PAYSON CITY
DEVELOPMENT SERVICES
DEPARTMENT

DEVELOPMENT GUIDELINES

2019

TABLE OF CONTENTS

INTRODUCTION 3
SECTION1: GENERAL IMPROVEMENT REQUIREMENTS 4
SECTION 2: SURVEYING 18
SECTION 3: CULINARY WATER 21
SECTION 4: PRESSURIZED IRRIGATION 23
SECTION 5: SANITARY SEWER 24
SECTION 6: STORM DRAIN 28
SECTION 7: GRADING 34
SECTION 8: EROSION CONTROL 35
SECTION 9: STREET IMPROVEMENTS 37
SECTION 10: POWER AND LIGHT 45
SECTION 11: GEOTECHNICAL INFORMATION 47
SECTION 12: PAYSON CITY STANDARD DETAILS 50

INTRODUCTION

This document has been prepared and compiled by the Payson City Development Services Department.

This document is to assist developers in understanding the current procedures for the review and approval of development/ construction projects within the City. The review process may require multiple reviews and approvals.

These include the Concept Plan Approval, Preliminary Plan Approval, and Final Plan Approval. In addition to the previously mentioned reviews and approvals, developments may also require review and approvals for annexation and rezone requests.

This document includes a TABLE OF CONTENTS that directs the user to a specific topic and page; a process to guide the developer through the review and approval process; and information required to be included in the submittal process.

All drawings shall be saved in the datum NAD 83, Utah State Plane, Central Zone, US Survey Foot, NAVD 88. The items contained in the document have been prepared as a supplement to the adopted subdivision ordinances and standards, and are provided as an aid to the Developer.

The he use of this document will allow the Developer to more closely comply with adopted standards. This document is not intended to fully represent the current adopted subdivision ordinance, construction standards and drawings, master plans, or other City requirements. The Developer shall be responsible to comply with all of the adopted ordinances and standards of Payson City.

SECTION1: GENERAL IMPROVEMENT REQUIREMENTS

1. GENERAL
    a. This section defines the general requirements for public improvements within Payson City.
    b. The improvements shall include all the improvements of a public need, but not limited to streets, striping and signage, culinary water, sanitary sewer, pressurized irrigation, drainage, street lighting, and storm drainage.

2. DEFINITIONS:
    a. CONTRACTOR shall refer to the person or persons actually performing the construction work.
    b. CUSTOMER shall refer to any individual requiring utility services (power, water, sewer, pressurized irrigation, etc.)
    c. DEVELOPER shall refer to the contractor, property owner or agent as applicable.
    d. CITY ENGINEER shall refer to the Payson City Engineer or an authorized representative.
    e. OWNER shall refer to subdividers, developers, contractors or others responsible for the project within Payson City.

3. CONSTRUCTION DRAWINGS
    a. Complete and detailed construction plans and drawings of improvements shall be submitted to the Development Services Department.
    b. No construction shall start until plans have been reviewed and approved by the City Engineer, and other appropriate City officials.
    c. The following instructions are for the purpose of standardizing the preparation of drawings to obtain uniformity in appearance, clarity, size and style.
        i. One (1) set of construction plans and an electronic copy shall be submitted to the Development Services Department for review and returned to the Owner/ Contractor for corrections. When all corrections have been made and the plans approved, four revised final sets shall be provided to the City Engineer:
            1. One copy for the Contractor
            2. One copy for the Developer
            3. One copy for the City Engineer

4. Once copy for the City Inspector

d. The plans and designs shall meet the Payson City Design Guidelines, and standard technical specifications and drawings hereinafter outlined.
e. At the completion of the Project, the Developer shall also provide a set of As-Built drawings in AutoCAD format by electronic disk or flash drive.

4. PLAN SUBMITTAL - GENERAL
    a. North arrow.
    b. Scale bar.
    c. Consistent letter, stationing and numbering that reads left to right on the page and does not overlap with other text or leaders.
    d. Title block, located along the right side of each sheet to include:
        i. Project title.
        ii. Project location or address.
        iii. Date drawn.
        iv. Engineer, surveying, architect name, address, and phone number.
        v. Professional Engineer stamp box with signature and date.
        vi. Sheet number box.
        vii. Stamp plans “PRELIMINARY – NOT FOR CONSTRUCTION” until plans are approved.
    e. Existing property lines and easements.
    f. Construction notes with a reference to a Payson City or APWA Standard Detail.
    g. Plans must be stamped, signed, and dated by a Utah Licensed Professional.
    h. Call 811 Before You Dig or Blue Stake of Utah symbol.

5. TITLE SHEET
    a. Project name.
    b. Vicinity map.
    c. Drawing index table.
    d. Abbreviation table.
    e. Type of building information.
    f. Type of construction information.
    g. Type of occupancy information.
    h. Number of stories.
    i. If the proposed building will include automatic fire sprinklers or not.

j. Required and provided parking stalls calculation table.
k. Required and provided ADA stalls calculation table.
l. Required and provided VAN ACCESSIBLE ADA stalls calculation table.
m. Contact list:
    i. Developer.
    ii. Architect.
    iii. Civil Engineer.
    iv. Geotechnical Engineer.
n. Benchmark information.
o. Basis of bearing information.

6. HORIZONTAL CONTROL
    a. Site plan view showing proposed improvement using a solid line.
    b. Site plan view showing existing features using a dashed line.
    c. Site plan view showing phased or future improvements using a solid faded line.
    d. Property boundary with bearings and distances.
    e. Basis of bearing information.
    f. Existing and proposed public utility easements.
    g. Existing and proposed survey monuments.
    h. Parking lot dimensions including width and length.
    i. Parking lot driving aisle dimension.
    j. Location of proposed building (s) measured from two property corners.
    k. Building width and length dimension.
    l. Driveway width.
    m. Driveway location based on street stations.
    n. Location of proposed street lights.
    o. Location of proposed fire hydrants.
    p. Location of proposed garbage enclosure or dumpster/s.
    q. Parking lot pavement cross sections based on the soil report recommendations.
    r. Location and dimension of proposed commercial signs.
    s. Traffic signing and striping.
    t. Parking stalls striped using a four inch (4”) solid white line.
    u. ADA parking stall striped using a four inch (4”) solid blue line.
    v. ADA sign location.
    w. Existing and proposed curb and gutter.

x. Existing and proposed sidewalks.
y. Existing and proposed striping and signing.
z. Location of mail box or CBU.
aa. Construction notes with a reference to the APWA or Payson City standards.

7. GRADING AND DRAINAGE
    a. Layout of the subdivision or site plan.
    b. Table including the following information:
        i. Landscaping area in square feet and acres.
        ii. Roof area in square feet and acres.
        iii. Gravel area in square feet and acres.
        iv. Road area in square feet and acres.
    c. Existing and proposed contour lines.
    d. Existing and proposed contour labels.
    e. Size, material, slope, and length of proposed storm sewer lateral/s.
    f. Size, material, slope, and length of the existing and proposed storm sewer main lines.
    g. Size, material, and type of construction of the proposed and existing storm sewer manholes.
    h. Size and location of the existing and proposed storm sewer inlets.
    i. Size, material, and type of pretreatment device.
    j. Manhole type and diameter.
    k. Manhole flow line and rim elevation.
    l. Plan view showing drainage sub-basins and the piping system.
    m. Plan and profile sheets: vertical scale 1” = 2’; 1” = 4’.
    n. Benchmark information as measured on the field (not assumed).
    o. Location of existing and proposed utilities including pipe crossings.
    p. Drainage calculations showing the following:
        i. Cumulative peak flow calculations for each drainage sub-basin.
        ii. Capacity calculations for each segment of the pipe system.
        iii. Detention storage volume calculations.
        iv. HGL elevations.
        v. Orifice plate size calculations.
    q. Construction notes with a reference to the APWA or Payson City standards.

