

ADDENDUM NO. 3 TO DRAINAGE MANUAL

Effective October 13, 2008

The following is an amendment to the Town of Greenwich Drainage Manual. The submittal requirements, policy and procedures stated in Addendum No. 3 herein are required for all development plan submittals as of the effective date.

1. All development reviews submitted to the Planning & Zoning Commission, Inland Wetlands & Watercourses Agency, and Building Division shall meet the standards of the Town of Greenwich Roadway Design Manual & Standard Construction Details and Drainage Manual as amended and prepared by the Department of Public Works – Engineering Division.
2. The Engineering Division reviews development plan submittals for the Planning & Zoning Commission and Inland Wetlands & Watercourses Agency. Development plan submittals that only require a building permit are submitted directly to the Building Division and are not reviewed by the Engineering Division.
3. All documents that are required to be submitted for a development plan shall be submitted to the department that is issuing the approval or permit. Under no circumstance shall any documents or material be submitted directly to the Department of Public Works – Engineering Division.
4. It is recommended that all new submittals to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency be submitted five weeks prior to their expected public meeting date. This is recommended because all new submittals have a minimum four-week review period for the Engineering Division. The additional week is recommended for processing for the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency. The four-week period is based on the date that the Engineering Division receives the submittal and not the date it is submitted to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency.
5. It is recommended that all revisions for submittals to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency be submitted three weeks prior to their expected public meeting date. This is recommended because all revision submittals have a minimum two-week review period for the Engineering Division. The additional week is recommended for processing for the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency. The two-week period is based on the date that the Engineering Division receives the submittal and not the date it is submitted to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency.
6. The Engineering Division cannot guarantee review of submittals by an applicant's expected public meeting date if Guidelines 4 and 5 are not met. Submittals received one week prior to a meeting will be reviewed for the following meeting.
7. All administrative reviews submitted to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency will have a minimum two-week review period for the Engineering Division. The two-week period is based on the date that the Engineering Division receives the submittal and not the date it is submitted to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency.
8. All submittals for Certificate of Occupancy to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency will require a minimum two-week review period for the Engineering Division. Certificate of occupancy reviews will be handled in the order in which the Engineering Division receives them. The two-week period is based on the date that the Engineering Division receives the submittal and not the date it is submitted to the Planning & Zoning Commission and the Inland Wetlands & Watercourses Agency.
9. Submittal of revisions during construction is at the site engineer's discretion; however, the Engineering Division may require additional information to be submitted to verify the change. The Engineering Division may disagree with revisions if not approved prior to their construction and may require field modifications. If the site engineer submits a revision for review, the revised information should be submitted to the agency that provided initial approval (P&Z and/or IWWA). The review will take a minimum of two weeks from the date the Engineering Division receives the submittal.

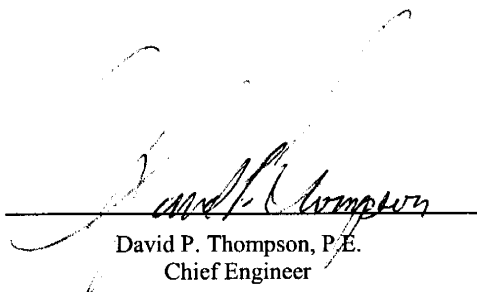
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10. At the start of construction, the site engineer will notify the contractor that all drainage structures must be inspected by the site engineer and located by the surveyor prior to backfilling. Improvement Location Surveys that have notes saying approximate location per contractor or similar are not acceptable and will require the drainage system to be excavated so its location can be verified. The site engineer is responsible for providing the final documentation that the drainage system has been constructed in accordance with the approved plans.

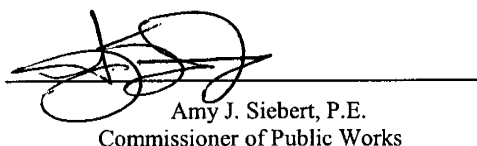
11. Meetings to discuss development reviews with the Engineering Division are only scheduled for Wednesdays. Please contact the Engineering Division prior to the Wednesday you would like to meet. Meetings can be scheduled in half hour blocks. Meetings can be scheduled from 8:30am to 11:30pm and 1:30pm to 3:30pm.

