



SITE DEVELOPMENT PERMIT CHECKLIST

This list is not for small single-family residences and duplex developments. Please note, this list is not intended to be an exhaustive list of comments that could be made during a review but, rather, an extensive list of common requirements to facilitate in the creation and design of plans.

STANDARD COMMENTS

Project Thresholds

- ☐ Once a site has been improved to a value equal to or greater than 50% of the site's assessed appraised or recent sale value (whichever is greater) over a rolling five-year duration, it has met Substantial Investment (SI), and the site must be brought into compliance with the City of Knoxville Code of Ordinances Chapter 22.5 (*Stormwater Ordinance*).
- ☐ When a building permit is not being applied for, a maximum of 25% of trees can be removed from the property within a 5-year period.
- ☐ If one acre or more of area is to be disturbed, a SWPPP and completed City of Knoxville NOI form must be submitted. See the "Qualified Local Program Construction General Permit" in the *Land Development Manual* for SWPPP requirements.
- ☐ A TDOT entrance permit must be obtained for all state routes.
- ☐ A Traffic Impact Study is required for developments with 400 or more parking spaces or as specified Knoxville Knox County Planning.
- ☐ Traffic safety hazards should be eased or eliminated. Engineering can take changes into consideration to mitigate any 'domino' effects.
- ☐ Ensure attenuation/detention requirements are met per the *Stormwater Ordinance*.
- ☐ Provide a downstream study if a site will have 0.5 acres or more of impervious and meets "Substantial Investment." A study is also required when a site is required to provide attenuation.
- ☐ Ensure the site meets the first flush requirements specified in the Stormwater Ordinance. See the Land Development Manual for prescribed treatment methods (e.g., stormwater basin, proprietary water quality devices, infiltration systems).
- ☐ A Special Pollution Abatement Permit (SPAP) shall be required for the following land hot spots:
 1. Vehicle, truck, or equipment maintenance, fueling, washing, or storage areas, e.g. automotive dealerships, automotive repair shops, and car wash facilities;
 2. Any development (or common development) containing more than four hundred (400) surface parking spaces or one hundred twenty thousand (120,000) square feet or more of surface parking area;
 3. Recycling and salvage yard facilities;
 4. Restaurants, grocery stores, and other food service facilities;

5. Commercial facilities with outside animal housing areas, e.g. animal shelters, fish hatcheries, kennels, livestock stables, veterinary clinics, and zoos; and
 6. Other producers of pollutants identified by the Director.
- ☐ If a new structure is being constructed in the floodplain, the structure's finished floor elevation must be raised to a minimum of one foot above the base flood elevation (500-year), or the structure must be floodproofed to an elevation equal to or greater than one foot above the base flood elevation in accordance with Chapter 12 of the City of Knoxville Code of Ordinance. Please note, single-family residential structures may not be floodproofed. Exception: Structures in floodplains for along any TVA dam-controlled river (Tennessee, French Broad, Holston) must be elevated or floodproofed to no lower than three feet above the 100-year flood elevation.
 - ☐ If an existing structure meets FEMA substantial improvement criteria. The structure must be properly elevated and/or floodproofed. If the applicant believes the improvements do not meet the substantial improvement criteria, an appraisal of the existing building may be submitted.
 - ☐ If the applicant believes the existing building is sufficiently elevated, submit a FEMA Elevation Certificate.
 - ☐ If a project in the floodplain proposes work in the "No-Fill" area or Floodway, a No-Rise may be required. See the "No-Rise Certification for Floodway Encroachment" and "No-Rise Certification for Fill Line Area Encroachment" policies of the LDM for more information.

