

**Public Works and
Engineering
Standards & Details**

March 2005
(Includes revisions through 2009)

Public Works and Engineering Standards and Details

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PREAMBLE

This Chapter contains specific guidance for designing and installing improvements to real estate in accord with accepted Town of Gilbert Standards. These are technical detail requirements generally of concern to Developers, Engineers, Architects and construction contractors. They relate to the Gilbert General Plan and other Chapters in this Code in that these specifications are considered to be the minimum acceptable criteria for assuring community-wide development quality and safety.

Although the improvement details are requirements, they are not legislated. Rather, they are in the nature of administrative rules which are established by the Town departments responsible for their approval and inspection of improvement sufficiency. Engineering details and related materials are updated from time-to-time by Town Staff and submitted to local government authorities for replacement of former standards in this code.

Current schematic diagrams which illustrate acceptable approaches or techniques are cross-referenced with the subject matter to which they refer in this Chapter for user convenience. It should be understood that these instructional graphics and formulas are meant to reflect general Town policies, they may be required to be adapted in response to special property circumstances in order to eliminate hazards or otherwise to meet the community's development objectives.

The intent of this Chapter is expressly to guarantee public safety and health while, at the same time, assuring reasonable economy for affordable development. Accordingly, creative, innovative or cost-reducing use of materials, system design, or construction practices may be accepted by Town plan review personnel upon finding that public welfare is duly protected.

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Article 1: Improvement Plans

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- 1.1 General Information
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1.1 General Information

1. The developer must comply with all the requirements of the Town of Gilbert Subdivision Ordinance.
2. All design must be in accordance with the Uniform Standard Specifications and Details published by the Maricopa Association of Governments and as amended by the Town of Gilbert.
3. New street right-of-way or utility easements must be coordinated through the Town of Gilbert Engineering Department.
4. Developer must contact the Town of Gilbert Engineering Department regarding existing and new private line agreements or waivers.
5. All utility design must be per latest Maricopa County Environmental Services Department requirements and submitted to them for approval prior to the issuance of the Town of Gilbert permit.
6. It is the responsibility of the Developer to obtain the Town's desired location for tile and then make necessary requests and coordination with Salt River Project and Roosevelt Water Conservation District (RWCD) to design tile for existing ditches.
7. The developer is required to contact Qwest, Salt River Project, Arizona Public Service, Cox Cable, and Southwest Gas for location of existing and proposed buried conduit or cable and must be shown on plans to ensure that no conflicts arise before approval can be given. (Conflicts arising from failure to do this shall be the responsibility of the developer).

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8. Any contractor found working on a project without an official set of stamped, approved drawings by the Town of Gilbert Engineering Department will be shut down until further notice.
9. Provide five (5) complete sets of plans for all reviews. Where sprinkler systems and landscaping plans are required for parkways and retention basins, they must be included in the total set of drawings.
10. Where the project is in conjunction with a site, apartment, townhouse or commercial property, four (4) sets of plans should be submitted to the Building Inspection Department along with the on-site plans. Do not submit plans directly to Engineering if the project is a combination on-site and off-site project.
11. Do not submit preliminary plans unless previously arranged.
12. The contractor shall notify the El Paso Natural Gas District Superintendent and the Southwest Gas District Superintendent forty-eight (48) hours prior to commencing construction in the vicinity of the rights-of-way so that they may have a representative present at all times.
13. All improvements within proposed retention basins and/or roadway parkways shall be performed in accordance with current Town policy and standards.
14. Deed for “unpolluted” easements, rights-of-way, or parcels upon which improvements are being constructed will be prepared by the Town Engineering Department and signed by the owner. The engineer must prepare and submit legal descriptions required together with a map of the described area.
15. Review all comments made at Subdivision Review and incorporate into plans.
16. See Street Light Improvement District process (Article 5).
17. Developer is to provide a “Letter of Assurance or an approved performance bond” from his financial lender guaranteeing the off-site improvement money for each unit he proposes for construction or recording. Engineer to provide preliminary construction estimate to substantiate the amount. When “Letter of Assurance” expires all construction will halt and permits will be held until new “Letter of Assurance” is filed with Engineering.
18. The improvement plans must include a general master utility layout for the subdivision as one of the sheets in the total set of plans.
19. The Town requires that all retention basins, arterial street parkways and right-of-way must be improved with sprinklers and landscaping as per the guidelines of the Town of Gilbert.
20. The developer is to provide a copy of his project soil investigations for Town review. Any areas of expansive soil will require special treatment during project construction. The Engineer shall note these areas and special requirements on the plans.
21. If the original developer sells a portion of acreage which was previously included in his overall tentative plat, the new developer and engineer must resubmit their acreage and

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proposed plat for “staff” review. This applies even if they still plan to follow the original tentative plat.

22. Engineer must provide a computer closure of his final plat before it can be recorded. The closure should be furnished with the first set of improvement plans submitted for review. Areas of all lots and tracts etc., to be listed on plat or submitted separately on 8½ x 11 inch paper.
23. Any projects submitted to the Town of Gilbert for review must be on Town of Gilbert datum. Plans should reflect all existing bench marks in the area of the project and if it is necessary to remove or destroy them due to new construction, notify the Town Engineer for method of re-establishment.
24. Any projects planned within the Roosevelt Water Conservation District (RWCD) must convey to the Town of Gilbert their existing water rights that are no longer required, prior to issuing of any construction permits. If the developer plans to continue irrigating new lots, then only the water rights for the street and house pad areas need to be conveyed to the Town.
25. Developer’s engineer and/or surveyor shall provide a letter and “As-Built” approved plans subsequent to construction. The “As-Built Plans” shall be signed and stamped with his professional seal certifying that utility lines and curbs have been installed according to the approved plans. Certification shall be addressed to the Town Engineer and must be received before the specific items will be accepted by the Town. As built Plans shall include property line ties to water and sewer services, curb ties to valves and stationary ties to sewer manholes. Final street grades showing all grade breaks, top of curb and flow line elevations at all P.C.’s. The locations and depths of all electrical, telephone, TV cables and gas mains.
26. “As-Built” plans of all retention basins including landscaping, appurtenant electrical systems, sprinkler systems, drywells and capacity calculations.
27. All “As-Built” plans shall be submitted on 24” x 36” mylars (4 mil thickness) archival quality. All “As Built” plans shall contain the following certificate signed and stamped by the Design Engineer “I hereby certify that the “As-Built” measurements as shown or noted hereon were made by myself or under my supervision and are correct to the best of my knowledge and belief.”
28. Excavation and construction work will not be permitted in public rights-of-way or public utility easements on Saturday, Sunday, or legal holidays.
29. The developer shall provide for temporary retention of adjacent street runoff during construction. Developer is also required to comply with the Town of Gilbert Storm Water Regulations and the Environmental Protection Agency (EPA) Guidelines for storm water discharge.
30. “As-Built” brass cap bench marks will be required in each project as follows:
 - Area > ten (10) acres require one bench mark.
 - Area > ten (10) acres but < twenty (20) acres require two (2) bench marks.
 - Area > twenty (20) acres to be determined by consultation with the Town Engineer

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31. As a condition for, and prior to, the issuance of any grading permit, the contractor shall submit an application for haul route permit along with any applicable temporary Traffic Control Plan. Upon approval of the proposed haul route, the off-site inspector and a representative of the contract shall inspect the roadways to be used by the contractor and take photographs to verify their existing condition. After all grading is complete, the off-site inspector and the contractor will again inspect the haul route and, if necessary, the contractor shall be charged with restoring the roadways to their previous condition or better.
32. The Town Engineer will accept off-site improvements following final inspection and receipt of approved as-built drawings. It is the responsibility of the developer, consulting engineer and contractor to coordinate timely submittals of the as-built plans in order to affect a final letter of acceptance.

Furthermore, final letters of acceptance shall not be issued to the developer of the project until all affected roadways are restored to their previous condition or better, and all applicable signing and pavement markings have been installed and inspected by the Traffic Engineering Section.

A drillers log (including strata encountered and depth) will be required on all drywells prior to the Town writing Letters of Acceptance.

Final Plan submittal procedure:

- a. Plans are reviewed and accepted
- b. The Engineer submits for signatures:
 1. Full set of mylar reproducible for Town files
 2. Cover sheets for his set of originals
 3. Three complete sets of blueprints and reduced set of prints. The Town retains 1 and 3 and give Engineer 2
- c. Project is constructed

“As-Built” plans shall be submitted on 24” x 36” photo mylars (four (4) mil thickness) archival quality prior to any Letters of Acceptance.

1.2 Improvement Plan Checklist

- A. Front or cover sheet. (Twenty-four (24) inches by thirty-six (36) inches)
 1. Small location map.
 2. Small scale subdivision sheet index map (north to top or right side of sheet).
 3. List of quantities. If project is to be phased, separate quantities must be provided for each phase.
 4. A note concerning the different permits required and who is responsible for obtaining.

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5. A note “All design and construction must be in accordance with the Uniform Standard Specifications and Details published by the Maricopa Association of Governments and as amended by the Town of Gilbert.”
6. A note stating which lots will receive water and sewer services and the sizes.
7. A note “The Contractor shall notify the Town of Gilbert Engineering Department at least twenty-four (24) hours in advance of any construction of inspection.” Call (480) 503-6847.
8. A note regarding the coordination by the developer and contractor to avoid the placement of driveways in conflict with utility services.
9. A note pertaining to the responsibility for the coordination of the relocation of power poles and other utilities.
10. Typical note for the contractor to adjust all valves, manholes, cleanouts, etc., both new and old to finish pavement grade per standard details.
11. Engineer’s seal and stamp of approval one each sheet.
12. Location provided for signature of approval for Maricopa County Environmental Services Department.
13. Show typical street and alley cross-sections for each situation per Standard Detail including proposed locations of all utilities within the right-of-way and public utility easement.
14. List all “Town of Gilbert” bench marks used on this project. Contact the Engineering Department (480-503-6848) for location and elevation. Take ties to Salt River Valley Water User’s Association, State and County bench marks if they are involved. Any project submitted to the Town of Gilbert for review must use N.G.V.D. or approved Town datum.
15. If details are shown, indicate to which sheet they refer.
16. Provide a separate key index sheet for all improvements (sewer, water, paving, storm drain, etc.)
17. Backfill and compaction within County right-of-way shall be in accordance with the latest Maricopa County Special Provisions for installation of underground utilities.
18. Contractor shall comply with the provision for traffic control as per the 2003 Edition of the Manual on Uniform Traffic Control Devices Handbook.
19. A note: “Call the Blue Stake Center (602) 263-1100, forty-eight (48) hours before you dig for location of all underground utilities.”

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20. A note: "Engineer certifies that he has contacted all interested utility companies and has transferred all existing and/or proposed utility lines and related information onto these plans, and that he has also correctly plotted the existing and proposed right-of-way and easement lines."
21. A note: "The contractor shall be required to install a night tie-in for any new water line that will affect existing service sufficient to warrant same in the opinion of the Town Off-Site Inspector."
22. A note: "All improvements within the retention basin and/or roadway parkways shall be in accordance with the latest Town of Gilbert Procedures for developers and engineers."
23. Contractor is advised that an excavation and dirt moving permit is required by the Maricopa County Health Department and the Town of Gilbert. It shall be the responsibility of the contractor to obtain this permit and comply with its requirements.
24. All sprinkler and landscape work must be installed in accordance with the requirements approved Design Review and approved plans.
25. All sight lines shall comply with Detail 92 or 93 (whichever is applicable) at time of installation.

B. Plan and profile sheets

1. Use a standard single plan and profile, twenty-four (24) inches by thirty-six (36) inches. The scale shall be one inch equals twenty (20) feet horizontal and one inch equals two (2) feet vertical. Double plan and profile is not acceptable.
2. Plans must show sizes, types and locations of all existing and new utilities, including services, paving, curb, sidewalk, fire hydrants, valves, manholes and all miscellaneous items of construction, such as street sign posts, driveways, etc.
- 3.* After drawings have been completed, along with required changes and corrections, if any, a complete set of reproducible must be furnished to the Engineering Department for their use, including any tile drawings by Salt River Valley User's Association.
4. Where gas is to be installed, a separate line for gas must be shown and labeled on each drawing. This must be coordinated with Southwest Gas.
5. Clearly differentiate between new and old improvements (existing six (6) inch pipe versus proposed six (6) inch pipe). Also, shade pavement, etc.
6. Plans must be stationed from left to right with north being towards the top or right side of the sheet.
7. Sewer and water shall be shown together on same sheet.
8. Paving and storm drain shall be shown together on same sheet.

*Following final approval and upon request, the Town Engineer will sign and return one set of prints and cover sheets to the Engineers, if desired.

1.3 Procedure for Improvement Plan Submittal

- A. All projects must have Preliminary Plat approval prior to improvement plan submittal.
- B. A letter of transmittal, in duplicate and signed by the Design Engineer, shall accompany all improvement plan submittals. The letter of transmittal shall indicate the following:
 - 1. Date of delivery of submittal
 - 2. The review number (1st review, 2nd review, etc.)
 - 3. The number and type of plans which are being submitted
 - 4. The number and type of all required standard forms being submitted
 - 5. Engineering tracking number

All plans submitted to the Town of Gilbert shall be submitted at the Community Development offices; do not hand carry any plans to Department Directors or Plan Reviewers. Without your copy of the transmittal letter stamped “received”, your plans are not in the review process. All review fees must be paid at the time of submittal.

- C. One copy of the letter of transmittal, stamped “received” by the Town will be your receipt of the submittal.
- D. Improvement plan submittals will be distributed for review on the following working day.
- E. First review submittals shall contain the following plans and required standard forms:

Pre-final Plat	5 sets
Landscape Plans	5 sets
Grading Plans	5 sets
Drainage Study	2 sets
Paving Plans	5 sets
Soils Report	1 set
Water Plans	5 sets
Sewer Plans/Reclaimed Water	5 sets
Streetlight Plans	5 sets
Signing & Striping Plans	5 sets
Boundary Closure	1 set
Executed Water Agreement	
Executed Sewer Agreement	
Executed Garbage Agreement	
Executed Street Light Agreement	
Executed Street Light I.D. Petition, Legal Description and Vicinity Map	
Draft Covenants, Conditions and Restrictions (C.C. & R's)	
Notice of Intent (NOI) and approved Storm Water Management Plan (SUMP)	
Current Title Report	
A.L.T.A. Extend Coverage Policy	

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First reviews that are incomplete and do not contain all of the above itemized plats, plans, reports, studies and required forms will not be accepted.

F. Utility Company Approvals:

A full set of improvement plans, including Landscape Plans, Grading Plans, Paving Plans, Water Plans, and Sewer Plans together with the “Utility Location and Conflict Notice” shall be submitted to each of the following utility companies:

Salt River Project
Salt River Valley Water User’s Association
Qwest
Cable T.V. Company
SRP Land Department
APS (if project is located in APS service area)
SWG if gas service is required
RWCD - Roosevelt Water Conservation District if in service area

An exhibit of the Town of Gilbert “Utility Location and Conflict Notice.”

G. The second review and all subsequent reviews shall include five (5) sets of the following:

Pre-Final Plat
Landscape Plans
Grading Plans
Drainage Study
Paving Plans
Water Plans
Sewer Plans
Streetlight Plans
Signing & Striping Plans
Final Covenants, Conditions & Restrictions - 1 copy
8½” x 11” P.M.T. of plat – 1 copy
Engineer’s Certificate of Quantities - 1 copy
Assurance of Construction (one copy) and Offsite Agreement Form
Signed Utility Conflict Notices from all Utilities
Engineer’s Cost Estimate - 1 copy

The “red lined” checked prints from the previous review shall accompany all succeeding reviews (no exceptions).

Repeat – Incomplete submittals will not be accepted.

H. All plans are received and entered into our review system on a “first come – first served” basis. In fairness to all other developers, engineers and contractors, please do not ask for preferential treatment.

I. Upon completion of your review, you will be notified by telephone when to pick up your submittal.

- J. Fees are determined according to current Fee Schedules.
- K. Off-site Improvement Fees: fees calculated from “Certificate of Quantities” shall be submitted with the final review of the Improvement Plans. All plats will be recorded by the Town of Gilbert (all recording fees will be paid by the developer).

1.4 Improvement Plan Submittal Procedures for Site Plans

1.4.1 Commercial and multi-family projects

- 1. These plans usually contain a combination of off-site and on-site plans. All projects must have site plan approval prior to improvement plan submittal. Requirements for submittal include:
 - 1. Four (4) complete sets of both the Architect’s and Engineer’s drawings as a total package to the Community Development office.
 - 2. All engineering and landscaping plans must be submitted on 24” x 36” sheets. There will be no exceptions.
 - 3. The applicant must submit there in person and fill out an application information form at the Community Development office.
 - 4. A separate Signing and Pavement Marking Plan (1:20/1:40 scale) shall be submitted addressing both off-site and on-site Signing and Pavement Markings.

Resubmittals must always be returned to the Community Development as the coordinating agency for commercial and multi-family projects.

1.4.2 Subdivision Review

The following materials, along with the necessary fee and any other required supporting data, must be submitted as a complete package, to Community Development. It is the applicant’s responsibility to be sure their submittal is complete.

One requirement of Subdivision Review and in some instances the most important step is Pre-Application “Preliminary Review”. This step is designed to give guidance to an Engineer or his Developer with regard to the critical design aspects of his plat or project. These include general street patterns, possible need to rezone, availability of utilities, intersection conflicts, among other items. Pre-Application review to be complete prior to submittal of Preliminary Plat.

A. Submittal requirements

Following the pre-application plan review, the subdivider shall present to the Planning Department fifteen (15) copies of the preliminary plat, a summary of lot sizes together with a completed application form and the appropriate fee as noted on the Fee Schedule

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1. General submittal requirements:
 - a. Fifteen (15) copies of the preliminary plat and one (1) eight and one-half (8½) inch by eleven (11) inch photo transparency (PMT) of the preliminary plat.
 - b. The preliminary plat shall be drawn at a scale of not more than one hundred (100) feet equals one (1) inch or adjusted to produce an overall drawing of twenty-four (24) inch by thirty-six inch. (Use more than one sheet, if necessary).
 - c. Submit a preliminary hydrology report in a separate bound folder. See Article 2 Drainage Engineering.
 - d. If the developer is planning to phase the improvement of their subdivision, it must be so indicated on their preliminary plat when submitted for subdivision review. If the developer later decides to phase, it will be necessary to re-submit for a second review.
 - e. Submit a summary of lot sizes which either: indicate the size of lot within ranges; or states the square footage of each lot.
 - f. Construction permit fee schedule (certificate of construction quantities).
2. Submittal identification
 - a. Name, address and telephone number of subdivider.
 - b. Name, address and telephone number of engineer, surveyor, landscape architect or land planner preparing plat.
 - c. Proposed name of subdivision and its location by Section, Township and Range: referenced by dimension and bearing to two (2) section corners. Basis of bearings used must be stated on plat.
 - d. Scale, north point and date of preparation including dates of any subsequent revisions.
 - e. Location map with reference to main arterials, canals, railroads, etc.
 - f. Name, book and page number of any recorded and adjacent subdivision having common boundary with tract.
 - g. By note, existing zoning classification of subject and adjacent tracts.
 - h. Boundary closure and acreage.
 - i. Boundaries of tract to be subdivided shall be fully dimensioned.

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3. Plat designated areas
 - a. Topography by contours and spot elevations related to N.G.V.D. or approved Town datum. Contour interval shall not exceed two (2) feet and shall adequately reflect character and drainage of land.
 - b. Location of fences, wells, lakes, ditches, power lines and trees.
 - c. Location and extent of areas subject to inundation and indicate frequency.
 - d. Location widths and names of all platted streets, railroads and utility rights-of-way of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to tract.
 - e. Show layout of proposed streets and alleys, giving widths, preliminary curve data and proposed names. (For PAD's, include the Architect's layout showing buildings, sidewalks, parking stalls, amenity package, etc., as part of the submittal.
 - f. Show "scaled" typical lot dimensions, dimensions of all corner lots and lots on curvilinear sections of streets; number each lot individually and give total number of lots and area of each lot, parcel and tract.
 - g. Give designation of all land to be dedicated or reserved for public use, with the use indicated. Describe the use of all tracts.
 - h. If multiple uses are planned, (multi-family, commercial, industrial) such areas shall be clearly designated together with existing zones and zoning changes, if any.
 - i. Show method of sewage disposal, a statement as to the type of facilities shall appear on the tentative plat. Also show the preliminary sewer layout, indicating grades, manhole locations, cleanouts, slopes, depths. See Article 3, Utility Approvals.
 - j. The preliminary layout of the water system shall be shown indicating fire hydrants, valves, meter vaults, water line sizes. See Article 1, Drainage Engineering and Article 3, Utility Approvals.
 - k. Denote refuse collection system.
 - l. The final plat shall contain a "Full Metes and Bounds" description which shall include:
 - 1) Description of all "U.S. Public Land Survey Corners" used in determining the location of the plat.
 - 2) Description of all exterior corners set that locate the plat within the section.
 - 3) Method of determining bearings and controlling corners used.

