



# GRANTSVILLE CITY PRELIMINARY APPLICATION CHECKLIST

**Please note that our processes are being continually improved. Verify that you are using the most updated version of the checklist.**

**Note: Any Variances outside of Grantsville Land Development Code shall require a Planned Unit Development (PUD) application approval prior to submitting for preliminary plan application.**

The applicant must submit copies of the preliminary subdivision plans to be reviewed by the City in accordance with the requirements as outlined in the City code. Once a set of preliminary plans are submitted, they are subject to a compliance review and may be returned to the applicant for revision if they are found to be inconsistent with basic requirements of the City code. A land surveyor or engineer licensed to practice in the State of Utah shall prepare the Preliminary Plan. All engineering and/or surveying documents submitted for City review shall be stamped by said engineer or land surveyor in accordance with the procedures of the Utah State Board for Professional Registration. If the plans contain more than one sheet, the sheets shall be numbered sequentially and clearly indicated on each sheet. The following information, at a minimum, shall be included with the application for Preliminary Application Approval (*additional information may be required by the Staff, Planning Commission or City Council*). The lack of information under any item specified herein, or improper information supplied by applicant, shall be cause of an incomplete application and disapproval of a Preliminary Plat. All plans must be submitted three weeks in advance of the meeting date. Anything submitted after this deadline may not be included in the presentation.

**Meetings:**

City Council meetings are held the 1<sup>st</sup> & 3<sup>rd</sup> Wednesday of each month at 7 p.m.  
 Planning Commission Meetings are held the 1<sup>st</sup> & 3<sup>rd</sup> Thursday of each month at 7 p.m.

Submit application online at:  
<https://grantsvilleut2.portal.iworq.net/portalhome/grantsvilleut2>  
 (All submittal information can be obtained on this website.)

**Information you will need to apply:**

<b>Project Information</b>	<b>Zoning:</b>
Name:	Total Lots:
Address:	Lot Size:
Date of Preparation:	Acres:
Date of Submission:	Open Space:

<b>Developer Information</b>	
Company Name:	Contact:
Address:	City, State, Zip:
Phone:	Alt. Phone:
Email:	Fax:



Engineer and/or Surveyor Information	
Company Name:	Contact:
Address:	City, State, Zip:
Phone:	Alt. Phone:
Email:	Fax:

**1. A complete Preliminary Plan Application must consist of the following:**

1.1 Submission online at - <https://grantsvilleut2.portal.iworq.net/portalhome/grantsvilleut2> as per Sections 2 and 3 on this checklist, **2. Items to upload to the Iworq Portal with your application** and **3. Items to be shown on the Preliminary Plans.**

1.1.1 The Iworq Portal application site has a maximum file size of 25MB. If the Preliminary Plans file is larger than 25MB, please email Zoning Administrative Assistant at [jbassett@grantsvilleut.gov](mailto:jbassett@grantsvilleut.gov).

1.2 A **Radius Report** obtained from Tooele County Recorder's office, **self-sealing envelopes, mailing labels and first-class postage** for all property owners located within 500 feet of subject property boundary. A **plat map** from the recorder's office (this will be included with radius report from the County) showing the property and all adjoining properties around it. **DO NOT PUT MAILING ADDRESSES ON ENVELOPES! THANK YOU! Addresses must be from Tooele County Recorder's Office!** This can be ordered online at <https://tooeleco.org/government/elected-officials/recorder-surveyor/>.

**2. Items to upload to the Iworq Portal with your application:**

Files need to be in PDF format and file name needs to follow this standardized format to facilitate a rapid check of application for completeness. Failure to do so may result in a delay in acceptance of the application.

File name format: the **bolded** word from the checklist followed by a hyphen then the name of the development (i.e. ownertitle-development.pdf).

2.1 Proof of ownership demonstrated by one copy of a title report and vesting documents of conveyance completed within the previous six months (**ownertitle**).

2.2 Tax clearance from the Tooele County Assessor indicating that all taxes, interest and penalties owing for the property have been paid (**tax**).

