HEBER CITY CORPORATION
75 North Main Street
Heber City, UT 84032
City Council Meeting Agenda

September 20, 2022

4:00 p.m. Work Meeting
6:00 p.m. Regular Meeting

TIME AND ORDER OF ITEMS ARE APPROXIMATE AND MAY BE CHANGED AS TIME PERMITS

I. WORK MEETING-4:00 P.M.

1. Discuss proposed amendments to Commercial Zones C-2, C-3, and C-4, to be consolidated into Chapter 18.28, in Title 18 and Building Height in Commercial Zones (Janson/Kohler) – 90 min

2. Discussion regarding the potential annexation of 37 acres along Highway 32 directly north of the Holmes Homes subdivision and Woodsmere Road (Kohler) – 15 min

3. Discussion regarding Commercial Building Standards specific to RC Ornamental construction (Kahler) – 10 min

II. REGULAR MEETING-6:00 P.M.

1. Call to Order

2. Pledge of Allegiance (Council Member Johnston)

3. Prayer/Thought by Invitation (Default: Council Member Phillips)

III. CONFLICT OF INTEREST DISCLOSURE:

IV. CONSENT AGENDA:

1. Approval of September 6, 2022, City Council Meeting Minutes (Cooke)

2. Consider Approval of Resolution 2022-24 for the Moderate Income Housing Report (Baron)

3. Consider Approval of Ordinance 2022-25 Updating the Chain of Command for Appointed Positions (Phillips, Smedley)

V. PUBLIC COMMENTS:

VI. GENERAL BUSINESS ITEMS:

1. Central Heber Water and Sewer Line Project Update (Funk) – 10 min

VII. ACTION ITEMS:

1. Consider Approval of Agreement for Dickman Legacy Ranch, LLC request for Sewer Connection (Smedley) – 20 min

2. Review proposed Administrative Amendment to the Highlands Master Development Agreement to determine whether it should be reviewed as a Modification Amendment (Kohler) – 15 min

3. Discussion Regarding the North Village Annexation & Associated MDA Template (Kohler) – 60 min

4. Consider Approval of Ordinance 2022-23 to Adopt the Heber City Storm Water Design Manual as an Amendment to the Heber City Standard Drawings and Specifications (Funk) – 20 min

5. Consider Adoption of Ordinance 2022-24 to Approve the North Village Transportation and Storm Water Master Plans as an Amendment to the Heber City Capital Facilities Plan and Heber City General Plan (Funk) – 40 min

6. Discuss Envision Center Heber Process and Steering Committee membership (Kohler, Brown) – 15 min

VIII. COMMUNICATION:

IX. CLOSED EXECUTIVE SESSION:

1. Personnel

Ordinance 2006-05 allows Heber City Council Members to participate in meetings via telecommunications media.

In accordance with the Americans with Disabilities Act, those needing special accommodations during this meeting or who are non-English speaking should contact Trina Cooke at the Heber City Offices 435.657.7886 at least eight hours prior to the meeting.

Posted on September 15, 2022, in the Heber City Municipal Building located at 75 North Main, the Heber City Website at www.heberut.gov, and on the Utah Public Notice Website at http://pmn.utah.gov. Notice provided to the Wasatch Wave.

WORK MEETING

TAB 1

City Council Staff Report

MEETING DATE:	September 20, 2022
SUBJECT:	Work session on the consolidated commercial zones and height
RESPONSIBLE:	Anthony L. Kohler, Planning Director
DEPARTMENT:	Planning Department
STRATEGIC RELEVANCE:	Community Development

SUMMARY

As part of the Envision Heber 2050 ordinances updates the Planning Commission has been working on consolidating and updating the C-2, C-3, and C-4 zoning districts. However, on May 3, 2022, the City Council approved Ordinance 2022-12 that imposes a 6 month temporary land use regulation that limits commercial building height to 3 stories. Council has referred the height issue to the Planning Commission to make a recommendation regarding adopting a permanent commercial building height of 3 stories. This resulted in additional discussion of the commercial zones and how to address the height issue.

The Planning Commission discussed the height issue at their May 24 meeting in anticipation of holding a work session on the matter on June 14, 2022. The Planning Commission discussed the height issue on June 14th and expressed concerns about moving contrary to the General Plan so soon. They suggested a list of possible ways extra height could be accommodated, based on the concept of the City receiving some benefit for the extra height. Alternatives are presented in the draft to allow for a fourth or fifth story, if certain design/use provisions are included in an application. Also, a new Height definition and a height measurement technique are included as companion amendments. At this time, only the Design Guidelines address height.

The Zoning Ordinance has three commercial zoning districts that address mostly commercial uses. The C-2 zone generally covers the north and south ends of Main Street, C-3 zone is the central portion of Main Street, and then C-4 is located mostly around 600 West and Midway Lane.

RECOMMENDATION

Staff recommends the City Council discuss the draft commercial zones consolidation, as part of

BACKGROUND

Envision Heber Phase 3, includes updates, simplifications and clarifications in most of the Code chapters.

These ordinance amendments are a result of the contract with People + Place, John Janson, Meg Ryan and the Planning Department staff. The proposals within the drafts include policy suggestions, State Law updates, and edits for greater clarity. It is also the intent of these updates to simplify the ordinances, and to refer engineering standards to the Heber City Standard Specifications instead of listing engineering requirements in the Zoning Ordinance.

Here is a summary of the changes to the commercial zones:

Commercial Zones summary

Due to the similarities between these zones they have been combined into one chapter. The actual zones remain, C-2, C-3, and C-4, but are consolidated under one chapter heading. The main changes are as follows:

- The purposes have remained the same except for the C-4 which was suggested in the Envision Heber 2050 General Plan that the area along Midway Lane and 600 West become more recreation and tourism oriented.
- Site plans are required as part of an application for a permitted or a conditional use permit
- Consultant suggests dropping agricultural uses
- Consultant suggests allowing mixed uses within a building
- As an alternate only allowing pawn shops, tattoo, massage, second hand stores, and cash stores in the C-2 zone and not within 500' of each other
- Prevent telecommunication towers unless they are stealth and only allow them in the C-2 and C-4 zones
- Defines a new use called "Commercial Complex" as a conditional use
- Only allow manufacturing/welding in an enclosed building in the C-2 zone and south of 1200 South
- Consider elimination of public storage facilities – only enclosed temperature controlled storage in the C-2 and C-4 zones
- 1 acre or larger and/or 60,000 square foot or larger developments become conditional uses
- Clarified certain landscaping requirements
- Added gasoline pump locational requirements
- The Planning Commission agreed to the three story limit as per the Temporary Zoning Ordinance but also suggested options to build higher than three stories, up to five

stories, if stepbacks are provided or mixed or office uses are proposed or if at least 10% affordable housing is part of the proposal.

Heber City has C-2 & C-4 Design Criteria and C-3 Design Criteria that limit building height to 5 stories. The City's General Plan which took over a year to complete a public engagement process, was adopted on March 17, 2020, recommends building height be limited to 4 stories in the downtown and be limited to 3 stories in other commercial areas along Main Street. This is shown in the Plan in conjunction with the Future Land Use (FLU) map where heights are defined by a table that defines the categories of use listed on the FLU map. Heights were discussed extensively in the General Plan process and although adopted as per the table never had full consensus of the Steering Committee. There were dissenting opinions, and considerable discussion of 5 stories in the downtown. Downtown was suggested to have a 2 story *minimum* height.

Other general plan future land use districts allowed for greater height – North Village/Utah Valley University Village (now covered by NVOZ), and the Jordanelle District.

The temporary zoning ordinance restriction adopted by the City Council limits commercial building height to 3 stories for all these zones. The temporary zoning ordinance is in place for a six-month period. The Planning Commission held a public hearing on August 9th and forwarded a recommendation to the City Council.

The Planning Commission made the following motion:

MOTION: Commissioner Phil Jordan moved to approve the draft recommendation to the City Council to address height and adding to the Use-Table mixed-use buildings as a conditional use in the three zones. With a further recommendation that the height in all three zones C-2, C-3, and C-4, should be allowed to five stories with the condition that those above three stories or more would comply with one of the following standards.
1) The application includes at least 10% affordable housing.
2) If it is a mixed-use building or office building.
3) If the building design includes at least 10 feet between the third and fourth stories.
Commissioner Oscar Covarrubias second stands.

Essentially the Planning Commission is suggesting that additional height be allowed if additional benefits are derived from that extra height. It was not a unanimous decision. Dissent opinion was basically to study the draft for an additional two weeks.

DISCUSSION

The proposed amendments will improve these chapters making them more user friendly and less confusing to administer. There are many updates, some with policy considerations, within the body of the draft that are not related to the height issue.

The zones currently have no area, width, locational, and height requirements and just refer to the Design Guidelines. Height alternatives are proposed in the draft. Height has become a recent significant issue and measuring height is addressed via a new definition and section in the Supplementary Regulations, also attached.

Height is a community character issue.

FISCAL IMPACT

The proposed amendment does not have a clear fiscal impact to the City, but reduced property tax generation is likely when an applicant could have previously added a story or two. Lower heights may also reduce interest in redevelopment, especially where an existing building needs to be purchased and demolished before something new is constructed. Hospitality uses often request greater heights.

CONCLUSION

No conclusions are warranted at this time

ALTERNATIVES

1. Work session is intended to clarify and provide direction. Some alternatives are suggested within the body of the draft.

POTENTIAL MOTION

Work session only.

ACCOUNTABILITY

Department: Planning Department, Planning Director
Staff Member: Anthony L. Kohler

EXHIBITS

18.28 Commercial Zones

18.28.010 Purpose and Objectives
18.28.020 Application Requirements
18.28.030 Permitted and Conditional Uses
18.28.040 Development Standards
18.28.050 Additional Regulations
18.28.060 Gross Floor Area Limitations for retail businesses
18.28.070 Gasoline Pump Island Locations and Lighting
18.28.080 Related Provisions

18.28.010 Purpose and Objectives

1. *The C-2 commercial zone has been established to facilitate the development of attractive entrances to the city. To reduce the conflict between commercial and residential uses along principal highways and streets adjacent to the central commercial districts and to facilitate the orderly expansion of commercial uses out from the central commercial district. Incorporating some of the historical architectural style evident on Main Street is suggested for development in the C-2 zone.*
2. *The C-3 central commercial zone has been established as a district in which the primary use of the land is for business purposes. The area covered by this zone is the historical core area encompassing Main Street and adjacent blocks, which acts as the dominant shopping and financial center for the city and surrounding territory. For this reason, the zone has been located in the central part of the city where the street pattern makes the business buildings readily accessible to all parts of the city and surrounding region and where business and shopping activities can be carried on with maximum convenience. The C-3 zone is characterized by wide, clean, well-lighted streets, ample pedestrian ways and vehicular parking lots for the convenience and safety of the public.*
3. *The C-4 general commercial zone has been established as a district in which the primary use of the land is for business, recreation, hospitality purposes. A railroad depot theme is suggested for new development in the area.*

Commented [JJ1]: Policy choice/consultant recommendation. New language proposed to reflect tourism recreation area

18.28.020 Application Requirements

All permitted and conditional uses are required to submit a site plan as part of an application that is available online and at the City offices.

18.28.030 Permitted and Conditional Uses

The following chart describes the uses that are appropriate in each commercial zone:

A. Symbol definitions:
P = PERMITTED USE (P) A site plan application is required with staff processing. Site plan applications are approved, when and if they meet the ordinance standards.
C = PLANNING COMMISSION CONDITIONAL USE REVIEW (C). A site plan application with Planning Commission review is required.
Blank means prohibited.

B. If a use is not specifically designated below, then it is prohibited.
C. All uses listed in the use table and that require a building permit shall also require a site plan application.

LAND USE ZONES	C-2	C-3	C-4	Limitations
~~The keeping of grazing animals~~	~~P~~	~~P~~	~~P~~	~~As regulated by Section 18.68.135~~
~~Hay, grain, and livestock feed sales establishments~~	-	-	~~P~~	-
Caretaker dwelling	P		P	
Kennels, if located more than 400' from a residential zone	C	~~C~~		
Home Occupations	P	P	P	
In-Home Daycare/Pre-School	P	P	P	
Mixed uses within a building	C	C	C	*50% of the ground floor required to be commercial, service, or office uses*
Bed and Breakfast Inns	P	P	P	As regulated by Section 18.108.034
Religious institutions, schools (public and private) and other public buildings	P	P	P	
Commercial Day Care Center and/or Pre-School	C	C	C	
Group Homes	P	P	P	
Fraternity/non-profit buildings, clubs, lodges	P	P	P	
Funeral establishments, mortuaries and wedding chapels;	P	P	P	
New and Used car lots	C			
Gymnasium/physical fitness /Spa establishments (may include massage)	P	P	P	
Pawn shops, tattoo, massage, second-hand stores	P	P	P	
Alternate: Pawn shops, tattoo, massage, second-hand stores, cash stores	P			None of these businesses allowed within 500' of each other
Recreation vehicle courts	C		C	As regulated by Section 18.96
Utility buildings, transmission lines, and structures, Electric substations	C	C	C	
Small Cell Installations	C	C	C	
Telecommunication towers	C		C	See Telecommunication ordinance 18.110

Commented [JJ2]: Policy choice/consultant recommendation. Suggest that this does not seem to be a needed use in a commercial zone

Commented [JJ3]: Policy choice . Discuss whether such uses should be in all the C zones or maybe just C-2?

Commented [JJ4]: Policy - suggest this new use be considered, if a mixed use building is suggested for a 4 or 5 story height option

Commented [JJ5]: Policy choice/consultant recommendation. Proposed Change from allowing in all three zones to just C-2 zone. Discuss

Commented [JJ6]: Policy choice. Discuss limiting these to just the C-2 and distancing them from each other. Alternative: to not allow

Commented [JJ7]: Policy choice/consultant recommendation. Discuss. Seems inappropriate downtown

Public Utilities. Shops and Storage Yards, and Public Buildings	P	P	P	
Public Water Reservoir/ Public Storage Tank	P	P	P	
Gas/convenience store with or w/o car wash	C	C	C	
Retail shops/Services	P	P	P	*≤ 30,000 square feet. > 30,000 regulated as a conditional use*
Big Box Retail (60,000 square feet and larger)	C			
Financial Institutions	P	P	P	Excludes check cashing and loan stores
Sit Down Restaurants	P	C	P	
Restaurants with drive-thru facilities	C	C	C	No drive-thru windows facing the street
Professional offices, Business Medical/Dental/Optical Office/Clinics and Laboratories	P	P	P	
Private Instructional Studio - Artist, Photography, Dance, Music, Drama, Health, Exercise	P	P	P	May include retail sales
Commercial Complex	C		C	
Hotels	C	C	C	
Commercial parking lots and/or parking structures as a singular use	C	C	C	
Craftsman Industrial style Light Manufacturing	C	C	C	*Within an enclosed building and including a retail component*
Manufacturing, ~~compounding~~ and processing	C			*Within an enclosed building*
Indoor and outdoor welding and sheet metal shops	C			Only allowed south of 1200 South
Warehouses, trucking and associated storage buildings	C			*Truck parking and outside storage not allowed within 60 feet of any public street*
Public Storage facilities	C			*All frontages on a public street shall include other commercial uses along the frontage and only*

Commented [JJ8]: Policy choice/consultant recommendation. Discuss. These could be eliminated downtown

Commented [JJ9]: Policy choice/consultant recommendation. Suggest a new term meant to cover a bigger store with pads out front, sharing parking and access

Commented [JJ10R9]: Definition to be added

Commented [JJ11]: Policy Choice. Discuss. This use may not work in those zones

Commented [JJ13R12]: Added welding below for C-2 zones

Commented [JJ12]: Policy choice/consultant recommendation. -Discuss elimination of these uses from some commercial zones

				allowed north of 500 N and South of 1200 South
Hospitals	C	C	C	
Enclosed Temperature Controlled Storage Units	C			
Wholesale establishments with stock on premises and a retail/office component/ store but not a storage warehouse	C			
Uses desiring an additional story	C	C	C	See section 18.28.040
Any use on a parcel larger than 1 acre and any use with a building footprint larger than 30,000 square feet.		C	C	
Any use on a parcel larger than 5 acres and any use with a building footprint larger than 60,000 square feet.	C			

Commented [JJ14]: Policy choice . Discuss elimination from commercial zones

Commented [JJ15]: Policy choice. Discuss eliminating from commercial zones

Commented [JJ16]: Policy choice/consultant recommendation. Discuss new policy to cover bigger developments

18.28.040 Development Standards

In the Commercial Zones, there shall be no area, width and location requirements except that all buildings and structures shall conform to the requirements of the adopted Heber City C-2 and C-4, and C-3 Design Standards and Guidelines. Height shall be a maximum of three stories unless one or more of the following standards are met:

a. The application includes at least 10% percent affordable housing
b. If it is a mixed-use building.
c. If it is an office building.
d. If the building design includes a stepback of a least ten feet between the second and third stories.

18.28.050 Additional Regulations.

The following provisions apply within the Commercial Zones:

1. *For buildings within the C-2 and C-4 zone, a strip of land at least fifteen feet in width adjacent to all public streets shall be landscaped as set forth in Chapter 18.76 of this title except for permitted driveways, except as required by the Heber City C-2 and C-4 Zone Design Standards and Guidelines. Buildings in a C-3 zone shall be located within a 15' "build to" zone which allows for outdoor gathering and dining to occur for certain uses but also allows the building to locate adjacent to the public ROW.*
2. *No dust, odors, smoke, vibration or intermittent light, glare or noise shall be emitted which is discernible beyond the premises except for normal traffic movement.*
3. *Storage of all merchandise, material and products shall be carried on within a building or within an area enclosed with a sight-obscuring fence or wall except for licensed vehicles in running order.*
4. *All off-street parking shall be hard-surfaced as regulated by Chapter 18.72.*

Commented [JJ17]: Policy choice/consultant recommendation. Suggest standardizing the setback for C-2 - some existing conflicts between the design standards and updated the three zones to provide for setbacks

5. *All buildings located adjacent to major streets shall have at least one entrance way facing onto said street.*
6. *Sale material may be displayed on business premises during normal working hours.*
7. *See 18.76.050 for building setbacks adjacent to residential use*

18.28.060 Gross floor area of buildings limitations for retail business.

1. *C-2 Zone. No floor area limitation.*
2. *C-3 Zone. Retail establishments shall not exceed 60,000 square feet of gross floor area within the C-3 Zone. No retail establishment shall be permitted to place any one building or any combination of buildings that exceed 60,000 square feet within said Zone. In no event shall any retail establishment, corporation, business, or entity have one or more buildings within less than 1,000 feet of each other, wherein the building or buildings would exceed a total of 60,000 square feet. Attempts to circumvent or exceed this maximum, 60,000 square feet, shall be strictly prohibited.*
3. *C-4 Zone. Retail establishments shall not exceed 60,000 square feet of gross floor area within the C-4 Zone. No retail establishment shall be permitted to place any one single building or any combination of buildings that exceed 60,000 square feet within said Zone. In no event shall any retail establishment, corporation, business, or entity have one or more buildings within less than 1,000 feet of each other, wherein the building or buildings would exceed a total of 60,000 square feet. Attempts to circumvent or exceed this maximum, 60,000 square feet, shall be strictly prohibited*

18.28.070 Gasoline Pump Island Location and Lighting

Gasoline pump islands shall be set back ~~not less than fifteen feet~~ from any right-of-way ~~street~~ line to accommodate the landscape setback and proper circulation/stacking for the pumps. Each pump shall provide stacking for a minimum of two standard sized vehicles defined as 20' for each. A circulation aisle beyond the stacking area is required that allows for a circular traffic movement. ~~to which the pump island is vertical and twelve feet from any street line to which the pump island is parallel and not less than twelve feet from any residential zone boundary line~~. ~~If the pump island is set in an angle on the property, it~~ Pump islands shall be so located that automobiles stopped for service will not extend over the property line. In no case shall pumps be set closer than twelve feet from any street lines, nor closer than ten feet from any side or rear property line. Lots from which gasoline is dispensed to customers at retail shall be not less than seventy-five by one hundred feet in size. Canopies over pump islands may extend to the closest edge of any required landscaping. ~~within five feet to the property lines.~~ Any above ground fuel tanks such as propane tanks shall be located with a minimum setback from the ROW as per the IBC or 30' whichever is greater. See the Lighting Chapter 18.78, for lighting standards.

18.28.080 Related Provisions

Chapter 18.12 Administration
Chapter 18.08 Definitions
Chapter 18.68 Supplementary Regulations
Chapter 18.108 Conditional Use Permits
Chapter 18.72 Off Street Parking and Loading

Chapter 18.103 Sign Regulations
Chapter 18.78 Lighting
Chapter 18.174 Enforcement
Chapter 17 Subdivisions
Heber City C-2 and C-4 Zone Design Standards and guidelines

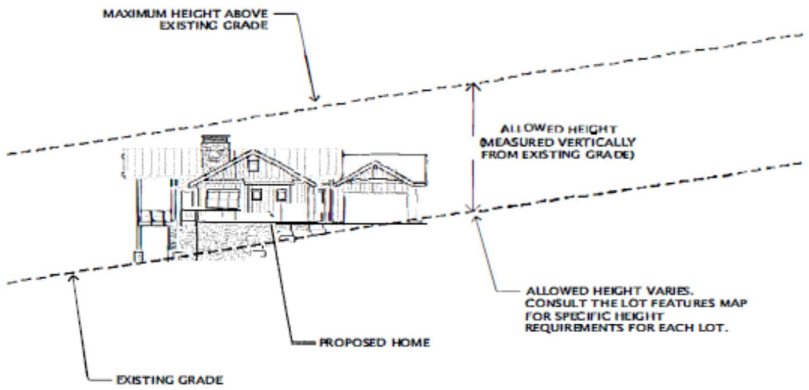
New Height Provisions

18.08.270 Height of Building: means the distance measured vertically from the highest point on a proposed or existing roof or eave (including but not limited to the roofing material, but excluding chimneys, pipes, HVACs, etc.) to the natural or finished grade (whichever is more restrictive) located directly below said point of the roof or eaves. Within any building footprint, height shall be measured vertically from any point on a proposed or existing roof (including but not limited to the roofing material) to the natural grade directly below said point on a proposed or existing roof.

18.68.110 Building Height Measurement and allowable projections above the maximum height limit

Allowable Projections - Penthouse or roof structures for the housing of elevators, stairways, tanks, ventilating fans or similar equipment required to operate and maintain the building, and fire or parapet walls, skylights, towers, steeples, flagpoles, chimneys, smokestacks, water tanks, theater lofts, or similar structures, may be erected above the height limits prescribed in this title, but no space above the height limit shall be allowed for the purpose of providing additional floor space. All HVAC equipment and stacks/piping shall be located at least 10' from the edge of flat roofed buildings and located on the opposite side of the street facing façade for a pitched roof building. Pitched roof buildings that extend perpendicular from the adjacent street shall not locate HVAC equipment on the roof.

The height of buildings shall be measured using the graphic below. The intent of the height guideline is to present a human-scaled roofscape, one which steps with the contours of the terrain and recalls the natural setting.



Submitted plans shall include:

- Roof ridgeline plan
- Existing topography shown below the roof areas
- Multiple spot locations shown on the roof plan stating roof elevation, existing grade elevation, finished grade elevation, and the differences in feet, rounded to the nearest 3" (0.25') from the roof elevation. The spot locations on the roof shall include roof peak ends, several in the center of the roof, and the maximum height points.

  In the field, elevations shall be taken before the final roofing materials are installed.

TAB 2

PowerPoint Presentation:

Potential Annexation Discussion

September 20, 2021

Petitioner: Chris Ensign

HEBER CITY

Vicinity Map



From the North West



From the South West



From the West on Highway 40



From South West on Old Highway 40

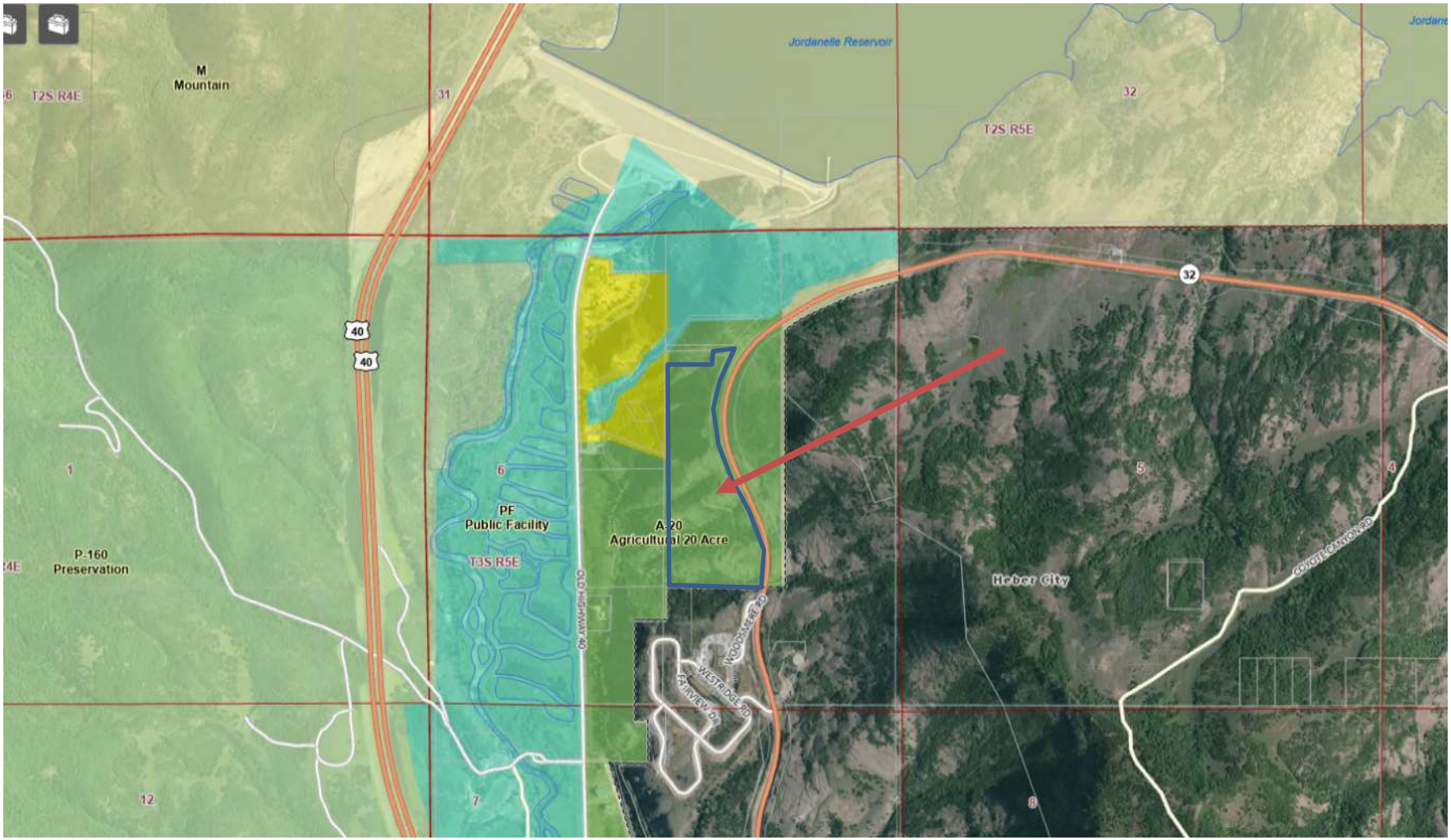


Aerial Photo

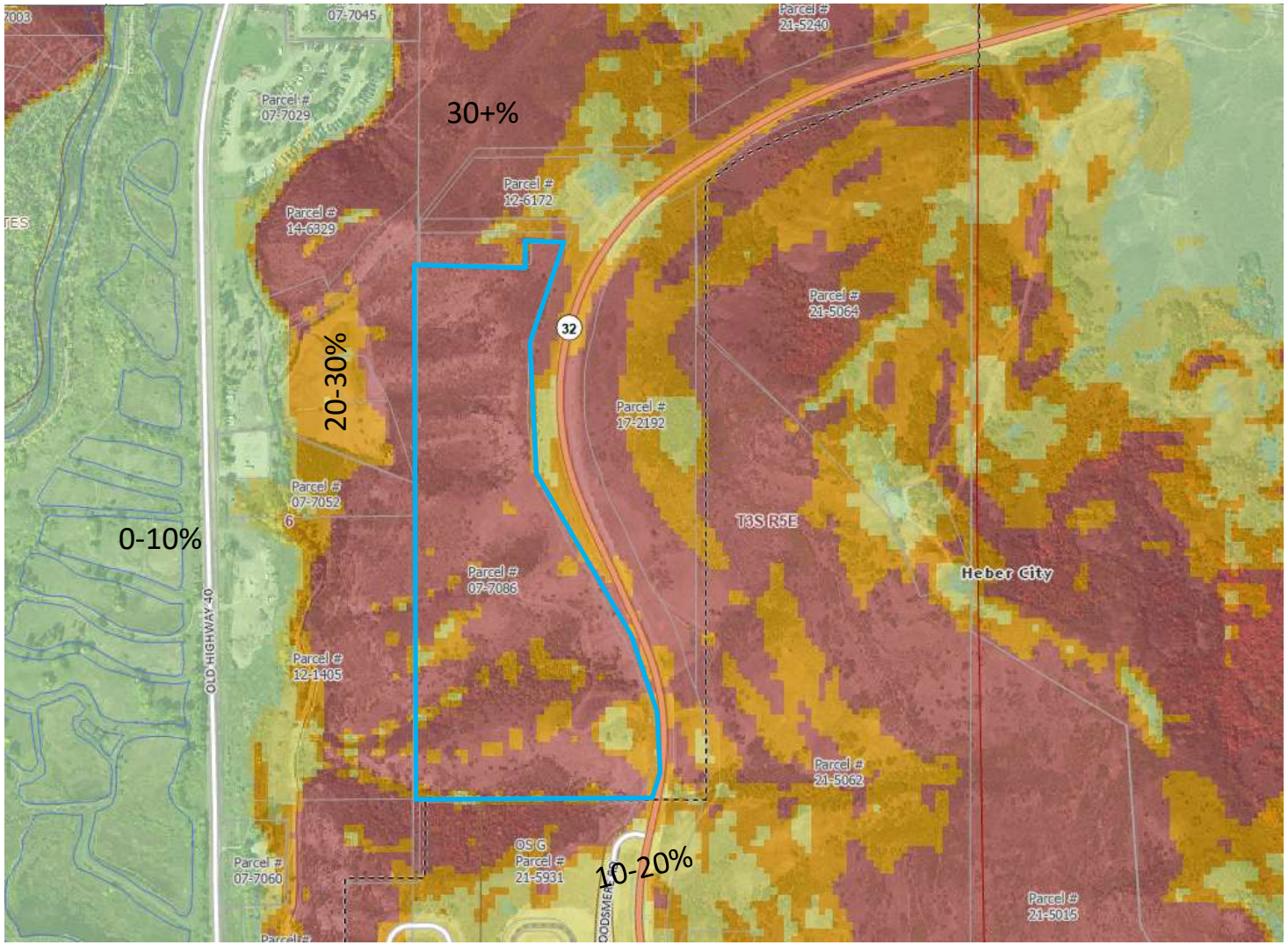


HEBER CITY

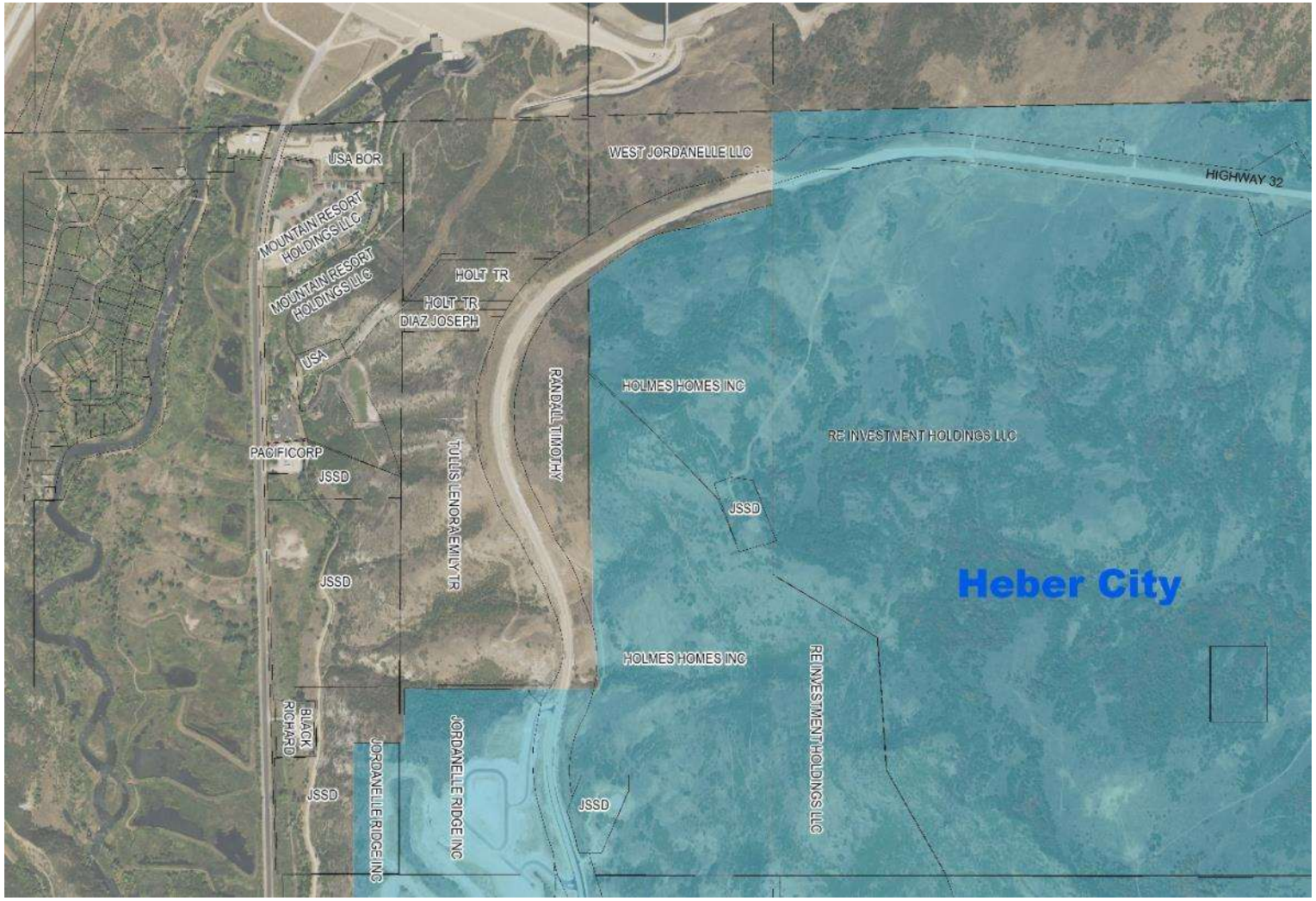
County Zone Map



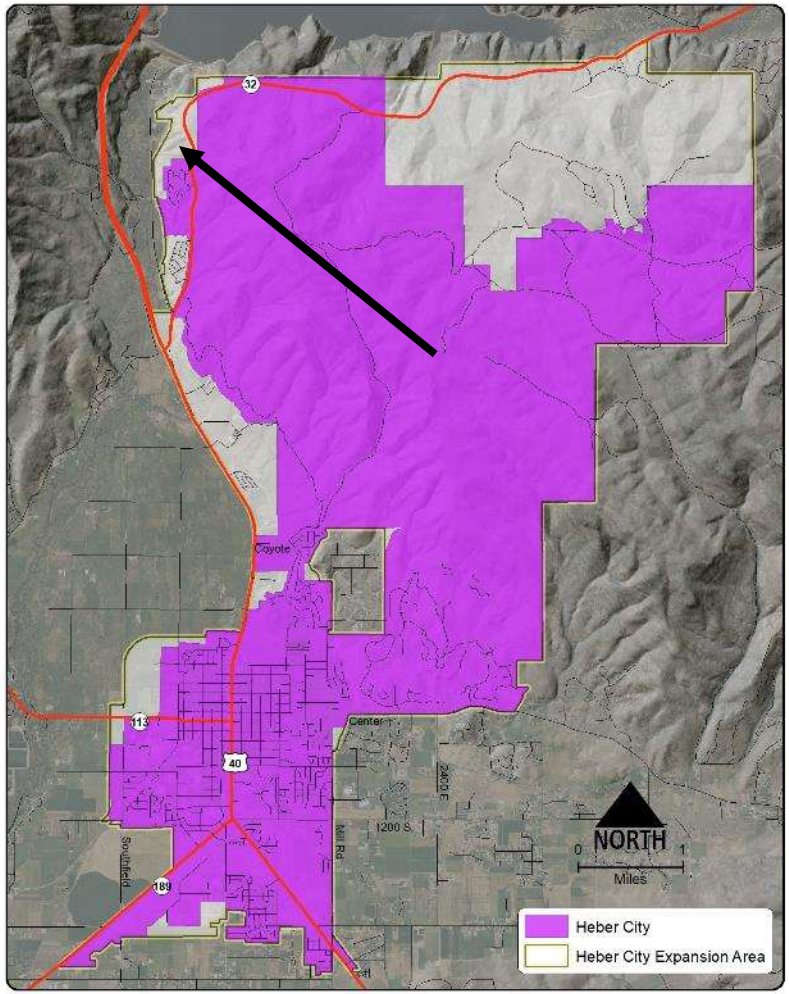
Slopes


30+%
20-30%
0-10%
10-20%
Parcel # 07-7045
Parcel # 21-5240
Parcel # 07-7029
Parcel # 12-6172
Parcel # 14-6329
Parcel # 21-5064
Parcel # 17-2192
Parcel # 07-7052
6
T3S R5E
Heber City
Parcel # 07-7086
OLD HIGHWAY 40
Parcel # 12-1405
Parcel # 21-5062
OS G
Parcel # 21-5931
Parcel # 07-7060
Parcel # 21-5015
32

Surrounding Property Owners



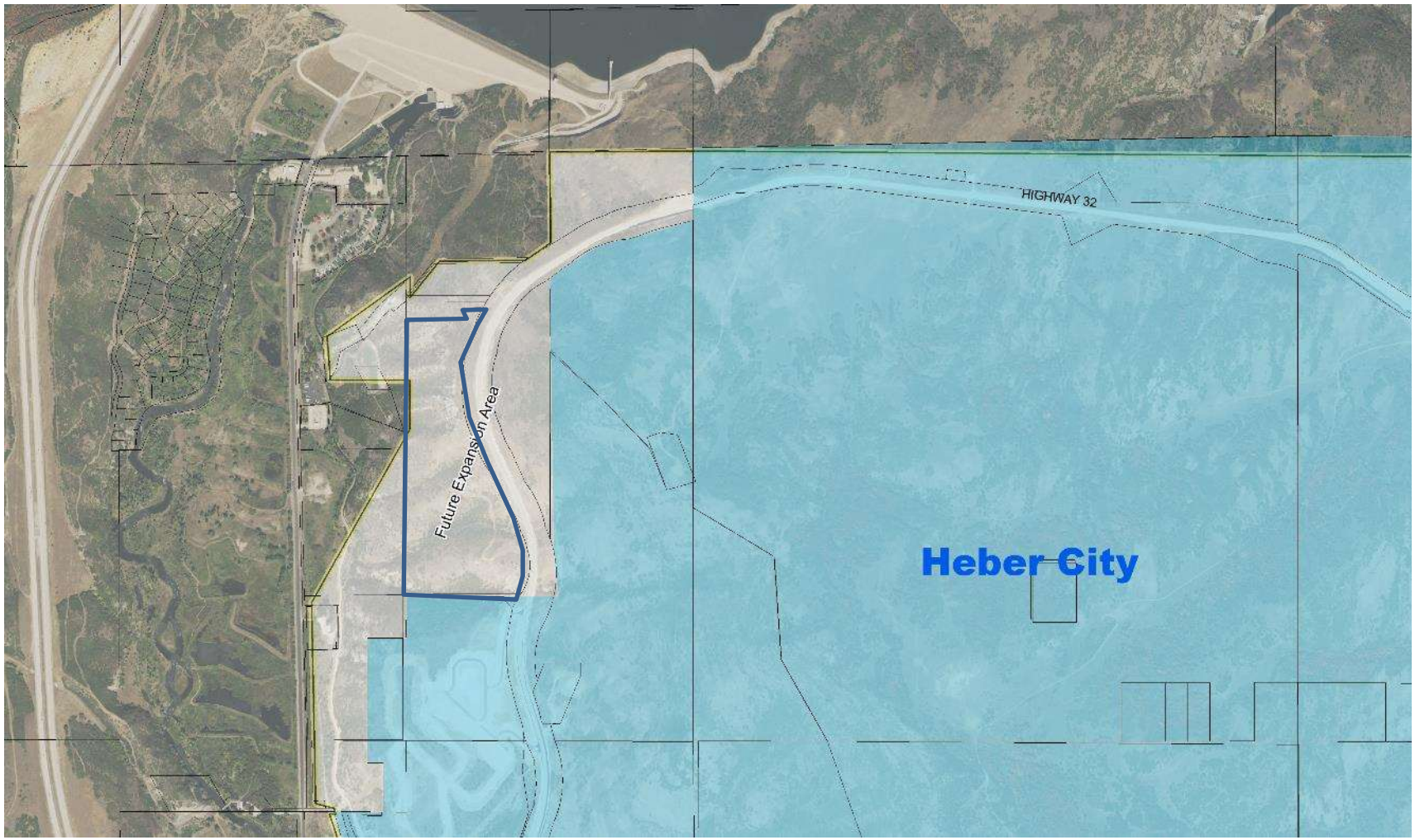
Annexation Policy Plan Map



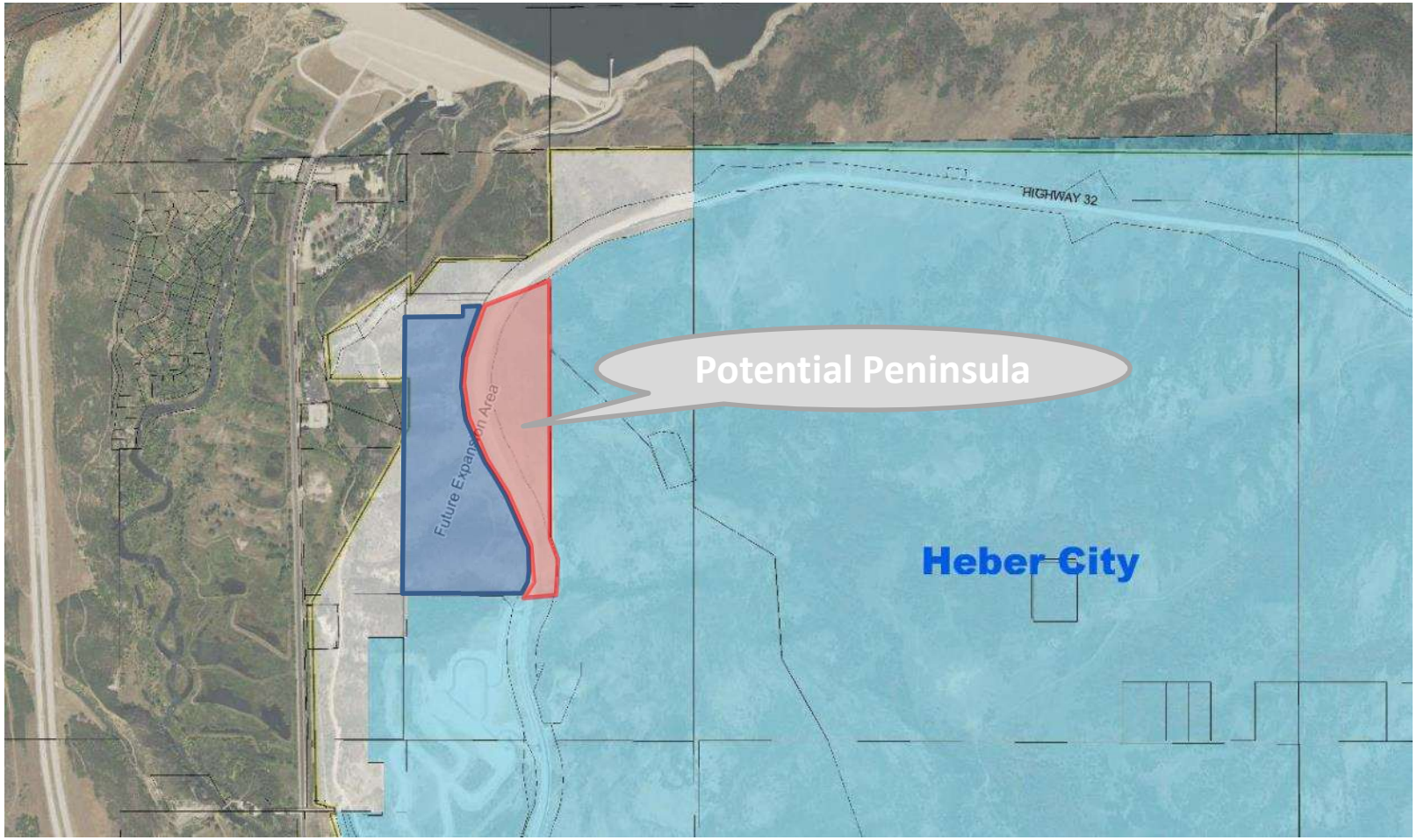
Expansion Area Map
June 15, 2021

HEBER CITY

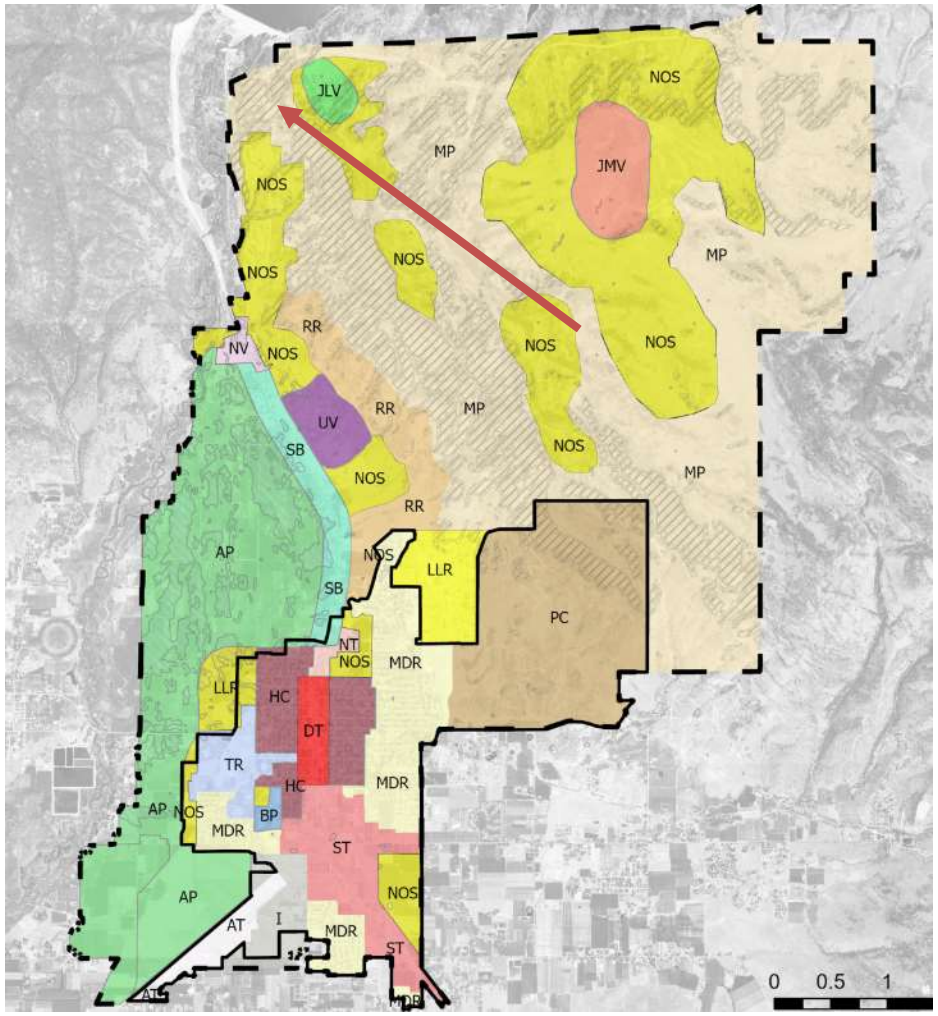
Heber City Expansion Area Map



Annexation Boundary

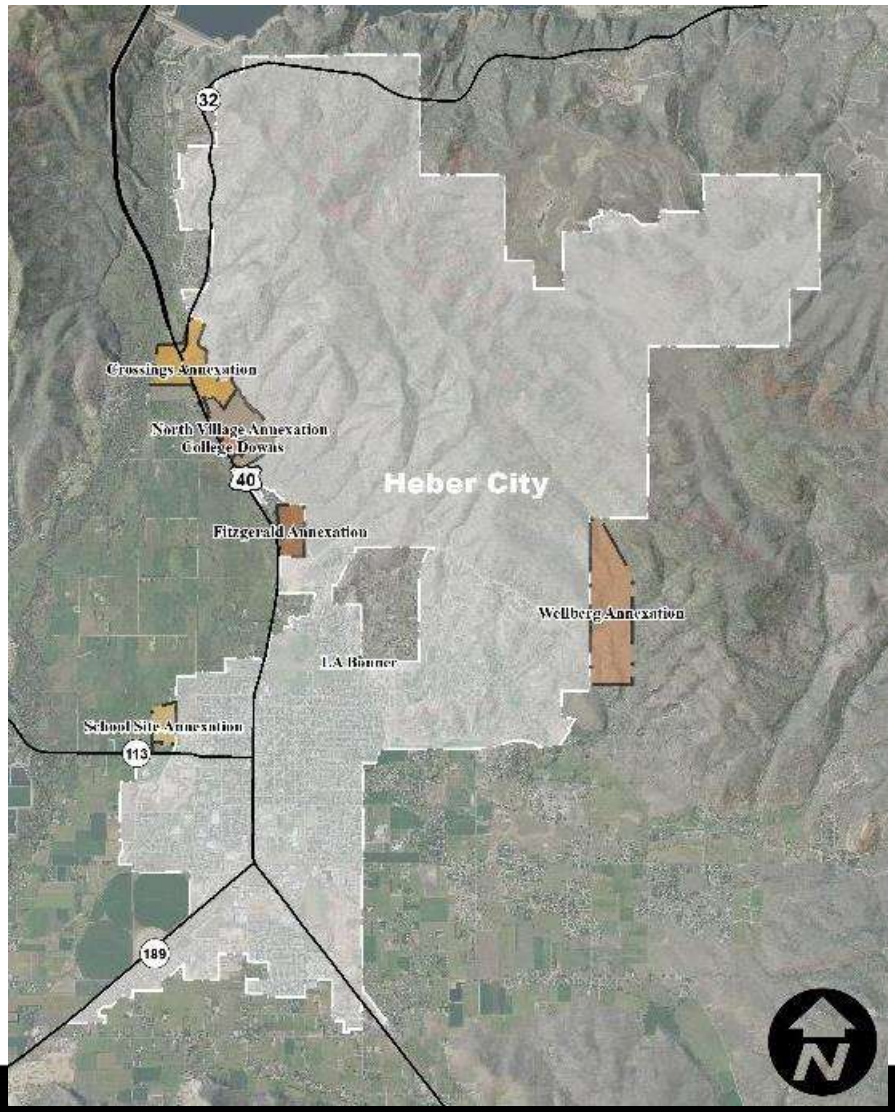


Future Land Use Map



Future Land Use Table	
District	Mountain Preservation
Uses	Recreational uses
Density	1 unit per 20 acres transferred to mountain residential areas
Characteristics	Steep slopes over 30%, stream corridors, wetlands, areas providing separation between communities. Clustered housing with density transfers to the villages

Pending Annexations



Project Details

Current Zoning Designation	A-20
Proposed Zoning Designation	TBD
Area	37.16 acres
Permitted Density	1 unit per 20 acres
Proposed Density	TBD
Permitted Uses	Agriculture, SFD
Approval Status	N/A
Studies Completed	Concept Plan

Issues

- Steep Slopes
- Annexation requires bringing in neighboring property to the east to avoid creating a peninsula
- Density, land use and open space
- Highway access

Policy Questions

- Would Council entertain an annexation petition for the property?

CONSENT AGENDA

TAB 1

MINUTES

HEBER CITY CORPORATION
75 North Main Street
Heber City, UT 84032
City Council Meeting Minutes
September 6, 2022

DRAFT Minutes

4:00 p.m. Closed Executive Session
5:15 p.m. Work Meeting
6:00 p.m. Regular Meeting

Mayor Pro Tem Stack called the meeting to order at 4:05 p.m. and welcomed everyone present.

I. CLOSED EXECUTIVE SESSION: 4:00 P.M.

1. Legal

2. Personnel

Motion: Council Member Kahler made the motion to enter Closed Executive Session for the purpose of discussing possible or pending litigation and personnel. Council Member Johnston made the second. **Rollcall Vote: Voting Yes:** Council Members Barney, Johnston, Kahler, Phillips, and Stack. The meeting entered Closed Executive Session at 4:07 p.m.

City Council Present:	Council Member Yvonne Barney
	Council Member Mike Johnston
	Council Member Rachel Kahler
	Council Member Scott Phillips – virtually
	Council Member Ryan Stack – Mayor Pro Tem
Absent:	Mayor Heidi Franco
Staff Present:	City Manager Matt Brower
	City Attorney Mark Smedley
Also Present:	Steve Osit, Airport Counsel
	Scott Crook, Special Counsel

Motion: Council Member Kahler made the motion to end the Closed Executive Session and return to open meeting. Council Member Johnston made the second. The meeting resumed as an open and public meeting at 5:30 p.m.

II. WORK MEETING: 5:15 P.M.

Mayor Pro Tem Ryan Stack opened the Work Meeting at 5:34 p.m. and welcomed everyone present.

City Council Present:	Council Member Yvonne Barney
	Council Member Mike Johnston
	Council Member Rachel Kahler
	Council Member Scott Phillips – virtually
	Council Member Ryan Stack – Mayor Pro Tem
Absent:	Mayor Heidi Franco
Staff Present:	City Manager Matt Brower
	City Attorney Mark Smedley
	Senior Planner Jamie Baron
	City Engineer Russ Funk
	Public Works Director Matthew Kennard
	Parks and Cemetery Director Mark Rounds
	Assistant to the City Manager Luke Searle
	Finance Manager Wes Bingham
	Officer Heath Harvey
	IT Specialist Anthon Beales
	City Recorder Trina Cooke

Staff Participating Remotely: IT Specialist Anthon Beales, Assistant to the City Manager Luke Searle, City Attorney Mark Smedley, Deputy City Recorder Robin Raines-Bond, Planning Administrative Assistant Meshelle Kijanen, Finance Manager Wes Bingham, City Engineer Russ Funk, and Accounting Technician Wendy Anderson.

Also Present: Sid Ostergaard, Amy Tuddenham, Pam Patrick, Jed Olsen, Ashley Farrell, Mia Yue, Si Hutt, David Hicks, PJ Abraham, Tatum Combs, Guy Tuite, Scott House, Scott Jaffa, Mike Bradshaw, Mike Lynch, Linda Middleton, Don K Taylor, Marian Crosby, Ken Crosby, and others who did not sign in or whose signatures were illegible.

Also Attending Remotely: (Names are listed as signed-in virtually) John Janson, Tracy Taylor, Kelli G, Ben Fritz, Kamen Goddard, KPCW Radio, Sandi Brower, Trevor Smith, and Marianne B Allen.

1. Review new Grants Cycle, MAG Resources, and Community Resources (Jess Bedingfield) – 5 min

Agenda item one was skipped as the presenter was not present.

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2. Discuss proposed amendments to the Commercial Zones C-2, C-3, and C-4, proposed to be consolidated into Chapter 18.28, in Title 18, and Building Height in Commercial Zones (Janson/Kohler) – 20 min

WM 2 Zones Height

Planning Consultant John Janson provided an overview of the effort to consolidate the three commercial zones as written in the Heber City Code and listed the proposed amendments. Planning Commission had forwarded a positive recommendation to the City Council. Mr. Janson shared a chart of proposed land uses in zones, whether the uses should be permitted or conditional, and where existing uses were recommended to be omitted. The building height recommendation was four stories in the downtown area and three stories in other commercial areas. Mayor Pro Tem Stack wished to include a total height limit by building story. He noted the meeting time limitation for further discussion and asked for the agenda item to return to the next meeting. Consensus of Council agreed. It was determined to have the item placed on the next Work Meeting agenda for 90 minutes.

3. Discussion regarding Chain of Command for Appointed Positions (Phillips) – 15 min

WM 3 Staff Report Chain of Command

Discussion of Work Meeting agenda item three was moved to the end of the Regular Meeting in order to begin the Regular City Council Meeting on time.

Council Member Phillips wished to clarify the City Code regarding the administration of the City. He proposed adding 2.14.040(1.1) 'Pursuant thereto, all employees, including appointed employees shall report directly to, and be exclusively responsible to the City Manager. All supervision, review and administration for such employees shall be handled by the City Manager'. Additionally, to insert the words 'administer for, and' to the sentence 'The City Manager shall administer for, and assist, and report to the Legislative Body of the City in all executive or administrative duties', in section 2.14.040(1.3). With Council majority indicating support of the added language, Council Member Phillips asked that the agenda item be place on the next City Council Meeting in order for Council to take action by vote.

City Manager Matt Brower referred to a section of the code that indicated the Chief of Police reported to the legislative body and asked Council support to change the language in order for the Chief of police to report to the City Manager as well in order to avoid conflicting language.

III. REGULAR MEETING: 6:00 P.M.

1. Call to Order

Mayor Pro Tem Ryan Stack called the Regular Meeting to order at 6:02 p.m. and welcomed everyone present.

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2. Pledge of Allegiance (Council Member Barney)

Council Member Barney led the recitation of the Pledge of Allegiance.

3. Prayer/Thought by Invitation (Default: Council Member Kahler)

Council Member Kahler shared appreciation for the public servants including Fire Department workers, EMT (emergency medical technicians) workers, retail workers, Parks and Cemetery workers, and the Public Works workers, who she felt were unsung heroes and often overlooked. She shared the following quote: "Public service is more than a job, it's an opportunity for people to provide meaningful service to the community and make it a better, and safer place. Public service can be frustrating. Dealing with difficult citizens is a challenge. Recognition for a job well done is elusive. The hours are long, and the job is sometimes dangerous, and certainly, public service does not pay very well. But we are so grateful for these public servants that have endured the trials and made a career of it, to make this a good place to live". Council Member Kahler expressed her gratitude for the City's public servants and asked everyone to honor their work, and recognize the men and women behind the scenes ensuring the City functioned, the water turned on, toilets flushed, and potholes filled.

IV. CONFLICT OF INTEREST DISCLOSURE:

There were no conflicts disclosed.

V. CONSENT AGENDA:

Motion: Council Member Johnston moved to remove the Tree Management Plan, agenda item three, from the Consent Agenda for further discussion and to approve Consent Agenda items one, two, four, and five. Council Member Kahler made the second.

Discussion: Mayor Pro Tem noted the information on agenda item two held outdated information. Mr. Brower explained the resolution was not being approved with the Consent Agenda item but was there as an example. The Council would only be approving the $7,500 to support the County-wide RAP initiative on Consent Agenda item two. The motion and second stood.

Rollcall Vote: Voting Yes: Council Members Barney, Johnston, Kahler, Phillips, and Stack. **Voting No:** None. The **Motion Passed unanimously, 5-0.**

1. Approval of August 16, 2022, City Council Meeting Minutes (Cooke)

CA 8.16.2022 DRAFT Minutes

2. Approval of $7,500 to support the County-wide RAP (Recreation, Arts, and Parks) Tax Initiative (Brower)

CA Item 2 RAP Staff Report

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3. Consider Approval of Resolution 2022-26 to adopt the Tree Management Plan for Heber City (Kohler)

CA Item 3 Resolution 2022-26 Tree Plan

Council Member Johnston commended the Tree Advisory Committee for their work compiling a comprehensive Tree Management Plan for Heber City. He expressed concern that the policy proposed would potentially prohibit certain trees that grew exceedingly well in Heber. He did not think the City should disallow tree varieties that were proven to do well for the sake of tree diversity. He also wished to see the reference to glyphosate and Round-up removed as he did not feel they should be listed by name in the document.

Council Member Barney noted the diversity of trees had been included in order to prevent possible spread of tree disease and to promote varieties of trees that may offer the tree population a better chance to thrive. Council Member Kahler questioned the purpose of removing the reference to glyphosate and Round-up. Council discussion continued.

Parks and Cemetery Director Mark Rounds shared that he had yet to find a weed solution more effective than the glyphosate found in Round-up. He noted the importance of using personal protection equipment when applying the product. Council Member Johnston felt there was a difference when using glyphosate behind a shed at the cemetery versus at the City Park where children played. His request was to remove reference to the product, not prevent the City from using the product.

Scott House, Co-Chair of the Open Space, Trails, Parks, and Trees Committee, explained that in order for the City to qualify for grants, it needed to have a Tree Management Plan in place. The Plan was a guide rather than formal policy. The Tree Sub-committee intended to return to Council in October to propose adoption of an Ordinance that would establish policy. Council Member Johnston understood the proposed Plan was not policy but expressed concern with the public's interpretation. Mayor Pro Tem Stack proposed modifying the language to eliminate "glyphosate (Round-up)" as well as eliminating language alluding to the prohibition of certain tree varieties. Council consensus approved of the suggested changes.

Motion: Council Member Kahler moved to approve the Tree Management Plan with the suggested changes recommended by Mayor Pro Tem Stack. Council Member Phillips made the second. **Voting Yes:** Council Members Kahler, Johnston, Barney, Phillips, and Stack. **Voting No:** none. The **Motion Passed unanimously, 5-0**.

4. Approval of a change order on the Heber City's 2021 Pressurized Irrigation (PI) Meter Retrofit Project to Maximize the WaterSMART Grant Award (Turnbow)

CA Item 4 Staff Report Change Order

5. Approval of Mayor's Nomination of Council Member for Audit Committee and Mia L Yue to Open Space, Trails, Parks, and Trees Advisory Board (Franco)

CA Item 5 Open Space Committee Nominee

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VI. PUBLIC COMMENTS:

Pam Patrick, Wasatch County Resident, read a statement asking the Council to be open, honest, respectful, and to listen and hear each other. In effort to be transparent, she shared that she too had donated to Mayor Franco's campaign. She wished to respond to comments made during the previous meeting by Council Member Kahler indicating the Mayor did not wish to see a bypass constructed. Ms. Patrick felt the statement was disingenuous. The bypass location had been in discussion for years and she felt it was okay to agree to disagree. She felt the community was disappointed in the manner Council handled disagreement. She offered the Council a gift of the book "Crucial Conversations" and felt it would benefit members of the Council to read.

Tatum Combs, Heber City Resident, wished to propose the City consider installing two speed bumps and a stop sign. Her home was on 600 West and she was concerned with the speeding. There were kids speeding and drag racing along the road all day and night. There were families with small children that lived on the road and she was very concerned about the children. A hit-and-run incident involving a parked car had happened the year previous. Dump trucks drove at 35 mph (miles per hour), not knowing the speed limit was 25 mph in the area.

VII. GENERAL BUSINESS ITEMS:

1. Public Hearing regarding Resolution 2022-22 Amending Fiscal Year 2022-2023 Budget for Seven City Fleet Vehicles (Bingham, Kennard)

GB 1 and Item 6 Staff Report Resolution 2022-22

City Finance Manager Wes Bingham shared the requirement to hold a Public Hearing any time the City proposed a budget amendment. The previous year's budget had included seven fleet vehicles but due to supply-chain backlog, the City had yet to receive the vehicles. The proposed Budget Amendment would move the purchase of the vehicles into the current 2022-2023 Fiscal Year.

Mayor Pro Tem Stack opened the Public Hearing at 6:35 p.m. With no-one from the public coming forward to comment, the Public Hearing was closed at 6:35 p.m.

2. Presentation and Annual Report from IHC (Hutt, Tuddenham) – 10 min

GB 2 Hospital PowerPoint

Intermountain Heber Valley Hospital

Si Hutt, Administrator at Intermountain Healthcare's Heber Valley Hospital, presented an annual update for the hospital. The Hospital was a not-for-profit hospital whose mission was to help people live as healthy of lives as possible. The presentation included highlights from 2021, the number of charity care cases enabling the Hospital's not-for-profit status, and listed additional programs, gifts, and donations to the community.

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Mr. Hutt shared the Wasatch Back Hospitals Community Board overseeing both the Heber Valley Hospital and the Park City Hospital and listed services available at either hospital as well as services shared between the two hospitals and services exclusive to each. A tele-health service was available over the phone for certain needs. He shared housing concerns that physicians had been unable to find housing in the call area of the Park City Hospital.

Council Member Kahler described her wish to get a traffic signal installed on 1200 South and asked how that would affect the hospital, as it would be located at one of the Hospital entrances. Mr. Hutt felt the Hospital would appreciate a traffic signal at the location.

3. Monthly Current Development Report (Planning Department) – 10 min

GB 3 PowerPoint

Senior Planner Jamie Baron listed new applications received by the City and noted the total number of applications received in 2022 was now at 43.

- Site Plan – RC Ornamental; Staff was working with the applicant in order to bring into compliance the percentage of metal permitted on the exterior of the building.
- Site Plan – Crow Bar; a mixed-use building with a restaurant on the main level, apartments above, and an office in the rear.
- Concept/Site Plan – Encircle Café; included a change of use to add a café with outdoor seating.
- MDA – L Remington Development; an amendment to the previous MDA (master development agreement) for the old Rocky Mountain Care facility with Bill Wark.
- Subdivision Final – Madison Meadows
- Honorable Mentions:
    - Annexation – LA Bonner
    - MDA – Highlands Amendment
    - CUP (conditional use permit) – NVSSD (North Village Special Service District) Sewer Lift Station; City Code required a CUP for public utilities.

Council Member Kahler shared information she had heard on the local radio indicating Park View development intended to change some of the designated affordable housing units to sell at market rate. Mr. Baron recalled the agreement was for an entirely deed-restricted affordable housing development and indicated he would follow up with the developer.

Council Member Johnston had received questions regarding the opening of Black Rifle Coffee. A meeting attendee indicated the project was moving forward.

Council Member Barney asked for clarification on the L Remington Development MDA amendment request. Mr. Baron explained the MDA was with the existing owner of the property who was trying to sell. A potential buyer was requesting the amendment.

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VIII. ACTION ITEMS:

1. Consider Approval of MOU (memorandum of understanding) for Back 40 Sewer Connection (Brower, Smedley) - 15 min

Item 1 Staff Report Back 40

City Attorney Mark Smedley presented the information regarding the request from the Back 40 Ranch House Grill to connect to the City's sewer system. The restaurant was not located in the City. The City had a policy to not permit sewer connection outside the City. Council had previously expressed willingness to assist the restaurant based upon the need due to a failing septic system. Staff had been negotiating an agreement between the City, County, Health Department, and the Back 40. Mr. Smedley described the County's wish to keep the exception isolated.

Council Member Stack referred to a section in the agreement, indicating the agreement would be nullified if the building structure was demolished. His concern was, in the case of a disaster or structural failure, the section would no longer permit sewer connection if the restaurant owner were to rebuild. Mr. Smedley interpreted the passage to mean the building could not be expanded upon but agreed to meet with the County to clarify the language.

Mayor Pro Tem Stack opened the discussion to public comment.

Tracy Taylor questioned whether the parking was adequate for the facility and felt it needed to be addressed. Mr. Smedley pointed out the restaurant was located in Wasatch County and therefore did not fall under Heber City jurisdiction. The issue at hand was whether to permit the requested sewer connection.

Motion: Council Member Kahler moved to accept the proposed memorandum of understanding (MOU) with regard to the Back 40 sewer connection, asking City Attorney Mark Smedley to work with Wasatch County on section 3 regarding the provisions in B.2. Council Member Phillips made the second. **Voting Yes:** Council Members Phillips, Kahler, Johnston, Barney, and Stack. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

2. Consider Approval of Ordinance 2022-22 Amending the Parks, Trails, and Open Space Master Plan and updating the acronym of the Open Space, Trails, and Trees from OSTPT to POSTT (Searle) – 10 min

Item 2 Staff Report Ordinance 2022-22

Assistant to the City Manager Luke Searle shared images of the proposed amendments to trail alignment as illustrated in the Parks, Trails, and Open Space Master Plan. Scott House, Co-Chair of the Open Space, Trails, Parks, and Trees Committee, explained the purpose of the recommendation was a significant cost savings for the installation of the trails if realignments were made to coincide with the Central Heber Water and Sewer Line Project.

Mr. House described the detailed process the committee had undertaken to research and locate the most effective alternative routes, including collaboration with UDOT (Utah Department of Transportation) and advice from the Wasatch County Trail Planner Don Taylor. While the proposed amendments offered alternatives to Center Street, Center Street would remain an optional trail route. Discussion continued.

City Engineer Russ Funk explained much of the information Mr. House had given the Council had been provided by Mr. Funk. He further clarified the economical and practical reasons for the alternate trail routes. Council Member Johnston felt strongly about sticking with "option A" on Center Street and relocating or burying power poles. He worried that if the City to implemented "option C", as he felt was being proposed, improvements to "option A" for the trail along Center Street would never take place. Mr. Funk offered to walk the proposed trail with Council Member Johnston and discuss further.

Don Taylor, Wasatch County Trail Planner, informed Council that the Committee had discussed many of the concerns Council was mentioning prior to concluding the best recommendation as had been presented. He noted a five-foot sidewalk with bike-lane was not mentioned in the Master Plan. Council Member Barney noted the high cost of moving or burying power-poles and the need to involve Heber Light and Power in such a discussion. Council Member Kahler mentioned the public hearing with the Planning Commission as well as Open Houses held for the affected neighborhoods in order to determine the recommended routes. She felt it was important to garner community support.

Mayor Pro Tem Stack opened the discussion for public comment.

Mike Bradshaw, Heber City resident, provided feedback for the proposed trail route alternatives including his preference for asphalt trails versus concrete. He expressed appreciation to the Committee and the Council for their work.

Linda Middleton emphasized using local contractors and local jobs. She asked whether the RAP (recreation, arts, and parks) tax was a separate taxing entity and whether the money collected would go to local projects. She wished to see local money, local jobs, local materials. She wanted to see less pavement because of what happened in Moab. She hoped the proposed trails would be flat and not at a steep angle. Who would maintain the trails and do snow removal? Who would prevent ATVs from driving on the trails through neighborhoods and making noise? Would the City be liable for incidents on the trails? She hoped that all of the money from the RAP tax would stay in local businesses in Heber and not be sent to India or China or manhole covers we can't get. That had been a problem in the past with getting construction projects done. Who maintains the trails?

Don Taylor replied that many trails were installed by developers and maintained by HOAs (homeowners associations) thereafter. The purpose of the Master Trails Plan was to allow the community connectivity from their home to the surrounding regional trails. The RAP tax would help with maintenance costs of the trails. He commended the efforts of Wasatch County, Heber City, and Midway City to hire locally. There was always the possibility of ATVs on trails, just as the electric scooters and electric bikes used the trails.

Luke Searle noted the second portion of the agenda item was to change the Committee's acronym to POSTT (Parks, Open Space, Trails, and Trees) from OSTPT (Open Space, Trails, Parks, and Trees).

Motion: Council Member Phillips moved to approve Ordinance 2022-22 as submitted by the Open Space, Trails, Parks, and Trees Committee as well as amend the committee's name to be the Parks, Open Space, Trails, and Trees Committee (POSTT). Council Member Barney made the second. **Rollcall Vote: Voting Yes:** Council Members Kahler, Johnston, Barney, Stack, and Phillips. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

3. Discussion regarding proposed Fitzgerald Annexation (Kohler) – 30 min

Item 3 Staff Report Fitzgerald Annexation

Senior Planner Jamie Baron reviewed the annexation process and informed Council the next steps would be to hold a Public Hearing, negotiate a Master Development Agreement (MDA), and present for Council consideration of approval. He showed an image of a map reflecting the location of the proposed annexation and reviewed zoning details as well as the concept plan. Staff was seeking Council feedback to move forward with the drafting of an MDA with the petitioner.

Annexation Representative Mike Bradshaw shared the petitioner's intention for the MDA for this annexation to be an addition to the Sorenson's existing MDA in hopes of simplifying the process. He pointed to the provisions in sections six and 8.5 that he felt permitted such additions. The objective was to provide connectivity to Highway 40. The plan included additional retention basins that would prevent storm drainage being sent across Highway 40 and into the North Fields. The spring located in a proposed park had been used by pioneers passing through the Valley. He believed the proposed development concept complied with the City's General Plan.

Council Member Kahler asked if the concept design would include affordable housing. Mr. Bradshaw indicated that affordable housing had yet to be considered. Council Member Phillips noted the lack of a school site and asked whether there was any plan for a school site. Mr. Bradshaw indicated ongoing work with the School District to identify a school site. Council Member Kahler wished to see additional parking in the plan to accommodate all the vehicles. Mr. Bradshaw shared intentions to disallow the use of garages for storage rather than parking. Council Member Kahler wished to see affordable housing included as she felt the proposed townhome concept plan provided good opportunity to fill the need. Council Member Barney agreed.

Mayor Pro Tem Stack did not support the proposed concept as the area was zoned for rural residential. He felt the rural residential area was an important part of the North Village Overlay Zone and maintained the spacing of the homes created a buffer between the rural area and village centers. Council Member Kahler felt the area had been zoned to protect the Fitzgerald land owners. She felt that when the City allowed high-density development to surround farmlands, it impeded farmer's abilities to continue farming. Mr. Bradshaw felt the proposed concept plan did conform to the rural-residential zoning requirements and asked Council to consider the entire Sorenson Annexation land area rather than only the area plan being presented. Discussion continued.

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Council Member Johnston wished to clarify the new Fitzgerald Annexation would be asked to make the same dedications of North Village Preservation Fees and affordable housing as the City was asking of the other North Village annexation petitioners. Council Member Phillips agreed and wished to ensure the need for additional schools was not overlooked.

4. Discussion regarding proposed amendment to the Sign Ordinance (Kohler) – 20 min

Item 4 Sign Ord Discussion

Senior City Planner Jamie Baron explained he was seeking Council direction regarding certain issues that had arisen regarding the City's recently adopted Sign Ordinance. He provided examples of businesses that wished to install signs that did not comply with the current ordinance. City Manager Matt Brower expressed a hope that the City would adopt uniform signs to provide City branding for City facilities and parks. Discussion regarding park signs versus commercial sign designs followed.

Dave Hicks, representing Karl Malone Power Sports, explained that, as part of a dealer agreement, each brand sold required representation on the retailer's sign. He pointed out that grocery stores who would want to advertise additional services such as a pharmacy or drive-thru would face much the same hurdles. Council Member Phillips asked Staff to compose a solution for Council consideration. Mayor Pro Tem Stack proposed permitting businesses to divide their total allowed sign space percentage in order to accommodate additional wall signs. Council Member Johnston supported the suggestion. He hoped the City would not over-regulate sign restrictions.

Mayor Pro Tem skipped to item six on the agenda.

Recess as the Heber City Council and Convene as the Community Reinvestment Agency (CRA) Board

Motion: Council Member Kahler made a motion to recess as the Heber City Council and convene as the Community Reinvestment Agency (CRA) board. Council Member Phillips made the second. **Voting Yes:** Council Members Barney, Johnston, Kahler, Phillips, and Stack. **Voting No**: none. The CRA board convened at 10:00 p.m.

5. CRA Strategic Discussion – 30 min

Item 5 CRA PowerPoint
Item 5 CRA Council Priorities
Item 5 CRA Envision Heber 2050 General Plan
Item 5 CRA Heber City Downtown Study - Final Draft

Mr. Brower explained his ranking of CRA board priorities was based upon the number of Council Members that had expressed support of each one. He had organized the priorities based on the Main Street America blueprint and provided a timeline to achieve the priorities.

Mr. Brower reviewed the strategic plan moving forward, beginning with the inclusion of CAMS (Community Alliance for Main Street) in order for Heber City to achieve Tier Two status with the Utah Main Street Program and become eligible for grants. Council expressed appreciation for the comprehensive plan.

Council Member Kahler expressed concern with the proposal that CAMS begin charging a membership fee and thereby competing with the Chamber of Commerce for memberships. Mr. Brower explained the need for CAMS to become financially sustainable long term.

Council consensus was for Staff to proceed. The item would be returned to a future meeting for formal approval by the CRA board.

Mr. Brower shared the importance of surrounding entities agreeing to partner with Heber City in the CRA program through interlocal agreements. He asked Council to consider their approach to the County and School District for their participation.

Motion: Council Member Phillips moved to adjourn as the CRA board and reconvene as the City Council. Council Member Kahler made the second. Voting Yes: Council Members Barney, Johnston, Kahler, Phillips, and Stack. **Voting No**: none. The CRA board adjourned and the City Council Meeting reconvened at 10:17 p.m.

Mayor Pro Tem Stack moved forward on the agenda to item ten.

Adjourn as the Community Reinvestment Agency (CRA) Board and Reconvene as the Heber City Council

6. Consider Approval of Resolution 2022-22 Amending Fiscal Year 2022-2023 Budget for Seven City Fleet Vehicles (Bingham, Kennard) – 5 min

Item 6 Staff Report Resolution 2022-22 - Copy

Based upon previous discussion and the opportunity for public comment during the Public Hearing held earlier in the meeting, there was no further discussion or comments from the public.

Motion: Council Member Johnston moved to approve Resolution 2022-22 amending the Fiscal Year 2022-2023 Budget for seven City fleet vehicles. Council Member Phillips made the second. **Rollcall Vote: Voting Yes:** Council Member Phillips, Kahler, Johnston, Barney, and Stack. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

Mayor Pro Tem Stack moved ahead on the Agenda to item eight.

7. Consider Approval of Ordinance 2022-21 Updating the Moderate Income Housing Plan (Baron) – 30 min

Item 7 PowerPoint
Item 7 Staff Report Ordinance 2022-21 MIHP

Senior City Planner Jamie Baron explained the State requirement for municipalities to provide an updated Moderate Income Housing Plan (MIHP) by October 1, 2022. The Planning Commission had held a Public Hearing and forwarded a positive recommendation to the City Council for approval of the MIHP as presented. Mr. Baron provided key data information used to compose the report including household size, median house value, and median household income for the City. He reviewed the remainder of the Plan for the Council including goals for implementation of the Plan.

Council Member Kahler felt Heber City was providing the moderate-income housing for the entire County and questioned what could be done to encourage surrounding entities to do more. Mr. Brower explained the States intent to review the reports received and withhold monies from entities found to not be doing enough to meet State compliance requirements. Council Member Barney proposed including a good land-lord program to incentivize affordable rental retention. She felt consideration for housing allowances for essential workers as well as incentivizing affordable housing and retention thereof should be moved up on the priority list into the current year. Mr. Baron explained requirements to implement the programs would be problematic for implementing that soon.

Motion: Council Member Kahler move to approve Ordinance 2022-21 with the findings and conclusions in the Staff Report. Council Member Phillips made the second**. Rollcall Vote: Voting Yes:** Council Members Stack, Barney, Johnston, Kahler, and Phillips. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

Council Member Kahler proposed enlisting a lobbyist to take the concerns of municipalities before the legislature. Mr. Brower reminded Council the City had a lobbyist.

Motion: Council Member Kahler moved to extend the City Council Meeting until 10:30 p.m. in order to finish discussion of the remaining three agenda items. Council Member Johnston made the second. **Voting Yes:** Council Members Barney, Johnston, Kahler, Phillips, and Stack. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

Mayor Pro Tem Stack moved the meeting back to agenda item five.

8. Consider Approval of Resolution 2022-23 to Amend the Consolidated Fee Schedule updating fees for Public Works, Culinary Water, Waste Water, and the Planning Department (Bingham, Searle) – 15 min

Item 8 Staff Report Resolution 2022-23

Assistant to the City Manager Luke Searle advised that all fees charged by the City needed to be included in the Consolidated Fee Schedule. Fees for Public Works services, Culinary Water, Waste Water, and Planning services needed to be updated. City Finance Manager Wes Bingham shared the proposed dollar amount of the changes and the reason for each. Council Member Kahler asked if the largest impact of the fee increases would be placed on the developers. Mr. Bingham noted the utility rate increases would have the largest impact but had been scheduled to take place in increments in order to have a gentler impact on customers.

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Motion: Council Member Kahler moved to approve Resolution 2022-23 as presented with the findings and conditions as presented by Staff. Council Member Johnston made the second. **Rollcall Vote: Voting Yes:** Council Members Kahler, Johnston, Barney, Stack, and Phillips. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

Mayor Pro Tem Stack noted he had neglected to call for public comment on the last few agenda items and asked if there was anyone present who wished to comment. None came forward.

9. Consider Resolution 2022-19 to Update the City Purchasing Policy (Bingham) – 10 min

Item 9 Staff Report Resolution 2022-19 Purchasing Policy

City Finance Manager Wes Bingham explained the proposed Purchasing Policy amendments would maintain accountability, transparency, and efficiency. The changes would allow the City to achieve cost savings on significant purchases and expenditures while not overwhelming Staff with extra paperwork and ineffective practices. Mr. Bingham reviewed the proposed addition of section E, prohibiting the distribution of gift cards to employees, as gift cards were considered a taxable benefit and subject to IRS (Internal Revenue Service) audit. Additional proposed amendments made changes to the purchasing process, purchase approval process, sealed bid purchase process, and the awarding of contracts process.

Motion: Council Member Kahler moved to approve the proposed changes to sections: 3.14.050; 3.14.070; 3.14.080; and 3.14.100 in Heber City's Purchasing Policy as outlined by Staff in Resolution 2022-19. Council Member Phillips made the second. **Rollcall Vote: Voting Yes:** Council Members Kahler, Johnston, Barney, Stack, and Phillips. **Voting no:** none. The **Motion Passed unanimously, 5-0.**

Mayor Pro Tem Stack confirmed there was no one from the public that wished to make a comment and returned the meeting to agenda item seven.

10. Consideration to Adopt Resolution 2022-25 Amending the Rules of Order and Procedure for the Heber City Council (Stack) – 15 min

Item 10 Staff Report Resolution 2022-25 Rules of Order and Procedure

Mayor Pro Tem Stack asked, based upon recommendation from the Utah Local Government Trust, to include Roberts Rules of Order in the City's 'Rules of Order and Procedure for the Heber City Council'. He asked that the public comment period on agenda items precede Council deliberation for the process to be ordered as follows:

1. Agenda item presentation
2. Public comment
3. Council deliberation and motion

Discussion regarding meeting procedure and time efficiency followed.

Motion: Council Member Phillips moved to approve Resolution 2022-25 with changes to the City's Rules of Order and Procedure as follows:

- Revise rule 4.2(F)(1)(a) to state the public comment period would be after the presentation and before Council deliberation and Council deliberation would be combined with the questions or comments from the Mayor.
- Amend rule 4.2(F)(1)(c) to state no public comment would be received after a motion was made unless the motion should fail for lack of a second.
- Amend rule 5.2(A)(1) inserting the language "the Chair shall recognize the motion and allow for opportunity of a second, at which point, there may be discussion on the motion by the Council but no further public comment. If there is no second or a motion is defeated, debate may continue".
- Revise rule 2.0 to include Robert's Rules of Order, 12th edition or newer, are adapted and incorporated herein by reference
- Update rule 7.C(8) to reflect the changes in the motion

Council Member Kahler seconded the motion.

Discussion: Council Member Phillips wished to clarify the changes in the motion did not limit public comment but rather rearranged where public comments were allowed.

Kelly Gomez, Heber City resident, felt that, as a member of the public, hearing Council deliberation often answered questions, thereby eliminating the need for many public comments. She hoped the change in order would be temporary.

Rollcall Vote: Voting Yes: Council Members Phillips, Kahler, Johnston, Barney, and Stack. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

Motion: Council Member Kahler moved to extend the meeting to 11:00 p.m. in order to discuss Work Meeting agenda item three that had been bypassed. Council Member Johnston made the second. **Voting Yes:** Council Members Barney, Johnston, Kahler, Phillips, and Stack. **Voting No:** none. The **Motion Passed unanimously, 5-0.**

Discussion returned to Work Meeting agenda item three.

IX. COMMUNICATION:

Council Member Johnston shared that he had been invited to work with the CAPS (Center for Advanced Professional Studies) students on an affordable housing project. CAPS was going to investigate affordable housing for public employees by doing financial analysis, public entity surveys to determine need, architectural renderings, and layouts. Council Member Kahler expressed support for the project but felt the group should be tasked with identifying locations as well rather than using the Duke property as a hypothetical location. She worried about public misperception.

Mr. Brower shared the following:

- A Public Works employee who had been injured on the job was home from the hospital, doing well, and expected to make a full recovery.
- There would be a ribbon-cutting ceremony and celebration to open a new City park on September 16 at 4:00 p.m.

DRAFT

- The second Heber Leadership Academy was underway.
- The Utah League of Cities and Towns Annual Conference was scheduled for October and Council was strongly encouraged to attend.
- He would be out of town for the September 20, 2022 Council Meeting and would participate virtually.

X. CLOSED EXECUTIVE SESSION:

1. Real Estate

Council did not enter a second Closed Executive Session at the end of the Council Meeting.

XI. ADJOURNMENT:

Motion: Council Member Kahler moved to adjourn. Council Member Phillips made the second. The meeting adjourned at 10:53 p.m.

_____

Trina Cooke, City Recorder

DRAFT

TAB 2

City Council Staff Report

MEETING DATE:	September 14, 2022
SUBJECT:	2022 MIHR, Resolution 2022-24
RESPONSIBLE:	Jamie Baron
DEPARTMENT:	Planning Department
STRATEGIC RELEVANCE:	Community and Economic Development

HEBER CITY
HEART OF THE WASATCH BACK

SUMMARY

The proposed is the 2022 Moderate Income Housing Report. The report is submitted to the state, as required by the State of Utah.

The policy questions include the following:

1. Should the Council adopt the proposed Moderate Income Housing Report as written?

RECOMMENDATION

Staff recommends the City Council adopt Resolution 2022-24 to comply with the State Requirements pertaining to Moderate Income Housing Reporting.

BACKGROUND

In 2019 the State Legislature passed SB 34, which now requires reporting and updating of the City's Moderate Income Housing Plan annually. In 2022, HB 462 changed the requirements to require reports to the Department of Workforce Services by October 1, 2022.

DISCUSSION

STATE REPORTING REQUIREMENTS
The State requires the following for submitting the report.

1. Create report summarizing efforts made and implementation plan for 2022-23 fiscal year.
2. Post the report on the City's website.
3. Submit the updated Housing element of the General Plan.

Staff has completed all of the required steps. The State has asked that the Council adopt the report by resolution, as it will stay on our website.

The following is a summary of the report.

- Identifies the Cities efforts to promote affordable housing with developments, potential developments, and zone changes.
- Outlines the proposed efforts of the 2022-23 year.
- Provides status updates to the deed restricted affordable units.

FISCAL IMPACT

N/A

CONCLUSION

The City is required to report work done by the City for affordable housing in 2021 to the State by October 1, 2022. The report shows that the City is improving the future affordable housing supply and that planned units will be coming to market over the next year. Staff is recommending the Council adopt Resolution 2022-24 with the following findings:

Findings

1. The Moderate Income Housing Report is required by SB 34 and HB 462
2. The Council has updated the Moderate Income Housing Plan on September 6, 2022

ALTERNATIVES

1. Approve
2. Continue
3. Deny

POTENTIAL MOTIONS

Staff Recommended Option – Approval

I move to **approve** Resolution 2022-24 as outlined in the conclusion of the staff report.

ACCOUNTABILITY

Department: Planning Department
Staff Member: Jamie Baron

EXHIBITS

1. Resolution 2022-24

Exhibit 1

RESOLUTION NO. 2022-24

AN RESOLUTION ADOPTING THE 2022 MODERATE INCOME HOUSING REPORT

WHEREAS, the Heber City Council finds it in the public interest to adopt the 2022 Moderate Income Housing Report, as required by Utah State Code and House Bill 462.

BE IT ORDAINED by the City Council of Heber City, Utah, that the 2022 Moderate Income Housing Report is **ADOPTED** as shown in Exhibit A.

This Resolution shall take effect immediately upon passage.

ADOPTED and PASSED by the City Council of Heber City, Utah this _____ day of _____, 2022, by the following vote:

	AYE	NAY
Council Member Rachel Kahler	_____	_____
Council Member Ryan Stack	_____	_____
Council Member Mike Johnston	_____	_____
Council Member Yvonne Barney	_____	_____
Council Member Scott Phillips	_____	_____

APPROVED:

_____

Mayor Heidi Franco

ATTEST:

_____ Date: _____

RECORDER

Date of First Recording: _____

Exhibit A

2022 Moderate Income Housing Report

Heber City

Summary

In 2021, Heber City has taken many actions to aid in the creation of affordable housing, including approving development agreements requiring 10% of more of the units to be deed restricted affordable units. 2021 also saw the start of majority of affordable housing developments. It is anticipated that much of the units will be to market in the 2022-2023 fiscal year. For the 2022-23 fiscal year, the Heber City Council has identified multiple strategies to aid in the creation and retention of affordable housing.

2021 GOALS AND POLICIES

1) GOAL: Heber City should provide a realistic opportunity to meet the estimated needs for additional moderate income housing.

POLICIES:

a) facilitate a reasonable opportunity for a variety of housing, including moderate income housing to meet the needs of people desiring to live there;
b) implement land use policies that allow persons with moderate incomes to benefit from and fully participate in all aspects of neighborhood and community life;
c) consider Inclusionary Housing ordinances to close the future housing need gap.
d) consider requiring land dedications for moderate income housing with annexations;
e) consider rezoning for densities necessary to assure the production of moderate income housing;
f) facilitate the rehabilitation or expansion of infrastructure that will encourage the construction of moderate income housing;
g) provide zoning regulations to encourage housing types for elderly or senior citizens including assisted care, independent care, and targeted senior retirement communities;
h) promote adequate housing opportunities to recruit and retain a workforce with the skills and credentials needed by community employers;
i) promote the creation and retention of housing stock affordable to very low, low, moderate, and moderate to area median income (AMI) households;
j) recognize the need for special target groups for affordable housing, namely, families in crisis, handicapped and other special need groups; and
k) encourage the rehabilitation of existing uninhabitable housing stock into moderate income housing;

2) GOAL: Heber City should continue to foster partnerships with non-profit organizations and developers, and identify new funding sources to implement affordable housing policies.

POLICIES:

a) focus on state and federal -sponsored programs, such as HOME Comprehensive Housing Assistance Mortgage Program, USDA's rural development, Community Development Block Grant Program, Utah Housing Authority's First Time Home Ownership, Credit to Own (CROWN), and ECHO;
b) consider using state and federal program funding to purchase land for affordable housing;
c) consider general fund subsidies to waive construction related fees that are otherwise generally imposed by the city;
d) consider utilization of state or federal funds or tax incentives to promote the construction of moderate income housing;
e) consider utilization of programs offered by the Utah Housing Corporation within that agency's funding capacity;
f) consider utilization of affordable housing programs administered by the Department of Community and Culture; and
g) continue to support the County-wide Housing Authority.

3) GOAL: Heber City shall biennially review the moderate income housing plan element of its general plan.

POLICIES:

a) As required by Utah State Code, Heber City shall send a copy of a biennial report to the Housing & Community Development Division of the Department of Workforce Services and Mountainland Association of Governments; the biennial review shall include a description of efforts made by the city to reduce, mitigate, or eliminate local regulatory barriers to moderate income housing, actions taken by the city to encourage preservation of existing moderate income housing and development of new moderate income housing, progress made within the city to provide moderate income housing, as measured by permits issued for new units of moderate income housing, and efforts made by the city to coordinate moderate income housing plans and actions with neighboring municipalities;
b) Heber City should update the Moderate Income Housing Element of the General Plan at each Census and at least once between each Census to ensure updated accurate data and policies; any fees or target group demographic data should be updated annually based on available data from the Census or official Census updates, HUD, or other government or demographic sources.

OBJECTIVES

1) Revise the Affordable Housing Ordinance to reflect current housing needs within the city:
    a) Consider changing the ordinance to an Inclusionary Housing ordinance, requiring up to 20% of all future market rate developments to provide affordable housing to close the future need gap of 128 units.
    b) consider deed restriction programs to keep new moderate income housing units affordable to target populations;
    c) consider land dedications by developers to promote land acquisition for the Wasatch County Housing Authority, Habitat for Humanity, and other affordable housing

organizations;
   d) consider alternative approaches to affordable housing dedications or payments by developers that will not create costs that are passed down to home buyers; and
   e) consider fee and impact fee waivers for affordable housing projects;
2) Remove and/or revise regulatory barriers to affordable housing in the city's land use regulations;
3) Educate home builders, neighborhoods, and developers about the need for affordable housing in Heber City;
4) Promote energy efficiency and LEED certified homes and developments;
5) Promote owner occupied housing units as the majority of all new affordable units.
6) Provide 397 units of 30% AMI or less in the next five years:
7) Promote utilization of accessory apartments to address 30% AMI rental needs.
8) Provide 190 units of 50% AMI or less in the next five years:
9) Promote utilization of accessory apartments to address 50% AMI rental needs.
10) Provide 366 units of 80% AMI or less in the next five years;

SENIOR CITIZEN

Provide a variety of housing types for senior citizens, including assisted care centers, independent care centers, and targeted senior retirement communities. These facilities need to be located near critical support facilities, namely: medical, shopping, churches, etc.

2021-2022 ACTIONS

From January 2021 – June 2022, the Heber City Council took the following actions to address affordable housing:

- Amended the Accessory Dwelling Unit (ADU) code to address state code changes and reduce regulations for ADU's.
- Established a Community Reinvestment Agency (CRA), with attainable housing as a key objective for the use of generated funds.
- Amended the Parking code to reduce the parking requirements for core commercial and mixed use centers.
- Approved a development agreement to rehabilitate a dilapidated care facility into 35 multi-family units, including a streamlined development process and reduced parking. The property owner has not proceeded with the development and has placed it on the market.
- Approved the Highlands Annexation, with a 10% requirement of affordable housing. The development contains multiple housing types including student housing and multi-family housing.
- Approved a development agreement to permit a 4-plex multi-family building for the housing of persons with disabilities.
- Approved the construction of a City Wide Utility Project, which will replace the existing water and sewer lines, and install secondary irrigation in the downtown area of the City.
- Approved a contract for consulting services to address the future land use of the down town area.

AFFORDABLE UNITS UPDATE

The following developments contain affordable units. The following indicates the current status of each development.

5 Year Affordable Housing Supply		
Development	**Units**	**Status**
The Orchard	2	Building Permits Issued – Under Construction
Wasatch Vista (Self Help Homes)	42	Subdivision Under Construction
Parkview Place (MCHA)	49	Building Permits Issued – Under Construction
Heber Meadows North	5	Building Permits Issued – Under Construction
Coyote Ridge	18	Building Permits Issued – Under Construction
Springs at Coyote Ridge	8	Building Permits Issued – Under Construction
98 E Center	3	Building Permits Issued – Under Construction
Old Mill Village	25	In Building Permit Review
Sawmill Town Home ADU's	62	In Building Permit Review
Meadows at Southfield (Self-Help)	46	Final Plat Approved
Highlands	67	Annexation Approved
Jordanelle Ridge (5yrs of 30 yr plan)	97	Annexation Approved
New London	60	Site Plan in Review
Turner Mill	29	Building Permits Issued – Under Construction

In addition to specific developments, the City has issued 12 ADU Permits.

Market Conditions

In addition to the affordable units identified are market rate multi-family and town home units that are under construction. As a result of the Covid 19 Pandemic, lumber and construction supply shortages, labor shortages, and net migration, the housing market in Utah, and particularly Heber City has outpaced development. This has led to many of the market rate (non-deed restricted) multi-family and town home units to cost more than what is considered affordable by HUD and State Standards, as outlined in the Moderate Income Housing Plan adopted September 6, 2022. Additionally, with the market demand, home builders are building larger homes.

2022-2023 ACTION PLAN

Under HB 462, Action Plans are a required element of Moderate Income Housing Plans (MIHP). The MIHP has been amended and submitted to the State of Utah, as required by HB 462. The Action Plan is based on the fiscal year of the City, which runs from July 1st to June 30th of each year.

For the 22-23 fiscal year, the follow is the Heber City Action Plan, with references to the strategies outlined is UCA 10-9a-403(2)(b)(iii).

Short Term – 1 Year

Fiscal Year 2022-2023		
Action	**Status**	**State Code Strategy**
Consider Zone Changes to facilitate Affordable Housing and negotiate deed restricted units.	Ongoing	A
Continue downtown Sewer, Water, Irrigation replacement project	Underway	B
Modify ADU code to reduce regulations	Complete	E
Begin Downton planning process to direct zone changes in downtown	Upcoming	F
Modify parking standards for mixed use and core areas	Complete	H
Modify Affordable Housing Code to be incentive based (non-legislative requests)	Upcoming	J
Implement Mortgage Assistance with Wasatch County Housing Authority	Complete	N
Ensure ADU's don't require additional Impact Fees	Complete	R
Begin search for possible property acquisition to create affordable units with other entities, including County, School District, Housing Authority, and non-profits	Underway	T
Implement Mansion Homes for residential transition areas	Upcoming	W

Mid Term – 1-5 Years

Fiscal Years 2023-2027		
Action	**Status**	**State Code Strategy**
Implement a good landlord and other programs to incentivize affordable rental unit retention. Continue to work with Housing Authority on deed restriction monitoring	Upcoming	K
Create a Community Land Trust	Upcoming	M
Apply for CDBG and other Grant funds for Matching of property acquisition	Upcoming	O
Consider Housing allowances for essential City workers	Upcoming	
Incentivize affordable housing and affordable housing retention	Upcoming	

Long Term – 5+ Years

Fiscal Years 2028 - Future		
Action	**Status**	**State Code Strategy**
Rehabilitate existing housing into Affordable Housing via CRA	Upcoming	C
Reinvest CRA funds into Affordable Housing.	Upcoming	P

Conclusion

Heber City has been working on affordable housing over the last several years and should see significant multi-family and town home units come to market over the next year. As Heber City plans for the next 5 years, the City Council is looking at multiple solutions ranging from acquiring land to a vision and zone changes of the down town area. It is anticipated that affordable housing will continue to be an issue and priority for the City over the next few years.

TAB 3

City Council Staff Report

MEETING DATE:	9/20/2022
SUBJECT:	Proposed Amendments to the City Code
RESPONSIBLE:	J. Mark Smedley
DEPARTMENT:	Legal
STRATEGIC RELEVANCE:	Community & Economic Development

As indicated previously, pursuant to training from the Utah Government's Trust on Rules, Powers and Procedure, Heber City and State Codes presented at the Heber City Council Meeting August 16, 2022, and discussion on the City Code, there was a desire to clarify the scope of responsibility of the city manager with regard to supervision of the appointed employees, inasmuch as the manager is the chief administrative officer of the City to whom all employees should report.

In an effort to articulate these thoughts and observations, it was requested that this item be placed upon the September 6, 2022 City Council Meeting work agenda for discussion. Pursuant to discussion on said September 6th Work Meeting Agenda, the City Council directed staff to submit this item on the Regular Agenda for the next Council Meeting on September 20, 2022, with a proposed Amendment to Sections 2.14.040 *Functions and Duties, and City Manager*, *and* 2.36.035, *Chief of Police and Officer and Duties*, of the Heber City Municipal Code, including but not limited to the supervision of the Chief of Police, to mitigate any perceived conflicts of reporting and supervisory procedures associated with the Chief of Police as an appointed employee, and the City Manager as the chief administrative officer of the City.

RECOMMENDATION

That the Council approve and adopt the proposed amendment to the Municipal Code as described above, by Ordinance.

BACKGROUND

See above.

DISCUSSION

See above.

FISCAL IMPACT

No direct fiscal impact, liability or risk to Heber City.

CONCLUSION

See above.

ALTERNATIVES

Approve;

Approve with revisions or conditions;

Not approve;

Continue.

POTENTIAL MOTIONS

Staff Recommended Option –

Move to approve and adopt the proposed Ordinance

Alternative 2 –

Move to approve and adopt the proposed Ordinance with the following revisions, changes or conditions. .. . .

Alternative 3 –

Move to continue or table the item.

Departments: Legal
Staff Members: J. Mark Smedley

EXHIBIT A.

Ordinance _2022- 25_____

AN ORDINANCE AMENDING SECTIONS 2.14.040 A, City Manager, ***FUNCTIONS AND DUTIES***; and 2.36.035 ***CHIEF OF POLICE and OFFICER AND DUTIES,*** OF THE HEBER CITY MUNICIPAL CODE.

ORDINANCE 2022-25

AN ORDINANCE AMENDING SECTIONS 2.14.040 A, City Manager, *FUNCTIONS AND DUTIES*; and 2.36.035 *CHIEF OF POLICE and OFFICER AND DUTIES***,** OF THE HEBER CITY MUNICIPAL CODE.

BE IT ORDAINED by the City Council of Heber City, Utah, that Sections 2.14.040 A and 2.36.035 of the Heber City Municipal Code, City Manager, *Functions and Duties*, and *Chief of Police and Officer and Duties*, are amended as set forth below. This Ordinance is amended to reflect the City Council's decision to clarify the role, responsibilities and supervisory duties of the City Manager as the chief administrative officer of the City, pursuant to all employees of the City.

2.14.040 Functions and Duties

A. Section 10-3b-303, (U.C.A.), 2008, provides that the governing body in a municipality operating under a six-member council form of government may appoint a city manager to perform executive and administrative duties or functions that the Legislative Body by ordinance, resolution, employment contract, or legislative motion delegates to the manager. The Legislative Body of the City can change such ordinances, resolutions, contract, motion, duties or functions by a majority vote. The Legislative Body supervises the performance of any executive or administrative duty or function within their powers per U.C.A. 10-3b-303(1) (a).

1. Pursuant thereto, all employees, including appointed employees, shall report directly to, and be exclusively responsible to the City Manager. All supervision, review and administration for such employees shall be handled by the City Manager.

2.36.035 Chief of Police and Officer Authority and Duties

The Chief of Police shall keep his office in such a place as the city manager, from time to time, directs, and shall, with the consent of the city manager, direct and control the police of the city, and by and with the consent of the mayor, may appoint such patrolmen and special police as may be required.

If any section, subsection, sentence, clause, phrase, or portion of this Ordinance is, for any reason, held invalid or unconstitutional by any court of competent jurisdiction, such provision shall be deemed a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions of this Ordinance.

If any provisions of the Heber City Code heretofore adopted are inconsistent herewith they are hereby repealed.

To the extent that any ordinances, resolutions, or policies of Heber City materially conflict with the provisions of this Ordinance, they are hereby amended to comply with the provisions hereof.

This Ordinance shall take effect immediately upon passage.

PASSED, APPROVED and ORDERED TO BE PUBLISHED BY THE HEBER CITY COUNCIL this _____ day of _____ 2022.

	AYE	NAY	ABSENT	ABSTAIN
Rachel Kahler	_____	_____	_____	_____
Michael Johnston	_____	_____	_____	_____
Ryan Stack	_____	_____	_____	_____
Scott Phillips	_____	_____	_____	_____
Yvonne Barney	_____	_____	_____	_____

APPROVED:

_____
Mayor Heidi Franco

ATTEST:

_____ Date: _____
RECORDER

ORDINANCE 2022-25

AN ORDINANCE AMENDING SECTIONS 2.14.040 A, City Manager, *FUNCTIONS AND DUTIES*~~;~~, and 2.36.035 *CHIEF OF POLICE and OFFICER AND DUTIES*, OF THE HEBER CITY MUNICIPAL CODE.

BE IT ORDAINED by the City Council of Heber City, Utah, that Sections 2.14.040 A and 2.36.035 of the Heber City Municipal Code, *City Manager, Functions and Duties*, and *Chief of Police and Officer and Duties*, are ~~is~~ amended as set forth below. This Ordinance is amended to reflect the City Council's decision to clarify the role, responsibilities and supervisory duties of the City Manager as the chief administrative officer of the City, pursuant to all employees of the City.

2.14.040 Functions and Duties

A. Section 10-3b-303, (U.C.A.), 2008, provides that the governing body in a municipality operating under a six-member council form of government may appoint a city manager to perform executive and administrative duties or functions that the Legislative Body by ordinance, resolution, employment contract, or legislative motion delegates to the manager. The Legislative Body of the City can change such ordinances, resolutions, contract, motion, duties or functions by a majority vote. The Legislative Body supervises the performance of any executive or administrative duty or function within their powers per U.C.A. 10-3b-303(1) (a).

1. Pursuant thereto, all employees, including appointed employees, shall report directly to, and be exclusively responsible to the City Manager. All supervision, review and administration for such employees shall be handled by the City Manager.

2.36.035 Chief of Police and Officer Authority and Duties

The Chief ~~C~~of Police shall keep his office in such a place as the city manager~~city council may~~, from time to time, directs, and shall, with the consent of the city manager~~advice of the city council~~, direct and control the police of the city, and by and with the consent of the mayor, may appoint such patrolmen and special police as may be required.

If any section, subsection, sentence, clause, phrase, or portion of this Ordinance is, for any reason, held invalid or unconstitutional by any court of competent jurisdiction, such provision shall be deemed a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions of this Ordinance.

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To the extent that any ordinances, resolutions, or policies of Heber City materially conflict with the provisions of this Ordinance, they are hereby amended to comply with the provisions hereof.

This Ordinance shall take effect immediately upon passage.

PASSED, APPROVED and ORDERED TO BE PUBLISHED BY THE HEBER CITY COUNCIL this _____ day of _____ 2022.

	AYE	NAY	ABSENT	ABSTAIN
Rachel Kahler	_____	_____	_____	_____
Michael Johnston	_____	_____	_____	_____
Ryan Stack	_____	_____	_____	_____
Scott Phillips	_____	_____	_____	_____
Yvonne Barney	_____	_____	_____	_____

APPROVED:

_____
Mayor Heidi Franco

ATTEST:

_____ Date: _____
RECORDER

General Business Items

Central Heber Water, Sewer, & PI Replacement Project Update

PROJECT PROGRESS UPDATE

9/20/2022

Presentation Overview

Project Status Overview

Sewer Update

Water Update

Pressurized Irrigation Update

Question and Answer



Project Status Overview

- 100 E
  - On Schedule to be completed this year with paving by Oct 15th
- 200 S & 300 S
  - Will not be completed and paved by end of year due to supply issues
  - Planning on Winter Work to help get back on schedule for the overall project.
  - Work anticipated to start on September 26th on 200 S
- Material Procurement
  - Water/PI - Approx 63% of materials for Phase 1A
  - Sewer – Have Materials for 100 East, but still need about 70% for 200 S & 300 S
- Impacts to Cost or Time
  - 100 E has less road base than anticipated
    - Team has evaluated options and believes best option is to pulverize the entire roadway to a depth of 8-10” and utilize pulverized material as base.
  - Overrun on road base quantities
    - Trenches for sewer and water lines ended up being wider than planned due to more cobble than anticipated in the trench zones causing sloughing and widening of trenches. Team is working on evaluating impact to project and ways to mitigate this moving forward.

Sewer

3 Sewer Crews on site - 2 mainline crews & 1 lateral crew

300 N

- Sewer main complete from Main St to 100 E

100 E

- Sewer main complete from 500 N to Center Street
- Sewer main from Center Street to 600 S complete by the 26th
- Lateral crew – following mainline crews w/ laterals should be completed by the 20th

Sewer started off slower than originally planned but is picking up speed now. This was due to unanticipated ground water in the trench at the 12-15 ft depth and a cobble rock layer causing sluffing in the trenches.

Water

2 Water Crews - 1 mainline crew & 1 water service crew

100 E

- Water Main complete from 500 North to 600 South
- Bac-T and Pressure testing is complete
- All water services and ties-ins anticipated to be complete by the 29th

Pressurized Irrigation

1 Pressurized Irrigation Crew

100 E

- PI main and services completed along 100 E
- Drain lines and sumps to complete the system are still being installed

Questions?
Concerns?



REGULAR MEETING

TAB 1

City Council Staff Report

HEBER CITY
HEART OF THE WASATCH BACK

MEETING DATE:	9/20/2022
SUBJECT:	Proposed Amendment to the Dickman Commingling Sewer Agreement
RESPONSIBLE:	J. Mark Smedley
DEPARTMENT:	Legal
STRATEGIC RELEVANCE:	Community & Economic Development

It is proposed that Heber City (The City), and the Dickman Legacy Ranch, LLC, the Owner of parcels within the previously known, Dickman Family Subdivision (Owners), amend a Commingling Sewer Agreement that was entered on March 29, 2005, to allow two (2) additional single family residences to connect to the Heber City Sewer Main Trunk Line along Hwy 113 (aka Midway Lane), amending the current aforementioned agreement which limits the total connections to four (4).

Heber City owns the trunk-line where the Owners' sewage will be deposited and commingled with sewage being delivered by Heber City to the HVSSD treatment plant. The City owned trunk-line was previously owned by HVSSD at the time the two above-mentioned Agreements were executed. This amendment proposes to increase the total connections from four to six.

In order to minimize the number of tap- ins to the existing sewer line, Owners have agreed to accommodate their desired two additional single family residences by connecting said sewer laterals for said homes, to only two sewer tie-in locations in the main sewer truck line.

Heber City is willing to increase the existing four (4) said connections for six (6), and allow commingling for said six residences, pursuant to the terms and provisions of the proposed Amending Agreement.

Heber City consents to this concept, so long as the Owners continue to indemnify and hold Heber City harmless pursuant to the indemnification provision 6 in the original 2005 Agreement. As additional consideration, Qwners reaffirm and specifically agree in the Amended Agreement to indemnify and hold Heber City harmless from (a) any claim arising out of the treatment of Owners' sewage and/or (b) any claim or damages arising as a result of Owners' sewage being in violation of its Sewage Treatment Service Contract with HVSSD, or their violation of this Agreement.

Owners will represent, acknowledge and affirm that the parcels to which the desired connections would affix are *Lots of Record* located in Wasatch County, and recognized as such by Wasatch County. Parcel boundaries may be modified and reconfigured, and still be served by the sewer laterals, so long as the parcels are within the outer perimeter of the area shown on the map, as Exhibit A.

Owners will reimburse Heber City for any costs or expenses associated with the additional connections, or any expansion necessary to service the lot owners of the Dickman Subdivision or its systems.

As a material term and condition of this Amended Agreement, in order to minimize the number of tap- ins to the existing sewer line, all connections to the Heber City trunk main sewer line along Hwy 113 must utilize the existing connection boxes or one other connection box that has not yet been constructed, so as to assure that only one new connection box is allowed to be tapped into the existing sewer line.

Heber City may charge Owners a special charge for wastes other than sewage. These could include, but not be limited to, any costs of operation and maintenance.

Attached herewith, is a proposed Amended Agreement referenced above.

RECOMMENDATION

Unless further revisions are desired, it is recommended that the Council adopt by Motion, the proposed Amended Agreement.

BACKGROUND

See above.

DISCUSSION

See above.

FISCAL IMPACT

No direct fiscal impact, liability or risk to Heber City.

CONCLUSION

Review and discuss, and if approved, adopt.

ALTERNATIVES

See below

POTENTIAL MOTIONS

Staff Recommended Option –

Adopt the proposed Amended Agreement.

Alternative 2 –

Adopt the proposed Amended Agreement, with the following conditions or revisions.

Alternative 3- Not authorize or approve.

Departments: Legal
Staff Members: J. Mark Smedley

EXHIBITS

Proposed Amended Agreement.

EXHIBIT A.

AMENDMENT TO THAT MARCH 29, 2005 PRIVATE SEWER CONNECTION AND COMMINGLING SEWER AGREEMENT

(Amended 2022).

THIS AMENDED AGREEMENT, is entered into this _____ day of _____, 2022, by and between Heber City (The City), and the h Legacy Ranch, LLC, the Owner of parcels within the previously known, Dickman Family Subdivision (Owners).

WHEREAS, the Owners desire to amend the 2005 Private Sewer Connection and Commingling Sewer Agreement to allow two (2) additional single family residences to connect to the Heber City Sewer Main Trunk Line along Hwy 113 (aka Midway Lane), amending the current aforementioned agreement which limits the total connections to four (4); and

WHEREAS, on the 7th day of December 1998, the Spring Creek Special Service District (SSD) entered an agreement with HVSSD to contract for sewage treatment services; and

WHEREAS, on the 19th day of December 1998, Heber City, Spring Creek SSD, and Heber Valley Special Service District entered into an Agreement to allow Spring Creek to commingle its sewage with the sewage of Heber City, and to allow Spring Creek to have its sewage treated at the Heber Valley Special Service District treatment plant; and

WHEREAS, the City owns the trunk-line where the Owners' sewage will be deposited and commingled with sewage being delivered by Heber City to the HVSSD treatment plant, which point is prior to a measuring device; and

WHEREAS, the City owned trunk-line was previously owned by HVSSD at the time the two above-mentioned Agreements were executed; and

WHEREAS, with this amendment, the total connections would increase from four to six; and

WHEREAS, in order to minimize the number of tap- ins to the existing sewer line, Owners would agree to accommodate the desired two additional single family residences by connecting said sewer laterals for said homes to only two sewer tie-in locations; and

WHEREAS, Heber City is willing to increase the existing four (4) said connections to six (6) and allow commingling for said six residences, subject to, and pursuant to the terms and provisions of this Amended Agreement,

NOW, THEREFORE, the Parties hereby agree and covenant as follows:

1. Each Owner is individually responsible for paying for their own, respective sewer service and connections, and solely and respectively responsible for any and all duties and obligations associated therewith.

2. Heber City consents to allow for two (2) additional single family residences to

connect to the Heber City Sewer Main Trunk Line along Hwy 113 (aka Midway Lane), amending the current aforementioned 2005 Agreement to accommodate the comingling of sewage up to a total of six (6) single family residences. Said commingling shall continue to enter and occur with the Heber City trunk-line prior to the location where Heber City's sewage is measured and tested.

3. Heber City consents to increase the connections to a total of six (6), and allow said commingling for the Owners' sewage being treated and the measuring and testing of the same, so long as the Owners indemnify and hold Heber City harmless pursuant to the indemnification provision 6 in the original 2005 Agreement, and the reaffirmed language in this Amended Agreement.

4. Owners represent, acknowledge and affirm that the parcels to which the desired connections would affix are *Lots of Record* located in Wasatch County, and recognized as such by Wasatch County. The aforementioned six laterals shall be for the six parcels shown on the attached map with county-issued Certificates of Zoning (Exhibit A). Parcel boundaries may be modified and reconfigured, and still be served by the sewer laterals, so long as the parcels are within the outer perimeter of the area shown on the map.

5. The Owners shall reimburse Heber City for any costs or expenses associated with the additional connections, and the actual process of connecting with said sewer or connection system, measuring of, testing of, treating of, or any expansion necessary to service the parcels, or the systems.

6. As a material term and condition of this Amended Agreement, in order to minimize the number of tap- ins to the existing sewer line, all connections to the Heber City trunk main sewer line along Hwy 113 must utilize the existing connection boxes or one other connection box that has not yet been constructed, so as to assure that only one new connection box is allowed to be tapped into the existing sewer line.

7. Owners reaffirm and again agree to indemnify and hold Heber City harmless from (a) any claim arising out of the treatment of Owners' sewage and/or (b) any claim for, or damages arising as a result of Owners' sewage being in violation of its Sewage Treatment Service Contract with HVSSD, or its violation of this Agreement and/or (c) any claim or damages arising as a result of any disruption, interruption, damage or failure, whatsoever, to or involving the Owners' connection system, including but not limited to any blockages, breaks or pressure releases, decreases or failures to the pipe system up to the point of connection into the Heber City trunk-line, including but not limited to the additional two connections referenced in this Amended Agreement.

8. Any sewer system and/or connection system used by Owners to deliver its sewage to the Heber City trunk-line shall be approved by Heber City before Owners are allowed to connect onto said trunk-line.

9. Owners shall be solely responsible for the maintenance, service, repair, upkeep and preservation and care of said sewer system and/or connection system up to the point of

connection with the Heber City trunk-line. All costs for the future connections, including but not limited to the two additional connections for the residential homes, shall be borne by, and paid to the City, by the parcel owner(s) prior to any required approvals by the City, and prior to the City allowing any connections to connection boxes located at two points to be determined by the City Engineer, along the west edge of the Hwy 113 right–of-way.

10. Owners shall be responsible for all costs and fees associated for the initial hookup of its sewage system to the Heber City trunk-line. Consistent and in accordance with the original 2005 Agreement, and, Exhibit A of said 2005 Agreement, (Sewer Connection Fee Schedule For Allowed Connections Outside Heber City), and also including now these two additional connections, Owners shall pay a "Base Rate" plus a "Monthly Usage Fee" equal to one and one-half times those rates, a "Heber City Collection System Fee" equal to one and one-half times that Fee, and a Heber Valley Special Service District Impact Fee per connection to HVSSD.

11. As additional consideration for said two connections, Owners shall donate $10,000.00 to the Heber City North Fields Preservation Fund.

12. Heber City is the beneficiary of the said December 7, 1998 Agreement, having acquired ownership of the aforementioned trunk-line, previously owned by HVSSD.

13. Owners shall be billed in the same manner as other residential customers, on a monthly basis. Heber City shall assume said billing responsibility pursuant to the fees and fee schedule set forth in Exhibit A.

14. Heber City may charge Owners a special charge for wastes other than sewage, These may include, but not be limited to, any costs of operation and maintenance occasioned by the character of such wastes and any damages to the System or Heber Valley Special Service District's Treatment System, fees that are updated to match current fees and assessments, or any fines or other penalties of costs resulting from loss of proper operations of the System or Heber Valley Special Service District's Treatment System due to the unapproved discharge within the Owners' property, their systems or directly related systems.

15. Heber City shall be allowed to assess impact and user fees, without limitation, to Owners as outlined in Exhibit A of the Original 2005 Agreement.

16. Heber City shall be allowed to modify or change said fees and/or fee schedule at any time without notice.

17. Owners agree to promptly pay all charges which are assessed by Heber City in accordance with this Amended Agreement, the original 2005 Agreement, and the aforementioned December 7, 1998 Agreement.

18. Owners acknowledge Heber City as beneficiary and assignee of HVSSD pursuant to said December 7, 1998 Agreement. In addition to the provisions of this Amended Agreement, and the original 2005 Agreement, Owners acknowledge that Heber City assumes the same position as indicated in said December 7, 1998 Agreement as HVSSD originally held. Owners

agree to perform all duties and satisfy all conditions and obligations for and in behalf of Heber City, which were previously afforded HVSSD pursuant to said 2005 Agreement, and the December 7, 1998 Agreement.

19. All provisions of said 2005 Agreement, and the December 7, 1998 Agreement not altered or amended by this Agreement, are adopted and incorporated into this Agreement for the benefit of Heber City and shall remain in force and binding upon Owners. Owners specifically and knowingly assume all such duties and obligations contained within said 2005 Agreement, and the December 7, 1998 Agreement, originally assumed by Spring Creek.

20. **ATTORNEYS FEES.** Any and all disputes arising out of or related to the terms and conditions of this Agreement, including the interpretation and validity of the terms herein and the respective rights and obligations of the parties, shall first be negotiated informally in good faith between the parties. If such informal negotiations do not resolve the dispute, the parties shall participate, in good faith, in mediation. If mediation is unsuccessful, then either party may pursue whatever legal remedies may be available, at law or equity, before a court of competent jurisdiction, the losing party to the controversy shall pay to the successful party reasonable attorney's fees incurred by such party and, in addition, such costs and expenses as are incurred in enforcing this Agreement.

WHEREUPON, the parties hereto have set their hands the day and year first above written.