8. WATER PLAN
    a. Layout of the subdivision or site plan.
    b. Size, material, and location of proposed individual or master water meters.
    c. Size, material, and location of proposed water laterals.
    d. Size, location, material, and type of joint of the proposed and existing water mains.
    e. Size, location, material, and type of joint of the proposed and existing water valves.
    f. Location of existing and proposed fire hydrants.
    g. Location of existing and proposed blow offs and air vacs.
    h. Location, type of joint, material and size of proposed bends with thrust blocks.
    i. Plan and profile sheets: vertical scale 1” = 2’; 1” = 4’.
    j. Benchmark information as measured on the field (not assumed).
    k. Location of existing and proposed utilities including pipe crossings.
    l. Construction notes with a reference to the APWA or Payson City standards.

9. SANITARY SEWER
    a. Layout of the subdivision or site plan.
    b. Location of nearest public drinking well if within a wellhead protection zone.
    c. Existing and proposed contour lines.
    d. Existing and proposed contour labels.
    e. Show daylight line (proposed contour line matches existing contour line).
    f. Size, material, slope, and length of proposed sanitary sewer lateral.
    g. Size, material, slope, and length of the existing and proposed sanitary sewer main lines.
    h. Size, material, and type of construction of the proposed and existing sanitary sewer manholes.
    i. Size and location of the existing and proposed sanitary sewer cleanouts.
    j. Size, material, and type of grease traps, sand traps, monitoring box, etc.
    k. Manhole flow line and rim elevation.
    l. Plan and profile sheets: vertical scale 1” = 2’; 1” = 4’.
    m. Benchmark information as measured on the field (not assumed).
    n. Location of existing and proposed utilities including pipe crossings.
    o. Construction notes with a reference to the APWA or Payson City standards.

10. POWER AND LIGHT

a. Site plan view showing proposed improvement using a solid line.
b. Site plan view showing existing features using a dashed line.
c. Site plan view showing phased or future improvements using a solid faded line.
d. Street names and/ or numbers.
e. Location of power line trench 2 feet behind the sidewalk.
f. Minimum two feet (2') separation between communication and power line conduits.
g. Location of existing and proposed street lights.
h. Location of existing and proposed transformer boxes.
i. Location of splice boxes.
j. Location of sectionalizers.
k. Location of switches.
l. Location of recorded and proposed utility easements.
m. Location of power poles guy wires.
n. Construction notes with a reference to the Payson City standards and the NESC.
o. Add a note: "Trenching two feet (2') behind the sidewalk and four feet (4') to the top of conduit for primary from final grade."

11. FIRE AND RESCUE

a. Site plan view showing proposed improvement using a solid line.
b. Site plan view showing existing features using a dashed line.
c. Site plan view showing phased or future improvements using a solid faded line.
d. Street names and/ or numbers.
e. Type of building information.
f. Type of construction information.
g. Type of occupancy information.
h. Number of stories above grade plane.
i. Building height above grade plane.
j. If the proposed building will include automatic fire sprinklers or not.
k. Location of existing and proposed fire lines.
l. Location of the Fire Control Room (required for fire sprinklers).
m. Location of existing and proposed fire hydrants.
n. Fire lane.
o. Fire truck turning envelope.

p. Fire flow demand calculations.
q. Snow removal storage areas.
r. Traffic calming devices (speed bumps, chicanes, etc.)
s. Emergency vehicle turn around area according to IFC Appendix D.

12. STORM WATER POLLUTION PREVENTION PLAN
    a. Existing and proposed contour lines.
    b. Existing and proposed storm drain features.
    c. Delineated Jurisdictional Wetlands.
    d. Structural Best Management Practices.
    e. Non-Structural Best Management Practices.
    f. Certification statement stamped, signed and dated by a Licensed Professional.

13. PLAN AND PROFILE
    a. Horizontal and vertical scale.
    b. Typical road cross sections.
    c. Road centerline stations (major every one hundred (100') and minor every fifty feet (50').
    d. Horizontal curves information based on a twenty five (25) mph design speed.
    e. Horizontal curve design according to AASHTO guidelines.
    f. Profile major grid every five (5) or ten (10) feet.
    g. Profile minor grid every one (1) or two (2) feet.
    h. Profile elevation labels.
    i. Plan view showing street and underground utilities layout.
    j. Existing ground profile shown using a dashed line.
    k. Proposed road profile shown using a solid line.
    l. Proposed road slopes in percentage.
    m. Sheet match-line information including station and following page numbers.
    n. Proposed vertical curves length and K value according to AASHTO guidelines.
    o. Proposed water line and pressurized irrigation including main sizes, type of joint, materials, size; location, type, material, and type of joint of isolation valves; fire hydrants assembly with location of water valve and pipe size; blow-offs location and size; PRV stations; water laterals location and dimension; and meter sizes.

p. Proposed sanitary sewer lines sizes, materials, slopes; elevation of rim, invert in and invert out; sewer lateral location, size, and material; pressure sewer lines and lift stations.
q. Proposed storm drain system including culverts, open channels size, slope, material; manhole location, size, and material; elevation on rim, flow line in and flow line out; curb inlets; end sections with rip-rap; detention basins and irrigation ditches.
r. Solved underground utility crossings (check water and storm drainage crossings).

14. DETAIL SHEET
    a. Each set of plans shall be accompanied by separate detail sheets.
    b. Detail sheet shall include all current Payson City Standards Engineering Details plus any special or specific construction details required for the project.

15. ADDITIONAL REPORTS AND FORMS
    a. Based on the type of applications, the following reports may be required:
        i. Title report.
        ii. Geotechnical report.
        iii. Drainage report.
        iv. Traffic Impact Study.
        v. Approved Jurisdictional Delineation by the USACE.
        vi. Sensitive Land Overlay report.
        vii. Project Notification Form.
        viii. Land Disturbance Permit.
        ix. Notice of Intent for Construction Activities.
        x. Notice of Intent for Industrial Activities.
        xi. Dewatering Permit from the Utah State Division of Water Quality.
        xii. Engineering Cost Estimation.
        xiii. Conveyance of Water Rights to Payson City.
        xiv. Payment of inspection and material testing fees.
        xv. Utilities Notification form.

17. INSPECTION, TESTING AND QUALITY CONTROL

a. All construction work involving the installation of improvements in Payson City shall be subject to City inspections and testing as outlined in the quality control section of each specification.
b. Request for inspection:
    i. Request for inspections shall be made to the Public Works Secretary by the person responsible for the construction.
    ii. Notice shall be given forty-eight (48) hours in advance of the work starting.
    iii. Any work shall be inspected prior to being backfilled or covered.
c. Construction completion inspection:
    i. A final inspection shall be made by the Public Works Director, or a designee upon receipt of a request by the owner after all the construction work is completed.
    ii. Any faulty or defective work shall be corrected by the persons responsible for the work within a period of thirty (30) days from the date of the City Engineer's Inspection Report defining the faulty or defective work.
d. Quality Control Testing:
    i. Material testing shall be conducted by an independent laboratory, approved by the Public Works Director, at the owner's expense. Material testing and inspection fees must be paid in full before requesting a pre-construction meeting.
    ii. All testing shall comply with the current ASTM, AASHTO, AWWA or Public Drinking Water Regulation standards and shall meet the minimum testing requirements as outlined in the specifications.
    iii. Personnel performing test shall have the appropriate certifications to perform such tests.
    iv. The cost of any and all re-testing required to bring materials into specification shall be borne by the owner.
    v. The time and locations of all test shall be approved by the Public Works Director's office.
    vi. If determined necessary by the Public Works Director or a designee, additional material testing can be required.
e. Test report:

i. Written test results will be required for review by the Public Works Director after each portion of the work (i.e. pipeline construction, earthwork, curb, gutter and sidewalk, roadway construction, etc.)

18. AS-BUILT DRAWINGS

a. Before final inspection, the Contractor shall provide a complete set of as-built drawings that includes all items specified on the construction drawings.
b. The as-built drawings shall show all improvement dimensions as constructed in the field.
c. The as-built drawings shall be submitted on a flash drive saved on AutoCAD and Adobe Acrobat format.
d. No bond retainer shall be released until as-built drawings are received by the Public Works Director.

