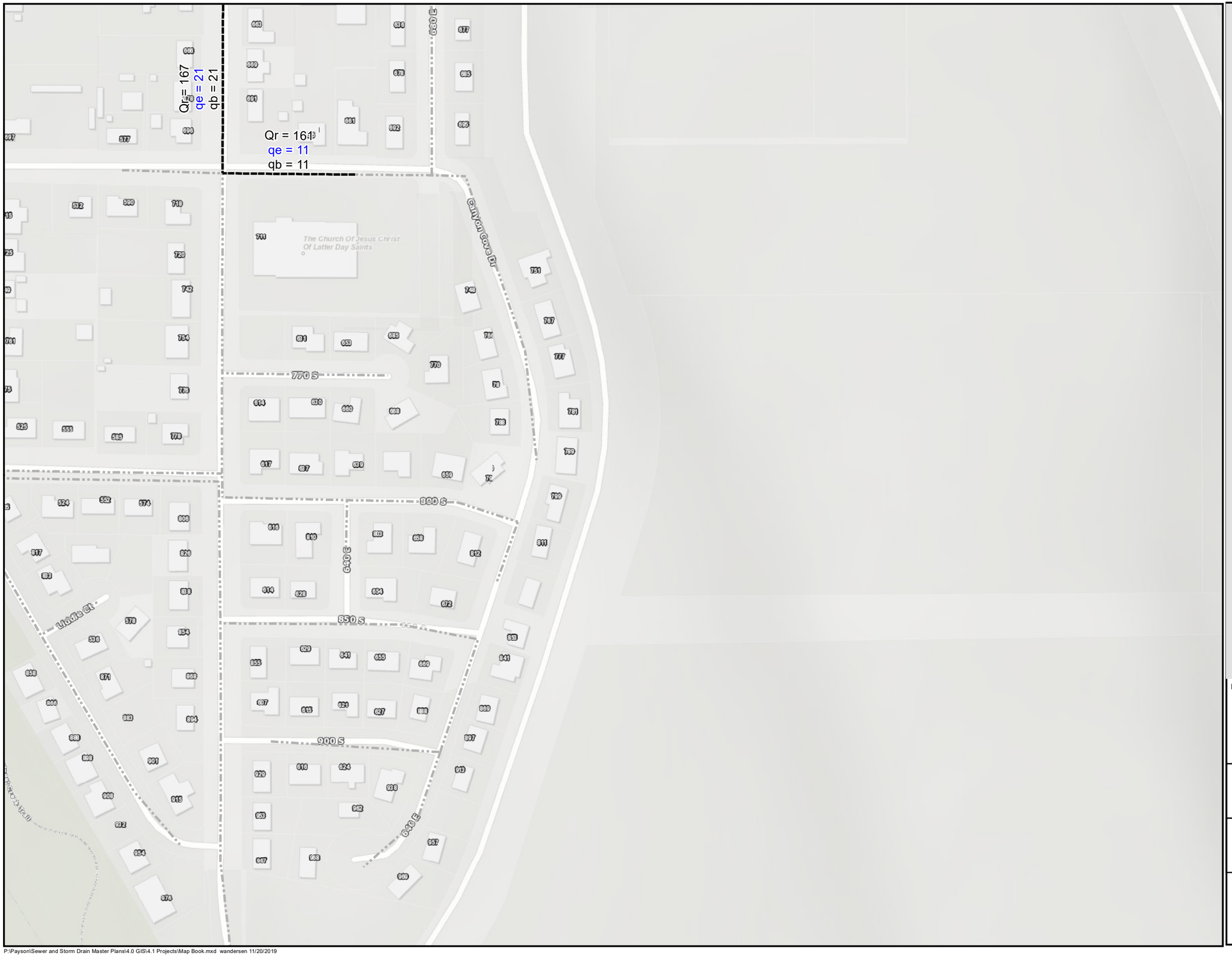
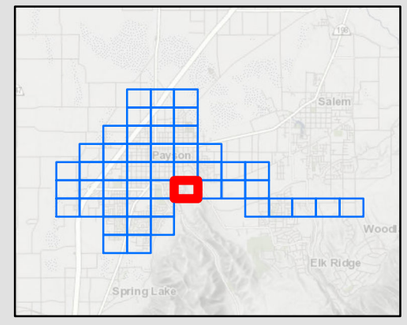


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

GRID LOCATION
K6

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

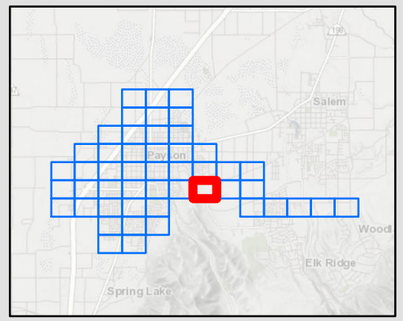
FIGURE NO.
31

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

GRID LOCATION
K7

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
32

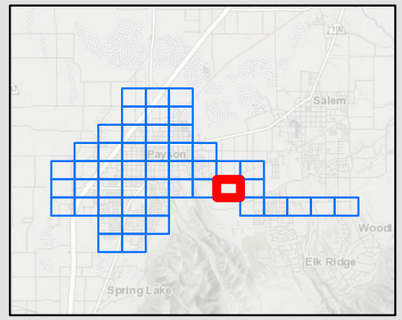
P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

NORTH

SCALE:

0 200 Feet

GRID LOCATION
K8

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
33

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

Qr = 4,011
qe = 214
qb = 845

Qr = 3,838
qe = 215
qb = 844

Qr = 3,169
qe = 215
qb = 845

Qr = 4,243
qe = 215
qb = 843

Qr = 6,317
qe = 219
qb = 842

Qr = 5,558
qe = 215
qb = 845

Qr = 5,693
qe = 213
qb = 843

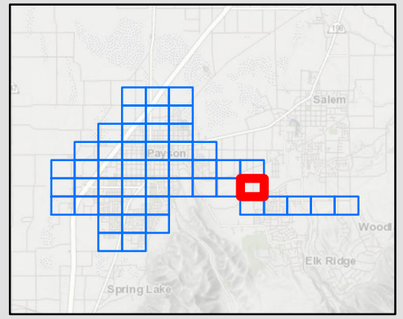
10810
10850
10845
10005
11091
11077

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

NORTH

SCALE:

0 200 Feet

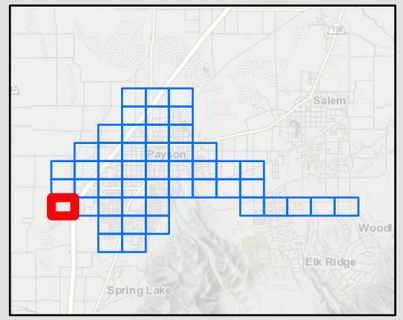
GRID LOCATION
K9

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
34

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019



Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled

Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

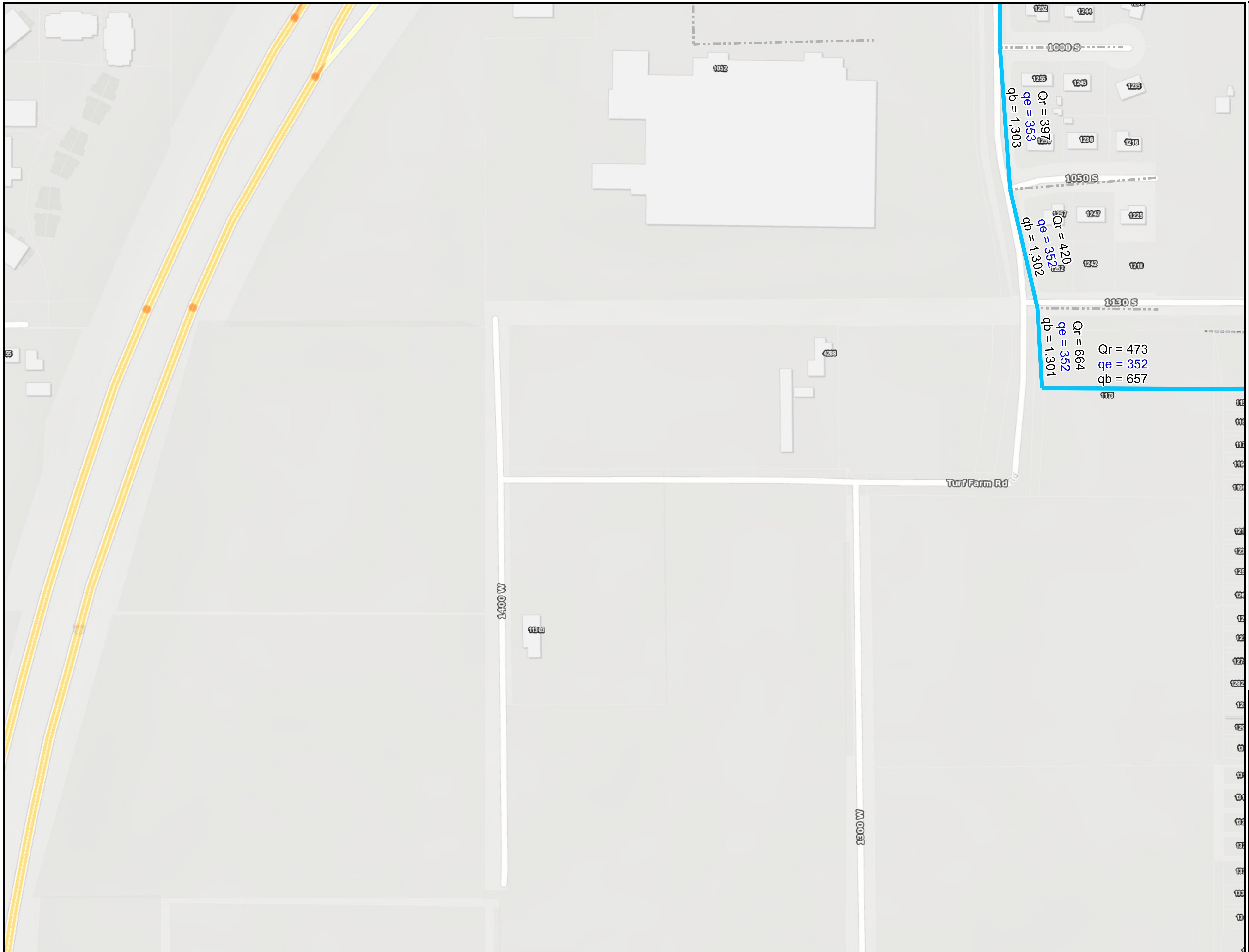
GRID LOCATION L1

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO. 35

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

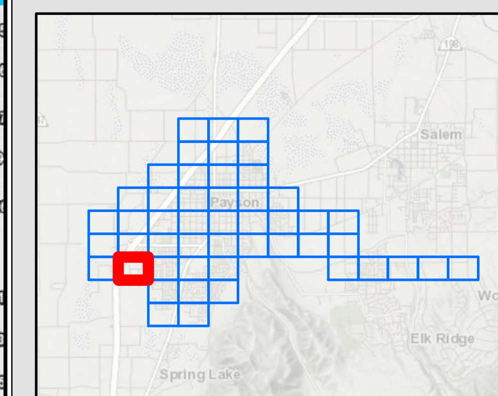


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

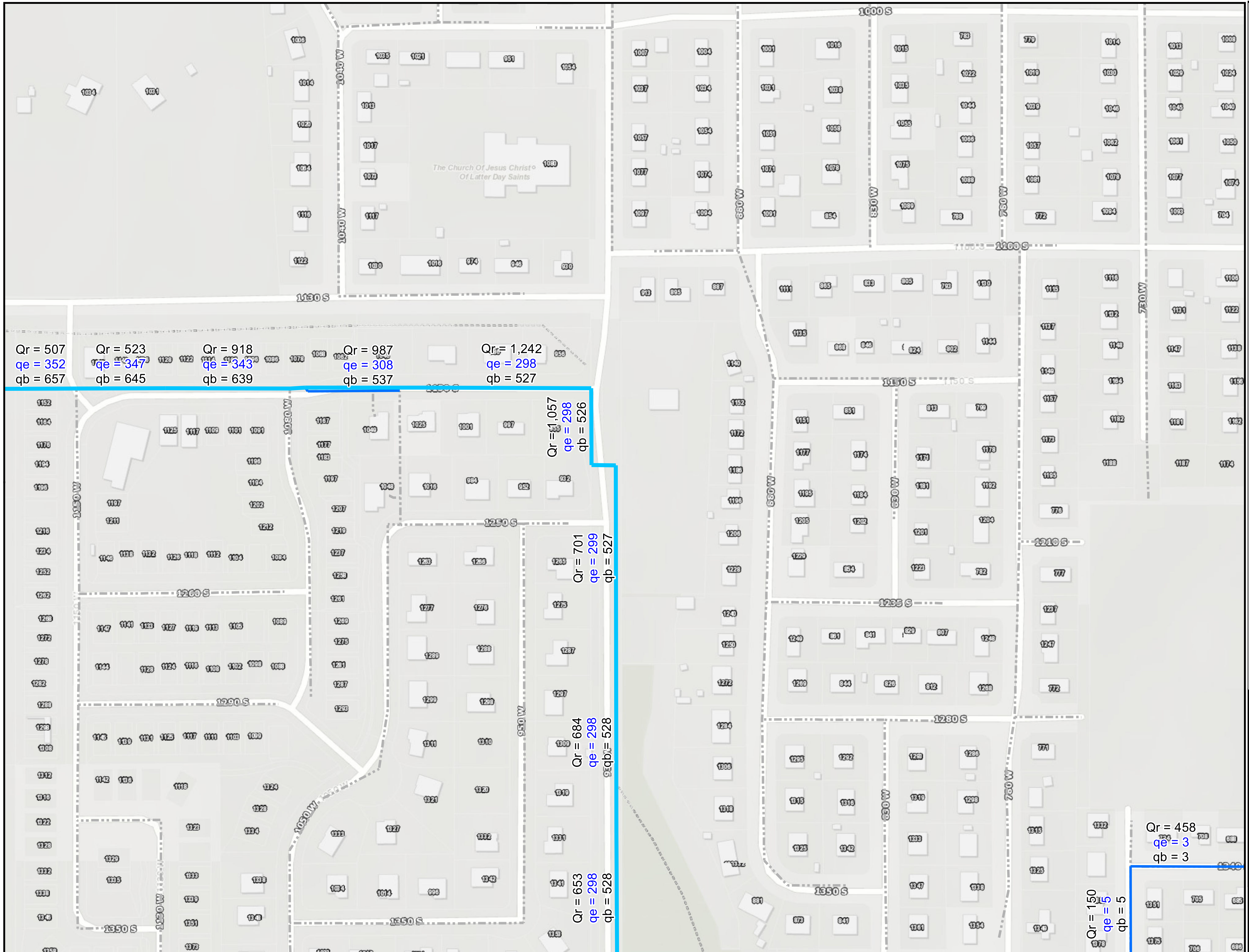
GRID LOCATION
L2

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
36

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

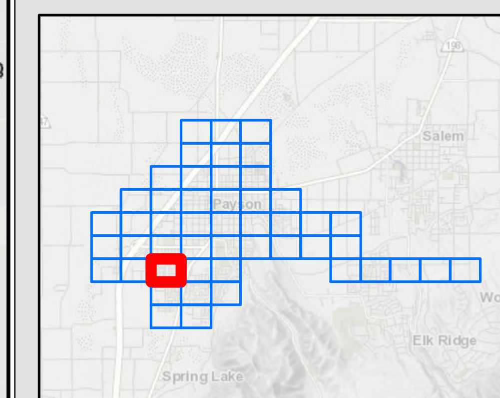


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

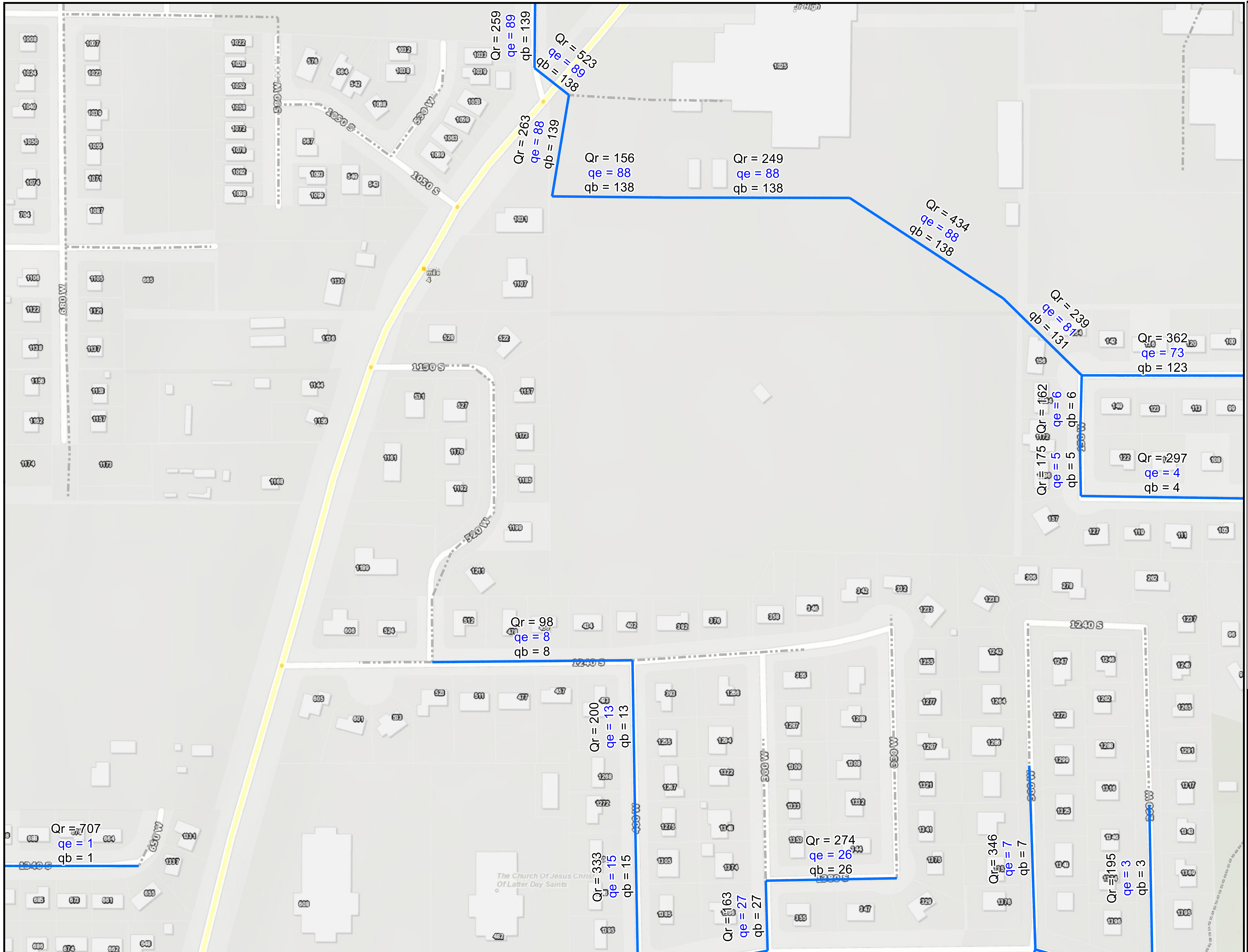
GRID LOCATION
L3

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
37

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

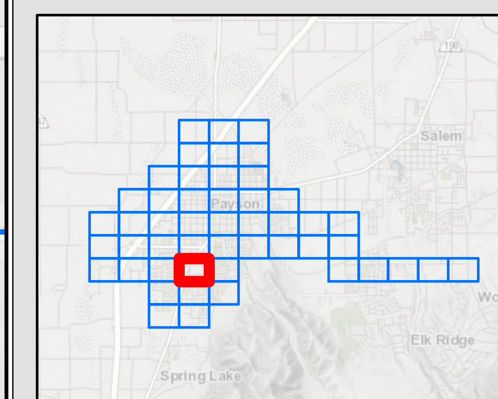

Qr = 259
qe = 89
qb = 139
Qr = 523
qe = 89
qb = 138
Qr = 263
qe = 88
qb = 139
Qr = 156
qe = 88
qb = 138
Qr = 249
qe = 88
qb = 138
Qr = 434
qe = 88
qb = 138
Qr = 239
qe = 87
qb = 131
Qr = 362
qe = 73
qb = 123
Qr = 162
qe = 6
qb = 6
Qr = 175
qe = 5
qb = 5
Qr = 297
qe = 4
qb = 4
Qr = 98
qe = 8
qb = 8
Qr = 200
qe = 13
qb = 13
Qr = 707
qe = 1
qb = 1
Qr = 333
qe = 15
qb = 15
Qr = 163
qe = 27
qb = 27
Qr = 274
qe = 26
qb = 26
Qr = 346
qe = 7
qb = 7
Qr = 195
qe = 3
qb = 3
1050 S
1150 S
1240 S
520 W
680 W
650 W
The Church Of Jesus Christ Of Latter Day Saints

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)

qe = Existing peak flow (gpm)

qb = Buildout peak flow (gpm)

NORTH:

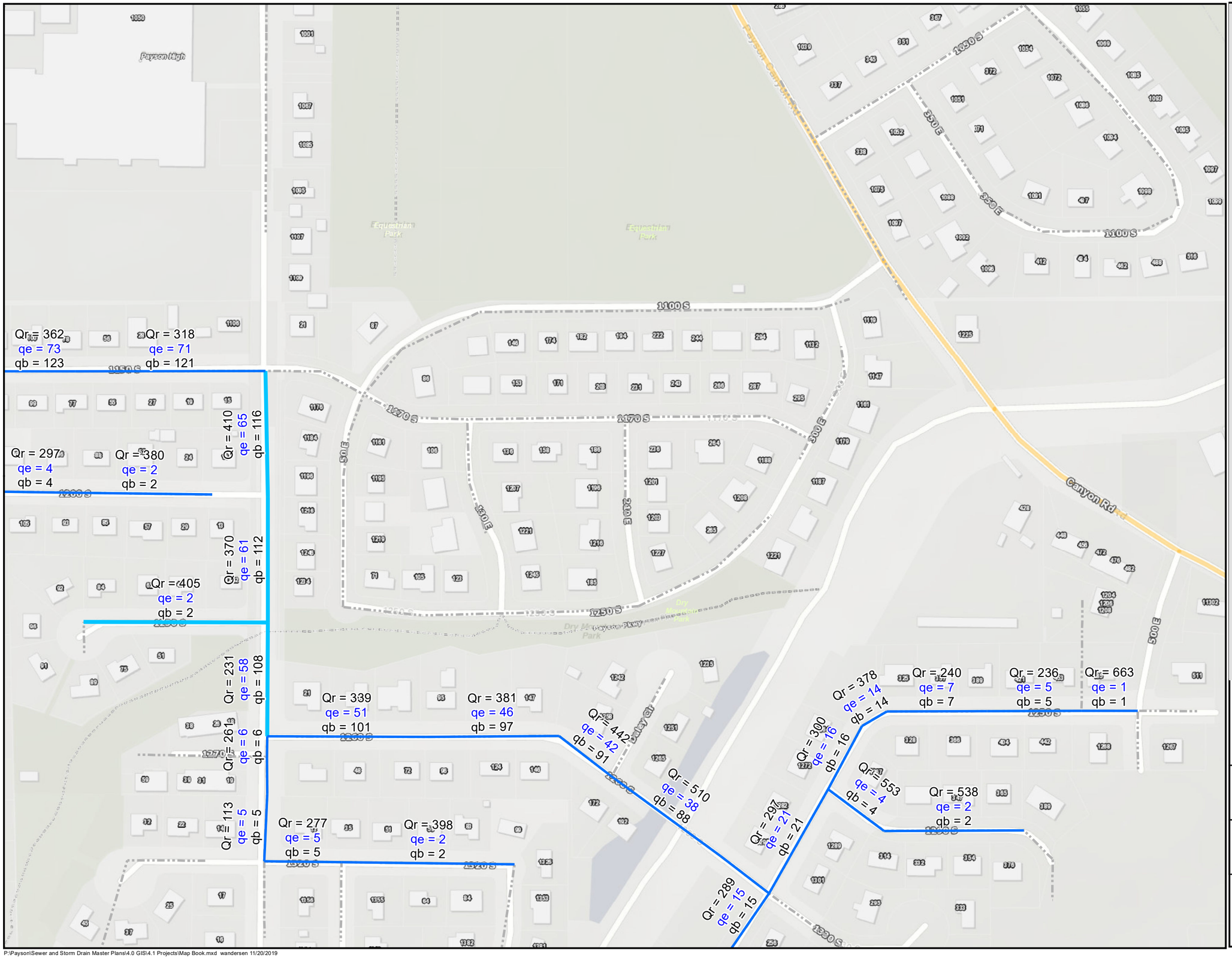
SCALE: 0 200 Feet

GRID LOCATION
L4

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
38

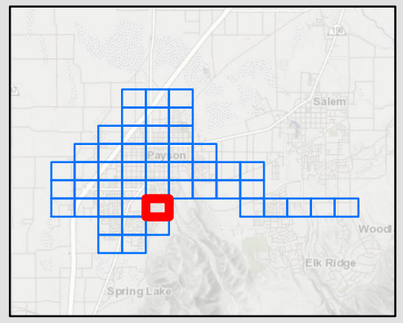


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

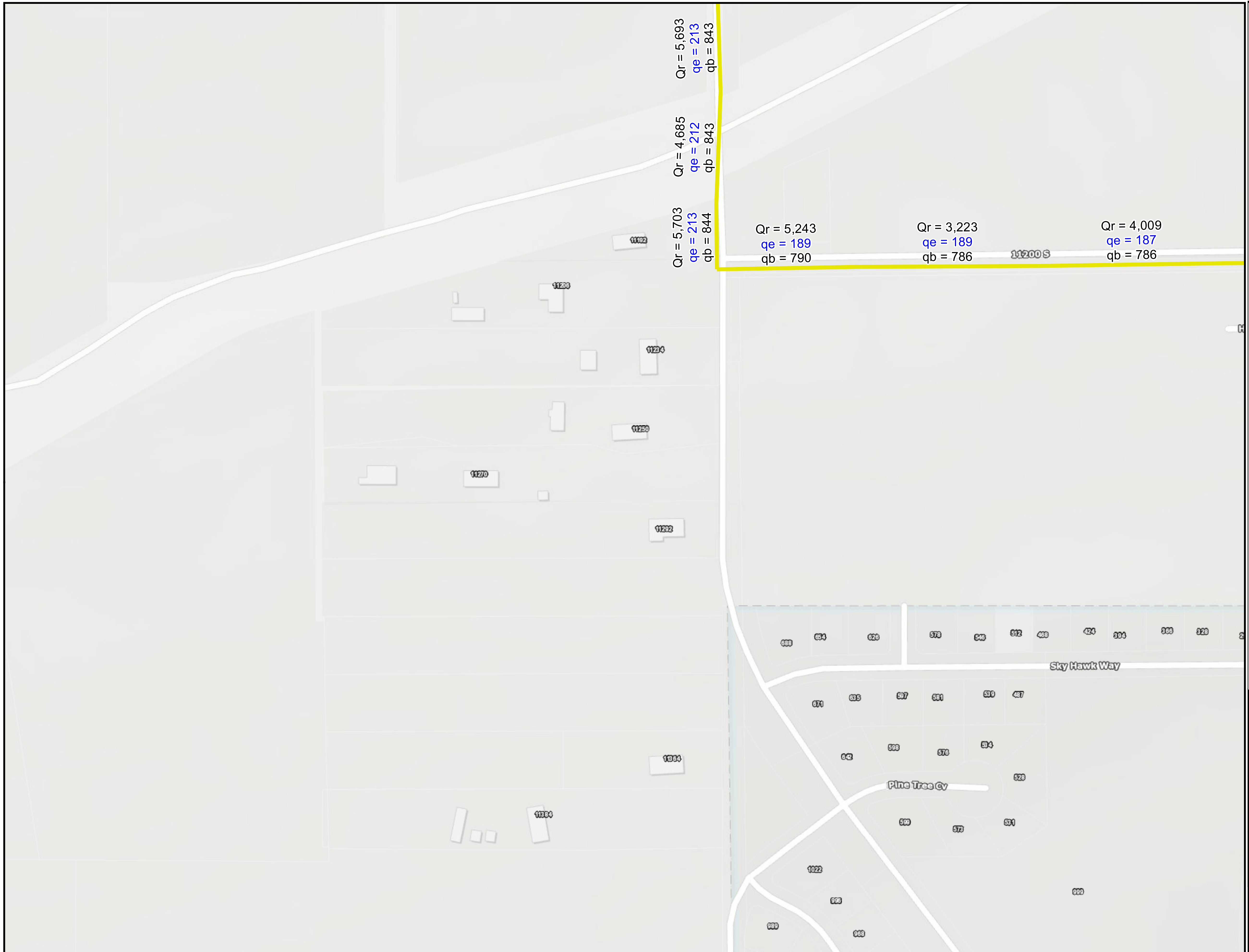
GRID LOCATION
L5

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
39

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

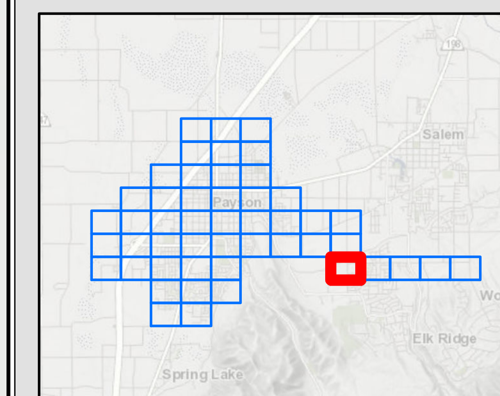


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)

qe = Existing peak flow (gpm)

qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

GRID LOCATION
L9

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO. 40

Qr = 4,315
qe = 190
qb = 788

Qr = 4,123
qe = 187
qb = 786

Qr = 3,134
qe = 188
qb = 786

Qr = 3,117
qe = 187
qb = 786

Qr = 1,159
qe = 188
qb = 786

Qr = 1,297
qe = 187
qb = 786

Qr = 1,083
qe = 189
qb = 787

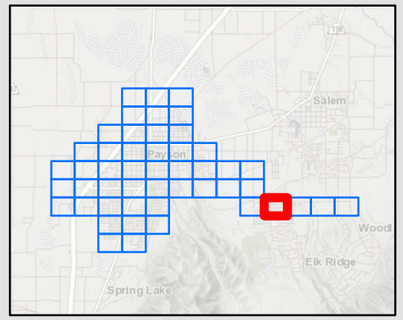
Twilight Way
Horizon View Loop
Moonlight Dr
Moonlight Dr
Horizon View Loop
Pheasant Glen
Fox Xing
Fox Xing
Bear Hollow Ln
Qyrill Run Ln
Cub Cir
Sky Hawk Way
Wolverine Creek
Cotton Tail Ln
Grisley Ln
Doe Hill Dr
Deer Run Loop
Armstrong Dr
1700 S

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels
Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE:
0 200
Feet

GRID LOCATION
L10

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
41

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

Qr = 1,083
qe = 189
qb = 787

Qr = 1,117
qe = 188
qb = 786

Qr = 1,385
qe = 188
qb = 787

Qr = 1,302
qe = 188
qb = 787

Qr = 1,295
qe = 187
qb = 788

Qr = 1,320
qe = 187
qb = 787

Qr = 2,116
qe = 186
qb = 787

Qr = 1,414
qe = 187
qb = 786

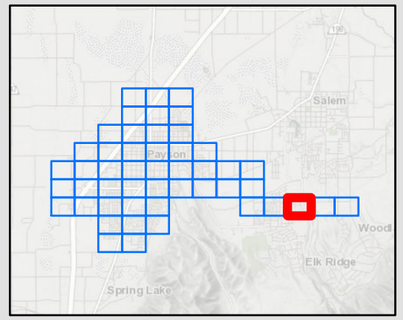
Salem
11200 S
Harris Way
Red Bud Blvd
Unadilla
Washout
Loafer Canyon Rd
Rocky Mountain Way
800 W

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE:

0 200 Feet

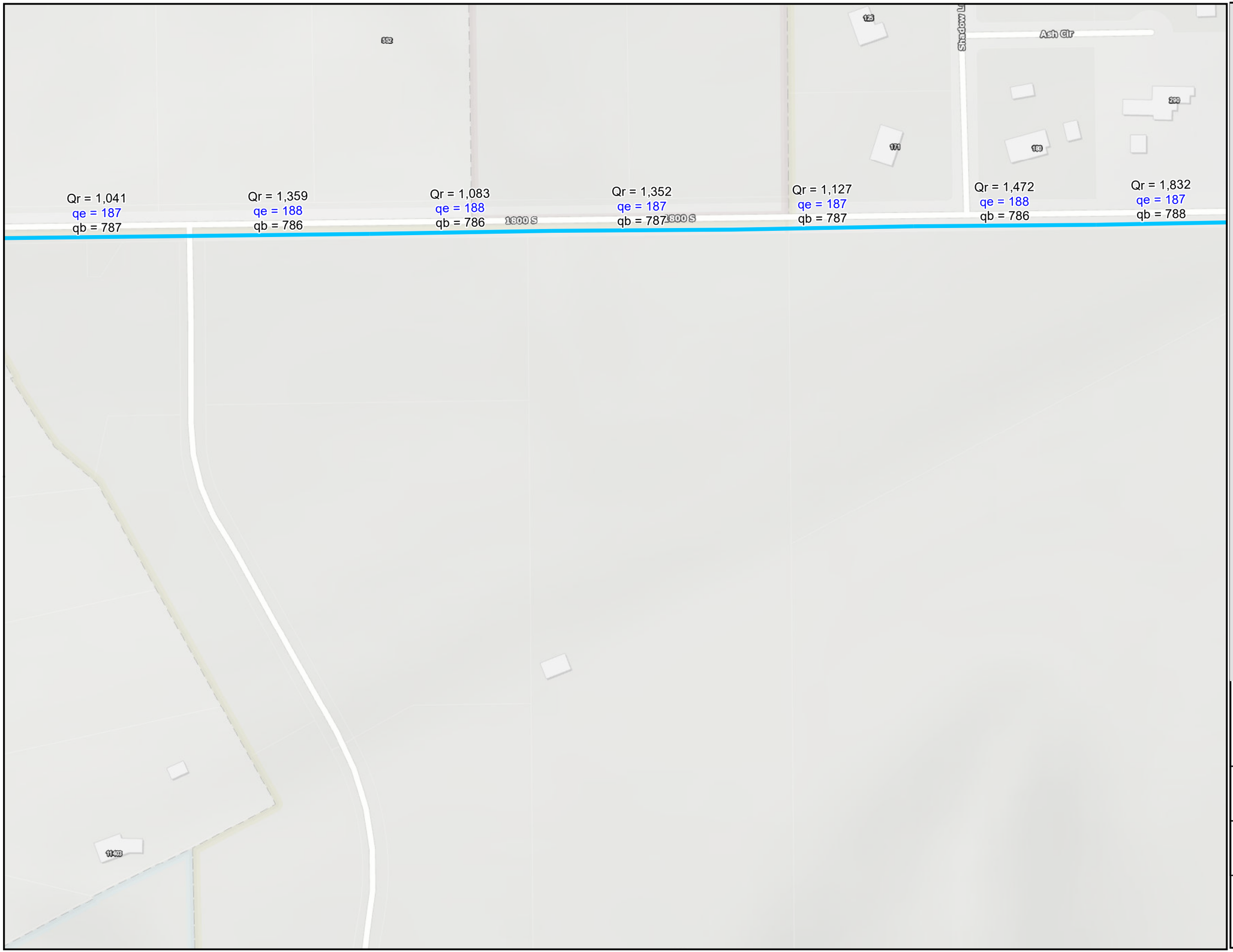
GRID LOCATION
L11

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
42

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

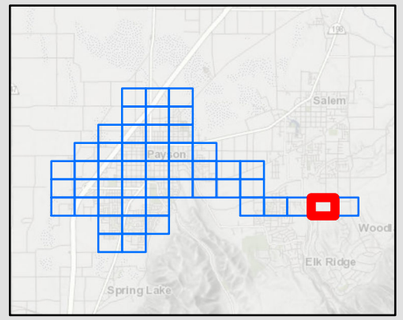


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

NORTH

SCALE:

0 200 Feet

GRID LOCATION
L12

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
43

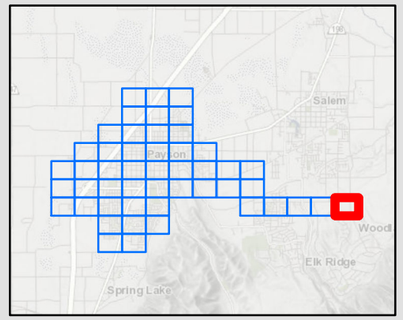
P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

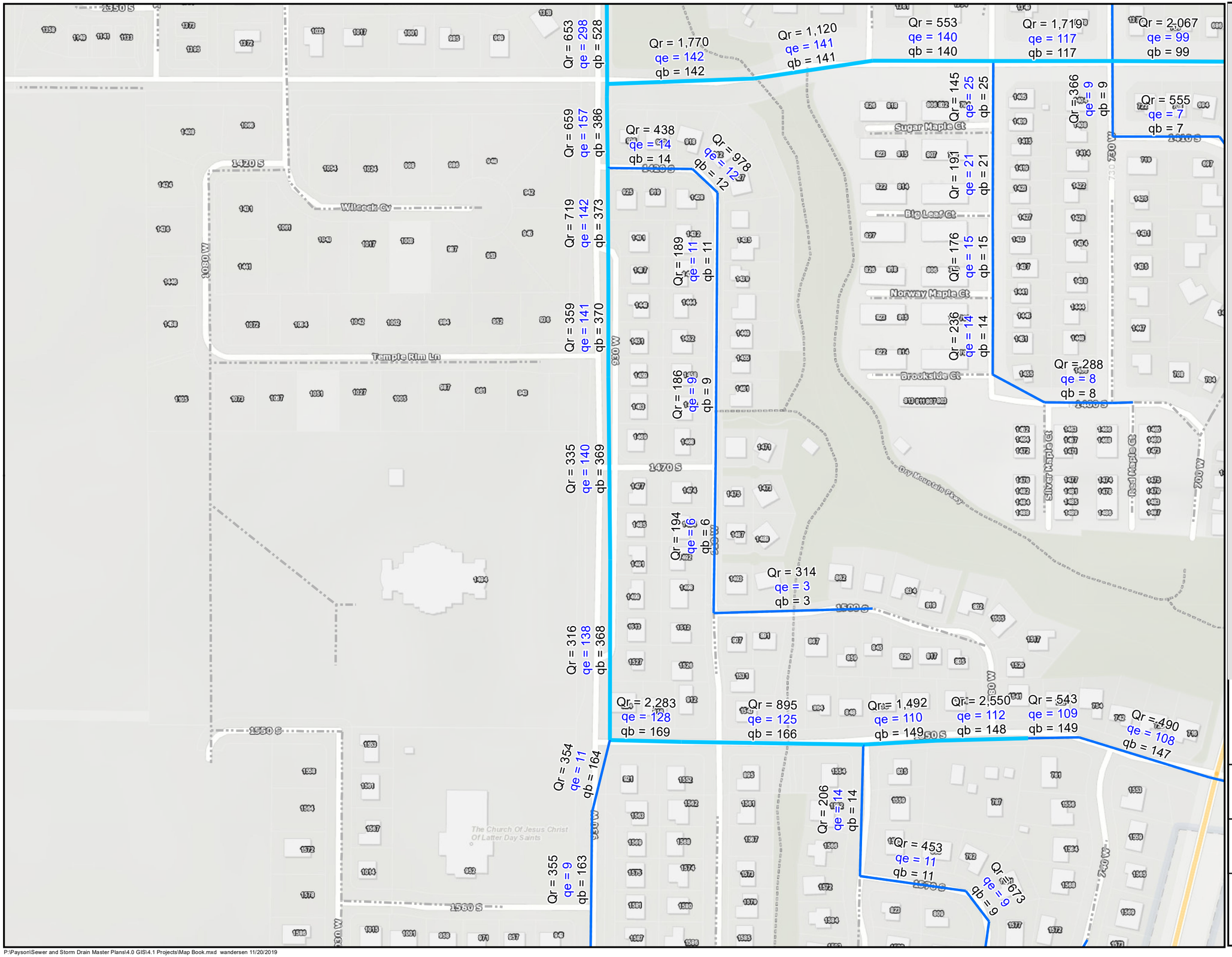
GRID LOCATION
L13

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
44

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

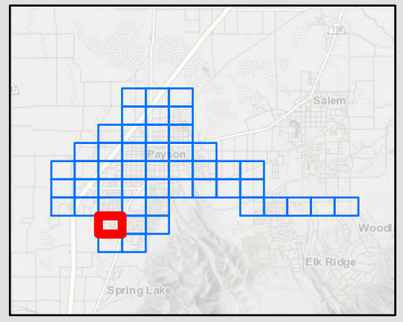


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

GRID LOCATION
M3

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
45

P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

Qr = 2,067
qe = 99
qb = 99

Qr = 591
qe = 99
qb = 99

Qr = 414
qe = 99
qb = 99

Qr = 359
qe = 96
qb = 96

Qr = 130
qe = 45
qb = 45

Qr = 187
qe = 44
qb = 44

Qr = 503
qe = 12
qb = 12

Qr = 219
qe = 4
qb = 4

Qr = 255
qe = 15
qb = 15

Qr = 235
qe = 17
qb = 17

Qr = 374
qe = 19
qb = 19

Qr = 474
qe = 20
qb = 20

Qr = 170
qe = 50
qb = 50

Qr = 149
qe = 2
qb = 2

Qr = 734
qe = 6
qb = 6

Qr = 789
qe = 30
qb = 30

Qr = 333
qe = 29
qb = 29

Qr = 229
qe = 12
qb = 12

Qr = 243
qe = 8
qb = 8

Qr = 183
qe = 16
qb = 16

Qr = 80
qe = 25
qb = 25

Qr = 206
qe = 25
qb = 25

Qr = 196
qe = 24
qb = 24

Qr = 139
qe = 19
qb = 19

Qr = 209
qe = 23
qb = 23

Qr = 272
qe = 3
qb = 3

Qr = 154
qe = 51
qb = 51

Qr = 172
qe = 57
qb = 57

Qr = 174
qe = 55
qb = 55

Qr = 206
qe = 53
qb = 53

Qr = 176
qe = 50
qb = 50

Qr = 172
qe = 47
qb = 47

Qr = 176
qe = 45
qb = 45

Qr = 203
qe = 41
qb = 41

Qr = 512
qe = 37
qb = 37

Qr = 447
qe = 3
qb = 3

Qr = 174
qe = 58
qb = 58

Qr = 146
qe = 0
qb = 0

Qr = 211
qe = 107
qb = 147

Qr = 199
qe = 0
qb = 0

Qr = 126
qe = 104
qb = 144

Qr = 188
qe = 103
qb = 143

Qr = 147
qe = 96
qb = 136

Qr = 144
qe = 5
qb = 5

Qr = 179
qe = 60
qb = 60

Qr = 175
qe = 2
qb = 2

Qr = 162
qe = 35
qb = 75

Qr = 188
qe = 5
qb = 5

Qr = 177
qe = 30
qb = 70

Qr = 183
qe = 28
qb = 68

Qr = 142
qe = 27
qb = 67

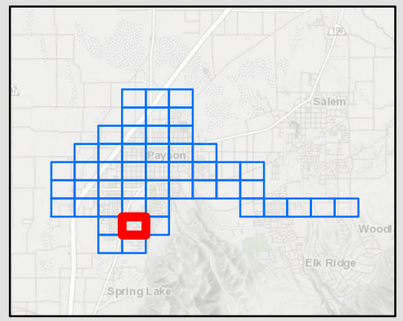
1450 S
1500 S
1600 S
1440 S
700 W
630 W
600 W
500 W
430 W
400 W
300 W
250 W
200 W
Payson
Payson Parkway
Saddlebrook
Saddlebrook Pocket Parks
Dry Mountain Park

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

SCALE:

0 200 Feet

GRID LOCATION
M4

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
46

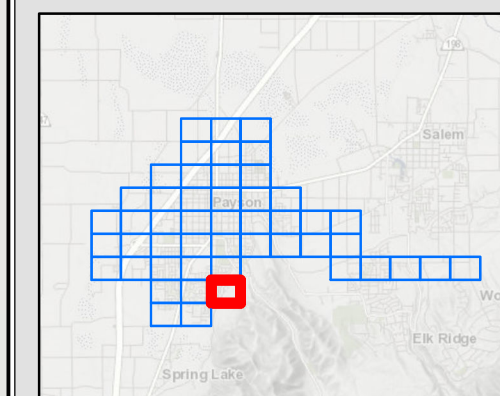
P:\Payson\Sewer and Storm Drain Master Plans\4.0 GIS\4.1 Projects\Map Book.mxd wandersen 11/20/2019

Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)

qe = Existing peak flow (gpm)

qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

GRID LOCATION
M5

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
47

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Qr = 355
qe = 9
qb = 163

Qr = 464
qe = 3
qb = 3

Qr = 328
qe = 5
qb = 159

Qr = 348
qe = 3
qb = 157

Qr = 475
qe = 3
qb = 157

Qr = 617
qe = 9
qb = 9

Qr = 613
qe = 4
qb = 4

Qr = 412
qe = 3
qb = 157

Qr = 570
qe = 3
qb = 157

Qr = 464
qe = 3
qb = 157

Qr = 779
qe = 3
qb = 157

Qr = 892
qe = 4
qb = 157

Qr = 1,123
qe = 2
qb = 157

Qr = 469
qe = 3
qb = 157

Qr = 316
qe = 3
qb = 157

Qr = 314
qe = 3
qb = 157

Qr = 323
qe = 3
qb = 157

1600 S
1620 S
1200 S
640 W
720 W
1030 W
Spring Creek

Legend

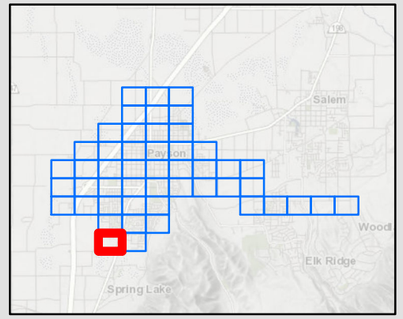
Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"

Existing Sewer Force Main

Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)
qe = Existing peak flow (gpm)
qb = Buildout peak flow (gpm)

NORTH:

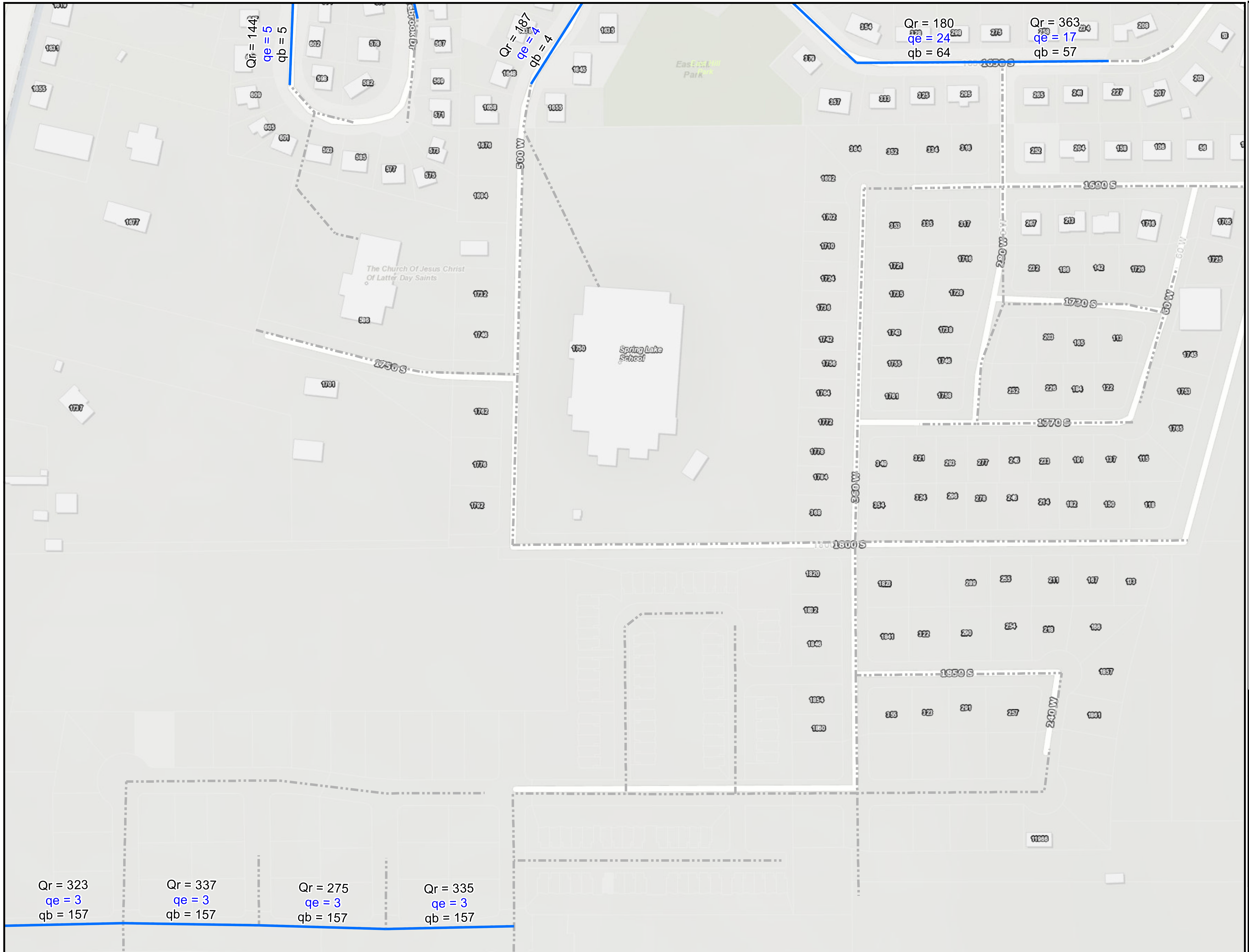
SCALE: 0 200 Feet

GRID LOCATION
N3

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
48

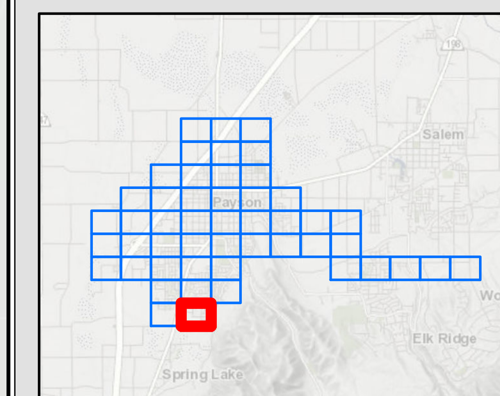


Legend

Modeled Existing Sewer Pipe

Diameter in inches

- 6" or less
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 24"
- 27"
- 36"
- Existing Sewer Force Main
- Existing Sewer Pipe Not Modeled



Existing Sewer Pipe Labels

Qr = Rated capacity (gpm)

qe = Existing peak flow (gpm)

qb = Buildout peak flow (gpm)

NORTH:

SCALE: 0 200 Feet

GRID LOCATION
N4

PAYSON CITY
SEWER MASTER PLAN

BOWEN COLLINS & ASSOCIATES

FIGURE NO.
49

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APPENDIX D

TREATMENT PLANT IMPROVEMENT PLAN

CITY OF PAYSON

WATER RECLAMATION FACILITY

CAPITAL FACILITIES PLAN

2019

AQUA ENGINEERING

TABLE OF CONTENTS

TABLES

FIGURES

CHAPTER 1 - INTRODUCTION

1.1 Introduction and Purpose

This document is a Wastewater Systems Capital Facilities Plan for the City of Payson, located in Utah County, Utah. The purpose of this capital facilities plan is to appraise the capacities and condition of existing equipment and processes at the City of Payson Water Reclamation Facility and to evaluate the current and future needs. Information from previous facilities plans is referenced in this report, and older projections are compared against actual growth and WWTP record data to justify continuing with or adjusting previous recommendations and expansion plans.

This report provides additional data and evaluation to:

- Establish the design criteria for short-term and long-term expansion at the WRF including projected influent flows, organic loading, nutrient loading, and solids handling based on projected population growth.
- Review the condition and capacities for all major processes and equipment at the WRF.
- Explain and justify the recommended equipment, processes, and upgrades at the WRF to accommodate projected growth.
- Present preliminary design and configurations for the recommended expansion alternatives, as well as establish a preliminary budget for the improvements.

1.2 WRF Overview

The City of Payson first installed their water reclamation facility in 1930's. There have been several upgrades to the facility. The most recent completed expansion includes headworks, aeration tanks and aeration basins, a primary digester rehabilitation, new final clarifier and solid handling building. Currently the WRF has design capacity for average daily flow of 3.0 Million Gallons per Day (MGD), with a peak hydraulic capacity of 5.75 MGD.

1.3 Discharge Permit

The City is permitted under UPDES permits No. UT0020427, UTL0020427, UTR020427 A summary of the discharge requirements is summarized in Table 1-1.

Table 1-1 Current Discharge Permit

Parameter	30-Day Average	7-Day Average	Daily Maximum
BOD_5	25 mg/L	35 mg/L	NA
TSS	25 mg/L	35 mg/L	NA
Fecal Coliform	*200/100 mL	*250/100 mL	NA
Total Coliform	*2000/100 mL	*2500/100 mL	NA
Ammonia-Nitrogen			
Summer (June-August)	NA	NA	15.8 mg/L
Fall/Spring (Sept-Nov /March-May)	NA	NA	16.8 mg/L
Winter (Dec – Feb)	NA	NA	20.5 mg/L
Total Chlorine Residual	NA	NA	2.5 mg/L
Oil and Grease	NA	NA	10 mg/L
WET (Acute)	NA	NA	Pass/Fail

CHAPTER 2 - EXISTING CONDITIONS

2.1 Existing Environmental Conditions

The information in this section is a general environmental assessment for the area.

2.1.1 Surface and Groundwater Hydrology

In general, surface water in the City flows from Payson Canyon, southeast corner of the City limit to Utah Lake, northwest direction. Utah Lake is protected for the 2B beneficial use classification since 2013 for infrequent contact recreation. Utah lake has only one outlet, Jordan River, which is a tributary of the Great Salt Lake, and is also protected for the 2B beneficial use. The Great Salt Lake is an endorheic basin and has high salinity. Discharge from Payson WRF enters an unnamed irrigation return drainage ditch to Beer Creek then Benjamin Slough to Utah Lake. The groundwater depth is approximately 6 ft below the surface at the location of the Payson WRF. Groundwater will not be disturbed by the Payson WRF.

2.1.2 Physiology, Topography, Geology and Soils

The soil resource report and the topography map are attached at the end of this report, as Appendix A. Geology of the City of Payson consists of loam, silty clay and alluvium. Alluvium is derived from locally originated limestone and fine loamy alluvium derived from alluvium. The majority of the land in the Payson is prime farmland of statewide importance per the USDA Soil Survey website. (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

2.1.3 Precipitation, Temperature, and Prevailing Winds

The elevation of the City of Payson is approximately 4,600 feet above mean sea level. The climate of the City of Payson is semi-arid with an annual average precipitation of approximately 16 inches of rain per year, and the average snowfall is 53 inches per year. The average high temperature occurs in July at 90°F and the average low temperature occurs in January at 38°F. According to Western Regional Climate Center, the prevailing wind direction in the area is North West.

2.1.4 Terrestrial and aquatic Plants, Animals, and Natural Communities

The City of Payson is moderately vegetated with residential lawns and gardens and a variety of deciduous and evergreen trees. Some of the native plant species for the Northern Utah include greasewood, shadscale and salt brush with some saltgrass, sagebrush, seepweed, and rabbitbrush.

Federally listed Endangered species in the area include Brown Bear, Clay Phacelia, Desert Milkvetch, June Sucker, Ute Ladies' Tresses, and Western Yellow Billed Cuckoo.

2.1.5 Air Quality and Noise

Utah County was out of compliance on PM_{10} in 1987 but it has been attaining the standard since 1996. Maintenance Plans for Utah County have been developed by DAQ; these plans will allow Utah to petition the EPA to de-list the area as "nonattainment". Annual mean concentration of PM is 2.5 in Utah County has been below EPA's standard for at least the last 17 years. Overall, air quality is fair in the area and the WRF will not impact the existing air quality standard.

Noise in the area with WRF is usually due to highway noise from traffic on I-15 and other surface streets. According to Utah County Ordinance Chapter 12, Industrial areas such as where the WRF is, has been permitted to have a maximum noise level of 80 dB.

2.1.6 Land Use and Development

The region is mostly residential, with some industrial development. The Land Use Element Map is included in Appendix B. There is some tourism in the region but it is minimal compared to other development in the area.

The existing WRF is in the incorporated lands of Utah County, Utah. The parcel that is South of the boundary belongs to the Utah Dept. of Transportation and East of the boundary is owned by Utah Associated Municipal Power Systems. These areas have already been developed as industrial and there is not much space for new development.

2.1.7 Existing Water Quality and Public Health Concerns

Currently the effluent from the wastewater facility is discharging to the irrigation ditch through a 24 inch pipe. It flows into the Beer Creek which flows into Benjamin Trough that enters Utah Lake. The WRF currently holds three UPDES permits, UT0020427, UTL0020427, UTR020427 and the facility has been in compliance with all the permits. There are no public health problems caused by inadequate wastewater treatment disposal practices.

2.2 Existing Wastewater Flows and Treatment Systems

The WRF services the rural communities of Payson and Elk Ridge, Utah. Wastewater into the WRF is a mixture of typical municipal wastewater and industrial wastewater from nearby manufacturing facilities such as Payson Fruit Growers. Influent flow data including flow rates, biochemical oxygen demand (BOD) loading, total suspended solids (TSS) loading, and effluent water quality measurements from 2011 to 2014 are available and were used to establish per capita loading and flow rates. The primary design parameters to be established and confirmed are:

- Population and Growth (ERUs)
- Flow
- BOD
- TSS
- Ammonia

Based on the 2010 Demographic and Economic Analysis by Governor's Office of Planning and Budget, a growth rate for Payson is 2.2 % and it is 4.7 % for Elk Ridge until 2020, and then it will drop to 1.7 % for Payson and 1.9 % for Elk Ridge. These values will be utilized to project population growth in this report. Existing flow data is compared against the estimated population to establish a per capita flow in terms of gallons per day and to establish current and projected ERU's. On average, Payson and Elk Ridge contribute 89% and 11% of the total flow to the plant respectively. This report summarizes the most recent data and estimates available to establish and confirm the design criteria for the expansions and upgrades necessary at the WRF.

2.2.1 Existing Population, Projected Growth & ERU's

Based on the 2010 US Census data, the 2015 population was estimated at 23,257 including 20,140 for Payson and 3,117 for Elk Ridge by the Governor's Office of Planning and Budget – Demographic and Economic Analysis Section. According to the State's projections, the City of Payson has a growth rate of 2.2 % and Elk Ridge has a growth rate of 4.6 % until 2020, and then drops to 1.7 % and 1.9%, respectively. Table 2-1 provides a summary of projected population for Payson and Elk Ridge through 2050. Figure 2-1 is a graphical representation of the same data.

Table 2-1 Summary of projected population growth

Projected Population			
Year	Payson	Elk Ridge	Total
2010	18,294	2,436	20,730
2015	20,140	3,117	23,257
2020	22,832	3,898	26,730
2030	26,945	4,687	31,631
2040	31,798	5,635	37,433
2050	37,526	6,776	44,301

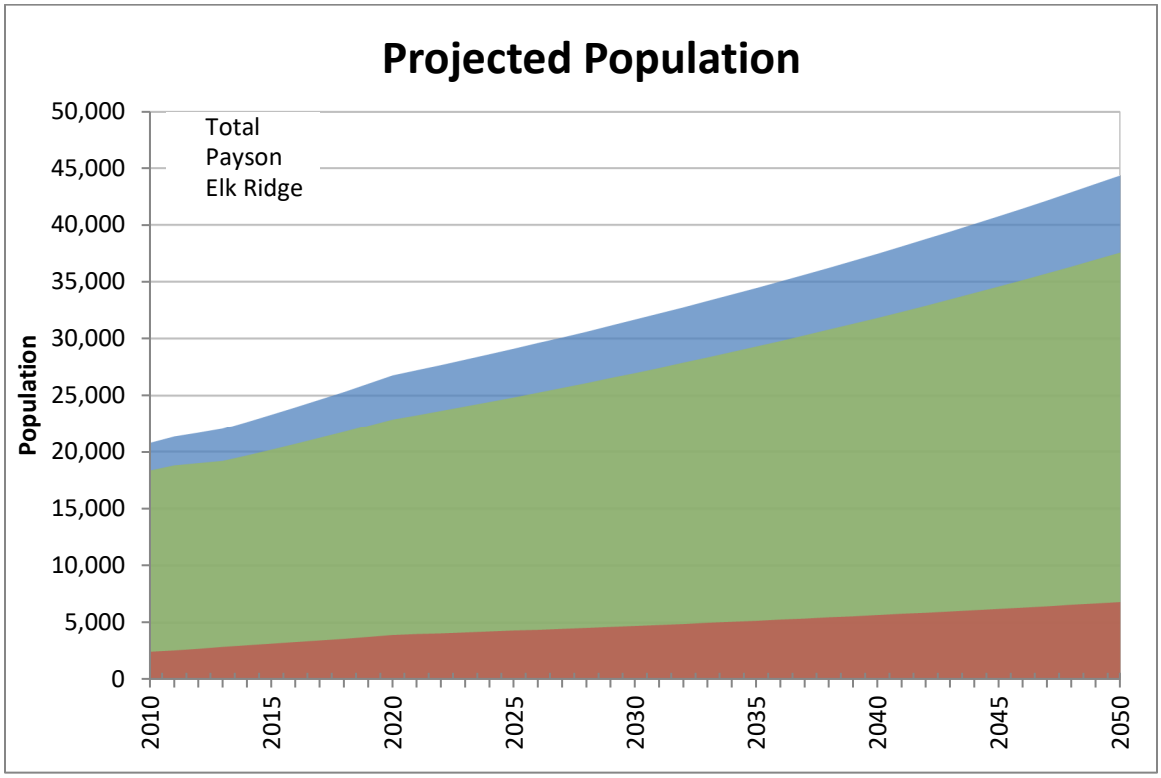


Figure 2-1 Projected population growth for Payson and Elk Ridge through 2050.

The use of and cost to construct/expand sanitary sewers and wastewater treatment plants needs to be equally divided among all users connected to the system. The basic unit used to equate population growth to flow rates and sewer connections is an Equivalent Residential Unit (ERU). An ERU represents the contribution of a typical detached single-family dwelling to the sewer system and WWTP. Since population is closely related to ERU count, population growth is used to estimate future ERU's and their impact on flow and loading on the WWTP. Currently, the WWTP is serving 6,547 ERUs (2017 personal communication). The information provided from the city regarding to its connection within the city of Payson and Elk Ridge calculates 1 ERU is equivalent to 3.6 people, where many cities in Utah use values from 3.0 to 3.5 people per ERU. Details regarding an actual per capita flow are discussed later in this report. For the purposes of this report and to stay consistent with the sewer collection system data, 1 ERU is equivalent to 360 gallons per day (gpd) flow. Growth and increased loading to the WWTP will be evaluated

in terms of additional flow, which will be equated to additional ERU's. These values will be used to project the timing of when flowrates and loading may reach critical values that require expansion or upgrades to the WRF. This report will focus on growth and recommended improvements to the WRF for the next 10-years (through 2030) while providing some guidance for expansion and growth for the next several decades.

2.2.2 Influent Flow

Monthly average influent flow data was collected from January 2012 through December 2018. Average daily flow has been gradually increasing over the last few years due to the population growth of Payson and Elk Ridge. Figure 2-2 shows how the average monthly flow has changed as the population has increased.

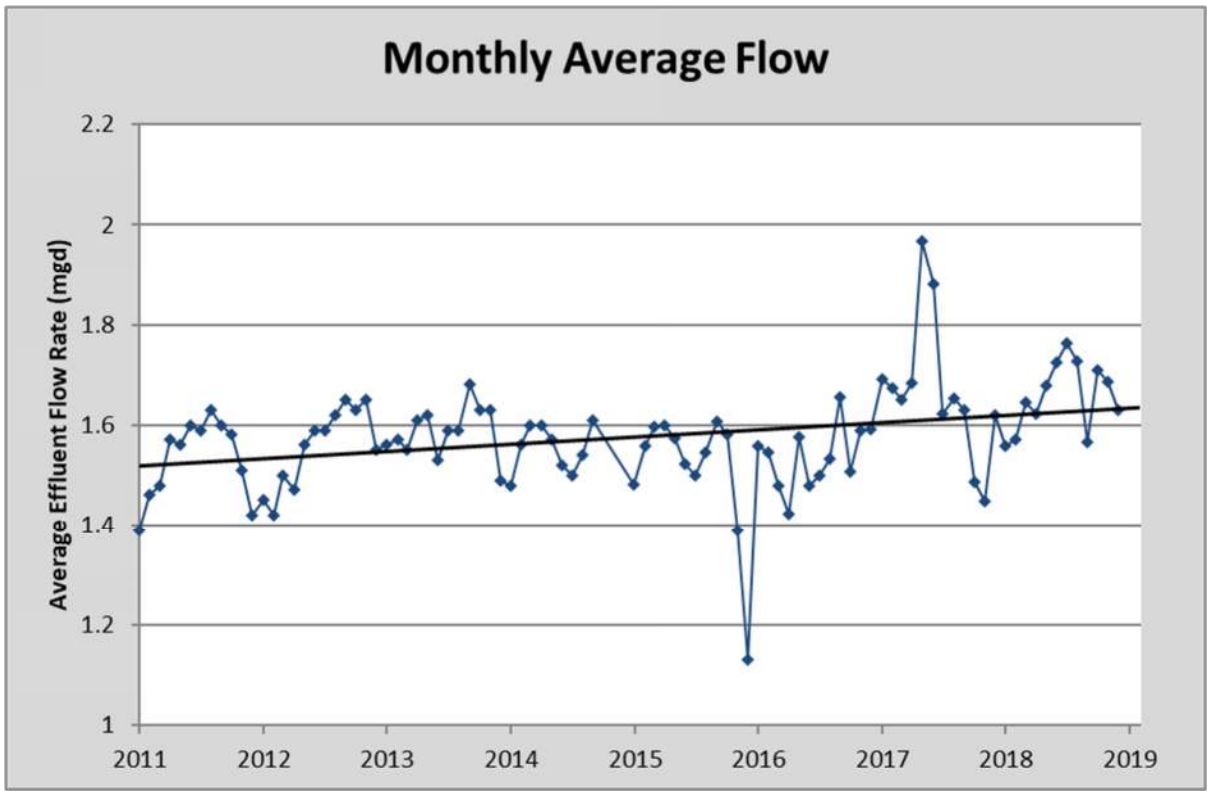


Figure 2-2 Average Monthly Flow

Monthly average flows over this time period range from 1.12 MGD to 1.96 MGD as shown in Figure 2-3. Over last four years, the monthly average influent flow has been relatively constant throughout the year. Typically the lowest monthly average inflow was recorded in January and the maximum average flow was recorded in September.