2.3 Intent to Serve - Utility Approval forms (**serve**).

2.4 Approval of the subdivision name from the Tooele County Recorder's office (**subname**).



- 2.5 Site analysis map as specified in Section 21.1.13 (**analysismap**).
- 2.6 Geologic technical maps and investigation reports regarding area suitability (**geotech**).
- 2.7 Water and Sewer system to be modeled by City Engineer and a \$1,500.00 fee will be collected for each service to be modeled including AUTOCAD files (**wsmodel**).
- 2.8 A traffic study is required for all major subdivisions and commercial projects and shall be completed by a licensed engineer. A traffic study shall include trip generation, trip distribution on connecting streets and roadway capacity. Subdivisions and commercial projects with over 100 peak hour trips shall complete a traffic impact study in accordance with Institute of Transportation Engineers recommended standards (**trafficstudy**).
- 2.9 Development phasing schedule, if applicable, including the sequence for each phase, approximate size in area of each phase, and proposed phasing of construction of all private and public improvements (**phasing**).
- 2.10 Submit a preliminary Storm water pipe and basin calculations per the City storm water documentation (**stormwatercalc**).
- 2.11 Recorded Record of Survey document for all parcels/lots being developed (**survey**).
- 2.12 If the development is not being connected to the City drinking water or sewer system, a letter showing a completed Tooele County Health Department Subdivision Feasibility Study deeming the project feasible (**countyhealth**).
- 2.13 A copy of the State Highway Access permit or Railroad Crossing permit when a new street will connect to a State highway or will cross a railroad, along with any design requirements as established by the Utah Department of Transportation (**statepermit**).
- 2.14 If the applicant is not the owner of record, a notarized statement that the applicant has been authorized by the owner to submit the application (**authorizedowner**).



**3. Items to be shown on the Preliminary Plans:**

Plans shall be on 11-inch x 17-inch plans.

- 3.1 A cover sheet which contains the following information:
  - 3.1.1 A vicinity location map showing the location of the development as part of a larger tract and the relative location to streets (must include offsite major intersections and 2000 foot minimum around the proposed development) and other geographic features.
  - 3.1.2 A vicinity map listing major streets, North arrow, scale, highlighting of the proposed property, etc.
  - 3.1.3 Name and approximate address of the proposed development. Verify the name is unique in Tooele County. County, Township, Range, Section, Quarter Section, blocks, the number of lots, principal meridian and true North.
  - 3.1.4 Name, address, phone number(s), and email of the developer, engineer, and surveyor.
  - 3.1.5 Boundary lines of the tract to be subdivided in heavy lines. The creation of nuisance strips will not be permitted.
  - 3.1.6 North arrow, scale bar, and print date.
  - 3.1.7 The acreage of the entire tract, the acreage of the portion to be developed, and the size of each lot.
  - 3.1.8 The areas for which approval will be requested for the different phases of development, if part of a larger development.
  - 3.1.9 Index of sheets.
  - 3.1.10 Signature blocks for Consultant Engineer's / City Engineer / Public Works.
  - 3.1.11 List of details being used (unless the details are in the plans).
  - 3.1.12 Temporary and permanent benchmarks and horizontal control points including their descriptions (per the latest Tooele County survey information).
- 3.2 A preliminary plan / site analysis which contains the following information:
  - 3.2.1 An area plan showing the total area on a single sheet, for subdivisions requiring more than one sheet at the required scale.



- 3.2.2 Show plan sheets at 10 to 40 feet per 1-inch.
- 3.2.3 Identify any multi-family dwellings, shopping centers, community facilities, commercial, industrial, or other uses exclusive of single-family dwellings.
- 3.2.4 Location and dimensions of all existing and proposed streets (lot/road layout), buildings, and exceptional topography within the tract and the surrounding 100 feet or full street width including intersections, whichever is greater.
- 3.2.5 Property boundaries of all proposed lots. The creation of nuisance strips (not meeting minimum lot requirements) will not be permitted.
- 3.2.6 Location and dimensions of existing and proposed irrigation features, and other waterways/ creeks within the tract and within the surrounding 100 feet.
- 3.2.7 Show the location of any areas of potential flood hazard within 200 feet of the subdivision (include creeks, drainage pipes, etc.).
- 3.2.8 Total Development Area, the number of proposed dwelling units/commercial lots.
- 3.2.9 Locations and dimensions of all proposed parks and open spaces.
- 3.2.10 Show all Easements (existing and proposed) and Rights of Way (existing and proposed). Roadway dedications to the City should be written as follows: "Dedicated to Grantsville City as ... (type of dedication)". Label the square feet of the area being dedicated.
- 3.2.11 All conservation areas labeled by type.
- 3.2.12 Parcels of land that will have a conservation, drainage easement, or are to be dedicated for schools, roads, parks, or other public purposes shall be shown on each preliminary improvement plan.
- 3.2.13 Property owners' names and parcel numbers of both the adjoining properties and those within the subdivision.
- 3.2.14 A plan showing how adjacent undeveloped property may be developed in the future.
- 3.2.15 Show all ponds, wetlands and other hydrologic features (existing and proposed).