19. GUARANTEE OF WORK

a. The Owner shall warrant and guarantee that the improvements provided for hereunder, and every part thereof, will remain in good condition for a period of **one (1) year** after the date of the acceptance of the project by the City. Payson City Standard Detail PB 1 illustrates the process for posting performance guarantee bonds.
b. The Owner shall make all the necessary repairs and maintain the improvements and every part thereof in good condition during the specified time at no cost to the City.
c. The guarantee hereby stipulated shall extend to and include, but shall not be limited to:
    i. Road base.
    ii. Asphalt or concrete pavement.
    iii. All pipes.
    iv. Pipe joints.
    v. Valves.
    vi. Manholes.
    vii. Backfill
    viii. Curb
    ix. Gutters
    x. Sidewalks

xi. Striping and signage.

d. Whenever, in the judgment of the Public Works Director, said work shall be in need of repair, maintenance, or reconstruction, written notice shall be served upon the Owner and thereupon the Owner shall undertake and complete such repairs in a timely manner.

e. If the Owner fails to do so within thirty (30) days from the date of the service of such notice, the Public Works Director shall have such repairs made and the cost of such repairs shall be paid by the Owner including any additional expenses incurred by the City.

20. TRAFFIC CONTROL AND ROAD CLOSURES

a. The Contractor shall provide and maintain all necessary signs and barricades needed for traffic control according to the MUTCD guidelines, latest edition.

b. All necessary precautions shall be taken to protect the work and to safeguard the public.

c. Street road closures shall be approved by the City Engineer or his designee.

d. Sidewalk closures shall include a walkable path for people with disabilities.

21. SURVEY MONUMENTS

a. Standard survey control monuments shall be installed in all streets to be dedicated for public use.

22. PRE CONSTRUCTION MEETING

a. All work completed in the right of way shall use a qualified contractor.

i. Contractor shall be licensed in accordance with state laws.

ii. The City may refuse a contractor from public works construction for any of the following reasons from the past 5 years:

1. Failure to pay suppliers or subcontractors on previous work.
2. Poor communication.
3. Threatening or intimidating communications.
4. Willful and deceptive efforts to perform defective or substandard work.
5. Defective or substandard work on previous projects.
6. Unethical acts.

iii. Contractor shall have proper insurance.

1. Liability: One million dollars ($1,000,000) per person, two million dollars ($2,000,000) per event.
2. Workers Compensation Insurance.

b. A preconstruction meeting is required on all development or public works construction projects.
c. Verify the following:
    i. Land Disturbance Permit has been issued
    ii. Storm Water Pollution Prevention Plan is approved and UPDES NOI has been issued.
    iii. Other necessary permits have been obtained.
    iv. Conveyance of water rights to Payson City has been completed.
    v. Payment of inspection and material testing fees has been completed.
    vi. Payson Fire Department Review approval letter signed.
    vii. When applicable, developer agreements are signed and executed.
    viii. When applicable, final plat application is approved.
    ix. When applicable, performance guarantee bond has been posted.
d. Attendance is required by contractor project manager, site supervisor(s), design engineer, consultants, significant subcontractors, significant suppliers, Public Works Director, Development Engineer, and City Inspectors.
e. Discuss the following topics:
    i. Site supervisors and 24-hour contacts.
    ii. Compliance with OSHA guidelines.
    iii. Coordination.
    iv. Schedule.
    v. Required material testing submittals.
    vi. Geotechnical issues.
    vii. Survey issues.
    viii. Coordination of inspections.
    ix. Specifications & standards.
    x. Request for partial and final bond releases.

24. IMPROVEMENTS SEQUENCE

a. City improvements shall be installed in the following sequence, unless otherwise directed by the Public Works Director:
    1. Rough grading
    2. Sanitary Sewer
    3. Culinary Water
    4. Pressurized Irrigation
    5. Storm Sewer
    6. Dry Utilities (In Public Right Of Way)
    7. Sub Base
    8. Curb and Gutter
    9. Road Base
    10. Asphalt
    11. Dry Utilities (In Easements)
    12. Sidewalks and Trails
    13. Manholes and Valve Collars
    14. Survey Monument
    15. Street Signs
    16. Street Lights
    17. Clean Up
b. Contractors and Developers shall ensure that all the improvement items previous to paving the road are installed, inspected, surveyed, and approved by the City Inspector.
c. No road cut permits will be issued on new City streets for **five (5) years** from the date the street was accepted by the City.

25. UPDES STORMWATER PERMIT

a. A UPDES (Utah Pollutant Discharge Elimination System) Permit from the State of Utah is required for all projects that disturb greater than 1 acre or are less than one (1) acre and part of common plan of development or sale that is greater than 1 acre.

27. BUILDING PERMITS

a. No building permit shall be issued for a subdivision until:
    i. Road base is placed, graded, compacted, and approved on the entire road surface.
    ii. Curb and gutter is in place.
    iii. Street signs are installed.
    iv. All underground utilities are in place, accepted, and functional.
    v. Fire hydrants are installed and in full operation.
    vi. It is reasonable to expect the subdivision improvements to be completed prior to the occupancy of the buildings.

28. CERTIFICATE OF OCCUPANCY

a. A developer shall not sell any portion of an approved development without informing the prospective buyer or builder that occupancy may not be obtained until all permanent improvements are installed and approved by the City.

SECTION 2: SURVEYING

1. SURVEYING STANDARDS
    a. All surveying of property lines and construction surveying for the locating of construction improvements shall be conducted under the direct supervision of a Utah Professional Licensed Surveyor (PLS).

2. HORIZONTAL CONTROL
    a. Payson City maintains all of its data in the North American Datum of 1983 (NAD83) Utah Central Zone State Plane (U.S. Feet) coordinate system, also known as the Grid System.
    b. All construction data shall be provided to Payson City in this coordinate system.
    c. There should be at least two principal corners in a subdivision plat and possibly more for uniquely shaped subdivisions with the intent of providing state plane data to define the major extents of the subdivision.

3. VERTICAL CONTROL
    a. All vertical data shall be in accordance with the North American Vertical Datum of 1988 (NAVD 88).
    b. Surveyors shall not develop a local vertical datum.

4. SURVEY MONUMENTS
    a. Monument classifications shall be as follows:
        i. Class I –When within pavements use ring and lid per APWA Plan No. 274. Outside of paved roadways may use monument cap and base per APWA Std. Plan No. 272.
        ii. Class II – 18” #5 Rebar and aluminum or plastic cap stamped with PLS number driven flush to pavement surface or within 2” of ground surface.
        iii. Class - III a metal plug drilled and set into the back of curb at the projected property line.

5. SURVEY MONUMENT INSTALLATION
    a. Subdivision or Property Corner Monuments shall be set at:
        i. All angle points in survey boundary (Class II).

ii. All points of tangency and points of curvature on and along survey boundary (Class II).
iii. All Lot corners.
iv. Three hundred foot (300') intervals, unless otherwise approved. If line of sight is not obtainable within a three hundred foot (300') interval, then monuments will be required to be closer together unless otherwise approved by the City Surveyor.
v. When it is not possible to set a property corner fronting the street a Class III monument will be set.

b. Section Corner replacements shall be Class I monuments. Any Section Corner replacement will be done under the supervision of the City or County Surveyor. Monuments must be set prior to the final acceptance of the improvements.
c. Where hard rock or other physical obstructions are encountered, monument length sufficient to resist removal may vary within reasonable limits.

6. EASEMENTS
    a. All plats shall show the existing and proposed easements. When easements are to be provided for a lot of record, a Word document containing the easement legal description and exhibit map shall be provided to the City. The legal description must be tied to a Section Corner and include a basis of bearing. City Staff will review the legal description and (upon acceptance) will insert it into a formatted City Easement and provide the applicant with a signature copy of the Easement. After the Easement is signed and notarized the applicant will return the Easement to the City for recording at the Utah County Recorder's Office.

7. PLATS
    a. Subdivisions: All subdivision plats shall be in accordance with the Payson City Subdivision Ordinance.
    b. Right of Way Dedication: All roadways to be dedicated shall have a plat prepared in accordance with the standards for subdivision plats as defined in the City's subdivision ordinance.