Information

- ☐ Indicate the city block # on the site development plan.
- ☐ Indicate the Parcel ID # on the site development plan.
- ☐ Show the names, phone numbers, and addresses of all interested parties (Owner, Developer, and Design Professional) on the site development plan.
- ☐ Show and label a vicinity map with all adjacent streets on the plans.
- ☐ Ensure that all plans have a graphical scale.
- ☐ Ensure that all plans have a north arrow.
- ☐ Ensure that all plans are stamped & signed by professional engineer, landscape architect, or architect registered in TN.
- ☐ Calculate the total site acreage, total disturbed area, total existing impervious area, total vehicular use area, and total post developed impervious area (including any pervious pavers) and show the values on the drawings.
- ☐ Prior to plan approval, any stamps saying, "Not for Construction", "Preliminary", etc. should be removed from the plans.
- ☐ Ensure proposed structures, retaining walls, detention ponds, and infiltration areas do not conflict with existing utility and drainage easements.
- ☐ If creating a subdivision of 6 or more lots, it is required to provide three permanent monuments. Identify the monuments on the plans.
- ☐ Provide a site plan showing the routing of all proposed utilities.

- ☐ On the layout plan, identify all ROW repairs due to utility work. Repairs should be in accordance with detail COK-12; provide detail with plans.

Existing Conditions

- ☐ Clearly label all existing features to either remain or to be removed.
- ☐ Clearly show and label all property lines.
- ☐ Show and label any existing easements.
- ☐ Show all existing drainage features and label them correctly with inverts.
- ☐ Show the no-fill line, riparian buffer zone, floodway, 500-year floodplain, and 100-year floodplain on the site plans.
- ☐ Identify closed depressions on the site plan, and ensure compliance with Chapter 22.5 of the City Code.
- ☐ Identify any blue-line streams or wetlands on the plans. If streams or wetlands are modified, an ARAP must be issued by TDEC.
- ☐ If a storm pipe exists under an existing building, the storm system must be rerouted, and the existing pipe must be abandoned per City of Knoxville specifications.
- ☐ Grading
- ☐ Ensure contours are legible and are labeled, at a minimum, every 10 elevation feet (existing and proposed).
- ☐ Show all existing and proposed contours at 2' intervals (maximum).
- ☐ Ensure that all proposed contour lines tie back in properly.
- ☐ Obtain adjacent property owners' written permission for any grading on their property.
- ☐ The maximum allowable slope is 2H:1V. Proposed permanent soil stabilization measures may be considered if provided and designed by an appropriate design professional.
- ☐ Ensure proposed retaining walls meet the requirements of the retaining wall policy in the Land Development Manual.

TRANSPORTATION

Streets and ROW

- ☐ Provide a roadway section showing the width of the base under curb, prime coat, and tack coat in accordance with the Land Development Manual.
- ☐ Include a note on the plans to contact the City Sign & Marking Division at 865-215-6720 prior to installation of any ROW signs/or markings for in-field verification.
- ☐ Encroachments into the ROW are not permissible.
- ☐ Specify on the site plans whether proposed roads will be public or private right-of-way per the Knoxville-Knox County Planning Subdivision Regulations.
- ☐ Provide horizontal curve information for each proposed street; ensure compliance with AASHTO standards.

- ☐ Provide vertical curve information for each proposed street; ensure compliance with AASHTO standards.
- ☐ ROW curbing is required to meet the requirements of TDOT detail RP-VC-10. Include a detail with the drawings.
- ☐ Steep slopes are not allowed in the road's clear zone, provide a 10 ft clear zone from edge of street (max grade 4%).
- ☐ Submit a Street Signage Plan with locations and details for all subdivisions.
- ☐ Prior to performing work in the ROW, obtain a traffic control permit from the City of Knoxville Division of Traffic Engineering (roadclosures@knoxvilletn.gov).
- ☐ Provide a note on the site plan stating contractor is responsible for repairing ROW elements damaged during construction per City of Knoxville standards.
- ☐ Clarify on the site plans if any utility poles are being removed or relocated. Clearly show on the plans where utilities are being relocated. Coordinate relocation with the appropriate utility providers.
- ☐ Clarify on the site plans if any existing streetlights are to be removed. Coordinate replacement of the lights with the City of Knoxville Streetlight Coordinator (streetlighting@knoxvilletn.gov).
- ☐ The minimum allowable width for a drive through lane is 10 feet.

