wherever erosion may be a problem, secure with pegs or staples.
- As sodding of clearly defined areas is complete, roll sod to provide firm contact between roots and soil.
- After rolling irrigate until the soil is wet 4" below the sod.
- Keep sodded area moist to a depth of 4" until the grass takes root. This can be determined by gently tugging on the sod.
- Mowing should not be attempted until the sod is firmly rooted, usually 2-3 weeks.

Sodded Waterways: The sod must be able to withstand the flow velocity specified in the channel design. Lay sod strips perpendicular to the direction of flows, with the lateral joints staggered in a brick-like pattern. Edges should be butted tightly together.

1. Sodded slopes may require pinning to prevent sod from sliding while it is getting established.



Figure 7-7.10-1. Correct sod placement

**Maintenance and
Inspection
Points**

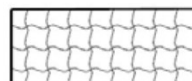
After the first week, water as necessary to maintain adequate moisture in the root zone and prevent the sod from going dormant. Grass height should not be cut to less than 2" to 3". Re-sod areas where an adequate stand of sod is not obtained.

References

North Carolina Erosion and Sediment Control Planning and Design Manual

STABILIZATION PRACTICES

7.11 ROLLED EROSION CONTROL PRODUCTS



ROLLED EROSION CONTROL
PRODUCT

Definition	Rolled erosion control products (RECPs) are manufactured sheets of mulch materials (e.g., straw, coir, wood fibers, curled wood, etc.) that are bound into netting composed of either photodegradable synthetic or natural materials. They are usually delivered to a construction site in rolls which are then installed as a protective covering designed to protect soil and hold seed and mulch in place on slopes and in channels so that vegetation can become well established. This section only addresses RECPs applied to slopes. RECPs as channel linings are covered in Section 7.27 Channels.
Purpose	To reduce soil erosion and assist in the growth, establishment and protection of temporary or permanent vegetation on steep slopes.
Conditions Where Practice Applies	RECPs can be applied to steep slopes where erosion hazards are high and conventional seeding is likely to be too slow in providing adequate protective cover. RECPs shall be applied to cut or fill slopes of 2.5:1 or steeper with a height of 10 feet or greater in need of protection during establishment of temporary or permanent ground cover.
Planning Considerations	<p>There are many types of erosion control nets and blankets on the market that may be appropriate in certain circumstances. In general, most nets require mulch in order to prevent erosion because they have a fairly open structure. Blankets typically do not require mulch because they usually provide complete protection of the surface.</p> <p>Good ground contact is critical to the effectiveness of these products. If good ground contact is not achieved, runoff can concentrate under the product, resulting in significant erosion. It is preferred that loose woven netting made with natural fibers be used.</p> <p>Most netting used with blankets is photodegradable, meaning they break down under sunlight (not UV stabilized). However, this process can take months or years even under bright sun. Once vegetation has established, sunlight does</p>

not reach the mesh. It is not uncommon to find non-degraded netting still in place several years after the installation. This can be a problem if maintenance requires the use of mowers or ditch cleaning equipment. In addition, birds and small animals can become trapped in the netting.

Biodegradable blankets are available for use in sensitive areas. These organic blankets are usually held together with a fiber mesh and stitching which may last up to one year.

Design Criteria Formal design of RECPs applied to slopes is not required. However, for each location erosion control blankets are used, the type of blanket should be indicated in the EPSC Plans.

The use of erosion control blankets on cut or fill slopes may be considered for the following conditions:

- In flat or rolling terrain, on 2H:1V or 3H:1V fill slopes and/or 2H:1V or 3H:1V cut slopes (in soils) that are 20 feet or greater in height;
- In mountainous or hilly terrain, 2H:1V or 3H:1V fill slopes and/or 2H:1V or 3H:1V cut slopes (in soils) that are 30 feet or greater in height;
- On slopes built of highly erodible soils such as sandy/loess soils in West Tennessee;
- On slopes running adjacent to a stream or adjacent to a large ditch or channel that empties directly into high-quality or sediment-impaired waters near the roadway construction;
- At point of stormwater runoff concentration where off-site runoff threatens stability of cut slopes.

On sites with flat slopes or short slope lengths, it may be possible to substitute mulch control netting or open weave textiles for erosion control blanket, based on economic considerations.

In addition to the above criteria, the designer should consider the design life of the erosion control blanket. The designer should ensure that it is possible for the permanent vegetation to become well established before the degradable portions of the blanket have degraded to the point that their resistance to erosion is significantly reduced.

Construction Specifications Even if properly designed, if not properly installed, erosion control blankets will likely not function as desired. Proper installation is imperative. Even if properly installed, if not properly timed and nourished, vegetation will likely not grow as desired. Proper seed/vegetation selection is also imperative.

Grade the surface of installation areas so that the ground is smooth and soil loose. When seeding prior to installation, follow the steps for seed bed preparation, soil amendments, and seeding. All gullies, rills, and any other disturbed areas must be fine graded prior to installation. Spread seed before blanket installation. **(Important:** Remove all large rocks, dirt clods, stumps, roots, grass clumps, trash, and other obstructions from the soil surface to allow for direct contact between the soil

surface and the blanket.) Terminal anchor trenches are required at blanket end. Terminal anchor trenches should be a minimum of 12 inches in depth and 6 inches in width.

Installation for Slopes: Place the blanket 2-3 feet over the top of the slope and into an excavated end trench measuring approximately 12 inches deep by 6 inches wide. Pin the blanket at 1 foot intervals along the bottom of the trench, backfill, and compact. Unroll the blanket down (or along) the slope maintaining direct contact between the soil and the blanket. Overlap adjacent rolls a minimum of 3 inches. Pin the blanket to the ground using staples or pins in a 3 foot center-to-center pattern or as recommended by manufacturer.

Anchoring Devices: 11 gauge, at least 6 inches length by 1 inch width, staples or 12 inch minimum length wooden stakes are recommended for anchoring the blanket to the ground.

Drive staples or pins so that the top of the staple or pin is flush with the ground surface. Anchor each blanket every 3 feet along its center. Longitudinal overlaps must be sufficient to accommodate a row of anchors and uniform along the entire length of overlap and anchored every 3 feet along the overlap length. Roll ends may be spliced by overlapping 1 foot (in the direction of water flow), with the upstream/upslope mat placed on top of the downstream/downslope blanket. This overlap should be anchored at 1 foot spacing across the blanket. When installing multiple width mats heat seamed in the factory, all factory seams and field overlaps should be similarly anchored.

Maintenance and Inspection Points

Good contact with the ground must be maintained, and erosion must not occur beneath the blanket.

Any areas of the blanket that are damaged or not in close contact with the ground shall be repaired and stapled.

If erosion occurs due to poorly controlled drainage, the problem shall be fixed and the eroded area repaired.

Monitor and repair the blanket as necessary until ground cover is established. Inspections should include walking across the slope to check for erosion gullies that can be felt rather than seen.

References

TDOT Design Division Drainage Manual

TDOT Erosion Control Standard Drawing EC-STR-34

North Carolina Erosion and Sediment Control Planning and Design Manual

POLLUTION PREVENTION

7.16 CONCRETE WASHOUT



CONCRETE WASHOUT

Definition	A designated area where concrete wash can harden, can be broken up, and can then be placed in the dumpster or backfilled.
Purpose	To prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite or performing onsite washout in a designated area.
Conditions Where Practice Applies	<p>Concrete washout areas are applicable where:</p> <ul style="list-style-type: none">• Concrete trucks and other concrete-coated equipment are washed onsite.• Slurries containing portland cement concrete or asphalt concrete are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.• Washing of exposed aggregate concrete.• Building or house construction mortar mixer waste
Planning Considerations	There are two main types of concrete washouts to be considered, prefabricated washout containers and site-built washouts.

PREFABRICATED WASHOUT CONTAINERS

Many private companies offer heavy-duty, prefabricated concrete washout containers that are delivered to the site. Some services provide only the containers while others also provide the maintenance and disposal of the materials. Utilizing full-service concrete washout companies removes much of the burden from the jobsite superintendent and tends to result in a more maintained washout facility. When selecting a company to handle concrete waste, ensure that they are properly disposing of all materials. If the project utilizes a concrete pump truck, the prefabricated container should have an adequate ramp to accommodate the concrete pump truck.

SITE-BUILT WASHOUTS

There are many design options for the site-built washout, but preference should be given to those built below-grade to prevent breaches and reduce the likelihood of runoff. Above-grade structure can also be used if they are sized properly to avoid spillage, constructed properly to prevent leaks, and diligently maintained.

An important factor that dictates the success of concrete washout facilities is whether or not concrete truck drivers and subcontractors are educated on the use of the washout facilities. The site superintendent should educate all appropriate parties on proper use of concrete washout facilities. Signs should be posted indicating the location and designated use of the facilities.

Design Criteria When using prefabricated washout containers, ensure containers can withstand heavy impacts and are watertight.

Site-built washouts should be constructed by providing a temporary pit or bermed area sized large enough to handle solids, wash slurry, and rainfall to prevent overflow and include a minimum of 4" freeboard. Above-grade washouts should allow adequate at least 4" of freeboard for structural stability of berms or containment walls. The temporary pit containing dry waste concrete may be incorporated into fill areas as needed. The waste concrete may be broken into smaller pieces to allow proper soil compaction. The storage area should be lined with geotextile fabric to allow water to infiltrate, further aiding the dewatering and drying process.

Consideration should be given to locating washout facilities. The designer should included suggested concrete washout areas on all applicable SWPPPs. Each facility should be located conveniently for concrete trucks, preferably near the area where concrete is being poured, and away from heavy volume construction traffic or access areas to prevent disturbance or tracking. Facilities should also be located a minimum of 50 feet away from storm drains, open ditches, and waterbodies. Appropriate gravel or rock should cover paths to concrete washout facilities if the facilities are located in undeveloped areas.

On large sites with extensive concrete work, concrete washouts should be located in multiple areas for ease of use.

Construction Specifications

- The storage pit area should be lined with a permeable geotextile fabric.
- Do not allow runoff from the storage area. Construct a temporary pit or bermed area large enough to contain anticipated slurry amount, solid waste, and direct rainwater.
- Wash out wastes into the temporary pit where the concrete can set, be broken up, and then disposed properly.
- Avoid creating runoff by draining water to a bermed or level area when washing concrete to remove fine particles and expose the aggregate.

**Maintenance
and Inspection
Points**

Ensure contractors avoid mixing excess amounts of fresh concrete and perform washout of concrete trucks offsite or in designated areas only. Do not allow concrete trucks to wash into storm drains, open ditches, streets, or streams. Do not allow excess concrete to be dumped onsite, except in designated areas. Do not wash sweepings from exposed aggregate concrete into the street or storm drains.

Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 inches for above grade facilities and 12 inches for below grade facilities. Inspect plastic linings and sidewalls of site-built washouts to ensure they have not been damaged during construction activities. Inspect all surfaces of prefabricated washouts to ensure the container is not leaking.

Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

Inspectors should note whether washout facilities are being used and maintained regularly. If inspector finds that concrete trucks are being washed out in locations other than designated washout areas, the inspector should notify the site superintendent immediately and the site superintendent should correct the issue.

References

California Stormwater BMP Handbook

City of Knoxville Best Management Practices Manual

Hamilton County, TN BMP Manual

EPA National Pollutant Discharge Elimination System Concrete Washout

RUNOFF CONTROL AND MANAGEMENT

7.25 TUBES AND WATTLES



Definition	A small temporary barrier, grade control structure or dam constructed across a swale, drainage ditch, or area of concentrated flow.
Purpose	To minimize the erosion rate by reducing the velocity of storm water in areas of concentrated flow, and to capture larger soil particles.
Conditions Where Practice Applies	This practice is applicable in a ditch to help reduce the effects of soil erosion and aid in sediment retention. Sediment tubes and wattles should not be used in streams.
Planning Considerations	The stability of tubes and wattles is very dependent upon proper staking. Thus, they may not be utilized on pavement, rocky soil or at any location where the stakes cannot be driven to the required depth.
Design Criteria	<p>The maximum drainage area to any given tube or wattle should be no more than 5 acres. When applied in a ditch, the same design requirements as rock check dams apply. The depth of flow on the center of the wattle or tube (weir) shall be computed for the peak flow rate generated by the 2-year, 24-hour storm in order to ensure that the top of the structure and ditch will not be overtopped. For sites draining to high quality streams or streams listed as impaired by sediment, the depth must be determined for the 5-year, 24-hour peak flow rate. The weir section must be at least 9 inches deep. See Table 7.25-1 for the minimum spacing for ditch applications.</p> <p>Joints within a ditch section should be avoided. However, where joints are necessary, a second row of tubes or wattles is required with the joints staggered by a distance equal to half of the individual segment length.</p> <p>Tube/wattle netting should be a knitted material with 1/8 to 3/8 inch openings and made of photodegradable (polypropylene, HDPE) or biodegradable (cotton, jute, coir) material. The minimum diameter for any tube or wattle applied in a ditch should be 12 inches. This will ensure that the tube will function effectively as a velocity control device.</p>

Slope (%)	Maximum Tube/ Wattle Spacing (ft.)
< 2	125
2	100
3	75
4	50
5	40
6	30
> 6	25

Table 7.25-1 Maximum Spacing for Wattles/Tubes in Ditch Application (Source: TDOT)

Construction Specifications

Proper site preparation is essential to ensure tubes and wattles are in complete contact with the underlying soil surface. Remove all rocks, clods, vegetation or other obstructions so installed tubes and wattles have direct contact with the underlying soil surface.