8. CONSTRUCTION SURVEYING
    a. All public improvements shall be installed based on construction survey stakes placed under the direction of a Utah Professional Licensed Surveyor.

b. Survey stakes for the construction of streets shall be installed at an interval no greater than one hundred feet (100').
c. Fire hydrants shall not be installed without survey stakes to establish the finished grade and the exact location of the hydrant to prevent improperly depressed or elevated hydrants.
d. All curb returns shall be installed based on a radius point provided by the surveyor.

SECTION 3: CULINARY WATER

1. WATER DESIGN STANDARDS
    a. All water system installation and design must conform to Payson City Water System Master Plan and the Utah State Administrative Rules for Public Drinking Water System R309-510.

2. HYDRAULIC DESIGN CRITERIA
    a. Payson City may use a hydraulic model to verify that fire flow and water demand are as specified by the project plans. The proposed water system may need modifications to comply with the hydraulic model output.
    b. The minimum fire flow shall be two thousand (2,000) gallons per minute (gpm).
    c. The fire flow may be increased as determined by the Fire Marshall and based on the size of the proposed building (s), type of building, type of occupancy, and type of construction.
    d. The normal minimum pressure in all parts of the system shall be forty (40) psi.
    e. The anticipated maximum operating pressure of the system shall be one hundred to one hundred twenty (100 – 120) psi.
    f. The maximum pipe line flow velocities shall be six (6) fps.
    g. The proposed water system shall be design to conform to the pressure zones shown on the Payson City Water Master Plan.

3. CULINARY WATER PIPE SIZE AND TYPE
    a. Minimum allowable main line size is eight inches (8”) in diameter.
    b. Pipe type shall be PVC pipe (C-900) for water lines less than or equal to twelve (12”), or High Density Polyethylene (HDPE).
    c. Horizontal clearance between a water main and sewer lines shall be a minimum of ten feet (10’) edge to edge per Utah Administrative Code R317-3-2 and R309-550.
    d. Minimum cover required shall be forty eight inches (48”) to top of pipe.
    e. The culinary water main lines shall be installed on the North and West side of the street.
    f. The culinary water main lines shall be installed eighteen feet (18’) from the property line.
    g. All unused water service line shall be abandoned at water main line.

4. CULINARY WATER VALVES
    a. Water valves shall be located at all intersections and shall equal number of legs.
    b. Water valves shall be placed at intervals not to exceed eight hundred feet (800').
    c. Water valves shall be placed within ten feet (10') of the upstream and downstream ends of casing pipes.
    d. Blow-offs shall be placed at the ends of water lines and at low points in the system.
    e. All valves larger than twelve inches (12") shall be butterfly design.
    f. Direct bearing thrust blocks shall be comply with APWA Standard Plan 561.
    g. Cover collar for water valve box shall comply with APWA Standard Plan 574.
    h. Water valve frame and cover shall comply with APWA Standard Plan 502 or 503 respectively.
    i. Install an approved backflow prevention device as per Payson City Standard Drawings or APWA Standard Drawings (latest edition).
    j. Air-vacuum valve stations shall be placed at high points on transmission lines and at other locations as required for proper system operations.

5. CULINARY WATER LATERALS AND METERS
    a. Minimum size water service line and meter for residential use is one inch (1") diameter for residential connections according to APWA Standard Plan 551. All unused water service lines shall be abandoned at water main line.
    b. The water service line and meter for commercial, industrial, and manufacturing should be calculated based on the water demand and number of automatic sprinkler heads.

6. FIRE HYDRANTS
    a. Fire hydrant maximum spacing shall be five hundred feet (500') in residential areas and at the end of all dead end lines.
    b. Fire hydrants maximum spacing shall be three hundred feet (300') in commercial, industrial, and manufacturing areas.
    c. Fire Hydrant installation shall comply with APWA Standard Plan 511.
    d. Valves are required at main lines for all fire lines and fire hydrants.
    e. The location and the number of fire hydrants must be approved by the Payson City Fire Marshall.

7. EASEMENTS
    a. Minimum twenty foot (20') public utility easements (PUE) shall be provided for all public water mains installed outside of the street right of way.

SECTION 4: PRESSURIZED IRRIGATION

1. GENERAL
    a. Designed in accordance with all culinary water system requirements with the following exceptions:
        i. Design pressures should be ten (10') psi higher than the culinary water system in the same pressure zone unless otherwise approved.
        ii. The pipe material shall be colored purple, or a discrete color different from the culinary water main.
        iii. There shall be no cross connection between secondary and culinary water systems.
    b. Shall be installed at a minimum depth of thirty inches (30") and generally installed above the culinary water line.

SECTION 5: SANITARY SEWER

1. SEWER DESIGN STANDARDS
    a. All sanitary sewer installation and design shall comply with the Payson City's Wastewater Collection System Master Plan, and R317-3-2.

2. HYDRAULIC DESIGN CRITERIA
    a. Sewer lines shall be designed to maintain a flow velocity of two feet per second (2 fps) during peak flows.
    b. Where design velocities are projected to be greater than fifteen feet per second (15 fps), the sewers and manholes shall be protected against displacement by erosion and impact.
    c. Sanitary sewers shall be designed to carry the peak discharge as specified below:
        i. Laterals and collector mains: 400 gallons/ capita/ day
        ii. Interceptor and outfall mains: 250 gallons/ capita/ day
    d. Minimum Manning's "n" value is 0.012.
    e. Buoyance of sewers shall be considered and flotation of the pipe shall be prevented with appropriate construction where high groundwater conditions are anticipated.
    f. Velocity Calculations for gravity sewers:

Manning's Equation (Gravity):

$$V = \frac{1.486}{n} \times (R_H)^{\frac{2}{3}} \times S^{\frac{1}{2}}$$

Where: V = velocity in feet/second
n = coefficient of roughness (Manning), n = 0.013
S = slope of energy grade line, ft/ft
R_H = hydraulic radius, ft
= cross-sectional area of flow (ft^2) / wetted perimeter or diameter (in.) / 48

3. SANITARY SEWER PIPE SIZE AND TYPE
    a. Minimum main line size shall be eight inches (8") in diameter.
    b. Minimum depth of a sewer main, to top of pipe, will be not less than forty eight (48") below subgrade of roadway.

c. Sanitary sewers shall be designed of sufficient depth to permit sewer laterals from basements to be connected. Exceptions may be granted in subdivisions or areas in which no basements are to be constructed. A note shall be made on the plat to prohibit basements in these areas.
d. Allowable sanitary sewer main pipe material for all projects shall be green PVC SDR 35, or High Density Polyethylene (HDPE).
e. Horizontal clearance to any culinary water line shall be at least 10 feet (10') edge to edge per R309-550 and R317-3-2.
    i. Any other utility crossing the sewer main shall do so as close to a right angle as possible.
    ii. For waterline crossings, the water shall be a minimum of eighteen inches (18") above the sewer.
f. Unless otherwise accepted and approved by the City Engineer, the minimum slopes shall be the following:
    i. Eight inch (8") sewer lines: 0.40%
    ii. Ten inch (10") sewer lines: 0.28%
    iii. Twelve inch (12") sewer lines: 0.22%
    iv. Fifteen inch (15") sewer lines: 0.15%
    v. Eighteen inch (18") sewer lines: 0.12%
    vi. Twenty one (21") and larger sewer lines: 0.10%
g. Sewer main lines shall be located along the centerline of the road.

