

**CITY OF TEMPE**

**ADMINISTRATIVE COMPLETENESS REVIEW CHECKLIST**

**Engineering Permit Project**

It is highly advised that the design professional utilize this checklist to perform their own administrative completeness review of the documents and plans prior to submittal to the City.

Project Name: \_\_\_\_\_

Project Address: \_\_\_\_\_

Project DS/EN Number: DS \_\_\_\_\_ EN \_\_\_\_\_

Description of Work: \_\_\_\_\_

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**NOTICE OF DEFICIENCIES**

City Plan Reviewer: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**CERTIFICATION**

I CERTIFY THAT THE REFERENCED PLANS COMPLY WITH ALL APPLICABLE CITY ORDINANCES AND STANDARDS, INCLUDING FEDERAL, STATE AND COUNTY REQUIREMENTS AND REGULATIONS. IN ADDITION, I CERTIFY THAT THIS CHECKLIST HAS BEEN COMPLETED ENSURING ALL ITEMS LISTED ARE PROPERLY ADDRESSED. I UNDERSTAND THAT IF I FAIL TO ADDRESS ALL APPLICABLE ITEMS IN THIS CHECK LIST, THE PLANS MAY BE IMMEDIATELY RETURNED TO ME WITHOUT ANY FORMAL REVIEW BEING PERFORMED.

Engineer's Name: \_\_\_\_\_

Engineer's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Please complete and return this check list with each civil submittal. Discussion of this checklist should be directed to the plan reviewer listed above.

Engineer of record (ENG) must fill out all boxes in the first column as either (Addressed) or N/A (Not Applicable).

Civil plan reviewer (RVW) shall check the second column as X (Required)

- Return this checklist with your submittal. All checked items must be addressed. Indicate the plan sheet number where information may be found OR indicate why you believe that it does not apply on this project.

## **GENERAL**

- Application

## **ENGINEERING**

Construction Plans must include (but not limited to):

ENV / RVW

- All plans and reports sealed by a professional civil engineer registered in the State of Arizona
- General Notes & other discipline plan notes shown in the latest edition of the City's Engineering Design Criteria manual
- Engineering plans to be submitted on 24"x36" sheets and legible at 50% reduction
- Maximum scale for engineering plans is 1"= 30'
- Cover Sheet
  - Complete legal description/assessor parcel number (APN)/gross and net area
  - Vicinity map with north arrow pointing to the right or top edge of sheet
  - Owner's name as it appears on the deed and mailing address with contact name and number
  - Completed Utility Company Submittals block
  - Permit and "As-Built" information block
  - Include name, address and phone number of Engineering company and Owner with contact name for each
  - Include a sheet index
  - Include a benchmark, use and note City of Tempe datum
  - Provide an estimate of quantities of construction items (see Manual for list)
  - APPROVAL FOR (OFFSITES AND DRAINAGE ONLY or whatever discipline is required)

\_\_\_\_\_  
CITY ENGINEER

\_\_\_\_\_  
DATE

- Include the most current local Arizona Blue Stake block on all construction plan sheets.
- Use 1" = 30' maximum engineering scale and show a bar scale.
- Show net area of site in square feet and acres.
- Include the Arizona Registered Professional Civil Engineer's seal, signature, date signed, and expiration date on each sheet.
- Grading & Drainage Plan**
  - Show on plans the retention volume required and provided, top and bottom elevations for retention areas, rim elevations for drywells and catch basins, invert elevations for catch basins and drainage pipes. 4:1 maximum side slopes for landscaped retention areas. Maximum depth of 3' in landscaped areas and 1' maximum depth in paved areas. Show the high water levels (HWL) at all basins and at

grates or manholes for catch basins and underground storage tanks. Include cross-sections at all property lines and frontages, basins, swales, ditches, means of storm water conveyance and retention. Figure 1 in the Single-Family Residential Improvements section of this manual can be used for single-family residential projects.