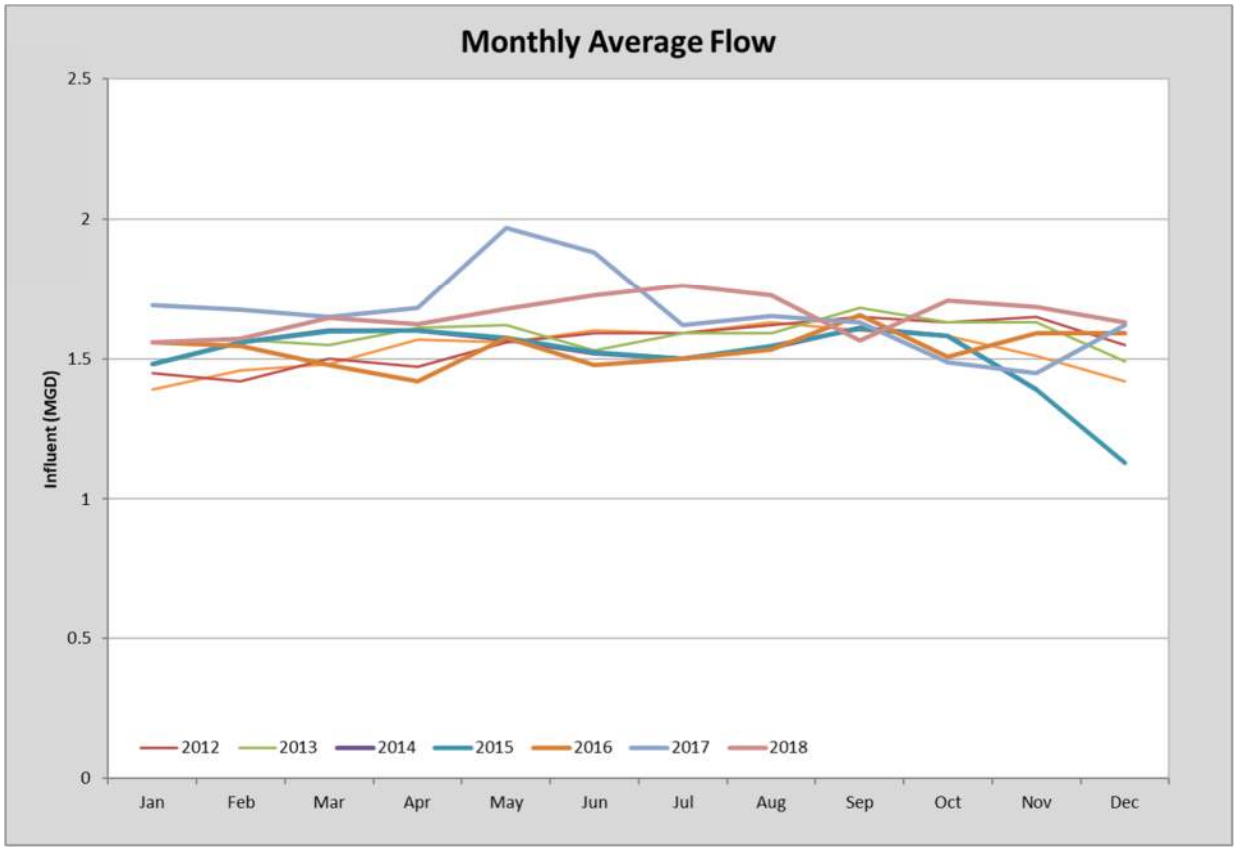


Figure 2-3 Monthly average daily flow

The overall average daily flow during 2018 was 1.7 MGD with a peak flow of 1.80 MGD which was calculated based on the rate of flow greater than 99.9 % of the daily flow data. Dry and Wet season flow was not calculated for the facility due to its consistent flow throughout the year.

The water usage per capita was calculated to be 67 gallons per day with the estimated population in 2018 of 25,279, which is below the state design allowance of 100 gallons per capita per day

(Utah Admin. Code R317-3-2). Therefore, no infiltration/inflow analysis has been done for this report. The residential sewer systems for this facility are designed on the basis of an annual average daily rate of flow of 100 gallons per capita per day as state requires per UAC, subsequently the design flow is 360 gpm per ERU. It is expected to reach the current capacity of the plant, 3.0 MGD, in 2027 if population grows as projected. Furthermore, the influent is anticipated to reach 5 MGD at year 2058 with the same assumption explained previously. The summary of projected influent can be found in Figure 2-4, and the City of Payson has had submitted and the State has approved their Water Conservation and Management Plan, as attached at Appendix C.

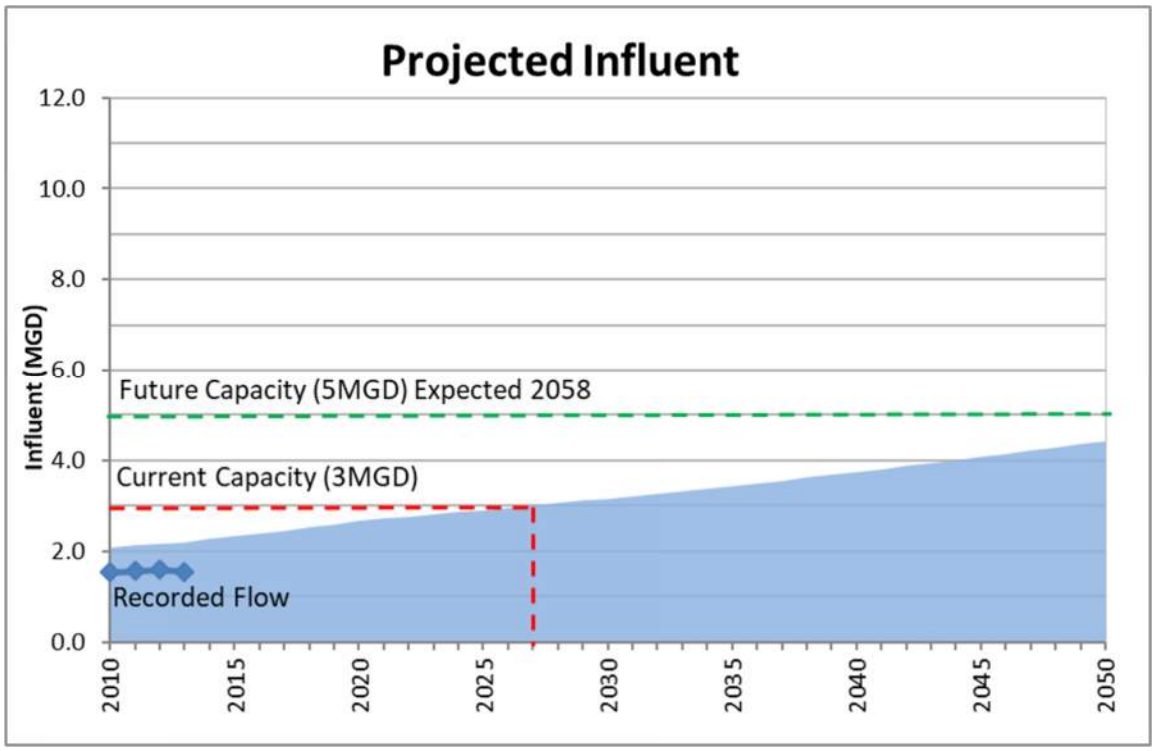


Figure 2-4 Projected Influent

2.2.3 Wasteload Analysis

A wasteload analysis was completed April 10th , 2017 to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of

discharge concentrations on n-stream water quality. This wasteload analysis is associated with the WWTF discharge permit into the Beer Creek. Appendix D contains a copy of the analysis. The wasteload analysis concluded that violations of receiving water beneficial uses with their associated water quality standards, including important downstream segments, will not occur for the evaluated parameters of concern listed in the wasteload analysis if the effluent limitations in the discharge permit are met. It is anticipated to have similar quality of the discharge from the treatment facility, except for the more stringent nutrient limit, consequently, the expected impact of this facility plan is minimal, including discharge volume increase based on population growth.

2.2.4 Influent BOD and TSS

Influent flow volume is not the only factor when considering the WWTP's loading and capacity. The concentration of constituents or strength of the influent also determines the ultimate load on the plant. A plant may be within its hydraulic capacity but exceeding its design biological and solids loading. Specific constituents of interest include biochemical oxygen demand (BOD) and total suspended solids (TSS). The total daily load, determined in pounds of BOD and TSS per day, is a function of each constituent's concentrations and the flow rate. Currently, the Payson

WRF has average BOD capacity for 5836 lbs/day and TSS capacity of 6255 lbs/day.

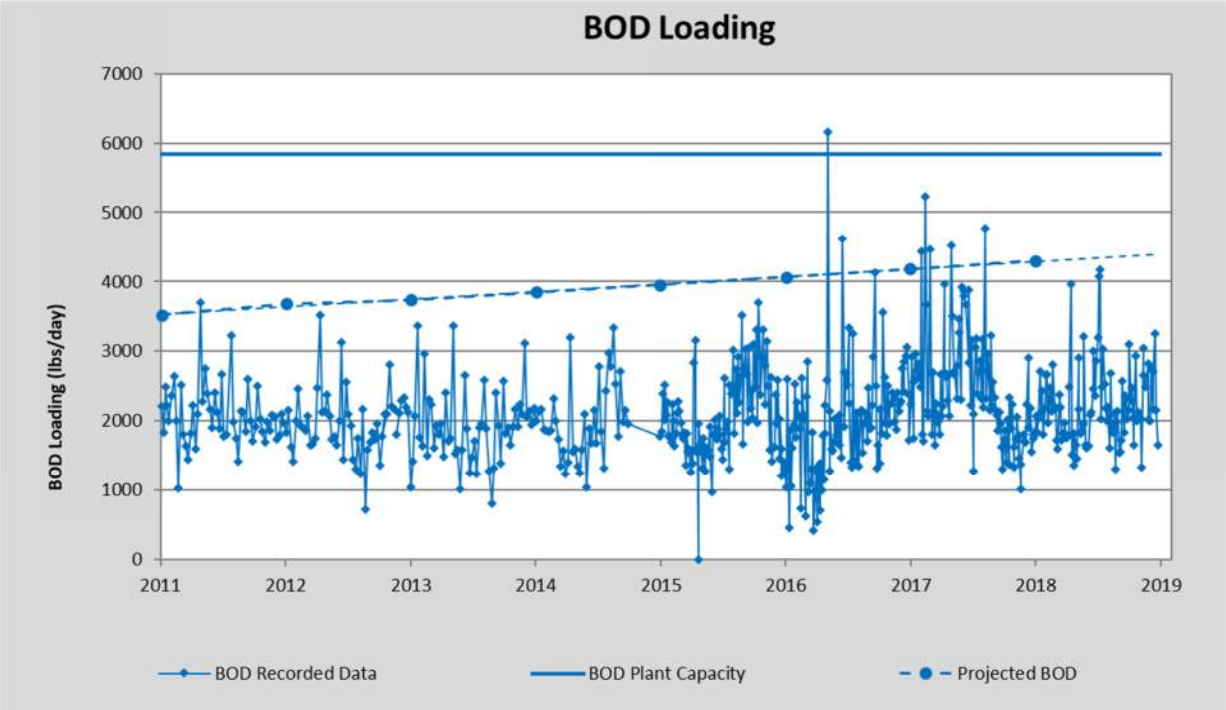


Figure 2-5 summarizes current loading data for BOD and projected loading for BOD based on the population. Figure 2-6 illustrates current loading data and projected loading data for TSS.

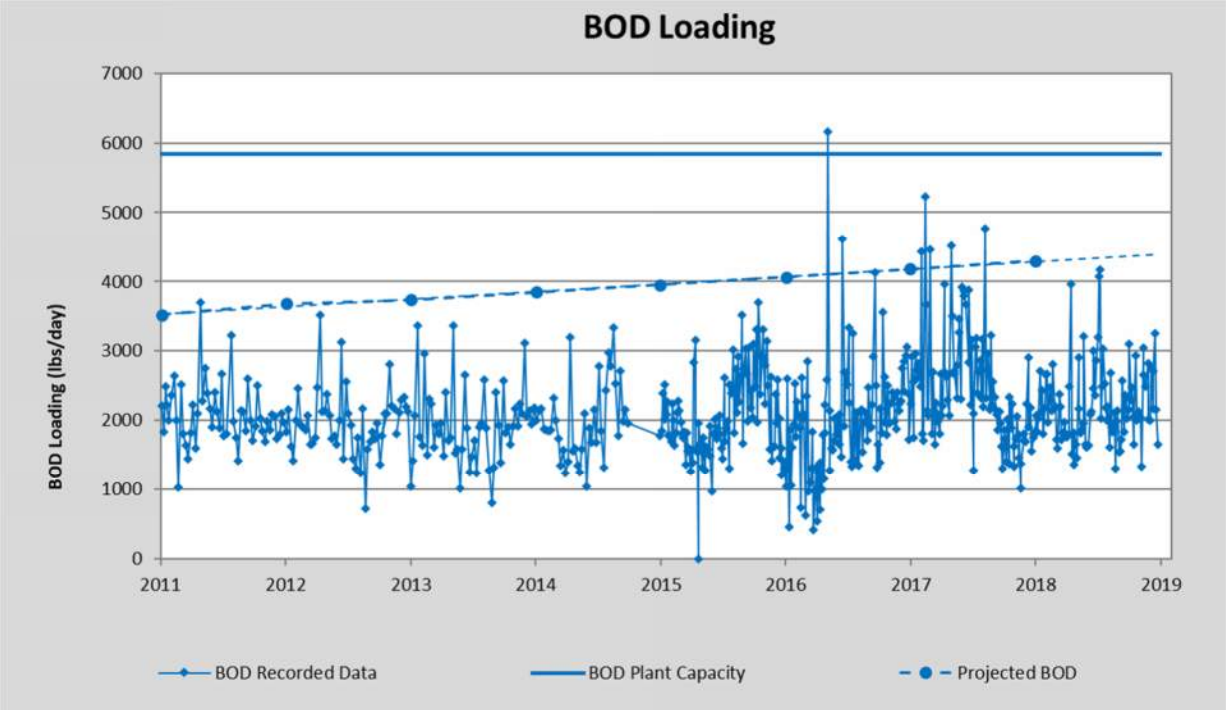


Figure 2-5 BOD Loading

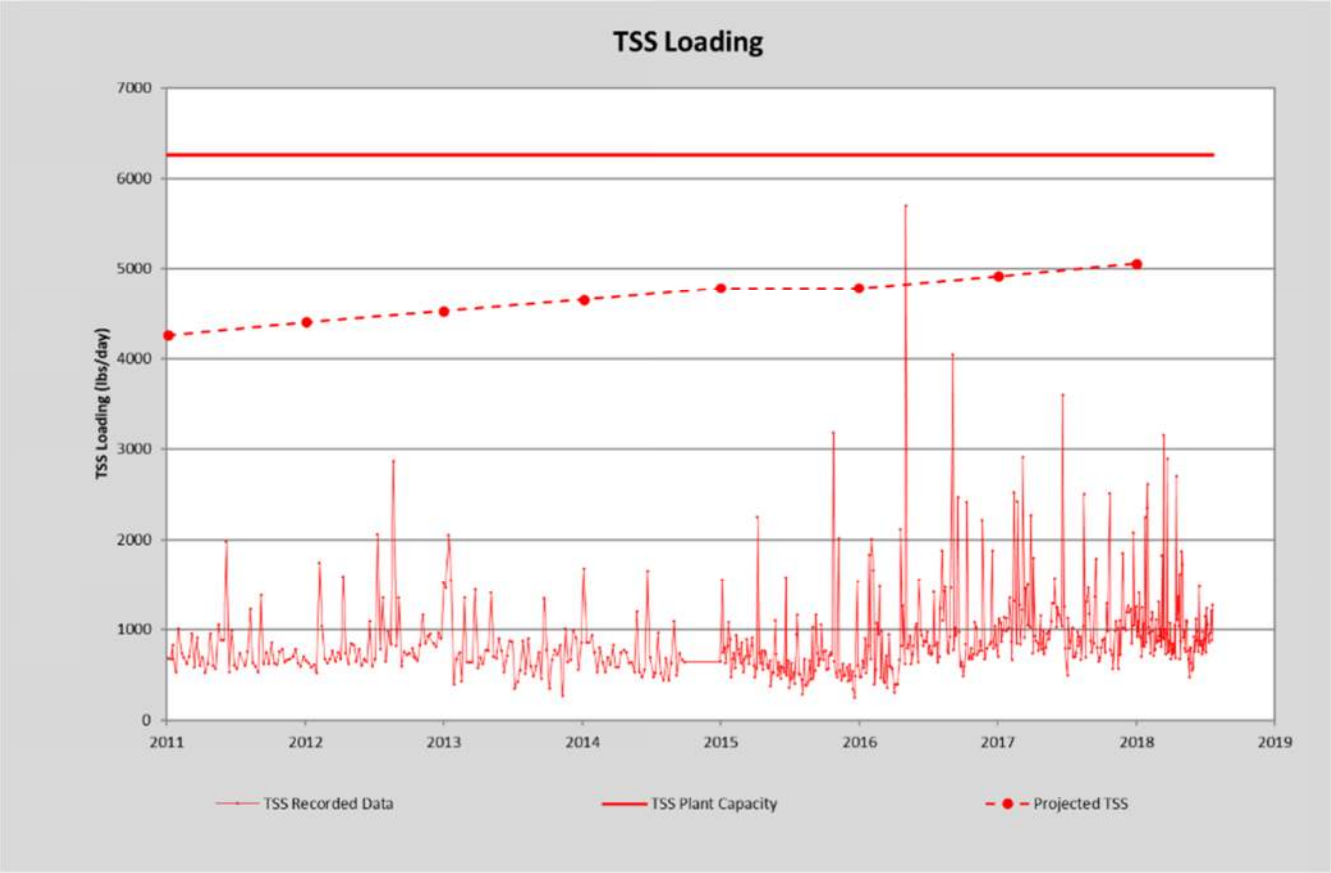


Figure 2-6 TSS Loading

Based on the data provided from the facility, yearly average of Biochemical Oxygen Demand (BOD) was 162 mg/L for the last three years, which is equivalent to a loading of 1666 lbs/day with the average flow of 1.7 MGD. Based on the population, BOD loading for this facility is 0.07 lbs/day/capita for 2018. Total Suspended Solid (TSS) data was averaging to be 77 mg/L, that is, total loading of 746 lbs/day and 0.03 lbs/day/capita. Typically, the residential sewer systems shall be designed on the basis of the BOD loading of 0.17 lbs per capita per day and the TSS loading of 0.20 lbs per capita per day (Utah Admin. Code R317-4-3). Consequently, the design basis of 0.17 lbs per capita for BOD and 0.20 lbs per capita for TSS were used in this report when projecting the city's future BOD and TSS loadings.

It is expected to reach the current BOD capacity of the plant, 5,836 lbs/day, by 2035 with per capita loading of 0.17 lbs/day/capita if population grows as projected. Also it will take the WRF fourteen (14) years to reach the plant's TSS capacity of 6,255 lbs/day assuming that the per capita loading of 0.20 lbs/day/capita by 2030. The value presented in this report may be conservative since current loading is significantly lower than the design basis loading values and will be used in this analysis throughout.

With the design future flow of 5 MGD on a year of 2058, BOD and TSS Loadings are anticipated to be 8,474 lb BOD/day and 9,969 lb TSS/day.

2.2.5 Influent Ammonia

The average ammonia concentration at the water reclamation facility is 25.4 mg/L which gives a current loading of 340 lbs per day with the flow of 1.7 MGD. Typically, municipal influent concentrations for total nitrogen, reported as Total Kjeldahl Nitrogen (TKN) is 40 mg/L. Based on the typical TKN value of 40 mg/L, influent ammonia loading will be 1000 lbs per day when plant reaches influent loading of 3.0 MGD. At the design influent flow rate of 5 MGD, anticipated TKN Loading to be treated in this plant is 1,617 lb/day.

2.2.6 Influent Phosphorus

Influent total phosphorus data was not included in the data provided by the City, however, typical influent concentration of phosphorus, 10 mg/L, will be used in this analysis. Currently the State is working on nutrient pollutants. It looks like in the near future there will be limits on phosphorus and nitrogen. The limits that are currently being discussed are Total Phosphorus (TP) 1 mg/l. It will be assumed that the new facility will be designed to meet the nutrient requirements.

Phosphorus can be removed both chemically and biologically. For this facility it will be assumed that the biological phosphorus removal will be used.

There is a potential that the phosphorus limit may be reduced below 1 mg/l and that is the typical threshold for biological phosphorus removal. If that happens in the future chemical precipitation

may be required. However, using biological phosphorus removal will substantially reduce the amount of coagulants that will be needed to meet lower limits in the future.

2.2.7 Payson Fruit Growers

Payson Fruit Growers is the largest industries discharging wastewater to the reclamation facility, and it is the only future industrial growth expected for the facility. Its peak discharge is approximately 130,000 gallons per day. The current permit allows them to discharge 1,400 lbs BOD/day. They now would like to discharge total of 2,000 lbs BOD/day. It will be discussed how to treat the additional 600 lbs/day and corresponding cost for the additional treatment capacity it will require.

2.3 Expansion Parameters Summary

Assuming the population growth rates of 3.4 % for Payson and 5.1 % for Elk Ridge for next 20 years, the following parameters are predicted for 2040.

- Population 37,433
- Influent 3.75 MGD
- BOD 6,363 lb/day
- TSS 7,486 lb/day
- TKN 1,251 lb/day
- TP 312 lb/day

2.3.1 Effluent Requirement

Below is the effluent requirement that is anticipated for the facility with the expansion.

- BOD 25mg/l
- TSS 25 mg/l
- E Coli 126 / 158 CFU
- pH 6.5-9.0
- DO 5 mg/l min
- TRC 1.8 mg/l max
- TIN 10 mg/l
- TP 1 mg/l

CHAPTER 3 - REVIEW OF EXISTING FACILITY

3.1 Introduction

The current facility was last updated in 2010 and over the last few years of operation a better understanding of the facility has been gained. This review will evaluate the existing facilities and address limitations and improvements. Summary of the overall design capacity of the current facility can be found in Table 3-1 below. The WRF currently holds three UPDES permits, UT0020427, UTL0020427, UTR020427 and the facility has been in compliance with all the permits. Currently there is no onsite system service, nor combined sewer system within the area. There is no flow reduction programs in effect for the area served by this facility.

Table 3-1 Current Capacity

Flow	3 MGD
BOD	5,836 lbs/day
TSS	6,255 lbs/day
Ammonia	686 lbs/day

One of the items that will be addressed in this chapter is redundancy. There is different equipment that is critical to the facility and when those items fail the results may cause permit violations. Current permits for the City of Payson and the overall site plan is attached at the end of this report, as Appendix D and Appendix E.