4. SANITARY SEWER MANHOLES
    a. Sewer manholes shall be installed:
        i. At a maximum spacing of four hundred feet (400').
        ii. At all changes in grade, size or alignment, and at all intersections with other main lines.
        iii. At the end of main lines (no cleanouts allowed).
        iv. Manholes are required on laterals six inches (6") or larger at the intersection with a sewer main line twelve inches (12") in diameter or less.
    b. Sewer manholes shall be sized based on the following:
        i. Manholes shall conform to APWA Standard Plan 411.
        ii. Five foot (5') diameter for sewers under twelve inches (12") diameter.
        iii. Five foot (5') diameter for sewers twelve inches (12") diameter and larger, or when three (3) or more pipes intersect the manhole.

iv. Five foot (5') diameter manholes requires at three way manholes, 90° bends, over fifteen inches (15") and eighteen inches (18") pipes, manholes over fifteen feet (15') deep, and in manholes with over one foot (1') drop in manhole.

v. Six foot (6') diameter manholes required for pipes twenty four inches (24") and greater, at three (3) way manholes, where the deflection exceeds 90°, and where height of manhole exceeds sixteen feet (16').

c. Sanitary sewer thirty inches (30") frame and cover shall conform to APWA Standard Plan 402.

d. Sanitary sewer cover collar for sanitary sewer manhole shall comply with APWA Standard Plan 413.

e. Manholes shall be placed within ten feet (10') of the upstream and downstream ends of casing pipes.

5. SANITARY SEWER LATERALS

a. Minimum sanitary sewer lateral size for residential land use shall be four inches (4") in diameter.

b. Minimum sanitary sewer lateral size for commercial, industrial and manufacturing land uses shall be 6 inches (6") in diameter.

c. Lateral size shall be based on the number of fixture units in the residence and slope of lateral. Up to ninety (90) fixture units shall be allowed per each four inch (4") lateral set at a two percent (2%) slope.

d. No roof drains, storm drains, foundation drains, or sub-drains shall be connected to the sanitary sewer system.

e. The minimum slope for a four inch (4") lateral shall be 2.00%.

f. The minimum slope for a six inch (6") lateral shall be 1.00%

g. Connection of sanitary sewer laterals shall be at 2:00 and 10:00 o'clock.

h. Cleanouts shall be required every 100 feet (100') and at angle points.

i. Pretreatment will generally be required for each use producing a sewer load different from a standard residential unit. Grease traps shall conform to APWA Standard Plan 441.

j. All unused sewer laterals shall be abandoned at the main line.

k. Sanitary sewer lateral connections shall comply with APWA Standard Plan 431.

l. All sanitary sewer design must comply with the Payson City Standards or as approved by the City Engineer.

m. All unused sanitary sewer service line shall be abandoned at sewer main line

6. EASEMENTS
    a. Minimum twenty foot (20') wide public utility easements (PUE) are required for all publicly owned and maintained sewer main lines located on private property.
    b. Sewer easements shall extend ten feet (10') beyond dead end manholes.

7. SEWAGE LIFT STATIONS
    a. Sewage lift stations, where required, shall be designed to conform to all requirements of the State Administrative Rules, and shall be approved by the City Engineer.
    b. Velocity of force main shall be never less than three feet per second(3 fps).
    c. Air relief valves may be required to prevent air lock. Air vent shall be filtered to prevent odor with an approved device.
    d. No segment of force main shall have zero slope.
    e. Force main shall be installed with tracer wire.
    f. Lift stations shall be built where required to pump sewage from low elevation areas into an existing or proposed gravity system.
    g. Lift stations shall be enclosed in a permanent structure as approved by the City Engineer.
    h. Lift station enclosures shall be sized adequately to accommodate all the required pumps, wet wells, all required plumbing items, electrical equipment, and all the appurtenant items, as approved by the City Engineer.
    i. Equipment for a SCADA system shall be provided inside the lift station. The SCADA system shall be compatible to the City's system and shall be approved by the City Engineer or his designee.
    j. Property for lift stations shall be deeded to the City, if it will be owned and maintained by the City, or the Home Owner Association, or Business Owner Association, if maintained by a private entity.
    k. Lift stations shall be provided with standby power systems as required by the State Code.

SECTION 6: STORM DRAIN

1. DRAINAGE PLAN:
    a. All system installation and design must conform to Payson City's Storm Water Master Plan.
    b. Surface drainage shall be designed as such that all drainage is addressed within own project boundaries and not adversely affect other properties.
    c. Provide protection to the project from natural drainage ways such as existing drainage irrigation.
    d. Identify all existing storm drain and irrigation features within and adjacent to the project boundaries.
    e. Projects within a delineated wetlands or high groundwater table zone, must meet and address those conditions as part of the project including, but not limited to the following:
        i. Provide minimal building elevations based on groundwater table depth elevation.
        ii. Provide the high groundwater table elevation measured during spring season.
    f. Identify public and private drainage systems.
    g. Provide overall pre-development and post-development pervious and impervious surface area measurements.

2. HYDRAULIC DESIGN CRITERIA:
    a. The design of a storm drainage system should have as its objective the design of a balance between the maximum allowable discharge rate and downstream receiving system's capacity.
    b. All drainage studies shall use rainfall data published by the National Oceanic and Atmospheric Administration (NOAA).
    c. The NOAA Precipitation Frequency Data Server is located at the following link: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/ut_pfds.html

Duration	Frequency (inches/hour)					
	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
5 min	1.97	2.72	3.38	4.42	5.35	6.42
10 min	1.50	2.08	2.58	3.36	4.07	4.89
15 min	1.24	1.71	2.13	2.78	3.36	4.04
30 min	0.83	1.15	1.43	1.87	2.27	2.72
60 min	0.52	0.71	0.89	1.16	1.40	1.68
120 min	0.32	0.42	0.51	0.66	0.79	0.94
3 hours	0.24	0.31	0.37	0.47	0.55	0.65
6 hours	0.16	0.19	0.22	0.27	0.31	0.35
12 hours	0.10	0.12	0.14	0.16	0.18	0.20
24 hours	0.06	0.08	0.09	0.10	0.11	0.12

Duration	Frequency (inches)					
	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
5 min	0.16	0.23	0.28	0.37	0.45	0.54
10 min	0.25	0.35	0.43	0.56	0.68	0.82
15 min	0.31	0.43	0.53	0.70	0.84	1.01
30 min	0.42	0.58	0.72	0.94	1.14	1.36
60 min	0.52	0.71	0.89	1.16	1.40	1.68
120 min	0.64	0.84	1.02	1.31	1.57	1.87
3 hours	0.73	0.93	1.11	1.40	1.64	1.94
6 hours	0.94	1.15	1.34	1.60	1.84	2.11
12 hours	1.20	1.44	1.66	1.96	2.18	2.44
24 hours	1.51	1.80	2.04	2.38	2.64	2.88

d. Piped systems are to be designed using a twenty five (25) year, twenty four (24) hour storm event.
e. Retention or detention basins are to be designed using a one hundred (100) year, twenty four (24) hour storm event.
f. The storm water drainage system shall be separated and independent of the sanitary sewer system.
g. Storm drainage system shall be design using the Rational Method or other methods approved by the City Engineer. Hillside developments must also use the TR-55 method to analyze the drainage channels from above the development.
h. A copy of the storm drainage calculations shall be submitted along with the construction plans.

i. The drainage calculations should include the Hydraulic Grade Line (HGL) elevation.
j. Inlets shall be provided so that surface water is not carried across around any street intersections.
k. When calculations indicate that curb capacities are exceeded, catch basins shall be used to intercept flow.

3. RETENTION OR DETENTION PONDS:
    a. Retention or detention basins are to be designed using a one hundred (100) year, twenty four (24) hour storm event.
    b. As part of the design consideration, a geotechnical study with a percolation rate is required to determine infiltration rates and the highest ground water table elevation.
    c. Percolation test must show that the capability of draining the pond within twenty four (24) hours.
    d. The floor of a detention basin must be at least of one foot (1') above the highest elevation of the groundwater table.
    e. In order to control erosion and sedimentation, the detention pond shall be landscaped with grass sod or rock on all the slopes and the bottom of the facility.
    f. The maximum design depth for a storm drain detention basin shall be three feet (3') with an additional one foot (1') for free board to the top of the spillway.
    g. The storm drain basin shall be designed with a minimum 5:1 (horizontal to vertical) slope.
    h. Provide a minimum fifteen foot (15') wide maintenance access area to the hydraulic related features. Include a vehicle maintenance turnaround area.