Driveways

- ☐ A stamped drawing showing the appropriate sight distance triangles for all driveways and street intersections may be required. The sight distance submittal shall specify the required sight distance per AASHTO (Green Book 7th Edition), the posted speed limit, the grades of the roadways, and all assumptions. Utilize AASHTO stopping sight distance for driveways sight triangles. Ensure there are no vertical (e.g. plants or utilities) or horizontal obstructions; provide sight line profiles when appropriate.
- ☐ The maximum allowed driveway slope is 15%.
- ☐ The number of driveways provided must be less than or equal to the maximum allowed in Article 11 Table 11-5 of the Zoning Ordinance.
- ☐ The minimum driveway spacing from an intersection must comply with Article 11 Table 11-6 of the Zoning Ordinance.
- ☐ Driveways in a development must be separated by a minimum distance equal to the width of the wider driveway.
- ☐ Provide written consent from neighboring property owner for curb cuts encroaching on the frontage of an adjacent property.
- ☐ Entrances need to meet the requirements of TDOT detail RP-D-15 or RP-D-16. Include a detail with the plans. When proposing a RP-D-16 Type-C driveway, provide a flat panel of sidewalk on either side of the driveway prior to providing a ramp.
- ☐ The driveway radius should not be depicted as extending through the sidewalk.
- ☐ Right-in and right-out driveways must be oriented at an angle which ensures compliance (e.g. 30 degrees). TDOT lowered curb must continue through the driveway. Sidewalk must continue through the driveway, and all joints must be perpendicular to sidewalk edges. Right-in and right-

out island curbing must be angled back or rounded to prevent tire damage (e.g. RP-SC-1). Where curb heights transition, the curb should be tapered.

- ☐ The driveway and curb cut widths must comply with Article 11 Table 11-7 of the Zoning Ordinance. Provide appropriate dimensions on the site plans.
- ☐ Remove unused driveways and curb cuts. Right-of-way curbing, gutter, sidewalk and landscaping are to be reinstalled per City standards at these locations.

Parking Lots

- ☐ Identify the proposed location of the dumpster. Depending on the dumpster location, a turning template may be required to verify that it can be properly serviced. If a dumpster is not proposed, clarify this fact on the submittal. The City of Knoxville Solid Waste Department can issue (with a subscription fee) a maximum of one push cart to a commercial site.
- ☐ If dumpster pad is proposed show on plans for pad to be raised approximately two (2) to four (4) inches above grade to prevent stormwater flow across pad. Show spot elevations for dumpster pad(s). Catch basins should not be located under or directly adjacent to dumpster pads. When possible direct flow from pad into grass or vegetated area this should not cause the runoff to bypass any required attenuation or water quality device.
- ☐ Ensure the site does not cause queuing into the right-of-way.
- ☐ Parking lots must be setback from the ROW property line at least 25 feet if it shares frontage (in the same block) with a residentially zoned property on a street with less than 4 lanes. This does not apply to multi-family dwelling.
- ☐ The minimum parking lot setback from the ROW for parking lots 20,000 ft² or larger is 10 feet.
- ☐ The minimum parking lot setback from the ROW for parking lots less than 20,000 ft² is 6 feet.
- ☐ Minimum parking lot setback for Industrial zones abutting Agricultural or Residential zones is 20 feet
- ☐ Minimum parking lot setback for Office or Commercial zones abutting Agricultural or Residential zones is 20 feet
- ☐ Minimum parking lot setback for Multi-dwelling structures/developments abutting Agricultural or SFR zones is 10 feet
- ☐ Minimum parking lot setback for Non-residential uses in Agricultural or Residential zones is 10 feet
- ☐ All parking spaces must comply with the minimums and maximums in Article 11.5 Table 11-4 of the Zoning Ordinance.
- ☐ All drive aisles must comply with the minimums and maximums in Article 11.5 Table 11-4 of the Zoning Ordinance.
- ☐ The number of compact vehicle spaces must be 20% or less than the total provided spaces.
- ☐ Compact spaces should be clustered together.
- ☐ Compact spaces must be marked with signs restricting their use.
- ☐ Ensure all compact spaces meet the minimum requirements of Article 11.5 of the Zoning Ordinance.

