# Civil Engineering Plans Review Checklist

The following items are required for ALL PROJECTS and must be included or noted as not applicable for the application to be considered complete.

## REQUIRED FOR ALL PROJECTS:

1.1 Written project narrative of the proposed development that discusses all existing and proposed conditions and utilities including conceptual layouts for future phases if the development is planned to be phased.

1.2 Copy of the appropriate application checklist with all information provided as requested or a detailed explanation as to why a requirement is not applicable.

1.3 All plan sheets shall be sealed by the engineer of record.

1.4 All plan sheet scales shall be graphical and written.

1.5 Provide fill compaction requirements, testing specifications, and frequency of testing to ensure proper compaction.

1.6 Provide a drainage report and narrative of the proposed development.

1.7 Provide a general note on the plans stating all improvements will be completed in compliance with all of the City of Spring Hill's specifications.

1.8 Floodplain incumbered properties will be required to provide a Flood Study including a hydrologic and hydraulic analysis, and a downstream analysis/assessment showing no adverse impacts to adjacent, upstream, and downstream properties and structures including culverts, bridges, and buildings. A LOMR/CLOMR will be required.

1.9 A hydrologic and hydraulic downstream analysis and/or capacity analysis will be required by all developments proposing no detention and/or conveyance to existing storm sewer facility showing no adverse impacts to adjacent, upstream, and downstream properties and structures including culverts, bridges, and buildings.

1.10 RV Parks must have an evacuation plan if built within the floodplain.

1.11 Provide Topography of existing conditions with slopes called out throughout the site to confirm the development is not within a hillside preservation area.

1.12 Provide autoturn and Fire exhibit for fire trucks, and includes Hydrant to Hydrant spacing, every portion of the building to fire lane spacing (150'), hydrant to FDC spacing, fire lane called out specifically (using a stipple pattern), dead-end fire lanes called out with length dimensions and turnarounds dimensioned if applicable, pavement section, fire lane striping or signage as applicable, overhead power lines called out and shown, fire lane radii labeled.

1.13 Provide location of mechanical units (HVAC etc.).

1.14 Provide coordination with electrical franchise utility documentation.

1.15 Fire apparatus roads must be provided in accordance with the UDC and IFC.

1.16 Provide bench marks based on NAVD88 and NAD83

## REQUIRED FOR TRANSPORTATION RELATED IMPROVEMENTS:

2.1 Provide an overall paving plan sheet for the entire development that includes all ADA ramps proposed for the development as a separate plan sheet. Provide paving details and pavement type location.

2.2 Provide plan and profiles of all proposed streets, including sidewalk and multi-use trials, must be at a scale of 1"=40' horizontal and 1"=4' vertical or larger with the profile view directly under the corresponding plan view. (UDC Tables 13-3, 13-4, 17-2)

2.3 Provide plan and profiles of all sidewalks and multi-use trails if no roadway improvements are proposed, at a scale of 1"=40' horizontal and 1"=4' vertical or larger with the profile view directly under the corresponding plan view. (UDC Tables 13-3, 13-4, 17-2)

2.4 Label all existing and proposed curb returns.

2.5 Label the edge of pavement.

2.6 Display street elevations on all profile views at a minimum of every 100 feet except at vertical curves and changes in centerline slope which will require elevations to be spaced no greater than every 25 feet. Elevation call outs shall include the back of curb for both sides of the street. Where the centerline and back of curbs are equal, only one call out elevation will be required to be displayed.

2.7 Display street grades as a percent on all profile views.

2.8 Display both horizontal and vertical curve data and street centerlines at proposed street curvature points in accordance with AASHTO standards.

2.9 Display and appropriately label all driveway approaches.

2.10 Display all flumes.

2.11 Display all existing and proposed sidewalks and bicycle paths.

2.12 Show and dimensions turn lanes and deceleration lanes with associated storage and transition areas.

2.13 Display and label all curb and barrier free ramps including surface color and texture treatment.

2.14 Display and label all existing and proposed guardrails and barricades.

2.15 Dimension all stacking distances and provide calculations or standards utilized for stacking distance determination.

2.16 Dimension and label distances between driveways and intersecting streets including stopping sight distance measurements and calculations. Label and dimension the sight triangle and visibility clearances. State the roadway design speed.

2.17 Show and label all fire lanes and provide a detail of the fire lane striping and signage. Dimension all fire lanes and fire lane radii.

2.18 Label all pavement construction (asphalt, concrete, etc.)

2.19 Sawed Joints must be placed every 20' all directions except at expansion joint or construction joint or at an average as close to 20' as reasonably possible. Longitudinal sawed joint shall be placed at center of pavement when there is no construction joint. Saw joint is to be continuous through curb when applicable. Expansion joints are to be placed at the PC's of an intersection and then every 200' maximum thereafter. Provide joint details.