Install tubes and wattles by laying them flat on the ground. Install stakes at spacings per the manufacturer's recommendation. Stakes should be installed on the downstream side of the wattles/tubes.

Install tubes so no gaps exist between the soil and the bottom of the tube.

Keep tubes in place until the contributing drainage area has been stabilized.

The ends of the wattle or tube must extend up the ditch side slopes at least 6" vertical above the weir flow depth (see Figure 7.25-1 below).

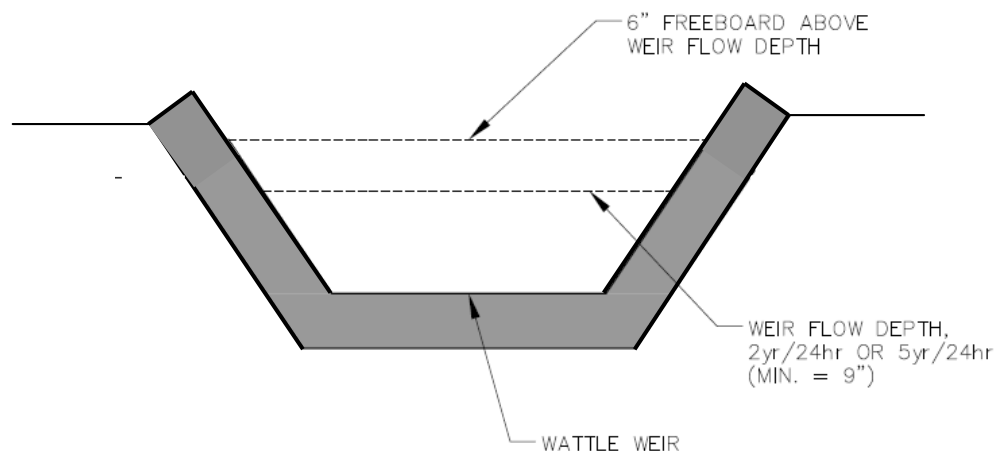


Figure 7.25-1 Cross sectional view of wattle installed in ditch

**Maintenance
and Inspection
Points**

- Inspect wattles and tubes after installation for gaps under the tubes and for gaps between the joints of adjacent ends of tubes. Ensure stakes are on the downstream side.
- Repair all rills, gullies, and undercutting near tubes.
- Remove all sediment deposits when the sediment reaches 1/3 the height of the exposed tube.
- Remove and/or replace installed sediment tubes as required to adapt to changing construction site conditions.
- Most tubes and wattles are filled with biodegradable materials. When the fill materials degrade and settle, the wattle should be replaced.
- At the end of the project, biodegradable wattles and tubes can be split open, the netting material and stakes removed, and the biodegradable material left in place to aid stabilization.

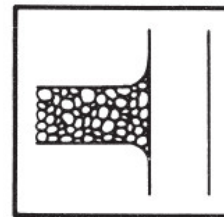
References *TDOT Design Division Drainage Manual*

TDOT Erosion Control Standard Drawing EC-STR-31

South Carolina Department of Health & Environmental Control Stormwater Management BMP Handbook

SEDIMENT CONTROL PRACTICES

7.28 CONSTRUCTION EXIT



GRAVEL CONSTRUCTION EXIT

Definition	A stone pad on geotextile fabric or a rumble strip located at any point where traffic will be moving from a construction site onto a public roadway or other paved area.
Purpose	To reduce or eliminate the transport of material from the construction area onto a public roadway by providing an area where mud and soil can be removed from the tires of construction vehicles.
Conditions Where Practice Applies	This practice is applicable wherever construction traffic leaves a construction site and enters a public right of way.
Planning Considerations	<p>Construction exits should be planned and installed at any point that construction traffic exits the project. These stone pads should not be placed in areas with hydric or saturated soils.</p> <p>Stormwater management must be considered around the construction exit as well.</p> <p>Avoid steep grades and exits in or near curves in public roads.</p>
Design Criteria	<p>Calculations are not required; however, a typical construction exit should conform to the specifications listed below.</p> <ul style="list-style-type: none"> A layer of geotextile fabric is required to stabilize and support the aggregate. The geotextile fabric should extend the full length and width of the construction exit. The fabric should meet the requirements of the standard specifications for geotextiles, AASHTO designated M-288, erosion control. The stone pad should be constructed from clean, washed stone with a 2 inch to 4 inch gradation at a minimum thickness of 8 inches. At a minimum, the stone pad should be 50 feet long and 20 feet wide. In addition a turning radius of 20 feet should be provided on each side of the pad where it intersects with the public roadway. See Figures 7.28-1 and -2. The area where the pad is to be installed must be undercut at least 3 inches, and then the geotextile fabric should be installed before placing the stone.

Construction Specifications

- Stormwater management around the construction exit must be taken into consideration. If stormwater runoff flows across the stone pad and onto the public right of way, mud on the pad can be washed into the ROW as well. Diversions or waterbars should be installed at the upgradient end of the pad, directing runoff into sediment traps for treatment prior to discharging runoff into the ROW.
- Excavate areas where construction exits are to be constructed to a depth of at least 3 inches and clear the area of all vegetation, roots, and other objectionable material.
- Construction exit areas should be at minimum 50 feet in length by 20 feet in width.
- Install a geotextile underliner across the full width and depth of the construction exit to separate the rock from underlying soil.
- Provide clean, washed stone to a depth of 8 inches. Stone should vary in size from 2 to 4 inches. Rock must be clean rock with no fines. Crusher run and road base are not acceptable materials for a construction exit, as the fines can be tracked out onto the road.

Waterbar Diversion:

On sites where the grade toward the public roadway is greater than 2%, a waterbar diversion 6 to 8 inches in depth with 3:1 side slopes should be constructed at the upper end of the construction exit to prevent stormwater from washing sediment off the construction exit and into the public roadway or storm drain system. See Figure 7.28-1. Other devices, such as berms also may be used to divert stormwater from flowing down the construction exit and onto the public ROW.

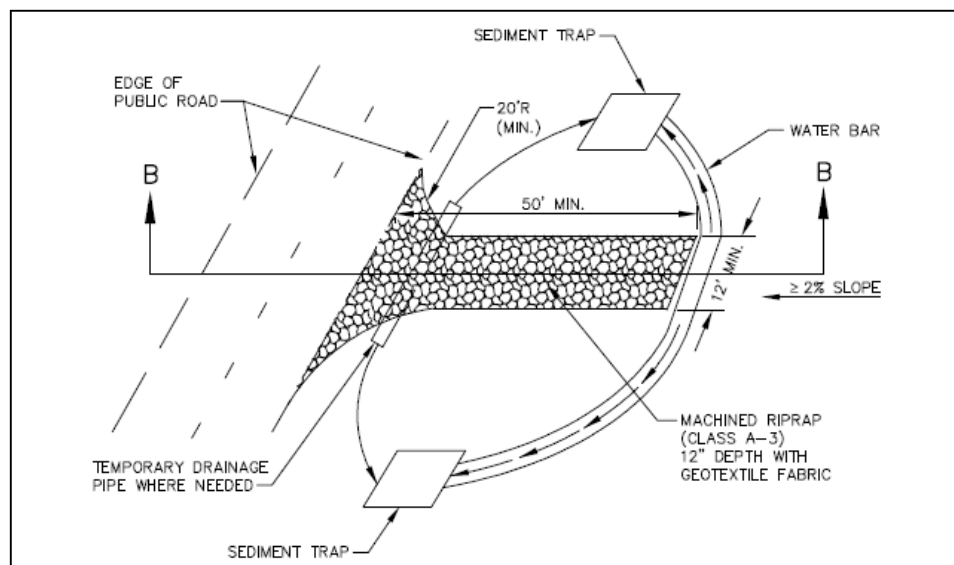


Figure 7.28-1 Construction Exit with Water Bars

**Maintenance
and Inspection
Points**

The exit must be maintained in a condition that will prevent tracking or flow of material onto public rights-of-way or into the storm drain system. This may require periodic top dressing with fresh stone or full replacement of stone as conditions demand, and repair and/or cleanout of any related diversions and sediment traps. All materials spilled, dropped, washed, or tracked from vehicles or site onto roadways or into storm drains must be removed by the end of the day.

References

TDOT Design Division Drainage Manual

North Carolina Erosion and Sediment Control Planning and Design Manual

SEDIMENT CONTROL PRACTICES

7.34 SILT FENCE



SILT FENCE

Definition A temporary sediment control measure, composed of woven geotextile fabric supported by steel or wood posts, used to intercept sediment transported from areas where runoff occurs as sheet flow.

Purpose To prevent sediment carried by sheet flow from leaving the site and entering natural drainage ways or storm drainage systems by slowing storm water runoff, causing ponding and the deposition of sediment at the structure. Silt fence does not filter sediment.

Conditions Where Practice Applies Silt fence may be used in a variety of locations including:

- at the toe of, or on, an exposed slope
- around the perimeter of an exposed construction site
- along the banks of ditches or swales
- around the perimeter of a soil stockpile
- around buffer areas

Silt fence shall not be installed across streams, ditches, waterways, or other concentrated flow areas.

Planning Considerations Silt fence is a system to retain sediment on the construction site. The fence retains sediment primarily by retarding flow and promoting deposition. In operation, the geotextile silt fence material ponds runoff behind it, as the flow rate through the geotextile is often much lower than the flow rate of the runoff coming to the silt fence. Ponding behind the silt fence is necessary to encourage sediment settling. The designer should anticipate ponding and provide sufficient storage areas and overflow outlets to prevent flows from overtopping the fence. Since silt fence is not designed to withstand high water levels, locate them so that only shallow pools can form. Tie the ends of silt fence into higher ground to prevent flow around the end of the fence before the pool reaches design level. Silt fence should be curled uphill

on each end of the fence in a “J” pattern to prevent end flow and scour. Provide stabilized outlets to protect the fence system and release storm flows that exceed the design storm.

Deposition occurs as the storage pool forms behind the fence. The designer can direct flows to specified deposition areas through appropriate positioning of the fence or by providing an excavated area behind the fence. Plan deposition areas at accessible points to promote routine cleanout and maintenance.

Silt fence serves no function along ridges or near drainage divides where there is little movement of water. Confining or diverting runoff unnecessarily with a sediment fence may create erosion and sedimentation problems that would not otherwise occur.

Anchoring of silt fence is critical. The toe of the fabric must be anchored in a trench backfilled with compacted earth. Mechanical compaction must be provided in order for the fence to effectively pond runoff.

Design Criteria Silt fence should be installed along the contour, never up or down a slope. This is essential to ensure that the fence will not accidentally concentrate stormwater flows, thus creating worse erosion problems.

Silt fence can be installed without backing or with wire backing.

- The maximum drainage area for a continuous fence without backing shall be 1/4 acre per 100 linear feet of fence length, up to a maximum area of 2 acres. The maximum slope length behind the fence on the upslope side should be 110 feet (as measured along the ground surface).
- The maximum drainage area for a continuous silt fence with backing shall be 1 acre per 150 linear feet of fence length. The slope length above the silt fence with backing should be no more than 300 feet.

Silt fence should be installed so as to be as close as possible to the ground contour. The bottom of the fence at the ground line should be on a 0% grade, plus or minus 0.5%.

When used at the bottom of a slope, silt fence should be installed 5 feet to 7 feet away from the toe to allow extra space for the ponding of water and collection of sediments.

The expected life span of the silt fence is 6 to 12 months. Therefore, projects of long duration may require a complete replacement of the silt fence. The quantity for silt fence to be in place for a long period of time should be based on the assumption that the material will be replaced every 9 months, on the average.

Table 7.34-1 contains the fabric specifications for silt fence with and without backing. For silt fence without backing, posts shall be hardwood posts that are 2.25” (nominal) x 2.25” (nominal) x 58”. T-type steel posts also may be used. Silt fence with backing shall be installed on a minimum of 1.25 lb/ft steel posts with 14 gauge wire backing that has a maximum mesh size of 6 inches. Ensure that steel posts have projections for fastening the fabric.