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- 4) Total area of plat and a “Certificate of Dedication” for all public rights-of-ways, easements and tracts and areas of all tracts.
- 5) Total area of each lot (in square feet).

B. Preliminary plat review. Copies will be routed to the following agencies by the Town of Gilbert, where applicable.

1. Public Works:
 - a. Traffic Engineer
 - b. Property Agent
 - c. Utilities
 - d. Street Numbering
2. Planning Department
3. Building Department
4. Parks and Recreation Department
5. Gilbert Public Schools
6. Public Safety Department
7. United States Post Office
8. Arizona Department of Health Services
9. Maricopa County Health Department
10. Gilbert Cable Vision
11. Southern Pacific Railroad
12. Maricopa County Flood Control
13. Maricopa County Sheriff
14. Arizona Department of Transportation
15. City of Chandler
16. City of Mesa
17. Town of Queen Creek
18. Roosevelt Water Conservation District (RWCD)
19. Arizona Public Service
20. Salt River Project (power, water and land dept.)
21. Southwest Gas

Reviewing agencies shall be requested to transmit their recommendations to the Department in writing. The Department shall summarize the reviewing offices’ recommendations, prepare a staff report regarding the project and present it to the Planning and Zoning Commission.

1.4.3 Standard Agreements and Forms

All site and subdivision plan submittal will need to include the following standard agreements and forms.

- A. Off-site Improvement Agreement
 1. Off-site Improvement Agreement for subdivisions
 2. Off-site Improvement Agreement for non-subdivisions

- B. Assurance of Construction (one or more required)
 - 1. Assurance of Construction for subdivisions
 - 2. Assurance of Construction for non-subdivisions
 - 3. Performance bond or letter of credit
 - 4. Alternate method of assurance letter
- C. Construction permit fee schedule (certificate of construction quantities).
- D. Utility locates and conflict notices
- E. Reclaimed Water User's Agreement

1.5 Policy on Letters of Acceptance

1.5.1 Conditional Letter of Acceptance

A Conditional Letter of Acceptance will be issued on the sewer and water improvements when the following have been completed.

Water System

- 1. Compaction tests have been taken and approved (entire system) on the trench backfill.
- 2. Pressure and bacteria tests have been taken and approved on the entire system.
- 3. The meter and valve boxes are set (per a blue stake for each box) or the Town receives a letter from the contractor stating they will be set after the concrete work is done.

Sewer System/Reclaimed Water

- 1. Compaction tests have been taken and approved (entire system) on the trench backfill.
- 2. Pressure testing, Mandrel and close circuit televising of the system have been completed and approved.

NOTES:

- 1. No other permits will be issued until the above mentioned tests and conditions are met.

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2. The original contractor will make all repairs on the improvements they have installed.
3. The original contractor will do all “locates” for the utilities they have installed until the Town issues a Final Letter of Acceptance.

1.5.2 Letter of Acceptance

A Letter of acceptance for improvements will be issued when all of the following conditions have been met.

Paving

1. All concrete and asphalt work has been completed and approved.
2. Manhole rings and covers have been brought to grade and approved.
3. As-builts have been submitted and approved.
4. Pavement striping is completed and all street and regulatory signs are in place.
5. All monuments are in place.

Sewer/Reclaimed Water

1. The entire system has been cleaned and had a deflection test (if applicable).
2. As-builts have been submitted and approved.
3. Manholes have been cleaned, sprayed with insecticide laden paint, and all plugs have been removed.

Water

1. If (because of damage by other contractors) the Inspector deems it necessary, additional pressure and/or bacteria tests have been taken and accepted.
2. As-builts have been submitted and approved.
3. All fire hydrants, valves, and meter boxes have been raised to grade.

Retention Facilities

1. As facilities are completed and functional.
2. As-builts have been submitted and approved.

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NOTE: All “As-built” measurements and data are to be taken and collected by the engineering firm responsible for the plans.

1.5.3 As-built Certification

The following is an example of the “As-built” certification document required by the Town of Gilbert.

AS-BUILT CERTIFICATION

I hereby certify that the “As-Built” measurements as shown or noted hereon were made by myself or under my supervision and are correct to the best of my knowledge and belief.

Signature

Date

SEAL

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Article 2: Drainage Engineering

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- 2.1 Storm Drainage
- 2.2 General Notes
- 2.3 Retention Policy
- 2.4 Retention Volume
- 2.5 Retention in Right-of-way and Landscape Easement (Track)
- 2.6 On Lot Retention
- 2.7 Retention Basin Design
- 2.8 Statement to Appear on Plats and Grading and Drainage Plans
- 2.9 Drywell Policy
- 2.10 Statement Appearing on All Plans and Plats Involving Drywells
- 2.11 Streets
- 2.12 Storm Drains
- 2.13 Flood Zone Policy
- 2.14 Finished Floor Elevations
- 2.15 Hydrology Reports

2.1 Storm Drainage

Storm Drainage Checklist:

1. Preliminary subdivision review.
 - A. Preliminary drainage report submitted?
 - B. Are limits of watershed shown, including off-site drainage?
 - C. Are there any existing drainage structures such as waste or delivery ditches, channels, etc.?
 - D. Is it clear what will be done with them?
 - E. Has a drainage exhibit been submitted showing drainage patterns of all streets in the subdivisions?
 - F. What is required retention in cubic feet?
 - G. What is the approximate size and depth of the basin?
 - H. What method is available for draining the basin in thirty-six (36) hours?

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- I. Will subdivision be phased?
- J. Is it clear what will be done as a temporary solution of storm run-off during phasing?
- K. Are any special easements needed for pipes, ditches, temporary basins, etc.?
- L. Is the one-hundred-year flood plain, if applicable, shown on plat?

If any part of the project is located in a one-hundred-year FEMA floodzone, contact the Town's Floodplain Administrator for necessary forms and information.

- M. Are pad and finished floor elevations shown on the Grading and Drainage Plans?
- N. Maximum allowable grade difference between adjacent developments to be no more than 1-½ feet.

2. Final subdivision review:

- A. Has final drainage report been included with the first submittal of plans?
- B. Is a drainage exhibit showing peak street flows and drainage areas included?
- C. Are tile sizing calculations included?
- D. Are catch basin calculations included?
- E. Is a detail of retention basin grading shown?
- F. What is the required volume?
- G. What is the calculated volume?
- H. Are inlet and outlet structures shown?
- I. Is irrigation system design included?
- J. Is lot grading plan included?
- K. Method of draining basin in thirty-six (36) hours?
- L. Is the one-hundred-year flood plain, if applicable, shown on final plat?
- M. Do the civil and landscape plans for the basins coincide?
- N. Are water surface elevations and relevant cross-sections shown?
- O. Are pad and finished floor elevations shown on the Grading and Drainage Plans?

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3. Commercial site drainage.
 - A. Have all property lines, proposed or existing building, asphalt, grass, desert landscape and concrete areas been shown and the dimensions of same?
 - B. Are all existing grades shown? Either by a grid method or contour lines especially at property lines, driveways and sidewalks.
 - C. Has the finished grade of all surfaces been indicated?
 - D. Is the finished floor and pad elevation shown?
 - E. Is the direction of roof drainage shown?
 - F. Are all items of construction that will affect drainage shown?
 - G. Is the site divided into drainage areas and calculations shown for the run-off and retention of each area?
 - H. Were the correct run-off coefficients used?
 - I. What method of draining the retention area is provided?

2.2 General Notes

1. A note “All design and construction must be in accordance with the Uniform Standard Specifications and Details published by the Maricopa Association of Governments and as amended by the Town of Gilbert.”
2. A note “The Contractor shall notify the Town of Gilbert Engineering Department at least twenty-four (24) hours in advance of any construction of inspection.” Call (480) 503-6847.
3. A note regarding the coordination by the developer and contact to avoid the placement of driveways in conflict with utility services.
4. A note pertaining to the responsibility for the coordination of the relocation of power poles and other utilities.
5. Backfill and compaction within County right-of-way shall be in accordance with the latest Maricopa County Special Provisions for installation of underground utilities.
6. Contractor shall comply with the provision for traffic control as per the 2003 Edition of the Manual on Uniform Traffic Control Devices Handbook.
7. A note: “Call the Blue State Center (602) 263-1100, forty-eight (48) hours before you dig for location of all underground utilities.

8. A note: "Engineer certifies that he has contacted all interested utility companies and has transferred all existing and/or proposed utility lines and related information onto these plans, and that he has also correctly plotted the existing and proposed right-of-way and easement lines."
9. A note: "The contractor shall be required to install a night tie in for any new water line that will affect existing service sufficient to warrant same in the opinion of the Town Off-Site Inspector."
10. A note: "All improvements within the retention basin and/or roadway parkways shall be in accordance with the latest Town of Gilbert Procedures for developers and engineers."
11. Contractor is advised that an excavation and dirt moving permit is required by the Maricopa County Health Department and the Town of Gilbert. It shall be the responsibility of the contractor to obtain this permit and comply with its requirements.

2.3 Retention Policy

- A. All new developments shall provide retention for the run-off generated by the fifty-year, twenty-four-hour storm (3-inches). The area to be considered as generating run-off to be retained shall be the development itself and one-half of the right-of-way of the adjacent street(s).

2.4 Retention Volume

- A. The volume will be determined from the following formula:

$$V = DAC$$

V = volume (cubic feet)

D = fifty-year, twenty-four-hour rainfall depth – (0.25 feet)

A = area (square feet)

C = weighted run-off coefficient

- B. A weighted run-off coefficient shall be determined based on the following:

Roofs and concrete C = .95

Asphalt C = .90

Desert Landscaping C = .70

Green Landscaping C = .25

NOTE: Depending on the situation, other methods of determining run-off volume may be used with prior approval of the Town Engineer.

2.5 Retention in right-of-way and landscape easement

- A. Fifty percent of the right-of-way behind the sidewalk and fifty percent of the required landscape easement (track) may be used for retention. The maximum allowable depth

is two and one-half (2.5) feet (measured from the adjacent street top of curb) and the maximum allowable side slope is 4:1. (See Typical Retention Basin Design)

2.6 On Lot Retention – Residential Subdivisions

On Lot retention may be used only in suburban ranch developments provided that:

- A. The lot is graded to provide a minimum of three (3.0) inches of freeboard over and above the amount required to retain the fifty-year, twenty-four-hour storm.
- B. Suburban ranch lots are twenty thousand (20,000) square feet, or greater in size.
- C. Lots less than 35,000 square feet in size cannot use an Agrarian Street (see Standard Detail NO. 28) and must provide retention basins for street run-off.
- D. Plats are to contain the following statement: “On lot stormwater retention is required in this subdivision. No stormwater shall discharge onto neighboring properties or streets.”

2.7 Retention Basin Design

- A. The maximum allowable side slope on any basin is 4:1. Any basin located on arterial street frontage is limited to a depth of two and one-half (2.5) feet (measured from the adjacent street top of curb) and a ponding depth of two (2.0) feet. Other basins may be three and one-half (3.5) feet deep (measured from top of curb) and pond water to a maximum depth of three (3.0) feet. (see Typical Retention Basin Designs)
- B. All retention basins must drain within thirty-six (36) hours. If water is ponded to a depth of one foot or greater a positive means of draining the water must be provided. If the water is ponded to a depth of less than one foot, a percolation test must be performed to show the basin’s ability to drain naturally within thirty-six (36) hours.
 - 1. Basin Maintenance: A Homeowners Association will set up to maintain all basins.
 - 2. Should any basin fail to drain any storm event up to and including the fifty-year, twenty-four-hour storm within thirty-six (36) hours, the owner(s) will make the necessary corrections.
 - 3. Any water that enters the basin must do so in a manner that does not damage the landscaping, cause scouring or erosion.
 - 4. The basin’s side slopes should vary to eliminate a “bowl” effect. Consult the Town’s current Planning Guidelines for aesthetic considerations.
 - 5. The minimum pipe acceptable for use as an equalizer is eight-inch C-900 PVC.
 - 6. Headwalls are to be provided for all pipe inlets/outlets.

- a. Headwall grates will be required for all pipes size 10-inches and larger.
- C. Commercial/industrial areas.
 - 1. A maximum of fifty (50) percent of the paved areas (excluding roadways) may be used for retention. The maximum ponding depth is one foot and this may occur in only fifteen (15) percent of the inundated area. A maximum of fifty (50) percent of the parking may be used for retention.
 - 2. In paved areas where retention occurs, the maximum slopes are two and one-half (2.5) percent in the driving area and four (4.0) percent in the parking areas. Handicap areas are to meet ADA requirements.
 - 3. The first inch of rainfall run-off retention must be provided for off of pavement.

2.8 Statement to Appear on Plats and Grading and Drainage Plans

- A. All retention basins must drain any storm event up to and including the fifty-year, twenty-four hour storm within thirty-six (36) hours. Owner(s) of any basin failing to meet this requirement must take corrective action to bring the basin into compliance.

2.9 Drywell Policy

- A. The Town of Gilbert permits the use of drywells to drain retention areas if there is no other convenient method available to drain the site, and where the drywells have been designated and constructed according to the guidelines of this policy.
- B. It is the owner's responsibility to maintain the drywell. Drywells that cease to drain a project within a thirty-six hour period are to be replaced with new ones where alternate methods of drainage are still not available.
 - 1. Drywell design and construction
 - a. The Town of Gilbert standard drywell is the Maxwell IV. It or an approved equal shall be used. All drywell details shall be shown on the construction drawings.
 - b. The number of drywells used shall be such that the volume to be drained by each well shall not exceed forty-three-thousand five-hundred (43,500) cubic feet. The Engineer shall submit information substantiating the number of drywells.
 - c. Offset drywells a minimum of twenty (20) feet from any basin surface inlet.
 - d. When a drywell is constructed in a landscaped basin the rim of the drywell shall be two (2.0) inches above the finished basin elevation.

- e. Drywells are to remain sealed until all paving or basin landscaping is completed (or at least until new grass is stable) then to be un-sealed and inspected.
- f. Drywells are to have a minimum settling basin depth of nineteen (19) feet, thirty-inch bolt down grates and shall penetrate a minimum of ten (10) feet into highly permeable soils.
- g. Drywells are to be spaced a minimum of seventy-five (75) feet center to center.
- h. No allowance may be taken for drywell volume in basin capacity calculations.
- i. The Engineering Department shall inspect each well site prior to placement of the liner and backfill to verify ten (10) feet penetration into sand and gravel. Where it is unclear whether sand and gravel has been penetrated, a percolation test shall be performed in the following manner.

Drywell Test: The drywell shall be filled with clean water until the rate of inflow and the percolation rate have stabilized for a period of one hour. If the rate of inflow is greater than or equal to 0.5 cfs, the drywell shall be considered acceptable. If the rate of inflow is less than 0.5 cfs, the succeeding drywells installed shall be increased in depth or the total number of drywells on the project increased to make up the difference.

- j. Drywells shall not be constructed within the street right-of-way.

2.10 Statement Appearing on All Plans and Plats Involving Drywells

The following statement shall appear on all plans which include the use of drywells: “All drywells shown on this project shall be maintained by the owners and are to be replaced by the owner when they cease to drain the surface water in a thirty-six-hour period. Regular maintenance of the drywell silting chamber is required to achieve the best operation of the drywell”.

2.11 Streets

- A. For major and minor arterials, major collectors, and primary collector streets the ten-year one-hour storm event shall only inundate one lane of traffic per half street. For secondary collector and local streets the ten-year, one-hour storm event must be contained between the two-curb faces at a maximum depth of six (6.0) inches. There shall be no cross street flow on any streets, except secondary collectors and local streets, for any storm up to and including the ten-year, one-hour storm event. Cross street flow on secondary collectors and local streets shall be limited to eight (8) inches in depth. The fifty-year storm event must be contained in the street right-of-way. The one-hundred-year storm event must be contained below the finished floors of the building.

1. Scuppers are not to be used unless grade limitations mandate it. Scuppers will be built in accordance with M.A.G. Standard Detail No. 206. Scuppers that use a metal cover (walking surface) will not be allowed.
2. Catch basins may be curb opening type, grate opening type, or a combination curb and grate opening. All grate openings must be bicycle safe.

2.12 Storm Drains

- A. Size of storm sewer pipe shall be determined by the Manning Formula which is expressed as:

$$Q = va = \frac{1.49}{n} \cdot r^{2/3} \cdot s^{1/2}$$

Q = Quantity of flow in cubic feet per second

V = Velocity of flow in feet per second

a = Required area in square feet

n = Coefficient of roughness (use 0.013 concrete pipe; 0.011 for plastic pipe)

r = Hydraulic radius in feet - $\frac{\text{cross sectional area of flow}}{\text{wetted perimeter}}$

S = Slope of energy gradient in feet per foot

- B. Adjustments of pipe sizes as determined by the Manning Formula may be necessary due to hydraulic gradient considerations.

- C. Other guidelines related to size and configuration of storm sewer systems are as follows:

1. The minimum pipe size allowed in Town of Gilbert right-of-way is fifteen inch.
2. Pipes will be designed for flows intercepted by the inlets
3. The maximum length between access openings shall not exceed five-hundred feet for pipes less than thirty-six (36) inches in diameter or eight-hundred (800) feet for pipes thirty-six (36) inches in diameter or greater. Access opening may be in the form of an inlet, manhole, junction box or other approved appurtenance.
4. Minimum cover for storm sewer pipe shall be two (2) feet from finish grade of the outside top of pipe, except where approved structural correction is provided when cover requirements cannot be met.
5. Minimum widths shall be determined as follows:

<u>Pipe Sizes</u>	<u>Easement Width</u>
15" – 18"	10'
21" – 33"	15'
36" – 48"	20'

- D. Where multiple pipes are installed, edge of easement shall be five (5) feet clear of outside of pipe. Where easements do not generally follow established lot lines, add five (5) feet to the easement width on side toward the building.
1. Storm sewers shall be designed to provide an average velocity when running full of not less than three (3) feet per second. It is desirable that the sewer be so designed that the velocity of flow increases progressively.
 2. When a trunk line passes through a junction, the pipe crown lines will be at the same elevation. An exception is that when the inflow and outflow pipes are of the same diameter, the outflow pipe invert elevations will be one-tenth of one foot (0.1) lower than the inflow pipe invert.
 3. The angle of an inflow trunk line pipe to the outflow trunk line pipe at a junction will not exceed ninety (90) degrees.
 4. If a lateral pipe line enters a junction with its invert elevation above the crownline elevation of the outflow trunkline pipe, the lateral discharge will be considered as drop inlet inflow.
 5. Storm drain manhole covers shall be East Jordan Iron Works #00222459 or Neenah #NF-Deeter 1295, for four-foot manholes and East Jordan Iron Works #00223124 or Neenah #NF-Deeter, 1296 for five-foot manholes.
 6. The total energy losses at a junction, HL, is assumed to be made up on one or more of the following losses:
 - a. Expansion loss, h_i , when storm water enters the junction.
 - b. Contraction loss, h_o , when storm water leaves the junction.
 - c. Bend loss, h_Δ , due to the change in horizontal direction of storm water velocity. These losses shall be estimated as follows:

$$HL = h_i + h_o + h_\Delta$$

$$HL = \text{Total Energy}$$

$$h_i = \text{Expansion Loss (Flow into junction)}$$

$$h_o = \text{Contraction Loss (Flow out of junction)}$$

$$h_\Delta = \text{bend loss}$$

$$v_i = \text{Velocity in feet per second, } Q/A \text{ of upstream pipe}$$

$$v_o = \text{Velocity in feet per second, } Q/A \text{ of downstream pipe}$$

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Δ = Horizontal angle in degrees between the direction of flow of incoming and outgoing pipes

k = Bend loss coefficient

7. The hydraulic grade line shall be a minimum of 1.0 foot below all manhole rims and inlet structures.

NOTE: If water is falling into the storm drain at junction box the junction loss shall be increased by thirty (30) percent.