2.20 Include all details for proposed sidewalks, bike paths, ramps and pavement cross-sections.

2.21 Include Pavement Marking and Signage Plans and details.

2.22 Include temporary Traffic Control Plans.

2.23 Provide a truck route from the highway to the site.

## REQUIRED FOR UTILITY RELATED IMPROVEMENTS:

### GENERAL UTILITY IMPROVEMENTS:

3.1 Provide a note that all TDEC approvals will be required before pre-construction meeting.

3.2 Provide bench marks at approximately 1,500-foot intervals based on NAVD88 and NAD83.

3.3 Label floodplain encroachments. Manholes constructed in the floodplain will be required to be sealed and vented in accordance with the wastewater specifications.

3.4 Provide water, sewer, and fire flow demand calculations.

3.5 Show and label all existing and proposed utilities, drainage features, lot lines, easement lines, and Rights of Way limits on plan views.

3.6 Show, label and station all manholes, junction boxes, valve boxes, water fittings, inlets, fire hydrants, and all other such surface features in plan and profile views.

3.7 Include overall plan views of the water system and the sanitary sewer system layout for the entire development (including future phases).

3.8 Show, label and station water mains and sanitary sewers in both plan and profile views scaled at a minimum of 1”=50’ horizontal and 1”=5’ or 1”=10’ vertical.

3.9 Display existing and proposed ground elevations at the centerline of water and sewer pipe spaced no greater than every 100 feet, specifically calling out depth of cover including pavement thickness when applicable.

3.10 Label all water and sewer pipe sizes and material types in their respective profile views.

3.11 Show and label all parallel and crossing utilities (including drainage features) in all profile views.

3.12 Dimension separation distances between all parallel utilities and all utility crossings.

3.13 Show pipe thicknesses in Profile view and measure separation from outside of the pipes.

3.14 Call out backfill under pavement in the water and sewer profiles.

3.15 Provide trench details including compaction requirements.

3.16 Show and label all sheeting, shoring, and bracing locations and provide details in accordance with the City of Spring Hill’s specifications. Deep manholes and mains will require trench boxing, etc. Provide details and notes denoting proper use of trench boxing.

3.17 Call out the method of pipe installation (bore or open trench). All borings will require profile views indicating and dimensioning enter and exit boring pits with the distances between the bottom of channels and the upper limit of the pipe casing.

3.18 Display casing and conduit for future utility crossings.

3.19 In addition to hard copies and electronic pdf's, provide the electronic plans and models to the City of Spring Hill for review (AutoCAD, AutoSketch, Visio, Generic CADD, or other).

3.20 Call out all hydrants, valves, manholes, utility poles, etc. That are proposed to be placed in the sidewalk area. Additional easements and meandering of sidewalks will be required to prevent obstructions in the sidewalk. Compliance with applicable ADA standards will be required.

## WATER IMPROVEMENTS:

3.21 Provide Water Service Fixture Unit counts per the 2018 International Plumbing Code.

3.22 Provide a minimum of two water feeds to proposed developments. Dead end waterlines will not be accepted unless no other option is available.

3.23 Water mains will be required to be extended for future developments in coordination and as directed by staff in compliance with the City specifications.

3.24 Provide a water meter on all fire lines for townhomes, apartments, and condominiums.

3.25 Provide a double detector check valve in a backflow preventer vault when connecting fire lines to the water main.

3.26 Dimension and label distances from fire hydrant to fire hydrant and fire hydrant to FDC's as the hose lays.

3.27 Provide a general note on the plans stating all newly laid water pipe will be hydrostatically tested and disinfected in accordance with the City of Spring Hill's water specifications.

## SEWER IMPROVEMENTS:

3.28 Services shall tie into sewer mains, and not into inline manholes. Provide flowline of the service tie in along the main southeast of building. Provide slope of service line and depth of service at the building cleanout. Change in direction will require a cleanout.

3.29 Provide flow direction arrows on the plan views.

3.30 Provide water lines and water service lines on the sewer plan and profile sheets. Identify all crossings as conflict crossings in the plan view with zig-zag callout borders.

3.31 Display all flow line invert elevations at all manhole connections and every 100 feet.

3.32 Show and label all grease traps in accordance with the City of Spring Hill's Fats, Oils & Grease Ordinance.

3.33 Show and label all oil-water separators in accordance with the City of Spring Hill's specifications.

3.34 Provide a general note on the plans stating all manholes will be vacuum tested to a vacuum of 10 inches in accordance with the City of Spring Hill's sewer specifications.

3.35 Provide a general note stating all pipes will be low pressure air exfiltration tested as specified in ASTM C828-80 in accordance with the City of Spring Hill's sewer specifications.