- 3.3 A preliminary street improvement plan which contains the following:
  - 3.3.1 Property boundaries of all proposed lots.
  - 3.3.2 Proposed streets and existing streets (plan view), sidewalks, curbs and gutters, and ADA curb ramps. Identify the widths, horizontal curve radii, slope, and direction of slope for all items listed. Curb returns shall meet minimum radii requirements defined in Grantsville City Standard Drawings.
  - 3.3.3 Typical cross sections of all streets within and adjacent to the development showing the width, type, and thickness of the pavement design. Thicknesses should be as presented in the Geotechnical report, or per City minimum requirements, whichever is greater.
  - 3.3.4 Clearly label the existing features as to “remain” or “be removed”.
  - 3.3.5 Temporary dead-end streets, longer than 150 feet, shall conform to Grantsville City Standard Drawings with turn-arounds.
  - 3.3.6 Cul-de-sacs require a minimum pavement diameter of 96 feet (IFC Appendix D103.1) and meet all requirements of the Street Standards ordinance for cul-de-sacs.
  - 3.3.7 Location of street signs, stop signs, street markings, and street lights.
  - 3.3.8 Show street names (existing and proposed).
  - 3.3.9 A traffic study shall be provided as stated in city code 21.4.5 (p):
    - (p) A traffic study is required for all major subdivisions and commercial projects and shall be completed by a licensed engineer. A traffic study shall include trip generation, trip distribution on connecting streets and roadway capacity. Subdivisions and commercial projects with over 100 peak hour trips shall complete a traffic impact study in accordance with Institute of Transportation Engineers recommended standards.
  
- 3.4 A preliminary grading plan which contains the following:
  - 3.4.1 Property boundaries of all proposed lots.
  - 3.4.2 Existing elevations shown by light (gray scaled) dashed contours. Labeled contours with elevations to extend 25 feet beyond the project limits.
  - 3.4.3 Label the location and elevation of the benchmark for the project. The elevations must be tied to a found USGS datum (based on Tooele County benchmark information).



- 3.4.4 Clearly label the existing features as to “remain” or “be removed”.
- 3.4.5 Design elevations represented by solid contours using 2-foot intervals for average slopes less than 25 percent and 5-foot intervals for average slopes greater than 25 percent. In flat areas 1-foot intervals may be required. The contours must be labeled with elevations (spot elevations to be placed as needed for clarity).
- 3.4.6 Roadways must show slope arrows as to direction of proposed slope. [No detailed street grading information (i.e. TBC, PC/PT, elevations etc.) needed until final plans.]
- 3.4.7 House plan finished floor elevations. Indicate retaining walls necessary to ensure water does not run to adjacent lots. (Drainage swales to the street and around the house are required for final.)
- 3.4.8 Proposed driveway locations required for all lots (that have 60 foot of frontage or less).
- 3.4.9 Calculate the approximate size of the retention basin-based rational method of drainage, percolating within three days after the storm, overflow release location to not impact neighboring properties.
- 3.4.10 Show flood elevations and the location of any areas of potential flood hazard within the boundary of the subdivision (include creeks, drainage pipes, etc.).