HEBER CITY

BY: _____

Mayor Heidi Franco

TITLE: Heber City Mayor

DATE: _____

DICKMAN LEGACY RANCH, LLC,
Successor to Dickman Family subdivision

BY: _____

_____

TITLE:_____

DATE:_____

EXHIBIT A



Combined exhibits.pdf

TAB 2

City Council Staff Report

MEETING DATE:	September 20, 2022
SUBJECT:	2nd Highlands MDA Amendment
RESPONSIBLE:	Anthony L. Kohler, Planning Director
DEPARTMENT:	Planning Department
STRATEGIC RELEVANCE:	Community Development

SUMMARY

Highlands has submitted a second request to amend the Highlands MDA through an Administrative Amendment. Section 17.2.4 of the Highlands MDA requires the Administrator (City Manager), to notify the City Council of the request, and Council has the option of permitting the request to proceed as an Administrative Amendment approved by the City Manager, or can require the amendment to be processed as a Modification Amendment, which requires a larger and longer process of approval that includes approval by the City Council and review by the Planning Commission.

RECOMMENDATION

Staff recommends the proposed amendment be processed as an Administrative Amendment.

BACKGROUND

Section 17 of the MDA identifies the following as permitted Administrative Amendments that can be approved by the City Manager:

1) **Infrastructure.** Modification of the location and/or sizing of the infrastructure for the Project that does not materially change the functionality of the infrastructure.
2) **Design Guidelines**. Modifications of the Design Guidelines.
3) **Development Unit Allocations.** Any allocation of Development Unit densities to be made by Holdings or its successors.
4) **Minor Amendment**. Any other modifications deemed to be minor modifications by the Administrator.

The proposed plan and second amended approved plan are compared below, with each shown in Exhibit 1 and Exhibit 2. The proposed changes are directly related to the City's request for the development to be modified to accommodate the 100-foot wide drainage corridors shown in the draft Storm Water Master Plan, as well as to address the alignment of streets and intersections in the draft Transportation Master Plan.

In Summary, the revised plan proposes the following changes.

1. Changes the layout of the Community Park to a linear park shape connecting to the Town Center to address the draft Storm Water Master Plan, which requires a 100 foot width open space corridor along all drainages.
2. Brings a water feature through the Town Center, part of the linear Community Park and gathering area.
3. Places detention basins in multiple open space areas as per the original plan.
4. Overall open space remain the same, but the community park (Linear Park) area increases by 2.1 acres.
5. The Clubhouse was relocated from the Wasatch Canal & Commons Blvd to the neighborhood near the Meeting House. Two trailheads are located in the plan along the linear park - one near Highlands Park and the other at the confluence of the Wasatch Greenway and the Town Center. These will be equipped with water filling stations, benches & trash receptacles along with interpretive signage showing the location and overall trail system within the Highlands and connections beyond.
6. Decreases the overall units by 45 units. Unit decrease is a result of moving ERU allocations around and increasing the Hotel unit keys from 80-135 based on an actual Hotel developer that wants to come to Heber City.
7. Increases the overall ERU's by .74 (does not exceed the allowable ERU's permitted by underlying zoning).
8. Changes the Multi-Family buildings from three buildings (54 units each) to two buildings (88 units each). The density could adjust from one building to another but all development will comply with ERU's, Building Heights & Park & Open Space requirements.
9. Introduces an additional commercial building and moves the self-storage building to the south end of the development. These two alterations were an attempt to address the change in access from a full movement to a right-in right-out on the commercial corner of Highway 40 that resulted from the City's request to move the existing roundabout to the east. This alteration decreased the marketability of the corner for a convenience store and is the developer's attempt to ameliorate that loss.
10. All buildings along Highway 40 except the self-storage building have been lowered to one story. The self-storage building is three stories above grade and one below grade.

Plan Comparison

Use	Approved Concept	2nd Amended Concept
Detached Cottages	163 units	178 units
Estate SFD	35 units	36 units
Duplex	0 units	0 units
Townhomes	491	484 units
Condominiums	120 units	100 units
Stacked Flats	162 units	176 units
Vertical Mixed Use Apartments	148 units	100 units
RESIDENTIAL SUBTOTAL	**1,119 units**	**1,074 units**
Affordable Units	112 units	108 units
Storage	48,000 sf	100,000 sf

Use	Approved Concept	2nd Amended Concept
Hotel	80 keys	135 keys
Convenience Store	8,000 sf	None
Commercial	96,000 sf	96,000 sf
Community Park	4.85 acres	6.95 acres
Other Open Space	38.62 acres	36.52 acres
Total Open Space	**43.47 acres (30.42%)**	**43.47 acres (30.42%)**
Total Area	142.88 acres	142.88 acres
Total ERUs	736.15	736.89

DISCUSSION

Pros

The proposed amendment:

1. Conforms with the City's draft Storm Water Master Plan;
2. Conforms with the City's draft Transportation Plan;
3. Decreases the total number of dwellings from 1,119 to 1,074 units;
4. Decreases the number of vertical mixed-use dwelling units from 148 to 100 units;
5. Maintains the 96,000 commercial square footage of the original plan;
6. Improves the proposed Gathering Area to include a water feature; and
7. Places 1 to 3 story buildings between Highway 40 and the 4 story Town Center Buildings.

Cons

The proposed amendment:

1. Increases the number of stacked flats from 162 to 176 dwelling units;
2. Decreases the total number of affordable units from 112 to 108 units;
3. Increase the storage building from 48,000 to 100,000 sf; and
4. Increases the hotel from 80 keys to 135 keys.

FISCAL IMPACT

None.

CONCLUSION

The proposed amendment:

1. Results directly from the implementation of draft Storm Water Master Plan and draft Transportation Master Plan, both requirements of the original Highlands MDA;
2. Is consistent with the Highlands MDA, General Plan and North Village Overlay Zone (NVOZ);
3. Decreases residential density;
4. Maintains the same amount of open space;

5. Increases the community park from 4.85 acres to 6.95 acres while keeping the same amenities as well as adding additional enhancements shown on the master plan; and
6. Improves the Gathering Area/Linear Park by utilizing a water feature and connecting the Community Park directly into the Town Center/Gathering Area.

ALTERNATIVES

1. Proceed as Administrative Amendment
2. Proceed as Modification Amendment

POTENTIAL MOTIONS

Staff Recommended Option – Proceed as Administrative Amendment

I move to proceed with the amendment as an ***Administrative Amendment***.

Alternative 2 – Proceed as Modification Amendment

I move to proceed with the amendment as a ***Modification Amendment.***

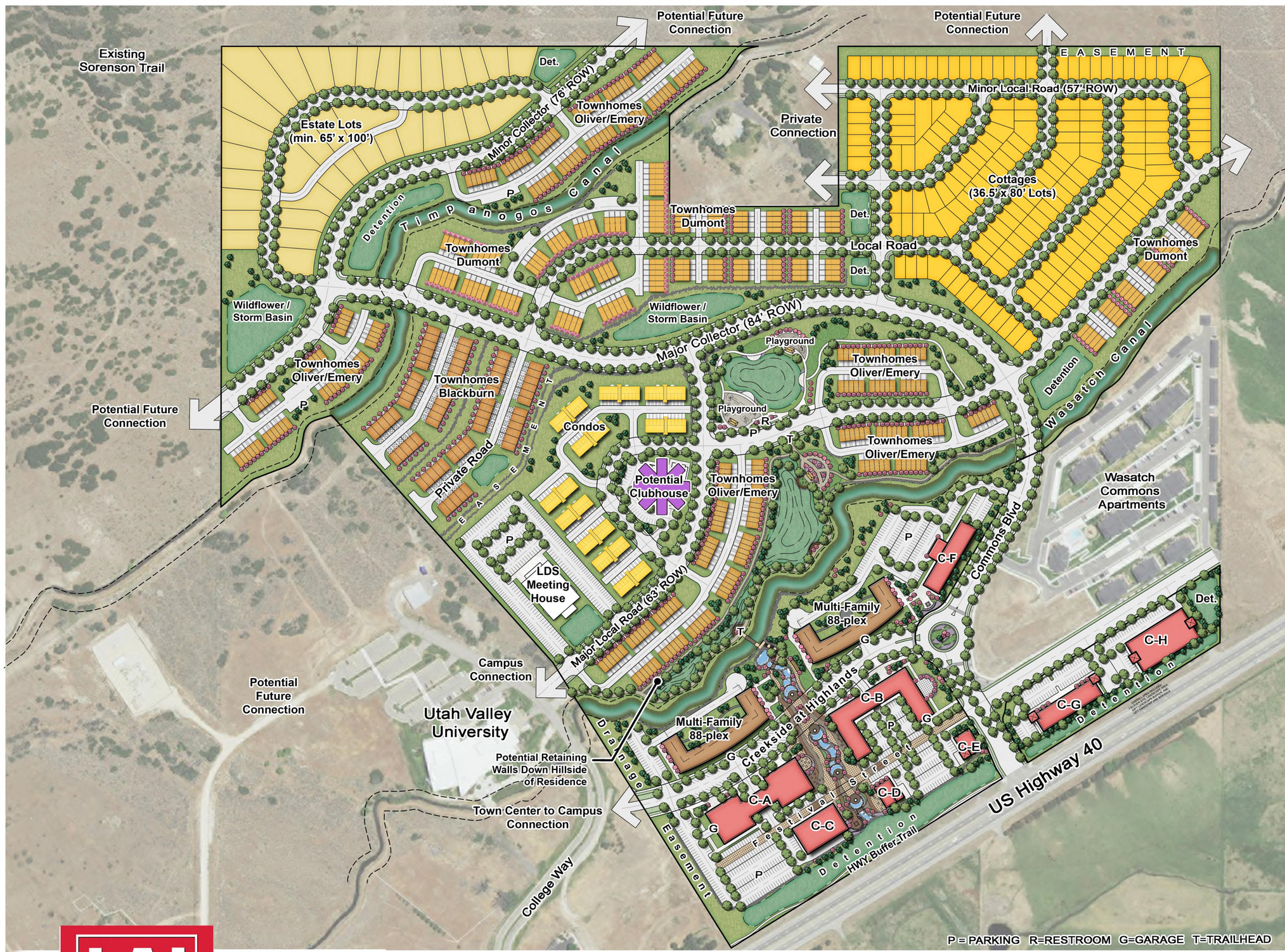
ACCOUNTABILITY

Department: Planning Department, Planning Director
Staff Member: Anthony L. Kohler

EXHIBITS

Exhibit 1: Current Adopted Plan (1st amendment)
Exhibit 2: Proposed Plan (2nd amendment)
Exhibit 3: Proposed Drainage Plan
Exhibit 4: Proposed Changes Detail Spreadsheet
Exhibit 5: Highlands Town Center Cross Section
Exhibit 6: Highlands Town Center Detail
Exhibit 7: Highlands Creek Detail

Exhibit 1



DEVELOPMENT SUMMARY

Total Site Acreage = 142.88 ac.
Total ERU's = 736.89 Total ERU Allowed = 737

DR Horton Product - 798 Units (566 ERU's)

- Estate Lots (>1600 sf) = 36 Units
- Cottages (<1,600 sf) = 178 Units
- Condos (<1200 sf) =
  10 Plex x 10 Bldg = 100 Units
- Townhome - Dumont (1174 sf) = 156 Units
- Townhome - Blackburn (1485 sf)= 70 Units
- Townhome - Oliver / Emery = 258 Total Units
  Oliver (1899 sf) = 90 Units
  Emery (1406 sf) = 168 Units

Town Center Product - 276 Units (171 ERU's)

- Multi-Family - 88 Plex: 4 Stories + Garage
  2 Buildings = 176 Units
  Garage Parking = 264 Spaces (1.5/Unit)
- Commercial / Mixed-Use (C-A): 4 Stories + Garage
  Retail (1st Floor): 28,000 sf
  Residential (3 Floors): 40 Units (Student Housing)
  Garage Parking = 200 Spaces
  - Commercial = 140 spaces (5/1000 sf)
  - Residential = 60 Spaces (1.5/Unit)
- Commercial / Mixed-Use (C-B): 4 Stories + Garage
  Retail (1st Floor): 27,000 sf
  Residential (3 Floors): 60 Units
  Garage Parking = 225 Spaces
  - Commercial = 135 Spaces (5/1000 sf)
  - Residential = 90 Spaces (1.5/Unit)
- Commercial (C-C): 1 Story
  Retail (Grocery): 16,000 sf
- Commercial (C-D): 1 Story
  Restaurant (1st Floor): 5,000 sf
- Commercial (C-E): 1 Story
  Restaurant (1st Floor): 5,000 sf
- Commercial (C-F): 4 Stories
  Hotel (4 Floors): 135 Keys
  Total: 60,000 sf * (15,000 / Floor)
- Commercial (C-G): 1 Story
  Gym (1st Floor): 15,000 sf
- Commercial (CH): 3 Stories + Basement
  Storage Unit (4 Floors): 25,000 sf EA
  Total: 100,000 sf*

LINEAR PARK = 6.95 AC

TOTAL COMM / MIXED-USE = 96,000 SF
(Storage Unit not included in total per DA)
TOTAL UNITS = 1,074
Market Rate = 966
Affordable (10%) = 108 (Student Housing Applies)
TOTAL GARAGE PARKING = 689 SPACES
Commercial = 275 Spaces (5/1000 sf)
Residential = 414 Spaces (1.5/Unit)

Highlands - Conceptual Master Plan - v9

Heber City, Utah
September 20, 2022 • Project #201010

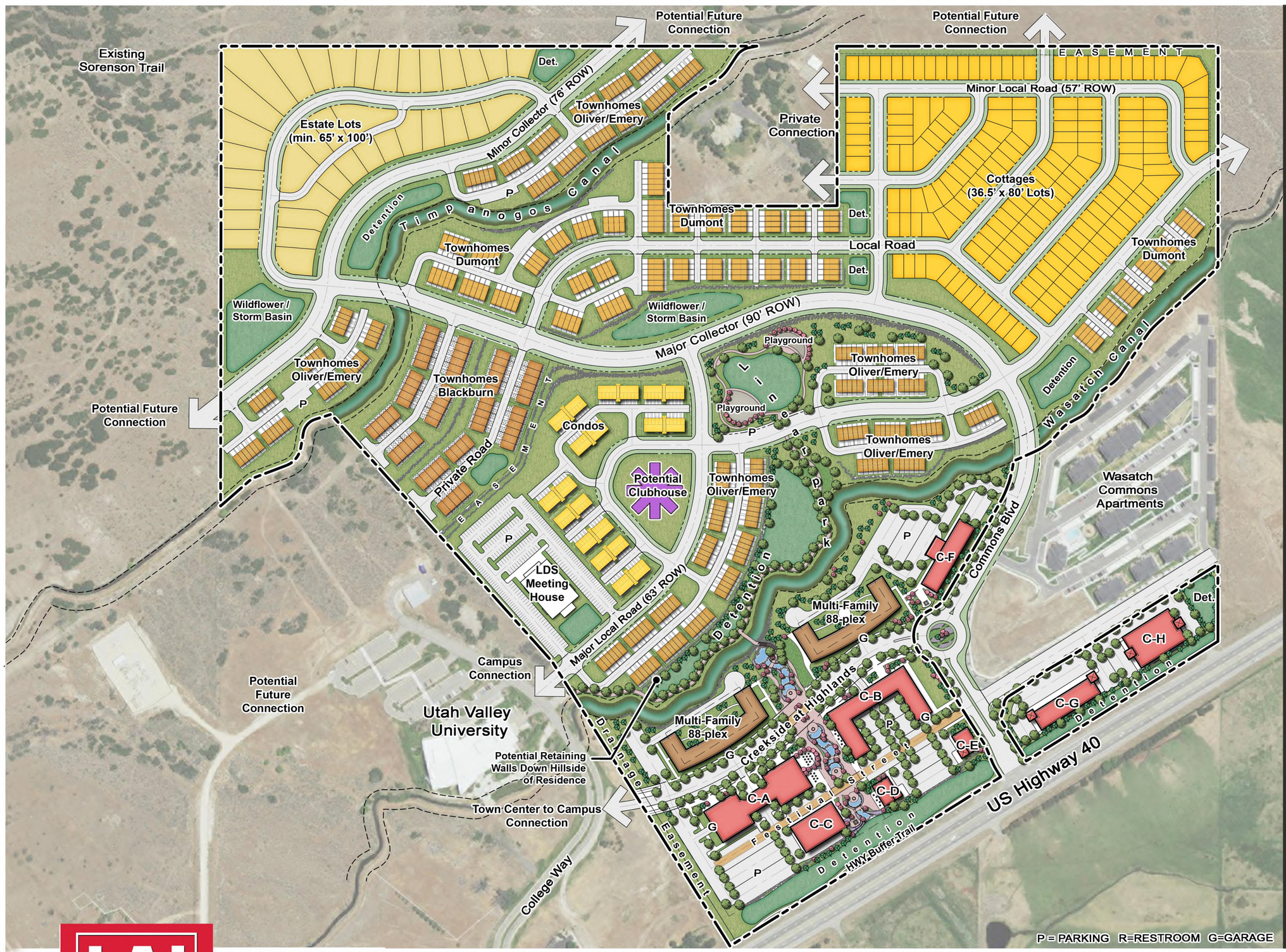
LAI DESIGN GROUP
Design for when it Matters
Highlands HEBER CITY • UTAH
www.LAIdesigngroup.com
303.734.1777 - Corporate

Architecture ■ Planning & Entitlements ■ Visual Media ■ Landscape Architecture ■ Real Estate Advisory

* For Illustrative Purposes Only

NORTH
0' 150' 300'
GRAPHIC SCALE: 1" = 150'

Exhibit 2



DEVELOPMENT SUMMARY

Total Site Acreage = 142.88 ac.
Total ERU's = 736.89 Total ERU Allowed = 737

DR Horton Product - 798 Units (566 ERU's)

- Estate Lots (>1600 sf) = 36 Units
- Cottages (<1,600 sf) = 178 Units
- Condos (<1200 sf) =
  10 Plex x 10 Bldg = 100 Units
- Townhome - Dumont (1174 sf) = 156 Units
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  Retail (1st Floor): 28,000 sf
  Residential (3 Floors): 40 Units (Student Housing)
  Garage Parking = 200 Spaces
  - Commercial = 140 spaces (5/1000 sf)
  - Residential = 60 Spaces (1.5/Unit)
- Commercial / Mixed-Use (C-B): 4 Stories + Garage
  Retail (1st Floor): 27,000 sf
  Residential (3 Floors): 60 Units
  Garage Parking = 225 Spaces
  - Commercial = 135 Spaces (5/1000 sf)
  - Residential = 90 Spaces (1.5/Unit)
- Commercial (C-C): 1 Story
  Retail (Grocery): 16,000 sf
- Commercial (C-D): 1 Story
  Restaurant (1st Floor): 5,000 sf
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  Restaurant (1st Floor): 5,000 sf
- Commercial (C-F): 4 Stories
  Hotel (4 Floors): 135 Keys
  Total: 60,000 sf * (15,000 / Floor)
- Commercial (C-G): 3 Story
  Gym (1st Floor): 15,000 sf
- Commercial (CH): 3 Stories + Basement
  Storage Unit (4 Floors): 25,000 sf EA
  Total: 100,000 sf*

LINEAR PARK = 5.44 AC.

TOTAL COMM / MIXED-USE = 96,000 SF
(Storage Unit not included in total per DA)
TOTAL UNITS = 1,074
Market Rate = 966v
Affordable (10%) = 108 (Student Housing Applies)
TOTAL GARAGE PARKING = 689 SPACES
Commercial = 275 Spaces (5/1000 sf)
Residential = 414 Spaces (1.5/Unit)

LAI DESIGN GROUP
Design for when it Matters

Highlands
HEBER CITY · UTAH

Highlands - Conceptual Master Plan - v9

Heber City, Utah
August 30, 2022 • Project #201010

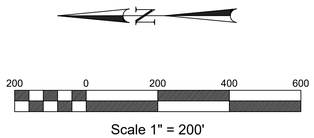
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NORTH
0' 150' 300'
GRAPHIC SCALE: 1" = 150'

Exhibit 3



LEGEND:

- ON SITE RETENTION POND
- OFF SITE RETENTION POND
- MIXED ONSITE / OFFSITE
- DETENTION POND FOR EXISTING ON SITE APARTMENTS

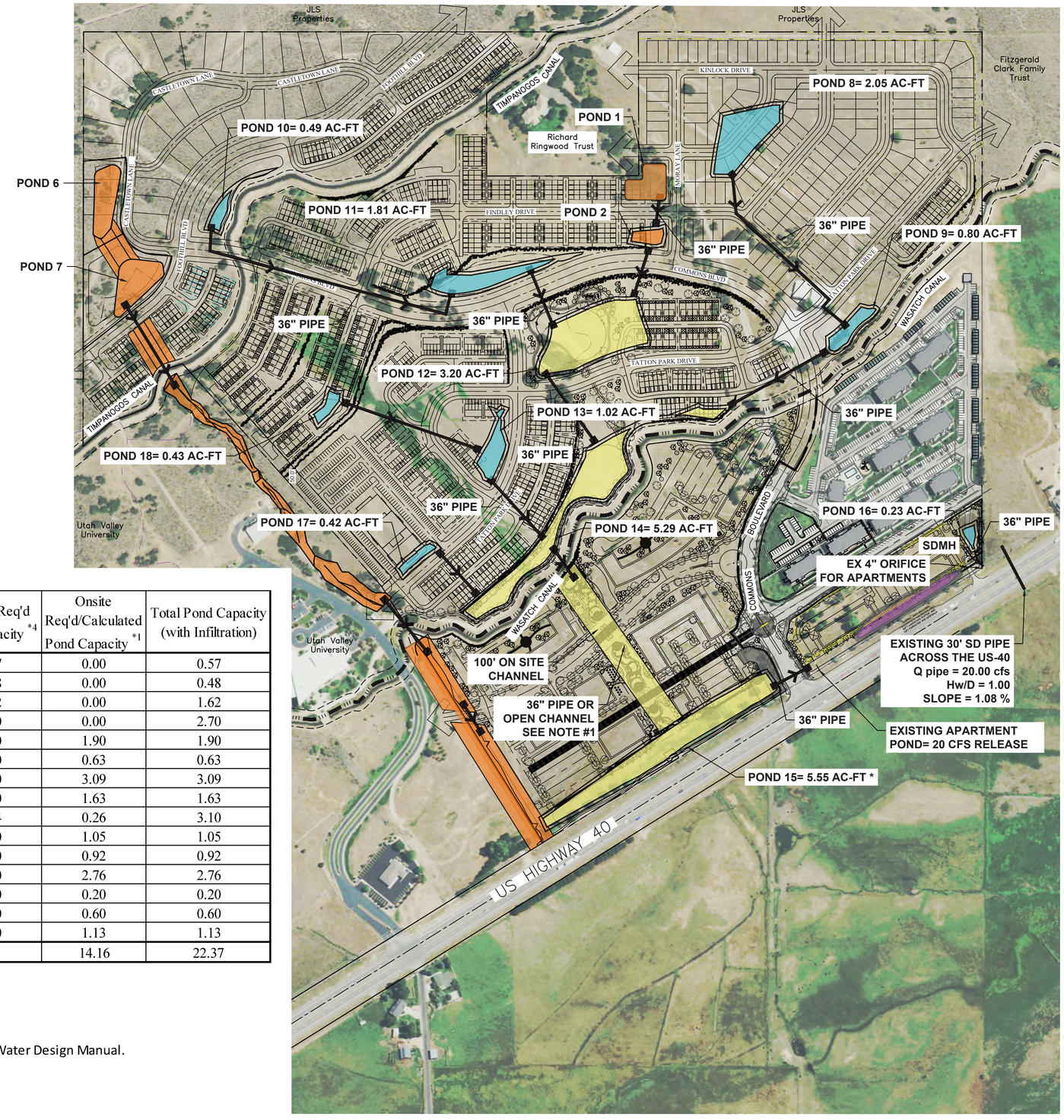
GENERAL NOTES:

1. THE PIPELINE SHOWN THROUGH THE TOWN CENTER CAN BE EITHER 36" PIPE OR AN OPEN CHANNEL TO BE DETERMINED THROUGH THE TOWN CENTER PLANNING ANALYSIS.

TABLE 1: POND ANALYSIS

Pond	Flow Criteria	Designed Pond Capacity (ACFT) *2	On-site/Off-site Total Pond Capacity (No Infiltration) *3	Infiltration Rate (in/hr)	Pond Infiltration (CFS)	Off-site Req'd Pond Capacity *4	Onsite Req'd/Calculated Pond Capacity *1	Total Pond Capacity (with Infiltration)
1	OFF-SITE	0.57	0.57	2.00	0.79	0.57	0.00	0.57
2	OFF-SITE	0.48	0.48	2.00	0.29	0.48	0.00	0.48
6	OFF-SITE	1.62	1.62	2.00	0.75	1.62	0.00	1.62
7	OFF-SITE	2.70	2.70	2.00	1.16	2.70	0.00	2.70
8	ON-SITE	2.05	2.70	2.00	1.33	0.00	1.90	1.90
9	ON-SITE	0.80	0.86	2.00	0.50	0.00	0.63	0.63
10	ON-SITE	0.49	3.11	2.00	0.27	0.00	3.09	3.09
11	ON-SITE	1.81	2.14	2.00	1.12	0.00	1.63	1.63
12	MIXED	3.20	0.74	2.00	2.10	2.84	0.26	3.10
13	ON-SITE	1.02	1.34	2.00	0.63	0.00	1.05	1.05
14	MIXED	5.29	1.68	2.00	3.08	0.00	0.92	0.92
15	MIXED	5.55	4.08	2.00	3.58	0.00	2.76	2.76
16	ON-SITE	0.23	0.66	2.00	0.14	0.00	0.20	0.20
17	ON-SITE	0.42	0.72	2.00	0.25	0.00	0.60	0.60
18	ON-SITE	0.43	1.22	2.00	0.26	0.00	1.13	1.13
TOTAL		26.66	24.61		16.26	8.21	14.16	22.37

*1. On-site required pond capacity calculated with an infiltration rate of 2 in/hr
*2. This is based on preliminary grading of Highlands.
*3. This is the required/calculated capacity of the pond based on a 100 year - 24 hour storm event.
*4. This is the off-site pond capacity required per the Heber City Master Plan North Village Storm Water Design Manual.



HIGHLANDS
WASATCH COUNTY, UTAH
ON SITE RETENTION

231 West 800 South Salt Lake City, Utah 84101
Ward Engineering Group
Planning Engineering Surveying
PH: 801 .487. 8040

CLIENT: CARDINAL FUNDING
DWG: PROPOSED BASE-ONSITE DRAINAGE PONDS EXHIBIT_.DWG
JOB No: XXX
DO NOT SCALE THIS DRAWING DRAWING IS REDUCED IF LESS THAN 22"x 34" DIMENSIONS AND NOTES TAKE PRECEDENCE

DRAWN BY: KP
DESIGN BY: XXX
CHECKED BY: SNT
DATE: 08/25/2022

REVISIONS

SHEET
EX-01B

CALL BEFORE YOU DIG.
IT'S FREE &
IT'S THE LAW
1-800-662-4111
208-2100

FILENAME: O:\THACKERY\Wasatch Commons\Engineering\Design\Base\Concept\PROPOSED BASE-ONSITE DRAINAGE PONDS EXHIBIT_.dwg TAB: ONSITE RETENTION PLOT DATE AND TIME: 8/26/2022 11:21 AM

Exhibit 4

Highlands Density ERU's (Dr Horton v8)

8/22/2022

Average ERU for both Zones in Heber City	Size	Quantity	ERUs	TOTAL
Hotel/Motel Room, RV Pad, Small Studio or Student Housing, < 500sf	<500 SF	175	0.25	43.75
One Bedroom: Hotel Room, Apartment or condo < 800sf	<800sf	184	0.33	60.72
One or Two Bedroom: Apartment, Townhome, Cottage Home or Condo < 1200 sf	<1200sf	313	0.50	156.5
Apartment, Condo, Duplex or Townhome < 1600 sf	<1600sf	424	0.75	318
All Other Residential Uses >1600 sf	>1600 sf	114	1	114
Commercial per 2000 sf	Per 2,000 sf	48	0.86	41.28
			Total ERU:	**734.25**
			Total Acres:	142.88
			TOTAL ERU/AC REQUIRED:	**5.1**

737 TOTAL ERU ALLOWED
670 + 67 (10% Affordable Housing Credit)

ERUs Allowed	**737**
Total ERU	**734.25**
Availble ERU's	2.75
Total Units	**1075**
w/ Hotel	**1210**

Table 3 MDA Page 45 - 01/20/2021

ERU Breakdown	Quanity Provided	Percentage	Min	Max
Condo	**120**	**11%**	**10%**	**35%**
Multi-Family	**276**	**26%**	**10%**	**50%**
Townhome	**463**	**43%**	**15%**	**75%**
SF	**216**	**20%**	**10%**	**75%**
Total	**1075**	**100%**		

ERU - Dr Horton

	Quantity	ERUs	TOTAL	
Hotel/Motel Room, RV Pad, Small Studio or Student Housing, < 500sf	0	0.25	0	
One Bedroom: Hotel Room, Apartment or condo < 800sf	0	0.33	0	
One or Two Bedroom: Apartment, Townhome, Cottage Home or Condo < 1200 sf	261	0.5	130.5	
Apartment, Condo, Duplex or Townhome < 1600 sf	424	0.75	318	
All Other Residential Uses >1600 sf	114	1	114	
Commercial per 2,000 sf	0	0.86	0	**UNITS**
		Total ERU:	**562.5**	**799**
		Total Acres:	76.78	
		TOTAL ERU/AC SHOWN:	**7.3**	

ERU- Town Center

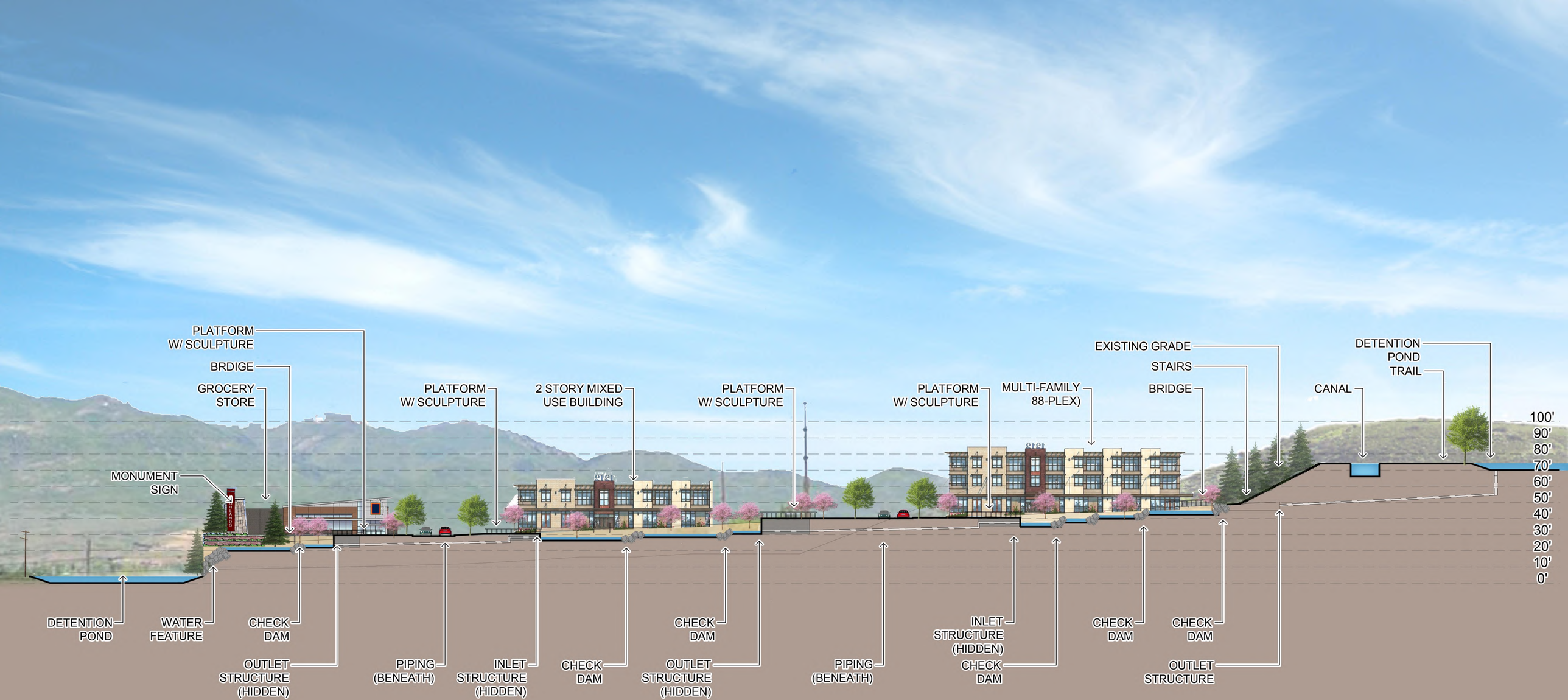
	Quantity	ERUs	TOTAL	
Hotel/Motel Room, RV Pad, Small Studio or Student Housing, < 500sf	175	0.25	43.75	
One Bedroom: Hotel Room, Apartment or condo < 800sf	184	0.33	60.72	
One or Two Bedroom: Apartment, Townhome, Cottage Home or Condo < 1200 sf	52	0.5	26	
Apartment, Condo, Duplex or Townhome < 1600 sf	0	0.75	0	
All Other Residential Uses >1600 sf	0	1	0	
Commercial per 2000 sf	48	0.86	41.28	**UNITS**
		Total ERU:	**171.75**	**276**
		Total Acres:	66.10	
		TOTAL ERU/AC SHOWN:	**2.6**	

HIGHLANDS BUILDING EXAMPLES

Product	Notes	SF
Condo	Alley - 20'/16' (Mixed)	<1200 SF
Cottage Lots (36'-6" x 80'-0")	26' Wide	1520-1554 SF
Townhomes		
Blackburn	Alley Loaded - 24'x46'	1485 SF
Oliver	Alley Loaded - 20'x42'	1899 SF
Emery	Alley Loaded - 16'x42'	1406 SF
Dumont	Alley Loaded - 18'x52'	1174 SF
Town Center MU Bldgs	Studio - 1 bath	450 sf
	1 bed - 1 bath	684 sf
	2 bed - 2 bath	969 sf
Town Center 54 plex Apartments	Studio - 1 bath	359 sf
	1 bed - 1 bath	796 sf
	2 bed - 2 bath	1011 sf

	Unit Type																		
	Blackburn	Oliver/Emery	Dumont	Cottage	Condo	Estate	88 PLEX	88 PLEX	C-F	C-A	C-B	C-C	C-D	C-E	C-F	C-G	Total	
Hotel/Motel Room, RV Pad, Small Studio or Student Housing (.25 ERU)	-	-					0	0	135	40	-						**175**	
One Bedroom: Hotel Room, Apartment or condo (.33 ERU)	-	-					72	72	-	-	40						**184**	
One or Two Bedroom: Apartment, Townhome, Cottage Home or Condo (.5 ERU)	-		141		120		16	16	-	-	20						**313**	
Apartment, Condo or Townhome (.75ERU)	94	150		180			-	-	-	-	-						**424**	
All Other Residential Uses (1.0 ERU)		78		0		36	-	-	-	-	-						**114**	
									-								**1210**	**Residential w/ Hotel**
TOTAL UNITS	**94**	**228**	**141**	**180**	**120**	**36**	**88**	**88**		**40**	**60**	**0**				**0**	**1075**	**NO HOTEL**
COMMERCIAL SF	0	0	0	0	0	0	0	0	0	28000	27000	16000	5000	5000	15000		**96000**	COMMERCIAL
PARKING - PARKING COMMERCIAL							0	0	135	140	135	80	25	25	75	0	615	**1029 Parking**
PARKING - UNITS							132	132	0	60	90	0	0	0	0	0	414	
PARKING - GARAGE							132	132		200	225						689	616 Garage
							3 Stories	3 Stories	4 Stories	2 Stories	3 Stories	1 Story	1 Story	1 Story	Gym	Storage		

Exhibit 5



LAI DESIGN GROUP
Design for when it Matters

Highlands
HEBER CITY • UTAH

Highlands - Town Center Section

Heber City, Utah

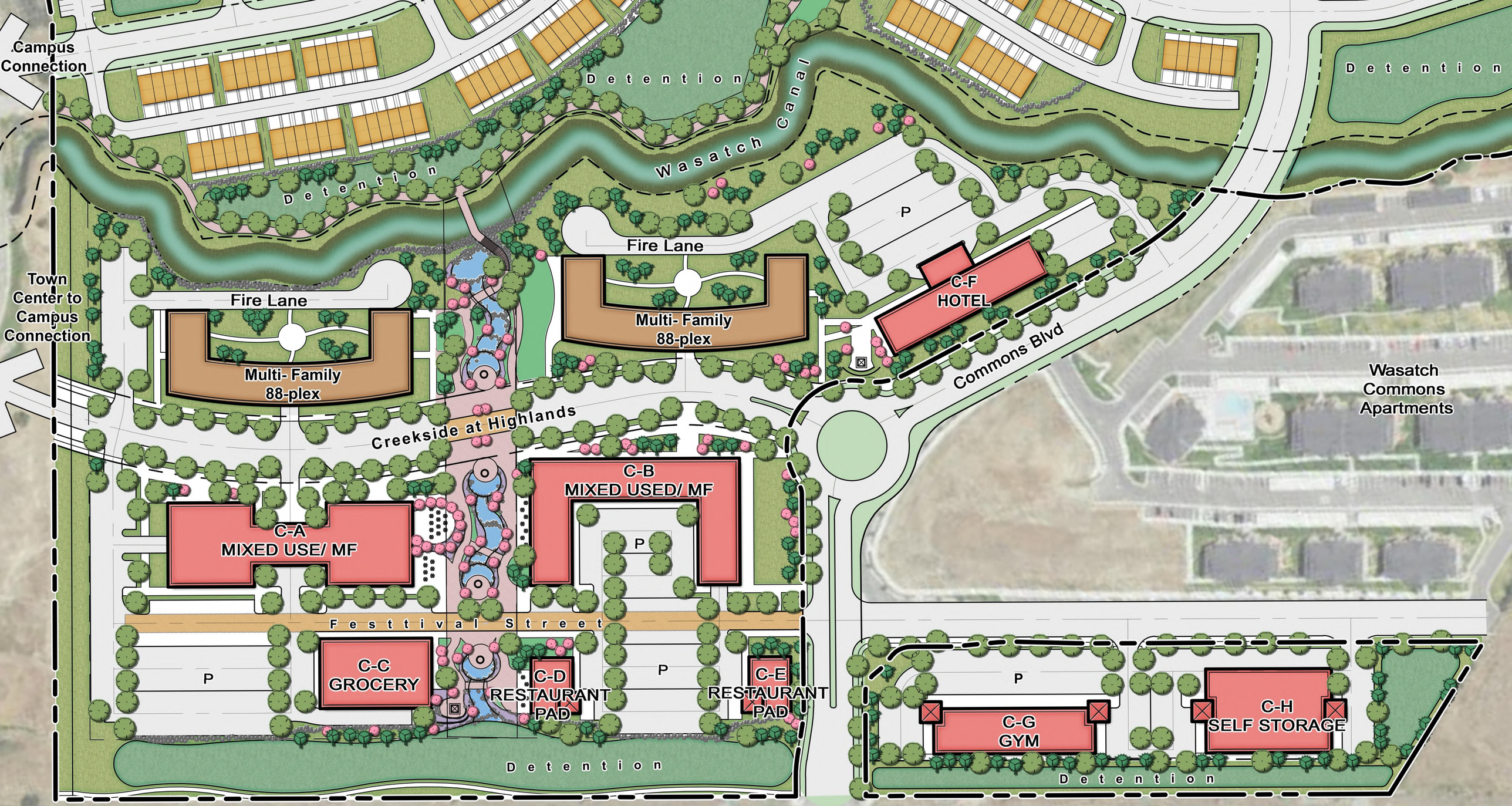
August 25, 2022 • Project #201010

www.LAIdesigngroup.com
303.734.1777 - Corporate

*** For Illustrative Purposes Only**

Architecture ■ Planning & Entitlements ■ Visual Media ■ Landscape Architecture ■ Real Estate Advisory

Exhibit 6



* For Illustrative Purposes Only

Highlands - Town Center

Heber City, Utah

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NORTH

GRAPHIC SCALE: 1" = 60'

Exhibit 7

DETENTION POND

LINEAR PARK

WASATCH CANAL

BRIDGE

RETAINING WALL

OUTFALL

STAIRS

FIRE LANE

PARK GARAGE DECK COURTYARD

RETAINING WALL

BRIDGE

FIRE LANE

PARK GARAGE DECK COURTYARD

SOD

CHECK DAM

CHECK DAM

INLET STRUCTURE (HIDDEN)

PLANTING BED

BENCHE

SOD

MULTI-FAMILY 88 PLEX

MULTI-FAMILY 88 PLEX

TO GARAGE

PLATFORM & SCULPTURE

TO GARAGE

SPECIALTY PAVERS

OUTFALL STRUCTURE (HIDDEN)

SOD

CHECK DAM

RETAIL PATIO

CHECK DAM

C-B (MIXED-USE/MF)

SURFACE PARKING ABOVE GARAGE

PLATFORM & SCULPTURE

RETAIL PATIO

C-A (MIXED-USE/MF)

CHECK DAM, TYP.

BRIDGE

INLET STRUCTURE (HIDDEN)

RETAIL PATIO

PLATFORM & SCULPTURE

SOD

BENCH

FESTIVAL STREET W/ SPECIALTY PAVERS

OUTFALL STRUCTURE (HIDDEN)

PLATFORM & SCULPTURE

SOD

PARKING

C-C GROCERY

C-D RESTAURANT & PATIO

BRIDGE

PARKING

BENCHES, TYP.

PLANTING BEDS, TYP.

PARKING

LOADING ZONE

HIGHLANDS MONUMENT

PLANTING BEDS, TYP.

WATER FEATURE, TYP.

BENCHES

DETENTION

LAI DESIGN GROUP

Design for when it Matters

Creekside at Highlands

Heber City, Utah

August 25, 2022 • Project #201010

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TAB 3

City Council Staff Report

MEETING DATE:	September 20, 2022
SUBJECT:	North Village Annexation MDA Template
RESPONSIBLE:	Anthony L. Kohler, Planning Director
DEPARTMENT:	Planning Department
STRATEGIC RELEVANCE:	Community Development

HEBER CITY
HEART OF THE WASATCH BACK

SUMMARY

Staff has been working on finalizing a final development agreement template by utilizing the DMJ and Highlands MDAs for the North Village Annexation petitioners. The North Village Annexation has four separate annexation petitioners, each of which will have their own MDA. Staff and the petitioners have drafted a template for review by Council, but there is still some work to finalize the draft. Staff is looking for input from Council on the current draft, which is aimed at the North Village Views development. Once that agreement is finalized, it can be utilized as a template for the other three developments within the annexation.

RECOMMENDATION

Staff recommends Council provide input on the draft MDA for the North Village Views.

BACKGROUND

The North Village Annexation has four separate developers. Council indicated it wanted to have a separate MDA for each development. Council also asked for the annexation to await the upcoming Transportation and Storm Water Master Plans that are being considered by Council on September 20.

The basic draft MDA originated from the Sorenson Annexation. That MDA was simplified for the Highlands Annexation MDA. Finally, the Highlands MDA was simplified for use with the DMJ Annexation. The DMJ Annexation MDA is being used as a template for the North Village Annexations, but the Highlands MDA has some parts that were not included in the commercial DMJ development, such as affordable housing, that needs to be included in the North Village Annexation MDAs.

Staff has been working towards drafting an MDA for the North Village developments to present to Council. Once Council has reviewed each of the four MDAs for the North Village Annexation, the Council can then consider approval of the North Village Annexation. The current draft of the MDA does still need additional review and editing before it can be recommended for approval by Staff.

Significant recommended changes from previous MDAs include the following:

- **Section 3.6 and 3.6.1:** Should the developer aim for 11 units of 60% AMI moderate income housing instead of 22 total units (20% of which would be 60% AMI and 80% of which would be 80% AMI)? Staff feels the City should aim for more attainable housing at the 60% AMI level, as the 80% AMI housing is still not affordable to most essential workers.

- **Section 3.6.2:** Staff has talked with Park City and has some ideas to include for moderate income housing, including the City having the first right of refusal on all affordable housing unit sales. This allows the City to update deed restrictions in the future to meet best practices. Additional language needs to be inserted into the agreement.

- **Section 4.1:** Added a paragraph to ensure the developer cannot make a claim for a Taking when dwelling units are lost as plans are revised by developers to meet the Storm and Transportation Master Plans.

- **Section 6.1:** Add a paragraph that requires adherence to the Parks & Trails Master Plan.

DISCUSSION
N/A

FISCAL IMPACT
N/A

CONCLUSION
N/A

ALTERNATIVES
N/A

POTENTIAL MOTIONS
N/A

ACCOUNTABILITY

Department: Planning Department, Planning Director
Staff Member: Anthony L. Kohler

EXHIBITS

Exhibit 1: Draft MDA Template for North Village Views

Exhibit 1:
Draft MDA Template for North Village Views

WHEN RECORDED, RETURN TO:

Heber City
Attention: City Recorder
75 North Main Street
Heber City, Utah 84032

Tax Parcel Nos.:

(Space above for Recorder's use only.)

DEVELOPMENT AGREEMENT FOR THE NORTH VILLAGE VIEWS RESIDENTIAL DEVELOPMENT

THIS DEVELOPMENT AGREEMENT FOR THE NORTH VILLAGE VIEWS RESIDENTIAL DEVELOPMENT (this "**Agreement**") is made and entered into as of the _____ day of _____, 2022, by and between HEBER CITY, a political subdivision of the State of Utah (the "**City**"), and NORTH VILLAGE PROPERTIES, LLC, a Utah limited liability company ("**NVP**"). Each of NVP and the City are hereinafter referred to individually as a "**Party**" and collectively as the "**Parties**."

RECITALS

A. The capitalized terms used in these Recitals are defined in Section 1.2, below.

B. NVP is the owner of approximately 36.8 acres of undeveloped real property situated to the north of the Utah Valley University campus in Wasatch County, State of Utah, a legal description of which is set forth in **Exhibit A**, attached hereto (the "**Property**"). This Agreement and the Site Plan meets the intent of, and is guided by, the Envision 2050 Heber General Plan.

C. On _____, 2022, the City approved and adopted, a Site Plan for the Project, subject to the Parties entering into this Agreement and the agreeing to annexation of the Property into the City. The Site Plan for the Property shall allow for a residential housing development, including recreational and open space uses. All such uses shall be consistent with the permitted uses in the NVOZ.

D. Provision of infrastructure to the Property is vital to its development in accordance with the Site Plan and this Agreement and, consistent with the foregoing, NVP will prepare an Infrastructure Plan (aka Civil Drawings).

E. NVP may not be the developer of the entire Property but may sell or otherwise convey some or all the Property to one or more Persons who will undertake the actual development work (each a **"Developer"** and together, the **"Developers"**). Notwithstanding that there may be sub-developers, transferees, purchasers or assignees from the original Developer or Developers, only those parties that NVP specifically designates in a written agreement as their "Successor", or

"Successor's in Interest", shall retain the right and standing to oppose, or seek amendment of this Agreement, or any other subsequent amendment thereto. Any third party not so specifically designated, that may purchase or receive portions, phases, lots or parts of this Development/Project, shall have no standing to oppose or seek amendment of any part of this Agreement, nor have any part in any negotiations to alter, change or amend. Additionally, notwithstanding the foregoing, once all backbone improvements are laid down, implemented and approved by the City, any subsequent Developer, Assignee, Successor, or Successor in Interest obtaining any portion, or part, or phase of this Development/Project by sale, transfer or assignment shall have no standing to oppose or seek to amend any portions of this Development/Project.

F. The Parties now desire to enter into this Agreement to establish and set forth the rights and responsibilities of NVP and its successors in interest, including but not limited to, those developers, sub-developers and builders who will develop the Property as a residential project in accordance with the terms hereof, and to establish the rights and responsibilities of the City to annex the Property into the boundaries of Heber City and to authorize and regulate such development pursuant to the requirements of this Agreement.

G. The City Council has reviewed this Agreement and determined that it is consistent with the Act, the Zoning Ordinance and the Heber City General Plan, and that it provides for and promotes the health, safety, welfare, convenience, aesthetics, and general good of the community as a whole. The Agreement does not contradict, and specifically complies with, and is governed by Utah Code Ann Section 10-9a. The Parties understand and intend that this Agreement is a "development agreement" within the meaning of, and entered into pursuant to the terms of, the Act.

H. NVP and the City have cooperated in the preparation of this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the City and NVP hereby agree to the following:

TERMS

1. **Incorporation of Recitals and Exhibits/ Definitions.**

1.1 **Incorporation.** The foregoing Recitals and **Exhibits A** through **E** are hereby incorporated into this Agreement.

1.2 **Definitions.** Any capitalized term or phrase used in this Agreement has the meaning given to it below or in the section where the definition of such term is given.

1.2.1 **Act** means the Municipal Land Use, Development, and Management Act, Utah Code Ann. §§10-9a-101, *et seq.* (2008).

1.2.2 **Administrative Action** means and includes any amendment to the Exhibits to this Agreement or other action that may be approved by the Administrator as provided in Section 17.

1.2.3 **Administrator** means the Person designated by the City as the Administrator of this Agreement.

1.2.4 **Agreement** has the meaning set forth in the preamble and includes all Exhibits attached hereto.

1.2.5 **Public Gathering Areas** means any public owned area or public park identified on the Site Plan that is intended to provide services to the community at large, such that it would be considered to be a System Improvement.

1.2.6 **Applicant** means a Person submitting a Development Application, a Modification Application or a request for an Administrative Action.

1.2.7 **Assessment Area** means an area or areas created by the Special Service District pursuant to Utah Code Ann. § 11-42-101, *et seq.* (2008), or other applicable State Law, with the approval of NVP and other Property Owners, if required, to fund the construction of some or all of the Backbone Improvements.

1.2.8 **Backbone Improvements** means those improvements shown as such in the Infrastructure Plan and which are, generally, infrastructure improvements that are intended to support the overall development of the Property and not merely a part of the development of any particular Subdivision. Backbone Improvements are generally considered to be in the nature of "System Improvements," as defined in Utah Code Ann. § 11-36a-101, *et seq.* (2008).

1.2.9 **Building Permit** means a permit issued by the City to allow construction, erection or structural alteration of any building, structure, private or public infrastructure, On-Site Infrastructure on any portion of the Project, or to construct any Off-Site Infrastructure.

1.2.10 **CC&Rs** means one or more declarations of conditions, covenants and restrictions regarding certain aspects of design and construction on the Property recorded or to be recorded with regard to the Property or any part thereof, as amended from time to time.

1.2.11 **Capital Facilities Plan** means a plan adopted or to be adopted by the City in the future to substantiate the collection of Impact Fees as required by State law.

1.2.12 **City** means the City of Heber, a political subdivision of the State of Utah.

1.2.13 **City Consultants** means those outside consultants employed by the City in various specialized disciplines such as traffic, hydrology or drainage to review certain aspects of the development of the Project.

1.2.14 **City Updated North Village Street Master Plan** shall mean the City's Street Master Plan and Street Capital Facilities Plan.

1.2.15 **City Updated North Village Stormwater Master Plan** shall have the meaning provided in Paragraph 12.3.

1.2.16 **City's Future Laws** means the ordinances, policies, standards, procedures and processing fee schedules of the City that will be in effect as of a particular time in the future when a Development Application is submitted for a part of the Project and that may, in accordance with the provisions of this Agreement, be applicable to the Development Application.

1.2.17 **City's Vested Laws** means the ordinances, policies, standards, procedures and processing fee schedules of the City related to zoning, subdivisions, development, public improvements and other similar or related matters that are in effect as of the Effective Date.

1.2.18 Intentionally Omitted.

1.2.19 **Council** means the elected City Council of the City.

1.2.20 **Default** shall have the meaning provided in Paragraph 14.

1.2.21 **Design Guidelines** means the design guidelines referenced in the North Village Over Lay Zone.

1.2.22 **Developer** shall have the meaning provided in Recital E.

1.2.23 **Development Application** means an application to the City for development of a portion of the Project, a Building Permit, improvement plans or any other permit, certificate or other authorization from the City required for development of the Project.

1.2.24 **Development Property** shall have the meaning provided in Section 23.1.

1.2.25 **Development Report** means a report containing the information specified in Section 3.4 submitted to the City by NVP or any successor for the sale of any Parcel to a Developer, Sub-developer or Builder or the submittal of a Development Application by a Developer, Sub-developer or Builder pursuant to an assignment from NVP.

1.2.26 **Development Unit** means either a commercial or residential use of property with respect to which an ERU calculation can be applied in accordance with this Agreement.

1.2.27 **Effective Date** means the date on which the later of both the following shall have occurred: the Parties have executed this Agreement and the City's annexation of the Property has been completed and takes effect pursuant to Utah Code Ann. §10-2-425.

1.2.28 **Eligible Improvements** shall have the meaning provided in Section 8.9.

1.2.29 **Development Entitlements** shall have the meaning provided in Section 3.1 of this Agreement.

1.2.30 **Equivalent Residential Unit (ERU)** means the residential density allocated to: (a) any given Residential Unit when measured against a single-family dwelling unit, which measure shall be determined pursuant to Section 18.21.020.2.2(2) of the City's Vested Laws; and (b) commercial ERUs will be calculated as provided in Section 18.21.020.2.2(2) of the City's Vested Laws. For purposes of clarity, the Parties agree that no ERUs shall be allocated to schools and churches.

1.2.31 **Final Plat** means the recordable map or other graphical representation of land prepared in accordance with Utah Code Ann. §10-9a-603, and approved by the City, effectuating a Subdivision of any portion of the Project.

1.2.32 **Highway 40** means a "state highway" type transportation corridor maintained by the Utah Department of Transportation and referred to as U.S. Highway 40.

1.2.33 **Homeowners' Association(s)** means one or more associations formed pursuant to Utah law to perform the functions of an association of property owners.

1.2.34 **Impact Fees** means those fees, assessments, exactions or payments of money imposed by the City as a condition on development activity as specified in Utah Code Ann. §§ 11-36a-101, *et seq.*, (2008).

1.2.35 **Improved Open Space** means open space, including but not limited to that which has been improved with one or more of the following, as selected by the City Manager or his or her designee: first and foremost those amenities listed in the City's Park's Site Plan, churches, schools and associated lands, playgrounds, tennis courts, club houses, swimming pools, trail systems, trail heads, skate parks, volleyball courts, Public Gathering Areas or parks, sports fields, bathrooms, irrigated landscaping, associated paved parking for improved open space, pavilions, playgrounds, trailheads, drinking fountains, natural areas integrated with open spaces and park areas, or other improvements.

1.2.36 **Infrastructure Plan** means the conceptual infrastructure plan, including culinary water, secondary water, storm water, sanitary sewer and private roads, as amended from time to time.

1.2.37 **Intended Uses** means the use of all or portions of the Project for open spaces, parks, trails and other uses permitted in the Zoning Ordinance, Design Guidelines and as shown on the Site Plan.

1.2.38 **Site Plan** means the Site Plan attached as **Exhibit B**, which Site Plan is a conceptual/illustrative depiction of the presently anticipated development plan for the Property, which Site Plan may be modified from time-to-time by NVP to respond to market, engineering and other development objectives.

1.2.39 **Modification Application** means an application to amend this Agreement (but not including those changes which may be made by Administrative Action).

1.2.40 **Mortgage** means (1) any mortgage or deed of trust or other instrument or transaction in which the Property, or a portion thereof or a direct or indirect ownership or other interest therein, or any improvements thereon, is conveyed or pledged as security, or (2) a sale and leaseback arrangement in which the Property, or a portion thereof, or any improvements thereon, is sold and leased back concurrently therewith.

1.2.41 **Mortgagee** means any holder of a lender's beneficial or security interest (or the owner and landlord in the case of any sale and leaseback arrangement) under a Mortgage.

1.2.42 Intentionally omitted.

1.2.43 **Non-City Agency** means a governmental or quasi-governmental entity, other than those of the City, which has jurisdiction over the approval of an aspect of the Project.

1.2.44 **North Fields** means that certain real property located generally west of the Property and generally depicted on **Exhibit C** attached hereto.

1.2.45 **Notice** means any notice to or from any Party to this Agreement that is either required or permitted to be given to another Party.

1.2.46 **Off-Site Infrastructure** means the off-site public or private infrastructure, such as roads and utilities, specified in the Infrastructure Plan that is necessary for development of the Property but is not located on the portion of the Property that is subject to a Development Application.

1.2.47 **On-Site Infrastructure** means the on-site public or private infrastructure, such as roads or utilities, specified in the Infrastructure Plan that is necessary for development of the Property and is located on that portion of the Property that is subject to a Development Application.

1.2.48 **On-Site Retention/Detention** shall mean a storm drain facility that is provided on-site upon private property within the development.

1.2.49 **Open Space** means the following: all parks (regardless of size or type); pedestrian, bicycle, and equestrian trails and pathways; passive open spaces, water features, and natural habitat areas; parkways and commonly maintained natural or landscaped areas; sidewalks, street tree plantings and medians; ballfields and recreational spaces (including, without limitation, any such facilities provided by or upon a school or church site, excepting areas within building footprints other than community gardens); drains and detention basins and swells, canals, protected slope areas, and any other quasi-public area that the City determines to be Open Space as a part of the approval of a Development Application. Open Space includes, but is not limited to, those areas identified as Open Space in the Site Plan.

1.2.50 **Outsourcing** means the process of the City contracting with City Consultants or paying overtime to City employees to provide technical support in the review and approval of the various aspects of a Development Application, as is more fully set out in this Agreement.

1.2.51 **Parcel** means an area identified on the Site Plan with a specific land use designation that is intended to be further subdivided for future development.

1.2.52 **Person** means any natural person, corporation, Limited Liability Company, trust, joint venture, association, company, partnership, limited partnership, governmental authority or other entity.

1.2.53 **Phase** means the development of a portion of the Project.

1.2.54 Intentionally omitted.

1.2.55 **Planning Commission** means the City's Planning Commission.

1.2.56 **Project** means the mixed-used Site Plan to be developed on the Property in accordance with this Agreement, including, without limitation, all associated public and private facilities, Intended Uses, Phases and all of the other aspects approved as part of this Agreement and the Site Plan.

1.2.57 **Intentionally omitted.**

1.2.58 **Property Owner or Property Owners** means NVP and any other successor-in-interest to NVP as an owner of the Property or any portion thereof, including but not limited to, Developers, Sub-developers and builders.

1.2.59 **Site Plan** means the conceptual plan submitted to the City for the first stage of the approval of a residential housing development in accordance with the City's Vested Laws.

1.2.60 **Sub-developer** means any Person that obtains title to a Parcel from a Developer for development.

1.2.61 **Subdivision** means the division of any portion of the Project into a subdivision pursuant to State Law and/or the Zoning Ordinance.

1.2.62 **System Improvement** means those elements of infrastructure that fall within the definition of System Improvements pursuant to Utah Code Ann. §11-36a-102(21). System Improvements shall be defined as set out in the North Village Capital Facilities Plans and Master Plans.

1.2.63 **Zone** means the City's North Village Overlay District Zone.

1.2.64 **Zoning Ordinance** means the City's Land Use and Development Ordinance adopted pursuant to the Act that is in effect as of the Effective Date.

2. **Development of the Project.** Development of the Project shall be in accordance with this Agreement, the City's Vested Laws and the City's Future Laws as expressly set forth in this Agreement. The Parties acknowledge and agree that if there is a conflict with this Agreement and the City's current or future laws, then this Agreement shall supersede and take precedence to the fullest extent possible.

3. **Development of the Property in Compliance with the Site Plan.**

3.1 **Project Density.** Except as may be otherwise augmented hereinafter, Property Owners shall be entitled to and are vested with the right to develop and construct up to 219 ERUs on the Property consistent with the Intended Uses specified in the Zoning Ordinance and generally identified on the Site Plan (collectively, the "**Base Density Entitlements**"). The Base Density Entitlements represent the base density allocation per gross acre allowed by the City's Vested Laws and have been approved pursuant to the City's review of the Site Plan in accordance with the requirements of the North Village Overlay District Zone. In addition to the Base Density Entitlements, Property Owners shall be entitled to and are vested with the right to develop and construct an additional 22 ERUs on the Property consistent with the Intended Uses specified in the Zoning Ordinance and generally identified on the Site Plan (collectively, the "**Bonus Density Entitlements**," and together with the Base Density Entitlements, the "**Development Entitlements**"), which reflects a ten percent (10%) increase in base density granted by reason of the Moderate Income Housing requirements imposed pursuant to this Agreement.

3.2 **Intended Uses by Parcel and Densities.** Intended Uses and Densities currently contemplated for each Parcel are shown on the Site Plan for the Property, which plan has been prepared in compliance with the requirements of the Heber City ordinances set forth in Chapter 17.20 Plans of the City's Vested Laws. Uses on the property shall not include stacked flats unless approved by the City Council.

3.3 **Use of Density.** Notwithstanding the maximum gross density permitted under the Zone, NVP may allocate the Development Entitlements among any Subdivision within the Project;

3.4 **Accounting for Density for Parcels Sold to Sub-developers.** In connection with the sale of any Parcel sold by NVP to a Developer or Sub-developer, NVP shall provide the City with a written document specifying the identity of the Person to whom the Parcel is sold, the allocation, if any, of any Development ERUs associated with such Parcel, and the Open Space requirements and/or obligations associated with such Parcel. In connection with the recordation of a Final Plat or other document of conveyance for any Parcel sold to a Developer or Sub-developer, NVP shall provide the City Recorder with a development report (a "**Development Report**") identifying the Parcel(s) sold, the Residential Development ERU and/or other type of use or Development Unit allocated with the Parcel(s), the Development ERU remaining with NVP and any material effects of the sale on the Site Plan.

3.4.1 Return of Unused Density. If a Developer or Sub-developer cannot or does not utilize all of the Development ERU allocated to it in connection with the transfer of one or more Parcels at the time the Developer or Sub-developer receives approval for the final Development Application for such

transferred Parcel(s), the unused Development ERU shall automatically revert back to NVP. Such Development ERU shall be accounted for in any subsequent Development Report that NVP, or any of its successors in interest may be required to file with the City Recorder.

3.5 **Parcel Sales.** The City acknowledges that the precise location and details of the public improvements, lot layout and design and any other similar item regarding the development of a particular Parcel may not be known at the time of the sale of a Parcel.

3.6 **Moderate Income Housing Requirements.** NVP shall comply or shall cause Developers and/or Sub-developers to comply with the City's adopted Moderate Income Housing Ordinance & Plan (Ordinance 2018-31), adopted August 16, 2018, which requires the Project to develop not less than 22 ERUs of Moderate Income Housing in the Project. NVP and Heber City recognize a target of 80% AMI is insufficient to meet the affordable housing need, and both agree to instead the development shall instead target 11 ERUs at 60% AMI. Moderate Income Housing ERUs constructed within the Project, which shall include work force housing, shall not be counted against the Development Entitlements approved for the Project pursuant to this Agreement. NVP and the Developers and Sub-developers shall take into consideration any Moderate Income Housing units when planning and constructing infrastructure within the Project. NVP shall reasonably disperse the Moderate Income Housing units throughout the Project. NVP shall also be entitled to allocate any such Moderate Income Housing requirements to Developers and/or Sub developers as NVP may elect. The Moderate Income Housing ERUs shall be developed on a proportional basis with the development. Developer and the City shall follow and comply with any deed restrictions as outlined in the Moderate Income Housing Ordinance & Plan. Payment of a fee in lieu to fulfil the requirements of the Moderate Income Housing Ordinance & Plan is not an option, unless specifically agreed to by the City.

3.6.1 Allocation of Moderate Income Housing. 5 percent of the ERUs in the development shall be constructed as Moderate Income Housing.100 percent of these ERUs constructed as Moderate Income Housing in the Project shall be deed restricted and preserved in perpetuity for those income qualified at 60% of the Average Medium Income for Wasatch County, Utah. A minimum of at least fifty percent (50%) of the ERUs constructed as Moderate Income Housing in the Project and preserved in perpetuity for those income qualified at 60% of the Average Medium Income for Wasatch County, shall be "for sale" product.

3.6.2 Rights of First Offer. Households. With regard to the Moderate Income Housing ERUs subject to the sixty percent (60%) AMI deed restriction, subject to the applicable parties thereto reaching agreement

following good faith negotiations as to the specific terms pursuant to which a right of first offer is granted, NVP shall grant or cause the applicable Developers and/or Sub-developers to grant to the following entities in descending order of priority a right of first offer to master lease or purchase, as applicable, Moderate Income Housing constructed and operated as affordable housing and available within the Project for rent or sale to income qualifying households otherwise meeting the requirements of this Agreement: the **City**, the Wasatch County School District (the "**District**") and Wasatch County (the "**County**"). In the event the City, the District, and the County do not exercise their respective first rights, the applicable Moderate Income Housing ERUs may be sold or rented, as the case may be to members of the general public meeting the income qualification requirements, employed in Wasatch County and living or desiring to live in Wasatch County. Heber City shall have the first right of refusal on all sales of affordable units.

3.6.2.1 Deed Restrictions Protecting the Affordability and Sustainability of the Affordable Homes at NORTH VILLAGE VIEWS RESIDENTIAL DEVELOPMENT.

a. Prior to final approval for the North Village Views Residential Development, and, prior to transfer of ownership from Developer/ Owner of any Affordable Housing Units/ Homes, Developer/ Owner shall negotiate and enter into with the City a ***Deed Restrictions Covenant,*** *(which shall be recorded with the Wasatch County Recorder),* that shall serve as a Covenant Running With the Land to protect the affordability and sustainability of the Affordable Units/homes at North Village Views Residential Development, Heber City, Wasatch County, Utah. Some of the terms of such a Covenant should include, but shall not be limited to the following:

1. The Covenant is to provide and articulate terms, conditions, and restrictions. The Covenant shall be enforceable by the City and, upon its execution and recording in the public records of the County Recorder of Wasatch County, Utah, shall run with the land, enforceable against the Owners; each Unit Owner, and each Unit Owner's successors interest, assignees, heirs, devisees, mortgagees, lessees, trustees, beneficiaries, executors, administrators, personal representatives; any subsequent owners; and any other parties claiming an interest in the Property. In addition to the recording of this Covenant, Developer/Owner shall cause that any deed or plat map associated with any affordable housing properties or units shall reference said Covenant.

2. The City shall forever retain the right to purchase all Affordable housing units, in perpetuity, pursuant to such a Covenant running with the land and units.

3. Administration and Enforcement. The City shall have the right to enforce the terms of such a Covenant and may enforce its terms as it deems administratively proper through its employees, administrative offices, agents, or assigns. The Heber City Police Department shall be authorized to investigate certain affordable housing violations and to issue citations pursuant to applicable City Code and State Statute. The City may enforce this Covenant by any appropriate legal or equitable action including but not limited to specific performance, injunction, abatement, damages and such other remedies and penalties as may be specified in this Covenant. This Covenant shall inure to the benefit of the City and nothing herein shall be construed as creating a general scheme to the enforced by Unit Owners against each other.

4. The Unit shall be Owner-Occupied unless a Unit Owner shall receive prior written consent of the City, in its sole and absolute discretion, for an exception. Each Unit Owner shall occupy the Unit as a Primary Residence. Unless the City gives its prior written consent, each Unit Owner shall not obtain, purchase, or otherwise acquire any other direct or indirect interest in real property while the Unit owner is a Unit Owner; neither the Unit Owner nor any person in the Unit Owner's Household shall establish a trust of which the Unit Owner is a beneficiary if such trust's corpus contains any other real property.

5. Resale of Unit. The Unit Owner shall send Notice to the City of such Unit Owner's intent to sell the unit (the date of such Unit Owner's Notice to the City shall be the "Offer Date") and shall not Sell any interest in such Unit without written consent of the City.

3.6.3 **Off-site Moderate Income Housing.** At the discretion of the developer, some or all of the affordable housing requirements may be met in partnership with the City to allow construction and location of affordable housing units off site on any available property whether owned by the City, third parties or other entities. The exact details of such an arrangement, if presented by the City and discretionally negotiated by developer, would be negotiated with the City at the time of development, if possible, and if the City has the property available at that time. It is the intent that such option

would not reduce the developer's requirements below that required in this MDA.

4. **Zoning and Vested Rights.**

4.1 **Compliance with City Requirements and Standards.** Developer and Owners expressly acknowledge that nothing in this Agreement shall be deemed to relieve Developer or any Continuing or Successor Owner from its obligations to comply with all applicable requirements of the City necessary for approval and recordation of subdivision plats and site plans for the Project, which are in place at the time of a complete and approved application, including the payment of unpaid fees, the approval of subdivision plats and site plans, the approval of building permits and construction permits, and compliance with all applicable ordinances, resolutions, policies and procedures of the City except as otherwise provided in this Agreement. Specifically, Developer and Owner acknowledge and agree that in the event adherence to the City Updated North Village Storm Water and the North Village Street Master Plans, may or actually does affect or compromise entitlements, Developer and Owner shall not be allowed to claim damages, takings or costs from or against the City.

4.2 **Current Zoning.** Concurrently with its execution of this Agreement, the City has annexed the Project to the City and zoned the Property under the North Village Overlay District Zone. The North Village Overlay District Zone (Section 18.21.010 and Section 18.21.060 of the Heber City Code) was approved by the Council on March 16, 2021.

4.3 **Term of Agreement.** The term of this Agreement shall commence on the Effective Date and continue either for a period of ten (10) years, or the day upon which the final certificate of occupancy is approved and granted, whichever first occurs, (the "**Term**"), unless it is terminated in accordance with Section 26. The Term may, at NVP's option, be extended for one (1) additional five (5) year period, provided NVP is not in material default of any provisions of this Agreement and after providing the City with written notice not less than six (6) months prior to the scheduled expiration date. Unless otherwise agreed between the Parties, NVP's vested rights and interests set forth in the Agreement shall expire at the end of the Term, or as the Term may be extended by mutual agreement of the Parties. Upon termination of this Agreement for any reason, the obligations of the Parties to each other created under this Agreement shall terminate, but none of the licenses, building permits, or certificates of occupancy granted prior to the expiration of the Term or termination of this Agreement shall be rescinded or limited in any manner, nor will any rights or obligations of Property Owners or the City intended to run with the land be terminated.

5. **Approval Processes for Development Applications.**

5.1 **Phasing.** The City acknowledges that NVP, Developers, and Sub-developers who have purchased Parcels of the Property may submit multiple applications from time to time to develop and/or construct portions of the Project in phases.

6. **Open Space, Improved Public Parks, and Trails Requirements.**

6.1 **Development Timing: Open Space, Neighborhood Parks, and Trails**. Neighborhood Parks and Trails shall be constructed and developed concurrently with the respective development within which said trails are located. The City shall not be obligated to make final approval and place into warranty any public improvements located within or constructed in conjunction with the development of a particular Phase until the parks and trails located within such Phase have been constructed, or the City has received an improvement completion assurance in the form of either a cash escrow deposit, a letter of credit or such other form of completion assurance as may then be accepted by the City with respect to such parks and trails meeting the requirements of Section 10-9a-604.5 of the Utah Municipal Land Use Development Management Act. Provide language that requires adherence to the Parks, Trials and Open Space Master Plan requirements.

6.2 **Dedication of Open Space or Trails**. Property within the canal easements shall be granted and dedicated by the Property Owner to the City, or other public entity as determined by the City. Dedication of Trails to the City shall be by plat recordation or by dedication by deed from the applicable Property Owner which shall be without any financial encumbrance or other encumbrance (including easements) which unreasonably interferes with the use of the property for Open Space and/or Trails; In the event trails are established solely for the internal use by Homeowners' Association, no public easement shall be granted by NVP or any other Property Owner.

6.3 **Maintenance of Open Space/or Trails**. Except as otherwise specifically provided in this Agreement, upon acceptance by the City of Trails and after formal possession, the City shall be responsible for maintaining the Public Trail after final inspection and acceptance of the applicable improvements included therein, if any. If the Trails are dedicated to an entity other than the City, the dedication shall provide for the maintenance of the applicable Trails. Unless approved by, and dedicated to the City, any associated landscaping with such Trials shall be maintained by the respective property owners association.

6.4 **Tax Benefits**. The City acknowledges that Property Owners may seek to qualify for certain tax benefits by reason of conveying, dedicating, gifting, granting or transferring Open Space and/or Trails to the City or to a charitable organization. Property Owners shall have the sole responsibility to claim and qualify for any tax benefits sought by Property Owners by reason of the foregoing. The City shall

reasonably cooperate with Property Owners to the maximum extent allowable under law to allow Property Owners to take advantage of any such tax benefits.

6.5 **North Fields Preservation**. NVP, for itself and with respect to each subsequent Owner of the Property, agrees that upon issuance of a building permit for a Development Unit, the Owner of such Development Unit shall pay to the City a fee equal to $2,500 per ERU or partial ERU attributable to such Development Unit (the "**North Fields Preservation Fee**"). The City shall utilize funds collected pursuant to the North Fields Preservation Fee solely for the purpose of preserving open space in the North Fields, including purchase of development rights. The City agrees that the North Fields Preservation Fee shall not be charged for Development Units constructed and operated as Moderate Income Housing Units.

7. **Public Improvements.**

7.1 **Utilities and On-Site Infrastructure.** The City acknowledges that NVP will prepare an Infrastructure Plan (a/k/a Civil Drawings). The Parties acknowledge that there will be a Capital Facilities Plan for the Public Infrastructure approved and adopted by the City. The Property Owners shall have the responsibility and obligation, to construct and fund, or cause to be constructed and installed, in phases, the On-Site and Off-Site Infrastructure according to the Capital Facilities Plan that is necessary to support the development proposed within a specific Development Application. If any Property Owners elect to construct any On-Site Infrastructure or Off-Site Infrastructure required by the Capital Faculties Plan as a condition of approval of a Development Application, the Property Owner shall pay the cost thereof, subject to its reimbursement rights set forth in Section 7.2. The City shall comply with the statutory processes and all other applicable laws, rules, and regulations governing such work. Parties contemplate that each Phase will be served by sanitary sewer, culinary water and secondary irrigation systems provided by others.

7.2 **Excess Improvements/Upsizing.** Any infrastructure requested by the Developer or required by the Development shall be the responsibility of the Developer. The City and NVP acknowledge and agree that, as a part of the Capital Facilities Plan, certain portions of the infrastructure improvements shown on the Capital Facilities Plan (including both On and Off-site Infrastructure) may need to be enlarged, increased or otherwise "upsized" or upgraded (collectively, the "**Excess Improvements**") at the request of the City or other responsible Non-City Agency to serve, directly or indirectly, developments or future developments on land areas outside of the Project's boundaries or owned by parties other than Property Owners (collectively, the "**Benefitted Property**"). In recognition of the foregoing, and as a material inducement to the execution of this Agreement by NVP:

7.2.1 **Reimbursements.** The City agrees that it shall reimburse the applicable Property Owners for, or to the extent permissible under then-applicable law and as identified in the approved Capital Facilities Plan, costs incurred by the applicable Property Owners in the construction of Excess Improvements. Subject to the City's approval, Property Owners may, from time to time, oversize and/or install and construct portions of the infrastructure specified in the Infrastructure Plan that are System Improvements. The City shall ensure that Property Owners, as applicable, are reimbursed for actual costs from Impact Fees for oversizing. City shall also make available reimbursement/pioneering agreements to reimburse Property owners-for installing Off-site System Improvements to serve their property as required by State law. Said pioneering agreements shall have a maximum duration of 10 years from the date of City's acceptance of associated improvements.

7.2.2 **Building Fee and Impact Fee Credits.** To the extent that any reimbursements paid to a Property Owner pursuant to the Reimbursement Procedures do not fully reimburse Property Owners for the amounts expended or costs incurred by the Property Owner in the construction of the Excess Improvements, City shall credit the applicable Property Owner up to the value of such deficiency against the Impact Fees applicable to the Project.

7.2.3 **Backbone Improvements.** Property Owners shall not be compensated for any "upsizing" of the Backbone Improvements that are not included as System Improvements in the approved Capital Facilities Plan.

7.3 Secondary Access**.** Subject to approval of the City and Wasatch County Fire Service District, NVP shall cause one of the proposed Secondary Access Roads to be completed in connection with the first phase of the Project. If approved, said Secondary Access Road shall satisfy the requirements of the City and the Wasatch County Fire Service District with respect to adequate ingress and egress for the Project.

7.4 **Variations between Infrastructure Plan, Capital Facilities Plan and any City's Future Capital Facilities Plan.** The Parties acknowledge that the City may adopt a new or amended Capital Facilities Plan. Additionally, the City may adopt new or amended Impact Fee ordinances as permitted by State Law for the collection of Impact Fees to pay for the construction of parts or all of the Backbone Improvements. The new Capital Facilities Plan shall in no way change any land uses or permitted uses of the Project; limit or control the rate, timing, phasing or sequencing of the approval, development or construction of all or any part of the Project in any manner so long as all applicable requirements of this Agreement and

relevant sections of the Zoning Ordinance are satisfied. The Capital Facilities Plan and any future Capital Facilities Plan may differ from the Infrastructure Plan. As a part of the approval of a Development Application, the City may require Property Owners to build portions of the Backbone Improvements as shown on the Capital Facilities Plan (after it is adopted) instead of as shown on the Infrastructure Plan. If the Parties cannot reach agreement on the terms of a reimbursement agreement, the terms of such a reimbursement agreement shall be subject to the mediation and arbitration provisions of Section 14. Notwithstanding the above, nothing herein obligates the City to pay for the minimum backbone infrastructure needed for the Project.

7.5 **No Additional Off-Site Infrastructure Requirements.** Notwithstanding anything to the contrary in the City's Vested Laws, the City shall not, directly or indirectly, charge Developers or Sub-developers, or any of their respective affiliates or successors, any development fees, impact fees, water hookup fees, or any similar fees, charges, assessments or exactions for Off-Site Infrastructure not contemplated in the Capital Facilities Plan, or subsequent updates to said Plan. However, any and all such development fees, impact fees, water hookup fees, or any similar fees, charges, assessments or exactions for On-Site Infrastructure, shall be borne by Developers and Sub-developers, or any of their respective affiliates or successors, or residents, regardless of whether they are off-site or on-site, pursuant to the Capital Facilities Plan. In the event that Developer or Sub-developer is required to build Off-Site Infrastructure, and subject to the aforementioned 10 year limited duration, in the event pioneering agreements are used, the City would collect a pro-rata share from future, benefitting developers.

7.6. **Modifications of Infrastructure Locations and the Boundaries of the Development Areas.** The City acknowledges that the exact locations of On and Off-Site Infrastructure and the boundaries of the Parcels are conceptual in nature and that additional surveying, engineering and similar studies are needed to finalize lot locations, road and utility alignments as well as road and utility sizing. Therefore, Parcel boundaries, road and utility alignments and, subject to the requirements of this Agreement, infrastructure sizing may be further modified and revised upon the City's approval of subsequent Development Applications in accordance with subsequent subarea infrastructure Site Plans that will be prepared by Developer for each Phase, and the City's Vested Laws, all subject to City final approval.

7.7 **Utilities Provided by the North Village Special Service District (NVSSD) and the Jordanelle Special Service District (JSSD).** The Parties acknowledge that the Project is currently served by the NVSSD and the JSSD for sewer and water, including secondary water. It is the intent by both Parties that the NVSSD and the JSSD shall continue to serve the project for these utilities through such service districts as long as they have capacity and are capable of serving. The

Developer shall provide Commitment Letters from JSSD and NVSSD for the plat being served before final approval for that particular plat is granted. If at any time it is deemed unfeasible to have JSSD or NVSSD serve the Project, the Developer shall secure other service providers. The City shall not be liable or responsible to provide such services.

7.8. **Water Rights.** Developers shall be required to comply with the JSSD and NVSSD water policies generally applicable to all NVSSD customers.

7.9. **Streets.** Street frontage shall be improved in compliance with the City's Standards and Specifications and the NVOZ.

Development shall obtain UDOT access approval for any accesses onto a state highway.

7.10 **Off-Site Connectivity**. All trails, canals, ditches and roads shall connect with existing trails, canals, ditches and roads located immediately adjacent to the Project such that there is consistent, smooth linkage and connectivity with any and all municipal systems.

8. **Cable/Fiber Optic Service.** Subject to all applicable federal and state laws, as well as the City's authorization and capacity to timely install in a reasonable manner all required infrastructure and provide such service, NVP agrees that the City shall be the sole cable/fiber optic network provider for the Development. The City shall install or cause to be installed all underground conduits necessary to make available a minimum of one cable service/fiber optic communication provider, or other comparable information and communication service provider, within the Project. NVP shall cooperate and reasonably accommodate the City's installation and development of said cable service/fiber optic network, (CFON). Notwithstanding the foregoing, Property Owners may contract with any cable TV/fiber optic and other communication provider of their own choice and grant an exclusive right of access and/or easement to such provider to furnish cable TV/fiber optic and other communication services for those dwelling units or other uses on such Property Owner's real property so long as the property is private and not dedicated to the public. The City may charge and collect all taxes and fees with respect to cable, fiber optic and other communication lines as allowed under an applicable City ordinance or state law.

9. **CC&Rs.** As more fully set forth in the CC&Rs, Property Owners shall create and establish one or more Property Owners' Associations, which shall be responsible for the implementation and enforcement of the CC&Rs and the Design Guidelines, including but not limited to architectural reviews, water efficiency, wildfire education, open space, and private street and storm water system maintenance. Recordation of the CC&Rs and creation of such Property Owners' Associations shall be required at the time of Final Plat review and approval. They shall be recorded both with the County and City Recorders. The City shall not be responsible for the implementation and/or enforcement of any such CC&Rs and Design Guidelines. The CC&Rs may be amended by the processes specified in the CC&Rs without any requirement of approval of such amendments by the City. If any provision of the Design Guidelines is inconsistent with a specific

provision of this Agreement, the terms of this Agreement shall govern. Prior to the issuance of any building permits for residential, business, commercial or recreational use, but excluding On or Off-Site Infrastructure or other infrastructure proposed by Property Owners, the architectural control committee established by the CC&Rs shall certify that the proposed Development Application complies with the Design Guidelines. To facilitate uniform application and enforcement of the Design Guidelines, the Design Guidelines shall incorporate the design standards set forth in the Zone. Potential avenues of enforcement of the applicable CC&Rs available to the applicable Property Owners' Association or Owners shall include judicial enforcement by a court having subject matter jurisdiction over the particular dispute.

10. **Fees & Bonding.**

10.1 **General Requirement of Payment of Fees.** The City acknowledges its fees are subject to applicable State law. The City's impact fee requirements will be set forth in the City's approved Capital Facilities Plan for the Project area to be developed subsequent to this Agreement and incorporated herein.

10.2 **Warranty Bonding.** To the extent other public financing vehicles are not available for any on or off-site, publicly dedicated infrastructure or similar improvements for the Project, Property Owners, Developers or Sub-developers, as applicable, shall provide performance or warranty bonds, per the Heber City Code, in the form of letters of credit or cash bonds (all forms approved by the City) in relation to any on or off-site, publicly dedicated infrastructure or similar improvements for the Project (the "**Security**"), including, without limitation, roads, curb and gutter, storm drains, sewer, water, street lighting, signs, sidewalks, landscaping within public rights of way, public open space, public parks and trails. Notwithstanding anything to the contrary under the City's Vested Laws, Property Owners shall not be required to post any such security for any privately-owned infrastructure or improvements, not necessary for public health and safety. The Security required under this section shall otherwise conform to the requirements of State Law.

11. **Construction Standards and Requirements.**

11.1 **Building Permits.** No buildings or other structures that require permits, shall be constructed within the Project without the Developer or Sub-developer first obtaining building permits in accordance with the City's Vested Laws. Developers and Sub-developers may apply for and obtain a grading permit following Preliminary Site Plan approval if the Developers or Sub-developers, as applicable, have submitted and received approval of a site-grading plan and SWPPP and subject to a Land Disturbance Permit issued pursuant to Section 12 below.

11.2 **City and Other Governmental Agency Permits.** Before commencement of construction or development of any buildings, structures or other work or improvements upon any portion of the Project, a Developer or Sub-developer shall,

at their expense, secure, or cause to be secured, any and all permits which may be required by the City under the City's Vested Laws or any other governmental entity having jurisdiction over the work. The City shall reasonably cooperate with Developers Sub-developers in seeking to secure such permits from other governmental entities.

11.3 **Limitation to Three Stories.** No structure in the Project shall exceed three (3) stories in height unless approved by the City Council.

12. **Grading, On-Site Processing of Natural Materials; Storm Water Management.**

12.1 Intentionally Omitted.

12.2 **On-Site Processing of Natural Materials**. Property Owners may use the natural materials located on the Project, including, without limitation, sand, gravel and rock, and may process such natural materials into construction materials, including, without limitation, aggregate or topsoil, for use in the construction of On and Off-Site Infrastructure, commercial buildings, residential structures, or other buildings or improvements located in the Project and other locations outside the Project. Property Owner shall remediate any damage to trails, infrastructure, drainage or natural water features caused by such use. Notwithstanding this provision, this does not permit the construction of any subdivision or site-specific improvements prior to the requisite Final Plat review and approval for such improvements. Any such uses shall not be considered gravel pits.

12.3 **Storm Water Management**. The Parties acknowledge that the City is presently contemplating a future regional storm water master plan (as finalized and adopted by the City, the "**City Updated North Village Stormwater Master Plan**"). Concurrent with Provision 4.1 above, NVP shall be required to comply with all future policies and standards of the North Village Stormwater Master Plan and associated Stormwater Design Manual, yet to be adopted, and all standards and requirements of any and all exhibits attached and incorporated into this Agreement, including but not limited to the Engineering Review Letter.

12.3.1 As a condition of annexation, as outlined in the **City Updated North Village Storm water Master Plan**, Developer and Property Owner shall restore or replace the historic, natural drainage channels downstream of the existing irrigation canals, as outlined and contemplated in the above referenced Master Plan.

12.4 Intentionally Omitted.

12.5. **Future Transportation Plan.** The Parties acknowledge that the City is presently contemplating a future Updated North Village Transportation Plan (as

finalized and adopted by the City, the (when finalized and adopted by the City, the "**City Updated North Village Transportation Plan**"). Concurrent with Provision 4.1 above, NVP shall be required to comply with all future policies and standards of the North Village Transportation Plan, yet to be adopted, and all standards and requirements of any and all exhibits attached and incorporated into this Agreement, including but not limited to the Engineering Review Letter.

13. **Provision of Municipal Services.** The City shall provide all City services to the Project that it provides from time to time to other residents and properties within the City including, but not limited to, development services and inspections, road and streetlight maintenance on public streets, police, and other emergency services. Such services shall be provided to the Project at the same levels of service, and on the same terms and rates as provided to other residents and properties in the City, unless such services are provided by other entities, or, because of the unique topography, location or other special or unique circumstances in the area covered by this Agreement, the cost to provide such services is higher than the like property rate throughout the City, and the City is able to demonstrate by empirical evidence, that such costs are a result of substantive additional or increased costs of municipal services, or financial burden to the City, then such additional costs, including but not limited to those required for additional special fire or police services, may be passed on to the Property Owners by way of special municipal service zonal fees, or some other equivalent of such fees. The City may charge such increased rate fees to Property Owners with respect to the Project, Phase, or sections of a Phase proportionate to their share of the increased cost.

14. **Default.** Any failure by any party to perform any term or provision of this Agreement, which failure continues uncured for a period of thirty (30) days following the receipt of written notice of such failure from the other party (unless such period is extended by mutual written consent, and subject to Sections 14.2 through 14.4), shall constitute a **"Default"** under this Agreement. Any notice given pursuant to the preceding sentence (**"Asserted Default Notice"**) shall comply with Section 14.1.

14.1. **Notice.** If a Property Owner or the City causes an event which remains uncured for a period of thirty (30) days, this would constitute a Default of this Agreement. The Party claiming a Default shall provide a written Asserted Default Notice to the other Party.

14.1.1. **Contents of the Asserted Default Notice.** The Asserted Default Notice shall:

14.1.1.1 Claim of Default. Specify the claimed event of Default;

14.1.1.2. Identification of Provisions. Identify with particularity the provisions of any applicable law, rule, regulation or provision of this Agreement that is claimed to be in Default;

14.1.1.3. Specify Materiality. Identify why the claimed Default is claimed to be material; and

14.1.1.4. Proposed Cure. Specify the manner in which said failure may be satisfactorily cured.

14.2. **Cure.** Following receipt of an Asserted Default Notice, the defaulting Party shall have sixty (60) days in which to cure such claimed Default (the "Cure Period"). If more than 60 days is required for such cure, the defaulting Party shall have such additional time as is reasonably necessary under the circumstances in which to cure such Default so long as the defaulting Party commences such cure within the Cure Period and pursues such cure with reasonable diligence.

14.3. **Meet and Confer, Mediation, Arbitration.** Upon the failure of a defaulting Party to cure a Default within the Cure Period or in the event the defaulting Party contests that a Default has occurred, before initiating any formal litigation proceedings the Parties shall first engage in Mediation.

14.4. **Remedies.** If the Parties are not able to resolve the Default by Mediation, the Parties shall have the following remedies:

14.4.1. **Legal Remedies.** Legal Remedies available to both Parties shall include all rights and remedies available at law and in equity, including, but not limited to, injunctive relief, specific performance and/or damages. In addition to any other rights or remedies, any Party may institute legal action to cure, correct or remedy any default, to specifically enforce any covenant or agreement herein, or to enjoin any threatened or attempted violation. Nothing in this section is intended to, nor does it limit Developer's or City's right to such legal and equitable remedies as permitted by law. It is specifically acknowledged by both Parties that neither Party waives any such rights for legal and equitable remedies.

14.4.2. **Enforcement of Security.** The right to draw on any security posted or provided in connection with the Project and relating to remedying of the particular Default.

14.4.3. **Withholding Further Development Approvals.** The right to withhold all further reviews, approvals, licenses, building permits and/or other permits for development of that portion of the Property owned by the defaulting Property Owner.

14.5. **Public Meeting.** For any Default by a Property Owner, before any remedy in Section 14.4.1 may be imposed by the City, Property Owners shall be afforded the right to attend a public meeting before the Council and to address the Council regarding the claimed Default.

14.6. **Emergency Defaults.** Anything in this Agreement notwithstanding, if the Council finds on the record in a public meeting that a Default by Property Owners materially impairs a compelling, countervailing interest of the City and that any delays in imposing a remedy to such a Default would also impair a compelling, countervailing interest of the City, the City may impose the remedies of Section 14.4., without any further requirements or obligations to the Property Owners. The City shall give Notice to Property Owners in accordance with the City's Vested Laws of any public meeting at which an emergency Default is to be considered and Property Owners shall be allowed to attend such meeting and address the Council regarding the claimed emergency Default.

14.7. **Cumulative Rights.** The rights and remedies set forth herein shall be cumulative.

15. **Notices.** All notices required or permitted under this Amended Development Agreement shall, in addition to any other means of transmission, be given in writing by certified mail and regular mail to the following address:

To the Property Owners:

North Village Properties, LLC
Attn: Seth Hobby
3135 Richmond St.
Salt Lake City, UT 84106

To the City:

City of Heber
Attn: City Recorder
25 North Main Street
Heber, Utah 84032

15.1 **Effectiveness of Notice.** Except as otherwise provided in this Agreement, each Notice shall be effective and shall be deemed delivered on the earlier of:

15.1.1 **Physical Delivery.** Its actual receipt, if delivered personally, by courier service, or by facsimile, provided that a copy of the facsimile Notice is mailed or personally delivered as set forth herein on the same day and the sending Party has confirmation of transmission receipt of the Notice.

15.1.2 **Electronic Delivery.** Its actual receipt if delivered electronically by email, provided that a copy of the email is printed out in physical form and mailed or personally delivered as set forth herein on the same day and the sending Party has an electronic receipt of the delivery of the Notice.

15.1.3 **Mail Delivery.** On the day the Notice is postmarked for mailing, postage prepaid, by First Class or Certified United States Mail and actually deposited in or delivered to the United States Mail.

15.1.4 **Change of Notice Address.** Any Party may change its address for Notice under this Agreement by giving written Notice to the other Party in accordance with the provisions of this Section.

16. **Administrative Amendments.**

16.1 **Allowable Administrative Applications:** The following modifications to this Agreement may be considered and approved by the Administrator.

16.1.1 **Infrastructure.** Modification of the location and/or sizing of the infrastructure for the Project that does not materially change the functionality of the infrastructure.

16.1.2 **Design Guidelines.** Modifications of the Design Guidelines.

16.1.3 **Development Unit Allocations.** Any allocation of Development Unit densities to be made by NVP or its successors.

16.1.4 **Minor Amendment.** Any other modifications deemed to be minor modifications by the Administrator.

16.2 **Application to Administrator.** Applications for Administrative Amendments shall be filed with the Administrator.

16.2.1 **Referral by Administrator.** If the Administrator determines for any reason that it would be inappropriate for the Administrator to determine any Administrative Amendment, the Administrator may require the Administrative Amendment to be processed as a Modification Application.

16.2.2 **Administrator's Review of Administrative Amendment.** The Administrator shall consider and decide upon the Administrative Amendment within a reasonable time not to exceed forty-five (45) days from the date of submission of a complete application for an Administrative Amendment. Applicant must provide all documents in their completed form and pay any required fee in accordance with State law.

16.2.3 **Notification Regarding Application and Administrator's Approval.** Within ten (10) days of receiving a complete application for an Administrative Amendment, the Administrator shall notify the Council in writing. Unless the Administrator receives a notice pursuant to these Sections, requiring that the proposed Administrative Amendment be

considered by the Council as a Modification Application, the Administrator shall review the application for an Administrative Amendment and approve or deny the same within the 45-day period set forth in Section 17.2.2. If the Administrator approves the Administrative Amendment, the Administrator shall notify the Council in writing of the proposed approval and such approval of the Administrative Amendment by the Administrator shall be conclusively deemed binding on the City. A notice of such approval shall be recorded against the applicable portion of the Property in the official City records.

16.2.4 **City Council Requirement of Modification Application Processing.** If the Council requires the proposed Administrative Amendment to be considered by the Council as a Modification Application, it shall, within two (2) business days after the first Council meeting following notification by the Administrator pursuant to Section 17-2-3 above, notify the Administrator that the Administrative Amendment must be processed as a Modification Application, and that the Council shall be the final determining body for any and all Modification Applications.

16.2.5 **Appeal of Administrator's Denial of Administrative Amendment.** If the Administrator denies any proposed Administrative Amendment, the Applicant may process the proposed Administrative Amendment to the Council for final adjudication. The Council shall be the final determining body for any and all Modification Applications.

17. **Amendment.** Except for Administrative Amendments, any future amendments to this Agreement shall be considered as Modification Applications subject to the following processes:

17.1 **Submissions of Modification Applications.** Only the City or NVP or an assignee of NVP, approved in writing by the City, and one that succeeds to all of the rights and obligations of NVP under this Agreement may submit a Modification Application.

17.2 **Modification Application Contents.** Modification Applications shall:

17.2.1 **Identification of Property.** Identify the property or properties affected by the Modification Application.

17.2.2 **Description of Effect.** Describe the effect of the Modification Application on the affected portions of the Project.

17.2.3 **Identification of Non-City Agencies.** Identify any Non-City agencies potentially having jurisdiction over the Modification Application.

17.2.4 **Map.** Provide a map of any affected property and all property within three hundred feet (300') showing the present or Intended Use and density of all such properties.

17.2.5 **Fee.** Modification Applications shall be accompanied by a fee in an amount reasonably estimated by the City to cover the costs of processing the Modification Application.

17.3. **Mutual Cooperation in Processing Modification Applications.** Both the City and Applicants shall cooperate reasonably in promptly and fairly processing Modification Applications.

17.4 **Planning Commission Review of Modification Applications.**

17.4.1 **Review.** All aspects of a Modification Application required by law to be reviewed by the Planning Commission shall be considered by the Planning Commission as soon as reasonably possible in accordance with the City's Vested Laws in light of the nature and/or complexity of the Modification Application. The City shall not be required to begin its review of any application unless and until the Applicant has submitted a complete application.

17.4.2 **Recommendation.** The Planning Commission's vote on the Modification Application shall be only a recommendation.

17.5 **Council Review of Modification Application.** After the Planning Commission, if required by law, has made or been deemed to have made its recommendation of the Modification Application, the Council shall consider the Modification Application.

17.6 **Council's Objections to Modification Applications.** If the Council objects to the Modification Application, the Council shall provide a written determination advising the Applicant of the reasons for denial, including specifying the reasons the City believes that the Modification Application is not consistent with the intent of this Agreement and/or the City's Vested Laws (or, only to the extent permissible under this Agreement, the City's Future Laws).

17.7 **Mediation of Council's Objections to Modification Applications.** If the Council and Property Owners are unable to resolve a dispute regarding a Modification Application, the Parties shall attempt within seven (7) days to appoint a mutually acceptable expert in land planning or such other discipline as may be appropriate. If the Parties are unable to agree on a single acceptable mediator, each shall, within seven (7) days, appoint its own individual appropriate expert. These two experts shall, between them, choose the single mediator. Property Owners shall pay the fees of the chosen mediator. The chosen mediator shall within fourteen

(14) days, review the positions of the parties regarding the mediation issue and promptly attempt to mediate the issue between the parties.

17.8 **Amendments by NVP**. Notwithstanding any other provision in this Agreement to the contrary, NVP may propose and if approved by the City, execute any amendment or other modification of this Agreement or the Site Plan, without the consent of any Property Owner provided that such amendments, modifications, land uses and density allocations: (a) are consistent with the requirements of the City's Vested Laws; and (b) shall not alter the ERU density allocated to such Property Owner identified in a duly executed Development Report or assignment from NVP or otherwise affect any development rights associated with such Property Owner's Development Property set forth in a property specific development agreement with the City pertaining to such Development Property or a recorded Subdivision Plat specific to such Development Property and no other portion of the Project. For avoidance of doubt, neither the City nor NVP shall be required to obtain the consent of any Property Owner or any subsequent owner of a portion of the Project in order to amend this Agreement pursuant to this Section 17.

18. **Estoppel Certificate**. Upon twenty (20) days prior written request by a Property Owner, the City will execute an estoppel certificate to any third party certifying that this Agreement has not been amended or altered (except as described in the certificate) and remains in full force and effect, and that such Property Owner is not in default of the terms of this Agreement (except as described in the certificate), and such other matters as may be reasonably requested by the Property Owner. The City acknowledges that a certificate hereunder may be relied upon by transferees and mortgagees.

19. **Attorney Fees and Costs.** Subject to the Default provisions of Section 14 above, any and all disputes arising out of or related to the terms and conditions of this Agreement, including the interpretation and validity of the terms herein and the respective rights and obligations of the parties, shall first be negotiated informally in good faith between the parties. If such informal negotiations do not resolve the dispute, the parties shall participate, in good faith, in mediation. If mediation is unsuccessful, then either party may pursue whatever legal remedies may be available, at law or equity, before a court of competent jurisdiction, the losing party to the controversy shall pay to the successful party any and all costs and expenses, including reasonable attorney's fees, investigating such actions, taking depositions and discovery, and all other necessary costs incurred in, arising out of or resulting from such default (including any incurred in connection with any appeal or in bankruptcy court) incurred by such party and, in addition, such costs and expenses as are incurred in enforcing this Agreement.

20. **Entire Agreement.** Unless expressly provided herein, nothing in this Agreement shall be interpreted to conflict with, replace or waive any requirements, obligations, standards, duties, rights and enforcements afforded to the Parties, provided by and through the NVOZ Zone and Ordinance, and shall be interpreted and presumed by the Parties to be consistent, in harmony

with, and incorporated herein with this Agreement. This Agreement and all Exhibits hereto, is the entire agreement between the Parties and may not be amended or modified except either as provided herein or by a subsequent written amendment signed by all Parties.

21. **Headings.** The captions used in this Agreement are for convenience only and a not intended to be substantive provisions or evidences of intent.

22 **No Third-Party Rights/No Joint Venture.** This Agreement does not create a joint venture relationship, partnership or agency relationship between the City and Property Owner. Further, the Parties do not intend this Agreement to create any third-party beneficiary rights. The Parties acknowledge that this Agreement refers to a private development and that the City has no interest in, responsibility for or duty to any third parties, including but not limited to JSSD or NVSSD, concerning any improvements to the Property unless the City has accepted the dedication of such improvements at which time all rights and responsibilities for the dedicated public improvement shall be the City's.

23. **Assignability.**

23.1 **Transfer to Developers and Sub-developers.** Notwithstanding anything to the contrary in this Agreement, NVP or its successor may sell any portion of the Property to one or more Developers and/or Sub-developers at any time from and after the Effective Date. Each such transferred portion of the Property (each, a "**Development Property**") shall be developed by the Developer and/or Sub-developer in accordance with and subject to the terms hereof, including, without limitation, the following:

23.1.1 Developer or Sub-developer shall assume in writing for the benefit of the City and Property Owners all of the obligations and liabilities of Property Owners hereunder with respect to the Development Property;

23.1.2 Developer and Sub-developer shall be afforded the rights of Property Owners granted hereunder in respect of the applicable Development Property only, including, without limitation, any rights of Property Owners in and the impact fee credits and/or reimbursements pertaining to such Development Property; provided, however, that unless NVP otherwise agrees in writing, Developer and/or Sub-developer shall not, in each case without the prior written consent of NVP, which may be granted or withheld in NVP's sole discretion:

(ii) submit any design guidelines to the City in respect to the Development Property and/or propose any amendments, modifications or other alterations to the Design Guidelines or any other design guidelines previously submitted by NVP Owners to the City in respect of the Development Property;

(iii) process any Final Plats, site plans or Development Applications for the Development Property and/or propose any amendments, modifications or other alterations of any approved Final Plats, site plans, and/or Development Applications procured by NVP for the Development Property; or

(iv) propose or oppose any amendments, modifications or other alterations to this Agreement.

23.1.3 The City agrees not to accept or process any of the foregoing matters from a Developer and/or Sub-developer unless the matter has been approved by the owner of the Development Property.

23.1.4 NVP shall not amend, modify or alter this Agreement or the Design Guidelines, or any Final Plats, Development Agreements and/or site plans approved for the Development Property in a manner that would materially interfere with Developer and/or Sub-developer's rights hereunder in respect of such Development Property, in each case without Developer and/or Sub-developer's prior written consent, which shall not be unreasonably withheld, conditioned or delayed.

24. **Effect of Breach.** Notwithstanding any other provision of this Agreement, no breach or default hereunder, by any Person succeeding to any portion of a Property Owner's obligations under this Agreement shall be attributed to Property Owner. Nor may a Property Owner's rights hereunder be canceled or diminished in any way by any breach or default by any such Person. No breach or default hereunder by a Property Owner shall be attributed to any Person succeeding to any portion of such Property Owner's rights or obligations under this Agreement, nor shall such transferee's rights be canceled or diminished in any way by any breach or default by such Property Owner. During the development of the Project, until final approval of and dedication to the City, Developer, Owners or Owners, and their assigns, transferees, and sub - developers shall maintain the City as an additional named insured where reasonably possible, and without adding unreasonable cost, on any relevant or applicable liability insurance associated with the Project.

25. **Mortgagee Protection.** This Agreement shall be superior and senior to any lien placed upon the Property, or any portion thereof, including the lien of any Mortgage. Notwithstanding the foregoing, no breach of this Agreement shall defeat, render invalid, diminish or impair the lien of any such Mortgage made in good faith and for value, but all of the terms and conditions contained in this Agreement shall be binding upon and effective against any Person that acquires title to the Property, or any portion thereof, by foreclosure, trustee's sale, deed in lieu of foreclosure or otherwise. Notwithstanding the provisions of this Section, no Mortgagee shall have any obligation or duty under this Agreement to construct or complete the construction of improvements, or to guarantee such construction or completion. If the City receives a written notice from a Mortgagee requesting a copy of any notice of default given to a Property Owner or

a Sub-developer and specifying the address for service thereof, then the City shall deliver to such Mortgagee, concurrently with service thereon to the Property Owner or a Sub-developer, as applicable, any notice of default or determination of noncompliance given to the Property Owner or such Sub-developer. Each Mortgagee shall have the right (but not the obligation) for a period of 90 days after the receipt of such notice from the City to cure or remedy the default claimed or the areas of noncompliance set forth in the City's notice. If such default or noncompliance is of a nature that it can only be cured or remedied by such a Mortgagee upon obtaining possession of the Property, then such Mortgagee may seek to obtain possession with diligence and continuity through a receiver or otherwise, and shall within 90 days after obtaining possession cure or remedy such default or noncompliance. If such default or noncompliance cannot with diligence be cured or remedied within either such 90 -day period, then such Mortgagee shall have such additional time as may be reasonably necessary to cure or remedy such default or noncompliance if such Mortgagee commences such cure or remedy during such 90 -day period and thereafter diligently pursues completion of such cure or remedy to the extent possible.

26. **Termination.**

26.1 This Agreement shall be terminated and of no further effect upon the occurrence of any of the following events:

(i) Expiration of the Term of this Agreement, unless extended as provided in Section 4.3;

(ii) Completion of the Project in accordance with the Development Entitlements and the City's issuance of all required occupancy permits and acceptance of all dedications and improvements required under the Development Entitlements and this Agreement;

(iii) Except for the payment of applicable fees and assessments, as for any specific residential dwelling or other structure within the Project, this Agreement shall be terminated for such dwelling or other structure upon the issuance by City of a certificate of occupancy therefore;

(iv) Entry of final judgment (with no further right of appeal) or issuance of a final order (with no further right of appeal) directing City to set aside, withdraw, or abrogate City's approval of this Agreement,

(v) The effective date of a party's election to terminate the Agreement as specifically provided in this Agreement, or

(vi) in the event that Developer or the project are in default, or where material, contractual and developmental obligations are not met, or any deadlines and conditions of this Agreement, and relevant State

and Federal Laws not fulfilled or are violated, after appropriate default notices and cure provisions of this Agreement.

26.2 **Notice of Termination.** City shall, upon written request made by Developer or Developer's successor(s) or assign(s) or any Owner to City's Planning Director, determine if the Agreement has terminated with respect to any parcel or lot at the Property, and shall not unreasonably withhold, condition, or delay termination as to that lot or parcel. Upon termination of this Agreement as to any lot or parcel, City shall upon Developer or Developer's successor(s) or assign(s) or any Owner's request record a notice of termination that the Agreement has been terminated. The aforesaid notice may specify, and Developer or Developer's successor(s) or assign(s) and Owners agree, that termination shall not affect in any manner any continuing obligation to pay any item specified by this Agreement. Termination of the Agreement as to any parcel or lot at the Property shall not affect Developer or Developer's successor(s) or assign(s) or any Owner's rights or obligations under any of the Development Entitlements and Subsequent Entitlements, including but not limited to, the General Plan, Specific Plan, Zoning Ordinance and all other City policies, regulations, and ordinances applicable to the Project at the Property. City may charge a reasonable fee for the preparation and recordation of any notice(s) of termination requested by Developer or Developer's successor(s) or assign(s) or any Owner.

26.3 **Partial Termination.** In the event of a termination of this Agreement with respect of any portion of the Property, any then-existing rights and obligations of the parties with respect to such portion of the Property shall automatically terminate and be of no further force, effect or operation. However, no termination of this Agreement with respect to any portion of the Property or the Project shall affect in any way the parties' rights and obligations hereunder with respect to any other portion of the Property or Project not subject to the termination. Subject to the provisions of the Default Paragraph 14, the expiration or termination of this Agreement shall not result in any expiration or termination of any Entitlement then in existence, without further action of City.

27. **Insurance and Indemnification.** Each Property Owner shall defend and hold the City and its officers, employees and consultants harmless for any and all claims, liability and damages arising out of the negligent actions or inactions of such Property Owner, its agents or employees pursuant to this Agreement, unless caused by the City's negligence or willful misconduct.

28. **Hazardous, Toxic, and/or Contaminating Materials.** Each Owner shall defend and hold the City and its elected and/or appointed boards, officers, agents, employees and consultants harmless from any and all claims, liabilities, costs, fines, penalties and/or charges of any kind whatsoever relating to the existence and removal, or caused by the introduction of hazardous, toxic and/or contaminating materials by such Property Owner on the Project or arising

out of action or inactions of Developer, except where such claims, liability costs, fines, penalties and charges are due to the actions of the City or its elected or appointed boards, officers, agents, employees or consultants.

29. **Binding Effect.** If NVP or another Property Owner conveys any portion of the Property to one or more Sub-developers, the property so conveyed shall have the same rights, privileges, Intended Uses and configurations, and shall be subject to the same limitations and rights of the City, applicable to such property under this Agreement prior to such conveyance, without any required approval, review, or consent by the City, except as otherwise provided herein.

30. **No Waiver.** Failure of any Party hereto to exercise any right hereunder shall not be deemed a waiver of any such right and shall not affect the right of such Party to exercise at some future date any such right or any other right it may have.

31. **Severability.** If any provision of this Agreement is held by a court of competent jurisdiction to be invalid for any reason, the Parties consider and intend that this Agreement shall be deemed amended to the extent necessary to make it consistent with such decision and the balance of this Agreement shall remain in full force and affect.

32. **Force Majeure.** Any prevention, delay or stoppage of the performance of any obligation under this Agreement which is due to strikes, labor disputes, inability to obtain labor, materials, equipment or reasonable substitutes therefor; acts of nature, inclement weather, governmental restrictions, regulations or controls, judicial orders, enemy or hostile government actions, wars, civil commotions, fires or other casualties or other causes beyond the reasonable control of the Party obligated to perform hereunder shall excuse performance of the obligation by that Party for a period equal to the duration of that prevention, delay or stoppage.

33. **Time is of the Essence.** Time is of the essence to this Agreement and every right or responsibility shall be performed within the times specified.

34. **Appointment of Representatives.** To further the commitment of the Parties to cooperate in the implementation of this Agreement, the City and NVP each shall designate and appoint a representative to act as a liaison between the City and its various departments and NVP. The initial representative for the City shall be City Manager, or his designee and the initial representatives for NVP shall be Seth Hobby. The Parties may change their designated representatives by Notice. The representatives shall be available at all reasonable times to discuss and review the performance of the Parties to this Agreement and the development of the Project.

35. **Mutual Drafting.** Each Party has participated in negotiating and drafting this Agreement and therefore no provision of this Agreement shall be construed for or against either Party based on which Party drafted any particular portion of this Agreement.

36. **Applicable Law.** This Agreement is entered into in the City in the State of Utah and shall be construed in accordance with the laws of the State of Utah irrespective of Utah's choice of law rules.

37. **Recordation and Running with the Land.** This Agreement shall be recorded in the office of the Wasatch County Recorder. Copies of the City's Vested Laws, **Exhibit D**, shall not be recorded. A secure copy of **Exhibit D** shall be filed with the City Recorder and each Party shall also have an identical copy. The provisions of this Agreement shall constitute real covenants, contract and property rights and equitable servitudes, which shall run with all of the land subject to this Agreement. The burdens and benefits hereof shall bind and inure to the benefit of each of the Parties hereto and all successors in interest to the Parties hereto. All successors in interest shall succeed only to those benefits and burdens of this Agreement which pertain to the portion of the Project Area to which the successor holds title. Such titleholder is not a third party beneficiary of the remainder of this Agreement or to zoning classifications and benefits relating to other portions of the Project Area. The obligations of Property Owners hereunder are enforceable by the City, and no other Person shall or may be a third party beneficiary of such obligations unless specifically provided herein.

38. **Authority.** The parties to this Agreement each warrant that they have all of the necessary authority to execute this Agreement. Specifically, on behalf of the City, the signature of the Mayor of the City is affixed to this Agreement lawfully binding the City pursuant to City Policy. This Agreement is approved as to form and is further certified as having been lawfully adopted by the City by the signature of the City Attorney.

39. **Covenant of Good Faith and Fair Dealing.** No party shall do anything which shall have the effect of injuring the right of another party to receive the benefits of this Agreement or do anything which would render its performance under his agreement impossible. Each party shall perform all acts contemplated by this Agreement to accomplish the objectives and purposes of this Agreement.

40. **Further Actions and Instruments.** The Parties agree to provide reasonable assistance to the other and cooperate to carry out the intent and fulfill the provisions of the Agreement. Each of the parties shall promptly execute and deliver all documents and perform all acts as necessary to carry out the matters contemplated by this Agreement.

41. **Partial Invalidity Due to Governmental Action.** In the event state or federal laws or regulations enacted after the Execution Date of this Agreement, or formal action of any governmental jurisdiction other than City, prevent compliance with one or more provisions of this Agreement, or require changes in plans, maps or permits approved by City, the parties agree that the provisions of this Agreement shall be modified extended or suspended only to the minimum extent necessary to comply with such laws or regulations.

[Signatures appear on the following two pages.]

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement by and through their respective, duly authorized representatives as of the day and year first herein above written.

PROPERTY OWNER

North Village Properties, LLC
Utah limited liability company

By: _____
Name: Jared Fredrick
Title: Manager

PROPERTY OWNER ACKNOWLEDGMENT

STATE OF UTAH)
:§.
CITY OF SALT LAKE)

On the _____ day of _____, 2022, personally appeared before me Jared Fredrick, who being by me duly sworn, did say that he is the Manager of North Village Properties, LLC, and that the foregoing instrument was duly authorized by the company at a lawful meeting held by authority of its operating agreement and signed in behalf of said company.

_____
NOTARY PUBLIC

CITY

Heber City, a political subdivision of the State of Utah

By:_____
Name:
Its:_____

Approved as to form and legality: Attest:

City Attorney City Recorder

By:_____ By:_____

CITY ACKNOWLEDGMENT

STATE OF UTAH)
:§.
CITY OF HEBER)

On the _____ day of _____, 2022, personally appeared before me Heidi Franco who being by me duly sworn, did say that she is the Mayor of City of Heber, a political subdivision of the State of Utah, and that said instrument was signed in behalf of the City by authority of its governing body.

_____
NOTARY PUBLIC

EXHIBIT A

TO DEVELOPMENT AGREEMENT FOR NVP MIXED USE RESIDENTIAL DEVELOPMENT

Legal Description

Exhibit A

Development Agreement for North Village Views Residential Development

Legal Description

PARCELS 21-2609 & 07-853, ENTRY #442251:

Beginning at a point on the centerline of the Timpanogos Canal said point being North 00°28'54" West 270.81 feet and WEST 115.94 from the Northeast Corner of Section 19, Township 3 South, Range 5 East, Salt Lake Base and Meridian and running;
Thence South 51°57'07" East 113.12 feet along the centerline of said Timpanogos Canal; Thence South 55°05'22" East 52.87 feet along the centerline of said Timpanogos Canal; Thence South 52°41'32" East 44.68 feet along the centerline of said Timpanogos Canal; Thence South 47°56'47" East 261.47 feet along the centerline of said Timpanogos Canal; Thence South 39°35'56" East 102.04 feet along the centerline of said Timpanogos Canal; Thence South 75°005'38" East 26.17 feet along the centerline of said Timpanogos Canal; Thence
North 89°46'54" East 71.96 feet along the centerline of said Timpanogos Canal; Thence southeasterly 120.62 feet along the arc of a 98.00 foot radius curve to the right, the chord bears South 54°57'25" East 113.15 feet along the centerline of said Timpanogos Canal; Thence South 19°41'44" East 102.74 feet along the centerline of said Timpanogos Canal; Thence South 34°55'51" East 147.43 feet along the centerline of said Timpanogos Canal; Thence South 37°00'16" East 100.58 feet along the centerline of said Timpanogos Canal; Thence
South 48°04'46" East 20.70 feet along the centerline of said Timpanogos Canal; Thence South 55°31'15" East 116.23 feet along the centerline of said Timpanogos Canal; Thence South 74°48'25" West 17.48 feet; Thence westerly 193.02 feet along the arc of a 347.00 foot radius curve to the right, chord bears North 89°15'29" West 190.54 feet; Thence North 73°19'22" West 74.75 feet; Thence northwesterly 113.35 feet along the arc of a 353.00 foot radius curve to the left, chord bears North 82°31'19" West 112.87 feet; Thence
South 88°16'44" West 182.17 feet; Thence northwesterly 67.72 feet along the arc of a 347.00 foot radius curve to the right, chord bears North 86°07'48" West 67.61 feet; Thence North 10°34'50" East 167.93 feet; Thence
North 79°25'10" West 110.01 feet; Thence northwesterly 15.55 feet along the arc of a 10.00 foot radius curve to the right, chord bears North 34°53'04" West 14.03 feet; Thence northeasterly 16.62 feet along the arc of a 60.00 foot radius curve to the left, chord bears North 01°42'58" East 16.57 feet; Thence northwesterly 102.91 feet along the arc of a 303.35 foot radius curve to the right, chord bears North 73°10'38" West 102.42 feet; Thence North 63°59'49" West 141.63 feet; Thence southwesterly 37.15 feet along the arc of a 20.00 foot radius curve to the right, chord bears South 62°46'58" West 32.04 feet; Thence
North 63°59'49" West 21.15 feet; Thence northwesterly 31.71 feet along the arc of 60.00 foot radius curve to the left, chord bears North 79°08'12" West 31.34 feet; Thence South 85°43'26" West 41.59 feet; Thence southwesterly 89.28 feet along the arc of a 150.00 foot radius curve to the right, chord bears South 08°57'08" West 87.97 feet; Thence South 26°00'11" West 54.74 feet; Thence North 63°59'49" West 88.89 feet; Thence northwesterly 190.66 feet along the arc of a 603.00 foot radius curve to the left, chord bears
North 73°03'19" West 189.87 feet; Thence North 73°03'19" West 189.87 feet; Thence North 82°06'48" West 75.29 feet; Thence North 06°27'11" East 77.53 feet; Thence northwesterly 86.47 feet along the arc of a 150.00 foot radius curve to the left, chord bears North 10°03'42" West 85.28 feet; Thence South 27°27'52" East 146.06 feet; Thence North 43°52'21" East 685.58 feet to the point of beginning.

PARCELS 21-2267 & 21-2266, ENTRY #432395:

Beginning at a point being South 00°30'30" East 1085.37 feet and
South 89°53'52" West 669.21 feet from the Northeast Corner of Section 19, Township 3 South, Range 5 East, Salt Lake Base and Meridian and running thence, South 89°53'52" West, a distance of 466.35 feet; Thence,
South 42°04'20" West, a distance of 263.-72 feet to a point on the northwest sideline of State Highway 40; Thence, North 31°21'37" West, along said sideline a distance of 402.47 feet; Thence, North 87°13'09" East, a distance of 520.38 feet; Thence , North 32°30'59" West, a distance of 298.91 feet; Thence, North 52°35'58" East, a distance of 139.08 feet; Thence, North 32°24'17" West, a distance of 96.36 feet; Thence, North 49°02'11" West, a distance of 30.17 feet; Thence South 68°24'22" West 515.30 feet to a point on the northwesterly sideline of said State Highway 40; Thence, North 24°49'56" West, along said sideline a distance of 150.48 feet; Thence, North 69°59'05" East, a distance of 399.34 feet; Thence, South 70°20'17" East, a distance of 104.96 feet to the centerline of Wasatch Canal; Thence, along the center line of said Wasatch Canal the following nine (9) courses; (1) South 62°37'14" East 78.81 feet; (2) South 39°53'29" East 132.39 feet; (3) South 55°57'44" East 111.02 feet; (4) South 43°39'59" East 56.24 feet; (5) South 35°00'02" East 23.20 feet; (6) South 20°24'36" East 117.27 feet; (7) South 41°35'39" East 119.93 feet; (8) South 24°37'46" East 140.91 feet; (9) South 33°44'06" East 85.31 feet to the point of beginning.