3.36 Provide a general note on the plans stating all new gravity sewer lines and service laterals shall be required to be inspected using CCTV video.

3.37 Provide a note where the "serviceability" of a lot or residence is questionable stating that the service tee is to be placed at the lowest possible elevation on the main line and the service line is to be laid on a minimum slope. The home builder is responsible for location the elevation of the end of the service line and setting building finished floor elevations such that gravity service is available. A sewer connection must be provided for each parcel or proposed lot.

3.38 All service connections shall be shown as SDR 26 PVC tee wye (machine made only), being four (4) inch for residential and six (6) inch for commercial.

3.39 Sewer pipe will be required to be SDR 26 PVC pipe or Class 250 ductile iron pipe as specified in Section B.14 and C.8 of the City of Spring Hill Sewer Specifications.

3.40 SDR 26 PVC pipe shall have a minimum of 30 inches of cover in private property and 48 inches in paved areas subject to vehicular traffic. In general, sewers should set at a minimum depth of five (5) feet.

3.41 Sewer crossings shall have a minimum of 18 inches below the bottom of the culvert or conduit and the sewer line.

3.42 Manholes shall be provided at a distance not greater than 350 feet for sewers 15 inches in diameter or less, 400 feet for sewers 18 inches and larger.

3.43 Clearly call out if the development proposes a lift station. All sheets that relate to the design and construction of a lift station must be differentiated from other sheets with the plan set.

3.44 NOTE: International building code requires slopes of 1/8 inch per foot for laterals of 3” to 6”, being 1.041667%. Recommend 1.5% to avoid issues with not meeting the minimum required slope in construction.

## REQUIRED FOR STORM SEWER RELATED IMPROVEMENTS:

4.1 Show, label and station all storm sewers (including future phases) in plan and profile views at a minimum scale of 1”=40’ horizontal and 1”=4’ vertical. Provide separate land and profiles of storm sewers.

4.2 Label storm sewer pipe diameter, box size, slopes, and type of materials for all storm sewer systems.

4.3 Label all energy dissipaters. Call out rock riprap size and specifications including underlying blanket thickness. Include all hydraulic data, dimensioning, and sizing calculations with construction details for all proposed energy dissipators.

4.4 Include details for all headwalls and flumes.

4.5 Show and label all existing and proposed utilities, drainage features, lot lines, easement lines, and Rights of Way limits on plan views.

4.6 Label all pipe sizes, inlets, manholes, junction boxes, inlets, connections, top-of-curb elevations, etc. in both the plan and profile views.

4.7 List hydraulics on each segment of pipe profile that includes design flow and storm frequency event, Manning’s roughness coefficient, full flow capacity, slope, depth, velocity, and v^2/2g. Plot and label the hydraulic grade line and friction slope when at or above full pipe flow. UDC Article 15.B.

4.8 Show and label all existing and proposed ground lines (including pavement) in the profile view.

4.9 Show and label flow line invert elevations in profile views at connections and spaced not to exceed 100 feet.

4.10 Provide dimensioned details of all non-standard junction boxes, headwalls, storm sewers, flumes and manholes.

4.11 Label water surface elevations at storm drain outfall in profile views.

4.12 Call out minimum finished floor elevations at sags in pavement.

4.13 Show and label drainage easements onsite and downstream as necessary to convey site drainage.

4.14 Show conveyance of the 100-year storm event within Rights of Way and drainage easements.

4.15 Show and label runoff and flow direction at all inlets.

4.16 Provide inlet capacity, including formulas used and inlet design computation tables.

## REQUIRED FOR BRIDGES AND CULVERTS

5.1 Show and label geotechnical soil boring information on the plan view, and provide a copy of the geotechnical report (UDC Article 15.F).

5.2 Plan and profile bridge or culvert crossing starting a minimum of 50 feet upstream of the structure and extending a minimum of 50 feet downstream of the structure. Label slopes, backfill, riprap design and design methods/calculations, pipe material, guardrail details, sidewalks, etc.

5.3 Provide all hydraulic calculations. Clearly state the culvert flow type (inlet, outlet, submerged, and unsubmerged).

5.4 Show, label, and state the tailwater elevation and computation. Short narrative or statement should be provided explaining why this elevation is used as the tailwater condition.

5.5 Show and label skew angle, vertical and horizontal centerline alignments.

5.6 Provide bridge scour analysis.

5.7 Provide all electronic design files and state which program was used to run the design calculations. HEC-RAS is the preferred hydraulic calculation software.