**No other information/infrastructures are to be shown on the grading plan.**

- 3.5 A preliminary drainage plan which contains the following:
  - 3.5.1 A Geotechnical report including percolation calculations.
  - 3.5.2 Provide a drainage report and utilize calculated vertical percolation rates to determine infiltration rate. City Engineer will cross-reference vertical percolation rates, with typical design infiltration rates, with a factor safety of 2 based on NRCS soil classifications at the bottom of retention/detention basin.
  - 3.5.3 Property boundaries of all proposed lots.
  - 3.5.4 Calculate the approximate size of the detention/retention basin-based rational method of drainage, percolating within three days after the 10-year storm return interval (10% chance), 24-hour duration storm, overflow release location to not impact neighboring properties.
  - 3.5.5 Show the location of any areas of potential flood hazard within the boundary of the subdivision (include creeks, drainage pipes, etc.).



- 3.5.6 Clearly label the existing features as to “remain” or “be removed”.
- 3.5.7 Location, size, type, length, and grade of proposed and existing drainage features within 100 feet of the development or to the next manhole, whichever is greater. Show drainage direction in plan view.
- 3.5.8 Storm Drain Manholes being placed at 400-foot maximum intervals, inlets, catch basins, stubs, and plugs. All lines **MUST SHOW** flow arrows indicating direction of flow.
- 3.5.9 Max surface flow to SD inlet shall not be more than 500 feet.
- 3.5.10 Any existing drainage features conveying water though the property shall be in open sized ditches with rip-rap protection sized for the volume and flow of the 100-year storm return interval (1% chance), 24-hour duration.
- 3.5.11 Parcels of land that will have a conservation or drainage easement are to be dedicated to Grantsville City.
- 3.6 A preliminary pressurized irrigation plan (if applicable) which contains the following:
  - 3.6.1 Property boundaries of all proposed lots.
  - 3.6.2 Location and size of proposed and existing pipes, valves, air inlet and removal facilities, irrigation drains, and temporary blow offs, etc. within 100 feet of the development. Irrigation pipes lines should be located 4 feet from the lip of gutter on the opposite side of the street from the SD pipe.
  - 3.6.3 Clearly label the existing features as to “remain” or “be removed”.
- 3.7 A preliminary sanitary sewer plan which contains the following:
  - 3.7.1 Property boundaries of all proposed lots.
  - 3.7.2 Location, size, and type of proposed and existing pipes within 100 feet of the development. The edge of the sewer pipe shall be located approximately 5 feet off street centerlines on the downhill side of the street.
  - 3.7.3 Clearly label the existing features as to “remain” or “be removed”.
  - 3.7.4 Flow arrows shall be shown on all lines.
  - 3.7.5 Manholes being placed at 400-foot maximum intervals, grease traps, and stubs. A minimum of 4 feet of cover over all pipes and 4 feet of cover over pipes at any property boundary.





- 3.8 A preliminary drinking water plan which contains the following:
  - 3.8.1 Property boundaries of all proposed lots.
  - 3.8.2 Location and size of proposed and existing pipes within 100 feet of the development.
  - 3.8.3 Clearly label the existing features as to “remain” or “be removed”.
  - 3.8.4 Main lines’ edge of pipe shall be located approximately 5 feet off street centerlines on the uphill side of the road. Water lines shall be located a minimum of 10 feet from all other wet utilities (between edge of pipes).
  - 3.8.5 Location of proposed and existing meters, valves, hydrant blow offs, temporary blow offs, stubs, plugs, etc.
  - 3.8.6 Proposed fire hydrants. Spacing should be 500 feet between fire hydrants as measured by hose length being laid within the City Right of Way.
  - 3.8.7 Sufficient number of valves (one in each direction at waterline intersections) shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at not more than 500-foot intervals in commercial districts and at not more than one block or 800-foot intervals in other districts.
  
- 3.9 A detail sheet which contains the following:
  - 3.9.1 All non-standard details for unique situations in the development plans.
  
- 3.10 A preliminary landscape plan which contains the following:
  - 3.10.1 Property boundaries of all proposed lots.
  - 3.10.2 General Vegetation Characteristics (existing and proposed).
  - 3.10.3 The planned location of protected open spaces.
  - 3.10.4 Potential connections with existing green space and trails.
  - 3.10.5 Clearly label the existing features as to “remain” or “be removed”.
  - 3.10.6 Note areas to be water wise landscaping (low volume of irrigation water required).