- ☐ For parking modules with parking on one side, the maximum protrusion into the modules (space depth) is 1 foot.
 - ☐ For parking modules with parking on two sides, the maximum protrusion (space depth) 2 feet (1' for each parking row).
 - ☐ Protrusions into parking modules may not affect more than 25% of the parking spaces.
 - ☐ All parking spaces must be designed so that drivers are not required to back into a public street.
 - ☐ When vehicles are required to back into an alley, the alley plus the on-site parking aisle must meet the minimum aisle width.
 - ☐ The maximum grade allowed in parking spaces and drive aisles is 10%.
 - ☐ Surface drainage from the 10-year 24-hour storm is required to be collected so as to preclude uncontrolled drainage onto the paved portion of street rights-of-way.
 - ☐ A divider median is required at a minimum interval of one median per every 6 parking rows.
 - ☐ Parking rows must be terminated at both ends with terminal islands with a minimum area of 120 ft².
 - ☐ Interior islands must have a minimum area of 120 ft² for each parking row that they interrupt.
 - ☐ All areas devoted to permanent off-street parking surfaced as to control dust, rutting, erosion as a result of continuous use, and migration of surface materials.
 - ☐ All parking spaces must be clearly delineated
- Gravel parking lots must be designed to prevent migration and rutting and must control dust.
- Provide a border (e.g. curbing, fencing, or landscape timbers) to control migration.
 - Provide an appropriate grid system (e.g. flush curbs, flush landscape timbers, or manufactured grid system) to prevent rutting.
 - Gravel lots should only use clean stone to control dust.
- ☐ All vehicular and pedestrian signs must be MUTCD compliant

Sidewalks

- ☐ Sidewalks must meet the requirements of City of Knoxville details COK-6 and COK-13.
- ☐ If proposed curbing or sidewalk eliminates a roadside ditch, provide an adequate drainage system.
- ☐ Provide spot elevations at the four corners of all ROW sidewalk ramps and turning panels to ensure ADA compliance.
- ☐ Provide a 4-foot minimum accessible path (exclusive of curb width) around all obstacles in the sidewalk area.
- ☐ Provide details for crosswalk repair. Crosswalk shall be composed of 10 ft long bars, 12 in wide bars, 2 ft gaps, parallel with traffic, thermoplastic, and retroreflective.

Bicycles

- ☐ Provide the number of bicycle spaces equal to or greater than the minimums shown in Article 11 Table 11-8 of the Zoning Ordinance.

- ☐ The required bicycle parking spaces are required to be located in a convenient and visible area within fifty (50) feet of a principal entrance.
- ☐ Bicycle parking facilities must be sufficiently separated from motor vehicle parking areas (e.g. grade separation, distance or physical barrier, such as curbs, wheel stops, poles, or other similar features)
- ☐ Users must not be required to climb or descend stairs in order to access the bicycle parking facility unless there is a bicycle wheel through parallel to the stairs
- ☐ Bicycle parking must not impede pedestrian or accessible routes.
- ☐ Bicycle parking spaces must include a rack which permits the locking of the bicycle frame and one wheel to the rack or fixture and support bicycles in a stable position without damage to the wheels, frame, or components.
- ☐ Bicycle racks must be spaced 3.0' from the side of the rack to any obstruction, including edge of pavement. Clearly demonstrate this on plans/details.
- ☐ Bicycle racks must be spaced 3.0' forwards or backwards from the centerline of the rack to any obstruction, including edge of pavement. Clearly demonstrate this on plans/details.
- ☐ Bicycle racks must be spaced 4.0' from the side of the rack to another bike rack. Clearly demonstrate this on plans/details.
- ☐ Bicycle racks must be spaced 10.0' feet forwards or backwards from the centerline of the rack to the centerline of another bike rack. Clearly demonstrate this on plans/details.
- ☐ Bicycle parking and access to bicycle parking must be surfaced as to control dust, rutting, erosion resulting from continuous use, and migration of surface materials.