- Show positive grade breaks at all property and right of way lines.
- Hydrology, hydraulics and retention calculations for a 100-year storm event including the "Volume Required" and the "Volume Provided".
- A plan sheet with delineated drainage areas that easily identifies the retention areas, fully dimensioned with high water elevation noted. The lot outfall shall be a minimum of 4" above high water elevation. Include section views if needed for clarity.
- Finish floor elevation is to be a minimum of 12" above the high water design and 8" above the lot outfall.
- When paved areas are incorporated into lot retention, water depth is not to exceed 1.0' and must provide means of dissipation.
- Retention Basin Volume calculations that can be easily verified and shown by basin.
- An acceptable method of dissipating storm water within a 36-hour period. If a drywell is to be used, the drywell volume can be included in the calculations for volume provided. A dual chamber drywell such as the Maxwell Plus drywell or an approved equal is required for dissipation whenever any basins or paved areas greater than 1.0' in depth are incorporated into retention. No allowances for volume due to percolation rate will be given. See Sections C.3 and C.4 for drywell limitations. Any projects at locations involved in fuel dispensing shall use a multi-stage drywell system such as the Envibro System drywell or an approved equal; be aware that these drywells have limiting flow capacities which will govern the dissipation rate of the basin.
- RETENTION DESIGN CRITERIA

There are two methods accepted by the Engineering Division for calculating required retention volume for improvements to single-family homes. Both methods use the following formula:

$$V = (P \div 12) * A * C$$

V = Volume required to retain (cubic feet)

P = Precipitation Depth (in inches) of storm water required to be retained

A = Total area of lot (in square feet) plus any additionally required areas

C = Coefficient of Non-Absorption

**METHOD 1:**

Tempe's standard method of calculating onsite storm water retention uses the formula above with the following data:

Where,

P = 2.4 inches (based on the 100-year, 1-hour storm event)

C = 0.95

$$V = (2.4 \div 12) * A * (0.95)$$

**METHOD 2:**

The City allows the usage of the Drainage Design Manual, Volume I for the Flood Control District of Maricopa County (Fourth Edition, Chapter 3, Rational Method) as an alternative method for determining required retention volume. This method determines the volume based on a 100-year 2-hour storm event, which has a precipitation depth (P) of 2.2 inches. This method also has different Coefficient of Non-Absorption (C) values that vary by the size of the lot and the approximate percentage of the lot covered with improvements (house, decking, driveway, sidewalks, etc., i.e. anything other than undeveloped land).

$$V = (2.2 \div 12) * A * C$$

- Above-grade retention areas shall not occupy more than 67% of the onsite landscaped street frontage areas.
- Provide a minimum of 1' freeboard above the high water design elevation on all sides of a central retention area, including lowest development gutter flow line.
- Retention volume must be disposed of in 36 hours.
- Basins greater than 1.0' in depth will require a dual-chamber drywell or other approved disposal mechanism.
- Underground Storm Water Retention Tanks may be acceptable requiring specific approval by the City Engineer and at a minimum must meet the following requirements. Note that these requirements may change without notice.
  - a. The installation of corrugated metal pipe with aluminum coating for underground retention tank system shall be in accordance with MAG Specification No.621. Excavation, bedding, and backfill shall be in accordance with MAG Specification No.601 and the material per MAG Specification No. 760. Corrugated high density polyethylene (CHDPE) pipe may be used provided supporting documents are submitted with design plans and the following requirements are met.
  - b. Required is a report prepared by a soils engineer registered in Arizona, showing the following information at each proposed location of the underground tank system(s). The report must include:
    - 1) Soil boring results to a depth of at least 10 feet below the bottom of the proposed retention tank(s), at each location, showing the depth of the proposed installation and the depth to groundwater.
    - 2) Soil conditions at each location of underground retention tank system(s). Include in the report and also show on the plans the following data:
      - a) Soil pH
      - b) Resistivity in ohm-cm
      - c) Chloride concentration in ppm
      - d) Sulfate concentration in ppm
      - e) Moisture content
  - c. Submit documentation demonstrating that the design life of the lining and coating of the underground retention tank system will be greater than 50 years. Design life of tank is also to be noted on plan sheet. The methodology for determining the soil side service life of the corrugated steel pipe must conform to the Soil Side Durability of Corrugated Steel Pipe, Final Report 1991, prepared for the National Corrugated Steel Pipe Association.
    - 1) Show details for the lining and coating of the corrugated metal pipe retention tank(s) on the plans.
    - 2) Submit a letter from the soils engineer stating that the pipe material, lining, and coating are suitable for the soil conditions at the site and the pipe will last at least 50 years based on the soils conditions encountered; also when using CHDPE pipe.
  - d. Submit calculations showing traffic and load bearing capacity of the underground retention tank system.
    - 1) Show the pipe gauge and corrugation size for CMP on the plans.
    - 2) Show the D-Load for RCP on the plans.
    - 3) Meet the manufacturer's minimum cover requirements for CHDPE pipe. These minimum cover requirements may have to be exceeded in order to install the required access manholes.
  - e. Provide a minimum of two access points for each underground retention tank.
    - 1) The access shall consist of 48-inch manhole shafts with 30-inch manhole frames and covers at grade labeled "RETENTION TANK", refer to MAG Std Details 424 & 522. Grated covers to allow for the inlet of surface storm water run-off may also be used in lieu of the solid covers.