3.2 Headworks

3.2.1 Primary Screens

There are two primary screens. The screening size is ¼" and the screen manufacturer is Huber. The screens are as shown in Figure 3-1. The design capacity of each of the screens is a peak flow of 3 MGD. The two screens are redundant to each

Figure 3-1 Primary Screen

other so if one screen is out of service the second screen should have the capacity to allow the peak flow to pass through the screen. However, during a large storm event in 2014 the flow entering the treatment facility exceeded the peak design flow and wastewater overtopped the channels in the headworks.

3.2.2 Washpactors

Each of the primary screens has a washpactor to collect the screenings and clean the organic material. The washpactors are functioning but in the near future it is anticipated that they will need additional maintenance as they get closer to their design life.

3.2.3 Grit System

The grit system consists of a cyclone grit trap shown in Figure 3-2. The solenoid valves are starting to wear out and need to be replaced. The solenoid valves control the air for the air lift pump and the air that agitates the grit on the bottom of the grit trap prior to the air lift pump operating. The agitation increases the efficiency of grit removal from the grit trap. The air lift pump sends the grit slurry to a grit washer shown in Figure 3-3. The grit trap's capacity is 6.4 MGD and appears to be in good working order and should work for the plant flow for several additional years. The grit washer shown in Figure 3-3 appears to show wear in the stainless steel tub. It is recommended that this be upgraded.

Figure 3-2 Grit Trap

3.2.4 Headworks Building

The headworks building is constructed of block and is in generally good condition. One limitation of the building is the electrical controls that are in a separate room within the building. Hydrogen sulfide that off gasses as it enters

Figure 3-3 Grit Washer

the screens is entering the electrical room and causing corrosion in the electrical gear. The corrosion may be minimized using a twofold approach. First the wood framed wall can seal the room better to prevent the gases from entering the room. The second issue is the ventilation in the building. The exhaust fan in the headworks area has failed. Birds have nested in the fan and rendered it inoperable. The exhaust fan should be upgraded which will help with the corrosion in the electrical room. Originally the electrical room was designed with a positive pressure ventilation system. This fan has also failed and is not providing the positive pressure. Updating both of the ventilation system is necessary to protect the electrical gear in the future.

3.3 Splitter Box

A structure was installed in the previous upgrade that would allow for the plant to expand the flow capacity by adding a second primary pump station near the headworks building. The existing wet well is only sized for the current design flow, 3 MGD. This structure will split the flow to a new wet well and pumping station. The wastewater flow also leaves this splitter box and is piped to the primary wet well.

Figure 3-4 Splitter Box

3.4 Primary Pumps

The primary pumps are located in the basement of the digester building as shown in Figure 3-5. The pumps seem to be working adequately. They are sized for the current design flow of the facility with one pump acting as a redundant unit for the other two. One difficulty with the pumps is access when doing maintenance. A crane rail needs to be installed which will allow the

Figure 3-5 Primary Pumps

pumps to be removed from their location with less effort. A temporary crane rail has been installed but it interferes with the disconnect switches for the pumps.

The crane rail and electrical gear is shown in Figure 3-6. The electrical gear should be relocated to allow for better access to the pumps. In addition to the crane rail shown, an additional method will be needed to move the pumps outside the building. Currently the pumps need to be moved across the floor and manually crried up the stairs from the basement.

Figure 3-6 Crane Rail

3.5 Primary Clarifier

The primary clarifier was taken off-line and recoated as part of the last upgrade. The coating should have another ten years of life before it requires another coating. At that time it may be necessary to replace the mechanism. One of the major limitations of the primary clarifier is that there is no redundancy unit, in other words, if one is taken down the facility cannot treat full capacity. It is recommended to install an additional primary clarifier of the same size and operate two during normal conditions. This operation allows additional solid removal because of the lower overflow rate, and provides redundancy.

Figure 3-7 Primary Clarifier

3.6 Trickling Filter

The trickling filter is shown in Figure 3-8 and is filled with rock media. The filter was installed in the 1980 upgrade. The mechanism bearings were recently changed. However, it appears the process has reached its design life. In addition with the new nutrient

Figure 3-8 Converted Trickling Filter Tanks

limits this unit process will no longer be effective in removing the required nutrients. The location and elevation of the trickling filter will be a good place to install a new primary clarifier.

Figure 3-9 Trickling Filter

Losing this unit process results in need of additional treatment capacity to replace this unit. In addition to the trickling filter there are two additional old tanks that at one time were trickling filters. They were installed in the early 1960's as part of the original plant as seen in Figure 3-9. The configuration of these tanks is not optimal for an activated sludge process. Therefore, they should be demolished and a new concrete basin should be installed to replace the trickling filter.

3.7 Intermediate Clarifiers

There are two intermediate clarifiers that were originally final clarifiers in the 1960 upgrade. They currently remove some of the solids generated in the trickling filter and direct them to the front of the treatment facility. The solids are then removed along with the primary sludge in the primary clarifiers. There has been a problem with these clarifiers where they are somehow capturing the solids from the activated sludge system and transferring them to the primary clarifier which has reduced the solids inventory in the STM Aerotors. To remedy this problem one of the clarifiers has been inactivated and the solids are allowed to overflow the weirs and transfer back to the STM Aerotors. Therefore, it is recommended that the clarifiers be abandoned. The area where they are located can be used for new tanks for nutrient removal. By installing the nutrient removal tanks in this area there should be enough slope to have the wastewater flow from the primary clarifiers through the tanks and to the STM Aerotors, which eliminates the need for the intermediate pump station.

Figure 3-10 Intermediate Clarifiers

3.8 Activated Sludge (STM Aerotors)

Figure 3-11 STM Aerotors

There have been mechanical problems with the STM Aerotors. The chains have broken more times than originally anticipated and the drives have needed replacement. Because of these problems it is anticipated that the tank will be converted to another method such as fine bubble diffusion system at some time in the future. The tank is shown in Figure 3-11. This conversion will require a blower building and diffusers in the tank. With this assumption it is anticipated that the activated sludge basins will be constructed with fine bubble diffusers to supply air.

One of the redundancy issues associated with the STM Aerotor is if one wheel is not functioning half of the basin has to be shut down to repair the wheel. It was anticipated that each wheel would be redundant for the system. However, experience has dictated that half of the aeration system is lost when repairs are being done. With a new aeration basin this will allow for better redundancy in the system because there will be additional flow trains that can be isolated from each other.

3.9 Final Clarifiers

Currently there are two final clarifiers. One of the clarifiers was installed as part of the last upgrade. The other clarifier is an older clarifier that was installed in an earlier upgrade. The older clarifier only has an 8-foot side water depth with makes it less efficient than the newer clarifier. The mechanism is getting close to its design life of 30 years and should be replaced in the near future. The mechanism was sandblasted and recoated in the last upgrade and should be good for a few more years. A new final clarifier should be installed which would be a redundant clarifier. It would allow for any single clarifier to be taken off-line for repairs and allow the

other two clarifiers to meet the flow demands. The newest clarifier is having problems with the drive mechanism and should be replaced.

3.10 Final Filters

The bridges in the filter building are getting old and have reached their design life. They need to be replaced. To expand the capacity of the treatment facility the filters will need to be expanded. Expanding the building and lengthen the sand filters is one alternative, but the other alternative would be to install the diamond filters from Aqua Aerobics. This system would fit in the existing building and allow for additional flow to pass through the system using the existing building foot print.

Figure 3-12 Filter Bridges

3.11 RAS / WAS Building

The sump pump in the RAS/WAS building needs to be replaced. In addition, all of the flow meters need to be replaced in the building. The VFD's are not functioning reliably so they need to be replaced also.

3.12 RAS Pumps

The RAS pumps are shown in Figure 3-13 and they are currently working. However, they will need to be rebuilt in the near future with new impellers. The pumps and piping are in need of a new paint job.

Figure 3-13 RAS Pumps

3.13 WAS System

The WAS pumps are not used unless the newest clarifier is not in operation. The water surface in the new clarifier allows the WAS to flow to the DAF thickener without using the pumps. The pumps have seen little use due to this operation. The plug valve shown in Figure 3-14 is not operating as it should and will need to be replaced.

Figure 3-14 WAS Plug Valve

3.14 DAF

The DAF Air Panel shown in Figure 3-15 is not functioning correctly and needs to be rebuilt. The DAF Pumps shown in Figure 3-16 are in need of a rebuild also. The DAF is susceptible to freezing in the winter time because of the intermittent use. Therefore, it is recommended that a new structure is placed over the DAF.

Figure 3-15 DAF Air Panel

3.15 Chlorine Contact Basin

The chlorine contact basin is currently functioning. However, the new discharge permit will require dechlorination prior to discharge. It is recommended that UV disinfection be installed at the facility to replace the chlorine contact basin. The risk management plan that the City currently is required to have would be eliminated by removing chlorine from the site. The UV bulbs may be installed in the existing chlorine contact basin or a new basin could be installed to house the lights. The existing chlorine contact basin is shown in Figure 3-17.

Figure 3-17 Chlorine Contact Basin

3.16 Sludge Recirculation Pumps

The sludge recirculation pumps transfer the sludge through the heat exchanger to keep the digesters heated. The rotary lobe pumps have not lasted as well as expected. It is recommended that when they need to be replaced, a different type of pump will be used.

3.17 Waste Pumps

Figure 3-18 Sludge Recirculation Pumps

The waste pumps pump the thickened sludge from the DAF to the digesters. Currently they are air diaphragm pumps as shown in Figure 3-19. The limitation with these pumps is they require large air compressors and dryers to function properly. If the compressors need to be replaced in the future the pumps could be changed to a different type of pump that would not require the compressors and dryers.

Figure 3-19 Waste Pumps

3.18 Digesters

The existing digesters have the capacity for the current design of the treatment facility. However, if a tank needs to be taken off-line for service, the remaining digesters do not have the capacity necessary to take care of the solids handling at the plant. It is recommended that a new digester to be installed that allows for future growth and adds redundancy to the existing system. The gas hoses on the digesters have reached their design life and should be replaced.

3.19 Digester Mixers

The digester mixers are currently operating properly and should be adequate for a few more years.

3.20 Boiler

There is only a single boiler for the treatment plant at this time shown in Figure 3-20. At times, the digesters cannot

Figure 3-20 Boiler

reach the needed temperature for the digestion process. It is recommended that two new boilers be installed that will increase the heat capacity for the facility. They should be sized for the new digester and the existing digesters.

3.21 Heat Exchanger

Currently there is a tube in tube heat exchanger as shown in Figure 3-21. The heat exchanger is sized to match the boiler and is functioning as anticipated. When larger boilers are installed, heat exchangers need to be upsized also. It is recommended that an additional heat exchanger be paired with the redundant boiler so there is redundancy in the boiler and heat exchanger.

Figure 3-21 Heat Exchanger

3.22 Dewatering Facility

The dewatering facility was constructed recently. The dewatering unit is a Huber screw press and there is room for an additional press in the building. An additional unit would provide redundancy and additional capacity for future growth. In addition, a crane rail in the dewatering building would help with maintenance on the equipment.

3.23 Reuse Pump Station

The reuse pump station stores water in a bolted tank and currently the tank is only used if there is demand beyond what the wastewater plant can supply. This allows the water to become stagnant in the tank and the water quality is degrading. It is recommended to install additional pumps within the system that will cause the flow to continue through the tank, so it is recirculated. This will allow the tank to act as a equalization tank instead of just a storage tank.

3.24 Generator

The existing generator is at design capacity and is reaching its design life. It should be replaced and increased in size to meet the new electrical demands.

3.25 SCADA System

The SCADA system has reached its useful life and should be upgraded with new PLC's and HMI.

CHAPTER 4 - PROCESS SELECTION

4.1 Introduction

At the time of this facility plan, the existing permit has expired and the new permit has not been released. It is anticipated that there will be several changes in the new permit that will be either introduced in the new permit or added to future permits. The following constituents will be included permit limits in the near future:

4.1.1 Ammonia

The ammonia standard was changed in the water quality standards and it is anticipated that ammonia limits will be at most 1 mg/l.

4.1.2 Chlorine

A new model is being used for waste load allocations. This new model is showing that much lower chlorine limits are required in all new permits.

4.1.3 Phosphorus

Utah had adopted a new secondary standard for Phosphorus. In 2020 all discharging mechanical plants are required to meet a limit of 1 mg/l.

4.1.4 Total Inorganic Nitrogen (TIN)

It is anticipated that that a new rule will be implemented through the State which will require a TIN limit from mechanical plants to be 10 mg/l.

4.2 Process Requirements

The ammonia will require additional oxygen in the treatment system and reduce the effectiveness of the old trickling filter. Due to this change, the trickling filter should be replaced with additional activated sludge capacity.

The reduction in chlorine limits will require either dechlorination or UV to be used for disinfection. Converting to UV will remove the need for chlorine and eliminate the need for a risk management plan.

The phosphorus requirements can be either removed using chemical addition or through a biological process. The capital cost for the biological process is much more than the chemical capital costs. However, the biological operating costs are much less expensive than the chemical process. The existing facility has anaerobic digesters so if biological processes are used to remove phosphorus it will be released in the digester. This will require a side stream process to remove the phosphorus before either the decant or the pressate is sent back to the treatment facility. There are several new processes being used for this but they typically require chemical removal of the phosphorus. Therefore, installing chemical phosphorus removal at this time is the best solution until better side stream processes are developed. In the future it is recommended to install biological phosphorus removal assuming the side stream treatment processes become better proven. At this time the chemical phosphorus system can be used if the biological process becomes upset.

The TIN requirement will require anoxic basins to be installed to reduce the nitrogen biologically.

CHAPTER 5 - FACILITY UPGRADE ALTERNATIVES

In this section, the following alternatives were considered for the City of Payson; Do Nothing, 5 MGD with Biological Nutrient Removal (BNR) with redundant chemical nutrient removal, 5 MGD with Advanced Biological Nutrient Removal (ABNR), 5 MGD with ABNR and aerobic stabilization , 5 MGD with BNR and aerobic sludge stabilization, 3 MGD with BNR with redundant chemical nutrient removal, 3 MGD with Advanced Biological Nutrient Removal (ABNR), and 3 MGD with ABNR and aerobic stabilization. 3 MGD with BNR and aerobic sludge stabilization. Each option was evaluated in regard to site layout, installation cost, and operation and maintenance cost.

Statepoint Engineering evaluated strictly chemical phosphorus removal and the chemical dosing caused several process problems. Therefore, chemical precipitation is only being used as a backup to BNR. The Memo can be found in Appendix F.

Total containment, Rapid Infiltration Basins, nor land application options were considered for this report because of the treatment capacity of the existing facility and area each of those would require. The flows from the City of Payson are quite large and regionalization for this quantity of wastewater would be very difficult. Due to the distance and costs associated with regionalization in comparison to the magnitude of the required improvements, regionalization was not considered feasible at this time.

The area that is served by the facility would not change due to this capital facility plan and the only known industrial user for the facility is Payson Fruit Growers, as discussed previously. None of these alternatives described below will have impacts on groundwater since the treatment is closed system and treated water will enter surface water as it is discharged from the facility.

Payson City currently is carrying a total debt of $6,299,932 that they are making a payment of $1,004,674 on 2018. Among that debt, about $110,000 will be paid off by the end of 2018 and another debt of $530,000 should be paid off by 2022, the rest of the existing debt is around

$340,000 per year and should be paid off by the year of 2027. It is the City's plan to have this plan in effect by the year of 2023, thus, existing debt service of $340,000 is included in the fee calculation for each option.

5.1 Do Nothing

The current facility at City of Payson is functional and has additional capacity for some future growth of the community. No major modification would be done to the facility with this alternative. Because there will be no redundant equipment with this alternative, it may be difficult to maintain the effluent standard when maintenance is needed to one of the larger equipment. This option does not include any further treatment for the anticipated nutrient removal regulation. Furthermore, once Payson Fruit Grower uses their permitted 1,400 lbs/day limit, the facility will not only reach its nutrient capacity, but additional 400 lbs/day will not be treated unless some additional treatment system will be installed.

5.1.1 Probable Cost of Do Nothing Option

There will not be any additional debt for this option. Payson City currently is carrying a total debt of $6,299,932 that they made a payment of $1,004,674 in 2018. Among that debt, about $110,000 will be paid off by the end of 2018 and another debt of $530,000 should be paid off by 2022. The rest of the existing debt is around $340,000 and should be paid off by the year of 2027. Anticipated annual operation cost for the Do Nothing option is estimated based on Payson's current annual cost of operation and is shown in Table 5-1 below.

Table 5-1 Do Nothing Option

1.5 MGD	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 4 staff)	$529,065
Professional Services	$102,267
Operating	$534,669
Maintenance	$330,162
Existing Debt Service as of 2023	$340,000
Transfer	$186,982
Total Probable Cost	**$2,023,145**

The annual cost for the Do Nothing option including O&M and debt payment is expected to be $2.0 million, which yields to a minimum monthly user fee of $25.75 with 6,547 ERUs.

5.2 5 MGD Expansion with Redundancy – Chemical Nutrient Removal

The influent is anticipated to reach 5 MGD by 2035. To accommodate extra 2 MGD, significant modifications will be needed for the Payson wastewater treatment plant. Some permit changes are anticipated before this 5 MGD upgrade including following: anoxic/aerobic basin due to anticipated more stringent nutrient requirement, a blower building to accommodate the air requirement for the anoxic/aerobic basin, and UV system to replace the chlorine contact basin.

5.2.1 Headworks Upgrades

The primary pump station needs to be upgraded with a larger pump to transfer a greater influent flow. To accommodate the additional 2 MGD to the current 3 MGD, it is necessary to expand the existing headworks, unless water level on the downstream can be modified 16 inches. It is anticipated that an additional trench and screen will be installed on the south side of the existing headworks structure.

5.2.2 Anaerobic Basin

The existing trickling filter has been nearly reaching its maximum capacity, and it is recommended to be replaced with more efficient biological treatment system. The facility will

need three (3) anaerobic basin trains consists of 20 ft x 200 ft x 17 ft deep basin to treat 5 MGD. It will operate with two duty trains with the third train as standby. The fine bubble diffusers will be installed within each basin. Small bubbles released near the floor of the basin, rise to the surface providing enough air for the growth of the microorganisms. A Blower building will be necessary for this process as it will require significant increase in volume of air compared to the trickling filter.

5.2.3 Anoxic/Aerobic Basin

There will be two (2) anoxic basins with recycle lines from the aerobic basins. While there are many types of mixing systems that could be implemented in anoxic basins, it is recommended to use a simple educator tube mixer for this application. The mixer is a simple design, consists of an 18 inch standpipe, installed at the bottom of the basin with the top of the pipe right below the water surface. An airline connects near the bottom of the mixer and creates an air bubble which rises to the surface within the vertical pipe. The bubble displaces a volume of water, creating mixing currents in the basin. The educator tube does not have any submerged moving parts, which reduces the complexity and frequency of maintenance. Additionally, educator tubes require a relatively small amount of process air that excess air produced from process air blower can be used in the application. The fine bubble diffusers will be installed within the aerobic section of the basin. Small bubbles released near the floor of the basin rise to the surface providing sufficient air to the wastewater for BOD and ammonia reduction as well as complete mixing within a basin.

5.2.4 Chemical Addition for Phosphorus Removal

Some coagulant will likely be added to the water stream at the point between anoxic/aerobic basin and aerobic basin for Phosphorus removal. The coagulant will be pumped into the water stream at a certain rate for dissolved phosphorus to form particulates that can be removed later in the process. This process will require two chemical storage tanks and two metering pumps inside of a building. It is recommended to install an air conditioned/heated building on the south end of the STM aerotor. THe foot print is expected to be approximately 30 ft x40 ft.

5.2.5 Digester (40 ft. diameter)

An additional digester is required for the 5 MGD upgrade expansion. This allows one of the existing digesters to be taken off line when maintenance is needed, while keeping the capacity of digesting 5 MGD.

5.2.6 Blower Building

A blower building will store several blowers that are needed for aerobic basins as well as the anoxic/aerobic basin. There will be a standby blower so that when one of the units is down, the maintenance work can take place without shutting down the treatment system.

5.2.7 DAF Building

Currently, their existing DAF is located outdoor at the facility. Cold weather during winter in Utah County has been interfering the effectiveness of the DAF unit. Also, as it was mentioned in chapter 3, the panel needs to be rebuilt. It is recommended that a building be retrofit over the existing DAF unit to store the DAF unit and its panel within a heated enclosure during winter.

5.2.8 Boiler Building

The existing boiler will be too small for the 5 MGD digesting process. It is recommended that the facility will install at least two new boilers inside of a building that will be heated during winter time. It can be part of the DAF building by extending the structure approximately 30 ft on the south end.

5.2.9 Primary Pump Station

The existing primary pump station is not sufficient for the additional influent volume. A new primary pump station will be required for 5 MGD expansion. The new primary pump station will be located on the North side of the existing primary pump station.

5.2.10 Primary Clarifier (70 ft. diameter)

Two primary clarifiers will be installed in addition to the existing 70-ft primary clarifier. There will be three primary clarifiers total. The new primary clarifiers will be placed where the trickling filter is currently located. Once installed, the facility will be able to perform regular maintenance, inspection, and any repairs on one of the primary clarifiers without disturbing the treatment capacity.

5.2.11 Final Clarifier

An additional final clarifier with a diameter of 70 ft will be required for the 5 MGD expansion. It will be located on the North side of the existing two final clarifiers. This will allow one of the final clarifiers to be down for maintenance or repair while keeping the 5 MGD treatment capacity.

5.2.12 Additional Screw Press

The chemical addition will increase the solid production of the facility. Consequently, an additional screw press should be installed in the existing dewatering building to accommodate the excess solid production.

5.2.13 UV Basin

As previously discussed in chapter 3, it is recommended to convert the existing chlorine contact basin to the UV contact basin. The UV lights can be retrofitted into the existing channel. A building will need to be installed for the UV contact basin.