12. All submittals will first be reviewed to determine that all required information has been submitted. If information is missing the submittal will be sent back as an incomplete application and not be reviewed until all the information is included.

13. The remaining pages attached are the submittal requirements for all development reviews. The attached pages include checklists and forms that must be submitted with all reviews.



David P. Thompson, P.E.
Chief Engineer



Amy J. Siebert, P.E.
Commissioner of Public Works

Submittal Requirements for Development Plan Reviews

1. Drainage Summary Report (Submit Checklist with Drainage Summary Report)

a) Project Narrative

Project description and purpose (for existing and proposed conditions)

- Natural and manmade feature at the site, including, at a minimum, wetlands, watercourses, floodplains, and development (roads, buildings, and other structures)
- Site topography, drainage patterns, flow paths, and ground cover
- Impervious area and runoff coefficient
- Site soils as defined by USDA soil surveys including soil names, map unit, erodibility, permeability, depth, texture, and soil structure
- Stormwater discharges from the site, including quality and known sources of pollutants and sediment loadings
- Critical areas, buffers, and setbacks established by the local, state, and federal regulatory authorities
- Water quality classification of on-site and adjacent waterbodies

Potential stormwater impacts

- Potential pollution sources (e.g., erosive soils, steep slopes, vehicle fueling, vehicle washing, etc.)
- Summary of pre- and post-development peak flows for the 1, 2, 5, 10, 25, 50, and 100-Year Storms
- Summary of pre- and post-development volumes for the 1, 2, 5, 10, 25, 50, and 100-Year Storms

Critical on-site resources

- Wells, aquifers
- Wetlands, streams, ponds
- Public drinking water supplies

Critical off-site (adjacent to or downstream of site) resources

- Neighboring land uses
- Wells, aquifers
- Wetlands, streams, ponds
- Public drinking water supplies

Proposed stormwater management practices

- Source controls and pollution prevention
- Alternative site planning and design
- Stormwater treatment practices
- Flood control and peak runoff attenuation management practices

b) Soil Investigation

Maps

- USDA Soil Map of Watersheds

Field Tests

- Deep test holes excavated three feet below bottom of proposed infiltration systems – Use Engineering Division Form (Depth of bedrock, depth of mottling, depth of groundwater)

Submittal Requirements for Development Plan Reviews

- Percolation tests of proposed infiltration systems – Use Engineering Division Form
- Soil permeability tests using constant head or falling head method shall be used if exfiltration is used in the hydrograph routing analysis

c) Calculations

Pollutant Reduction

- Water Quality Volume (WQV) (see sizing example from 2004 Connecticut Stormwater Quality Manual – Chapter 7.7)
- Water Quality Flow (WQF) (see sizing example from 2004 Connecticut Stormwater Quality Manual – Chapter 7.7)

Groundwater Recharge

- Groundwater Recharge Volume (GRV) (see sizing example from 2004 Connecticut Stormwater Quality Manual – Chapter 7.7)