NOTE: If a junction incorporates full diameter inlet shaping the junction head loss may be reduced by fifty (50) percent.

NOTE: It will not be necessary to calculate the hydraulic grade line if all the following apply:

- a. The top surfaces of successive runs are lined up at changes in size rather than the bottom surfaces.
 - b. The surface of the water at the point of discharge does not lie above the top of the outlet.
 - c. The invert of the outflow pipe is one-tenth of one foot (0.1) lower than the invert of the inflow pipe at a junction where inflow and outflow pipes are of the same size.
 - d. The angle of an inflow trunk line to the outflow trunk line pipe at a junction is less than thirty (30) degrees.
8. The engineering drawings must designate the type of pipe to be used including size and slope. Use the following as a guide for choosing pipe required in different situations.
 - a. Reinforced pipe (R.C.P. thirty-six (36) inches diameter or larger and R.G.R.C.P., any diameter) may be used in all situations. The engineering drawings shall designate the Class or D-load specifications as per ASTM-C-76 and when requested, the engineer shall verify his choice of pipe with load computations.
 - b. Cast-in-place pipe (R.G.C.P.) may be used in certain situations. The engineer is required to provide evidence that soil conditions are adequate for use of this pipe, and obtain permission to use C.I.P.P. as an alternate.

2.13 Flood Zone Policy

- A. Consult Town of Gilbert Ordinance No. 525.

- B. All developments shall be designed so that the run-off produced by storms greater than the fifty-year, twenty-four hour storm will not adversely affect them or increase the risk to any downstream developments.

2.14 Finished Floor Elevation

- A. Consult Town of Gilbert Ordinance No. 525.
- B. All finished floor and finished pad elevations shall be shown on the grading and drainage plans to be above minimum of 14" above outfall of the lot.

2.15 Hydrology Reports

2.15.1 Preliminary Hydrology Report

- A. A preliminary drainage report must be presented with the application for subdivision review. No review will be scheduled without this report. This report shall be on separate, letter size sheets with any necessary maps. Handwritten comments are not acceptable.
- B. Delineate the boundaries of watershed, if the subdivision is subject to off-site drainage.
- C. Indicate any existing drainage or irrigation structures such as: waste or delivery ditches, natural drainage channels etc., and what will be done with them.
- D. Indicate on the preliminary plat drawing the drainage pattern, grade breaks and slopes of all streets.
- E. Indicate the retention volume required using the method described. Present a preliminary retention basin plan including size, depth and possible methods of draining it.
- F. If the development, or any part of it, is located in a mapped floodplain indicate the steps that will be taken to comply with Ordinance No. 525.

2.15.2 Final Hydrology Report

- A. Final hydrology report must be submitted with the first submittals of the engineering plans. Reports shall be on letter size sheets with necessary maps neatly folded, all in a folder. Handwritten comments are not acceptable.
- B. Justify the weighted run-off coefficient (C factor) used in the calculations of run-off volume.
- C. Provide pertinent cross-sections that show conformance to depth and side slope requirements in retention basins.

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- D. Provide calculations showing the methodology used in determining the basin(s) volume(s).
- E. A map is to accompany the report which delineates clearly the different areas to be considered and labels by number the different critical points of interest or where inlets are to be located.
- F. Show that the ten-year storm event's run-off will be handled per Section 1.10 of this Manual.
- G. Justify the scupper and catch basin sizes called out in the plans.

NOTE: Assume twenty-five (25) percent blockage and size the scuppers and catch basins accordingly. If a MAG No. 534 combination open curb-grate type catch basin is used the twenty-five (25) percent blockage factor is not required but no credit is to be given to the open curb face in capacity calculations.

- H. Each sub area is to be analyzed for the peak flow generated by the ten-year one-hour storm event. You may assume a maximum of fifteen (15) minutes for run-off from lots.
- I. Indicate how each basin will drain within thirty-six (36) hours and provide pertinent calculations. Supply percolation tests if required (see Retention Basin Design, following Section 1.6)
- J. Show how the run-off not retained from the storm events greater than the fifty-year, twenty-four hour storm will exit the site and not increase the risk to downstream sites.
- K. Indicate how the development will conform to Gilbert's Floodplain Ordinance No. 525.
- L. Provide any information or calculations regarding off-site drainage affecting the site.
- M. Show how water entering the basin(s) via scuppers, pipes, etc. will not cause scouring or adversely affect the landscaping.
- N. Provide any other information necessary for clarification purposes.

DRAINAGE ENGINEERING

FIGURE 1

FRICITION SLOPE

Q in cfs
 A in Square Feet
 P in Feet
 K loss bends

$$\text{Friction Slope} = \frac{Q^2}{K A^5}$$

$$K = \frac{1,486}{n} \cdot A \cdot R^{2/3}$$

$$R = \frac{\text{Area}}{\text{Wetted Perimeter}} = \frac{A}{P}$$

<i>Pipe Diameter (Inches)</i>	<i>Conveyance Factor (K)</i>	
	<i>n = 0.011</i>	<i>n = 0.013</i>
8	14	12
10	26	22
12	42	36
15	76	65
18	124	105
21	188	158
24	267	226
27	367	310
30	485	410
33	625	529
36	789	666
39	977	825
42	1189	1006
45	1429	1209
48	1689	1436

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Article 3: Street Specifications

Sections:

- 3.1 Street Improvements
 - 3.1.1 General Notes
- 3.2 Street Types
- 3.3 Roadway Widths (by type)
- 3.4 Street Signage
- 3.5 Driveway Details
- 3.6 Paving Standards
- 3.7 Roadway Installation Specifications
- 3.8 Curb, Gutter, Sidewalk, Driveway, Alley Entrance Specifications
- 3.9 Parkway Grading
- 3.10 Decorative Asphalt

3.1 Street Improvements

Street Improvements Checklist:

1. Have you complied with the Town of Gilbert standard street widths, as specified in Subdivision review? All dimensions on plans must be face to face of curb.
2. Minimum curb grade in the Town of Gilbert is 0.0025, Ft/Ft.
3. Are grade changes and grade breaks clearly marked in the plan review?
4. Is all curve information shown on the plan and profile sheets?
5. Valley gutters shall have a minimum 0.20' drop across intersection.
6. Curb returns shall have a minimum 0.10' drop.
7. "Grade to daylight" or provide catch basins at the end of new paving projects where necessary. Also, provide barricades or delineators where there are traffic hazards immediately following end of project paving as directed by the Town of Gilbert. Refer to the 2003 Edition of the Manual on Uniform Traffic Control Devices Handbook.
8. The Town requires a "crown" on all streets. See Typical Street Sections in Town of Gilbert Standard Details.
9. Eight (8) inch thick sidewalk required for alley and commercial driveway entrances. All other sidewalk to be four (4) inches thick.
10. Minimum residential curb return radius of twenty (20) feet and thirty (30) feet minimum for arterial and collector streets to face of curb.

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11. Survey monuments required at all street intersections, all section corners and quarter corners. Brass caps in concrete bases can be used at all curve or P.I. points and in cul-de-sacs as per Standard Details. Street centerlines and monument lines shall coincide. Monuments for section corners and quarter corners “shall” be per MAG Standard Detail 120-2 type “E”.
12. Show sufficient pavement tapers at beginning and end of projects to properly channel traffic back to original or new alignment. Generally tapers should be of temporary construction consisting of at least two (2) inch asphaltic base course over compacted native soil (Tapers are to be sawcut and removed when pavement is extended). The taper formula to determine appropriate length, should be $L=WS$ for posted speed of 45mph or more, and $L=\frac{ws^2}{60}$ for speeds of 40 mph or less.
13. Have you shown and labeled the installation of street sign posts at each intersection per Town of Gilbert Standard Detail. Locations normally coincide with the corner where a STOP sign would be located. Developer shall furnish and install all street signs per Town of Gilbert Standard Detail No. 70-73, 79 and traffic control signs per Manual on Uniform Traffic Control devices.
14. Have you done a complete field survey and shown all existing topo and what is to be done with it? (Power poles, trees, ditches, existing signs and striping, etc.)
15. Plans must show installation of two and one-half (2½) inches AC and base as required by soils report on all alleys and private access ways.
16. Have you provided sufficient site clearance where necessary, such as removal of existing obstructions near an intersection, etc.?
17. All driveway widths and locations shall be as per Town of Gilbert Standard Details.
18. Any project proposing to pave the alleys must coordinate with all existing utility companies to alert them to the need for telco junction boxes installed flush with paving to avoid damage.
19. Projects calling for widening an existing pavement to a new curb and gutter location require, at minimum, the sawcut and removal of existing pavement to the monument line.
20. Did you provide ramps for handicapped as per MAG Standard Detail No. 231 and all ADA requirements?
21. Show all existing concrete or dirt ditches on plans and indicate that they are to be tiled or removed and/or filled and compacted per MAG Specifications 205 and 211.
22. Show the public utility easement at the front of all lots. Indicate and show that the sewer house connections must be installed all the way to the easement line (8’ P.U.E.). This is required to avoid possible conflict with electrical lines when the plumber connects the house to the service.
23. Delineator spacing is to comply with the 2003 Edition of the Manual on Uniform Traffic Control Devices handbook.

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24. Make sure that P.V.C. sleeves required for sprinkler system, gas mains, street light, traffic signals and cable television are shown on the paving plans. Size the P.V.C. sleeves as per landscape architect or Town Engineer.
25. All developers of residential, apartment/condominium, commercial, industrial and business parks, etc., are responsible for paying the design, materials and installation cost for street lighting. Refer to the Street Light Policy for further details, requirements and conditions.
26. The developer's engineer is responsible for coordinating locations of all utilities within the street right-of-way, such that the street lights are able to be installed with the light pole at the back of the sidewalk, or within two (2) feet of the back of sidewalk.
27. Horizontal Curves: A minimum sight distance with clear visibility, measured along the centerline, shall be provided of at least five-hundred (500) feet on major streets, two-hundred (200) feet on collector streets and one-hundred-twenty (120) feet on all other streets.
28. Tangents: A tangent of at least one-hundred (100) feet long shall be introduced between reverse curves and between curves and at street intersection on major and collector streets.
29. Installation of valley gutters must be approved by the Town Engineer.
30. Traffic control design is required for all streets. Developer "shall" be responsible for the design and construction of all traffic (vehicle and pedestrian) controls on and related to this project. Traffic control "shall" be per "2003 Edition of the Manual on Uniform Traffic Control Devices handbook" and Town of Gilbert Standard Details. All traffic control, including required signage, shall be installed within one (1) week of the installation of the "first lift" of paving.
31. The maximum length of a cul-de-sac shall be six-hundred (600) feet and the maximum number of units is twenty (20).
32. Provide typical sections of all streets showing curb, gutter, sidewalk, paving, subgrade and proposed locations of all utilities.
33. Any development which, by its nature, would invite heavier than normal truck traffic shall be required to make a study of the expected Equivalent Axle Loadings (EAL's) for a twenty-year design period and design a pavement depth as warranted by that study and in accordance with the design criteria of the Asphalt Institute.
34. As a condition for, and prior to, the issuance of any grading permit, the contractor shall submit an application for haul route permit along with any applicable temporary Traffic Control Plan. Upon approval of the proposed haul route the off-site inspector and a representative of the contractor shall inspect the roadways to be used by contractor and take photographs to verify their existing condition. After all grading is complete the off-site inspector and contractor will again inspect the haul route and, if necessary, the contractor shall be charged with restoring the roadways to their previous condition or better.

35. The Town policy under which private streets are approved through the planning, zoning, platting and Town Council process is that they will be constructed to meet the same Town standards for public streets; there are no exceptions. The fact that a development has been approved with private streets indicates that the streets, as designed, do not meet Town standards in terms of one or more of the following:

- a. Right-of-way dedications
- b. Sidewalks
- c. Pavement width
- d. Geometrics

Furthermore, final letters of acceptance shall not be issued to the developer of the project until all affected roadways are restored to their previous condition or better.

Private streets that are not gated shall provide traffic controls that comply with the 2003 Edition of the Manual on Uniform Traffic Control Devices Handbook.

3.1.1 General Notes

General street specifications for the Town of Gilbert are detailed as follows:

- A. All construction shall be in accordance with the current M.A.G. Specifications and Details, with the Town of Gilbert additions and deletions.
- B. The contractor shall obtain all necessary permits prior to construction. The Town Engineer shall be notified twenty-four (24) hours prior to starting the different phases of construction for scheduling inspections.
- C. Acceptance of the completed right-of-way improvements will not be given until four (4) mil mylar reproducible "As-Built" plans have been submitted to and approved by the Town Engineer.
- D. Location of all water valves must be referenced at all times during construction and made available to the Water Distribution Division. Only Town Employees are authorized to operate the water valves and fire hydrant connections to the Town's water system.
- E. No paving construction shall be started until all underground utilities within the roadway prism are completed.
- F. Work performed without approval of the Town Engineer and/or all work and materials not in conformance with the specifications is subject to removal and replacement at the contractor's expense.
- G. The maximum stake interval for grades of two tenths of one (0.2) percent or less shall be twelve and one-half (12.5) feet for concrete work and twenty-five (25) feet for asphalt roadway section. All curb returns shall be staked for the P.C., P.T. and the midpoint of return.
- H. Base course will not be placed on subgrade until base requirements have been completed and accepted by the Town Engineer.

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- I. Gutters will be water tested in the presence of the Town Engineer or his authorized representative to insure proper drainage, prior to final approval by the Town Engineer.
- J. Exact point of matching, termination and overlay, if necessary, may be determined in the field by the Town Engineer.
- K. No job will be considered completed until all curbs, pavement and sidewalks have been swept clean of all dirt and debris and all survey monuments are installed, punched and dated according to the plans.
- L. The contractor is responsible for locating all valves, manholes and blow offs in advance of construction and replacing same to finished grade.
- M. The Town of Gilbert is not responsible for liability accrued due to delays and/or damage to utilities in conjunction with this construction. Also, the Town will not participate in the cost of construction or utility relocation.
- N. Traffic control shall be maintained in accordance with M.A.G. Specification 401, and the 2003 Edition of the Manual on Uniform Traffic Control Devices handbook. All traffic controls, including striping and required signage, shall be installed within one (1) week of the installation of the “first lift” of paving.
- O. Testing
 - 1. Testing of materials and construction performance by an approved testing lab is required.
 - 2. The Town Inspector will determine the number and type of tests needed.
 - 3. The contractor/developer will notify the testing lab of the needed tests, coordinate with the inspector and testing lab and pay the costs to perform the tests.
- P. Ordinance #1437, approved by the Town Council in October 2002, states: No construction water from fire hydrants shall be used on parcel or lots of ten acres or more in size. For more information, the ordinance is located on the Town of Gilbert website at: www.ci.gilbert.az.us. To obtain construction water, the contract is required to make application with the Public Works Water Division. A security deposit is required to receive a fire hydrant meter. The town reserves the right to specify the time and location that construction water can be delivered.
- Q. All flood retention basin development and installations must be completed and accepted before the paving permit will be issued for the subdivision.
- R. Prior to final approval and acceptance of the work the developer/contractor will be required to clean and repair adjacent (off-project) roadways used during the course of their construction.
- S. Use of “Reclaimed Asphalt” is prohibited unless approved by the Town Engineer.
- T. Grinding and/or patching of curbs-gutters-aprons valley gutters – driveways – scuppers – manhole bases and inverts or any concrete structure to correct deficiencies that result from

improper grade setting, or construction methods, or breakage due to any circumstances shall not be permitted.

- U. All metallic materials inlets, grates, frames and covers catch basins – nose angles shall be painted per M.A.G. Specification No. 790, Paint No. 9 (light gray).
- V. Parkway grading shall be designed to insure that runoff cannot be retained behind curbs or walks.
- W. All parkway grading must be completed before any paving may begin.
- X. All signs shall be installed Detail 79.

3.2 Street Types

The Town of Gilbert Street hierarchy policy includes the following general types: Major Arterial, Minor Arterial, Major & Industrial Collector, Residential Collector, Local Industrial, Local and Agrarian.

Specifications for Access Points on various street types are reflected in Town of Gilbert Standard Details:

No. 1	Major Arterials
No. 2	Minor Arterials
No. 3	Major & Industrial Collector
No. 4	Residential Collector Streets
No. 5	Local Industrial Streets
No. 6	Local & Agrarian Streets

3.3 Roadway widths (by type)

General rights-of-way expectations/requirements are established to accommodate projected traffic generation demand according to various development types.

Roadway dimension specifications, by street type, are depicted in Town of Gilbert Standard Details:

No. 21	Major Arterial Street
No. 22	Minor Arterial Street
No. 23	Major Collector Street
No. 24	Residential Collector Street
No. 25	Industrial Collector Street
No. 26	Local Industrial Street
No. 27	Local Street
No. 28	Agrarian Street

3.4 Street Signage

Street name specifications are set forth on Town of Gilbert Standard Detail No. 70, 71, 71A, 72, 72A, & 73.

3.5 Driveway Details

Site access from public rights-of-way is specified according to land use and anticipated traffic type.

Town of Gilbert Standard Details, pertaining to driveways and refuse truck maneuvering areas are:

M.A.G. Detail 250	Residential Driveway
M.A.G. Detail 251	Return Type Driveways
No. M-42	Commercial Driveway
No. 80	Driveways for Refuse Trucks/Dumpster Bins

3.6 Paving Standards

Specifications for paving of all types are set forth in this section. Related improvements, such as parkway treatments, pathways, curb, gutter, sidewalk and scuppers are also referenced.

Town of Gilbert Standard Details for paving base are as follows:

No. 33	Depth of Base Course, 4" Minimum Bituminous Surface
No. 34	Depth of Base Course, 2-1/2" Minimum Bituminous Surface
No. 35	Depth of Base Course, 2-1/2" Minimum Bituminous Surface
No. 36	Depth of Base Course, 2-1/2" Minimum Bituminous Surface

Related paving specifications, pertaining to street designs include the following Town of Gilbert Standard Details.

No. 41	Cul-de-Sac
No. 45	Backfill, pavement & Surface Replacement

Town of Gilbert Standard Details for pathways and scuppers include:

No. 42	Meandering Sidewalk
M.A.G. Detail 206	Scupper

3.7 Roadway Installation Specifications

Procedures and materials for constructing roadway improvements are as follows:

- A. *Roadway excavation and subgrade preparation.* Roadway excavation shall consist of excavation involved in the grading and construction of roadways, except structure excavation, trench excavation and any other excavation separately designated.
 - 1. *Subgrade preparation.* The subgrade shall be scarified and loosened to a depth of six (6) inches. When fill material is required a layer of approximately three (3) inches

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may be spread and compacted with the subgrade material to provide a better bond. The subgrade cut and fill areas shall be constructed to achieve a uniform soil structure.

However, areas containing highly expansive clays within roadway areas may be compacted in place without scarification as directed by the Town Engineer. Moisture content of subgrade materials shall be brought to that required for compaction by the addition of water, by the addition and blending of dry, suitable material or by the drying of existing material. The material shall then be compacted to a minimum of ninety-five (95) percent as determined in accordance with ASTM D-698.

All subgrade shall be approved by the Town Engineer prior to placement of ABC or select materials. The contractor shall provide means to proof roll roadway subgrade at the direction of the Town Engineer utilizing a minimum eighteen thousand (18,000) pound live axle load. Subgrade containing soft or excessively wet areas shall be removed and replaced with suitable materials under the direction of the Town Engineer. In this event the Soil Engineer should also be notified.

2. *Placement and compaction of fill.* Areas over which fills are to be placed shall be cleared of all vegetation, debris and/or rubble and scarified to a depth of six (6) inches to provide a bond between the existing ground and the material to be deposited thereon. Unless otherwise specified, the original ground area upon which fills are to be constructed shall be compacted to uniform density of not less than ninety-five (95) percent in accordance with ASTM D-698. The loose thickness of each layer of fill material before compacting shall not exceed eight (8) inches. At the time of compaction, the specified compaction shall be obtainable and the fill be firm and unyielding.