**\*Approved plans to be stamped and saved in the file.**



**4. Items to be submitted after DRC meeting:**

- 4.1 A PDF of the complete corrected set of the Preliminary Plat with the corrected set of the design as detailed in section 21.2.8 & 21.2.2.9 (second set of the revised plans with revisions resulting from the DRC changes; make sure that the dates on the plans are updated) (there will be a 14-day review).
- 4.2 A PDF and ACAD file of the Preliminary Plat site plan including but not limited to parcel boundaries, street right-of-way, proposed lot lines, proposed parks, trails, open space, locations of natural features to be preserved, drainage corridors and basin locations (on a flash drive) (second set of the revised plans).

**SPECIAL NOTE**

The Preliminary Plan approval shall be valid for a period of not more than six (6) months. The applicant or authorized representative may obtain no more than two (2) six-month (6) extensions by petitioning the Planning Commission. The Planning Commission may not grant any extension of a Preliminary Plan without substantial progress having been demonstrated by the applicant or authorized representative.

**Water Application Submitted to City Recorder:** See City Recorder for water requirements.



# Intent To Serve Form

Date submitted: \_\_\_\_\_

Name of Owner:
Name of Agent or Representative:
Property Address or Location (Attach Map):
Assessor's Parcel Number:
Proposed Lots/ERC's:
Signature of Owner or Agent:

## Approving Agency: Grantsville City Public Works Department

This Intent to Serve form is part of the water, sewer, and roads connection process. Please note, Grantsville City will provide water, sewer, and street connection services to a residential or commercial building project **provided** there is sufficient ability to serve, if fees are paid on time, and if all steps are completed in accordance with City, State, and Federal regulations. Utility modeling must be submitted to determine the impacts to the City's systems. Traffic impacts and any environmental impacts must also be considered and summarized for review. Intent to Serve approvals issued will be honored for a period of one calendar year from the date signed by an authorized signor for Grantsville City.

All excavations are required to meet Grantsville City specifications for back fill materials and compaction. Excavations will be inspected by Grantsville City prior to and during backfill operations.

Any approval rendered under this permit does not imply approval to cross any private property or right-of-way and pertains to Grantsville City rights-of-ways and/or easements. Approval under this application is in accordance with all laws and ordinances of the State of Utah and Grantsville City.

Applicant is responsible for determining ownership of right-of-ways and easements.

Utility	Approved	Disapproved
Water		
Sewer		
Roads		

<b>Additional comments:</b>

X

James Waltz  
Public Works Director, Grantsville City

X

Date Signed



# GRANTSVILLE CITY

## STORM DRAINAGE DESIGN GUIDELINES

### 1. Storm Water Collection System Requirements

#### a) Design Storms

- i. The storm water pipe collection system shall be designed to convey the 24-hour duration – 10-year storm water event if continuous pathway to the Great Salt Lake. Collection systems for basin and street shall be sized for the 24-hour duration – 100-year storm water event when discharging to a detention /retention basin.

#### b) Storm Water Runoff into Street Encroachment Requirements

- i. Flow from the 10-year storm shall not extend more than halfway into the travel lane adjacent to the curb and a minimum 12-foot wide travel lane shall be maintained for emergency vehicles. If there is a curb then no more than 8-feet from the curb face.

#### c) Easement and Access Requirements

- i. Easement widths and access for drainage channels, detention basins, lots line swales, and public storm drainage lines shall be reviewed and approved by the City Engineer.

#### d) Acceptable Pipe Materials

- i. Acceptable pipe materials include corrugated HDPE with smooth interior, corrugated PVC with smooth interior, and reinforced concrete pipe (RCP). Corrugated metal pipe (CMP) is not acceptable for public improvements.

#### e) Minimum Pipe Diameter

- i. The minimum pipe diameter for any public storm water collection system pipe is 15-inches.

#### f) Manhole Spacing

- i. Minimum manhole spacing is 400-feet from pipes 21-inch diameter, unless otherwise approved by the City Engineer.

#### g) Manhole Drops

- i. A minimum drop of 0.10feet is required at all storm drainage structures between the inlet and outlet pipe. Where changes in pipe sized occur in a manhole the inlet pipe crown must match the larger outlet pipe crown.