## REQUIRED FOR DRAINAGE ANALYSIS:

6.1 All hydrologic analysis shall use NOAA Atlas 14 Point Precipitation Frequency Estimates.

6.2 Provide separate drainage area maps for existing and proposed conditions.

6.3 Show and label Time of Concentration lines (broken down to flow type if using the velocity method). Please note that Sheet Flow length must either be based on engineering judgement with supporting data or use McCuen and Spiess approximate length equation (can be found in USDA NRCS Part 630 Chapter 15 – Time of Concentration manual, page 15-7, equation 15-9). Time of Concentration calculations and equations shall meet the USDA NRCS Part 630 Chapter 15 published in 2010 (references all major excepted manuals including TR-55).

6.4 Show and label existing and proposed storm sewers and inlets.

6.5 Provide flow arrows within each subbasin.

6.6 Label all concentrated flow design points and list each point in the drainage calculations. UDC

6.7 Label approved zoning or future land use designation for each area shown.

6.8 Label peak runoff at all inlets, dead-end streets, alleys, outfalls, and offsite flows crossing the property.

6.9 Include runoff and routing methods, parameters, and calculations for all areas.

6.10 Label all crests, sags, and street and alley intersections.

6.11 Show and label the effective and proposed floodplain.

## REQUIRED FOR DETENTION OR RETENTION PONDS:

7.1 Provide cross sections of the detention basin, controlling outfall structure, and emergency spillway.

7.2 Profile the detention basin, controlling outfall structure, and emergency spillway.

7.3 Show existing and proposed contours for the detention basin.

7.4 Include embankment sections for water storage impoundment with compaction specifications.

7.5 Include structural details and hydraulic calculations for the controlling outfall structure and emergency spillway.

7.6 Include detention basin volume calculations and clearly state design methodologies.

7.7 Include detention elevation versus storage curves and elevation versus discharge curves.

7.8 Show and label all fencing.

7.9 Obtain an approved detention basin maintenance/management plan prior to pre-construction meeting. Plan must note responsibility of the owner/HOA to "Provide for minimum maintenance and repair needs that include, but are not limited to, removal of silt, litter and other debris, cutting of grass, and vegetation removal, and replacement of landscape vegetation in detention or retention ponds and inlets and drainage pipes and any other storm water appurtenance." per UDC 15.7.

7.10 Access via easement or ROW to the pond, and min. 10 wide max. 10% sloped access to the bottom of pond for maintenance.

7.11 Retention ponds will be required to have ability to drain out to empty the pond for maintenance.

7.12 Provide all electronic design files and state which program was used to run the design calculations.

7.13 Enclosed detention pond outfall structures must be analyzed for buoyancy.

## REQUIRED FOR GRADING PLANS

8.1 Show and label existing and proposed contours and spot elevations that address lot to lot drainage. Delineate the proposed limits of land disturbing activities.

8.2 Grading within the floodplain will require a Conditions Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR).

8.3 Plan and profile all proposed channels or channel improvements, showing existing contours and proposed centerline, top-of-bank, channel bottom, stationing, and the 100-year water surface elevation.

8.4 Include all hydraulic calculations for all channels, existing or proposed associated with the proposed development.

8.5 Provide cross sections of typical swales, berms, channels, and any other such improvement. Provide slopes and alignment on plans. Provide capacity with minimum of 1-foot of freeboard.

8.6 Provide typical sections for all channel improvements representative of all geometries of the channel.

8.7 Provide structural details for channel lining treatments (seeding, sodding, concrete, gabions, etc.).

8.8 Show and label proposed fences, required screen walls, gates, and retaining walls. Label maximum heights.

## REQUIRED FOR EROSION CONTROL PLANS

9.1 Provide erosion control plan in accordance with the City of Spring Hill's National Pollution Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Phase II Program.

9.2 Show and label the extents or limits of clearing, grubbing, and all land disturbing areas.

9.3 Show and label floodplains, waterways, channels, septic tanks and drain fields, underground tanks, water wells, wellhead protection areas, and any other such critical area boundaries or existing utilities.

9.4 Provide details of temporary erosion/sediment control devices and best management practices for all phases of the development

9.5 Provide a plan view to show and label all temporary erosion/sediment control devices.

9.6 Show and label all natural drainage features for both existing and proposed conditions.

9.7 Show and label construction entrances, stockpiles, and concrete washouts.

9.8 Provide permanent stabilization details.

9.9 Provide locations and details of all temporary sedimentation basins, including drainage calculations, de-watering times, basin dimensions, and outlet/dewatering structure designs.

9.10 Provide all water quality buffer zones in accordance with UDC 15.6.C.1-4.

9.11 Provide the following notes on the final plat:

a. All utility and drainage easements located on proposed lots are to be maintained by the individual property owners of said lot.

b. All Common Areas/ Open Spaces re to be maintained by the Home Owners Association, their heirs or assigns.

c. No HVAC Equipment is permitted in Public Utility and Drainage Easements where utilities are located.

d. All Open Space areas are a Public Utility and Drainage Easement.