B. *Roadway Base Course.* Untreated base, i.e., select or aggregate base course, shall comply with M.A.G. specifications unless the use of a different type of material is specifically authorized by the Town Engineer. Untreated base of six (6) inches or less in compacted thickness may be placed in a single layer. Untreated base more than six (6) inches in thickness shall be built up in successive layers of approximately equal compacted thickness not to exceed a maximum thickness of six (6) inches. The requirements which follow are applicable to all types of material.

1. *Placement and compaction.* After distribution, the base material shall first be watered and then immediately bladed to a uniform layer that will net, after compaction, the required thickness. If the materials deposited are not uniformly blended together, the blading operation shall be continued to such extent as may be necessary to eliminate segregation. The quantity of water applied shall be an amount which will assure proper compaction resulting in a maximum density of not less than one-hundred (100) percent as determined by ASTM D-698. Care shall be exercised in connection with watering operations to avoid wetting the subgrade or any underlying base course to detrimental extent. Upon completion, the base surface shall be true, even and uniform conforming to the grade and cross-section specified by the Town Engineer.
2. *Base Course Deficiency.* When in the opinion of the Town Engineer, there is reason to believe that deficiency in thickness or an excess of plasticity exists, samples will be taken in the same pattern as that defined in M.A.G. Specification 321. If the base has

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been covered or it is otherwise impractical to correct the deficiency, the following corrective measures shall be taken by the contractor at no additional cost to the Town.

<u>TYPE</u>	<u>DEFICIENCY</u>	<u>CORRECTIVE MEASURE</u>
I	1" or more	Place an additional asphalt in thickness overlay, Type D-½ if ½ the thickness of the deficiency in thickness for the full roadway width over the area involved, not less than six-hundred-sixty (660) feet or one city block in length.
II	A plasticity index of five (5) to ten (10) inclusive	Place an asphalt concrete overlay ½ inch in thickness over the same total area as required for Type I.
III	A plasticity index of over 10	Remove deficient material from affected area and replace with material complying with the specifications.

- C. *Asphalt concrete pavement.* This procedure shall consist of leveling, surface and/or base courses and curbs placed upon the previously prepared base or subgrade in accordance with these specifications to the compacted thickness and design shown on the plans or ordered in writing by the Town Engineer.
1. *Weather and moisture conditions.* Asphalt concrete shall be placed only when the surface is dry and when the ambient air temperature is forty (40) degrees Fahrenheit and rising. No asphalt concrete shall be placed when the weather is foggy or rainy, or when the base on which the material is to be placed has a moisture content in excess of optimum. Asphalt concrete shall be placed only when the Town Engineer determines that weather conditions are suitable.
 2. *Placing, spreading and finishing.* Asphalt concrete shall be delivered and placed and at a temperature no higher than necessary to accomplish placing, finishing and spreading. Tarpaulins shall be furnished and used to cover all loads during transportation if, as determined by the Town Engineer, difficulties in spreading, finishing, or compacting are experienced and the temperature of the mixture at a point six (6) inches below the exposed top surface, does not exceed two-hundred-fifty (250) degrees Fahrenheit when taken at the point of delivery in the truck. No free treating fluid shall be present in the truck bodies at the time of asphalt concrete loading. The handling of the completed mixture shall at all times be such as to prevent segregation, and the material as spread shall be free from areas of excess material (coarse or fine). Float rock developed in the process of raking shall be placed on an underlying course of otherwise disposed of. In no case shall it be scattered over the surface of a final course. Asphalt shall be finished at a compacted ¼-inch above the lip of curb.
 3. *Base Preparation.* The base, as prepared by the contractor, on which the asphalt concrete is to be placed, shall be smooth, firm and true to grade and cross-section as shown on the plans and shall be so maintained throughout the period of placing asphalt concrete. If necessary, in order to obtain the above specified base condition

and if ordered by the Town Engineer, a leveling course of asphalt concrete compacted in layers not exceeding two (2) inches in thickness or aggregate base shall be spread to level irregularities such as dips, depressions and sags. All irregularities such as humps or high spots shall be removed in order to provide a smooth base of uniform grade and cross-section, so that subsequent surfacing will be of uniform thickness. No additional compensation will be allowed for furnishing and placing these materials and full compensation for all materials and for all work incidental to the correcting of irregularities will be considered as included in the contract price for asphalt concrete.

4. *Spreading and finishing equipment.* Self propelled mechanical spreading and finishing equipment shall be provided with a screed or strike off assembly capable of distributing not less than the full width of traffic lane. The term screed includes any strike off device operating by cutting, crowding, or other practical action which is effective on mixtures at workable temperatures without tearing, shoving, or gouging and which will produce a finished surface of the smoothness and texture required. Self-propelled mechanical spreading and finishing equipment shall be equipped with a control system capable of automatically maintaining the screed elevation as specified herein. When more than one course is placed, longitudinal joints of each course shall be staggered not less than six (6) inches with relation to the longitudinal joints of the underlying course. Sufficient rolling equipment shall be furnished to compact and finish satisfactorily the amount of mixture being placed. A minimum of two (2) rollers and two (2) operators shall be provided for production of one- hundred-fifty (150) tons or less per hour where the thickness of lift to be placed is (1) inch or less, the minimum pieces of rolling equipment shall be three (3) rollers consisting, unless otherwise directed by the Town Engineer, of one (1) smooth wheel and two (2) pneumatic rollers and three (3) operators. In all cases one (1) additional roller and operator shall be provided for each additional one-hundred (100) tons, or fractional part thereof, per hour. Breakdown rolling shall begin as soon as the mixture will bear the roller without undue displacement. Rolling shall be longitudinal, overlapping on successive trips by at least $\frac{1}{2}$ but not more than $\frac{3}{4}$ the width of the rear wheels. Asphalt will be placed at a minimum temperature of two-hundred-fifty (250) degrees Fahrenheit. The motion of the roller shall at all times be slow enough to avoid displacement of the mixture. Rolling shall continue until the specific gravity of the compacted mixture is not less than ninety-five (95) percent of the specific gravity of specimens composed of the same materials in similar proportions or composed of the same mixture compacted in the laboratory by the seventy-five (75) blow method of ASTM D-1559.

At any place not accessible to the roller, the mixture shall be thoroughly compacted with tampers and finished, where necessary, with a hot smoothing iron to provide a uniform and smooth layer over the entire area compacted in this manner. The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than one-fourth ($\frac{1}{4}$) inch from the lower edge of a twenty-five-foot straightedge when the straightedge is placed parallel to the centerline of the roadway. The straightedge shall be furnished by the contractor and shall be acceptable to the Town Engineer. When deviations in excess of the above tolerance are found, such places as humps or depressions shall be corrected to meet the specified tolerance, or shall be cut out along neat straight lines and replaced with fresh hot mixture and

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thoroughly compacted to conform with the bond to the surrounding area. Materials and work necessary to correct such deviations shall be at no additional cost to the Town.

5. *Paving Deficiency.* When, in the opinion of the Town Engineer, there is reason to believe that the pavement may be deficient in thickness, cores will be taken at his direction, at random locations. When a deficiency of more than $\frac{1}{4}$ inch is found, two (2) additional cores will be taken not closer than one-hundred (100) feet apart nor closer than one-hundred (100) feet to the original core and the average of these three (3) cores shall be used to determine the amount of the deficiency. Further cores may be taken by the contractor if he so chooses, to determine the limits of the deficiency and shall be at no additional cost to the Town but shall be used in determining the average thickness of the pavement. Thickness of the cores shall be determined by average caliper measurement.

When the deficiency of the pavement thickness exceeds $\frac{1}{2}$ inch, the pavement shall be overlaid on the area affected, but in no case less than one city block or six-hundred-sixty (660) feet whichever is less in length, for the full weight of pavement, with a new mat of material specified by the Town Engineer, equal in thickness to the deficiency but not less than $\frac{3}{4}$ inch in any instance. This is to be done at no additional cost to the Town. When the pavement is deficient in thickness by more than $\frac{1}{4}$ inch, all coring done to establish this premise shall be at the expense of the contractor.

- D. *Asphaltic Concrete Overlay, Preparation of Surfaces.* Before placing asphalt concrete overlay, severely raveled areas or cracked areas that are depressed more than $\frac{3}{4}$ inch from the adjoining pavement shall be cut out and patched at least forty-eight (48) hours prior to the resurfacing operation. Over-asphalted areas or rough high spots shall be removed by burning or blading. Large shrinkage cracks shall be filled with asphalt sealing compound acceptable to the Town Engineer. The entire surface shall be cleaned with a power broom. Raveled areas that do not require removing shall be cleaned by hand brooming.

Asphaltic seal, tack coat and asphalt concrete shall only be placed when the ambient air temperature is seventy (70) degrees Fahrenheit and rising and existing surfaces are dry.

After surfaces have been prepared and all manholes and valves have been adjusted in the base course to the satisfaction of the Town Engineer, they shall receive a tack coat as specified by the Town Engineer. Traffic will not be permitted over surfaces which have received a tack coat. Asphalt rejuvenating agent, a cationic oil and resin emulsion, shall comply with Section 718 of M.A.G. Specifications and shall be applied at the rate of 0.07 to 0.15 gallons of undiluted concentrate per square yard. However, the exact quantity shall be as directed by the Town Engineer.

- E. *Asphalt Concrete.* The asphalt to be mixed with mineral aggregate shall be paving grade asphalt conforming to Section 710 and 711 of M.A.G. Specifications and as directed by the Town Engineer.
 1. When aggregate is subject to stripping, as determined by ASTM methods, dry hydrated lime conforming to the requirements of ASTM C-207 Type N, Portland cement conforming to M.A. G. Section 725 or other approved anti-strip agent shall be

added. Hydrated lime and Portland cement shall be added in accordance with M.A.G. Section 710.2.3. Other approved no strip agents shall be added in accordance with the manufacturer's recommendations upon approval by the Town Engineer.

2. Mineral filler shall conform to the requirements of AASHTO M-17. The mineral filler shall be dry hydrated lime conforming to the requirements of ASTM C-207 Type N, or Portland cement conforming to Section 725 or other approved mineral filler and shall be added to the aggregate in accordance with the requirements contained herein. The amount of mineral filler to be used shall be determined by the Town Engineer. The method of adding the mineral filler shall be such that the aggregate is uniformly coated and the mineral filler is uniformly distributed without loss or waste within the material prior to adding the asphalt to the mixture. Unless otherwise authorized by the Town Engineer, no work shall be started on the project, nor any mixture accepted until the contractor or his supplier has submitted a satisfactory job-mix formula based upon tests of the materials furnished.
3. Testing of asphalt and asphaltic products shall be done at the direction of the Town Engineer at prescribed intervals and specified in the Town of Gilbert Standard Specifications and per Section 321 of M.A.G. Specifications.

3.8 Curb, Gutter, Sidewalk, Driveway, Alley Entrance Specifications

The various types of concrete curb, gutter, sidewalk, driveways and alley intersections shall be constructed to the dimensions indicated on the plans and standard detail drawings. Joints shall be designated as expansion joints or contraction joints and shall be constructed as specified by the Town Engineer.

A. *Materials.*

1. Curb and gutter, vertical curb and sidewalk shall be class "B" concrete conforming to the applicable requirements of Section 725 of M.A.G. Specifications. Use of Fly Ash will not be permitted. Use of Calcium Chloride will not be permitted when ambient air temperature is ninety (90) degrees Fahrenheit or above increasing.
2. Valley gutter, aprons and all driveway entrances shall be class "A" concrete conforming to applicable requirements of M.A.G. Section 725. Use of Fly Ash will not be permitted unless approved by the Town Engineer in writing. Calcium Chloride will not be permitted when ambient air temperature is ninety (90) degrees Fahrenheit and rising, or when temperature is ninety (90) degrees Fahrenheit and rising, or when temperature falls below thirty-two (32) degrees Fahrenheit.
3. Driveways and entrances for commercial and industrial buildings and complexes shall be constructed utilizing class "A" concrete a minimum of eight (8) inches in thickness.
4. Private and residential entrances and driveways other than rolled curb shall be constructed per M.A.G. Standard Detail 250.
5. Aprons shall be constructed in accordance with approved plans and specifications utilizing class "A" concrete for commercial and residential projects.

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6. Footings for valley gutters within the apron structures shall be constructed with class “A” concrete in accordance with approved plans and specifications. Footings shall be finished smooth and constructed independent of the apron structure. The use of bond breakers, such as felt, plastic, etc. will not be permitted unless approved in writing by the Town Engineer. Footings shall be constructed a minimum of twenty-four (24) hours prior to placement of concrete within the apron structure unless otherwise approved by the Town Engineer.
7. Valley gutters shall be constructed of class “A” concrete and poured continuous.

B. *Subgrade Construction.*

1. *Curb subgrade.* The subgrade shall be constructed and compacted true to grades and lines as shown on the plans and as specified by the Town of Gilbert. All soft or unsuitable materials shall be removed to a depth of not less than six (6) inches below subgrade elevation and replaced with material satisfactory to the Town Engineer. Subgrade materials shall be moistened or dried to optimum moisture content plus or minus two (2) percent and compacted to a minimum of ninety (90) percent of the maximum density in accordance with ASTM D-698.
2. *Sidewalk subgrade.* Materials having expansive potentials of four (4) percent or less shall be moisture conditioned and compacted to the following specifications. Subgrade materials shall be moisturized to a moisture content of two (2) percent to four (4) percent above optimum for a minimum depth of eight (8) inches and compacted to a density of ninety (90) to ninety-five (95) percent a minimum of twenty-four (24) hours prior to concrete placement. Subgrade conditions shall be maintained in this condition until the time of concrete placement.

Subgrade materials having an expansive potential greater than four (4) percent shall be moisture conditioned two (2) percent to five (5) percent above optimum for a minimum depth of twelve (12) inches and compacted to a density of ninety (90) to ninety-five (95) percent, between thirty-six (36) and forty-eight (48) hours prior to concrete placement. These conditions shall be maintained until the time of concrete placement.

In no case shall curb subgrade consist of existing base materials and/or surfacing material already in place. Granular base materials or clean sands shall not be permitted for use as curb subgrade or be utilized as fill below bottom of curb, unless approved by the Town Engineer in writing.

3. *Valley Gutter, Apron and Driveway Subgrade.* Materials having expansive potential shall be moistened or dried to optimum moisture content plus or minus two (2) percent for a depth of eight (8) inches and compacted to a density between ninety (90) and ninety-five (95) percent. The subgrade shall be firm and unyielding prior to the placement of concrete.

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Non-expansive materials shall be moistened or dried to optimum moisture content plus or minus three (3) percent for a depth of eight (8) inches and compacted a density of ninety-five (95) percent.

C. *Concrete Curbs, Gutters and Sidewalks Construction.*

Concrete curbs, gutters and sidewalks shall be constructed by the conventional use of forms, or an appropriate machine upon approval of the Town Engineer. Forms shall be thoroughly cleaned prior to each use and shall be coated with a light oil or other releasing agent of a type which will not discolor the concrete. The concrete shall be thoroughly spaded away from forms so that there will be no rock pockets next to the forms. The concrete may be compacted by mechanical vibrators as approved by the Town Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface and coarse aggregate is below the concrete surface.

Expansion joints, unless otherwise specified, shall be constructed in accordance with the Town of Gilbert Standard Details and in a straight line and vertical plane perpendicular to the longitudinal line of the sidewalk or curb and gutter, except in cases of curved alignment, when they will be constructed along the radial lines of the curve. They shall be constructed to the full depth and width of the concrete and shall match the joints in the adjacent pavement, sidewalk or curb and gutter. Joints shall be constructed at all radius points, driveways, alley entrances and at adjoining structures with a maximum interval of fifty (50) feet between joints.

Contraction joints, unless otherwise specified, shall be constructed in accordance with the Town of Gilbert Standard Details and in a straight line and vertical plane perpendicular to the longitudinal line of the sidewalk or curb and gutter, except in cases of curved alignment when they will be constructed along the radial lines of the curb. They shall be constructed to a depth of one (1) inch and at five-foot intervals on sidewalk and curb & gutter widths of six (6) feet and eight-foot intervals on sidewalk widths of four (4) feet. Sidewalk score marks, at least ½ inch deep, are required every four (4) feet or every five (5) feet matching the width of the sidewalk. The front face form shall not be removed before the concrete has taken its initial set and has sufficient strength to carry its own weight. All gutters will be required to be flow tested.

Grinding and/or epoxy patching of curbs-gutters-aprons, valley gutters – driveways- scuppers – manhole bases and inverts of any concrete structure to correct deficiencies that result from improper grade setting, or construction methods, or breakage due to any circumstances shall not be permitted.

D. *Transportation and Delivery of Concrete.*

1. All concrete tickets shall have the time of departure from the batching hopper clearly stamped on each ticket.
2. No concrete shall be placed when ninety (90) minutes or more has elapsed from time of departure from the batching hopper and the temperature of the concrete reaches ninety (90) degrees Fahrenheit. At no time shall concrete be placed when the

temperature of the mixture is ninety (90) degrees Fahrenheit or above regardless of the elapsed time.

3.9 Parkway Grading

This grading shall include all work necessary to bring the surface of the parkway, between the back of curbs and sidewalks and/or between sidewalks and the right-of-way line, to the grade and cross-section shown on the plans or as directed by the Town Engineer. It shall also include median islands between divided roadways.

B. Rough Grading.

Fill material shall contain no rocks over three (3) inches in diameter, broken concrete, or debris of any nature. Backfill behind curbs and along the edges of the sidewalk shall be placed immediately upon the completion of those items.

C. Fine Grading.

The finished surface should be free of stone and all debris and be true to grade and cross section after compaction to a minimum of eight-five (85) percent of maximum density.

3.10 Decorative Asphalt

1. Asphalt stamping general notes 401a, 401b, and 401c. Shall apply to all standard details 402, 403a, 403b, and 404.
2. Detail 402 Offset Brick template shall be used on paved medians only.
3. Detail 403a, 403b – Tortoise Shell template and ashler slate shall be used on raised medians only.
4. Detail 404 Tri-hex Keystone template shall be used in designated crosswalk zones only.

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Article 4: Utility Approvals

Sections:

- 4.1 Utility Approvals
 - 4.1.1 Sewer Plan General Notes
- 4.2 Plastic Sewer Pipe Policy
- 4.3 Manhole Specifications and Standards
- 4.4 Water
 - 4.4.1 Water Plan General Notes
 - 4.4.2 Reclaimed Water
- 4.5 Utilities/Trenching Standards
- 4.6 Utilities
- 4.7 Trenching/Backfill Standards

4.1 Utility Approvals

Sewer Plans Checklist:

1. The developer must use P.V.C. pipe, alternate pipe materials to be approved in advance by Town Engineer.
2. The use of clean outs will be permitted only upon review and approval by the Town Engineer.
3. Show both on plan and profile the concrete encasement of sewer lines and waterlines where necessary per MAG Standard Detail 404.
4. Each lot or parcel must be provided with its own individual service unless otherwise approved. The location should be near the center of the lot and be coordinated as to avoid placement in conflict with proposed driveway locations.
5. Maintain at least minimum horizontal and vertical clearance from water lines per county Health Department requirements unless otherwise previously approved or provide for by special design such as encasements, etc.
6. A note must be on plans for “contractor to verify elevation of existing sewer stub before proceeding with balance of sewer trenching.”
7. Have you studied the future need for sewer in the surrounding area with regards to your present design slopes and depth?
8. Show in the profile the relationship between sewer and water at each crossing.
9. Both the slope and the end elevation must be shown on all sewer main stubs.
10. Engineers to furnish a copy of cut sheets to Town Off-Site Inspector.

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11. Sewer mains are normally placed five (5) feet south or west of street centerlines.
12. Sewer mains shall be low enough to avoid conflicts with all other utilities (water services, telephone lines, electric lines, storm drains, gas, etc.).
13. Drop manholes are to be avoided except in extreme circumstances.
14. Prior to submitting subdivision plans a master plan of the sewer with sizes, slopes, manhole flow lines and natural grades should be submitted for review on the preliminary plat for subdivision review.
15. Maricopa County Environmental Services Department requires that sewer lines and waterlines be encased in concrete and that the water line be ductile iron whenever the water line crosses under the sewer line.
16. Maintain a minimum of six-foot spacing between sewer and water services and show property line ties to each service.
17. Call out five-foot diameter manholes where conditions require it.

NOTE: In all cases where the line is over ten (10) feet deep or pipe size is greater than ten (10) inches, five-foot diameter manholes will be required.