#### h) Cover

- i. Minimum cover is 18-inches or 6 inches below the pavement section which ever is greater. Unless approved by City Engineer

#### i) Catch Basin Requirements

- i. Catch basins will not be allowed on the radius of curves at intersections.
- ii. Flow through catch basins shall not be allowed unless designed as a combination box with manhole lid access.
- iii. A snout or similar oil/debris/water separator is required prior to a detention basin, retention basin, or any other discharges from a development into a public drainage.

#### j) Detention/Retention Basin Requirements

- i. Maximum water level depths greater than 3-feet are required to have a 4-foot minimum fence around the basin to prevent animals and children from being harmed in the basin.



- ii. Project needs to address the frontage storm water as part of the project.
- iii. Retention basins shall completely infiltrate and drain within 72-hours from the beginning of a storm event for vector control. Percolation tests shall be completed for all infiltration basins and submitted with drainage calculations to the City for review.
- k) Manning's n Values
  - i. n value for linings shall be determined per an approved Engineers Manual based on size and placement of materials. Calculations shall include the reference used for the n value for review by the City Engineer.
- l) Rip-rap Sizing
  - i. Channel Riprap sizing calculations shall utilize the *Truckee Meadows Regional Drainage Manual* dated April 30, 2009 (see [https://www.washoecounty.gov/csd/engineering\\_capitalprojects/files-engineering-capital-projects/tmrdm\\_final\\_043009.pdf](https://www.washoecounty.gov/csd/engineering_capitalprojects/files-engineering-capital-projects/tmrdm_final_043009.pdf))
- m) Erosion Control
  - i. The developer would need to provide a copy of their Erosion Control Plans, SWPPP, Notice of Intent (NOI), and Notice of Termination (NOT) with the State if their construction project is greater than 1 acre.

**2. Hydrology Requirements**

- a) Rainfall Data
  - i. NOAA Atlas 14 shall be used for rainfall in the City of Grantsville (see [https://hdsc.nws.noaa.gov/hdsc/pfds\\_map\\_cont.html](https://hdsc.nws.noaa.gov/hdsc/pfds_map_cont.html))
- b) Design Storms
  - i. Detain 100-year 24-hour storm for project site
  - ii. For the West Bank drainage areas draining into your project you may discharge at the following rates until the 100-year storm volume that shall perc in 3 days:

**Table 1: Recommended Unit Discharge Requirement for the Baker and Pope Watersheds**

<b>24-hour Duration Storm Event</b>	<b>Baker and Pope Watershed Peak Unit Discharge (cfs/acre)</b>	<b>All Other Watersheds Peak Unit Discharge (cfs/acre)</b>
10 year	0.003	0.05
100 year	0.01	0.15

Source: Table 17 in Section 5 from the Storm Water Management Study for Baker and Pope Watersheds dated April 2015 by AQUA Engineering

- iii. Refer to Figure 1 for a map of Baker and Pope Watersheds.

**3. Drainage Report Requirements**

- a) If discharge will be above the allowed discharge per area rates shown on Table 1 then a pre and post development hydrologic analysis will be required showing flows will not cause a negative affect downstream. The Rational Method ( $Q=CiA$ ) may be used in computations for the rate of runoff for urban and small watershed 100 acres or less.
  - i.  $Q$  = peak rate of runoff, cubic feet per second



- ii. C = runoff coefficient
- iii. i = average rainfall intensity, inches per hour
- b) The SCS method, SCS TR-55 “Urban Hydrology for Small Watershed”, HEC-1/HEC-HMS, or other methods shall be used for larger watersheds.
- c) Table 2 shall be used for runoff coefficients.

**Table 2: Runoff Coefficients**

Land Use Type	Runoff Coefficients “C”
Rural	0.25-0.35
Single Family Residential	0.45-0.60
Multi-Residential	0.60-0.70
Neighborhood Commercial	0.85
Community Commercial	0.85
Tourist Commercial	0.85
Office	0.85
Manufacturing	0.85-0.90
Distribution and Warehousing	0.85-0.90
Public Facility	0.50-0.85
Pavement and Concrete Surfaces	0.90-0.95
Park	0.25
Open Space (0-5% grade – vegetated)	0.20-0.30
Open Space (0-5% grade – no vegetation)	0.30-0.40
Open Space (5-15% grade – vegetated or unvegetated)	0.40-0.50
Open Space (Over 15% grade – sparsely vegetated, rock or clay soils)	0.40-0.60