Table 7.34-1 Silt Fence Fabric Specifications

	Test Material	Without backing	With backing
Geotextile fabric type		Woven slit film	Woven monofilament
Apparent opening size	ASTM D4751	#30 to #70 standard sieve	#70 to #100 standard sieve
Water flux	ASTM D4491	≥ 4 gpm/ft ²	≥ 18 gpm/ft ²
Tensile strength	ASTM D4632	≥ 120 lb. (warp direction) 100 lb. (fill direction)	≥ 310 lb. (warp direction) 200 lb. (fill direction)
UV Stability (after 500 hrs)	ASTM D4355	$\geq 70\%$	$\geq 90\%$
Elongation	ASTM D4632	$\leq 20\%$ max.	---
Burst strength	ASTM D3786	≥ 250 PSI	≥ 400 psi
Puncture strength	ASTM D4833	≥ 60 lb.	≥ 105 lb.
Trapezoidal tear	ASTM D4533	≥ 50 lb (warp direction) 40 lb (fill direction)	≥ 100 lb (warp direction) 60 lb (fill direction)

Construction Specifications

- Ensure that the height of the sediment fence does not exceed 24 inches above the ground surface. Ponding water depth should not exceed 1.5 feet. (Higher fences may impound volumes of water sufficient to cause failure of the structure.)
- Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post or roll the fabric together and fasten to one post to create a stronger joint. Where joints are necessary, plan the roll layout so as not to have joints at low points.
- Do not attach filter fabric to trees.
- When silt fence is installed adjacent to streams, wetlands and other natural resources, silt fence with backing should be used.
- Install posts no more than 6 feet apart.
- Install posts 2 feet deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.
- Securely attach the silt fence fabric to the posts on the **upstream** side of the posts. For steel posts, attach fabric to the posts using wire or plastic zip ties with a minimum 50 pound tensile strength, at least 5 to a post. Three ties should be installed in the upper 8 inches for top strength. Ties should be installed on the diagonal, as opposed to on the horizontal, to grab more strands. For hardwood posts, attach fabric with 17 gauge wire staples (3/4" wide x 1/2" long), at least 5 to a post. 3 staples should be installed in the upper 8 inches for top strength.
- Install J-hooks for confining the water behind the fence and maximizing the trapping efficiency. See Figure 7.34-1 below.

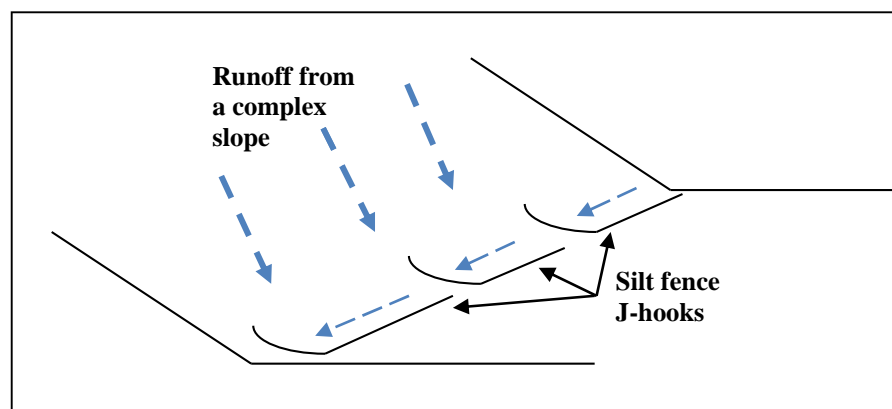


Figure 7.34-1 J-Hook Installation Example

Traditional silt fence trenching method for installation:

- Excavate a trench approximately 4 inches wide and 6 inches deep along the proposed line of posts and upslope from the barrier
- Place 10 inches of the fabric along the bottom and side of the trench. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance. Poor compaction can cause failure of the silt fence along the toe.
- The base of both end posts should be at least one foot higher than the middle of the fence. Check with a level as necessary.

Slicing method for installation:

- A slicing machine can be used to install silt fence. This method of installation provides excellent compaction and joint integrity along the toe.
- Posts should be set a maximum of 6 feet apart.
- The geotextile fabric should be inserted in a slit in the soil 8-12 inches deep. The slit should be created such that a horizontal chisel point, at the base of a soil-slicing blade, slightly disrupts the soil upward as the blade slices through the soil. This upward disruption minimizes horizontal compaction and creates an optimal soil condition for mechanical compaction against the geotextile. The geotextile should be mechanically inserted directly behind the soil-slicing blade in a simultaneous operation, achieving consistent placement and depth. No turning over (plowing) of soil is allowed for the slicing method.

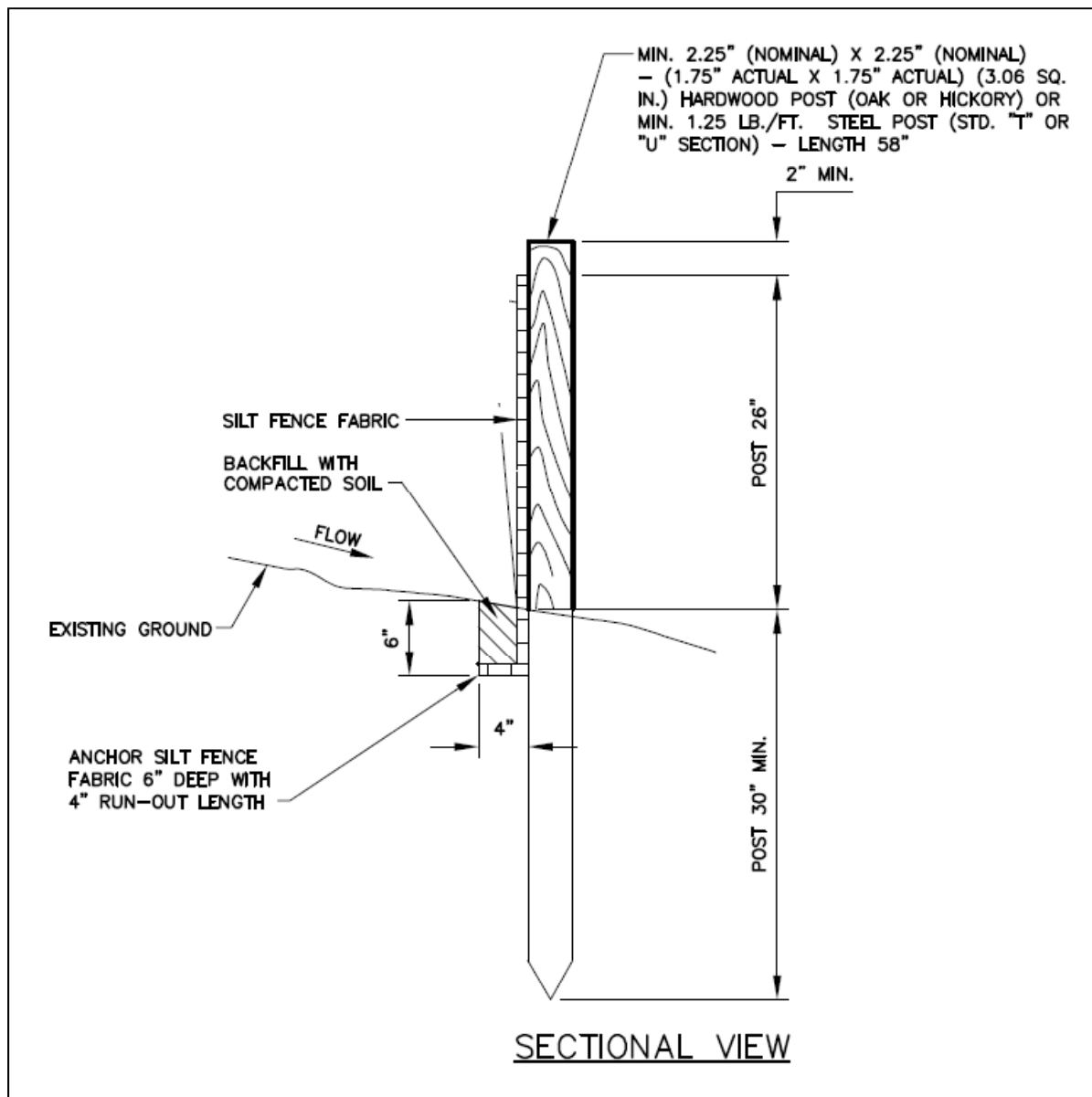


Figure 7.34-2 Silt fence details

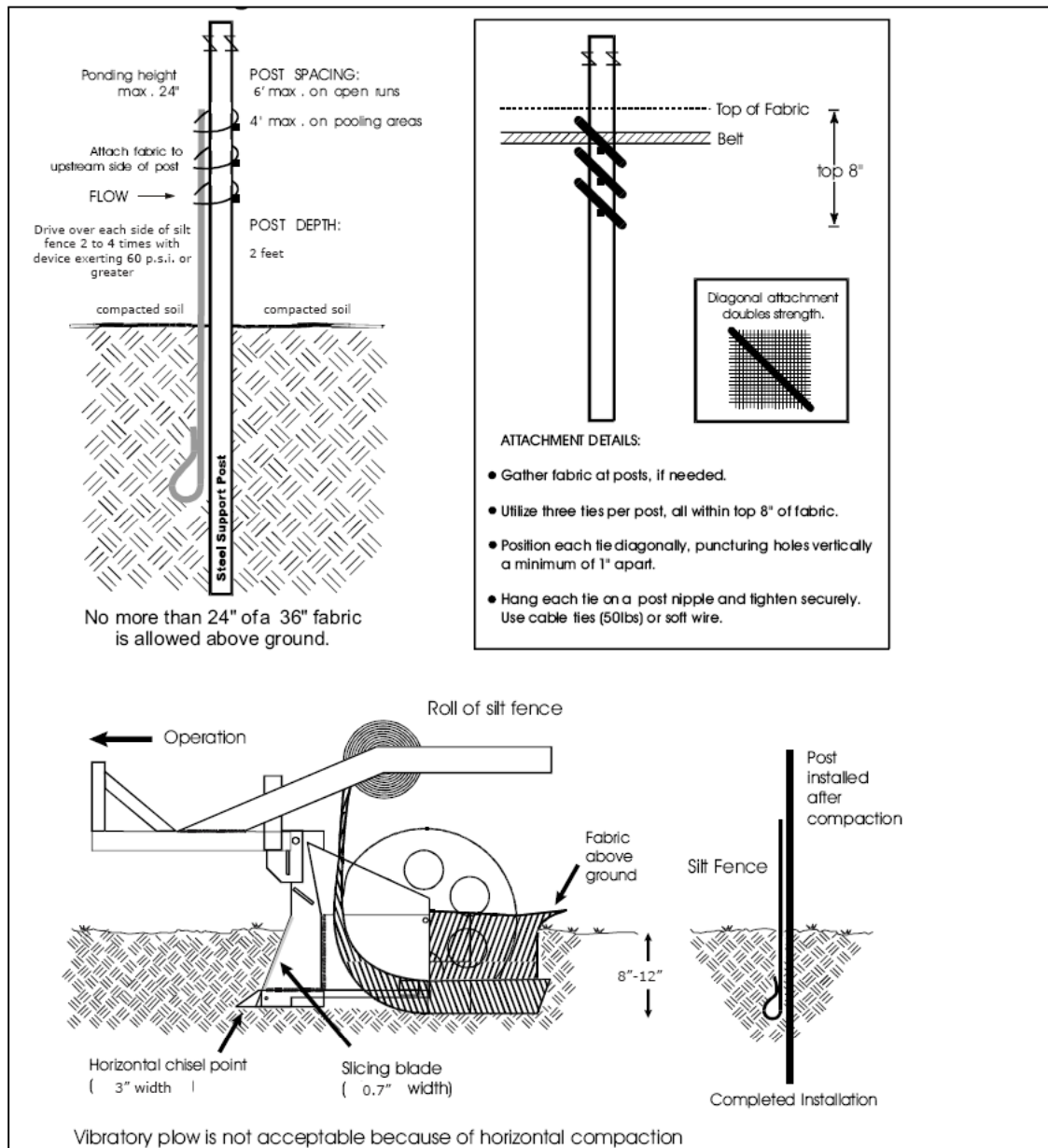


Figure 7.34-3 Silt Fence Slicer Installation Details (*Adapted from Silt Fence That Works*)

**Maintenance
and Inspection
Points**

Remove sediment once it has accumulated to $\frac{1}{2}$ the original height of the barrier.

Replace filter fabric whenever it is worn or has deteriorated to such an extent so that the effectiveness of the fabric is reduced.

All sediment accumulated at the fence should be removed and properly disposed of before the fence is removed.

Repair sagging silt fence to prevent failure or overtopping.

Monitor the toe for evidence of piping or erosion along the toe. Install J-hooks wherever runoff flows along the toe of the fencing to prevent undermining.

Silt fence should remain in place until disturbed areas have been permanently stabilized.