18. Manhole frames and lids shall be East Jordan Iron Works #00222459 or Neenah #NF-Deeter 1295, for four-foot manholes and East Jordan Iron Works #00223124 or Neenah #NF-Deeter, 1296 for five-foot manholes
19. Service taps into manholes will not be permitted, unless approved by the Town Engineer.
20. Consultant preparing plans shall add this note, in box with arrow to the appropriate manhole, on all sewer plans.

NOTE: Access to existing sanitary sewer mains will not be permitted until all new sewer construction has been approved and accepted. New sewer construction shall be isolated from the existing system as follows:

A reinforced plug will be placed in the outlet of the last manhole (most downstream) in the system under construction. This plug will not be removed without:

- a. All paving completed and manhole completed and manhole rings and covers at correct grade.
 - b. Inspectors permission.
 - c. Manholes have been sprayed with insecticide laden paint.
21. All sewers shall be so designed and constructed to give mean velocities, when flowing

full, of not less than two (2.0) feet per second.

4.1.1 Sewer Plan General Notes

The following general notes apply to all Sewer Plans.

- A. All construction shall be in accordance with current M.A.G. Specifications and Details, with the Town of Gilbert's additions and deletions.
- B. The contractor shall obtain all necessary permits prior to construction. The Town Engineer shall be notified twenty-four (24) hours prior to the different phases of construction for scheduling inspections.
- C. Acceptance of the completed right-of-way improvements will not be given until four (4) mil mylar reproducible "As-Built" plans have been submitted to and approved by the Town Engineer.
- D. Location of all water valves must be referenced at all times during construction and made available to the Public Works Department. Only Town employees are authorized to operate the valves and fire hydrant connections to the Town's water system.
- E. Any work performed without the approval of the Town Engineer and/or all work and materials not in conformance with the specifications is subject to removal and replacement at the contractor's expense.
- F. The contractor will uncover all existing lines being tied into to verify their location prior to trenching. The contractor will locate or have located all existing underground pipelines, telephone and electric conduits, and structures in advance of construction and will observe all possible precautions to avoid damage to the same. Call Blue Stake at (602) 263-1100 and notify S.R.P.
- G. Backfilling shall not be started until all lines are approved by the Town Engineer.
- H. All backfill for PVC sewer lines "shall" be per Town of Gilbert Standard Detail No. 86. All backfill for VCP sewer lines "shall" be per Town of Gilbert Standard Detail No. 87. All pavement and surface restoration "shall" be per Town of Gilbert Standard Detail No. 45.
- I. The Town of Gilbert is not responsible for liability accrued due to delays and/or damages to utilities in conjunction with this construction. Also, the Town will not participate in the cost of construction or utility relocation.
- J. Manhole steps to be plastic type only. Manhole steps shall not be permitted in five-foot diameter manholes.
- K. Precast manholes to have impression ring type bases, and use grout or Ram-nek between each precast section.

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- L. All rings and covers shall be East Jordan Iron Works #00222459 or Neenah #NF-Deeter 1295 for four-foot manholes and East Jordan Iron Works #00223124 or Neenah #NF-Deeter, 1296 for five-foot manholes.
- M. All taps shall be wye type.
- N. All sewer taps should be four and one-fourth (4¹/₄) feet deep at the property line.
- O. A minimum of six (6) feet of horizontal spacing between sewer and water services shall be maintained.
- P. Traffic control shall be per the 2003 Edition of the Manual on Uniform Traffic Control Devices handbook and Town of Gilbert Standard Details.
- Q. The Town Inspector will determine the number and location of the required compaction tests. The contractor/developer will notify the testing lab, coordinate with the inspector and testing lab, and pay the costs to perform the tests.
- R. Ordinance #1437, approved by the Town Council in October 2002, states: No construction water from fire hydrants shall be used on parcels or lots of ten acres or more in size. For more information, the ordinance is located on the Town of Gilbert website at: www.ci.gilbert.az.us. To obtain construction water, the contractor is required to make application with the Public Works Water Division. A security deposit is required to receive a fire hydrant meter. The Town reserves the right to specify the time and location that construction water can be delivered.
- S. The Town will not accept sewer lines with less than four (4) feet of cover.
- T. Prior to final approval and acceptance of the work the developer/contractor will be required to clean and repair adjacent (off-project) roadways used during the course of their construction.
- U. Consultant preparing plans shall add this note, in box with arrow to the appropriate manhole, on all sewer plans.

NOTE: Access to existing sanitary sewer mains will not be permitted until all new sewer construction has been approved and accepted. New sewer construction shall be isolated from the existing system as follows:

A reinforced plug will be placed in the outlet of the last manhole (most downstream) in the system under construction. This plug will not be removed without:

1. All paving completed and manhole rings and covers at correct grade.
2. Inspector's permission.

V. A 2" x 4" stake (painted green) shall be set one (1) foot behind each sewer service. All 2" x 4" stakes marking sewer services shall be firmly set into the ground at the elevation of the flow line and shall extend two (2) feet above the ground surface

4.2 Plastic Sewer Pipe Policy

When specified by the Design Engineer and detailed on the approved plans, plastic sewer pipe may be used in accordance with the following minimum requirements.

A. Design

The Design Engineer shall insure that his design specifications and drawings are made in accordance with the manufacturer's requirements, M.A.G. Standard Specifications, State and County Health Department codes and the following and Town of Gilbert Standard Details.

B. Installation and Testing

1. PVC pipe and fitting installation shall be in accordance with the applicable provisions of M.A.G. Section 601 and 615 and Town of Gilbert Standard Detail No. 86.
2. Granular material for the purpose of this section shall mean a material approved by the Town Engineer. ($\frac{3}{8}$ " chips)
3. After trenching has been completed, a four-inch layer of granular material shall be placed on the bottom of the trench and hand leveled. The pipe shall then be installed in accordance with Town of Gilbert Standard Detail No. 86 PVC Pipe Bedding Detail.
4. A required inspection will be made by the Town's Inspector after completion of laying of pipe but prior to haunching.
5. After the Town's Inspector is satisfied with the laying of pipe, the contractor will haunch the pipe with a granular material around the sides of the pipe to the spring line by hand. The granular material shall be carefully placed, fill all voids around the pipe and prevent lateral movement.
6. The contractor will place a second lift of granular material around the pipe to a level of at least six (6) inches above the pipe.
7. Each layer of granular material shall be compacted to a density of ninety-five (95) percent standard proctor.
8. A required inspection after completion of pipe bedding shall be made by the Town's Inspector. Compaction tests of the material around the pipe may be required by the Town Engineer and if required, the tests shall be paid by the contractor.
9. Upon completion and acceptance of backfilling and after a minimum of twenty (20) days, but before surface course of asphalt paving, a five (5) percent deflection testing device (go-no-go) will be pulled through the entire length of

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- 10. the main installed. Any section failing to pass this test shall be repaired and retested at no expense to the Town.
- 11. The contractor shall have a string placed through all sewer lines prior to calling for a deflection test.

C. *Deflection limits*

PIPE SIZE	MINIMUM DIAMETER OF DEVICE	
	5%	7.5%
8"	7.49	7.29
10"	9.37	9.12
12"	11.15	10.86
15"	13.66	13.30

D. *Sewer Inspection Requirements for New Lines*

The contractor shall have a television inspection performed on all new sewer lines including sewer services and a manhole pressure test per ASTM (C1244-93) prior to issuance of a conditional letter of acceptance. Air test one-hundred (100) percent of sewer lines after dry utility trenching and backfill has been tested.

E. *One-year Warranty*

The contractor/developer shall warranty the work performed under these specifications in accordance with M.A.G. Section 108.8.

4.3 Manhole Specifications and Standards

The following standards conform with Maricopa County Environmental Services and Arizona Department of Environmental Quality requirements.

A. *Manhole size and depth requirements*

Cover over crown of a sewer is to be a minimum of four (4) feet. Manhole diameter is to be four (4) feet, unless the manhole is more than ten (10) feet deep, or the line is over ten (10) inches in diameter; then, the manhole is to be five (5) feet in diameter.

B. *Manhole location, spacing and slope standards*

- 1. Except as itemized below, manholes shall be installed: at the end of each line; at all changes of grade, pipe size, or alignment; at all sewer pipe intersections; and at distances not exceeding the following:

Manhole Spacing

<u>Pipe Size</u>	<u>Max. Manhole Spacing</u>
8" – 15"	500 ft.
18" – 30"	600 ft.

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36" – 60"	800 ft.
over 60"	1300 ft.

2. Maximum line slope shall be determined so as not to exceed the maximum velocity of (10) feet per second.

Minimum Line Slope

<u>Line Size</u>	<u>Design Slope</u>
6" (taps)	.0050
8"	.0033
10"	.0024
12"	.0019
15"	.0014

3. Manholes may have a maximum drop of twenty-four (24) inches without use of a drop connection.
4. Manholes with ninety-degree bends must have a one-tenth-foot drop.
5. Sewer service may use single wyes only.

C. Manhole Frame and Lid Specifications

Manhole frames and lids shall be as East Jordan Iron Works #00222459 or Neenah #NF-Deeter 1295 for four-foot manholes and East Jordan Iron Works #00223124 or Neenah #NF-Deeter, 1296 for five-foot manholes.

D. Unusual Conditions

Refer to Maricopa Association of Governments Detail 404 for unusual conditions requiring sewer encasement.

4.4 Water

Water Plan Checklist

1. Water lines shall comply to AWWA standard P.V.C. C-900 Class 150 and C-905 Class 165 (Class 200 to be used when requested by the Town). Rieber sealing system gasket joint is recommended and preferred.

All fittings and valves shall be "mechanical joint" type, except as shown on Town of Gilbert Standard Detail No. 60.

Pipe bedding for P.V.C. C-900/C-905 shall conform to Town of Gilbert Standard Detail No. 85.

2. Valve space as per Town of Gilbert requirements (500 feet maximum). Water plans shall show distances between all fittings. This will be required to obtain approval of "As Built" plans.

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3. A note is required on the Plans: “The Contractor shall be required to install a night tie-in for any new water line that will affect existing services sufficient to warrant same in the opinion of the Town of Gilbert Off-Site Inspector” (This note could be placed on the cover sheet).
4. A note for the contractor to install a temporary plug or valves on a section of new line is required to test lines before connecting to existing water system where there is no valve on the end of existing line.
5. All services to lots shall run parallel with the lot line to the main. Minimum six-foot spacing between sewer and water services. In no case shall services or meter boxes be located under or in driveways. Services shall be placed at a maximum of three (3) feet from the property line.
6. Have you reviewed future extension problems with respect to proposed lines and valves to prevent loss of service to customers?
7. Gas lines shall not be permitted in the same trench or public utility easement (P.U.E.) that contains any water mains. All gas services are to be installed in a separate trench.
8. Fire hydrant locations and spacings shall be as determined by Town Fire Department and Engineering Department. Hydrants are to be on same side of street as the water main. Distance between hydrants in residential areas not to exceed five-hundred (500) feet. In commercial/industrial areas hydrant distance should not exceed three-hundred-fifty (350) feet from buildings and not exceed six-hundred-sixty (660) feet of hose lay between hydrants.
9. Placement of water mains is one foot behind sidewalks on the east or north side of streets. Where meandering walks are used the watermains shall be placed one (1) to two (2) feet behind the curb and gutter.
10. Valves on dead end water lines shall be placed to cause the least amount of inconvenience to existing services when the line is extended. If the valve is to be placed near the end of the stub, there should be at least two (2) full joints of pipe between the valve and the plug for lines twelve (12) inches and larger. One full joint should be installed between valve and plug for lines smaller than twelve (12) inches.
11. Fire hydrants will normally be required at the end of all “Dead End Lines.”
12. Twelve-foot “exclusive water line easement” are required for all water lines that will be installed on private property or private streets. Watermain “shall” be centered in the easement.
13. Use the following table for Meter Boxes and Meter Box Covers:

MAG Standard. Detail

<u>Meter Size</u>	<u>Box No.</u>	<u>Box Cover No.</u>
¾”	#A6000485*	#A6000484*
1”	#A6000485*	#A6000484*
2”	320-4	313-No. 4

*Armorcast Products Company; cover with hole for touch pad.

Call out the number of the MAG Standard Detail Numbers for your Meter Boxes and Covers in your list of quantities.

14. Add the following note to all water plans:

WATERMAIN CHLORINATION;

Calcium Hypochlorite shall be added to all new water mains/fire lines for disinfection per the following table:

12" mains-.35 lbs. or 5.6 oz. per one-hundred (100) feet of pipe
8" mains-.12 lbs. or 1.92 oz. per one-hundred (100) feet of pipe
6" mains-.08 lbs. or .48 oz. per one-hundred (100) feet of pipe

15. All commercial/industrial projects:
- A. Shall be equipped with a "Backflow Prevention Device" for the fire sprinkler line. See Town of Gilbert Fire Riser Details No. FS1 & FS2 (Detector check).
 - B. All commercial or industrial or manufacturing or processing facility shall provide for "Reverse Pressure Backflow Device" per Town of Gilbert Standard Detail No. 83.

4.4.1 Water Plan General Notes

The following general notes will apply to all Water Plans submitted to the Town of Gilbert.

- A. All construction shall be in accordance with current M.A.G. Specifications and Details with the Town of Gilbert's additions and deletions.
- B. Water lines shall comply to AWWA standard PVC C-900 Class 150/C-905 Class 165. Rieber sealing system gasket joint is recommended and preferred. Pipe bedding for PVC C-900/C-905 shall conform to Town of Gilbert Standard Detail No. 85. All fittings and valves shall be "mechanical joint" type, except as shown on Town of Gilbert Standard Detail No. 60. All water lines to be properly restrained using joint system such as: Megalug or an approved equal.
- C. The Town Engineer shall be notified twenty-four (24) hours prior to starting the different phases of construction for scheduling inspections.
- D. Acceptance of the completed right-of-way improvements will not be given until four (4) mil mylar reproducible "As-Built" plans have been submitted to and approved by the Town Engineer.
- E. Location of all water valves must be referenced at all times during construction and made available to the Water Distribution Division. Only Town employees are authorized to operate the valves and fire hydrant connections to the Town's water system.

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- F. Any work performed without the approval of the Town Engineer and/or all work and materials not in conformance with the specifications is subject to removal and replacement at the contactor's expense.
- G. The contractor will uncover all existing lines being tied into to verify their location prior to trenching. The contractor will locate or have located all existing underground pipelines, telephone and electric conduits, and structures in advance of construction and will observe all possible precautions to avoid damage to same. Call Blue Stake at (602) 263-1100 and notify SRP.
- H. All valves shall be gate type, unless otherwise noted, and open counter clockwise. Water valves shall be Mueller, Clow, Waterous or approved equal.
- I. Summits in water lines shall be located at fire hydrants.
- J. Backfilling shall not be started until lines are approved by the Town Engineer's Representative.
- K. All backfill for water lines "shall" be per Town of Gilbert Standard Detail No. 85 (C-900 PVC Water Pipe Bedding Detail). All pavement and surface restoration "shall" be per Town of Gilbert Standard detail No. 45.
- L. The contractor shall obtain all necessary permits prior to construction.
- M. The Town of Gilbert is not responsible for liability accrued due to delays and/or damage to utilities in conjunction with this construction. Also, the Town will not participate in the cost of construction or utility relocation.
- N. Ordinance #1437, approved by the Town Council in October 2002, states: No construction water from fire hydrants shall be used on parcels or lots of ten acres or more in size. For more information, the ordinance is located on the Town of Gilbert website at www.ci.gilbert.az.us. To obtain construction water, the contractor is required to make application with the Public Works Water Division. A security deposit is required to receive a fire hydrant meter. The Town reserves the right to specify the time and location that construction water can be delivered.
- O. Water services shall be installed in accordance with the Town of Gilbert Standard Detail 62.
- P. Fire hydrants shall be Clow – Medallion, AVK, Clow – F2500, Waterous or approved equal and installed per Town of Gilbert Standard Detail 60, and shall be 3'-6" bury depth. Adjustments in grade shall be done using "Gradelok" offset. Extensions on fire hydrants will not be permitted. A black, heavy duty bag with a "tie down" shall be placed over all new hydrants and maintained until the system has been approved by the inspector.
- Q. Traffic control shall be per the 2003 Edition of the Manual on Uniform Traffic Control Devices handbook and Town of Gilbert Standard Details.

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- R. The Town Inspector will determine the number and location of the require compaction tests. The contractor/developer will notify the testing lab, and pay the costs to perform the tests.
- S. The Town will not accept water lines with less than three (3) feet of cover.
- T. A minimum of six-foot horizontal spacing between sewer and water services shall be maintained.
- U. Prior to final approval and acceptance of the work the developer/contractor will be required to clean and repair adjacent (off-project) roadways used during the course of their construction.
- V. A 2" x 4" stake (painted blue) shall be set one (1) foot behind each water service. All 2" x 4" stakes marking water services shall be five (5) feet in length and firmly set into the ground to a depth of three (3) feet.
- W. All backflow prevention devices shall meet the requirements of the Town of Gilbert Backflow Protection Ordinance (#869), otherwise known as Article 7-14 of the Town of Gilbert Municipal Code: Cross Connection Control.
- X. All backflow devices shall be tested by a State Certified Backflow tester and test results forwarded to the Town of Gilbert Backflow Specialist. The Town will provide an up-to-date list of certified testers from which to be selected. Tester fees will be at the expense of the installer.
- Y. NOTE: A Town of Gilbert permit is required for the installation of any landscaping or irrigation system. Irrigation lines must be inspected before backfilling. Four (4) mil mylar as-builts are also required.
- Z. Use the following table for meter boxes and meter box covers:

Meter Size	MAG Std. Detail	MAG Std. Box No.
¾"	#A6000485*	#A6000484*
1"	#A6000485*	#A6000484*
2"	320-4	313-No. 4

*Armorcast Products Company; cover with hole for touch pad.

Call out the number of and the MAG Standard Detail Numbers for your Meter Boxes and Covers in your list of quantities.

- AA. Add the following note to all water plans.

Calcium Hypochlorite shall be added to all new water mains/fire lines for disinfection per the following table:

12" mains - .35 lbs. or 5.6 oz. per one-hundred (100) feet of pipe
8" mains - .12 lbs. or 1.92 oz. per one-hundred (100) feet of pipe

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6” mains - .08 lbs. or .48 oz per one-hundred (100) feet of pipe

AB. WATER METER REGISTER ODOMETER RESOLUTION SPECIFICATION

All water meter registers furnished to, or installed in the Town of Gilbert, Arizona shall conform to the following specifications.

- a. All registers shall have an encoded output and utilize Sensus Protocol. Registers will have electronic touch read capability and be entirely compatible with current Town of Gilbert meter reading equipment.
- b. Register resolution for meter size shall be as follows:

<u>METER SIZE</u>	<u>REGISTER RESOLUTION (gallons)</u>	<u>METER TYPE</u>
3/4” Metron Farnier or approved equal	1,000	Multi-jet or Single-jet
1” Metron Farnier or approved equal	1,000	Multi-jet or Single-jet
1-1/2” thru 10” Metron Farnier or approved equal	1,000	Single-jet

All meters shall meet AWWA new meter test standards.

Water and sewer service installation specifications are depicted in the Town of Gilbert Standard Details as follows:

No. 62	1” to 2” Water Service Installation
No. 60	Fire Hydrant
No. 61	Pavement Markers for Fire Hydrants
No. 83	Reduced Pressure Principle Device
No. 83-A	Air Release Valve
No. 83-B	Guard Posts
No. 83-C	Double Check Valve Assembly
No. 83-L	Reduced Pressure Principle - Landscape

4.4.2 Reclaimed Water

All reclaimed water lines shall be designed and installed per M.A.G. Standard Details listed under Section 616.

4.5 Utilities/trenching standards

The following standards will apply for utilities and backfill:

4.6 Utilities

Utilities will be placed and bedded in accordance with approved plans and details. Any change from the original plans shall be approved in writing by the Town Engineer prior to construction.

For the purpose of these specifications, utilities shall include water, sewer, gaslines, electric, cable, telephone and television cable.