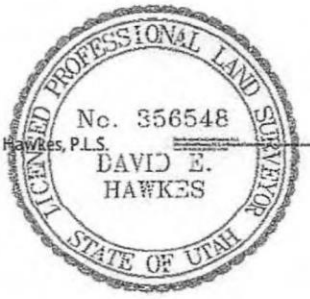
PARCEL 21-2042, ENTRY #428172:

Commencing at the Northeast Corner of Section 19, Township 3 South, Range 5 East, Salt Lake Base and Meridian, and running thence South 00°30'30" East 1085.37 feet and South 89°53'55" West 23.55 feet to the point of beginning for this description: Thence South 89°53'55" West, a distance of 396.07 feet; Thence North 00°08'04" West, a distance of 1.82 feet; Thence South 89°53'55" West, a distance of 203.30 feet to a point on the east sideline of the existing 65.00 foot Wasatch Canal Right of Way; Thence running along said sideline for the following five courses: (1) Thence North 43°17'59" West, a distance of 36.37 feet;
(2) Thence North 33°44'06" West, a distance of 72.49 feet; (3) Thence
North 24°37'46" West, a distance of 143.17 feet; (4) Thence North 41°35'39" West a distance of 118.70 feet; (5) Thence North 20°24'36" West, a distance of 15.84 feet; Thence North 55°53'06" East, a distance of 196.76 feet; Thence Southeasterly along the arc of a curve to the left, having a radius of 500.00 feet, the center which bears North 73°22'35" East, a distance of 64.45 feet; Thence North 69°43'31" East, a distance of 140.58 feet; Thence northwesterly along the arc of a curve to the right, having a radius of 400.00 feet, the center which bears North 69°43'31" East, a distance of 255.08 feet; Thence southeasterly along the arc of a curve to the right, having a radius of 470.00 feet, the center bears South 18°25'33" West, a distance of 62.16 feet; Thence
South 63°59'49" East, a distance of 96.94 feet; Thence southeasterly along the arc of a curve to the left, having a radius of 300.00 feet, the center of which bears South 77°17'51" East, a distance of 154.23 feet; Thence southeasterly along the arc of a curve to the left, having a radius of 300.00 feet, the center which bears North 73°°14'46" East, a distance of 109.50 feet; Thence
South 37°40'01" East, a distance of 361.29 feet; Thence southeasterly along the arc of a tangent curve to the left, having a radius of 250.00 feet, the center which bears North 52°20'00" East, a distance of 105.15 feet to the point of beginning.

EXHIBIT A

A parcel of land lying and situate in the Southeast Quarter of Section18, and the Northeast Quarter of Section 19, Township 3 South, Range 5 East, Salt Lake Base and Meridian. Comprising 1.21 acres of Lot 1, North Horizon Subdivision, as recorded in Book 511, at Page 306 of the Wasatch County Records. Basis of Bearing for subject parcel being
North 87°06'33" West 2619.46 feet, measured, between the 2005, 3" Wasatch County Brass Cap monumenting the Southeast Corner of said Section 18 and the 1976, 3" Wasatch County Aluminum cap monumenting the South Quarter of said Section 18; Subject parcel being more particularly described as follows:

Commencing at the 1976, three inch brass cap monument monumenting the Southeast Corner of said Section 18, thence North 87°06'33" West 1580.22 feet coincident with the monument line of the south line of the Southeast Quarter of said Section 18; Thence North 02°53'27" East 305.38 feet to a point on the southeasterly right of way line of Moulton Lane and the True Point of Beginning;
Thence North 63°50'34" East (North 63°43'50" East, plat) 80.84 feet coincident with said right of way line; Thence departing said right of way South 26°25'22" East 54.19 feet to a point of curvature; Thence southeasterly 43.25 feet along the arc of a 242.00 foot radius curve to the left (center bears North 63°34'38" East) through a central angle of 10°14'24" to a point of tangency; Thence South 36°39'46" East 518.08 feet along a line running parallel to and 66.00 feet easterly of the westerly boundary of said Lot 1 to a point of curvature; Thence easterly 123.36 feet easterly along the arc of a 242.00 foot radius curve to the left (center bears North 53°20'14" East) through a central angle of 29°12'27" to a point on the southerly boundary of said subdivision; Thence South 28°36'44" West (South 28°36'44" West, plat) 106.54 feet coincident with said subdivision boundary; Thence North 36°39'49" West
(North 36°46'30" West, plat) 791.82 feet coincident with the westerly line of said Lot 1 and the prolongation thereof to the point of beginning.



David Hawkes, P.L.S.

EXHIBIT A

Commencing at the Northeast Corner of Section 19, Township 3 South, Range 5 East, Salt Lake Base and Meridian, thence South 00°30'30" East 1085.41 feet coincident with the east line of said quarter section to the True point of beginning;

Thence North 89°53'52" East 116.19 feet;
Thence South 00°06'08" East 125.00 feet;
Thence South 89°53'52" West 1216.77 feet;
Thence South 42°04'13" West 226.85 feet to the east right of way of US Highway 40;
Thence North 32°01'03" West 114.23 feet coincident with said right of way;
Thence North42°04'13" East 264.68 feet;
Thence North 89°53'52" East 1135.57 feet to the point of beginning.

EXHIBIT B

TO DEVELOPMENT AGREEMENT FOR NVP MIXED USE RESIDENTIAL DEVELOPMENT

Site Plan



EXHIBIT C

TO DEVELOPMENT AGREEMENT FOR NVP MIXED USE RESIDENTIAL DEVELOPMENT

North Fields

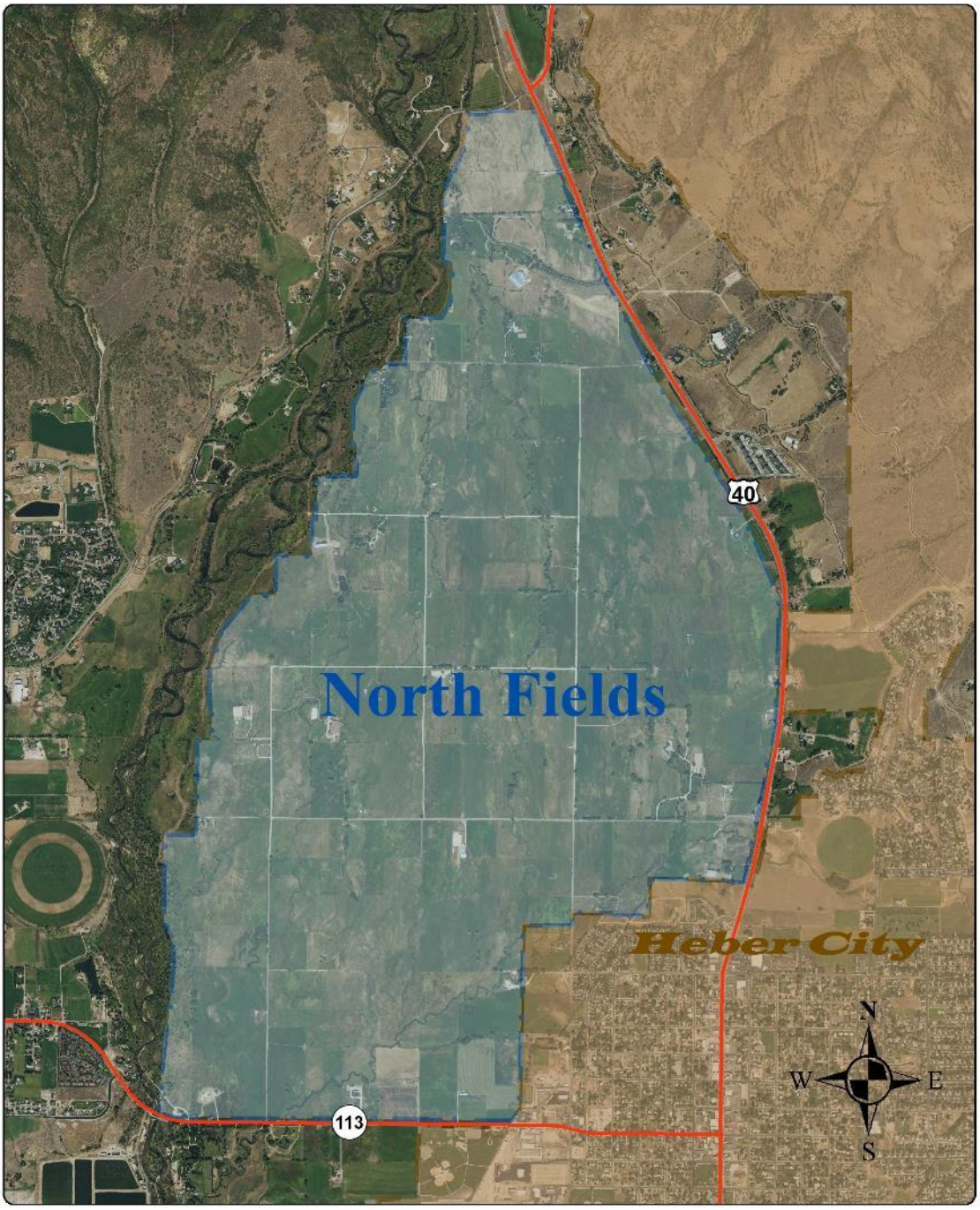


EXHIBIT D

TO DEVELOPMENT AGREEMENT FOR NVP MIXED USE RESIDENTIAL DEVELOPMENT

City's Vested Laws

For the City's Vested Laws, reference the North Village Overlay Zone (NVOZ), adopted by the City Council of Heber City, Utah, in Chapter 18.81 of Heber Municipal Code on March 16, 2021.

EXHIBIT E

TO DEVELOPMENT AGREEMENT FOR NVP MIXED USE RESIDENTIAL DEVELOPMENT

Horrocks Engineering Report

TAB 4

City Council Staff Report

MEETING DATE: September 20, 2022
SUBJECT: Adoption of the Heber City Storm Water Design Manual
RESPONSIBLE: Russell Funk, City Engineer
DEPARTMENT: Engineering
FILE NO: 21015
STRATEGIC RELEVANCE:
- Principles: Necessary Administrative Action
-Goals: 2) Infrastructure Sustainability

SUMMARY

The purpose of this item is to present a proposed Heber City Storm Water Design Manual, receive input from the City Council, and to seek for approval by Ordinance by the City Council.

RECOMMENDATION

1. Consider and approve Ordinance 2022-23 adopting the Heber City Storm Water Design Manual as an Amendment to the Heber City Standard Drawings and Specifications.

BACKGROUND

Heber City has established design criteria and regulations for public and private storm water management systems within the city. However, those criteria and regulations are in various places in the City Code, Master Plan Documents, and in the Engineering Standard Specifications and Drawings. In addition, the existing design criteria and regulations are not updated relative to State storm water regulations to which Heber City will eventually be subject.

This Heber City Storm Water Design Manual brings all of those design criteria and regulations into one document and expounds upon and incorporates some of the upcoming State storm water regulations. It also provides standard methodologies to facilitate uniformity in both the preparation and review of the storm water aspects of development applications.

DISCUSSION

Attached to this report is the Heber City Storm Water Design Manual. It is divided into sections that address submittals requirements and the various aspects of a storm water management system. These include: rainfall, runoff, conveyance, storage, discharge, water quality, and low-impact development.

FISCAL IMPACT

None

CONCLUSION

This Heber City Storm Water Manual will:

- Bring all storm-water-related information into one document,
- Better prepare the City for upcoming State regulations,
- Facilitate the preparation of development applications by developers and their engineers, and

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- Facilitate the review of development applications by City staff.

ALTERNATIVES
None

POTENTIAL MOTIONS

Staff Recommended Option - Approval
"I move to Approve Ordinance 2022-23 adopting the Heber City Storm Water Design Manual as presented."

Or

"I move to Approve Ordinance 2022-23 adopting the Heber City Storm Water Design Manual with conditions listed as follows: …"

Alternative 1 - CONTINUANCE
"I move to Continue this item to ___Date___ , with direction to Staff on information and/or changes needed to render a decision, as follows: …"

Alternative 2 - DENIAL
"I move to Deny this item with the findings described as follows: …"

ACCOUNTABILITY

Department: Engineering
Staff Member: Russell Funk, City Engineer

EXHIBITS / ATTACHMENTS

Proposed Heber City Storm Water Design Manual
Ordinance No. 2022-23

HEBER CITY

HEART OF THE WASATCH BACK

HEBER CITY STORM WATER DESIGN MANUAL

Heber City Engineering

DRAFT

SEPTEMBER 8, 2022

HEBER CITY
75 N Main Street
Heber City, UT 84032

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Introduction

Purpose of document

The purpose of this document is to establish design standards and guidelines for storm drainage infrastructure within Heber City. This document also promotes uniformity among development design submittals and drainage reports.

The design criteria in this document are for use on public and private projects within the city. There are other adopted City documents that also reference requirements related to storm drain systems within the city. These documents include the Heber City Standard Specifications and Drawings, the Heber City Master Plans, and the Heber City Municipal Code. This document is designed to work in collaboration with these other stated references, however, in the case of discrepancies the more stringent standard will apply. All requirements and the intent of design requirements in this document shall be met unless otherwise approved by the City Engineer.

Definitions

cfs	*Cubic feet per second (449 gallons per minute)*
Ac-Ft	*Acre-foot (volume of water required to cover an acre of land to a depth of one foot)*
Detention	*Short term storage of runoff provided by a pond or similar facility. An outlet is provided that allows water to be released from the facility at a predetermined rate.*
LID	*Low Impact Development is an approach to improving water quality by reducing the amount of storm runoff generated by a project and relying on infiltration or evaporation to handle runoff where it is generated.*
Retention	*Long term storage of storm water provided by a pond or similar facility that does not allow water to be discharged. Water will stay in a retention pond after a storm event until it either evaporates or infiltrates into the bottom of the pond.*

DRAFT

Approval Procedure

Preliminary Drainage Plan and Report

i. A preliminary drainage plan and report are required for all site plan and subdivision developments within the city. The preliminary drainage plan must include the following as applicable:
    1. Existing topography (2-foot contours or finer) extending at least 100 feet beyond the site
    2. Existing drainage infrastructure and features
    3. Existing drainage and gravity irrigation channel/canal features
    4. Watershed delineations and existing drainage patterns/flow paths
    5. Proposed drainage infrastructure and features (onsite and offsite)
    6. Proposed drainage patterns/flow paths

ii. The preliminary drainage report must include the following as applicable:
    1. Introduction
    2. Project Scope
    3. Project Location
    4. Description of Existing Conditions
    5. Drainage Design Criteria
    6. Off-Site Watershed Drainage and Hydrology
        a. Preliminary Upstream/Downstream Flood Analysis
        b. Preliminary Hazards & Debris-Flow Analysis
    7. On-Site Area Drainage and Hydrology and Hydraulics
    8. LID features
    9. Detention and/or Retention Facilities
    10. Water Quality Features (e.g., LID, HDS, pretreatment etc.)
    11. Major Stream Crossings
    12. Non-pressurized Irrigation Systems

Final Drainage Plan and Report

iii. Final drainage plans and report are required for all site plan and subdivision developments within the City shall be submitted after acceptance/approval of the preliminary submittal. The final drainage report shall be submitted for review prior to final site plan or subdivision approval.

iv. Final Drainage Plans must include the following as applicable:
    1. Existing and proposed topography (2-foot contours or finer) extending at least 100 feet beyond the site
    2. Existing drainage infrastructure and features
        a. Onsite features (channels, flow control, etc.)
        b. Offsite features (debris basins, etc.)
    3. Existing drainage and gravity irrigation channel/canal features
    4. Watershed delineations and existing drainage patterns/flow paths
    5. Location of all proposed drainage features
        a. Onsite features (channels, flow control, etc.)
        b. Offsite features (debris basins, etc.)

6. Proposed drainage patterns/flow paths
7. Proposed drainage details
8. Improvements to city facilities
9. LID, water quality and retention features

v. Final Drainage Report must include as applicable:
1. Introduction
2. Project Scope
3. Project Location
4. Detailed Description of Existing Conditions
5. Drainage Design Criteria
6. Off-Site Drainage and Hydrology with Final Calculations
    a. Final Upstream/Downstream Flood Analysis
    b. Final Hazards & Debris-Flow Analysis
    c. Recommended Mitigation
7. On-Site Drainage Hydrology and Hydraulics with Final Calculations
8. Description of LID Measures
    a. Justification for products selected and why they are most appropriate
    b. Compliance with on-site retention rules
9. Detailed Description of Detention and/or Retention Facilities
10. Major Stream Crossing
11. Non-pressured Irrigation Systems
12. Permanent Erosion Control Features
13. Water Quality Features (e.g., LID, HDS, pretreatment etc.)
14. Storm Drain System Calculations

All plans and reports are subject to review and approved by Provo River Watershed Council. See Appendix A for list of resources for drainage design in Heber City.

Design Standards and Analysis Methods

These standards apply to all developments within Heber City including the North Village area or other areas that may annex into the City in the future. Heber City may establish additional storm drain design criteria for certain development areas through a new Storm Drain Master Plan and/or Master Plan update. All developments shall comply with the City Storm Drain Master Plan that is applicable for the respective development.

Design Storms for Conveyance

New developments within Heber City must have an initial and a major storm drain system for storm water conveyance. The initial system's purpose is to reduce the frequency of street flooding, reduce maintenance costs, and provide protection against regularly recurring damage from storm runoff. The initial conveyance system must handle the 10-year storm event at a duration equal to or less than the time of concentration (T_c), and typically consists of pipe, storm drain inlets, curb and gutter, or drainage swales that convey the storm water.

The purpose of the major conveyance system is to avoid major property damage or loss of life during flood level runoff conditions. The major system is comprised of the initial conveyance system elements but also includes the entire roadway cross section, including park strip and sidewalk, or other safe surface routes. The major system must protect against flooding during the 100-year storm event at a duration equal to or less than the T_c.

Every effort shall be made to keep the major system above ground. But, where that is impractical, the City Engineer may approve the major system to be underground if it is designed for it from the top of the catchment. “Funneling” at the bottom of a catchment is not allowed. The following figure details how the initial and major systems must function.

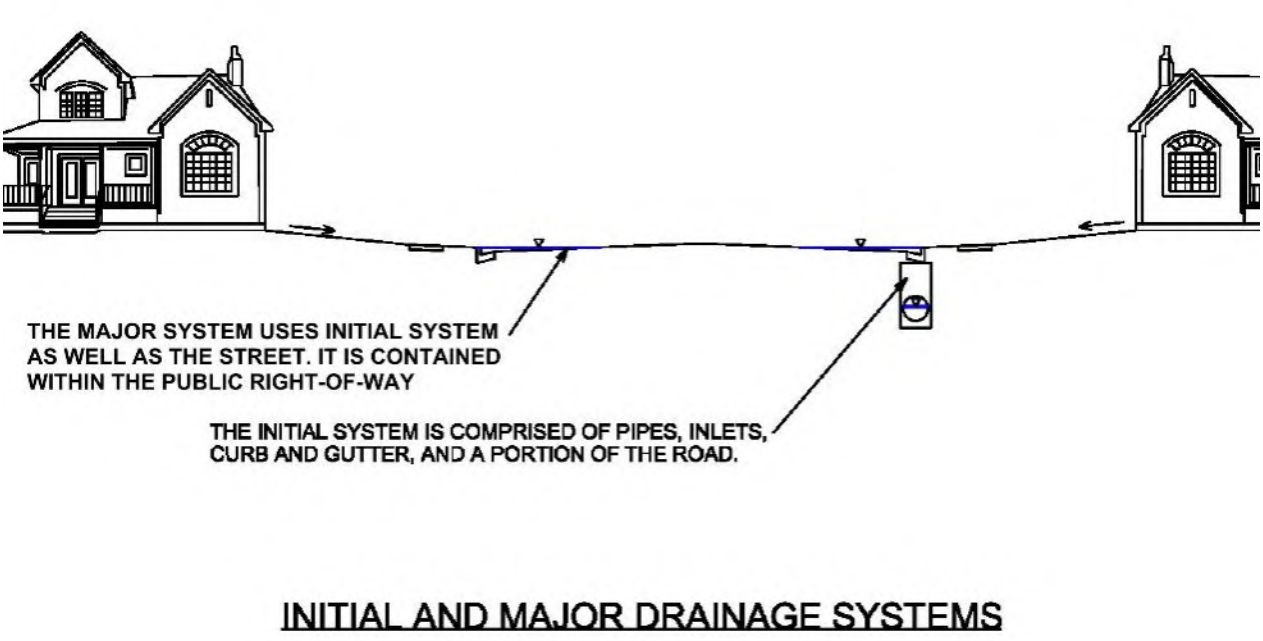


Figure 1. Initial and Major Drainage Systems

Directly connected impervious areas should be independent watershed basins and should not be combined and averaged with pervious areas.

Storage Facilities

Storm drain storage facilities are required for flood control and water quality purposes. Storage facilities may be above ground basins/ponds or below ground storage systems. Detention storage facilities require an approved suitable discharge location approved by the City Engineer. Retention facilities are required when no suitable discharge location is available. Detention facilities must be designed to store and detain the 25-year event with a maximum release rate of the lesser of 0.1 cfs/acre or historic flows in the 2-year, 10-year and 25-year events. See the Post Construction Peak Discharge section for more detailed requirements. Retention storage facilities must provide retention volume for the 100-year, 24-hour event. Infiltration may be considered as outflow when sizing retention facilities. See the section on

Infiltration in this document for details regarding infiltration requirements. However, if infiltration is utilized for facility sizing design, shorter storm durations with higher intensities must be checked (i.e., rational spreadsheet), and the controlling or largest volume, minus the infiltration, shall be used to size the storage facility. Therefore, the 24-hour storm may not result in the largest storage volume. When utilizing the SCS Type II 24-hour storm for sizing storage facilities with infiltration, the storm distribution must provide a peak intensity where the majority of the rainfall occurs during a shorter period of time.

Storm Drain System Hydraulic Requirements

Pipe systems used for conveyance must be designed such that they flow unpressurized during the required design event. Minimum pipe diameter for public storm drain pipes within City right-of-way is 18 inches but may be reduced to 15 inches for pipes from a single inlet box. Private storm drain pipe may be reduced to 10 inches but must still adhere to conveyance design storm requirements. Pipe material must adhere to Heber City Standard Specifications and Drawings. Junction boxes or manholes should be placed such that the maximum pipe length between two structures does not exceed 400 feet.

Apply an inlet clogging factor of 30% for inlets on grade and 50% for inlets in sags.

The minimum pipe slopes shall be pursuant to HEC 22 Table 7-7. The n-values shall be 0.012 for plastic pipe and 0.013 for concrete pipe.

On steeper slopes, provide a sufficient number of inlets to reduce inlet bypass to less than 0.2 cfs and to reduce risk of water sweeping pedestrians off their feet.

Design storm drain system per HEC-22.

Channel Hydraulic Requirements

Open channels that are part of the initial conveyance system shall be designed to convey the 10-year flow while maintaining one-foot of freeboard. Channels that are located within a FEMA Special Flood Hazard Area, open channels that are the major conveyance system, and natural drainage channels shall be designed to convey the 100-year flow with one foot of freeboard. All channel sections must be adequately designed, detailed, and constructed, pursuant to the latest edition of HEC 15, to prevent erosion of the channel bed and banks.

Above Ground Storage Basins (Ponds)

Above ground storage basins (ponds) shall be designed as attractive and usable spaces. Water depth should be five feet or less where feasible, appropriate landscaping shall be incorporated, and include elements that eliminate standing water and low flow impacts. Detention ponds shall include a low-flow surface channel, or underdrain that is sized for the 2-year storm event.

The required freeboard for detention basins is two feet in areas where any portion of the pond is constructed above existing ground and one foot when the pond is excavated in existing ground.

Basins that are not acting as a biofilter, or which have natural flow only, shall include at least one sump manhole to help facilitate infiltration of storm water, and the inlet into the basin shall be connected directly to the sump manhole.

Basin side slopes should be 5H:1V or flatter on two or more sides, 4H:1V or flatter slopes on remaining sides, with a minimum 1% bottom slope. If the natural existing slope is greater than 8% then basin side

slopes may be increased to 3H:1V. A suitable location for ingress and egress shall be incorporated for ponds deeper than three feet, and this must include an access at least 15-feet wide at less than 15% grade. A minimum five-foot buffer between any pond grading and the property lines shall be provided.

Landscaping: Grass or other suitable landscaping materials should be used, and turf irrigation systems shall be installed for ponds that will be maintained by City personnel, unless a low-maintenance landscaping alternative is approved. Irrigating methods and practices must be accounted for in the hydrologic and infiltration calculations when designing and sizing ponds. Developers will be required to escrow funds to landscape ponds when located on private lots for future reimbursement to the owner who completes the landscaping at a future time. Developers will not use landscaping that may hinder infiltration if it is used in the sizing of the pond or required for Municipal Separate Storm Sewer (MS4) compliance. See infiltration section for more information on infiltration and landscaping requirements.

Easements: If basins are placed on private property, a minimum 20-foot easement for all underground lineal pipeline facilities and access to maintain ponds must be provided. Additionally, an easement must be provided over the pond area and a minimum of five feet beyond the pond top of slope perimeter. The easement shall be ten feet beyond the pond perimeter when an access along the pond edge is required. Pond easements shown on subdivision plats shall have restrictive language labeled with dimensions to facilitate locating in the field.

Basins shall be designed with provisions for an emergency overflow that will avoid flood damage to surrounding properties in the event of a storm exceeding the design capacity of the basin.

Retention basins shall be designed with mechanisms to ensure that the basin will completely drain within 48 hours after the 24-hour event with additional precipitation. (Verify a 72-hour storm will not overtop the basin). See the section on Infiltration in this document for details regarding infiltration requirements.

Basin inlets and outlets shall have trash racks or grates installed. A storm water pretreatment device, approved by the City, shall be installed upstream of the pond or sump inlets. See the Water Quality section of this report for requirements.

Culverts

Culverts that convey off-site flows through a project or beneath a road shall be designed for the 100-year event. Culverts shall be designed so the headwater elevation does not exceed 1.5 times the culvert diameter, or one foot below the elevation where water spills over the road or out of the channel. Concrete box culverts shall have a minimum 5-feet height from floor to ceiling, and multi-barrel culverts may not be used where high amounts of debris is expected. If multi-barrel culverts are used in other locations, designers must consider elevations of roads, buildings, driveways, and other features to prevent adverse impacts. Normal depth equations (Manning's Equations) cannot be used for culvert analysis. Inlet and outlet control shall be checked, and culvert hydraulic calculations provided.

Roadway Drainage

Inlets within roadways should be placed to control spread, or the amount of water flowing along the side of the road and in the gutter. Allowable spread is determined by the roadway classification as follows:

Table 1. Design Spread for Roadways

Design Frequency and Spread		
Roadway Classification	**Design Frequency**	**Design Spread**
Highway or Major Collector > 35 MPH	10-Year @ T_c	Shoulder (Outside of travel lane)
Highway or Major Collector ≤ 35 MPH	10-Year @ T_c	Shoulder + three feet
Local Street	10-Year @ T_c	½ Driving Lane

Inlets should also be placed upstream of intersections and pedestrian ramps to reduce bypass flows. Spread calculations shall be checked using HEC 22, Appendix A, Chart 1B.

Rainfall Runoff Computation Methods

Precipitation data obtained from the NOAA ATLAS 14 Point Precipitation Frequency website including intensity and depth data for Heber City is contained in Appendix B. This information shall be used for all development within Heber City.

Several hydrologic methods may be applicable depending on what type of analysis is required. The Rational Method is the most common method and may be used for sizing pipes, checking inlet spread and estimating peak flow rates for areas up to 100 acres.

Rational Method runoff coefficients are shown in Table 2. The runoff coefficients listed in Table 2 are the minimum values to be used in Heber City. Any runoff coefficients for other characteristics should be adjusted to account for the 100-year rainfall.

Table 2. Rational Runoff Coefficients

Surface or Cover Type *	**Runoff Coefficient (C)**
Asphalt or Concrete Pavement	0.90 (asphalt) 0.95 (concrete)
Roofs of Buildings (type dependent)	0.90 (asphalt shingles) 0.95 (steel)
Grass-covered Sandy Soils, Slopes 2% or less	0.13
Grass-covered Sandy Soils, Slopes > 2%	0.20
Grass-covered Clay Soils, Slopes 2% or less	0.22
Grass-covered Clay Soils, Slopes > 2%	0.49

* Surfaces not addressed in this table shall be approved by the City Engineer.

For storm analyses that require developing a volume or routing a volume of runoff, a dynamic hydrograph simulation model is required using AutoDesk SSA, HEC-HMS, or SWMM. Within dynamic hydrograph simulation models, the transform method shall be the NRCS Unit Hydrograph Method, and the routing method for runoff hydrographs shall be the Muskinghum-Cunge Method. Multiple hydrographs were developed by the Soil Conservation Service (SCS), now known as Natural Resources Conservation Service (NRCS). The SCS Type II 24-hour storm distribution should be used for estimating the precipitation for developments within Heber City.

The SCS method uses the Curve Number Method for determining rainfall runoff. Curve Numbers are determined by using a land cover type in conjunction with a hydrologic soil group. Land cover information can be obtained by means of aerial topography or GIS data. Hydrologic soil group

information may be obtained from NRCS's Web Soil Survey website. The land cover and hydrologic soil group information are used to select an appropriate curve number using the manual titled *TR-55 Urban Hydrology for Small Watersheds*. TR-55 worksheets and calculation methods are provided in Appendix G and shall be utilized for developments that use the SCS method to estimate run-off. Typical CN values are included in Appendix C. Engineering judgement should be used when selecting curve numbers. Part 630 of the National Engineering Handbook says, "As a result of construction and other disturbances, the soil profile can be altered from its natural state and the listed group assignments generally no longer apply, nor can any supposition based on the natural soil be made that will accurately describe the hydrologic properties of the disturbed soil. In these circumstances, an onsite investigation should be made to determine the hydrologic soil group." Site specific factors such as terrain, potential precipitation on frozen ground, future conditions and other factors should be considered when selecting curve numbers. The SCS method shall only be used for estimating the run-off for development which are greater than 10 acres.

The Federal Aviation Administration (FAA) Method for estimating detention or retention volumes may also be used for approximating storage facility volume requirements for developments. It is outdated because it does not model the release rate correctly. However, with the Guo Averaging Parameter, it is valid and can be used. However, it is not applicable to in-series (cascading) ponds. This method is applicable for developments less than 100 acres, and the SCS method is required for developments larger than 100 acres. The FAA Method uses a spreadsheet to evaluate several storm durations for a given return period for either the 100-year storm (retention) or 25-year storm (detention). The total inflow volume for a storm duration is developed by multiplying the peak flow rate by the storm duration. The volume out is developed by utilizing a controlled discharge amount (discharge with detention only), and/or exfiltration from the detention pond when conditions permit. The required volume is equal to the inflow volume minus the outflow volume. This is evaluated for all storm durations to determine which storm duration provides the maximum required volume. Developments that use the FAA Method for estimating storage facility volumes shall use the spreadsheets provided by the City including the Guo Averaging Parameter when off-site discharge is utilized. An example is shown in Appendix I, or other approved spreadsheet formats.

Several methods for estimating time of concentration exist. They were each developed for specific parameters such as watershed size, slope, etc. Time of concentration methods used should be applicable to the areas in which they are being analyzed. The minimum time of concentration value should be 5 minutes.

For all software models, input and output data shall be provided so that it can be reviewed by the City. A copy of the model file shall also be provided to the City for review. Models must be provided to the City in Civil 3D Storm and Sanitary Analysis. City may consider other software models based on prior approval from the City Engineer.

Post Construction Peak Discharge

Heber City has adopted a 0.10 cfs/acre maximum release standard for undeveloped areas, i.e., areas outside Central Heber. This rate is assumed to be the historical undeveloped flow. For example, a 10-acre housing development would be able to have a post-development discharge rate of 1.0 cfs (10 acres x 0.10 cfs/acre) provided there is a suitable point to discharge to. If the historic flow is found to be less than the 0.1 cfs/acre, this shall be used as the maximum allowed post-development discharge. Moreover, if the downstream system does not have capacity for the 0.1 cfs/acre discharge rate, the

available capacity will become the controlling factor. To ensure that flow from new developments do not exceed 0.10 cfs/acre, detention facilities with controlled discharge are required. In cases where there is no suitable point to discharge to, retention facilities are required. See storage facilities section for more information.

Infiltration

Infiltration of treated storm water into the ground is encouraged. Detention and retention basin volumes may be sized by considering infiltration as an outflow component. Prior to assuming infiltration is a viable option, infiltration tests shall be conducted by a professional geotechnical engineer, geologist, or soil scientist licensed in Utah that determines the infiltration rate and demonstrates that the proposed soil profile is suitable for infiltration and will readily accept the water. Infiltration tests shall be performed using the double ring infiltrometer test in accordance with ASTM D 3385, and shall be performed at the location of where the result will be applied and at the elevation of the bottom of the facility where infiltration will occur. A minimum of two tests shall be performed with a minimum of one test per 10,000 square feet of the infiltration area.

Groundwater elevations shall be determined. Potential ground water level fluctuations shall be considered, and the lowest elevation of any detention basin should be at least two feet higher than the highest seasonal groundwater elevation. All design infiltration rates shall have a safety factor of two (2) or higher applied to the actual rate measured by the official infiltration test.

Only the plan view area at the bottom of the storage facility may be used as an infiltration surface in infiltration calculations unless stage-volume-discharge curves are created and used. Infiltration must not be considered as an outflow prior to the storm water entering the pond, as this could create negative storage volume.

Infiltration rates shall only be applied to the same soil that has been tested. If topsoil or other less permeable soil is added to a storage facility where percolation is being applied, the infiltration rate used in the design shall match rate of the less permeable soil. Alternatively, a permeable layer of gravel shall be used in the entire infiltration area.

An infiltration rate map is included in Appendix D. It is included to provide general infiltration information but shall not replace actual field tests.

Comply with all State groundwater protection regulations, guidelines and permits such as those associated with infiltration, infiltration wells, Class V injection wells and any others applicable to the site.

Long-Term Storm Drain Facility Maintenance

All public storm drain facilities will be maintained by Heber City unless otherwise specified in the development agreements. Developers, property owners, or their representatives such as a Homeowners Association, shall enter into a post-construction storm water management agreement with the City for all privately owned storm drain facilities, and/or publicly owned storm drain facilities that convey storm water from private roads and facilities. See Appendix J for template agreements.

Low Impact Development

Low Impact Development (LID) is a method of reducing storm runoff by capturing, treating, and retaining it on a very local level within each individual development. Although Heber City is not currently on the Utah MS4 list, it is anticipated to become an MS4 community in the future. LID is required by the Utah Department of Environmental Quality as part of an MS4 Program. To prepare for future compliance with the MS4 storm water discharge program and to reduce post-development storm water run-off in general, developments within Heber City must retain and treat the 80th percentile rainfall event as part of LID requirements. LID measures can also help achieve the onsite retention and treatment requirements. The 80th percentile depth for Heber City has been determined to be 0.47 inches. See Appendix E for this calculation. The Reese method, as shown in Appendix E, shall be used to calculate the volumetric runoff coefficient used for determining the 80th percentile volume. For developments larger than 10 acres use SCS Method to determine 80th percentile volume.

Localized LID methods are encouraged, however, the 80th percentile volume may be incorporated into larger detention or retention storage facilities if those facilities are located on site within the development area, or adjacent to, and if approved by the City Engineer.

Several typical LID measures are described in the following paragraphs. Portions of the LID descriptions have been taken from the Utah City Engineers Association (UCEA) and Utah DEQ LID Manual. See Appendix F for LID general details. The following LID descriptions are the approved LID measures to be used in Heber City. Any other proposed LID measures shall be approved by the City Engineer on a case-by-case basis. Please see the DEQ “Guide to Low Impact Development with Utah” for additional LID design guidelines and design flow-chart requirements.

Vegetated Swales

Vegetated swales may be considered dry or wet swales, and serve as a vegetative buffer between paved areas and storm drain facilities. The main advantages of vegetated swales are the degree of velocity reduction, detention, infiltration, and reduction of hard surface runoff. Storm runoff flows through the swale, where sediment and pollutants may settle out prior to entering downstream drainage facilities. A curb cut is one means of directing flow into swales where changes in elevation are limited.

Swales are often an attractive BMP solution because they can take advantage of already planned park strips. It should be noted that studies have shown that vegetated swales have a moderate ability to remove pollutants from storm water.

Dry Swales

A dry swale is a shallow, gently sloping drainage channel with broad, vegetated, side slopes. Dry swales provide temporary storage, filtration, and infiltration of storm runoff. A dry swale is versatile because it requires a relatively small area. Reduced channel velocities increase infiltration and water quality treatment and may reduce peak runoff. Channel vegetation can include turf, meadow grass, shrubs, and in limited quantities, small trees. Dry swales must be located above the water table to provide drainage. Dry swales are only allowed when groundwater is equal to or greater than 2-feet below the swale bottom elevation. When infiltrations rates are greater than 6.0 in/hour, dry swales shall either be designed as a biofilter for treatment of storm water or be preceded by an approved pre-treatment system. See the Water Quality section in this report for requirements. Retention LIDs shall provide treatment through settling, decreased flow rate, and bioretention with a designed release time.

Wet Swales

Wet swales are a type of filtration BMP and occur when the water table is located close to the surface. Wet swales act as a long and linear shallow treatment system. Like dry swales, check dams can be used as needed to create cells and contain the entire water quality treatment volume. Cells may be planted with emergent wetland plant species to improve pollutant removal. Wet swales, at a minimum, shall be preceded by a pre-treatment device to capture and remove pollutants and coarse sediment particles, see the Water Quality section below.

Infiltration Basin/Galleries

An infiltration basin is essentially a detention basin that is constructed such that storm water can exit the basin by means of infiltration into the surrounding ground. These include underground pipe and chamber systems. These systems can reduce pollutants by settling out or filtering materials and any pollutants that may be bound to those materials. They are also effective at reducing nutrients, metals and other pollutants.

Basins with no outlet or highly restricted outlets can be effective at eliminating pollutants, but there is some risk of concentrating pollutants or introduction of pollutants to groundwater that must be considered. One way to address this is by the utilization of a biofilter, hydrodynamic separator (HDS), or other pollutant removal measures within or upstream of a basin that is sized to handle the water quality design storm. All infiltration basins shall be preceded by a pre-treatment or treatment system to capture and remove pollutants and coarse sediment particles, see requirements in the Water Quality section below.

Basins and galleries must be sized to drain within 48 hours after the end of the design storm and to not overtop in the 72-hour storm.

Underground injection wells are included in this category, but water quality and applicable regulations must be considered and utilized.

Rain Gardens

A rain garden is a planted depression or similar feature that allows storm runoff from impervious urban areas like roofs, driveways, walkways, parking lots, and compacted lawn areas the opportunity to infiltrate into the soil.

Rain gardens are an LID tool that can be used in new or established developments. Rain gardens can be constructed in commercial and residential sites. The garden may be located near a street or parking lot in a shallow depression where runoff can be diverted into it. Native perennial plants are recommended in rain gardens with a barrier to reduce weeds. Nutrients in the storm runoff are reduced as plants or other growing media make use of them to grow.

Rain gardens can be constructed to allow infiltration. Where complete infiltration is not desired or is not feasible due to existing soil conditions, an underdrain may be installed to convey excess water to a storm drain retention system.

Studies underway at Utah State University have identified common reed and sedges are the optimal plant for use in northern Utah to remove nutrients, metals, and other pollutants (Dupont and McLean), but it must be harvested and disposed of elsewhere at regular intervals to prevent concentration of

pollutants in the soil or in the biofilters. Mulching and leaving in place does not address this. Whether such concentrations are critical depends on the contact with groundwater, and is still under study.

Root zone soil media must be shallow and water must pool or move slowly through the system or the pollutant removal is ineffective.

Rain garden filtration media shall meet the specification for biofilters (see Water Quality section below), are only allowed in private areas, and shall be maintained by the property owner.

Water Quality

Water quality is of utmost importance to Heber City. There are a variety of mechanisms to protect water quality from storm drain discharge systems. All storm water must pass through a pre-treatment or treatment system prior to discharging to a storage facility (above or below ground) that captures the 25-year to 100-year storm events. LID measures are intended to reduce storm runoff and to improve overall water quality. However, as most LID measures rely on infiltration, water quality must also be considered during design and implementation. Unless the native soil infiltration rate is less than 6.0 in/hr and/or the LID facility is designed and determined to treat the storm water (biofilter treatment), an approved hydrodynamic separator (HDS) pre-treatment device shall be used prior discharging to LID systems. All storm water that flows over an impervious surface must be treated.

Pre-treatment and Treatment Systems

Pre-treatment and treatment systems shall be sized, at a minimum, to treat the 2-year storm event at the duration that produces the highest flow rate while also being able to by-pass the peak conveyance storm at the time of concentration (T_c) without disrupting the treatment system. The peak conveyance storm represents the actual capacity of the initial conveyance system and may be larger than the 10-year event. Note, treatment systems that also serve as LID retention areas may be sized for the 80th percentile storm event but shall adhere to the by-pass requirements stated above. Requirements for pre-treatment and treatment are listed below.

Oil-Water and Hydrodynamic Separators (HDS) Pre-Treatment Devices:

All developments are required to install an appropriately sized hydrodynamic separator (HDS) prior to discharging to the retention/detention storage facility that captures the 25-year to 100-year storm events unless the LID methods utilized in the development incorporate a sized biofilter per the specification listed below and the storm water is not re-introduced to a source of pollution after it flows through the localized LID methods. Pre-treatment devices shall be maintained at least twice per year and per the guidelines provided by the manufacturer. All HDS devices must achieve, at a minimum, the following treatment levels:

- The HDS system shall be required to have a General Use Level Designation (GULD) performance verification through the TAPE program (Emerging stormwater treatment technologies (TAPE) - Washington State Department of Ecology). The device shall be sized to treat the peak runoff flow rate generated by the 2-year storm event at the Tc, when using Rational Method. Use the storm duration and distribution that creates the highest flow rate during a 2-year storm event when using other run-off computation methods.The proposed hydraulic loading rate (HLR) must not exceed the design HLR of the proposed device to be used. TAPE approval letters can be fou

nd on the website and provide the design HLR and/or the maximum treatment flow rate for each model.

- The HDS system shall be concrete unless otherwise approved by the City Engineer
- The HDS system shall provide 90% removal of trash and neutrally buoyant material larger than 5mm at the design treatment flow rate. Adding a screen to the tested system is not allowed to meet this spec, as modifying a TAPE verified system with a screen can significantly affect hydraulics, and thus water quality performance.
- The HDS system shall be designed to by-pass the peak conveyance storm event and prevent these larger storm events from washing out the oil, debris, and sediment that has been previously captured (off-line storage).
- The HDS system shall provide a minimum sump and oil storage capacity as follows:

Treatment Capacity Range (cfs)	Minimum Sump Storage Capacity (yd^3)	Minimum Oil Capacity (gal)
0-4	> 0.4	> 60
4-9	> 2	> 200
9-20	> 4	> 500
> 20	> 8	> 1000

Biofilter Treatment Systems: Biofilter is a generic description for bioswales, vegetated filter strips, rain gardens, or other structures that use a filtration media to capture storm water pollutants. The pollutants are decomposed by a biomass such as plants, a tree, or a specially designed biofilter media. These systems are typically connected to a storm drain system and if used shall be combined with detention/retention facilities.

All biofilters shall be sized to treat the 2-year T_c storm event flow rate while also be sized to by-pass larger flows without disrupting the treatment system. Biofilters shall treat the storm water prior to infiltrating into the native soils with infiltration rates greater than 6.0 in/hr and/or prior to discharging to a detention/retention facility unless a sized HDS system is properly incorporated as pre-treatment.

The growing media of the biofilter and shall be designed and certified to meet the following specifications.

RAIN GARDEN AND BIOFILTER GROWING MEDIA (Soil + Organics)

Assume a saturated hydraulic conductivity rate of 2.0 in/hr. Then, divide it by a safety factor of 2.0. So, the net rate is 1.0 in/hr.

RAIN GARDEN AND BIOFILTER SOIL

Particle Size Distribution

sand: 70-80%

silt: 0-30%

clay: 0-15%

Chemical Attribute and Nutrient Analysis

pH: 6.8-7.5

organic matter: < 1.5%

nitrogen: < 15 ppm

phosphorous: < 15 ppm

salinity: < 6 mmhos/cm

RAIN GARDEN AND BIOFILTER ORGANICS

shredded mulch: 3-5% (by weight of growing media)

VEGETATION

The filter area shall be vegetated with drought tolerant species that thrive in sandy soils. Table 3 provides a suggested seed mix for sites that will not need to be irrigated after the grass has been established.

Table 3. Suggested Seed Mix

Common Name	Scientific Name	Variety	PLS[2] lbs per Acre	Ounces per Acre
Sand bluestem	Andropogon hallii	Garden	3.5	
Sideoats grama	Bouteloua curtipendula	Butte	3	
Prairie sandreed	Calamovilfa longifolia	Goshen	3	
Indian ricegrass	Oryzopsis hymenoides	Paloma	3	
Switchgrass	Panicum virgatum	Blackwell	4	
Western wheatgrass	Pascopyrum smithii	Ariba	3	
Little bluestem	Schizachyrium scoparium	Patura	3	
Alkali sacaton	Sporobolus airoides		3	
Sand dropseed	Sporobolus cryptandrus		3	
Pasture sage[1]	Artemisia frigida			2
Blue aster[1]	Aster laevis			4
Blanket flower[1]	Gaillardia aristata			8
Prairie coneflower[1]	Ratibida columnifera			4
Purple prairieclover[1]	Dalea (Petalostemum) purpurea			4
Sub-Totals:			27.5	22
Total lbs per acre:			**28.9**	

[1] Wildflower seed (optional) for a more diverse and natural look.
[2] PLS = Pure Live Seed.

EXECUTION

thickness: >/= 18 inches

compaction: 80-85% of maximum dry density as measured by AASHTO T-99 (ASTM D698)

vegetation: Mix seed well and broadcast, followed by hand raking to cover seed and then mulched. Hydromulching can be effective for large areas. Do not place seed when standing water or snow is present or if the ground is frozen. Weed control is critical in the first two to three years, especially when starting with seed. When using sod, specify sand–grown sod. Do not use conventional sod. Conventional sod is grown in clay soil that will seal the filter area, greatly reducing overall function of the BMP.

Irrigation: Provide spray irrigation at or above the WQCV elevation or place temporary irrigation on top of the rain garden surface. Do not place sprinkler heads on the flat surface. Remove temporary irrigation when vegetation is established. If left in place this will become buried over time and will be damaged during maintenance operations. Adjust irrigation schedules during the growing season to provide the minimum water necessary to maintain plant health and to maintain the available pore space for infiltration.

Water Quality Control Measures

Other water quality control requirements are listed below.

Detention/Retention Facilities (Pollutant Control, LID): Detention basins are used to attenuate peak flow rates of a runoff hydrograph. They also can be designed to allow sediment, debris, and other contaminants to settle out by reducing water velocity or holding the water until it infiltrates or evaporates.

Retention facilities have no outlet and water is removed by infiltration or evaporation. Retention basins still function as a BMP the same way a detention basin does. Detention and retention facilities shall be used in combination with hydrodynamic separators or biofiltration systems.

These facilities require regular maintenance to remove debris, contaminants, and sediment build-up.

Outlet Protection/Energy Dissipation Devices: Outlet protection reduces or eliminates soil erosion thereby preventing the migration of soil to downstream channels. Outlet protection, pursuant to HEC 14, is required at all open discharge points.

Slope Protection: Slope protection ensures slopes will be stable during and after construction. The primary means of stabilization of a slope is establishing permanent vegetation, but may also consist of temporary or permanent rock, mulch, erosion control blankets, check dams, diversion dikes, or other means of protection. All slopes shall be stabilized after disturbance. Slopes of 3H:1V and steeper require permanent slope stabilization.

Source Protection

The Utah Division of Drinking Water requires that each well and spring serving a public drinking water system must have a source protection plan. Part of that plan includes the protection of groundwater from point and non-point sources. Developers within Heber must certify that all private and public

source protection zones are protected from storm water pollutants. Source protection zones for Heber City culinary water sources are shown on the source protection maps in Appendix H.

Storm water infiltration, drainage wells, or storm water injection wells are prohibited within 100 feet of Zone 1 of any source protection area. All storm drain storage facilities within 100 feet of a Zone 1 area shall be lined with an approved waterproof liner to prevent all storm water infiltration.

Natural Channels

All major natural channels must maintain a buffer of open space and offset from development. This buffer is intended to help maintain water quality, prevent damage from flooding events, and maintain habitat and aesthetics. A minimum buffer width of 100-ft centered on the major natural drainage channel should be maintained. Development (including individual lots and buildings) is not allowed in the buffer zone. The drainage channel shall be protected and remain undisturbed where possible and with the exception of road or other crossings. Crossings of the natural channels shall be a minimum distance of 200-feet measured along the channel. Exceptions may be granted where proposed road crossings are adjacent to canal crossings or collector roads. Additional landscaping, green space, trails, or other amenities may be allowed if it is shown they will not negatively affect water quality or compromise the other goals of the buffer area. All improvements proposed in the natural drainages shall be approved by the City.

Flood and Debris Flow Hazards

FEMA Flood Analysis

Ensure all pertinent FEMA flood mapping data is incorporated into plans and plats maps. Ensure all FEMA guidelines from https://www.fema.gov are followed including the sections on Floods & Maps, Floodplain Management, and Flood Insurance. FEMA uses the most accurate flood hazard information available and applies rigorous standards in developing Flood Insurance Rate Maps (FIRMs). All areas within Flood Hazard Areas shall be shown on plans and plats, and all Base Flood Elevation (BFE) data pertinent to the development must be provided.

To change the FIRM designation of a property, a Letter of Map Amendment (LOMA) and/or the Letter of Map Revision-Based on Fill (LOMR-F) processes must be strictly followed.

Debris-Flow Flood Hazard Analysis

The Western Unities states is beginning to see increased precipitation intensity and increasing fire size and frequency (Kean and Staley et al, 2021). Generally, there is not adequate time to prevent or mitigate a debris flow hazard *after* a wildfire has taken place. The USGS has found that 1-year storm events will typically trigger a post-wildfire debris flow event. Therefore, if a wildfire takes place, some type of debris flow is likely to happen within 1-year of the fire. These types of hazards should be prevented or controlled as deemed feasible. New development with undeveloped land upstream or downstream of the property containing natural slopes 30% and greater and/or where the City Engineer determines there could be a potential debris-flow risk, requires a specialized post wild-fire debris-flow analysis of the site including an estimated post-fire hazard assessment with mitigation measures.

Flood and Debris-flow hazard analysis reports shall include but shall not be limited to the following information for the areas to be developed:

- FEMA Flood Mapping Data including 100-year flood hazard zones
- Include and label the drainageways susceptible to periodic flooding associated with storm events or rapid snowmelt that are outside the FEMA designated flood zones
- U.S. Geological Survey Map
- Aerial Map
- Contour map with slopes labeled
- Geotechnical Test pit data
- Geologic Mapping Data to include historic upstream and downstream alluvial fan deposits and historic upstream or pass-through debris/mud flows as data is available.
- Vegetative cover type and percentage analysis
- Utah Division of Water Rights – Dam Safety requirements
- Post-fire debris-flow volume calculations with flood and post-fire debris-flow hazard assessment and mitigation

Flood and post-fire debris-flow hazard assessment and mitigation recommendations shall adhere to the following guidelines:

At a minimum, the volume of debris sediment shall be calculated using the model equation (2) from the 2010 Cannon study (Cannon et al,, 2010). The entire drainage basin shall be modeled. Methods from the Gartner 2014 study and equation (3) may also be used until another model paper is published and adopted by USGS. (Gartner et al., 2014).

The minimum storm event interval shall be a 10-year occurrence with a T_c peak rainfall depth, unless otherwise approved by the City Engineer. Intensity is used for the Gartner method.

When the Gartner method is used, the watershed area burned at moderate to high severity shall be calculated based on a vegetation type assessment of the entire drainage basin. Vegetation type and coverage area data shall be obtained and summarized under the direction of a licensed Professional Engineer or other approved licensed professional. Forested areas and other areas with small or large tree species (deciduous or evergreen) and/or thick brush, such as Gambel Oak shall be assumed to burn at moderate to high severity. Staley et al. (2018) spells out further guidance on vegetation types and burn severity per vegetation type.

Debris flow is difficult to accurately model due to the nature of the material being carried by the storm water, especially if the natural channel that the debris flow will enter and travel through is altered by road crossings, culverts, or other diversions/obstructions over and through the natural channel. Unless the natural channel is undisturbed and can be accurately modeled to safely convey the debris flow without having to travel through any obstructions, culverts, roads, etc. that would otherwise plug or divert the flow off-course, the estimated debris volume needs to be contained in a debris-basin upstream from development. Road or other crossings shall be designed to allow and divert debris flow and/or flood water over the crossing using depression or other mechanism to allow the flow to pass the crossing continue down the natural channel. Other measures to contain and/or divert the debris volume may be considered, as approved by the City Engineer.

References

Cannon, S.H., Gartner, J.E., Rupert, M.G., Michael, J.A., Rea, A.H., & Parrett, C. (2010). Predicting the probability and volume of postwildfire debris flows in the intermountain western United States. *GSA Bulletin*, *v. 122*(1-2), 127-144. https://doi.org/10.1130/B26459.1

Gartner, J.E., Cannon, S.H., & Santi, P.M. (2014). Empirical models for predicting volumes of sediment deposited by debris flows and sediment-laden floods in the transverse ranges of southern California. *Engineering Geology*, *176*, 45-56. https://doi.org/10.1016/j.enggeo.2014.04.008

Kean, J.W., & Staley, D.M. (2021). Forecasting the frequency and magnitude of postfire debris flows across southern California. *Earth's Future*, *9*(3), e2020EF001735. https://doi.org/10.1029/2020EF001735

Staley, D.M., Tillery, A.C., Kean, J.W., McGuire, L.A., Pauling, H.E., Rengers, F.K., & Smith, J.B. (2018). Estimating post-fire debris-flow hazards prior to wildfire using a statistical analysis of historical distributions of fire severity from remote sensing data. *International Journal of Wildland Fire*, *27*(9), 595-608. https://doi.org/10.1071/WF17122

Appendices

Appendix A

Drainage Design Resources

Standard Drawings | Heber City, UT (heberut.gov)

Standard Specifications | Heber City, UT (heberut.gov)

Storm-Intensity-Curves-PDF (heberut.gov)

Low Impact Development - Utah Department of Environmental Quality

DWQ-2019-000161.pdf (utah.gov)

Microsoft PowerPoint - A Guide to Low Impact Development within Utah (Training)

Emerging stormwater treatment technologies (TAPE) - Washington State Department of Ecology

Nonpoint Source: Urban Areas | US EPA

DRAFT

Appendix B

(IDF Data)

Precipitation Frequency Estimates (in/hr)										
Average recurrence interval (years)	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
1	1.54	1.16	0.96	0.646	0.4	0.251	0.191	0.126	0.079	0.047
2	1.94	1.48	1.22	0.824	0.51	0.314	0.237	0.155	0.097	0.058
5	2.68	2.03	1.68	1.13	0.699	0.413	0.302	0.191	0.118	0.072
10	3.34	2.54	2.1	1.41	0.873	0.505	0.364	0.223	0.137	0.083
25	4.38	3.34	2.76	1.86	1.15	0.656	0.46	0.27	0.163	0.099
50	5.38	4.09	3.38	2.27	1.41	0.794	0.545	0.31	0.185	0.112
100	6.52	4.96	4.1	2.76	1.71	0.958	0.647	0.355	0.209	0.125
200	7.86	5.98	4.94	3.33	2.06	1.15	0.772	0.405	0.234	0.14
500	10	7.63	6.31	4.25	2.63	1.46	0.985	0.499	0.273	0.159
1000	12	9.13	7.55	5.08	3.14	1.75	1.18	0.597	0.307	0.175

Precipitation Frequency Estimates (inches)										
Average recurrence interval (years)	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
1	0.13	0.19	0.24	0.32	0.40	0.50	0.57	0.75	0.95	1.13
2	0.16	0.25	0.31	0.41	0.51	0.63	0.71	0.93	1.17	1.40
5	0.22	0.34	0.42	0.57	0.70	0.83	0.91	1.14	1.43	1.72
10	0.28	0.42	0.52	0.71	0.87	1.01	1.09	1.34	1.65	2.00
25	0.37	0.56	0.69	0.93	1.15	1.31	1.38	1.62	1.97	2.38
50	0.45	0.68	0.84	1.14	1.41	1.59	1.64	1.86	2.23	2.69
100	0.54	0.83	1.03	1.38	1.71	1.92	1.94	2.12	2.51	3.01
200	0.66	1.00	1.24	1.66	2.06	2.30	2.32	2.43	2.82	3.35
500	0.84	1.27	1.58	2.12	2.63	2.93	2.96	2.99	3.29	3.82
1000	1.00	1.52	1.89	2.54	3.14	3.50	3.54	3.57	3.70	4.20

NOAA Atlas 14, Volume 1, Version 5 (Feb 2022)
Location name: Heber City, Utah, USA
Latitude: 40.4924°, Longitude: -111.4129°
Elevation: 5642.1 ft
Refer to NOAA Atlas 14 document for more information

NOAA Atlas 14, Volume 1, Version 5
Location name: Heber City, Utah, USA*
Latitude: 40.4924°, Longitude: -111.4129°
Elevation: 5642.1 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.128** (0.111-0.149)	**0.162** (0.142-0.190)	**0.223** (0.194-0.261)	**0.278** (0.239-0.326)	**0.365** (0.306-0.433)	**0.448** (0.364-0.533)	**0.543** (0.428-0.653)	**0.655** (0.496-0.799)	**0.836** (0.601-1.04)	**1.00** (0.689-1.27)
10-min	**0.194** (0.169-0.227)	**0.247** (0.215-0.289)	**0.338** (0.294-0.397)	**0.423** (0.363-0.497)	**0.556** (0.465-0.659)	**0.681** (0.553-0.811)	**0.827** (0.651-0.994)	**0.997** (0.755-1.22)	**1.27** (0.914-1.59)	**1.52** (1.05-1.94)
15-min	**0.240** (0.210-0.282)	**0.306** (0.267-0.359)	**0.420** (0.365-0.493)	**0.524** (0.450-0.615)	**0.690** (0.576-0.816)	**0.844** (0.686-1.00)	**1.02** (0.807-1.23)	**1.24** (0.936-1.51)	**1.58** (1.13-1.97)	**1.89** (1.30-2.40)
30-min	**0.323** (0.282-0.380)	**0.412** (0.359-0.483)	**0.565** (0.491-0.663)	**0.706** (0.606-0.829)	**0.929** (0.776-1.10)	**1.14** (0.924-1.35)	**1.38** (1.09-1.66)	**1.66** (1.26-2.03)	**2.12** (1.53-2.65)	**2.54** (1.75-3.24)
60-min	**0.400** (0.349-0.470)	**0.510** (0.445-0.598)	**0.699** (0.608-0.821)	**0.873** (0.750-1.03)	**1.15** (0.960-1.36)	**1.41** (1.14-1.68)	**1.71** (1.34-2.05)	**2.06** (1.56-2.51)	**2.63** (1.89-3.28)	**3.14** (2.16-4.01)
2-hr	**0.502** (0.447-0.578)	**0.627** (0.559-0.719)	**0.826** (0.732-0.950)	**1.01** (0.885-1.16)	**1.31** (1.12-1.52)	**1.59** (1.32-1.85)	**1.92** (1.54-2.27)	**2.30** (1.78-2.77)	**2.93** (2.15-3.62)	**3.50** (2.46-4.43)
3-hr	**0.573** (0.515-0.649)	**0.712** (0.640-0.804)	**0.908** (0.810-1.03)	**1.09** (0.967-1.24)	**1.38** (1.20-1.57)	**1.64** (1.39-1.88)	**1.94** (1.60-2.28)	**2.32** (1.84-2.80)	**2.96** (2.22-3.65)	**3.54** (2.54-4.47)
6-hr	**0.754** (0.690-0.838)	**0.929** (0.847-1.03)	**1.14** (1.04-1.28)	**1.34** (1.21-1.49)	**1.62** (1.44-1.81)	**1.86** (1.62-2.09)	**2.12** (1.82-2.42)	**2.43** (2.03-2.81)	**2.99** (2.42-3.69)	**3.57** (2.76-4.51)
12-hr	**0.954** (0.875-1.05)	**1.17** (1.07-1.30)	**1.43** (1.30-1.58)	**1.65** (1.50-1.82)	**1.97** (1.76-2.19)	**2.23** (1.97-2.50)	**2.51** (2.18-2.85)	**2.82** (2.40-3.24)	**3.29** (2.71-3.86)	**3.70** (2.98-4.56)
24-hr	**1.13** (1.06-1.21)	**1.40** (1.31-1.50)	**1.72** (1.62-1.85)	**2.00** (1.87-2.13)	**2.38** (2.21-2.54)	**2.69** (2.48-2.87)	**3.01** (2.77-3.21)	**3.35** (3.06-3.58)	**3.82** (3.45-4.10)	**4.20** (3.76-4.61)
2-day	**1.30** (1.22-1.40)	**1.62** (1.51-1.74)	**1.98** (1.85-2.12)	**2.28** (2.13-2.44)	**2.71** (2.52-2.90)	**3.04** (2.81-3.25)	**3.39** (3.11-3.62)	**3.75** (3.42-4.02)	**4.24** (3.83-4.56)	**4.63** (4.14-5.00)
3-day	**1.44** (1.35-1.54)	**1.78** (1.67-1.92)	**2.18** (2.05-2.34)	**2.52** (2.35-2.69)	**2.97** (2.77-3.18)	**3.34** (3.09-3.57)	**3.71** (3.42-3.97)	**4.09** (3.75-4.39)	**4.62** (4.19-4.97)	**5.03** (4.52-5.44)
4-day	**1.57** (1.48-1.69)	**1.95** (1.83-2.09)	**2.39** (2.24-2.56)	**2.75** (2.57-2.94)	**3.24** (3.03-3.47)	**3.63** (3.37-3.89)	**4.03** (3.73-4.32)	**4.44** (4.08-4.77)	**5.00** (4.55-5.39)	**5.44** (4.90-5.88)
7-day	**1.87** (1.74-2.02)	**2.30** (2.15-2.49)	**2.81** (2.62-3.04)	**3.23** (3.00-3.49)	**3.80** (3.53-4.11)	**4.25** (3.92-4.59)	**4.71** (4.33-5.10)	**5.18** (4.73-5.61)	**5.82** (5.26-6.34)	**6.31** (5.67-6.90)
10-day	**2.14** (1.98-2.31)	**2.64** (2.46-2.85)	**3.21** (2.99-3.47)	**3.67** (3.40-3.96)	**4.29** (3.97-4.63)	**4.75** (4.39-5.14)	**5.23** (4.80-5.65)	**5.70** (5.22-6.18)	**6.34** (5.75-6.88)	**6.81** (6.14-7.44)
20-day	**2.81** (2.63-3.02)	**3.47** (3.25-3.74)	**4.20** (3.93-4.51)	**4.76** (4.45-5.11)	**5.50** (5.13-5.91)	**6.05** (5.63-6.50)	**6.60** (6.11-7.10)	**7.13** (6.58-7.69)	**7.81** (7.16-8.44)	**8.31** (7.60-9.02)
30-day	**3.40** (3.19-3.62)	**4.20** (3.95-4.47)	**5.03** (4.73-5.35)	**5.66** (5.32-6.02)	**6.49** (6.09-6.89)	**7.08** (6.64-7.54)	**7.67** (7.17-8.18)	**8.23** (7.68-8.78)	**8.94** (8.28-9.56)	**9.45** (8.72-10.1)
45-day	**4.28** (4.02-4.57)	**5.28** (4.96-5.64)	**6.31** (5.93-6.72)	**7.09** (6.65-7.55)	**8.08** (7.56-8.60)	**8.79** (8.20-9.35)	**9.47** (8.81-10.1)	**10.1** (9.38-10.8)	**10.9** (10.1-11.6)	**11.4** (10.5-12.3)
60-day	**5.09** (4.79-5.42)	**6.28** (5.91-6.70)	**7.45** (7.02-7.93)	**8.32** (7.83-8.84)	**9.39** (8.82-9.97)	**10.1** (9.50-10.8)	**10.8** (10.2-11.5)	**11.5** (10.7-12.2)	**12.3** (11.4-13.1)	**12.8** (11.9-13.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

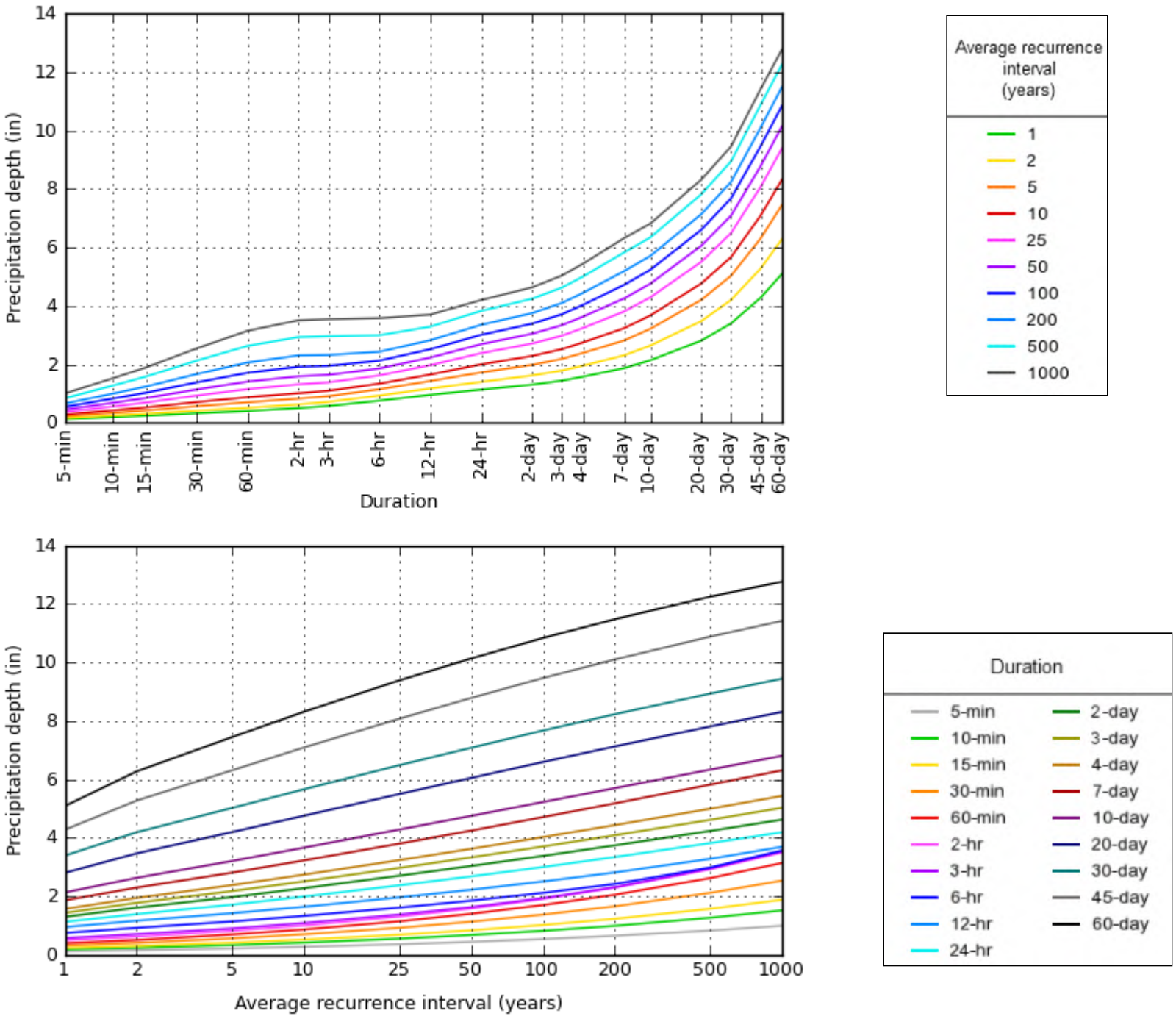
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.4924°, Longitude: -111.4129°

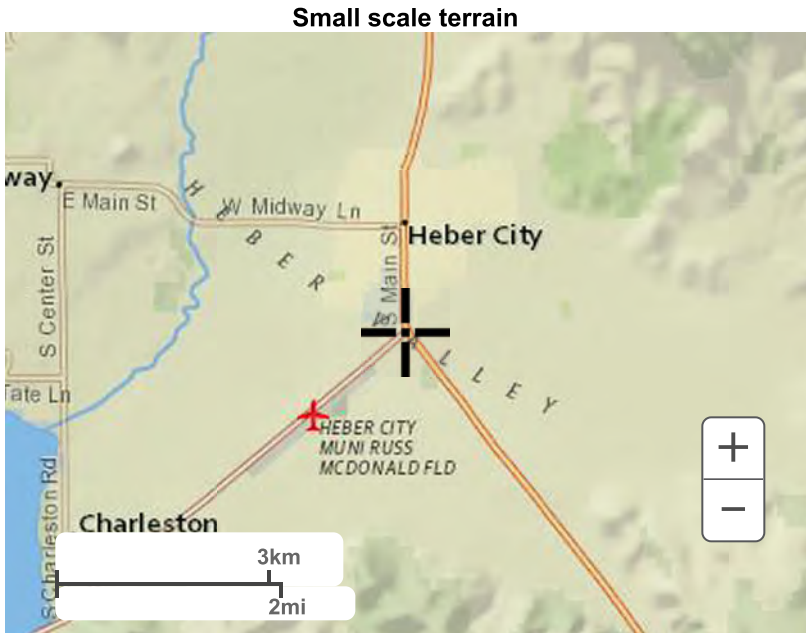


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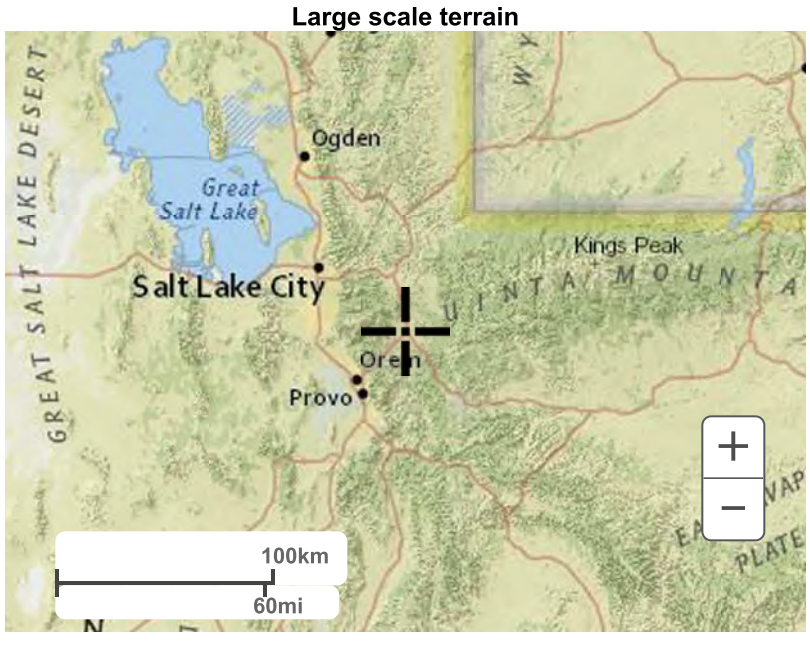
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Maps & aerials

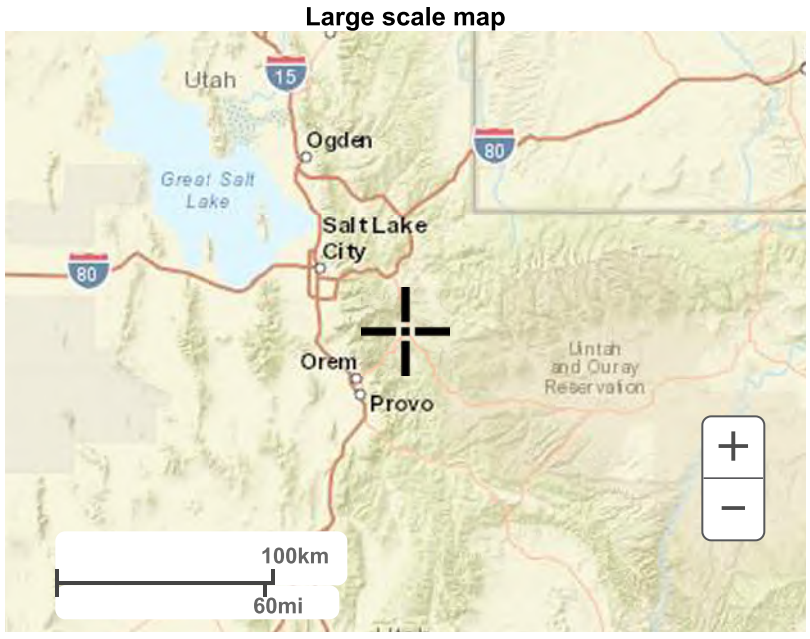
Small scale terrain



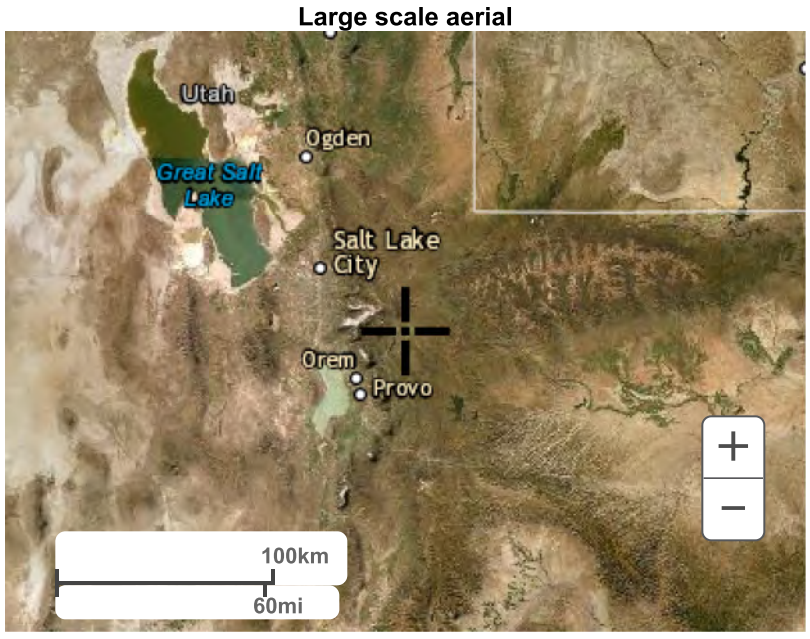
Large scale terrain



Large scale map



Large scale aerial



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Appendix C

(CN Tables)

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

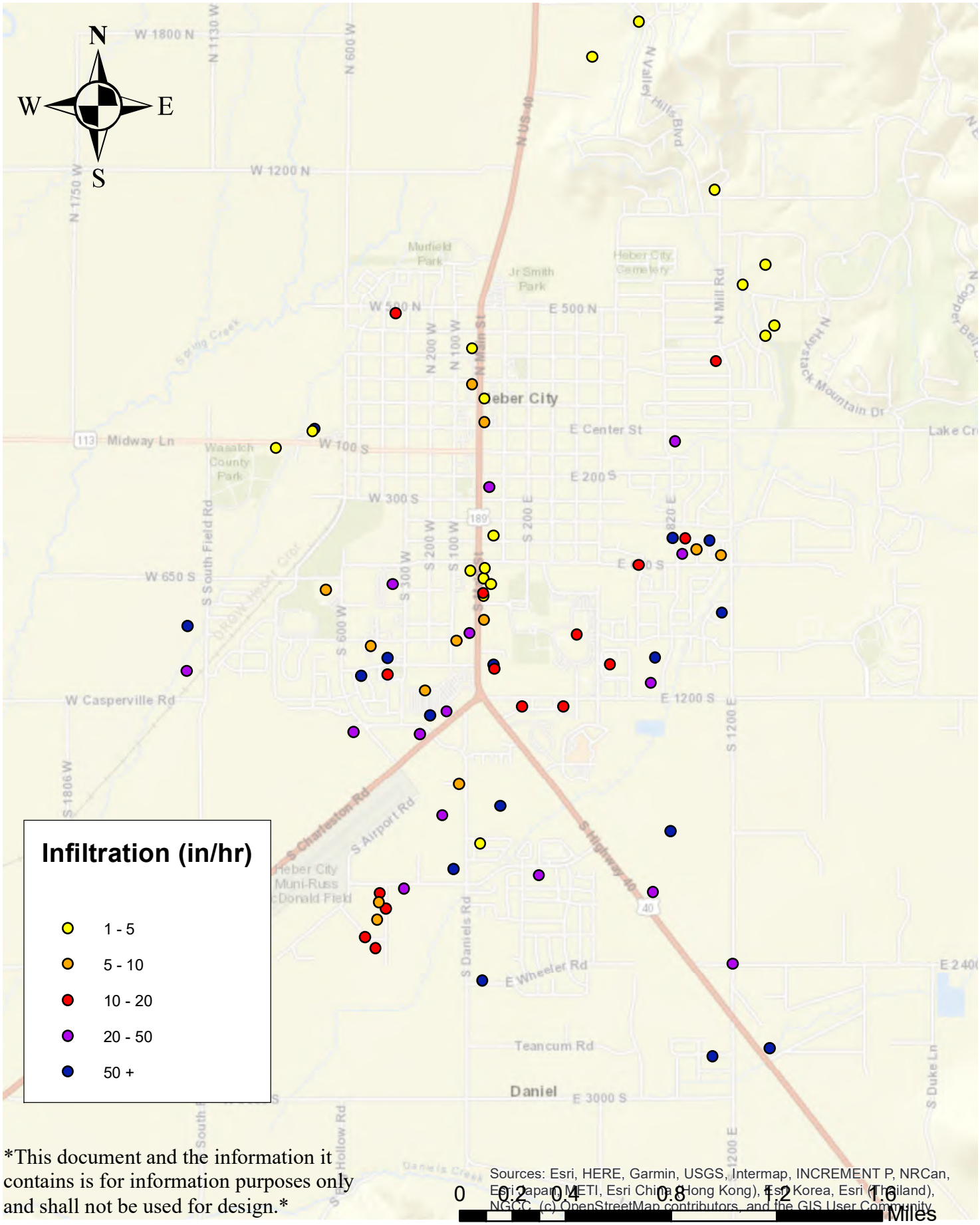
Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2/]	A [3/]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

Appendix D

(Infiltration & Groundwater Maps)



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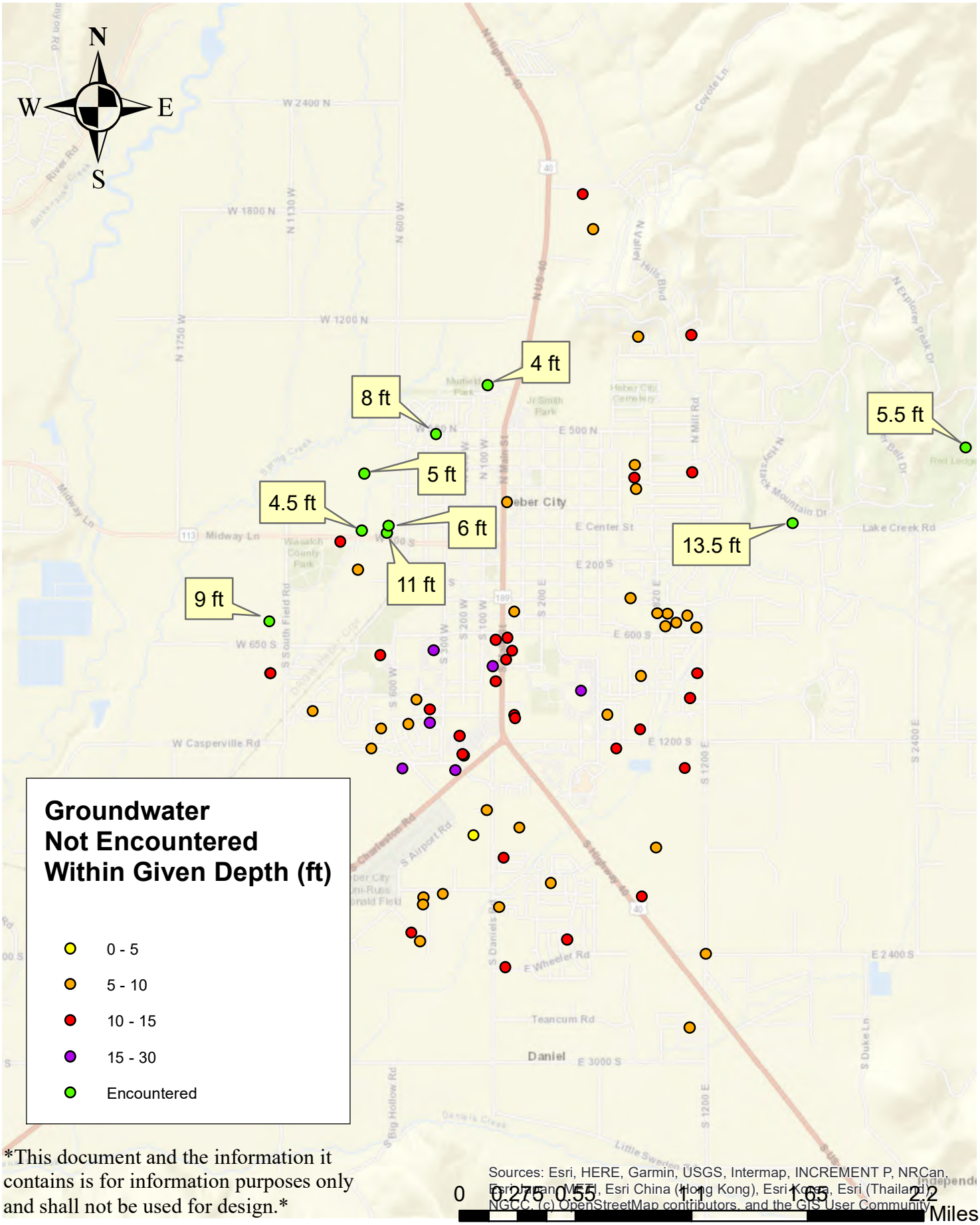
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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HORROCKS ENGINEERS
728 West 100 South
Heber, UT 84032
(435) 654-2226

Infiltration Rate

DATE 6/9/2022
DRAWN



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Groundwater Depth

DATE 6/9/2022

DRAWN

Appendix E

(80th Percentile Calculations)

HEBER CITY NOAA RAINFALL DATA

PDS-based precipitation frequency estimates with 90% confidence intervals 1
Duration Average recurrence interval
https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ut

	100	50	20	10	4	2	1	0.5	0.2	0.1
	1	2	5	10	25	50	100	200	500	1000
5-min	0.127	0.161	0.221	0.275	0.363	0.445	0.541	0.653	0.836	1
10-min	0.193	0.245	0.336	0.419	0.552	0.678	0.823	0.995	1.27	1.53
15-min	0.239	0.304	0.416	0.52	0.685	0.84	1.02	1.23	1.58	1.89
30-min	0.322	0.409	0.561	0.7	0.922	1.13	1.37	1.66	2.12	2.55
60-min	0.398	0.506	0.694	0.866	1.14	1.4	1.7	2.06	2.63	3.15
2-hr	0.504	0.628	0.825	1.01	1.31	1.59	1.91	2.3	2.94	3.52
3-hr	0.579	0.719	0.915	1.1	1.39	1.65	1.95	2.32	2.96	3.55
6-hr	0.764	0.941	1.16	1.35	1.63	1.87	2.14	2.44	3.01	3.59
12-hr	0.972	1.19	1.45	1.67	2	2.26	2.55	2.87	3.34	3.75
24-hr	1.18	1.46	1.77	2.03	2.4	2.69	2.99	3.3	3.73	4.06
2-day	1.37	1.69	2.05	2.34	2.75	3.06	3.38	3.71	4.16	4.5
3-day	1.53	1.88	2.27	2.6	3.04	3.39	3.75	4.11	4.6	4.98
4-day	1.68	2.07	2.5	2.85	3.34	3.72	4.11	4.51	5.04	5.45
7-day	2.01	2.47	2.98	3.4	3.96	4.39	4.84	5.29	5.88	6.33
10-day	2.29	2.82	3.39	3.84	4.44	4.89	5.34	5.78	6.35	6.77
20-day	3.02	3.72	4.45	5.01	5.73	6.26	6.78	7.27	7.89	8.32
30-day	3.67	4.5	5.34	5.99	6.81	7.4	7.97	8.51	9.18	9.65
45-day	4.6	5.65	6.68	7.47	8.46	9.16	9.83	10.4	11.2	11.7
60-day	5.47	6.71	7.91	8.8	9.91	10.7	11.4	12.1	12.8	13.3

PARK CITY NOAA RAINFALL DATA

PDS-based precipitation frequency estimates with 90% confidence intervals 1
Duration Average recurrence interval

	100	50	20	10	4	2	1	0.5	0.2	0.1
	1	2	5	10	25	50	100	200	500	1000
5-min	0.128	0.162	0.222	0.277	0.367	0.451	0.549	0.665	0.854	1.03
10-min	0.195	0.247	0.338	0.422	0.558	0.687	0.836	1.01	1.3	1.56
15-min	0.241	0.306	0.419	0.524	0.692	0.851	1.04	1.25	1.61	1.94
30-min	0.325	0.412	0.565	0.705	0.932	1.15	1.4	1.69	2.17	2.61
60-min	0.402	0.51	0.699	0.873	1.15	1.42	1.73	2.09	2.69	3.23
2-hr	0.515	0.641	0.839	1.02	1.33	1.61	1.95	2.34	2.99	3.59
3-hr	0.595	0.737	0.933	1.12	1.41	1.67	1.99	2.36	3.02	3.62
6-hr	0.793	0.975	1.19	1.39	1.68	1.92	2.19	2.51	3.09	3.65
12-hr	1.01	1.24	1.5	1.73	2.07	2.35	2.65	2.98	3.47	3.89
24-hr	1.31	1.6	1.92	2.18	2.55	2.84	3.13	3.44	3.84	4.16
2-day	1.56	1.92	2.3	2.62	3.05	3.38	3.73	4.08	4.55	4.91
3-day	1.74	2.14	2.57	2.93	3.43	3.81	4.21	4.62	5.16	5.59
4-day	1.92	2.36	2.84	3.25	3.8	4.24	4.69	5.15	5.78	6.27
7-day	2.32	2.86	3.43	3.91	4.57	5.08	5.6	6.13	6.84	7.39
10-day	2.65	3.26	3.9	4.41	5.09	5.6	6.11	6.61	7.27	7.76
20-day	3.47	4.27	5.06	5.67	6.46	7.03	7.59	8.13	8.79	9.27
30-day	4.2	5.15	6.08	6.8	7.72	8.39	9.04	9.66	10.4	11
45-day	5.16	6.32	7.44	8.31	9.43	10.2	11	11.8	12.7	13.3
60-day	6.13	7.52	8.83	9.84	11.1	12	12.9	13.7	14.7	15.4

DIFFERENCE

AVERAGE(0.5 X HEBER CITY / PARK CITY) = 0.47

0.496	0.497	0.498	0.496	0.495	0.493	0.493	0.491	0.489	0.485
0.495	0.496	0.497	0.496	0.495	0.493	0.492	0.493	0.488	0.490
0.496	0.497	0.496	0.496	0.495	0.494	0.490	0.492	0.491	0.487
0.495	0.496	0.496	0.496	0.495	0.491	0.489	0.491	0.488	0.489
0.495	0.496	0.496	0.496	0.496	0.493	0.491	0.493	0.489	0.488
0.489	0.490	0.492	0.495	0.492	0.494	0.490	0.491	0.492	0.490
0.487	0.488	0.490	0.491	0.493	0.494	0.490	0.492	0.490	0.490
0.482	0.483	0.487	0.486	0.485	0.487	0.489	0.486	0.487	0.492
0.481	0.480	0.483	0.483	0.483	0.481	0.481	0.482	0.481	0.482
0.450	0.456	0.461	0.466	0.471	0.474	0.478	0.480	0.486	0.488
0.439	0.440	0.446	0.447	0.451	0.453	0.453	0.455	0.457	0.458
0.440	0.439	0.442	0.444	0.443	0.445	0.445	0.445	0.446	0.445
0.438	0.439	0.440	0.438	0.439	0.439	0.438	0.438	0.436	0.435
0.433	0.432	0.434	0.435	0.433	0.432	0.432	0.431	0.430	0.428
0.432	0.433	0.435	0.435	0.436	0.437	0.437	0.437	0.437	0.436
0.435	0.436	0.440	0.442	0.443	0.445	0.447	0.447	0.449	0.449
0.437	0.437	0.439	0.440	0.441	0.441	0.441	0.440	0.441	0.439
0.446	0.447	0.449	0.449	0.449	0.449	0.447	0.441	0.441	0.440
0.446	0.446	0.448	0.447	0.446	0.446	0.442	0.442	0.435	0.432

The 80th Percentile Volume

LID Impact on Hydrology

Storm water programs have focused on the goal of mimicking predevelopment hydrologic conditions over the last several decades as municipal and department of transportation (DOT) storm water programs have increased their efforts to comply with the Federal Clean Water Act of 1972 and their associated MS4 permits. LID BMPs, green infrastructure practices, and retention of the 80th percentile volume or of the predevelopment hydrologic condition are tools and requirements that are used to accomplish this goal.

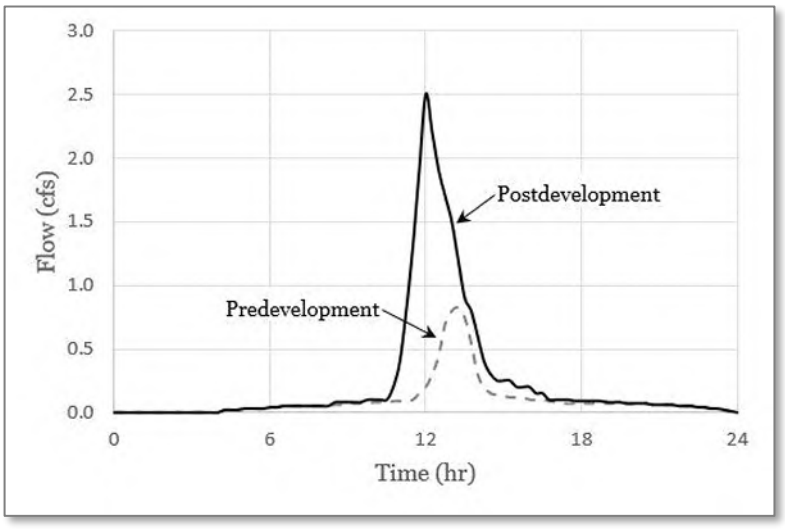


Figure 9: Typical hydrologic impact of development on-site hydrology.

More frequent peak flows, higher peak flows, and higher runoff volumes are well-documented hydrologic impacts of urbanization and development due to an increase in impervious surfaces (D.B. Booth, 1997; Konrad & Booth, 2002) (*Figure 9*).

Traditional approaches to storm water management that remove runoff from a site by quickly conveying flows to a storm drain network are also effective in protecting life and property and should be implemented in tandem with low impact design principles. Within Utah, discharges are typically limited to between 0.1 cfs and 0.2 cfs per acre.

An LID approach to site development produces a hydrologic condition that more closely mimics the pre-development hydrologic condition. Peak flows are reduced and are less frequent (*Figure 10*); runoff volume is also reduced (WEF Press, 2012).

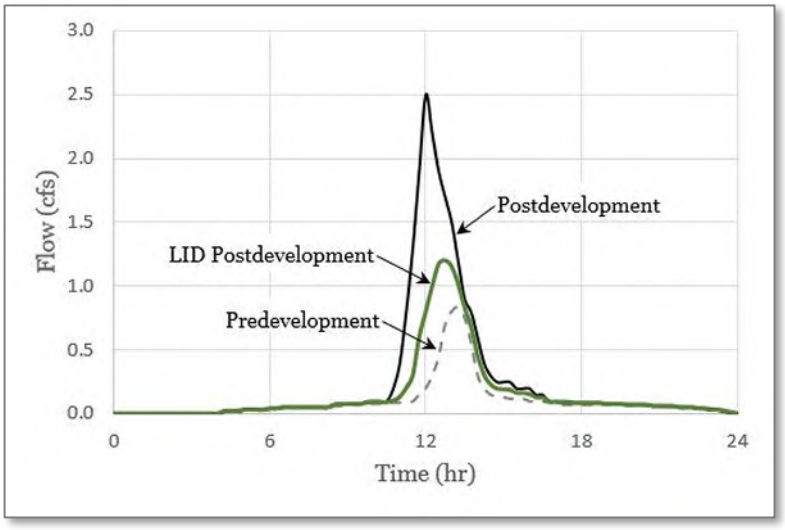


Figure 10: General post development hydrograph with LID.

Developing the 80th Percentile Volume

Project Volume Retention Goal, V_{goal}

V_{goal} for New Development: The volume of runoff generated within the project's limits of disturbance over a 24-hour period during the 80th percentile storm event or a predevelopment condition, whichever is less.

V_{goal} for Redevelopment: For a redevelopment project that results in a net increase in impervious surface greater than 10%, V_{goal} is the net increase in volume between the existing condition and the proposed condition generated by the 80th percentile storm event over a 24-hour period.

Water Quality Volume, WQV – The volume of runoff generated within a BMP's drainage area over a 24-hour period during the 80th percentile storm event.

The following steps may be used to determine the project volume retention goal and the water quality volume.

Step 1: 80th Percentile Depth

Method 1

A table of 80th percentile storm depths can be found in *Appendix A*. These values have been determined by the permittees.

Method 2

Planners and developers should verify with the MS4 before determining an 80th percentile with this method.

Determine the 80th percentile precipitation depth.

1. Obtain long-term daily rainfall data from the following sources:
    a. National Oceanic and Atmospheric Administration (NOAA): https://www.ncdc.noaa.gov/cdo-web/datatools/selectlocation; or
    b. Reliable historical local data; or
    c. Any other reliable data source.
2. Sort data low to high.
3. Remove snowfall and small precipitation events (≤0.1 inch).
4. Use the Excel PERCENTILE function to calculate the 80th percentile rainfall depth.

A more in-depth discussion on determining the 80th percentile precipitation depth is found here: https://documents.deq.utah.gov/water-quality/stormwater/DWQ-2019-004584.pdf.

A reliable record of historical precipitation data should meet the following conditions:

1. Come from an active rain gage;
2. Have at least 30 years of data;
3. Have 90% data coverage for the period of record.

Step 2: Imperviousness

To determine the project's volume retention goal, determine the imperviousness within the disturbance limits of the project. To determine the water quality volume of a BMP's drainage area, determine the imperviousness of the drainage area. The imperviousness of the BMP drainage area will include any off-site impervious areas that are part of the BMP's drainage area.

Project imperviousness = Post-development impervious area / Project's disturbance limits

BMP imperviousness = Post-development impervious area within BMP drainage area / BMP drainage area

Step 3: Volumetric Runoff Coefficient

Determine the volumetric runoff coefficient (R_V).

The volumetric runoff coefficient (also referred to as just the 'runoff coefficient') is a calculation of the percentage of rainfall that results in surface runoff. Runoff coefficients for small, frequent storms, such as for the 80th percentile, are not equivalent to runoff coefficients for large, less-frequent storms such as the 10-yr event and greater that are used with the Rational Method. The effects of infiltration, retention, and interception are increased for the smaller storm events compared to the larger events. Because of this, runoff coefficients for smaller storms are numerically smaller than for larger storms.

In 1983 data from over 50 sites nationwide was evaluated as part of the Nationwide Urban Runoff Program (NURP) (Driscoll, 1983). From these sites, mean and median R_V values were calculated and compared to the site's imperviousness. This research led to the following conclusions that are also discussed by Schueler who did additional analysis of the NURP sites:

1. "Most of the variation in mean R_V among sites can be attributed to differences in the level of urbanization, and in particular, to the site imperviousness."
2. "R_V's were found to be relatively consistent at individual sites and were only weakly correlated with storm-related variables such as precipitation volume, intensity, and duration."
3. "The runoff coefficient could serve as a reliable estimator of runoff volumes, given an initial estimate of rainfall volume." (Schueler, Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs, 1987)

Various coefficients for smaller storms have also been developed using national datasets and through local research. Municipalities are encouraged to research these and other runoff coefficients or develop their own in determining which method to use within their jurisdiction for use with the 80th percentile storm. Deciding on a single runoff coefficient methodology for a jurisdiction will simplify the design and review process.

Development of a runoff coefficient is done by monitoring the runoff volume produced from a storm event. The runoff coefficient is the ratio between the monitored runoff volume and the total precipitation volume expressed in the following equation and will vary depending on land use and imperviousness of the measured area:

$$R_V = \frac{V_R}{V_P}$$

Where:

R_V = Volumetric runoff coefficient, unitless

V_R = Monitored runoff volume, cf

V_P = Total precipitation volume, cf

The total precipitation volume can be determined using the following equation:

$$V_P = \frac{dA}{12}$$

Where:

d = Precipitation depth, in.

A = Drainage area, sf

It is not the intent of this manual or the Division of Water Quality to recommend specific methodologies. An in-depth summary of runoff coefficients used throughout the country by municipalities and DOTs was developed by the California Department of Transportation (Caltrans) and published as a Technical White Paper titled *Runoff Coefficient Evaluation for Volumetric BMP Sizing*. It can be found here: http://www.dot.ca.gov/design/hsd/guidance/CTSW-TM-15-312_03_01-Runoff_Coeff_for_Vol_BMP_Sizing.pdf. This white paper specifically discusses Method 1 in more detail.

For all the equations presented below, i represents the percent of imperviousness of the drainage area in decimal format (0.0 – 1.0).

Method 1 – Reese method

Comparing the imperviousness of 44 nationwide sites to their respective calculated volumetric runoff coefficient, a simple linear regression equation was created to estimate the volumetric runoff coefficient for small urban catchments. Land uses for these sites were classified as residential, mixed, commercial, industrial, and urban open and nonurban (Schueler, Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs, 1987). Outliers were removed from this dataset by Reese to derive the equation below. Removing outliers from the dataset reduces the impact of erroneous measurements (Reese, 2006).

$R_V = 0.91i - 0.0204$

Method 2 – Hydrologic soil groups

Regression equations for runoff coefficient equations were derived based on imperviousness and the NRCS hydrologic soil groups for the 2-year event as presented in *Table 5* (Guo, 2013).

Table 5: Runoff coefficient equations based on the NRCS Soil Group.

NRCS Soil Group		
A	B	C/D
$R_{V\text{-}A} = 0.84i^{1.302}$	$R_{V\text{-}B} = 0.84i^{1.169}$	$R_{V\text{-}C/D} = 0.83i^{1.122}$

Method 3 – Granato method

This runoff coefficient is calculated based on a two-line regression model of the runoff coefficient developed by the United States Geological Survey (USGS). This method of developing the runoff coefficient was developed to assist DOTs and contractors to estimate long-term volume reduction for highway projects and has been adopted for use by UDOT. Additional information relating to this runoff coefficient and its applicability can be found in NCHRP Report 792.

$R_V = 0.225i + 0.05$; when $i < 0.55$

$R_V = 1.14i - 0.371$; when $i \geq 0.55$

Step 4: 80th Percentile Volume

Calculate the 80th percentile volume using the following equations for V_{goal} or WQV.

$$V_{goal} = R_V dA \quad \text{or} \quad WQV = R_V dA$$

Where:

V_{goal} and WQV = 80th percentile volume, cf

R_V = Volumetric runoff coefficient, unitless

d = 80th percentile storm depth, ft (convert from inches to feet if required)

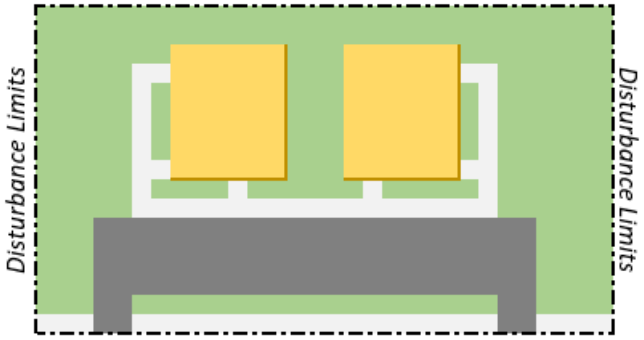
A = Project area or BMP drainage area, sf

The images on the following page show how V_{goal} and WQV are related. Examples from local case studies and different land uses further demonstrate the usage of these equations. See *Land Use Examples* and *Local Case Studies*.

V_{goal}

New Development

V_{goal} is the volume generated from the 80th percentile storm event over the entire project site or a predevelopment hydrologic condition, whichever is less.



$V_{goal} = R_V dA$

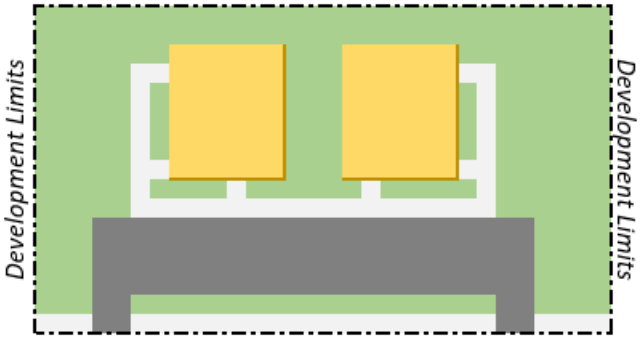
R_V = Volumetric runoff coefficient (based on the project's total area)

d = 80th percentile storm depth, ft

A = Project area, sf

Redevelopment

V_{goal} is the net volume increase generated from the 80th percentile storm event over the project area when the increase in impervious surface is greater than 10%.



Proposed Redevelopment
(Impervious surface increase > 10%)



$V_{goal} = V2 - V1$

$V_2 = R_V dA$

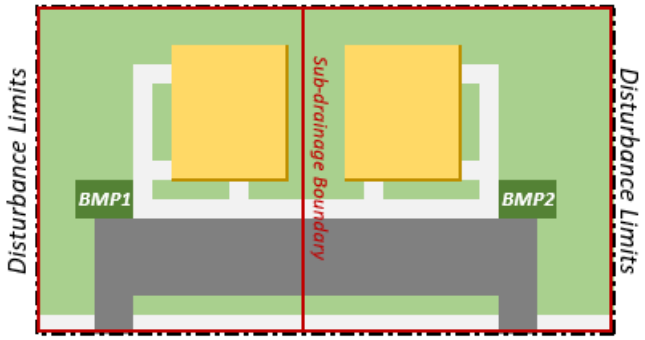
- Volume generated by the 80th percentile storm depth for the proposed project condition.

$V_1 = R_V dA$

- Volume generated by the 80th percentile storm depth for the existing project condition.

Water Quality Volume, WQV

The WQV is the 80th percentile volume of the sub-drainage area for each BMP.



Within the sub-drainage area boundaries, WQV is the 80th percentile volume based on the BMP's drainage area, the imperviousness of the BMP's drainage area, and the 80th percentile storm depth.

$WQV = R_V dA$

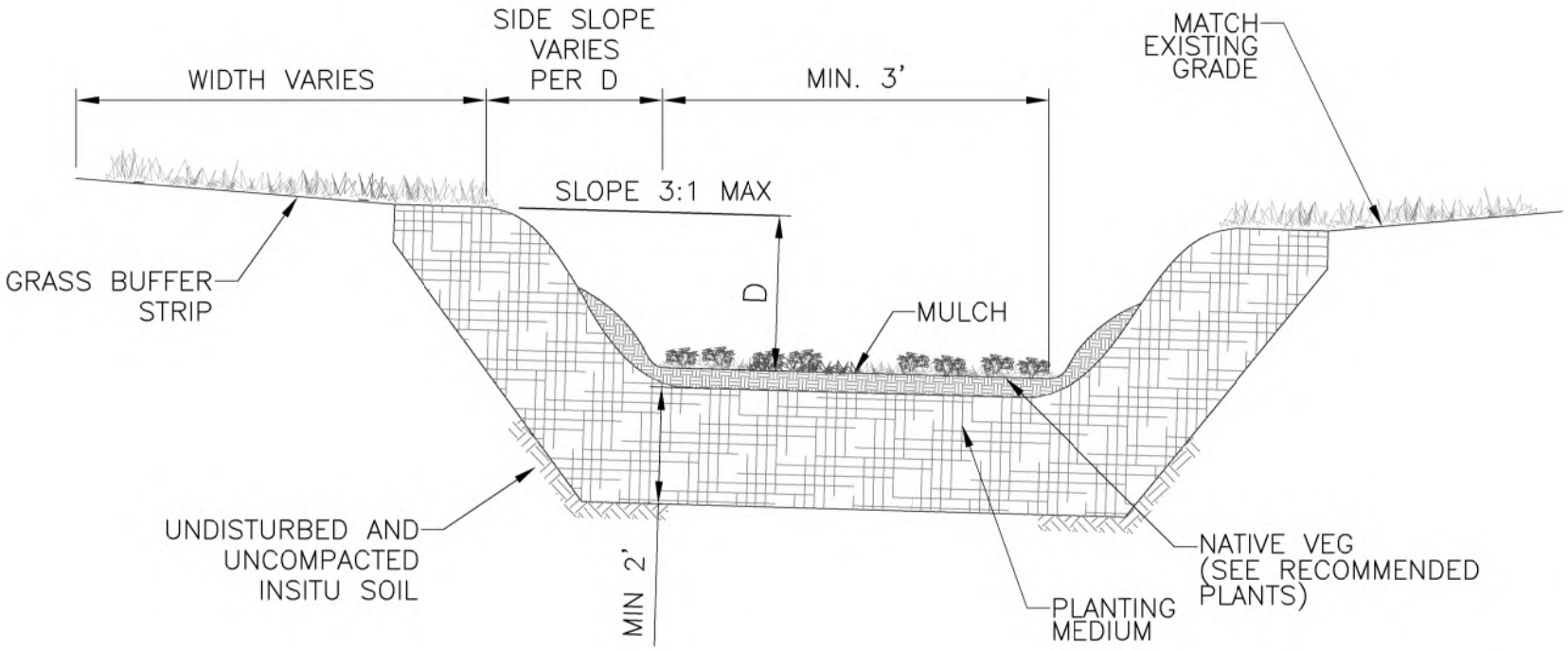
R_V = Volumetric runoff coefficient (based on the sub-drainage area's imperviousness)

d = 80th percentile storm depth, ft

A = Sub-drainage area, sf

Appendix F

(UCEA LID Details)



CALL BLUESTAKES
@ 1-800-662-4111 AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION

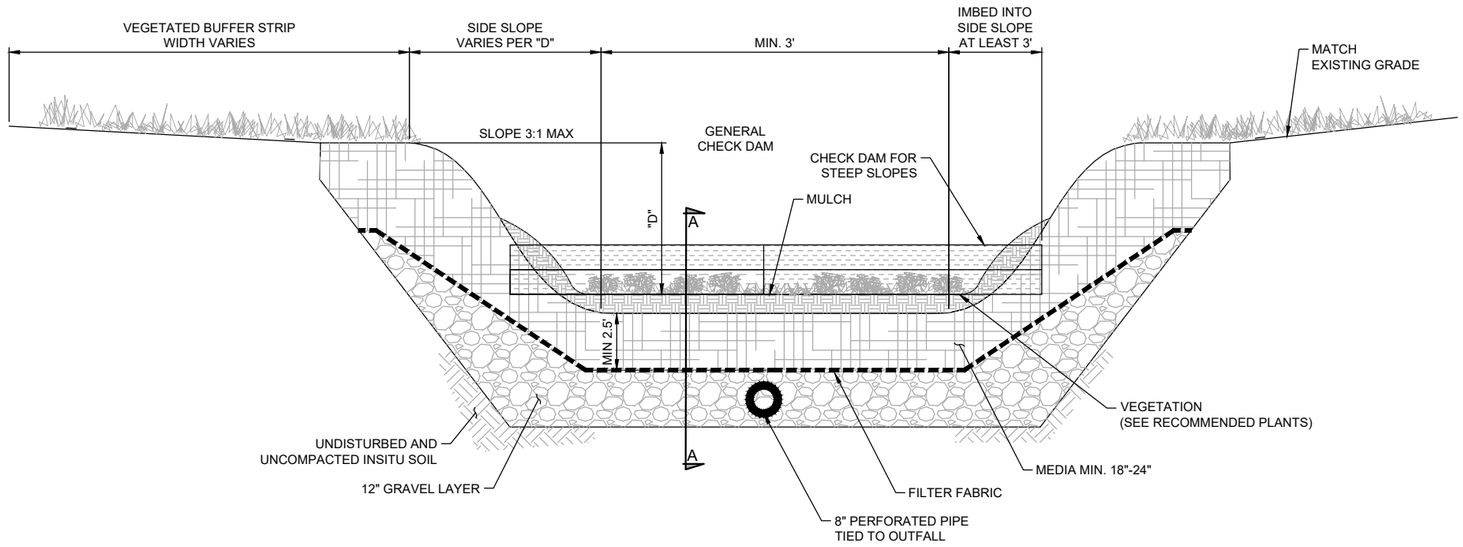
UCEA
UTAH CITY ENGINEERS ASSOCIATION

TYPICAL WET SWALE CROSS-SECTION

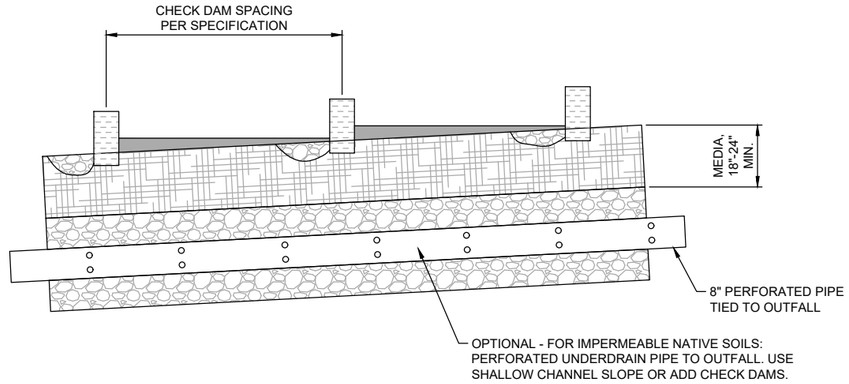
01_LID_StormwaterBMP_WetSwales

REVISIONS			
REV	DATE	BY	

DESIGNED UCEA	DATE 12/31/19	PROJECT NO. LID_01
DRAWN UCEA	DATE 12/31/19	SHEET NO. LID_01
CHECKED UCEA	DATE 12/31/19	DRAWING NO. LID_01



DRY SWALE SECTION



SECTION A

NOTE:

THIS DETAIL IS A MODIFIED VERSION OF UCEA STANDARD DRAWING.

XX / XX — TYPICAL DRY SWALE

03_LID_StormwaterBMP_Dry

REV	DATE	BY	DESCRIPTION

REVISIONS

SCALE

HORIZONTAL 1" = 2'

VERTICAL NONE

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

HORROCKS ENGINEERS

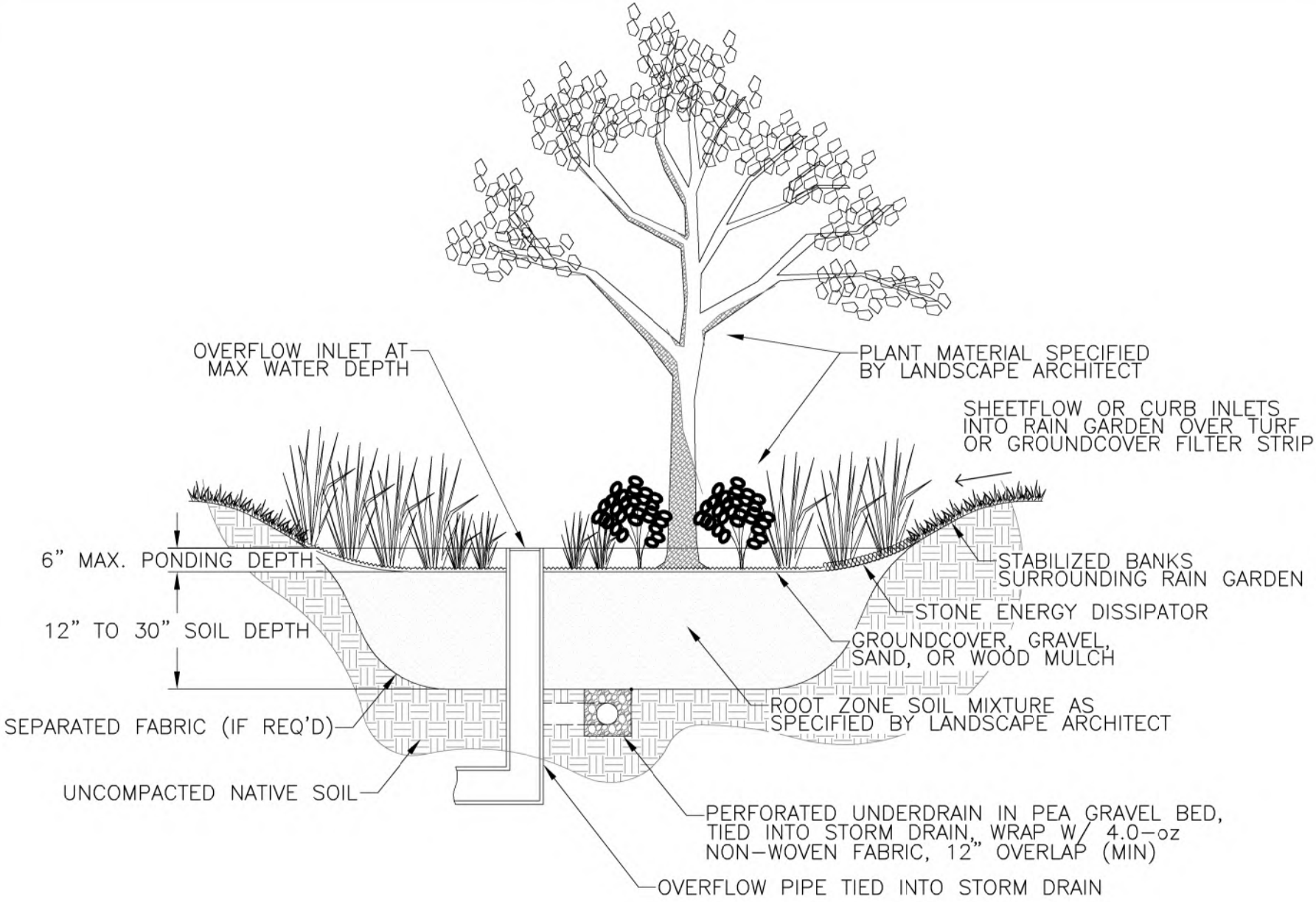
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100

####

####

DESIGNED	DATE	PROJECT NO.
####	####	####
DRAWN	DATE	SHEET NO.
####	####	#### OF ####
CHECKED	DATE	DRAWING NO.
####	####	01

H:\Heber City\City Projects\2020 North Village Master Plan\Storm Drain\Storm Drain Manual\Updated BMP Drawings\TYP DRY SWALE DETAILS.dwg - 01 - 5/11/2022 4:22 PM - lisa]



CALL BLUESTAKES @ 1-800-662-4111 AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION

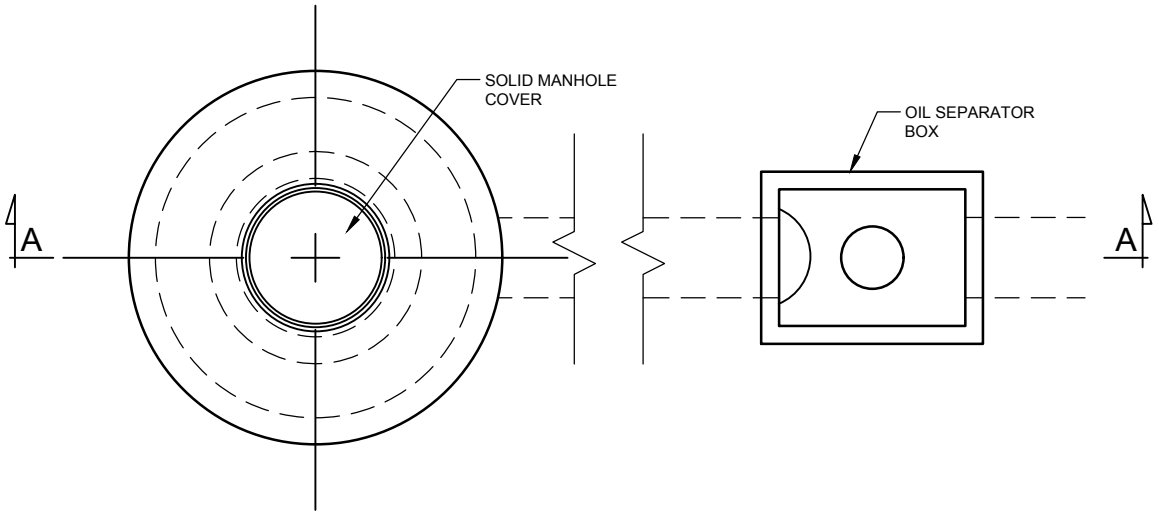
UCEA UTAH CITY ENGINEERS ASSOCIATION

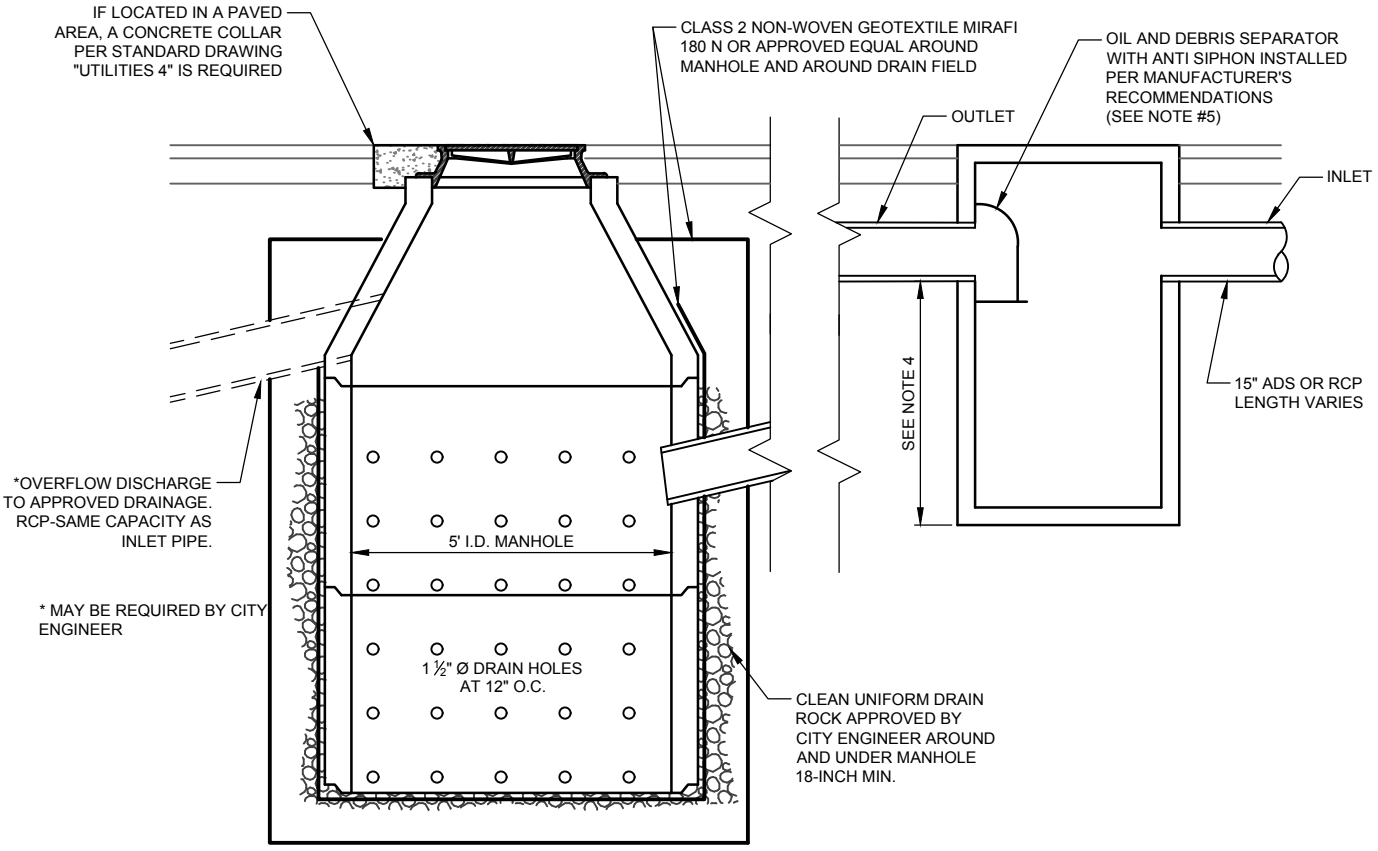
RAIN GARDEN

05_LID_StormwaterBMP_Rain_Garden

REVISIONS			
REV	DATE	BY	

DESIGNED UCEA	DATE 12/31/19	PROJECT NO. LID_05
DRAWN UCEA	DATE 12/31/19	SHEET NO. LID_05
CHECKED UCEA	DATE 12/31/19	DRAWING NO. LID_05





SECTION A-A

NOTES:

1. CONSTRUCT DROP INLET BOX TO MATCH WIDTH OF CURB & GUTTER. MATCH INSIDE LENGTH OF BOX TO INSIDE LENGTH OF FRAME.
2. D & L I-3516 WITH ADJUSTABLE CURB BOX.
3. STANDARD CAST IRON MANHOLE RING & LID.
4. SUMP DEPTH = 36" MIN. FOR 12" DIAMETER OUTLET AND SMALLER, FOR OUTLET DIAMETER 15" AND LARGER, DEPTH = 2.5 TO 3 TIMES THE DIAMETER.
5. SEE STANDARD SPECIFICATION 02772 PONDS.