- i. Weighted values of the runoff coefficient “C” may be required where land use is most accurately described as a mixture of the land uses listed above or where it is a mixture of pervious and impervious areas and not represented by a single entry in **Table 2**
- d) Intensity-Duration-Frequency curves for NOAA Atlas 14 shall be used for determining the applicable intensity. (see [https://hdsc.nws.noaa.gov/hdsc/pfds/pfds\\_map\\_cont.html?bkmrk=ut](https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ut))
- e) Definition for Time of Concentration
  - i.  $t_c = 10 \text{ or } \frac{L}{V \times 60}$  whichever is greater
    - $t_c$  = initial time of concentration at inlet, minutes
    - L = length from uppermost point of watershed inlet, feet
    - V = channel or overland velocity, feet per second
  - ii. Given the time of concentration at a design point, the time of concentration at the next design point is determined by adding travel time, expressed as:



iii.  $t = \frac{L}{V \times 60}$  .

t = travel time, minutes

L = length of channel or conduit between design points, feet

V = channel or conduit, feet per second

#### 4. Submittal Requirements for Drainage Drawings and Report

##### a) Project Drawings

- i. Hydraulic grade line (HGL) profiles, (see sample sheet).
- ii. Location and size of all existing and proposed structures.
- iii. Proposed materials.
- iv. Pertinent elevations and slopes.
- v. Pipe capacity and 10-year and 100-year flows and velocities.

##### b) Drainage Report – The following standards apply to the Drainage Report (public and private).

###### 1. Title Page:

- a. Project name.
- b. Preparer's name, firm, date.
- c. Professional engineer's seal of preparer and signature.

###### 2. Introduction:

###### a. Site location:

- i. Street location, parcel number(s), and section reference.
- ii. Adjacent developments.

###### b. Site description:

- i. Topography, ground cover, etc.
- ii. Existing drainage facilities, major drainage facilities, flood hazard areas, irrigation ditches, other site conditions that must be considered.

###### c. Proposed project description.

###### d. Other previous studies relevant to site.

###### 3. Historic drainage system (discuss the following):

###### a. Major basins and offsite contributions:

- i. Relationship to major drainage facilities.
- ii. Major basin drainage characteristics (topography, runoff, cover, use, erosion, etc.).

###### b. Sub-basin and site drainage (1 and 2 may be tabulated on map):

- i. Minor (10-year) and major (100-year) storm flows for each sub-basin affecting the site.
- ii. Existing drainage patterns: channelized or overland flow, point of discharge, etc.
- iii. Effect of historic flows on adjacent properties.

###### 4. Proposed (developed) drainage system (discuss each of the following):

###### a. Criteria:

- i. Size of major basins, tributary sub-basins, and other offsite contributions.
- ii. Hydrologic method to be used for analysis (Rational, SCS, etc.).
- iii. Design storm intensities (minor 10-year, major 100-year) or as required by the City Engineer.

###### b. Runoff and other contributions:

- i. Historic storm flow rates and paths.



- ii. Developed storm flow rates and paths for minor and major storms.
- iii. Contributions added from open joined system.
- iv. Demonstrate that flows are routed to a public system with adequate capacity.
- c. Piping:
  - i. Demonstrate the capacity of the storm drain system, including all downstream improvements.
  - ii. Verify storm flows from inlets to ultimate outlets of the drainage system.
- d. Retention system including:
  - i. Volume required to hold 100-year storm with 1-foot freeboard minimum.
  - ii. Show the overflow location for volumes over the 100-year storm.
  - iii. Passage of storms exceeding the 5-year up to the 100-year.
  - iv. Engineer to provide detailed description of downstream constraints (or none) and design calculations on how to mitigate the problem.
  - v. Need for detention shall be clearly identified in the preliminary or schematic report and the necessary detention area shall be identified on preliminary plans.
- e. Streets (This information may be shown on the plans.):
  - i. Depth and velocity of flow for major and minor storms. Demonstrate that a 12-foot clear lane exists for emergency vehicles at all times.
  - ii. Drainage system.
- f. Open channel flow (This information may be shown on the plans.):
  - i. Type.
  - ii. Depth and velocity.
  - iii. Freeboard.
  - iv. HEC-RAS analysis when required by the City Engineer.
- g. Storm drains and culverts (Show all data on plans.)