References

TDOT Design Division Drainage Manual

TDOT Erosion Control Standard Drawing EC-STR-3B

North Carolina Erosion and Sediment Control Planning and Design Manual

Devon Distributing Corporation. <http://www.tommy-sfn.com/index.html>

Metropolitan Council (Minnesota) Minnesota Urban Small Sites BMP Manual

APPENDIX “A”

NOTICE OF INTENT

**TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION**

Division of Water Resources

William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-8332 (TDEC)**Notice of Intent (NOI) for General NPDES Permit for Stormwater Discharges from Construction Activities (TNR100000)**

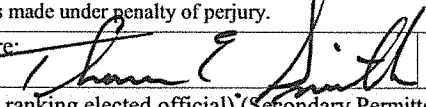
Site or Project Name: North Church LLC S/D Section 4 Phase 3		Existing NPDES Tracking Number: TNR	
Street Address or Location: South of Medical Center Parkway & Greshampark Drive Intersection		Start date: October 2015	
		Estimated end date: October 2018	
Site Activity Description: Commercial Site Development		Latitude (dd.dddd): 35.8645	
		Longitude (dd.dddd): -86.4456	
County(ies): Rutherford	MS4 Jurisdiction: Murfreesboro	Acres Disturbed: 4.47	
		Total Acres: 4.47	
Does a topographic map show dotted or solid blue lines <input type="checkbox"/> and/or wetlands <input type="checkbox"/> on or adjacent to the construction site? If wetlands are located on-site and may be impacted, attach wetlands delineation report. If an Aquatic Resource Alteration Permit has been obtained for this site, what is the permit number? ARAP permit No.:			
Receiving waters: Overall Creek			
Attach the SWPPP with the NOI <input checked="" type="checkbox"/> SWPPP Attached		Attach a site location map <input checked="" type="checkbox"/> Map Attached	

Site Owner/Developer Entity (Primary Permittee - person, company, or legal entity that has operational or design control over construction plans and specifications): C.M. Gatton Trustee

Site Owner/Developer Signatory (V.P. level/higher - individual responsible for site - signs certification below): Tommy Smith		Signatory's Title or Position (V.P. level/higher - signs certification below): Chief Manager	
Mailing Address: 123 N. Church St		City: Murfreesboro	State: TN Zip: 37130
Phone: 615-893-8877	Fax:	E-mail: TS100@bellsouth.net	
Optional Contact:		Title or Position:	
Mailing Address:		City:	State: Zip:
Phone:	Fax:	E-mail:	

Owner or Developer Certification (must be signed by president, vice-president or equivalent, or ranking elected official) (Primary Permittee)

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Owner or Developer Name: (print or type) Tommy Smith	Signature: 	Date: 9/16/15
---	--	----------------------

Contractor(s) Certification (must be signed by president, vice-president or equivalent, or ranking elected official) (Secondary Permittee)

I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated.

Contractor company name (print or type):			
Contractor signatory (print/type): (V.P. level or higher)		Signature:	Date:
Mailing Address:		City:	State: Zip:
Phone:	Fax:	E-mail:	

Other Contractor company name (print or type):			
Other Contractor signatory (print/type): (V.P. level or higher)		Signature:	Date:
Mailing Address:		City:	State: Zip:
Phone:	Fax:	E-mail:	

OFFICIAL STATE USE ONLY

Received Date:	Reviewer:	Field Office:	Permit Number TNR	Exceptional TN Water:
Fee(s):	T & E Aquatic Flora and Fauna:		Impaired Receiving Stream:	Notice of Coverage Date:

Notice of Intent (NOI) for General NPDES Permit for Stormwater Discharges from Construction Activities (TNR100000)

Purpose of this form: A completed notice of intent (NOI) must be submitted to obtain coverage under the Tennessee General NPDES Permit for Discharges of Stormwater Associated with Construction Activity (permit). **Requesting coverage under this permit means that an applicant has obtained and examined a copy of this permit, and thereby acknowledges applicant's claim of ability to be in compliance with permit terms and conditions.** This permit is required for stormwater discharge(s) from construction activities including clearing, grading, filling and excavating (including borrow pits) of one or more acres of land. This form should be submitted at least 30 days prior to the commencement of land disturbing activities, or no later than 48 hours prior to when a new operator assumes operational control over site specifications or commences work at the site.

Permit application fee: (see table below) must accompany the NOI and is based on total acreage to be disturbed by an entire project, including any associated construction support activities (e.g. equipment staging yards, material storage areas, excavated material disposal areas, borrow or waste sites).

Acres Disturbed	= or > 150 acres	= or > 50 < 150 acres	= or > 20 < 50 acres	= or > 5 < 20 acres	= or > 1 < 5 acres	Subsequent coverage*
Fee	\$10,000	\$6,000	\$3,000	\$1,000	\$250	\$100

*Subsequent Primary Operators seeking coverage under an actively covered larger common plan of development or sale

Who must submit the NOI form: Per Section 2 of the permit, all site operators must submit an NOI form. "Operator" for the purpose of this permit and in the context of stormwater associated with construction activity means any person associated with a construction project who meets either or both of the following two criteria: (1) The person has operational or design control over construction plans and specifications, including the ability to make modifications to those plans and specifications. This person is typically the owner or developer of the project or a portion of the project (e.g. subsequent builder), or the person that is the current land owner of the construction site. This person is considered the primary permittee; or (2) The person has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions. This person is typically a contractor or a commercial builder who is hired by the primary permittee, and is considered a secondary permittee.

Owners, developers and all contractors that meet the definition of the operator in subsection 2.2 of the permit shall apply for permit coverage on the same NOI, insofar as possible. After permit coverage has been granted to the primary permittee, any subsequent NOI submittals must include the site's previously assigned permit tracking number and the project name. The comprehensive site-specific SWPPP shall be prepared in accordance with the requirements of part 3 of the permit and must be submitted with the NOI unless the NOI being submitted is to only add a contractor (secondary permittee) to an existing coverage.

Notice of Coverage: The division will review the NOI for completeness and accuracy and prepare a notice of coverage (NOC). Stormwater discharge from the construction site is authorized as of the effective date of the NOC.

Complete the form: Type or print clearly, using ink and not markers or pencil. Answer each item or enter "NA," for not applicable, if a particular item does not fit the circumstances or characteristics of your construction site or activity. If you need additional space, attach a separate piece of paper to the NOI form. **The NOI will be considered incomplete without a permit fee, a map, and the SWPPP.**

Describe and locate the project: Use the legal or official name of the construction site. If a construction site lacks street name or route number, give the most accurate geographic information available to describe the location (reference to adjacent highways, roads and structures; e.g. intersection of state highways 70 and 100). Latitude and longitude (expressed in decimal degrees) of the center of the site can be located on USGS quadrangle maps. The quadrangle maps can be obtained at the USGS World Wide Web site: <http://www.usgs.gov/>; latitude and longitude information can be found at numerous other web sites. Attach a copy of a portion of a 7.5 minute quad map, showing location of site, with boundaries at least one mile outside the site boundaries. Provide estimated starting date of clearing activities and completion date of the project, and an estimate of the number of acres of the site on which soil will be disturbed, including borrow areas, fill areas, stockpiles and the total acres. For linear projects, give location at each end of the construction area.

MS4 Jurisdiction: If this construction site is located within a Municipal Separate Storm Sewer System (MS4), please list name of MS4. A current list of MS4s in Tennessee may be found at http://www.state.tn.us/environment/water/water-quality_storm-water.shtml

Give name of the receiving waters: Trace the route of stormwater runoff from the construction site and determine the name of the river(s), stream(s), creek(s), wetland(s), lake(s) or any other water course(s) into which the stormwater runoff drains. Note that the receiving water course may or may not be located on the construction site. If the first water body receiving construction site runoff is unnamed ("unnamed tributary"), determine the name of the water body that the unnamed tributary enters.

ARAP permit may be required: **If your work will disturb or cause alterations of a stream or wetland, you must obtain an appropriate Aquatic Resource Alteration Permit (ARAP).** If you have a question about the ARAP program or permits, contact your local Environmental Field Office (EFO).

Submitting the form and obtaining more information: Note that this form must be signed by the company President, Vice-President, or a ranking elected official in the case of a municipality, for details see subpart 2.5. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit the completed NOI form (keep a copy for your records) to the appropriate EFO for the county(ies) where the construction activity is located, addressed to **Attention: Stormwater NOI Processing.**

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett	38133-4119	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305-4316	Chattanooga	540 McCallie Avenue STE 550	37402-2013
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

APPENDIX “B”

NOTICE OF TERMINATION

**TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)**

Division of Water Pollution Control (WPC)

6th Floor Annex, L&C Tower, 401 Church Street, Nashville, Tennessee 37243

1-888-891-TDEC (8332)

Notice of Termination (NOT) for General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)

This form is required to be submitted when requesting termination of coverage from the CGP. The purpose of this form is to notify the TDEC that either all stormwater discharges associated with construction activity from the portion of the identified facility where you, as an operator, have ceased or have been eliminated; or you are no longer an operator at the construction site. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the local WPC Environmental Field Office (EFO) address (see table below). For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC).

Type or print clearly, using ink and not markers or pencil.

Site or Project Name:	NPDES Tracking Number: TNR
Street Address or Location:	County(ies):

Name of Permittee Requesting Termination of Coverage:			
Permittee Contact Name:		Title or Position:	
Mailing Address:	City:	State:	Zip:
Phone: ()	E-mail:		

Check the reason(s) for termination of permit coverage:

<input type="checkbox"/>	Stormwater discharge associated with construction activity is no longer occurring and the permitted area has a uniform 70% permanent vegetative cover OR has equivalent measures such as rip rap or geotextiles, in areas not covered with impervious surfaces.
<input type="checkbox"/>	You are no longer the operator at the construction site (i.e., termination of site-wide, primary or secondary permittee coverage).

Certification and Signature: (must be signed by president, vice-president or equivalent ranking elected official)

I certify under penalty of law that either: (a) all stormwater discharges associated with construction activity from the portion of the identified facility where I was an operator have ceased or have been eliminated or (b) I am no longer an operator at the construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge stormwater associated with construction activity under this general permit, and that discharging pollutants in stormwater associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

For the purposes of this certification, elimination of stormwater discharges associated with construction activity means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized, the temporary erosion and sediment control measures have been removed, and/or the site or portions of the site have obtained permit coverage by subsequent operators or that all stormwater discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have otherwise been eliminated from the portion of the construction site where the operator had control.

Permittee name (print or type):	Signature:	Date:
---------------------------------	------------	-------

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett, TN	38133	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305	Chattanooga	540 McCallie Avenue STE 550	37402
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

APPENDIX “C”

INSPECTION FORMS



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)

Division of Water Pollution Control (WPC)

6th Floor Annex, L&C Tower, 401 Church Street, Nashville, Tennessee 37243

1-888-891-8332 (TDEC)

General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)

CGP Inspection Worksheet for Twice-Weekly Inspections of Erosion Prevention and Sediment Controls

Site or Project Name:		NPDES Tracking Number: TNR
Primary Permittee Name:		Date of Inspection:
Current approximate disturbed acreage:	Has daily rainfall been documented? <input type="checkbox"/> Yes <input type="checkbox"/> No	Name of Inspector:
Current weather/site conditions:		Inspector's TNEPSC Certification Number:

Please check the box if the following items are on-site:

- ☐ Notice of Coverage (NOC) ☐ Stormwater Pollution Prevention Plan (SWPPP) ☐ Twice weekly inspection documentation
☐ Site contact information ☐ Rain Gage ☐ Off-site Reference Rain Gage Location: _____

Best Management Practices (BMPs):

Are the Erosion Prevention and Sediment Controls (EPSCs) functioning correctly in the following locations:

1. Disturbed areas/material storage areas	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Outfall points (or nearest accessible downstream point if an outfall is inaccessible)	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Construction ingress/egress points	<input type="checkbox"/> Yes <input type="checkbox"/> No
If the answer is "No" for any of the above, please describe the problem and corrective actions to be taken. Otherwise, describe any pertinent observations:	
4. Are (EPSCs) installed and maintained in the field per SWPPP? If "No", describe below.	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Have site discharges caused an objectionable color contrast in the receiving stream (Permit section 5.3.2)? If "Yes", describe below the measures implemented to eliminate contrast.	<input type="checkbox"/> Yes <input type="checkbox"/> No
6. Have discharges from dewatering activities been managed by appropriate controls per Section 4.1.4 of the Permit? If "No", describe below the measures to be implemented to achieve compliance.	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. If construction activity at any location on-site has temporarily/permanently ceased, was the area stabilized within 15 days per Section 3.5.3.2? If "No", describe below each location and measures taken to stabilize the area(s).	<input type="checkbox"/> Yes <input type="checkbox"/> No
8. Are non-stormwater discharges (per Section 1.2.3) and housekeeping measures such as storing chemicals, construction related debris litter, oils, fuels, building products, truck wash (per Section 3.5.3.1 (f) and (g)) being properly managed? If "No", describe below the measures to be implemented to achieve compliance.	<input type="checkbox"/> Yes <input type="checkbox"/> No
9. If a concrete washout facility is located on site, is it clearly identified on the project and maintained? If "No", describe below the measures to be implemented to achieve compliance	<input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No
10. Have all previous deficiencies been addressed? If not, describe the remaining deficiencies. <input type="checkbox"/> Check if deficiencies/corrective measures have been reported on a previous form.	<input type="checkbox"/> Yes <input type="checkbox"/> No

Certification and Signature (must be signed by the certified inspector and the permittee per Sections 3.5.8.2 (g) and 7.7.2 of the CGP)

I certify under penalty of law that this report and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Inspector Name and Title (print or type):	Signature:	Date:
Permittee Name and Title (print or type):	Signature:	Date:

CGP Inspection Worksheet for Twice-Weekly Inspections of Erosion Prevention and Sediment Controls

Purpose of this form/ Instructions

An inspection, as described in section 3.5.8.2. of the General Permit for Stormwater Discharges from Construction Activities ("Permit"), shall be performed at least twice every calendar week and documented on this form. Inspections shall be performed at least 72 hours apart. Where sites or portion(s) of construction sites have been temporarily stabilized, or runoff is unlikely due to winter conditions (e.g., site covered with snow or ice), such inspection only has to be conducted once per month until thawing results in runoff or construction activity resumes.