SUMP DISPOSAL & OIL SEPARATOR

HORROCKS ENGINEERS
728 WEST 100 SOUTH #2
HEBER CITY, UTAH 84032
(435) 654-2226

DATE: FEBRUARY 2019
SCALE: N.T.S.

75 NORTH MAIN STREET
HEBER CITY, UTAH 84032
(435) 654-0757

HEBER CITY
HEART OF THE WASATCH BACK

HEBER CITY STANDARD DRAWING

STORM DRAIN-3

V:\ENGR\Stds\StdSpec\StdSpec 2019\Dwg Files\STORM DRAIN-3.dwg - Sump Oil - 2/06/2019 11:30am, rfunk

Appendix G

(TR-55 Worksheets)

Worksheet 2: Runoff curve number and runoff

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1/] Table 2-2	CN [1/] Figure 2-3	CN [1/] Figure 2-4	Area ☐ acres ☐ mi^2 ☐ %	Product of CN x area
	Totals ➡					

[1/] Use only one CN source per line

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____ ; **Use CN** ➡ ☐

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

Worksheet 3: Time of Concentration (T_c) or travel time (T_t)

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

Check one: ☐ T_c ☐ T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

	Segment ID	
1. Surface description (table 3-1)		
2. Manning's roughness coefficient, n (table 3-1)		
3. Flow length, L (total L † 300 ft) ft		
4. Two-year 24-hour rainfall, P_2 in		
5. Land slope, s ft/ft		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t hr		+ =

Shallow concentrated flow

	Segment ID	
7. Surface description (paved or unpaved)		
8. Flow length, L ft		
9. Watercourse slope, s ft/ft		
10. Average velocity, V (figure 3-1) ft/s		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t hr		+ =

Channel flow

	Segment ID	
12. Cross sectional flow area, a ft^2		
13. Wetted perimeter, p_w ft		
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft		
15 Channel slope, s ft/ft		
16. Manning's roughness coefficient, n		
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V ft/s		
18. ~~Flow~~ length, L ft		
19. $T_t = \frac{L}{3600\ V}$ Compute T_t hr		+ =
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) Hr		

Worksheet 4: Graphical Peak Discharge method

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

1. Data

Drainage area ..... A_m = _____ mi^2 (acres/640)

Runoff curve number .....CN = _____ (From worksheet 2)

Time of concentration ..... T_c = _____ hr (From worksheet 3)

Rainfall distribution ..... = _____ (I, IA, II III)

Pond and swamp areas sprea
throughout watershed ..... = _____ percent of A_m (_____ acres or mi^2 covered)

	Storm #1	Storm #2	Storm #3
2. Frequency ..... yr			
3. Rainfall, P (24-hour) ..... in			
4. Initial abstraction, I_a ..... in (Use CN with table 4-1)			
5. Compute I_a / P			
6. Unit peak discharge, q_u ..... csm/in (Use T_c and I_a / P with exhibit 4– _____)			
7. Runoff, Q ..... in (From worksheet 2) Figure 2-6			
8. Pond and swamp adjustment factor, F_p ..... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond ans swamp area.)			
9. Peak discharge, q_p ..... ft^3/s			

(Where $q_p = q_u A_m Q F_p$)

Worksheet 5a: Basic watershed data

Project	Location	By	Date
Check one: ☐ Present ☐ Developed	Frequency (yr)	Checked	Date

Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2—in)	Initial abstraction I_a (in)	I_a/P

From worksheet 3 | From worksheet 2 | From table 5-1

Worksheet 5b: Basic watershed data

Project	Location	By	Date
Check one: ☐ Present ☐ Developed	Frequency (yr)	Checked	Date

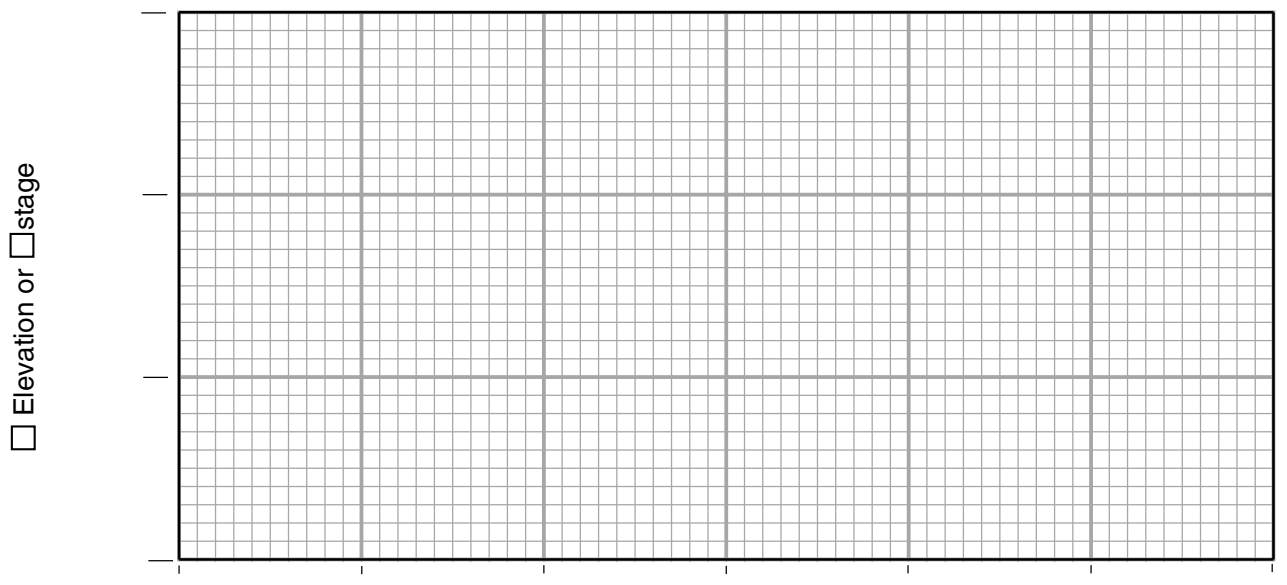
Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5-II 2/											
	Subarea T_c (hr)	ΣT_t to outlet (hr)	I_a/P	A_mQ (mi^2—in)	Discharges at selected hydrograph times 3/ (cfs)											
Composite hydrograph at outlet																

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is A_mQ multiplied by tabular discharge from appropriate exhibit 5.

Worksheet 6a: Detention basin storage, peak outflow discharge (q_o) known

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed



1. Data:
   Drainage area ..... A_m = _____ mi^2
   Rainfall distribution type (I, IA, II, III) = _____

	1st Stage	2nd Stage
2. Frequency ..... yr		
3. Peak inflow discharge q_i ..... ft^3/s (from worksheet 4 or 5b)		
4. Peak outflow discharge q_u ..... ft^3/s		1/
5. Compute $\frac{q_o}{q_i}$		

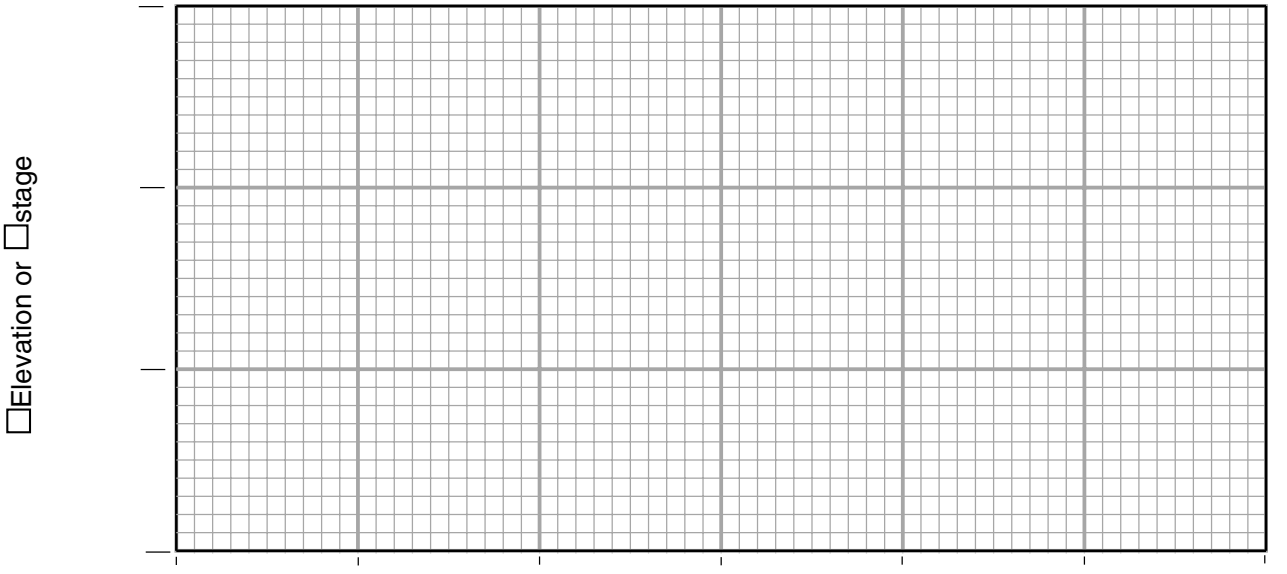
6. $\frac{V_s}{V_r}$ ..... (Use $\frac{q_o}{q_i}$ with figure 6-1)
7. Runoff, Q ..... in (From worksheet 2)
8. Runoff volume V_r..... ac ft ($V_r = QA_m$ 53.33)
9. Storage volume, V_s ..... ac-ft
   ($V_s = V_r \left(\frac{V_s}{V_r}\right)$)
10. Maximum storage E_{max} (from plot)

1/ 2nd stage q_o includes 1st stage q_o.

Worksheet 6b: Detention basin storage, storage volume (V_s) known

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed



1. Data:
   Drainage area ..... A_m = _____ mi^2
   Rainfall distribution type (I, IA, II, III) = _____

	1st Stage	2nd Stage
2. Frequency ..... yr		
3. Storage volume V_s ..... ac-ft		
4. Runoff, Q ..... in (from worksheet 2)		
5. Runoff volume ..... ac-ft ($V_r = QA_m$ 53.33)		

1/ 2nd stage q_o includes 1st stage q_o.

6. Compute $\frac{V_s}{V_r}$ .....

7. $\frac{q_o}{q_i}$ ..... in
   (Use $\frac{V_s}{V_r}$ with figure 6-1)

8. Peak inflow discharge q_i ..... in
   (From worksheet 4 or 5b)

9. Peak outflow discharge q_o ..... ft^3/s 1/
   ($q_o = q_i$ ($\frac{q_o}{q_i}$))

10. Maximum storage E_{max} (from plot)

Appendix H

(Source Protection Maps)

Legend

- Broadhead Spring
- Fuel Tank
- Animal Feeding
- Golf Course
- Red Ledges Yard
- Septic System
- Other Wells

Broadhead Springs Zones

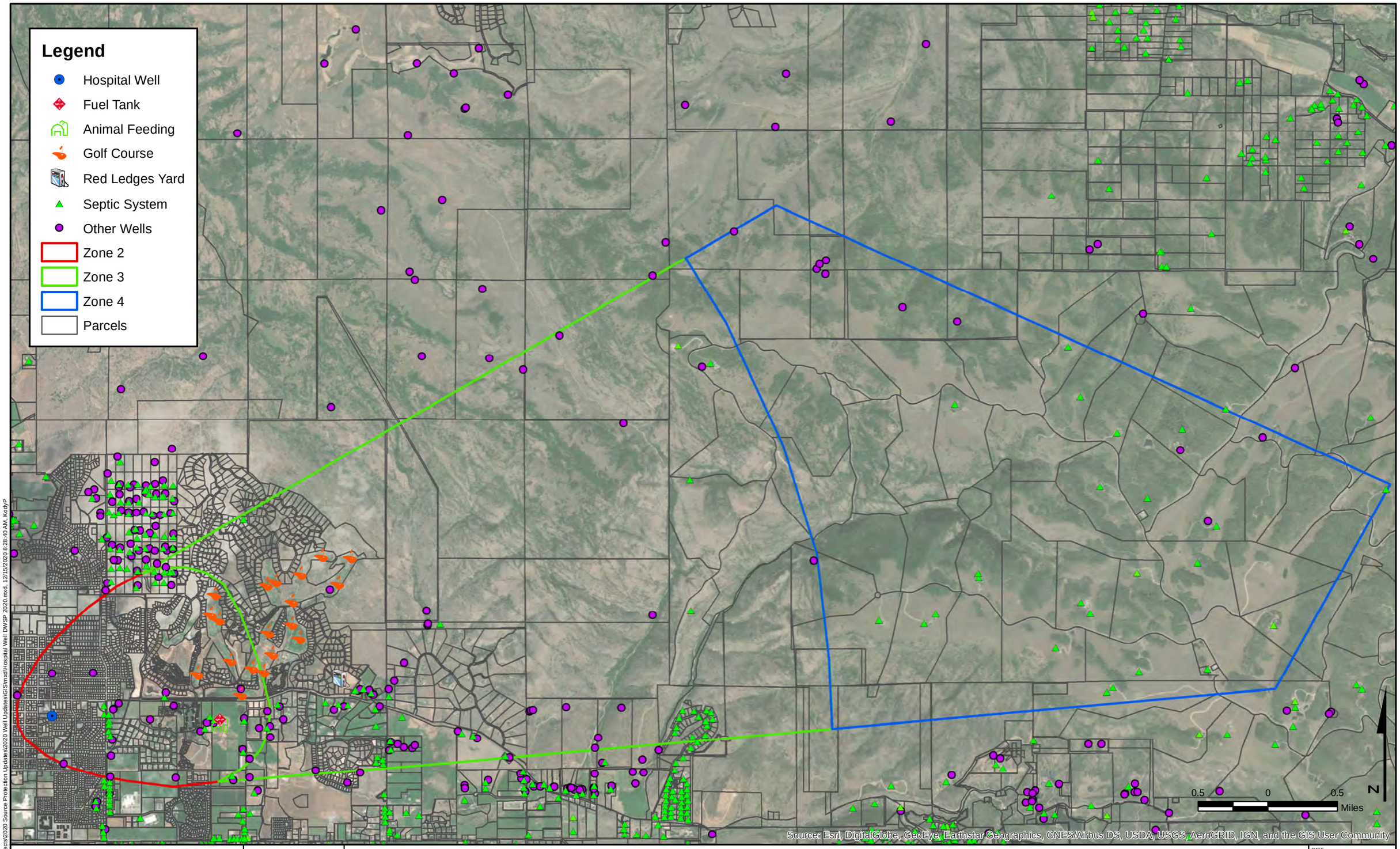
- Zone 2
- Zone 3
- Zone 4
- Parcels

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Pleasant Grove, UT (801) 763-5100

Broadhead Springs Delineation Zones & PCS's

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W E
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HORROCKS ENGINEERS

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(435) 654-2226

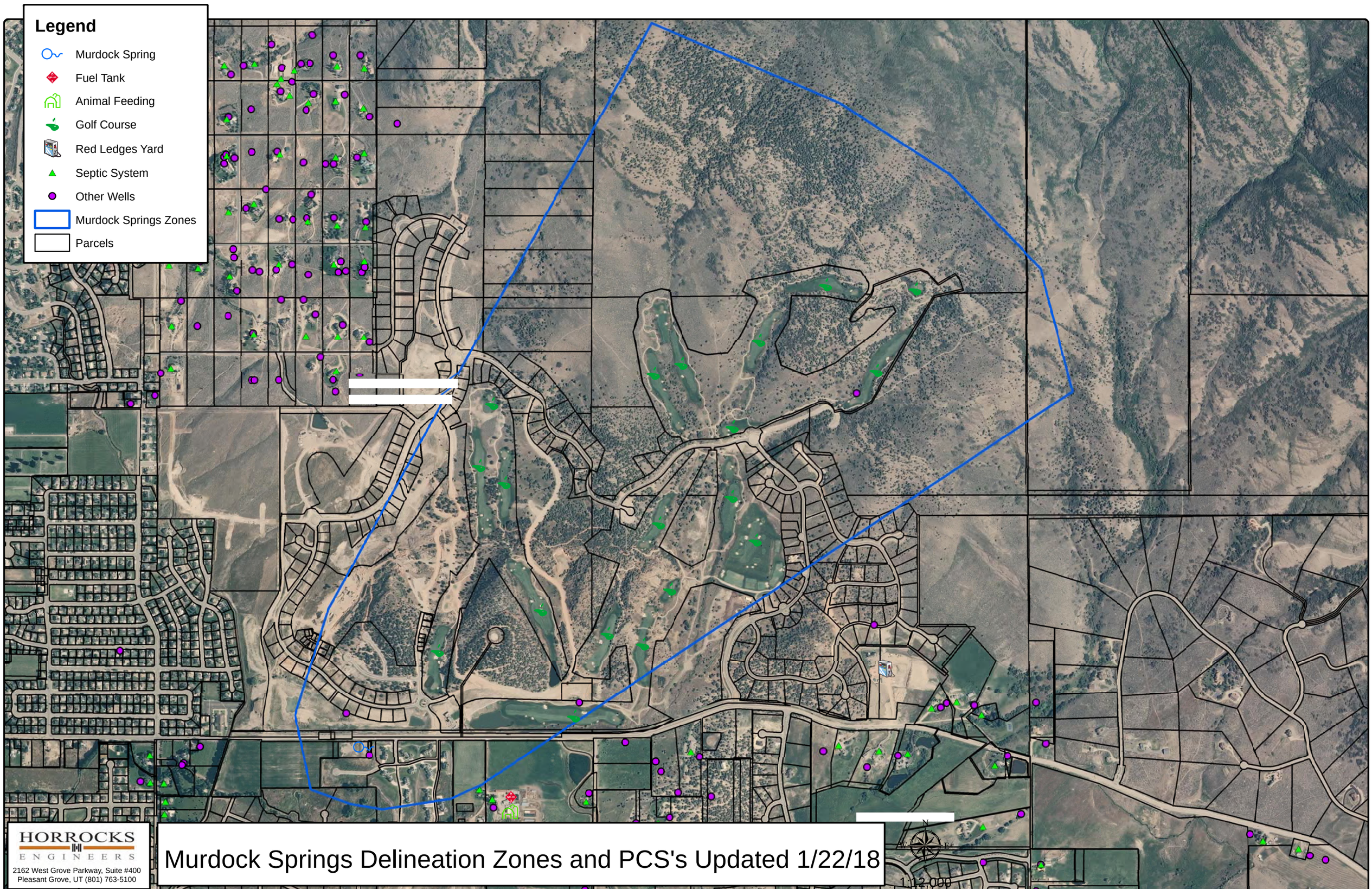
Hospital Well Delineation Zones & PCS's

2020 DWSP Update

DATE 12/15/2020

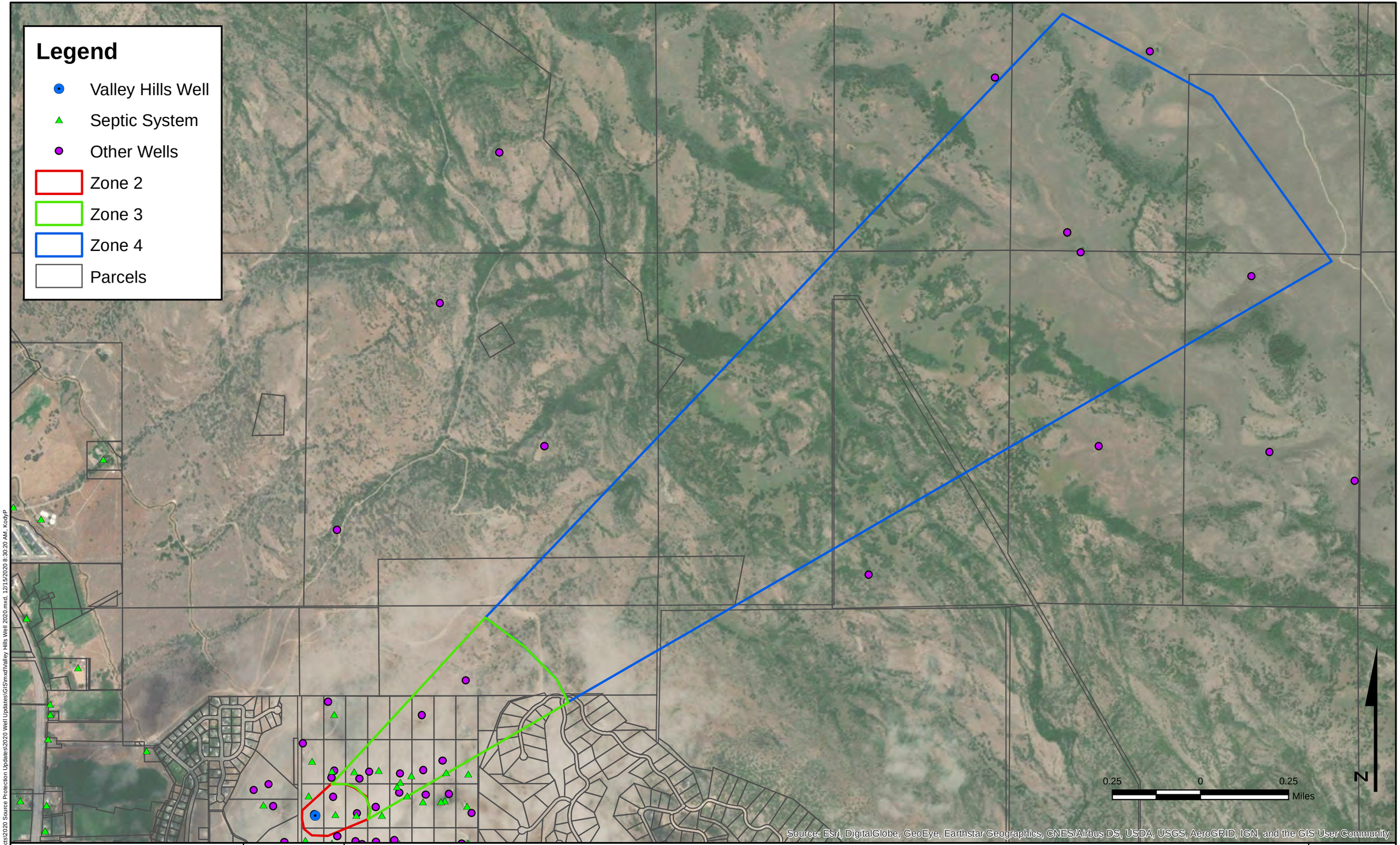
DRAWN

Figure 1



Murdock Springs Delineation Zones and PCS's Updated 1/22/18

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Valley Hills Well Delineation Zones & PCS's

2020 DWSP Update

DATE 12/15/2020

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Figure 2

Legend

- Well #1
- Fuel Tank
- Animal Feeding
- Golf Course
- Red Ledges Yard
- Septic System
- Other Wells
- Zone 2
- Zone 3
- Zone 4
- Parcels

0.5 0 0.5 Miles

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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HORROCKS ENGINEERS

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(435) 654-2226

Well #1 Delineation Zones & PCS's

2020 DWSP Update

DATE 12/15/2020

DRAWN

Figure 3

Appendix I

(FAA Method Storage Facility Volume)

Obtain Excel file from City

Detention Pond Design
FAA Method with Guo Parameter

Runoff Coefficients		
Surface Type	Area	C
Hardscape	123805	0.9
Roof	56760	0.9
Landscape	83409	0.44
	263974	

Orifice Sizing		
Discharge	0.98	cfs
Head	4	ft
Orifice Coeff.	0.61	
Diameter	4.28	in

Basin Parameters		
Total Basin Area (A) =	9.8	acres
Connected Basin Area (A) =	6.06	acres
Weighted Coefficient (C) =	0.75	
Release Rate =	0.1	cfs/acre
Time of Concentration (tc) =	15	minutes

Pipe Volumes		
I.D. (in.)	Length	Vol. (cf)
0	0	0
0	0	0
		0

Time (min)	100-yr Rainfall (in)	100-yr Rainfall Intensity (in/hr)	Inflow Volume (cf)	Adjustment Factor	Outflow (cfs)	Outflow Volume (cf)	100-yr Required Detention Volume (cf)
5	0.54	6.52	9014	1.00	0.98	294	8720
10	0.83	4.96	13729	1.00	0.98	588	13141
15	1.02	4.08	16933	1.00	0.98	882	16051
20	1.14	3.42	18925	0.88	0.86	1029	17896
25	1.26	3.02	20917	0.80	0.78	1176	19741
30	1.38	2.76	22909	0.75	0.74	1323	21586
35	1.44	2.46	23822	0.71	0.70	1470	22352
40	1.49	2.24	24735	0.69	0.67	1617	23118
45	1.55	2.06	25648	0.67	0.65	1764	23884
50	1.60	1.92	26561	0.65	0.64	1911	24650
55	1.66	1.81	27474	0.64	0.62	2058	25416
60	1.71	1.71	28387	0.63	0.61	2205	26182
65	1.73	1.59	28678	0.62	0.60	2352	26326
70	1.75	1.50	28968	0.61	0.60	2499	26469
75	1.76	1.41	29259	0.60	0.59	2646	26613
80	1.78	1.34	29549	0.59	0.58	2793	26756
85	1.80	1.27	29840	0.59	0.58	2940	26900
90	1.82	1.21	30130	0.58	0.57	3087	27043
95	1.83	1.16	30421	0.58	0.57	3234	27187
100	1.85	1.11	30711	0.58	0.56	3381	27330
105	1.87	1.07	31002	0.57	0.56	3528	27474
110	1.89	1.03	31292	0.57	0.56	3675	27617
115	1.90	0.99	31583	0.57	0.55	3822	27761
120	1.92	0.96	31873	0.56	0.55	3969	27904
125	1.92	0.92	31902	0.56	0.55	4116	27786
130	1.92	0.89	31930	0.56	0.55	4263	27667

Simplied Rational Method Pond Sizing Template Calculation for 25-year Storm Event

Drainage areas	Sq. Ft	C Value
buildings	1	0.95
Aspahlt	1	0.95
Grass	1	0.15
Gravel	1	0.65
Concrete	1	1.00
Total	**5**	
Weighted C	0.740	
Infiltration min/in	1	
Safety Factor (2 minimum)	2	
Infiltration ft/min	0.0417	
Discharge per Acre (cfs) (Max=0.1)	0.1000	

25-yr Storm		
	in.	in/hr
5	0.36	4.36
10	0.55	3.32
15	0.69	2.74
30	0.92	1.85
60	1.14	1.14
120	1.31	0.65
180	1.38	0.46
360	1.62	0.27
720	1.97	0.16
1440	2.36	0.10

Mannings Calculation Spreadsheet			
Pipe D (in)	S (in/in)	n	
15	0.008	0.013	
V =	**4.72** ft/s		
Q =	**5.79** cfs		

Pipe Discharge	
	(cfs)
	0
	0
	0
	0
	0
	0
	0
	0
	0

	Depth (Ft)	Avg Length (Ft)	Avg Width (Ft)	Capacity (CF)
Pond Dimension				0
	Diam. (Ft)	**Depth (Ft)**		
Sump Manhole(s) (in the pond)			1	0
Drain Rock Around Sump MH (in pond)				0
Sump Manhole(s) (not in pond)				0
Drain Rock Around Sump MH (not in pond)				0
	Diam. (In)	**Length (Ft)**		
Underground Pipe Storage (no infiltration)				0
	Height (Ft)	**Length (Ft)**	**Avg Width (Ft)**	
Wrapped Drain Rock				0
	Height (Ft)	**Length (Ft)**	**Avg Width (Ft)**	
Underground Storage Chambers and Wrapped Drain Rock				

Drain Rock Void Ratio %	40
Will pond be Landscaped with Topsoil? (Y/N)	N
Will Underground Storage Chambers be under the pond? (Y/N)	N

Total Storage Capacity (CF)	0
Pond Exfiltr Surface (SF) (Must be zero if pond is landscaped with topsoil)	0
Underground Exfiltration Surfaces (SF)	0
Total Exfiltration Surface (SF)	0

Time (min)	Accum. Vol (CF)	Exfiltration (CF)	Discharge (CF)	Storage Req. (CF)	Max (CF)
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	0	0	0
30	0	0	0	0	0
60	0	0	0	0	0
120	0	0	0	0	0
180	0	0	0	0	0
360	0	0	0	0	0
720	1	0	0	0	0
1440	1	0	1	0	0
				Ultimate Demand	**0**

System is **Not Ok**

Notes:
Exfiltration from pond only allowed if the pond is not landscaped with topsoil. Only the bottom surface area of the pond may be used in exfiltration calculation.

Simplied Rational Method Pond Sizing Template Calculation for 100-yr Storm Event

Drainage areas	Sq. Ft	C Value
buildings	1	0.95
Aspahlt	1	0.95
Grass	1	0.15
Gravel	1	0.65
Concrete	1	1.00
Total	**5**	
Weighted C	0.740	
Infiltration min/in	1	
Safety Factor (2 minimum)	2	
Infiltration ft/min	0.0417	
Discharge per Acre (cfs) (Max=0.1)	0.1000	

100-yr Storm		
	in.	in/hr
5	0.54	6.49
10	0.82	4.94
15	1.02	4.08
30	1.37	2.75
60	1.70	1.70
120	1.91	0.96
180	1.94	0.65
360	2.12	0.35
720	2.52	0.21
1440	2.97	0.12

Mannings Calculation Spreadsheet			
Pipe D (in)	S (in/in)	n	
15	0.008	0.013	
V =	**4.72** ft/s		
Q =	**5.79** cfs		

Pipe Discharge	
	(cfs)
	0
	0
	0
	0
	0
	0
	0
	0
	0

	Depth (Ft)	Avg Length (Ft)	Avg Width (Ft)	Capacity (CF)
Pond Dimension				0

	Diam. (Ft)	Depth (Ft)	Quanity	
Sump Manhole(s) (in the pond)			1	0
Drain Rock Around Sump MH (in pond)				0
Sump Manhole(s) (not in pond)				0
Drain Rock Around Sump MH (not in pond)				0

	Diam. (In)	Length (Ft)	
Underground Pipe Storage (no infiltration)			0

	Height (Ft)	Length (Ft)	Avg Width (Ft)	
Wrapped Drain Rock				0

	Height (Ft)	Length (Ft)	Avg Width (Ft)	
Underground Storage Chambers and Wrapped Drain Rock				

Drain Rock Void Ratio %	40
Will pond be Landscaped with Topsoil? (Y/N)	N
Will Underground Storage Chambers be under the pond? (Y/N)	N

Total Storage Capacity (CF)	0
Pond Exfiltr Surface (SF) (Must be zero if pond is landscaped with topsoil)	0
Underground Exfiltration Surfaces (SF)	0
Total Exfiltration Surface (SF)	0

Time (min)	Accum. Vol (CF)	Exfiltration (CF)	Discharge (CF)	Storage Req. (CF)	Max (CF)
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	0	0	0
30	0	0	0	0	0
60	1	0	0	0	0
120	1	0	0	1	1
180	1	0	0	0	1
360	1	0	0	0	1
720	1	0	0	0	1
1440	1	0	1	0	1
				Ultimate Demand	**1**

System is **Not Ok**

Notes:
Exfiltration from pond only allowed if the pond is not landscaped with topsoil. Only the bottom surface area of the pond may be used in exfiltration calculation.

Guo, James C.Y. (1999). "*Detention Basin Sizing for Small Urban Catchments*," ASCE J. of Water Resources Planning and Management, Vol 125, No.6, Nov.

DETENTION BASIN SIZING FOR SMALL URBAN CATCHMENTS

by James C.Y. Guo, *PhD, P.E., Professor,*
Department of Civil Engineering, University of Colorado at Denver, Denver, Colorado.

Abstract
The Federal Aviation Administration (FAA) method for sizing small detention and retention basins is a volume-based approach that is sensitive to the release rate. In practice, such a release rate is often approximated by open channel hydraulics or culvert hydraulics. Without a consistent guideline, this practice of approximation can result in significant discrepancy or violation of the volume balance between the inflow and outflow hydrographs. In this study, a consistent procedure was developed to derive the average release from the allowable peak outflow. The required parameters for this method include peak inflow, design storm duration, and the time of concentration of the watershed. With this modification, the detention storage volume maximized by the FAA method can satisfy the volume conservation between hydrographs.

Key Words: Detention, Rational, FAA

INTRODUCTION

Urban stormwater facilities are designed to pass the peak flow through conveyance systems or to store a portion of the runoff volume in detention systems. For a small urban catchment with a tributary area less than 100 acres, the rational method is suitable for peak runoff predictions and the Federal Aviation Administration (FAA) method is recommended for detention storage volume predictions. The FAA's procedure is to maximize the required storage volume by the volume difference between the inflow and outflow volumes produced by a series of rain storms on the watershed. During the optimization process, the outflow volumes are calculated by an approximate average release from the detention basin. In current practice, there is not any guidance as to how to estimate the average release.

As a volume-based method, the FAA procedure has been widely used for small urban catchments in spite of its ambiguity in estimating the average release from the basin. For instance, the average release may be calculated by open channel flow, orifice formula, or culvert hydraulics. These hydraulic approaches result in violation of the hydrologic principle of volume conservation between the inflow and outflow hydrographs and inaccurate calculations on the required detention storage volume. To improve the current practice, this study suggests that the average release be a fraction of the allowable release rate. This fraction can be further derived by the volume conservation principle between inflow and outflow hydrographs during the maximization process. In this study, this ratio was found to vary with respect to storm duration, and is not a constant as recommended in many design criteria such as the Denver Design Criteria Manuals, and FAA Airfield and Heliports Design Criteria. The revised procedure can also be applied to other volume-based methods such as the capture runoff volume method (Guo and Urbonas, 1996) for sizing storm water quality control ponds. It provides a

consistent guideline to the estimation of the average release from a basin, and warrants volume conservation between the inflow and outflow hydrographs.

DETENTION STORAGE VOLUME BY THE FAA METHOD

The volume-based approach such as the FAA method is applicable to urban catchments with a tributary area less than 150 acres. To predict the peak runoff from such a small urban watershed, the Rational method states:

$$Q_d = \alpha C I_d A \tag{1}$$

The rainfall intensity in Eq 1 can be described as:

$$I_d = \frac{aP}{(b + T_d)^n} \tag{2}$$

in which α = unit conversion factor, equal to 1 for English units, and 1/360 for SI units, C = runoff coefficient, A= watershed area in acres (hectare), I_d = rainfall intensity in inch/hr (mm/hr), T_d = rainfall duration in minutes, Q_d= peak runoff rate in cfs (cms) and a, b, and n= constants on the Intensity- Duration- Frequency (IDF) formula.

Storm water detention process is to reduce the peak runoff and to delay the time to peak as well. In practice, the allowable release rate from a basin is defined by the downstream critical capacity, or the pre-development condition.
In this study, the average release is suggested to be a fraction of the allowable peak runoff, Q_a. Therefore, we have:

$$Q_m = mQ_a \tag{4}$$

in which Q_a = the allowable release which occurs at time T_a in Figure 1, Q_m = average release rate, and m = ratio of the average release to the allowable peak runoff rate. For a storm event, the detention storage volume is equal to the volume difference of the inflow and outflow as:

$$V_i = \alpha C I_d A T_d \tag{5}$$

$$V_o = Q_m T_d = mQ_a T_d \tag{6}$$

$$V_d = 60\left[\alpha C I_d A T_d - Q_m T_d\right] = 60\left[Q_d T_d - Q_m T_d\right] \tag{7}$$

in which V_i = inflow volume, V_o = outflow volume, and V_d = the required storage volume in cubic feet or cubic meter. The factor of 60 is to convert seconds to minutes. The reliability of Eq 7 depends on the specified average outflow in Eq 4. Without an adequate guidance, Eq 7 may lead to any result based on engineer's best estimation. Although an adjustment factor have been recommended to avoid underestimation of the detention volume by Urbonas and Stahle (1991) and Guo (1990), it is necessary to develop a consistent guideline for Eq 4.

MAXIMIZATION OF DETENTION STORAGE VOLUME

The peak runoff flow that occurs at the time of concentration, T_c is recommended for conveyance designs. It is well understood that the design storm duration for a detention basin is usually longer that T_c. As illustrated in Figure 1, the peak flow, Q_d, is produced by the design storm for the detention design. To estimate the required storage volume with no prior knowledge of the outlet hydraulics, it is suggested that the storage volume be calculated using the linear rising outflow hydrograph, i.e. line OB in Figure 1 (Malcom 1982) (Guo 1997). Based on the volume difference between the inflow and outflow hydrographs in Figure 1, the detention storage volume, i.e. the shaded area, is:

$$V_d = 60\left[Q_d T_d - \frac{Q_a}{2}(T_d + T_c) \right] \tag{8}$$

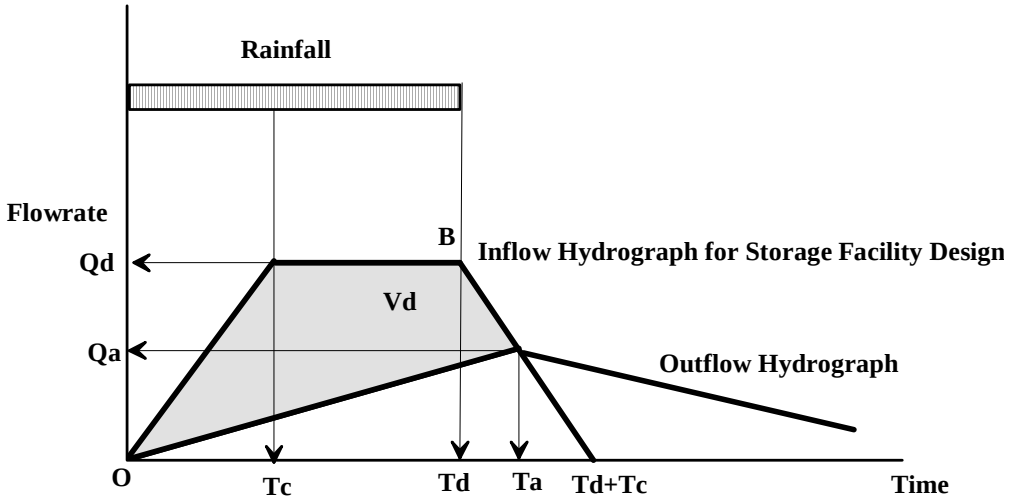


Figure 1. Detention Storage Volume Estimated by Hydrographs

Equating Eq 7 to Eq 8, the value of m is derived as:

$$m = \frac{1}{2}(1 + \frac{T_c}{T_d}) \quad \text{for } 0.5<m<1 \text{ and } T_d > T_c \tag{9}$$

Often the value of m is recommended to be a constant between 0.80 and 0.90 for all storm events (Urbanos and Stahre in 1991). Eq 19 indicates that the value of m varies with respect to the rain storm duration and can not be applied to a storm with duration less than T_c because the maximized operation of a detention basin requires the entire catchment to be tributary. The current practice does not have any limitation on storm duration and results in a maximization procedure starting from 5-minute rainfall. Eq. 9 begins with a value equal to unity when the storm duration is equal to T_c and then reduces to 0.5 when T_d is much longer than T_c. In comparison, the current practice of applying a constant value of m to all storm events can lead

to significant mistake. Substituting Eq 9 into Eq. 5 with the aid of Eq 3, the FAA method is modified to:

$$V_d = 60\left[\alpha C I_d A - \frac{Q_a}{2}(1+\frac{T_c}{T_d})\right]T_d \qquad (10)$$

The basic concept in the FAA method is to find the maximum volume difference between the inflow and outflow volumes under a series of storm events with different durations. Eq 10 shall be tested for a range of T_d until Eq 10 is maximized as:

$$V_m = 60\left[\alpha C I_m A - \frac{Q_a}{2}(1+\frac{T_c}{T_m})\right]T_m \quad \text{at } T_d = T_m \qquad (11)$$

where the subscript m represents the maximized solution.

DESIGN SCHEMATICS AND EXAMPLES

The example watershed used in this study is located in the City of Denver, Colorado. The 100-year IDF in Denver is specified by a = 74.1, b = 10, and n = 0.786. The developed watershed of 100 acres has a time of concentration of 25 minutes and runoff coefficient of 0.65. It produces a 100-year developed peak runoff of 296.86 cfs. The allowable release is 33% of the developed peak runoff. As a result, the allowable release rate is

$$Q_a = 0.33 Q_p = 97.96 \quad cfs \qquad (12)$$

The detention volumes for various periods of storm duration are calculated in Table 1. The maximized volume is found to be 8.52 acre-ft for this example.

Duration	Rainfall Intensity	Inflow Volume	Average Parameter	Average Outflow	Outflow Volume	Storage Volume
minutes	inch/hr	acre-ft	M	cfs	acre-ft	acre-ft
		Eq5	Eq 9	Eq 4	Eq 6	Eq 10
50.00	2.97	13.28	0.75	72.36	4.98	8.30
60.00	2.63	14.12	0.71	68.34	5.65	8.47
70.00	**2.37**	**14.83**	**0.68**	**65.47**	**6.31**	**8.52**
80.00	2.16	15.45	0.66	63.32	6.98	8.47
90.00	1.99	16.00	0.64	61.64	7.64	8.36

Table 1. Example for Maximization of Detention Volume.

CONCLUSIONS

Different hydrologic methods were developed for different hydrologic conditions. In the development of technical design criteria, it is a continual effort to maintain consistency among various design methods. The FAA method intends to be a simplified volume-based approach.

However, the current practice falls short in the estimation of the average outflow. This study presents a modification to the volume-based approach such as the FAA method so that the estimated detention volume can be consistent with the hydrograph method. Modifications to the FAA procedures shall not change its original intention as a simplified approach. As a result, this study applies the volume conservation principle between the simplified hydrographs to relate the average outflow as a fraction of the allowable release rate.

In this study, it was found that the average outflow can be determined by the allowable release from the basin, design storm duration, and the time of concentration of the watershed. In practice, the average release was often considered to be the average flow rate over the base time of the outflow hydrograph. This study indicates that this average outflow in fact is the equivalent average release rate that drains the basin storage volume over the storm duration time. Secondly, the ratio of average release to allowable release was not so constant as recommended by the current practice. Instead, it varies between one and 0.5, depending on storm duration. Applying a constant ratio to all storm events may result in a significant discrepancy against the volume conservation between the inflow and outflow hydrographs. Eq 9 provides a consistent guideline that modifies the current FAA procedures to satisfy the hydrograph volume balance.

APPENDIX I. REFERENCES

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135	1.93	0.86	31958	0.56	0.54	4410	27548
140	1.93	0.83	31986	0.55	0.54	4557	27429
145	1.93	0.80	32014	0.55	0.54	4704	27310
150	1.93	0.77	32043	0.55	0.54	4851	27192
155	1.93	0.75	32071	0.55	0.54	4998	27073
160	1.93	0.73	32099	0.55	0.54	5145	26954
165	1.94	0.70	32127	0.55	0.53	5292	26835
170	1.94	0.68	32156	0.54	0.53	5439	26717
175	1.94	0.66	32184	0.54	0.53	5586	26598
180	1.94	0.65	32205	0.54	0.53	5733	26472

Appendix J

(Storm Water Maintenance Agreement and Management Plan)

When recorded, mail to:
Heber City Recorder
75 North Main Street
Heber City, Utah 84032

LONG-TERM STORM WATER MAINTENANCE AGREEMENT
(Development Name)

THIS STORM WATER MAINTENANCE AGREEMENT (this "Agreement") is made and entered into this _____ day of _____, 2022, by and between Heber City, a municipal corporation of the State of Utah (the "City"); and _____ ("Owner") whose address is _____ Heber City, Utah 84032.

RECITALS

A. The City is authorized and required to regulate and control the disposition of storm and surface waters within the City, as set forth in the Heber City Code, as amended ("Ordinance"), and as adopted pursuant to the Utah Water Quality Act, as set forth in Utah Code Ann § 19-5-101, er seq., as amended (the "Act").

B. The Owner hereby represents and acknowledges that it is the owner in fee simple or is solely responsible through separate agreement(s) for storm water and its management from certain real properties more particularly described in Exhibit "A", attached hereto and incorporated herein by this reference (the "Property"), and in any amendments thereto, which property is subject to the regulations described above.

C. The Owner desires to build or develop the Property and/or to conduct certain regulated construction activities on the Property which will alter existing storm and surface water conditions on the Property and/or adjacent lands; and

D. To facilitate the anticipated development of the Property, the Owner desires to build and maintain, at Owner's expense, storm and surface water management facilities, including structures, improvements, grading and drainage plans and/or vegetation to control the quantity and quality of the storm water (the "Storm Water Facilities"); and

E. The Storm Water Facilities are shown in the final site plans for subdivisions accepted for the Property, in any related engineering drawings, and in any amendments thereto, which plans, and drawings are on file in the Heber City Engineering Department, and are hereby incorporated herein by this reference (the "Development Plan"); and

F. A detailed description of the Storm Water Facilities, which includes the operation and maintenance procedures required to enable the Storm Water Facilities to perform their designed functions (the "Long-Term Storm Water Management Plan"), is attached hereto as Exhibit "B". This plan is incorporated herein by this reference and may be amended from time to time by the City to comply with City's storm water management plan, MS4 UPDES permit, and other federal, state, and local requirements; and

G. As a condition of Development Plan acceptance, Owner is required to enter into this Agreement establishing a means of operating and documenting the execution of the Long-Term Storm Water Management Plan within the Property.

AGREEMENT

NOW, THEREFORE, in consideration of the benefits received, and to be received by the Owner, its successors, and assigns, as a result of the City's acceptance of the Long-Term Storm Water Management Plan the parties agree as follows:

1. Construction of Storm Water Facilities. The Owner shall, at its sole cost and expense, construct the Storm Water Facilities in strict accordance with the Development Plan, specifications, and any amendments thereto which have been accepted by the City or its agent.

2. Maintenance of Storm Water Facilities. The Owner shall, at its sole cost and expense, operate and maintain the Storm Water Facilities for flow from the property, and natural flow passing through the property, in strict accordance with the Long-Term Storm Water Management Plan. Owner's maintenance obligations shall be limited to structures, systems, and appurtenances on Owner's land, and facilities into which storm water flows outside of the public right-of-way, including all system and appurtenances built to convey storm water, as well as all structures, improvements, and vegetation provided solely to control the quantity and quality of the storm water. Maintenance, for purposes of this Agreement, is defined as good working condition so that the Storm Water Facilities are performing their design functions and capacities. The Owner shall, at its sole cost and expense, perform all work necessary to keep the Storm Water Facilities in good working condition.

3. Annual Maintenance Report. The Owner shall, at its sole cost and expense, submit an Annual Maintenance Report and Certification to the City of the Storm Water Facilities pursuant to the inspection schedule(s) in the Long-Term Storm Water Management Plan. The purpose of the Annual Maintenance Report and Certification is to assure safe and proper functioning of the Storm Water Facilities. The annual inspection shall cover all aspects of the Storm Water Facilities, including, but not limited to: parking lots, structural improvements, berms, channels, outlet structures, pond areas, access roads, vegetation, landscaping, etc. Deficiencies shall be noted in the Annual Maintenance Report. The Report shall also contain a Certification as to whether adequate maintenance has been performed and whether the structural controls are operating as designed to protect water quality. The Annual Maintenance Report and Certification shall be due by June 30, of each year and shall be in a form provided by the City with visual documentation, an example of which is attached in Exhibit "C" of the Long-Term Storm Water Management Plan, and that may be modified from time to time to accommodate laws, rules, and regulatory changes.

4. Oversight Inspection Authority. The Owner hereby grants permission to the City, its authorized agents and employees, to enter upon the Property and to inspect the Storm Water Facilities upon reasonable notice of not less than three business days to the Owner. The purpose of the inspection shall be to determine and ensure that the Storm Water Facilities are adequately maintained, are continuing to perform in an adequate manner, and are in compliance with all

applicable laws, regulations, rules, and ordinances, as well as the Long-Term Storm Water Management Plan.

5. **Notice of Deficiencies.** If the City or its agent finds the Storm Water Facilities contain any defects or are not being maintained adequately, the City or its agent shall send the Owner written notice of the defects or deficiencies and provide the Owner with reasonable time to cure such defects or deficiencies, stated in the notice. Such notice shall be sent certified mail to the Owner's address set forth below.

6. **Owner to Make Repairs.** The Owner shall, at its sole cost and expense, make such repairs, changes or modifications to the Storm Water Facilities as may be determined as reasonably necessary by the City or its agent within the required cure period to ensure the Storm Water Facilities are adequately maintained and continue to operate as designed and accepted.

7. **Corrective Action.** In the event the Owner fails to adequately maintain the Storm Water Facilities in good working condition acceptable to the City agent, the City or its agent may proceed with any enforcement mechanism provided in Heber City Code. The City or its agent may also give written notice that the Storm Water Facilities will be disconnected from the City's municipal separate storm sewer system. Any damage resulting from the disconnected system will be the Owner's responsibility. It is expressly understood and agreed that neither the City nor its agent are under any obligation to maintain or repair the Storm Water Facilities, and in no event shall this Agreement be construed to impose any such obligation on the City or its agent. The actions described in this Section are in addition to and not in lieu of the legal remedies available to the City as provided by law for Owner's failure to remedy deficiencies or any other failure to perform under the terms and conditions of this Agreement.

8. **Reimbursement of Costs.** In the event the City or its agent, pursuant to this Agreement, incurs any costs, or expends any funds resulting from enforcement or cost for labor, use of equipment, supplies, materials, and the like related to storm drain disconnection from the City's municipal separate storm sewer system, the Owner shall reimburse the City or its agent upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the City or it agent. After said thirty (30) days, such amount shall be deemed delinquent and shall be subject to interest at the rate of ten percent (10%) per annum. Owner shall also be liable for any collection costs, including attorney's fees and court costs, incurred by the City or its agent in collection of delinquent payments. The Owner hereby authorizes the City or its agent to assess any of the above-described costs, if remained unpaid, by recording a lien against the Property.

9. **Successors and Assigns.** This Agreement shall be recorded in the office of the County Recorder and the covenants and agreements contained herein shall run with the land and whenever the Property shall be held, sold, conveyed or otherwise transferred, it shall be subject to the covenants, stipulations, agreements and provisions of this Agreement which shall apply to, bind and be obligatory upon the Owner hereto, its successors and assigns, and shall bind all present and subsequent owners of the Property described herein. If the property is sold, the parties may execute an assignment of this Agreement and release of the seller's liability upon the City's consent and agreement.

10. **Severability Clause.** The provisions of this Agreement shall be severable and if any phrase, clause, sentence, or provision is declared unconstitutional, or the applicability thereof to

the Owner, its successors and assigns, is held invalid, the remainder of this Agreement shall not be affected thereby.

11. Utah Law and Venue. This Agreement shall be interpreted under the laws of the State of Utah. Suits for any claims or for any breach or dispute arising out of this Agreement shall be maintained in the appropriate court of competent jurisdiction in Salt Lake County, Utah.

12. Indemnification. This Agreement imposes no liability of any kind whatsoever on the City or its agent. The Owner hereby agrees to indemnify and hold the City and its officers, employees, agents and representatives from and against all actions, claims, lawsuits, proceedings, liability, damages, losses, and expenses (including attorneys' fees and court costs) that result from the performance of this agreement, but only to the extent the same are caused by any negligent or wrongful act or omissions of the Owner, and the Owner's officers, employees, agents, and representatives.

13. Amendments. This Agreement shall not be modified except by written instrument executed by the City and the owner of the Property at the time of modification, and no modification shall be effective until recorded in the office of the County Recorder.

14. Subordination Requirement. If there is a lien, trust deed or other property interest Recorded against the Property, the trustee, lien holder, etc., shall be required to execute a subordination agreement or other acceptable recorded document agreeing to subordinate their interest to this Agreement.

15. Exhibits and Recitals. The recitals set forth above and all exhibits to this Agreement are incorporated herein to the same extent as if such items were set forth herein in their entirety within the body of this Agreement.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the parties have signed and subscribed their names hereon and have caused this Agreement to be duly executed as of the day and year first set forth above.

OWNER

By: _____
Name: _____
Its: _____

OWNER ACKNOWLEDGMENT

STATE OF UTAH)
:ss.
COUNTY OF WASATCH)

On the ____ day of _____ 2022, before me _____ , personally appeared Michael Bradshaw, who being by me duly sworn, did say that he is the President of _____, a Utah corporation, and is authorized to execute the foregoing in its behalf and that he executed it in such capacity.

_____
NOTARY SIGNATURE

HEBER CITY

By: _____
Russell Funk, City Engineer

CITY ACKNOWLEDGMENT

STATE OF UTAH)
:ss.
COUNTY OF WASATCH)

On the ____ day of _____ 2022, before me _____ , Russell Funk who being by me duly sworn, did say that he is the City Engineer of Heber City, a political subdivision of the State of Utah, and that said instrument was signed in behalf of the City by authority of its City Council and said City Engineer acknowledged to me that the City executed the same.

_____
NOTARY SIGNATURE

EXHIBIT A
(Legal Descriptions)

Parcel ID# ??-??-???-???, LOT ... also described as:

BEGINNING...

AND

Parcel ID# ??-??-???-???, LOT ... also described as:

BEGINNING...

EXHIBIT B
(Long-Term Storm Water Management Plan)
(Separate Attachment)

EXHIBIT B

Long-Term Storm Water Management Plan

for

(Development Name)
Heber City, Utah

PURPOSE AND RESPONSIBILITY

As required by the Clean Water Act and resultant local regulations, including Heber City Storm water Management Program, those who develop land are required to build and maintain systems to minimize litter and contaminants in storm water runoff that pollute waters of the State.

This Long-Term Storm Water Management Plan (LTSWMP) describes the systems, operations and the minimum standard operating procedures (SOPs) necessary to manage pollutants originating from or generated on this property. Any activities or site operations at this property that contaminate water entering the City's storm water system or natural drainages are prohibited unless SOPs are written and accepted by the City to manage those activities or operations and amended into this LTSWMP.

The LTSWMP is aimed at protecting water quality and minimizing pollutants that could be generated by this property.

CONTENTS

SECTION 1: SITE DESCRIPTION, USE AND IMPACT

SECTION 2: TRAINING

SECTION 3: RECORDKEEPING

SECTION 4 APPENDICES

SECTION 1: SITE DESCRIPTION, USE AND IMPACT

The purpose of site infrastructure within the project is to control and contain pollutants which, if improperly managed, could adversely impact the environment. This LTSWMP includes standard operating procedures (SOP)s that are intended to direct maintenance operations and responsibly manage the grounds and infrastructure to ensure the chances of adverse impacts are minimized.

Parking, Sidewalk and Flatwork

Runoff from private roadways is the responsibility of the development. The development is also responsible for runoff from any private impervious areas or parking within the project. The various subdivisions within the project are made up of a variety of multi-family and single family lots ranging from approximately ?,000 square feet to ??,000 square feet. Each private lot has a concrete driveway. Any sediment, debris, fluids, or other waste left or that collect on these areas will be carried by runoff to the storm drain inlets. This waste material will settle in the storm drain system increasing maintenance cost and any material dissolving in the runoff will pass through the system. Maintenance involves regular sweeping, but it can also involve pavement washing to remove stains, slick spots, and oil/chemical spills when necessary. The Sweeping and the Pavement Washing SOPs are used to manage the pollutants associated with pavements.

Landscaping

This property's landscape operations can result in grass clippings, sticks, branches, dirt, mulch, fertilizers, pesticides, and other pollutants to fall or be left on paved areas. This waste material will settle in the storm drain system, increasing maintenance costs, and contributing to the solid and dissolved runoff waste that can pass through storm drain system and impact water quality. Primary pollutants of concern in the Heber area are nitrates and organic material, so it is vital that paved areas with direct connection to the City storm drain systems remain clean of landscape debris. The Landscape Maintenance SOP is written to control and manage this potential pollution source.

Storm Drain System

Storm water inlets are located within the curb and gutter of private roads and parking areas. These inlets direct all runoff from the development (developed flow) into privately maintained ponds and infrastructure. In cases where developed flow from these areas is mixed with developed flow from public roads and retained in ponds on private property, the ponds and infrastructure will be privately maintained. Maintenance will include cleaning, repair, and replacement of the facilities.

Storm water in natural drainages passing through the property (undeveloped flow) will be kept separate from storm water generated by the development. Where the natural undeveloped storm water flow is retained in ponds at roads or other crossings on private property, these ponds and infrastructure will be privately maintained. Maintenance will include cleaning, repair, and replacement of the faculties.

In cases where developed storm water flow is retained and subsequently discharged into City infrastructure downstream, the development is responsible for the quantity and quality of the storm water prior to entering the City's system.

Waste Management

Trash receptacles with lids are intended to prevent exposure to precipitation which minimizes liquids that can leak onto pavements and into the storm drain system. They also minimize the amount of light weight trash that is exposed to wind and scattered along the ground. Good waste management systems, if managed improperly, can end up as the source of the very pollution that they were intended to control. The Waste Management SOP is written to control and manage waste.

Snow and Ice Removal Management

Salt is a necessary material for ensuring safe parking and pedestrian walkways. However, snow removal operations, if improperly managed, will have an adverse impact on vegetation and local water resources.

SECTION 2: TRAINING

The purpose of training is to ensure that all homeowners and maintenance contractors know and understand the SOPs that are specifically written to manage and maintain the property. Maintenance contractors must follow good practices and meet the minimum standards described in the LTSWMP SOPs. A file of all training records in Appendix C will be maintained for review.

SECTION 3: RECORDKEEPING

Maintain records of operation and maintenance activities in accordance with SOPs. Mail a copy of the record to Heber City annually by June 30th of each year.

SECTION 4: APPENDICES

Appendix A- Infrastructure Locations, Site Drawings, and Details

Appendix B- SOPs

Appendix C- Recordkeeping Documents

APPENDIX A – INFRASTRUCTURE LOCATIONS, SITE DRAWINGS, AND DETAILS

(INSERT PROJECT SPECIFIC DOCUMENTS HERE)

APPENDIX B – SOPs

Pavement Maintenance Operations

General:

These SOPs are not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in these SOPs.

1. **Purpose and Selection:**
   a) Reduce storm water pollution by sweeping and removing pollutants that will be carried to City storm water systems during storm water runoff or by non-storm water runoff.
   b) The sweeper is intended for removing material that collects on pavements by use and the natural degradation of pavements, i.e., material that collect, drop from vehicles and the natural erosion and breaking up of pavements.

2. **Regular Procedure:**
   a) Remain aware of debris and sweep minor debris is needed by hand.
   b) Generally sweeping machinery should be used during autumn when leaf fall is heavy and early spring after winter thaw. Sometimes sweeping machinery will be necessary when accumulations are spread over a large area of the pavement.
   c) Manage outside activities that leave waste or drain pollutants to pavements. This involves outside functions including but not limited to: Yard sales, yard storage, fund raisers, etc. Do not allow car wash fund raiser or other activities that allow detergents or other pollutants to be wash into storm drain systems.

3. **Disposal Procedure:**
   a) Service contractors to dispose at licensed facilities.
   b) Dispose of hand collected materials in dumpsters.

4. **Training:**
   a) Annually and at hiring.

Landscape Maintenance Operations

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

Rule: Prevent any solids, liquids, or light weight material from being carried away from the construction or maintenance envelop by wind or water.

5. Application:

a) This SOP should provide sufficient direction for many of the general landscaping operations, e.g., fertilizer and pesticide applications, mowing, weeding, tree trimming, digging, sprinkler repairs, varying landscape cover management, etc.

6. Maintenance Procedure:

a) Grooming
- Lawn Mowing - Immediately following operation, sweep or blow clippings onto vegetated ground.
- Fertilizer Operation - Prevent overspray. Sweep or blow fertilizer onto vegetated ground immediately following operation.
- Pesticide Operation - Prevent overspray, use spot treatment, sweep, or blow dry pesticide onto vegetated ground immediately following operation.

b) Remove or contain all erodible or loose material prior forecast wind and precipitation events before any non-storm water will pass through and over the project site and at end of work period. Light weight debris and landscape materials require immediately attention when wind expected.

c) Landscape project materials and waste can usually be contained or controlled by operational best management practices.
- Operational; including but not limited to:
  - Strategic staging of materials eliminating exposure, such as not staging on pavement
  - Avoiding multiple day staging of landscaping backfill and spoil on pavements
  - Haul off spoil as generated or daily
  - Scheduling work when weather forecast are clear.

d) Cleanup:
- Use dry cleanup methods, e.g., square nose shovel and broom. It is usually sufficient when no more material can be swept onto square nosed shovel.
- Power blowing tools

7. **Waste Disposal:**
   a) Dispose of waste according to General Waste Management SOP, unless superseded by specific SOPs for the operation.

8. **Equipment:**
   a) Tools sufficient for proper containment of pollutants and cleanup.
   b) Push broom and square blade shovel should be a minimum.

9. **Training:**
   a) Annually and at hiring
   b) Landscape Service Contractors must have equal or better SOPs.

Waste Management Operations

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

1. **Application:**
   a) This SOP is for all Staff, intended for the proper disposal of common everyday waste.

2. **Waste Collection Devices (Exposed units):**
   a) The site contains the following types of waste management containers.
      - Receptacles with lids

3. **Waste Disposal Restrictions for all waste Scheduled for the Landfill:**
   a) Generally, most waste generated at this property, and waste from spill and clean up operations can be disposed in dumpsters under the conditions listed in this SOP. Unless other disposal requirements are specifically identified by the product SDS or otherwise specified in other SOPs.
   b) Know the facility disposal requirements and restrictions. It should not be assumed that all waste disposed in collection devices will be disposed of at the landfill.
   c) Review landfill regulations for additional restrictions and understand what waste is prohibited. Ensure the SDS and Landfill regulations are not contradictory. Generally, the waste prohibited by the landfill is:
      - Liquid:
        - paint
        - pesticides/fertilizers
        - oil (all types)
        - antifreeze
        - batteries
        - liquid chemicals
        - etc.

        (Generally, *all the above hazardous waste when involved in minor spill cleanup operations can be disposed in covered dumpsters and our waste bays, if the liquid is contained in absorbent material, e.g. sand, dirt, loose absorbent, pads, booms etc., and transformed or dried such that it will not drip. This is not intended for wholesale disposal of out dated or spent liquid hazardous waste. When disposal of outdated or spent liquid is*

needed or for questions of how to dispose of other waste, contact the Health Department for instructions and locations.

4. **Waste Disposal Required for Landfill or Other:**
   a) Generally, for waste not accepted by the landfill.
   b) Follow SDS for disposal requirements. Review landfill regulations for additional restrictions and understand what waste is prohibited. Ensure the SDS and Landfill regulations are not contradictory
   General rules are:
      - Get approval prior to delivery.
      - Transport waste in secure leak proof containers that are clearly labeled.
   c) Lookup and follow disposal procedures for disposal of waste at other EPA approved sites.

5. **General Staff Maintenance Practices:**
   a) Prevent dumpsters and receptacles from becoming a pollution source by:
      - Closing lids
      - Reposition tipped receptacles upright.
      - Report full or leaking and unsecured dumpsters and receptacles to the company provider or repair it in house. Determine source liquids and prevent it.
      - Report any eminent pollutant hazard related to dumpsters and receptacles to the owner.

6. **Training:**
   a) Annually and at hiring

Storm Drain Maintenance Operations

General:

These SOPs are not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in these SOPs.

1. **Procedure:**
   a) Inspect for need:
      - Schedule cleaning for boxes and pipe that contain 2" or more of sediment and debris.
      - Remove debris by vacuum operated machinery.
      - When accumulations are mostly floating debris this material can be removed with a net.
      - Inspect standing water for mosquito larvae and contact the mosquito abatement district when necessary.

2. **Disposal Procedure:**
   a) Dispose of waste collected by machinery at regulated facilities.
   b) Floating materials and floating absorbent materials may be disposed in dumpster when dried out. Dry dirt and slurry may also be disposed in the dumpster.
   c) Disposal of hazardous waste
      - Dispose of hazardous waste at regulated disposal facilities, see Waste Management and Spill Control SOP
   d) Disposal of waste collected from sanitary sewer device at regulated facilities.

3. **Training:**
   a) Annually and at hire

Pavement Washing Operations

General:

These SOPs are not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in these SOPs.

1. **Procedure:**
   a) Prevent waste fluids and any detergents if used from entering storm drain system. The following methods are acceptable for this operation.
      - Dam the inlet using a boom material that seals itself to the pavement and pick up the wastewater with shop-vacuum or absorbent materials.
      - Collect wastewater with shop-vacuum simultaneous with the washing operation.
      - Collect wastewater with vacuum truck or trailer simultaneous with the washing operation.
   b) This procedure must not used to clean the initial spills. First apply the Spill Containment and cleanup SOP.

2. **Disposal Procedure:**
   a) Small volumes can usually be drained to the local sanitary sewer. Contact the South Valley Sewer District.
   b) Large volumes must be disposed at regulated facilities.

3. **Pavement Cleaning Frequency:**
   a) There is no regular pavement washing regimen. Pavement washing is determined by conditions that warrant it, including but not limited to: prevention of slick or other hazardous conditions or restore acceptable appearance of pavements.

4. **Training:**
   a) Annually and at hiring

Snow and Ice Removal Management

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

1. **Application:**
   a) Parking and sidewalk winter management operations.

2. **De-Icing Procedure:**
   a) Do not store or allow salt or equivalent to be stored on outside paved surfaces.
   b) Minimize salt use by varying salt amounts relative to hazard potential.
   c) Sweep excessive piles left by the spreader.
   d) Watch forecast and adjust salt amounts when warm ups are expected the same day.

3. **Training:**
   a) Annually and at hiring.
   b) Require snow and ice service contractors to follow the stronger of this SOP or their company SOPs.

Spill Control

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

1. **Rational:**
   a) All properties are susceptible to spills whether it is a result of operations or by customers. Insufficient response, inadequate containment materials and improper spill cleanup methods will result in pollutants in our waterways. Once the pollutants reach our storm drain system, or even the detention pond, they are difficult and expensive to remove.

2. **Containment Procedure:**
   a) Priority is to dam and contain flowing spills.
   b) Use spill kits booms if available or use any material available; including but not limited to, nearby sand, dirt, landscaping materials, etc.
   c) Hazardous or unknown waste material spills
      - Critical Emergency constitutes large quantities of flowing uncontained liquid that will affect areas with people or reach storm drain systems. Generally burst or tipped tanks. Call Hazmat, DWQ, Health Department, and City.
      - Minor Emergency constitutes a spill that has reached a storm drain but is no longer flowing. Call Health Department, and City
      - Spills that are contained on the surface and do not meet the criteria for Critical and minor emergencies may be managed by the responsible implementation of this SOP.

3. **Cleanup Procedure:**
   a) NEVER WASH SPILLS TO THE STORM DRAIN SYSTEMS.
   b) Clean per SDS requirements but generally most spills can be cleaned up according to the following:
      - Absorb liquid spills with spill kit absorbent material, sand or dirt until liquid is sufficiently converted to solid material.
      - Remove immediately using dry cleanup methods, e.g. broom and shovel, or vacuum operations.
      - Cleanup with water and detergents may also be necessary depending on the spilled material. However, the waste from this operation must be vacuumed or effectively picked up by dry methods. See Pavement Washing SOP.
      - Repeat process when residue material remains.

4. **DISPOSAL:**
   a) Follow SDS requirements but usually most spills can be disposed per the following b. & c.
   b) Generally, most spills absorbed into solid forms can be disposed to the dumpster and receptacles. Follow Waste Management SOP.
   c) Generally, liquid waste from surface cleansing processes may be disposed to the sanitary sewer system after the following conditions have been met:
      - Dry cleanup methods have been used to remove the bulk of the spill and disposed per the Waste Management SOP.
      - The liquid waste amounts are small and diluted with water. This is intended for spill cleanup waste only and never for the disposal of unused or spent liquids.

5. **Documentation:**
   a) Document all spills on Appendix C forms.

6. **SDS sheets:**
   a) SDS Manual is filed in break room.

7. **Materials:**
   a) Generally, sand or dirt will work for most clean up operations and for containment. However, it is the responsibility of the owner to select the absorbent materials and cleanup methods that are required by the SDS Manuals for chemicals used by the company.

8. **Training:**
   a) Annually and at hiring.

APPENDIX C – PLAN RECORDKEEPING DOCUMENTS

PURPOSE AND RESPONSIBILITY

This Maintenance Report serves to assure management and maintenance of a private storm water system as required by the Clean Water Act and resultant local regulations.

These storm water facilities are designed to manage the collection and distribution/infiltration and the quality of runoff from storm events. Annual reporting with the associated inspection provides for an ongoing awareness of their effectiveness and the general condition of the facilities and their function.

Please respond to the function and condition of the site facilities for each of the following aspects or areas of concern as a measure of its success in meeting its designed pollution protection of storm water. Include visual / photo documentation were feasible.

1. Parking, Sidewalk, impervious Area
Sediment, leaves, debris, spilt fluids or other waste that collects on parking lots and sidewalks will be carried by runoff, increasing the pollution of downstream waters.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

2. Landscaping
Landscaping is often designed to capture and infiltrate storm water as a desired effect of storm water management. However, the fall of leaves along with landscape operations that produce grass clippings, sticks, dirt, mulch, fertilizers, pesticides and other pollutants that are collected in the storm water are a great impairment to that water. The primary pollutants of concern in the Heber Valley include decaying organic material and nitrates which rob water body of dissolved oxygen required to sustain fish life and impair downstream drinking water quality.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

3. Storm Water Conveyance and Storage
Storm drain inlet boxes, pipe, detention ponds, etc. generally have some storm water treatment or pollution prevention as part of their design. The capture of floating trash and also the settling of heavier sediment particles to cleanout points, are a couple of examples.

Specific Management/Maintenance activities (litter retrieval, vactoring, mosquito abatement, illicit discharge detection) to support this cleanup have been: _____
_____
_____
_____
_____
_____

4. Waste Management
Dumpsters and trash receptacles with lids are intended to prevent precipitation exposure minimizing the uptake of trash contaminants into the storm water. Lids will also prevent the lightweight trash migrating in the wind. Waste handling is necessary part of almost all sites and requires diligent attention to not become a source of storm water pollution.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

5. Construction, Mechanical/Utility Systems & Outside Equipment/Storage
Chemicals and oils are a pollution source that may be a part of mechanical and utility systems existing on site. There may also be the occasional construction or repair activity with associated equipment and materials on site which pose a pollution threat if not given proper storm water consideration.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

MAINTENANCE LOG

Date	Facility/Location, Maintenance Performed, Spill Event	Observation Notes, including but not limited to; Inspection results, Observations, System Performance (effectiveness / inefficiencies), Concerns, Necessary Changes, Etc. Include before / after photos where feasible.	Initials

ORDINANCE NO. 2022-23

AN ORDINANCE ADOPTING THE HEBER CITY STORM WATER DESIGN MANUAL *as an Amendment to the Heber City Standards Drawings and Specifications.*

BE IT ORDAINED by the City Council of Heber City, Utah, that the Heber City Storm Water Design Manual, attached as and depicted in Exhibit A, is adopted as an Amendment to the Heber City Standards Drawings and Specifications.

This Ordinance shall take effect immediately upon passage.

ADOPTED AND PASSED by the City Council of Heber City, Utah this _____ day of _____, 2022, by the following vote:

	AYE	NAY	OBSTAIN
Rachel Kahler	_____	_____	_____
Michael Johnston	_____	_____	_____
Ryan Stack	_____	_____	_____
Scott D. Phillips	_____	_____	_____
Yvonne Barney	_____	_____	_____

APPROVED:

_____
Mayor Heidi Franco

ATTEST:

_____ Date: _____
RECORDER

Exhibit A.

PowerPoint Presentation:

Heber City – Storm Water Design Manual

9/20/2022

Stakeholder Involvement

Concerned Private Property Owners, represented by:

represented by:

Storm Water Design Manual Presentation Overview

Submittals Requirements

Rainfall

Runoff

Conveyance

Storage

Water Quality

Low-Impact Development

Standard Methodologies

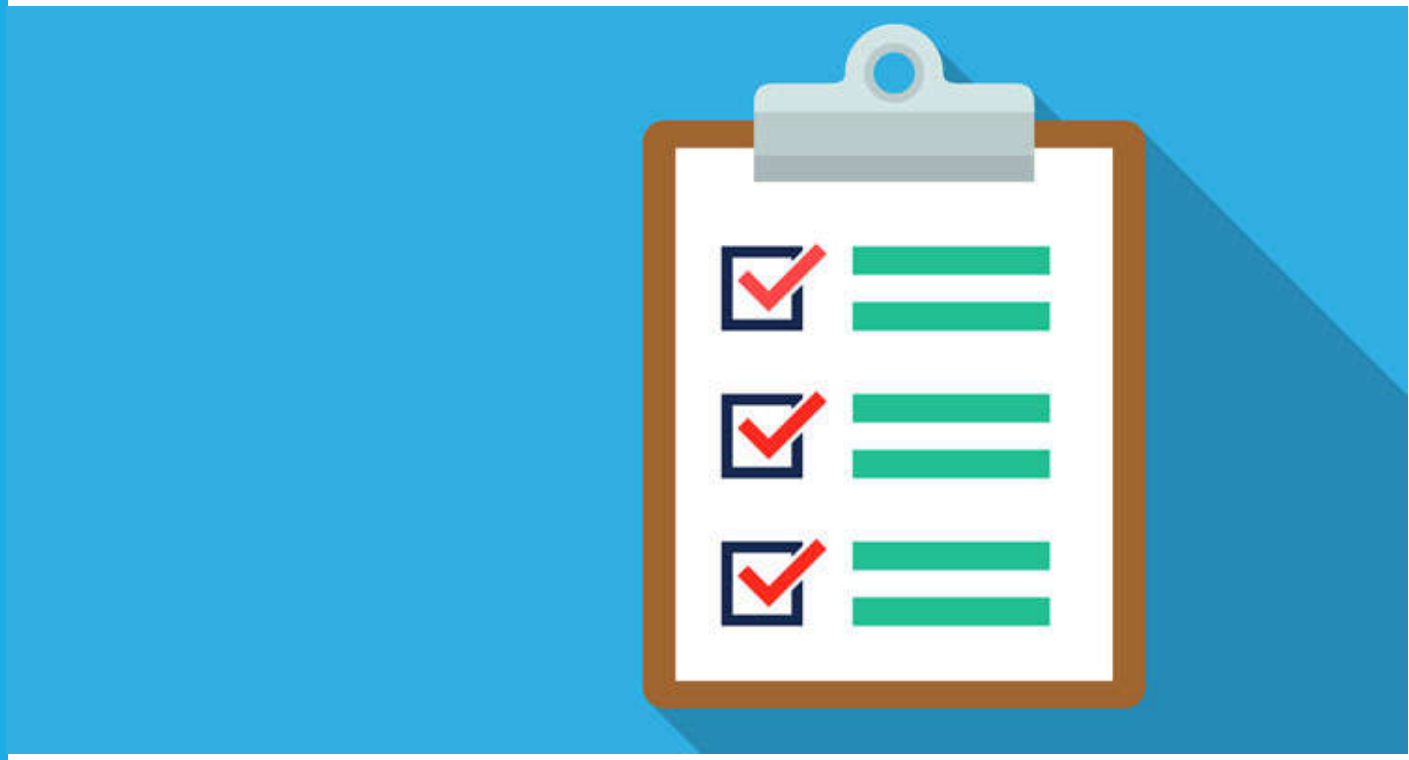
HEBER CITY
HEART OF THE WASATCH BACK

Submittal Requirements

Technical Reports

Engineering Calculations

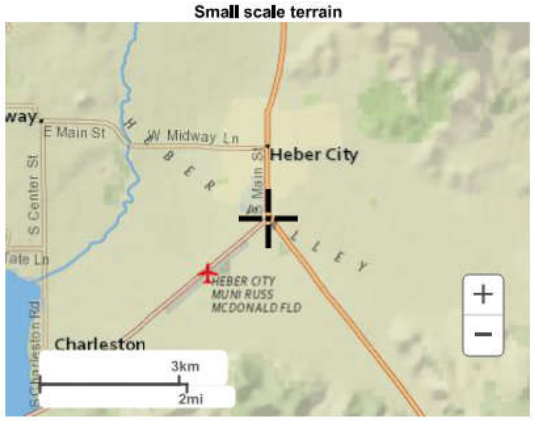
Engineering Drawings

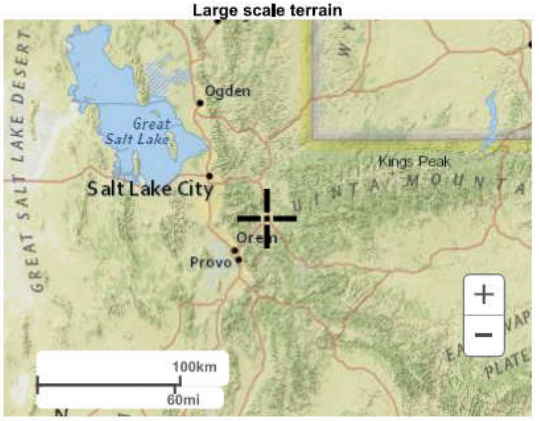


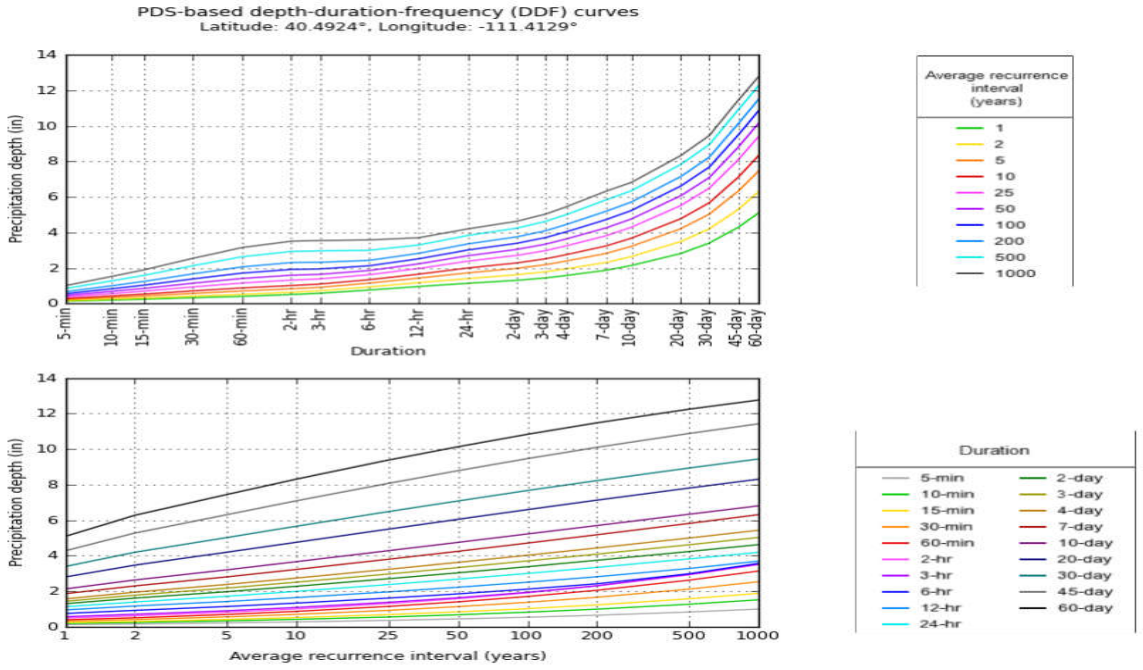
Rainfall

Volume of Rainfall for Return Periods

Temporal Distribution of Rainfall







NOAA Atlas 14, Volume 1, Version 5

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Runoff

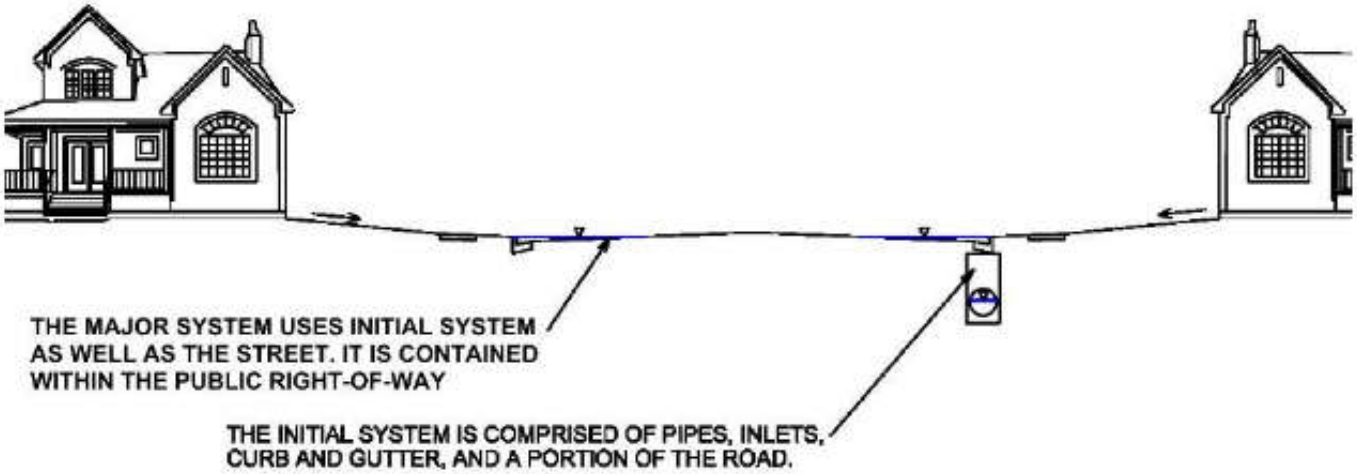
Volume and Flowrates of Runoff for Surface Types



Conveyance

Initial System for Nuisance Flows (piping)

Major System for Floodwaters (surface)



INITIAL AND MAJOR DRAINAGE SYSTEMS

Storage

Detention and Retention



Water Quality

Best Management Practices

Long-Term Storm Water Management Plan

Storm Water Management Agreement



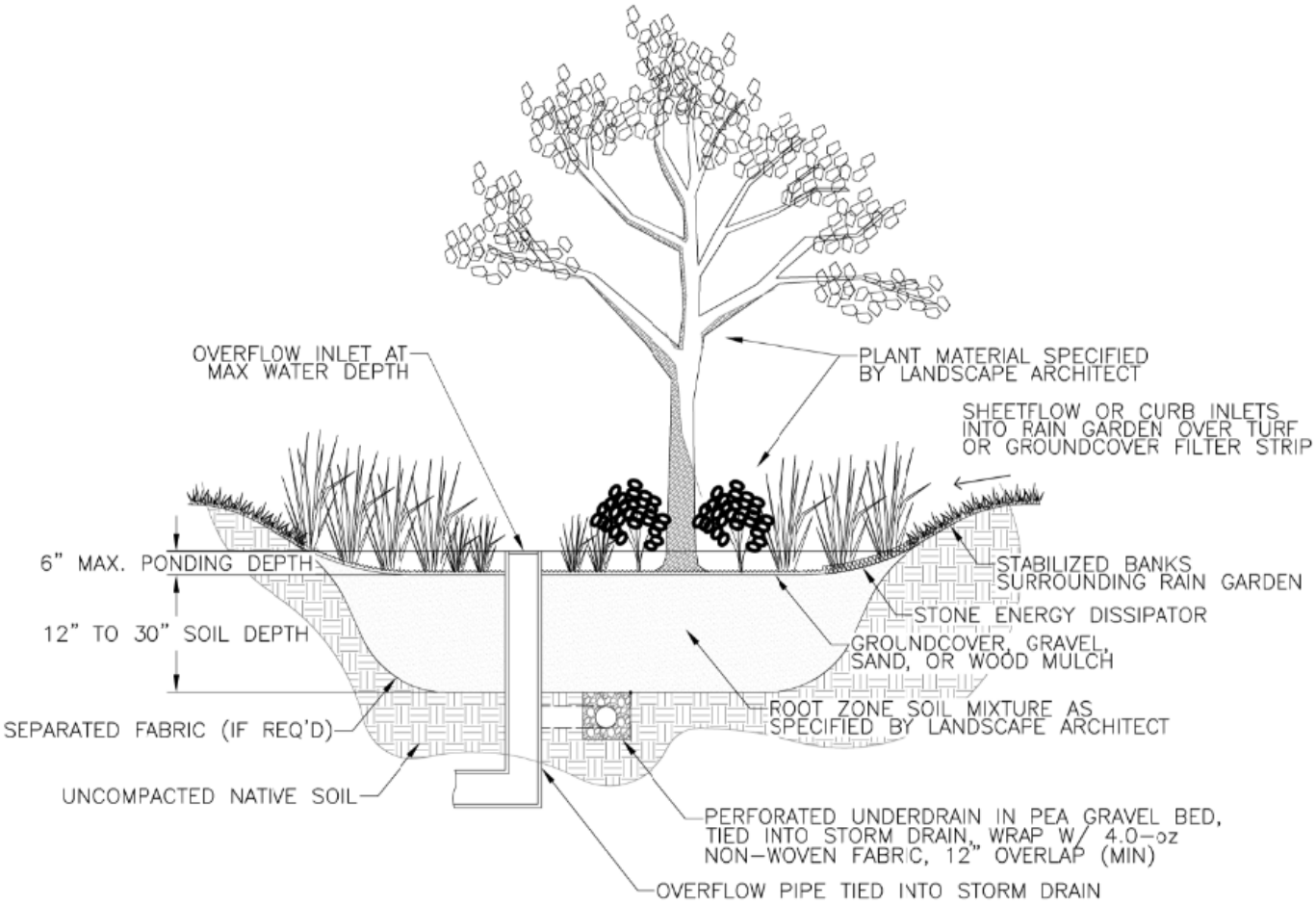
Storm Water Management Agreement

Runs with the Land



Low-Impact Development

An approach to land development, or redevelopment, that works with nature to more closely mimic pre-development hydrologic functions.



Standard Methodologies

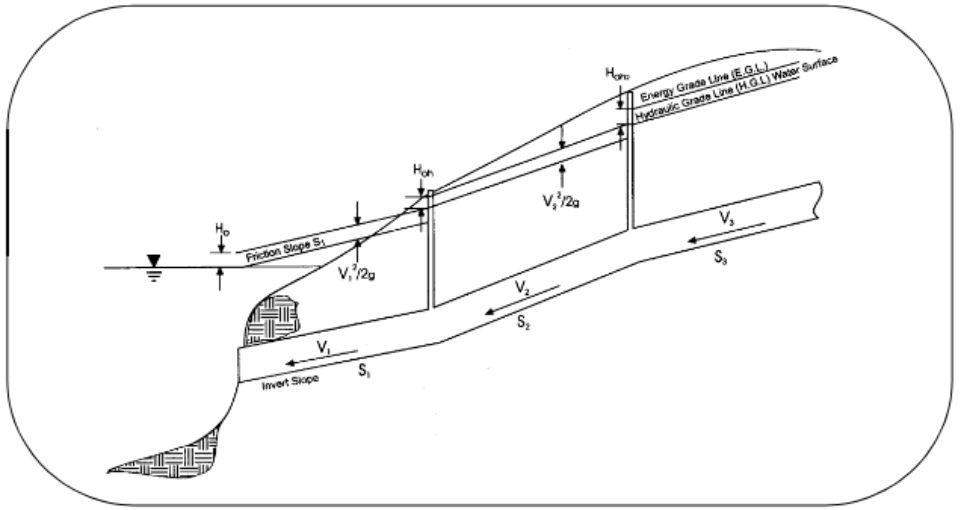
Publication No. FHWA-NHI-01-021
August 2001

U.S. Department
of Transportation

Federal Highway Administration

Hydraulic Engineering Circular No. 22, Second Edition

URBAN DRAINAGE DESIGN MANUAL



Questions or Comments?



TAB 5

City Council Staff Report

MEETING DATE: September 20, 2022
SUBJECT: 2022 North Village Streets and Storm Water Master Plan
RESPONSIBLE: Russell Funk, City Engineer
DEPARTMENT: Engineering
FILE NO: 20018
STRATEGIC RELEVANCE:
- Principles: Necessary Administrative Action
-Goals: 2) Infrastructure Sustainability

SUMMARY

The purpose of this item is to present the proposed North Village Streets and Storm Water Master Plans and Impact Fee Facility Plans, receive input from the City Council, and seek for Council approval by Ordinance.

RECOMMENDATION

1. Approval of Ordinance 2022-24 adopting the North Village Streets and Storm Water Master Plans and Impact Fee Facility Plans as an Amendment to the Heber City Capital Facilities Plan and General Plan.

BACKGROUND

Heber City staff and our consultants have been working to develop this plan for over 2 years. During this time we have met with numerous stakeholders and incorporated much of their input into the proposed plans.

The intent of the plan is to guide development in the North Village area to ensure that the streets and storm water infrastructure planned and built will meet the overall needs of all development planned for the area.

DISCUSSION

The proposed North Village Streets and Storm Water Master Plans and Impact Fee Facility Plan is attached to this Staff Report.

The major components of the report include:

- Population and Growth Projections
- Street System Master Plan including:
    - Details of the Analysis & Modeling Performed
    - A Summary and Exhibits Outlining the Proposed System Improvements
    - Cost Estimates for the Proposed System Improvements
- Storm Water System Master Plan including:
    - Major Concepts
        - Separating Developed and Natural Runoff
        - Runoff from Developed areas will be Treated and Retained on-site
        - Large Upstream Retention/Debris Basins for Natural Runoff

        - Detention & Infiltration Basins along Historic Channels for Natural Runoff
        - Restore/Replace Historic Drainage Channels Below the Irrigation Canals.
        - Bypassing of the Irrigation Canals for Natural Runoff
        - Recommended Buffer Zones along Major Natural Drainage Channels
    - Details of the Modeling & Analysis Performed
    - A Summary and Exhibits Outlining the Proposed System Improvements
    - Design Information for System Improvements
    - Cost Estimates for the Proposed System Improvements

FISCAL IMPACT
None

CONCLUSION
N/A

ALTERNATIVES
None

POTENTIAL MOTIONS

Staff Recommended Option - Approval
"I move to Approve Ordinance 2022-24 adopting the North Village Streets and Storm Water Master Plans and Impact Fee Facility Plans as presented."

Or

"I move to Approve Ordinance 2022-24 adopting the North Village Streets and Storm Water Master Plans and Impact Fee Facility Plans with conditions listed as follows: …"

Alternative 1 - CONTINUANCE
"I move to Continue this item to ___Date___ , with direction to Staff on information and/or changes needed to render a decision, as follows: …"

Alternative 2 - DENIAL
"I move to Deny this item with the findings described as follows: …"

ACCOUNTABILITY

Department: Engineering
Staff Member: Russell Funk, City Engineer

EXHIBITS / ATTACHMENTS

Proposed North Village Streets and Storm Water Master Plans and Impact Fee Facility Plan Ordinance 2022-24

IMPACT FEE FACILITIES PLAN
FOR
STREET SYSTEM AND STORM WATER

NORTH VILLAGE MASTER PLAN 2022 TO 2042

HEBER CITY

HEART OF THE WASATCH BACK

September 15, 2022

Prepared by
Heber City & Horrocks

North Village Master - Plan Table of Contents

Chapter 1 - Executive Summary 1-1

Chapter 2 - Impact Fee Facility Plan Summary 2-1

Chapter 3 - Projected Population Growth 3-1

Chapter 4 - North Village Street System Master Plan 4-1

Chapter 5 - North Village Storm Water Master Plan 5-1

Appendix 1 ..... North Village Zone Areas

Appendix 2 ..... MAG and U.S. Census Bureau Population Data

Appendix 3 ..... North Village Study Area and NVOZ Densities

Appendix 4 ..... Vistro Traffic Volumes

Appendix 5 ..... ITE Trip Generation

Appendix 6 ..... Street System Cost Summary

Appendix 7 ..... Storm Water Design Water Manual

- **Appendix A ..... Cross Drainage Flow Rates Summary Map**
- **Appendix B ..... IDF Data**
- **Appendix C ..... CN List**
- **Appendix D ..... Infiltration & Groundwater Maps**
- **Appendix E ..... 80th Percentile**
- **Appendix F ..... LID Details**
- **Appendix G ..... TR-55 Worksheets**
- **Appendix H ..... Source Protection Maps**
- **Appendix I ..... FAA Spreadsheets**
- **Appendix J ..... Storm Water Maintenance Agreement and Management Plan**

Appendix 8 ..... Cross Drainage Flow Rates Summary Map

Appendix 9 ..... North Village Percolation Testing Summary

Appendix 10 ..... North Village Drainage Area

Appendix 11 ..... Storm Water Facility Cost Summary

Chapter 1

Executive Summary

1.1 Document Purpose and Organization

Heber City is responsible for providing public services to customers within a current area of approximately 5,617 acres in Wasatch County, that does not include North Village and Jordanelle area. The current municipal boundary of Heber City is approximately 13,905 acres, including North Village and the Jordanelle Property area. If all of the North Village area annexes to Heber City the total area of Heber City will be approximately 14,640 acres.

The public services provided by Heber City in North Village and Jordanelle Property areas will be limited to Storm Water and Streets. The Master Plan study area of North Village south of SR 32 and east of US 40 is approximately 1,167 acres. The North Village area including the areas north of SR 32 and east of US 40 is 1,692 acres. The total study area is approximately 3,080 acres including the contributing drainage basins east of North Village. See Appendix 1 for the North Village Zone areas on how this information was obtained.

This document is a compilation of the master plan for North Village area, including the Storm Water and Streets Facilities Plan, and Impact Fee Facilities Plan, hereafter collectively called the "Master Plan". This Master Plan document combines these elements into one comprehensive study. The impact fee analysis for North Village will be prepared in a separate study.

The annexation of North Village into Heber City has created the need to prepare this Master Plan. The City adopted the North Village Overlay Zone NVOZ into their Municipal Code in March 2021 to help facilitate and direct the development in North Village. The NVOZ document includes a General Master Plan Zoning Map, which was also utilized to prepare this Master Plan.

North Village currently has very little public infrastructure and is currently ~95% open land. To adequately service the projected growth and development in North Village, new public facilities for North Village are needed. The new streets and storm drainage systems were planned for and are reported in this document and are the capital improvements necessary to allow for this growth in order to meet the demands of the projected development in North Village through the year 2042, while maintaining the current City Level of Service (LOS) for those facilities. This document also provides associated improvement costs for the capital improvements.

Service Area

This Master Plan was prepared for North Village area south of SR 32. Most of the area has not yet annexed into Heber City, but remains in Wasatch County unincorporated, although most of the area is anticipated to eventually annex into the City. This Master Plan should not only apply

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to areas of North Village that are annexed into Heber City but also the areas that remain in Wasatch County. It is recommended that Heber City coordinate with Wasatch County to pursue a Memorandum of Understanding regarding enforcement of the requirements of this Master Plan regardless of whether properties in the North Village area annex into Heber City or develop in Wasatch County.

Organization of the Master Plan Document

The first three chapters of this document outline the purpose of this Master Plan, provide a basis for the impact fee facilities plan, and anticipated population growth for Heber City and North Village. These chapters yield the general foundation for this report which is necessary to analyze each facility through a 20-year planning period.

North Village streets and storm drain systems were analyzed through a 20-year planning period. Chapters 4 and 5 document the findings of the analysis for each facility, respectively. A separate appendix contains the additional data and material supporting this document.

1.2 Summary of Capital Improvement Costs

Recommended capital improvements were analyzed and are provided in their respective chapters. These improvements are necessary to maintain the current Level of Service (LOS) in North Village during future growth and development. The capital improvements recommended in this study are not used to improve LOS to Heber City residents or North Village with respect to streets or storm water. Any projects which may improve existing LOS would be paid for by operating funds.

Estimated costs of the recommended improvements are summarized in Table 1-1 by facility type. The improvement costs are in 2022 dollars and are the costs for all public facilities during the 20-year planning period. Contingencies, engineering, legal and administrative fees are also included. It is anticipated that these improvements be funded through Impact Fees or Public Improvement Districts. Developer contributions, City operating funds, and other funds such as grants or other public entity funds are other potential sources.

Table 1-1 Estimated Cost of Recommended Improvements

Facility	Estimated Cost of Recommended Improvements (2022 dollars)
Streets	$70,237,963
Storm Drain	$22,234,086
TOTAL	**$92,472,049**

All public facilities projected through the 20-year planning period were determined based on the need created by both future residential and non-residential growth. The cost of each facility was determined from sound estimating procedures using historic construction cost records for each particular facility, current land acquisition costs, typical engineering costs, and normal

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construction contingencies. Each individual project was analyzed to determine if the costs should be funded by impact fees and then the total costs were summarized. These cost distributions and totals can be found in each chapter in the estimated improvement cost section. Since Heber City has just recently annexed North Village, and the majority of the area is open land, there are no known facilities with excess capacity, therefore any costs for any excess capacity in existing facilities have not been included in the cost totals of this study.

Utility and Impact Fees

Utility fees were not analyzed in this study. It is recommended that the existing storm drain utility fee in Heber City also apply to residents in North Village.

The impact fee analysis will be completed with a separate study.

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Chapter 2

Impact Fee Facility Plan Summary

2.1 Information for Future Fee Analysis

This Master Plan report does not expressly include the impact fee analysis. The impact fee analysis will be completed in a separate report. However, it is anticipated that the information presented in this document, including the impact fee facilities plan, will be used to help prepare the impact fee analysis. In preparation for the impact fee analysis, this report includes information to help facilitate the impact fee analysis that will be a companion document to this Master Plan.

An impact fee is a one-time charge with the purpose of raising revenue for new or expanded public facilities necessitated by development. Impact fees are imposed as a condition of receiving development approval. Under the Impact Fee Act, such facilities must have a useful life of ten years or more. They must also be owned or operated by or on behalf of a local government, special service district, or qualifying private entity. An impact fee, is expressly distinguished from a tax, a special assessment under the special improvement or special district acts, a building permit fee, a hook-up fee, a fee for project improvements, or other reasonable permit or application fees, such as conditional use or subdivision application fees (The Utah Land Use Institute, April 2014, *Utah Impact Fee Handbook and Checklists*).

Impact fees cannot be used to correct existing public facility deficiencies or for routine maintenance activities. The premise behind impact fees is based on the critical assumption that if no development were allowed, the existing facilities would adequately serve the existing level of development within the City. Therefore, the recommended streets and storm drain improvements, outlined in chapters 4 and 5, represent improvements needed to accommodate new growth and to maintain the existing Level of Service (LOS) for these facilities within the North Village.

2.2 Proportionate Share

Impact fees are a form of development exaction. An exaction is generally a fee, in-kind requirement, or dedication of land imposed on development to offset the burdens created by that development on municipal services. Exactions provide only a secondary benefit to existing residents. Much has been written about U.S. Supreme Court decisions, such as Dolan v. Tigard (1994) 114 S.ct.2309, and Utah Supreme Court decisions, such as B.A.M Development v. Salt Lake County, 2008 UT 74, 196 P.3d 601 (Utah 2008) and how they mandate the balancing of burdens created by and imposed upon development. The impact fee seeks to do this. (The Utah Land Use Institute, 2014, *Utah Impact Fee Handbook and Checklists*).

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Impact fees should be proportionate and relate to the capital facility service demands of development. The Impact Fees Act includes seven evaluation factors set forth by the Utah Supreme Court decision known as Banberry Development Corp. vs. South Jordan City. These seven factors should be incorporated into the impact fee analysis.

2.3 Future Impact Fee Facilities and Utility Fee

Street System

See Chapter 4 for the Street System Master Plan. Figure 1 in Chapter 4 shows the Street System Plan for North Village and the Impact Fee Facilities recommended for North Village. Future streets are those that should be constructed to meet the needs of the projected ultimate population and future traffic growth. New future streets will generally be constructed by developers, and existing streets that need to be improved will be constructed by a combination of Heber City, UDOT, developers and other potential stakeholders.

Storm Water

See Chapter 5 for the Storm Water Master Plan. Required Impact Fee Facilities for storm water control are solely for undeveloped flow and will all be within or near existing natural drainage channels. All developments within North Village are required to retain storm water on site and follow the guidelines presented the Heber City Storm Water Design Manual. Storm Water Impact Fee Facilities include the following:

- Debris/retention basins upstream of developments
- Culverts under both the Timpanogos and Wasatch irrigation canals at each of the seven existing natural drainage channels
- Intermediate retention and infiltration areas within the natural drainage channels to maintain current infiltration of stormwater runoff
- A final retention basin at the bottom of the drainage on the east side of US 40 to capture any remaining storm water runoff that has not been infiltrated upstream

Utility Fees

Utility fees are monthly fees Heber City uses to generate sufficient revenue to fund respective operating expenses for various facilities. Operating expenses include the monies used for personnel and contractual services, materials, supplies, depreciation, maintenance, and other miscellaneous expenses, and the existing population should fund operating expenses. The scope of this study does not include the review, analysis, or revisions to existing utility fees. All other City fees such as taxes, hookup fees, or other fees are also not covered in this study. New users in North Village will be subject to the existing Heber City storm drain utility fee. See Chapter 5 for more detailed information on this fee.

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Chapter 3

Projected Population Growth

3.1 Introduction

A pleasant living environment and a high growth rate along the Wasatch Front have caused Heber City to experience a large increase in population over the past recent years. It is anticipated that the growth will be concentrated in North Village area. To continue providing adequate service to Heber City, and to maintain the current level of service to the residents of Heber City, the City's facilities must be analyzed and improved to keep up with the demands of this growth. This study looks at the transportation and storm water needs of North Village.

The projected conditions relating to North Village facility needs are based upon a number of assumptions such as present growth rates, economic stimuli, environmental and recreational development, but are largely based on the development currently in the planning phase for this area. However, as these factors change, the projected conditions made in this Master Plan Study will also change. To help minimize the effect of changing conditions, the recommendations made in this Master Plan study will be based upon the projected population within the planning period.

3.2 Methodology for Determining Projected Population

The method for projecting population through the year 2042 for Heber City is based on 2020 U.S. Census Estimates and the projected Heber City growth rate, as determined by the Governor's Office of Planning and Budgeting and Mountainland Association of Governments (MAG). MAG has stated that the population and growth rates listed for Heber City include the entire North Village area south of SR 32. Although the growth rate shown in this study for all of Heber City, which includes the North Village, is based on MAG's future population projections for Heber City, the population growth rates used for North Village are proportionally higher because it was assumed approximately half of the total population growth in Heber City will be in the North Village area. The population projection to year 2042 was also compared to the projected ultimate population for North Village which is based on the current population plus generated population from projected future land development within the North Village area and known annexations. The North Village Overlay Zone (NVOZ) Land Use Map and the development summary from Heber City Planning Department were the basis for this information.

The 2042 projected population based on MAG's growth rate is currently less than half the projected North Village ultimate population based on land use and recent planned development. MAG is currently in the process of updating the population growth projections for Heber City

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and North Village due to the large amount of development already planned for North Village to ensure the growth rates for all of Heber City are accurate. Heber City needs to coordinate with MAG to update the growth rates while considering all the developers that are planning to annex and develop in North Village, and which will likely increase once this Master Plan is adopted. The population projections for North Village in this study need to reflect any updates in MAG's projections and recommendations from Heber City staff and Council in the upcoming months.

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3.3 Results of Calculation

Figure 3-1 shows graphically the population projection for North Village to year 2042. This method assumes an average growth rate of 8.0 % per year to 2042. The 2022 population was estimated by taking the number of apartments and single-family dwellings in North Village (south of SR 32) and multiplying it by the average estimated number of people per household (3.37) in 2020. This number was then compared to the difference between the U.S. Census Bureau and MAG's population data for Heber City. U.S. Census Bureau's 2020 population for Heber City is 16,856 and does not appear to include the people in the North Village. Whereas MAG's 2020 population for Heber City is 18,250 and does include people in the North Village, south of SR 32, according to MAG. This is a difference of 1,394 people. There has been little growth in this part of North Village since 2020, therefore, 1,394 people was used as the 2022 population for North Village south of SR 32. The effect of homes in North Village that may not be occupied by Heber City residents (e.g. second-homes) has not been considered in this study. See Appendix 2 for population data from MAG and the U.S. Census Bureau.

Figure 3-1

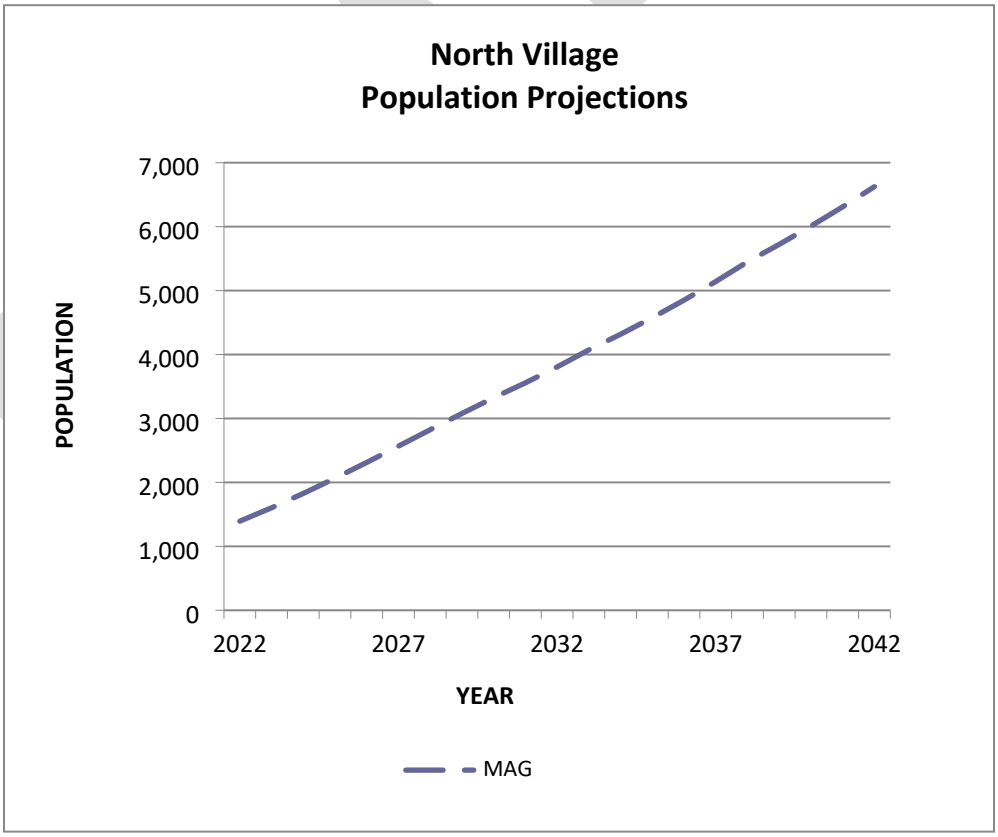


Table 3-1 lists the population growth rates projected through the year 2042. If the population increases faster than projected, the potential revenue generated will need to be monitored to ensure funds are spent within the time prescribed by law. If the population increases slower than projected, the revenue generated may be insufficient and financing alternatives may need to be considered to complete projects. It is recommended that the Master Plan be updated periodically to minimize these types of revenue changes.

Table 3-1 Heber City and North Village Population Projections

	HEBER CITY TOTAL (from MAG)				NORTH VILLAGE EST				HEBER CITY w/o NV			GROWTH RATES
YEAR	%CHG	HC POP	CHG POP		% OF HCT	% CHG	NV POP	CHG	POP TOTAL	CHG		
2020		18,250			7.64%	0.00%	1,394		16,856	0		MAG Avg Chg/Yr (2021-2030)
2021	2.56%	18,717	467		7.45%	0.00%	1,394	0	17,323	467		2.56%
2022	2.56%	19,196	479	946	7.26%	0.00%	1,394	0	17,802	479	946	
2023	2.56%	19,688	491		8.14%	15.00%	1,603	209	18,085	282		MAG Avg Chg/Yr (2031-2040)
2024	2.56%	20,192	504		9.05%	14.00%	1,828	224	18,364	280		1.95%
2025	2.56%	20,709	517	1,021	9.97%	13.00%	2,065	238	18,644	279	559	
2026	2.56%	21,239	530		10.89%	12.00%	2,313	248	18,926	282		MAG Avg Chg/Yr (2041-2045)
2027	2.56%	21,783	544		11.79%	11.00%	2,567	254	19,215	289		1.95%
2028	2.56%	22,340	558		12.64%	10.00%	2,824	257	19,516	301		
2029	2.56%	22,912	572		13.44%	9.00%	3,078	254	19,834	318		WC UI Ave Chg/Yr (2021-2030)
2030	2.56%	23,499	587	2,260	14.15%	8.00%	3,325	246	20,174	340	1,248	3.90%
2031	1.95%	23,957	458		14.85%	7.00%	3,557	233	20,400	226		
2032	1.95%	24,424	467		15.58%	7.00%	3,806	249	20,618	218		WC UI Ave Chg/Yr (2031-2040)
2033	1.95%	24,900	476		16.36%	7.00%	4,073	266	20,828	210		3.45%
2034	1.95%	25,386	486		17.01%	6.00%	4,317	244	21,069	241		
2035	1.95%	25,881	495	1,924	17.68%	6.00%	4,576	259	21,305	236	905	
2036	1.95%	26,386	505		18.38%	6.00%	4,851	275	21,535	230		
2037	1.95%	26,900	515		19.11%	6.00%	5,142	291	21,758	223		
2038	1.95%	27,425	525		19.87%	6.00%	5,450	308	21,974	216		
2039	1.95%	27,959	535		20.47%	5.00%	5,723	273	22,237	262		
2040	1.95%	28,505	545	2,119	21.08%	5.00%	6,009	286	22,496	259	961	
2041	1.95%	29,060	556		21.71%	5.00%	6,309	300	22,751	255		
2042	1.95%	29,627	567		22.36%	5.00%	6,625	315	23,002	251		
TOTAL CHANGE (2022-2042)			10,431					5,231		5,200		
ESTIMATE 2022			19,196					1,394		17,802		
TOTAL 2042			**29,627**					**6,625**		**23,002**		
ULTIMATE PER LANDUSE								**14964**				

NOTES:
- MAG = Mountainland Associations of Governments

MAG Persons per Household Projections

Year	Persons/HH
2020	3.37
2030	3.06
2040	2.94
Average	3.12

US Cenus Persons Per Household

Year	Persons/HH
2020	3.48

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Table 3-2 lists the future developments in North Village. Concept development plans recently proposed to Heber City and the NVOZ ordinance were both considered. The table calculates the new residential units and non-residential square footage at full buildout. The ultimate population is estimated by multiplying the total new projected number of residential units by the average number of persons per household (3.12 - average for next 20 years). The existing population is included but also absorbed by this number where the existing homes and properties are proposed to redevelop. Table 3-2 includes the existing and future developments within North Village including those that are north of SR 32. The projected ultimate population also includes North Village areas north of SR 32, although this study is only for North Village area south of SR 32 and east of US 40. See Appendix 3 for additional information on the NVOZ allowed densities.

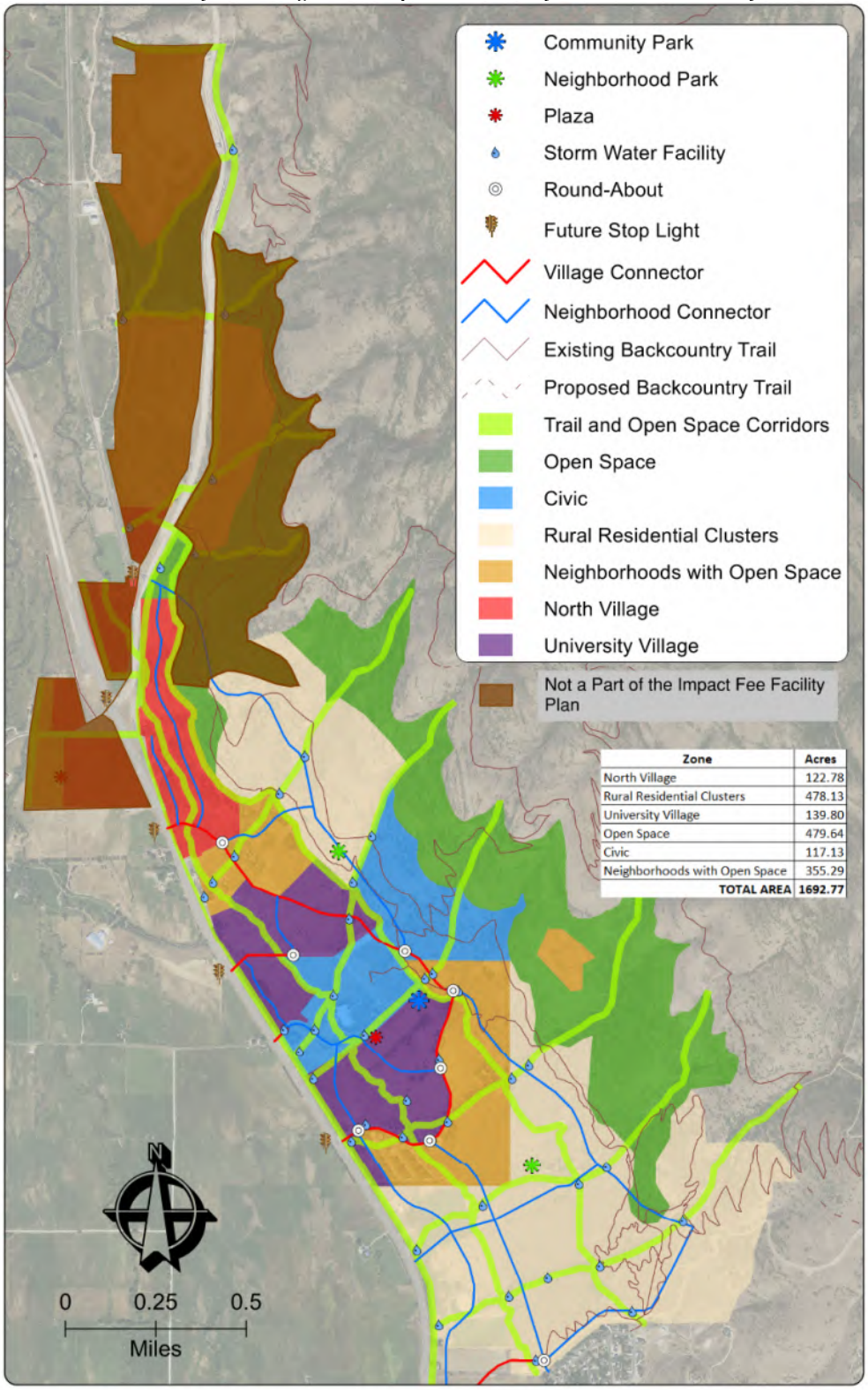
See Table 3-1 above to see how the average person's per household for the next 20 years was calculated. Figure 3-2 below shows the area of North Village that are and are not included in this study.

Table 3-2 Heber City's Developments and Ultimate Population

Development	MP	THs	Apts	SFD	Comm. SF	Industrial SF	Car Wash	Storage	Church	Hotel Rms	Status
Sorenson	85			85							MDA
Sorenson	30			30							MDA
Sorenson	35			35							MDA
Sorenson	70			70							Concept
Sorenson	175			39							Concept
Sorenson	225			225							Concept
Sorenson Civic	0			6							Concept
Sorenson	56			34							Concept
Sorenson	120		120								MDA
Sorenson	130		130								Preliminary/Final
Sorenson	90			83							Preliminary/Final
Sorenson		121		40							Preliminary/Final
Sorenson	30	233									Preliminary/Final
Sorenson	96			45							Preliminary/Final
Sorenson	20			22							Preliminary/Final
Sorenson	140	64		25							Preliminary/Final
Sorenson (High School)											MDA
North Village Resort Residential		37									Annexation Process
Heiner Residential		13									Annexation Process
Jordanelle Ridge Unincorporated		48		83							Unincorporated
Moulton Lane Development Unincorporated				90							Unincorporated
Highlands Residential		76		173					1		MDA
Jordanelle Ridge Plat C				78							Preliminary/Final
Jordanelle Ridge Townhomes Phase B		201									Construction
Highlands Mixed Use		208	664	20	88,000			48,000		80	MDA
North Village Views		180	180								Annexation Process
Finch Creek Townhomes		139			12,040						Annexation Process
Assisted Living					120,000						Annexation Process
Resort Commercial					190,171						Annexation Process
Heiner Commercial					73,000						Annexation Process
North Village Crossings Unincorporated		10	328		39,000		2,500			100	Unincorporated
River Road Existing Homes					72,240						Unincorporated
Baum			144		121,300						Unincorporated
DMJ						125,325					MDA
Fitzgerald		28		111					1		Annexation Process
UVU											Public University
Commons			320								Unincorporated
College Downs		38	220		8000					40	Annexation Process
		1,396	**2,106**	**1,294**	**723,751**	**125,325**	**2,500**	**48,000**	**2**	**220**	
ERU's per unit		0.5	0.75	1							
ERU's		698	1,580	1,294							
Ultimate Population based on 3.12 persons per household		4,356	6,571	4,037							
Population Total (3.12 per household)		**14,964**									
Dwelling Unit Total		**4,796**									
Non-Residential SF Total		**899,576**									
Hotel Unit Total		**220**									

Figure 3-2 North Village Community Design Map (3/21)

Note: Road Layout is changed. See Chapter 4 for Street System Master Plan and layout



Zone	Acres
North Village	122.78
Rural Residential Clusters	478.13
University Village	139.80
Open Space	479.64
Civic	117.13
Neighborhoods with Open Space	355.29
TOTAL AREA	1692.77

North Village Community Design Map

Chapter 4

North Village Street System Master Plan

4.1 Summary and Recommendations

Introduction

North Village is approximately 1,693 acres in size. There are currently no major road networks in the area. The recommended future street system for North Village contains five road classifications: Minor Local, Major Local, Minor Collector, Major Collector, and Minor Arterial. At a minimum, developers are required to provide Minor or Major Local streets within their developments, consistent with Heber City's Streets Master Plan. Traffic generated by the development itself may facilitate the need for streets larger than local streets. Developers are required to provide the street classification necessary to accommodate the development.

Residents in the Wasatch County and other areas outside of North Village also impact the street system. Future planned development areas, Heber City's Transportation General Plan, and the North Village Overlay Zone Plan have been used to determine the recommendations for future street improvements. The traffic model data used was based on full build-out in North Village.