DRAINAGE AND STORMWATER

General

- ☐ If removing or abandoning any stormwater pipes, add a note to the plans to contact the City of Knoxville Department of Engineering 865-215-2148 prior to removing or abandoning any stormwater pipes. Pipes structures must be either completely removed or abandoned in place; Indicate which method will be used, as well as the associated requirement on the plans.
 - If removed, any remaining structures that were tied to the pipe must be repaired per City or TDOT standards. A formal inspection by City Engineering staff (or 3rd party PE) of the repair is required before covering up.
 - If the pipe will be abandoned in place, the ends of the pipe must be blocked off per City or TDOT standards. The entire volume of the pipe must then be filled with flowable fill or concrete. A City Engineering inspector (or 3rd party PE) must be present for this work.
- ☐ Ensure all required stormwater easements (e.g. detention, retention, access, water quality facility, drainage, etc.) are provided. See the *Stormwater Ordinance* and the *Land Development Manual* for further guidance.
- ☐ Detention and Retention easements must be 5 feet outside the top of the cut slope and 5 feet outside the toe of the fill slope.

If the top of cut cannot be located, the easement shall be 5 feet outside of the top of berm elevation. If the toe of a fill slope cannot be located, the distance of the easement's extent shall be

determined by including the following distances: 5 feet for the berm width plus 5 feet for the outside of the toe width plus the top of berm elevation minus the bottom of pond elevation (this creates a theoretical 1:1 slope distance).

- ☐ Water quality easements fully encompass the treatment device and must be a minimum of 20' by 20' square.
- ☐ "Access Easements" are required for all detention facilities and water quality devices on the plan. The access easement must be traversable from the right-of-way and a minimum of 20 feet wide. A "Blanket Access Easement" may be granted in lieu of a specific access easement.
- ☐ Stormwater systems must discharge to a natural or manmade stormwater facility, or be discharged in a manner that does not create an erosive or safety condition.
- ☐ Provide drainage easements for through-water pipe systems crossing property lines.
- ☐ Downstream studies must include calculations showing the capability of the receiving stormwater facility to convey the 2-year and 10-year frequency storms. The calculations must be routed through the second existing street crossing, a blue-line stream, interstate right-of-way, railroad right-of-way, or off-site stormwater detention, whichever is closest. Failure of the downstream study may result in detention or alternate mitigation being required. Provide the following:
 - Narrative summary including a tabular summary of results,
 - Detailed pre- and post- delineated drainage maps that include contours.
 - Map and/or detailed description of the downstream system.
 - Pre- and post- developed acreage, curve numbers, and time of concentration.
 - A statement ensuring that the downstream system's existence, location, and functionality have been verified and any known problems have been identified.
- ☐ Riparian buffer zones are either 30 or 60 feet wide measured horizontally from the top of a stream bank or the width of the floodway whichever is greater. Typically, riparian buffers should be planted with 3 tiers (height) of plants that are clustered in a way seen in natural buffers. These tiers include trees, shrubs, and grasses. Plants in the buffer must be native and non-invasive to east Tennessee.

General Calculations

- ☐ Stormwater calculations should be prepared and stamped by a professional engineer.
- ☐ Stormwater calculations must include all required storm events per the *Stormwater Ordinance*. Calculations must include a report from the modeling software. The report should include drainage area information, curve numbers, times of concentration, and all other required input data. The report from the modeling software must specify the output flows and volumes (for sites requiring retention) at all outfall points for all design storms.
- ☐ CN 98 should be used for the pond's 100-year water surface elevation.
- ☐ The city standard design storms are as follows: 1-year - 2.5in; 2-year - 3.0in; 5- year - 3.7in; 10- year - 4.3in; 25- year - 5.0in; 50- year - 5.7in; and 100- year - 6.3in
- ☐ Required hydrologic and hydraulic computation shall be in accordance with NRCS unit hydrograph procedures using AMC II curve numbers and type II rainfall distribution.
- ☐ When using the rational method for pipe calculations, the flows must be verified using an NRCS method. This can be done by running the NRCS method for a pipe system's entire drainage area

and comparing that flow the Rational flow. If the flow from the Rational method is lower, the intensity should be increased so that the rational flow is equal to or greater than the NRCS flow.