Peak Flow Control

- Hydrologic and hydraulic design calculations for pre- and post-development conditions (Analysis shall utilize Natural Resource Conservation Service TR-55 Tabular Hydrograph or TR-20 methodology)
 - The design storm frequencies shall be 1, 2, 5, 10, 25, 50, and 100-year
 - The 24-Hour design rainfall shall be 2.7, 3.5, 4.2, 5.0, 6.2, 7.3, and 9.0 inches (Precipitation data from Northeast Regional Climate Center, Publication No. RR 93-5, The 1-year comes from Rainfall Frequency Atlas of the United States also known as TP-40)
 - Offsite areas that drain through the developed property shall be included (All offsite information shall be from survey maps, Town GIS mapping, and field investigations)
 - Watershed map for existing and proposed conditions showing points of concern, time of concentration flow path, runoff curve numbers, etc.
 - Time of concentration for existing and proposed conditions shall be calculated (no direct entry)
 - Imperviousness of the entire site and each watershed area
 - NRCS runoff curve numbers
 - Peak runoff rates, volumes, and velocities for each watershed area and all points of concern
 - ◇ Stream Channel Protection: 2-year frequency (“over-control” of 2-year storm) (see sizing example from 2004 Connecticut Stormwater Quality Manual – Chapter 7.7)
 - ▣ The channel protection criteria does not apply under the following conditions:
 - a. The entire channel protection volume is recharged to groundwater
 - b. Sites less than or equal to one acre of impervious cover
 - c. The site discharges to a large river (fourth order or greater), lake, estuary, or tidal water where the development is less than 5 percent of the watershed area upstream of the development site unless known water quality problems exist in the receiving waters.
 - ◇ Conveyance Protection: 10-year frequency
 - ◇ Peak Runoff Attenuation: 2-year, 5-year, 10-year, and 25-year
 - ▣ The Engineering Division may waive the peak runoff attenuation criteria for sites that discharge to a large river (fourth order or greater), lake, estuary, or tidal waters where the development area is less than 5 percent of the watershed area upstream of the development site.
 - ◇ Emergency Outlet Sizing: safely pass the 100-year frequency
 - Hydrograph routing calculations (Utilize stage-discharge manual analysis or routing program)
 - Culvert capacity calculations
 - Documentation of sources for all computation methods and field test results

Submittal Requirements for Development Plan Reviews

- Downstream analysis, where detention is proposed
 - The downstream analysis shall include the following elements:
 - ◇ Routing calculations shall proceed down stream to a confluence point where the site drainage area represents 10 percent of the total drainage area (i.e., the “10 percent rule”)
 - ◇ Calculations of peak flows, velocities, and hydraulic effects at critical downstream locations (stream confluences, culverts, other channel constrictions, and flood-prone areas) to the confluence point where 10 percent rule applies
 - ◇ The analysis shall use an appropriate hydrograph routing method, such as TR-20, to route the pre- and post-development runoff hydrographs from the project site to the downstream critical locations
- Storm drainage calculations for connections to Town drainage systems
 - Drainage system must be found to have adequate capacity
- Gutter flow calculations
 - All roads and driveways (See Chapter 11 of the Connecticut Department of Transportation Drainage Manual for design standards)
- Outlet protection calculations
 - Discharges to watercourses or wetlands shall use a preformed scour hole or riprap apron (See Chapter 11 of the Connecticut Department of Transportation Drainage Manual for design standards)
 - All other discharges shall use a level spreader
 - All outlets shall be a minimum of ten feet from all property lines. Level spreaders shall be installed parallel to contours

2. Construction Plans (Submit Checklist with Construction Plans)

a) Construction Plan Set Standards

Required size (no larger than 36” x 48” and no smaller than 24” x 36”)

Required scale (maximum scale of 1” = 40’, larger scales up to 1” = 100’ may be used to represent overall site development plans or for conceptual plans)

- Seal and Signature of licensed professionals
 - Surveys – Licensed Surveyor
 - Construction plans – Professional Engineer
- Construction materials
- Stormwater control product designations (if applicable)
- Methods of installation
- Reference to applicable material and construction standards
- The revision schedule shall be included on the plan from the beginning of the final site plan to the final revisions during construction
- All revised plans shall include a letter listing each change on the plan.

Cover sheet with sheet index

- Title block
- Legend
- North arrow
- Property boundary of subject property (including parcels, or portions thereof, of abutting land and roadways within one hundred feet of the property boundary)
- Site locus map (recommended scale 1” = 1,000’) with north arrow
- Town of Greenwich – Engineering Division Standard Notes – Use Engineering Division Notes

Submittal Requirements for Development Plan Reviews

Survey Plan (Existing Conditions Survey)