4. STORM DRAIN PIPE SIZE AND TYPE:
    a. The storm drain pipe shall be located on the North and West side of the street.
    b. The storm drain pipe shall be located four and one half feet (4.5') from the Top Back of Curb (TBC).
    c. The minimum depth shall be eighteen inches (18") measured from the bottom of the road base to the top of the pipe.
    d. The minimum vertical separation between a storm drain pipe and other utilities shall be twelve inches (12").

e. The minimum public storm drain main pipeline diameter is fifteen inches (15”) and twelve inches (12”) for laterals collecting runoff from one storm drain inlet.
f. All public storm drain lines within public right of ways shall be reinforced concrete pipe, unless approved by the City Engineer.
g. A storm drain manhole is required for accesses at all pipe transitions including changes in direction, elevation, slope, and pipe size.
h. The minimum slope for a storm drain pipe is 0.40 percent.

5. STORM DRAIN MANHOLES:
    a. Storm drain manholes spacing shall not exceed four hundred feet (400’).
    b. The construction of the storm drain manholes shall comply with the APWA Standard Plan 411.
    c. Storm sewer thirty inches (30”) frame and cover shall conform to APWA Standard Plan 402.
    d. Storm sewer cover collar for storm sewer manhole shall comply with APWA Standard Plan 413.

6. STORM DRAIN INLETS:
    a. A minimum of twelve inches (12”) of separation from flow line of outlet pipe to the floor of the inlet box is required.
    b. Inlet boxes shall be the drop back hood type of inlet box and comply with APWA Standard Plan 315.1 or 315.2.
    c. Inlet boxes should be placed at a distance of no more than four hundred feet (400’) of street curb and gutter.
    d. A double inlet type of boxes shall be installed at low points of vertical curves, downgrade cul-de-sacs or dead end streets and in areas with steep slopes.
    e. The use of combination inlet type of structures is discouraged and allowed as approved by the City Engineer.

7. CULVERTS
    a. The minimum culvert size is eighteen inches (18”) inches in diameter.
    b. Trash racks shall be used where the City determines that there is a high risk of severe blockages.

9. OPEN CHANNELS
    a. Located within a dedicated right of way, drainage easement or equivalent.
    b. Convey a twenty-five (25) year twenty-four (24) hour storm event with a minimum freeboard of one foot (1').
    c. Line with rock or other similar erosion control if velocities are expected to exceed two feet per second (2 fps).
    d. No side slopes steeper than 2H: 1V.

10. HEADWALLS
    a. For any culvert entrance or exit a headwall and concrete apron shall be required to control erosion.
    b. Staked rock with a concrete apron may be used for concrete pipe culverts.

11. EASEMENTS
    a. Minimum twenty-foot (20') wide public utility easements (PUE) are required for all publicly owned and maintained storm sewer main lines located on private property.
    b. Storm drainage easements shall extend ten feet (10') beyond dead end manholes.

12. PRIVATE LOT DRAIN CONNECTION:
    a. Lot drains shall use type SDR35 and the color white PVC for all piping.
    b. Lot drains shall be 4 inch diameter minimum.
    c. A back flow prevention device may be required on lot drain lines as determined by the City.

13. WATER QUALITY:
    a. A pretreatment device is required prior to all connections onto a City system, into an underground detention or retention basin system, which include Class V Injection wells or sumps.
        i. Pretreatment device must meet manufacturer design requirements and the following criteria:
            1. Remove floatable contaminants.
            2. Filter sediments.
            3. Filter hydrocarbons.
    b. Pretreatment manhole shall comply with Payson City Standard Detail 343.

c. Submit a Storm Water Pollution Prevention Plan (SWPPP) for construction activity.
d. Provide a Storm Drainage System Maintenance Agreement for all components of the proposed private drainage system.
    i. The party responsible for executing the maintenance agreement, i.e., homeowners or business association, property owner, etc.
    ii. Extent of the maintenance activities to be performed.
    iii. Frequency of the proposed recordkeeping and reporting of performed maintenance and inspection activities.
    iv. Provide easements to Payson City to access and inspect temporary and permanent storm water controls.

SECTION 7: GRADING

1. GRADING
    a. All site grading of shall comply with the grading requirements of this section, current zoning and subdivision ordinances, and Appendix J of the International Building Code (IBC), latest edition.

2. STREETS
    a. Streets should be designed to match natural grade as much as practical within design requirements.
    b. When the design centerline of new streets exceed two percent (2%) grade, the streets shall be tabled across intersections at a grade that does not exceed two percent (2%) for the consideration of ADA compliant crosswalks.

3. CUTS & FILLS
    a. Imported fill material shall meet the requirements of the geotechnical report.
    b. Fill material shall not include organic, frozen or other deleterious materials. No rock or similar irreducible material greater than twelve inches (12”) in any dimension shall be included in fills.
    c. Cut or fill slopes shall be located within the boundaries of the lots and shall not cross into an adjacent parcel.
    d. Elevation changes between two adjacent parcels exceeding four feet (4’) in height shall use a 2H: 1V slope or a retaining wall.

4. SUBDIVISION LOTS
    a. Drainage across property lines shall not exceed that which existed prior to grading.
    b. Excess or concentrated drainage shall be contained on site or directed to an approved drainage facility. Erosion of the ground in the discharge area shall be prevented by installation of non-erosive down drains or other devices.

SECTION 8: EROSION CONTROL

1. GENERAL
    a. Necessary measures shall be taken to prevent erosion due to drainage at all points in new projects.
    b. During grading and construction, the developer shall control all potential storm runoff so that eroded soil and debris cannot enter any downstream water course or adjoining property.
    c. All drainage that leaves a new project shall be adequately addressed to mitigate all erosion on adjacent properties.
    d. Erosion mitigation shall be permanent unless otherwise approved.

2. UPDES PERMIT
    a. All new construction that disturbs one acre of land or more shall obtain a UPDES Storm Water General Permit for Construction Activities (Permit #UTR300000) before construction begins.
    b. The permit requires the operator, typically the contractor, to control and eliminate storm water pollution sources through the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).
    c. The permit also requires inspection of the BMP controls either:
        i. At least once every seven (7) calendar days, or
        ii. At least once every fourteen (14) days and within twenty four (24) hours of the end of a storm event of one half inch (0.5”) or greater.

3. SWPPP
    a. The Storm Water Pollution Prevention Plan (SWPPP) shall be prepared and submitted to the Development Services Department for review before the contractor can obtain the UPDES permit.
    b. The plan shall include, among other things:
        i. Possible sources of storm water pollutants
        ii. Selection of Best Management Practices (BMPs) to reduce or eliminate pollutant impacts.
        iii. A SWPPP template that addresses all of the information required in the SWPPP can be obtained from the State of Utah Division of Water Quality web site: http://www.waterquality.utah.gov/UPDES/stormwatercon.htm

4. PERMITTING PROCESS
    a. The Operator prepares a SWPPP in accordance with the UPDES Permit.
    b. The Operator Submits SWPPP to City for review.
    c. Once the City has reviewed the SWPPP, the operator applies for the UPDES Permit by completing the Notice of Intent (NOI) form. The form can be completed online at: https://secure.utah.gov/stormwater/main.html
    d. Construction may commence only after:
        i. The SWPPP has been reviewed by the City
        ii. The NOI has been submitted
        iii. The Operator has attended a pre-construction meeting with designated City personnel to review and discuss the SWPPP, and
        iv. All other applicable permits have been obtained from the City.
    e. Once construction has been completed and the site stabilized, the contractor shall complete the Notice of Termination (NOT) form and submit to the Division of Water Quality.

SECTION 9: STREET IMPROVEMENTS

1. STREET
    a. All streets within Payson City shall be designed structurally to conform to the Payson City Transportation Master Plan, AASHTO and MUTCD guidelines.

2. STREET WIDTHS
    a. Proposed street shall have the minimum width for the rights of way. The width is measured from lot line to lot line.
    b. Street widths shall comply with the street classifications as defined by the Payson City Transportation Master Plan.