4.7 Trenching/Backfill Standards

Utility trenches shall be backfilled with native onsite materials or material approved by the Town Engineer. Backfill may be water settled by methods approved by the Town Engineer in four-foot lifts except for the top three (3) feet immediately below subgrade elevation. The top three (3) feet shall be mechanically compacted in lifts not to exceed eight (8) inches unless otherwise approved by the Town Engineer. Backfill shall be compacted to a minimum density of ninety (90) percent of maximum density at optimum moisture as determined by ASTM D-698 from top of pipe to three (3) feet below subgrade and to a minimum of ninety-five (95) percent of maximum density at plus or minus two (2) percent of optimum moisture content within the top three (3) feet. All utility trenches behind curb shall be backfilled and compacted to a minimum density of ninety (90) percent at or exceeding optimum moisture content.

Town of Gilbert Standard Details for trenching and backfill are shown in the following illustrations in:

- | | |
|--------|---------------------------------------|
| No. 84 | Bedding Detail Concrete Pipe |
| No. 85 | Bedding Detail C-900/C-905 Water Pipe |
| No. 86 | Bedding Detail PVC Sewer Pipe |
| No. 87 | Bedding Detail V.C.P. Sewer Pipe |

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Article 5: Street Light Requirements

Sections:

- 5.1 Street Light Requirements
 - 5.1.1 Street Light General Notes
- 5.2 Street Light Design Guidelines
- 5.3 Street Light Improvement District
 - 5.3.1 Street Light Improvement District Checklist
- 5.4 Process
- 5.5 New Developments/Public Streets

5.1 Street Light Requirements

Street Light Check List:

1. Developers of all residential, commercial, industrial or other types of properties are responsible for the design and installation of street lighting on all streets within and adjacent to their sites. Street light plans and details shall be included with the improvement plans.
2. Street lighting designs shall use high pressure sodium luminaries controlled by individual photo cells mounted on steel poles. Spacing of street lights shall be based on light level requirements, type of luminaire and illumination level requirements listed in Table I, below.

<i>Street type</i>	<i>Luminaire</i>	<i>ANSI/IES Type</i>	<i>Minimum avg. fc</i>	<i>Mounting heights</i>
Local	9,500 lumen (100 watt) HPS	II	0.3	35'
Minor/Major Collector	16,000 lumen (150 watt) HPS (Note 2)	II	0.4	35'
Minor Arterial	30,000 lumen (250 watt) HPS	III	0.7	40'
Major Arterial	30,000 lumen (250 watt) HPS	III	0.7	40'

Notes:

1. Local and minor collector street types shall have an average to minimum illumination ratio not to exceed 6.1, all other street types shall have a ratio not to exceed 3.1.
2. Developers may use nine-thousand five-hundred (9,500) Lumen (100W) HPS on minor collector streets when spacing of intersections and/or lot lines mandate close pole spacings.
3. All new street lighting circuits shall be installed underground and will be owned by the utility.
4. Street lights shall be fully shielded in such a manner that light emitted by the fixture, either directly from the lamp or indirectly from the luminaire, is projected below or horizontal plane

running through the lowest point on the fixture where light is emitted. External shields or reflectors are not allowed.

5. Intersection at all local and collector type streets shall have at least one street light at the intersection. Minor and major arterial intersections shall have at least two (2) street lights at the intersection. At signalized intersections, street light plans shall be coordinated with street lights mounted on traffic signals.
6. The developer shall coordinate all design, electrical service criteria and needs with the utility company serving the lighting system.
7. The developer shall conform to the latest requirements of the serving utility and pay all fees for design and energization.
8. Plans for street lighting shall show the locations, distance between lights, luminarie types/sizes, mounting heights and pole types. The Town may require computerized calculations to show the light levels and intensities on the roadway.
9. Street lights for local and minor collector streets shall generally be located at the side lot lines. On major collector and minor arterial streets, street lights shall be placed on both sides of street. Major arterials shall typically have lights placed in the median using double mast arm poles.
10. The following checklist is offered to facilitate the process:
 - a. Retain a professional engineer of the appropriate discipline to design streetlight and coordinate plans with the Town staff.
 - b. Street light plans will be submitted at a scale of one-hundred (100) feet to one inch. Final light pole locations will be shown on the Paving and/or Utility plans.
 - c. The Town's plan review schedule and review turn around time is also in effect for street lighting plans and review process.
 - d. One (1) complete set of mylars and an additional mylar cover sheet shall be submitted for approval signatures. The additional mylar cover sheet will be returned to the developer. One (1) set is to be sent to the electric utility company by the developer.
 - e. Street lighting plans submittals will be coordinated through the normal approval plan process. The review and compliance to standards will be the responsibility of the Town Engineer.

5.1.1 General Notes

Street Light General Notes

- A. The contractor shall comply with State and Town statutes, and manufacturer's recommendations.
- B. The Electrical Contractor shall comply with all licensing requirements set forth by the State Register of Contractors office to perform work relating to street light installation in the Town right-of-way.

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- C. Contractor shall obtain an underground utilities (right-of-way) permit and a street light permit for the project prior to construction.
- D. Working / “As Built” Plans: Acceptance of the completed improvements will not be given until four (4) mil mylar reproducible “As-built” plans have been submitted to and approved by the Town Engineer.
- E. Light Poles and Identification: Light poles shall be installed plumb, be adjusted to provide proper alignment to the roadway being lighted and be properly grounded when the installation is completed. The contractor shall furnish and install a number on each light pole. Street light pole identification and specifications will be provided by the Town of Gilbert.
- F. Arterial and Collector streetlights to be base mounted. Local streetlights to be direct buried.
- G. Luminaries:
 - 1. Luminaries shall be installed level and include a lamp and photocell. Contractor shall assure that the luminaries shall be free of dust, dirt or anything that would impair the output of the light before he leaves the site.
 - 2. Luminaries furnished with multi-tap ballasts shall be rewired or reconnected to match the voltage supplied by the electric utility company.
- H. Embedment: For embedment, the following requirements shall apply:
 - 1. Direct buried poles shall be set in a twelve (12) inch round excavation augured 6’ 6” deep in undisturbed earth. Pole shall be set plumb in two (2) directions, ninety (90) degrees apart. Hand tamping of ABC with pneumatic or vibrating equipment is the acceptable method of compaction. Backfill shall be compacted to ninety (90) percent of maximum density as defined by ASTM D-2922 and D-3017.
 - 2. A ground rod shall be installed in pull box in undisturbed soil and a lead in solid copper bare bond wire (#8) shall be installed in 1” liquid-tight flexible steel conduit with PVC jacket for pole grounding.
 - 3. Surplus excavation shall be disposed of by the contractor.
- I. Wiring and Conduit: Requirements are:
 - 3. Wiring shall be installed per Utility Standards.
 - 4. Conduit shall be installed at the depth specified on the plans. Conduit shall be one inch Liquid-Tight Flexible Steel Conduit with PVC jacket. Conduit must be UL rated and suitable for underground use.

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- J. Connections and Grounding:
 - 1. Connections shall be per Utility Standards.
 - 2. Each pole shall have a 8' x 5/8" copper clad ground rod driven beneath pull box. A #8 bare copper lead from the ground rod in pull box to landing lug in street light pole hand hole.
- K. Pull Boxes: Excavation for pull boxes and material specifications shall be per the Electric Utility Company Standards.
- L. Trench: Trench shall be installed per the Utility Company Standards. The use of a common Electric Utility Company trench is permitted. It is the contractor's responsibility to contact the Utility Company for coordination of the trenching and the installation of conduit.
- M. Restoration: It is the contractor's responsibility to restore all property, landscaping, paving and driveways that are disturbed during street light construction to their original condition in conformance with "MAG" specification section 107.9.
- N. Testing Street Light System: The developer shall be responsible for furnishing all personnel and equipment to successfully perform the following test:
 - Prior to acceptance, the developer shall energize and operate the entire roadway lighting system, 48 hours for two (2) consecutive days without interruption or failure. If a lamp or a ballast should fail, it shall be immediately replaced.
- O. Warranty: The contractor shall guarantee all work for a period of one year from the Date of final acceptance by the Engineering Manager, against imperfect workmanship, failure, malfunction of materials and/or equipment due to faulty or imperfect workmanship. This guarantee is to be in writing to the Town at the time of issuing final acceptance. Work found to be defective within the warranty period shall be replaced without cost to the Town.

5.2 Street Light Design Guidelines

- 1. The layout and design shall include existing and possible street light location information for all streets adjacent to and across from the development.
- 2. Special effort shall be made during the design process that one (1) street light is located at each intersection. All cul-de-sacs shall have at least one (1) street light.
- 3. Pole spacing should result in an illuminance rating that is with the IES RP-8 guidelines, using light loss factors of .8.
- 4. Wire and conduit sizes shall be in accordance with the needs of the circuit with the following exceptions: conduit smaller than two (2) inch shall not be used from pull box; conduit smaller

than one (1) inch shall not be used from pull box to the pole; and wire smaller than #12 shall not be used from pull box to the fixture.

5. It is the developer's responsibility to provide the Town inspector with the appropriate list(s) of completed street light locations for which power is requested. Each street light pole and street light station shall be identified by an address number relative to the street on which it is installed. The developer is required to install identifying index letters and or numbers on the street side of each pole. All letters and numbers on the street side of each pole. All letters and numbers shall be two (2) inches high and mounted on each pole with the bottom number placed a minimum of seven (7) feet above the ground level. The letters/numbers shall be stenciled on the pole using white enamel based paint. Address will be provided to the developer by the Town.
6. The underground trenching shall include two (2) inch schedule forty (40) grey PVC conduit. All trench depths shall be in accordance with the electric utility company standards. Trenching, excavation, and backfill shall be in accordance with MAG specifications Section 601, unless otherwise specified.
7. The photo control shall be mounted on each luminaire.
8. Arterial streets with no sidewalk will have a six-foot clearance from 'back of curb' to the center of the light pole. If a sidewalk is planned, light poles will be one (1) foot back of walk.
9. It is the Contractor's responsibility to restore all property, landscaping, paving and driveways that are disturbed during street light construction to their original condition in conformance with "MAG" specification section 107.9.
10. The developer shall provide and submit to the engineering division, accurate "as-builts" plans on the approved set of construction plans prior to receiving "occupancy" approval.
11. The developer shall warranty all workmanship for a period of not less than one year from the date of acceptance by the Town.

5.3 Street Light Improvement District

A Street Light Improvement District is created under the provisions of Arizona Revised Statutes providing a means for a municipality to provide street lighting for unincorporated and incorporated communities. It is formed by a petition to the Town signed by a majority of the property owners in the district. It may also be formed by the Town on its own initiative, subject to the approval of the property owners in the district.

Any owner of record can sign such a petition. In the case of jointly owned property between husband and wife, either may sign for that particular parcel of property. The petition is then returned to the Town Engineering Department which completes the balance of the legal documents necessary to form the District.

After posting the Resolution of Intention, if protests are insufficient to stop the proceeding, the work is ordered by the Town. Thereafter, the utility or private contractor will process an agreement and

schedule the work. Since these lights are on public streets controlled by the Town, the Town Engineer for the Town of Gilbert approves the location and placement of the lights.

Any costs involved in forming such a district are borne by the Town and the serving utility once the petition is received. The developer pays for the street lights and the installation cost. The property owners within the district are assessed annually for the electricity, operation, maintenance and replacement

The Town Council acts as the Board of Directors of the Street Light Improvement District. The lights are owned, operated and maintained by the Town of Gilbert under the SLID Guidelines.

5.3.1 Street Light Improvement District (SLID) Checklist

1. Obtain Unanimous Petition from developer/owner with appropriate certificates.
2. Assign Street Light Improvement District file number (Example: SLID 95-10) and log number in index.
3. After the petition has been received by the Town, prepare Council Communication, Resolution of Intention and Ordering Street Light Improvements. Attach the signed petition and vicinity map to the Council memo.
4. A “Full Metes and Bounds Description” of the plat “Shall” be typed on the reverse side of the Unanimous Petition for Street Light Improvement District. The description “shall” include:
 - f. Description of all “U.S. Public Land Corners” used in determining the location of the plat.
 - g. Description of all exterior corners set that locate the plat within the section.
 - h. Methods of determining bearings and controlling corners used.
 - i. Total area of plat.
 - j. A map showing the location of said improvement district shall be attached.

5.4 Process

The process for forming a Street Light Improvement District (SLID) is as follows:

- A. Prepare district limits
- B. Utility company to be provided an approved street light layout for facility design purposes.
- D. Developer is required to install street lights in accordance with approved plans.
- E. Council considers adoption of Streetlight Improvement District Resolution.
- F. Town/utility enters into a district agreement.
- G. Utility or contractor schedules work.
- H. Utility or contractor installs improvements.

- I. Town and utility if necessary, accepts improvements.
- J. County collects charges with annual tax assessments.

NOTE: Generally, it takes eight (8) to eleven (11) months from start to completion of the project.

5.5 New Developments/Public Streets

Street light installation and electricity for street lighting in new developments will be provided by the Street Light Improvement District process. (Public Streets Only)

The process for formation of the improvement will be initiated by petition of request by the developer to create the district, and will follow the outline set forth in Section 5.4.

5.6 New Developments/Private Streets

Streetlight installation and electricity for street lighting in new developments containing private streets will be provided by agreement between the Developer and the serving utility. Plans for street lights in private streets on private streets to comply with utility company standards.

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Article 6: Traffic Requirements

Sections:

- 6.1 Traffic Signal/Traffic Signal Interconnect Plans
 - 6.1.1 Requirements
 - 6.1.2 General Notes
- 6.2 Traffic Signing Plans
 - 6.2.1 Requirements
 - 6.2.2 General Notes
- 6.3 Pavement Marking Plans
 - 6.3.1 General Notes
- 6.4 On-Street Parking Allowances – Street Width Requirements
 - 6.4.1 Requirements
- 6.5 Traffic Impact Procedures

6.1 Traffic Signal/Traffic Signal Interconnect Plans

6.1.1 Requirements:

- A. Traffic signal plans shall be submitted on separate sheets apart from any other part of the construction documents with a scale no less than 1"=40'.
- B. Identify all ingress/egress points to include street intersections and residential/commercial driveways within 500' of the installation point of the traffic signal.
- C. Show all new and existing utilities within the right-of-way and label them accordingly.
- D. Show all existing town limits and the existing and proposed right-of-way and dimension them accordingly.

6.1.2 General Notes:

- A. Contractors installing traffic signals or traffic signal interconnect shall obtain the appropriate Traffic Engineering permits from the Development Services Department prior to beginning any work within the Town's right-of-way.
- B. During the installation of traffic signals or traffic signal interconnect; the Contractor will be responsible for making contact with the Traffic Operations Section to arrange for inspections. At no time shall conduit be backfilled in the Town's right-of-way without an inspection. Any questions concerning traffic signals, traffic signal interconnect or to arrange for an inspection, contact the Traffic Operations Section at (480)503-6933 or (480)503-6937. Inspections must be scheduled a minimum of 48-hours (or 2 business days) in advance.
- C. Any conduit for a new signal or traffic signal interconnect, shall have detectable pull tape placed in each conduit.

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- D. When required, the Contractor shall install 2-3” conduits to box an intersection for future traffic signal installation by the TOWN.
- E. When installing traffic signal interconnect, use the Town of Gilbert Standard Detail #94, #100, and #102. Pull boxes are to be spaced every 1000 feet on a conduit run, and are to be placed on each side of an intersecting roadway.
- F. Traffic signal conduit and pull boxes shall be installed using Town of Gilbert Standard Details #94, #95, and #96.
- G. Loop detection shall be installed using Town of Gilbert Standard Detail #99.
- H. All signal pole foundations and sidewalk ramps shall be modified per Town of Gilbert Standard Detail #103.
- I. All traffic signal construction notes shall conform to Town of Gilbert Standard Detail #105.
- J. CCTV camera details (when applicable) shall conform to Town of Gilbert Standard Detail #106.
- K. Spread spectrum radio antennas shall be mounted in accordance with Town of Gilbert Standard Detail #107.
- L. Phasing and Preemption shall conform to Town of Gilbert Standard Detail #108.
- M. Control cabinet foundation shall conform to Town of Gilbert Standard Detail #110.

6.2 Traffic Signing Plans

6.2.1 Requirements:

- A. Traffic signing plans shall be submitted on separate sheets apart from any other part of the construction documents with a scale no less than 1”=40’
- B. Show the existing roadway and proposed signing for 500 ft beyond the project limits on each approach to the project.
- C. Identify all ingress/egress points to include street intersections and residential/commercial driveways within 500’ of the project limits on both approaches and on both sides of the street.
- D. Show all new and existing signs within the right-of-way and identify them. Label existing signs “EXISTING” and show them grayed out.
- E. Show all city limits and show the Town, right-of-way and identify them.
- F. All islands on roadways shall be signed per the MUTCD guidelines, to include an R4-7 and Type I Object Marker per Town of Gilbert detail 210B. The beginning of each median where none exists prior, are to be signed.

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- G. STOP signs are to be shown at all local residential streets that intersect with collector or arterial streets within a subdivision. Local/local street intersections will not be STOP controlled unless directed by the Traffic Engineer. STOP signs will be shown at all collector/collector and collector/arterial street intersections.
- H. All signing shall conform to the 2003 Edition of the Manual on Uniform Traffic Control Devices handbook with regard to size, color, shape, and placement.

6.2.2 General Notes:

- A. Contractors installing traffic signs shall obtain a signing permit from the Community Development Department prior to beginning any work within the Town's right-of-way.
- B. All signing installed within the Town's right-of-way shall be installed by an individual that has current certification from the International Municipal Signal Association (IMSA) or the American Traffic Safety Services Association (ATSSA), or equivalent. Equivalency shall be submitted for review prior to being accepted by the Town.
- C. A pre-installation meeting with Town staff will be required prior to installing any signs or posts within the right-of-way. Permits may be issued prior to this meeting but will not be valid until after the pre-installation meeting is held. To schedule a pre-installation meeting contact the Traffic Engineering Section at 480-503-6186 2 business days prior.
- D. All signing shall conform to the 2003 Edition of the Manual on Uniform Traffic Control Devices handbook with regard to size, color, shape, and placement.
- E. Street Name Sign installation – street name signs shall be installed at each intersection. If street name signs are to be installed on an existing or proposed street light pole, each sign shall be installed on a separate bracket. For street name sign blades that are 23" and under a 12" bracket shall be used. For blades that are 24" to 35", an 18" bracket shall be used. For blades that are 36" and above, a 24" bracket shall be used.
- F. All sign sheeting shall conform to the following requirements:
 - 1. As a minimum all signing will incorporate ASTM Type IV sheeting. The exceptions are as follows:
 - a. All WARNING signs (yellow series) shall be ASTM Type XI (fluorescent Yellow) sheeting.
 - b. All regulatory signs shall be ASTM Type XI sheeting.
 - 2. Street Name signing is as follows:
 - a. Any arterial street intersection shall be ASTM Type XI sheeting.
 - b. All other intersections shall be ASTM Type IV sheeting.

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- c. All overhead internally illuminated street name signs shall be ASTM Type XI translucent sheeting.
 - d. All School Area signing shall be ASTM Type XI sheeting (fluorescent yellow-green).
3. All sheeting stated above shall be 3M or approved equivalent to include the same warranty period. Any requests to use sheeting other than 3M shall be made in writing 30 days prior to installation.
- G. All signs shall be installed using 1- $\frac{3}{4}$ " or 2" square tubing as per the Town of Gilbert Standard Detail #79.
 - H. The Contractor shall allow the concrete in the postholes to cure for at least 24-hours prior to standing the poles.
 - I. Signs shall be secured to post using 3/8" x 2- $\frac{1}{2}$ " plated hex head bolts with flat washers (2 each) a nylon washer against sign and nylon stop nuts.
 - J. Any signing that is to be relocated shall be reinstalled as per Town of Gilbert Standard Detail #79.
 - K. Any sign that is to be installed within 25 feet of an existing street light pole shall be installed on that pole and not on a separate support Signs that need to be removed during construction shall be done so by the Contractor at their expense.
 - L. The Contractor shall ensure that at no time a traffic sign is installed in such a way as to be blocked by trees or vegetation. In these cases the Contractor shall contact the Traffic Engineering Section to provide an alternate location for the installation of signing in question.
 - M. Signing quantities and installation locations are subject to change at the time of installation based upon current accepted practice. The Contractor completing the signing installation is required to make contact with the Traffic Engineering Section prior to any signing being installed within the Town's right-of-way.
 - N. All signing shall be installed within 5 days after the installation of the first lift of asphalt.