5.2.14 Filter Building Expansion

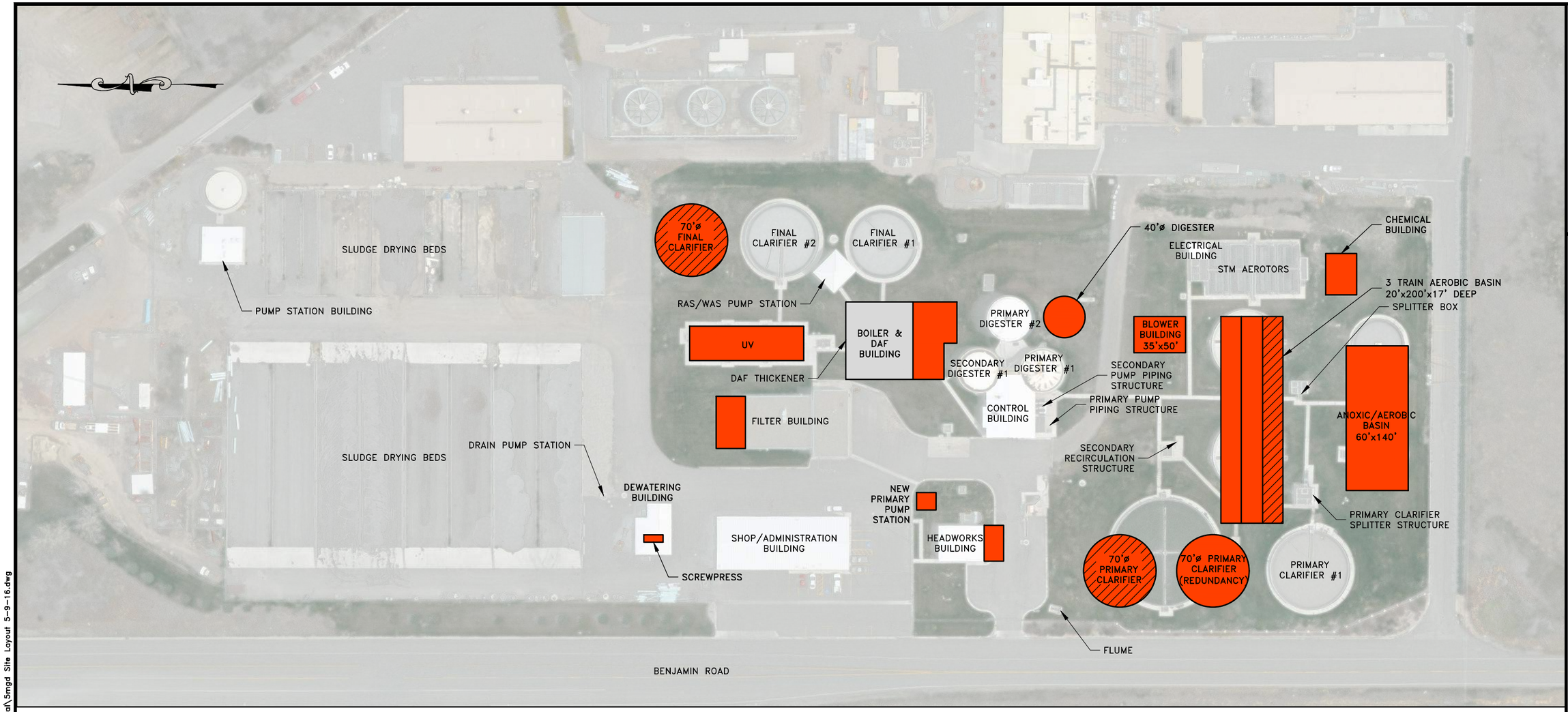
The existing sand filter will need to be replaced with cloth filters to accommodate additional volume of influent for the 5 MGD expansion. The footprint of the basin is likely to stay the same if it is decided to utilize the diamond cloth filters. However, the foot print of the building will expand for additional equipment and controls for the 5 MGD option.

5.2.15 Upgrade Effluent Pipe

Currently the facility has 24 inch diameter discharge from the chlorine contact basin and the Beer Creek Slough. With average design flow of 5 MGD, velocity of the discharge will be 2.5 ft/s. Design peak flow is to be determined at the time of the actual design of the facility, however, it is likely for the peak hourly flow to be at least 8 MGD or larger. The velocity of the outfall will be 4 ft/s once the peak flow is 8 MGD, and that is too rapid for the outfall structure and the existing pipe. It is recommended to increase the discharge pipe line to be minimum of 30 inch diameter line to accommodate the additional flow volume.

5.2.16 Site Layout

The following is the proposed layout for the 5 MGD expansion.



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Scale in Feet

LEGEND

= NEW STRUCTURES IN UPGRADE

= REDUNDANCY IN UPGRADE

NO.	DATE	DESIGN	DRAWN	CHECKED
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REVISIONS

CITY OF PAYSON

WASTEWATER TREATMENT FACILITY UPGRADE

5 MGD SITE LAYOUT

AQUA ENGINEERING
533 W. 2600 S., SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 298-1327 FAX (801) 299-0153

0 1/2 1

DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

FIGURE

FIG 5-1

02/14/2017 X:\Payson\2014 Payson Facility Plan\Drafting\General\5mgd Site Layout 5-9-16.dwg

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5.2.17 5 MGD Expansion Probable Cost

The following cost estimate was developed for the proposed project. Detailed cost estimate can be found in Appendix G.

Table 5-2 Cost 5MGD

DESCRIPTION		COST
Site Work and Yard Piping	$	300,000
Plant Repairs	$	150,000
Demolition	$	124,500
Headworks	$	182,500
Primary Lift Station	$	323,750
Anoxic Basin	$	816,000
Aerobic Basin	$	2,180,000
Primary Clarifier	$	1,930,000
Final Clarifier	$	1,150,000
Digester	$	1,056,000
Solid Handling	$	360,000
Chemical Storage	$	254,400
UV Basin	$	2,400,000
Reuse Pump Station Remodel	$	910,000
Filter Building Upgrade	$	910,000
Boiler & DAF Building	$	1,360,000
Electrical	$	2,721,430
Construction Cost Subtotal	$	16,328,580
Contingency 20%	$	3,265,716
Construction Cost Total	$	19,594,296
Engineering, Construction Observation 10%	$	1,959,430
Legal & Permitting 5%	$	979,715
Total Probable Cost	**$**	**22,533,440**

The estimated cost for the 5 MGD Expansion Upgrade is approximately $22.5 million. Assuming that the total amount is borrowed with 3% interest, the new debt payment would be $1,514,601 a year for next 20 years. Operation and maintenance cost for the 5 MGD option was estimated based on Payson's current annual cost of operation and is shown in Table 5-3 below.

Table 5-3 5 MGD

5 MGD	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 5 staff)	$ 661,331
Professional Services	$ 122,720
Operating	$ 1,336,673
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 1,514,601
Chemical Cost (4.4 mg/L P Removed)	$ 97,723
Total Probable Cost	**$ 4,590,192**

The annual cost for the 5 MGD option including Operation and Maintenance and debt payment is expected to be $4.6 million, which yields to a minimum monthly user fee of $58.43 with 6,547 ERUs, which is an increase of over $26 per ERU per month compared to the monthly fee of the current system.

5.3 - 5 MGD Expansion with Advanced Biological Nutrient Removal System

This option is similar to the 5 MGD Expansion that was previously discussed in Section 5.2. However, it uses Advanced Biological Nutrient Removal (ABNR) system in place of a conventional nutrient removal method such as aerobic basin. The majority of the upgrades to the current facility stays the same as the option discussed in Section 5.2, except for the following.

5.3.1 ABNR System

ABNR uses a patented system by Clearas that harnesses microbiology in a photobioreactor environment to accelerate photosynthesis, the consumption of carbon dioxide, and excess nutrients. Following the system, advanced microfiltration is used to filter out high quality water from return activated algae. The return activated algae can then either flow back to the beginning of the ABNR process or removed from the process, dried, then sold as animal supplements or feedstock, or converted into green bio-oil such as transportation fuels, or high-value chemicals used in the manufacturing of nutraceutical, pharmaceutical, and/or cosmetic

products. For this option, the ABNR will be able to treat 3 MGD. The effluent from the system will have a total phosphorus concentration of 0.035 mg/L and can be blended with the other 2 MGD to have 0.95 mg/L.

ABNR system will require area for the greenhouse as well as the harvesting facility. It is anticipated that those two facilities will take up half of the existing sludge drying beds area.

5.3.2 Anaerobic Basin

Having the ABNR system will require more nutrients in its influent, to be specific, more ammonia, thus, the aerobic basin will be significantly smaller than the one designed for the 5 MGD Option discussed in Section 5.2. If the existing trickling filter is to be replaced with a more efficient biological treatment system, the facility will need three (3) anaerobic basin trains consisting of a 20 ft x 140 ft x 17 ft deep basin. Since less nutrient is required to be removed from its stream, this option will require a basin that is 40 % shorter than the 5 MGD option discussed in section 5.2. It will operate with two duty trains, with the third one as standby. The fine bubble diffusers will be installed within each basin. Small bubbles released near the floor of the basin rise to the surface providing sufficient air for the growth of the microorganisms. A blower building will be required for this process as it will require significant volume of air compared to the trickling filter; the blower size will be discussed later in this section.

5.3.3 Anoxic/Aerobic Basin

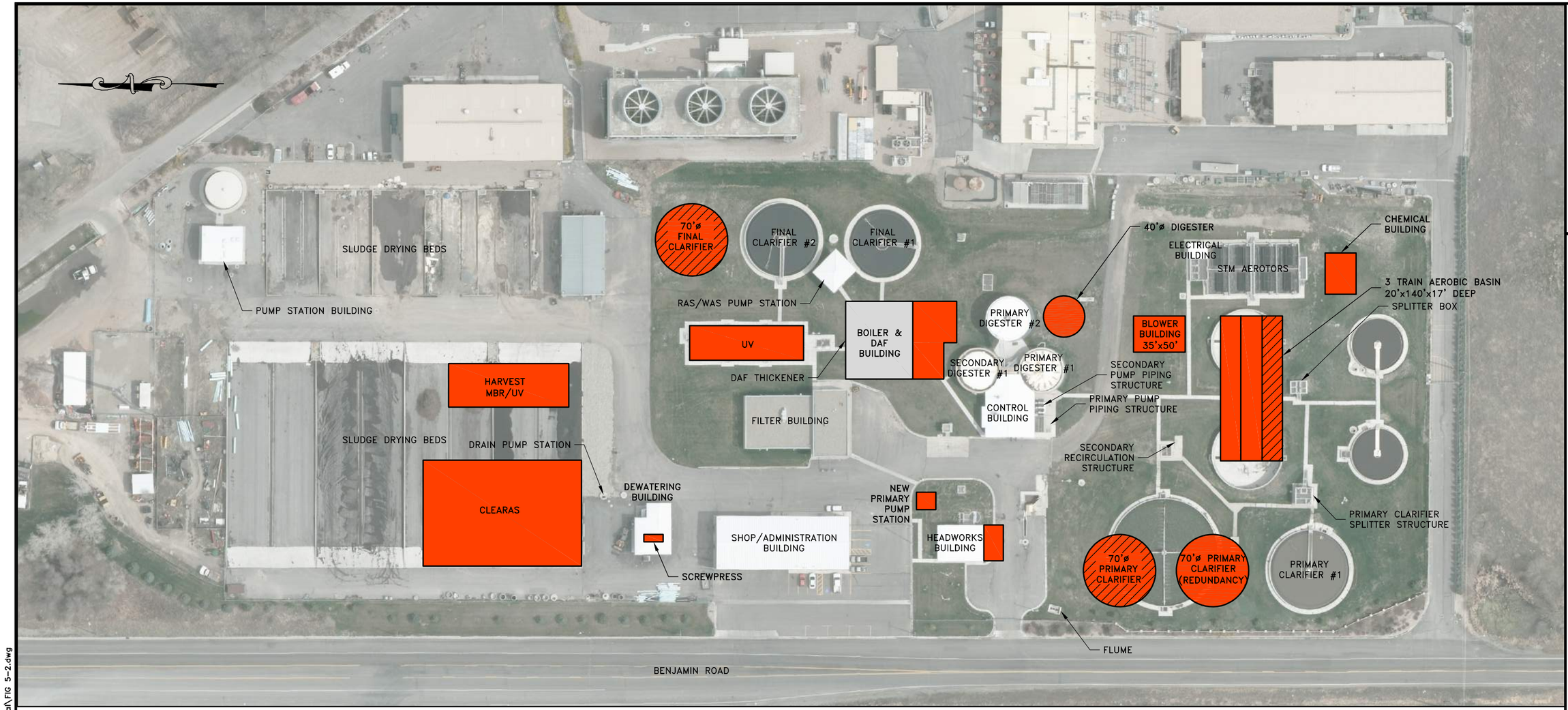
Since both Phosphorus and Ammonia will be removed by the ABNR, there will be no need for the additional Anoxic/Aerobic Basin for this Option.

5.3.4 Chemical Addition for Phosphorus Removal

As previously mentioned, Phosphorus will be removed by the ABNR system so there will not be any chemical addition for the 5MGD with ABNR Option.

5.3.5 Site Layout

The following is the proposed layout for the 5 MGD expansion with ABNR.



0 50 100
Scale in Feet

LEGEND

= NEW STRUCTURES IN UPGRADE

= REDUNDANCY IN UPGRADE

NO.	DATE	DESIGN	DRAWN	CHECKED
0	00/00/0000	–	–	–

REVISIONS

CITY OF PAYSON

WASTEWATER TREATMENT FACILITY UPGRADE

5 MGD SITE LAYOUT / 3 MGD CLEARAS

AQUA ENGINEERING
533 W 2800 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

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DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

FIGURE

FIG 5-2

05/26/2019 X:\Payson\2014 Payson Facility Plan\Drafting\General\FIG 5-2.dwg

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5.3.6 5 MGD with ABNR Probable Cost

The following cost estimate was developed for the proposed project. Although the capital expense for this option is significantly higher than that of 5 MGD expansion with conventional nutrient removal system, potential sales of algae from this system could offset the cost and pay itself off quicker and bring revenue from the sales.

Table 5-4 Cost for 5 MGD with ABNR

DESCRIPTION	COST
Site Work and Yard Piping	$ 300,000
Plant Repairs	$ 150,000
Demolition	$ 116,250
Headworks	$ 170,000
Primary Lift Station	$ 312,500
Aerobic Basin	$ 1,640,000
Primary Clarifier	$ 1,895,000
Final Clarifier	$ 1,150,000
Digester	$ 1,056,000
Solid Handling	$ 360,000
Advanced Biological Nutrient Removal (3MGD Bended Flow Treatment)	$ 15,200,000
UV Basin	$ 1,800,000
Reuse Pump Station Remodel	$ 110,000
Boiler & DAF Building	$ 1,120,000
Electrical	$ 3,806,963
Construction Cost Subtotal	**$ 29,186,713**
Contingency 20%	$ 5,837,343
Construction Cost Total	$ 35,024,055
Engineering, Construction Observation 10%	$ 3,502,406
Legal & Permitting 5%	$ 1,751,203
Total Probable Cost	**$ 40,277,663**

The estimated cost for the 5 MGD Expansion with ABNR Upgrade is approximately $40 million. Assuming that the total amount is borrowed with 3% interest, the new debt payment would be $2,690,224 a year for next 20 years. Operation and maintenance cost for the 5 MGD with ABNR option was estimated based on Payson's current annual cost of operation and is shown in Table 5-5 and Table 5-6 below.

Table 5-5 5 MGD with ABNR without Algae Revenue

5 MGD with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 5 staff)	$ 661,331
Professional Services	$ 122,720
ABNR O&M	$ 1,732,000
Operating	$ 1,336,673
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 2,707,292
Revenue from Algae ($0.5 to $2 per lb, $0 used)	$0
Total Probable Cost	**$ 7,417,160**

Table 5-6 5 MGD with ABNR with Algae Revenue ($0.75/lb)

5 MGD with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 5 staff)	$ 661,331
Professional Services	$ 122,720
ABNR O&M	$ 1,732,000
Operating	$ 1,336,673
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 2,707,292
Revenue from Algae ($0.5 to $2 per lb, $.75 used)	($1,595,415)
Total Probable Cost	**$ 5,821,745**

Table 5-6 is the cost of annual fee if there is no revenue from the algae sales. The expected fee including O&M, debt payment is approximately $7.4 million per year. The annual probable cost yields to a minimum monthly user fee of $94.41 with 6,547 ERUs, which is over $62 increase per ERU per month compared to the current system.

In Table 5-7, the assumption of the revenue from algae, $.75 per pound was used for the cost analysis. The revenue of the algae sales can vary depending on the market for the algae. The

annual fee for the 5 MGD with ABNR option is expected to be $5.8 million including the revenue from algae expected to be $1.6 million per year. The annual probable cost yields to a minimum monthly user fee of $74.10 with 6,547 ERUs, which is an increase of over $42 per ERU per month compared to the anticipated monthly fee of the current system. At this time, it is anticipated that the loans would need to be guaranteed with user fees so the algae sales would not be credited until the sales were established in the future.

5.4 5 MGD Expansion with ABNR, Aerobic Stabilization

This option is similar to the 5 MGD Expansion with ABNR that was previously discussed in Section 5.3. This option utilizes as many of the existing structures as possible to reduce the overall cost of the installment yet have the efficiency to remove more nutrients than the current system. Following includes the elimination and additional equipment and/or structures needed for this option.

5.4.1 Convert Anaerobic Digesters to Aerobic Stabilization Tanks

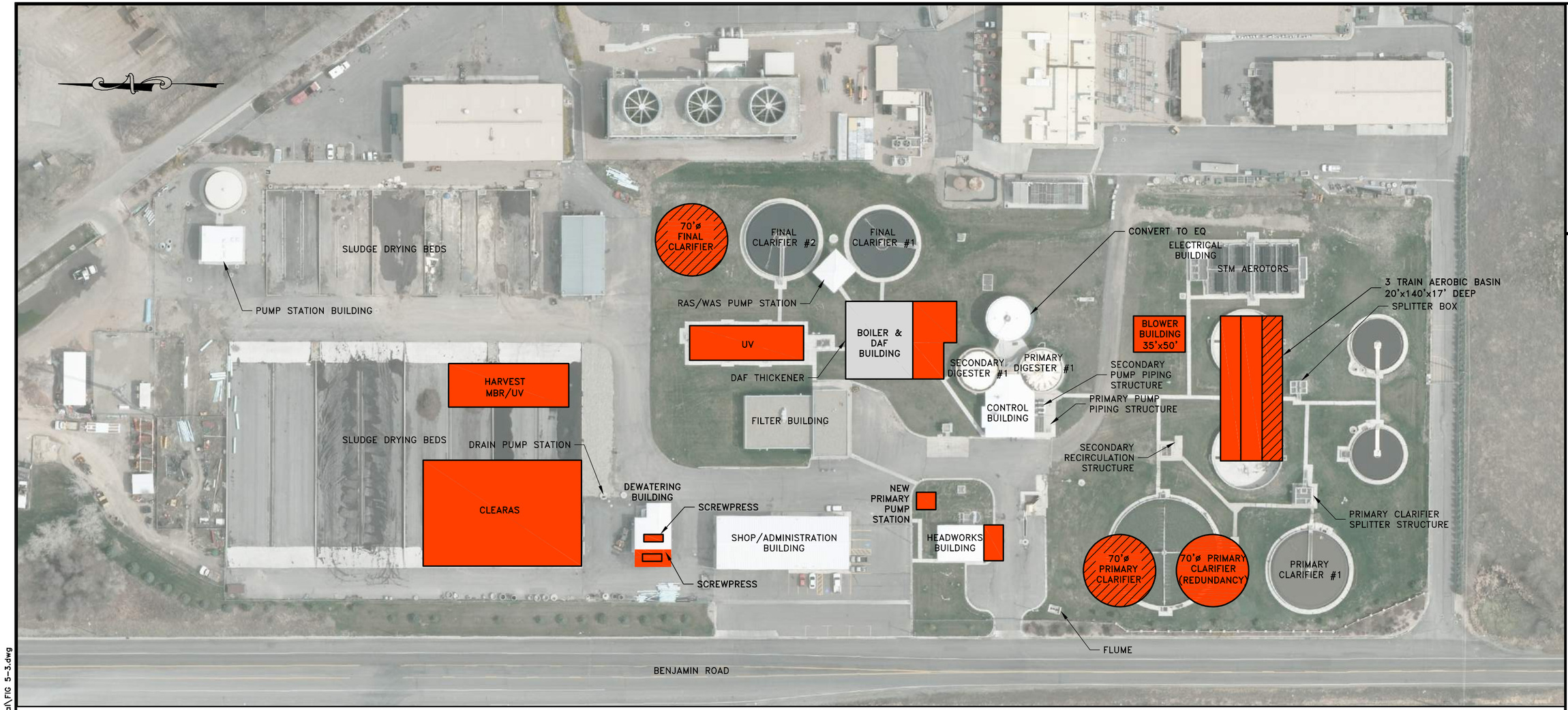
The anaerobic digesters will be aerated and used as equalization tanks for dewatering.

5.4.2 Solid Handling Equipment

It is anticipated that this option will produce more sludge off of digestion when compared to the 5 MGD with ABNR option. Therefore, it requires two (2) more dewatering equipment. It will operate with two duty units and one standby.

5.4.3 Site Layout

The following is the proposed layout for the 5 MGD with ABNR and aerobic stabilization.



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Scale in Feet

LEGEND

= NEW STRUCTURES IN UPGRADE

= REDUNDANCY IN UPGRADE

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REVISIONS

CITY OF PAYSON

WASTEWATER TREATMENT FACILITY UPGRADE

5 MGD SITE LAYOUT / 3 MGD CLEARAS/AEROBIC STABILIZATION

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FIGURE

FIG 5-3

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5.4.4 5 MGD with ABNR Probable Cost

The following cost estimate was developed for the proposed project. Since this option does not include constructions of aerobic basins, primary clarifiers, the DAF building, and a digester, when compared to the 5MGD with ABNR option, it is slightly less expensive than the previous option discussed. However, the production of the algae depends on the influent volume, therefore, the anticipated revenue will be the same for both options. Below is the expected capital cost for this option.

Table 5-7 Cost for 5 MGD with ABNR, Aerobic Stabilization

DESCRIPTION	COST
Site Work and Yard Piping	$ 300,000
Plant Repairs	$ 150,000
Demolition	$ 36,000
Headworks	$ 195,000
Primary Lift Station	$ 312,500
Aerobic Basin	$ 2,038,000
Primary Clarifier	$ 1,895,000
Final Clarifier	$ 1,150,000
Convert Anaerobic Digester to Aerobic Eq Tanks	$ 380,000
Solid Handling	$ 850,000
Advanced Biological Nutrient Removal (3MGD Bended Flow Treatment)	$ 15,200,000
UV Basin	$ 840,000
Reuse Pump Station Remodel	$ 110,000
Electrical	$ 3,518,475
Construction Cost Subtotal	**$ 26,974,975**
Contingency 20%	$ 5,394,995
Construction Cost Total	$ 32,369,970
Engineering, Construction Observation 10%	$ 3,236,997
Legal & Permitting 5%	$ 1,618,499
Total Probable Cost	**$ 37,225,466**

The estimated cost for the 5 MGD Expansion with ABNR, Anaerobic Digestion Upgrade is approximately $37 million. Assuming that the total amount is borrowed with 3% interest, the new debt payment would be $2,502,136 a year for next 20 years. Operation and maintenance cost for the 5 MGD with ABNR, Anaerobic Digestion option was estimated based on Payson's current annual cost of operation and is shown in Table 5-8 and Table 5-9 below.