## 5. Areas within flood hazard zone when applicable

- a) Impacts.
- b) Protection.
- c) Compliance with Federal Emergency Management Administration (FEMA) requirements, RMC 18.12 "Flood Hazard Areas", and critical flood zones. Show existing and proposed CLOMR and LOMR information, and show status of submittal and review process.

## 6. Conclusions

- a) Benefits
- b) Adverse effects with solutions for mitigation of impacts

## 7. Appendices

- a) Hydrologic and hydraulic computations:
  - i. List and explain basin assumptions and input factors used
    - 1) Tabularized and/or discussed as necessary.
    - 2) Indicate any sensitivity analysis performed.
    - 3) Include source tables and references for parameters, such as soil groups, SCS curve numbers, C values, n values, etc.
  - ii. Historic runoff:
    - 1) Off-site.
    - 2) On-site.





- iii. Developed runoff:
    - 1) Off-site – Flows that have been concentrated into one area from the project shall not flow higher than the project flow in that area.
    - 2) On-site.
  - iv. Detention for up to the 100-year storm.
  - v. Hydraulic computations:
    - 1) Hydraulic grade line (HGL) minor storm.
    - 2) Hydraulic grade line (HGL) major storm.
    - 3) Inlet/outlet calculations.
  - vi. Rip-rap sizing.
- b) Drainage plan:
- i. Site drainage plan:
    - 1) Show the existing and proposed contours for the property.
    - 2) The site drainage plan may be at the same scale as the grading plan but must meet legibility requirements for scanned documents. Show all sub-drainage areas per catch basin or channel and tabulate existing and proposed drainage showing length, assumed velocity and time of concentration on various runs of grass, gutters, etc., cumulative time of concentration, average rainfall intensity, area, runoff coefficient (weighted if necessary), and peak flows for 10-year and 100-year storms.
    - 3) All inlets and manholes shall be labeled to correspond to tabular numbering system used in drainage report. Pipe sizes, grades, velocities, peak flows and hydraulic grade lines shall be shown for all parts of the system in a tabular form on the plans.
    - 4) Both location plan (overall drainage) and sub-drainage plan shall be signed and sealed by a Utah Registered Civil Engineer and shall be included in the construction plans for the subdivision/development.
    - 5) On grading plans show peak flows for 10-year and 100-year storms at inlets and other sub-basin points of concentration, at discharge points and in channels. Show peak flows entering and leaving the site; trace path leaving site to nearest major drainage facility without adverse impact to downstream owners.
    - 6) On plan and profile sheets, show peak flows for 10-year and 100-year storms at all inlets and in pipes as per above, and in pipes show slope, velocity, and capacity, and hydraulic grade line if surcharged.
    - 7) If the lot cannot drain the yard to the street, then a basin shall be located in the rear yard to prevent storm runoff from draining to the neighbors from the back of the property.
  - ii. Benchmarks – To be shown on plans with benchmarks to match the existing state approved benchmarks.
  - iii. Existing and proposed property lines.
  - iv. Existing and proposed drainage easements.
  - v. Street names, grades, widths and rights-of-way or easements.
  - vi. Routing and accumulative flows at the upstream and downstream ends of the site and at various critical points on-site for both minor and major runoff. Inflow and outflow for both storms for all sub basins.



- vii. Street cross sections showing 100-year flood levels, no more than  $\frac{1}{2}$  way into the outside travel lane for emergency vehicle clear lane.
- viii. Existing and proposed major drainage facilities.
- ix. Open channel flow in major channels shall be provided with the following information on plans:
  - 1) Channel and hydraulic grade line (HGL) profiles.
  - 2) Cross sections and required rights-of-way at 100-foot intervals.
  - 3) Location and size of all existing and proposed structures.
  - 4) Channel section and lining details.
  - 5) Freeboard for 100-year flows.
  - 6) Channel capacity and storm flows, 10-year and 100-year flows and velocities.