Inspectors performing the required twice weekly inspections must have an active certification by completing the "Fundamentals of Erosion Prevention and Sediment Control Level I" course. (<http://www.tnepsc.org/>). A copy of the certification or training record for inspector certification should be kept on site.

Qualified personnel, as defined in section 3.5.8.1 of the Permit (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, locations where vehicles enter or exit the site, and each outfall.

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the site's drainage system. Erosion prevention and sediment control measures shall be observed to ensure that they are operating correctly.

Outfall points (where discharges leave the site and/or enter waters of the state) shall be inspected to determine whether erosion prevention and sediment control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced or modified, or repaired as necessary, before the next rain event if possible, but in no case more than 7 days after the need is identified.

Based on the results of the inspection, the site description identified in the SWPPP in accordance with section 3.5.1 of the Permit and pollution prevention measures identified in the SWPPP in accordance with section 3.5.2 of the Permit, shall be revised as appropriate, but in no case later than 7 days following the inspection. Such modifications shall provide for timely implementation of any changes to the SWPPP, but in no case later than 14 days following the inspection.

All inspections shall be documented on this Construction Stormwater Inspection Certification form. Alternative inspection forms may be used as long as the form contents and the inspection certification language are, at a minimum, equivalent to the division's form and the permittee has obtained a written approval from the division to use the alternative form. Inspection documentation will be maintained on site and made available to the division upon request. Inspection reports must be submitted to the division within 10 days of the request. If the division requests the Construction Stormwater Inspection Certification form to be submitted, the submitted form must contain the printed name and signature of the trained certified inspector and the person who meets the signatory requirements of section 7.7.2 of the Permit.

Trained certified inspectors shall complete inspection documentation to the best of their ability. Falsifying inspection records or other documentation or failure to complete inspection documentation shall result in a violation of this permit and any other applicable acts or rules.

APPENDIX “D”

½ SIZE CONSTRUCTION PLANS

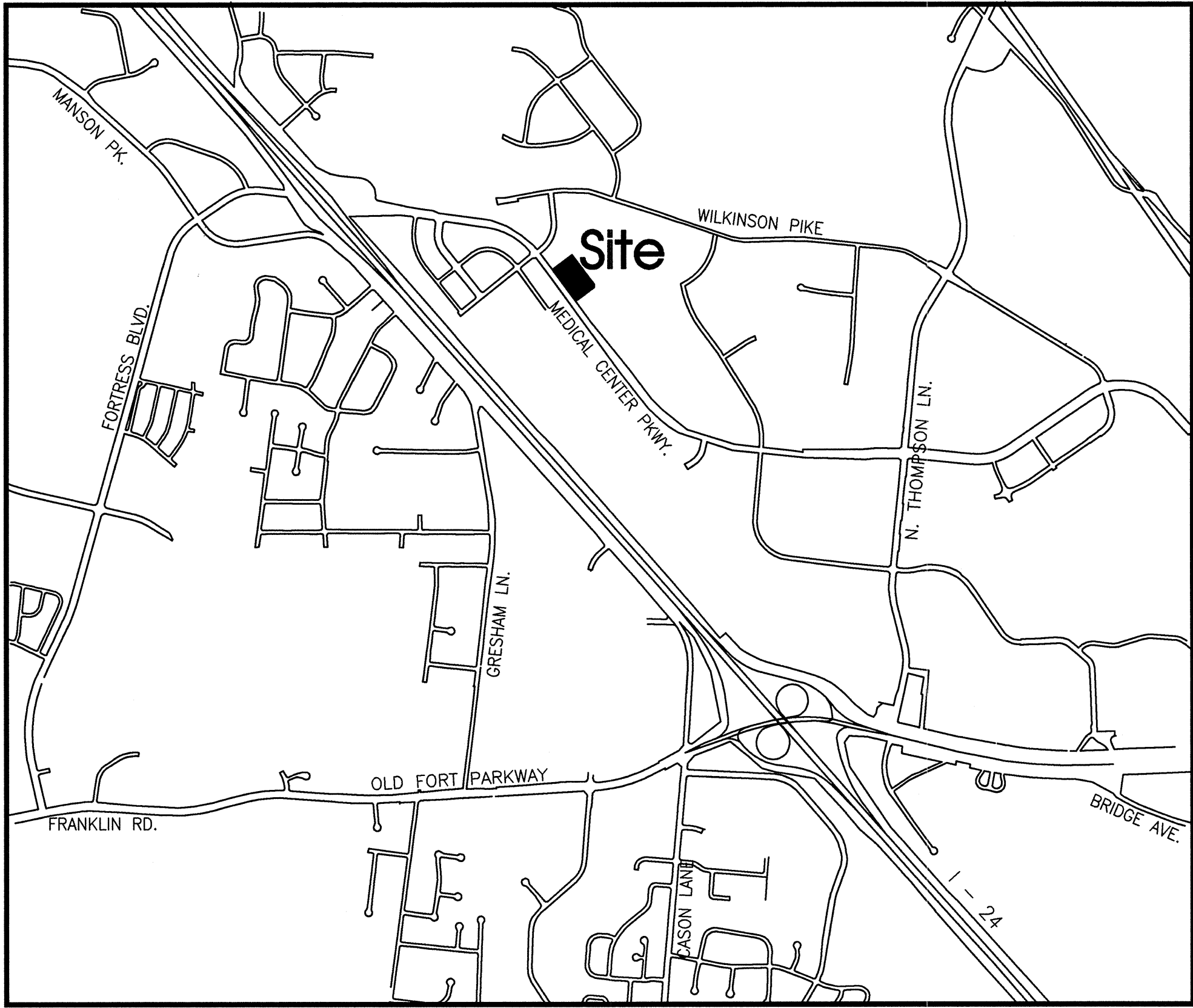
North Church LLC Subdivision

Section 4, Phase 3

Murfreesboro, Tennessee

Preliminary Plat & Construction Plan Set

Drawing Index	
Sheet No.	Title
1	Cover Sheet
2	Master Plan
3	Master Sewer
4	Master Drainage
5	Existing Conditions , Initial EPSC & and Plan
6	Grading and Drainage & Final EPSC Plan
7	Preliminary Plat
8	Sewer Profile
9	Notes & Details



Site Location Map
Not To Scale

Watershed: Overall Creek

Owner/Developer:
C.M. Gatton, Trustee
1000 West State St.
Bristol, TN 37621
Contact: Tommy Smith
(P): 615-893-8877

Floodplain Note:
This site lies within Zone X, not in the 100 Year Floodplain, per
Community Panel No. 47149C0255H Dated Jan. 5, 2007.

Land Data:
Zoning: MU with GDO-1 Overlay
1 lot on 3.36± Acres

Yard Requirements:
MU:
Front: 15' (50' along Major Arterial, Minor Arterial, or Collector Streets)
Side: 10' (20' along RS)
Rear: 20'

Deed Reference:
Tax Map 79, Parcel 95.00
R.Bk. 348, Pg. 2035

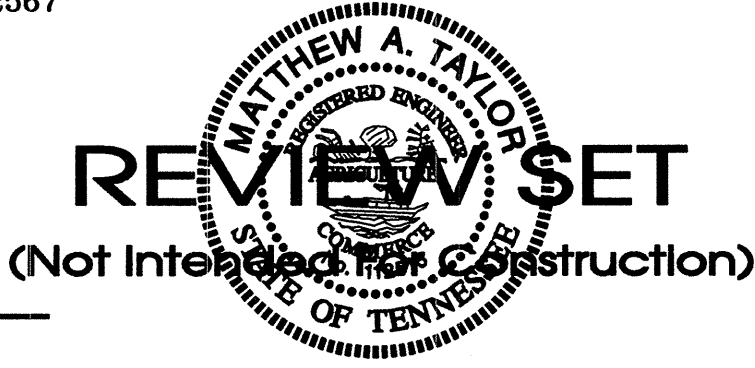
Approved by the Murfreesboro Planning Commission, with such
conditions as are indicated in the minutes of the Commission on ____.

Preliminary Plat approval shall not constitute final approval for recording
purposes.

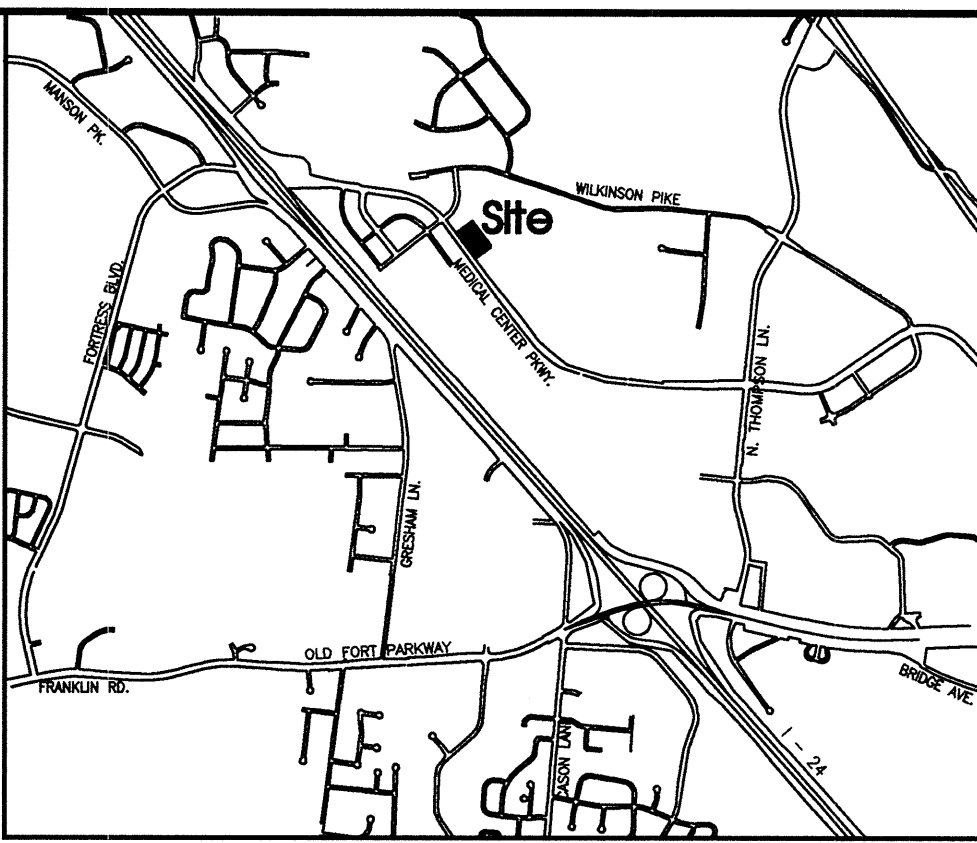
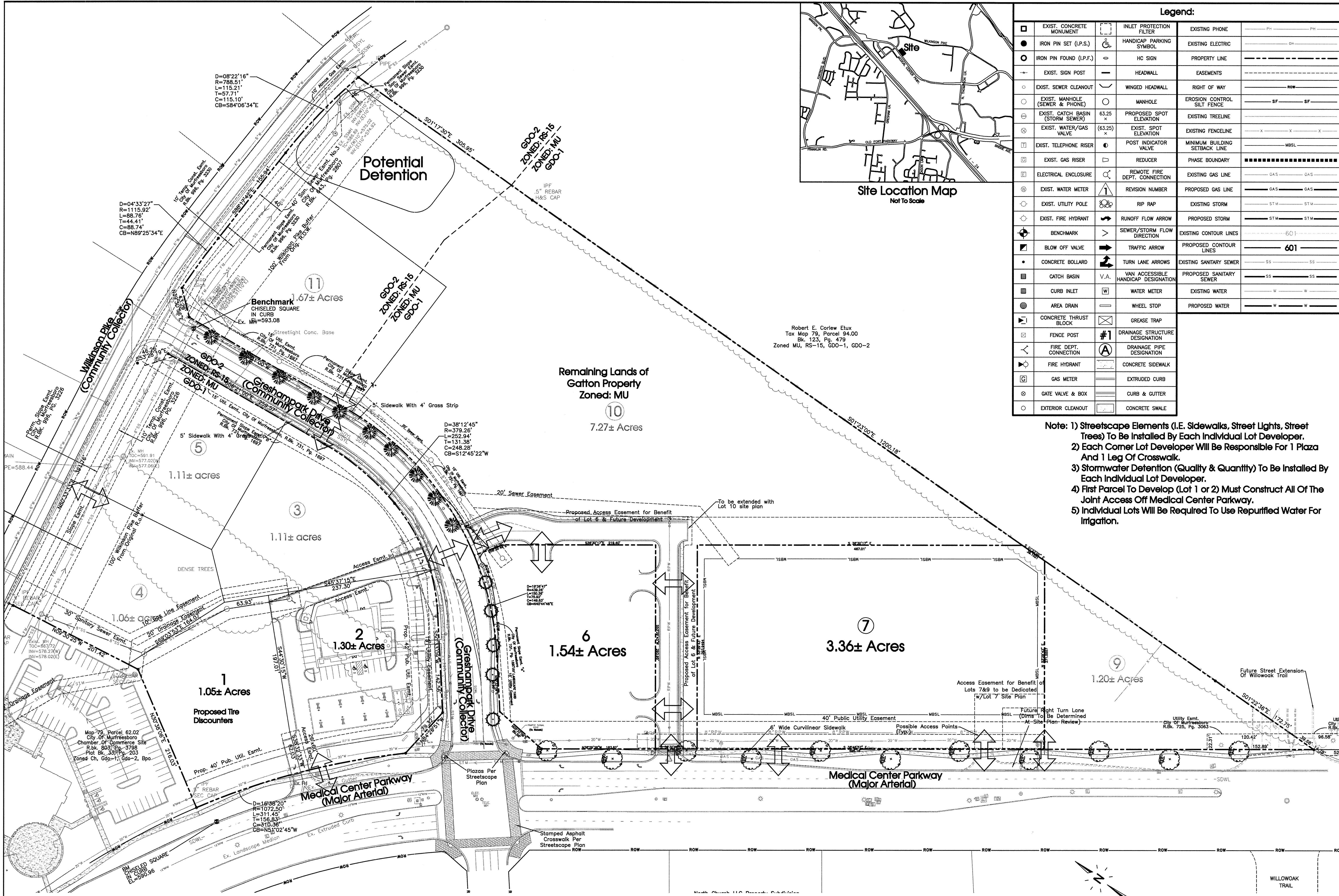
SEC, Inc. SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING

850 MIDDLE TENNESSEE BOULEVARD MURFREESBORO, TENNESSEE 37129
PHONE: (615) 890-7901 E-MAIL: MTAYLOR@SEC-CIVIL.COM FAX: (615) 895-2567
NO PORTION OF THIS DRAWING MAY BE REPRODUCED WITHOUT THE EXPRESSED WRITTEN CONSENT OF S.E.C. INC.

By: _____ Date: _____
Matthew A. Taylor, P.E. TN. Reg. #112515



Sheet 1 of 9
North Church LLC Subdivision
Section 4, Phase 3
Construction Drawings
S.E.C. Project #08144
Submittal: 8-27-15



Site Location Map
Not To Scale

Legend:

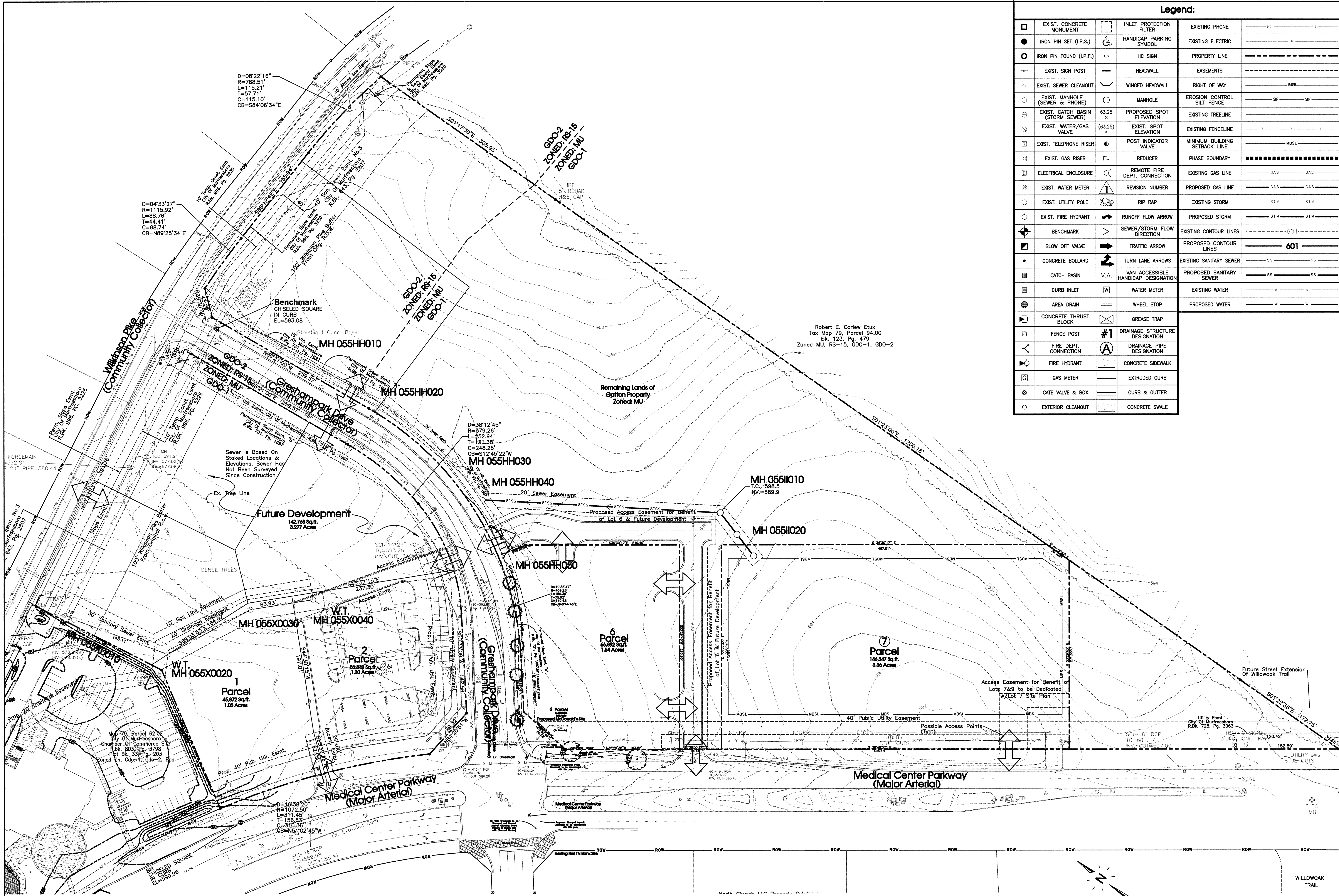
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	IRON PIN FOUND (I.P.F.)		HC SIGN		PROPERTY LINE
	EXIST. SIGN POST		HEADWALL		EASEMENTS
	EXIST. SEWER CLEANOUT		WINGED HEADWALL		RIGHT OF WAY
	EXIST. MANHOLE (SEWER & PHONE)		MANHOLE		EROSION CONTROL SILT FENCE
	EXIST. CATCH BASIN (STORM SEWER)		PROPOSED SPOT ELEVATION		EXISTING TREELINE
	EXIST. WATER/GAS VALVE		EXIST. SPOT ELEVATION		EXISTING FENCELINE
	EXIST. TELEPHONE RISER		POST INDICATOR VALVE		MINIMUM BUILDING SETBACK LINE
	EXIST. GAS RISER		REDUCER		PHASE BOUNDARY
	ELECTRICAL ENCLOSURE		REMOTE FIRE DEPT. CONNECTION		EXISTING GAS LINE
	EXIST. WATER METER		REVISION NUMBER		PROPOSED GAS LINE
	EXIST. UTILITY POLE		RIP RAP		EXISTING STORM
	EXIST. FIRE HYDRANT		RUNOFF FLOW ARROW		PROPOSED STORM
	BENCHMARK		SEWER/STORM FLOW DIRECTION		EXISTING CONTOUR LINES
	BLOW OFF VALVE		TRAFFIC ARROW		PROPOSED CONTOUR LINES
	CONCRETE BOLLARD		TURN LANE ARROWS		EXISTING SANITARY SEWER
	CATCH BASIN		VAN ACCESSIBLE HANDICAP DESIGNATION		PROPOSED SANITARY SEWER
	CURB INLET		WATER METER		EXISTING WATER
	AREA DRAIN		WHEEL STOP		PROPOSED WATER
	CONCRETE THRUST BLOCK		GREASE TRAP		
	FENCE POST		DRAINAGE STRUCTURE DESIGNATION		
	FIRE DEPT. CONNECTION		DRAINAGE PIPE DESIGNATION		
	FIRE HYDRANT		CONCRETE SIDEWALK		
	GAS METER		EXTRUDED CURB		
	GATE VALVE & BOX		CURB & GUTTER		
	EXTERIOR CLEANOUT		CONCRETE SWALE		

- Note: 1) Streetscape Elements (I.E. Sidewalks, Street Lights, Street Trees) To Be Installed By Each Individual Lot Developer.
2) Each Corner Lot Developer Will Be Responsible For 1 Plaza And 1 Leg Of Crosswalk.
3) Stormwater Detention (Quality & Quantity) To Be Installed By Each Individual Lot Developer.
4) First Parcel To Develop (Lot 1 or 2) Must Construct All Of The Joint Access Off Medical Center Parkway.
5) Individual Lots Will Be Required To Use Repurified Water For Irrigation.

SEC, Inc. SITE ENGINEERING CONSULTANTS
ENGINEERING - SURVEYING - LAND PLANNING
800 MIDDLE TENNESSEE BOULEVARD, MURFREESBORO, TENNESSEE 37129
PHONE: (615) 895-5555 FAX: (615) 895-5557
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North Church LLC Subdivision
Section 4, Phase 3
Murfreesboro, Tennessee

Master Plan
REVISIONS:
DRAWN: CFB3
DATE: 8-27-15
CHECKED:
FILE NAME:
0814NorthChurchSAP3.dwg
SCALE:
1"=60'
JOB NO.
08144
SHEET:
2 of 9



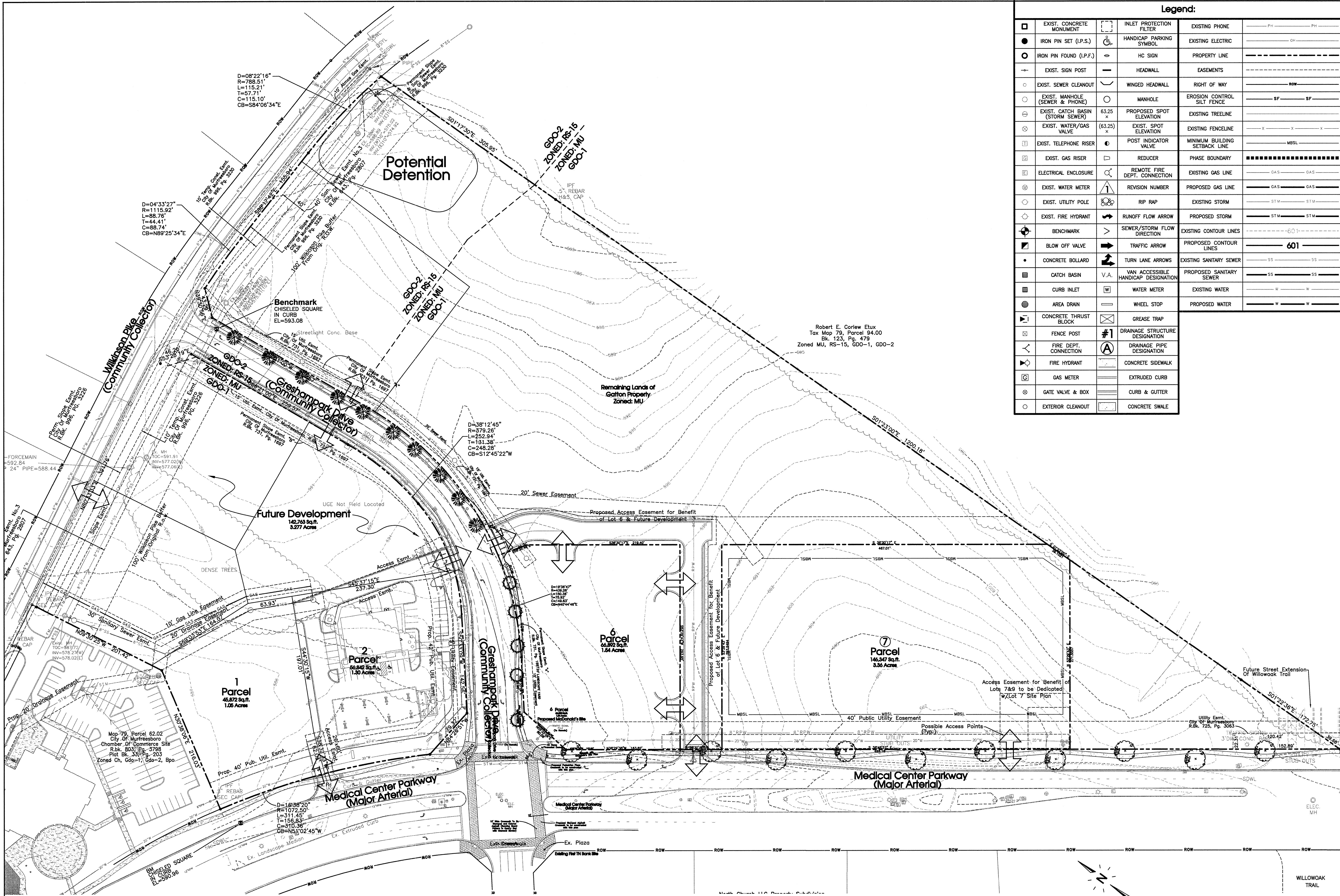
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	IRON PIN FOUND (I.P.F.)		EXISTING ELECTRIC
	EXIST. SIGN POST		PROPERTY LINE
	EXIST. SEWER CLEANOUT		EASEMENTS
	EXIST. MANHOLE (SEWER & PHONE)		RIGHT OF WAY
	EXIST. CATCH BASIN (STORM SEWER)		EROSION CONTROL
	EXIST. WATER/GAS VALVE		EXISTING TREELINE
	EXIST. TELEPHONE RISER		EXISTING FENCELINE
	EXIST. GAS RISER		MINIMUM BUILDING SETBACK LINE
	ELECTRICAL ENCLOSURE		PHASE BOUNDARY
	EXIST. WATER METER		EXISTING GAS LINE
	EXIST. UTILITY POLE		PROPOSED GAS LINE
	EXIST. FIRE HYDRANT		EXISTING STORM
	BENCHMARK		PROPOSED STORM
	BLOW OFF VALVE		EXISTING CONTOUR LINES
	CONCRETE BOLLARD		PROPOSED CONTOUR LINES
	CATCH BASIN		EXISTING SANITARY SEWER
	CURB INLET		PROPOSED SANITARY SEWER
	AREA DRAIN		EXISTING WATER
	CONCRETE THRUST BLOCK		PROPOSED WATER
	FENCE POST		GREASE TRAP
	FIRE DEPT. CONNECTION		DRAINAGE STRUCTURE DESIGNATION
	FIRE HYDRANT		DRAINAGE PIPE DESIGNATION
	GAS METER		CONCRETE SIDEWALK
	GATE VALVE & BOX		EXTRUDED CURB
	EXTERIOR CLEANOUT		CURB & GUTTER
			CONCRETE SWALE