- 2) The access may include a fixed ladder, anchored to the wall of the retention tank. A structural engineer or the manufacturer must certify the structural integrity of the ladder installation.
  - 3) Provide concrete collars, per City of Tempe Standard Detail T-446, for all manholes located in pavement areas or subject to wheel loads.
  - f. Show a backfill detail on the plans. The detail shall include the material and compaction requirements and must address backfill and compaction under the pipe haunches, to the springline of the pipe.
  - g. Include a note on the plans specifying that all joints in the underground retention tank system(s) will be water-tight, manufactured joints.
  - h. Provide a minimum of 3 feet of cover, to the bottom of the base of the pavement structure, over the underground retention tank system(s) located in traffic areas. Provide a minimum of 3 feet of cover over the retention tank(s) in non-pavement areas.
  - i. Provide a detail on the plans showing the connection of the retention tank drain pipe into the interceptor chamber of the dry well. The invert of the drain pipe must be at or above the elevation of the inlet to the 4-inch cross-over pipe to the dry well chamber.
  - j. The drain pipe from the retention tank to the drywell interceptor chamber cannot be used to convey water from a retention basin into the underground retention tanks. Any water conveyed from a retention basin, road or parking surface is to be conveyed via storm drain pipe tied independently into the underground retention tank. Surface run-off water may also be directly discharged into underground retention tanks when grated lids are substituted for the solid covers at any of the manhole access points noted in e.(1) above, however, this is not a preferred inlet.
  - k. Underground Storm Water Retention Tank location and proximity to any structure is also to be clearly shown on the Architectural site plan.
  - l. Contact the City of Tempe Engineering Division for all current requirements.
    - 1) Subsurface Storm Water Management may be acceptable requiring specific approval by the City Engineer and at a minimum must meet the following requirements. Note that these requirements may change without notice.
      - a. Acceptable systems may include StormTech Chamber System, CONTECH CHAMBERMaxx or an approved equal.
      - b. Not for use at a fuel dispensing or fuel storage sites.
      - c. A ma
      - d. A drywell is required in any case and shall be located downstream of a manifold.
      - e. Multi-stage pollutant/sediment treatment required upstream of chambers. Include an "isolation" chamber to trap sands/silts/fines.
      - f. Inspection/cleaning ports are required at each end of each chamber.
      - g. Cleanouts are required at each end of manifold.
    - No drywells allowed in paved areas.
    - No direct connections from a catch basin or storm drain allowed to drywells.
    - All above-grade retention areas shall maintain slopes no steeper than 4:1.
- Drainage Report is required for all commercial and multi-family projects; provide a summary table of storm water retention on the plans
  - Show roof drainage pattern on grading and drainage plans
  - Storm Water Pollution Prevention Plan (SWPPP) for developments over one acre
  - NOI Certification required prior to second submittal
  - Water/Fire Line Plan**