- Prepared according to the Minimum Standards for Surveys and maps in Connecticut
- The class of survey shall be A-2 and T-2 and represented on the plan
- Sealed and signed by a professional land surveyor
- Depict topography at contour intervals of one foot
- Spot elevations
- The referenced or assumed elevation datum
- Two (2) benchmarks on the site within one hundred feet of the proposed construction
- Outside limits of disturbances
- Plan references
- Shall include the entire Town of Greenwich Right-of-Way for the property frontage (drainage, curbs, sidewalk, trees, walls, contours, etc)
- Storm drainage, sewer, water, etc
- Roads, buildings, driveways, patios, walks, walls and other structures
- Utilities and easements

Site Plan (Use multiple plan sheets to keep legible)

- Depict existing and proposed topography at contour intervals of one foot
- Spot elevations
- Storm drainage, sewer, water, etc
- Sight Distance
- Driveway widths at road and property line
- Locations of stormwater discharges
- Perennial and intermittent streams
- Deep test and percolation test holes locations
- Vegetation and proposed limits of clearing and disturbance
- Resource protection areas such as wetlands, lakes, ponds, and other setbacks (stream buffers, drinking water well setbacks, septic setbacks, etc.)
- Roads, buildings, driveways, patios, walks, walls and other structures
- Utilities and easements
- Temporary and permanent conveyance systems (grass channels, swales, ditches, storm drains, etc.) including grades, dimensions, and direction of flow
- Location of floodplain and floodway limits and relationship of site to upstream and downstream properties and drainage systems
- Location, size, maintenance access, and limits of disturbance of proposed structural stormwater management practices (treatment practices, flood control facilities, stormwater diversion structures, etc.)
- Final landscaping plans for structural stormwater management practices and site revegetation
- Locations of non-structural stormwater management practices (i.e., source controls)
- Sealed and signed by a professional engineer

Roof Layout Plan

- Roof layout
- Gutters and leaders to drainage structure
- Gutter flow direction

Driveway Profiles & Site Distance (Submit Checklist for Driveway Entrance)

- Sight distance
- Sight distance profiles
- Driveway profile
- Driveway dimensions
 - Width at property line
 - Width at roadway
 - Distance to intersection
 - Distance between driveways

Submittal Requirements for Development Plan Reviews

- Distance from property line to driveway
- Driveway entrance details
- Pavement cross-section
- Sealed and signed by a professional engineer

Construction Details

- Catch basins, manholes, chambers, control structures, etc
- Trench section
- Retaining wall cross-section
- Curbs, sidewalks, driveway entrance, etc
- Road cross-section, profile, etc
- Pipe cross-section, profile, etc

Erosion and Sediment Controls

- The Erosion & Sediment Control plan shall comply with the requirements of the current version of the Connecticut Guidelines for Soil Erosion and Sediment Control
- Site plan showing controls
- Construction phasing and erosion & sediment controls sequencing plan
- Details plan
- Computations if required
- Operations and maintenance of erosion & sediment controls

3. Supporting Documents and Studies

a) Provide other sources of information used in the design of construction and post-construction stormwater controls for the site development, as applicable:

- Soil maps, borings/test pits, percolation/infiltration tests (Include in Drainage Summary Report)
- Groundwater impacts for proposed infiltration structures (Include in Drainage Summary Report)
- Reports on wetlands and other surface waters
- Water quality impacts to receiving waters and biological/ecological studies
- Flood study/calculations

4. Operations and Maintenance Report

a) Detailed inspection and maintenance requirements/tasks

- Parties legally responsible for maintenance (name, address, and telephone number)
- Provisions for financing of operations and maintenance activities (schools sites, commercial sites, business sites)
- Maintenance Agreement
- Inspection and maintenance schedules
- Inspection and maintenance schedules included on Improvement Location Survey
- Operations & Maintenance Log Form

b) Submitted with Certificate of Occupancy

- Final Report
- Report shall include an Improvement Location Survey
- Improvement Location Survey shall include inspection and maintenance schedules