3. ROAD CLASSIFICATIONS

Type	ROW Width	Minimum CL Radius	Curb Radius	Pavement Width	Park-strip Width	Sidewalk Width
SUB LOCAL	56’	100’	20’	30’	6’	5’
RESIDENTIAL	66’	100’	20’	40’	6’	5’
COLLECTOR	76’	200’	25’	50’	6’	5’
ARTERIAL	86’	500’	35’	60’	6’	5’
INFILL LOTS	Varies	100’	25’	24’	6’	5’
MH ZONES	Varies	100’	25’	24’	6’	5’
A-5-H	Varies	100’	25’	20’	6’	5’

Type	Maximum Grade	Minimum Grade	Curb & Gutter	Pavement Thickness	Road Base Thickness	P.U.E. Width
SUB LOCAL	10%	0.5%	2’	3.5”	8.0”	10’
RESIDENTIAL	10%	0.5%	2’	3.5”	8.0”	10’
COLLECTOR	10%	0.5%	2’	5.0”	8.0”	10’
ARTERIAL	10%	0.5%	2’	5.0”	10.0”	10’
INFILL LOTS	10%	0.5%	2’	3.5”	8.0”	10’
MH ZONES	10%	0.5%	2’	3.5”	8.0”	10’
A-5-H	10%	0.5%	2’	Gravel	8.0”	10’

a. The City Engineer may authorize a new perimeter street and the Developer may be required to improve half of the street width plus ten feet (10') and dedicate the entire required street right-of-way width.
b. The pavement cross section for a public right of way should be based on a CBR value obtained from lab results and recommended by a Geotechnical Engineer.

4. ROAD DESIGN
    a. Sidewalks in areas of high pedestrian traffic shall require greater width as determined by the City Engineer.
    b. Minimum curb return turning radius may increase based on the type of traffic and design vehicles and should be designed according to the AASHTO Design Guidelines, latest edition.

5. GEOMETRIC DESIGN
    a. Streets shall be designed to provide adequate stopping sight distance in accordance with the AASHTO guidelines.
    b. A vertical curve shall be provided in all changes in grade where the algebraic difference is one percent (1%) or greater.
    c. The K value for vertical curve shall be calculated using a twenty five (25) mph design speed for local roads, thirty (30) mph for collector roads, and thirty five (35) mph for arterial roads.

6. INTERSECTIONS
    a. Street intersection centerline offsets shall be no less than one hundred fifty feet (150').
    b. Street intersection horizontal alignment shall be as near to ninety degrees (90°) as possible +/- ten degrees (10°) maximum.
    c. The grade of an intersecting street shall not exceed two percent (2%) and have a fifty foot (50') long tangent minimum.
    d. Intersections should be sloped at an angle no greater than two percent (2%) to accommodate pedestrian crossing. It may necessary to "table" an intersection in new construction areas.
    e. Intersections should not be located on the interior of, or near, sharp curves. Intersections should be located a sufficient distance from all curves to provide

proper sight distance for vehicles on the intersecting road or driveway and on the through road.

f. New intersections with more than four (4) “legs” are generally not permitted.
g. When designing local road networks, block lengths without an intervening connector street shall not exceed eight hundred feet (800') in length unless previous approval has been obtained from the City Engineer. Cul-de-sacs are not considered an intervening connecting street.

7. CUL-DE-SACS
    a. Cul-de-sac shall not exceed **five hundred feet (500’)** in length measured from edge of cross street to center of cul-de-sac.
    b. The turnaround radius (at property line) shall not be less than fifty five feet (55’) for residential areas and sixty five feet (65’) for commercial and industrial areas.
    c. Paved cul-de-sacs with curb and gutter and sidewalk will be required on the permanent end of any city street.
    d. A fire hydrant and street light will be required at the end of the cul-de-sac.

8. SIGNS AND PAVEMENT MARKINGS
    a. All street name and traffic control signs and pavement markings required on the street system within a project or as a result of the project, shall be installed at the developer's expense in accordance with the standard drawings and MUTCD standards.
    b. A signing plan should be submitted with the engineering drawings, however, additional signing and traffic control may be added to the project as determined by the City’s Representative.
    c. Street signs installation shall comply with the APWA Standard Plan 292 and Payson City Standard Detail R11.
    d. Public road signs shall use green background with white letters.
    e. Private road signs shall use blue background with white letters.

9. PAVEMENT
    a. All streets, public or private, shall be surfaced to grade, with asphalt concrete pavement, to the required minimum width and thickness in accordance with these specifications.

b. All streets require a slurry seal coat to be installed no sooner than six (6) months after completion yet prior to release of the warranty bond.

10. CURB& GUTTER/ SIDEWALK/ WATERWAY

a. Curb & Gutter shall be placed on each side of developed streets.
b. A twenty four inches (24") Type E curb & gutter shall be used on all streets. See APWA Plan 205 for design guidelines.
c. Sidewalk shall be placed on each side of developed streets.
d. Sidewalks shall be five feet (5') in width except where other widths are deemed appropriate by the City Engineer and comply with the latest Americans with Disabilities Act requirements (ADA).
e. A maximum grade of five percent (5%), or two percent (2%) greater than the existing/proposed street grade, whichever is less, shall be required as measured along the running length of a meandering sidewalk.
f. Whenever any sidewalk connects with any trails, paths and/or other sidewalks that are larger or smaller in width, a transitional area will be required for design and safety standards.

11. PLANTER STRIPS

a. Planter strips of a minimum six feet (6') in width shall be used in all street cross sections except as determined by the City Engineer. See Payson City Standards and Specifications for design guidelines.
b. Must be landscaped with at least fifty percent (50%), by area of matured plant, of live vegetation.
c. Shall not be filled with any impervious material unless approved by the Public Works Director.
d. Shall be sloped at a minimum of two percent (2%) and a maximum of ten (10%).

12. TRAILS

a. Shared use trails shall be installed in accordance with the Transportation Master Plan.
b. Provide a ten foot (10') wide trail with two and a half inches (2.5") of asphalt over four inches (4") of road base.
c. Meandering trails and sidewalks shall be carefully laid out on the construction plans as follows:

i. Distance between inflection points of meander shall be typically spaced two hundred (200') to three hundred feet (300').
ii. In no case shall the distance be less than one hundred feet (100') unless necessary to avoid an obstacle as approved by the City.
iii. Meander should not curve at a radius less than two hundred feet (200') unless necessary to avoid an obstacle as approved by the Public Works Director.
iv. Additional easements may be required for the placement of meandering sidewalk or trail along the rights-of-way.
v. All pedestrian trails and sidewalks shall conform to ADA standards.

13. CURB SIDE MAILBOXES

a. A. All roadside mail boxes should be installed in accordance with applicable postal standards in the following locations:
    i. In areas where the sidewalk is next to the curb, install boxes eighteen inches (18") behind the sidewalk so as to not encroach into the sidewalk.
    ii. In areas where a planter strip is provided, install mail boxes within the strip, provided no part extends into the sidewalk or beyond the back of the curb.
    iii. In rural areas where no barrier curb is installed, install boxes a minimum clear zone of ten feet (10') from the traveled way should be provided.
b. All mailboxes shall be handicap accessible.

14. TRANSITIONS & TAPERS

a. All streets shall transition with tapers set at a ratio of no less than 15:1.
b. The transition taper area may be installed as a temporary asphalt section with no less than three inches (3") of asphalt over eight inches (8") of road base.

15. CROSS-GUTTERS

a. No cross gutters shall be allowed across major collector or major and minor arterial streets.
b. On commercial and industrial streets, cross gutters are generally not allowed and require approval by the City Engineer for their use.
c. The City Engineer may prohibit construction of cross gutters on any street deemed necessary.

16. CONCRETE COLOR

a. If the Developer chooses to color required curb, gutter, sidewalk, crosswalks, or trails, the color shall be either Davis – Sunset Rose, or Davis 641 – Yosemite Brown.


Sunset Rose


Yosemite Brown

17. SECOND ACCESS REQUIREMENTS

a. A second street access is required under the following conditions:
    i. A project that has thirty (30) or more residential lots.
    ii. Second access spacing must comply with the International Fire Code, Appendix D.