- Based upon centerline stationing and offsets, show, locate, and dimension all existing and proposed utilities on the plans.
  - For public water lines not located within the Public right of way, exclusive public water easements are required and shall be a minimum of 12 ft. wide centered on the pipe. (Wider easements may be required based on pipe diameter and depth of cover)
  - For water services not located within the Public right of way, exclusive public water easements are required for the service lines from the main up to and including the water meter.
  - Show dimensions of rights of way features and all easements, existing and proposed.
  - Water meters and fire hydrants shall be located within a recorded exclusive waterline easement contiguous with the water main system. Backflow preventers shall be located on private property & outside of the public right-of-way or outside of public easements.
  - Isolation valves at branch connections in the looped water line system should be provided. The number of valve as required in order to provide means for isolating every branch by closing one or more valves. Typically this will require one valve less than the number of branches.
  - All public waterline pipes shall be ductile iron Class 52 and shall be wrapped in high-density polyethylene in accordance with MAG Standard Specification 610.
  - All parallel water and sewer lines shall be separated by a horizontal distance of 10'.
  - Trench, backfill, and pavement replacement shall conform to Tempe Standard Detail T-450 for all street cuts approved by the City Engineer.
  - Service taps shall not be closer than 5' on any line.
  - Potable water service lines, meters and back flow devices shall be the same size.
  - Separation of public water and sewer lines shall be 10 ft. center-center. (Wider separation may be required based on pipe diameter and depth of cover.)
  - Public water lines should be 16 ft. minimum away from any foundations or 20 ft. minimum away from any trees.
  - In all cases the public water line shall be above any crossing (other public utility, onsite private utilities, and other non-structural appurtenances).
  - Public water easements are required for service lines from the main up to and including the water meter.
  - For fire sprinkler lines and new fire hydrants off of existing mains, three-valve clusters will be required for hospitals, high rise buildings, schools, and other high density areas as determined during plan review.
  - All backflow prevention devices shall be located out of the Right-of-Way or easements
- Sewer Plan**
- Show a north arrow on each sheet of plans pointing up or to the right
  - Include a site plan/location map showing pipe sizes, pipe type, manholes, direction of flow, and cleanouts.
  - Based upon centerline stationing and offsets show, locate, and dimension all existing and proposed utilities on the plan.
  - Show dimensions of rights of way features and all easements.
  - Public sewers shall be located in either the right-of-way or a minimum 12 foot wide exclusive sewer easement. When located in an easement, the sewer line shall be centered in the easement. Wider easements may be required based upon pipe diameter, depth of cover or location of adjacent utilities
  - The following requirement must be met when an existing sewer tap, which is not currently in use, is to be utilized in design. A sealed/signed statement from the design engineer must be submitted with the plans indicating that the existing sewer tap has been physically located and has been flow tested, TV'd, etc. to ensure the sewer tap's serviceability. This must be received prior to City plan approval and prior to any permit issuance.
  - Provide an estimate of the sanitary sewer average discharge rate in gal/day
  - All abandoned sewer services shall be capped at the sewer main.
  - Include street centerline station and offset dimension from street centerline to main at manholes and all changes in alignment.