North Village design criteria used in this study are summarized below:

- Road Width:
  - Minor Local — ROW 56 feet — Asphalt 26 feet
  - Major Local — ROW 62 feet — Asphalt 32 feet
  - Minor Collector — ROW 68 feet — Asphalt 38 feet
  - Major Collector — ROW ≥ 80 feet — Asphalt 50* feet
  - Minor Arterial — ROW ≥ 90 feet — Asphalt 60 feet

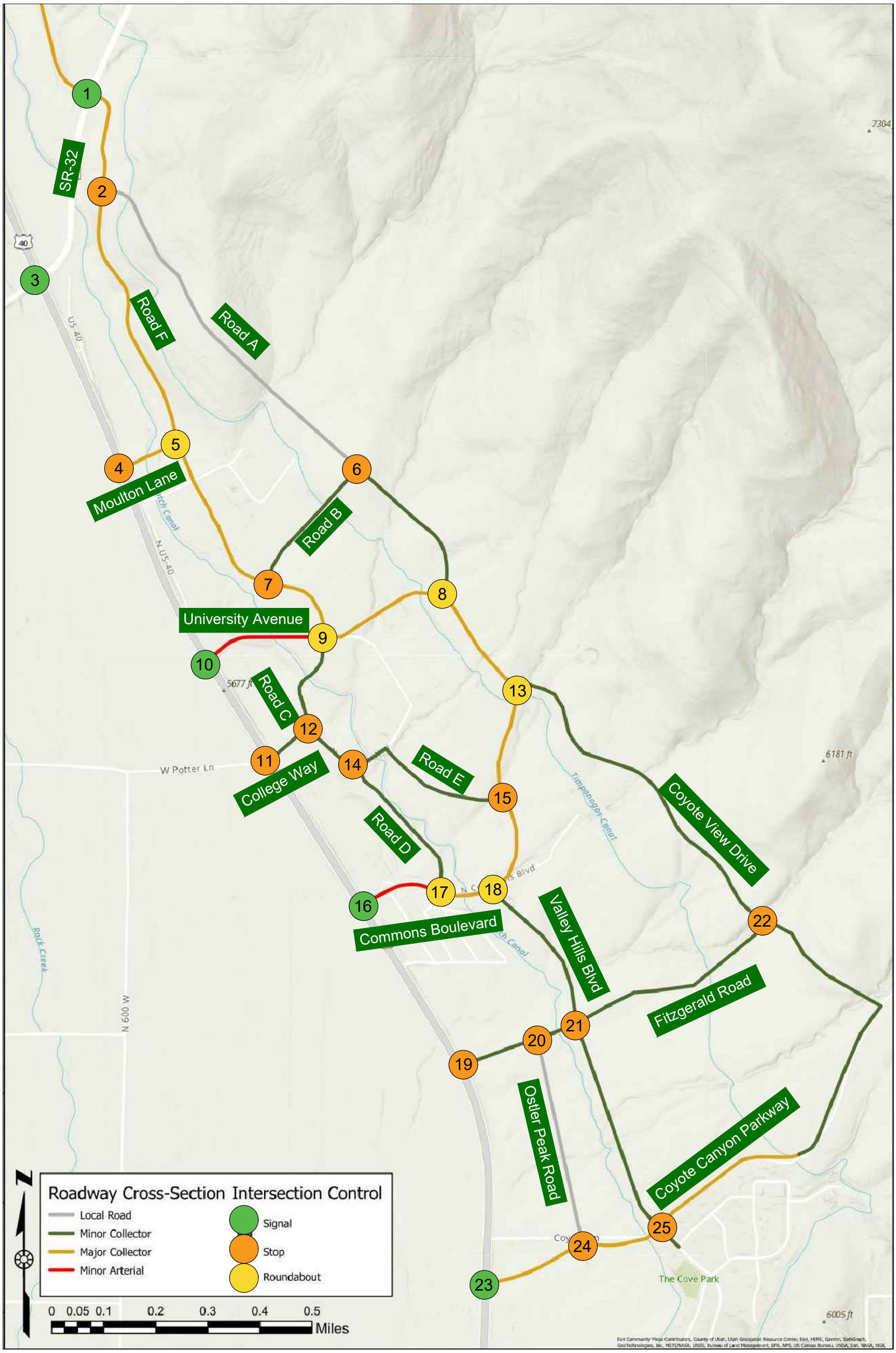
* See Heber City Standard Drawing Cross Section

- Trip Generation:
  - Single Family — 9.43 Average Trips/Unit
  - Townhomes — 7.20 Average Trips/Unit
  - Multi-family — 6.74 Average Trips/Unit
  - Non-Residential / Commercial — 14.96 Average Trips/ksf

Street System Plan

Figure 4-1 shows the Street System Plan for Heber North Village. The existing and future streets shown in the Master Plan reflect the major network of streets, transportation needs, and recommended Impact Fee Facilities for North Village. Future streets are those that should be

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Horrocks.
2162 WEST GROVE PARKWAY
SUITE #100
PLEASANT GROVE, UT. 84062
(801) 763-5100

Overview Map
Heber North Village

FIGURE 4-1

SCALE:
N/A

DATE:
9/2022

constructed to meet the needs of the projected population and traffic growth. New future streets will generally be constructed by developers, and existing streets that need to be improved will be constructed by a combination of Heber City, UDOT, developers and other potential stakeholders. Existing streets include US 40, SR-32, Commons Boulevard, College Way, Coyote Canyon Parkway, and Valley Hills Boulevard connecting to the south.

Development Standards

Heber City's streets comprise five typical street classifications: Minor Local, Major Local, Minor Collector, Major Collector, and Minor Arterial. The Master Plan designates each existing and future major street as one of these classifications. A description of the widths and typical costs of the respective streets are shown in **Table 4-1**. Developers are required to construct Minor and/or Major Local streets depending on input from Heber City Planning and Engineering, unless the Street Master Plan recommends a larger street to be constructed. The developer may be reimbursed from impact fees for the upgraded street costs depending on the street classification needed for the development itself. Cross-sections for the larger collector and arterial streets are discussed in section 4.1.1 Roadways.

Table 4-1: Heber City's Portion of Cost and Street Size Requirements

Classification	Right-of-Way Width (ft)	Paved Width (ft)	Cost Increase from Major Local ($/LF)
Minor Local	56	26	N/A
Major Local	62	32	N/A
Minor Collector	68	38	$24.52
Major Collector	85	50**	$42.91
Minor Arterial	95	60	$73.56

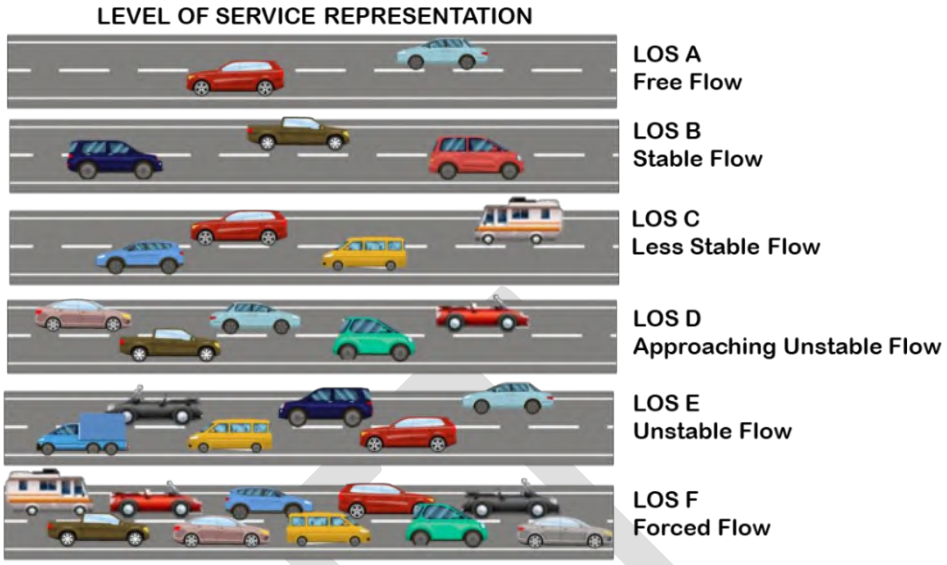
* If pavement width varies, cost per lineal foot is $3.06/LF
** See Heber City Standard Drawing Cross Section

Level of Service

Street systems offer a wide range of choices in terms of services provided. The characteristics of streets are often evaluated in terms of travel time, frequency, comfort, reliability, convenience, and safety. The term level of service (LOS) is used to describe these attributes.

The current standard for LOS on Heber City streets is a LOS of C or better. At LOS C, stable operation is provided, but flows approach the range at which an increase in volume immediately results in a deterioration of service. **Figure 4-2** shows a visual representation of LOS A through F.

Figure 4-2: Level of Service



4.1.1 Roadways

Introduction

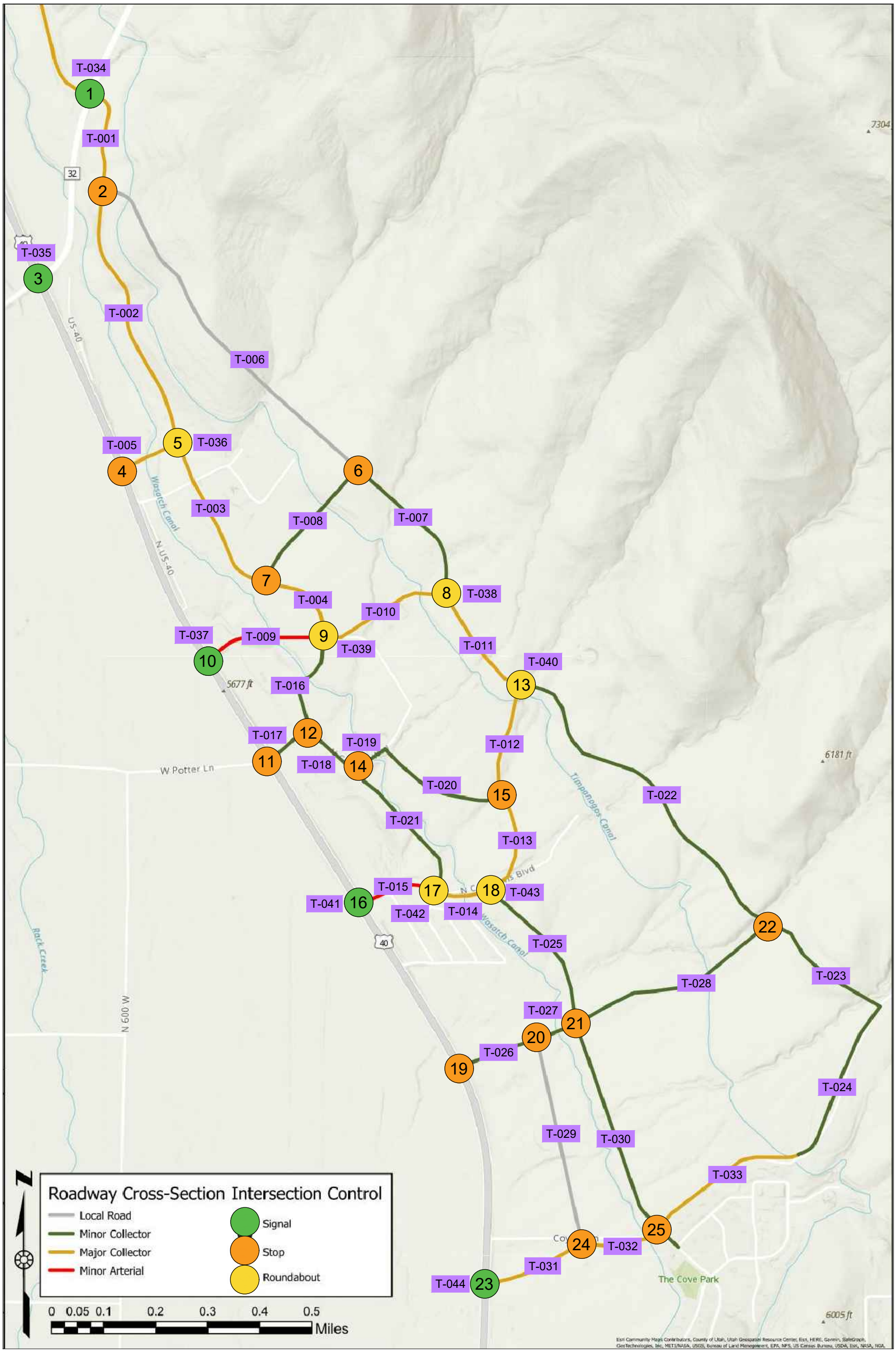
North Village is growing, and the roadway system is designed to facilitate this growth. The roadways are sized according to the developments planned in the immediate vicinity and for the traffic that will utilize the new and improved roadways. There are few existing roadways, and they will be improved or extended to meet the transportation needs of the new projects.

Recommended Street Impact Fee Facilities (Improvements/Extensions)

The street system Impact Fee Facilities recommended to meet the projected population are shown in **Figure 4-3**. These recommendations were determined by projecting the future areas of development, reviewing the adopted Heber City Transportation General Plan, analyzing traffic count data, and incorporating input from City Officials. A detailed listing of the recommended improvements is given in the following paragraphs. Roadway type names differ from the typical roadway classifications, and it is the intent to build typical cross sections throughout the development.

This Master Plan has been adjusted from the original road network shown in Heber City's North Village Overlay Zone plan. These adjustments reflect the need to accommodate higher or lower traffic volumes projected by traffic modeling done for this study. Where traffic modeling did not justify Minor Collectors (Neighborhood Connectors) they were modified to Local (Residential) roadways. Likewise, Major Collectors (Village Connectors) were modified to be Minor Arterials due to the higher volumes of traffic directed to the signalized intersections entering North Village from US 40.

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Horrocks.
2162 WEST GROVE PARKWAY
SUITE #100
PLEASANT GROVE, UT. 84062
(801) 763-5100

Roadway & Intersection Project Locations
Heber North Village

FIGURE 4-3

SCALE: N/A

DATE: 9/2022

Local Street Improvements

T-006 Road A: Road A does not currently exist. It will be approximately 1,700 feet long and should be constructed as a Major Local street between SR 32 and Road B. This project also includes a bridge across the Timpanogos Canal. Topography may make it infeasible to construct this road. If built, it will be 100% developer funded.

T-029 Ostler Peak Road: Approximately 500 feet of the overall 2,200 feet of Ostler Peak Road currently exists on the southern end. It should be constructed as a Major Local between Fitzgerald Road and Coyote Canyon Parkway. It will be 100% developer funded.

Minor Collector Street Improvements

T-007 Road A: Road A does not currently exist. It will be approximately 1,700 feet long and should be constructed as a Minor Collector between Road B and University Avenue.

T-008 Road B: Road B does not currently exist. It will be approximately 1,500 feet long and should be constructed as a Minor Collector between Road F and Road A.

T-016 Road C: Road C does not currently exist. It will be approximately 1,000 feet long and should be constructed as a Minor Collector between University Avenue and College Way. This project includes a bridge across the Wasatch Canal.

T-017 College Way: This section of Collage Way currently exists. It will be approximately 500 feet long and should be reconstructed as a Minor Collector between US 40 and Road C.

T-018 Collage Way: This section of Collage Way currently exists. It will be approximately 700 feet long and should be constructed as a Minor Collector Road C and Road D.

T-019 Collage Way: This section of Collage Way currently exists. It will be approximately 400 feet long and should be constructed as a Minor Collector between Road D and to the UVU south property line. This project includes a bridge across the Wasatch Canal.

T-020 Road E: Road E does not currently exist. It will be approximately 1,400 feet long and should be constructed as a Minor Collector between the UVU south property line and Commons Boulevard.

T-021 Road D: Road D does not currently exist. It will be approximately 1,600 feet long and should be constructed as a Minor Collector between Collage Way and Commons Boulevard.

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T-022 Coyote View Drive: This section of Coyote View Drive does not currently exist. It will be approximately 3,800 feet long and should be constructed as a Minor Collector between Commons Boulevard and Fitzgerald Road.

T-023 Coyote View Drive: This section of Coyote View Drive does not currently exist. It will be approximately 1,700 feet long and should be constructed as a Minor Collector between Fitzgerald Road and Coyote Canyon Parkway.

T-024 Coyote View Drive: This section of Coyote View Drive does not currently exist. It will be approximately 1,800 feet long and should be constructed as a Minor Collector between Coyote View Drive and the Timpanogos Canal to the south.

T-025 Valley Hills Boulevard: This section of Valley Hills Boulevard does not currently exist. It will be approximately 1,800 feet long and should be constructed as a Minor Collector between Commons Boulevard and Fitzgerald Road.

T-026 Fitzgerald Road: This section of Fitzgerald Road does not currently exist. It will be approximately 800 feet long and should be constructed as a Minor Collector between US 40 and Ostler Peak Road.

T-027 Fitzgerald Road: This section of Fitzgerald Road does not currently exist. It will be approximately 500 feet long and should be constructed as a Minor Collector between Ostler Peak Road and Valley Hills Boulevard. This project includes a bridge across the Wasatch Canal.

T-028 Fitzgerald Road: This section of Fitzgerald Road does not currently exist. It will be approximately 2,300 feet long and should be constructed as a Minor Collector between Valley Hills Boulevard and Coyote View Drive. This project includes a bridge across the Timpanogos Canal.

T-030 Valley Hills Boulevard: This section of Valley Hills Boulevard does not currently exist. It will be approximately 2,300 feet long and should be constructed as a Minor Collector between Fitzgerald Road and Coyote Canyon Parkway.

Major Collector Street Improvements

T-001 Road F: This section of Road F does not currently exist; it will be approximately 1,200 feet long and should be constructed as a Major Collector between SR 32 and Road A.

T-002 Road F: This section of Road F does not currently exist. It will be approximately 2,800 feet long and should be constructed as a Major Collector between Road A and Moulton Lane.

T-003 Road F: This section of Road F does not currently exist. It will be approximately 1,800 feet long and should be constructed as a Major Collector between Moulton Lane

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and Road B.

T-004 Road F: This section of Road F does not currently exist. It will be approximately 1,800 feet long and should be constructed as a Major Collector between Road B and University Avenue.

T-005 Moulton Lane: Moulton Lane will be shifted north of its current location. It will be approximately 600 feet long and should be constructed as a Major Collector between US 40 and Road F. Per an access agreement with UDOT, this road is to be constructed as a 3/4 intersection at US 40 and located at least 2,200 feet from the south side of SR-32.

T-010 University Avenue: This section of University Avenue does not currently exist. It will be approximately 1,400 feet long and should be constructed as a Major Collector between Road F and Road A. This project includes a bridge across the Timpanogos Canal.

T-011 University Avenue: This section of University Avenue does not currently exist. It will be approximately 1,300 feet long and should be constructed as a Major Collector between Road A and Commons Boulevard.

T-012 Commons Boulevard: This section of Commons Boulevard does not currently exist. It will be approximately 1,200 feet long and should be constructed as a Major Collector between University Avenue and Road E.

T-013 Commons Boulevard: This section of Commons Boulevard does not currently exist. It will be approximately 1,100 feet long and should be constructed as a Major Collector between Road E and Valley Hills Boulevard.

T-014 Commons Boulevard: This section of Commons Boulevard does not currently exist. It will be approximately 600 feet long and should be constructed as a Major Collector between Valley Hills Boulevard and Road D. This project includes a bridge across the Wasatch Canal.

T-031 Coyote Canyon Parkway: This section of Coyote Canyon Parkway currently exists. It is approximately 1,100 feet long and is constructed as a Major Collector between US 40 and Ostler Peak Road.

T-032 Coyote Canyon Parkway: This section of Coyote Canyon Parkway currently exists. It is approximately 900 feet long and is constructed as a Major Collector between Ostler Peak Road and Valley Hills Boulevard. This project includes a bridge across the Wasatch Canal.

T-033 Coyote Canyon Parkway: This section of Coyote Canyon Parkway currently exists. It is approximately 1,700 feet long and is constructed as a Major Collector between Valley Hills Boulevard and the Timpanogos Canal. This project includes a bridge across the Timpanogos Canal.

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Minor Arterial Street Improvements

T-015 Commons Boulevard: This section of Commons Boulevard currently exists. It will be approximately 800 feet long and should be reconstructed as a Minor Arterial between US 40 and Road D.

T-009 University Avenue: This section of University Avenue is currently a dirt road. It will be approximately 1,200 feet long. It should be reconstructed as a Minor Arterial from US 40 to Road F. This project includes a bridge across the Wasatch Canal.

Other Improvements

T-045 North Village Streets Master Plan Updates: This project will fund updates to the North Village transportation Master Plan every 5 years.

4.1.2 Intersections

Introduction

A variety of factors will affect the traffic and the intersection improvements needed to meet the future growth in North Village. The intersection types used in this study are signalized, two-way stop controlled, and roundabouts. Roundabouts may be a good alternative to stop-controlled intersections as they can be single lane or multiple lanes. Roundabouts allow for a higher volume of vehicles to pass through than a stop-controlled intersection, however they require a larger physical footprint. The basic intersection layouts are shown in the following pages and are not to be used for the final design as they are not construction drawings.

Projected populations were used in conjunction with development plans to determine where the new streets should be constructed based on the planned and potential areas of development. **Figure 4-3** shows the intersection locations and type of control i.e., traffic signal, roundabout, stop sign.

Signalized Intersections

The intersections that are signal controlled are generally higher volume roadways. A traffic signal should not be installed unless it meets warrants for a signal. Even when an intersection meets warrants for a signal, this does not indicate that a signal must be installed. Traffic signals do not always increase the safety of an intersection, and this is an important aspect to consider when evaluating the installation of a new traffic signal. The proposed signalized intersections include SR 32 and Road F, US 40 and University Avenue, US 40 & Commons Boulevard, and US 40 and Coyote Canyon Parkway. There are no proposed signalized intersections within North Village.

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Roundabouts

The intersections that have a roundabout installed have yield control at each approach and vehicles inside the roundabout have priority. The roundabout can have a single or multiple lanes and can accommodate large volumes of traffic. Roundabouts near UDOT highways, such as US 40, need to be located far enough away to avoid future vehicle queue lengths backing up into the intersection. Discussions with UDOT suggest this distance needs to be approximately 600-feet in the North Village. There is one existing intersection with a roundabout on Commons Boulevard, which was constructed less than 250 feet from US 40. This existing roundabout needs to be shifted further from Highway 40 to avoid restricting traffic. Some roundabouts are an optional intersection improvement and would improve the LOS for any intersection that is stop-controlled. Intersections that meet warrants for all-way stop controlled intersections have the greatest improvement to the LOS with the installation of a roundabout.

A roundabout is proposed to be constructed on Commons Boulevard where it intersects with Valley Hills Boulevard. University Avenue is proposed to have three additional roundabouts installed, one at the intersection of Road F, one at Road A, and another at Coyote View Drive. Road F will have one roundabout at the intersection with Moulton Lane, and the other mentioned previously at the intersection with University Avenue. Roundabouts may also be installed as traffic calming measures, or to enhance the community, and significantly improve the delay experienced during the off-peak hours over a stop-controlled intersection.

Stop Controlled Intersections

The intersections that are stop controlled may have all approaches stop controlled (an all-way stop), or only two approaches stop controlled (two-way stop). Three leg intersections can be stop controlled on all legs or on the one leg with the least traffic volume. Two-way stop control is typically used when two roads intersect, with the stop control placed on the road having the least traffic volume. Most of the new intersections are two-way stop controlled.

The new developments in North Village create a network of roadways, and new intersections where these roads converge. The new intersections are designed to handle the anticipated traffic volumes based upon the proposed roadway use. **Table 4-2** shows the type of intersection control for each intersection as well as the number of lanes in each approach. **Table 4-3** shows the anticipated volume of vehicles for each intersection separated into each movement for the PM peak hour at full project build-out. These traffic volumes on each movement support the recommendations for the number of lanes for each approach at the intersection.

The Average Daily Traffic (ADT) on a roadway measures the number of vehicle trips that happen on an average day. This metric assists in determining the size of the roadway for an acceptable Level of Service. The projected ADT for the full build-out on North Village roadways is shown in **Table 4-4**.

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Table 4-2: Number of Lanes for Intersection Approach

Intersection Number	Intersection Control	Controlled Movement	NB Lane Configuration			SB Lane Configuration			EB Lane Configuration			WB Lane Configuration		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
1	Signalized	All	1	1	1	1	1	1	1	1	1	1	1	1
2	Two-way Stop	W	-	1	1	1	1	-	-	-	-	1	-	1
3	Signalized	All							1	1	1	1	1	1
4	Two-way Stop	W										-	-	1
5	Roundabout	All				-	1	-	-	1	-	-	1	1
6	Two-way Stop	All	1	1	-	-	1	1	-	1	1			
7	Two-way Stop	S	-	1	1	1	1	-	1	-	1			
8	Roundabout	All	-	1	-	-	1	-	-	1	-			
9	Roundabout	All	-	1	-	-	1	-	-	2	-	-	2	-
10	Signalized	All			1	2						2	-	1
11	Two-way Stop	E/W	1		1	1		1	1	1	1	1	1	1
12	Two-way Stop	S	1		1	1		1	1	1	-	1	1	-
13	Roundabout	All		1			1						1	
14	Two-way Stop	W		1	1	1	1	-				1		1
15	Two-way Stop	E	1	1	-	-	1	1	1	-	1			
16	Signalized	All			1	2						2	-	1
17	Roundabout	All	-	1	-	-	1	-	-	2	-	-	2	-
18	Roundabout	All	-	1	-	-	1	-	-	2	-	-	1	-
19	Two-way Stop	W			1	1						1	-	1
20	Two-way Stop	N/S	1	1	1	1	1	1	1	1	1	1	1	1
21	Two-way Stop	E/W	1	1	1	1	1	1	1	1	1	1	1	1
22	Two-way Stop	E	1	1	-	-	1	1	1	-	1			
23	Signalized	All			1	1						1	-	1
24	Two-way Stop	S				1	-	1	1	1		-	1	1
25	Two-way Stop	N/S	1	1	1	1	1	1	1	1	1	1	1	1

Table 4-3: Lane Volumes

Intersection Number	NB Lane Volumes			SB Lane Volumes			EB Lane Volumes			WB Lane Volumes		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
1	29	69	111	29	102	0	0	10	39	13	5	18
2		28		16	134							9
3			97	111						141	0	13
4			185	121								173
5	65	1			105	108	274		32			
6			4		6					10		3
7	126	0	14	21	105	11	16	0	63	6	0	50
8		18				93	154	33				
9	215	0	0	0	0	174	139	434	183	0	249	0
10			311	446						380		258
11			53	115						14		131
12	94	55	0	0	25	24	55	32	82	0	26	0
13		18				33						
14	82	55			25	55		32			26	
15		140			88							
16			399	342						282		204
17	61					202	278	361	102		223	
18	47					89	129	140	92		88	
19			29	15						4		29
20	8					10	4	36	4		16	
21	11					4	29		7			
22												
23			177	190						106		97
24						62	129	238			141	
25	89					36	61	177			105	

Table 4-4: Average Daily Traffic

Average Daily Traffic		
Roadway Name	ADT	Roadway Type
Road A	2,600	Minor Collector
Road B	1,200	Minor Collector
Road C	6,100	Minor Collector
Road D	8,800	Minor Collector
Road E	4,500	Minor Collector
Fitzgerald Road	2,500	Major Collector
Ostler Peak Road	1,900	Major Local
College Way	4,500	Minor Collector
Commons Blvd 1	13,900	Minor Arterial
Commons Blvd 2	5,200	Major Collector
Coyote Canyon Parkway	9,200	Major Collector
Coyote View Drive	2,700	Minor Collector
Moulton Lane	5,800	Major Collector
Road F	8,600	Major Collector
SR 32	8,800	Minor Arterial
University Ave 1	16,100	Minor Arterial
University Ave 2	5,800	Major Collector
Valley Hills Blvd	2,800	Minor Collector

Intersection Improvements

T-034 Intersection 1: This project will construct a UDOT traffic signal on SR 32 at the intersection of SR 32 and Road F. This is anticipated to be 100% funded by UDOT once the warrant is met.

T-035 Intersection 3: This is an existing UDOT traffic signal on US 40 at the intersection of US 40 and SR 32. Any improvements needed at this intersection are anticipated to be 100% funded by UDOT.

T-036 Roundabout 5: This project will construct a single-lane roundabout at the intersection of Moulton Lane and Road F. Stop control at this location may also be an acceptable means of traffic control, although safety may not be improved as much as with the recommended roundabout.

T-037 Intersection 10: This project will construct a UDOT traffic signal on US 40 at the intersection of US 40 and Collage Way. This is anticipated to be 100% funded by UDOT once the warrant is met.

T-038 Roundabout 8: This project will construct a single-lane roundabout at the intersection of University Avenue and Road A. Stop control at this location may also be an acceptable means of traffic control, although safety may not be improved as much as with the recommended roundabout.

T-039 Roundabout 9: This project will construct a multi-lane roundabout at the intersection of University Avenue, Road F, and Road C. A traffic signal at this location is also an acceptable means of traffic control to meet City LOS criteria. Stop control does not meet the criteria.

T-040 Roundabout 13: This project will construct a single-lane roundabout at the intersection of University Avenue, Coyote View Drive, and Commons Boulevard. Stop control at this location may also be an acceptable means of traffic control, although safety may not be improved as much as with the recommended roundabout.

T-041 Intersection 16: This project will construct a UDOT traffic signal on US 40 at the intersection of US 40 and Commons Boulevard. This is anticipated to be 100% funded by UDOT once the warrant is met.

T-042 Roundabout 17: This project will remove the existing roundabout and construct a new multi-lane roundabout further east at the intersection of Commons Boulevard and Road D. A traffic signal at this location is also an acceptable means of traffic control to meet City LOS criteria. Stop control does not meet the criteria.

T-043 Roundabout 18: This project will construct a single-lane roundabout at the intersection of Commons Boulevard and Valley Hills Boulevard. Stop control at this

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location may also be an acceptable means of traffic control, although safety may not be improved as much as with the recommended roundabout.

T-044 Intersection 23: This project will construct a UDOT traffic signal on US 40 at the intersection of US 40 and Coyote Canyon Parkway. This is anticipated to be 100% funded by UDOT once the warrant is met.

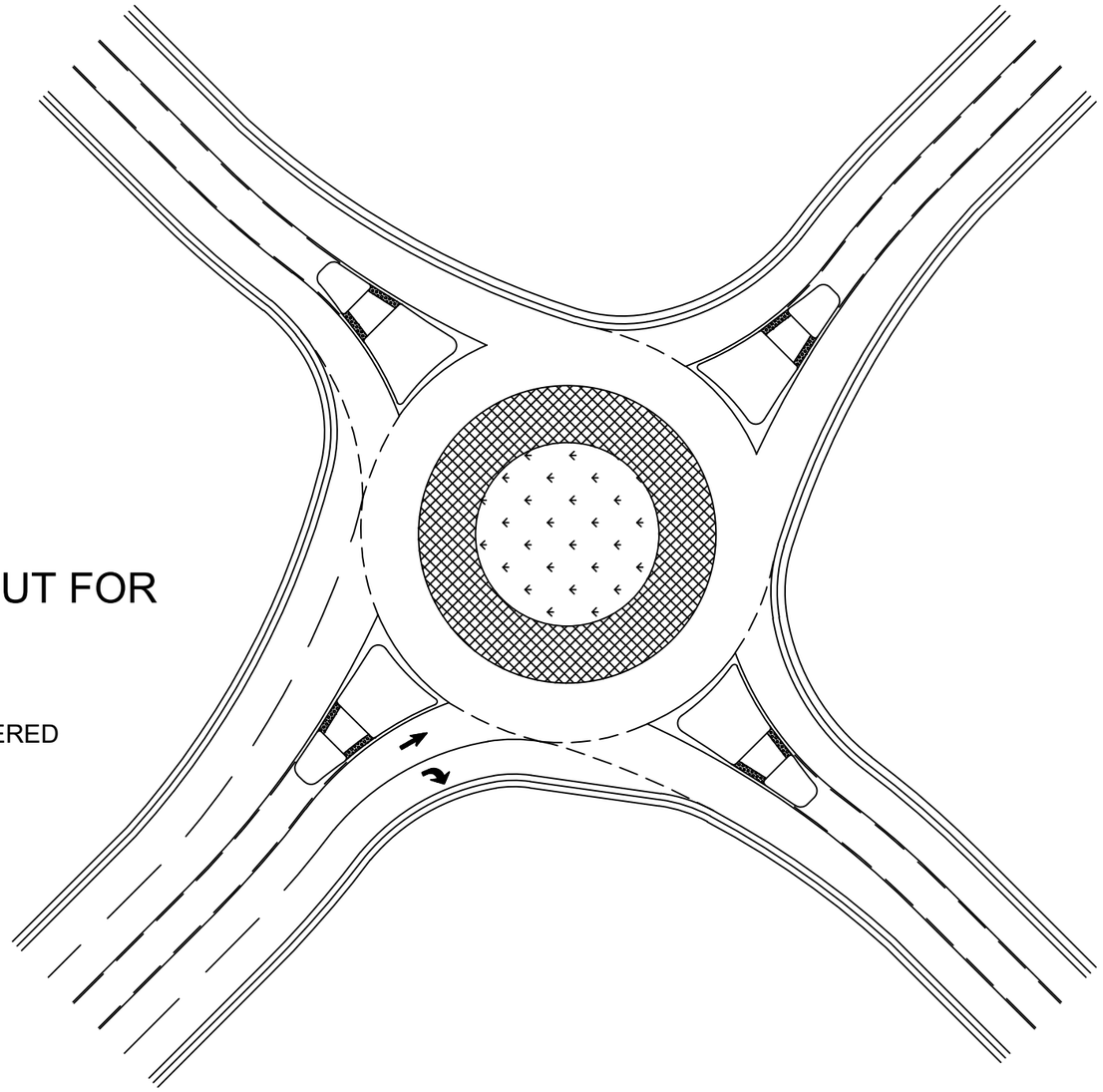
These new intersections should be carefully designed for each physical location as field conditions vary from location to location. There are numerous conditions which could lead to changes in the field and the figures shown in this document are not intended as design or construction documents, merely as concepts for the new intersection layouts.

Figure 4-4 shows the basic concept for a roundabout with only one leg being multi-lane. The multi-lane roundabout has an inscribed diameter of 180 feet and the major roadway (University Avenue/Commons Boulevard) consists of two travel lanes in each direction while the minor roadway has a single lane in each direction. The conceptual design is not to be used for construction and is representative of the design for intersections number 9 and 17. The single lane roundabout shown in **Figure 4-5** has an inscribed diameter of 120 feet and is representative of intersections 5, 8, 13, and 18.

Figure 4-6 shows the basic concept for signalized intersections (SR 32 and Road F). All signalized intersections for the project area are on UDOT roadways, and as such are not under the jurisdiction of Heber City.

Figure 4-7 shows the basic concept for a stop-controlled intersection with four legs. Many intersections in this project only have three legs and must be adapted as development occurs. It is possible that developers will design their project access to connect to a three-legged intersection by adding the fourth leg. All construction designs must be approved by Heber City.

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THIS IS A GENERAL LAYOUT FOR THE INTERSECTIONS:

9 & 17

*THESE LOCATIONS NEED TO BE CONSIDERED INDIVIDUALLY

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE	
HORIZONTAL	N/A
VERTICAL	N/A

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

HORROCKS ENGINEERS

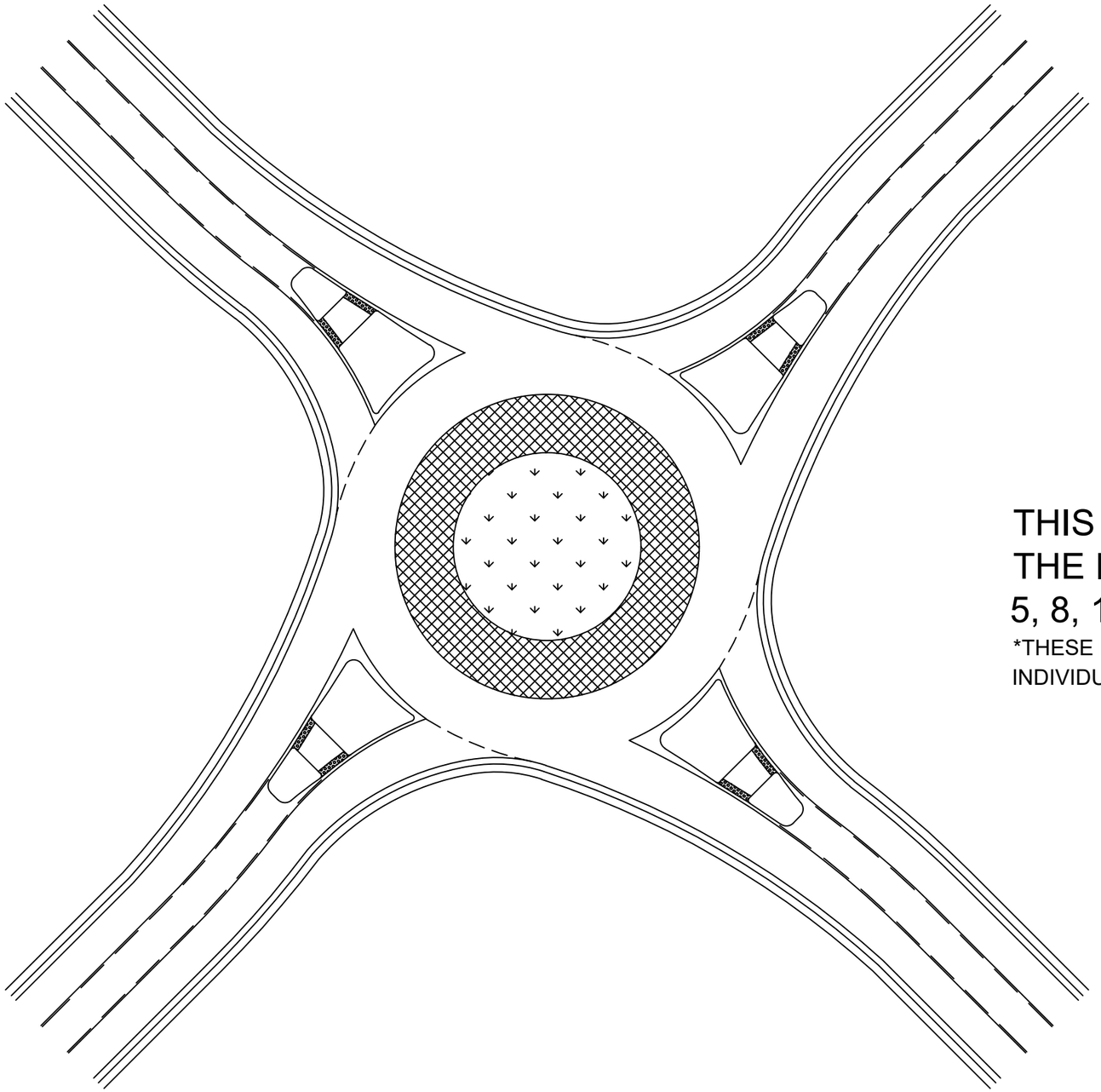
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100

HEBER - NORTH VILLAGE

2-LANE ROUNDABOUT - 150 FT INSCRIBED CIRCLE

DESIGNED	DATE	PROJECT NO.
DRAWN	DATE	SHEET NO. OF
CHECKED	DATE	DRAWING NO.

C:\Users\david.rollins\Horrocks Engineers\Civil Traffic Group - North Village Master Plan Transportation\Transportation\IFFP\Intersection Layouts.dwg - 2-LANE ROUNDABOUT - 9/14/2022 02:26pm, david.rollins



THIS IS A GENERAL LAYOUT FOR THE INTERSECTIONS:
5, 8, 13, & 18

*THESE LOCATIONS NEED TO BE CONSIDERED INDIVIDUALLY

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE
HORIZONTAL N/A
VERTICAL N/A

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

HORROCKS ENGINEERS

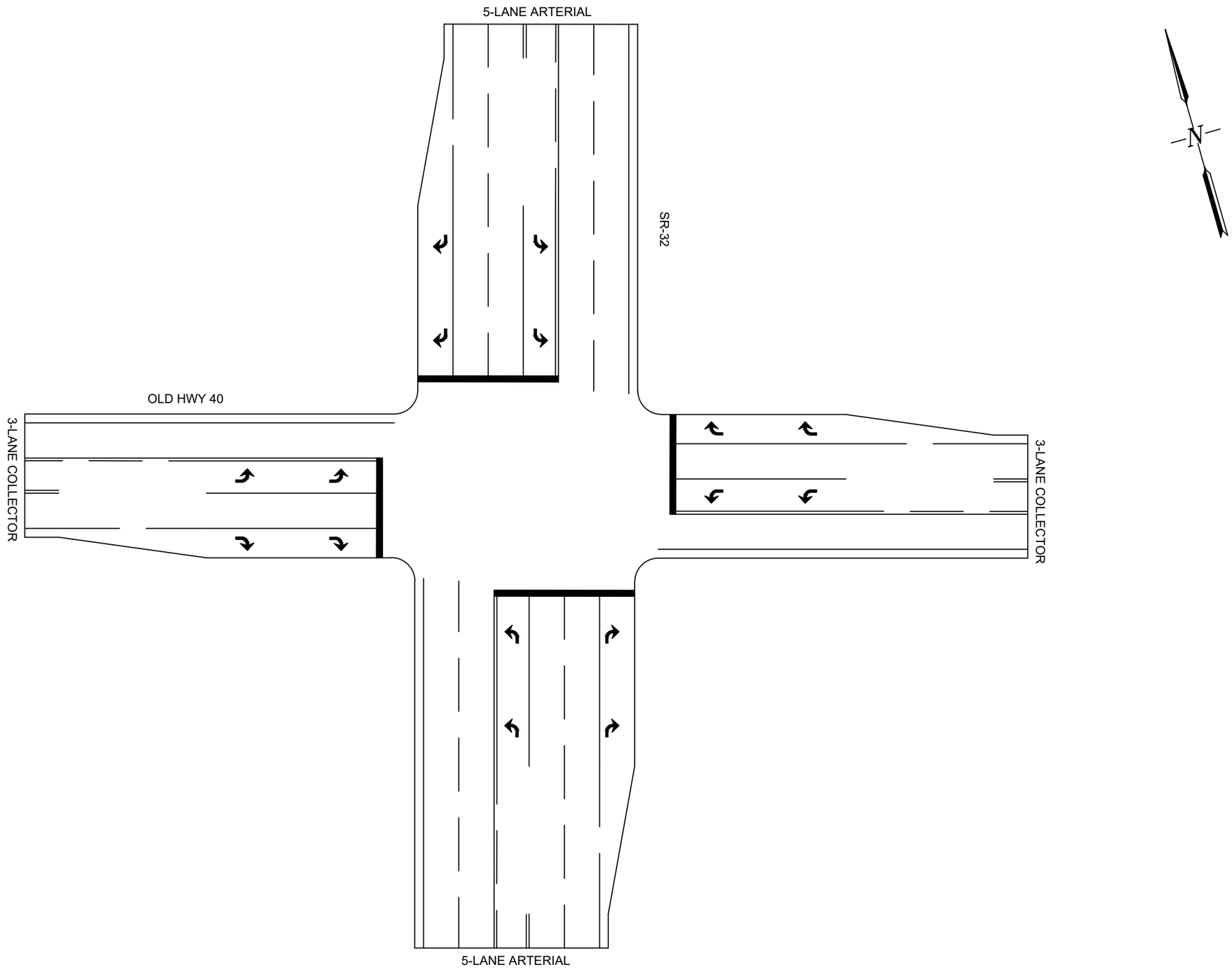
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100

HEBER - NORTH VILLAGE

1-LANE ROUNDABOUT - 120 FT INSCRIBED CIRCLE

DESIGNED	DATE	PROJECT NO.
DRAWN	DATE	SHEET NO. OF
CHECKED	DATE	DRAWING NO.

C:\Users\ryan.dummer\Horrocks Engineers\Civil Traffic Group - North Village Master Plan Transportation\Transportation\IFFP\Intersection Layouts.dwg - 1-LANE ROUNDABOUT - 5/13/2022 01:21pm, ryan.dummer



C:\Users\david.rollins\Horrocks Engineers\Civil Traffic Group - North Village Master Plan Transportation\Transportation\FFP\Intersection Layouts.dwg - SR-32 & OLD HWY 40 - 8/18/2022 03:41pm, david.rollins

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE	
HORIZONTAL	N/A
VERTICAL	N/A

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

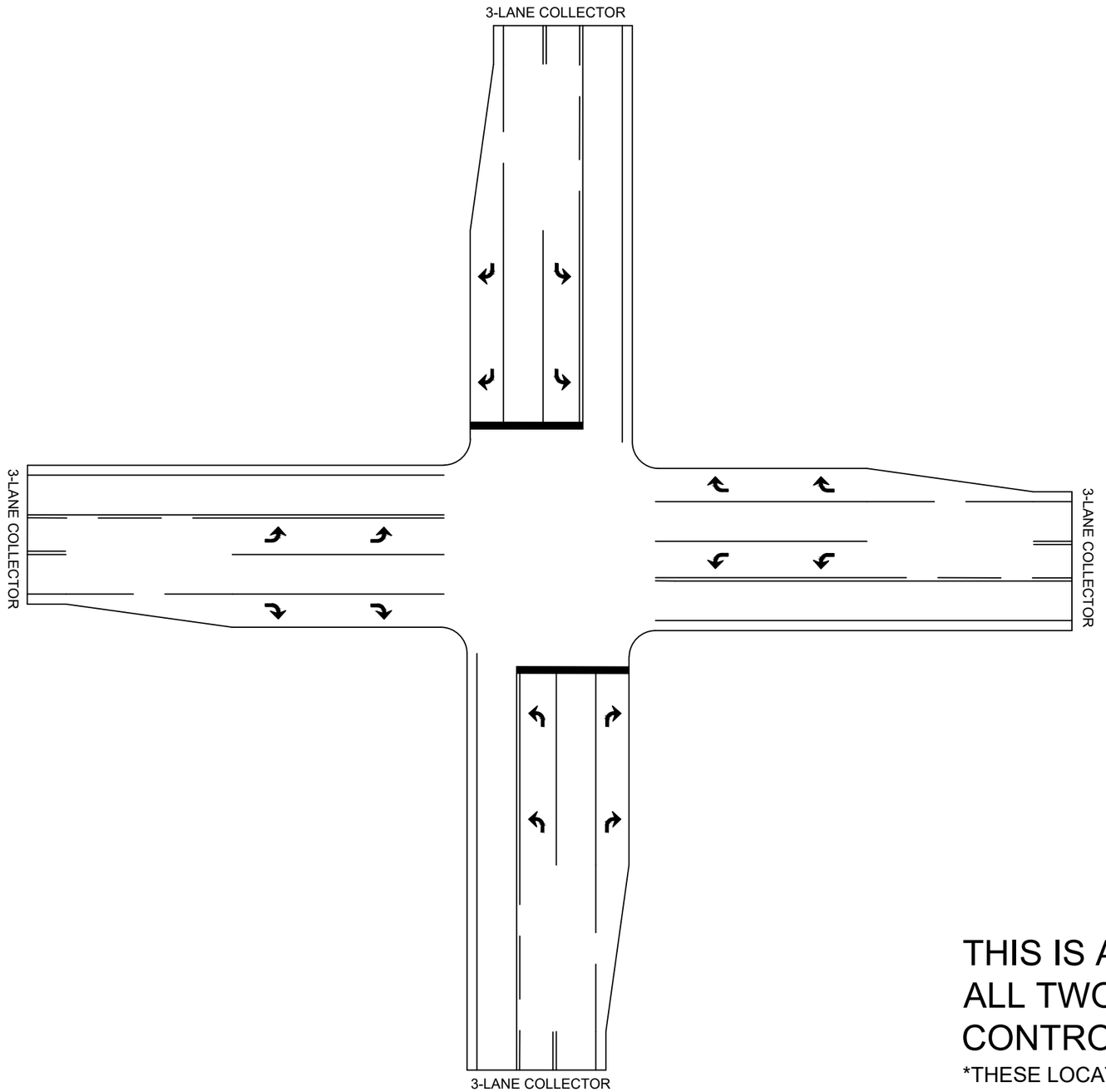
HORROCKS ENGINEERS

2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100

HEBER - NORTH VILLAGE

SR-32 & OLD HWY 40 INTERSECTION LAYOUT

DESIGNED	DATE	PROJECT NO.
DRAWN	DATE	SHEET NO. OF
CHECKED	DATE	DRAWING NO.



THIS IS A GENERAL LAYOUT FOR ALL TWO-WAY STOP CONTROLLED INTERSECTIONS.

*THESE LOCATIONS NEED TO BE CONSIDERED INDIVIDUALLY

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE	
HORIZONTAL	N/A
VERTICAL	N/A

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

HORROCKS ENGINEERS
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100

HEBER - NORTH VILLAGE

3-LANE 2-WAY STOP

DESIGNED	DATE	PROJECT NO.
DRAWN	DATE	SHEET NO. OF
CHECKED	DATE	DRAWING NO.

C:\Users\david.rollins\Horrocks Engineers\Civil Traffic Group - North Village Master Plan Transportation\Transportation\FFP\Intersection Layouts.dwg - 3-LANE 2-WAY STOP - 8/18/2022 03:42pm, david.rollins

4.2 Future Conditions

A variety of factors will affect the traffic and the street improvements needed to meet the future growth in Heber North Village. Some of the sources of data used to determine the future traffic conditions and the proposed street improvements are:

- Population growth rates
- Utah Department of Transportation (UDOT) Road Classification Map
- Various Traffic Studies
- Projected Residential and Non-Residential development
- Heber City Transportation Plan

As these factors change, the timing of improvements recommended in this study could be affected. To help minimize this effect, the recommendations made in this study will be based upon the number of people served by Heber City's street system rather than time periods and/or external factors beyond the City's control.

Projected populations were used to determine where the new streets should be constructed based on the potential areas of development. Existing traffic patterns and Average Daily Traffic counts (ADT) were used to help project future traffic patterns and areas in need of road improvements. Future traffic models of the Heber Valley were compared with Heber City's adopted General Transportation Plan, UDOT's Road Classification Map for Heber City, and North Village Overlay Zone Plan. Each road was checked to confirm future road classifications and needed road widths to accommodate the projected growth.

The North Village Master Plan analysis included traffic modeling to evaluate the trip distribution onto the planned roadway network. The trips were assigned based on projected traffic according to the zoning and using ITE trip generation rates. See Table 3-2 in Chapter 3 which lists each planned development area and the associated number of residential units and non-residential square footage for each at build-out. The traffic model was based on full build-out. See Appendix 4 for the Vistro traffic volumes from the traffic model,

It is not yet known if some of the areas analyzed for the road network in this Master Plan will choose to remain in Wasatch County and not annex into Heber City. In those cases where this occurs, Heber City should coordinate with Wasatch County to develop a Memorandum of Understanding (MOU) to provide consistency and continuity of the road network across jurisdictions.

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4.3 Street System Analysis and Level of Service

Street Impact Fees Administration

An impact fee is a one-time fee with the purpose of raising revenue for new or expanded public facilities required to serve new development and maintain the existing level of service. Impact fees cannot be used to correct existing roadway deficiencies or for routine maintenance activities. The premise behind impact fees is based on the critical assumption that if no new development were allowed, the existing street system would adequately serve the existing level of development in the City. Therefore, the recommended roadway improvements outlined in this Master Plan, should be used in the development of the impact fees. These improvements are growth related and are needed to accommodate the projected growth and maintain a minimum level of service "C" in the North Village.

Trip Generation Rates

Each area associated with a land use in the Heber City General Plan will generate traffic trips as the land is developed. The residential land uses allow for a variety of housing types. Each housing type was found in the *Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition,* and the number of trips associated with each type was determined. Four categories were chosen, Single Family Detached Housing, Single Family Attached Housing (townhomes), Multifamily Housing, and Senior Housing to reflect the majority of housing in the North Village area. These housing types, and the respective trips they generate, were used to determine a proportionate share of improvement costs needed for each type. The multifamily and high-density types were averaged together to simplify the impact fee calculation and distribution of impact fees. The trip generation rates for residential land uses are summarized in **Table 4-5** below. See Appendix 5 for ITE Trip Generation information.

Table 4-5: Residential Trip Rates

Dwelling Unit Type	Trips Generated per Day
Single Family Detached Housing (210)	9.43
Single Family Attached Housing (215)	7.20
Multifamily Housing (220)	6.74
Senior Adult Housing – Single-Family (251)	4.31
Senior Adult Housing – Multifamily (252)	3.24

Because of the wide range of different types of commercial and industrial development that occur in North Village, non-residential impact fees are determined on an individual basis. The fee is based on the amount of new trips generated by the individual business. Each departure or arrival from a business or residence is counted as a trip, i.e., one car equals two trips. The average residential trip rate for North Village was calculated by multiplying the anticipated quantity of each housing type by the trip generation rate, then dividing by the total number of housing units. This was calculated to be 7.18 trips per residential unit in North Village. See Chapter 3 for more population information.

Table 4-6 shows the population growth rates used to project future trips into the year 2042.

Table 4-6: STREET POPULATION & ERU's

YEAR	POPULATION % CHG	POPULATION TOTAL	POPULATION CHG	RESIDENTIAL UNITS	RESIDENTIAL CHG	RESIDENTIAL NEW TRIP'S		NON-RESIDENTIAL % CHG	NON-RESIDENTIAL 1000 SF	NON-RESIDENTIAL CHG	NON-RESIDENTIAL NEW TRIP'S		RES+NON-RES NEW TRIP'S	
						Trip's/Unit = 7.18					Avg Trip's/1000 Sq Ft = 14.96			
2022	0.00%	1,394		414					-				-	
2023	15.00%	1,603	209	481	67	481			-		-		481	
2024	14.00%	1,828	224	553	72	516			10	10	150		666	
2025	13.00%	2,065	238	629	76	547			20	10	150		697	
2026	12.00%	2,313	248	708	79	570		12.00%	30	10	150		720	
2027	11.00%	2,567	254	790	82	585	2,699	11.00%	33	3	49	498	634	3,197
2028	10.00%	2,824	257	872	82	591		10.00%	37	3	50		641	
2029	9.00%	3,078	254	953	81	585		9.00%	40	3	49		634	
2030	8.00%	3,325	246	1,032	79	566		8.00%	43	3	48		614	
2031	7.00%	3,557	233	1,107	75	535		7.00%	46	3	45		580	
2032	7.00%	3,806	249	1,187	80	573	2,850	7.00%	49	3	48	240	621	3,090
2033	7.00%	4,073	266	1,272	85	613		7.00%	53	3	52		665	
2034	6.00%	4,317	244	1,351	78	562		6.00%	56	3	47		609	
2035	6.00%	4,576	259	1,434	83	596		6.00%	59	3	50		646	
2036	6.00%	4,851	275	1,522	88	632		6.00%	63	4	53		685	
2037	6.00%	5,142	291	1,615	93	669	3,072	6.00%	67	4	56	259	725	3,331
2038	6.00%	5,450	308	1,714	99	710		6.00%	71	4	60		770	
2039	5.00%	5,723	273	1,801	87	627		5.00%	74	4	53		680	
2040	5.00%	6,009	286	1,893	92	658		5.00%	78	4	56		714	
2041	5.00%	6,309	300	1,989	96	691		5.00%	82	4	58		749	
2042	5.00%	6,625	315	2,090	101	726	3,412	5.00%	86	4	61	398	719	
TOTAL CHANGE (2022 to 2042)			5,231		1,677	11,036				76	1,136		12,104	
Ultimate Buildout			14,964	5,345		38,400			904		13,522		51,922	
EST 2022			1,394		414	2,969				-	-		2,969	
TOTAL 2042			6,625		2,091	14,005				76	1,136		15,073	

4.4 Economic Feasibility Analysis

Costs of the recommended Impact Fee Facilities for the full build-out are shown in **Table 4-7**. The estimated material and installation cost for the road improvements, intersections, and updates to this plan is $70,237,963. This number is based on 2022 material and labor costs and should be updated regularly to reflect changes in price.

It is anticipated that the recommended improvements will be funded by Impact Fees or Public Improvement Districts (PID's) created within North Village. This report does not include the impact fee analysis or a funding mechanism for the proposed Capital Improvements. The calculation, collection, and proposed implementation of impact fees will be presented in a separate study. The study should also include any proposed PID's and how they will work with together with the City for the administration of the Impact Fees in North Village area.

In past Master Plans Heber City has had a policy of subsidizing 45 percent of the Non-Residential Street impact fee to reduce the burden on businesses generating revenue for the City. The subsidy funds came from the City's general fund or another source to make up the difference. It is estimated that over the next 20 years, new business will generate an additional 13,522 trips. This Non-Residential subsidy was only applicable to businesses generating property tax revenue for Heber City. All others paid the full streets impact fee. This policy should be revisited with the City Council during the impact fee analysis study to confirm if it will continue.

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Table 4-7: Cost Summary of Recommended Street Improvements

NORTH VILLAGE STREET CAPITAL IMPROVEMENTS																				
IMPROVEMENT DESCRIPTION			LENGTH / COST	LUMP SUM	LOCAL	MINOR COLLECTOR	MAJOR COLLECTOR*	WIDTH ROW	WIDTH ASPHALT	ROW	PAVEMENT & UBC	GRANULAR FILL	CLEAR & GRUB	CURB & GUTTER	SIDEWALK	Chip Seal	OVERLAY EXIST	WIDENING	ENG CM INSP	COST
ULT	CIP#		ft	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	
	T-001	Road F - East of SR 32 to Local Road A	1,200				X	85	50	X	X	X	X	X	X				X	$1,602,084
	T-002	Road F - Road A to Moulton Ln	2,800				X	85	50	X	X	X	X	X	X				X	$3,738,197
	T-003	Road F - Moulton Ln to Road B	1,800				X	85	50	X	X	X	X	X	X				X	$2,403,126
	T-004	Road F - Road B to University Ave	1,000				X	85	50	X	X	X	X	X	X				X	$1,335,070
	T-005	Moulton Ln (shifted north) - US 40 to Road F	600				X	85	50	X	X	X	X	X	X				X	$801,042
	T-006*	Local Road A - Road F to Road B	4,000		X			62	32	X	X	X	X	X	X				X	$4,143,721
	T-007*	Local Road A - Road B to University Ave	1,700		X			62	32	X	X	X	X	X	X				X	$1,761,081
	T-008*	Road B - Road F to Road A	1,500			X		68	38	X	X	X	X	X	X				X	$1,687,625
	T-009*	University Ave - US 40 to Road F	1,200				X	95	60	X	X	X	X	X	X			X	X	$2,128,120
	T-010*	University Ave - Road F to Road A	1,400				X	85	50	X	X	X	X	X	X				X	$1,869,098
	T-011*	University Ave - Road A to Commons Blvd	1,300				X	85	50	X	X	X	X	X	X				X	$1,735,591
	T-012	Commons Blvd - University Ave to Road E	1,200				X	85	50	X	X	X	X	X	X				X	$1,602,084
	T-013	Commons Blvd- Road E to Valley Hills Blvd	1,100				X	85	50	X	X	X	X	X	X				X	$1,468,577
	T-014*	Commons Blvd - Valley Hills Blvd to Road D	600				X	85	50	X	X	X	X	X	X				X	$801,042
	T-015	Commons Blvd - US 40 to Road D	800				X	95	60	X	X	X	X	X	X			X	X	$1,418,747
	T-016*	Road C - University Ave to College Way	1,000			X		68	38	X	X	X	X	X	X				X	$1,125,083
	T-017	College Way - US 40 to Road C	500			X		68	38	X	X	X	X	X	X			X	X	$613,678
	T-018	College Way - Road C to Road D	700			X		68	38	X	X	X	X	X	X				X	$787,558
	T-019*	College Way - Road D to Collage PL	400			X		68	38	X	X	X	X	X	X				X	$450,033
	T-020	Road E - College PL to Commons Blvd	1400			X		68	38	X	X	X	X	X	X				X	$1,575,117
	T-021	Road D - College Way to Commons Blvd	1,600			X		68	38	X	X	X	X	X	X				X	$1,800,134
	T-022	Coyote View Dr - Commons Blvd to Fitzgerald D	3,800			X		68	38	X	X	X	X	X	X				X	$4,275,317
	T-023	Coyote View Dr - Fitzgerald Dr to Coyote Cyn Pk	1,700			X		68	38	X	X	X	X	X	X				X	$1,912,642
	T-024	Coyote Cyn Pkwy - Coyote View Dr to Timp Can	1,800			X		68	38	X	X	X	X	X	X				X	$2,025,150
	T-025	Valley Hills Blvd - Commons Blvd to Fitzgerald D	1,800			X		68	38	X	X	X	X	X	X				X	$2,025,150
	T-026	Fitzgerald Dr - US 40 to Ostler Peak Rd	800			X		68	38	X	X	X	X	X	X				X	$900,067
	T-027*	Fitzgerald Dr - Ostler Peak Rd to Valley Hills Blv	500			X		68	38	X	X	X	X	X	X				X	$562,542
	T-028*	Fitzgerald Dr - Valley Hills Blvd to Coyote View D	2,300			X		68	38	X	X	X	X	X	X				X	$2,587,692
	T-029	Ostler Peak Rd - Fitzgerald Dr to Coyote Cyn Pk	2,200		X			62	32	X	X	X	X	X	X				X	$2,279,047
	T-030	Valley Hills Blvd - Fitzgerald Dr to Coyote Cyn P	2,300			X		68	38	X	X	X	X	X	X				X	$2,587,692
	T-031	Coyote Cyn Pkwy - US 40 to Ostler Peak Rd	1,100				X	85	50	X	X	X	X	X	X			X	X	$1,693,579
	T-032*	Coyote Cyn Pkwy - Ostler Peak Rd to Valley Hill	900				X	85	50	X	X	X	X	X	X			X	X	$1,385,655
	T-033*	Coyote Cyn Pkwy - Valley Hills Blvd to Timp Can	1,700				X	85	50	X	X	X	X	X	X				X	$2,269,619
	T-034	Intersection 1 - UDOT Traffic Signal (SR 32)	$500,000	X															X	$690,000
	T-035	Intersection 3 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-036	Intersection 5 - Single Lane Roundabout	$750,000	X															X	$1,035,000
	T-037	Intersection 10 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-038	Intersection 8 - Single Lane Roundabout (2-Way	$750,000	X															X	$1,035,000
	T-039	Intersection 9 - Multi Lane Roundabout	$750,000	X															X	$1,035,000
	T-040	Intersection 13 - Single Lane Roundabout (2-Wa	$1,000,000	X															X	$1,380,000
	T-041	Intersection 16 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-042	Intersection 17 - Multi Lane Roundabout	$1,000,000	X															X	$1,380,000
	T-043	Intersection 18 - Multi Lane Roundabout	$1,000,000	X															X	$1,380,000
	T-044	Intersection 23 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-045	North Village Master Plan Update (5 yrs x 4 Time	$160,000	X																$192,000
		TOTAL STREETS:																**TOTAL:**		**$70,237,963**

NOTES:

- Road Widening assumes existing road asphalt is 26' wide. Upsizing is difference between existing and master planned asphalt width; ie. Local 32', Minor Collector 38', Major Collector 50', Minor Arterial 60'.
- UDOT Intersection Improvements are expected to have a cost of $0 incurred by Heber City.
- Percent paid by developers for road widening costs on existing roads: Major/Minor Locals 100%, Minor Collectors 83%, Major Collectors 75%.
- Percent paid by developers for cost to construct new roads: see above notes.
- Curb and gutter price storm drain system price of $105 per foot is for one side of the road. The formula multipies by 2 to cover boths side of the road and all of the storm drain system.
- Prices do not include bridges, blasting, retaining walls, relocation of utilities, or guardrails.
- Prices inlcudes oversizing of storm pipes and facilities due to road widing from Major Local. And also lenghting of culverts at drainage crossings.

* Includes a bridge over a canal.

The amounts in Table 4-7 only include engineering and construction costs to build the road cross section (clear & grub of road cross section area, excavation for road section curb to curb, subbase, road base, asphalt, and curb & gutter). Therefore, the costs in Table 4-7 exclude engineering and construction costs for the following items, which are anticipated to be included and paid for by developments as part of the developer contributions as these items are needed.

- Mass grading/earth moving/slope construction
- Bridges/box culverts
- Pipes under roadways at drainage crossings
- Rock blasting
- Slope stabilization/erosion control
- Retaining walls
- Guardrail
- Streetlights
- Decorative features/landscape
- Landscaping
- Etc.

See Appendix 6 for the complete streets cost summary including unit costs.

Developer Contributions

The City has a policy that developers are responsible for 100 percent of the cost of on-site improvements needed to serve their development. Developers are also responsible for extending off-site, full width street improvements needed to serve their development. Reimbursement for a portion of these costs may be available through reimbursement agreements for the purpose of collecting funds from future adjacent property owners that front the street. The City will also reimburse developers the cost to upgrade streets from a Major Local to a Minor Collector, Major Collector, or Minor Arterial if they are identified in this Master Plan and impact fee funds are available.

Streets are required to be extended either through or along the front of a development to the farthest property line to facilitate extension by future adjacent property owners.

Road Fund Sources

Class B and C road funds are part of a funding program established by the Utah Legislature in 1937 as a means of helping counties and incorporated municipalities for the improvement of roads and streets throughout the State. 30 percent of state highway user taxes and fees are allocated to the class B and class C road account. This is a restricted account to be used for the construction and maintenance of county roads and municipal streets that have been documented as eligible for funding according to regulations governing this fund. Class B and C road funds are distributed bi-monthly using the formula prescribed in Utah Code 72-2-108(2-5).

Other funding sources include state transportation taxes, grants, and UDOT Small Urban funds.

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Chapter 5

North Village Storm Water Master Plan

5.1 Summary and Recommendations

Introduction

Population growth and development in North Village of Heber City has the potential to alter existing hillside drainage paths which could then ultimately have a negative impact on sensitive areas downstream. It is imperative that Heber City storm water requirements are followed, and the Impact Fee Facility improvements, as specified in this Master Plan, are implemented to ensure proper storm water control of North Village both now and in the future. The hydrology, water quality, and the storm water level-of-service of the Heber Valley should not be adversely affected by growth in North Village.

This chapter evaluates the storm drain requirements for the ultimate 2042 boundary area of North Village. Calculations and recommendations are based on the most recent City zoning and annexation plan for the North Village Overlay District (NOVZ). Recommendations are made to ensure that the drainage system remains adequate to meet the projected increases in storm water flow and water quality requirements. As development occurs, the recommended storm water facilities provided in this plan will be required, while maintaining historic discharge paths and channels. Storm Water retention will be implemented to prevent unwanted changes to the historic discharge patterns.

Recommended Impact Fee Facilities will all be within or near existing natural drainage channels, they include the following:

- Debris/retention basins upstream of developments
- Culverts under both the Timpanogos and Wasatch irrigation canals at each of the seven existing natural drainage channels
- Intermediate retention and infiltration areas within the natural drainage channels to maintain current infiltration of storm water runoff
- A final retention basin at the bottom of the drainage on the east side of US 40 to capture any remaining storm water runoff that has not been infiltrated upstream

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The existing natural drainages of North Village hillside have been modeled by Ensign Engineering using EPA SWMM software with the following parameters:

- Hydrologic Method — SCS Curve Number
- Design Event — 100-Year Storm
- Retention Capacity — 24-hr, 100-Year Storm
- Natural Channel Buffer Zone — 50 feet min each side of Channel (100 feet total)

Storm Drain Discharge Standard

Storm water requirements for development in North Village are outlined in the Heber City Storm Water Design Manual, which is included in Appendix 7. Prior to development, all storm water from undeveloped areas will continue to collect in existing natural drainage channels and flow west. Once development occurs, the facilities listed in this Master Plan must be completed within the existing drainage channels to control and retain the 100-year flow through the natural drainages. All storm water runoff from developed areas must be retained on-site and not be comingled with undeveloped flow or discharged to the natural drainage channels. The retention volumes for storm water from development must be designed separately, therefore, developed flow shall not discharge to the natural drainages. The 100-year flow path for the flow from development must also be provided to show how the flow will be kept out of the natural drainages, and kept within the conveyance system, and consequently be contained in on-site retention areas.

Water Quality

Heber City values water quality and the Storm Water Design Manual (SWDM) includes water quality components for proposed developments. The SWDM includes a list of minimum water quality design features for development, and requires Low Impact Development (LID) measures to be incorporated by each development. See Appendix 7 and refer to the most recent edition of the SWDM for water quality requirements for development.

Utah Pollution Discharge Elimination System (UPDES) permits are also required on construction sites larger than one acre and on sites less than one acre if they are part of a common larger development. Measures to control water quality are recommended to be continued and implemented. Measures include public outreach, facilities inventory mapping, official construction site storm water runoff control, pollution prevention, and good housekeeping. It is also recommended that Heber City create and implement an official Storm Water Management Program in the near future, however, this is not part of the Impact Fee Facilities Plan.

Hazard Mitigation

As development occurs in North Village area, the risk to structures and life may potentially increase. The City would like to be cognizant of potential hazards in the area and the recommended improvements in this plan include basic retention projects to help reduce the risk of flooding and debris flow within the natural drainages. Each development is required to submit

a hazard analysis of the area to be developed and provide a plan to mitigate the hazards that are found. The hazard analysis and recommendations shall be prepared by a qualified Geotechnical and Geological expert who shall determine all potential hazards and provide recommendations for each. The hazard mitigations may compliment the projects proposed it in this plan. And as each development submits their analysis, the findings may be utilized in future Master Plan updates.

To reduce the risk of flooding and debris flow hazard in the natural drainages, any proposed crossing of a natural drainage channel such as road or trail crossings shall be designed so that the 100-year flow remains within the drainage channel. The drainage paths and the channel crossing shall be designed such that water and debris flow over the road and back down the channel if the culvert or overflow structures were to ever be plugged. These road crossings shall include a dip or low point designed to pass the 100-year flow plus one-foot of freeboard over the roadway as a backup in case of culvert plugging. The design shall also ensure to the extent practical no intermingling of storm water runoff from development and natural undeveloped flow. To assist in this endeavor, the design could also include designing the development's underground storm water conveyance system for the 100-year flow in some situations.

Ground Water

There are certain areas of North Village which may have shallow ground water tables. All new development is required to complete a geotechnical study which includes evaluations of groundwater levels in the development area. If shallow groundwater is discovered, or it is found that there is potential for shallow ground water from streams, channels, or canals nearby, the development is required to provide means of controlling the groundwater for all infrastructure and buildings. Additionally, retention basins and other water quality devices need to be designed such that they do not contaminate groundwater.

Recommended Impact Fee Facilities

The recommended capital improvements are shown in Figure EX-110, which includes a table containing details about each project. This figure includes a guide for the location of the planned future storm drain facilities and improvements for natural undeveloped flow within the existing natural drainage channels. The proposed improvements are designed strictly for undeveloped flow that enters the natural drainage channels. The timing of these projects will be directly related to the location of development, sequencing, and the need for natural drainage attenuation and control. As the projects are needed, developers will be responsible to design and construct the projects which will be paid for by reimbursements from the City via impact fees collected or from other funding mechanisms such as PID where applicable. The capacity of the projects illustrated in Figure EX-110 are at full development build-out with some conservancy in the assumed areas that will remain undeveloped. There will likely also be an intermediate phase of the recommended projects where not all the projects within each drainage basin can be constructed because the area that has been planned to be ultimately developed has not yet developed. The City will need to work with developers to ensure the intermediate phase of the storm water control still functions until the ultimate "built-out" scenario can be reached.

There are several areas where the natural drainage channels have been disturbed and/or filled in

due to past development. These areas are mainly at the bottom or west end of the natural drainages near US 40. The methodology behind this Master Plan requires that these locations be reestablished to allow the natural flow to continue downstream through the channel. The timing and need to reestablish the natural drainage channels will be dictated by the development schedules, location, and the need for the other Master Planned projects within each channel. As the Master Planned culverts at the canal crossings within the natural drainages are installed, the potential for flow within the natural drainages downstream of the canals is likely increased. This will trigger the need to reestablish the natural drainage channel downstream of the canals. The developments within the natural drainages that needs to be reestablished and the projects that trigger the need to reestablish the natural drainage channel shall be responsible to complete the channel reestablishment work. Reestablishing the natural drainage channel is not an Impact Fee Facilities Project, but shall be responsibility of the developers to complete with their developments, which shall be a condition of annexation into the City. Channel shall be designed to convey the historic 100-year storm with a minimum of 2-feet of free board. Other design criteria for the natural channels, such as minimum buffer widths, still apply

The Impact Fee Facilities listed in this Master Plan were designed using EPA SWMM modeling software. The model considers the existing drainage basins/canyons of North Village, and uses elevation data, contributing area, and surface information within the entire area of North Village to produce peak flows for each drainage basin. Sizing of retention ponds and culverts have been optimized to minimize cost while ensuring that adequate capacity is provided. Each project is based on an ultimate build-out scenario with some safety factor on the size of the ultimate contributing basin undeveloped area. If the size of these basins is larger in the future due to reduced development area, then the model will need to be updated and the capacity updated to reflect the actual size of the drainage basins. Development will not all happen at once, therefore, there will be an intermediate phase where the designed facilities will not fully function as proposed. Therefore, the recommended improvements need to be sequenced to prevent unwanted discharge. The City will need to work with developers to ensure that the storm water collection and infiltration adequately functions during the intermediate stages of development.

Factors such as runoff curve number, time of concentration, and outflow curves, were taken into account to ensure that hydrographs are as accurate as possible and there is a reasonable balance obtained between performance and cost. This report only provides the required pond volumes. The actual required area needed is based on several adjustable factors such as pond depth and footprint perimeter alignment which cannot be finalized until the design and construction phase.

It is important to note that the use and capacity of existing canals, streams, and irrigation ditches, were not evaluated as part of this report. A capacity analysis of these facilities was beyond the scope of this Master Plan and is not being improved with this study nor by the Capital Facilities which may be funded by impact fees.

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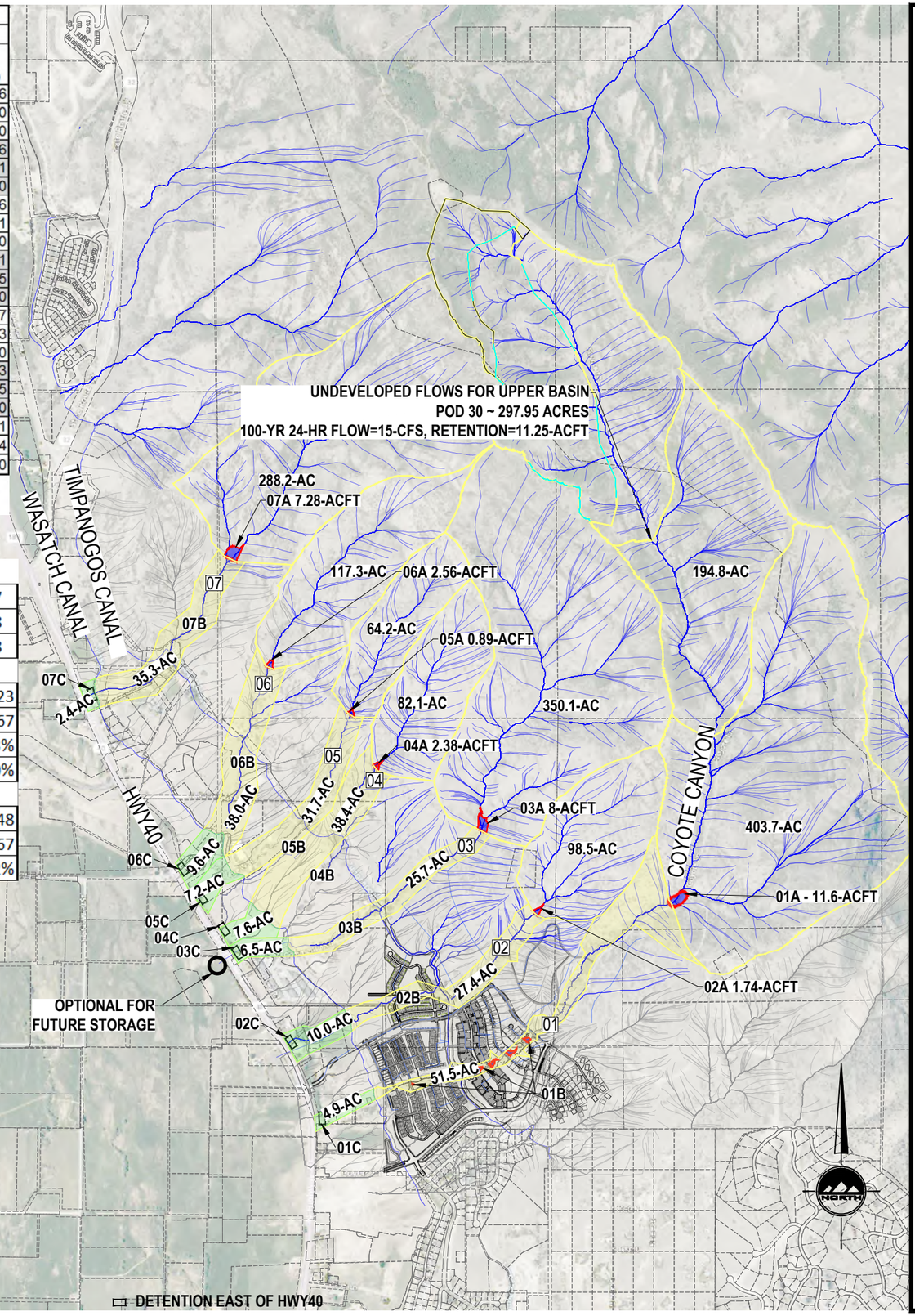
UNDEVELOPED FLOWS THROUGH JORDANELLE CANYONS WITH DRAINAGE IMPROVEMENTS

	STORAGE / LID MEASURE	HISTORIC 100-YR 24-HR PEAK IN (CFS)	HISTORIC 100-YR 24-HR STOR (ACFT)	INFIL. (IN/HR)	100-YEAR PEAK IN (CFS)	100-YEAR STOR (ACFT)	100-YEAR INFIL (ACFT)	25-YEAR PEAK IN (CFS)	25-YEAR STOR (ACFT)	25-YEAR INFIL (ACFT)	10-YEAR PEAK IN (CFS)	10-YEAR STOR (ACFT)	10-YEAR INFIL (ACFT)
01A	SEDIMENT BASIN	162	87	5.45	65.9	11.60	9.05	30.5	9.39	39.19	17.7	5.98	27.96
01B	ROADS / TRAILS			27	22.6	1.15	16.79	0.8	0.00	0.00	0.4	0.00	0.00
01C	EAST HWY 40 *			2	0.8	* 0.50	0.01	0.1	0.00	0.00	0.1	0.00	0.00
02A	SEDIMENT BASIN	33	13	2	25.3	1.74	0.80	10.2	1.74	4.76	5.4	1.48	3.66
02B	ROADS / TRAILS			2	11.9	2.06	2.19	1.4	0.00	0.98	0.2	0.00	0.11
02C	EAST HWY 40 *			2	1.2	* 0.50	0.02	0.2	0.00	0.00	0.1	0.00	0.00
03A	SEDIMENT BASIN	100	35	3.75	54.1	8.00	4.80	23.1	8.00	17.95	12.5	5.35	12.06
03B	ROADS / TRAILS			2	17.7	2.33	1.49	0.5	0.00	0.37	0.2	0.00	0.11
03C	EAST HWY 40 *			2	11.1	1.56	1.03	0.2	0.00	0.00	0.1	0.00	0.00
04A	SEDIMENT BASIN	42	12.5	1	23.1	2.38	0.36	9.6	1.59	3.69	4.8	1.16	3.21
04B	ROADS / TRAILS			1	2.7	0.42	1.01	0.7	0.00	0.46	0.3	0.00	0.15
04C	EAST HWY 40 *			1	1.0	* 0.50	0.01	0.2	0.00	0.00	0.1	0.00	0.00
05A	SEDIMENT BASIN	16	7	2.5	12.5	0.89	0.55	4.4	0.46	3.14	2.4	0.28	2.17
05B	ROADS / TRAILS			2	2.5	0.15	1.64	0.6	0.00	0.38	0.2	0.00	0.13
05C	EAST HWY 40 *			2	1.0	* 0.50	0.01	0.2	0.00	0.00	0.1	0.00	0.00
06A	SEDIMENT BASIN	41	14.5	3.75	80.5	2.56	1.32	32.9	1.61	6.72	14.5	1.14	4.63
06B	ROADS / TRAILS			2	2.7	0.18	1.83	0.7	0.00	0.45	0.3	0.00	0.15
06C	EAST HWY 40 *			2	1.2	* 0.50	0.04	0.2	0.01	0.01	0.1	0.00	0.00
07A	SEDIMENT BASIN	90	34	1.75	40.1	7.28	1.91	16.6	4.28	13.32	8.8	2.77	9.11
07B	ROADS / TRAILS			2	2.6	0.20	1.62	0.6	0.00	0.42	0.3	0.00	0.14
07C	EAST HWY 40 *			2	0.7	* 0.50	0.01	0.1	0.00	0.00	0.0	0.00	0.00

* Minimum basin size at bottom of all drainages (0XC) is 0.5-acft. Volumes and inflow listed are based on assumed undeveloped area and will need to be verified with individual overall drainage basin/development plans.

DEBRIS BASIN VOLUME SUMMARY

		01	02	03	04	05	06	07
Stormwater Volume Planned		13.60	3.80	11.89	2.80	1.04	2.74	7.48
With 0.5 acft minimum at Hwy 40		14.10	4.30	11.89	3.30	1.54	3.24	7.98
Cannon et al. equation (2010)	***Volume (ac-ft)***	14.10	2.33	8.68	2.09	1.54	3.00	7.23
10-year 60-minute depth (in)		0.867	0.867	0.867	0.867	0.867	0.867	0.867
% of Area over 30% Slopes		74%	54%	71%	58%	49%	65%	73%
	Percent Burn	80.7%	100.0%	100.0%	100.0%	94.17%	100.0%	100.0%
Gartner et al equation (2014)	***Volume (ac-ft)***	13.03	4.09	11.59	3.29	1.54	3.24	7.48
5-year 60-minute intensity (in/hr)		1.67	1.67	1.67	1.67	1.67	1.67	1.67
	Percent Burn	100.00%	100.00%	100.00%	73.40%	12.13%	13.65%	29.02%



HORIZONTAL GRAPHIC SCALE

2000 0 1000 2000 4000

(IN FEET)

HORZ: 1 inch = 2000ft.

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NORTH VILLIAGE
UNDEVELOPED DRAINAGE MASTER PLAN
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UNDEVELOPED DRAINAGE
COYOTE CANYON
DISCHARGE VOLUMES
UPDATED INFIL RATES

PROJECT NUMBER 10229A
PRINT DATE 7/19/22
DRAWN BY C. DUNKEL
CHECKED BY B. MORGAN
PROJECT MANAGER B. MORGAN

EX-110

Impact Fee Facilities

The improvements recommended to meet the existing and future storm water control needs of North Village are provided in this section. These projects are only for attenuation and control of storm water from natural undeveloped areas near the channel. All storm water from development must be retained within each development.

D-01A Sediment Basin: 11.6 AC-FT (Q100). This project is intended to be a dual-purpose use retention and infiltration area. Its primary purpose is to attenuate storm water from the 403.7 acre drainage basin above development and infiltrate it into the ground. The secondary purpose is to serve as a debris capture area and basin for post-fire flooding and debris flow. The need for this project will be initiated by development below the canals and within and near drainage channel 01 and below drainage basin 01A.

D-01B Roads/Trails: 1.2 AC-FT (Q100). This project is a series of retention and infiltration galleries that are anticipated to be built upstream of the road, canal, or trail crossing in drainage channel 01. However, this project does not necessarily need to be designed and completed with the road and/or canal crossings and could be simple retention/infiltration areas along the channel. The need for this project will be initiated by development above or below the canals and within or near drainage channel 01.

D-01C East Hwy 40 Detention: 0.5 AC-FT (Q100). This project is intended to capture and retain/infiltrate any remaining flow in channel 01 that is not retained by project 01A and 01B.

D-01D Timp Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Timpanogos Canal in drainage channel 01.

D-01E Wasatch Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Wasatch Canal in drainage channel 01.

D-02A Sediment Basin: 1.7 AC-FT (Q100). This project is intended to be a dual-purpose use retention and infiltration area. Its primary purpose is to attenuate storm water from the 95.8 acre drainage basin above development and infiltrate it into the ground. The secondary purpose is to serve as a debris capture area and basin for post-fire flooding and debris flow. The need for this project will be initiated by development below the canals and within and near drainage channel 02 and below drainage basin 02A.

D-02B Roads/Trails: 2.1AC-FT (Q100). This project is a series of retention and infiltration galleries that are anticipated to be built upstream of the road, canal, or trail crossing in drainage channel 02. However, this project does not necessarily need to be designed and completed with the road and/or canal crossings and could be simple retention/infiltration areas along the channel. The need for this project will be initiated by development above or below the canals and within or near drainage channel 02.

D-02C East Hwy 40 Detention: 0.5 AC-FT (Q100). This project is intended to capture

and retain/infiltrate any remaining flow in channel 02 that is not retained by project 02A and 02B.

D-02D Timp Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Timpanogos Canal in drainage channel 02.

D-02E Wasatch Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Wasatch Canal in drainage channel 02.

D-03A Sediment Basin: 8.0 AC-FT (Q100). This project is intended to be a dual-purpose use retention and infiltration area. Its primary purpose is to attenuate storm water from the 350.1 acre drainage basin above development and infiltrate it into the ground. The secondary purpose is to serve as a debris capture area and basin for post-fire flooding and debris flow. The need for this project will be initiated by development below the canals and within and near drainage channel 03 and below drainage basin 03A.

D-03B Roads/Trails: 2.3 AC-FT (Q100). This project is a series of retention and infiltration galleries that are anticipated to be built upstream of the road, canal, or trail crossing in drainage channel 03. However, this project does not necessarily need to be designed and completed with the road and/or canal crossings and could be simple retention/infiltration areas along the channel. The need for this project will be initiated by development above or below the canals and within or near drainage channel 03.

D-03C East Hwy 40 Detention: 1.6 AC-FT (Q100). This project is intended to capture and retain/infiltrate any remaining flow in channel 03 that is not retained by project 03A and 03B.

D-03D Timp Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Timpanogos Canal in drainage channel 03.

D-03E Wasatch Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Wasatch Canal in drainage channel 03.

D-04A Sediment Basin: 2.4 AC-FT (Q100). This project is intended to be a dual-purpose use retention and infiltration area. Its primary purpose is to attenuate storm water from the 82.1 acre drainage basin above development and infiltrate it into the ground. The secondary purpose is to serve as a debris capture area and basin for post-fire flooding and debris flow. The need for this project will be initiated by development below the canals and within and near drainage channel 04 and below drainage basin 04A.

D-04B Roads/Trails: 0.4 AC-FT (Q100). This project is a series of retention and infiltration galleries that are anticipated to be built upstream of the road, canal, or trail crossing in drainage channel 04. However, this project does not necessarily need to be designed and completed with the road and/or canal crossings and could be simple retention/infiltration areas along the channel. The need for this project will be initiated by development above or below the canals and within or near drainage channel 04.

D-04C East Hwy 40 Detention: 0.5 AC-FT (Q100). This project is intended to capture and retain/infiltrate any remaining flow in channel 04 that is not retained by project 04A and 04B.

D-04D Timp Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Timpanogos Canal in drainage channel 04.

D-04E Wasatch Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Wasatch Canal in drainage channel 04.

D-05A Sediment Basin: 0.9 AC-FT (Q100). This project is intended to be a dual-purpose use retention and infiltration area. Its primary purpose is to attenuate storm water from the 64.2 acre drainage basin above development and infiltrate it into the ground. The secondary purpose is to serve as a debris capture area and basin for post-fire flooding and debris flow. The need for this project will be initiated by development below the canals and within and near drainage channel 05 and below drainage basin 05A.

D-05B Roads/Trails: 0.2 AC-FT (Q100). This project is a series of retention and infiltration galleries that are anticipated to be built upstream of the road, canal, or trail crossing in drainage channel 05. However, this project does not necessarily need to be designed and completed with the road and/or canal crossings and could be simple retention/infiltration areas along the channel. The need for this project will be initiated by development above or below the canals and within or near drainage channel 05.

D-05C East Hwy 40 Detention: 0.5 AC-FT (Q100). This project is intended to capture and retain/infiltrate any remaining flow in channel 05 that is not retained by project 05A and 05B.

D-05D Timp Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Timpanogos Canal in drainage channel 05.

D-05E Wasatch Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Wasatch Canal in drainage channel 05.

D-06A Sediment Basin: 2.6 AC-FT (Q100). This project is intended to be a dual-purpose use retention and infiltration area. Its primary purpose is to attenuate storm water from the 117.3 acre drainage basin above development and infiltrate it into the ground. The secondary purpose is to serve as a debris capture area and basin for post-fire flooding and debris flow. The need for this project will be initiated by development below the canals and within and near drainage channel 06 and below drainage basin 06A.

D-06B Roads/Trails: 0.2 AC-FT (Q100). This project is a series of retention and infiltration galleries that are anticipated to be built upstream of the road, canal, or trail crossing in drainage channel 06. However, this project does not necessarily need to be designed and completed with the road and/or canal crossings and could be simple retention/infiltration areas along the channel. The need for this project will be initiated by development above or below the canals and within or near drainage channel 06.

06C East Hwy 40 Detention: 0.5 AC-FT (Q100). This project is intended to capture and retain/infiltrate any remaining flow in channel 06 that is not retained by project 06A and 06B.

D-06D Timp Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Timpanogos Canal in drainage channel 06.

D-06E Wasatch Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Wasatch Canal in drainage channel 06.

D-07A Sediment Basin: 7.3 AC-FT (Q100). This project is intended to be a dual-purpose use retention and infiltration area. Its primary purpose is to attenuate storm water from the 288.2 acre drainage basin above development and infiltrate it into the ground. The secondary purpose is to serve as a debris capture area and basin for post-fire flooding and debris flow. The need for this project will be initiated by development below the canals and within and near drainage channel 07 and below drainage basin 07A.

D-07B Roads/Trails: 0.2 AC-FT (Q100). This project is a series of retention and infiltration galleries that are anticipated to be built upstream of the road, canal, or trail crossing in drainage channel 07. However, this project does not necessarily need to be designed and completed with the road and/or canal crossings and could be simple retention/infiltration areas along the channel. The need for this project will be initiated by development above or below the canals and within or near drainage channel 07.

D-07C East Hwy 40 Detention: 0.5 AC-FT (Q100). This project is intended to capture and retain/infiltrate any remaining flow in channel 07 that is not retained by project 07A and 07B.

D-07D Timp Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Timpanogos Canal in drainage channel 06.

D-07E Wasatch Canal Crossing: 100 LF. This project is the pipe for the natural drainage to flow under the Wasatch Canal in drainage channel 06.

Economic Statement

The estimated cost of each Impact Fee Facilities project is listed in Table 5-3 in Section 5.4. The funding mechanism for these projects will likely be impact fees and/or Public Improvement Districts (PID), but may also include grants, third party contributions, or other sources. The calculation, collection, and proposed implementation of impact fees will be presented in a separate report, as well as the analysis and administration of any proposed Public Improvement Districts that may help fund the projects.

The maintenance of the storm drain systems and natural drainages will be funded by the storm drain utility fee charged to all existing residential and non-residential users. This fee would also

cover the cost of storm drain projects benefiting existing users, including street sweeping, and drainage maintenance. It is recommended that the current storm water utility fee be continued. The fees are currently $12.67/month for residential single family, multifamily less than an acre, and non-residential less than an acre. For multifamily residential and non-residential properties greater than an acre the fee is currently $9.86/acre/month with a maximum fee of $104.92/month for any parcel. This utility fee will generate the funds necessary for proper operation and maintenance of the City storm drain facilities. This fee should be charged to all developed property in North Village. The storm water utility fee should be reviewed annually to keep abreast of increasing inflation and construction cost indexes.

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5.2 Existing and Future Growth Conditions

Population growth and development in North Village of Heber City has the potential to change the historic storm water drainage paths of the North Village hillside which would impact downstream channels and water bodies including the north fields west of US-189. The amount of precipitation runoff that is produced from a given area is related to the amount of water that infiltrates into the soil and/or is retained by vegetation. Alterations to soil and vegetation conditions cause less infiltration and retention and result in a larger amount of runoff. Constructing impervious surfaces such as roads, sidewalks, driveways, and homes in previously open areas increase the volume of water, rate of runoff, and concentration of pollutants in the runoff. These issues can change the hydrology and water quality, and result in a variety of problems, including habitat modification, increased flooding, decreased aquatic wildlife diversity, and increased sedimentation and erosion. It is imperative that guidelines are followed and needed improvements are implemented to ensure proper storm water control of North Village now and in the future. The hydrology and water quality of the Heber Valley shall not be adversely affected by growth in North Village.

Some of the sources and criteria used to determine future storm water control needs are:

- Growth projections
- Environmental regulations of EPA, FEMA, and DEQ
- Residential / non-residential development
- Heber City General Plan and zoning maps

Input and requests from various agencies and stakeholders in the Heber Valley have been taken into account with the production of this Master Plan. Some of the agencies and stakeholders include:

- Wasatch County and Health Department
- State of Utah Departement of Environmental Quality (DEQ)
- Provo River Water Shed Council (PRWC)
- Bureau of Reclamation (BOR)/Wasatch County Water Efficiency Project (WCWEP)
- United States of America Department of Interior (DOI)
- Utah Reclamation Commission
- Division of Wildlife Resources
- Utah Department of Agriculture and Food
- North Field Irrigation Company
- North Field Property Owners
- United States Geological Survey (USGS)

As factors change, or if new input is received, the recommendations made in this study could be affected. Continued communication with agencies and stake holders is important as this Master Plan is updated in the future. To minimize the effect of changing future conditions, recommendations made in this report are based upon future development, planned roadway improvements, recent water quality regulations, and the impact they may have upon future land uses. Storm drain improvement projects should be completed in conjunction with water quality

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needs and land development.

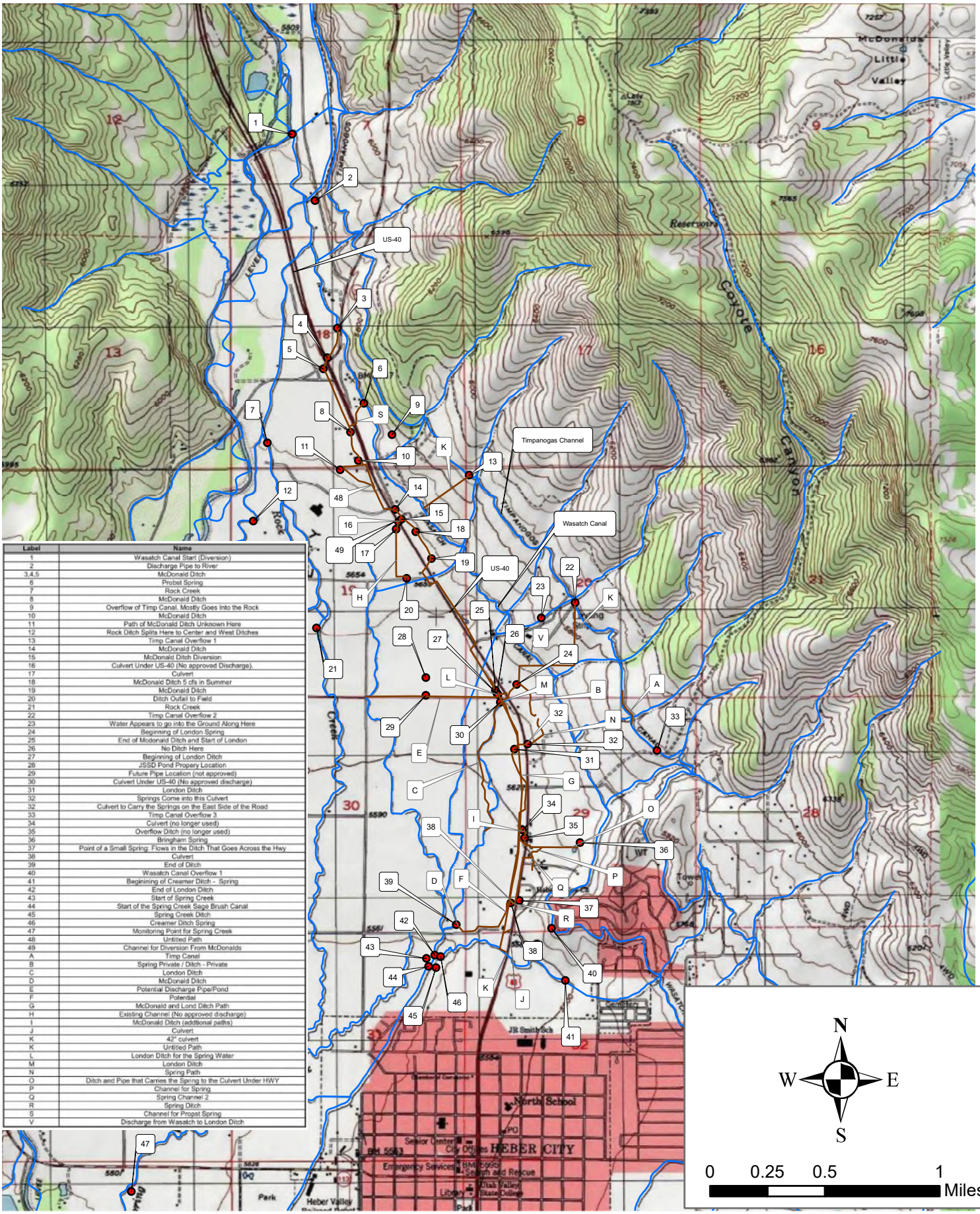
Existing North Village Drainage Basins

The existing topography of North Village consists of seven large canyons, one of which is Coyote Canyon. Natural drainage channels exist in each of these canyons which have served as outfalls for the natural undeveloped storm water. Historically these drainage outfalls continued west toward Provo River, but since the late 1800s these natural drainage channels have been cut off by the two federally owned canals that run north and south through the area. These canals were not sized for all of the storm drainage but have subsequently ended up collecting flow from the existing drainage basins. Historically, these canals could accommodate small storm events, but they can overtop and flood the surrounding area during larger events. Federal policy prohibits any storm water from development areas from discharging into these canals. See Appendix 8 for the Cross Drainage Flow Rates Summary map which summarizes data from an older drainage study completed for the WCWEP.

Existing Conditions & Map

North Village existing storm drain facilities are shown in Figure 5-1 Existing Drainage Features. This map was created from information gathered during meetings with WCWEP and North Fields Irrigation Company. Some of the labels are simply notes taken during the meeting and may not directly relate to existing facilities.

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Label	Name
1	Wasatch Canal Start (Diversion)
2	Discharge Pipe to River
3,4,5	McDonald Ditch
6	Probst Spring
7	Rock Creek
8	McDonald Ditch
9	Overflow of Timp Canal, Mostly Goes Into the Rock
10	McDonald Ditch
11	Path of McDonald Ditch Unknown Here
12	Rock Ditch Splits Here to Center and West Ditches
13	Timp Canal Overflow 1
14	McDonald Ditch
15	McDonald Ditch Diversion
16	Culvert Under US-40 (No approved Discharge).
17	Culvert
18	McDonald Ditch 5 cfs in Summer
19	McDonald Ditch
20	Ditch Outfal to Field
21	Rock Creek
22	Timp Canal Overflow 2
23	Water Appears to go into the Ground Along Here
24	Beginning of London Spring
25	End of Mcdonald Ditch and Start of London
26	No Ditch Here
27	Beginning of London Ditch
28	JSSD Pond Propery Location
29	Future Pipe Location (not approved)
30	Culvert Under US-40 (No approved discharge)
31	London Ditch
32	Springs Come into this Culvert
32	Culvert to Carry the Springs on the East Side of the Road
33	Timp Canal Overflow 3
34	Culvert (no longer used)
35	Overflow Ditch (no longer used)
36	Bringham Spring
37	Point of a Small Spring: Flows in the Ditch That Goes Across the Hwy
38	Culvert
39	End of Ditch
40	Wasatch Canal Overflow 1
41	Beginining of Creamer Ditch - Spring
42	End of London Ditch
43	Start of Spring Creek
44	Start of the Spring Creek Sage Brush Canal
45	Spring Creek Ditch
46	Creamer Ditch Spring
47	Monitoring Point for Spring Creek
48	Untitled Path
49	Channel for Diversion From McDonalds
A	Timp Canal
B	Spring Private / Ditch - Private
C	London Ditch
D	McDonald Ditch
E	Potential Discharge Pipe/Pond
F	Potential
G	McDonald and Lond Ditch Path
H	Existing Channel (No approved discharge)
I	McDonald Ditch (additional paths)
J	Culvert
K	42" culvert
K	Untitled Path
L	London Ditch for the Spring Water
M	London Ditch
N	Spring Path
O	Ditch and Pipe that Carries the Spring to the Culvert Under HWY
P	Channel for Spring
Q	Spring Channel 2
R	Spring Ditch
S	Channel for Propst Spring
V	Discharge from Wasatch to London Ditch

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Existing Drainage Features

DATE 9/2/2022
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Figure 5-1

Future Discharge of Storm Water

Several meetings and discussions with downstream stakeholders have taken place regarding storm water from North Village and it has been determined that due to the sensitive nature of the North Fields, the physical constraints, and respecting the wishes of the stakeholders who, based on the unique history relating to storm water in the area, want to see that no storm water discharge go to the North Fields or to the Provo River. Development in North Village will be required to fully retain all storm water from undeveloped and developed areas for the 100-year return period.

Storm Water from development is required to be fully retained per the Heber City Storm Water Design Manual and will not be allowed to discharge to the natural drainages or be combined with the natural runoff that flows to the drainage channels. The recommended improvements in the Plan are sized to handle only storm water from undeveloped areas after all the proposed development in North Village has been built. There is some safety factor in the assumed area that will remain undeveloped in and around the drainage channels, however, it is assumed that North Village will fully develop in the future and all of the storm water from development will be retained with each development area, while the storm water from undeveloped areas will remain in the natural drainage channel and be retained and infiltrated within the channel and master planned basins.

Although it is the intent of this Master Plan to maintain separation between natural and developed storm water runoff, because all storm water for the 100-year storm event will be retained on the east side of US 40 with no planned discharge to the North Fields, the City will consider allowing for the combining of these flows on a case-by-case basis when it can be shown that doing so will not compromise water quality or the other goals of this plan.

Future Conditions for Natural Drainages

All major natural channels must maintain a buffer of open space and offset from development. This buffer is intended to help maintain water quality, prevent damage from flooding events, and maintain habitat and aesthetics. A minimum buffer width of 100-ft centered on the major natural drainage channel should be maintained. Development (including individual lots and buildings) is not allowed in the buffer zone. The drainage channel shall be protected and remain undisturbed where possible and with the exception of road or other crossings. Additional landscaping, green space, trails, or other amenities may be allowed if it is shown they will not negatively affect water quality or compromise the other goals of the buffer area. All improvements proposed in the natural drainages shall be approved by the City.

Modeling of Storm Water Runoff for Master Planned Facilities

Ensign Engineering modeled the existing drainage basins with EPA SWMM using the SCS curve number method. Curve numbers were based on land cover and hydrologic soil groups. Land cover was estimated using aerial imagery and hydrologic soil groups were taken from the USGS Web Soil Survey.

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The following criteria were used:

- Hydrologic Method — SCS Curve Number
- Design Event — 100-Year Storm
- Retention Capacity — 24-hr, 100-Year Storm
- Natural Channel Buffer Zone — 50 feet each side of Channel (100 feet total)

Summary of Projected Storm Water Runoff

As part of the modeling projects, the North Village area was divided the seven major subbasins used to approximate the runoff of the storm water from the undeveloped areas remaining at the time of future build-out. Areas anticipated to be developed are not included in this study and will need to be modeled separately by each development. The subbasins included the upper area that that will remain undeveloped, the main channel area through the developed areas, and the lower portion near US-40. An upper retention basin, which will also serve as a post-fire debris basin, has been planned to reduce runoff and lessen the risk of downstream flooding. The middle and lower sections of the watershed will have various ponds, berms, and basins to act as a retention and infiltration system that contains the 100-year runoff event prior to reaching US 40. Pipes sized for the 100-year storm event are planned under each canal to help prevent water from entering the canals. See Figure EX-110 for additional information.

See Table 5-1 for a summary of the infiltration rates used in the model and storage volumes determined within each basin by the Model.

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Table 5-1 North Village Storm Water Runoff Volumes from Undeveloped Areas

Storage / LID Measure		Infil. (In/Hr)	Min Required Storage (Ac-Ft)
1 A	Sediment Basin	5.45	11.6
1 B	Roads/Trails	27	1.15
1 C	East Hwy 40	2	0
2 A	Sediment Basin	2	1.74
2 B	Roads/Trails	2	2.06
2 C	East Hwy 40	2	0.01
3 A	Sediment Basin	3.75	8
3 B	Roads/Trails	2	2.33
3 C	East Hwy 40	2	1.56
4 A	Sediment Basin	1	2.38
4 B	Roads/Trails	1	0.42
4 C	East Hwy 40	1	0.01
5 A	Sediment Basin	2.5	0.89
5 B	Roads/Trails	2	0.15
5 C	East Hwy 40	2	0
6 A	Sediment Basin	3.75	2.56
6 B	Roads/Trails	2	0.18
6 C	East Hwy 40	2	0.02
7 A	Sediment Basin	1.75	7.28
7 B	Roads/Trails	2	0.2
7 C	East Hwy 40	2	0

See Figure EX-110 for the watershed delineations, flow rates, retention volumes and debris volumes. Infiltration rates were measured in the field at each drainage basin and a safety factor of two was applied for the study. A summary of the North Village Percolation Testing results is provided in Appendix 9.

Projected Development Area

The total drainage area of the watershed that encompasses North Village is 3,013 acres and the projected development area is 1,167 acres, south of SR 32 and east of US 40. See Appendix 10 for an outline of the drainage area. It is anticipated that much of this area will be annexed into Heber City in the future, and this Storm Water Master Plan covers the entire North Village area. However, some of North Village may not annex into the City but remain in the County. The components and recommendations of this Master Plan should not only apply to areas of North Village that are annexed into Heber City but also to areas that remain in Wasatch County. It is recommended that Heber City coordinate with Wasatch County to pursue a Memorandum of Understanding regarding enforcement of the requirements of this Master Plan regardless of whether properties in the North Village area annex into Heber City or develop in Wasatch County.

Future Growth

The projected residential and non-residential units and ERUs are determined using the growth numbers in Chapter 3. Total ERU's projected for 2042 equal 1,928 residential and 51 non-residential equivalent residential units (ERU's). This estimation is based on projected population growth and land use areas that are expected to develop in the next 20 years. These growth projections will be updated as Mountain Land Association of Governments (MAG) updates the population and growth projections for Heber City or as Heber City calculates new population projections for North Village. See Table 5-2 below, and see Chapter 3 for more information on population.

Future capital facility projects are dictated by maintaining the natural drainage channels and storm water conveyance from the undeveloped areas in North Village. The projects are proposed to be funded by the storm water impact fees which will be paid by new users. Public Improvement Districts may also be utilized.

Table 5-2 Projected Residential and Non-Residential Growth

	NORTH VILLAGE POPULATION				RESIDENTIAL			NON-RESIDENTIAL					RES+NON-RES	
YEAR	% CHG	TOTAL	CHG		ERU	CHG		% CHG	CONN	CHG	ERU's		ERU's	
											ERU'S/CONN			
											3.6			
2022	0.00%	1,394	0		414	-		0.00%	0.00	0.00	0.00		-	
2023	15.00%	1,603	209		481	67		0.00%	0.00	0.00	0.00		67.02	
2024	14.00%	1,828	224		553	72		0.00%	5.00	5.00	18.00		89.93	
2025	13.00%	2,065	238	671	629	76	215	0.00%	10.00	5.00	18.00	36.00	94.15	251
2026	12.00%	2,313	248		708	79		12.00%	15.00	5.00	18.00		97.43	
2027	11.00%	2,567	254		790	82		12.00%	16.80	1.80	6.48		88.03	
2028	10.00%	2,824	257		872	82		12.00%	18.82	2.02	7.26		89.54	
2029	9.00%	3,078	254		953	81		12.00%	21.07	2.26	8.13		89.59	
2030	8.00%	3,325	246	1,259	1,032	79	404	12.00%	23.60	2.53	9.10	48.97	88.03	453
2031	7.00%	3,557	233		1,107	75		7.00%	25.25	1.65	5.95		80.54	
2032	7.00%	3,806	249		1,187	80		7.00%	27.02	1.77	6.36		86.17	
2033	7.00%	4,073	266		1,272	85		7.00%	28.91	1.89	6.81		92.21	
2034	6.00%	4,317	244		1,351	78		7.00%	30.94	2.02	7.29		85.61	
2035	6.00%	4,576	259	1,252	1,434	83	401	7.00%	33.10	2.17	7.80	34.20	90.82	435
2036	6.00%	4,851	275		1,522	88		6.00%	35.09	1.99	7.15		95.15	
2037	6.00%	5,142	291		1,615	93		6.00%	37.20	2.11	7.58		100.86	
2038	6.00%	5,450	308		1,714	99		6.00%	39.43	2.23	8.03		106.91	
2039	5.00%	5,723	273		1,801	87		6.00%	41.79	2.37	8.52		95.86	
2040	5.00%	6,009	286	1,433	1,893	92	459	6.00%	44.30	2.51	9.03	40.31	100.74	500
2041	5.00%	6,309	300		1,989	96		5.00%	46.52	2.22	7.97		104.27	
2042	5.00%	6,625	315		2,090	101		5.00%	48.84	2.33	8.37		109.48	
TOTAL CHANGE (2022-2042)			5,231			1,677				49	49		1725	
EST 2022			1,394			414				0	0		414	
TOTAL 2042			6,625			2,090				49	49		2139	
ULTIMATE PER LANDUSE						14,964								

5.3 Storm Water Control and Level of Service

Maintaining Level of Service in North Village

The purpose of a storm drain system is to prevent damage to property and provide for a reasonable level of safety for the public. Safety risks associated with storm water include potential flooding and effects on water quality. The small amount of existing development in North Village controls storm water runoff through sumps, catch basins, collection pipes, street curb and gutter networks, and retention ponds. The existing level of service for storm water control in the North Village is good and there is no known risk of flooding risks to structures or life.

The high level of service for Storm Water Control in North Village needs to be maintained as growth and development continues. The City's Storm Water Design Manual (SWDM) provides requirements for storm water design throughout the City. In addition to the requirements found in the SWDM, recommended control methods for handling future storm water runoff from development in North Village include the following:

- Collaboration and Participation in this North Village Storm Water Master Plan
- Full retention of storm water to eliminate downstream discharge and to capture pollutants
- Pretreatment pollutant removal devices designed specifically for the project
- Construction site runoff control
- Regular maintenance and good housekeeping
- Public education and outreach on pollutant control
- Facility inventory management
- Storm Water Management Agreements

Note: Pretreatment type devices can be an additional method of increasing water quality like inlets, sumps and ponds, but need to be regularly maintained to function properly.

The U.S. Environmental Protection Agency (EPA) presently regulates the water quality released into streams from large cities. Although Heber is not considered a large city, the EPA has plans to place water quality restrictions on smaller cities in the future. In anticipation of stricter water quality regulations in the future, the City should continue to develop more advanced storm water control measures as well as provide additional storm water regulations.

Developer Storm Water Maintenance Agreements

Each development within North Village shall have a Storm Water Maintenance Agreement (SWMA) and associated Long-Term Storm Water Management Plan with Heber City. It is preferred that storm water from private roads and facilities will be conveyed and retained separately from public storm water from the City owned public roads and trails. The private HOAs will be required to maintain the pipes, inlets, water quality features, retention facilities, etc. for private systems. While the City will own and maintain their own facilities within the public roadways. If private and public storm water is combined within a development due to constraints that prohibit the facilities to remain separate, then the SWMA between the City and

developer must address maintenance of the shared facilities. See Appendix 7 for the Storm Water Design Manual which contains a sample SWMA and Associated Long-Term Storm Water Management Plan within its Appendix J.

Interlocal Discharge Agreements

Wasatch County Water Efficiency Project (WCWEP) - CUWCD and the BOR prohibit storm water discharge from development to enter the Wasatch and Timpanogos Canals. The City also has a non-written gentleman's agreement with WCWEP that prohibits the natural unattenuated storm water in the natural drainages from flowing directly into the Timpanogos and Wasatch Canals as the area develops downstream of the canals. Culverts are planned under the canal at each location where the canals cross the natural drainages. These will be installed with development that occurs in the area or as WCWEP and Heber City determine they are needed.

Wasatch County

This Master Plan is for the entire North Village area. Most of the area has not yet annexed into Heber City, but remains in unincorporated Wasatch County, although most of the area is expected to eventually annex into the City. The requirements of this Master Plan should not only apply to areas of North Village that are annexed into Heber City but also the areas that remain in Wasatch County. Heber City will coordinate with Wasatch County to develop a Memorandum of Understanding (MOU) to provide consistency and continuity for the Master Planned storm drain systems.

The County is currently looking into doing a study to combine storm drain efforts with the City and potentially install regional detention/retention facilities for water quality purposes. In June 2000 a study was done recommending four basins be constructed to reduce the amount of sediment and phosphorus entering into the Provo River system. As the City designs its own facilities, mutually beneficial opportunities should be investigated to incorporate features enhancing water quality and reducing the economic impact to both the City and County. As part of the SWMP's six minimum control measures, Heber City will work to reduce pollutant discharge to streams and water bodies which affect Wasatch County and other downstream users. Heber City should also coordinate with Wasatch County in the steps to create a Storm Water Management Program that will provide benefit countywide.

City Storm Water Management Program

Considering the growth in Heber City, an official Storm Water Management Program is needed. Heber City and/or the Heber Valley will soon be classified as a small municipal separate storm sewer system (MS4). The Utah Department of Environmental Quality (DEQ) Division of Water Quality (DWQ) has storm water management regulations and guidelines to help facilitate storm water control for a small MS4. The program could be a combined effort between Wasatch County and Heber City.

The following are guidelines Heber City currently has in place which support proper storm water management:

1. Heber City Ordinance 15.08.080 was put in place to help facilitate a variety of items with respect to home construction. The ordinance provides some building site storm water control requirements, and it also helps control debris and dirt in the roadway to reduce storm drain system contamination.
2. Construction sites greater than one acre or projects less than one acre that are part of a larger common plan of development are required to obtain a Utah Pollutant Discharge Elimination System (UPDES) permit. With the permit, the site must also have an approved Storm Water Pollution Prevention Plan (SWPPP). All SWPPP plans are reviewed by the City Engineer.
3. All new development in North Village must retain storm water at the 100-year storm event for retention.
4. All new developments must adhere to the most recent version of the City's Storm Water Design Manual.

In addition to the items listed above, Heber City will continue implementing the following storm water control guidelines:

1. Public Education and Outreach: City will continue public education and outreach efforts to promote a change in behavior by the public to reduce water quality impacts associated with pollutants in storm water runoff. This will include education efforts targeting residents, businesses, developers/contractors, and industrial facilities. The education and outreach will focus on specific pollutants and pollutant sources that impact downstream receiving waters including: sediments (dirt, clay, sand), fertilizer/pesticides (nutrients such as phosphorus and nitrogen), and chemicals/ hazardous wastes (oil/grease, fuels, paint, cleaning products, etc.). It is recommended the City work with the Provo River Watershed group and Wasatch County to identify specific guidelines and distribution packets.
2. Storm Water Facilities Inventory: The City will maintain a record map of all storm drain facilities, including all inlets, manholes, culverts, pipes, ponds, storage facilities, sumps, oil separator boxes, pollutant removal devices, discharge points, canals, streams, flood channels, and other pertinent storm drain facilities that discharge into State waters.
3. Construction Site Storm Water Runoff Control: City will develop and adopt an ordinance that requires the use of erosion and sediment control practices at construction sites. The ordinance shall at a minimum be equivalent with the technical requirements set forth in the UPDES Storm Water General Permit for Construction Activities found at http://waterquality.utah.gov/UPDES/stormwatercon.htm. The ordinance shall include the following: Sanctions to ensure compliance, for construction projects disturbing greater than or equal to one acre, and to projects less than one acre that are part of a larger common plan of development. Require construction operators to prepare a Storm Water Pollution Prevention Plan (SWPPP) and apply sediment and erosion control BMP's as necessary to protect water quality, reduce pollutant discharge, and control waste such as, but not limited to, discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste. It is recommended that the City use ordinance language previously approved and used by the Provo River Watershed Council.
4. Pollution Prevention and Good Housekeeping: The City will prepare an operations and maintenance program to complete and track the following items: Perform annual inspections to identify when cleaning and maintenance of public storm drain facilities is

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needed. Clean all inlets, ponds, canals, streams, and other pertinent public storm drain facilities of all debris, trash, oil accumulations, and excess sediment buildup. Repair any failures of installed public infrastructure. Maintain all access to public storm drain facilities. Monitor the drainage of all storage facilities and facilitate the proper discharge or infiltration of water from storm drain facilities to reduce stagnant water areas. Prioritize storm sewer system maintenance, with the highest priority areas being maintained at the greatest frequency. Prepare a schedule for street and public owned parking lot sweeping. Follow inspection checklists and record keeping procedures for all cleaning and maintenance.

The four storm water control items listed above are a good start to direct Heber City towards adopting the necessary programs for a beneficial storm drain system. The DEQ Division of Water Quality general permit for storm water discharge from small MS4s contains more extensive guidelines and procedures that will help Heber City implement an official Storm Water Management Program (SWMP). The following is a summary of the key components in a SWMP:

1. Provisions to develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from the MS4, protect water quality, and satisfy the appropriate water quality requirements of the Utah Water Quality Act.
2. Six Minimum Control Measures:
    a. Public Education and Outreach and Storm Water Impacts
    b. Public Involvement/Participation
    c. Illicit Discharge Detection and Elimination (IDDE)
    d. Construction Site Storm Water Runoff Control
    e. Long-Term Storm Water Management in New Development and Redevelopment (Post-Construction Storm Water Management)
    f. Pollution Prevention and Good Housekeeping for Municipal Operations
3. Shared Responsibility: Implementation of one or more of the six minimum measures may be shared with another entity, or the entity may fully take over the measure.
4. Provisions to review and Update the Storm Water Management Program

There are additional requirements of a small MS4, other than the SWMP, when implementing a storm water discharge permit, such as non-storm water discharge control, record keeping, permit conditions, and penalties. A recommended project in the next several years, with the involvement of Wasatch County, is to adopt a voluntary SWMP that focuses on the four items required of a SWMP. The official SWMP documents should be created and implemented and followed until the EPA and DEQ decide a mandatory Permit for Discharge is required.

5.4 Economic Feasibility Analysis

Costs of the proposed new improvements are shown in Table 5-3. The estimated material and installation cost for the Impact Fee Facilities is $22,334,086. This number is based on material and labor rates that are current as of 2022, and estimates should be updated regularly to reflect changes inflation and the current construction cost index. See Appendix 11 for the complete storm water facility cost summary including unit costs.

It is anticipated that the recommended improvements will be funded by Impact Fees or Public Improvement Districts created within North Village, although other funding mechanisms such as grants or third-party contributions should also be considered. This report does not include the impact fee analysis or a funding mechanism for the proposed Capital Improvements. The calculation, collection, and proposed implementation of those impact fees will be presented in a separate study. The study should also include any proposed Public Improvement Districts and show how they will work with together with the City for the administration of the Impact Fees or other funding sources for the Storm Water Impact Fee Facilities recommended in North Village area.

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Table 5-3 Estimated Cost of Storm Water Improvements.