Table 5-8 5 MGD Aerobic Stabilization with ABNR without Algae Revenue

5 MGD Aerobic Stabilization with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 5 staff)	$ 661,331
Professional Services	$ 122,720
ABNR O&M	$ 1,732,000
Operating	$ 1,336,673
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 2,502,136
Revenue from Algae ($0.5 to $2 per lb, $0 used)	$0
Total Probable Cost	**$ 7,212,004**

Table 5-9 5 MGD Aerobic Stabilization with ABNR with Algae Revenue ($0.75/lb)

5 MGD Aerobic Stabilization with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 5 staff)	$ 661,331
Professional Services	$ 122,720
ABNR O&M	$ 1,732,000
Operating	$ 1,336,673
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 2,502,136
Revenue from Algae ($0.5 to $2 per lb, $.75 used)	($1,595,415)
Total Probable Cost	**$ 5,616,589**

Table 5-8 is the cost of operation if there is no revenue from the algae sales. The expected fee is approximately $7.2 million per year. The annual probable cost yields to a minimum monthly user fee of $91.80 with 6,547 ERUs, which is $60 increase per ERU per month compared to the current system.

In Table 5-9, the assumption of the revenue from algae, $0.75 per pound was used for the cost analysis. The revenue of the algae sales can vary depending on the market for the algae. The annual fee for the 5 MGD with ABNR option is expected to be $5.6 million including the revenue from algae expected to be $1.6 million per year. The annual probable cost yields to a

minimum monthly user fee of $71.49 with 6,547 ERUs, which is an increase of over $39 per ERU per month compared to the anticipated monthly fee of the current system.

5.5 5 MGD Expansion with Aerobic Stabilization

This option is similar to the 5 MGD Expansion in Section 5.2. This option utilizes as many of the existing structures as possible to reduce the overall cost of the installment yet have the efficiency to remove more nutrients than the current system. Following includes the elimination and additional equipment and/or structures needed for this option.

5.5.1 Convert anaerobic digesters to aerobic stabilization tanks

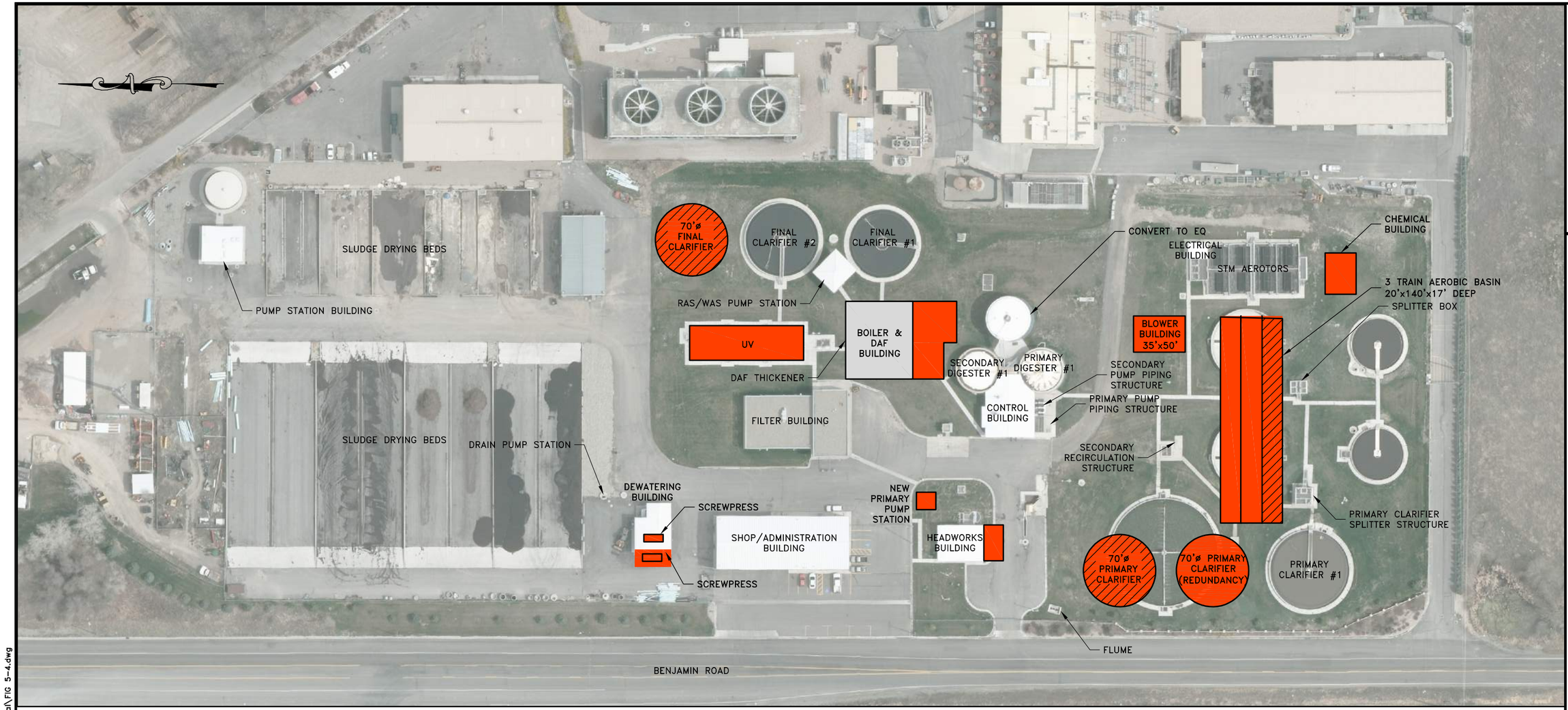
The anaerobic digesters will be aerated and used as equalization tanks for dewatering.

5.5.2 Solid Handling Equipment

It is anticipated that this option will produce more sludge off of digestion when compared to the 5 MGD with ABNR option. Therefore, it requires two (2) more dewatering equipment. It will operate with two duty units and one standby.

5.5.3 Site Layout

The following is the proposed layout for the 5 MGD expansion.



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Scale in Feet

LEGEND

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WASTEWATER TREATMENT FACILITY UPGRADE

5 MGD SITE LAYOUT /AEROBIC STABILIZATION

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FIGURE

FIG 5-4

05/26/2019 X:\Payson\2014 Payson Facility Plan\Drafting\General\FIG 5-4.dwg

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5.5.4 5 MGD with ABNR Probable Cost

The following cost estimate was developed for the proposed project. Since this option does not include constructions of aerobic basins, primary clarifiers, the DAF building, and a digester, when compared to the 5MGD with ABNR option, it is slightly less expensive than the previous option discussed. However, the production of the algae depends on the influent volume, therefore, the anticipated revenue will be the same for both options. Below is the expected capital cost for this option.

Table 5-10 Cost for 5 MGD with Aerobic Stabilization

DESCRIPTION	COST
Site Work and Yard Piping	$ 300,000
Plant Repairs	$ 150,000
Demolition	$ 124,500
Headworks	$ 182,500
Primary Lift Station	$ 323,750
Anoxic Basin	$ 816,000
Aerobic Basin	$ 2,180,000
Primary Clarifier	$ 1,930,000
Final Clarifier	$ 1,150,000
Solid Handling	$ 720,000
Chemical Storage	$ 254,400
UV Basin	$ 2,400,000
Reuse Pump Station Remodel	$ 110,000
Filter Building Upgrade	$ 910,000
Convert Anaerobic Digester to Aerobic Eq Tanks	$ 380,000
Electrical	$ 2,386,230
Construction Cost Subtotal	$ 14,317,380
Contingency 20%	$ 2,863,476
Construction Cost Total	$ 17,180,856
Engineering, Construction Observation 10%	$ 1,718,086
Legal & Permitting 5%	$ 859,043
Total Probable Cost	**$ 19,757,984**

The estimated cost for the 5 MGD Expansion with Aerobic Stabilization Upgrade is approximately $19.7 million. Assuming that the total amount is borrowed with 3% interest, the new debt payment would be $2,318,661 a year for next 20 years. Operation and maintenance

cost for the 5 MGD with ABNR, Anaerobic Digestion option was estimated based on Payson's current annual cost of operation and is shown in Table 5-8 below.

Table 5-11 5 MGD with Aerobic Stabilization

5 MGD With Aerobic Stabilization	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 5 staff)	$ 661,331
Professional Services	$ 122,720
Operating	$ 1,336,673
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 1,328,047
Chemical Cost (4.4 mg/L P Removed)	$ 97,723
Total Probable Cost	**$ 4,403,638**

Table 5-8 is the annual cost for the 5 MGD with aerobic stabilization including Operation and Maintenance and debt payment is expected to be $4.4 million, which yields to a minimum monthly user fee of $56.05 with 6,547 ERUs, which is an increase of over $24 per ERU per month compared to the monthly fee of the current system.

5.6 3 MGD Expansion with Redundancy

The overall capacity of the existing plant is 3 MGD. At the capacity of 3 MGD, the plant should be able to operate until about 2022 based on the population growth. However, the changes in the permit require several upgrades prior to 2022. To be specific, the chemical addition for the phosphorus removal will have to be installed by January of 2020 as required by Utah DEQ. In addition, it is recommended to have redundancy on some of the major treatment equipment in case of maintenance and/or major repair on the equipment. This alternative would upgrade the treatment facility to meet the new requirements in the permit and add redundancy for the main process.

5.6.1 Primary Clarifier (70 ft. diameter)

A primary clarifier will be installed to duplicate the treatment of the existing 70-ft primary clarifier. The primary clarifier will be placed where the existing trickling filter is located. Once installed, the facility will be able to perform regular maintenance, inspection, and any repairs on the primary clarifier without disturbing the treatment capacity.

5.6.2 Anaerobic Basin

The existing trickling filter has almost reached its maximum capacity, and it is recommended to be replaced with more efficient biological treatment system. The 3 MGD upgrade will require one (1) train with a dimension of 20 ft x 100 ft x 17 ft deep basin, therefore, two (2) trains are recommended to be installed for redundancy. The fine bubble diffusers will be installed within each basin. This process requires significantly greater volume of air compared to the trickling filter. It is anticipated that there will be a heated building with blowers inside; approximate area is 35 ft x 50 ft.

5.6.3 Blower Building

The blower building will store several blowers that are needed for aerobic basins. It is recommended a standby blower be installed so that when one of the units is taken off-line, the facility can still treat the full capacity without disturbance.

5.6.4 Chemical Addition for Phosphorus Removal

Some coagulant will likely to be added to the water stream after aerobic basin for Phosphorus removal. This process will require two chemical storage tanks and two metering pumps inside of a heated building. The coagulant will be pumped into the water stream at a certain rate for dissolved phosphorus to form particulates that can be removed later on in the process.

These chemicals will need to be stored indoors with a heater during winter months. A building approximately 30 ft x30 ft is required for the chemical storage and other equipment that will be required.

5.6.5 DAF Building

Currently the DAF is located outdoor at the Payson wastewater treatment facility. As a result, cold weather during winter time seems to reduce the effectiveness of the DAF unit. Also, the panel has not been functioning correctly and needs to be rebuilt. It is recommended that the building be retrofitted over the existing DAF unit to protect both the unit and the panel from cold winter weather.

5.6.6 Boiler Building

The existing boiler is undersized for the current digesters. It is recommended that the facility will install at least two new boilers inside of a building that will be heated during winter time. It can be part of the DAF building by extending the structure approximately 30 ft on the south end.

5.6.7 Heat Exchangers

Along with the additional boiler, two new heat exchangers need to be installed to work with the boilers to heat the digesters. Those heat exchangers can be in the same building as the boilers.

5.6.8 Final Clarifier

A final clarifier with a diameter of 70 feet is recommended to be installed at the Payson wastewater treatment facility. The new final clarifier will be placed on the north side of the existing final clarifiers. Having three final clarifiers will allow the maximum treatment capacity of 4.95 MGD for the final clarifying process. This will allow the facility to run two final clarifiers to meet the capacity of 3 MGD, but gives ability to take one of the final clarifiers off line when needed.

5.6.9 Additional Screw Press

The chemical addition will increase the solid production of the facility. An additional screw press should be installed in the existing dewatering building to dewater the additional solids.

5.6.10 UV Basin

The chlorine contact basin should be converted to UV lights for disinfection process. The UV lights can be retrofitted into the existing channel. A building will also need to be installed over the existing chlorine contact basin for the UV contact basin conversion.

5.6.11 Old Drying Bed Pump Station

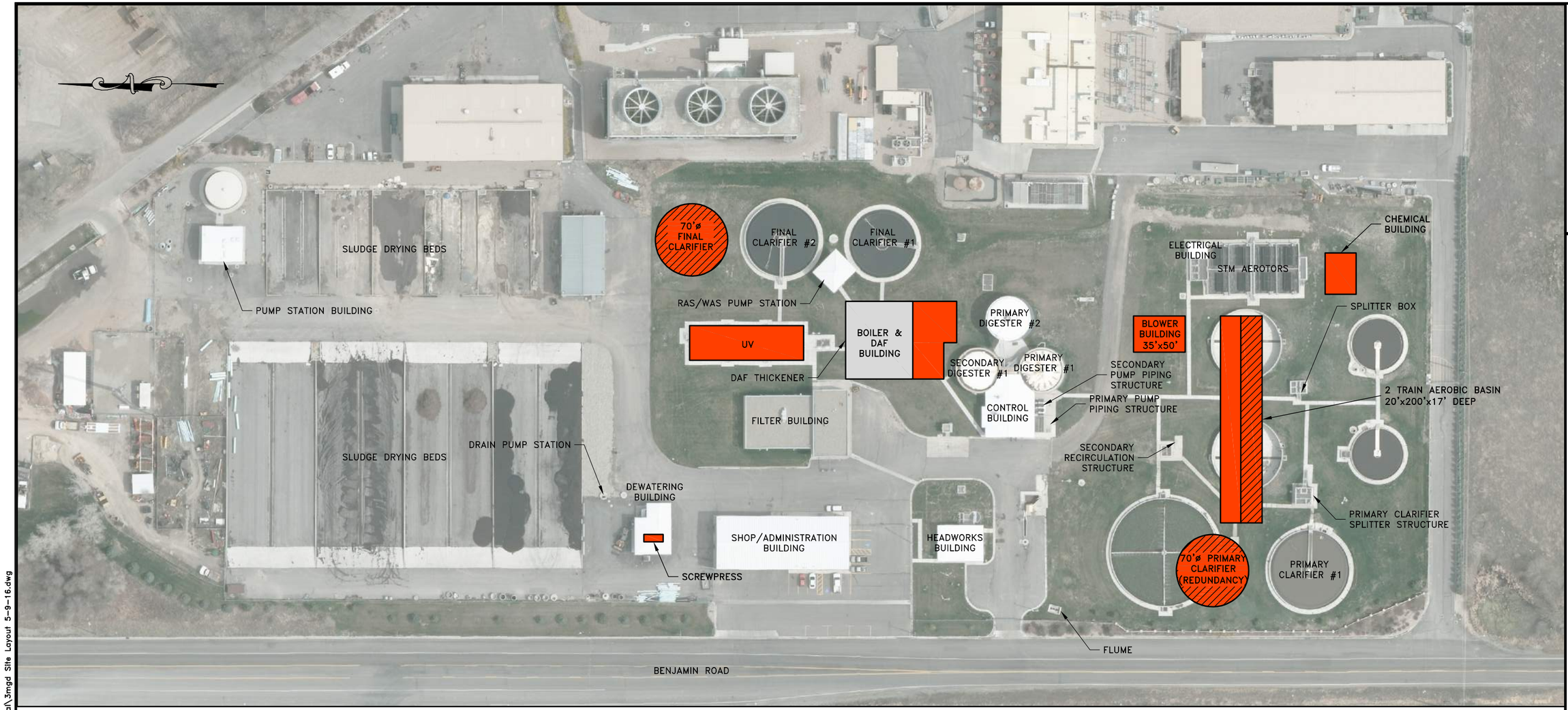
The pump station located near the old drying beds needs to be upgraded. It is currently pumping water from the power plant and needs to be upgraded.

5.6.12 Digester Piping

The piping in the digester building is old and needs to be replaced.

5.6.13 Site Layout

The proposed layout for the 3 MGD expansion is shown in Figure 5-5.



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Scale in Feet

LEGEND

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REVISIONS

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WASTEWATER TREATMENT FACILITY UPGRADE

3 MGD SITE LAYOUT

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DRAWING IS TO SCALE
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FIGURE

FIG 5-5

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5.6.14 3MGD Expansion Probable Cost

The following cost estimate was developed for the proposed project.

Table 5-12 Cost 3MGD

DESCRIPTION				COST
Site Work and Yard Piping			$	320,000
Plant Repairs			$	150,000
Demolition			$	94,500
Aerobic Basin			$	1,560,000
Primary Clarifier			$	1,115,000
Final Clarifier			$	1,150,000
Solid Handling			$	360,000
Chemical Storage			$	314,400
UV Basin			$	1,320,000
Reuse Pump Station Remodel			$	110,000
Filter Building			$	660,000
Boiler & DAF Building			$	960,000
Electrical			$	1,622,780
		Construction Cost Subtotal	**$**	**9,736,680**
		Contingency 20%	$	1,947,336
		Construction Cost Total	$	11,684,016
	Engineering, Construction Observation 10%		$	1,168,402
		Legal & Permitting 5%	$	584,201
		Total Probable Cost	**$**	**13,436,618**

The estimated cost for the 3 MGD Expansion Upgrade is approximately $13.4 million. Assuming that the total amount is borrowed with 3% interest, the debt payment would be $903,723 a year for next 20 years. Running cost for the 3 MGD option was estimated based on Payson's current annual cost of operation and is shown in Table 5-13 below.

Table 5-13 3 MGD

3 MGD		
DESCRIPTION	**Annual Cost**	
Employee Related (assuming 4 staff)	$	529,065
Professional Services	$	102,267
Operating	$	668,336
Maintenance	$	330,162
Transfer	$	186,982
Existing Debt Service as of 2023	$	340,000
New Debt Service	$	903,152
Chemical Cost (4.4 mg/L P Removed)	$	97,723
Total Probable Cost	**$**	**3,157,687**

The annual fee for the 3 MGD option including O&M and debt payment is expected to be $3.1 million, which yields to a minimum monthly user fee of $40.19 with 6,547 ERUs, which is an increase of $8.30 per ERU per month compared to the anticipated monthly fee of the current system.

5.7 3 MGD Expansion with Advanced Biological Nutrient Removal System

This option is similar to the 3 MGD Expansion that was previously discussed in Section 5.4. However, it uses Advanced Biological Nutrient Removal (ABNR) system in place of conventional nutrient removing method such as aerobic basin. Majority of the upgrades to the current facility stays the same as the option discussed in Section 5.4, except for the following.

5.7.1 ABNR System

For this option, the ABNR will be able to treat 2 MGD, expected total phosphorus concentration of 0.035 mg/L will be the effluent.

5.7.2 Aerobic Basin

Having the ABNR system will require more nutrients in its influent, to be specific, more ammonia, thus, aerobic basin will be significantly smaller than the one designed for the 5 MGD

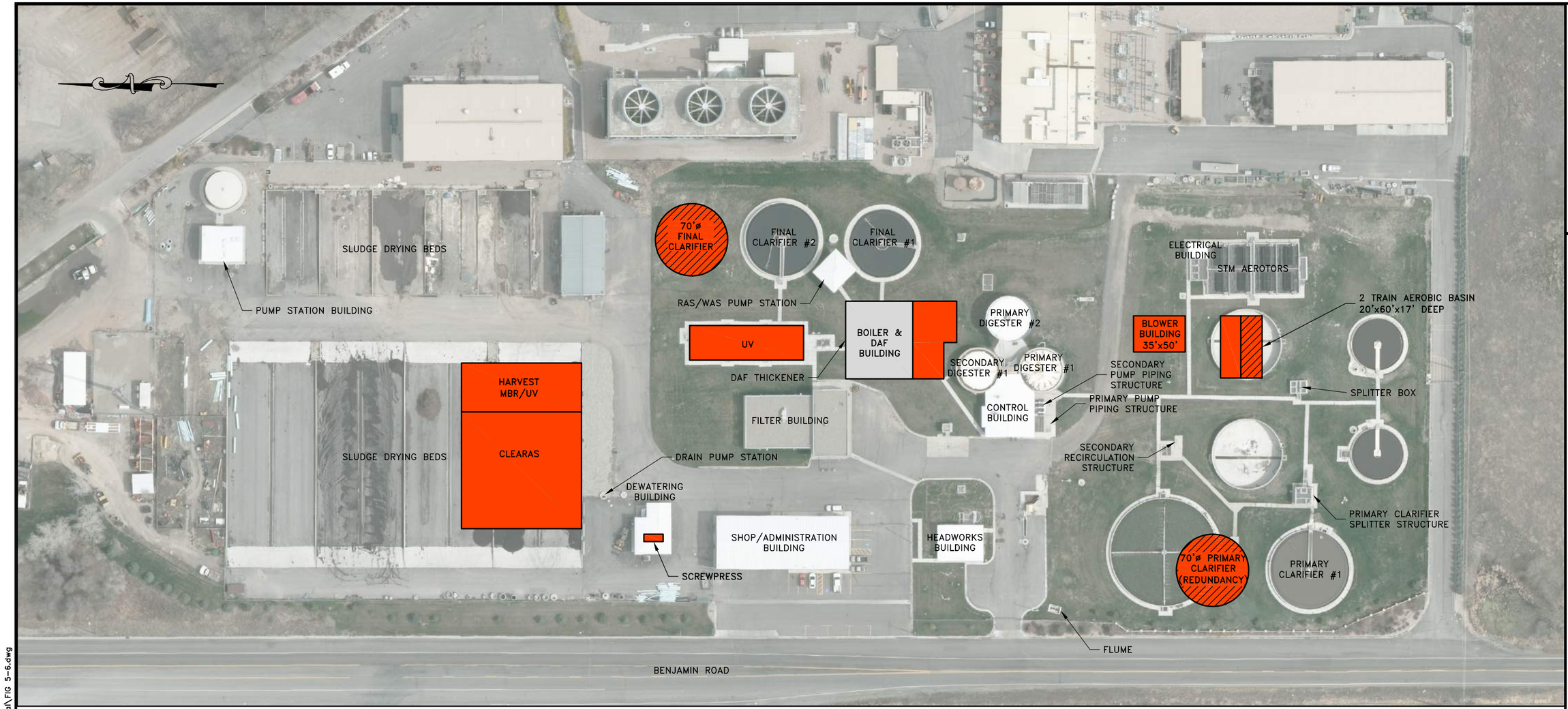
Option discussed in Section 5.4. If the existing trickling filter is to be replaced with more efficient biological treatment system, the facility will need three (3) anaerobic basin trains consists of 20 ft x 60 ft x 17 ft deep basin. Which is 40 % reduction in the length of the basin from 3 MGD Option. It is expected to operate as discussed for 3 MGD Option previously in Section 5.4.2.