SEC, Inc. SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING
850 MIDDLE TENNESSEE BOULEVARD
MURFREESBORO, TENNESSEE 37129-2567
NO PORTION OF THIS DRAWING MAY BE REPRODUCED WITHOUT THE EXPRESSED WRITTEN CONSENT OF SEC, INC.

North Church LLC Subdivision
Section 4, Phase 3
Murfreesboro, Tennessee

Master Sewer

REVISIONS:
DRAWN: CFB3
DATE: 8-27-15
CHECKED:
MAT
FILE NAME:
08144NorthChurchSAP3.dwg
SCALE:
1"=60'
JOB NO.
08144
SHEET:
3 of 9



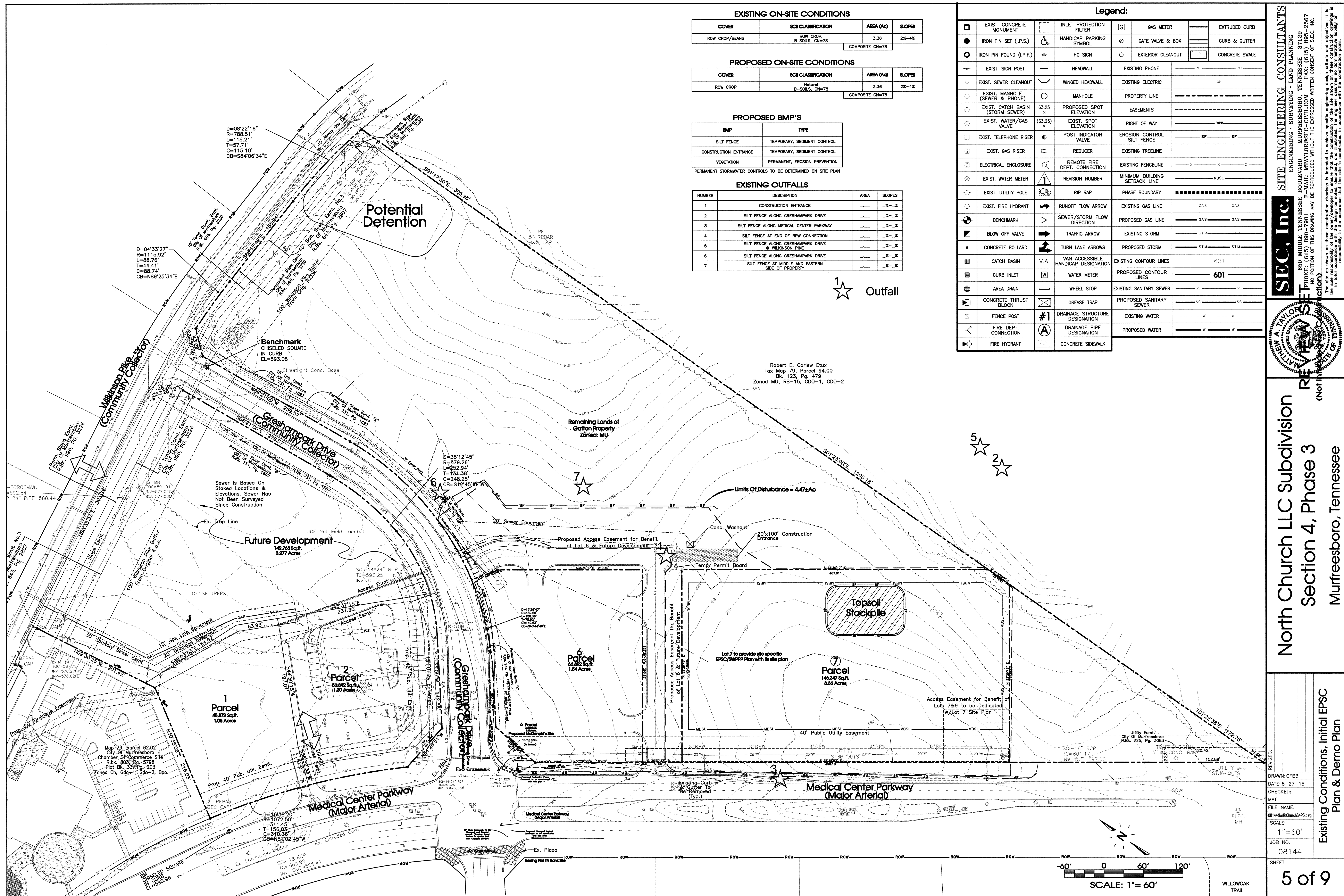
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	IRON PIN FOUND (I.P.F.)		HC SIGN
	EXIST. SIGN POST		HEADWALL
	EXIST. SEWER CLEANOUT		WINGED HEADWALL
	EXIST. MANHOLE (SEWER & PHONE)		MANHOLE
	EXIST. CATCH BASIN (STORM SEWER)		PROPOSED SPOT ELEVATION
	EXIST. WATER/GAS VALVE		EXIST. SPOT ELEVATION
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	EXIST. GAS RISER		REDUCER
	ELECTRICAL ENCLOSURE		REMOTE FIRE DEPT. CONNECTION
	EXIST. WATER METER		REVISION NUMBER
	EXIST. UTILITY POLE		RIP RAP
	EXIST. FIRE HYDRANT		RUNOFF FLOW ARROW
	BENCHMARK		SEWER/STORM FLOW DIRECTION
	BLOW OFF VALVE		TRAFFIC ARROW
	CONCRETE BOLLARD		TURN LANE ARROWS
	CATCH BASIN		VAN ACCESSIBLE HANDICAP DESIGNATION
	CURB INLET		WATER METER
	AREA DRAIN		WHEEL STOP
	CONCRETE THRUST BLOCK		GREASE TRAP
	FENCE POST		DRAINAGE STRUCTURE DESIGNATION
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	FIRE HYDRANT		CONCRETE SIDEWALK
	GAS METER		EXTRUDED CURB
	GATE VALVE & BOX		CURB & GUTTER
	EXTERIOR CLEANOUT		CONCRETE SWALE
	EXISTING PHONE		EXISTING ELECTRIC
	EXISTING ELECTRIC		PROPERTY LINE
	EASEMENTS		RIGHT OF WAY
	EROSION CONTROL SILT FENCE		EXISTING TREELINE
	EXISTING FENCELINE		MINIMUM BUILDING SETBACK LINE
	PHASE BOUNDARY		EXISTING GAS LINE
	PROPOSED GAS LINE		EXISTING STORM
	PROPOSED STORM		EXISTING CONTOUR LINES
	PROPOSED CONTOUR LINES		EXISTING SANITARY SEWER
	PROPOSED SANITARY SEWER		EXISTING WATER
	PROPOSED WATER		PROPOSED WATER

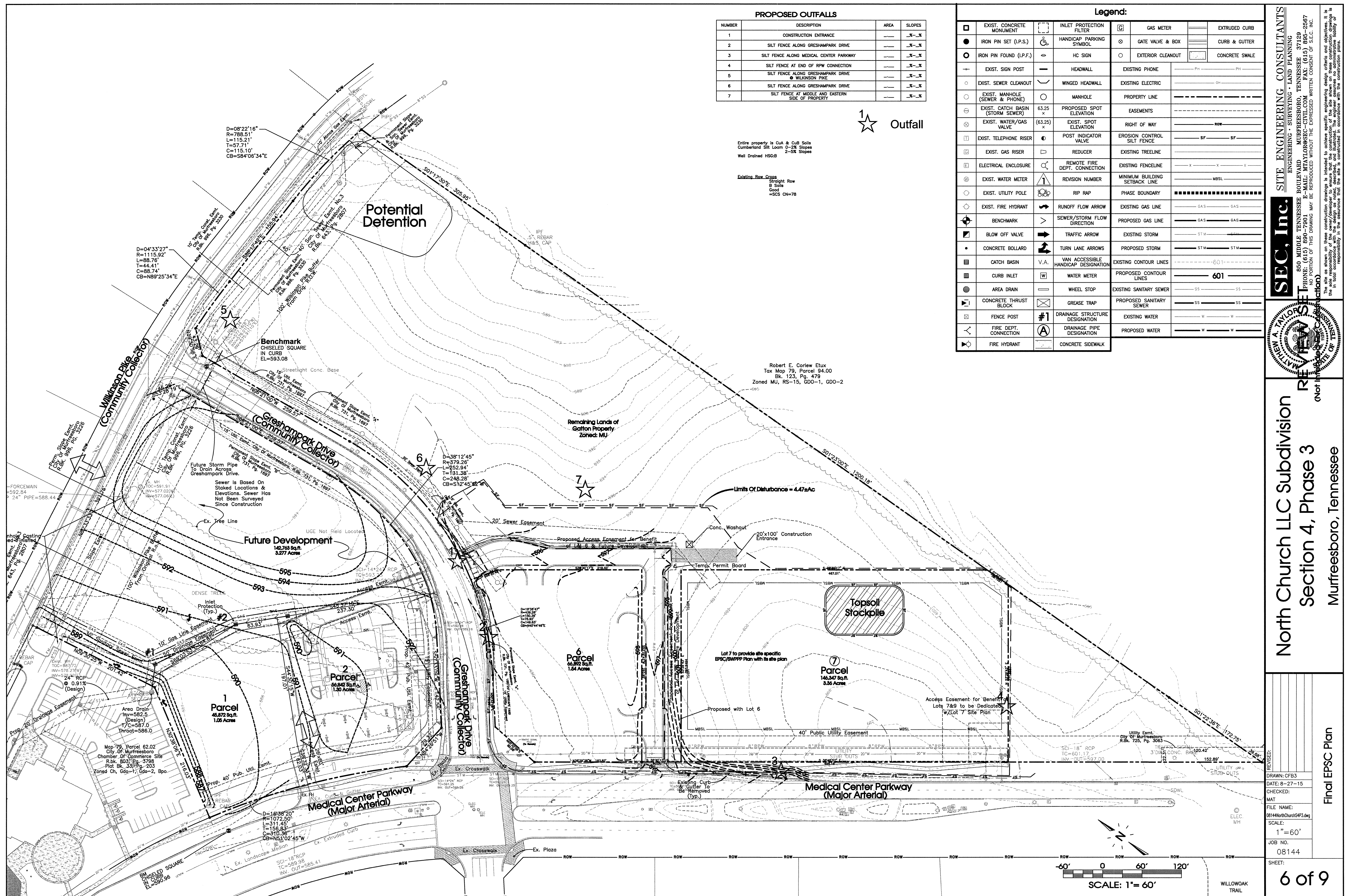
SEC, Inc. SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING
860 MIDDLE TENNESSEE BOULEVARD • MURFREESBORO, TENNESSEE 37139
PROPOSED PROJECT: NORTH CHURCH LLC SUBDIVISION, SECTION 4, PHASE 3
NO PORTION OF THIS DRAWING MAY BE REPRODUCED WITHOUT THE EXPRESSED WRITTEN CONSENT OF SEC, INC.