		IMPROVEMENT DESCRIPTION	LENGTH, QUANTITY, COST	VOLUME	PEAK FLOW	DISTURBED AREA		LUMP SUM	PIPE SIZE	CASING SIZE	Upper Basin	Mid Basin	US 40 Basin	SITE RESTORE	IRR & LANDSCAPE	LAND	ENG CM INSP	TOTAL PROJECT COST
ULT				AF	CFS	AC		i	j	k	l	m	n	o	p	q	r	
	D-01A	Upper Detention Basin - Coyote	1	11.60	65.9	4.78					X			100%			X	$3,798,433
	D-01B	Intermediate Detention Basins - Coyote		1.15	22.6	0.93						X		100%		X	X	$755,851
	D-01C	US40 Retention Basin - Coyote	1	0.50	0.8	0.34							X		100%	X	X	$287,519
	D-01D	Timp Canal Crossing - Coyote	100						36	48							X	$297,596
	D-01E	Wasatch Canal Crossing - Coyote	100						36	48							X	$297,596
	D-02A	Upper Detention Basin - Fitzgerald	1	1.74	25.3	0.86					X			100%			X	$576,932
	D-02B	Intermediate Detention Basins - Fitzgerald		2.06	11.9	1.67						X		100%		X	X	$1,353,959
	D-02C	US40 Retention Basin - Fitzgerald	1	0.50	1.2	0.34							X		100%	X	X	$287,519
	D-02D	Timp Canal Crossing - Fitzgerald	100						36	48								$252,200
	D-02E	Wasatch Canal Crossing - Fitzgerald	100						36	48								$252,200
	D-03A	Upper Detention Basin - Commons	1	8.00	54.1	2.92					X			100%			X	$2,600,738
	D-03B	Intermediate Detention Basins - Commons		2.33	17.7	1.89						X		100%		X	X	$1,531,420
	D-03C	US40 Retention Basin - Commons	1	1.56	11.1	1.06							X		100%	X	X	$897,061
	D-03D	Timp Canal Crossing - Commons	100						36	48							X	$297,596
	D-03E	Wasatch Canal Crossing - Commons	100						36	48							X	$297,596
	D-04A	Upper Detention Basin - Highlands	1	2.38	23.1	1.02					X			100%			X	$781,302
	D-04B	Intermediate Detention Basins - Highlands		0.42	2.7	0.34						X		100%		X	X	$276,050
	D-04C	US40 Retention Basin - Highlands	1	0.50	1.0	0.34							X		100%	X	X	$287,519
	D-04D	Timp Canal Crossing - Highlands	100						36	48							X	$297,596
	D-04E	Wasatch Canal Crossing - Highlands	100						36	48								$252,200
	D-05A	Upper Detention Basin - UVU	1	0.89	12.5	0.78					X			100%			X	$312,142
	D-05B	Intermediate Detention Basins - UVU		0.15	2.5	0.12						X		100%		X	X	$98,589
	D-05C	US40 Retention Basin - UVU		0.50	1.0	0.34							X		100%	X	X	$287,519
	D-05D	Timp Canal Crossing - UVU	100						36	48								$252,200
	D-05E	Wasatch Canal Crossing - UVU	100						36	48								$252,200
	D-06A	Upper Detention Basin - Views	1	2.56	80.5	1.06					X			100%			X	$838,531
	D-06B	Intermediate Detention Basins - Views		0.18	2.7	0.15						X		100%		X	X	$118,307
	D-06C	US40 Retention Basin - Views	1	0.50	1.2	0.34							X		100%	X	X	$287,519
	D-06D	Timp Canal Crossing - Views	100						36	48							X	$297,596
	D-06E	Wasatch Canal Crossing - Views	100						36	48							X	$297,596
	D-07A	Upper Detention Basin - Crossings	1	7.28	40.1	2.01					X			100%			X	$2,334,237
	D-07B	Intermediate Detention Basins - Crossings		0.20	2.6	0.16						X		100%		X	X	$131,452
	D-07C	US40 Retention Basin - Crossings	1	0.50	0.7	0.34							X		100%	X	X	$287,519
	D-07D	Timp Canal Crossing - Crossings	180						36	48							X	$351,593
	D-07E	Wasatch Canal Crossing - Crossings	100						36	48								$252,200
	D-08A	Master Plan Updates every 5 years (4 times)	$120,000					X										$156,000
		TOTAL STORM DRAIN FACILITY COST:		45.50														**$22,234,086**

IMPACT FEE FACILITIES PLAN
FOR
STREET SYSTEM AND STORM WATER

NORTH VILLAGE MASTER PLAN 2022 TO 2042 APPENDIX

HEBER CITY

HEART OF THE WASATCH BACK

September 15, 2022

Prepared by
Heber City & Horrocks

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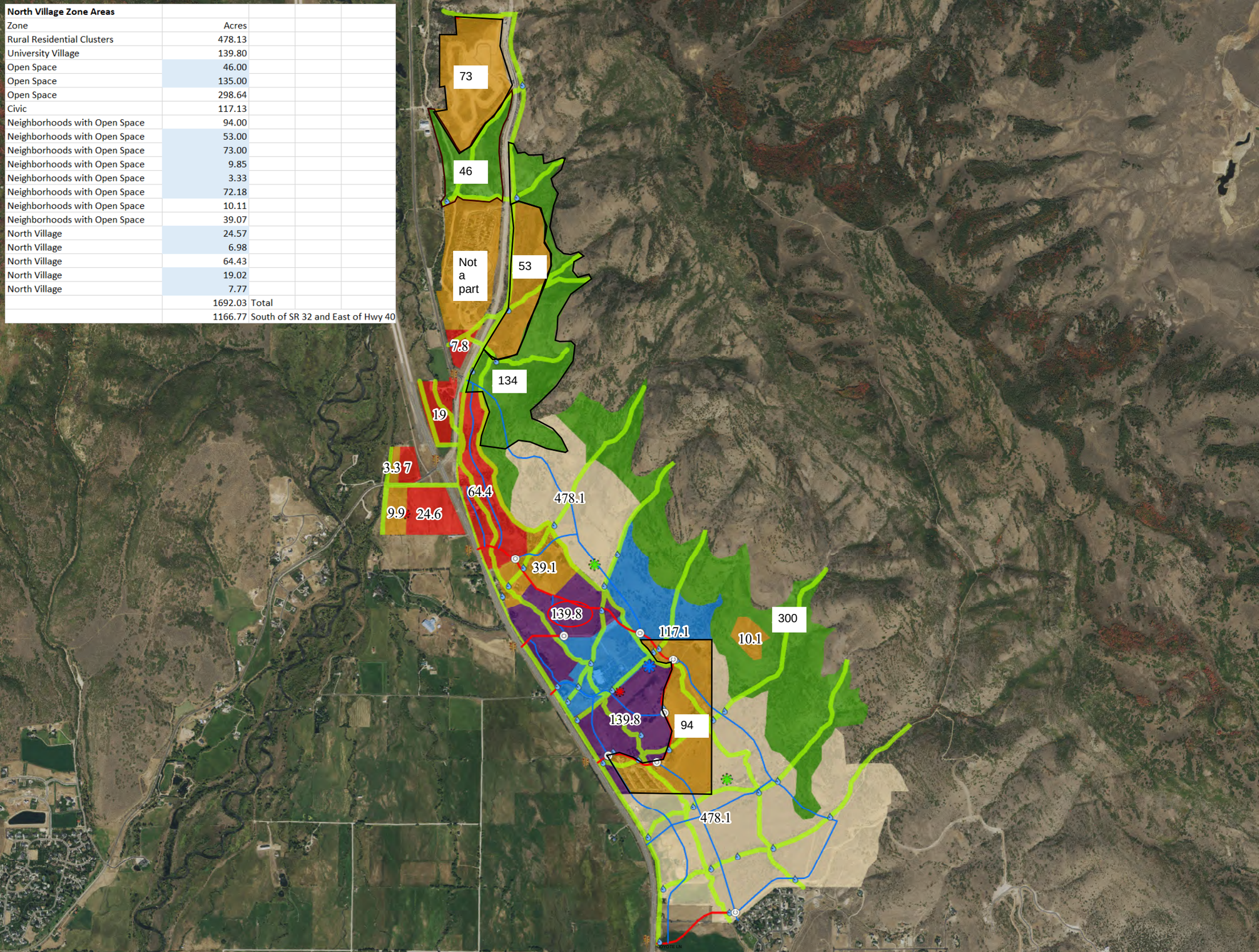
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Appendix 11 ..... **Storm Water Facility Cost Summary**

Appendix 1
North Village Zone Areas

North Village Zone Areas				
Zone	Acres			
Rural Residential Clusters	478.13			
University Village	139.80			
Open Space	46.00			
Open Space	135.00			
Open Space	298.64			
Civic	117.13			
Neighborhoods with Open Space	94.00			
Neighborhoods with Open Space	53.00			
Neighborhoods with Open Space	73.00			
Neighborhoods with Open Space	9.85			
Neighborhoods with Open Space	3.33			
Neighborhoods with Open Space	72.18			
Neighborhoods with Open Space	10.11			
Neighborhoods with Open Space	39.07			
North Village	24.57			
North Village	6.98			
North Village	64.43			
North Village	19.02			
North Village	7.77			
	1692.03	Total		
	1166.77	South of SR 32 and East of Hwy 40		



Appendix 2
MAG and U.S. Census Bureau Population Data

Mountainland AOG Small Area Population and Employment Projections

2020-2050

	Population				*Employment			
	2020	2030	2040	2050	2020	2030	2040	2050
Summit County	42,829	50,558	57,983	63,097	39,605	46,410	52,538	58,535
Coalville	1,593	1,750	1,925	2,150	598	680	770	909
Francis	1,614	2,100	2,700	3,400	185	249	330	439
Henefer	1,060	1,200	1,325	1,425	117	137	156	177
Kamas	2,274	2,800	3,400	4,200	974	1,241	1,551	2,026
Oakley	1,834	2,150	2,500	2,900	354	429	514	630
Park City	8,517	8,758	8,893	8,961	21,441	23,696	25,255	27,158
Summit County	25,936	31,800	37,239	40,061	15,937	19,978	23,962	27,195
Utah County	679,188	861,852	1,080,082	1,297,515	325,797	405,681	493,054	593,648
Alpine	10,683	11,761	12,594	12,735	1,426	1,511	1,554	1,615
American Fork	32,855	40,752	48,846	51,391	30,817	33,813	36,894	39,804
Cedar Fort	671	773	1,855	11,845	54	337	848	1,215
Cedar Hills	10,483	10,442	10,288	10,232	1,103	1,314	1,476	1,513
Draper (UC)	2,678	2,886	3,034	3,078	0	0	0	0
Eagle Mountain	39,885	65,038	99,064	141,252	3,497	13,575	29,311	51,041
Elk Ridge	4,055	4,314	5,167	5,780	61	68	68	73
Fairfield	152	145	140	542	3	9	30	113
Genola	1,721	2,109	2,536	3,813	128	197	389	633
Goshen	1,009	1,185	1,671	2,095	32	43	63	100
Highland	19,337	21,257	23,375	24,250	2,438	2,574	2,956	2,959
Lehi	70,129	88,555	110,747	124,436	33,985	44,621	57,181	73,820
Lindon	12,135	13,105	13,564	13,719	13,492	16,299	18,356	21,336
Mapleton	12,390	16,480	19,726	21,724	1,314	2,619	3,309	3,912
Orem	99,814	105,540	117,630	127,517	65,226	67,664	66,876	66,535
Payson	22,436	30,341	42,728	64,887	8,868	10,492	13,793	21,552
Pleasant Grove	43,621	46,029	47,679	48,252	17,387	20,190	22,938	26,139
Provo	122,971	142,223	155,397	159,265	90,706	96,767	103,994	107,500
Salem	11,337	21,426	36,057	48,708	2,100	3,433	7,355	11,835
Santaquin	14,033	18,539	29,024	40,390	1,558	4,371	7,810	11,821
Saratoga Springs	39,085	79,815	117,641	138,600	7,997	24,108	39,164	52,322
Spanish Fork	44,793	58,643	79,575	93,509	21,777	27,389	34,137	41,673
Springville	37,758	48,562	58,174	61,969	17,664	24,942	30,700	36,947
Vineyard	14,887	24,017	33,870	36,265	3,757	8,900	13,381	18,505
Woodland Hills	1,694	1,824	2,018	2,200	0	0	0	0
Unincorporated UC	8,576	6,092	7,682	49,060	407	445	471	685
Wasatch County	35,713	48,168	59,665	68,904	12,992	15,534	17,948	20,370
Charleston	800	1,200	1,650	2,150	196	265	347	445
Daniel	1,125	1,691	2,000	2,400	97	132	148	175
Heber	18,250	23,500	27,800	32,500	8,801	10,213	11,477	13,215
Hideout	975	1,375	1,950	2,650	0	0	0	0
Independence	225	300	425	600	11	14	18	25
Interlaken	224	224	224	224	0	0	0	0
Midway	6,277	8,577	9,877	11,577	2,009	2,461	2,687	3,096
Wallsburg	364	366	386	401	18	18	18	19
Unincorporated WC	7,473	10,935	15,353	16,402	1,860	2,432	3,253	3,394

Gardner Policy Institute (GPI) 2017 Long-term projections county-level data is used to control small area projections.

GPI produces county projections through 2065. Small area data is only projected by MAG to 2050.

Produced by Tim Hereth | 801/229-3843 | thereth@mountainland.org

**Employment Data does not include agriculture, mining, or construction jobs.*

Comments from Discussion with Tim 9/1/2022

HC population includes the main part of the NV map he sent but not past SR 32

MAG current has it at 28,500 in 2040

The new model has the JR Plat B and C as well.

He does not see the trends changing, so they may be able update the numbers based on trends

QuickFacts

Heber city, Utah

QuickFacts provides statistics for all states and counties, and for cities and towns with a ***population of 5,000 or more***.

Table

PEOPLE	
Population	
Population Estimates, July 1 2021, (V2021)	⚠ 17,290
Population estimates base, April 1, 2020, (V2021)	⚠ 16,831
Population, percent change - April 1, 2020 (estimates base) to July 1, 2021, (V2021)	⚠ 2.7%
Population, Census, April 1, 2020	16,856
Population, Census, April 1, 2010	11,362
Age and Sex	
Persons under 5 years, percent	⚠ 8.8%
Persons under 18 years, percent	⚠ 33.8%
Persons 65 years and over, percent	⚠ 7.2%
Female persons, percent	⚠ 50.2%
Race and Hispanic Origin	
White alone, percent	⚠ 91.0%
Black or African American alone, percent (a)	⚠ 0.8%
American Indian and Alaska Native alone, percent (a)	⚠ 0.4%
Asian alone, percent (a)	⚠ 1.8%
Native Hawaiian and Other Pacific Islander alone, percent (a)	⚠ 0.0%
Two or More Races, percent	⚠ 3.1%
Hispanic or Latino, percent (b)	⚠ 17.6%
White alone, not Hispanic or Latino, percent	⚠ 78.7%
Population Characteristics	
Veterans, 2016-2020	324
Foreign born persons, percent, 2016-2020	10.0%
Housing	
	X

All Topics	Heber city, Utah
Housing units, July 1, 2	
Owner-occupied housi	
Median value of owner	
Persons per household, 2016-2020	**3.48**
Median selected monthly owner costs -with a mortgage, 2016-2020	$1,769
Median selected monthly owner costs -without a mortgage, 2016-2020	$441
Median gross rent, 2016-2020	$1,222
Building permits, 2021	X
Families & Living Arrangements	
Households, 2016-2020	4,651
Persons per household, 2016-2020	**3.48**
Living in same house 1 year ago, percent of persons age 1 year+, 2016-2020	83.4%
Language other than English spoken at home, percent of persons age 5 years+, 2016-2020	17.2%
Computer and Internet Use	
Households with a computer, percent, 2016-2020	96.8%
Households with a broadband Internet subscription, percent, 2016-2020	93.6%
Education	
High school graduate or higher, percent of persons age 25 years+, 2016-2020	93.9%
Bachelor's degree or higher, percent of persons age 25 years+, 2016-2020	37.9%
Health	
With a disability, under age 65 years, percent, 2016-2020	5.7%
Persons without health insurance, under age 65 years, percent	⚠ 8.2%
Economy	
In civilian labor force, total, percent of population age 16 years+, 2016-2020	74.6%
In civilian labor force, female, percent of population age 16 years+, 2016-2020	67.5%
Total accommodation and food services sales, 2017 ($1,000) (c)	D
Total health care and social assistance receipts/revenue, 2017 ($1,000) (c)	D
Total transportation and warehousing receipts/revenue, 2017 ($1,000) (c)	16,348
Total retail sales, 2017 ($1,000) (c)	265,083
Total retail sales per capita, 2017 (c)	$16,804
Transportation	
Mean travel time to work (minutes), workers age 16 years+, 2016-2020	20.9
Income & Poverty	
Median household income (in 2020 dollars), 2016-2020	$80,417
Per capita income in past 12 months (in 2020 dollars), 2016-2020	$30,100
Persons in poverty, percent	⚠ 5.2%
BUSINESSES	
Businesses	
Total employer establishments, 2020	X
Total employment, 2020	X

Total annual payroll, 20	
Total employment, perc	
Total nonemployer esta	
All employer firms, Reference year 2017	562
Men-owned employer firms, Reference year 2017	342
Women-owned employer firms, Reference year 2017	88
Minority-owned employer firms, Reference year 2017	S
Nonminority-owned employer firms, Reference year 2017	480
Veteran-owned employer firms, Reference year 2017	S
Nonveteran-owned employer firms, Reference year 2017	494

All Topics

Persons per household, 2016-2020	Heber city, Utah
	3.48

GEOGRAPHY

Geography	
Population per square mile, 2020	1,874.1
Population per square mile, 2010	1,351.4
Land area in square miles, 2020	8.99
Land area in square miles, 2010	8.41
FIPS Code	4934200

About datasets used in this table

All Topics	Heber city, Utah
Persons per household, 2016-2020	**3.48**

Value Notes

⚠ Estimates are not comparable to other geographic levels due to methodology differences that may exist between different data sources.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info ⓘ icon to the left of each row in TABLE view to learn about sampling error.

The vintage year (e.g., V2021) refers to the final year of the series (2020 thru 2021). Different vintage years of estimates are not comparable.

Users should exercise caution when comparing 2016-2020 ACS 5-year estimates to other ACS estimates. For more information, please visit the 2020 5-year ACS Comparison Guidance page.

Fact Notes

(a) Includes persons reporting only one race
(c) Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data
(b) Hispanics may be of any race, so also are included in applicable race categories

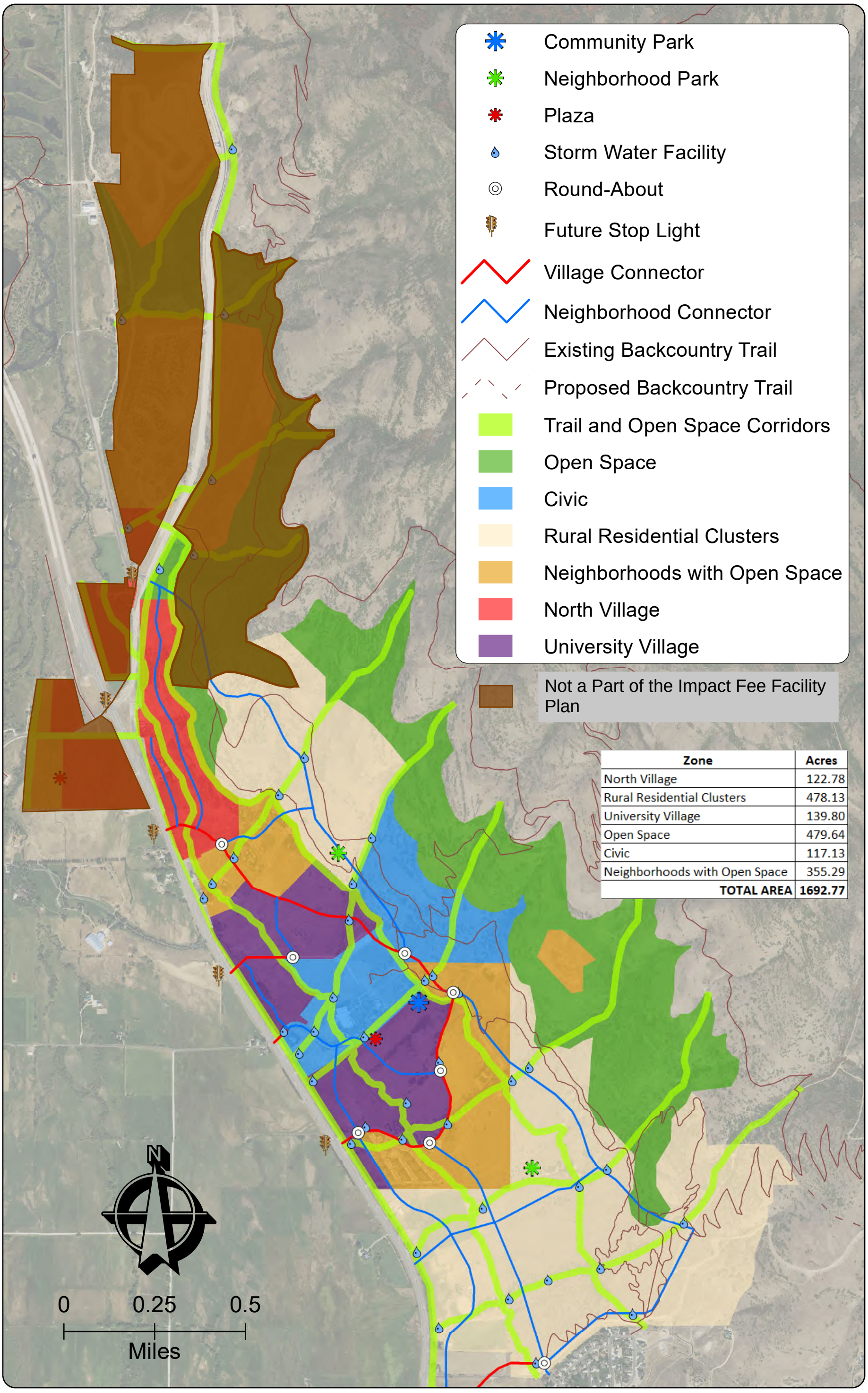
Value Flags

- Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or upper interval of an open ended distribution.
F Fewer than 25 firms
D Suppressed to avoid disclosure of confidential information
N Data for this geographic area cannot be displayed because the number of sample cases is too small.
FN Footnote on this item in place of data
X Not applicable
S Suppressed; does not meet publication standards
NA Not available
Z Value greater than zero but less than half unit of measure shown

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

Appendix 3

North Village Study Area and NVOZ Densities



Zone	Acres
North Village	122.78
Rural Residential Clusters	478.13
University Village	139.80
Open Space	479.64
Civic	117.13
Neighborhoods with Open Space	355.29
TOTAL AREA	**1692.77**

North Village Community Design Map

2.1 DENSITY

1. Base Sub-District Density Allocation Per Gross Acre: Overall property averages are subject to any Master Development Agreement (MDA) or Annexation Agreement (AA) documentation or any previously formal entitlements from approved plans for this particular property from Wasatch County government. Such agreements may include North Fields preservation requirements or the payment of fees for open space/agricultural land preservation.

    1. NV: 4.5 ERUs per gross acre base density

    2. NOS: 3.5 ERUs per gross acre, clustering required.

    3. UV: Six ERUs per gross acre base density

    4. RR: Two ERUs per gross acre, clustering encouraged.

    These densities are essentially ranges that not all properties will be able to achieve. They are contingent on site design considerations, sensitive lands avoidance, City Stormwater Standards, water availability, as well as Federal, State, and local service providers/stakeholders processes and approvals, All development/ERUs may be subject to a negotiated preservation fee paid at the time of recording of any plats, in return for the increased flexibility provided for in this ordinance. As part of the overall residential density calculation, commercial ERUs (.86 ERU per every 2000 sq ft) shall be included in the residential density calculation.

2.ERU Density Definitions

    1. Incremental increase will be 0.10 ERU per 500 square feet. For planning purposes only, a detached single-family home shall be 1 ERU per dwelling, regardless of the size of the home.

ERU Uses (1)	Notes	ERUs
Hotel or Motel Room, RV Pad, Transient Housing, Small Studio or Student Housing Unit	Not to exceed 500	0.25
One Bedroom: Hotel Room, Apartment or Condo	Not to exceed 800 sf	0.33
One or Two Bedroom: Apartment, Townhome, Cottage Home (detached SFD when part of a PUD) or Condo	Not to exceed 1,200 sf	0.50
Apartment, condo, or Townhouse	No to exceed 1,200 sf	0.75
All Other Residential Uses	Detatched Single-family and other residential units over 1,600 sf	1.0

Appendix 4
Vistro Traffic Volumes

Vistro Traffic Volumes

	Roadway Segment	Vistro Daily	Redistributed Daily Traffic Volumes
T-001	Old Highway 40 - West of SR 32	2430	2500
T-002	Old Highway 40 - East of SR 32 to Local Road A	2076	2100
T-003	Old Highway 40 - Local Road A to Moulton Lane	8606	8600
T-004	Old Highway 40 - Moulton Lane to Road B	3198	3200
T-005	Old Highway 40 - Road B to North of University Avenue	4725	4800
T-006	Moulton Lane shifted north - US 40 to Old Hwy 40	5709	5700
T-007	Local Road A - Old Hwy 40 to Road B	426	500
T-008	Local Road A - Road B to University Ave	2609	2600
T-009	Road B - Old Hwy 40 to Local Road A	1089	1100
T-010	University Ave - US 40 to Old Hwy 40	16041	16000
T-011	University Ave - Old Hwy 40 to Local Road A	6842	5800
T-012	University Ave - Local Road A to Coyote Lane/Commons Blvd	1500	2500
T-013	Commons Blvd - Coyote Lane to Road E	2303	3600
T-014	Commons Blvd- Road E to Valley Hills Blvd	1993	2400
T-015	Commons Blvd - Valley Hills Blvd to Road D	5206	5200
T-016	Commons Blvd - US 40 to Road D	13830	13900
T-017	Road C - University Ave to College Way	6066	6100
T-018	College Way - US 40 to Road C	3661	4500
T-019	College Way - Road C to Road D	2468	2500
T-020	College Way - Road D to Road E	2863	2900
T-021	Road E - College Way to Commons Blvd	4481	4500
T-022	Road D - College Way to Commons Blvd	8740	8100
T-023	Coyote Canyon View - Commons Blvd to Road F	100	<500
T-024	Coyote Canyon Parkway - Road F to bridge over Timpanogos Canal	2638	2700
T-025	Valley Hills Blvd - Commons Blvd to Road F	454	500
T-026	Road F - US 40 to Road G	1623	2500
T-027	Road F - Road G to Valley Hills Blvd	1151	2100
T-028	Road F - Valley Hills Blvd to Coyote Lane	1155	1200
T-029	Road G - Road F to Coyote Lane	1860	1900
T-030	Valley Hills Blvd - Road F to Coyote Lane	2822	2800
T-031	Coyote Lane - US 40 to Road G	10082	9200
T-032	Coyote Lane - Road G to Valley Hills Blvd	7701	6800
T-033	Coyote Canyon Parkway - Valley Hills Blvd to bridge over Timpanogo	2606	2600

Appendix 5
ITE Trip Generation

Land Use: 210
Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates based on a small sample of sites are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 251), and higher than those for senior adult housing -- single-family (Land Use 251). Further analysis of this housing type will be conducted in a future edition of *Trip Generation Manual*.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For 30 of the study sites, data on the number of residents and number of household vehicles are available. The overall averages for the 30 sites are 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Arizona, California, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, North Carolina, Ohio, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, and West Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077,1078, 1079

Single-Family Detached Housing
(210)

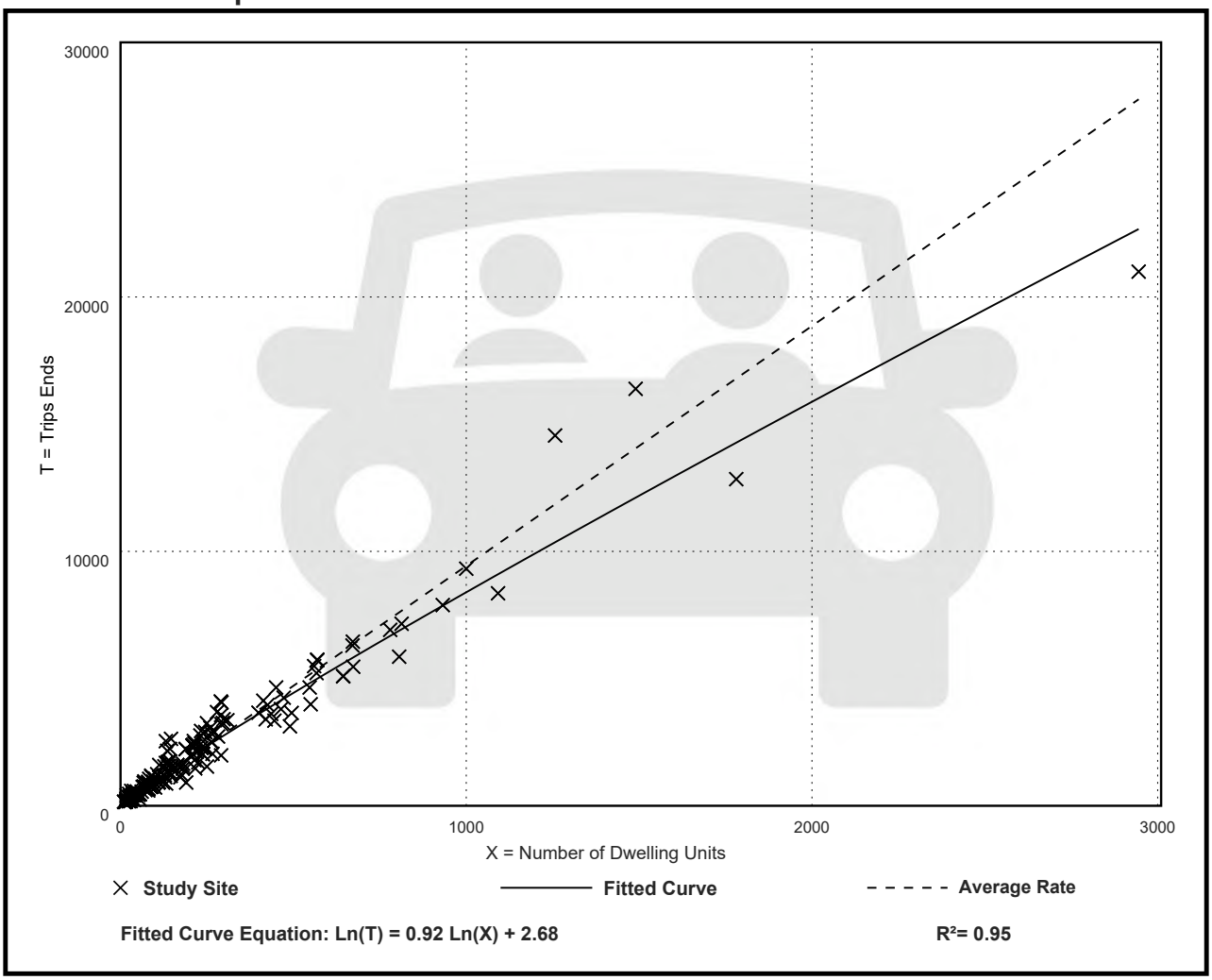
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.92 Ln(X) + 2.68

R^2= 0.95

Land Use: 215
Single-Family Attached Housing

Description

Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.

Additional Data

The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Utah, Virginia, and Wisconsin.

Source Numbers

168, 204, 211, 237, 305, 306, 319, 321, 357, 390, 418, 525, 571, 583, 638, 735, 868, 869, 870, 896, 912, 959, 1009, 1046, 1056, 1058, 1077

Single-Family Attached Housing
(215)

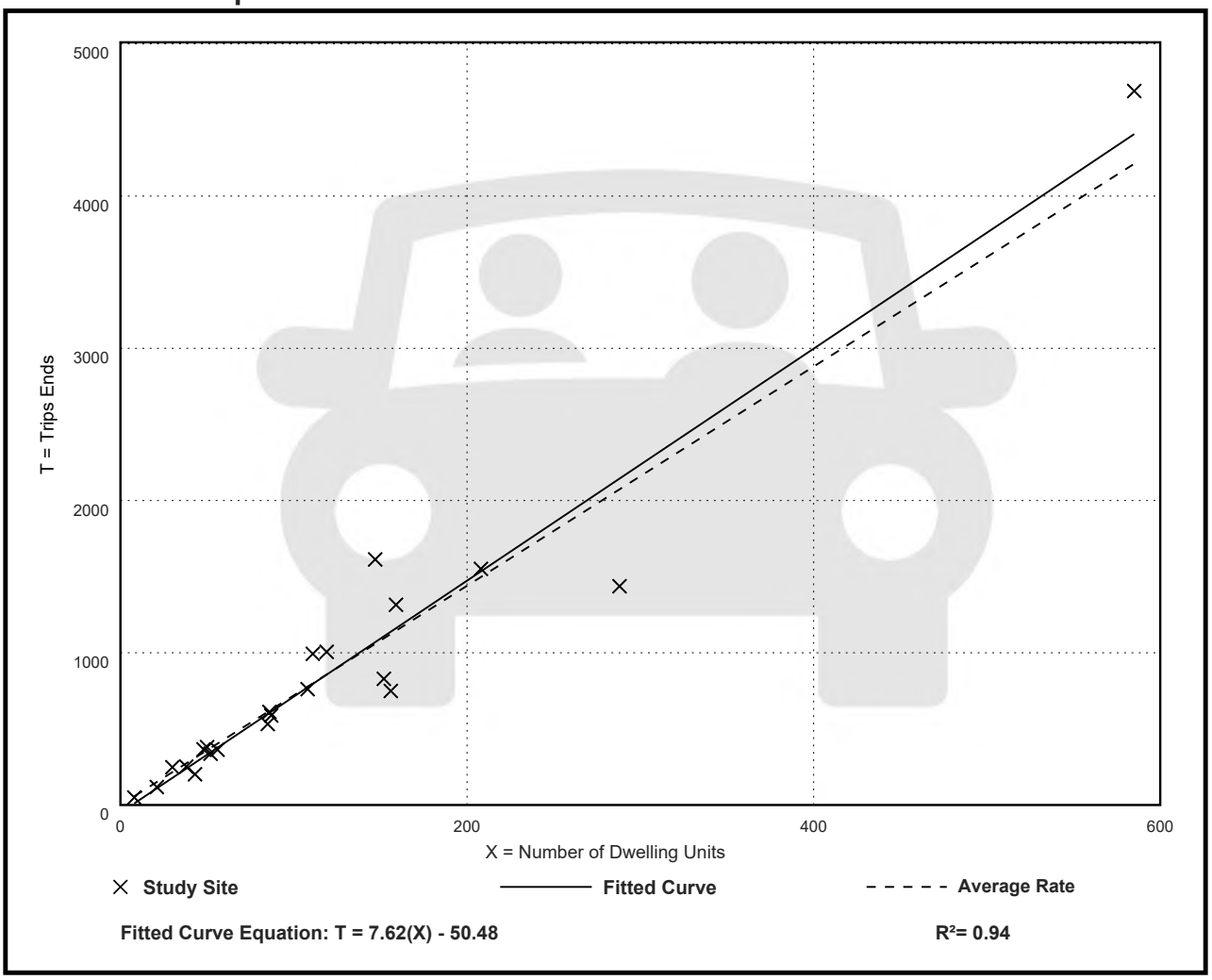
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 22
Avg. Num. of Dwelling Units: 120
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.20	4.70 - 10.97	1.61

Data Plot and Equation



Land Use: 220
Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

- A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.
- A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.
- A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.
- A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), affordable housing (Land Use 223), and off-campus student apartment (low-rise) (Land Use 225) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

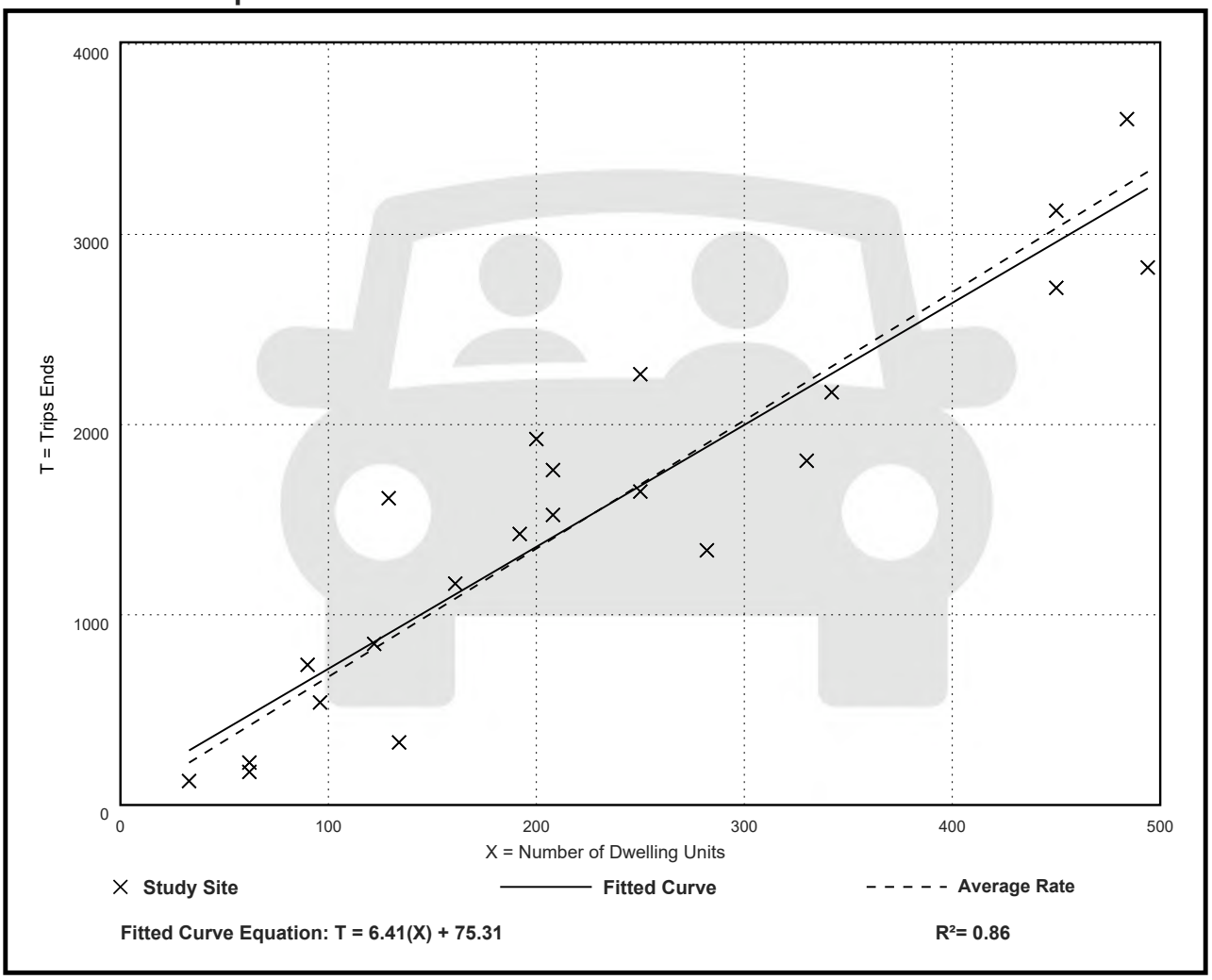
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 22
Avg. Num. of Dwelling Units: 229
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

Data Plot and Equation



Fitted Curve Equation: T = 6.41(X) + 75.31

R^2= 0.86

Land Use: 251
Senior Adult Housing—Single-Family

Description

Senior adult housing—single-family sites are independent living developments that are called various names including retirement communities, age-restricted housing, and active adult communities. The development has a specific age restriction for its residents, typically a minimum of 55 years of age for at least one resident of the household.

Residents in these communities are typically considered active and requiring little to no medical supervision. The percentage of retired residents varies by development. The development may include amenities such as a golf course, swimming pool, 24-hour security, transportation, and common recreational facilities. They generally lack centralized dining and on-site health facilities.

The dwelling units can be either detached or attached. The types of housing types represented by sites in the database include traditional single-family detached homes, patio homes, duplexes, and townhouses. Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.

Senior adult housing—multifamily (Land Use 252), congregate care facility (Land Use 253), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related land uses.

Additional Data

Caution should be used when applying trip rates for this land use as it may contain a wide variety of studies ranging from communities with very active, working residents to communities with older, retired residents. As more data become available, consideration will be given to future stratification of this land use.

Many factors affected the trip rates for detached senior adult housing. Factors such as the average age of residents, development location and size, affluence of residents, employment status, and vehicular access should be taken into consideration when conducting an analysis. Some developments were located within close proximity to medical facilities, restaurants, shopping centers, banks, and recreational activities.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For the six sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 98 percent of the units were occupied.

Senior Adult Housing - Single-Family (251)

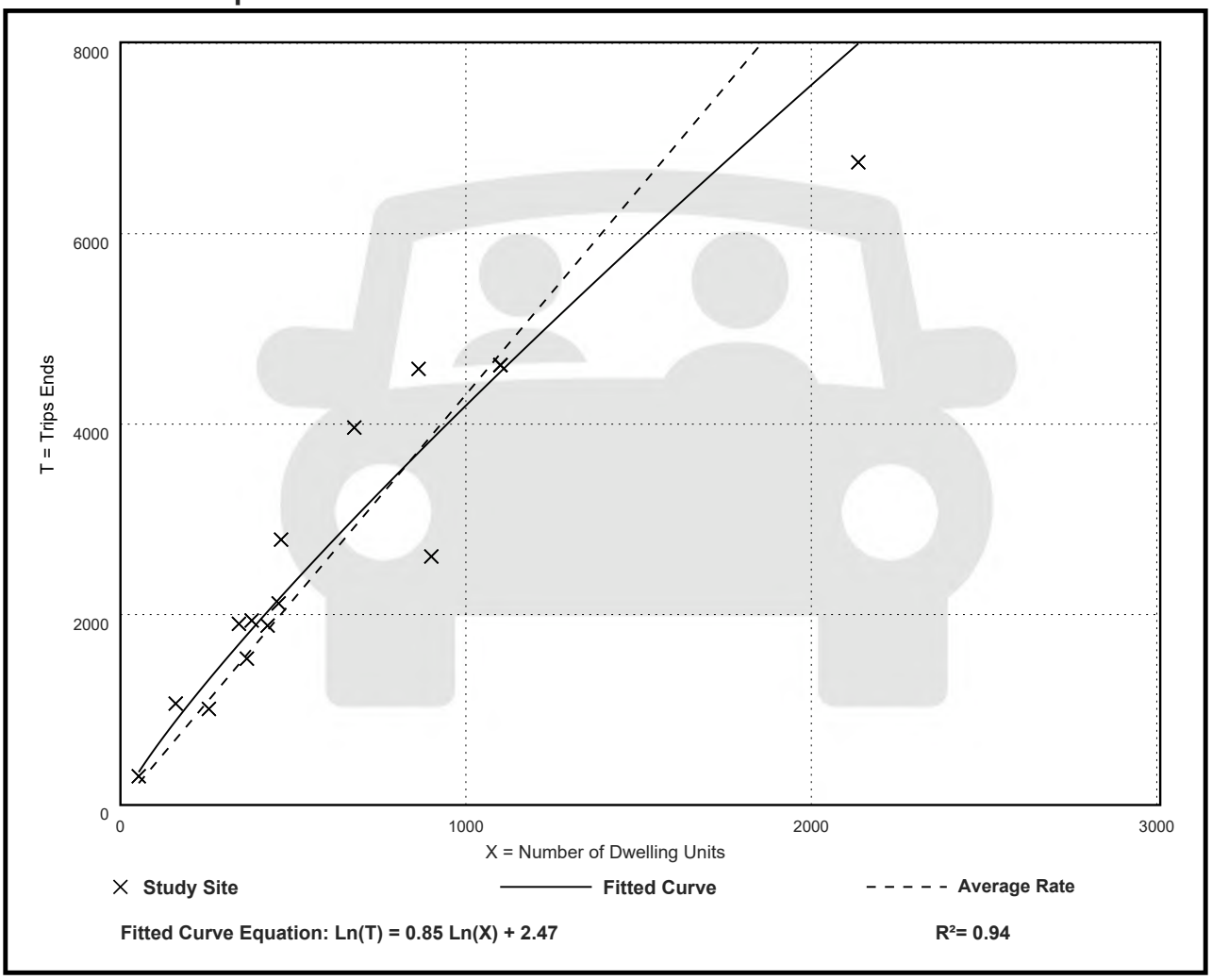
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 15
Avg. Num. of Dwelling Units: 646
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.31	2.90 - 6.66	1.07

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.85 Ln(X) + 2.47

R^2= 0.94

Land Use: 252
Senior Adult Housing—Multifamily

Description

Senior adult housing–multifamily sites are independent living developments that are called various names including retirement communities, age-restricted housing, and active adult communities. The development has a specific age restriction for its residents, typically a minimum of 55 years of age for at least one resident of the household.

Residents in these communities are typically considered active and requiring little to no medical supervision. The percentage of retired residents varies by development. The development may include amenities such as a golf course, swimming pool, 24-hour security, transportation, and common recreational facilities. They generally lack centralized dining and on-site health facilities.

The dwelling units share both floors and walls with other units in the residential building. Senior adult housing—single-family (Land Use 251), congregate care facility (Land Use 253), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related land uses.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, and the 2000s in Alberta (CAN), California, Maryland, New Hampshire, New Jersey, Ontario (CAN), and Pennsylvania.

Source Numbers

237, 272, 576, 703, 734, 970, 1060

Senior Adult Housing - Multifamily
(252)

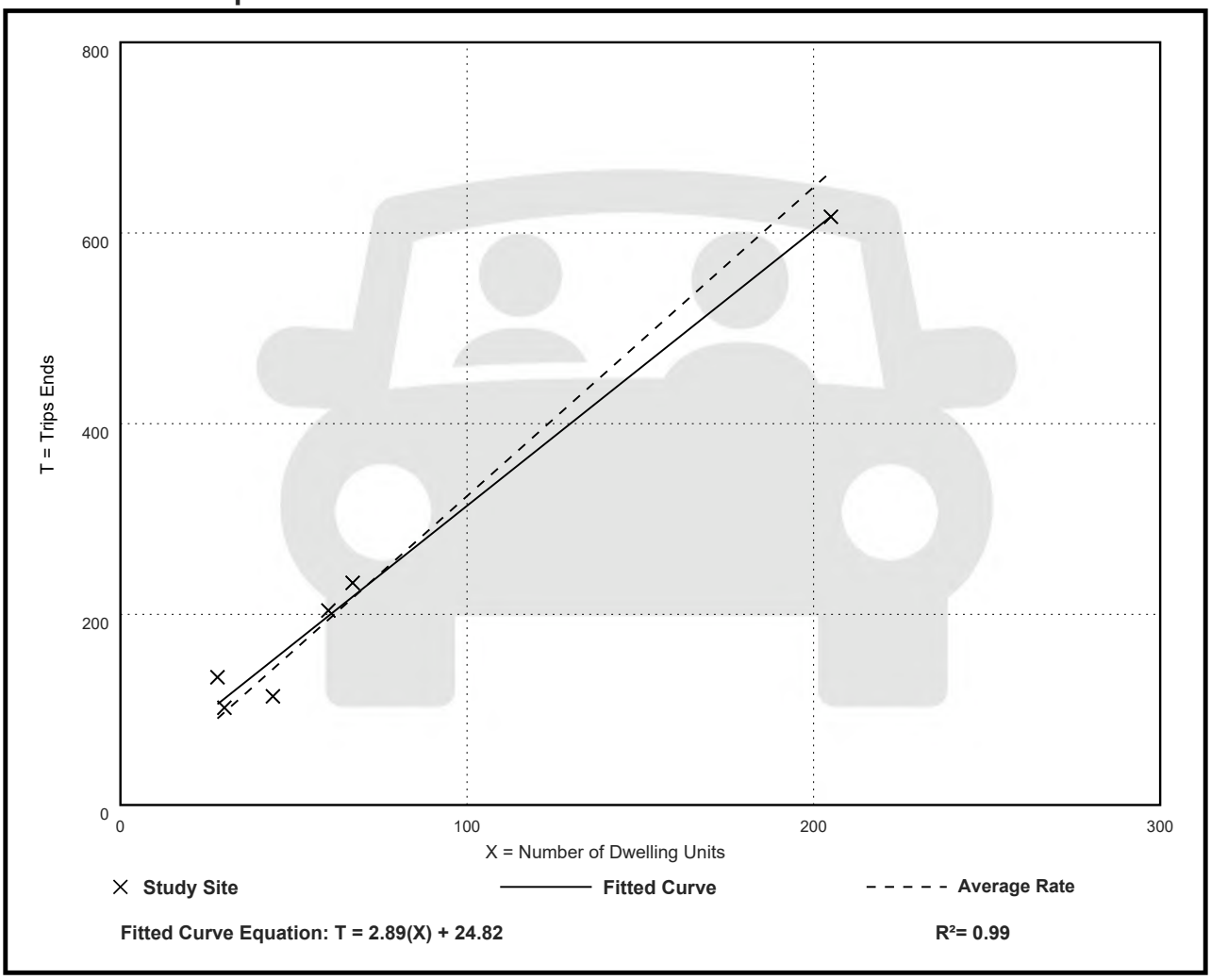
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. Num. of Dwelling Units: 72
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.24	2.59 - 4.79	0.53

Data Plot and Equation



Fitted Curve Equation: T = 2.89(X) + 24.82

R^2= 0.99

Appendix 6
Street System Cost Summary

Road Price List

Description	Price	Units
Right Of Way	$200,000.00	Acre
Pavement & UBC	$4.50	S.F.
Granular Fill	$40.00	C.Y.
Clear & Grub	$3.50	C.Y.
Chip Seal	$2.00	S.Y.
Curb & Gutter	$105.00	L.F.
2" Overlay Existing Asphalt	$1.50	S.F.
Sidewalk one side of street	$50.00	LF
Design, CM, Insp	15%	
Contingency & Util Conflicts	20%	

Table 4-7: Cost Summary of Recommended Street Improvements

NORTH VILLAGE STREET CAPITAL IMPROVEMENTS

ULT	CIP#	IMPROVEMENT DESCRIPTION	LENGTH / COST	LUMP SUM	LOCAL	MINOR COLLECTOR	MAJOR COLLECTOR	WIDTH ROW	WIDTH ASPHALT	ROW	PAVEMENT & UBC	GRANULAR FILL	CLEAR & GRUB	CURB & GUTTER	SIDEWALK	Chip Seal	OVERLAY EXIST	WIDENING	ENG CM INSP	COST
			ft	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	
	T-001	Road F - East of SR 32 to Local Road A	1,200				X	85	50	X	X	X	X	X	X				X	$1,602,084
	T-002	Road F - Road A to Moulton Ln	2,800				X	85	50	X	X	X	X	X	X				X	$3,738,197
	T-003	Road F - Moulton Ln to Road B	1,800				X	85	50	X	X	X	X	X	X				X	$2,403,126
	T-004	Road F - Road B to University Ave	1,000				X	85	50	X	X	X	X	X	X				X	$1,335,070
	T-005	Moulton Ln (shifted north) - US 40 to Road F	600				X	85	50	X	X	X	X	X	X				X	$801,042
	T-006*	Local Road A - Road F to Road B	4,000		X			62	32	X	X	X	X	X	X				X	$4,143,721
	T-007*	Local Road A - Road B to University Ave	1,700		X			62	32	X	X	X	X	X	X				X	$1,761,081
	T-008*	Road B - Road F to Road A	1,500			X		68	38	X	X	X	X	X	X				X	$1,687,625
	T-009*	University Ave - US 40 to Road F	1,200				X	95	60	X	X	X	X	X	X			X	X	$2,128,120
	T-010*	University Ave - Road F to Road A	1,400				X	85	50	X	X	X	X	X	X				X	$1,869,098
	T-011*	University Ave - Road A to Commons Blvd	1,300				X	85	50	X	X	X	X	X	X				X	$1,735,591
	T-012	Commons Blvd - University Ave to Road E	1,200				X	85	50	X	X	X	X	X	X				X	$1,602,084
	T-013	Commons Blvd- Road E to Valley Hills Blvd	1,100				X	85	50	X	X	X	X	X	X				X	$1,468,577
	T-014*	Commons Blvd - Valley Hills Blvd to Road D	600				X	85	50	X	X	X	X	X	X				X	$801,042
	T-015	Commons Blvd - US 40 to Road D	800				X	95	60	X	X	X	X	X	X			X	X	$1,418,747
	T-016*	Road C - University Ave to College Way	1,000			X		68	38	X	X	X	X	X	X				X	$1,125,083
	T-017	College Way - US 40 to Road C	500			X		68	38	X	X	X	X	X	X			X	X	$613,678
	T-018	College Way - Road C to Road D	700			X		68	38	X	X	X	X	X	X				X	$787,558
	T-019*	College Way - Road D to Collage PL	400			X		68	38	X	X	X	X	X	X				X	$450,033
	T-020	Road E - College PL to Commons Blvd	1400			X		68	38	X	X	X	X	X	X				X	$1,575,117
	T-021	Road D - College Way to Commons Blvd	1,600			X		68	38	X	X	X	X	X	X				X	$1,800,134
	T-022	Coyote View Dr - Commons Blvd to Fitzgerald Dr	3,800			X		68	38	X	X	X	X	X	X				X	$4,275,317
	T-023	Coyote View Dr - Fitzgerald Dr to Coyote Cyn Pkwy	1,700			X		68	38	X	X	X	X	X	X				X	$1,912,642
	T-024	Coyote Cyn Pkwy - Coyote View Dr to Timp Canal	1,800			X		68	38	X	X	X	X	X	X				X	$2,025,150
	T-025	Valley Hills Blvd - Commons Blvd to Fitzgerald Dr	1,800			X		68	38	X	X	X	X	X	X				X	$2,025,150
	T-026	Fitzgerald Dr - US 40 to Ostler Peak Rd	800			X		68	38	X	X	X	X	X	X				X	$900,067
	T-027*	Fitzgerald Dr - Ostler Peak Rd to Valley Hills Blvd	500			X		68	38	X	X	X	X	X	X				X	$562,542
	T-028*	Fitzgerald Dr - Valley Hills Blvd to Coyote View Dr	2,300			X		68	38	X	X	X	X	X	X				X	$2,587,692
	T-029	Ostler Peak Rd - Fitzgerald Dr to Coyote Cyn Pkwy	2,200		X			62	32	X	X	X	X	X	X				X	$2,279,047
	T-030	Valley Hills Blvd - Fitzgerald Dr to Coyote Cyn Pkwy	2,300			X		68	38	X	X	X	X	X	X				X	$2,587,692
	T-031	Coyote Cyn Pkwy - US 40 to Ostler Peak Rd	1,100				X	85	50	X	X	X	X	X	X			X	X	$1,693,579
	T-032*	Coyote Cyn Pkwy - Ostler Peak Rd to Valley Hills B	900				X	85	50	X	X	X	X	X	X			X	X	$1,385,655
	T-033*	Coyote Cyn Pkwy - Valley Hills Blvd to Timp Canal	1,700				X	85	50	X	X	X	X	X	X				X	$2,269,619
	T-034	Intersection 1 - UDOT Traffic Signal (SR 32)	$500,000	X															X	$690,000
	T-035	Intersection 3 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-036	Intersection 5 - Single Lane Roundabout	$750,000	X															X	$1,035,000
	T-037	Intersection 10 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-038	Intersection 8 - Single Lane Roundabout (2-Way St	$750,000	X															X	$1,035,000
	T-039	Intersection 9 - Multi Lane Roundabout	$750,000	X															X	$1,035,000
	T-040	Intersection 13 - Single Lane Roundabout (2-Way S	$1,000,000	X															X	$1,380,000
	T-041	Intersection 16 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-042	Intersection 17 - Multi Lane Roundabout	$1,000,000	X															X	$1,380,000
	T-043	Intersection 18 - Multi Lane Roundabout	$1,000,000	X															X	$1,380,000
	T-044	Intersection 23 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-045	North Village Master Plan Update (5 yrs x 4 Times)	$160,000	X																$192,000
		TOTAL STREETS:																**TOTAL:**		**$70,237,963**

NOTES:

- Road Widening assumes existing road asphalt is 26' wide. Upsizing is difference between existing and master planned asphalt width; ie. Local 32', Minor Collector 38', Major Collector 50', Minor Arterial 60'.
- UDOT Intersection Improvements are expected to have a cost of $0 incurred by Heber City.
- Percent paid by developers for road widening costs on existing roads: Major/Minor Locals 100%, Minor Collectors 83%, Major Collectors 75%.
- Percent paid by developers for cost to construct new roads: see above notes.
- Curb and gutter price storm drain system price of $105 per foot is for one side of the road. The formula multipies by 2 to cover boths side of the road and all of the storm drain system.
- Prices do not include bridges, blasting, retaining walls, relocation of utilities, or guardrails.
- Prices inlcudes oversizing of storm pipes and facilities due to road widing from Major Local. And also lenghting of culverts at drainage crossings.

* Includes a bridge over a canal.

Appendix 7
Storm Water Design Water Manual

HEBER CITY

HEART OF THE WASATCH BACK

HEBER CITY STORM WATER DESIGN MANUAL

Heber City Engineering

DRAFT

SEPTEMBER 8, 2022

HEBER CITY
75 N Main Street
Heber City, UT 84032

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Introduction

Purpose of document

The purpose of this document is to establish design standards and guidelines for storm drainage infrastructure within Heber City. This document also promotes uniformity among development design submittals and drainage reports.

The design criteria in this document are for use on public and private projects within the city. There are other adopted City documents that also reference requirements related to storm drain systems within the city. These documents include the Heber City Standard Specifications and Drawings, the Heber City Master Plans, and the Heber City Municipal Code. This document is designed to work in collaboration with these other stated references, however, in the case of discrepancies the more stringent standard will apply. All requirements and the intent of design requirements in this document shall be met unless otherwise approved by the City Engineer.

Definitions

cfs	*Cubic feet per second (449 gallons per minute)*
Ac-Ft	*Acre-foot (volume of water required to cover an acre of land to a depth of one foot)*
Detention	*Short term storage of runoff provided by a pond or similar facility. An outlet is provided that allows water to be released from the facility at a predetermined rate.*
LID	*Low Impact Development is an approach to improving water quality by reducing the amount of storm runoff generated by a project and relying on infiltration or evaporation to handle runoff where it is generated.*
Retention	*Long term storage of storm water provided by a pond or similar facility that does not allow water to be discharged. Water will stay in a retention pond after a storm event until it either evaporates or infiltrates into the bottom of the pond.*

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Approval Procedure

Preliminary Drainage Plan and Report

i. A preliminary drainage plan and report are required for all site plan and subdivision developments within the city. The preliminary drainage plan must include the following as applicable:
    1. Existing topography (2-foot contours or finer) extending at least 100 feet beyond the site
    2. Existing drainage infrastructure and features
    3. Existing drainage and gravity irrigation channel/canal features
    4. Watershed delineations and existing drainage patterns/flow paths
    5. Proposed drainage infrastructure and features (onsite and offsite)
    6. Proposed drainage patterns/flow paths

ii. The preliminary drainage report must include the following as applicable:
    1. Introduction
    2. Project Scope
    3. Project Location
    4. Description of Existing Conditions
    5. Drainage Design Criteria
    6. Off-Site Watershed Drainage and Hydrology
        a. Preliminary Upstream/Downstream Flood Analysis
        b. Preliminary Hazards & Debris-Flow Analysis
    7. On-Site Area Drainage and Hydrology and Hydraulics
    8. LID features
    9. Detention and/or Retention Facilities
    10. Water Quality Features (e.g., LID, HDS, pretreatment etc.)
    11. Major Stream Crossings
    12. Non-pressurized Irrigation Systems

Final Drainage Plan and Report

iii. Final drainage plans and report are required for all site plan and subdivision developments within the City shall be submitted after acceptance/approval of the preliminary submittal. The final drainage report shall be submitted for review prior to final site plan or subdivision approval.

iv. Final Drainage Plans must include the following as applicable:
    1. Existing and proposed topography (2-foot contours or finer) extending at least 100 feet beyond the site
    2. Existing drainage infrastructure and features
        a. Onsite features (channels, flow control, etc.)
        b. Offsite features (debris basins, etc.)
    3. Existing drainage and gravity irrigation channel/canal features
    4. Watershed delineations and existing drainage patterns/flow paths
    5. Location of all proposed drainage features
        a. Onsite features (channels, flow control, etc.)
        b. Offsite features (debris basins, etc.)

6. Proposed drainage patterns/flow paths
7. Proposed drainage details
8. Improvements to city facilities
9. LID, water quality and retention features

v. Final Drainage Report must include as applicable:
1. Introduction
2. Project Scope
3. Project Location
4. Detailed Description of Existing Conditions
5. Drainage Design Criteria
6. Off-Site Drainage and Hydrology with Final Calculations
    a. Final Upstream/Downstream Flood Analysis
    b. Final Hazards & Debris-Flow Analysis
    c. Recommended Mitigation
7. On-Site Drainage Hydrology and Hydraulics with Final Calculations
8. Description of LID Measures
    a. Justification for products selected and why they are most appropriate
    b. Compliance with on-site retention rules
9. Detailed Description of Detention and/or Retention Facilities
10. Major Stream Crossing
11. Non-pressured Irrigation Systems
12. Permanent Erosion Control Features
13. Water Quality Features (e.g., LID, HDS, pretreatment etc.)
14. Storm Drain System Calculations

All plans and reports are subject to review and approved by Provo River Watershed Council. See Appendix A for list of resources for drainage design in Heber City.

Design Standards and Analysis Methods

These standards apply to all developments within Heber City including the North Village area or other areas that may annex into the City in the future. Heber City may establish additional storm drain design criteria for certain development areas through a new Storm Drain Master Plan and/or Master Plan update. All developments shall comply with the City Storm Drain Master Plan that is applicable for the respective development.

Design Storms for Conveyance

New developments within Heber City must have an initial and a major storm drain system for storm water conveyance. The initial system's purpose is to reduce the frequency of street flooding, reduce maintenance costs, and provide protection against regularly recurring damage from storm runoff. The initial conveyance system must handle the 10-year storm event at a duration equal to or less than the time of concentration (T_c), and typically consists of pipe, storm drain inlets, curb and gutter, or drainage swales that convey the storm water.

The purpose of the major conveyance system is to avoid major property damage or loss of life during flood level runoff conditions. The major system is comprised of the initial conveyance system elements but also includes the entire roadway cross section, including park strip and sidewalk, or other safe surface routes. The major system must protect against flooding during the 100-year storm event at a duration equal to or less than the T_c.

Every effort shall be made to keep the major system above ground. But, where that is impractical, the City Engineer may approve the major system to be underground if it is designed for it from the top of the catchment. “Funneling” at the bottom of a catchment is not allowed. The following figure details how the initial and major systems must function.

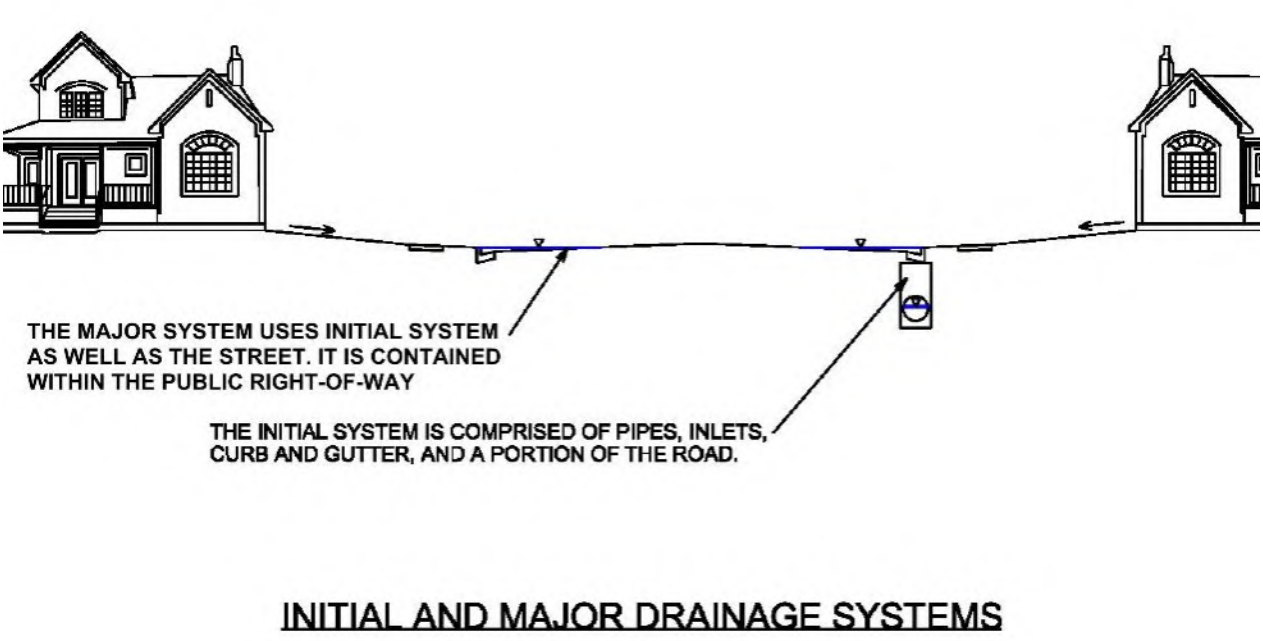


Figure 1. Initial and Major Drainage Systems

Directly connected impervious areas should be independent watershed basins and should not be combined and averaged with pervious areas.

Storage Facilities

Storm drain storage facilities are required for flood control and water quality purposes. Storage facilities may be above ground basins/ponds or below ground storage systems. Detention storage facilities require an approved suitable discharge location approved by the City Engineer. Retention facilities are required when no suitable discharge location is available. Detention facilities must be designed to store and detain the 25-year event with a maximum release rate of the lesser of 0.1 cfs/acre or historic flows in the 2-year, 10-year and 25-year events. See the Post Construction Peak Discharge section for more detailed requirements. Retention storage facilities must provide retention volume for the 100-year, 24-hour event. Infiltration may be considered as outflow when sizing retention facilities. See the section on

Infiltration in this document for details regarding infiltration requirements. However, if infiltration is utilized for facility sizing design, shorter storm durations with higher intensities must be checked (i.e., rational spreadsheet), and the controlling or largest volume, minus the infiltration, shall be used to size the storage facility. Therefore, the 24-hour storm may not result in the largest storage volume. When utilizing the SCS Type II 24-hour storm for sizing storage facilities with infiltration, the storm distribution must provide a peak intensity where the majority of the rainfall occurs during a shorter period of time.

Storm Drain System Hydraulic Requirements

Pipe systems used for conveyance must be designed such that they flow unpressurized during the required design event. Minimum pipe diameter for public storm drain pipes within City right-of-way is 18 inches but may be reduced to 15 inches for pipes from a single inlet box. Private storm drain pipe may be reduced to 10 inches but must still adhere to conveyance design storm requirements. Pipe material must adhere to Heber City Standard Specifications and Drawings. Junction boxes or manholes should be placed such that the maximum pipe length between two structures does not exceed 400 feet.

Apply an inlet clogging factor of 30% for inlets on grade and 50% for inlets in sags.

The minimum pipe slopes shall be pursuant to HEC 22 Table 7-7. The n-values shall be 0.012 for plastic pipe and 0.013 for concrete pipe.

On steeper slopes, provide a sufficient number of inlets to reduce inlet bypass to less than 0.2 cfs and to reduce risk of water sweeping pedestrians off their feet.

Design storm drain system per HEC-22.

Channel Hydraulic Requirements

Open channels that are part of the initial conveyance system shall be designed to convey the 10-year flow while maintaining one-foot of freeboard. Channels that are located within a FEMA Special Flood Hazard Area, open channels that are the major conveyance system, and natural drainage channels shall be designed to convey the 100-year flow with one foot of freeboard. All channel sections must be adequately designed, detailed, and constructed, pursuant to the latest edition of HEC 15, to prevent erosion of the channel bed and banks.

Above Ground Storage Basins (Ponds)

Above ground storage basins (ponds) shall be designed as attractive and usable spaces. Water depth should be five feet or less where feasible, appropriate landscaping shall be incorporated, and include elements that eliminate standing water and low flow impacts. Detention ponds shall include a low-flow surface channel, or underdrain that is sized for the 2-year storm event.

The required freeboard for detention basins is two feet in areas where any portion of the pond is constructed above existing ground and one foot when the pond is excavated in existing ground.

Basins that are not acting as a biofilter, or which have natural flow only, shall include at least one sump manhole to help facilitate infiltration of storm water, and the inlet into the basin shall be connected directly to the sump manhole.

Basin side slopes should be 5H:1V or flatter on two or more sides, 4H:1V or flatter slopes on remaining sides, with a minimum 1% bottom slope. If the natural existing slope is greater than 8% then basin side

slopes may be increased to 3H:1V. A suitable location for ingress and egress shall be incorporated for ponds deeper than three feet, and this must include an access at least 15-feet wide at less than 15% grade. A minimum five-foot buffer between any pond grading and the property lines shall be provided.

Landscaping: Grass or other suitable landscaping materials should be used, and turf irrigation systems shall be installed for ponds that will be maintained by City personnel, unless a low-maintenance landscaping alternative is approved. Irrigating methods and practices must be accounted for in the hydrologic and infiltration calculations when designing and sizing ponds. Developers will be required to escrow funds to landscape ponds when located on private lots for future reimbursement to the owner who completes the landscaping at a future time. Developers will not use landscaping that may hinder infiltration if it is used in the sizing of the pond or required for Municipal Separate Storm Sewer (MS4) compliance. See infiltration section for more information on infiltration and landscaping requirements.

Easements: If basins are placed on private property, a minimum 20-foot easement for all underground lineal pipeline facilities and access to maintain ponds must be provided. Additionally, an easement must be provided over the pond area and a minimum of five feet beyond the pond top of slope perimeter. The easement shall be ten feet beyond the pond perimeter when an access along the pond edge is required. Pond easements shown on subdivision plats shall have restrictive language labeled with dimensions to facilitate locating in the field.

Basins shall be designed with provisions for an emergency overflow that will avoid flood damage to surrounding properties in the event of a storm exceeding the design capacity of the basin.

Retention basins shall be designed with mechanisms to ensure that the basin will completely drain within 48 hours after the 24-hour event with additional precipitation. (Verify a 72-hour storm will not overtop the basin). See the section on Infiltration in this document for details regarding infiltration requirements.

Basin inlets and outlets shall have trash racks or grates installed. A storm water pretreatment device, approved by the City, shall be installed upstream of the pond or sump inlets. See the Water Quality section of this report for requirements.

Culverts

Culverts that convey off-site flows through a project or beneath a road shall be designed for the 100-year event. Culverts shall be designed so the headwater elevation does not exceed 1.5 times the culvert diameter, or one foot below the elevation where water spills over the road or out of the channel. Concrete box culverts shall have a minimum 5-feet height from floor to ceiling, and multi-barrel culverts may not be used where high amounts of debris is expected. If multi-barrel culverts are used in other locations, designers must consider elevations of roads, buildings, driveways, and other features to prevent adverse impacts. Normal depth equations (Manning's Equations) cannot be used for culvert analysis. Inlet and outlet control shall be checked, and culvert hydraulic calculations provided.

Roadway Drainage

Inlets within roadways should be placed to control spread, or the amount of water flowing along the side of the road and in the gutter. Allowable spread is determined by the roadway classification as follows:

Table 1. Design Spread for Roadways

Design Frequency and Spread		
Roadway Classification	**Design Frequency**	**Design Spread**
Highway or Major Collector > 35 MPH	10-Year @ T_c	Shoulder (Outside of travel lane)
Highway or Major Collector ≤ 35 MPH	10-Year @ T_c	Shoulder + three feet
Local Street	10-Year @ T_c	½ Driving Lane

Inlets should also be placed upstream of intersections and pedestrian ramps to reduce bypass flows. Spread calculations shall be checked using HEC 22, Appendix A, Chart 1B.

Rainfall Runoff Computation Methods

Precipitation data obtained from the NOAA ATLAS 14 Point Precipitation Frequency website including intensity and depth data for Heber City is contained in Appendix B. This information shall be used for all development within Heber City.

Several hydrologic methods may be applicable depending on what type of analysis is required. The Rational Method is the most common method and may be used for sizing pipes, checking inlet spread and estimating peak flow rates for areas up to 100 acres.

Rational Method runoff coefficients are shown in Table 2. The runoff coefficients listed in Table 2 are the minimum values to be used in Heber City. Any runoff coefficients for other characteristics should be adjusted to account for the 100-year rainfall.

Table 2. Rational Runoff Coefficients

Surface or Cover Type *	**Runoff Coefficient (C)**
Asphalt or Concrete Pavement	0.90 (asphalt) 0.95 (concrete)
Roofs of Buildings (type dependent)	0.90 (asphalt shingles) 0.95 (steel)
Grass-covered Sandy Soils, Slopes 2% or less	0.13
Grass-covered Sandy Soils, Slopes > 2%	0.20
Grass-covered Clay Soils, Slopes 2% or less	0.22
Grass-covered Clay Soils, Slopes > 2%	0.49

* Surfaces not addressed in this table shall be approved by the City Engineer.

For storm analyses that require developing a volume or routing a volume of runoff, a dynamic hydrograph simulation model is required using AutoDesk SSA, HEC-HMS, or SWMM. Within dynamic hydrograph simulation models, the transform method shall be the NRCS Unit Hydrograph Method, and the routing method for runoff hydrographs shall be the Muskinghum-Cunge Method. Multiple hydrographs were developed by the Soil Conservation Service (SCS), now known as Natural Resources Conservation Service (NRCS). The SCS Type II 24-hour storm distribution should be used for estimating the precipitation for developments within Heber City.

The SCS method uses the Curve Number Method for determining rainfall runoff. Curve Numbers are determined by using a land cover type in conjunction with a hydrologic soil group. Land cover information can be obtained by means of aerial topography or GIS data. Hydrologic soil group

information may be obtained from NRCS's Web Soil Survey website. The land cover and hydrologic soil group information are used to select an appropriate curve number using the manual titled *TR-55 Urban Hydrology for Small Watersheds*. TR-55 worksheets and calculation methods are provided in Appendix G and shall be utilized for developments that use the SCS method to estimate run-off. Typical CN values are included in Appendix C. Engineering judgement should be used when selecting curve numbers. Part 630 of the National Engineering Handbook says, "As a result of construction and other disturbances, the soil profile can be altered from its natural state and the listed group assignments generally no longer apply, nor can any supposition based on the natural soil be made that will accurately describe the hydrologic properties of the disturbed soil. In these circumstances, an onsite investigation should be made to determine the hydrologic soil group." Site specific factors such as terrain, potential precipitation on frozen ground, future conditions and other factors should be considered when selecting curve numbers. The SCS method shall only be used for estimating the run-off for development which are greater than 10 acres.

The Federal Aviation Administration (FAA) Method for estimating detention or retention volumes may also be used for approximating storage facility volume requirements for developments. It is outdated because it does not model the release rate correctly. However, with the Guo Averaging Parameter, it is valid and can be used. However, it is not applicable to in-series (cascading) ponds. This method is applicable for developments less than 100 acres, and the SCS method is required for developments larger than 100 acres. The FAA Method uses a spreadsheet to evaluate several storm durations for a given return period for either the 100-year storm (retention) or 25-year storm (detention). The total inflow volume for a storm duration is developed by multiplying the peak flow rate by the storm duration. The volume out is developed by utilizing a controlled discharge amount (discharge with detention only), and/or exfiltration from the detention pond when conditions permit. The required volume is equal to the inflow volume minus the outflow volume. This is evaluated for all storm durations to determine which storm duration provides the maximum required volume. Developments that use the FAA Method for estimating storage facility volumes shall use the spreadsheets provided by the City including the Guo Averaging Parameter when off-site discharge is utilized. An example is shown in Appendix I, or other approved spreadsheet formats.

Several methods for estimating time of concentration exist. They were each developed for specific parameters such as watershed size, slope, etc. Time of concentration methods used should be applicable to the areas in which they are being analyzed. The minimum time of concentration value should be 5 minutes.

For all software models, input and output data shall be provided so that it can be reviewed by the City. A copy of the model file shall also be provided to the City for review. Models must be provided to the City in Civil 3D Storm and Sanitary Analysis. City may consider other software models based on prior approval from the City Engineer.

Post Construction Peak Discharge

Heber City has adopted a 0.10 cfs/acre maximum release standard for undeveloped areas, i.e., areas outside Central Heber. This rate is assumed to be the historical undeveloped flow. For example, a 10-acre housing development would be able to have a post-development discharge rate of 1.0 cfs (10 acres x 0.10 cfs/acre) provided there is a suitable point to discharge to. If the historic flow is found to be less than the 0.1 cfs/acre, this shall be used as the maximum allowed post-development discharge. Moreover, if the downstream system does not have capacity for the 0.1 cfs/acre discharge rate, the

available capacity will become the controlling factor. To ensure that flow from new developments do not exceed 0.10 cfs/acre, detention facilities with controlled discharge are required. In cases where there is no suitable point to discharge to, retention facilities are required. See storage facilities section for more information.

Infiltration

Infiltration of treated storm water into the ground is encouraged. Detention and retention basin volumes may be sized by considering infiltration as an outflow component. Prior to assuming infiltration is a viable option, infiltration tests shall be conducted by a professional geotechnical engineer, geologist, or soil scientist licensed in Utah that determines the infiltration rate and demonstrates that the proposed soil profile is suitable for infiltration and will readily accept the water. Infiltration tests shall be performed using the double ring infiltrometer test in accordance with ASTM D 3385, and shall be performed at the location of where the result will be applied and at the elevation of the bottom of the facility where infiltration will occur. A minimum of two tests shall be performed with a minimum of one test per 10,000 square feet of the infiltration area.

Groundwater elevations shall be determined. Potential ground water level fluctuations shall be considered, and the lowest elevation of any detention basin should be at least two feet higher than the highest seasonal groundwater elevation. All design infiltration rates shall have a safety factor of two (2) or higher applied to the actual rate measured by the official infiltration test.

Only the plan view area at the bottom of the storage facility may be used as an infiltration surface in infiltration calculations unless stage-volume-discharge curves are created and used. Infiltration must not be considered as an outflow prior to the storm water entering the pond, as this could create negative storage volume.

Infiltration rates shall only be applied to the same soil that has been tested. If topsoil or other less permeable soil is added to a storage facility where percolation is being applied, the infiltration rate used in the design shall match rate of the less permeable soil. Alternatively, a permeable layer of gravel shall be used in the entire infiltration area.

An infiltration rate map is included in Appendix D. It is included to provide general infiltration information but shall not replace actual field tests.

Comply with all State groundwater protection regulations, guidelines and permits such as those associated with infiltration, infiltration wells, Class V injection wells and any others applicable to the site.

Long-Term Storm Drain Facility Maintenance

All public storm drain facilities will be maintained by Heber City unless otherwise specified in the development agreements. Developers, property owners, or their representatives such as a Homeowners Association, shall enter into a post-construction storm water management agreement with the City for all privately owned storm drain facilities, and/or publicly owned storm drain facilities that convey storm water from private roads and facilities. See Appendix J for template agreements.

Low Impact Development

Low Impact Development (LID) is a method of reducing storm runoff by capturing, treating, and retaining it on a very local level within each individual development. Although Heber City is not currently on the Utah MS4 list, it is anticipated to become an MS4 community in the future. LID is required by the Utah Department of Environmental Quality as part of an MS4 Program. To prepare for future compliance with the MS4 storm water discharge program and to reduce post-development storm water run-off in general, developments within Heber City must retain and treat the 80th percentile rainfall event as part of LID requirements. LID measures can also help achieve the onsite retention and treatment requirements. The 80th percentile depth for Heber City has been determined to be 0.47 inches. See Appendix E for this calculation. The Reese method, as shown in Appendix E, shall be used to calculate the volumetric runoff coefficient used for determining the 80th percentile volume. For developments larger than 10 acres use SCS Method to determine 80th percentile volume.

Localized LID methods are encouraged, however, the 80th percentile volume may be incorporated into larger detention or retention storage facilities if those facilities are located on site within the development area, or adjacent to, and if approved by the City Engineer.

Several typical LID measures are described in the following paragraphs. Portions of the LID descriptions have been taken from the Utah City Engineers Association (UCEA) and Utah DEQ LID Manual. See Appendix F for LID general details. The following LID descriptions are the approved LID measures to be used in Heber City. Any other proposed LID measures shall be approved by the City Engineer on a case-by-case basis. Please see the DEQ “Guide to Low Impact Development with Utah” for additional LID design guidelines and design flow-chart requirements.

Vegetated Swales

Vegetated swales may be considered dry or wet swales, and serve as a vegetative buffer between paved areas and storm drain facilities. The main advantages of vegetated swales are the degree of velocity reduction, detention, infiltration, and reduction of hard surface runoff. Storm runoff flows through the swale, where sediment and pollutants may settle out prior to entering downstream drainage facilities. A curb cut is one means of directing flow into swales where changes in elevation are limited.

Swales are often an attractive BMP solution because they can take advantage of already planned park strips. It should be noted that studies have shown that vegetated swales have a moderate ability to remove pollutants from storm water.

Dry Swales

A dry swale is a shallow, gently sloping drainage channel with broad, vegetated, side slopes. Dry swales provide temporary storage, filtration, and infiltration of storm runoff. A dry swale is versatile because it requires a relatively small area. Reduced channel velocities increase infiltration and water quality treatment and may reduce peak runoff. Channel vegetation can include turf, meadow grass, shrubs, and in limited quantities, small trees. Dry swales must be located above the water table to provide drainage. Dry swales are only allowed when groundwater is equal to or greater than 2-feet below the swale bottom elevation. When infiltrations rates are greater than 6.0 in/hour, dry swales shall either be designed as a biofilter for treatment of storm water or be preceded by an approved pre-treatment system. See the Water Quality section in this report for requirements. Retention LIDs shall provide treatment through settling, decreased flow rate, and bioretention with a designed release time.

Wet Swales

Wet swales are a type of filtration BMP and occur when the water table is located close to the surface. Wet swales act as a long and linear shallow treatment system. Like dry swales, check dams can be used as needed to create cells and contain the entire water quality treatment volume. Cells may be planted with emergent wetland plant species to improve pollutant removal. Wet swales, at a minimum, shall be preceded by a pre-treatment device to capture and remove pollutants and coarse sediment particles, see the Water Quality section below.

Infiltration Basin/Galleries

An infiltration basin is essentially a detention basin that is constructed such that storm water can exit the basin by means of infiltration into the surrounding ground. These include underground pipe and chamber systems. These systems can reduce pollutants by settling out or filtering materials and any pollutants that may be bound to those materials. They are also effective at reducing nutrients, metals and other pollutants.

Basins with no outlet or highly restricted outlets can be effective at eliminating pollutants, but there is some risk of concentrating pollutants or introduction of pollutants to groundwater that must be considered. One way to address this is by the utilization of a biofilter, hydrodynamic separator (HDS), or other pollutant removal measures within or upstream of a basin that is sized to handle the water quality design storm. All infiltration basins shall be preceded by a pre-treatment or treatment system to capture and remove pollutants and coarse sediment particles, see requirements in the Water Quality section below.

Basins and galleries must be sized to drain within 48 hours after the end of the design storm and to not overtop in the 72-hour storm.

Underground injection wells are included in this category, but water quality and applicable regulations must be considered and utilized.

Rain Gardens

A rain garden is a planted depression or similar feature that allows storm runoff from impervious urban areas like roofs, driveways, walkways, parking lots, and compacted lawn areas the opportunity to infiltrate into the soil.

Rain gardens are an LID tool that can be used in new or established developments. Rain gardens can be constructed in commercial and residential sites. The garden may be located near a street or parking lot in a shallow depression where runoff can be diverted into it. Native perennial plants are recommended in rain gardens with a barrier to reduce weeds. Nutrients in the storm runoff are reduced as plants or other growing media make use of them to grow.

Rain gardens can be constructed to allow infiltration. Where complete infiltration is not desired or is not feasible due to existing soil conditions, an underdrain may be installed to convey excess water to a storm drain retention system.

Studies underway at Utah State University have identified common reed and sedges are the optimal plant for use in northern Utah to remove nutrients, metals, and other pollutants (Dupont and McLean), but it must be harvested and disposed of elsewhere at regular intervals to prevent concentration of

pollutants in the soil or in the biofilters. Mulching and leaving in place does not address this. Whether such concentrations are critical depends on the contact with groundwater, and is still under study.

Root zone soil media must be shallow and water must pool or move slowly through the system or the pollutant removal is ineffective.

Rain garden filtration media shall meet the specification for biofilters (see Water Quality section below), are only allowed in private areas, and shall be maintained by the property owner.

Water Quality

Water quality is of utmost importance to Heber City. There are a variety of mechanisms to protect water quality from storm drain discharge systems. All storm water must pass through a pre-treatment or treatment system prior to discharging to a storage facility (above or below ground) that captures the 25-year to 100-year storm events. LID measures are intended to reduce storm runoff and to improve overall water quality. However, as most LID measures rely on infiltration, water quality must also be considered during design and implementation. Unless the native soil infiltration rate is less than 6.0 in/hr and/or the LID facility is designed and determined to treat the storm water (biofilter treatment), an approved hydrodynamic separator (HDS) pre-treatment device shall be used prior discharging to LID systems. All storm water that flows over an impervious surface must be treated.

Pre-treatment and Treatment Systems

Pre-treatment and treatment systems shall be sized, at a minimum, to treat the 2-year storm event at the duration that produces the highest flow rate while also being able to by-pass the peak conveyance storm at the time of concentration (T_c) without disrupting the treatment system. The peak conveyance storm represents the actual capacity of the initial conveyance system and may be larger than the 10-year event. Note, treatment systems that also serve as LID retention areas may be sized for the 80th percentile storm event but shall adhere to the by-pass requirements stated above. Requirements for pre-treatment and treatment are listed below.

Oil-Water and Hydrodynamic Separators (HDS) Pre-Treatment Devices:

All developments are required to install an appropriately sized hydrodynamic separator (HDS) prior to discharging to the retention/detention storage facility that captures the 25-year to 100-year storm events unless the LID methods utilized in the development incorporate a sized biofilter per the specification listed below and the storm water is not re-introduced to a source of pollution after it flows through the localized LID methods. Pre-treatment devices shall be maintained at least twice per year and per the guidelines provided by the manufacturer. All HDS devices must achieve, at a minimum, the following treatment levels:

- The HDS system shall be required to have a General Use Level Designation (GULD) performance verification through the TAPE program (Emerging stormwater treatment technologies (TAPE) - Washington State Department of Ecology). The device shall be sized to treat the peak runoff flow rate generated by the 2-year storm event at the Tc, when using Rational Method. Use the storm duration and distribution that creates the highest flow rate during a 2-year storm event when using other run-off computation methods.The proposed hydraulic loading rate (HLR) must not exceed the design HLR of the proposed device to be used. TAPE approval letters can be fou

nd on the website and provide the design HLR and/or the maximum treatment flow rate for each model.

- The HDS system shall be concrete unless otherwise approved by the City Engineer
- The HDS system shall provide 90% removal of trash and neutrally buoyant material larger than 5mm at the design treatment flow rate. Adding a screen to the tested system is not allowed to meet this spec, as modifying a TAPE verified system with a screen can significantly affect hydraulics, and thus water quality performance.
- The HDS system shall be designed to by-pass the peak conveyance storm event and prevent these larger storm events from washing out the oil, debris, and sediment that has been previously captured (off-line storage).
- The HDS system shall provide a minimum sump and oil storage capacity as follows:

Treatment Capacity Range (cfs)	Minimum Sump Storage Capacity (yd^3)	Minimum Oil Capacity (gal)
0-4	> 0.4	> 60
4-9	> 2	> 200
9-20	> 4	> 500
> 20	> 8	> 1000

Biofilter Treatment Systems: Biofilter is a generic description for bioswales, vegetated filter strips, rain gardens, or other structures that use a filtration media to capture storm water pollutants. The pollutants are decomposed by a biomass such as plants, a tree, or a specially designed biofilter media. These systems are typically connected to a storm drain system and if used shall be combined with detention/retention facilities.

All biofilters shall be sized to treat the 2-year T_c storm event flow rate while also be sized to by-pass larger flows without disrupting the treatment system. Biofilters shall treat the storm water prior to infiltrating into the native soils with infiltration rates greater than 6.0 in/hr and/or prior to discharging to a detention/retention facility unless a sized HDS system is properly incorporated as pre-treatment.

The growing media of the biofilter and shall be designed and certified to meet the following specifications.

RAIN GARDEN AND BIOFILTER GROWING MEDIA (Soil + Organics)

Assume a saturated hydraulic conductivity rate of 2.0 in/hr. Then, divide it by a safety factor of 2.0. So, the net rate is 1.0 in/hr.

RAIN GARDEN AND BIOFILTER SOIL

Particle Size Distribution

sand: 70-80%

silt: 0-30%

clay: 0-15%

Chemical Attribute and Nutrient Analysis

pH: 6.8-7.5

organic matter: < 1.5%

nitrogen: < 15 ppm

phosphorous: < 15 ppm

salinity: < 6 mmhos/cm

RAIN GARDEN AND BIOFILTER ORGANICS

shredded mulch: 3-5% (by weight of growing media)

VEGETATION

The filter area shall be vegetated with drought tolerant species that thrive in sandy soils. Table 3 provides a suggested seed mix for sites that will not need to be irrigated after the grass has been established.

Table 3. Suggested Seed Mix

Common Name	Scientific Name	Variety	PLS[2] lbs per Acre	Ounces per Acre
Sand bluestem	Andropogon hallii	Garden	3.5	
Sideoats grama	Bouteloua curtipendula	Butte	3	
Prairie sandreed	Calamovilfa longifolia	Goshen	3	
Indian ricegrass	Oryzopsis hymenoides	Paloma	3	
Switchgrass	Panicum virgatum	Blackwell	4	
Western wheatgrass	Pascopyrum smithii	Ariba	3	
Little bluestem	Schizachyrium scoparium	Patura	3	
Alkali sacaton	Sporobolus airoides		3	
Sand dropseed	Sporobolus cryptandrus		3	
Pasture sage[1]	Artemisia frigida			2
Blue aster[1]	Aster laevis			4
Blanket flower[1]	Gaillardia aristata			8
Prairie coneflower[1]	Ratibida columnifera			4
Purple prairieclover[1]	Dalea (Petalostemum) purpurea			4
Sub-Totals:			27.5	22
Total lbs per acre:			**28.9**	

[1] Wildflower seed (optional) for a more diverse and natural look.
[2] PLS = Pure Live Seed.

EXECUTION

thickness: >/= 18 inches

compaction: 80-85% of maximum dry density as measured by AASHTO T-99 (ASTM D698)

vegetation: Mix seed well and broadcast, followed by hand raking to cover seed and then mulched. Hydromulching can be effective for large areas. Do not place seed when standing water or snow is present or if the ground is frozen. Weed control is critical in the first two to three years, especially when starting with seed. When using sod, specify sand–grown sod. Do not use conventional sod. Conventional sod is grown in clay soil that will seal the filter area, greatly reducing overall function of the BMP.

Irrigation: Provide spray irrigation at or above the WQCV elevation or place temporary irrigation on top of the rain garden surface. Do not place sprinkler heads on the flat surface. Remove temporary irrigation when vegetation is established. If left in place this will become buried over time and will be damaged during maintenance operations. Adjust irrigation schedules during the growing season to provide the minimum water necessary to maintain plant health and to maintain the available pore space for infiltration.

Water Quality Control Measures

Other water quality control requirements are listed below.

Detention/Retention Facilities (Pollutant Control, LID): Detention basins are used to attenuate peak flow rates of a runoff hydrograph. They also can be designed to allow sediment, debris, and other contaminants to settle out by reducing water velocity or holding the water until it infiltrates or evaporates.

Retention facilities have no outlet and water is removed by infiltration or evaporation. Retention basins still function as a BMP the same way a detention basin does. Detention and retention facilities shall be used in combination with hydrodynamic separators or biofiltration systems.

These facilities require regular maintenance to remove debris, contaminants, and sediment build-up.

Outlet Protection/Energy Dissipation Devices: Outlet protection reduces or eliminates soil erosion thereby preventing the migration of soil to downstream channels. Outlet protection, pursuant to HEC 14, is required at all open discharge points.

Slope Protection: Slope protection ensures slopes will be stable during and after construction. The primary means of stabilization of a slope is establishing permanent vegetation, but may also consist of temporary or permanent rock, mulch, erosion control blankets, check dams, diversion dikes, or other means of protection. All slopes shall be stabilized after disturbance. Slopes of 3H:1V and steeper require permanent slope stabilization.

Source Protection

The Utah Division of Drinking Water requires that each well and spring serving a public drinking water system must have a source protection plan. Part of that plan includes the protection of groundwater from point and non-point sources. Developers within Heber must certify that all private and public

source protection zones are protected from storm water pollutants. Source protection zones for Heber City culinary water sources are shown on the source protection maps in Appendix H.

Storm water infiltration, drainage wells, or storm water injection wells are prohibited within 100 feet of Zone 1 of any source protection area. All storm drain storage facilities within 100 feet of a Zone 1 area shall be lined with an approved waterproof liner to prevent all storm water infiltration.

Natural Channels

All major natural channels must maintain a buffer of open space and offset from development. This buffer is intended to help maintain water quality, prevent damage from flooding events, and maintain habitat and aesthetics. A minimum buffer width of 100-ft centered on the major natural drainage channel should be maintained. Development (including individual lots and buildings) is not allowed in the buffer zone. The drainage channel shall be protected and remain undisturbed where possible and with the exception of road or other crossings. Crossings of the natural channels shall be a minimum distance of 200-feet measured along the channel. Exceptions may be granted where proposed road crossings are adjacent to canal crossings or collector roads. Additional landscaping, green space, trails, or other amenities may be allowed if it is shown they will not negatively affect water quality or compromise the other goals of the buffer area. All improvements proposed in the natural drainages shall be approved by the City.

Flood and Debris Flow Hazards

FEMA Flood Analysis

Ensure all pertinent FEMA flood mapping data is incorporated into plans and plats maps. Ensure all FEMA guidelines from https://www.fema.gov are followed including the sections on Floods & Maps, Floodplain Management, and Flood Insurance. FEMA uses the most accurate flood hazard information available and applies rigorous standards in developing Flood Insurance Rate Maps (FIRMs). All areas within Flood Hazard Areas shall be shown on plans and plats, and all Base Flood Elevation (BFE) data pertinent to the development must be provided.

To change the FIRM designation of a property, a Letter of Map Amendment (LOMA) and/or the Letter of Map Revision-Based on Fill (LOMR-F) processes must be strictly followed.

Debris-Flow Flood Hazard Analysis

The Western Unities states is beginning to see increased precipitation intensity and increasing fire size and frequency (Kean and Staley et al, 2021). Generally, there is not adequate time to prevent or mitigate a debris flow hazard *after* a wildfire has taken place. The USGS has found that 1-year storm events will typically trigger a post-wildfire debris flow event. Therefore, if a wildfire takes place, some type of debris flow is likely to happen within 1-year of the fire. These types of hazards should be prevented or controlled as deemed feasible. New development with undeveloped land upstream or downstream of the property containing natural slopes 30% and greater and/or where the City Engineer determines there could be a potential debris-flow risk, requires a specialized post wild-fire debris-flow analysis of the site including an estimated post-fire hazard assessment with mitigation measures.

Flood and Debris-flow hazard analysis reports shall include but shall not be limited to the following information for the areas to be developed:

- FEMA Flood Mapping Data including 100-year flood hazard zones
- Include and label the drainageways susceptible to periodic flooding associated with storm events or rapid snowmelt that are outside the FEMA designated flood zones
- U.S. Geological Survey Map
- Aerial Map
- Contour map with slopes labeled
- Geotechnical Test pit data
- Geologic Mapping Data to include historic upstream and downstream alluvial fan deposits and historic upstream or pass-through debris/mud flows as data is available.
- Vegetative cover type and percentage analysis
- Utah Division of Water Rights – Dam Safety requirements
- Post-fire debris-flow volume calculations with flood and post-fire debris-flow hazard assessment and mitigation

Flood and post-fire debris-flow hazard assessment and mitigation recommendations shall adhere to the following guidelines:

At a minimum, the volume of debris sediment shall be calculated using the model equation (2) from the 2010 Cannon study (Cannon et al,, 2010). The entire drainage basin shall be modeled. Methods from the Gartner 2014 study and equation (3) may also be used until another model paper is published and adopted by USGS. (Gartner et al., 2014).

The minimum storm event interval shall be a 10-year occurrence with a T_c peak rainfall depth, unless otherwise approved by the City Engineer. Intensity is used for the Gartner method.

When the Gartner method is used, the watershed area burned at moderate to high severity shall be calculated based on a vegetation type assessment of the entire drainage basin. Vegetation type and coverage area data shall be obtained and summarized under the direction of a licensed Professional Engineer or other approved licensed professional. Forested areas and other areas with small or large tree species (deciduous or evergreen) and/or thick brush, such as Gambel Oak shall be assumed to burn at moderate to high severity. Staley et al. (2018) spells out further guidance on vegetation types and burn severity per vegetation type.

Debris flow is difficult to accurately model due to the nature of the material being carried by the storm water, especially if the natural channel that the debris flow will enter and travel through is altered by road crossings, culverts, or other diversions/obstructions over and through the natural channel. Unless the natural channel is undisturbed and can be accurately modeled to safely convey the debris flow without having to travel through any obstructions, culverts, roads, etc. that would otherwise plug or divert the flow off-course, the estimated debris volume needs to be contained in a debris-basin upstream from development. Road or other crossings shall be designed to allow and divert debris flow and/or flood water over the crossing using depression or other mechanism to allow the flow to pass the crossing continue down the natural channel. Other measures to contain and/or divert the debris volume may be considered, as approved by the City Engineer.

References

Cannon, S.H., Gartner, J.E., Rupert, M.G., Michael, J.A., Rea, A.H., & Parrett, C. (2010). Predicting the probability and volume of postwildfire debris flows in the intermountain western United States. *GSA Bulletin*, *v. 122*(1-2), 127-144. https://doi.org/10.1130/B26459.1

Gartner, J.E., Cannon, S.H., & Santi, P.M. (2014). Empirical models for predicting volumes of sediment deposited by debris flows and sediment-laden floods in the transverse ranges of southern California. *Engineering Geology*, *176*, 45-56. https://doi.org/10.1016/j.enggeo.2014.04.008

Kean, J.W., & Staley, D.M. (2021). Forecasting the frequency and magnitude of postfire debris flows across southern California. *Earth's Future*, *9*(3), e2020EF001735. https://doi.org/10.1029/2020EF001735

Staley, D.M., Tillery, A.C., Kean, J.W., McGuire, L.A., Pauling, H.E., Rengers, F.K., & Smith, J.B. (2018). Estimating post-fire debris-flow hazards prior to wildfire using a statistical analysis of historical distributions of fire severity from remote sensing data. *International Journal of Wildland Fire*, *27*(9), 595-608. https://doi.org/10.1071/WF17122

Appendices

Appendix A

Drainage Design Resources

Standard Drawings | Heber City, UT (heberut.gov)

Standard Specifications | Heber City, UT (heberut.gov)

Storm-Intensity-Curves-PDF (heberut.gov)

Low Impact Development - Utah Department of Environmental Quality

DWQ-2019-000161.pdf (utah.gov)

Microsoft PowerPoint - A Guide to Low Impact Development within Utah (Training)

Emerging stormwater treatment technologies (TAPE) - Washington State Department of Ecology

Nonpoint Source: Urban Areas | US EPA

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Appendix B

(IDF Data)

Precipitation Frequency Estimates (in/hr)										
Average recurrence interval (years)	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
1	1.54	1.16	0.96	0.646	0.4	0.251	0.191	0.126	0.079	0.047
2	1.94	1.48	1.22	0.824	0.51	0.314	0.237	0.155	0.097	0.058
5	2.68	2.03	1.68	1.13	0.699	0.413	0.302	0.191	0.118	0.072
10	3.34	2.54	2.1	1.41	0.873	0.505	0.364	0.223	0.137	0.083
25	4.38	3.34	2.76	1.86	1.15	0.656	0.46	0.27	0.163	0.099
50	5.38	4.09	3.38	2.27	1.41	0.794	0.545	0.31	0.185	0.112
100	6.52	4.96	4.1	2.76	1.71	0.958	0.647	0.355	0.209	0.125
200	7.86	5.98	4.94	3.33	2.06	1.15	0.772	0.405	0.234	0.14
500	10	7.63	6.31	4.25	2.63	1.46	0.985	0.499	0.273	0.159
1000	12	9.13	7.55	5.08	3.14	1.75	1.18	0.597	0.307	0.175

Precipitation Frequency Estimates (inches)										
Average recurrence interval (years)	5-min	10-min	15-min	30-min	60-min	2-hr	3-hr	6-hr	12-hr	24-hr
1	0.13	0.19	0.24	0.32	0.40	0.50	0.57	0.75	0.95	1.13
2	0.16	0.25	0.31	0.41	0.51	0.63	0.71	0.93	1.17	1.40
5	0.22	0.34	0.42	0.57	0.70	0.83	0.91	1.14	1.43	1.72
10	0.28	0.42	0.52	0.71	0.87	1.01	1.09	1.34	1.65	2.00
25	0.37	0.56	0.69	0.93	1.15	1.31	1.38	1.62	1.97	2.38
50	0.45	0.68	0.84	1.14	1.41	1.59	1.64	1.86	2.23	2.69
100	0.54	0.83	1.03	1.38	1.71	1.92	1.94	2.12	2.51	3.01
200	0.66	1.00	1.24	1.66	2.06	2.30	2.32	2.43	2.82	3.35
500	0.84	1.27	1.58	2.12	2.63	2.93	2.96	2.99	3.29	3.82
1000	1.00	1.52	1.89	2.54	3.14	3.50	3.54	3.57	3.70	4.20

NOAA Atlas 14, Volume 1, Version 5 (Feb 2022)
Location name: Heber City, Utah, USA
Latitude: 40.4924°, Longitude: -111.4129°
Elevation: 5642.1 ft
Refer to NOAA Atlas 14 document for more information

NOAA Atlas 14, Volume 1, Version 5
Location name: Heber City, Utah, USA*
Latitude: 40.4924°, Longitude: -111.4129°
Elevation: 5642.1 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.128** (0.111-0.149)	**0.162** (0.142-0.190)	**0.223** (0.194-0.261)	**0.278** (0.239-0.326)	**0.365** (0.306-0.433)	**0.448** (0.364-0.533)	**0.543** (0.428-0.653)	**0.655** (0.496-0.799)	**0.836** (0.601-1.04)	**1.00** (0.689-1.27)
10-min	**0.194** (0.169-0.227)	**0.247** (0.215-0.289)	**0.338** (0.294-0.397)	**0.423** (0.363-0.497)	**0.556** (0.465-0.659)	**0.681** (0.553-0.811)	**0.827** (0.651-0.994)	**0.997** (0.755-1.22)	**1.27** (0.914-1.59)	**1.52** (1.05-1.94)
15-min	**0.240** (0.210-0.282)	**0.306** (0.267-0.359)	**0.420** (0.365-0.493)	**0.524** (0.450-0.615)	**0.690** (0.576-0.816)	**0.844** (0.686-1.00)	**1.02** (0.807-1.23)	**1.24** (0.936-1.51)	**1.58** (1.13-1.97)	**1.89** (1.30-2.40)
30-min	**0.323** (0.282-0.380)	**0.412** (0.359-0.483)	**0.565** (0.491-0.663)	**0.706** (0.606-0.829)	**0.929** (0.776-1.10)	**1.14** (0.924-1.35)	**1.38** (1.09-1.66)	**1.66** (1.26-2.03)	**2.12** (1.53-2.65)	**2.54** (1.75-3.24)
60-min	**0.400** (0.349-0.470)	**0.510** (0.445-0.598)	**0.699** (0.608-0.821)	**0.873** (0.750-1.03)	**1.15** (0.960-1.36)	**1.41** (1.14-1.68)	**1.71** (1.34-2.05)	**2.06** (1.56-2.51)	**2.63** (1.89-3.28)	**3.14** (2.16-4.01)
2-hr	**0.502** (0.447-0.578)	**0.627** (0.559-0.719)	**0.826** (0.732-0.950)	**1.01** (0.885-1.16)	**1.31** (1.12-1.52)	**1.59** (1.32-1.85)	**1.92** (1.54-2.27)	**2.30** (1.78-2.77)	**2.93** (2.15-3.62)	**3.50** (2.46-4.43)
3-hr	**0.573** (0.515-0.649)	**0.712** (0.640-0.804)	**0.908** (0.810-1.03)	**1.09** (0.967-1.24)	**1.38** (1.20-1.57)	**1.64** (1.39-1.88)	**1.94** (1.60-2.28)	**2.32** (1.84-2.80)	**2.96** (2.22-3.65)	**3.54** (2.54-4.47)
6-hr	**0.754** (0.690-0.838)	**0.929** (0.847-1.03)	**1.14** (1.04-1.28)	**1.34** (1.21-1.49)	**1.62** (1.44-1.81)	**1.86** (1.62-2.09)	**2.12** (1.82-2.42)	**2.43** (2.03-2.81)	**2.99** (2.42-3.69)	**3.57** (2.76-4.51)
12-hr	**0.954** (0.875-1.05)	**1.17** (1.07-1.30)	**1.43** (1.30-1.58)	**1.65** (1.50-1.82)	**1.97** (1.76-2.19)	**2.23** (1.97-2.50)	**2.51** (2.18-2.85)	**2.82** (2.40-3.24)	**3.29** (2.71-3.86)	**3.70** (2.98-4.56)
24-hr	**1.13** (1.06-1.21)	**1.40** (1.31-1.50)	**1.72** (1.62-1.85)	**2.00** (1.87-2.13)	**2.38** (2.21-2.54)	**2.69** (2.48-2.87)	**3.01** (2.77-3.21)	**3.35** (3.06-3.58)	**3.82** (3.45-4.10)	**4.20** (3.76-4.61)
2-day	**1.30** (1.22-1.40)	**1.62** (1.51-1.74)	**1.98** (1.85-2.12)	**2.28** (2.13-2.44)	**2.71** (2.52-2.90)	**3.04** (2.81-3.25)	**3.39** (3.11-3.62)	**3.75** (3.42-4.02)	**4.24** (3.83-4.56)	**4.63** (4.14-5.00)
3-day	**1.44** (1.35-1.54)	**1.78** (1.67-1.92)	**2.18** (2.05-2.34)	**2.52** (2.35-2.69)	**2.97** (2.77-3.18)	**3.34** (3.09-3.57)	**3.71** (3.42-3.97)	**4.09** (3.75-4.39)	**4.62** (4.19-4.97)	**5.03** (4.52-5.44)
4-day	**1.57** (1.48-1.69)	**1.95** (1.83-2.09)	**2.39** (2.24-2.56)	**2.75** (2.57-2.94)	**3.24** (3.03-3.47)	**3.63** (3.37-3.89)	**4.03** (3.73-4.32)	**4.44** (4.08-4.77)	**5.00** (4.55-5.39)	**5.44** (4.90-5.88)
7-day	**1.87** (1.74-2.02)	**2.30** (2.15-2.49)	**2.81** (2.62-3.04)	**3.23** (3.00-3.49)	**3.80** (3.53-4.11)	**4.25** (3.92-4.59)	**4.71** (4.33-5.10)	**5.18** (4.73-5.61)	**5.82** (5.26-6.34)	**6.31** (5.67-6.90)
10-day	**2.14** (1.98-2.31)	**2.64** (2.46-2.85)	**3.21** (2.99-3.47)	**3.67** (3.40-3.96)	**4.29** (3.97-4.63)	**4.75** (4.39-5.14)	**5.23** (4.80-5.65)	**5.70** (5.22-6.18)	**6.34** (5.75-6.88)	**6.81** (6.14-7.44)
20-day	**2.81** (2.63-3.02)	**3.47** (3.25-3.74)	**4.20** (3.93-4.51)	**4.76** (4.45-5.11)	**5.50** (5.13-5.91)	**6.05** (5.63-6.50)	**6.60** (6.11-7.10)	**7.13** (6.58-7.69)	**7.81** (7.16-8.44)	**8.31** (7.60-9.02)
30-day	**3.40** (3.19-3.62)	**4.20** (3.95-4.47)	**5.03** (4.73-5.35)	**5.66** (5.32-6.02)	**6.49** (6.09-6.89)	**7.08** (6.64-7.54)	**7.67** (7.17-8.18)	**8.23** (7.68-8.78)	**8.94** (8.28-9.56)	**9.45** (8.72-10.1)
45-day	**4.28** (4.02-4.57)	**5.28** (4.96-5.64)	**6.31** (5.93-6.72)	**7.09** (6.65-7.55)	**8.08** (7.56-8.60)	**8.79** (8.20-9.35)	**9.47** (8.81-10.1)	**10.1** (9.38-10.8)	**10.9** (10.1-11.6)	**11.4** (10.5-12.3)
60-day	**5.09** (4.79-5.42)	**6.28** (5.91-6.70)	**7.45** (7.02-7.93)	**8.32** (7.83-8.84)	**9.39** (8.82-9.97)	**10.1** (9.50-10.8)	**10.8** (10.2-11.5)	**11.5** (10.7-12.2)	**12.3** (11.4-13.1)	**12.8** (11.9-13.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

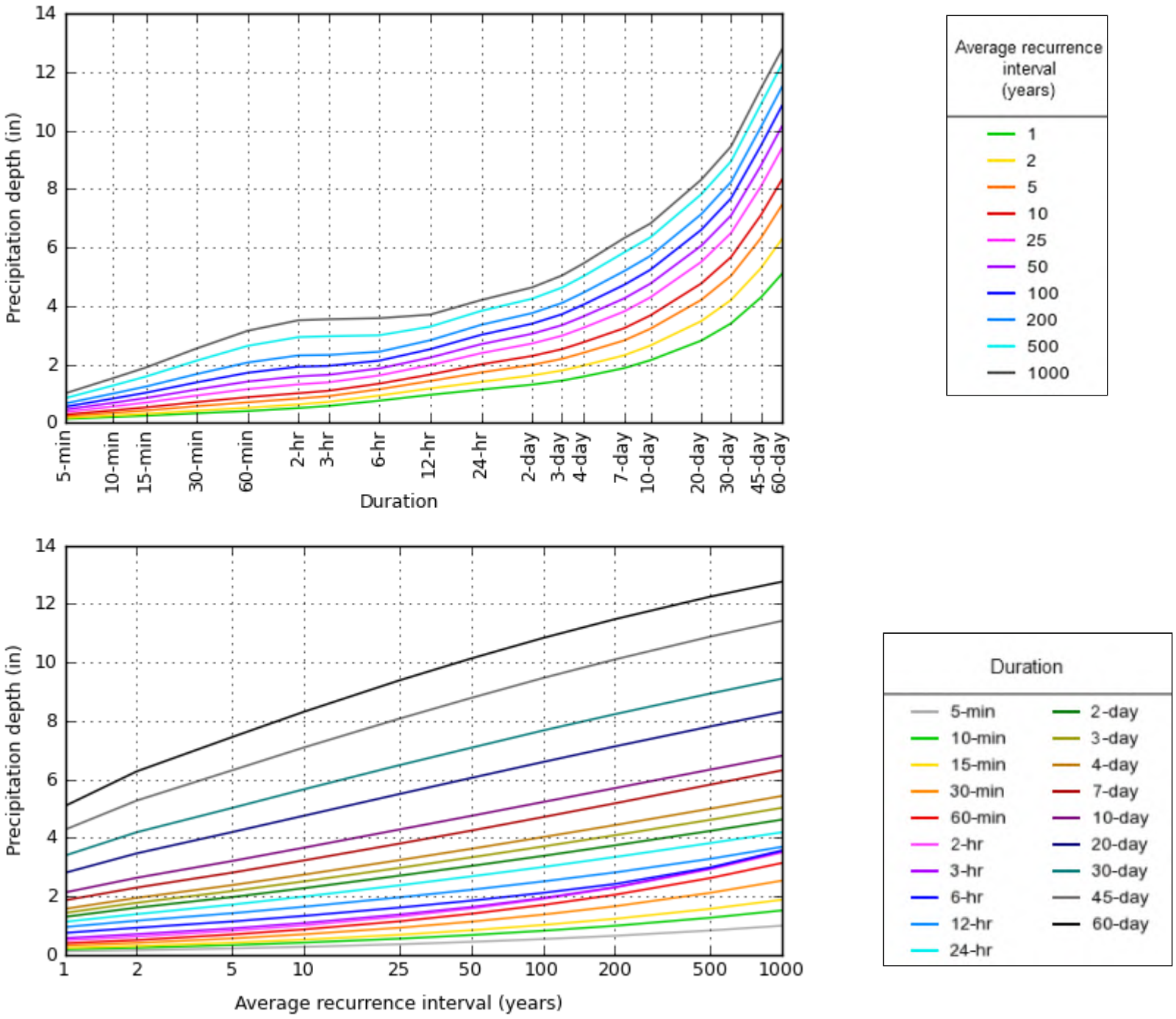
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.4924°, Longitude: -111.4129°

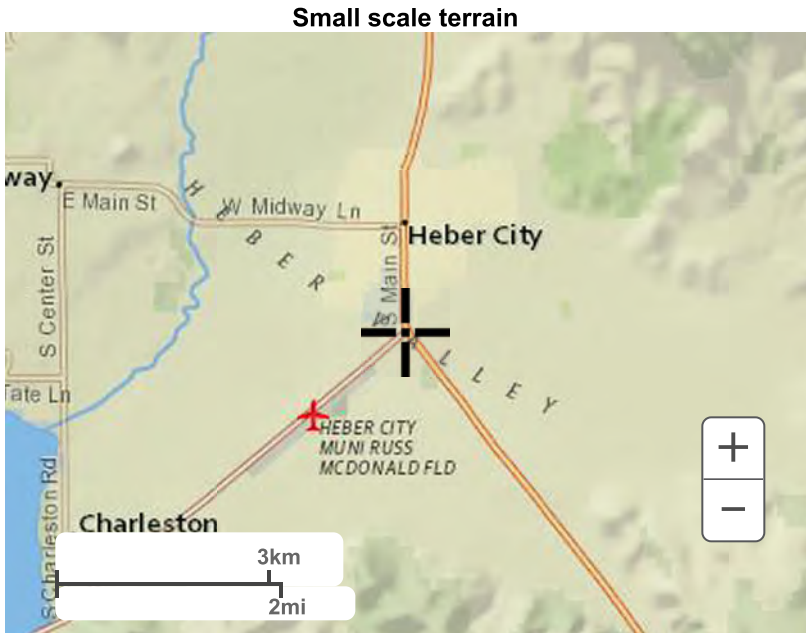


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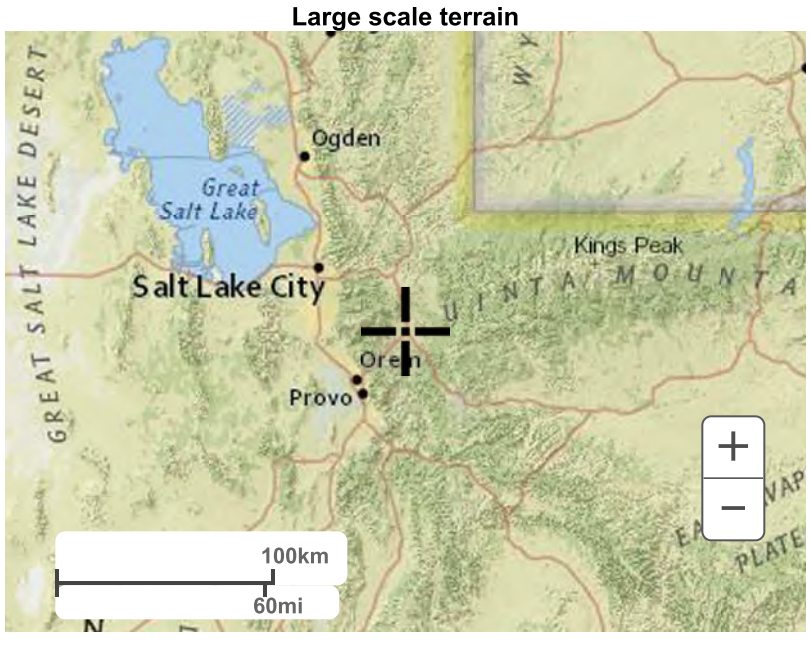
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Maps & aerials

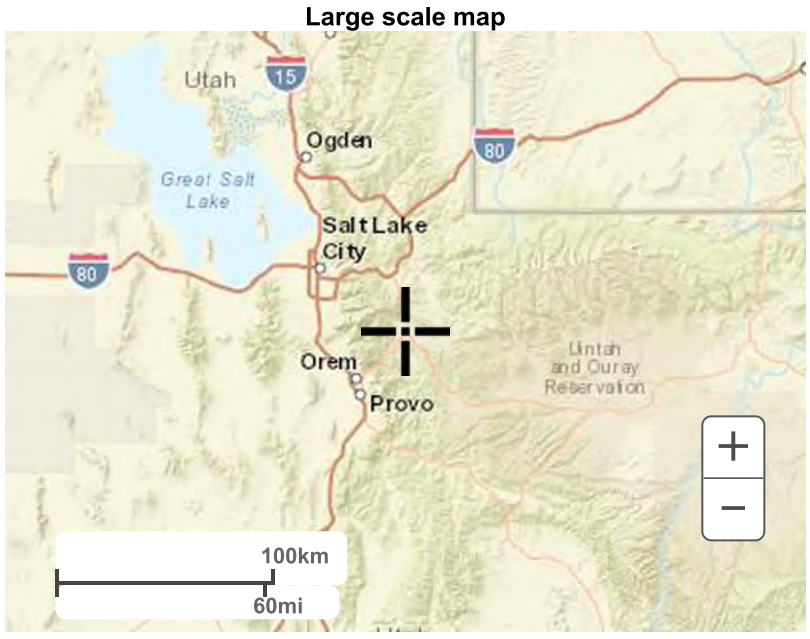
Small scale terrain



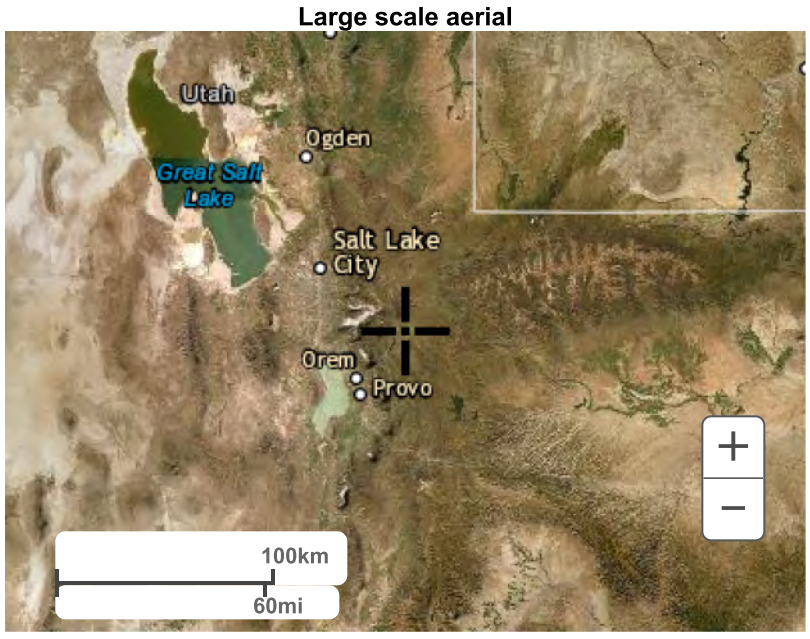
Large scale terrain



Large scale map



Large scale aerial



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Disclaimer

Appendix C

(CN Tables)

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

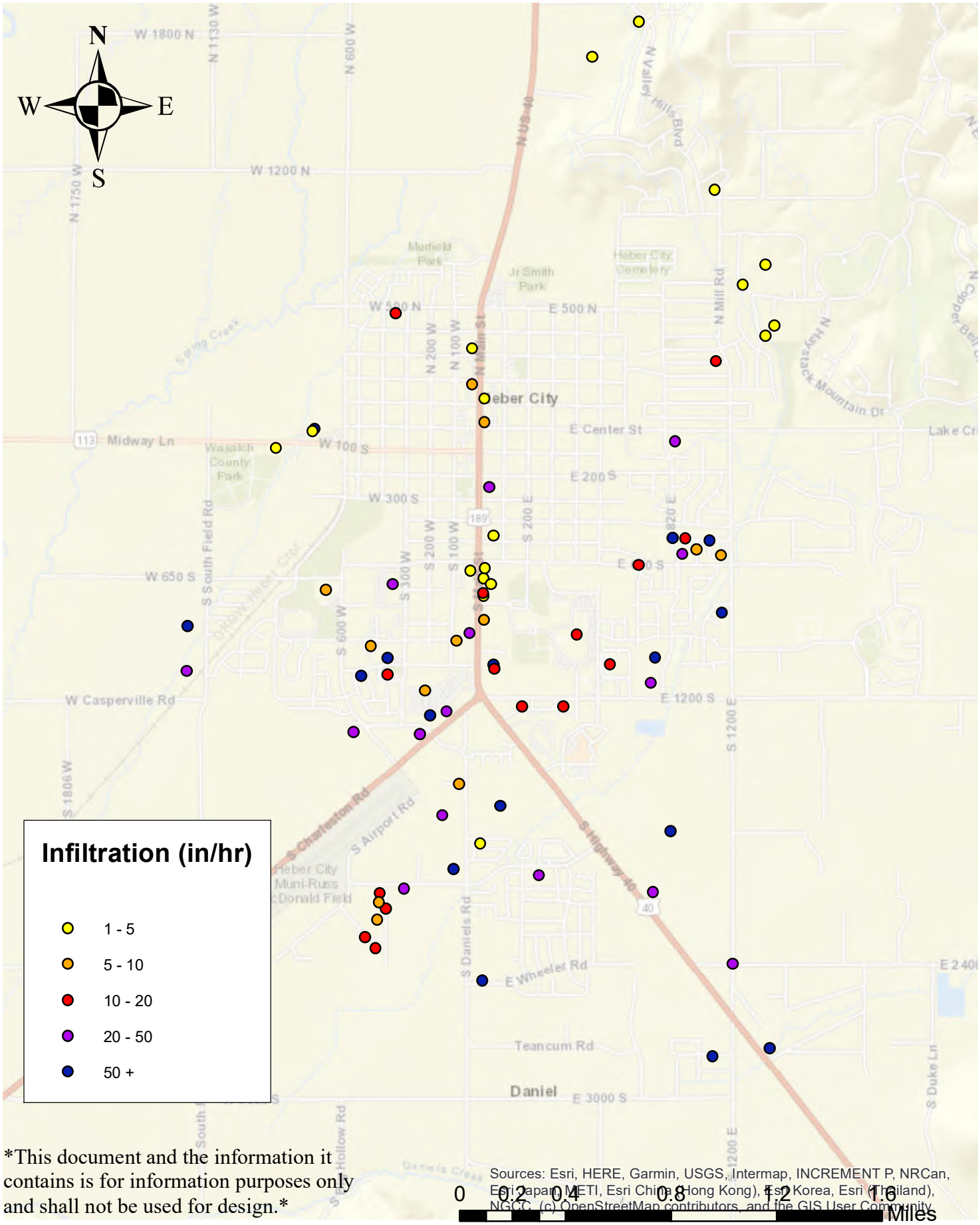
Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2/]	A [3/]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

Appendix D

(Infiltration & Groundwater Maps)



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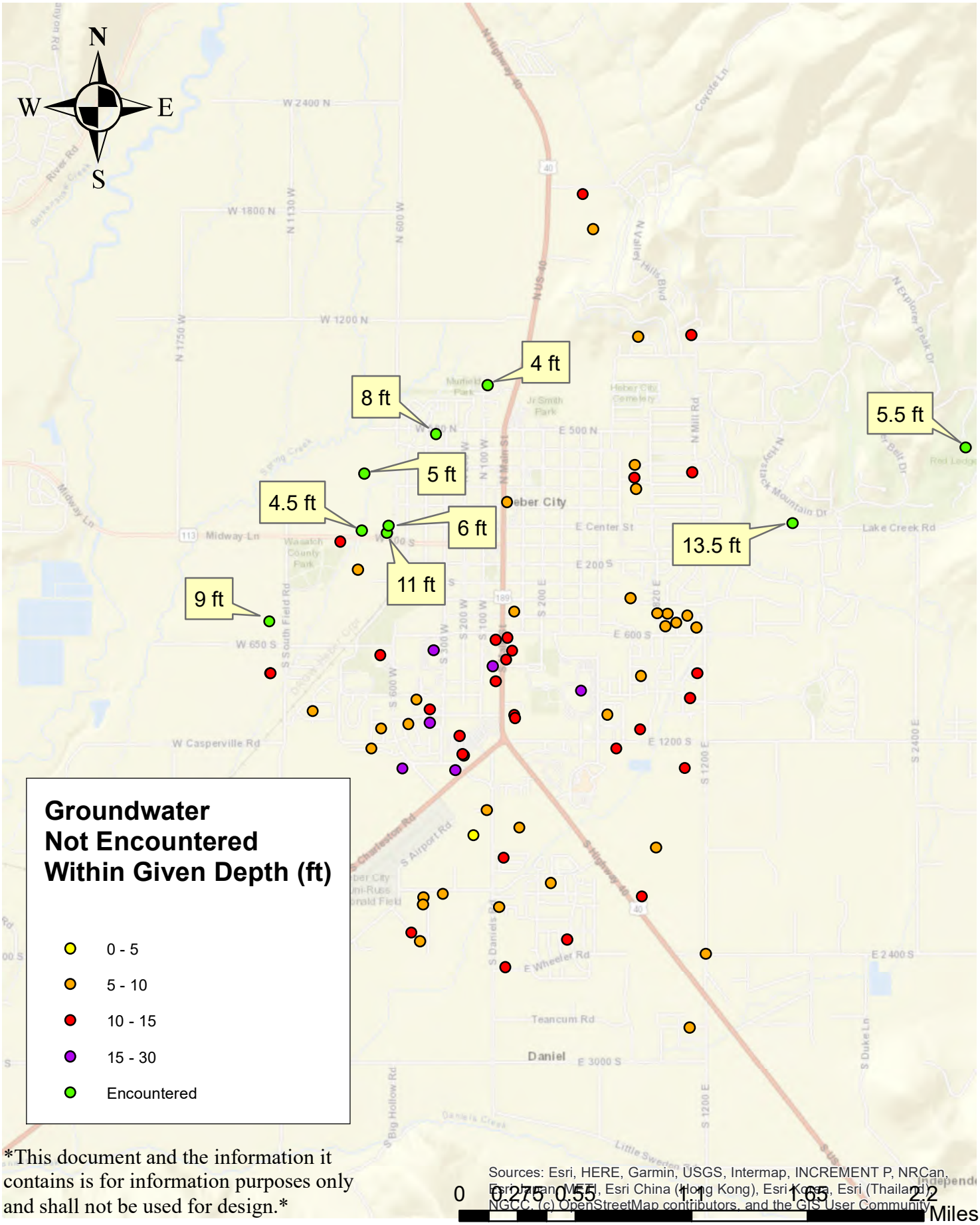
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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HORROCKS ENGINEERS
728 West 100 South
Heber, UT 84032
(435) 654-2226

Infiltration Rate

DATE 6/9/2022
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HORROCKS ENGINEERS
728 West 100 South
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(435) 654-2226

Groundwater Depth

DATE 6/9/2022
DRAWN

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Appendix E

(80th Percentile Calculations)

HEBER CITY NOAA RAINFALL DATA

PDS-based precipitation frequency estimates with 90% confidence intervals 1
Duration Average recurrence interval
https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ut

	100	50	20	10	4	2	1	0.5	0.2	0.1
	1	2	5	10	25	50	100	200	500	1000
5-min	0.127	0.161	0.221	0.275	0.363	0.445	0.541	0.653	0.836	1
10-min	0.193	0.245	0.336	0.419	0.552	0.678	0.823	0.995	1.27	1.53
15-min	0.239	0.304	0.416	0.52	0.685	0.84	1.02	1.23	1.58	1.89
30-min	0.322	0.409	0.561	0.7	0.922	1.13	1.37	1.66	2.12	2.55
60-min	0.398	0.506	0.694	0.866	1.14	1.4	1.7	2.06	2.63	3.15
2-hr	0.504	0.628	0.825	1.01	1.31	1.59	1.91	2.3	2.94	3.52
3-hr	0.579	0.719	0.915	1.1	1.39	1.65	1.95	2.32	2.96	3.55
6-hr	0.764	0.941	1.16	1.35	1.63	1.87	2.14	2.44	3.01	3.59
12-hr	0.972	1.19	1.45	1.67	2	2.26	2.55	2.87	3.34	3.75
24-hr	1.18	1.46	1.77	2.03	2.4	2.69	2.99	3.3	3.73	4.06
2-day	1.37	1.69	2.05	2.34	2.75	3.06	3.38	3.71	4.16	4.5
3-day	1.53	1.88	2.27	2.6	3.04	3.39	3.75	4.11	4.6	4.98
4-day	1.68	2.07	2.5	2.85	3.34	3.72	4.11	4.51	5.04	5.45
7-day	2.01	2.47	2.98	3.4	3.96	4.39	4.84	5.29	5.88	6.33
10-day	2.29	2.82	3.39	3.84	4.44	4.89	5.34	5.78	6.35	6.77
20-day	3.02	3.72	4.45	5.01	5.73	6.26	6.78	7.27	7.89	8.32
30-day	3.67	4.5	5.34	5.99	6.81	7.4	7.97	8.51	9.18	9.65
45-day	4.6	5.65	6.68	7.47	8.46	9.16	9.83	10.4	11.2	11.7
60-day	5.47	6.71	7.91	8.8	9.91	10.7	11.4	12.1	12.8	13.3

PARK CITY NOAA RAINFALL DATA

PDS-based precipitation frequency estimates with 90% confidence intervals 1
Duration Average recurrence interval

	100	50	20	10	4	2	1	0.5	0.2	0.1
	1	2	5	10	25	50	100	200	500	1000
5-min	0.128	0.162	0.222	0.277	0.367	0.451	0.549	0.665	0.854	1.03
10-min	0.195	0.247	0.338	0.422	0.558	0.687	0.836	1.01	1.3	1.56
15-min	0.241	0.306	0.419	0.524	0.692	0.851	1.04	1.25	1.61	1.94
30-min	0.325	0.412	0.565	0.705	0.932	1.15	1.4	1.69	2.17	2.61
60-min	0.402	0.51	0.699	0.873	1.15	1.42	1.73	2.09	2.69	3.23
2-hr	0.515	0.641	0.839	1.02	1.33	1.61	1.95	2.34	2.99	3.59
3-hr	0.595	0.737	0.933	1.12	1.41	1.67	1.99	2.36	3.02	3.62
6-hr	0.793	0.975	1.19	1.39	1.68	1.92	2.19	2.51	3.09	3.65
12-hr	1.01	1.24	1.5	1.73	2.07	2.35	2.65	2.98	3.47	3.89
24-hr	1.31	1.6	1.92	2.18	2.55	2.84	3.13	3.44	3.84	4.16
2-day	1.56	1.92	2.3	2.62	3.05	3.38	3.73	4.08	4.55	4.91
3-day	1.74	2.14	2.57	2.93	3.43	3.81	4.21	4.62	5.16	5.59
4-day	1.92	2.36	2.84	3.25	3.8	4.24	4.69	5.15	5.78	6.27
7-day	2.32	2.86	3.43	3.91	4.57	5.08	5.6	6.13	6.84	7.39
10-day	2.65	3.26	3.9	4.41	5.09	5.6	6.11	6.61	7.27	7.76
20-day	3.47	4.27	5.06	5.67	6.46	7.03	7.59	8.13	8.79	9.27
30-day	4.2	5.15	6.08	6.8	7.72	8.39	9.04	9.66	10.4	11
45-day	5.16	6.32	7.44	8.31	9.43	10.2	11	11.8	12.7	13.3
60-day	6.13	7.52	8.83	9.84	11.1	12	12.9	13.7	14.7	15.4

DIFFERENCE

AVERAGE(0.5 X HEBER CITY / PARK CITY) = 0.47

0.496	0.497	0.498	0.496	0.495	0.493	0.493	0.491	0.489	0.485
0.495	0.496	0.497	0.496	0.495	0.493	0.492	0.493	0.488	0.490
0.496	0.497	0.496	0.496	0.495	0.494	0.490	0.492	0.491	0.487
0.495	0.496	0.496	0.496	0.495	0.491	0.489	0.491	0.488	0.489
0.495	0.496	0.496	0.496	0.496	0.493	0.491	0.493	0.489	0.488
0.489	0.490	0.492	0.495	0.492	0.494	0.490	0.491	0.492	0.490
0.487	0.488	0.490	0.491	0.493	0.494	0.490	0.492	0.490	0.490
0.482	0.483	0.487	0.486	0.485	0.487	0.489	0.486	0.487	0.492
0.481	0.480	0.483	0.483	0.483	0.481	0.481	0.482	0.481	0.482
0.450	0.456	0.461	0.466	0.471	0.474	0.478	0.480	0.486	0.488
0.439	0.440	0.446	0.447	0.451	0.453	0.453	0.455	0.457	0.458
0.440	0.439	0.442	0.444	0.443	0.445	0.445	0.445	0.446	0.445
0.438	0.439	0.440	0.438	0.439	0.439	0.438	0.438	0.436	0.435
0.433	0.432	0.434	0.435	0.433	0.432	0.432	0.431	0.430	0.428
0.432	0.433	0.435	0.435	0.436	0.437	0.437	0.437	0.437	0.436
0.435	0.436	0.440	0.442	0.443	0.445	0.447	0.447	0.449	0.449
0.437	0.437	0.439	0.440	0.441	0.441	0.441	0.440	0.441	0.439
0.446	0.447	0.449	0.449	0.449	0.449	0.447	0.441	0.441	0.440
0.446	0.446	0.448	0.447	0.446	0.446	0.442	0.442	0.435	0.432

The 80th Percentile Volume

LID Impact on Hydrology

Storm water programs have focused on the goal of mimicking predevelopment hydrologic conditions over the last several decades as municipal and department of transportation (DOT) storm water programs have increased their efforts to comply with the Federal Clean Water Act of 1972 and their associated MS4 permits. LID BMPs, green infrastructure practices, and retention of the 80th percentile volume or of the predevelopment hydrologic condition are tools and requirements that are used to accomplish this goal.