- Include sewer line station at centerline of each manhole.
  - All parallel water and sewer lines shall be separated by a minimum horizontal distance of 10' and contained in an exclusive water/sewer easement. The minimum easement width for this configuration is 20'. A wider easement may be required depending on pipe size and depth of bury.
  - Pipe crossing separation/protection shall be provided per M.A.G. Standard Detail 404.
  - All pipes shall be V.C.P. double extra strength for pipe diameters of 8, 10, 12, 15 inches.
  - All taps shall be machine drilled only. Individual single-family residential taps may be 4 inch. All others shall be a minimum of 6 inch diameter.
  - Public sewer lines should be a minimum of 20 ft. away from any trees
  - Public sewer lines should be a minimum of 16 ft. away from any foundations
  - Trench, backfill, and pavement replacement shall conform to Tempe Standard Detail T-450 for all street cuts approved by the City Engineer.
  - Dry/private utility separation distance shall be a minimum of 2' both horizontally and vertically from all City of Tempe utilities; parallel separation from water lines shall be minimum of 6'.
  - If any lines are located within the jurisdiction of the state or County their permit is required
- Paving Plan**
- The engineer shall provide sufficient cross sections and profiles of existing and proposed improvements. Include typical sections and pavement structural sections.
  - Single-family residential development shall have 4" roll curb and gutter, arterial streets shall have 7" vertical curb and gutter and all other streets shall have 6" vertical curb and gutter.
  - Provide sufficient information showing existing upstream and downstream construction to justify the design.
  - The proposed paving grades shall match existing or proposed improvements both upstream and downstream.
  - The design grades shall match the existing or proposed improvements on the opposite side of the street.
  - Wing type driveway entrances shall be located on all streets except for local residential streets with roll curb in front of single-family homes and where approved by the Engineering Division.
  - Sidewalks are required adjacent to both sides of all city streets and shall be 8' wide along arterial streets, 5'-6" wide on L-1 local streets, and 6'-0" wide for all other streets.
  - Show all proposed valley gutters, aprons, catch basins, scuppers, and other drainage structures.
  - Handicap sidewalk ramps are required at all intersections.
  - Show all curb transitions.
  - Call out all M.A.G. and Tempe Details in the construction notes or show "special" detail on plan.
  - Driveway widths shall be per Tempe Detail T - 320

**Street Lighting Plan**

**Submittal to APS or SRP**

**PROJECT REQUIREMENTS**

- Easement Information: legal, exhibits, dedications, or agreements not shown on the plat which are required to be prepared via separate instrument.
- Title Report/Deed current within 3 months

- Tie property to at least two official record survey control corners, preferably section and/or quarter corners
- Show all lot dimensions, widths of easements, and rights-of-way, including bearings and distances.
- Show and dimension the parking lot layout, drainage pattern, proposed spot elevations and existing topography of site and adjacent areas.
- Show and dimension all existing utilities (water, gas, power, irrigation, sewer, storm drain, etc.) and locate by tying to property line and/or street centerline.
- Distinguish between all existing and proposed construction and clearly show any planned phasing.
- Call out all applicable standard specifications and standard details (City of Tempe, MAG, etc.) on the plans.
- Show the Development Services (DS) Number and Engineering Private Development (EN) Number (assigned during the first review) and Project Address in right hand bottom margin on the right edge of each sheet. Use 36 pt. Helvetica Kroy or 350 CL Leroy Lettering.
- Provide title block on each sheet showing project name, type of drawing (water, sewer, paving, grading and drainage, etc.) sheet number and Township range and quarter section.
- Provide signed and notarized Water Line Easement Agreement prior to or with second submittal, requires legal description and exhibit (s)
- Provide signed and notarized Sidewalk Easement Agreement prior to or with second submittal, requires legal description and exhibit (s)
- Provide signed and notarized Declaration for Maintenance and Repair of Underground Retention System agreement prior to or with second submittal, requires exhibit (s)
- Provide signed and notarized Public Sidewalk Easement Agreement prior to or with second submittal, requires legal description and exhibit (s)
- Provide signed and notarized Sidewalk Maintenance and Use Agreement prior to or with second submittal, requires legal description and exhibit (s)
- Provide signed Agreement to Underground Overhead Utility Lines prior to second submittal
- "Approval to Construct" (ATC) packet and Maricopa County Environmental Service Department (MCESD) approval. Signature from Maricopa County must be obtained prior to second submittals.
- Health Certifications are required from Maricopa County Environmental Service Department (MCESD) prior to second submittal