6.3 Pavement Marking Plans

6.3.1 General Notes:

- A. The general Contractor or the Sub-Contractor installing pavement markings within the Town's right-of-way are required to obtain a striping permit prior to any installation. Permits applications can be obtained from the Development Services Department located at 90 E. Civic Center Dr, Gilbert, AZ. 85296, or by calling (480)503-6700.
- B. All pavement markings shall conform to the Arizona Department of Transportation Standard Drawings and Specifications unless otherwise specified in the 2003 Edition of the Manual on Uniform Traffic Control Devices handbook, or as noted on the plans.

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- C. The Contractor shall spot mark the entire project before applying any markings. When the spotting is complete the Contractor shall contact the Traffic Engineering Section at (480) 503-6186 to make arrangements for inspection prior to applying any paint (2 business days advance notice is required). The permanent marking plans may be modified as directed by the Engineer. The Contractor shall refer any questions concerning pavement markings to the Town of Gilbert Traffic Engineering Section.
- D. Any pavement markings applied prior to field inspection by the Town of Gilbert's Traffic Engineering Section shall be removed and re-stripped at the Contractor's expense.
- E. All striping will be applied initially in paint (to include all items specified to be applied in thermoplastic). The Contractor will be required to re-stripe the entire project 30 to 45 days after initial striping. At this time all symbols, transverse markings, and holding bars will be re-stripped in Thermoplastic paint, and the remainder of the project in paint.
- F. Raised pavement markers shall be installed on the new pavement. They shall be installed per ADOT Standard Detail 4-M-2.02 and 4-M-2.03.1. They shall be non-adhesive with an abrasive resistant surface. They shall be secured to the pavement with a hot, flexible marker adhesive. All markers shall be installed so that the reflective face of each marker is facing the direction of traffic and is perpendicular to the direction of traffic flow.
- G. Where raised pavement markers are placed along solid striping, the nearest edge of each marker shall be offset no less than 4 inches and no more than 6 inches from the nearest edge of the striping.
- H. Turn lane arrows shall be installed per ADOT Standard Detail 4-M-1.16 with the exception of the word marking "ONLY" which shall not be used.
- I. The dimensions shown to the pavement marking stripes are to the center of the stripe, or in the case of a double stripe, to the center of the 2 lines.
- J. All permanent pavement lines parallel to the flow of traffic shall be installed at a minimum thickness of 15 mills and shall be placed in accordance with the Arizona Department of Transportation Section 708 – Permanent Pavement Markings.
- K. All striping shall be a minimum width of 4 inches except where noted on the plans, or as noted below:
 - 1. All edgelines shall be 6"
 - 2. All holding bars shall be 8"
 - 3. All crosswalk lines shall be 12"
 - 4. All STOP bars shall be 18"
- L. The pavement marking dimensions on any given set of plans may be schematic and not to scale, therefore the Contractor shall follow all standard details that are noted on the plans when installing pavement markings.

- M. When striping obliteration is necessary, it shall be accomplished by water blasting (other methods may be allowed with prior approval of the Town Traffic Engineer). If obliteration causes shadowing, or in the opinion of the Engineer will cause confusion on the part of the driver, the Contractor shall seal the area with slurry per M.A.G. Specifications 713 and 715, Type I. Applying paint over striping does not constitute stripe obliteration. Striping obliteration may go beyond the project limits so that the new striping will match permanent existing pavement markings.
- N. Median ends shall be marked in accordance with the Town of Gilbert Details 304A and 304B.
- K. If necessary for smooth traffic flow, the Contractor may be required to add additional asphalt to accommodate traffic. The Contractor or Developer will be required to complete this at their expense.
- P. Should field conditions change due to construction on adjacent pieces of roadway, the Contractor shall be responsible for notifying the Town of Gilbert Traffic Engineer at (480) 503-6186 and will be required to submit for review an updated striping and signing plan 21 days prior to paving. The Contractor may be required to re-stripe, stripe, and design striping for adjacent portions of roadway that are affected by their construction. Any changes, additions, or deletions will be accomplished by the Contractor at their expense.
- Q. All signing and pavement markings shall be installed within 5 days of completion of the final lift of asphalt or as required by the Engineer.

6.4 On-Street Parking Allowances – Street Width Requirements

6.4.1 Requirements: *(all measurements are from face of curb to face of curb)*

- A. Streets with access from two (2) directions – 28’ street width with parking allowed on both sides of the street;
- B. Streets with access from two (2) directions with a on-way traffic pattern – 20’ street width with parking allowed on one (1) side of the street, in the direction of travel;
- C. Streets with access from one (1) direction only (i.e. Cul-de-sac) – 28’ street width with parking allowed on one (1) side only. No parking to be indicated on the side where fire hydrants are located.

Traffic signing in these instances will be the responsibility of the developer and shall conform to current standards and practice.

6.5 Traffic Impact Procedures

One of the Town of Gilbert’s primary objectives is to operate and maintain a safe and efficient roadway system. The review and management of development-generated traffic is an integral part of operating and maintaining a safe and efficient roadway system. The Traffic Impact Procedures as outlined in this document

have been established to meet this objective. The Traffic Impact Procedures establish a range of traffic impact study categories based on the characteristics of the development and the estimated peak hour traffic volumes. The procedures also outline the analysis approach and methods.

A Traffic Impact Study, TIS, identifies existing traffic volumes and conditions, development traffic volumes and conditions and their combined impacts on the existing and future roadway system. The TIS is a useful tool for early identification of potential traffic problems and can play an important part in the success of a development. When insufficient attention is given to the assessment of traffic impacts, the following problems may result:

- on-site congestion and/or congestion on adjacent roadways;
- inadequate access capacity;
- high accident experience;
- limited flexibility to modify the development to eliminate problems or adjust to changed conditions

These problems can negatively affect the success of a development and can damage the marketability and return on investment of the development. The performance of a TIS provides an opportunity for the Town and the developer to share information and jointly address traffic related problems. It provides a means of

balancing development needs with the functional integrity of the roadways that serve both the development and the region.

The need for a Traffic Impact Study should be assessed as early as possible in the development process when there is maximum flexibility for eliminating traffic-related problems. Preparation of a TIS, at this stage in the development process, is also recommended in Chapter 2 “Site Planning” of the Institute of Transportation Engineers publication “Transportation and Land Development”

The procedures contained herein are provided to:

- assist developers through the approval process by outlining the requirements and level of detail of traffic analysis that will be required of them during the approval process
- standardize the types and details of analysis required in the assessment of traffic impacts for developments with similar levels of size and intensity
- ensure consistency in the preparation and review of a TIS through standardization of the reports

A TIS will be required of all developments or additions to existing developments generating 100 or more trips during the morning or afternoon peak hour. A TIS may also be required for developments generating lower peak hour volumes where; current traffic problems or concerns exist, the public may perceive an adverse impact on the adjacent neighborhoods or other areas, the proximity of site drives to other drives or intersections could create traffic concerns, or other specific problems or concerns may be aggravated

by the proposed development. Should such conditions arise the Town Traffic Engineer will evaluate the need for the study based on technical merit.

Figure 1 is intended to show the development process that may require a TIS. Developments processed under Development Master Plans, DMP's, Comprehensive Plan Amendments, CPA's, or as rezoning cases will not be required to provide a revised TIS during the subdivision or building permit processes unless:

- the level of development changes significantly to warrant a new study
- the adjacent roadway system changes significantly to warrant a new study
- detailed information for commercial access analysis was not available during the initial development process

The need for an initial TIS or a revised TIS will be determined by the Town Traffic Engineer in accordance with the intent of these guidelines.

The Traffic Impact Study may be prepared by an engineering firm selected by the developer or, if requested, by an on-call consultant under contract to Town of Gilbert. If the TIS is prepared by an on-call consultant under contract to the Town of Gilbert, the Consulting Engineer will be requested to provide a cost estimate for conducting the TIS. This estimate will be presented to the developer for review. The funds for the study shall be provided by the developer to the Town of Gilbert prior to commencement of the study.

A draft TIS will be submitted to both the developer and the Town for review. Review comments are to be provided within two weeks of submittal. If it is determined that the proposed development falls within two or more governmental jurisdictions, an agreement will be made by the Town of Gilbert, the developer, and the involved agencies, and an additional two (2) weeks will be added for a maximum review period of four (4) weeks.

1. TIS Evaluation

A Traffic Impact Study is required for all new developments or additions to existing developments, for any of the processes shown in Figure 1, which generate 100 or more trips during the morning or afternoon peak hour of adjacent street traffic. The specific analysis requirements and level of detail are determined by the following categories:

CATEGORY I

Developments which generate 100 or more peak hour trips but fewer than 500 trips during the morning or afternoon peak hour. A Category I Traffic Impact Analysis may also be required for sites generating less than 100 trips during the morning or afternoon peak hour for any of the following reasons:

- a. The existence of any current traffic problems or concerns in the local area such as an offset intersection, a high number of traffic accidents, etcetera
- b. The sensitivity of the adjacent neighborhoods or other areas where the public may perceive an adverse impact
- c. The proximity of site drives to other drives or intersections
- d. Other specific problems or concerns that may be aggravated by the proposed development

Should such conditions arise the Town Traffic Engineer will evaluate the need for the study based on technical merit.

CATEGORY II

Developments which generate 500 or more peak hour trips but fewer than 1,000 trips during the morning or afternoon peak hour.

CATEGORY III

Developments which generate 1,000 or more peak hour trips but fewer than 1,500 trips during the morning or afternoon peak hour.

CATEGORY IV

Developments which generate more than 1,500 trips during the morning or afternoon peak hour.

The developer must first estimate the number of vehicle trips generated by the proposed development using the procedure(s) outlined in this document. For the convenience of the developer examples of various size developments which generate 100 morning or afternoon peak hour trips have been provided in Appendix A. The developer must obtain the concurrence of the Town Traffic Engineer or his designated representative on

the number of trips generated by the development, if TIS is required, and the Analysis Category. The developer may also directly request the Town of Gilbert Traffic Engineering Staff make these determinations. Should the developer be unable to meet the approval of the Town Traffic Engineer the developer may make an appeal to the Town Engineer and/or the Public Works Director.

2. ANALYSIS APPROACH AND METHODS

The traffic analysis approach and methods are presented below.

A. Study Area

The minimum study area will be determined by project type and size in accordance with the criteria in Table 1. The study area for the proposed development includes traffic signal controlled intersections; intersections without signal control and driveways to ensure their operation and level of service are adequately assessed. The Town Traffic Engineer may require expansion of the study area when the minimum study areas identified in Table 1 do not provide sufficient information to meet the intent of the Traffic Impact Study guidelines. For example, a large (Category III) development in a rural area located two miles from a freeway interchange from which most of the trips are anticipated to access the development may require an enlarged study area to include assessment of the freeway interchange.

B. Study Horizon Years

The study horizon years will be determined by project type and size in accordance with the criteria in Table 1.

TABLE 1

Analysis Category	Development Characteristic	Study Horizon (a)	Minimum Study Area (b)
I	Small development 100 – 499 peak hour trips	1. Opening Year	1. Site access drives 2. Adjacent signal controlled intersections within ¼ mile and/or major street intersections without signal control and driveways within 500 feet
II	Moderate Development 500 – 999 peak hour trips	1. Opening Year 2. 5 Years after opening	1. Site access drives 2. All signal controlled intersections within ½ mile and/or major street intersections without signal control and major driveways within ½ mile
III	Large Development 1,000 – 1,500 peak hour trips	1. Opening Year 2. 20 Years after opening	1. Site access drives 2. All signal controlled intersections within 1 mile and/or major street intersections without signal control and major driveways within 1 mile

a. Assume full occupancy and build-out for single-phase developments. Multi-phase developments may require assessment of up to three (3) horizon years corresponding to key phases as directed by the Town Traffic Engineer.

b. An enlarged study area may be required when the minimum study areas identified in Table 1 do not provide sufficient information to meet the intent of the Traffic Impact Study guidelines.

3. Analysis Time Period

- a. Both the morning and afternoon weekday peak hours are to be analyzed. If the proposed project is expected to generate no trips or a very low number of trips during either the morning or evening peak periods the requirement to analyze one or both of these periods may be waived by the Town Traffic Engineer.
- b. Where the peak traffic hour in the study area occurs during a time period other than the normal morning or afternoon peak travel periods (for example midday), or occurs on a weekend, or of the proposed project has unusual peaking characteristics, these peak hours must also be analyzed.

4. Seasonal Adjustments

The traffic volumes for the analysis hours should be adjusted for the peak season if appropriate. Use of seasonal adjustment factors should be approved by the Town Traffic Engineer. The intent is not to assess maximum peak hourly volumes, such as the day after Christmas for a retail development, but to address peak seasonal volumes. If traffic counts were collected in a retirement community in July, and the peak traffic period occurs during the winter months, the counts should be adjusted to winter months.

5. Data Collection Requirements

All data is to be collected in accordance with the latest edition of the *ITE Manual of Transportation Engineering Studies* or as directed by the Town Traffic Engineer if not specifically covered in the ITE Manual.

- a. Turning movement counts shall be obtained for all existing cross-street intersections to be analyzed during the morning and afternoon peak periods. Available turning movement counts may be extrapolated a maximum of two years with concurrence of the Town Traffic Engineer.
- b. The current and projected daily traffic volumes shall be presented in the report. Available daily count data may be obtained from Town of Gilbert and extrapolated a maximum of two years with the concurrence of the Town Traffic Engineer.

Where daily count data are not available, mechanical counts may be required at the Town Traffic Engineer's discretion for rural highways where the closest intersection is ½ mile or further from the site.

- c. Roadway geometric information shall be obtained including roadway width, number of lanes, turning lanes, vertical grade, location of nearby driveways, and lane configuration at intersections.
- d. The location and type of traffic controls shall be identified.

6. Trip Generation

- a. The latest edition of ITE's *Trip Generation* shall be used for selecting trip generation rates. The guidelines contained in the *Trip Generation* shall be used to determine whether the average trip generation rate or equation should be used.
- b. Other rates may be used with the approval of the Town Traffic Engineer in cases where *Trip Generation* does not include trip rates for a specific land use category, or includes only limited data, or where local trip rates have been shown to differ from the ITE rates such as in the *Retirement Community Trip Generation Study* prepared for Maricopa County Department of Transportation by JHK & Associates, March 18, 1993.

7. Trip Distribution and Assignment

- a. Projected trips shall be distributed and added to the projected non-site traffic on the roadway network.

- b. Projected trips shall be distributed based upon a market area. The market area is the area surrounding the site from which the project is likely to draw a high percentage (80 percent or more) of its trips. The market area shall be established based upon a travel distance derived from travel time and travel speed. The market area will be determined with the criteria in Table 2. For development types not shown in Table 2, the market area will be determined based on the distance to similar competing developments. Peak hour speed limits shall reflect actual roadway conditions. The market area may be modified to account for similar commercial developments with concurrence of the Town Traffic Engineer. The specific assumptions and data sources used in deriving trip distribution and assignment shall be documented in the report.

TABLE 2

Land Use Activity	Factors for Determining Market Area	Database within the Market Area
Regional Shopping Center	<ol style="list-style-type: none"> 1. Competing similar commercial developments 2. Travel time – usually a maximum of 30 minutes 	Population Distribution* (sometimes weighted by projected spendable income in the proposed center)
Community Shopping Center	<ol style="list-style-type: none"> 1. Competing similar commercial developments 2. Travel time – usually a maximum of 20 minutes 	Population distribution* (sometimes weighted by projected spendable income in the proposed center)
Industrial park and office park	Travel time – usually a maximum of 30 minutes or a distance of 10-15 miles is assumed.	Population distribution*
Stadium	Travel time – usually a maximum of 40 minutes or more dependent on the size and character of the stadium	Population distribution* (sometimes weighted by travel time, i.e. the longer travel time is weighted less)
Residential	Travel time – usually a maximum of 30 minutes or a distance of 10 miles is assumed	Employment – opportunity distribution*

Source: Institute of Transportation Engineers. Transportation and Land Development Washington, D.C. 1987

*MAG Population Projections should be used for the design year(s)

8. Capacity Analysis

- a. Level of service shall be computed for signal controlled and non-signal controlled intersections as identified in the Study Area in Table 1, in accordance with the latest edition of the *Highway Capacity Manual*.
- b. For signal controlled intersections, operational analyses shall be performed for time horizons up to 5 years. Operational analyses shall also be performed for street sizing. The planning method will be acceptable for time horizons beyond 5 years and is also acceptable for Traffic Impact Studies prepared at the Development Master Plan level, unless used for street sizing.
- c. For urban roadways, and rural highways where signal controlled intersections are at or less than 1 mile apart, the capacity of the roadway is generally dominated by the capacity of the adjacent signal controlled intersections. Roadway levels of service need not be computed for these facilities.
- d. For rural highways where the signal controlled intersections are more than 1 mile apart, the level of service on the highway shall be estimated in accordance with the latest edition of the *Highway Capacity Manual*.

9. Traffic Signal Needs

- a. A traffic signal needs study shall be conducted for all arterial/arterial, arterial/collector and collector/collector intersections within the Study Area for the opening year. If the warrants are not met for the opening year, they should be evaluated for a 5-year horizon for Categories II, III and IV.
- b. Traffic Signal needs studies shall be conducted per ADOT PGP-4C-2-X, "Traffic Signal Needs Study."

10. Queuing Analysis

- a. A queuing analysis shall be conducted for all turn lanes under stop or signal control within the study area. Various methods for computing queue lengths may be used. Examples of approximate methods for estimating queue lengths for signal controlled and non-signal controlled intersections are given below.

For **signal controlled intersections**, find the number of vehicles arriving at the intersection. (ADOT Traffic Impact Analysis for Proposed Development, p 25).

Vehicles/cycle (for random arrivals) = $2 \times (\text{vehicles/hour}) / (\text{cycles/hour})$

Storage length = vehicles/cycles x 25 feet

Example: Find the storage length required for 150 vph turning left if the signal cycle is 90 seconds.

Vehicles/cycle = $2 \times (150 \text{ veh/hr}) / (1 \text{ cycle}/90 \text{ sec}) / (3600 \text{ sec/hr}) = 7.5 \text{ veh/cycle}$

Storage length = 7.5 veh/cycle x 25 feet = 187.5 feet

USE 200 feet

For **non-signal controlled intersections**, find the number of vehicles per average 2 minute period (AASHTO Green Book, p 829)

Vehicles/2 min period = (vehicles/hour)/(30 periods/hour)

Storage length = vehicles/2 min period x 25 feet

Example: Find the storage length required for 150 vehicles turning left at a non-signal controlled intersection.

Vehicles/2 min period = (150 veh/hr)/(30 periods/hr) = 5 vehicles

Storage length = 5 veh x 25 feet = 125 feet

USE 125 feet

11. Speed Considerations

- a. Vehicle speed is used to estimate safe stopping and cross-corner sight distances. The design speeds set forth in Procedure 5.5 “Geometric Design Standards – Design Speeds” of the *Maricopa County Roadway Design Manual* should be used to estimate safe stopping and cross-corner sight distances for roadways.

Safe stopping and cross-corner sight distances shall be evaluated using procedures 6.1 “General Controls” and 5.15 “Stopping Sight Distance” of the *Maricopa County Roadway Design Manual*.

12. Improvement Analysis

The roadways and intersections within the study area shall be analyzed with and without the proposed development to identify any projected impacts in regard to level of service and safety.

- a. Where an intersection will operate at a level of service below the design objectives set forth in Procedure 2.3 “Traffic Analysis – Traffic Impact Procedures” of the *Maricopa County Department of Transportation Roadway Design Manual*, alternatives which mitigate these impacts will be evaluated and included as part of the study.
- b. Where a highway will operate at a level of service below the design objectives set forth in Procedure 2.3 “Traffic Analysis – Traffic Impact Procedures” of the *Maricopa County Department of Transportation Roadway Design Manual*, alternatives which mitigate these impacts will be evaluated and included as part of the study.

13. Certification

- a. The Traffic Impact Analysis shall be prepared under the supervision of a Professional Engineer (Civil) registered in the State of Arizona.