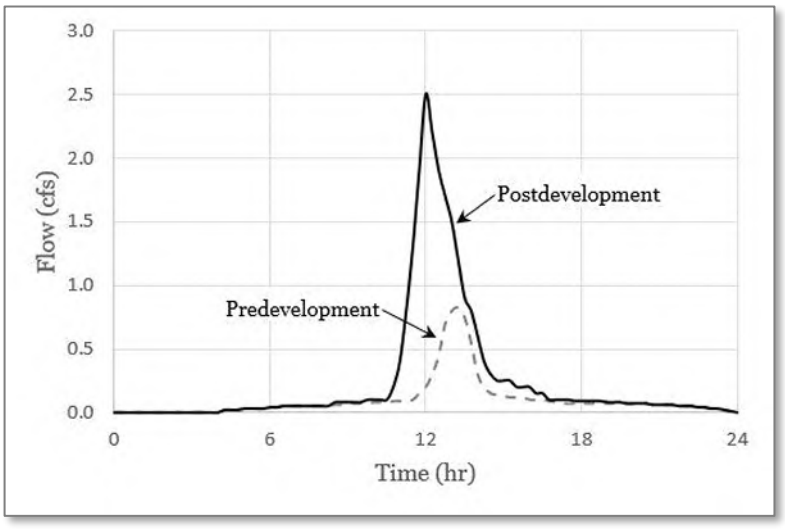


Figure 9: Typical hydrologic impact of development on-site hydrology.

More frequent peak flows, higher peak flows, and higher runoff volumes are well-documented hydrologic impacts of urbanization and development due to an increase in impervious surfaces (D.B. Booth, 1997; Konrad & Booth, 2002) (*Figure 9*).

Traditional approaches to storm water management that remove runoff from a site by quickly conveying flows to a storm drain network are also effective in protecting life and property and should be implemented in tandem with low impact design principles. Within Utah, discharges are typically limited to between 0.1 cfs and 0.2 cfs per acre.

An LID approach to site development produces a hydrologic condition that more closely mimics the pre-development hydrologic condition. Peak flows are reduced and are less frequent (*Figure 10*); runoff volume is also reduced (WEF Press, 2012).

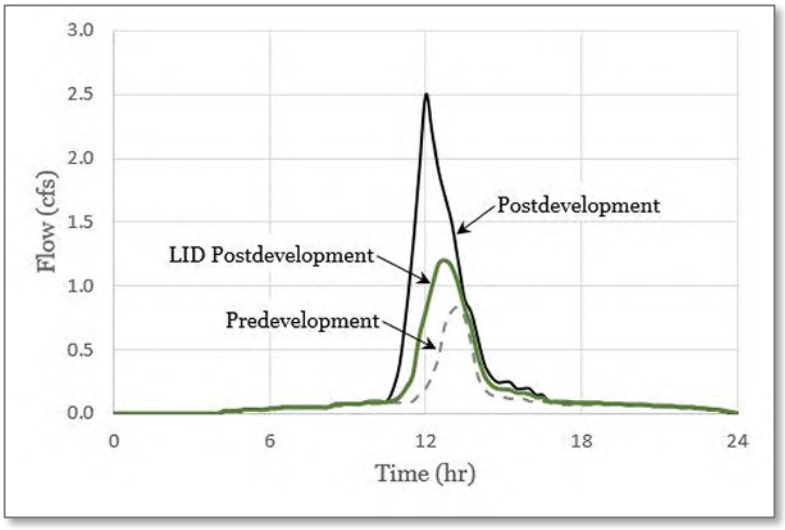


Figure 10: General post development hydrograph with LID.

Developing the 80th Percentile Volume

Project Volume Retention Goal, V_{goal}

V_{goal} for New Development: The volume of runoff generated within the project's limits of disturbance over a 24-hour period during the 80th percentile storm event or a predevelopment condition, whichever is less.

V_{goal} for Redevelopment: For a redevelopment project that results in a net increase in impervious surface greater than 10%, V_{goal} is the net increase in volume between the existing condition and the proposed condition generated by the 80th percentile storm event over a 24-hour period.

Water Quality Volume, WQV – The volume of runoff generated within a BMP's drainage area over a 24-hour period during the 80th percentile storm event.

The following steps may be used to determine the project volume retention goal and the water quality volume.

Step 1: 80th Percentile Depth

Method 1

A table of 80th percentile storm depths can be found in *Appendix A*. These values have been determined by the permittees.

Method 2

Planners and developers should verify with the MS4 before determining an 80th percentile with this method.

Determine the 80th percentile precipitation depth.

1. Obtain long-term daily rainfall data from the following sources:
    a. National Oceanic and Atmospheric Administration (NOAA): https://www.ncdc.noaa.gov/cdo-web/datatools/selectlocation; or
    b. Reliable historical local data; or
    c. Any other reliable data source.
2. Sort data low to high.
3. Remove snowfall and small precipitation events (≤0.1 inch).
4. Use the Excel PERCENTILE function to calculate the 80th percentile rainfall depth.

A more in-depth discussion on determining the 80th percentile precipitation depth is found here: https://documents.deq.utah.gov/water-quality/stormwater/DWQ-2019-004584.pdf.

A reliable record of historical precipitation data should meet the following conditions:

1. Come from an active rain gage;
2. Have at least 30 years of data;
3. Have 90% data coverage for the period of record.

Step 2: Imperviousness

To determine the project's volume retention goal, determine the imperviousness within the disturbance limits of the project. To determine the water quality volume of a BMP's drainage area, determine the imperviousness of the drainage area. The imperviousness of the BMP drainage area will include any off-site impervious areas that are part of the BMP's drainage area.

Project imperviousness = Post-development impervious area / Project's disturbance limits

BMP imperviousness = Post-development impervious area within BMP drainage area / BMP drainage area

Step 3: Volumetric Runoff Coefficient

Determine the volumetric runoff coefficient (R_V).

The volumetric runoff coefficient (also referred to as just the 'runoff coefficient') is a calculation of the percentage of rainfall that results in surface runoff. Runoff coefficients for small, frequent storms, such as for the 80th percentile, are not equivalent to runoff coefficients for large, less-frequent storms such as the 10-yr event and greater that are used with the Rational Method. The effects of infiltration, retention, and interception are increased for the smaller storm events compared to the larger events. Because of this, runoff coefficients for smaller storms are numerically smaller than for larger storms.

In 1983 data from over 50 sites nationwide was evaluated as part of the Nationwide Urban Runoff Program (NURP) (Driscoll, 1983). From these sites, mean and median R_V values were calculated and compared to the site's imperviousness. This research led to the following conclusions that are also discussed by Schueler who did additional analysis of the NURP sites:

1. "Most of the variation in mean R_V among sites can be attributed to differences in the level of urbanization, and in particular, to the site imperviousness."
2. "R_V's were found to be relatively consistent at individual sites and were only weakly correlated with storm-related variables such as precipitation volume, intensity, and duration."
3. "The runoff coefficient could serve as a reliable estimator of runoff volumes, given an initial estimate of rainfall volume." (Schueler, Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs, 1987)

Various coefficients for smaller storms have also been developed using national datasets and through local research. Municipalities are encouraged to research these and other runoff coefficients or develop their own in determining which method to use within their jurisdiction for use with the 80th percentile storm. Deciding on a single runoff coefficient methodology for a jurisdiction will simplify the design and review process.

Development of a runoff coefficient is done by monitoring the runoff volume produced from a storm event. The runoff coefficient is the ratio between the monitored runoff volume and the total precipitation volume expressed in the following equation and will vary depending on land use and imperviousness of the measured area:

$$R_V = \frac{V_R}{V_P}$$

Where:

R_V = Volumetric runoff coefficient, unitless

V_R = Monitored runoff volume, cf

V_P = Total precipitation volume, cf

The total precipitation volume can be determined using the following equation:

$$V_P = \frac{dA}{12}$$

Where:

d = Precipitation depth, in.

A = Drainage area, sf

It is not the intent of this manual or the Division of Water Quality to recommend specific methodologies. An in-depth summary of runoff coefficients used throughout the country by municipalities and DOTs was developed by the California Department of Transportation (Caltrans) and published as a Technical White Paper titled *Runoff Coefficient Evaluation for Volumetric BMP Sizing*. It can be found here: http://www.dot.ca.gov/design/hsd/guidance/CTSW-TM-15-312_03_01-Runoff_Coeff_for_Vol_BMP_Sizing.pdf. This white paper specifically discusses Method 1 in more detail.

For all the equations presented below, i represents the percent of imperviousness of the drainage area in decimal format (0.0 – 1.0).

Method 1 – Reese method

Comparing the imperviousness of 44 nationwide sites to their respective calculated volumetric runoff coefficient, a simple linear regression equation was created to estimate the volumetric runoff coefficient for small urban catchments. Land uses for these sites were classified as residential, mixed, commercial, industrial, and urban open and nonurban (Schueler, Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs, 1987). Outliers were removed from this dataset by Reese to derive the equation below. Removing outliers from the dataset reduces the impact of erroneous measurements (Reese, 2006).

$R_V = 0.91i - 0.0204$

Method 2 – Hydrologic soil groups

Regression equations for runoff coefficient equations were derived based on imperviousness and the NRCS hydrologic soil groups for the 2-year event as presented in *Table 5* (Guo, 2013).

Table 5: Runoff coefficient equations based on the NRCS Soil Group.

NRCS Soil Group		
A	B	C/D
$R_{V\text{-}A} = 0.84i^{1.302}$	$R_{V\text{-}B} = 0.84i^{1.169}$	$R_{V\text{-}C/D} = 0.83i^{1.122}$

Method 3 – Granato method

This runoff coefficient is calculated based on a two-line regression model of the runoff coefficient developed by the United States Geological Survey (USGS). This method of developing the runoff coefficient was developed to assist DOTs and contractors to estimate long-term volume reduction for highway projects and has been adopted for use by UDOT. Additional information relating to this runoff coefficient and its applicability can be found in NCHRP Report 792.

$R_V = 0.225i + 0.05$; when $i < 0.55$

$R_V = 1.14i - 0.371$; when $i \geq 0.55$

Step 4: 80th Percentile Volume

Calculate the 80th percentile volume using the following equations for V_{goal} or WQV.

$$V_{goal} = R_V dA \quad \text{or} \quad WQV = R_V dA$$

Where:

V_{goal} and WQV = 80th percentile volume, cf

R_V = Volumetric runoff coefficient, unitless

d = 80th percentile storm depth, ft (convert from inches to feet if required)

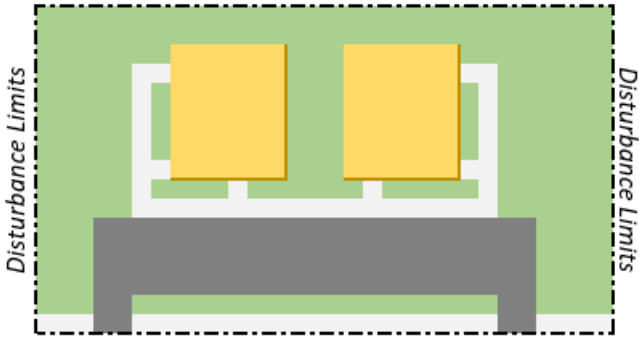
A = Project area or BMP drainage area, sf

The images on the following page show how V_{goal} and WQV are related. Examples from local case studies and different land uses further demonstrate the usage of these equations. See *Land Use Examples* and *Local Case Studies*.

V_{goal}

New Development

V_{goal} is the volume generated from the 80th percentile storm event over the entire project site or a predevelopment hydrologic condition, whichever is less.



$V_{goal} = R_V dA$

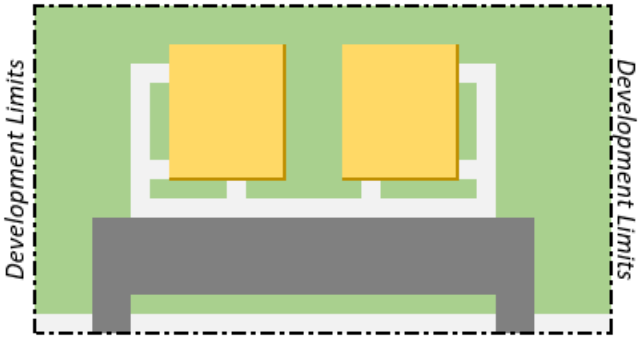
R_V = Volumetric runoff coefficient (based on the project's total area)

d = 80th percentile storm depth, ft

A = Project area, sf

Redevelopment

V_{goal} is the net volume increase generated from the 80th percentile storm event over the project area when the increase in impervious surface is greater than 10%.



Proposed Redevelopment
(Impervious surface increase > 10%)



$V_{goal} = V2 - V1$

$V_2 = R_V dA$

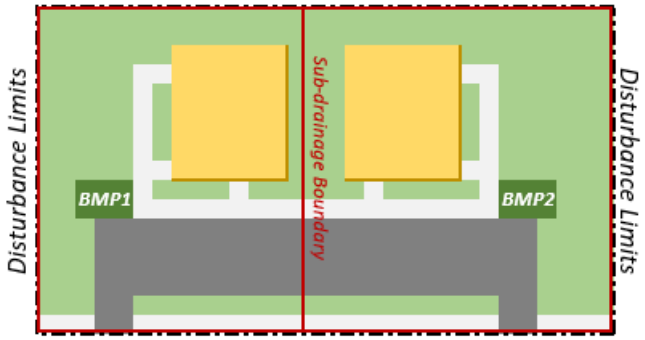
- Volume generated by the 80th percentile storm depth for the proposed project condition.

$V_1 = R_V dA$

- Volume generated by the 80th percentile storm depth for the existing project condition.

Water Quality Volume, WQV

The WQV is the 80th percentile volume of the sub-drainage area for each BMP.



Within the sub-drainage area boundaries, WQV is the 80th percentile volume based on the BMP's drainage area, the imperviousness of the BMP's drainage area, and the 80th percentile storm depth.

$WQV = R_V dA$

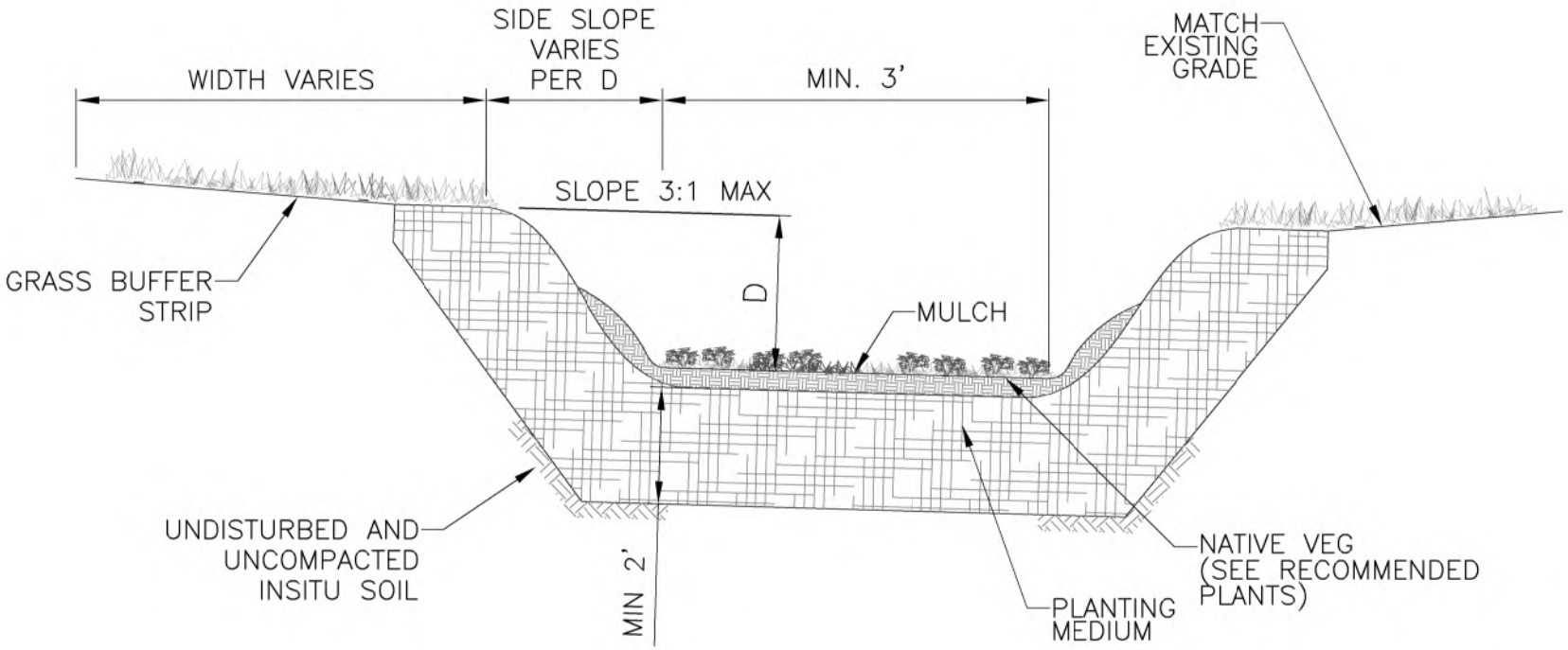
R_V = Volumetric runoff coefficient (based on the sub-drainage area's imperviousness)

d = 80th percentile storm depth, ft

A = Sub-drainage area, sf

Appendix F

(UCEA LID Details)



CALL BLUESTAKES
@ 1-800-662-4111 AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION

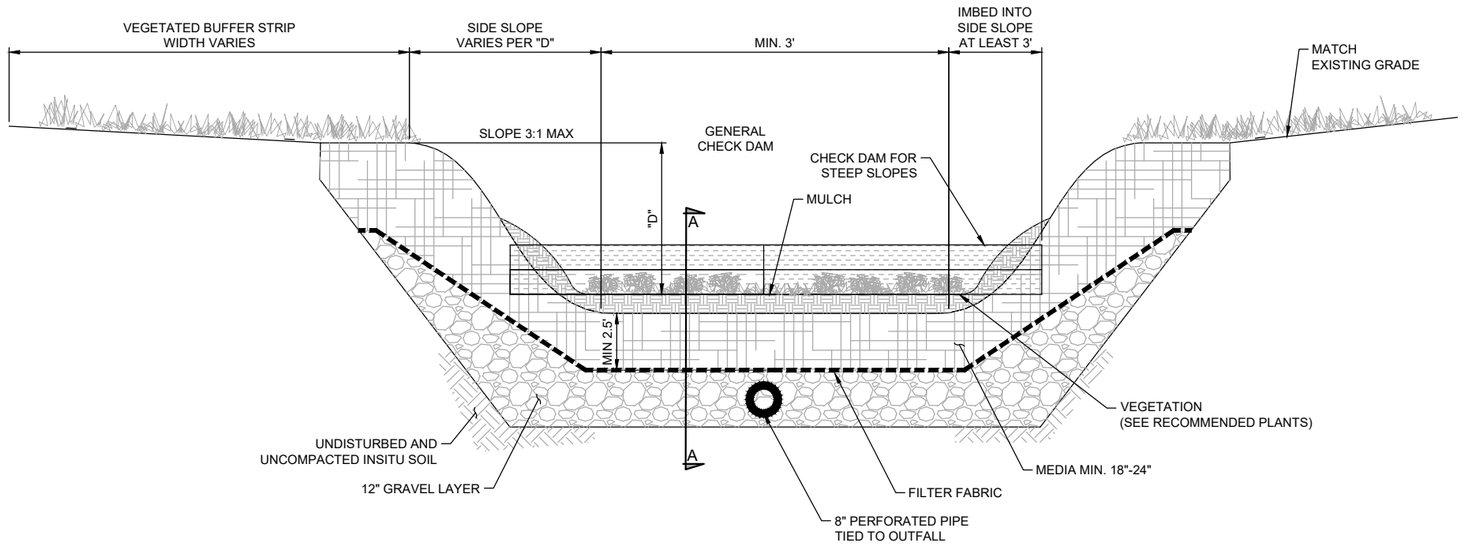
UCEA
UTAH CITY ENGINEERS ASSOCIATION

TYPICAL WET SWALE CROSS-SECTION

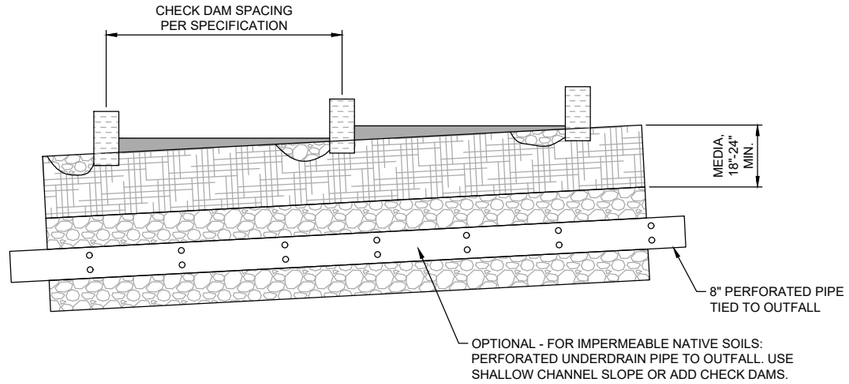
01_LID_StormwaterBMP_WetSwales

REVISIONS			
REV	DATE	BY	

DESIGNED UCEA	DATE 12/31/19	PROJECT NO. LID_01
DRAWN UCEA	DATE 12/31/19	SHEET NO. LID_01
CHECKED UCEA	DATE 12/31/19	DRAWING NO. LID_01



DRY SWALE SECTION



SECTION A

NOTE:

THIS DETAIL IS A MODIFIED VERSION OF UCEA STANDARD DRAWING.

XX / XX — TYPICAL DRY SWALE

03_LID_StormwaterBMP_Dry

REV	DATE	BY	DESCRIPTION

REVISIONS

SCALE

HORIZONTAL 1" = 2'

VERTICAL NONE

WARNING

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

HORROCKS ENGINEERS

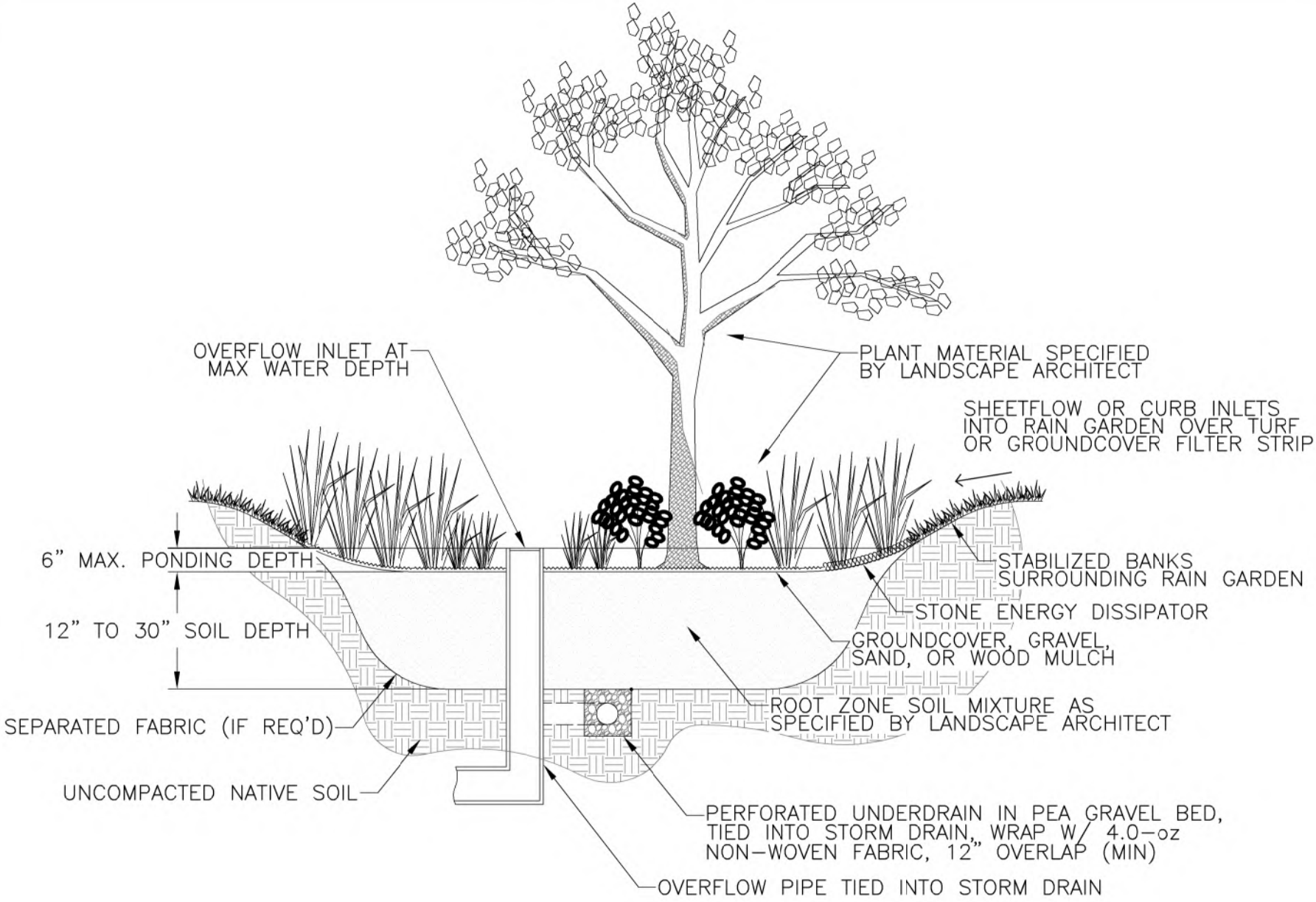
2162 West Grove Parkway
Suite 400
Pleasant Grove, UT 84062
(801) 763-5100

####

####

DESIGNED	DATE	PROJECT NO.
####	####	####
DRAWN	DATE	SHEET NO.
####	####	#### OF ####
CHECKED	DATE	DRAWING NO.
####	####	01

H:\Heber City\City Projects\2020 North Village Master Plan\Storm Drain\Storm Drain Manual\Updated BMP Drawings\TYP DRY SWALE DETAILS.dwg - 01 - 5/11/2022 4:22 PM - lisa]



CALL BLUESTAKES @ 1-800-662-4111 AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION

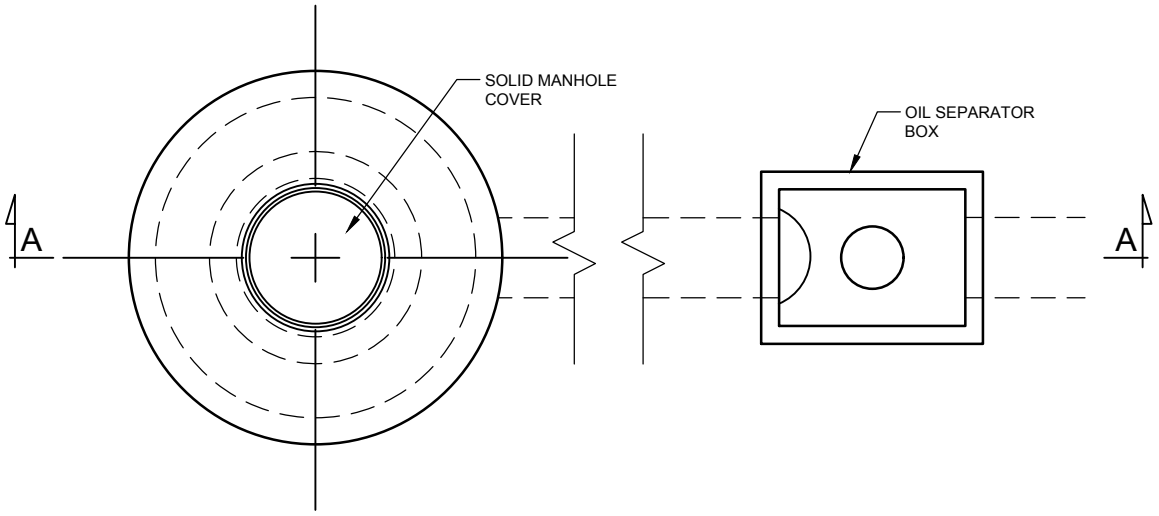
UCEA UTAH CITY ENGINEERS ASSOCIATION

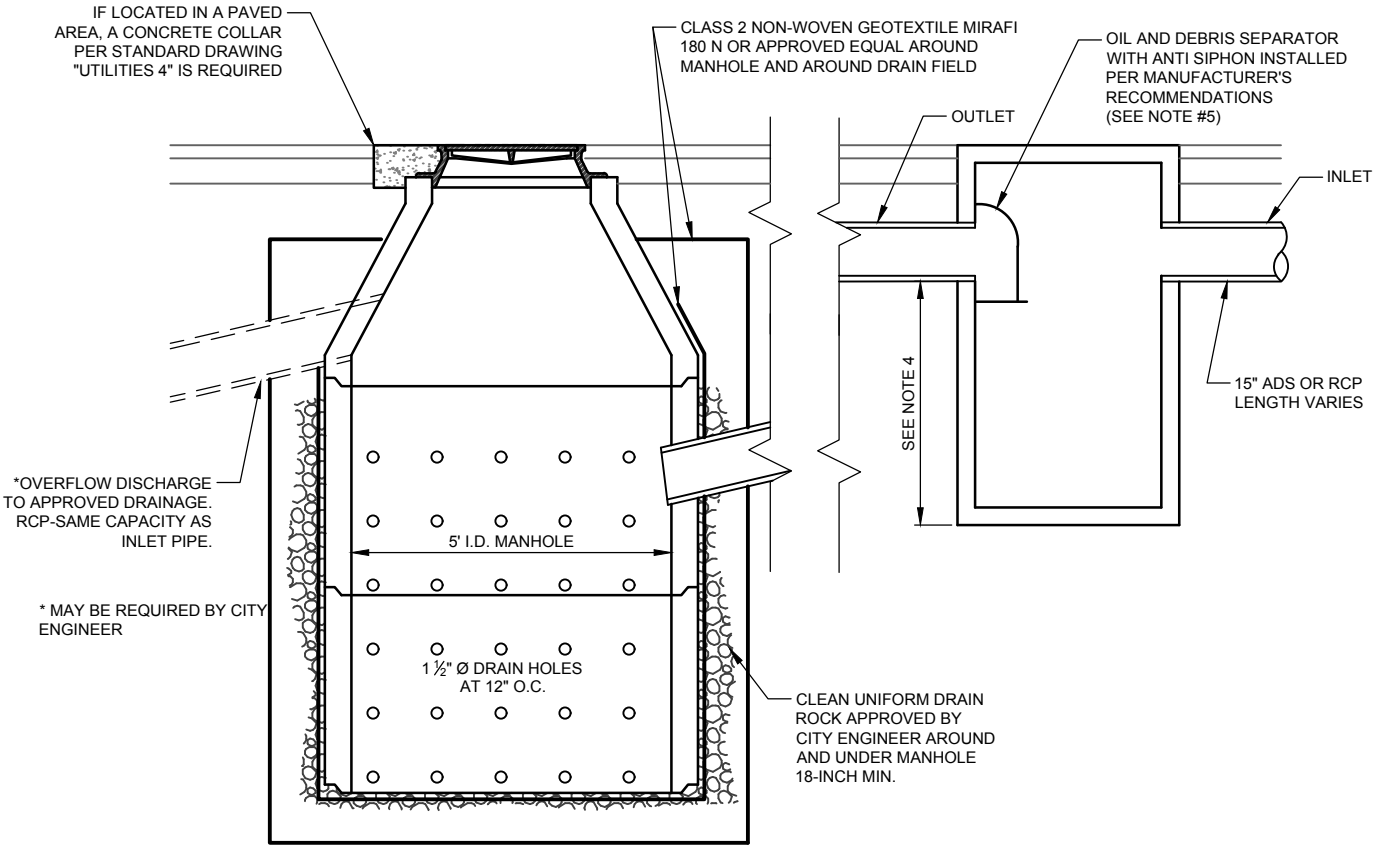
RAIN GARDEN

05_LID_StormwaterBMP_Rain_Garden

REVISIONS			
REV	DATE	BY	

DESIGNED UCEA	DATE 12/31/19	PROJECT NO. LID_05
DRAWN UCEA	DATE 12/31/19	SHEET NO. LID_05
CHECKED UCEA	DATE 12/31/19	DRAWING NO. LID_05





SECTION A-A

NOTES:

1. CONSTRUCT DROP INLET BOX TO MATCH WIDTH OF CURB & GUTTER. MATCH INSIDE LENGTH OF BOX TO INSIDE LENGTH OF FRAME.
2. D & L I-3516 WITH ADJUSTABLE CURB BOX.
3. STANDARD CAST IRON MANHOLE RING & LID.
4. SUMP DEPTH = 36" MIN. FOR 12" DIAMETER OUTLET AND SMALLER, FOR OUTLET DIAMETER 15" AND LARGER, DEPTH = 2.5 TO 3 TIMES THE DIAMETER.
5. SEE STANDARD SPECIFICATION 02772 PONDS.

SUMP DISPOSAL & OIL SEPARATOR

HORROCKS ENGINEERS
728 WEST 100 SOUTH #2
HEBER CITY, UTAH 84032
(435) 654-2226

DATE: FEBRUARY 2019
SCALE: N.T.S.

75 NORTH MAIN STREET
HEBER CITY, UTAH 84032
(435) 654-0757

HEBER CITY
HEART OF THE WASATCH BACK

HEBER CITY STANDARD DRAWING

STORM DRAIN-3

V:\ENGR\Stds\StdSpec\StdSpec 2019\Dwg Files\STORM DRAIN-3.dwg - Sump Oil - 2/06/2019 11:30am, rfunk

Appendix G

(TR-55 Worksheets)

Worksheet 2: Runoff curve number and runoff

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1/] Table 2-2	CN [1/] Figure 2-3	CN [1/] Figure 2-4	Area ☐ acres ☐ mi^2 ☐ %	Product of CN x area
	Totals ➡					

[1/] Use only one CN source per line

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____ ; **Use CN** ➡ ☐

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

Worksheet 3: Time of Concentration (T_c) or travel time (T_t)

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

Check one: ☐ T_c ☐ T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to Tc only)

	Segment ID	
1. Surface description (table 3-1)		
2. Manning's roughness coefficient, n (table 3-1)		
3. Flow length, L (total L † 300 ft) ft		
4. Two-year 24-hour rainfall, P_2 in		
5. Land slope, s ft/ft		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t hr		+ =

Shallow concentrated flow

	Segment ID	
7. Surface description (paved or unpaved)		
8. Flow length, L ft		
9. Watercourse slope, s ft/ft		
10. Average velocity, V (figure 3-1) ft/s		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t hr		+ =

Channel flow

	Segment ID	
12. Cross sectional flow area, a ft^2		
13. Wetted perimeter, p_w ft		
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft		
15 Channel slope, s ft/ft		
16. Manning's roughness coefficient, n		
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V ft/s		
18. ~~Flow~~ length, L ft		
19. $T_t = \frac{L}{3600\ V}$ Compute T_t hr		+ =
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) Hr		

Worksheet 4: Graphical Peak Discharge method

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

1. Data

Drainage area ..... A_m = _____ mi^2 (acres/640)

Runoff curve number .....CN = _____ (From worksheet 2)

Time of concentration ..... T_c = _____ hr (From worksheet 3)

Rainfall distribution ..... = _____ (I, IA, II III)

Pond and swamp areas sprea
throughout watershed ..... = _____ percent of A_m (_____ acres or mi^2 covered)

	Storm #1	Storm #2	Storm #3
2. Frequency ..... yr			
3. Rainfall, P (24-hour) ..... in			
4. Initial abstraction, I_a ..... in (Use CN with table 4-1)			
5. Compute I_a / P			
6. Unit peak discharge, q_u ..... csm/in (Use T_c and I_a / P with exhibit 4– _____)			
7. Runoff, Q ..... in (From worksheet 2) Figure 2-6			
8. Pond and swamp adjustment factor, F_p ..... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond ans swamp area.)			
9. Peak discharge, q_p ..... ft^3/s			

(Where $q_p = q_u A_m Q F_p$)

Worksheet 5a: Basic watershed data

Project	Location	By	Date
Check one: ☐ Present ☐ Developed	Frequency (yr)	Checked	Date

Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2—in)	Initial abstraction I_a (in)	I_a/P

From worksheet 3 | From worksheet 2 | From table 5-1

Worksheet 5b: Basic watershed data

Project	Location	By	Date
Check one: ☐ Present ☐ Developed	Frequency (yr)	Checked	Date

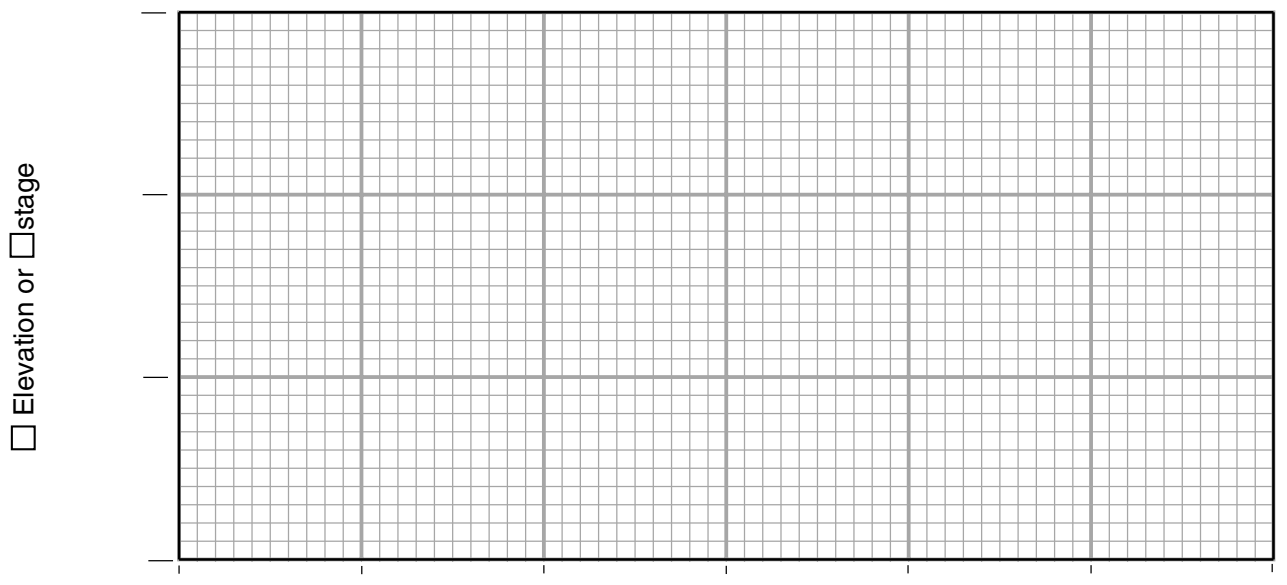
Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5-II 2/											
	Subarea T_c (hr)	ΣT_t to outlet (hr)	I_a/P	A_mQ (mi^2—in)	Discharges at selected hydrograph times 3/ (cfs)											
Composite hydrograph at outlet																

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is A_mQ multiplied by tabular discharge from appropriate exhibit 5.

Worksheet 6a: Detention basin storage, peak outflow discharge (q_o) known

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed



1. Data:
   Drainage area ..... A_m = _____ mi^2
   Rainfall distribution type (I, IA, II, III) = _____

	1st Stage	2nd Stage
2. Frequency ..... yr		
3. Peak inflow discharge q_i ..... ft^3/s (from worksheet 4 or 5b)		
4. Peak outflow discharge q_u ..... ft^3/s		1/
5. Compute $\frac{q_o}{q_i}$		

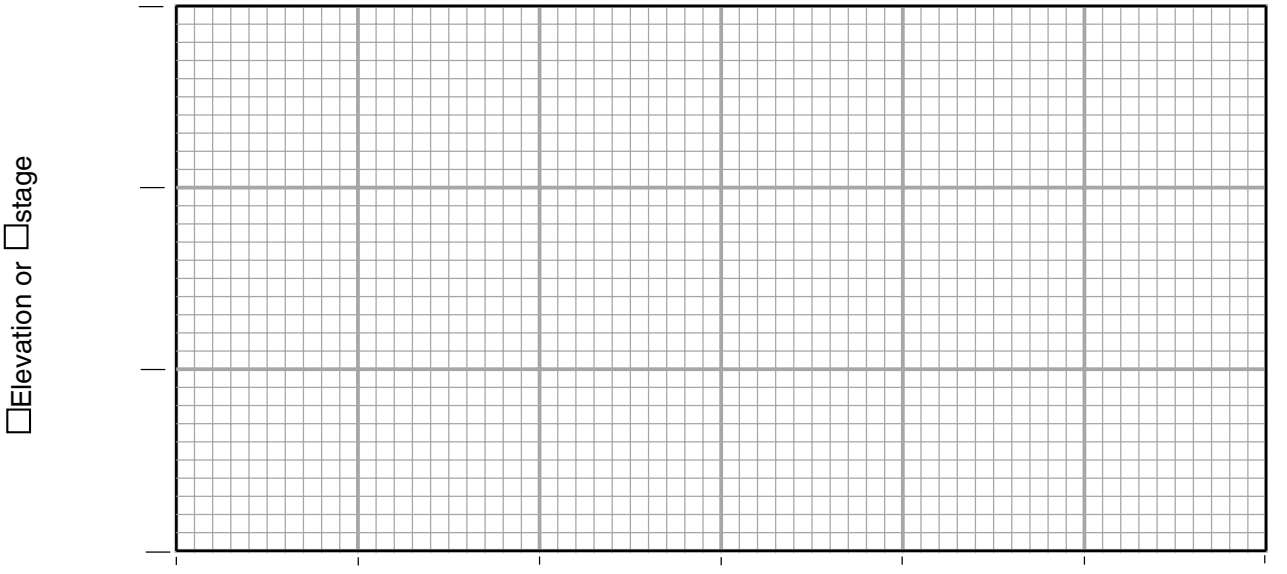
6. $\frac{V_s}{V_r}$ ..... (Use $\frac{q_o}{q_i}$ with figure 6-1)
7. Runoff, Q ..... in (From worksheet 2)
8. Runoff volume V_r..... ac ft ($V_r = QA_m$ 53.33)
9. Storage volume, V_s ..... ac-ft
   ($V_s = V_r \left(\frac{V_s}{V_r}\right)$)
10. Maximum storage E_{max} (from plot)

1/ 2nd stage q_o includes 1st stage q_o.

Worksheet 6b: Detention basin storage, storage volume (V_s) known

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed



1. Data:
   Drainage area ..... A_m = _____ mi^2
   Rainfall distribution type (I, IA, II, III) = _____

	1st Stage	2nd Stage
2. Frequency ..... yr		
3. Storage volume V_s ..... ac-ft		
4. Runoff, Q ..... in (from worksheet 2)		
5. Runoff volume ..... ac-ft ($V_r = QA_m$ 53.33)		

1/ 2nd stage q_o includes 1st stage q_o.

6. Compute $\frac{V_s}{V_r}$ .....

7. $\frac{q_o}{q_i}$ ..... in
   (Use $\frac{V_s}{V_r}$ with figure 6-1)

8. Peak inflow discharge q_i ..... in
   (From worksheet 4 or 5b)

9. Peak outflow discharge q_o ..... ft^3/s 1/
   ($q_o = q_i$ ($\frac{q_o}{q_i}$))

10. Maximum storage E_{max} (from plot)

Appendix H

(Source Protection Maps)

Legend

- Broadhead Spring
- Fuel Tank
- Animal Feeding
- Golf Course
- Red Ledges Yard
- Septic System
- Other Wells

Broadhead Springs Zones

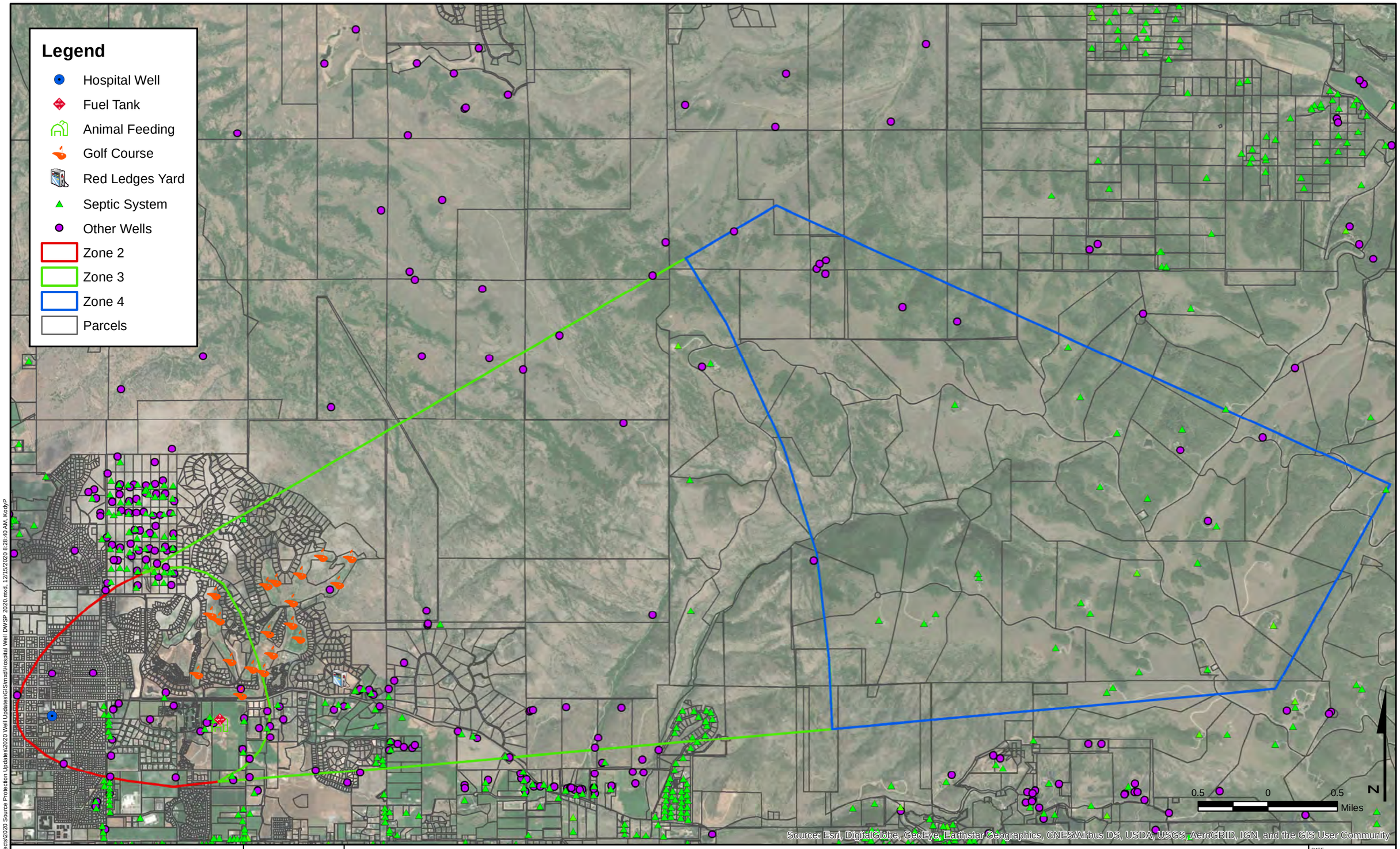
- Zone 2
- Zone 3
- Zone 4
- Parcels

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Pleasant Grove, UT (801) 763-5100

Broadhead Springs Delineation Zones & PCS's

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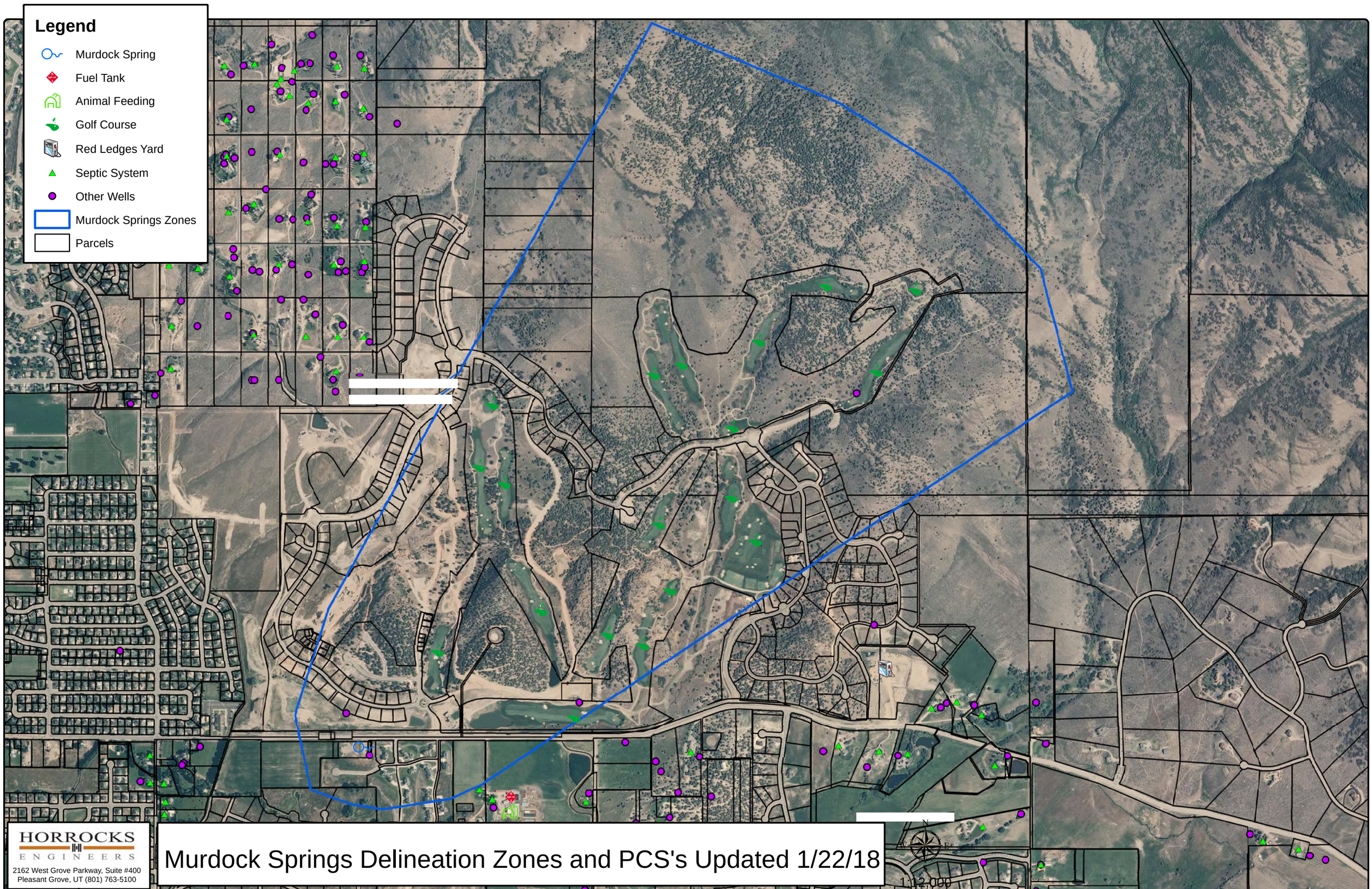
Hospital Well Delineation Zones & PCS's

2020 DWSP Update

DATE 12/15/2020

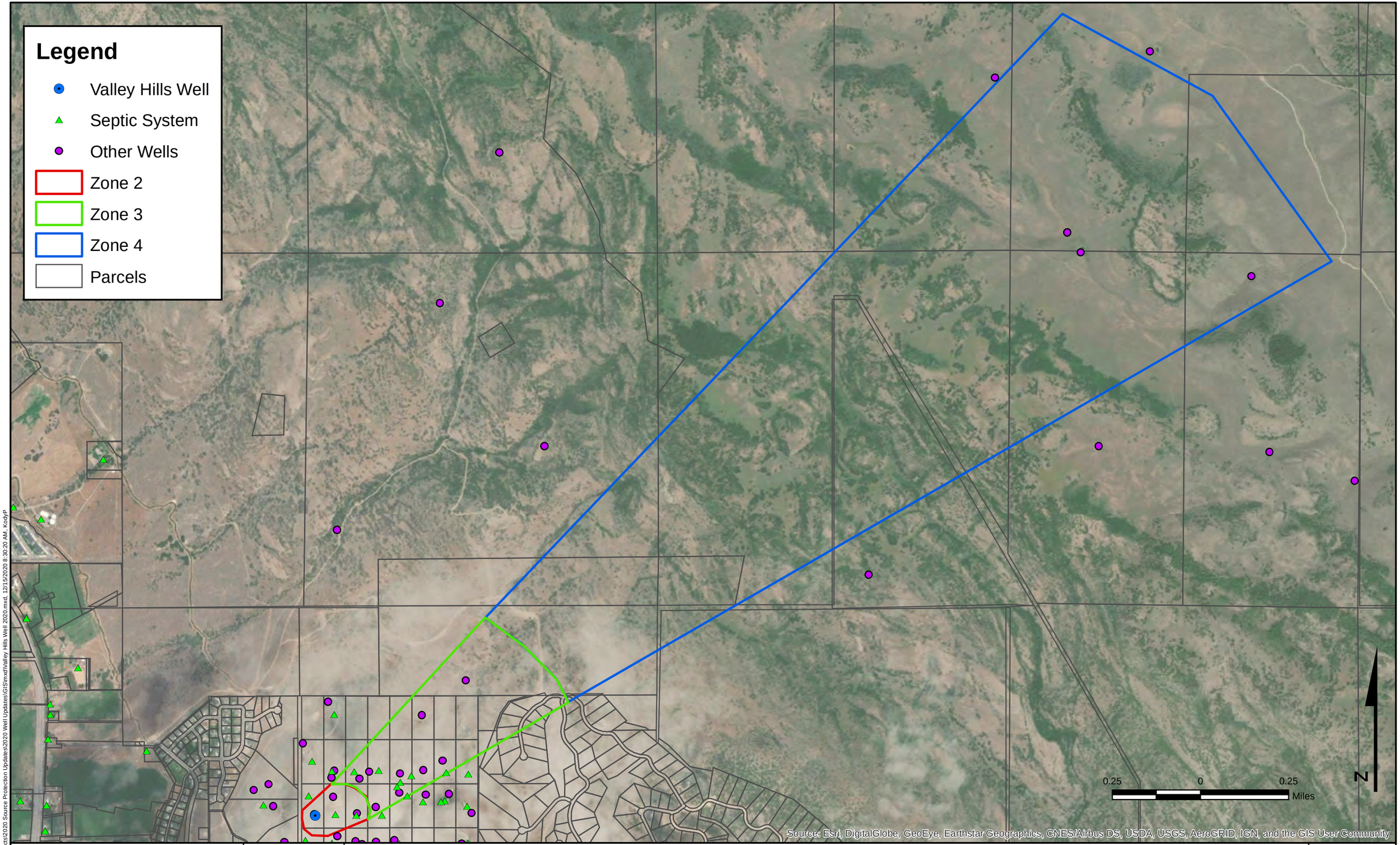
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Figure 1



Murdock Springs Delineation Zones and PCS's Updated 1/22/18

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Valley Hills Well Delineation Zones & PCS's

2020 DWSP Update

DATE 12/15/2020

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Figure 2

Legend

- Well #1
- Fuel Tank
- Animal Feeding
- Golf Course
- Red Ledges Yard
- Septic System
- Other Wells
- Zone 2
- Zone 3
- Zone 4
- Parcels

0.5 0 0.5 Miles

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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(435) 654-2226

Well #1 Delineation Zones & PCS's

2020 DWSP Update

DATE 12/15/2020

DRAWN

Figure 3

Appendix I

(FAA Method Storage Facility Volume)

Obtain Excel file from City

Detention Pond Design
FAA Method with Guo Parameter

Runoff Coefficients		
Surface Type	Area	C
Hardscape	123805	0.9
Roof	56760	0.9
Landscape	83409	0.44
	263974	

Orifice Sizing		
Discharge	0.98	cfs
Head	4	ft
Orifice Coeff.	0.61	
Diameter	4.28	in

Basin Parameters		
Total Basin Area (A) =	9.8	acres
Connected Basin Area (A) =	6.06	acres
Weighted Coefficient (C) =	0.75	
Release Rate =	0.1	cfs/acre
Time of Concentration (tc) =	15	minutes

Pipe Volumes		
I.D. (in.)	Length	Vol. (cf)
0	0	0
0	0	0
		0

Time (min)	100-yr Rainfall (in)	100-yr Rainfall Intensity (in/hr)	Inflow Volume (cf)	Adjustment Factor	Outflow (cfs)	Outflow Volume (cf)	100-yr Required Detention Volume (cf)
5	0.54	6.52	9014	1.00	0.98	294	8720
10	0.83	4.96	13729	1.00	0.98	588	13141
15	1.02	4.08	16933	1.00	0.98	882	16051
20	1.14	3.42	18925	0.88	0.86	1029	17896
25	1.26	3.02	20917	0.80	0.78	1176	19741
30	1.38	2.76	22909	0.75	0.74	1323	21586
35	1.44	2.46	23822	0.71	0.70	1470	22352
40	1.49	2.24	24735	0.69	0.67	1617	23118
45	1.55	2.06	25648	0.67	0.65	1764	23884
50	1.60	1.92	26561	0.65	0.64	1911	24650
55	1.66	1.81	27474	0.64	0.62	2058	25416
60	1.71	1.71	28387	0.63	0.61	2205	26182
65	1.73	1.59	28678	0.62	0.60	2352	26326
70	1.75	1.50	28968	0.61	0.60	2499	26469
75	1.76	1.41	29259	0.60	0.59	2646	26613
80	1.78	1.34	29549	0.59	0.58	2793	26756
85	1.80	1.27	29840	0.59	0.58	2940	26900
90	1.82	1.21	30130	0.58	0.57	3087	27043
95	1.83	1.16	30421	0.58	0.57	3234	27187
100	1.85	1.11	30711	0.58	0.56	3381	27330
105	1.87	1.07	31002	0.57	0.56	3528	27474
110	1.89	1.03	31292	0.57	0.56	3675	27617
115	1.90	0.99	31583	0.57	0.55	3822	27761
120	1.92	0.96	31873	0.56	0.55	3969	27904
125	1.92	0.92	31902	0.56	0.55	4116	27786
130	1.92	0.89	31930	0.56	0.55	4263	27667

Simplied Rational Method Pond Sizing Template Calculation for 25-year Storm Event

Drainage areas	Sq. Ft	C Value
buildings	1	0.95
Aspahlt	1	0.95
Grass	1	0.15
Gravel	1	0.65
Concrete	1	1.00
Total	**5**	
Weighted C	0.740	
Infiltration min/in	1	
Safety Factor (2 minimum)	2	
Infiltration ft/min	0.0417	
Discharge per Acre (cfs) (Max=0.1)	0.1000	

25-yr Storm		
	in.	in/hr
5	0.36	4.36
10	0.55	3.32
15	0.69	2.74
30	0.92	1.85
60	1.14	1.14
120	1.31	0.65
180	1.38	0.46
360	1.62	0.27
720	1.97	0.16
1440	2.36	0.10

Mannings Calculation Spreadsheet			
Pipe D (in)	S (in/in)	n	
15	0.008	0.013	
V =	**4.72** ft/s		
Q =	**5.79** cfs		

Pipe Discharge	
	(cfs)
	0
	0
	0
	0
	0
	0
	0
	0
	0

	Depth (Ft)	Avg Length (Ft)	Avg Width (Ft)	Capacity (CF)
Pond Dimension				0
	Diam. (Ft)	**Depth (Ft)**		
Sump Manhole(s) (in the pond)			1	0
Drain Rock Around Sump MH (in pond)				0
Sump Manhole(s) (not in pond)				0
Drain Rock Around Sump MH (not in pond)				0
	Diam. (In)	**Length (Ft)**		
Underground Pipe Storage (no infiltration)				0
	Height (Ft)	**Length (Ft)**	**Avg Width (Ft)**	
Wrapped Drain Rock				0
	Height (Ft)	**Length (Ft)**	**Avg Width (Ft)**	
Underground Storage Chambers and Wrapped Drain Rock				

Drain Rock Void Ratio %	40
Will pond be Landscaped with Topsoil? (Y/N)	N
Will Underground Storage Chambers be under the pond? (Y/N)	N

Total Storage Capacity (CF)	0
Pond Exfiltr Surface (SF) (Must be zero if pond is landscaped with topsoil)	0
Underground Exfiltration Surfaces (SF)	0
Total Exfiltration Surface (SF)	0

Time (min)	Accum. Vol (CF)	Exfiltration (CF)	Discharge (CF)	Storage Req. (CF)	Max (CF)
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	0	0	0
30	0	0	0	0	0
60	0	0	0	0	0
120	0	0	0	0	0
180	0	0	0	0	0
360	0	0	0	0	0
720	1	0	0	0	0
1440	1	0	1	0	0
				Ultimate Demand	**0**

System is **Not Ok**

Notes:
Exfiltration from pond only allowed if the pond is not landscaped with topsoil. Only the bottom surface area of the pond may be used in exfiltration calculation.

Simplied Rational Method Pond Sizing Template Calculation for 100-yr Storm Event

Drainage areas	Sq. Ft	C Value
buildings	1	0.95
Aspahlt	1	0.95
Grass	1	0.15
Gravel	1	0.65
Concrete	1	1.00
Total	**5**	
Weighted C	0.740	
Infiltration min/in	1	
Safety Factor (2 minimum)	2	
Infiltration ft/min	0.0417	
Discharge per Acre (cfs) (Max=0.1)	0.1000	

100-yr Storm		
	in.	in/hr
5	0.54	6.49
10	0.82	4.94
15	1.02	4.08
30	1.37	2.75
60	1.70	1.70
120	1.91	0.96
180	1.94	0.65
360	2.12	0.35
720	2.52	0.21
1440	2.97	0.12

Mannings Calculation Spreadsheet			
Pipe D (in)	S (in/in)	n	
15	0.008	0.013	
V =	**4.72** ft/s		
Q =	**5.79** cfs		

Pipe Discharge	
	(cfs)
	0
	0
	0
	0
	0
	0
	0
	0
	0

	Depth (Ft)	Avg Length (Ft)	Avg Width (Ft)	Capacity (CF)
Pond Dimension				0

	Diam. (Ft)	Depth (Ft)	Quanity	
Sump Manhole(s) (in the pond)			1	0
Drain Rock Around Sump MH (in pond)				0
Sump Manhole(s) (not in pond)				0
Drain Rock Around Sump MH (not in pond)				0

	Diam. (In)	Length (Ft)	
Underground Pipe Storage (no infiltration)			0

	Height (Ft)	Length (Ft)	Avg Width (Ft)	
Wrapped Drain Rock				0

	Height (Ft)	Length (Ft)	Avg Width (Ft)	
Underground Storage Chambers and Wrapped Drain Rock				

Drain Rock Void Ratio %	40
Will pond be Landscaped with Topsoil? (Y/N)	N
Will Underground Storage Chambers be under the pond? (Y/N)	N

Total Storage Capacity (CF)	0
Pond Exfiltr Surface (SF) (Must be zero if pond is landscaped with topsoil)	0
Underground Exfiltration Surfaces (SF)	0
Total Exfiltration Surface (SF)	0

Time (min)	Accum. Vol (CF)	Exfiltration (CF)	Discharge (CF)	Storage Req. (CF)	Max (CF)
5	0	0	0	0	0
10	0	0	0	0	0
15	0	0	0	0	0
30	0	0	0	0	0
60	1	0	0	0	0
120	1	0	0	1	1
180	1	0	0	0	1
360	1	0	0	0	1
720	1	0	0	0	1
1440	1	0	1	0	1
				Ultimate Demand	**1**

System is **Not Ok**

Notes:
Exfiltration from pond only allowed if the pond is not landscaped with topsoil. Only the bottom surface area of the pond may be used in exfiltration calculation.

Guo, James C.Y. (1999). "*Detention Basin Sizing for Small Urban Catchments*," ASCE J. of Water Resources Planning and Management, Vol 125, No.6, Nov.

DETENTION BASIN SIZING FOR SMALL URBAN CATCHMENTS

by James C.Y. Guo, *PhD, P.E., Professor,*
Department of Civil Engineering, University of Colorado at Denver, Denver, Colorado.

Abstract
The Federal Aviation Administration (FAA) method for sizing small detention and retention basins is a volume-based approach that is sensitive to the release rate. In practice, such a release rate is often approximated by open channel hydraulics or culvert hydraulics. Without a consistent guideline, this practice of approximation can result in significant discrepancy or violation of the volume balance between the inflow and outflow hydrographs. In this study, a consistent procedure was developed to derive the average release from the allowable peak outflow. The required parameters for this method include peak inflow, design storm duration, and the time of concentration of the watershed. With this modification, the detention storage volume maximized by the FAA method can satisfy the volume conservation between hydrographs.

Key Words: Detention, Rational, FAA

INTRODUCTION

Urban stormwater facilities are designed to pass the peak flow through conveyance systems or to store a portion of the runoff volume in detention systems. For a small urban catchment with a tributary area less than 100 acres, the rational method is suitable for peak runoff predictions and the Federal Aviation Administration (FAA) method is recommended for detention storage volume predictions. The FAA's procedure is to maximize the required storage volume by the volume difference between the inflow and outflow volumes produced by a series of rain storms on the watershed. During the optimization process, the outflow volumes are calculated by an approximate average release from the detention basin. In current practice, there is not any guidance as to how to estimate the average release.

As a volume-based method, the FAA procedure has been widely used for small urban catchments in spite of its ambiguity in estimating the average release from the basin. For instance, the average release may be calculated by open channel flow, orifice formula, or culvert hydraulics. These hydraulic approaches result in violation of the hydrologic principle of volume conservation between the inflow and outflow hydrographs and inaccurate calculations on the required detention storage volume. To improve the current practice, this study suggests that the average release be a fraction of the allowable release rate. This fraction can be further derived by the volume conservation principle between inflow and outflow hydrographs during the maximization process. In this study, this ratio was found to vary with respect to storm duration, and is not a constant as recommended in many design criteria such as the Denver Design Criteria Manuals, and FAA Airfield and Heliports Design Criteria. The revised procedure can also be applied to other volume-based methods such as the capture runoff volume method (Guo and Urbonas, 1996) for sizing storm water quality control ponds. It provides a

consistent guideline to the estimation of the average release from a basin, and warrants volume conservation between the inflow and outflow hydrographs.

DETENTION STORAGE VOLUME BY THE FAA METHOD

The volume-based approach such as the FAA method is applicable to urban catchments with a tributary area less than 150 acres. To predict the peak runoff from such a small urban watershed, the Rational method states:

$$Q_d = \alpha C I_d A \tag{1}$$

The rainfall intensity in Eq 1 can be described as:

$$I_d = \frac{aP}{(b + T_d)^n} \tag{2}$$

in which α = unit conversion factor, equal to 1 for English units, and 1/360 for SI units, C = runoff coefficient, A= watershed area in acres (hectare), I_d = rainfall intensity in inch/hr (mm/hr), T_d = rainfall duration in minutes, Q_d= peak runoff rate in cfs (cms) and a, b, and n= constants on the Intensity- Duration- Frequency (IDF) formula.

Storm water detention process is to reduce the peak runoff and to delay the time to peak as well. In practice, the allowable release rate from a basin is defined by the downstream critical capacity, or the pre-development condition.
In this study, the average release is suggested to be a fraction of the allowable peak runoff, Q_a. Therefore, we have:

$$Q_m = mQ_a \tag{4}$$

in which Q_a = the allowable release which occurs at time T_a in Figure 1, Q_m = average release rate, and m = ratio of the average release to the allowable peak runoff rate. For a storm event, the detention storage volume is equal to the volume difference of the inflow and outflow as:

$$V_i = \alpha C I_d A T_d \tag{5}$$

$$V_o = Q_m T_d = mQ_a T_d \tag{6}$$

$$V_d = 60\left[\alpha C I_d A T_d - Q_m T_d\right] = 60\left[Q_d T_d - Q_m T_d\right] \tag{7}$$

in which V_i = inflow volume, V_o = outflow volume, and V_d = the required storage volume in cubic feet or cubic meter. The factor of 60 is to convert seconds to minutes. The reliability of Eq 7 depends on the specified average outflow in Eq 4. Without an adequate guidance, Eq 7 may lead to any result based on engineer's best estimation. Although an adjustment factor have been recommended to avoid underestimation of the detention volume by Urbonas and Stahle (1991) and Guo (1990), it is necessary to develop a consistent guideline for Eq 4.

MAXIMIZATION OF DETENTION STORAGE VOLUME

The peak runoff flow that occurs at the time of concentration, T_c is recommended for conveyance designs. It is well understood that the design storm duration for a detention basin is usually longer that T_c. As illustrated in Figure 1, the peak flow, Q_d, is produced by the design storm for the detention design. To estimate the required storage volume with no prior knowledge of the outlet hydraulics, it is suggested that the storage volume be calculated using the linear rising outflow hydrograph, i.e. line OB in Figure 1 (Malcom 1982) (Guo 1997). Based on the volume difference between the inflow and outflow hydrographs in Figure 1, the detention storage volume, i.e. the shaded area, is:

$$V_d = 60\left[Q_d T_d - \frac{Q_a}{2}(T_d + T_c) \right] \tag{8}$$

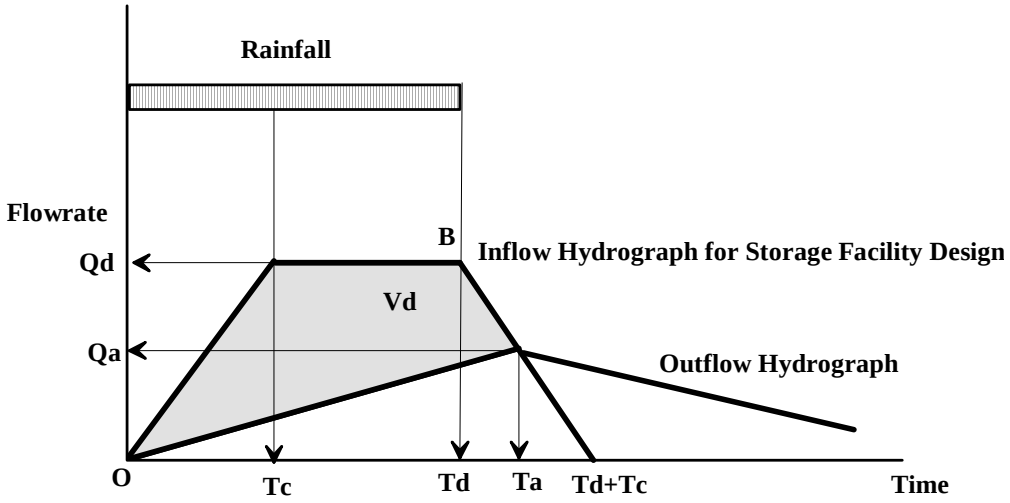


Figure 1. Detention Storage Volume Estimated by Hydrographs

Equating Eq 7 to Eq 8, the value of m is derived as:

$$m = \frac{1}{2}(1 + \frac{T_c}{T_d}) \quad \text{for } 0.5<m<1 \text{ and } T_d > T_c \tag{9}$$

Often the value of m is recommended to be a constant between 0.80 and 0.90 for all storm events (Urbanos and Stahre in 1991). Eq 19 indicates that the value of m varies with respect to the rain storm duration and can not be applied to a storm with duration less than T_c because the maximized operation of a detention basin requires the entire catchment to be tributary. The current practice does not have any limitation on storm duration and results in a maximization procedure starting from 5-minute rainfall. Eq. 9 begins with a value equal to unity when the storm duration is equal to T_c and then reduces to 0.5 when T_d is much longer than T_c. In comparison, the current practice of applying a constant value of m to all storm events can lead

to significant mistake. Substituting Eq 9 into Eq. 5 with the aid of Eq 3, the FAA method is modified to:

$$V_d = 60\left[\alpha C I_d A - \frac{Q_a}{2}(1+\frac{T_c}{T_d})\right]T_d \qquad (10)$$

The basic concept in the FAA method is to find the maximum volume difference between the inflow and outflow volumes under a series of storm events with different durations. Eq 10 shall be tested for a range of T_d until Eq 10 is maximized as:

$$V_m = 60\left[\alpha C I_m A - \frac{Q_a}{2}(1+\frac{T_c}{T_m})\right]T_m \quad \text{at } T_d = T_m \qquad (11)$$

where the subscript m represents the maximized solution.

DESIGN SCHEMATICS AND EXAMPLES

The example watershed used in this study is located in the City of Denver, Colorado. The 100-year IDF in Denver is specified by a = 74.1, b = 10, and n = 0.786. The developed watershed of 100 acres has a time of concentration of 25 minutes and runoff coefficient of 0.65. It produces a 100-year developed peak runoff of 296.86 cfs. The allowable release is 33% of the developed peak runoff. As a result, the allowable release rate is

$$Q_a = 0.33 Q_p = 97.96 \quad cfs \qquad (12)$$

The detention volumes for various periods of storm duration are calculated in Table 1. The maximized volume is found to be 8.52 acre-ft for this example.

Duration	Rainfall Intensity	Inflow Volume	Average Parameter	Average Outflow	Outflow Volume	Storage Volume
minutes	inch/hr	acre-ft	M	cfs	acre-ft	acre-ft
		Eq5	Eq 9	Eq 4	Eq 6	Eq 10
50.00	2.97	13.28	0.75	72.36	4.98	8.30
60.00	2.63	14.12	0.71	68.34	5.65	8.47
70.00	**2.37**	**14.83**	**0.68**	**65.47**	**6.31**	**8.52**
80.00	2.16	15.45	0.66	63.32	6.98	8.47
90.00	1.99	16.00	0.64	61.64	7.64	8.36

Table 1. Example for Maximization of Detention Volume.

CONCLUSIONS

Different hydrologic methods were developed for different hydrologic conditions. In the development of technical design criteria, it is a continual effort to maintain consistency among various design methods. The FAA method intends to be a simplified volume-based approach.

However, the current practice falls short in the estimation of the average outflow. This study presents a modification to the volume-based approach such as the FAA method so that the estimated detention volume can be consistent with the hydrograph method. Modifications to the FAA procedures shall not change its original intention as a simplified approach. As a result, this study applies the volume conservation principle between the simplified hydrographs to relate the average outflow as a fraction of the allowable release rate.

In this study, it was found that the average outflow can be determined by the allowable release from the basin, design storm duration, and the time of concentration of the watershed. In practice, the average release was often considered to be the average flow rate over the base time of the outflow hydrograph. This study indicates that this average outflow in fact is the equivalent average release rate that drains the basin storage volume over the storm duration time. Secondly, the ratio of average release to allowable release was not so constant as recommended by the current practice. Instead, it varies between one and 0.5, depending on storm duration. Applying a constant ratio to all storm events may result in a significant discrepancy against the volume conservation between the inflow and outflow hydrographs. Eq 9 provides a consistent guideline that modifies the current FAA procedures to satisfy the hydrograph volume balance.

APPENDIX I. REFERENCES

1. Adams County, Colorado. (1990) "*Storm Drainage Design and Technical Criteria*."

2. Department of the army and the Air Force. (1977) "*Surface Drainage Facilities for Airfields and Heliports*." Technical Manual No 5-820-1, Washington DC.

3. Federal Aviation Administration, Department of Transportation. (1970) "*Airport Drainage"*, AC No. 150/5320-5B.

4. Guo, James C.Y. (1977). "*Detention Basin Design and Sizing*. " Research Report, Department of Civil Engineering, University of Colorado at Denver, to be published by the Water Resources Publication, Inc. Littleton, Colorado.

5. Guo, James C.Y. and Urbona, Ben. (1996) "*Maximized Detention Volume Determined by Runoff Capture Ratio*." ASCE J. of Water Resources Planning and Management, Vol. 122, No. 1.

6. Malcom, H. Rooney. (1982) "*Some Detention Design Ideals.* " ASCE Proceedings of the Conference on Stormwater Detention Facilities, held in New England College, Hanniker, New Hampshire, edited by William DeGroot.

7. Shueler, Thomas R., and Helfrich, Mike. (1989) "*Design of Extended Detention Wet Pond System.* " Design of Urban Runoff Quality Controls, Edited by Larry A. Roesner, Ben Urbonas, and Michael B. Sonnen, American Society of Civil Engineers, New York, New York.

8. Urbonas, Ben and Stahre, Peter. (1991) "*Storm Water Detention.* " Prentice Hall, Englewood Cliffs, New Jersey.

135	1.93	0.86	31958	0.56	0.54	4410	27548
140	1.93	0.83	31986	0.55	0.54	4557	27429
145	1.93	0.80	32014	0.55	0.54	4704	27310
150	1.93	0.77	32043	0.55	0.54	4851	27192
155	1.93	0.75	32071	0.55	0.54	4998	27073
160	1.93	0.73	32099	0.55	0.54	5145	26954
165	1.94	0.70	32127	0.55	0.53	5292	26835
170	1.94	0.68	32156	0.54	0.53	5439	26717
175	1.94	0.66	32184	0.54	0.53	5586	26598
180	1.94	0.65	32205	0.54	0.53	5733	26472

Appendix J

(Storm Water Maintenance Agreement and Management Plan)

When recorded, mail to:
Heber City Recorder
75 North Main Street
Heber City, Utah 84032

LONG-TERM STORM WATER MAINTENANCE AGREEMENT
(Development Name)

THIS STORM WATER MAINTENANCE AGREEMENT (this "Agreement") is made and entered into this _____ day of _____, 2022, by and between Heber City, a municipal corporation of the State of Utah (the "City"); and _____ ("Owner") whose address is _____ Heber City, Utah 84032.

RECITALS

A. The City is authorized and required to regulate and control the disposition of storm and surface waters within the City, as set forth in the Heber City Code, as amended ("Ordinance"), and as adopted pursuant to the Utah Water Quality Act, as set forth in Utah Code Ann § 19-5-101, er seq., as amended (the "Act").

B. The Owner hereby represents and acknowledges that it is the owner in fee simple or is solely responsible through separate agreement(s) for storm water and its management from certain real properties more particularly described in Exhibit "A", attached hereto and incorporated herein by this reference (the "Property"), and in any amendments thereto, which property is subject to the regulations described above.

C. The Owner desires to build or develop the Property and/or to conduct certain regulated construction activities on the Property which will alter existing storm and surface water conditions on the Property and/or adjacent lands; and

D. To facilitate the anticipated development of the Property, the Owner desires to build and maintain, at Owner's expense, storm and surface water management facilities, including structures, improvements, grading and drainage plans and/or vegetation to control the quantity and quality of the storm water (the "Storm Water Facilities"); and

E. The Storm Water Facilities are shown in the final site plans for subdivisions accepted for the Property, in any related engineering drawings, and in any amendments thereto, which plans, and drawings are on file in the Heber City Engineering Department, and are hereby incorporated herein by this reference (the "Development Plan"); and

F. A detailed description of the Storm Water Facilities, which includes the operation and maintenance procedures required to enable the Storm Water Facilities to perform their designed functions (the "Long-Term Storm Water Management Plan"), is attached hereto as Exhibit "B". This plan is incorporated herein by this reference and may be amended from time to time by the City to comply with City's storm water management plan, MS4 UPDES permit, and other federal, state, and local requirements; and

G. As a condition of Development Plan acceptance, Owner is required to enter into this Agreement establishing a means of operating and documenting the execution of the Long-Term Storm Water Management Plan within the Property.

AGREEMENT

NOW, THEREFORE, in consideration of the benefits received, and to be received by the Owner, its successors, and assigns, as a result of the City's acceptance of the Long-Term Storm Water Management Plan the parties agree as follows:

1. Construction of Storm Water Facilities. The Owner shall, at its sole cost and expense, construct the Storm Water Facilities in strict accordance with the Development Plan, specifications, and any amendments thereto which have been accepted by the City or its agent.

2. Maintenance of Storm Water Facilities. The Owner shall, at its sole cost and expense, operate and maintain the Storm Water Facilities for flow from the property, and natural flow passing through the property, in strict accordance with the Long-Term Storm Water Management Plan. Owner's maintenance obligations shall be limited to structures, systems, and appurtenances on Owner's land, and facilities into which storm water flows outside of the public right-of-way, including all system and appurtenances built to convey storm water, as well as all structures, improvements, and vegetation provided solely to control the quantity and quality of the storm water. Maintenance, for purposes of this Agreement, is defined as good working condition so that the Storm Water Facilities are performing their design functions and capacities. The Owner shall, at its sole cost and expense, perform all work necessary to keep the Storm Water Facilities in good working condition.

3. Annual Maintenance Report. The Owner shall, at its sole cost and expense, submit an Annual Maintenance Report and Certification to the City of the Storm Water Facilities pursuant to the inspection schedule(s) in the Long-Term Storm Water Management Plan. The purpose of the Annual Maintenance Report and Certification is to assure safe and proper functioning of the Storm Water Facilities. The annual inspection shall cover all aspects of the Storm Water Facilities, including, but not limited to: parking lots, structural improvements, berms, channels, outlet structures, pond areas, access roads, vegetation, landscaping, etc. Deficiencies shall be noted in the Annual Maintenance Report. The Report shall also contain a Certification as to whether adequate maintenance has been performed and whether the structural controls are operating as designed to protect water quality. The Annual Maintenance Report and Certification shall be due by June 30, of each year and shall be in a form provided by the City with visual documentation, an example of which is attached in Exhibit "C" of the Long-Term Storm Water Management Plan, and that may be modified from time to time to accommodate laws, rules, and regulatory changes.

4. Oversight Inspection Authority. The Owner hereby grants permission to the City, its authorized agents and employees, to enter upon the Property and to inspect the Storm Water Facilities upon reasonable notice of not less than three business days to the Owner. The purpose of the inspection shall be to determine and ensure that the Storm Water Facilities are adequately maintained, are continuing to perform in an adequate manner, and are in compliance with all

applicable laws, regulations, rules, and ordinances, as well as the Long-Term Storm Water Management Plan.

5. **Notice of Deficiencies.** If the City or its agent finds the Storm Water Facilities contain any defects or are not being maintained adequately, the City or its agent shall send the Owner written notice of the defects or deficiencies and provide the Owner with reasonable time to cure such defects or deficiencies, stated in the notice. Such notice shall be sent certified mail to the Owner's address set forth below.

6. **Owner to Make Repairs.** The Owner shall, at its sole cost and expense, make such repairs, changes or modifications to the Storm Water Facilities as may be determined as reasonably necessary by the City or its agent within the required cure period to ensure the Storm Water Facilities are adequately maintained and continue to operate as designed and accepted.

7. **Corrective Action.** In the event the Owner fails to adequately maintain the Storm Water Facilities in good working condition acceptable to the City agent, the City or its agent may proceed with any enforcement mechanism provided in Heber City Code. The City or its agent may also give written notice that the Storm Water Facilities will be disconnected from the City's municipal separate storm sewer system. Any damage resulting from the disconnected system will be the Owner's responsibility. It is expressly understood and agreed that neither the City nor its agent are under any obligation to maintain or repair the Storm Water Facilities, and in no event shall this Agreement be construed to impose any such obligation on the City or its agent. The actions described in this Section are in addition to and not in lieu of the legal remedies available to the City as provided by law for Owner's failure to remedy deficiencies or any other failure to perform under the terms and conditions of this Agreement.

8. **Reimbursement of Costs.** In the event the City or its agent, pursuant to this Agreement, incurs any costs, or expends any funds resulting from enforcement or cost for labor, use of equipment, supplies, materials, and the like related to storm drain disconnection from the City's municipal separate storm sewer system, the Owner shall reimburse the City or its agent upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the City or it agent. After said thirty (30) days, such amount shall be deemed delinquent and shall be subject to interest at the rate of ten percent (10%) per annum. Owner shall also be liable for any collection costs, including attorney's fees and court costs, incurred by the City or its agent in collection of delinquent payments. The Owner hereby authorizes the City or its agent to assess any of the above-described costs, if remained unpaid, by recording a lien against the Property.

9. **Successors and Assigns.** This Agreement shall be recorded in the office of the County Recorder and the covenants and agreements contained herein shall run with the land and whenever the Property shall be held, sold, conveyed or otherwise transferred, it shall be subject to the covenants, stipulations, agreements and provisions of this Agreement which shall apply to, bind and be obligatory upon the Owner hereto, its successors and assigns, and shall bind all present and subsequent owners of the Property described herein. If the property is sold, the parties may execute an assignment of this Agreement and release of the seller's liability upon the City's consent and agreement.

10. **Severability Clause.** The provisions of this Agreement shall be severable and if any phrase, clause, sentence, or provision is declared unconstitutional, or the applicability thereof to

the Owner, its successors and assigns, is held invalid, the remainder of this Agreement shall not be affected thereby.

11. Utah Law and Venue. This Agreement shall be interpreted under the laws of the State of Utah. Suits for any claims or for any breach or dispute arising out of this Agreement shall be maintained in the appropriate court of competent jurisdiction in Salt Lake County, Utah.

12. Indemnification. This Agreement imposes no liability of any kind whatsoever on the City or its agent. The Owner hereby agrees to indemnify and hold the City and its officers, employees, agents and representatives from and against all actions, claims, lawsuits, proceedings, liability, damages, losses, and expenses (including attorneys' fees and court costs) that result from the performance of this agreement, but only to the extent the same are caused by any negligent or wrongful act or omissions of the Owner, and the Owner's officers, employees, agents, and representatives.

13. Amendments. This Agreement shall not be modified except by written instrument executed by the City and the owner of the Property at the time of modification, and no modification shall be effective until recorded in the office of the County Recorder.

14. Subordination Requirement. If there is a lien, trust deed or other property interest Recorded against the Property, the trustee, lien holder, etc., shall be required to execute a subordination agreement or other acceptable recorded document agreeing to subordinate their interest to this Agreement.

15. Exhibits and Recitals. The recitals set forth above and all exhibits to this Agreement are incorporated herein to the same extent as if such items were set forth herein in their entirety within the body of this Agreement.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the parties have signed and subscribed their names hereon and have caused this Agreement to be duly executed as of the day and year first set forth above.

OWNER

By: _____
Name: _____
Its: _____

OWNER ACKNOWLEDGMENT

STATE OF UTAH)
:ss.
COUNTY OF WASATCH)

On the ____ day of _____ 2022, before me _____ , personally appeared Michael Bradshaw, who being by me duly sworn, did say that he is the President of _____, a Utah corporation, and is authorized to execute the foregoing in its behalf and that he executed it in such capacity.

_____
NOTARY SIGNATURE

HEBER CITY

By: _____
Russell Funk, City Engineer

CITY ACKNOWLEDGMENT

STATE OF UTAH)
:ss.
COUNTY OF WASATCH)

On the ____ day of _____ 2022, before me _____ , Russell Funk who being by me duly sworn, did say that he is the City Engineer of Heber City, a political subdivision of the State of Utah, and that said instrument was signed in behalf of the City by authority of its City Council and said City Engineer acknowledged to me that the City executed the same.

_____
NOTARY SIGNATURE

EXHIBIT A
(Legal Descriptions)

Parcel ID# ??-??-???-???, LOT ... also described as:

BEGINNING...

AND

Parcel ID# ??-??-???-???, LOT ... also described as:

BEGINNING...

EXHIBIT B
(Long-Term Storm Water Management Plan)
(Separate Attachment)

EXHIBIT B

Long-Term Storm Water Management Plan

for

(Development Name)
Heber City, Utah

PURPOSE AND RESPONSIBILITY

As required by the Clean Water Act and resultant local regulations, including Heber City Storm water Management Program, those who develop land are required to build and maintain systems to minimize litter and contaminants in storm water runoff that pollute waters of the State.

This Long-Term Storm Water Management Plan (LTSWMP) describes the systems, operations and the minimum standard operating procedures (SOPs) necessary to manage pollutants originating from or generated on this property. Any activities or site operations at this property that contaminate water entering the City's storm water system or natural drainages are prohibited unless SOPs are written and accepted by the City to manage those activities or operations and amended into this LTSWMP.

The LTSWMP is aimed at protecting water quality and minimizing pollutants that could be generated by this property.

CONTENTS

SECTION 1: SITE DESCRIPTION, USE AND IMPACT

SECTION 2: TRAINING

SECTION 3: RECORDKEEPING

SECTION 4 APPENDICES

SECTION 1: SITE DESCRIPTION, USE AND IMPACT

The purpose of site infrastructure within the project is to control and contain pollutants which, if improperly managed, could adversely impact the environment. This LTSWMP includes standard operating procedures (SOP)s that are intended to direct maintenance operations and responsibly manage the grounds and infrastructure to ensure the chances of adverse impacts are minimized.

Parking, Sidewalk and Flatwork

Runoff from private roadways is the responsibility of the development. The development is also responsible for runoff from any private impervious areas or parking within the project. The various subdivisions within the project are made up of a variety of multi-family and single family lots ranging from approximately ?,000 square feet to ??,000 square feet. Each private lot has a concrete driveway. Any sediment, debris, fluids, or other waste left or that collect on these areas will be carried by runoff to the storm drain inlets. This waste material will settle in the storm drain system increasing maintenance cost and any material dissolving in the runoff will pass through the system. Maintenance involves regular sweeping, but it can also involve pavement washing to remove stains, slick spots, and oil/chemical spills when necessary. The Sweeping and the Pavement Washing SOPs are used to manage the pollutants associated with pavements.

Landscaping

This property's landscape operations can result in grass clippings, sticks, branches, dirt, mulch, fertilizers, pesticides, and other pollutants to fall or be left on paved areas. This waste material will settle in the storm drain system, increasing maintenance costs, and contributing to the solid and dissolved runoff waste that can pass through storm drain system and impact water quality. Primary pollutants of concern in the Heber area are nitrates and organic material, so it is vital that paved areas with direct connection to the City storm drain systems remain clean of landscape debris. The Landscape Maintenance SOP is written to control and manage this potential pollution source.

Storm Drain System

Storm water inlets are located within the curb and gutter of private roads and parking areas. These inlets direct all runoff from the development (developed flow) into privately maintained ponds and infrastructure. In cases where developed flow from these areas is mixed with developed flow from public roads and retained in ponds on private property, the ponds and infrastructure will be privately maintained. Maintenance will include cleaning, repair, and replacement of the facilities.

Storm water in natural drainages passing through the property (undeveloped flow) will be kept separate from storm water generated by the development. Where the natural undeveloped storm water flow is retained in ponds at roads or other crossings on private property, these ponds and infrastructure will be privately maintained. Maintenance will include cleaning, repair, and replacement of the faculties.

In cases where developed storm water flow is retained and subsequently discharged into City infrastructure downstream, the development is responsible for the quantity and quality of the storm water prior to entering the City's system.

Waste Management

Trash receptacles with lids are intended to prevent exposure to precipitation which minimizes liquids that can leak onto pavements and into the storm drain system. They also minimize the amount of light weight trash that is exposed to wind and scattered along the ground. Good waste management systems, if managed improperly, can end up as the source of the very pollution that they were intended to control. The Waste Management SOP is written to control and manage waste.

Snow and Ice Removal Management

Salt is a necessary material for ensuring safe parking and pedestrian walkways. However, snow removal operations, if improperly managed, will have an adverse impact on vegetation and local water resources.

SECTION 2: TRAINING

The purpose of training is to ensure that all homeowners and maintenance contractors know and understand the SOPs that are specifically written to manage and maintain the property. Maintenance contractors must follow good practices and meet the minimum standards described in the LTSWMP SOPs. A file of all training records in Appendix C will be maintained for review.

SECTION 3: RECORDKEEPING

Maintain records of operation and maintenance activities in accordance with SOPs. Mail a copy of the record to Heber City annually by June 30th of each year.

SECTION 4: APPENDICES

Appendix A- Infrastructure Locations, Site Drawings, and Details

Appendix B- SOPs

Appendix C- Recordkeeping Documents

APPENDIX A – INFRASTRUCTURE LOCATIONS, SITE DRAWINGS, AND DETAILS

(INSERT PROJECT SPECIFIC DOCUMENTS HERE)

APPENDIX B – SOPs

Pavement Maintenance Operations

General:

These SOPs are not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in these SOPs.

1. **Purpose and Selection:**
   a) Reduce storm water pollution by sweeping and removing pollutants that will be carried to City storm water systems during storm water runoff or by non-storm water runoff.
   b) The sweeper is intended for removing material that collects on pavements by use and the natural degradation of pavements, i.e., material that collect, drop from vehicles and the natural erosion and breaking up of pavements.

2. **Regular Procedure:**
   a) Remain aware of debris and sweep minor debris is needed by hand.
   b) Generally sweeping machinery should be used during autumn when leaf fall is heavy and early spring after winter thaw. Sometimes sweeping machinery will be necessary when accumulations are spread over a large area of the pavement.
   c) Manage outside activities that leave waste or drain pollutants to pavements. This involves outside functions including but not limited to: Yard sales, yard storage, fund raisers, etc. Do not allow car wash fund raiser or other activities that allow detergents or other pollutants to be wash into storm drain systems.

3. **Disposal Procedure:**
   a) Service contractors to dispose at licensed facilities.
   b) Dispose of hand collected materials in dumpsters.

4. **Training:**
   a) Annually and at hiring.

Landscape Maintenance Operations

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

Rule: Prevent any solids, liquids, or light weight material from being carried away from the construction or maintenance envelop by wind or water.

5. Application:

a) This SOP should provide sufficient direction for many of the general landscaping operations, e.g., fertilizer and pesticide applications, mowing, weeding, tree trimming, digging, sprinkler repairs, varying landscape cover management, etc.

6. Maintenance Procedure:

a) Grooming
- Lawn Mowing - Immediately following operation, sweep or blow clippings onto vegetated ground.
- Fertilizer Operation - Prevent overspray. Sweep or blow fertilizer onto vegetated ground immediately following operation.
- Pesticide Operation - Prevent overspray, use spot treatment, sweep, or blow dry pesticide onto vegetated ground immediately following operation.

b) Remove or contain all erodible or loose material prior forecast wind and precipitation events before any non-storm water will pass through and over the project site and at end of work period. Light weight debris and landscape materials require immediately attention when wind expected.

c) Landscape project materials and waste can usually be contained or controlled by operational best management practices.
- Operational; including but not limited to:
  - Strategic staging of materials eliminating exposure, such as not staging on pavement
  - Avoiding multiple day staging of landscaping backfill and spoil on pavements
  - Haul off spoil as generated or daily
  - Scheduling work when weather forecast are clear.

d) Cleanup:
- Use dry cleanup methods, e.g., square nose shovel and broom. It is usually sufficient when no more material can be swept onto square nosed shovel.
- Power blowing tools

7. **Waste Disposal:**
   a) Dispose of waste according to General Waste Management SOP, unless superseded by specific SOPs for the operation.

8. **Equipment:**
   a) Tools sufficient for proper containment of pollutants and cleanup.
   b) Push broom and square blade shovel should be a minimum.

9. **Training:**
   a) Annually and at hiring
   b) Landscape Service Contractors must have equal or better SOPs.

Waste Management Operations

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

1. **Application:**
   a) This SOP is for all Staff, intended for the proper disposal of common everyday waste.

2. **Waste Collection Devices (Exposed units):**
   a) The site contains the following types of waste management containers.
      - Receptacles with lids

3. **Waste Disposal Restrictions for all waste Scheduled for the Landfill:**
   a) Generally, most waste generated at this property, and waste from spill and clean up operations can be disposed in dumpsters under the conditions listed in this SOP. Unless other disposal requirements are specifically identified by the product SDS or otherwise specified in other SOPs.
   b) Know the facility disposal requirements and restrictions. It should not be assumed that all waste disposed in collection devices will be disposed of at the landfill.
   c) Review landfill regulations for additional restrictions and understand what waste is prohibited. Ensure the SDS and Landfill regulations are not contradictory. Generally, the waste prohibited by the landfill is:
      - Liquid:
        - paint
        - pesticides/fertilizers
        - oil (all types)
        - antifreeze
        - batteries
        - liquid chemicals
        - etc.

        (Generally, *all the above hazardous waste when involved in minor spill cleanup operations can be disposed in covered dumpsters and our waste bays, if the liquid is contained in absorbent material, e.g. sand, dirt, loose absorbent, pads, booms etc., and transformed or dried such that it will not drip. This is not intended for wholesale disposal of out dated or spent liquid hazardous waste. When disposal of outdated or spent liquid is*

needed or for questions of how to dispose of other waste, contact the Health Department for instructions and locations.

4. **Waste Disposal Required for Landfill or Other:**
   a) Generally, for waste not accepted by the landfill.
   b) Follow SDS for disposal requirements. Review landfill regulations for additional restrictions and understand what waste is prohibited. Ensure the SDS and Landfill regulations are not contradictory
   General rules are:
      - Get approval prior to delivery.
      - Transport waste in secure leak proof containers that are clearly labeled.
   c) Lookup and follow disposal procedures for disposal of waste at other EPA approved sites.

5. **General Staff Maintenance Practices:**
   a) Prevent dumpsters and receptacles from becoming a pollution source by:
      - Closing lids
      - Reposition tipped receptacles upright.
      - Report full or leaking and unsecured dumpsters and receptacles to the company provider or repair it in house. Determine source liquids and prevent it.
      - Report any eminent pollutant hazard related to dumpsters and receptacles to the owner.

6. **Training:**
   a) Annually and at hiring

Storm Drain Maintenance Operations

General:

These SOPs are not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in these SOPs.

1. **Procedure:**
   a) Inspect for need:
      - Schedule cleaning for boxes and pipe that contain 2" or more of sediment and debris.
      - Remove debris by vacuum operated machinery.
      - When accumulations are mostly floating debris this material can be removed with a net.
      - Inspect standing water for mosquito larvae and contact the mosquito abatement district when necessary.

2. **Disposal Procedure:**
   a) Dispose of waste collected by machinery at regulated facilities.
   b) Floating materials and floating absorbent materials may be disposed in dumpster when dried out. Dry dirt and slurry may also be disposed in the dumpster.
   c) Disposal of hazardous waste
      - Dispose of hazardous waste at regulated disposal facilities, see Waste Management and Spill Control SOP
   d) Disposal of waste collected from sanitary sewer device at regulated facilities.

3. **Training:**
   a) Annually and at hire

Pavement Washing Operations

General:

These SOPs are not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in these SOPs.

1. **Procedure:**
   a) Prevent waste fluids and any detergents if used from entering storm drain system. The following methods are acceptable for this operation.
      - Dam the inlet using a boom material that seals itself to the pavement and pick up the wastewater with shop-vacuum or absorbent materials.
      - Collect wastewater with shop-vacuum simultaneous with the washing operation.
      - Collect wastewater with vacuum truck or trailer simultaneous with the washing operation.
   b) This procedure must not used to clean the initial spills. First apply the Spill Containment and cleanup SOP.

2. **Disposal Procedure:**
   a) Small volumes can usually be drained to the local sanitary sewer. Contact the South Valley Sewer District.
   b) Large volumes must be disposed at regulated facilities.

3. **Pavement Cleaning Frequency:**
   a) There is no regular pavement washing regimen. Pavement washing is determined by conditions that warrant it, including but not limited to: prevention of slick or other hazardous conditions or restore acceptable appearance of pavements.

4. **Training:**
   a) Annually and at hiring

Snow and Ice Removal Management

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

1. **Application:**
   a) Parking and sidewalk winter management operations.

2. **De-Icing Procedure:**
   a) Do not store or allow salt or equivalent to be stored on outside paved surfaces.
   b) Minimize salt use by varying salt amounts relative to hazard potential.
   c) Sweep excessive piles left by the spreader.
   d) Watch forecast and adjust salt amounts when warm ups are expected the same day.

3. **Training:**
   a) Annually and at hiring.
   b) Require snow and ice service contractors to follow the stronger of this SOP or their company SOPs.

Spill Control

General:

This SOP is not expected to cover all necessary actions. Operators are allowed to adapt SOPs to unique site conditions in good judgment when it is necessary for safety, and the proper, and effective containment of pollutants. However, any changes of routine operations must be amended in this SOP.

1. **Rational:**
   a) All properties are susceptible to spills whether it is a result of operations or by customers. Insufficient response, inadequate containment materials and improper spill cleanup methods will result in pollutants in our waterways. Once the pollutants reach our storm drain system, or even the detention pond, they are difficult and expensive to remove.

2. **Containment Procedure:**
   a) Priority is to dam and contain flowing spills.
   b) Use spill kits booms if available or use any material available; including but not limited to, nearby sand, dirt, landscaping materials, etc.
   c) Hazardous or unknown waste material spills
      - Critical Emergency constitutes large quantities of flowing uncontained liquid that will affect areas with people or reach storm drain systems. Generally burst or tipped tanks. Call Hazmat, DWQ, Health Department, and City.
      - Minor Emergency constitutes a spill that has reached a storm drain but is no longer flowing. Call Health Department, and City
      - Spills that are contained on the surface and do not meet the criteria for Critical and minor emergencies may be managed by the responsible implementation of this SOP.

3. **Cleanup Procedure:**
   a) NEVER WASH SPILLS TO THE STORM DRAIN SYSTEMS.
   b) Clean per SDS requirements but generally most spills can be cleaned up according to the following:
      - Absorb liquid spills with spill kit absorbent material, sand or dirt until liquid is sufficiently converted to solid material.
      - Remove immediately using dry cleanup methods, e.g. broom and shovel, or vacuum operations.
      - Cleanup with water and detergents may also be necessary depending on the spilled material. However, the waste from this operation must be vacuumed or effectively picked up by dry methods. See Pavement Washing SOP.
      - Repeat process when residue material remains.

4. **DISPOSAL:**
   a) Follow SDS requirements but usually most spills can be disposed per the following b. & c.
   b) Generally, most spills absorbed into solid forms can be disposed to the dumpster and receptacles. Follow Waste Management SOP.
   c) Generally, liquid waste from surface cleansing processes may be disposed to the sanitary sewer system after the following conditions have been met:
      - Dry cleanup methods have been used to remove the bulk of the spill and disposed per the Waste Management SOP.
      - The liquid waste amounts are small and diluted with water. This is intended for spill cleanup waste only and never for the disposal of unused or spent liquids.

5. **Documentation:**
   a) Document all spills on Appendix C forms.

6. **SDS sheets:**
   a) SDS Manual is filed in break room.

7. **Materials:**
   a) Generally, sand or dirt will work for most clean up operations and for containment. However, it is the responsibility of the owner to select the absorbent materials and cleanup methods that are required by the SDS Manuals for chemicals used by the company.

8. **Training:**
   a) Annually and at hiring.

APPENDIX C – PLAN RECORDKEEPING DOCUMENTS

PURPOSE AND RESPONSIBILITY

This Maintenance Report serves to assure management and maintenance of a private storm water system as required by the Clean Water Act and resultant local regulations.

These storm water facilities are designed to manage the collection and distribution/infiltration and the quality of runoff from storm events. Annual reporting with the associated inspection provides for an ongoing awareness of their effectiveness and the general condition of the facilities and their function.

Please respond to the function and condition of the site facilities for each of the following aspects or areas of concern as a measure of its success in meeting its designed pollution protection of storm water. Include visual / photo documentation were feasible.

1. Parking, Sidewalk, impervious Area
Sediment, leaves, debris, spilt fluids or other waste that collects on parking lots and sidewalks will be carried by runoff, increasing the pollution of downstream waters.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

2. Landscaping
Landscaping is often designed to capture and infiltrate storm water as a desired effect of storm water management. However, the fall of leaves along with landscape operations that produce grass clippings, sticks, dirt, mulch, fertilizers, pesticides and other pollutants that are collected in the storm water are a great impairment to that water. The primary pollutants of concern in the Heber Valley include decaying organic material and nitrates which rob water body of dissolved oxygen required to sustain fish life and impair downstream drinking water quality.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

3. Storm Water Conveyance and Storage
Storm drain inlet boxes, pipe, detention ponds, etc. generally have some storm water treatment or pollution prevention as part of their design. The capture of floating trash and also the settling of heavier sediment particles to cleanout points, are a couple of examples.

Specific Management/Maintenance activities (litter retrieval, vactoring, mosquito abatement, illicit discharge detection) to support this cleanup have been: _____
_____
_____
_____
_____
_____

4. Waste Management
Dumpsters and trash receptacles with lids are intended to prevent precipitation exposure minimizing the uptake of trash contaminants into the storm water. Lids will also prevent the lightweight trash migrating in the wind. Waste handling is necessary part of almost all sites and requires diligent attention to not become a source of storm water pollution.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

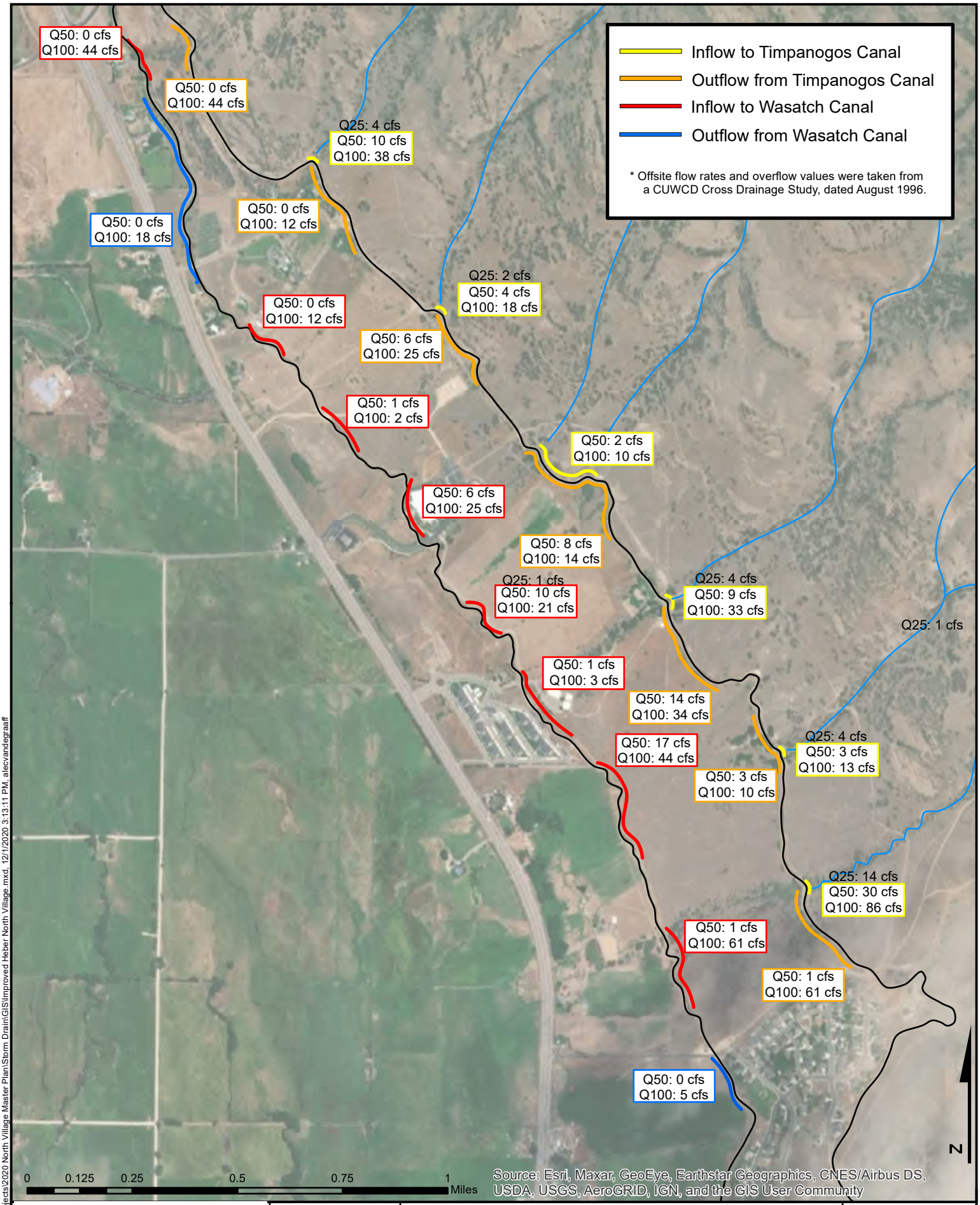
5. Construction, Mechanical/Utility Systems & Outside Equipment/Storage
Chemicals and oils are a pollution source that may be a part of mechanical and utility systems existing on site. There may also be the occasional construction or repair activity with associated equipment and materials on site which pose a pollution threat if not given proper storm water consideration.