- ☐ Provide pre- and post-developed drainage maps.
- ☐ Provide a breakdown of the CN calculations including the TR-55 category for each component CN.
- ☐ Provide the t_c calculation for any time of concentration greater than the minimum. Include the 3 component time-of-concentration parts: Sheet Flow, Shallow Concentrated, and Open Channel.
- ☐ Indicate, on the drainage maps, the critical path used for calculating all times of concentration greater than the minimum.
- ☐ Ensure off-site run-on is adequately addressed.

Pipes and Storm System

- ☐ Show all pipe sizes, lengths, slopes, inverts, and construction material on the plans.
- ☐ Provide details for all drainage structures (catch basins, manholes, etc.)
- ☐ Drainage pipes only collecting on-site runoff must be constructed of RCP, HDPE, DWPVC, or PPP.
- ☐ Steep pipes require anti-seep collars. Pipes with slopes between 12% and 35% require anti-seep collars or junction boxes every 35'. Pipes with slopes between 35% and 50% require anti-seep collars or junction boxes every 25'. The anti-seep collars should be placed against the downgrade side of the pipe bell. Provide a detail for anti-seep collar.
- ☐ Catch basins or junction boxes are required at all changes in grade, direction, pipe material, and pipe size.
- ☐ All catch basins in the ROW require a penta-headed bolt type locking system. (See a current revision of City of Knoxville standard detail COK-10).
- ☐ All storm pipes must have a minimum slope of 0.5%.
- ☐ Grass lined ditches must have a minimum slope of 2%.
- ☐ All catch basins, area drain grates, and manhole covers require a permanently cast environmental message or stamped medallion, i.e. "no dumping drains to river". Indicate this on a detail.
- ☐ Provide a detail for storm pipe trenches that are within the right-of-way; see City of Knoxville standard detail COK-5. Storm trenches under pavement or in the right-of-way require crush-and-run backfill from the spring line. 57 stone backfill is not allowed. Additionally, the minimum clearance from the top of pipe to the bottom of the subgrade is 1 foot.
- ☐ Ensure the top of catch basin elevations align with adjacent topographic information.
- ☐ Submit pipe, ditch, HGL, and catch basin inlet calculations.
- ☐ All through-water storm systems must be constructed with RCP (Exemptions may apply to common developments)
- ☐ All storm systems in the ROW must be constructed with RCP.
- ☐ All stormwater pipes, other than roof drains, must have a minimum diameter of 15".
- ☐ Provide a backfill detail for stormwater pipes.

Water Quality

- ☐ Include necessary calculations and specifications with the Special Pollution Abatement Permit (SPAP) submittal.
- ☐ Attach the following to SPAP applications: a site plan showing all proposed water quality facilities, their details, and operation and maintenance information.
- ☐ Proprietary Stormwater Control Measures (SCMs) that are acceptable to use for water quality treatment may be found on the list of approved stormwater manufactured treatment devices published by the New Jersey Department of Environmental Protection (NJDEP) at the following website: <http://www.nj.gov/dep/stormwater/treatment.html>.
- ☐ Water quality units must match the orientation in which they are certified by NJDEP (e.g. one inlet pipe and no grate inlet).
- ☐ Provide a site-specific detail for the proposed water quality unit including the units top elevation inverts.
- ☐ When proposing a flow-through-water quality device, provide calculations showing that floatable pollutants will not be released in the lesser of the upstream pipe capacity or the 100-year storm.
- ☐ When proposing a flow-through-water quality device in the 100-year floodplain, provide documentation showing the unit will not release floatables in the 100-year flood.

Attenuation

- ☐ Stormwater retention is required for areas draining to sinkholes if the site is required to provide a stormwater basin per the *Stormwater Ordinance*.
- ☐ Stormwater retention is required for projects located in a critical watershed if the site is required to provide a stormwater basin per the *Stormwater Ordinance*. See the *Stormwater Ordinance* for a list of critical watersheds.
- ☐ No woody vegetation may be placed within the storage area of the stormwater basin.
- ☐ Trees may not be planted in a stormwater basin or on its berm.
- ☐ Provide a removable and lockable trash rack on the riser.
- ☐ The outlet control structure and culvert should be made from RCP, concrete, or sturdy masonry.
- ☐ Detention Basins with low flow orifices (less than 15 inches) must have a filter box at the outlet structure's lowest orifice that is easily constructed and maintained. The filter box should be minimum 18" all directions, with hinged lid, and 2"-3" stone D50. The box may not allow the stone to escape.
- ☐ The minimum slope in the bottom of stormwater basins is 2% towards the outlet control structure.
- ☐ All inlet pipes should be located as far as possible from the outlet control structure.
- ☐ Stormwater basins must have a traversable 20 ft wide path between the access easement and the bottom of the pond. Maximum allowable slope is 3:1.
- ☐ If sumping a stormwater basin the following comments apply:
 - The sumped area cannot be used in detention calculations
 - The basin must be aerated (i.e. fountain)
 - A significant portion of the sumped area must be a minimum 5 ft deep.