Submittal Requirements for Development Plan Reviews

5. Certificate of Occupancy Issuance

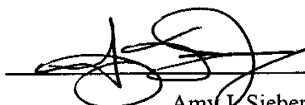
a) Certificate of Occupancy Issuance

- Engineering Division Checklist for Certificate of Occupancy
- Engineering Division Checklist for Improvement Location Survey
- Improvement Location Survey
- Copy of approved construction plans
- Copy of approved construction plans with revisions
- Copy of retaining wall plans
- Copy of retaining wall plans with revisions
- Engineering Division Site Inspection Certification Sign-Off
- Engineering Division Field Inspection Record Form
- Engineering Division Drainage Certification Sign-Off
- Engineering Division Retaining Wall Certification Sign-Off
- Engineering Division Retaining Wall Field Inspection Record Form
- Engineering Division Checklist for Operations & Maintenance Plan Report
- Final Operations and Maintenance Plan Report

Standard Construction Notes

Site and Subdivision Plans

1. A Highway Permit is required for all work within the Town of Greenwich – Right of Way.
2. All work within the Town of Greenwich – Right of Way shall be constructed to Town of Greenwich Standards.
3. Catch basins for private driveways shall have a minimum grate of two feet by two feet. If the driveway is curbed the catch basin shall have a minimum curb inlet of six inches. Each driveway catch basin shall also have a two-foot sump and bell trap.
4. All drainage connections to the Town drainage system shall be gravity lines. If a discharge from a sump pump is connected to the Town drainage system it must discharge to a drainage structure on private property and then be connected to the Town drainage system. All sump pumps require a backflow preventer (check valve) between the pump and the drainage structure. A Drain Connection Permit from the Highway Division is required for all connections to the Town drainage system.
5. The Engineering Division of the Department of Public Works shall be notified three days prior to the commencement of construction within the Town of Greenwich – Right of Way.
6. In roadway cuts, subdrains shall be required if seepage occurs during construction or within one year after road construction is completed and accepted, even though plans may have been approved without subdrains and/or roadway construction has been completed.
7. All retaining walls greater than three feet are required to be designed, and inspected during construction by a Professional Engineer Registered in the State of Connecticut. A Retaining Wall Certification Sign-Off and Retaining Wall Field Inspection Record form shall be submitted prior to the issuance of a Certificate of Occupancy.
8. All detention/retention systems shall be installed per manufacturers specifications. All systems shall use a manifold system to distribute runoff evenly into each row of infiltrators. The manifold shall be installed on the inlet and overflow sides when not handling the first flush and only on the inlet side when a first flush system is being installed.
9. All infiltrators shall be a minimum two feet above high groundwater, three feet above ledge and have a minimum percolation rate of one inch in twenty minutes. Exfiltration can be used in sizing the system only if the soil permeability is determined by a constant or falling head test. The percolation rate can't be used in sizing of the infiltrator system. Prior to installation of the infiltrators, an additional deep test hole and percolation test shall be performed, and the resident engineer shall verify that the proposed location for the infiltrators meets the above requirements.
10. The following shall be submitted upon completion of work and prior to the issuance of a Certificate of Occupancy:
 - Engineering Division Checklist for Certificate of Occupancy
 - Engineering Division Checklist for Improvement Location Survey
 - Improvement Location Survey
 - Copy of approved construction plans
 - Copy of approved construction plans with revisions
 - Copy of retaining wall plans
 - Copy of retaining wall plans with revisions
 - Engineering Division Site Inspection Certification Sign-Off
 - Engineering Division Field Inspection Record Form
 - Engineering Division Drainage Certification Sign-Off
 - Engineering Division Retaining Wall Certification Sign-Off
 - Engineering Division Retaining Wall Field Inspection Record Form
 - Engineering Division Checklist for Operation & Maintenance Plan
 - Final Operations and Maintenance Plan Report



Amy J. Siebert, P.E.
Commissioner of Public Works

Standard Notes

Subdivision Record Plan

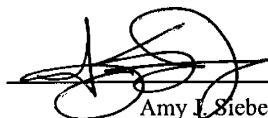
All plans that show a drainage course shall include the following note:

As a protection to the Town of Greenwich, Owner shall include clause in all deeds of sale to the effect that rights-of-way for drainage will be reserved. Upon approval of this subdivision plan, the owner or owners agree with the Town of Greenwich, that unless otherwise specified hereon, the affected areas of any drainage easement or the areas within at least ten (10) feet of the centerline (20 feet total) of any drainage swale, ditch or stream shown hereon are dedicated for drainage; that no building or other structure shall be located thereon and that the Town shall be under no obligation to enclose such drainage. However, any drainage line, ditch or stream, whether or not shown hereon, and not within established easement shown hereon, may be relocated by owner, with the approval of the Inland Wetlands & Watercourses Agency, where required.