Specific Management/Maintenance activities to address this pollution have been: _____
_____
_____
_____
_____
_____

MAINTENANCE LOG

Date	Facility/Location, Maintenance Performed, Spill Event	Observation Notes, including but not limited to; Inspection results, Observations, System Performance (effectiveness / inefficiencies), Concerns, Necessary Changes, Etc. Include before / after photos where feasible.	Initials

Appendix 8
Cross Drainage Flow Rates Summary Map



Z:\Heber City\City Projects\2020 North Village Master Plan\Storm Drain\GIS\Improved Heber North Village.mxd, 12/1/2020 3:13:11 PM, alecvandegraaff

HORROCKS ENGINEERS

728 West 100 South
Heber, UT 84032
(435) 654-2226

Cross Drainage Flow Rates (Pre-Developed)

DATE 12/1/2020

DRAWN

Figure 1

Appendix 9
North Village Percolation Testing Summary

July 7, 2022

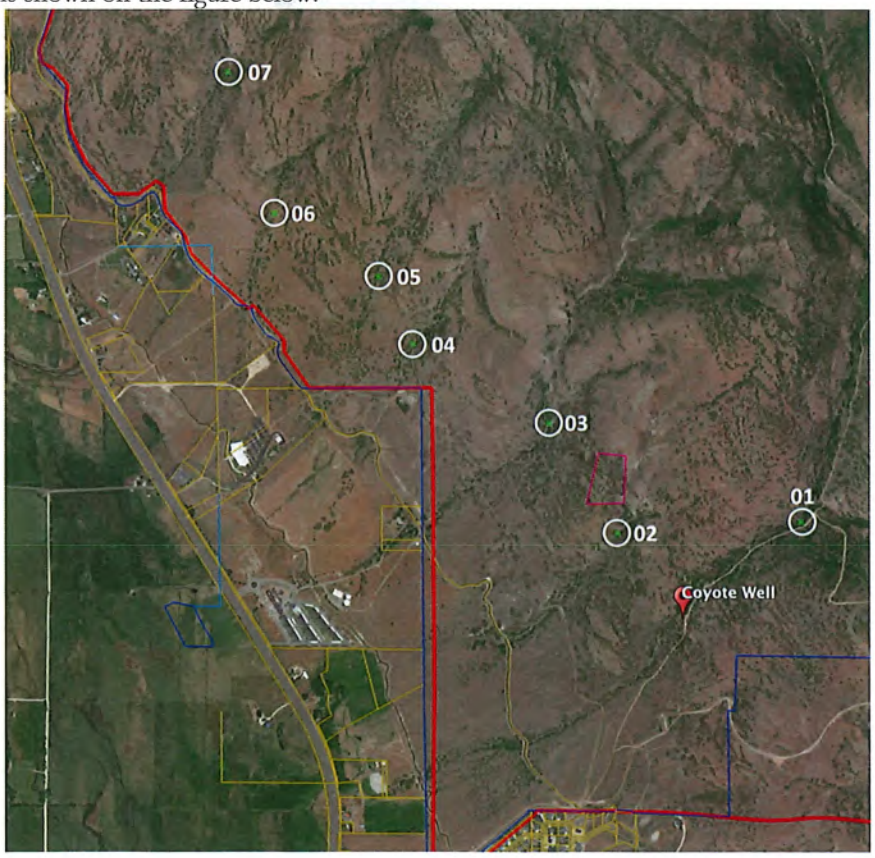
Brian Watson
Momentum Development Group, LLC
10421 South Jordan Gateway Blvd, #200
South Jordan, Utah 84095
brian@mdevg.com

RE: Storm Water Percolation Testing
Jordanelle Ridge
Heber City, UT
EPIC PROJECT #: 21SM4428

Dear Mr. Watson,

This letter summarizes Epic Engineering's storm water percolation testing for the proposed storm water detention basins to be included in the proposed Jordanelle Ridge project, Heber City, Utah. Epic Engineering's scope of work consisted only of the percolation testing on the 7 designated basin location. This letter summarizes the findings of the testing only and does not address any other engineering or geotechnical aspects of this site or surrounding areas. Soils discussed within this letter shall not supersede any soils discussed, tested, and analyzed by any geotechnical investigation.

It is Epic's understanding at the time of the soils exploration and percolation testing that the existing channels will be utilized as storm water catch basins. Percolation testing was done in the soils directly above the channel, within the basin locations shown on the figure below.



A member of Epic Engineering's geotechnical staff visited the sites on June 28-30, 2022. At the time of the site visits, the temperatures were approximately 80-90 degrees with clear skies. The native soils consisted of silty SAND and sandy SILT with gravels. A 12-inch hole was hand dug into the native soils to run percolation testing. Measurements were obtained every 30-minutes until a stabilized rate was reached. A total of 4 readings were taken at each location with final stabilized percolation rates listed in the table below.

Location	Soils	Percolation Rate (MPI)	Rate (in/hr)
Site #1	Silty SAND	5.5	10.9
Site #2	Silty SAND	15	4
Site #3	Silty SAND	8	7.5
Site #4	Sandy SILT	30	2
Site #5	Silty SAND	12	5
Site #6	Silty SAND	8	7.5
Site #7	Sandy SILT	17	3.5

Epic Engineering's scope of work consisted only of the percolation testing and soils observation of the exposed soil conditions in the test pit locations identified by the client. Other site grading activities being completed were not observed as part of this site visit. They are outside of the scope of work and are not addressed in this letter. The observations and recommendations presented in this letter were conducted within the limits prescribed by our client. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts, reports, or letters.

This letter concludes the Storm Water Percolation Testing services for the proposed Storm Water basin locations as identified by the client above for the Jordanelle Ridge project, Heber City, Utah. Please contact Epic Engineering at (435) 654-6600 if you would like to discuss the results of this storm water percolation test or have other questions.

Sincerely,
Epic Engineering, P.C.



Torrey Copfer, P.G.
Engineering Geologist

Appendix 10
North Village Drainage Area

UNDEVELOPED FLOWS THROUGH JORDANELLE CANYONS WITH DRAINAGE IMPROVEMENTS

	STORAGE / LID MEASURE	HISTORIC 100-YR 24-HR PEAK IN (CFS)	HISTORIC 100-YR 24-HR STOR (ACFT)	INFIL. (IN/HR)	100-YEAR PEAK IN (CFS)	100-YEAR STOR (ACFT)	100-YEAR INFIL (ACFT)	25-YEAR PEAK IN (CFS)	25-YEAR STOR (ACFT)	25-YEAR INFIL (ACFT)	10-YEAR PEAK IN (CFS)	10-YEAR STOR (ACFT)	10-YEAR INFIL (ACFT)
01A	SEDIMENT BASIN	162	87	5.45	65.9	11.60	9.05	30.5	9.39	39.19	17.7	5.98	27.96
01B	ROADS / TRAILS			27	22.6	1.15	16.79	0.8	0.00	0.00	0.4	0.00	0.00
01C	EAST HWY 40 *			2	0.8	* 0.50	0.01	0.1	0.00	0.00	0.1	0.00	0.00
02A	SEDIMENT BASIN	33	13	2	25.3	1.74	0.80	10.2	1.74	4.76	5.4	1.48	3.66
02B	ROADS / TRAILS			2	11.9	2.06	2.19	1.4	0.00	0.98	0.2	0.00	0.11
02C	EAST HWY 40 *			2	1.2	* 0.50	0.02	0.2	0.00	0.00	0.1	0.00	0.00
03A	SEDIMENT BASIN	100	35	3.75	54.1	8.00	4.80	23.1	8.00	17.95	12.5	5.35	12.06
03B	ROADS / TRAILS			2	17.7	2.33	1.49	0.5	0.00	0.37	0.2	0.00	0.11
03C	EAST HWY 40 *			2	11.1	1.56	1.03	0.2	0.00	0.00	0.1	0.00	0.00
04A	SEDIMENT BASIN	42	12.5	1	23.1	2.38	0.36	9.6	1.59	3.69	4.8	1.16	3.21
04B	ROADS / TRAILS			1	2.7	0.42	1.01	0.7	0.00	0.46	0.3	0.00	0.15
04C	EAST HWY 40 *			1	1.0	* 0.50	0.01	0.2	0.00	0.00	0.1	0.00	0.00
05A	SEDIMENT BASIN	16	7	2.5	12.5	0.89	0.55	4.4	0.46	3.14	2.4	0.28	2.17
05B	ROADS / TRAILS			2	2.5	0.15	1.64	0.6	0.00	0.38	0.2	0.00	0.13
05C	EAST HWY 40 *			2	1.0	* 0.50	0.01	0.2	0.00	0.00	0.1	0.00	0.00
06A	SEDIMENT BASIN	41	14.5	3.75	80.5	2.56	1.32	32.9	1.61	6.72	14.5	1.14	4.63
06B	ROADS / TRAILS			2	2.7	0.18	1.83	0.7	0.00	0.45	0.3	0.00	0.15
06C	EAST HWY 40 *			2	1.2	* 0.50	0.04	0.2	0.01	0.01	0.1	0.00	0.00
07A	SEDIMENT BASIN	90	34	1.75	40.1	7.28	1.91	16.6	4.28	13.32	8.8	2.77	9.11
07B	ROADS / TRAILS			2	2.6	0.20	1.62	0.6	0.00	0.42	0.3	0.00	0.14
07C	EAST HWY 40 *			2	0.7	* 0.50	0.01	0.1	0.00	0.00	0.0	0.00	0.00

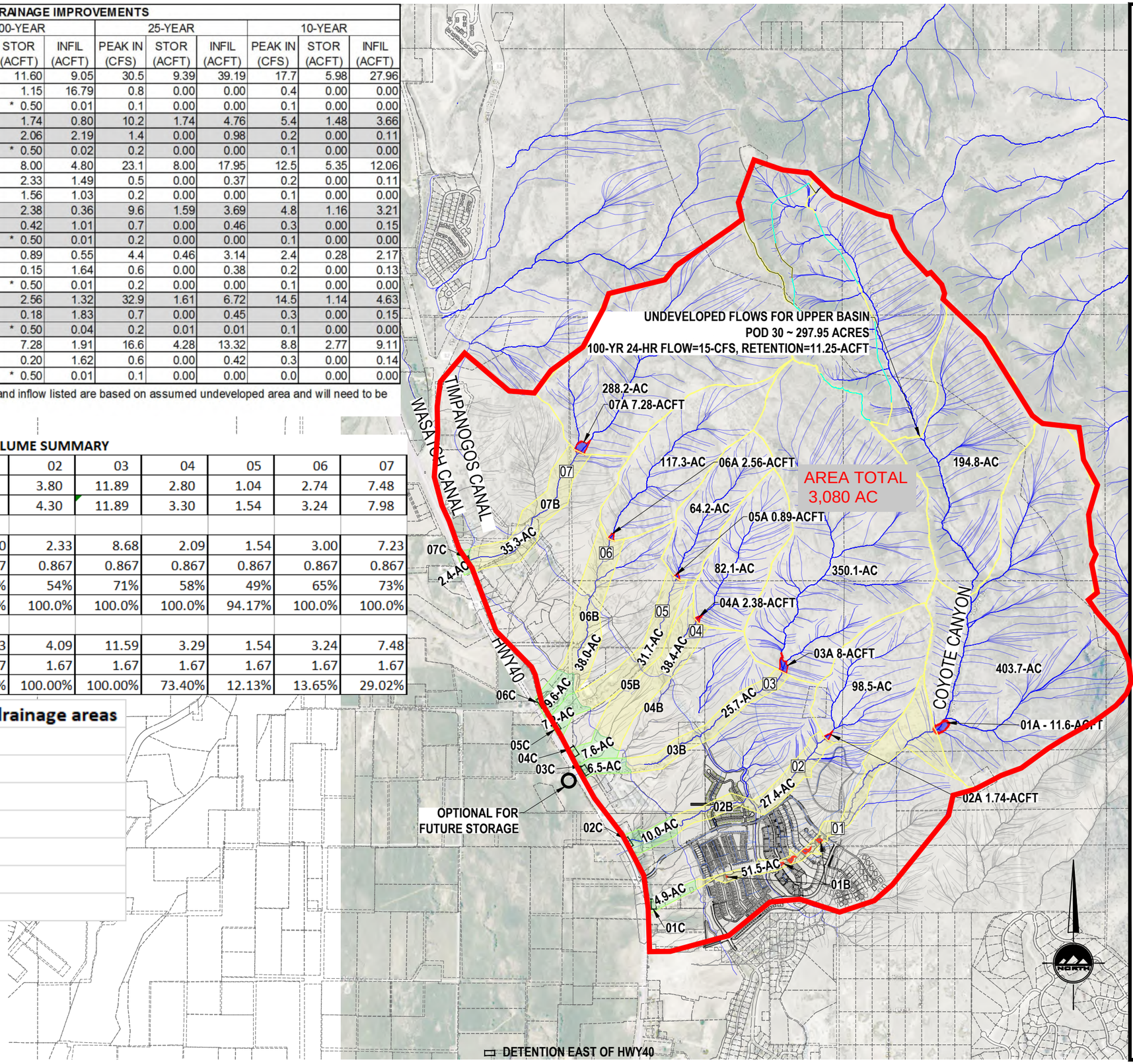
* Minimum basin size at bottom of all drainages (0XC) is 0.5-acft. Volumes and inflow listed are based on assumed undeveloped area and will need to be verified with individual overall drainage basin/development plans.

DEBRIS BASIN VOLUME SUMMARY

		01	02	03	04	05	06	07
Stormwater Volume Planned		13.60	3.80	11.89	2.80	1.04	2.74	7.48
With 0.5 acft minimum at Hwy 40		14.10	4.30	11.89	3.30	1.54	3.24	7.98
Cannon et al. equation (2010)	***Volume (ac-ft)***	14.10	2.33	8.68	2.09	1.54	3.00	7.23
10-year 60-minute depth (in)		0.867	0.867	0.867	0.867	0.867	0.867	0.867
% of Area over 30% Slopes		74%	54%	71%	58%	49%	65%	73%
	Percent Burn	80.7%	100.0%	100.0%	100.0%	94.17%	100.0%	100.0%
Gartner et al equation (2014)	***Volume (ac-ft)***	13.03	4.09	11.59	3.29	1.54	3.24	7.48
5-year 60-minute intensity (in/hr)		1.67	1.67	1.67	1.67	1.67	1.67	1.67
	Percent Burn	100.00%	100.00%	100.00%	73.40%	12.13%	13.65%	29.02%

100-year full retention Volumes for the upper drainage areas

01A	1198,342 CF (27.5 ACFT)
02A	164,970 CF (3.79 ACFT)
03A	645,865 CF (14.83 ACFT)
04A	103,506 CF (2.38 ACFT)
05A	38,867 CF (0.89 ACFT)
06A	111,526 CF (2.56 ACFT)
07A	316,969 CF (7.28 ACFT)



HORIZONTAL GRAPHIC SCALE

2000 0 1000 2000 4000

(IN FEET)

HORZ: 1 inch = 2000ft.

ENSIGN
THE STANDARD IN ENGINEERING

SALT LAKE CITY
45 W. 10000 S., Suite 500
Sandy, UT 84070
Phone: 801.255.0529

LAYTON
Phone: 801.547.1100

TOOELE
Phone: 435.843.3590

CEDAR CITY
Phone: 435.865.1453

RICHFIELD
Phone: 435.896.2983

WWW.ENSIGNENG.COM

FOR:
MOMENTUM DEVELOPMENT GROUP, LLC
10421 SOUTH JORDAN GATEWAY BLVD, #200
SOUTH JORDAN, UTAH 84095
CONTACT:
DAVE BARBEE
PHONE: 801-316-3193

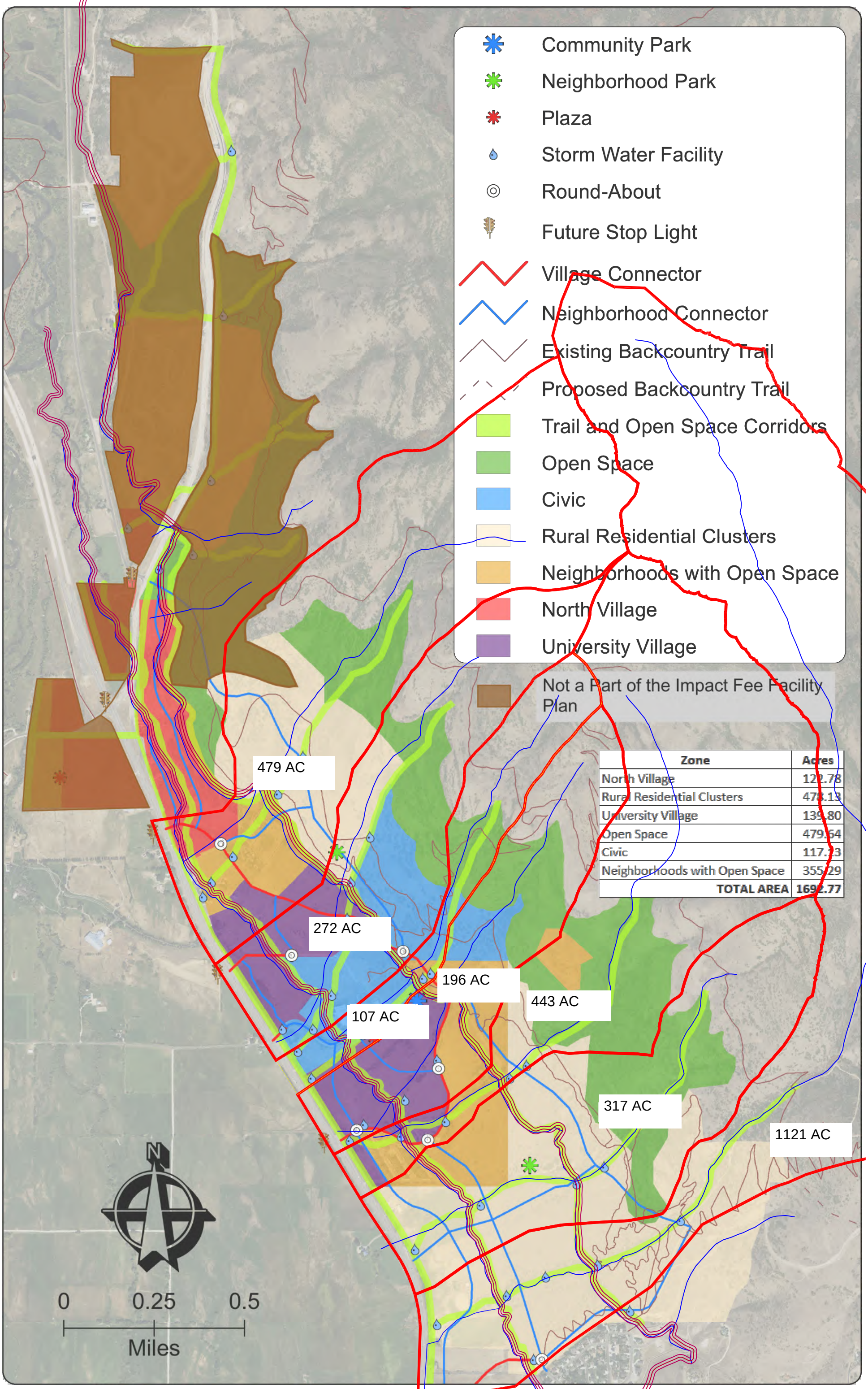
NORTH VILLIAGE
UNDEVELOPED DRAINAGE MASTER PLAN

700 COYOTE LANE
HEBER CITY, UTAH

UNDEVELOPED DRAINAGE
COYOTE CANYON
DISCHARGE VOLUMES
UPDATED INFIL RATES

PROJECT NUMBER 10229A
PRINT DATE 7/19/22
DRAWN BY C. DUNKEL
CHECKED BY B. MORGAN
PROJECT MANAGER B. MORGAN

EX-110



Zone	Acres
North Village	122.78
Rural Residential Clusters	478.13
University Village	139.80
Open Space	479.64
Civic	117.23
Neighborhoods with Open Space	355.29
TOTAL AREA	1692.77

North Village Community Design Map

Appendix 11
Storm Water Facility Cost Summary

North Village Storm Drain Price List

	Size	Description	Price	Units
j	18	Pipe	$80.00	LF
j	24	Pipe	$100.00	LF
j	36	Pipe	$140.00	LF
j	48	Pipe	$180.00	LF
k	18	Casing	$207.00	LF
k	24	Casing	$235.00	LF
k	36	Casing	$300.00	LF
k	48	Casing	$600.00	LF
k		Canal Concrete Lining	$150,000.00	LF
l		Upper Detention Basin	$200,000	AF
m		Intermediate Detention Basin	$240,000	AF
n		US40 Retention Basin	$150,000	AF
j		Site Restoration	$0.75	SF
m		Irrigation and Landscaping	$3.00	SF
o		Land	$200,000	AC
r		Design, CM, Insp	18%	
r		Contingency	30%	

NOTES / ASSUMPTIONS:

- Pipe and Casing costs from Heber Data Base and JRidge 2 development.
- Upper Detention Basin Costs Include: Excavation, High Embankment Fill, Emerg overflow, Pipes, Inlet/Outlet Structures, Site restoration (% of basin area), etc
  Avg cost per AF = $200 AF per JRidge2. Disturbed area scaled from topo.
- Intermediate Detention Basin Costs Include: Excavation, Low Embankment Fill, Emerg overflow, Pipes, Inlet/Outlet Structures, Site restoration (% of basin area), LID's, etc
  Avg cost per AF = $240 AF per JRidge2 and Area / Vol ratio 0.81 AC/AF.
- US40 Retention Basin Costs Include: Excavation, Low Embankment Fill (Assume 5' depth), Inlet Structure, Sumps, Landscaping, etc.
  Avg cost per AF = $150 AF per assumed and Area / Vol ratio 0.68 AC/AF per JRidgex2.
- Canal Crossing Costs Include: Pipe, Casing (50% of pipe length), Inlet/Outlet, Boring/Ex, Concrete channel lining (100 ft), etc.
- Design Costs Include: Cost Mgmt, Inspection, Dam Safety Coord, etc.
- Land assumed value.

Cost Summary of Recommended Storm Drain Improvements

NORTH VILLAGE STORM DRAIN CAPITAL IMPROVEMENTS

		IMPROVEMENT DESCRIPTION	LENGTH, QUANTITY, COST	VOLUME	PEAK FLOW	DISTURBED AREA		LUMP SUM	PIPE SIZE	CASING SIZE	Upper Basin	Mid Basin	US40 Basin	SITE RESTORE	IRR & LANDSCAP	LAND	ENG CM INSP	TOTAL PROJECT COST
ULT				AF	CFS	AC		i	j	k	l	m	n	o	p	q	r	
	D-01A	Upper Detention Basin - Coyote	1	11.60	65.9	4.78					X			100%			X	$3,798,433
	D-01B	Intermediate Detention Basins - Coyote		1.15	22.6	0.93						X		100%		X	X	$755,851
	D-01C	US40 Retention Basin - Coyote	1	0.50	0.8	0.34							X		100%	X	X	$287,519
	D-01D	Timp Canal Crossing - Coyote	100						36	48							X	$297,596
	D-01E	Wasatch Canal Crossing - Coyote	100						36	48							X	$297,596
	D-02A	Upper Detention Basin - Fitzgerald	1	1.74	25.3	0.86					X			100%			X	$576,932
	D-02B	Intermediate Detention Basins - Fitzgerald		2.06	11.9	1.67						X		100%		X	X	$1,353,959
	D-02C	US40 Retention Basin - Fitzgerald	1	0.50	1.2	0.34							X		100%	X	X	$287,519
	D-02D	Timp Canal Crossing - Fitzgerald	100						36	48								$252,200
	D-02E	Wasatch Canal Crossing - Fitzgerald	100						36	48								$252,200
	D-03A	Upper Detention Basin - Commons	1	8.00	54.1	2.92					X			100%			X	$2,600,738
	D-03B	Intermediate Detention Basins - Commons		2.33	17.7	1.89						X		100%		X	X	$1,531,420
	D-03C	US40 Retention Basin - Commons	1	1.56	11.1	1.06							X		100%	X	X	$897,061
	D-03D	Timp Canal Crossing - Commons	100						36	48							X	$297,596
	D-03E	Wasatch Canal Crossing - Commons	100						36	48							X	$297,596
	D-04A	Upper Detention Basin - Highlands	1	2.38	23.1	1.02					X			100%			X	$781,302
	D-04B	Intermediate Detention Basins - Highlands		0.42	2.7	0.34						X		100%		X	X	$276,050
	D-04C	US40 Retention Basin - Highlands	1	0.50	1.0	0.34							X		100%	X	X	$287,519
	D-04D	Timp Canal Crossing - Highlands	100						36	48							X	$297,596
	D-04E	Wasatch Canal Crossing - Highlands	100						36	48								$252,200
	D-05A	Upper Detention Basin - UVU	1	0.89	12.5	0.78					X			100%			X	$312,142
	D-05B	Intermediate Detention Basins - UVU		0.15	2.5	0.12						X		100%		X	X	$98,589
	D-05C	US40 Retention Basin - UVU		0.50	1.0	0.34							X		100%	X	X	$287,519
	D-05D	Timp Canal Crossing - UVU	100						36	48								$252,200
	D-05E	Wasatch Canal Crossing - UVU	100						36	48								$252,200
	D-06A	Upper Detention Basin - Views	1	2.56	80.5	1.06					X			100%			X	$838,531
	D-06B	Intermediate Detention Basins - Views		0.18	2.7	0.15						X		100%		X	X	$118,307
	D-06C	US40 Retention Basin - Views	1	0.50	1.2	0.34							X		100%	X	X	$287,519
	D-06D	Timp Canal Crossing - Views	100						36	48							X	$297,596
	D-06E	Wasatch Canal Crossing - Views	100						36	48							X	$297,596
	D-07A	Upper Detention Basin - Crossings	1	7.28	40.1	2.01					X			100%			X	$2,334,237
	D-07B	Intermediate Detention Basins - Crossings		0.20	2.6	0.16						X		100%		X	X	$131,452
	D-07C	US40 Retention Basin - Crossings	1	0.50	0.7	0.34							X		100%	X	X	$287,519
	D-07D	Timp Canal Crossing - Crossings	180						36	48							X	$351,593
	D-07E	Wasatch Canal Crossing - Crossings	100						36	48								$252,200
	D-08A	Master Plan Updates every 5 years (4 times)	$120,000					X										$156,000
		TOTAL STORM DRAIN:		45.50														**$22,234,086**

ORDINANCE NO. 2022-24

AN ORDINANCE ADOPTING THE NORTH VILLAGE TRANSPORTATION and STORM WATER MASTER PLANS *as an Amendment to the Heber City Capital Facilities Plan and Heber City General Plan.*

BE IT ORDAINED by the City Council of Heber City, Utah, that the North Village Transportation and Storm Water Master Plans, attached as and depicted in Exhibit A, are adopted as an Amendment to the Heber City Capital Facilities and Heber City General Plans.

This Ordinance shall take effect immediately upon passage.

ADOPTED AND PASSED by the City Council of Heber City, Utah this _____ day of _____, 2022, by the following vote:

	AYE	NAY	OBSTAIN
Rachel Kahler	_____	_____	_____
Michael Johnston	_____	_____	_____
Ryan Stack	_____	_____	_____
Scott D. Phillips	_____	_____	_____
Yvonne Barney	_____	_____	_____

APPROVED:

_____
Mayor Heidi Franco

ATTEST:

_____ Date: _____
RECORDER

Exhibit A.

PowerPoint Presentation:

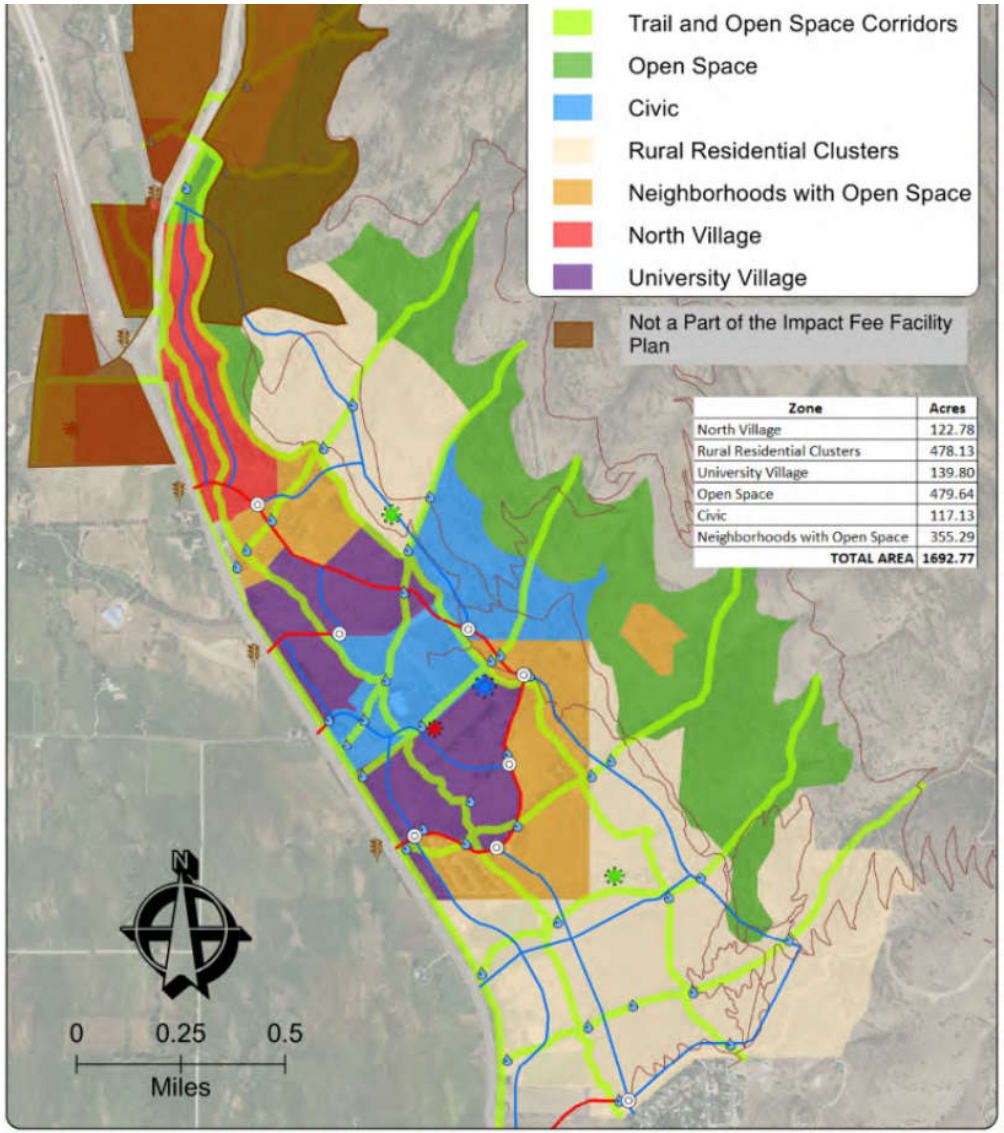
Heber City – North Village Area Streets & Storm Water Facilities Master Plan & Impact Fee Facilities Plan (IFFP)

9/20/2022

Area Covered

- North Village Area
  - East of Hwy 40
  - North of Coyote Canyon Parkway*
  - South of Hwy 32
  - West Side of Slope Ridge
- Excludes
  - *Coyote Ridge Subdivision
  - Resort Area
  - Jordanelle Ridge A, B, & C

Note: Much of this area has not yet been annexed into Heber City



North Village Community Design Map

Projected Growth

- Data Referenced
  - 2020 US Census
  - MAG
  - Gardner Policy Institute
  - Governor's Office of Planning/Budgeting
- Approx Half of Heber City Growth over Planning Period is Projected to be in the North Village Area

Note: After Recent Meeting with MAG & Planning Dept, planning to adjust growth % for North Village

Table 3-1 Heber City and North Village Population Projections

	HEBER CITY TOTAL (from MAG)				NORTH VILLAGE EST				HEBER CITY w/o NV			GROWTH RATES
YEAR	%CHG	HC POP	CHG POP		% OF HCT	% CHG	NV POP	CHG	POP TOTAL	CHG		
2020		18,250			7.64%	0.00%	1,394		16,856	0		MAG Avg Chg/Yr (2021-2030)
2021	2.56%	18,717	467		7.45%	0.00%	1,394	0	17,323	467		2.56%
2022	2.56%	19,196	479	946	7.26%	0.00%	1,394	0	17,802	479	946	
2023	2.56%	19,688	491		8.14%	15.00%	1,603	209	18,085	282		MAG Avg Chg/Yr (2031-2040)
2024	2.56%	20,192	504		9.05%	14.00%	1,828	224	18,364	280		1.95%
2025	2.56%	20,709	517	1,021	9.97%	13.00%	2,065	238	18,644	279	559	
2026	2.56%	21,239	530		10.89%	12.00%	2,313	248	18,926	282		MAG Avg Chg/Yr (2041-2045)
2027	2.56%	21,783	544		11.79%	11.00%	2,567	254	19,215	289		1.95%
2028	2.56%	22,340	558		12.64%	10.00%	2,824	257	19,516	301		
2029	2.56%	22,912	572		13.44%	9.00%	3,078	254	19,834	318		WC UI Ave Chg/Yr (2021-2030)
2030	2.56%	23,499	587	2,260	14.15%	8.00%	3,325	246	20,174	340	1,248	3.90%
2031	1.95%	23,957	458		14.85%	7.00%	3,557	233	20,400	226		
2032	1.95%	24,424	467		15.58%	7.00%	3,806	249	20,618	218		WC UI Ave Chg/Yr (2031-2040)
2033	1.95%	24,900	476		16.36%	7.00%	4,073	266	20,828	210		3.45%
2034	1.95%	25,386	486		17.01%	6.00%	4,317	244	21,069	241		
2035	1.95%	25,881	495	1,924	17.68%	6.00%	4,576	259	21,305	236	905	
2036	1.95%	26,386	505		18.38%	6.00%	4,851	275	21,535	230		
2037	1.95%	26,900	515		19.11%	6.00%	5,142	291	21,758	223		
2038	1.95%	27,425	525		19.87%	6.00%	5,450	308	21,974	216		
2039	1.95%	27,959	535		20.47%	5.00%	5,723	273	22,237	262		
2040	1.95%	28,505	545	2,119	21.08%	5.00%	6,009	286	22,496	259	961	
2041	1.95%	29,060	556		21.71%	5.00%	6,309	300	22,751	255		
2042	1.95%	29,627	567		22.36%	5.00%	6,625	315	23,002	251		
TOTAL CHANGE (2022-2042)			10,431					5,231		5,200		
ESTIMATE 2022			19,196					1,394		17,802		
TOTAL 2042			**29,627**					**6,625**		**23,002**		
ULTIMATE PER LANDUSE								**14964**				

NOTES:
- MAG = Mountainland Associations of Governments

MAG Persons per Household Projections

Year	Persons/HH
2020	3.37
2030	3.06
2040	2.94
Average	3.12

US Cenus Persons Per Household

Year	Persons/HH
2020	3.48

DRAFT

Streets
Presentation Overview

Process & Background Info

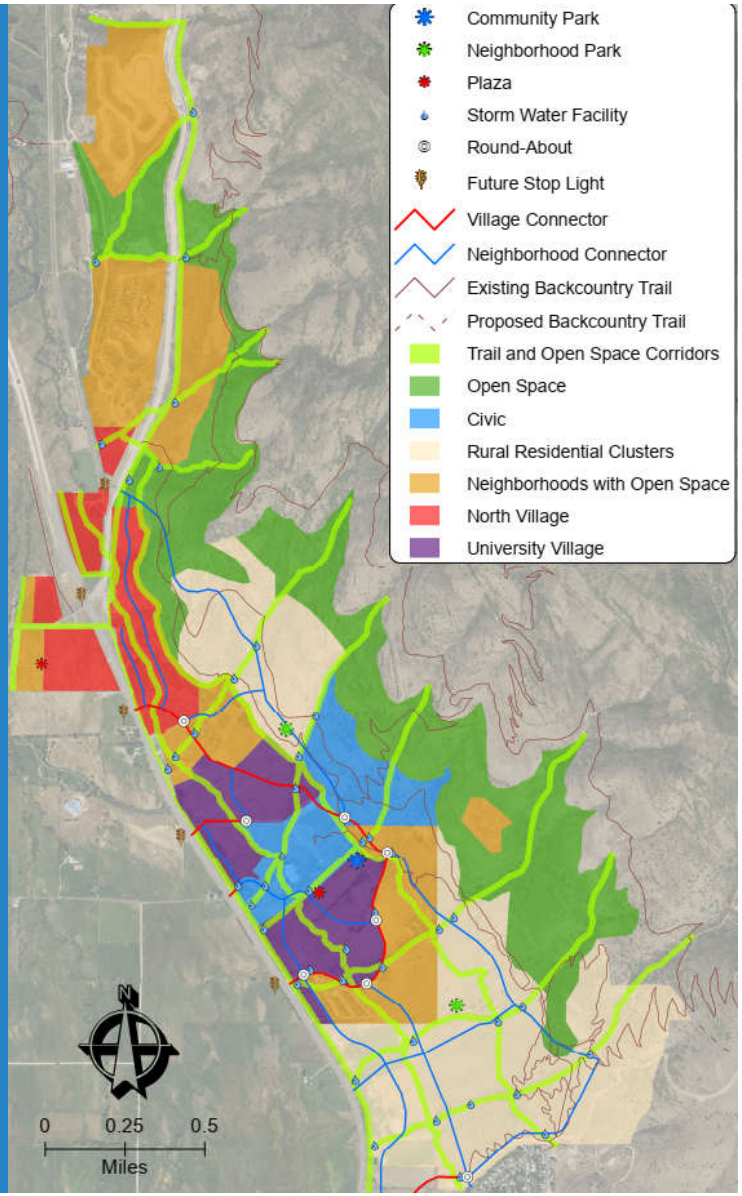
Stake Holder Input / Concerns

Proposed Roadway Network

Challenges

HEBER CITY
HEART OF THE WASATCH BACK

Process & Background Info



Traffic Analysis Process

- Take General Street Layout & Base Density From NVOZ
- Create Traffic Analysis Zones (TAZ)
- Trip Generation
  - Industry Standards
  - Traffic Impact Studies for Developments
- Street System Details
  - Level of Service (LOS) Requirements
  - Widths / Lanes
  - Intersections / Stacking
  - Controls (Traffic Signals, Roundabouts, All-Way Stops)
- Stress Testing
  - What if Density is Higher?

Stake Holder Input / Concerns

UDOT

- Compliance with Access Agreement & Standards
  - Location of Signals & Major Intersections
- Internal North/South Route
- Distance to Intersections off Hwy 40
  - Stacking Capacity (600 ft Requested)

Wasatch County

- Compliance with Access Agreement
  - Locations of Signals & Major Intersections
- Maintaining Hwy 40 as High Speed Corridor

Property Owners

- Street System Working with Topography & Development Plans
- Amount of Developable Land Required
- Time Required to Complete Plans

UVU

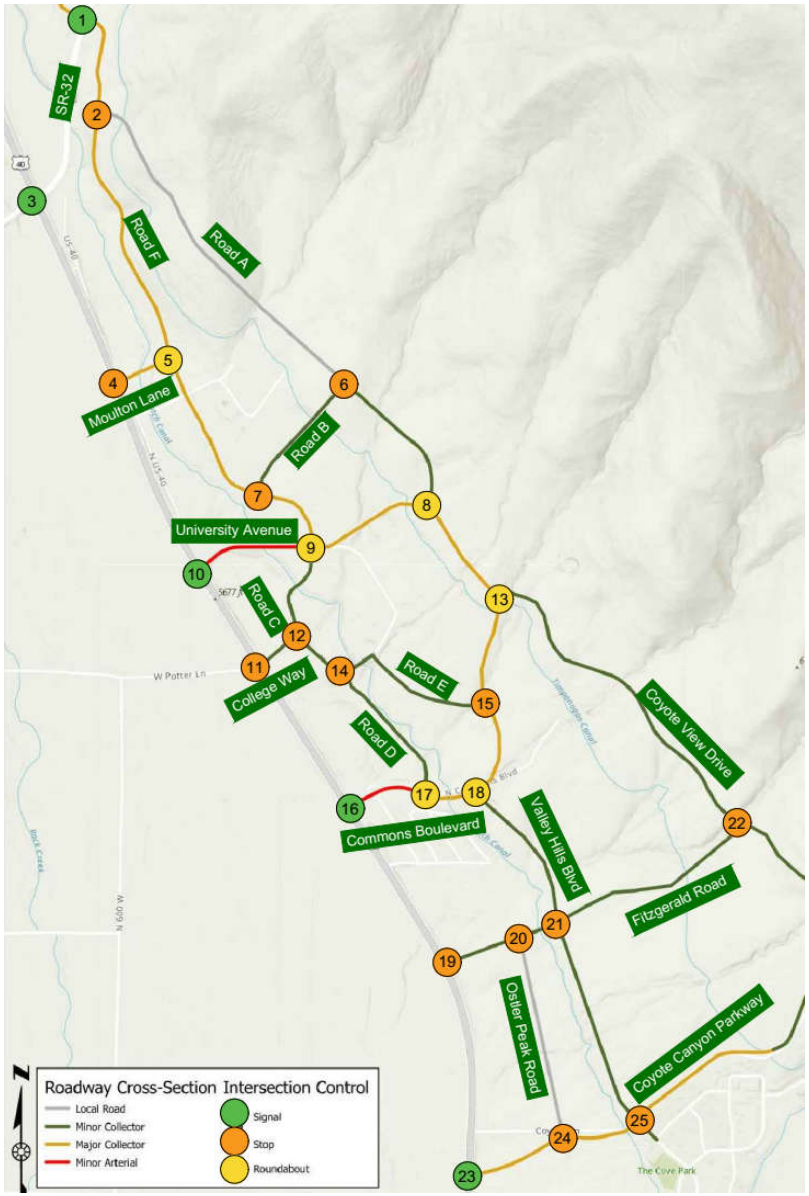
- Do Not Dissect Property
- Keep Roundabout and Road as far South as Possible

MAG

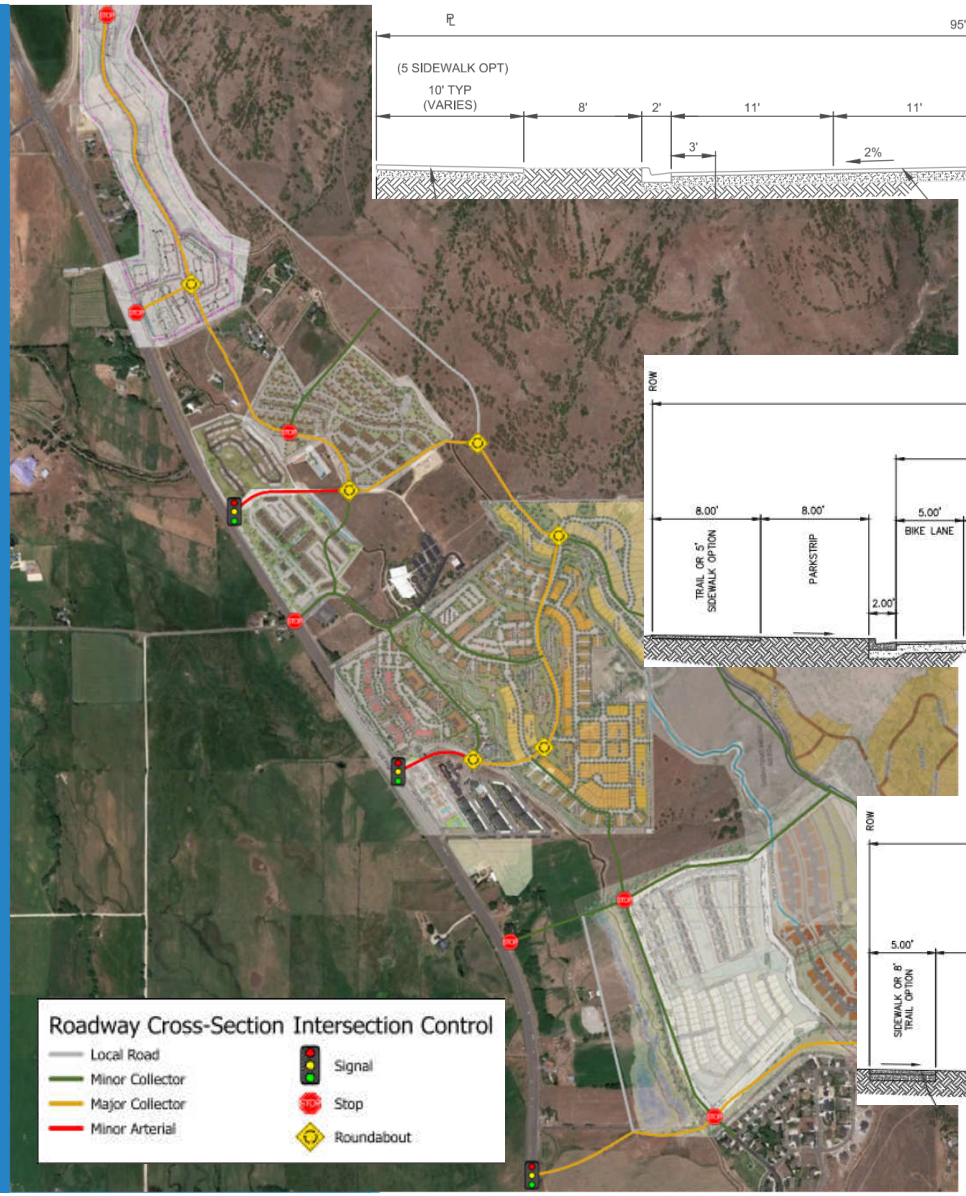
- Consistency with Regional Traffic Modeling
- Internal North/South Route

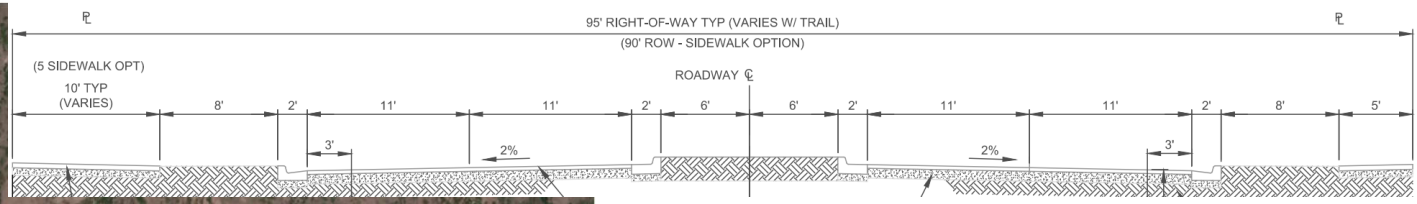
Proposed Streets Network

- Major Concepts
  - 3 Signals Allowed in North Village Area (Farthest Signal to the North will be Northern University Access)
  - Main Loop from Commons Blvd to Northern University Access
  - Moulton Lane to be ¾ Movement Only (2100-2200 ft from Hwy 32 Int)
  - Standard Distance from Hwy 40 for Major Intersections will be *600 ft
  - Relocation of Existing Roundabout at Commons Blvd
  - Roundabouts are Important to Plan City Should Try to Ensure they are Built where Feasible. Roundabouts Closer to Hwy 40 are Most Important

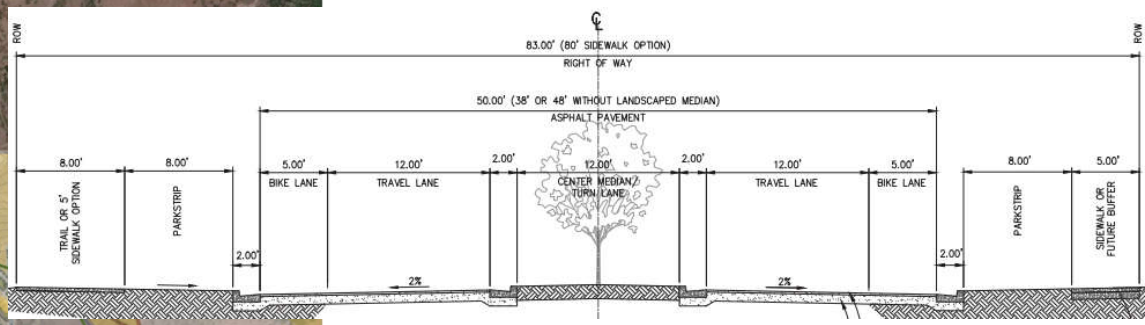


Proposed Streets Network

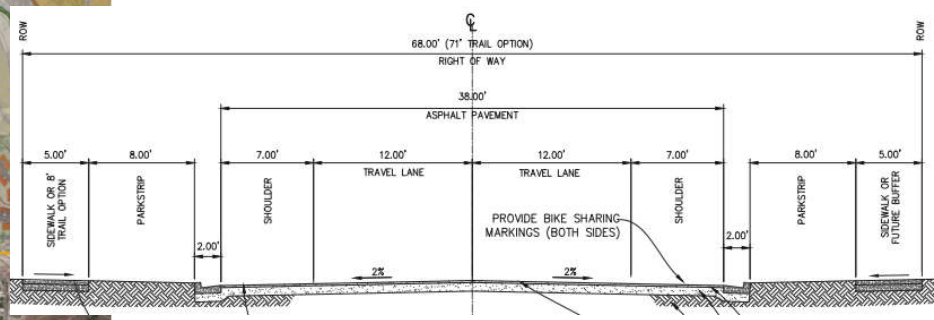




Minor Arterial



Village Connector



Neighborhood Connector

Projected Costs

- Total Cost of Street System Improvements:
- $70,237,963

Road Price List

Description	Price	Units
Right Of Way	$200,000.00	Acre
Pavement & UBC	$4.50	S.F.
Granular Fill	$40.00	C.Y.
Clear & Grub	$3.50	C.Y.
Chip Seal	$2.00	S.Y.
Curb & Gutter	$105.00	L.F.
2" Overlay Existing Asphalt	$1.50	S.F.
Sidewalk one side of street	$50.00	LF
Design, CM, Insp	15%	
Contingency & Util Conflicts	20%	

Table 4-7: Cost Summary of Recommended Street Improvements

NORTH VILLAGE STREET CAPITAL IMPROVEMENTS

ULT	CIP#	IMPROVEMENT DESCRIPTION	LENGTH / COST	LUMP SUM	LOCAL	MINOR COLLECTOR	MAJOR COLLECTOR	WIDTH ROW	WIDTH ASPHALT	ROW	PAVEMENT & UBC	GRANULAR FILL	CLEAR & GRUB	CURB & GUTTER	SIDEWALK	CHIP SEAL	OVERLAY EXIST	WIDENING	ENG CM INSP	COST
			ft	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	
	T-001	Road F - East of SR 32 to Local Road A	1,200				X	85	50	X	X	X	X	X	X				X	$1,602,084
	T-002	Road F - Road A to Moulton Ln	2,800				X	85	50	X	X	X	X	X	X				X	$3,738,197
	T-003	Road F - Moulton Ln to Road B	1,800				X	85	50	X	X	X	X	X	X				X	$2,403,126
	T-004	Road F - Road B to University Ave	1,000				X	85	50	X	X	X	X	X	X				X	$1,335,070
	T-005	Moulton Ln (shifted north) - US 40 to Road F	600				X	85	50	X	X	X	X	X	X				X	$801,042
	T-006*	Local Road A - Road F to Road B	4,000		X			62	32	X	X	X	X	X	X				X	$4,143,721
	T-007*	Local Road A - Road B to University Ave	1,700		X			62	32	X	X	X	X	X	X				X	$1,761,081
	T-008*	Road B - Road F to Road A	1,500			X		68	38	X	X	X	X	X	X				X	$1,687,625
	T-009*	University Ave - US 40 to Road F	1,200				X	95	60	X	X	X	X	X	X			X	X	$2,128,120
	T-010*	University Ave - Road F to Road A	1,400				X	85	50	X	X	X	X	X	X				X	$1,869,098
	T-011*	University Ave - Road A to Commons Blvd	1,300				X	85	50	X	X	X	X	X	X				X	$1,735,591
	T-012	Commons Blvd - University Ave to Road E	1,200				X	85	50	X	X	X	X	X	X				X	$1,602,084
	T-013	Commons Blvd- Road E to Valley Hills Blvd	1,100				X	85	50	X	X	X	X	X	X				X	$1,468,577
	T-014*	Commons Blvd - Valley Hills Blvd to Road D	600				X	85	50	X	X	X	X	X	X				X	$801,042
	T-015	Commons Blvd - US 40 to Road D	800				X	95	60	X	X	X	X	X	X			X	X	$1,418,747
	T-016*	Road C - University Ave to College Way	1,000			X		68	38	X	X	X	X	X	X				X	$1,125,083
	T-017	College Way - US 40 to Road C	500			X		68	38	X	X	X	X	X	X			X	X	$613,678
	T-018	College Way - Road C to Road D	700			X		68	38	X	X	X	X	X	X				X	$787,558
	T-019*	College Way - Road D to Collage PL	400			X		68	38	X	X	X	X	X	X				X	$450,033
	T-020	Road E - College PL to Commons Blvd	1400			X		68	38	X	X	X	X	X	X				X	$1,575,117
	T-021	Road D - College Way to Commons Blvd	1,600			X		68	38	X	X	X	X	X	X				X	$1,800,134
	T-022	Coyote View Dr - Commons Blvd to Fitzgerald Dr	3,800			X		68	38	X	X	X	X	X	X				X	$4,275,317
	T-023	Coyote View Dr - Fitzgerald Dr to Coyote Cyn Pkwy	1,700			X		68	38	X	X	X	X	X	X				X	$1,912,642
	T-024	Coyote Cyn Pkwy - Coyote View Dr to Timp Canal	1,800			X		68	38	X	X	X	X	X	X				X	$2,025,150
	T-025	Valley Hills Blvd - Commons Blvd to Fitzgerald Dr	1,800			X		68	38	X	X	X	X	X	X				X	$2,025,150
	T-026	Fitzgerald Dr - US 40 to Ostler Peak Rd	800			X		68	38	X	X	X	X	X	X				X	$900,067
	T-027*	Fitzgerald Dr - Ostler Peak Rd to Valley Hills Blvd	500			X		68	38	X	X	X	X	X	X				X	$562,542
	T-028*	Fitzgerald Dr - Valley Hills Blvd to Coyote View Dr	2,300			X		68	38	X	X	X	X	X	X				X	$2,587,692
	T-029	Ostler Peak Rd - Fitzgerald Dr to Coyote Cyn Pkwy	2,200		X			62	32	X	X	X	X	X	X				X	$2,279,047
	T-030	Valley Hills Blvd - Fitzgerald Dr to Coyote Cyn Pkw	2,300			X		68	38	X	X	X	X	X	X				X	$2,587,692
	T-031	Coyote Cyn Pkwy - US 40 to Ostler Peak Rd	1,100				X	85	50	X	X	X	X	X	X			X	X	$1,693,579
	T-032*	Coyote Cyn Pkwy - Ostler Peak Rd to Valley Hills E	900				X	85	50	X	X	X	X	X	X			X	X	$1,385,655
	T-033*	Coyote Cyn Pkwy - Valley Hills Blvd to Timp Canal	1,700				X	85	50	X	X	X	X	X	X				X	$2,269,619
	T-034	Intersection 1 - UDOT Traffic Signal (SR 32)	$500,000	X															X	$690,000
	T-035	Intersection 3 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-036	Intersection 5 - Single Lane Roundabout	$750,000	X															X	$1,035,000
	T-037	Intersection 10 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-038	Intersection 8 - Single Lane Roundabout (2-Way St	$750,000	X															X	$1,035,000
	T-039	Intersection 9 - Multi Lane Roundabout	$750,000	X															X	$1,035,000
	T-040	Intersection 13 - Single Lane Roundabout (2-Way S	$1,000,000	X															X	$1,380,000
	T-041	Intersection 16 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-042	Intersection 17 - Multi Lane Roundabout	$1,000,000	X															X	$1,380,000
	T-043	Intersection 18 - Multi Lane Roundabout	$1,000,000	X															X	$1,380,000
	T-044	Intersection 23 - UDOT Traffic Signal (US 40)	$500,000	X															X	$690,000
	T-045	North Village Master Plan Update (5 yrs x 4 Times)	$160,000	X																$192,000
		TOTAL STREETS:																TOTAL:		$70,237,963

NOTES:

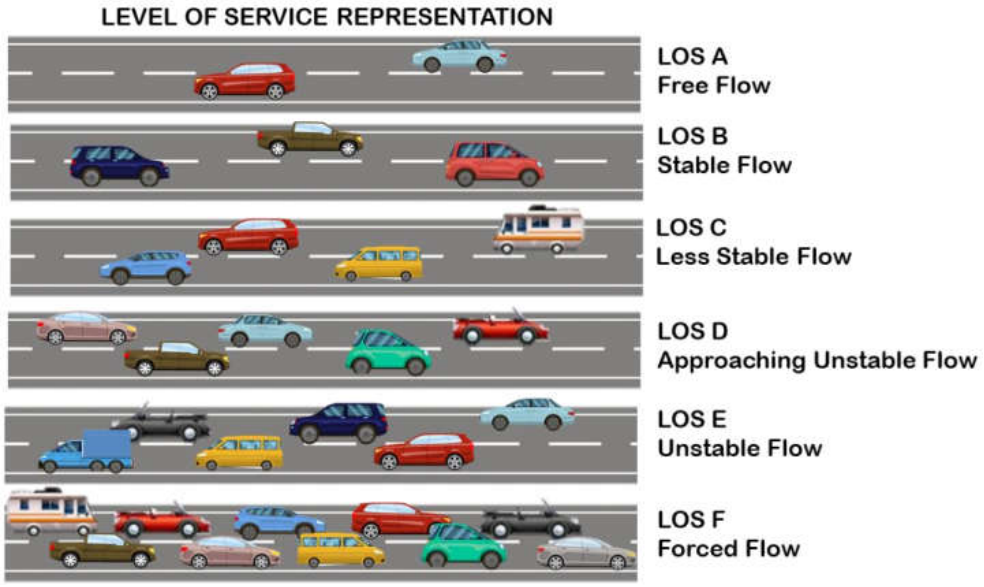
- Road Widening assumes existing road asphalt is 26' wide. Upsizing is difference between existing and master planned asphalt width; ie. Local 32', Minor Collector 38', Major Collector 50', Minor Arterial 60'.
- UDOT Intersection Improvements are expected to have a cost of $0 incurred by Heber City.
- Percent paid by developers for road widening costs on existing roads: Major/Minor Locals 100%, Minor Collectors 83%, Major Collectors 75%.
- Percent paid by developers for cost to construct new roads: see above notes.
- Curb and gutter price storm drain system price of $105 per foot is for one side of the road. The formula multipies by 2 to cover boths side of the road and all of the storm drain system.
- Prices do not include bridges, blasting, retaining walls, relocation of utilities, or guardrails.
- Prices inlcudes oversizing of storm pipes and facilities due to road widing from Major Local. And also lenghting of culverts at drainage crossings.
- * Includes a bridge over a canal.

Challenges



1) Signals on Hwy 40
   - Original Draft Plan Had 4 Proposed
   - Only 3 Allowed by UDOT Access Agreement
   - ¾ Movement on Northern Hwy 40 Access

2) Level of Service (LOS) Implications
   - Need for Minor Arterials
   - Coyote Canyon Parkway



Storm Water Presentation Overview

Historic Drainage Patterns

Irrigation Canals & Highway Construction

Challenges

Original Plan to Address Storm Water

Stake Holder Input/Concerns

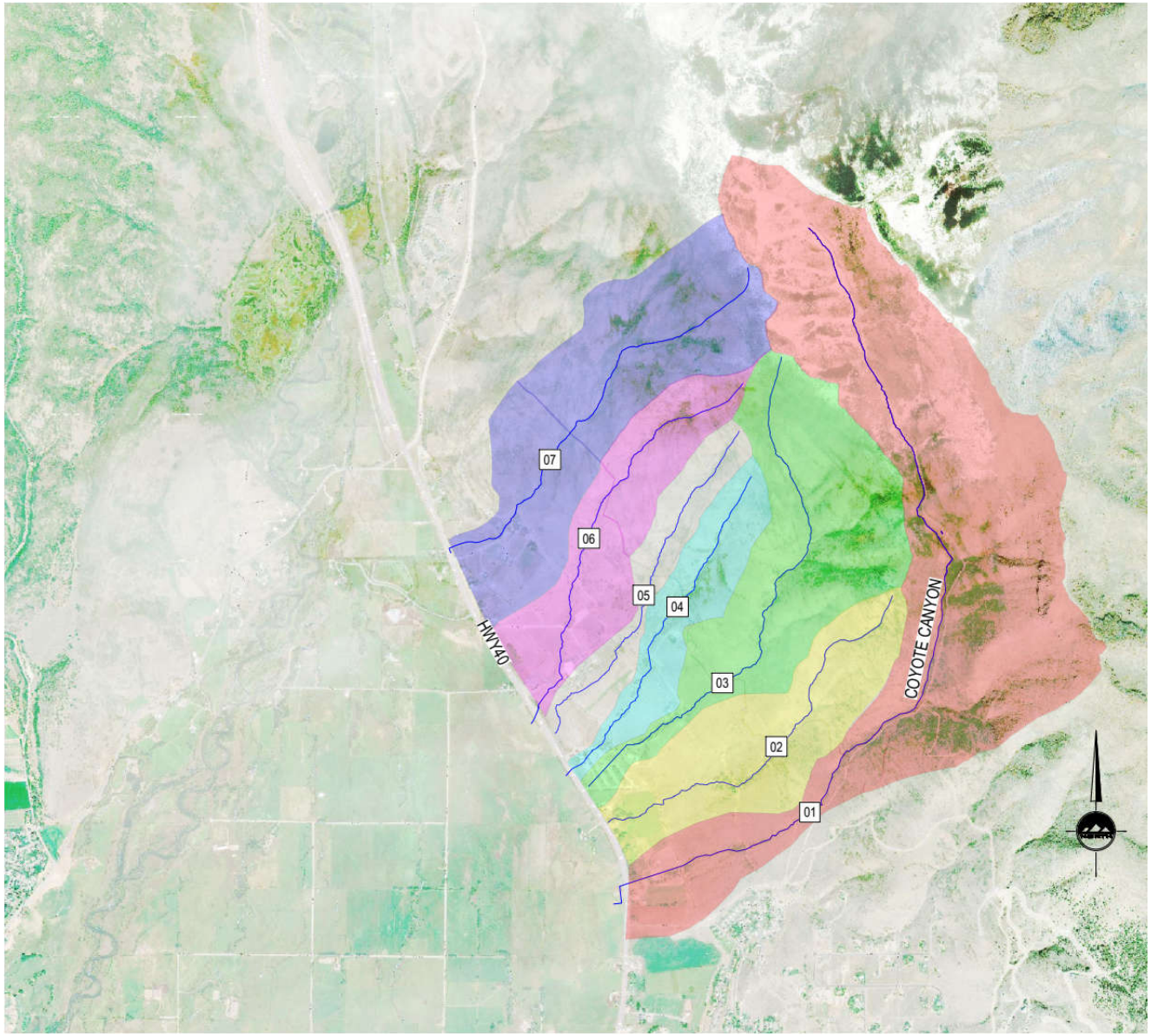
Proposed Concept to Address Storm Water

Concerns Addressed

Drainage Design Manual - Draft

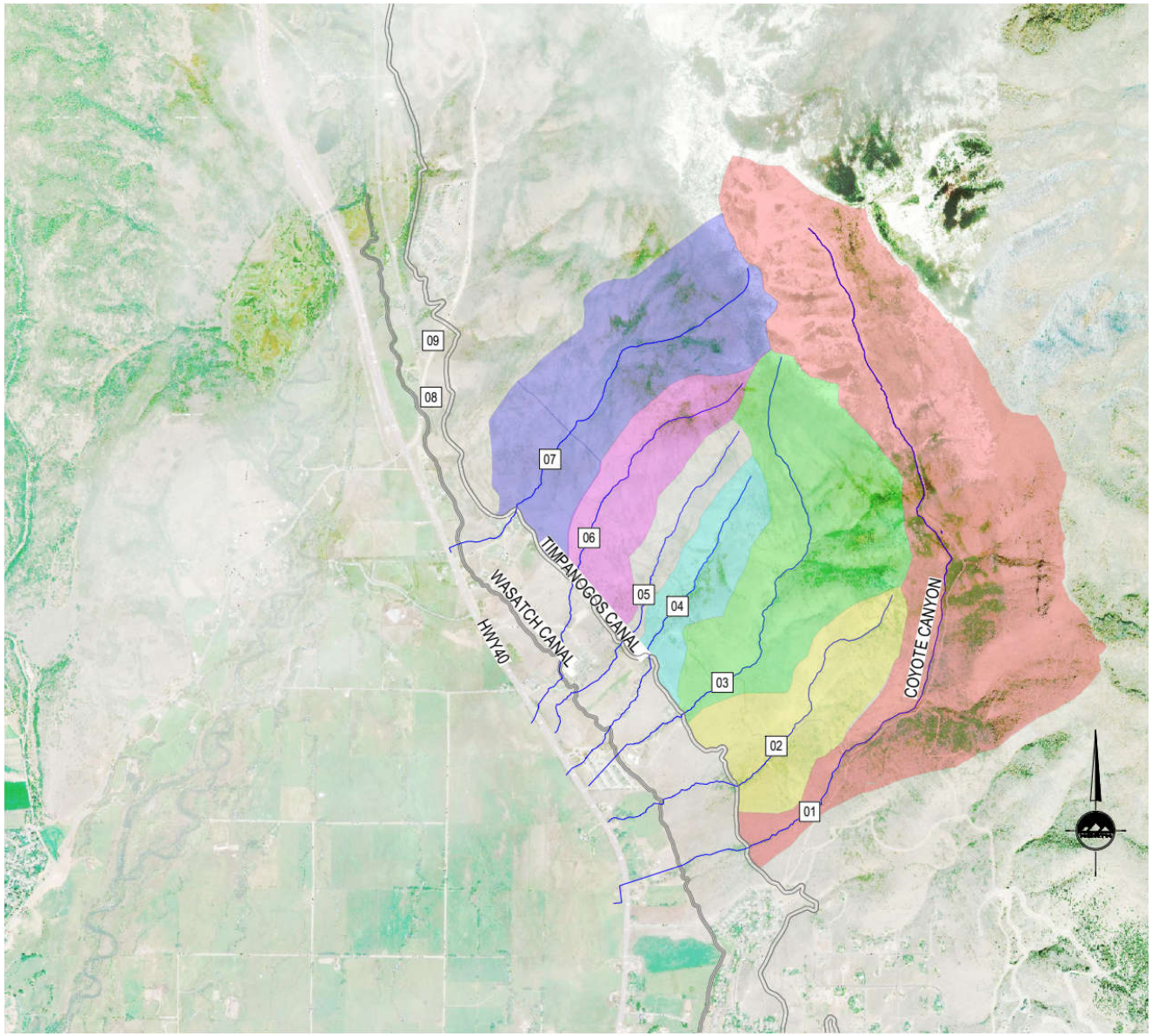
Historic Drainage Patterns

- From North Village Hillside through North Fields Area to the Provo River



Irrigation Canals & Highway Const

- Canals Constructed Late 1800's
- Intersected Natural Drainage Paths
- Hwy Construction
- Federal Ownership of Canals



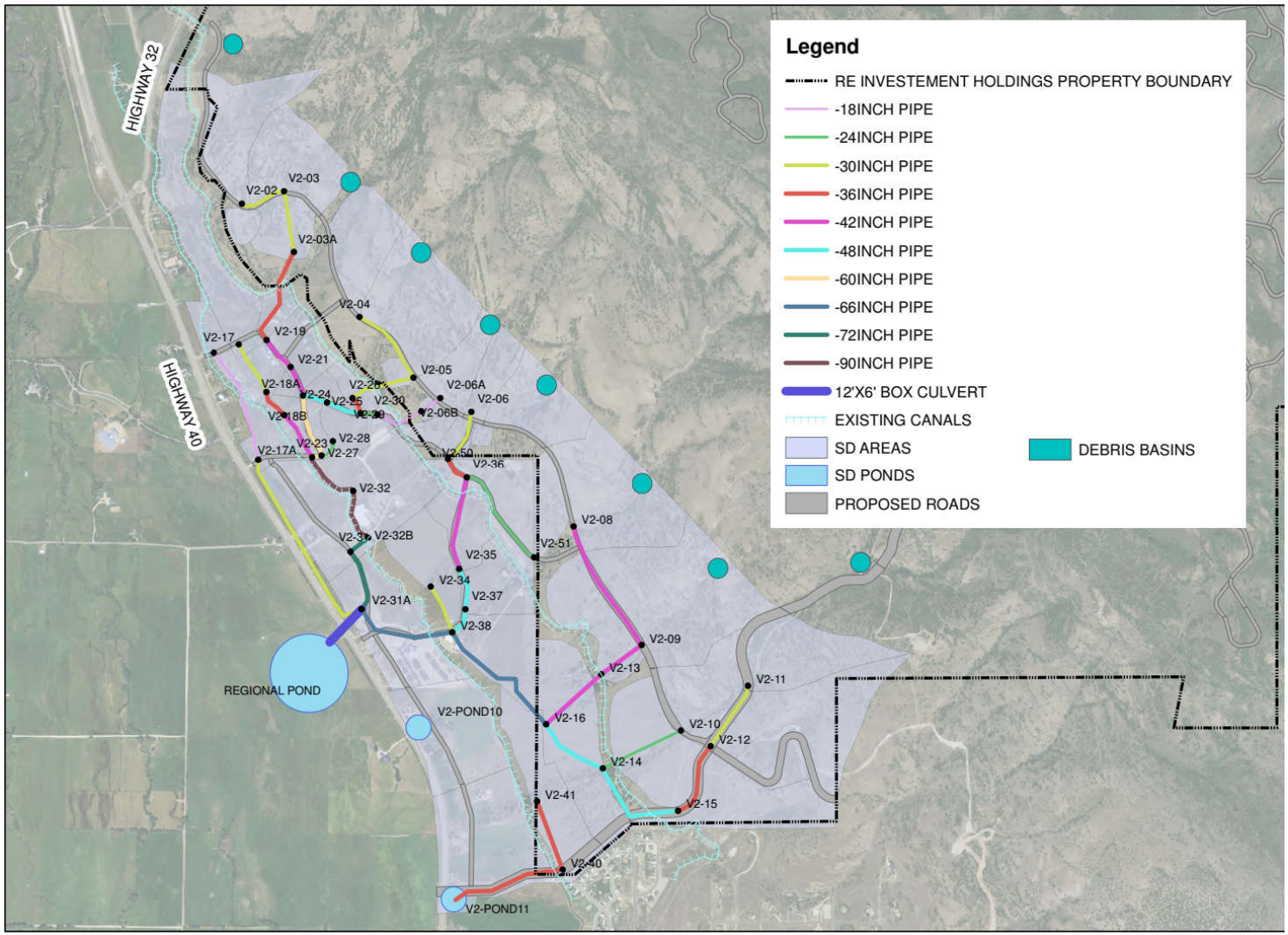
Challenges



1) Land Use Below Canals
   - Construction of Homes & Farms
   - Changes to Historic Drainage Paths
2) Canals Not Sized for Large Storms
3) Federal Policy – No Developed Flow in Canals
4) Perception of No Runoff to North Fields

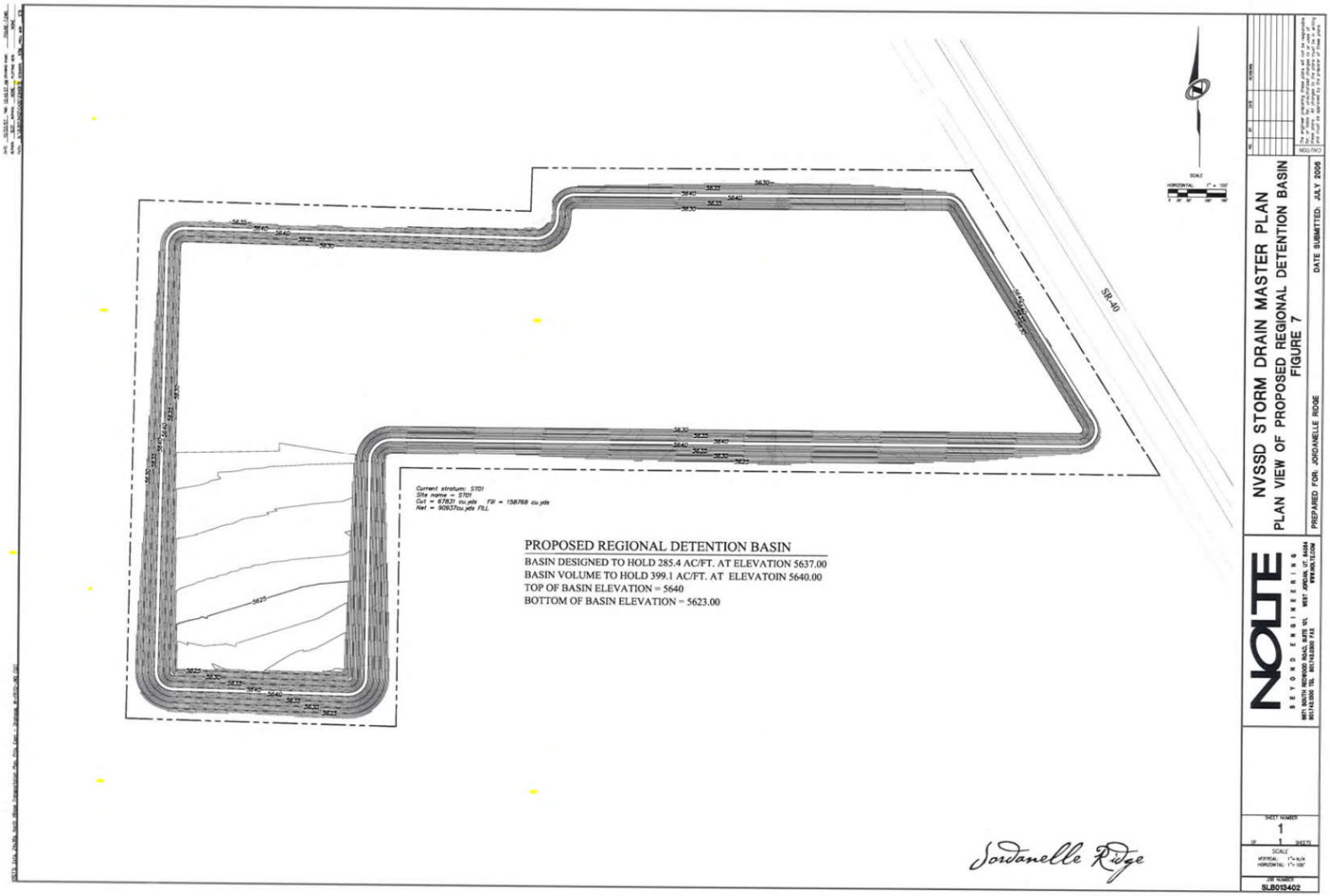
Original Plan to Address Storm Water

Not Publicly Supported



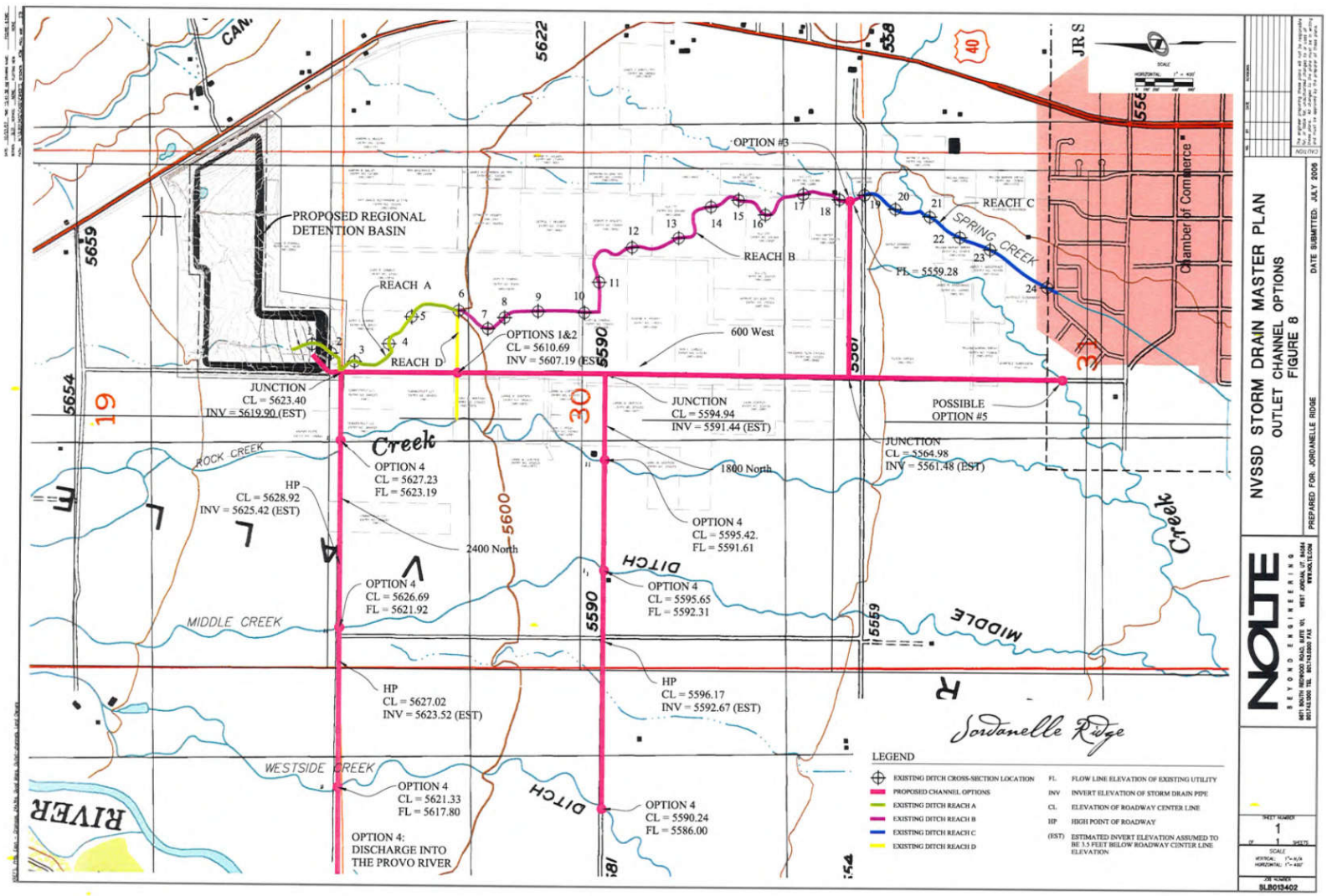
Original Plan to Address Storm Water

Not Publicly Supported



Original Plan to Address Storm Water

Not Publicly Supported



Stake Holder Input / Concerns

Heber City
- Flooding / Liability
- Water Quality Impacts
- Public Support

Provo River Watershed Council
- Direct Discharge to Provo River
- Water Quality Impacts

Utah Division of Water Quality
- Water Quality
- Permitting Requirements

Mitigation Commission & DWR
- Wildlife Impacts
- Direct Discharge to Provo River

USBR / DOI / CUWCD
- Developed Flow in Canals
- Capacity of Canals
- Flooding / Liability

Property Owners / Citizens
- Preservation of North Fields
- Water Quality Impacts
- Amount of Developable Land Required

North Fields Irrigation Company
- Impacts to North Fields Ditches
- Water Quality Impacts

Wasatch County
- Rain on Snow Events / Winter Conditions
- Bypass of Canals

With so many Considerations… How do we move forward?

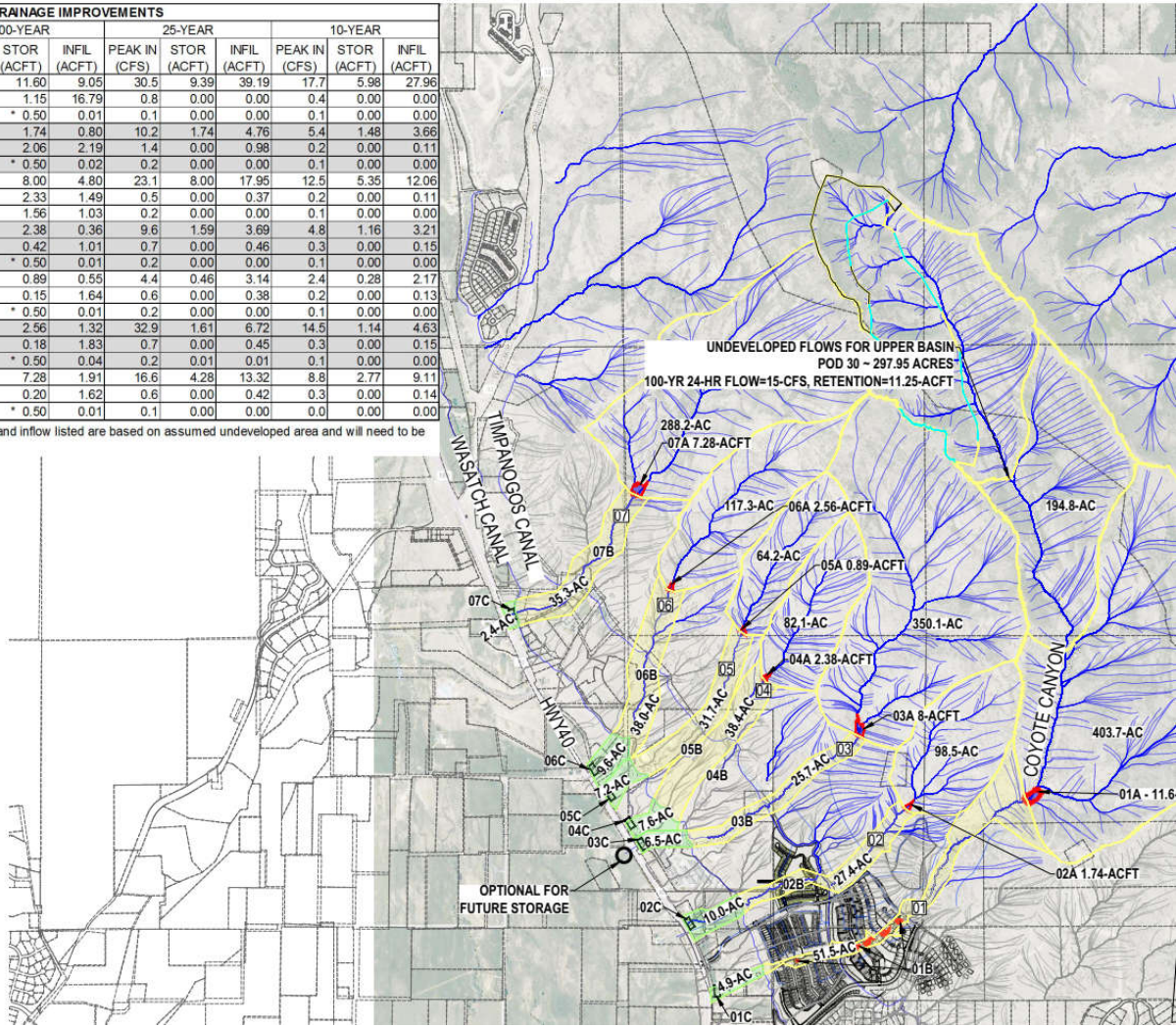


Proposed Plan to Address Stormwater

UNDEVELOPED FLOWS THROUGH JORDANELLE CANYONS WITH DRAINAGE IMPROVEMENTS

STORAGE / LID MEASURE		HISTORIC 100-YR 24-HR PEAK IN (CFS)	HISTORIC 100-YR 24-HR STOR (ACFT)	HISTORIC 100-YR 24-HR INFIL (IN/HR)	100-YEAR PEAK IN (CFS)	100-YEAR STOR (ACFT)	100-YEAR INFIL (ACFT)	25-YEAR PEAK IN (CFS)	25-YEAR STOR (ACFT)	25-YEAR INFIL (ACFT)	10-YEAR PEAK IN (CFS)	10-YEAR STOR (ACFT)	10-YEAR INFIL (ACFT)
01A	SEDIMENT BASIN	162	87	5.45	65.9	11.60	9.05	30.5	9.39	39.19	17.7	5.98	27.96
01B	ROADS / TRAILS			27	22.6	1.15	16.79	0.8	0.00	0.00	0.4	0.00	0.00
01C	EAST HWY 40 *			2	0.8	* 0.50	0.01	0.1	0.00	0.00	0.1	0.00	0.00
02A	SEDIMENT BASIN	33	13	2	25.3	1.74	0.80	10.2	1.74	4.76	5.4	1.48	3.66
02B	ROADS / TRAILS			2	11.9	2.06	2.19	1.4	0.00	0.98	0.2	0.00	0.11
02C	EAST HWY 40 *			2	1.2	* 0.50	0.02	0.2	0.00	0.00	0.1	0.00	0.00
03A	SEDIMENT BASIN	100	35	3.75	54.1	8.00	4.80	23.1	8.00	17.95	12.5	5.35	12.06
03B	ROADS / TRAILS			2	17.7	2.33	1.49	0.5	0.00	0.37	0.2	0.00	0.11
03C	EAST HWY 40 *			2	11.1	1.56	1.03	0.2	0.00	0.00	0.1	0.00	0.00
04A	SEDIMENT BASIN	42	12.5	1	23.1	2.38	0.36	9.6	1.59	3.69	4.8	1.16	3.21
04B	ROADS / TRAILS			1	2.7	0.42	1.01	0.7	0.00	0.46	0.3	0.00	0.15
04C	EAST HWY 40 *			1	1.0	* 0.50	0.01	0.2	0.00	0.00	0.1	0.00	0.00
05A	SEDIMENT BASIN	16	7	2.5	12.5	0.89	0.55	4.4	0.46	3.14	2.4	0.28	2.17
05B	ROADS / TRAILS			2	2.5	0.15	1.64	0.6	0.00	0.38	0.2	0.00	0.13
05C	EAST HWY 40 *			2	1.0	* 0.50	0.01	0.2	0.00	0.00	0.1	0.00	0.00
06A	SEDIMENT BASIN	41	14.5	3.75	80.5	2.56	1.32	32.9	1.61	6.72	14.5	1.14	4.63
06B	ROADS / TRAILS			2	2.7	0.18	1.83	0.7	0.00	0.45	0.3	0.00	0.15
06C	EAST HWY 40 *			2	1.2	* 0.50	0.04	0.2	0.01	0.01	0.1	0.00	0.00
07A	SEDIMENT BASIN	90	34	1.75	40.1	7.28	1.91	16.6	4.28	13.32	8.8	2.77	9.11
07B	ROADS / TRAILS			2	2.6	0.20	1.62	0.6	0.00	0.42	0.3	0.00	0.14
07C	EAST HWY 40 *			2	0.7	* 0.50	0.01	0.1	0.00	0.00	0.0	0.00	0.00

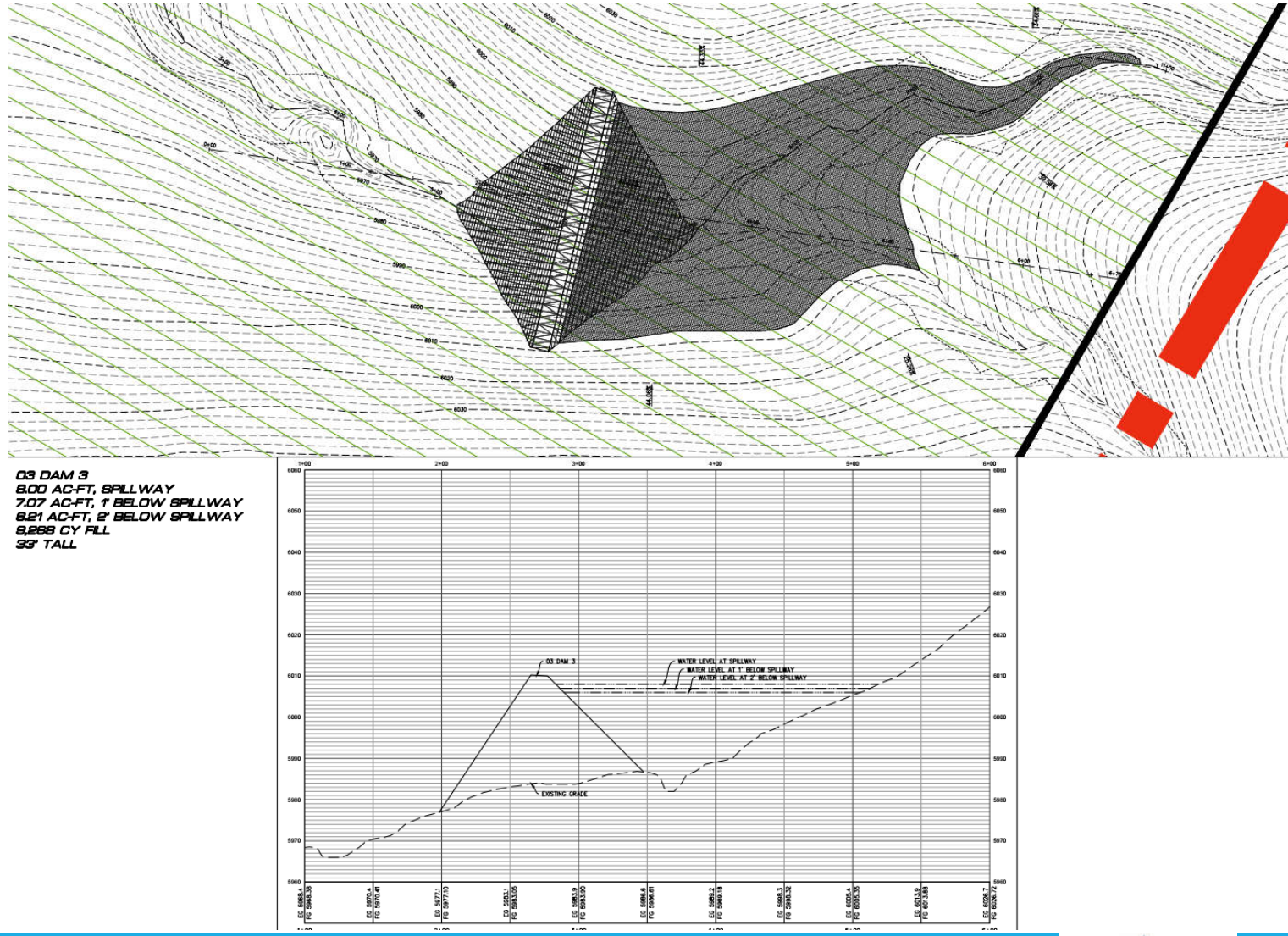
* Minimum basin size at bottom of all drainages (0XC) is 0.5-acft. Volumes and inflow listed are based on assumed undeveloped area and will need to be verified with individual overall drainage basin/development plans.



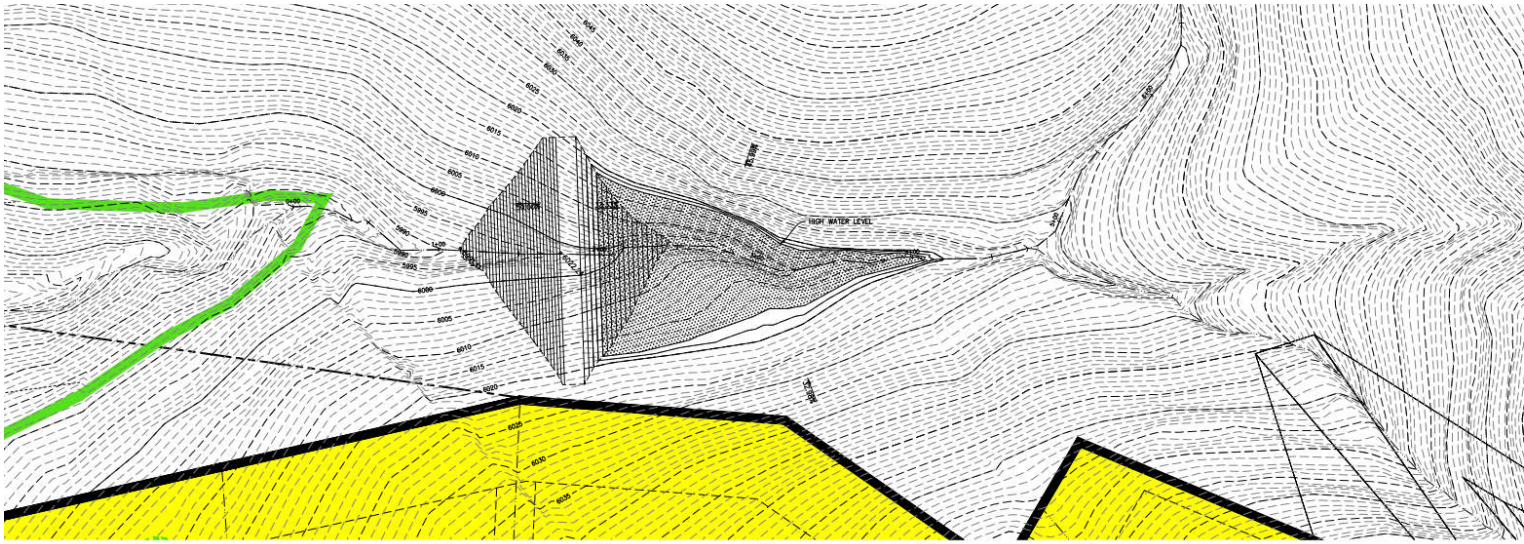
Major Concepts:

- Separation of Developed & Natural Runoff
- Developed Runoff Treated & Retained On-Site
- Natural Runoff will be Infiltrated in Detention Basins along Historic Channels
- Debris Basins Upstream of Developments
- As a Condition of Annexation – Properties will be required to Restore/Replace Historic Drainage Channels Below the Canals
- Irrigation Canals will be Bypassed
- Recommend Buffer for Major Drainages

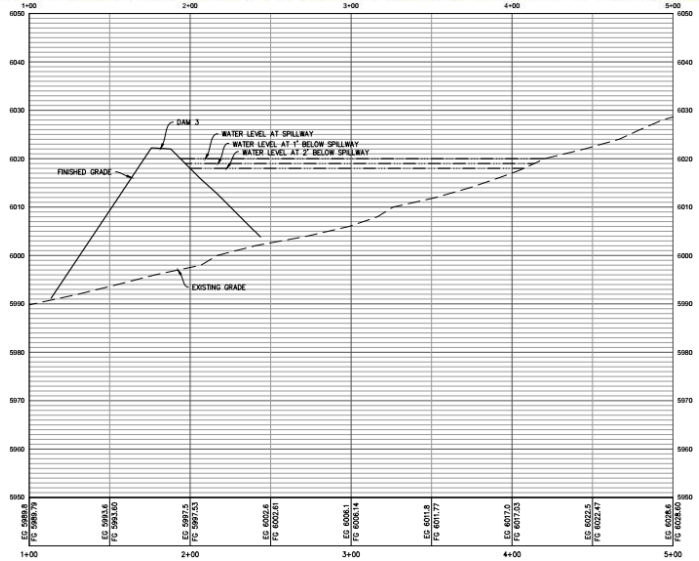
Proposed Plan to Address Storm Water



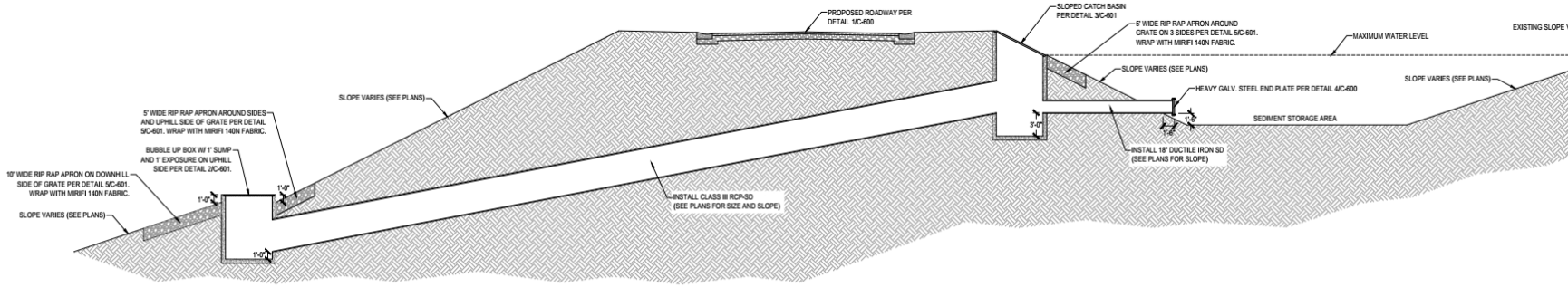
Proposed Plan to Address Storm Water



02 DAM 3
1.74 AC-FT, SPILLWAY
1.44 AC-FT, 1' BELOW SPILLWAY
1.17 AC-FT, 2' BELOW SPILLWAY
4,387 CY FILL
32' TALL

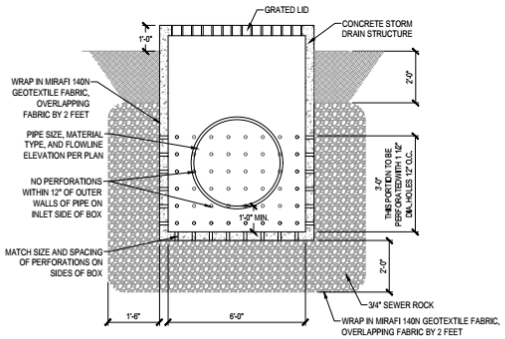


Proposed Plan to Address Storm Water



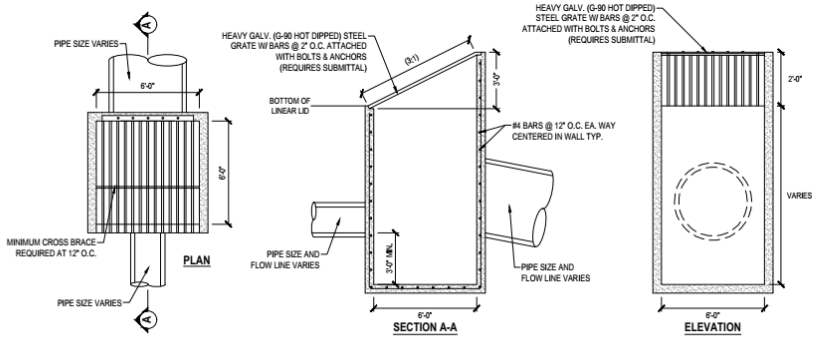
1 DETENTION BASIN DETAIL

SCALE: NONE



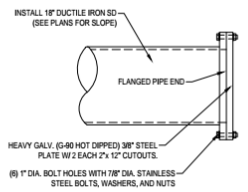
2 BUBBLE-UP BOX

SCALE: NONE



3 SLOPED CATCH BASIN

SCALE: NONE



4 STEEL END PLATE DETAIL

How Does This Plan Address Concerns

Water Quality Impacts

- Natural Runoff Separate from Developed Runoff
- Natural Runoff
  - Debris Basin / Detention Basins
  - Utilize Infiltration Where Possible
  - Mimic Sheet Flow & Natural Treatment Processes
- Developed Runoff
  - LID Techniques / Pretreatment
  - Retention Basins & Infiltration

Preservation of North Fields

- Potential Purchase Property or Develop Rights in NF
- Potential Use of Property Along Hwy 40 Discourages Development
- Infiltration Beds will Follow Natural Slope
- Minor Contours will Look Natural

Flooding Liability / Winter Conditions

- *Natural Runoff will Bypass Canals
- Detention Volume will Improve Upon Current Conditions

Developed Flow / Capacity of Canals

- *Natural Runoff will Bypass Canals

Direct Discharge to Provo River

- No Direct Discharge to Provo River

Impacts to North Fields Ditches

- Zero or Minimal Discharge to Ditches

Wildlife Impacts

- No Direct Discharge to Provo River

* Note: Canals were designed for some discharge. Goal is to have no discharge into Canals. Responsibility for Bypass?

Need for Debris Basins

- Flood After Fire
- Alluvial Fans









Top – Farmington

Bottom - Santaquin

Discussion Item – Buffer Areas

Recommendation – 100 ft min (50 ft Each Side of Centerline)

Future Conditions for Natural Drainages

All major natural channels must maintain a buffer of open space and offset from development. This buffer is intended to help maintain water quality, prevent damage from flooding events, and maintain habitat and aesthetics. A minimum buffer width of 100-ft centered on the major natural drainage channel should be maintained. Development (including individual lots and buildings) is not allowed in the buffer zone. The drainage channel shall be protected and remain undisturbed where possible and with the exception of road or other crossings. Additional landscaping, green space, trails, or other amenities may be allowed if it is shown they will not negatively affect water quality or compromise the other goals of the buffer area. All improvements proposed in the natural drainages shall be approved by the City.

Discussion Item – Buffer Areas

Recommendation – 100 ft min (50 ft Each Side of Centerline)

Arguments Against:

1) Wider than Necessary

- Can pass req'd runoff in much smaller cross section
- Requires too much developable land
- Too conservative based on flooding history

2) Desire for Usable Open Space

- Want parks for open space, not natural channels



Arguments For:

1) Natural Topography

- 100 ft generally matches exist channel widths

2) Meander of Channels

- Entire area is an alluvial fan. Streams can change course during storm events

3) Limited History

- Data we have is very limited. Catastrophic events are always possible

4) Aesthetics & Water Quality

- Erosion Control on Constructed Channels Vs Natural Vegetation
- Natural Buffer for Pollutants & Debris

5) Infiltration Areas are Critical to Overall Plan

6) Maintenance Access Along Channels

Items to Discuss - Buffer Areas

- Drainage 1 – Coyote Canyon



Items to Discuss - Buffer Areas

- Drainage 2 (Smaller Basin)



Items to Discuss - Buffer Areas

- Example:
  Constructed Channels









Discussion Item – Buffer Areas

Recommendation – 100 ft min (50 ft Each Side of Centerline)

What are Other Entities Doing:

Summit County

- 100 ft from High Water Mark on Each Side

Wasatch County

- 50 ft from High Water or Centerline

Saratoga Springs

- 2 ft above 100 –Yr High Water Mark
- Access Road Required along Channel



Projected Costs

- Total Cost of Storm Water System Improvements:
- $22,234,086

North Village Storm Drain Price List

	Size	Description	Price	Units
j	18	Pipe	$80.00	LF
j	24	Pipe	$100.00	LF
j	36	Pipe	$140.00	LF
j	48	Pipe	$180.00	LF
k	18	Casing	$207.00	LF
k	24	Casing	$235.00	LF
k	36	Casing	$300.00	LF
k	48	Casing	$600.00	LF
k		Canal Concrete Lining	$150,000.00	LF
l		Upper Detention Basin	$200,000	AF
m		Intermediate Detention Basin	$240,000	AF
n		US40 Retention Basin	$150,000	AF
j		Site Restoration	$0.75	SF
m		Irrigation and Landscaping	$3.00	SF
o		Land	$200,000	AC
r		Design, CM, Insp	18%	
r		Contingency	30%	

NOTES / ASSUMPTIONS:

- Pipe and Casing costs from Heber Data Base and JRidge 2 development.
- Upper Detention Basin Costs Include: Excavation, High Embankment Fill, Emerg overflow, Pipes, Inlet/Outlet Structures, Site restoration (% of basin area), etc
  Avg cost per AF = $200 AF per JRidge2. Disturbed area scaled from topo.
- Intermediate Detention Basin Costs Include: Excavation, Low Embankment Fill, Emerg overflow, Pipes, Inlet/Outlet Structures, Site restoration (% of basin area), LID's, etc
  Avg cost per AF = $240 AF per JRidge2 and Area / Vol ratio 0.81 AC/AF.
- US40 Retention Basin Costs Include: Excavation, Low Embankment Fill (Assume 5' depth), Inlet Structure, Sumps, Landscaping, etc.
  Avg cost per AF = $150 AF per assumed and Area / Vol ratio 0.68 AC/AF per JRidgex2.
- Canal Crossing Costs Include: Pipe, Casing (50% of pipe length), Inlet/Outlet, Boring/Ex, Concrete channel lining (100 ft), etc.
- Design Costs Include: Cost Mgmt, Inspection, Dam Safety Coord, etc.
- Land assumed value.

Cost Summary of Recommended Storm Drain Improvements

NORTH VILLAGE STORM DRAIN CAPITAL IMPROVEMENTS

		IMPROVEMENT DESCRIPTION	LENGTH, QUANTITY, COST	VOLUME	PEAK FLOW	DISTURBED ARE		LUMP SUM	PIPE SIZE	CASING SIZE	Upper Basin	Mid Basin	US 40 Basin	SITE RESTORE	IRR & LANDSCAP	LAND	ENG CM INSP	TOTAL PROJECT COST
ULT				AF	CFS	AC		i	j	k	l	m	n	o	p	q	r	
	D-01A	Upper Detention Basin - Coyote	1	11.60	65.9	4.78					X			100%			X	$3,798,433
	D-01B	Intermediate Detention Basins - Coyote		1.15	22.6	0.93						X		100%		X	X	$755,851
	D-01C	US40 Retention Basin - Coyote	1	0.50	0.8	0.34							X		100%	X	X	$287,519
	D-01D	Timp Canal Crossing - Coyote	100						36	48							X	$297,596
	D-01E	Wasatch Canal Crossing - Coyote	100						36	48							X	$297,596
	D-02A	Upper Detention Basin - Fitzgerald	1	1.74	25.3	0.86					X			100%			X	$576,932
	D-02B	Intermediate Detention Basins - Fitzgerald		2.06	11.9	1.67						X		100%		X	X	$1,353,959
	D-02C	US40 Retention Basin - Fitzgerald	1	0.50	1.2	0.34							X		100%	X	X	$287,519
	D-02D	Timp Canal Crossing - Fitzgerald	100						36	48							X	$252,200
	D-02E	Wasatch Canal Crossing - Fitzgerald	100						36	48							X	$252,200
	D-03A	Upper Detention Basin - Commons	1	8.00	54.1	2.92					X			100%			X	$2,600,738
	D-03B	Intermediate Detention Basins - Commons		2.33	17.7	1.89						X		100%		X	X	$1,531,420
	D-03C	US40 Retention Basin - Commons	1	1.56	11.1	1.06							X		100%	X	X	$897,061
	D-03D	Timp Canal Crossing - Commons	100						36	48							X	$297,596
	D-03E	Wasatch Canal Crossing - Commons	100						36	48							X	$297,596
	D-04A	Upper Detention Basin - Highlands	1	2.38	23.1	1.02					X			100%			X	$781,302
	D-04B	Intermediate Detention Basins - Highlands		0.42	2.7	0.34						X		100%		X	X	$276,050
	D-04C	US40 Retention Basin - Highlands	1	0.50	1.0	0.34							X		100%	X	X	$287,519
	D-04D	Timp Canal Crossing - Highlands	100						36	48							X	$297,596
	D-04E	Wasatch Canal Crossing - Highlands	100						36	48								$252,200
	D-05A	Upper Detention Basin - UVU	1	0.89	12.5	0.78					X			100%			X	$312,142
	D-05B	Intermediate Detention Basins - UVU		0.15	2.5	0.12						X		100%		X	X	$98,589
	D-05C	US40 Retention Basin - UVU		0.50	1.0	0.34							X		100%	X	X	$287,519
	D-05D	Timp Canal Crossing - UVU	100						36	48								$252,200
	D-05E	Wasatch Canal Crossing - UVU	100						36	48								$252,200
	D-06A	Upper Detention Basin - Views	1	2.56	80.5	1.06					X			100%			X	$838,531
	D-06B	Intermediate Detention Basins - Views		0.18	2.7	0.15						X		100%		X	X	$118,307
	D-06C	US40 Retention Basin - Views	1	0.50	1.2	0.34							X		100%	X	X	$287,519
	D-06D	Timp Canal Crossing - Views	100						36	48							X	$297,596
	D-06E	Wasatch Canal Crossing - Views	100						36	48							X	$297,596
	D-07A	Upper Detention Basin - Crossings	1	7.28	40.1	2.01					X			100%			X	$2,334,237
	D-07B	Intermediate Detention Basins - Crossings		0.20	2.6	0.16						X		100%		X	X	$131,452
	D-07C	US40 Retention Basin - Crossings	1	0.50	0.7	0.34							X		100%	X	X	$287,519
	D-07D	Timp Canal Crossing - Crossings	180						36	48							X	$351,593
	D-07E	Wasatch Canal Crossing - Crossings	100						36	48								$252,200
	D-08A	Master Plan Updates every 5 years (4 times)	$120,000					X										$156,000
		TOTAL STORM DRAIN:		45.50														**$22,234,086**

Heber City Storm Water Design Manual

Low Impact Development (LID) Requirements

- Must Retain & Treat 80th Percentile Storm
- LID Systems Overflow to Storm Drain System

Storm Drain Systems

- 10-yr Initial System (Storm Drain Pipes, Inlets, Etc)
- 100-Yr Major System (Road Systems, Open Channels, Culverts, Etc)

Pretreatment/Treatment Requirements

- Hydrodynamic Separators (HDS)
- Biofilters with Soil Media

Retention/Detention

- 100-Yr Retention
- 25-Yr Detention (Where Allowed)

Questions / Comments



TAB 6

City Council Staff Report

MEETING DATE:	September 20, 2022
SUBJECT:	Envision Downtown
RESPONSIBLE:	Anthony L. Kohler, Planning Director
DEPARTMENT:	Planning Department
STRATEGIC RELEVANCE:	Community Development

HEBER CITY
HEART OF THE WASATCH BACK

SUMMARY

Council budgeted for a comprehensive downtown visioning process for fiscal year 2022-2023. A contract has recently been executed with People & Place to assist with this process. People & Place, in conjunction with Staff, has created a draft calendar, process and Steering Committee list shown in Exhibit 1. Before proceeding further, Staff needs Council's input and direction.

RECOMMENDATION

Staff recommends Council discuss the proposed downtown process, draft Steering Committee list, and provide feedback to the consultants. In this review, does Council have additional people to include on the Steering Committee? Does Council support the draft Calendar of Events?

BACKGROUND

As Council discussed the downtown earlier this year, Council decided to proceed with a comprehensive process to involve residents of the area in planning the future of the downtown. The process is similar to the Envision Heber 2050 General Plan process the City undertook in the adoption of the new General Plan a couple of years ago, except the process will be focused on just the downtown area.

The City Council allocated money in the fiscal year 2022-2023 budget for the project. The City entered into a contract for downtown services on July 22, 2022 in the amount of $80,700 with People & Place consultants.

People & Place and Staff created a draft Calendar of Events in Exhibit 1 and a draft Steering Committee list shown in Exhibit 2 for Council to review.

DISCUSSION

N/A

FISCAL IMPACT

N/A

CONCLUSION

N/A

ALTERNATIVES

N/A

POTENTIAL MOTIONS

N/A

ACCOUNTABILITY

Department: Planning Department, Planning Director
Staff Member: Anthony L. Kohler

EXHIBITS

Exhibit 1: Draft Downtown Process
Exhibit 2: Draft Steering Committee List & Invitation Letter

Exhibit 1

091222 DRAFT Calendar of Steering Committee Meetings and Stakeholder Events

Steering Committee Meeting Time/Location:

- 4:00 pm (except where noted), Wednesdays (dates below), Police Department Community Room

Stakeholder Focus Group Meeting Times/Location:

- Main Street Focus Group:
  - 11:30-2:00 pm, November 2, Senior Center at the Library
  - 11:30-2:00 pm, February 1, Senior Center at the Library
- Recreation and Tourism District:
  - 11:30-2:00, November 3, Senior Center at the Library
  - 11:30-2:00 pm, February 2, Senior Center at the Library
- Central Neighborhoods:
  - 6:30-9:00, November 2, Senior Center at the Library
  - 11:30-2:00 pm, February 1, Senior Center at the Library
- Final All Focus Group Celebration:
  - 6:30-8:00 pm, March 29, Senior Center at the Library (location large enough?)

Steering Committee Meeting #1 (4 pm, September 28)

- Introductions
- Expectations/role/ground rules (also pre-identify co-chairs to open and close public meetings, if desired)
- What a central Heber vision and a central Heber general plan element is/why important
- Land use overview, trends and projections, base map and 2050 trend map, general plan status
- Review of process, quick preview of next meeting (dry run for workshop)
- Roadmap (timeline)
- Branding/website (same as Envision Heber)
- Discussion: What do you love about Main Street, central Heber neighborhoods, the area envisioned as a recreation/tourism hub? What do you want to see preserved or enhanced? What would you like to change or improve? What would you like residents to be able to do in each of these areas? OR: What are the big questions we need to answer? What challenges or opportunities do we face?

Team prepares presentation narrative and visuals, real time and online survey, mapping activity; include time for review process.

Steering Committee Meeting #2 (5 pm, October 19—plan on 2.5 hours for this one)

- Reminder of roles and process
- Review of values and quality of life goals to inform process (based on discussion from last meeting)
- Question list for web survey (may be identical to real time poll, expected to be a simplified values-type survey, feedback via email)
- Stakeholder workshop dry run/feedback
- Role of steering committee at workshop

Stakeholder Focus Group Workshops (November 2 and 3)

- Facilitator training day of workshop
- Workshop (presentation, survey, mapping activity)
- Survey goes live day of workshop, runs for 21 days

Team and staff review survey data and prepares basic potential scenarios.

Steering Committee Meeting #3 (November 30)

- Review of survey data

- Review of themes from stakeholder input
- Discussion of potential scenarios
- Follow up with email update to steering committee summarizing big ideas and scenarios being developed

Team and staff refine scenario ideas and develop them, along with tradeoffs story. Prepares presentation narrative and visuals, posters, real time survey, and online survey. Include time for review process. Email committee with update/draft as needed.

Steering Committee Meeting #4 (January 18)

- Scenario review/stakeholder focus group open houses dry run/feedback
- Question list for web survey (selecting preferences among scenario components, feedback via email)
- Role of steering committee at open house

Open House #1: Stakeholder Focus Group Scenarios Open Houses (February 1 and 2)

- Open house (presentation, poster session, choosing survey)
- Online survey goes live day of open house, runs for 21 days
- Email update to steering committee with summary big picture survey findings, next steps

Team reviews findings and drafts responsive vision items; allow time for review process.

Steering Committee Meeting #5 (March 8)

- Findings from open house and survey
- Review and feedback of draft vision, guiding principles, and map, including three illustrative area plans
- Preview of open house # 2

Team finalizes vision items and drafts general plan update language and identifies potential code updates needed.

Steering Committee Meeting #6 (March 22)

- Final review of vision, guiding principles and map, as well as general plan update language
- Review/discussion of draft general plan update language and list of potential code updates

Open House #2: Vision Unveil and Exploration of General Plan Goal and Policy Options (March 29)

- Celebration of vision and feedback on general plan policy/potential code updates (presentation and activity to explore general plan ideas)

Team refines general plan update language and code update recommendations and prepares marketing brochure.

Exhibit 2

091322 DRAFT

Envision Central Heber Steering Committee

Goal: A diverse group of around 35 community-minded individuals with a variety of associations and with interest in the Main Street area, central neighborhoods, and/or the recreation/tourism district. Individuals may represent viewpoints from business, citizen/resident, non-profit, government, civic/cultural, recreation/tourism, development/real estate/landowner, or other associations. Note that in addition to steering committee meetings, we will also be inviting stakeholders from each of the three study areas to participate in stakeholder focus group meetings, so there will be lots of opportunity to specially invite others to participate.

Name	Title	Area	Association
Dustin Grabau	Wasatch County Manager		government
Mark Nelson	Heber Valley Railroad	Rec/tourism dist.	business
Paul Sweat	Superintendent, Wasatch Co. School District	Main Street	education
Tom Hansen	Board President, Wasatch Co. School District	Main Street	education
Dallin Koecher	Executive Director, HVTED	Main Street/Rec & tourism	business
Tom Stone	CAMS Director	Main Street/Rec & tourism	business
Scott House	Chair, POSTT Committee	Rec/tourism dist.	rec, govt, res.
Jeremy Smith	5th and Main Developer	Main Street	development
Jeremy Clark	98 East Center Developer	Main Street	development
Eric Rasband or Steve Park	UDOT Region 3	Main Street	government
David Hicks or Andy Madsen	Karl Malone	Main Street	business
James Pensis	Owner, Boutique 1921	Main Street	business
Lane Lythgoe	Owner, Lythgoe Design Group	Main Street	business
Joshua Knight	Heber Planning Commission, Resident	All areas, Central neighborhoods	res, govt.
	Heber Planning Commission	All areas	government
	Heber Planning Commission	All areas	government
	Heber City Council	All areas	government
Heidi Franco	Mayor, Heber City	All areas	government
Brad or Stephen Kitchen	Developer, 600 West Self-Storage	Rec/tourism dist.	business
Jason Norlen	Heber Light and Power	Rec/tourism dist.	utility
	Heber Creeper Village	Rec/tourism dist.	business
Josh Cummings	Mixed use flex space	Rec/tourism dist.	business/land owner
	Recycling Yard	Rec/tourism dist.	business/land owner
Paige Douglas	Realtor, Exit Realty, Bed & Breakfast	Central neighborhoods	business, real estate
Jim and Jane Lane	Ice cream shop & Theater owners	Main Street	business
Jan Mawhinney	Owner Dairy Keen	Main Street	business
Mike and Jami Hewlett	Bulldozed house on 100 South	Central neighborhoods	residents
George Bennett		Central neighborhoods	residents
		Central neighborhoods	residents
		Central neighborhoods	residents
Luke Searle	Property Owner South East Heber	Central neighborhoods	residents
Additional members			

Dear XXX:

We are pleased to announce that Heber City is embarking on **Envision Central Heber**, a landmark initiative focusing on the future of Main Street, Heber's central city neighborhoods, and the emerging recreation and tourism district just west of the historic core. Together, we will develop a vision that captures what residents and business leaders imagine and hope for, and a new city policy that charts a course toward the future that citizens want in this important part of town. We look forward to an engaging and educational process, drawing out informed and thoughtful ideas as stakeholders and citizen explore the possibilities together.

As a part of this process, we are forming a steering committee made up of community leaders and citizens, to ensure transparency and an outcome that is responsive to the needs of our current and future residents and businesses. **We invite you to be a member of this committee and hope for your involvement in exploring and defining the future of central Heber.**

In the midst of ongoing growth and change, the impact of this process can be extraordinary. This is an opportunity for us to identify together both what we want to preserve and enhance in the future, while also exploring new opportunities and emerging challenges. Then, with a common vision in mind, we can develop supporting policies and actions.

This process is being facilitated by a consultant committed to a process that prioritizes listening and learning from stakeholders and residents, providing solid information for consideration, and addressing land use and growth issues through a collaborative process. As a member of the steering committee, you will help guide the process, identify issues and opportunities, and assist in the stakeholder/public process, which will encourage broad participation. We anticipate holding six steering committee meetings over a 7-month process.

Our first meeting is scheduled for 4:00 pm, Wednesday, September 28, at the Police Department Community Room (301 S. Main Street, Heber). Please RSVP to XXXX is you are able to come. This promises to be an invaluable opportunity to shape the future of Heber City, and we would greatly appreciate your participation.

Sincerely,

XXXX