18. ACCESS MANAGEMENT

a. Access to corner lots should be from the lesser-classified road at the greatest distance possible from the intersection.
b. Accesses should be aligned directly with existing access on opposite side of parcel.
c. Where it is not feasible to align driveways, major driveways on opposite side of the street should not be offset less than one hundred feet (150').
d. Where commercial lots are not large enough to allow access on opposite sides of the street to be aligned, the center of driveways not in alignment should be offset a minimum of two hundred fifty feet (250') on all collector streets, and three hundred feet (300') on arterial streets.
e. Greater distances may be required if needed for left-turn storage lanes.
f. Clear sight distance shall be provided for drivers entering or leaving all accesses onto local streets according to AASHTO Guidelines.
g. For corner residential lots, one (1) access on each frontage may be permitted if it is determined by the City Engineer that two (2) driveways are needed to provide

safe access for traffic entering and leaving the lot because of site distance and geometric design considerations.

h. Double frontage residential lots will only have one (1) access onto the lesser classified roadway unless approved by the City Engineer.
i. Circular driveways are considered one (1) access.
j. Single-family residential driveways shall have a maximum curb cut of forty feet (40').
k. Circular driveways should have a maximum curb cut of twenty feet (20') per side.
l. Right-turn deceleration lanes:
    i. Minimum requirements for installation of a right-turn lane on a collector or arterial road that is thirty five (35) mph or less is fifty (50) vehicles per hour (vph).
    ii. For greater than thirty five (35) mph, right-turn traffic of twenty five (25) vehicles per hour (vph) or more would require a right-turn deceleration lane.
    iii. Taper lengths and storage lengths of these lanes shall comply with AASHTO's Policy on Geometric Design of Highways and Streets.
    iv. Based upon safety and operational studies, median treatments such as Two-Way-Left-Turn Lanes (TWLTL) and Raised Non-Transferable medians may be required on arterial streets, as determined by the City Engineer and the Transportation Master Plan.
    v. New access locations created by development shall be unified whenever possible to create the fewest number of access points onto arterials or major collectors.
    vi. Joint use or shared access agreements shall be required where necessary.

19. TRAFFIC STUDY

a. A Traffic Impact Study may be required based on the size, location, and type of proposed project.
b. Items considered in a Traffic Impact Study shall include:
    i. A study of existing traffic conditions.
    ii. A traffic analysis of the existing traffic conditions plus the number of trips, according to the ITE Trip Generation Manual, generated by the proposed development.
    iii. Traffic analysis on adjacent signalized intersections.

iv. On and off site improvement analysis, conclusions, and recommendations.

SECTION 10: POWER AND LIGHT

1. REQUIREMENTS FOR NEW PROJECTS
    a. Conduit, wiring and streetlights shall be installed at the Developer's expense in all new and proposed project areas.
    b. Those projects areas will be lighted in accordance with a written plan that addresses intersections, public facilities, trails and crosswalks.
    c. Developer may purchase their own materials for the project. A copy of the material bids must be submitted to the Development Services Department before they are purchased to be sure they meet Payson City Standard Technical Specifications.
    d. Developer has the option of purchasing all the materials from the Payson City Power Department.

2. TRENCHING
    a. The Developer is required to do all the trenching, installation of conduits, set transformers sleeves, hand holes, etc.
    b. The Developer is required to supply and install all secondary wires, connections.
    c. Payson City will set the transformers, pull primary wires, terminate high voltage equipment and energize the system.

3. STREET LIGHTS
    a. Street lights that are in the right of way are set by the contractor and wired to power sources.
    b. Light fixtures and poles will be purchased from the Payson City Power Department.

4. TRENCH AND CONDUITS
    a. Trench located two feet (2') behind the sidewalk and within a Public Utility Easement.
    b. Trench located four feet (4') deep minimum measured from the top of the conduit to the final grade.
    c. Warning tape placed two feet (2') above power conduit.
    d. All 90° bends need to be thirty six inches (36") sweeps PVC or fiberglass.

e. Road crossing sleeves for power are seventy feet (70') minimum and need to be in line two feet (2') back of sidewalk.
f. Communication equipment is located on a different property corner other than power.
g. Electrical conduit is gray schedule forty (40) PVC.
h. Communication conduit use a color other than gray.
i. Gravel one inch (1") minus must be installed under all electrical sleeves and equipment with at least six inches (6") around them.
j. The Developer is responsible for all secondary wires, conduits, and connections.
k. The Developer is required to set transformer box four inches (4") to six inches (6") above grade. Hand holes to be places one inch (1") to two inches (2") above final grade.
l. The Developer is required to supply all secondary wires and connections. Payson City will set transformers, pull primary wire, terminate high voltage equipment, and energize the system.
m. Conduit inside all equipment and sleeves need to be two inches (2") above the inside gravel base with Bell end couplings.
n. One 5/8" x 8' ground rod installed in transformers and sectionalizers.
o. Two 5/8" x 8' ground rods installed in switches in opposite corners four inches (4") above inside base grade.

SECTION 11: GEOTECHNICAL INFORMATION

1. MINIMUM INFORMATION REQUIRED
    a. Project plan showing boring locations
        i. Boring logs shall include the following:
            1. Elevation
            2. Drill or backhoe type
            3. Samples
            4. Field tests
            5. Groundwater level fluctuations
        ii. Laboratory Test – Performance in general accordance with ASTM
            1. Sieve analysis
            2. Atterberg Limits
            3. CBR values (not assumed but calculated via lab test)
            4. Direct Shear
            5. Consolidation
            6. Identify soils according to USCS
            7. Moisture density curve (s)
        iii. Engineer Analysis and recommendations
            1. Foundations and retaining walls:
                a. Allowable bearing capacity
                b. Lateral loads friction coefficients
                c. Settlement
                d. Drainage – backfill of trenches information
                e. Seismic loading
            2. Pavements
                a. Traffic load analysis including construction heavy traffic
                b. Subgrade support value (CBR value calculated in the lab)
                c. Concrete and/ or asphalt pavement thickness
            3. Special considerations
                a. Site preparation
                b. Expansive soils
                c. Collapsible soils
                d. Slope stability
                e. Rock fall

f. Shallow ground water level
    i. Foundation drainage
    ii. Construction of basements
g. Surcharge/ preloading
h. Identification of geologic hazards

b. The number and depth of borings/pits for each specific project shall be determined by the geotechnical engineer. However, as a minimum, the depth should be deeper than any anticipated excavation (cuts, foundations, utilities, etc.).
c. The number of borings shall be determined by the geotechnical engineer/geologist and shall be compatible with the complexity/simplicity of the geology, subsurface conditions and the type of project.
d. Following the construction of the utilities in the street(s) within the project and prior to the final paving of the street(s), the Developer must submit written documentation from the consulting Geotechnical Engineer, the Design Engineer and the Contractor, indicating that each have received and read the Geotechnical Report and have incorporated the recommendations into the design and construction of the project.

2. USE OF FILTER FABRIC FOR STREET CONSTRUCTION
    a. Normal woven or non-woven filter fabric is a viable material to use when a separation layer is needed over a soft subgrade and beneath granular fill. These materials provide some minor reinforcing for supporting loads, but primarily act to prevent the movement of many fines up into the overlying crushed base or other clean granular material.
    b. If reinforcement of soft subgrade is desired, a geo grid should be designed for the intended purpose.

3. FLOWABLE FILL
    a. Utility excavations and subsequent backfill are the source of many problems for paved streets. It is extremely difficult to nearly impossible to place the utility, and backfill the trench, so that some subsequent differential settlement does not occur at the pavement surface. Costs associated with supplying, placing in lifts and compacting conventional backfill materials is high and results are unsatisfactory to marginal. Therefore, “flowable fill” is a preferential backfill alternative for

utility installations beneath paved streets where hydraulic equipment is difficult to use such as a trench narrower than thirty six inches (36”).

4. TRENCHLESS TECHNOLOGY
    a. Trenchless technology/directional drilling is encouraged for many utilities placed beneath streets without making a pavement utility cut. This procedure should be used whenever feasible.

SECTION 12: PAYSON CITY STANDARD DETAILS