The grantee of all parcels having a watercourse agrees to maintain the watercourse so as to permit the free flowing of water therein. Should any such grantee fail to maintain the obligation herein imposed, the Town of Greenwich shall have the privilege of entering upon said property and doing the required work, and the cost thereof shall be paid by the owner of the land in default.

All plans that show an area reserved for flood control shall include the following note or appropriate modification thereof:

Unless otherwise approved by the Commissioner of Public Works, that portion of the parks and playground area and lots ____ and ____ as shown on the plan, shall be reserved for flood control purposes. The Commissioner reserves the right to enter the property and alter the discharge structure in the future, if deemed necessary, to improve the flood control characteristics of the detention area. The integrity of the detention area, discharge headwall and other related drainage facilities must be maintained by the Association of property owners within the subdivision. Should any such Association fail to maintain the obligation herein imposed, the Town of Greenwich shall have the privilege to enter upon said property and perform the required work and the cost thereof shall be paid by the Association in default.



Amy L. Siebert, P.E.
Commissioner of Public Works

Checklist for Drainage Summary Report

Project Name: _____

Project Address: _____

| Included | N/A | Name of Item | Staff Use | | |
|--------------------------|--------------------------|--|--------------------------|--------------------------|--------------------------|
| | | | Agree | Disagree | Must Submit |
| <input type="checkbox"/> | <input type="checkbox"/> | Project Narrative | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Soil Maps | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Borings/Test pits | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Percolation/Permeability Tests | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Water Quality Volume (WQV) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Water Quality Flow (WQF) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Groundwater Recharge Volume (GRV) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Peak Runoff Existing & Proposed: 1, 2, 5, 10, 25, 50, & 100-Year | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Watershed Map Existing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Watershed Map Proposed | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Time of Concentration | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Imperviousness of Entire Site and Each Watershed | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | NRCS Runoff Curve Numbers | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Stream Channel Protection: 2-Year Frequency (“over-control” of 2-year storm) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Conveyance Protection: 10-year | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Peak Runoff Attenuation: 2, 5, 10, & 25-Year | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Emergency Outlet Sizing: Safely Pass the 100-Year | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Hydrograph Routing Calc’s | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Culvert Capacity Calc’s | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Downstream Analysis | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Town Storm Drain Calc’s | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Gutter Flow Calc’s | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Outlet Protection Calc’s | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Supporting Documents | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Sealed and Signed By a Professional Engineer | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Engineer’s Name: _____

Engineering Firm’s Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Checklist for New and Improved Driveways

Project Name: _____

Project Address: _____

| Included | N/A | Name of Item | Staff Use | | |
|--------------------------|--------------------------|--|--------------------------|--------------------------|--------------------------|
| | | | Agree | Disagree | Must Submit |
| <input type="checkbox"/> | <input type="checkbox"/> | Sight Distance on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Width at Property on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Width at Roadway on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Distance to Intersection on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Distance between Driveways on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Distance from Property Line to Driveway on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Driveway Entrance Type on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | TOG Driveway Entrance Details on Plans | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | TOG Curb Details on Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Lot < 50 LF only one Driveway | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Maximum of Two Driveways | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Must use TOG Bituminous Concrete or Concrete Apron – No Exceptions | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | 3% to 6% Grade for First Five Feet of Driveway | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | After First Five Feet The Next 20 Feet Shall Be A Maximum Grade of 4% | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Sight Distance must meet TOG Minimum Required | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | No Permanent Structures or Plantings in TOG ROW | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Minimum 25 Feet from Edge of Roadway to Gates | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Minimum 20 Foot Setback for Garage on Corner Lot | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Variance Requires Approval from Commissioner of DPW | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Driveway Profile Plan from Edge of Roadway to Garage | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | New Driveway Sight Line Plan Must be A-2 and T-2 Accuracy | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | New Driveway Sight Line Plan Must be for entire Lot Frontage between TOG ROW | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Engineer's Name: _____