North Church LLC Subdivision
Section 4, Phase 3
Murfreesboro, Tennessee

REVISIONS
REVISED: _____
DRAWN: CFB3
DATE: 8-27-15
CHECKED: _____
MAT _____
FILE NAME: 08144NorthChurchSAP3.dwg
SCALE: 1"=60'
JOB NO. 08144
SHEET: 4 of 9

Master Drainage

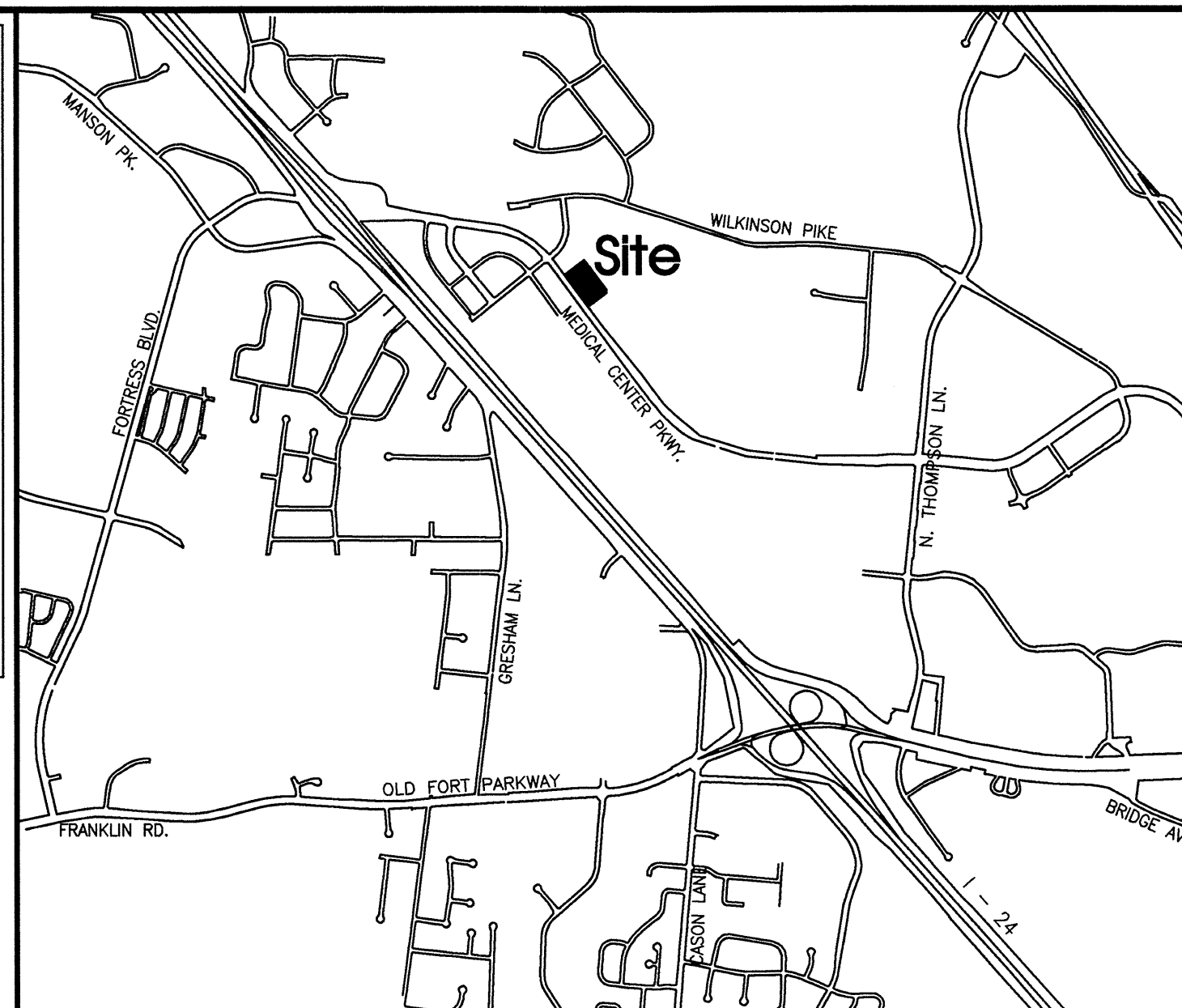




THIS APPROVAL SHALL NOT BE CONSTRUED AS CREATING A PRESUMPTION OF CORRECT OPERATION OR AS WARRANTING BY THE MURFREESBORO WATER AND SEWER DEPARTMENT THAT THE APPROVED FACILITIES WILL REACH THE DESIGNED GOALS.

APPROVAL DATE _____
APPROVAL EXPIRES IN 12 MONTHS

BY _____
For Sanitary Sewer & Repurified Water Only



Site Location Map

Not To Scale

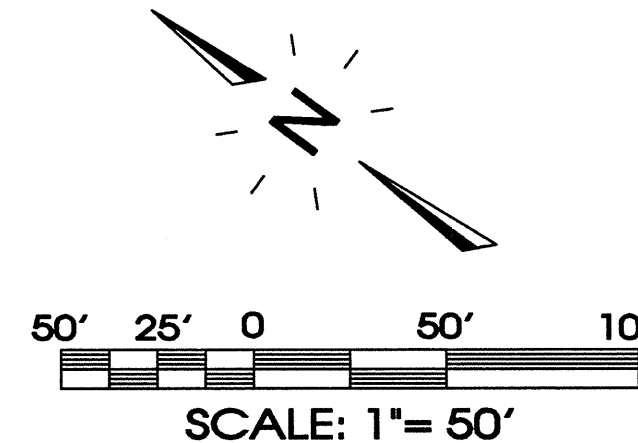
C.M. Gatton, Trustee
1000 West State St.
Bristol, TN 37621
Contact: Tommy Smith
(P): 615-893-8877

This site lies within Zone X, not in the 100 Year Floodplain, per
Community Panel No. 47149C0255H Dated Jan. 5, 2007.

Zoning: MU with GDO-1 Overlay
1 lot on 3.36± Acres

MU:
Front: 15' (50' along Major Arterial, Minor Arterial, or Collector Streets)
Side: 10' (20' along RS)
Rear: 20'

Tax Map 79, Parcel 95.00
R.Bk. 348, Pg. 2035

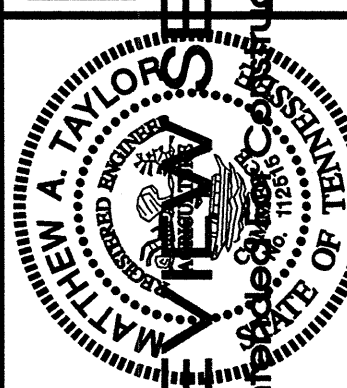


**Water Provider: Consolidated
Utility District of Rutherford County**

[illegible]

SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING

SEC, Inc.



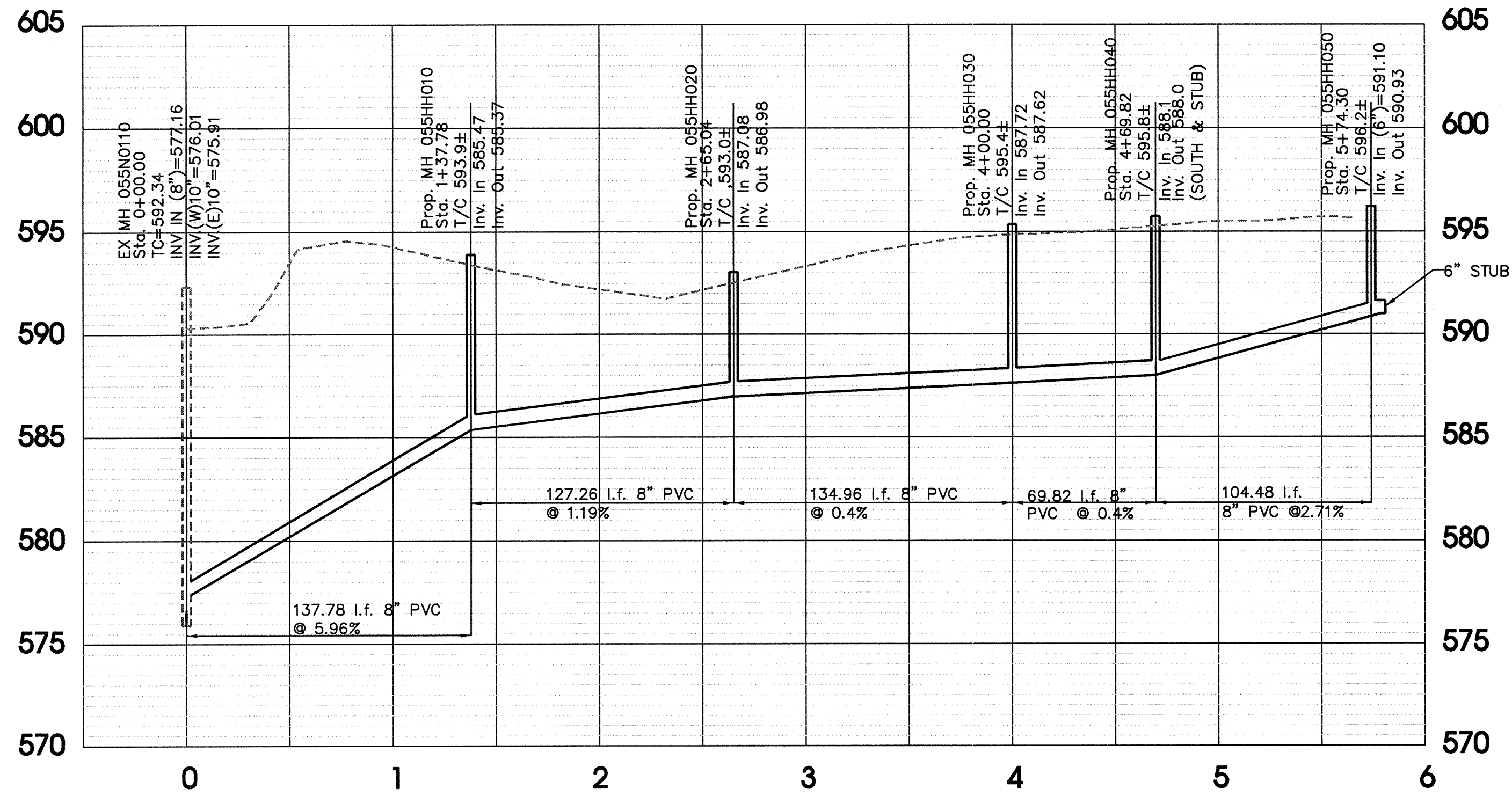
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North Church LLC Subdivision
Section 4, Phase 3

Murfreesboro, Tennessee

DRAWN: CFB3
DATE: 8-27-15
CHECKED:
MAT
FILE NAME: 08144NorthChurchS4P3.dwg
SCALE: 1"=50'
JOB NO. 08144
SHEET:

Preliminary Plat

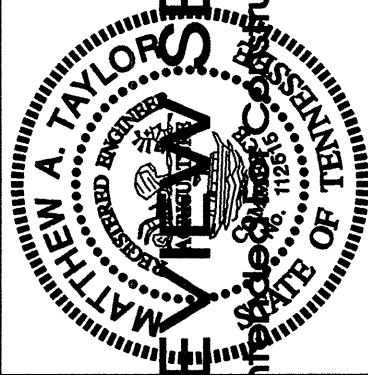


Sanitary Sewer Line A Profile

APPROVED FOR CONSTRUCTION
THE DOCUMENT BEARING THIS STAMP HAS BEEN REVIEWED BY THE
MURFREESBORO WATER AND SEWER DEPARTMENT
UNDER THE AUTHORITY DELEGATED BY THE
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER SUPPLY
AND IS HEREBY APPROVED FOR CONSTRUCTION.
THIS APPROVAL SHALL NOT BE CONSTRUED AS CREATING A PRESUMPTION
OF CORRECT OPERATION OR AS WARRANTING BY THE MURFREESBORO
WATER AND SEWER DEPARTMENT THAT THE APPROVED FACILITIES
WILL REACH THE DESIGNED GOALS.
APPROVAL DATE:
APPROVAL EXPIRES IN 12 MONTHS
BY:
For Sanitary Sewer & Reputified Water Only

REVISED:
DRAWN: CFB3
DATE: 8-27-15
CHECKED:
MAT
FILE NAME:
08144NorthChurchSAP3.dwg
SCALE:
1"=50' H
1"=5' V
JOB NO.
08144
SHEET:

North Church LLC Subdivision
Section 4, Phase 3
Murfreesboro, Tennessee



SEC, Inc.
ENGINEERING • SURVEYING • LAND PLANNING
850 MIDDLE TENNESSEE BOULEVARD MURFREESBORO, TENNESSEE 37129
PHONE: (615) 890-7901 E-MAIL: MTAYLOR@SEC-CIVIL.COM FAX: (615) 890-2867
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SITE ENGINEERING CONSULTANTS
The site as shown on these construction drawings is intended to achieve specific engineering design criteria and objectives. It is the sole responsibility of the owner/developer to ensure that the construction of this site shown on these construction drawings is in total accordance with the design and specifications shown on these drawings. The engineer assumes no responsibility in the assurance that the site is constructed in accordance with the construction plans.

Sewer Profile
8 of 9