- ☐ Ensure all areas drain to the stormwater basin as designed in the calculations during a 100-yr storm event.
- ☐ Provide an elevation/volume relationship table for stormwater basins
- ☐ Stormwater basins' design volume (volume used in calculations) should be 15% less than the volume to be constructed. This should be clearly indicated on an elevation-volume table. The 15% additional volume should be added by adjusting the surface area each two-foot contour (or each stage of the elevation-volume table).
- ☐ A minimum of 1 foot of freeboard from the 100-year storm elevation to the top of the berm is required for stormwater basins.

Green Infrastructure

- ☐ Sites with pervious surface infiltration systems must add the following note to the site plan: Development certification is required for underground stone media storage systems. Verification will need to be certified by a Registered Land Surveyor or a Professional Engineer. Verification should include the following items:
 - Elevation of the bottom of the pit (to be shot before fill is placed)
 - Length and width of the pit
 - Elevation of the top of the pit (when gravel fill is complete)
 - Geotextile is installed at bottom and sides of the pit
 - Use of clean stone
 - Additional items may need to be certified. Contact City of Knoxville Engineering Development Services, 865-215-2148, for additional information.
- ☐ Sites with underground detention vaults must add the following note to the site plan: Development certification is required for underground stone media storage systems. Verification will need to be certified by a Registered Land Surveyor or a Professional Engineer. Verification should include the following items:
 - Elevation of bottom of gravel pit (to be shot before fill is placed)
 - Certify fabric and installation in gravel pit per the approved plans
 - Stone depth and type
 - Entire length of all chambers are installed at the same elevation (shoot surface of gravel before installation of chambers, include spot shots of chamber rows at ends and every 50 feet at a minimum)

This information is also used to verify the depth of stone under the chambers

- ☐ Length, size, and number of chambers
- ☐ Fabric installed per the approved plans in the isolator rows
- ☐ Any invert elevations indicated on the approved plans
- ☐ Outlet structure information, elevations, etc.
- ☐ Manifold elevations, diameter of pipe used, etc. for each tie in
- ☐ Verify use of spacers (size and number) between each row

- ☐ Verify pit was backfilled correctly
- ☐ Standard storm details, e.g. joints are tight, structures/tie-ins are grouted appropriately or fabric wrapped appropriately.

EROSION PREVENTION AND SEDIMENT CONTROLS

General

- ☐ Show a construction entrance on the plans and in a detail. The minimum dimensions are 50' long, 16' wide, and 6" deep.
- ☐ Specify perimeter erosion prevention and sediment controls on the plans and details.
- ☐ To ensure proper alignment of the silt fence, show an arrow indicating the flow direction on the detail.
- ☐ Temporary seeding is required when grading operations are temporarily halted for over 14 days and on soil stockpiles.
- ☐ Permanent seeding is required when grading operations are completed and when construction operations will not impact the disturbed area. Seed areas that show signs of excessive erosion.
- ☐ Provide temporary inlet protection for all catch basins, inlets, and culvert entrances.
- ☐ Provide permanent outlet protection at all outlets. Riprap aprons should be sized per standards set forth in ES-25 (Knoxville BMP Manual), or their size should be verified with calculations. Classify the size of riprap, and indicate their minimum grading, i.e., D50.
- ☐ If infiltration systems are proposed, specify EPSC measures on the plans to prevent sediment from entering the stone media during construction.
- ☐ A double row and/or reinforced silt fence should be used along creeks.
- ☐ A note should be included on the plans saying, "Excavate the permanent stormwater basin as the first act of grading. Provide a dewatering device and use as a sediment basin during construction. Remove accumulated sediment and landscape the pond when the upstream drainage area is stabilized."