Engineering Firm's Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Checklist for Certificate of Occupancy

Project Name: _____

Project Address: _____

| Included | | N/A | Name of Item | Staff Use | | |
|--------------------------|--|--------------------------|--|--------------------------|--------------------------|--------------------------|
| | | | | Agree | Disagree | Must Submit |
| <input type="checkbox"/> | | <input type="checkbox"/> | Engineering Division Checklist for Improvement Location Survey | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Improvement Location Survey | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Copy of Approved Plans | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Copy of Approved Plans with Revisions | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Copy of Retaining Wall Plans | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Copy of Retaining Wall Plans with Revisions | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Engineering Division Site Inspection Certification Sign-Off | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Engineering Division Field Inspection Record Form | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Engineering Division Drainage Certification Sign-Off | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Engineering Division Retaining Wall Certification Sign-Off | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Engineering Division Retaining Wall Field Inspection Record Form | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Engineering Division Checklist for Operations & Maintenance Plan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | Final Operations & Maintenance Plan Report | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Engineer's Name: _____

Engineering Firm's Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Checklist for Improvement Survey Depicting “As-Built” Conditions

Project Name: _____

Project Address: _____

| Included | N/A | Name of Item | Staff Use | Staff Use | Staff Use |
|--------------------------|--------------------------|---|--------------------------|--------------------------|--------------------------|
| | | | Agree | Disagree | Must Submit |
| <input type="checkbox"/> | <input type="checkbox"/> | Property Lines | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Buildings, Garage, Etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Patios, Walks, Etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Driveways, Roads, Etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Tennis Court, Pool, Etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Fence, Walls, Etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Top & Bottom Elevation of Walls | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Spot Elevations | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | One Foot Contours | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Catch Basins, Manhole, Etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Roof Down Spout Locations and Entire Pipe Network to Discharge | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Footing Drain Network to Discharge | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | All Pipes Shall Have Type and Size Shown | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Underground Systems Shall Show Number of Units, Size, Model#, Bottom Elevation, Invert Elevation In and Out | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Control Structures Shall Show Outlet Type, Size, and Elevation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Scour Holes/Level Spreader, Etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Elevation of Discharge Outlets | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Invert Elevations for All Pipes | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Cover & Grate Elevations | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Inspection & Maintenance Schedules | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | Sealed and Signed by a State of Connecticut Licensed Surveyor | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Engineer’s Name: _____

Engineering Firm’s Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Site Inspection Certification Sign-Off

Project Name: _____

Project Address: _____

Engineer's Name: _____

Engineering Firm's Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

I hereby declare that on-site inspection of the project, while in progress, was provided under my supervision and that the drainage system and site work, including construction of sidewalk, curb, driveway, roads, handicap ramp, and all other related work except retaining walls, have been completed in accordance with the approved plans entitled

_____ dated _____

and revised _____. The Improvement Location Survey depicting "As-Built"

conditions and entitled _____

dated _____ and revised _____ has been included for the Engineering Division records. Attach Field Inspection Record form. Any additional information shall be added below.

Engineer's Signature _____ Date _____

Engineer's Seal

Drainage Certification Sign-Off

Project Name: _____

Project Address: _____

Engineer's Name: _____

Engineering Firm's Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

I hereby declare that the drainage system has been designed according to the Town of Greenwich – Engineering Division Drainage Manual dated January 1978 as amended October 13, 2008. Based on our Drainage Summary Report, Field Inspection Record, and the Improvement Location Survey depicting “As-Built” conditions and entitled

_____ dated _____

and revised _____. It is our professional opinion that the drainage system as designed and constructed will not have an adverse effect on offsite properties or offsite drainage infrastructure.