C. Study and Report Format

1. Introduction and Summary

- a. Purpose of report and study objectives
- b. Executive Summary

Site location and study area
Development description

Principal findings
Conclusions/Recommendations

2. Proposed Development (Site and Nearby)

- a. Site location
- b. Land use and intensity
- c. Site plan (copy must be legible)
 - Access geometrics
- d. Development phasing and timing

3. Study Area Conditions

- a. Study area
 - Area of significant traffic impact (including road segments, intersections and driveways)
 - Market area
- b. Land use
 - Existing land use
 - Anticipated future development
- c. Site accessibility
 - Existing and future area roadway system

4. Analysis of Existing Conditions

a. Physical characteristics

Roadway characteristics
Traffic control devices
Transit service
Pedestrian/bicycle facilities
Existing transportation demand management

b. Traffic volumes

Daily, morning and afternoon peak periods (one hour for each peak period), and others as required

c. Level of service

Morning peak hour, afternoon peak hour, and others as required

d. Safety related deficiencies

e. Data sources

5. Projected Traffic

a. Site traffic forecasting (each horizon year)

Trip generation
Mode split (if applicable)
Pass-by traffic (if applicable)
Trip distribution
Trip assignment

b. Non-site traffic forecasting (each horizon year)

Projections of non-site traffic by Maricopa Association of Governments Association of Governments Transportation Planning Office (MAGTPO) may be used. For larger developments and study areas, a transportation planning model run may be required.

c. Total traffic (each horizon year)

6. Traffic and Improvement Analysis

a. Site access

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b. Level of service analysis

Without project (including programmed improvements for each horizon year)

With project (including programmed improvements for each horizon year)

c. Roadway improvements

Improvements by MCDOT or others to accommodate non-site traffic

Additional alternative improvements to accommodate site traffic

d. Traffic safety

Sight distance

Acceleration/deceleration lanes, left-turn lanes

Adequacy of location and design of driveway access

e. Pedestrian considerations

f. Speed considerations

g. Traffic control needs

h. Traffic signal needs (base plus 5-year horizon)

i. Transportation demand management

7. Internal Project Site Circulation (if applicable)

a. Conflict points

Vehicle/vehicle

Vehicle/pedestrian

Sight distances

Building access delivery points

Drive-through lanes

b. Design features

Widths of internal circulation roadways

Parking dimensions

c. Other features

Fire lanes

Delivery truck circulation/truck docks

Access to waste containers

8. Conclusions

9. Recommendations

- a. Roadway improvements
 - Phasing
- b. Site access
- c. Internal site circulation
- d. Transportation demand management actions (if appropriate)
- e. Other

10. Appendices

- a. Traffic counts
- b. Capacity analyses worksheets
- c. Traffic signal needs studies

11. Figures and Tables

The following information should be provided:

- a. Site location
- b. Site plan
- c. Existing transportation system(s)
- d. Existing and future area development
 - Existing daily
- e. Existing peak hour turning volumes
 - Future transportation system
- f. Estimated site traffic generation (daily and peak period)
- g. Directional distribution of site traffic (daily and peak period)
- h. Site traffic (peak period)
- i. Non-site traffic (peak period)

- j. Total future traffic (peak period)

- k. Protected levels of service including existing, horizon year non-site and total horizon year (with site development) conditions

- l. Recommended improvements

Category I Figures and Tables may be documented within the text. For Categories II, III, and IV the items should be included as separate figures and/or tables. All figures and tables must be legible.

Approvals

- A. Submit traffic impact analysis to the Town Traffic Engineer and/or Developer

- B. A two (2) week review period will be provided. If another jurisdiction is involved, an inter-jurisdictional agreement will be made between the Town of Gilbert, the developer and other agencies. The review period will be extended an additional two (2) weeks for a maximum review period of four (4) weeks.

- C. The Town Traffic Engineer or designated representative shall review and approve the Traffic Impact Analysis.

- D. Should the developer be unable to meet the approval of the Town Traffic Engineer, the developer may make an appeal to the Town Engineer and/or the Public Works Director.

Design Standard Reference

- A. Design in accordance with the current Maricopa County Roadway Design Manual and other current MAG or Town of Gilbert policies, procedures and standards.

- B. Capacity analyses in accordance with the latest edition of the *Highway Capacity Manual*.

- C. Traffic Signal needs studies in accordance with the latest edition with ADOT PGP-4C-2-X, “Traffic Signal Needs Study”

- D. Data collection in accordance with the latest edition of the ITE Manual of *Traffic Engineering Studies*

- E. Trip generation in accordance with the latest edition of the ITE publication *Trip Generation*.

Appendix A

Thresholds for Requiring a Traffic Impact Study

Project sizes generating 100 morning or afternoon peak hour trips

The following table shows various development sizes, which generate 100 morning or afternoon peak hour trips. These sizes were determined using trip generation rates from the *ITE Trip Generation*, Fifth Edition. The latest edition shall be used for selecting trip generation rates.

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Thresholds for requiring traffic impact analysis – Project sizes generating 100 peak hour trips

Land Use	Unit	Threshold
Residential		
Single Family	DU	100 DU
Condominium/Townhomes	DU	175 DU
Apartments	DU	150 DU
Mobiles Homes	DU	180 DU
RV Park	SPACE	400 DU
Retirement Community	DU	250 DU
Commercial		
Walk-in Bank	1000 SF	5000 SF
Drive-in Bank	1000 SF	2000 SF
Walk-in S & L	1000 SF	18000 SF
Drive-in S & L	1000 SF	10000 SF
Shopping Center	1000 SF	6000 SF
Grocery Store	1000 SF	10000 SF
24-Hour Convenience Store	1000 SF	1500 SF
Discount Store	1000 SF	16000 SF
Furniture Store	1000 SF	250000 SF
Lumber Store	1000 SF	30000 SF
Hardware/Paint Store	1000 SF	20000 SF
Auto Sales	1000 SF	40000 SF
Nursery/Garden Center	ACRE	13.5 ACRES
Vehicle Repair (Automobile Care Center)	1000 SF	35000 SF
Bowling Alley	LANE	30 LANES
Gas Station	PUMP	6 SINGLE PUMPS
Racquet Club	COURT	26 COURTS
Health Club	1000 SF	24000 SF
Quality Restaurant	1000 SF	13000 SF
Sit Down High Turnover	1000 SF	6000 SF
Fast Food (with drive-thru)	1000 SF	2000 SF
Offices		
Office	1000 SF	43000 SF
Office Park	1000 SF	60000 SF
Business Parks	1000 SF	70000 SF
Research & Development	1000 SF	100000 SF
Government Office	1000 SF	9000 SF
Post Office	1000 SF	1000 SF

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Article 7: Solid Waste

Sections:

- 7.1 Single-Family Residential Developments
- 7.2 Multi-Family Residential Developments
- 7.3 Non-Residential Developments
- 7.4 Solid Waste Requirements

7.1 Single-Family Residential Developments

Applicable to zoning classifications R1-43 (Rural Residential) through R-2 (Two-Family Duplex Residential, with individual garages)

The Town of Gilbert is required by Arizona law to provide single-family residences with twice weekly service--one for collection of trash and one for collection of commingled recyclable materials. Additionally, the Town provides single-family residences with a monthly uncontained (or bulk) trash and green waste collection service. In order for the Town to continue to meet its obligation to all of its customers, developer plans for new single-family residential developments must accommodate weekly trash and recycling collection and monthly uncontained trash and green waste collection.

The Maricopa County Department of Public Health requires the Town of Gilbert to inspect a percentage of residential trash containers each service day to ensure compliance with County health regulations (e.g., compliance with bag and tie requirements). Additionally, a percentage of residential recycling containers are inspected each service day to ensure that non-recyclable contaminants are not present. In order for the Town's inspection program to be effective, inspectors must be able to identify each non-compliant serviced entity to allow corrective action to be taken. Developer plans for new single-family residential developments must, therefore, provide a means for correlating a trash and recycling container, which has been set out for service, with the dwelling unit from which it came.

The Town of Gilbert uses automated side-loading collection equipment for both trash and recycling collection. This equipment services the plastic trash or recycling containers from the right side only.

For safety reasons, Town of Gilbert collection equipment is not allowed to back more than 50 feet. As a result, collection service will not be provided for containers located on dead end streets or drives.

As a general rule, refuse collection services (trash, recycling, bulk trash and green waste) will not be provided in alleys. Service in alleys requires the specific approval of the Public Works Field Operations Manager, or his designee. A minimum criterion for the approval of alley service is that

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the safe and unimpeded operation of collection equipment can be assured. This requires that no obstructions be allowed in the alley, and may require single-sided service (i.e., all dwelling units backing onto the alley would be required to place their containers on the same side of the alley).

Minimum alley width is 20'. Alleys that are 23' and wider two sided collection is possible. There will be no bulk trash collection in an alley. Alleys less than 23' wide require one sided collection location identified with a curb marking or 3' by 3' pad with 2' between. No parking in alleys will be allowed. Design of drives within a project site shall take solid waste collection routes into account. The collection vehicle shall travel through a site once without backtracking. Drives shall have a minimum width of 20 feet, and shall be free of speed humps and speed bumps.

Restrictions similar to those for alleys may also be necessary for narrow streets. In this instance, on-street parking may be prohibited, or restricted to one side of the street, and, for collection efficiency, single-sided refuse collection service may be specified.

Solid waste collection vehicles require a minimum turning radius of 35 feet inside and 55 feet outside.

Solid waste collection vehicle routes shall be clear of all obstructions to prevent damage from the collection vehicle or damage to the vehicle itself. Obstructions, including but not limited to, plant growth, structures, and athletic equipment, shall not project into the roadway or alley, and a minimum overhead clearance of 14 feet is required.

7.2 Multi-Family Residential Developments

Applicable to zoning classifications R-2 (Two-Family Duplex Residential, without individual garages), R-3 (Multi-Family Residential, 18 dwelling units per acre), and R-4 (Multi-Family Residential, 22 dwelling units per acre)

Refuse container enclosures shall be installed per Town of Gilbert Standard Detail #80. The Public Works Field Operations Manager, or his designee, shall approve all enclosures and enclosure locations.

Refuse container enclosures shall accommodate 3-cubic yard, 4-cubic yard, 6-cubic yard, and 8-cubic yard containers.

The size and number of refuse containers needed depends on the size of the development. Typically, total volume needs can be calculated based on one-half cubic yard per living unit per week. For example, a development with 240 units x 0.5 yards = 120 cubic yards per week or 10 6-cubic yard containers serviced two times per week ($10 \times 6 \times 2 = 120$ cubic yards).

Refuse container enclosures shall be located such that each living unit is no more than 300 feet from a container.

Multi-family residential developments shall be designed with either single- or double-wide enclosures for trash. A 5 foot by 5 foot concrete pad screened on three sides shall be located adjacent to each enclosure to accommodate a 300-gallon recycling container. The area around the pad must be

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clear of obstructions to allow the container to be serviced by an automated side-loading collection vehicle.

The basic dimensions and construction criteria for container enclosures are as follows:

Single-wide enclosure

Net enclosure width - 12 feet minimum

Enclosure depth - 9 feet minimum

Concrete approach pad - 12 feet minimum width x 10 feet minimum depth x
6 inches thick reinforced concrete

Three safety posts shall be installed, spaced 3 feet apart, centered on the back screen wall and 8 feet from the inside edge of the enclosure gate to the inside edge of the safety post. Safety posts shall be painted to contrast with the enclosure, in a color used for trim in the development.

Gates shall be solid and architecturally coordinated with the development.

Double-wide enclosure

Net enclosure width - 22 feet minimum interior clear without midwalls;
with midwalls, 12 feet minimum on each side of the
midwall

Enclosure depth - 9 feet minimum

Concrete approach pad - 22 feet minimum width x 10 feet minimum depth x
6 inches thick reinforced concrete without
midwalls; 24 feet minimum width x 10 feet
minimum depth x 6 inches thick reinforced
concrete with midwalls

Three pairs of safety posts shall be installed, spaced 3 feet apart, centered on each 11 or 12 foot segment of the back screen wall and 8 feet from the inside edge of the enclosure gate to the inside edge of the safety post. Safety posts shall be painted to contrast with the enclosure, in a color used for trim in the development.

Gates shall be solid and architecturally coordinated with the development.

Triple-wide enclosure

Net enclosure width - 33 feet minimum interior clear without midwalls;
with midwalls, 12 feet minimum on each side of the
midwall

Enclosure depth - 9 feet minimum

Concrete approach pad - 33 feet minimum width x 10 feet minimum depth x
6 inches thick reinforced concrete without
midwalls; 36 feet minimum width x 10 feet
minimum depth x 6 inches thick reinforced
concrete with midwalls

Three pairs of safety posts shall be installed, spaced 3 feet apart, centered on each 11 or 12 foot segment of the back screen wall and 8 feet from the inside edge of the

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enclosure gate to the inside edge of the safety post. Safety posts shall be painted to contrast with the enclosure, in a color used for trim in the development. Gates shall be solid and architecturally coordinated with the development.

Double- and triple-wide enclosures may be designed and constructed in an echelon configuration. When this option is chosen, each half or third of the enclosures, respectively, shall follow the design and construction criteria of a single-wide enclosure with common internal screen walls.

Containers that are visible from a public roadway shall have enclosure gates that fully screen the containers from public view.

Gates, hinges, and mounting hardware shall be installed so there is a minimum 9 foot depth created within each enclosure.

Gates, hinges, and mounting hardware shall not intrude upon the minimum net enclosure opening.

Each enclosure gate shall have drop pins installed and holes drilled in the concrete at both the open and closed positions to prevent gates from closing into the collection vehicle or opening into drives and obstructing the movement of other vehicles.

Container enclosures are to be angled no more than 30 degrees from the center line of the solid waste collection vehicle route.

Container enclosures shall be a minimum of 5 feet from any planned or existing structure at its closest point (per Uniform Fire Code).

Containers that are visible from a public roadway shall have enclosure gates that screen the containers from public view. Enclosure gates must be kept closed at all times except for the day(s) of collection. A person gate may be installed to allow access to the container(s) without the need to open the main gates.

Solid waste collection vehicles require a minimum turning radius of 35 feet inside and 55 feet outside.

Refuse and recycling collection truck driveways, routes, and turn-arounds to the containers and enclosure area shall be asphalt, designed for collection vehicles weighing approximately 30 tons when loaded. The property owner shall be responsible for the maintenance of the asphalt.

No awnings, building projections, or landscaping vegetation shall project into the solid waste collection vehicle route. A minimum overhead clearance of 14 feet is required in the drive and 25 feet over the container enclosure area from the steel safety posts back a distance of 50 feet.

Routes shall be clear of all obstructions (curbs, walls, overhead wires, awnings, building projections, and vegetation) to prevent damage from the collection vehicle or damage to the vehicle itself.

Design of drives within a project site shall take solid waste collection routes into account. The collection vehicle shall travel through a site once without backtracking. Drives shall have a minimum width of 20 feet, and shall be free of speed humps and speed bumps. Container enclosures shall be oriented with respect to the drives to allow a straight-in approach to the container by the

collection vehicle. The collection vehicle will not perform “Y” turns or related maneuvers (i.e., turn and back up) in order to line up with the container.

7.3 Non-Residential Developments

Non-residential refuse container enclosures shall be installed per Town of Gilbert Standard Detail #80. The Public Works Field Operations Manager, or his designee, shall approve all enclosures and enclosure locations.

Refuse container enclosures shall accommodate 3-cubic yard, 4-cubic yard, 6-cubic yard, and 8-cubic yard containers.

The basic dimensions and construction criteria for container enclosures are as follows:

Single-wide enclosure

Net enclosure width - 12 feet minimum

Enclosure depth - 9 feet minimum

Concrete approach pad - 12 feet minimum width x 10 feet minimum depth x
6 inches thick reinforced concrete

Three safety posts shall be installed, spaced 3 feet apart, centered on the back screen wall and 8 feet from the inside edge of the enclosure gate to the inside edge of the safety post. Safety posts shall be painted to contrast with the enclosure, in a color used for trim in the development.

Gates shall be solid and architecturally coordinated with the development.

Double-wide enclosure

Net enclosure width - 22 feet minimum interior clear without midwalls;
with midwalls, 12 feet minimum on each side of the
midwall

Enclosure depth - 9 feet minimum

Concrete approach pad - 22 feet minimum width x 10 feet minimum depth x
6 inches thick reinforced concrete without
midwalls; 24 feet minimum width x 10 feet
minimum depth x 6 inches thick reinforced
concrete with midwalls

Three pairs of safety posts shall be installed, spaced 3 feet apart, centered on each 11 or 12 foot segment of the back screen wall and 8 feet from the inside edge of the enclosure gate to the inside edge of the safety post. Safety posts shall be painted to contrast with the enclosure, in a color used for trim in the development.

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Gates shall be solid and architecturally coordinated with the development.

Triple-wide enclosure

Net enclosure width - 33 feet minimum interior clear without midwalls;
with midwalls, 12 feet minimum on each side of the
midwall

Enclosure depth - 9 feet minimum

Concrete approach pad - 33 feet minimum width x 10 feet minimum depth x
6 inches thick reinforced concrete without
midwalls; 36 feet minimum width x 10 feet
minimum depth x 6 inches thick reinforced
concrete with midwalls

Three pairs of safety posts shall be installed, spaced 3 feet apart, centered on each 11
or 12 foot segment of the back screen wall and 8 feet from the inside edge of the
enclosure gate to the inside edge of the safety post. Safety posts shall be painted to
contrast with the enclosure, in a color used for trim in the development.

Gates shall be solid and architecturally coordinated with the development.

Double- and triple-wide enclosures may be designed and constructed in an echelon
configuration. When this option is chosen, each half or third of the enclosures, respectively,
shall follow the design and construction criteria of a single-wide enclosure with common
internal screen walls.

Containers that are visible from a public roadway shall have enclosure gates that fully screen
the containers from public view.

Gates, hinges, and mounting hardware shall be installed so there is a minimum 9 foot depth
created within each enclosure.

Gates, hinges, and mounting hardware shall not intrude upon the minimum net enclosure
opening.

Each enclosure gate shall have drop pins installed and holes drilled in the concrete at both the
open and closed positions to prevent gates from closing into the collection vehicle or opening
into drives and obstructing the movement of other vehicles.

Container enclosures are to be angled no more than 30 degrees from the center line of the
solid waste collection vehicle route.

Container enclosures shall be a minimum of 5 feet from any planned or existing structure at
its closest point (per Uniform Fire Code).

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Commercial properties shall be designed with double-wide enclosures, as a minimum, to accommodate one (1) refuse and one (1) recycling container.

The design and installation of single-wide enclosures requires the specific approval of the Public Works Field Operations Manager, or his designee.

Solid waste collection vehicles require a minimum turning radius of 35 feet inside and 55 feet outside.

Refuse and recycling collection truck driveways, routes, and turn-arounds to the containers and enclosure area shall be asphalt, designed for collection vehicles weighing approximately 30 tons when loaded. The property owner shall be responsible for the maintenance of the asphalt.

No awnings, building projections, or landscaping vegetation shall project into the solid waste collection vehicle route. A minimum overhead clearance of 14 feet is required in the drive and 25 feet over the container enclosure area from the steel safety posts back a distance of 50 feet.

Routes shall be clear of all obstructions (curbs, walls, overhead wires, awnings, building projections, and vegetation) to prevent damage from the collection vehicle or damage to the vehicle itself.

Design of drives within a project site shall take solid waste collection routes into account. The collection vehicle shall travel through a site once without backtracking. Drives shall have a minimum width of 20 feet, and shall be free of speed humps and speed bumps. Container enclosures shall be oriented with respect to the drives to allow a straight-in approach to the container by the collection vehicle. The collection vehicle will not perform “Y” turns or related maneuvers (i.e., turn and back up) in order to line up with the container.

Restaurants and Fast Food Establishments -- The enclosure shall be designed to accommodate refuse and recycling containers and a tallow bin for the collection of concentrated waste oil and grease. This will require a minimum of 5 feet greater width for the enclosure than reflected in Town of Gilbert Standard Detail #80 and installation of an additional interior wall.

7.4 Solid Waste Requirements

Roll off and compactor installation: concrete pad – preferred dimensions of pad are 10 feet wide and a length of 5 feet greater than the combined length of the compactor and container.

Examples: Pad: 10 feet wide X 40 feet long – stationary and container

Pad: 10 feet wide X 35 feet long – self contained

Pad: 10 feet wide X 12 feet long – vertical compactor

Pad: 10 feet wide X 30 feet long – 20 and 40 yard roll offs

The pad should be a minimum of 3000 PSI concrete, wire mesh reinforced and 6 inches thick

Electrical installation – to be designed by a registered State of Arizona electrical engineer