Sediment Basins

- ☐ Show the construction of any sediment basins on the phase 1 EPSC plan with all required diversion swales and berms.
- ☐ Specify for a cleanout marker to be installed in all sediment basins indicating the cleanout elevation. The recommended cleanout volume is 1/4 to 1/3 of the total storage volume of the basin
- ☐ A forebay is required at the primary inlet of all sediment basins. The forebay volume shall be at least 25% of the dry sediment storage volume; the forebay volume can count toward the basin's required dry storage volume.
- ☐ Provide sediment basin calculations specifying the required and provided amount of wet and dry storage.
- ☐ Provide means to ensure the sediment pond skimmer does not rest in the mud.
- ☐ Sediment basin outlet pipes must have an anti-seep collar.

- ☐ Sediment basin dewatering devices must be attached to the riser above the wet storage elevation.
- ☐ Provide a plan to convert the sediment basin to a dry detention basin post-construction.
- ☐ A sediment basin must not exceed a 4:1 length to width ratio. Non-porous baffles may be used to achieve the ratio.
- ☐ Sediment basins must be able to pass the peak runoff from a 25-year, 24-hour storm. The storm may be passed, in part, by principal or emergency spillways.

FLOODPLAIN DEVELOPMENT

General

- ☐ When proposing structures, walls, fences, dumpsters, etc. provide hydrodynamic, hydrostatic, buoyancy, and debris impact calculations for the structures located in the floodplain. See FEMA Technical Bulletin 3-93 - Non-Residential Floodproofing — Requirements Certification for guidance.
- ☐ Show dumpster and enclosure will not float and can withstand debris impact.

Elevation Certificate

The following items refer to common mistakes on Elevation Certificates. This list is not comprehensive as elevation certificates are governed by FEMA.

- ☐ Place an "N/A" for all blank spaces.
- ☐ All numerical values should be rounded to the tenths place.
- ☐ Specify 475434 as the community number.
- ☐ The format for the panel number is ##### (letter) #####.
- ☐ Block B10 must be "FIS Profile"
- ☐ Block B11 must be "NAVD 1988"
- ☐ Provide the lowest elevation of any mechanical equipment and also the 500-year floodplain elevation in the notes section.
- ☐ The firm zone should be one of the following: Shaded X Zone, AE Zone, or A Zone.
- ☐ If a building will be floodproofed, submit the FEMA form titled, "Floodproofing Certificate for Non-Residential Structures."

Floodproofing

The following items refer to common mistakes on a Floodproofing Certificate. This list is not comprehensive as Floodproofing certificates are governed by FEMA.

- ☐ Place an "N/A" for all blank spaces.
- ☐ All numerical values should be rounded to the tenths place.
- ☐ Specify 475434 as the community number.
- ☐ The format for the panel number is ##### (letter) #####.
- ☐ The elevation datum must be NAVD 1988.

- ☐ Floodproofing gates/doors must be automatic and cannot require manual intervention.
- ☐ Identify the required floodproofing elevation on architectural elevation drawings.
- ☐ Sign and seal the “Non-Residential Floodproofed Elevation Information Certification,” as is.
- ☐ Supply a comprehensive "Maintenance Plan" for the entire structure with the Floodproofing Certificate.
- ☐ An as-built floodproofing certificate will be required.
- ☐ For Section III, you may cross out “and constructed” and then sign and seal the statement for the design Floodproofing Certificate
- ☐ Specify the manufacturer model on the drawings for any waterproofing membrane, if applicable.
- ☐ Specify the manufacturer model on the drawings for any floodgates, if applicable.
- ☐ Provide the lowest elevation of any mechanical equipment and also the 500-year floodplain elevation in the notes section
- ☐ All proposed external mechanical and electrical (e.g. HVAC, outlets, control panels, lights, speakers, dispensers, etc.) must be adequately floodproofed or elevated one foot above the base flood elevation.