Engineer's Signature _____ Date _____

Engineer's Seal

Retaining Wall Certification Sign-Off

Project Name: _____

Project Address: _____

Engineer's Name: _____

Engineering Firm's Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

I hereby declare that the design and on-site inspection of all retaining walls greater than three feet, while in progress, was provided under my supervision and that they have been completed in accordance with the approved plans entitled

_____ dated _____

and revised _____. It is our professional opinion that all retaining walls greater than three feet as designed and constructed are structurally safe. Attach Retaining Wall Inspection Record form. Any additional information shall be added below.

Engineer's Signature _____ Date _____

Engineer's Seal

Field Inspection Record

Project Name: _____

Project Address: _____

Engineer's Name: _____

Engineering Firm's Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Construction Start Date: _____

| Inspection Number | Inspection Type | Inspection Date | Inspector's Name | Inspector's Signature | Attached Photos |
|---------------------|--|-----------------|------------------|-----------------------|--|
| 1 | E&S Controls at start of construction | | | | <input checked="" type="checkbox"/> Required |
| 2 | Soils verification for detention/retention systems | | | | <input checked="" type="checkbox"/> Required |
| 3 | Detention/Retention systems prior to backfilling | | | | <input checked="" type="checkbox"/> Required |
| 4 | Final site inspection | | | | <input checked="" type="checkbox"/> Required |
| Routine Inspections | | | | | |
| 5 | <input type="checkbox"/> Overall site inspection <input type="checkbox"/> Site inspection for possible revisions <input type="checkbox"/> Site inspection of revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 6 | <input type="checkbox"/> Overall site inspection <input type="checkbox"/> Site inspection for possible revisions <input type="checkbox"/> Site inspection of revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7 | <input type="checkbox"/> Overall site inspection <input type="checkbox"/> Site inspection for possible revisions <input type="checkbox"/> Site inspection of revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 8 | <input type="checkbox"/> Overall site inspection <input type="checkbox"/> Site inspection for possible revisions <input type="checkbox"/> Site inspection of revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 9 | <input type="checkbox"/> Overall site inspection <input type="checkbox"/> Site inspection for possible revisions <input type="checkbox"/> Site inspection of revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 10 | <input type="checkbox"/> Overall site inspection <input type="checkbox"/> Site inspection for possible revisions <input type="checkbox"/> Site inspection of revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |

Engineer's Signature _____ Date _____

 Engineer's Seal

Retaining Wall Field Inspection Record

Project Name: _____

Project Address: _____

Engineer's Name: _____

Engineering Firm's Name: _____

Street Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Construction Start Date: _____

| Inspection Number | Inspection Type | Inspection Date | Inspector's Name | Inspector's Signature | Attached Photos |
|---------------------|--|-----------------|------------------|-----------------------|--|
| 1 | Soil inspection for retaining wall footings | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 2 | Footings for retaining walls | | | | <input checked="" type="checkbox"/> Required |
| 3 | Retaining wall inspections during construction | | | | <input checked="" type="checkbox"/> Required |
| 4 | Retaining wall inspections upon completion | | | | <input checked="" type="checkbox"/> Required |
| Routine Inspections | | | | | |
| 5 | <input type="checkbox"/> Retaining wall inspection <input type="checkbox"/> Retaining wall inspection for revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 6 | <input type="checkbox"/> Retaining wall inspection <input type="checkbox"/> Retaining wall inspection for revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7 | <input type="checkbox"/> Retaining wall inspection <input type="checkbox"/> Retaining wall inspection for revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 8 | <input type="checkbox"/> Retaining wall inspection <input type="checkbox"/> Retaining wall inspection for revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 9 | <input type="checkbox"/> Retaining wall inspection <input type="checkbox"/> Retaining wall inspection for revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 10 | <input type="checkbox"/> Retaining wall inspection <input type="checkbox"/> Retaining wall inspection for revisions | | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |

Engineer's Signature _____ Date _____

 Engineer's Seal