5.7.3 Chemical Addition for Phosphorus Removal

As previously mentioned, Phosphorus will be removed by the ABNR system, there will not be any chemical addition for the 3 MGD with ABNR Option.

5.7.4 Site Layout

The proposed layout for the 3 MGD expansion with ABNR Option is shown in Figure 5-6.



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Scale in Feet

LEGEND

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REVISIONS

CITY OF PAYSON

WASTEWATER TREATMENT FACILITY UPGRADE

3 MGD SITE LAYOUT / 2 MGD CLEARAS

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FIGURE

FIG 5-6

05/26/2019 X:\Payson\2014 Payson Facility Plan\Drafting\General\FIG 5-6.dwg

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5.7.5 3 MGD with ABNR Probable Cost

The following cost estimate was developed for the proposed project. Although the capital expense for this option is significantly higher than that of the 3 MGD expansion with conventional nutrient removal system, potential sales of algae from this system could offset the cost and pay itself off quicker and bring revenue from the sales of the dried algae.

Table 5-14 Cost 3 MGD with ABNR

DESCRIPTION				COST
Site Work and Yard Piping				$ 320,000
Plant Repairs				$ 150,000
Demolition				$ 68,750
Aerobic Basin				$ 745,000
Primary Clarifier				$ 1,115,000
Final Clarifier				$ 1,150,000
Solid Handling				$ 360,000
Advanced Biological Nutrient Removal (2MGD Blended Flow Treatment)				$ 10,970,000
UV Basin				$ 720,000
Reuse Pump Station Remodel				$ 110,000
Boiler & DAF Building				$ 960,000
Electrical				$ 2,500,313
			Construction Cost Subtotal	**$ 19,169,063**
			Contingency 20%	$ 3,833,813
			Construction Cost Total	$ 23,002,875
			Engineering, Construction Observation 10%	$ 2,300,288
			Legal & Permitting 5%	$ 1,150,144
			Total Probable Cost	**$ 26,453,306**

The estimated cost for the 3 MGD Expansion with ABNR Upgrade is approximately $26.5 million. Assuming that the total amount is borrowed with 3% interest, the debt payment would be $1,778,078 a year for next 20 years. User cost for the 3 MGD with ABNR option was estimated based on Payson's current annual cost of operation and is shown in Table 5-15 below.

Table 5-15 3 MGD with ABNR without Algae Revenue

3 MGD with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 4 staff)	$ 529,065
Professional Services	$ 102,267
ABNR O&M	$ 604,646
Operating	$ 668,336
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 1,778,078
Revenue from Algae ($0.5 to $2 per lb, $0 used)	$0
Total Probable Cost	**$ 4,539,536**

Table 5-15 is the cost of operation if there is no revenue from the algae sales. The expected fee is approximately $4.5 million per year. The annual probable cost yields to a minimum monthly user fee of $57.78 with 6,547 ERUs, which is a $26 increase per ERU per month compared to the current system.

Table 5-16 3 MGD with ABNR with Algae Revenue

3 MGD with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 4 staff)	$ 529,065
Professional Services	$ 102,267
ABNR O&M	$ 604,646
Operating	$ 668,336
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 1,778,078
Revenue from Algae ($0.5 to $2 per lb, $.75 used)	($1,595,415)
Total Probable Cost	**$ 2,944,121**

In Table 5-16, the assumption of the revenue from algae, $0.75 per pound was used for the cost analysis. The revenue of the algae sales can vary depending on the market for the algae. The annual for the 3 MGD with ABNR option is expected to be $2.9 million including the revenue from algae expected to be $1.6 million per year. The annual probable cost yields to a minimum

monthly user fee of $37.47 with 6,547 ERUs, which is an increase of $5.58 per ERU per month compared to the anticipated monthly fee of the current system.

5.8 3 MGD Expansion with ABNR, Aerobic Stabilization

This option is similar to the 3 MGD Expansion with ABNR that was previously discussed in Section 5.6. This option utilizes as many of the existing structures as possible to reduce the overall cost of the installment yet has the efficiency to remove more nutrients than the current system. The following includes the elimination and additional equipment and/or structures needed for this option.

5.8.1 Primary Clarifier

In this option, the existing two (2) primary clarifiers will be kept. One of the clarifiers will need a new clarifier mechanism as it was discussed in Section 3.

5.8.2 Anaerobic Basin

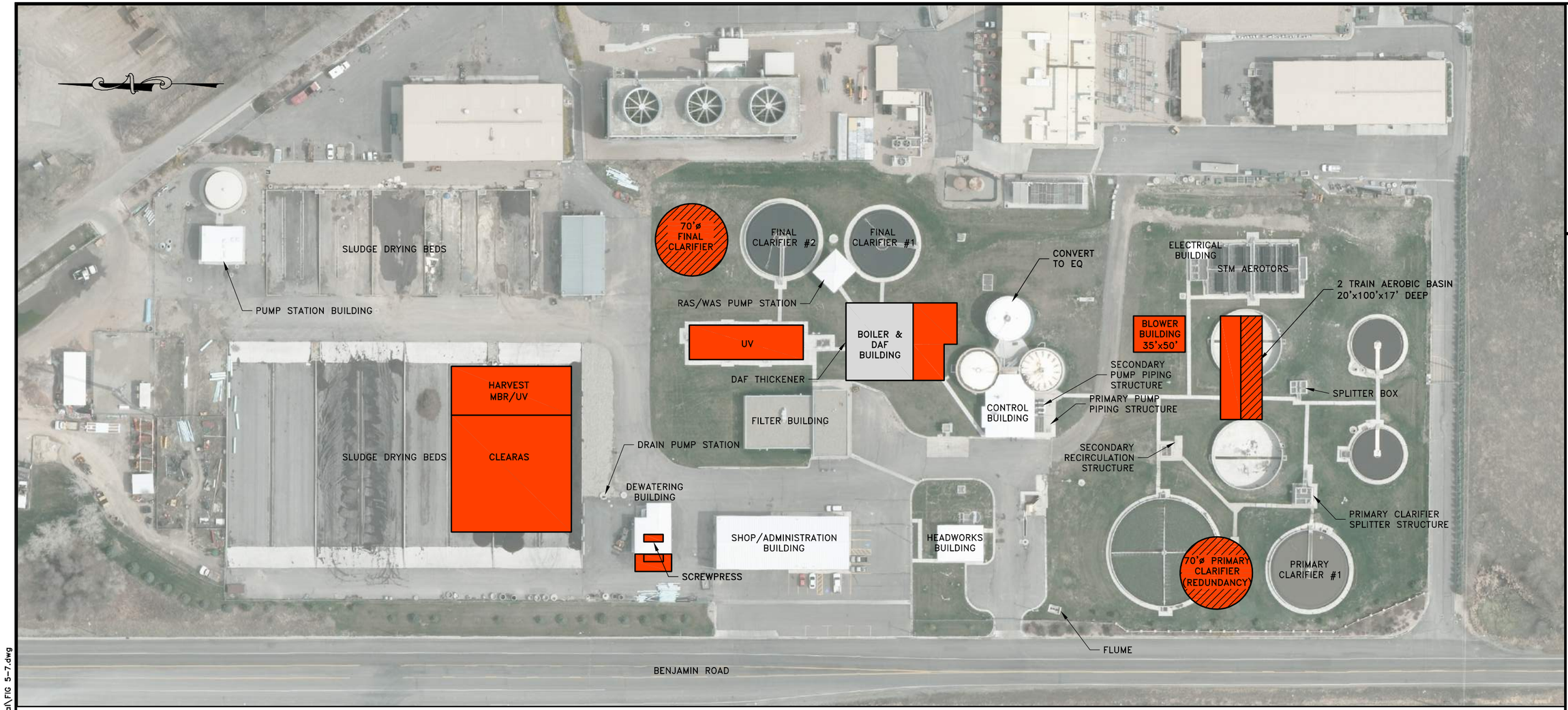
The existing trickling filter has been reaching its maximum capacity, and it is recommended to be replaced with a more efficient biological treatment system. The facility will need three (3) anaerobic basin trains consisting of a 20 ft x 80 ft x 17 ft deep basin. This basin is larger than what is required in the previous option; this is due to its longer duration of the digestion, however, it is still smaller than what is required for the Anaerobic-Anoxic- Aerobic basin options discussed in Section 5.5.

5.8.3 Solid Handling Equipment

It is anticipated that this option will produce more sludge off of digestion when compared to the 5 MGD with ABNR option. Therefore, it requires two (2) more dewatering equipment. It will operate with two duty units and one standby.

5.8.4 Site Layout

The following is the proposed layout for the 3 MGD with ABNR and Aerobic Stabilization expansion.



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Scale in Feet

LEGEND

= NEW STRUCTURES IN UPGRADE

= REDUNDANCY IN UPGRADE

NO.	DATE	DESIGN	DRAWN	CHECKED
0	05/09/16	--	--	--

REVISIONS

CITY OF PAYSON

WASTEWATER TREATMENT FACILITY UPGRADE

3 MGD SITE LAYOUT / 2 MGD CLEARAS, AEROBIC STABILIZATION

AQUA ENGINEERING
533 W. 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

0 1/2 1

DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

FIGURE

FIG 5-7

KRB 05/26/2019 X:\Payson\2014 Payson Facility Plan\Drafting\General\FIG 5-7.dwg

5.8.5 3 MGD with ABNR Probable Cost

The following cost estimate was developed for the proposed project. Since this option does not include constructions of aerobic basins, primary clarifiers, the DAF building and a digester, when compared to the 3 MGD with ABNR option, it is slightly less expensive than the previous option discussed. However, the production of the algae depends on the influent volume, therefore, the anticipated revenue will be the same for both options. Below is the expected capital cost for this option.

Table 5-17 Cost for 3 MGD with ABNR, Aerobic Stabilization

DESCRIPTION		COST
Site Work and Yard Piping	$	220,000
Plant Repairs	$	150,000
Demolition	$	36,000
Aerobic Basin	$	878,000
Primary Clarifier	$	335,000
Final Clarifier	$	1,150,000
Solid Handling	$	950,000
Advanced Biological Nutrient Removal (2MGD Blended Flow Treatment)	$	10,970,000
UV Basin	$	660,000
Reuse Pump Station Remodel	$	110,000
Electrical	$	2,375,850
Construction Cost Subtotal	**$**	**18,214,850**
Contingency 20%	$	3,642,970
Construction Cost Total	$	21,857,820
Engineering, Construction Observation 10%	$	2,185,782
Legal & Permitting 5%	$	1,092,891
Total Probable Cost	**$**	**25,136,493**

The estimated cost for the 3 MGD Expansion with ABNR, Aerobic Stabilization Upgrade is approximately $25.1 million. Assuming that the total amount is borrowed with 3% interest, the debt payment would be $1,689,415 a year for next 20 years. The annual running cost for the 3 MGD with ABNR, Anaerobic Digestion option was estimated based on Payson's current annual cost of operation and is shown in below.

Table 5-18 3 MGD with ABNR without Algae Revenue

3 MGD Aerobic Stabilization with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 4 staff)	$ 529,065
Professional Services	$ 102,267
ABNR O&M	$ 604,646
Operating	$ 668,336
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 1,689,567
Revenue from Algae ($0.5 to $2 per lb, $0 used)	$0
Total Probable Cost	**$ 4,451,025**

Table 5-18 is the cost of operation if there is no revenue from the algae sales. The expected fee is approximately $4.5 million per year. The annual probable cost yields to a minimum monthly user fee of $56.65 with 6,547 ERUs, which is $25 increase per ERU per month compared to the current system.

Table 5-19 3 MGD with ABNR Aerobic Digestion with Algae Revenue

3 MGD Aerobic Stabilization with ABNR	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 4 staff)	$ 529,065
Professional Services	$ 102,267
ABNR O&M	$ 604,646
Operating	$ 668,336
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 1,689,567
Revenue from Algae ($0.5 to $2 per lb, $.75 used)	($1,595,415)
Total Probable Cost	**$ 2,855,610**

In Table 5-19, the assumption of the revenue from algae, $0.75 per pound was used for the cost analysis. The revenue of the algae sales can vary depending on the market for the algae. The annual cost for the 3 MGD Aerobic Stabilization with ABNR option is expected to be $2.9 million including the revenue from algae which is expected to be $1.6 million per year. The annual probable cost yields to a minimum monthly user fee of $36.35 with 6,547 ERUs, which is

a increase of $4.45 per ERU per month compared to the anticipated monthly fee of the current system.

5.9 3 MGD Expansion with Aerobic Stabilization

This option is similar to the 3 MGD Expansion in Section 5.2. This option utilizes as many of the existing structures as possible to reduce the overall cost of the installment, yet have the efficiency to remove more nutrients than the current system. The following includes the elimination and additional equipment and/or structures needed for this option.

5.9.1 Convert Anaerobic Digesters to Aerobic Stabilization Tanks

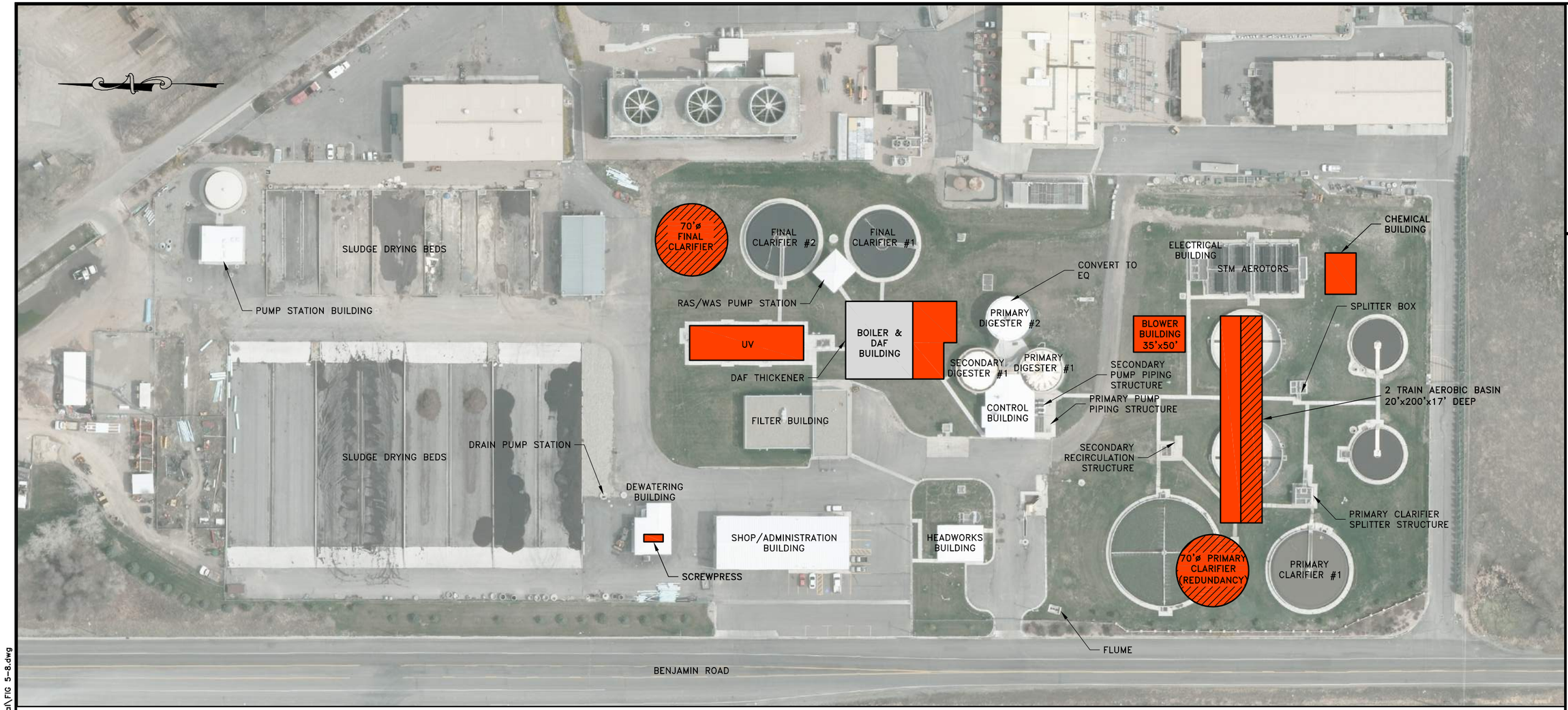
The anaerobic digesters will be aerated and used as equalization tanks for dewatering.

5.9.2 Solid Handling Equipment

It is anticipated that this option will produce more sludge off of digestion when compared to the 5 MGD with ABNR option. Therefore, it requires two (2) more dewatering equipment. It will operate with two duty units and one standby.

5.9.3 Site Layout

The following is the proposed layout for the 3 MGD expansion.



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Scale in Feet

LEGEND

= NEW STRUCTURES IN UPGRADE

= REDUNDANCY IN UPGRADE

NO.	DATE	DESIGN	DRAWN	CHECKED
0	05/09/16	–	–	–

REVISIONS

CITY OF PAYSON

WASTEWATER TREATMENT FACILITY UPGRADE

3 MGD SITE LAYOUT / AEROBIC STABILIZATION

AQUA ENGINEERING
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0 1/2 1

DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

FIGURE

FIG 5-8

05/26/2019 X:\Payson\2014 Payson Facility Plan\Drafting\General\FIG 5-8.dwg

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5.9.4 3 MGD with ABNR Probable Cost

The following cost estimate was developed for the proposed project. Since this option does not include constructions of aerobic basins, primary clarifiers, the DAF building, and a digester, when compared to the 3MGD with ABNR option, it is slightly less expensive than the previous option discussed. However, the production of the algae depends on the influent volume, therefore, the anticipated revenue will be the same for both options. Below is the expected capital cost for this option.

Table 5-20 Cost for 3 MGD with Aerobic Stabilization

DESCRIPTION		COST
Site Work and Yard Piping	$	320,000
Plant Repairs	$	150,000
Demolition	$	94,500
Aerobic Basin	$	1,560,000
Primary Clarifier	$	1,115,000
Final Clarifier	$	1,150,000
Solid Handling	$	360,000
Chemical Storage	$	314,400
UV Basin	$	1,320,000
Reuse Pump Station Remodel	$	110,000
Filter Building	$	660,000
Convert Anaerobic Digester to Aerobic Eq Tanks	$	380,000
Electrical	$	1,506,780
Construction Cost Subtotal	**$**	**9,040,680**
Contingency 20%	$	1,808,136
Construction Cost Total	$	10,848,816
Engineering, Construction Observation 10%	$	1,084,882
Legal & Permitting 5%	$	542,441
Total Probable Cost	**$**	**12,476,138**

The estimated cost for the 3 MGD Expansion with Aerobic Stabilization Upgrade is approximately $12.4 million. Assuming that the total amount is borrowed with 3% interest, the new debt payment would be $838,592 a year for next 20 years. Operation and maintenance cost for the 3 MGD with ABNR, Anaerobic Digestion option was estimated based on Payson's current annual cost of operation and is shown in Table 5-8 below.

Table 5-21 3 MGD with Aerobic Stabilization

3 MGD Aerobic Stabilization	
DESCRIPTION	**Annual Cost**
Employee Related (assuming 4 staff)	$ 529,065
Professional Services	$ 102,267
Operating	$ 668,336
Maintenance	$ 330,162
Transfer	$ 186,982
Existing Debt Service as of 2023	$ 340,000
New Debt Service	$ 838,592
Total Probable Cost	**$ 2,995,405**

Table 5-8 is the annual cost for the 3 MGD with aerobic stabilization including Operation and Maintenance and debt payment is expected to be $3.0 million, which yields to a minimum monthly user fee of $38.13 with 6,547 ERUs, which is an increase of over $6.23 per ERU per month compared to the monthly fee of the current system.

5.10 Additional BOD for the Payson Fruit Growers

The overall capacity of the plant will be either 3 MGD or 5 MGD as desired, however, some of the significant upgrades needs to be made to receive additional 600 lb BOD per day from the Payson Fruit Growers. With this upgrade, the water treatment facility will be able to operate until the maximum capacity is reached by all of the municipal influent based on the anticipated population growth. This alternative would upgrade the treatment facility to meet the new requirements in the permit and add redundancy for the main process.

5.10.1 Aerobic Basin

To treat the additional 600 lb BOD per day, the aeration basin, previously discussed in Section 5.2.2 and 5.3.2, needs to be expanded. It will require 10 % more capacity when compared to the 3 MGD option, and all of the components including diffuser, piping, blower, and a larger building for the blowers.

5.10.2 Screw Press

Additional BOD loading will result in increased solid production of the facility. An additional screw press should be installed in a building. Some additional space will be required for the additional screw press and thus the solid handling building needs to be expanded.

5.10.3 Additional BOD Treatment Probable Cost

The cost estimate for the additional BOD removal is shown in Table 5-22.

Table 5-22 Cost Payson Fruit Growers

AQUA ENGINEERING
533 W 2600 S Suite 275 Bountiful, UT 84010
Phone (801) 299-1327 Fax (801) 299-0153

Engineer's Opinion of Probable Cost
Client: Payson
600 lbs Additional Capacity

ITEM	DESCRIPTION	Qty	Unit	Each	COST
Aerobic Basin					
1	Concrete Basin	100	cu.yd.	$1,100	$110,000
2	Diffuser	1	lump	$5,000	$5,000
3	Air Piping	1	lump	$10,000	$10,000
4	Blower Up-sizing	1	lump	$30,000	$30,000
5	Installation	1	lump	$10,000	$10,000
				Subtotal	$165,000
Solid Handling					
7	Dewatering Mechanism Up-sizing	1	lump	$40,000	$40,000
				Subtotal	$40,000
Electrical					
8	Electrical and Instrumentation	15	%	$30,750.00	$30,750
				Subtotal	$30,750
				Construction Cost Subtotal	**$235,750**
				Contingency 20%	$51,865
				Construction Cost Total	$287,615
				Engineering, Construction Observation 10%	$28,762
				Legal & Permitting 5%	$14,381
				Total Probable Cost	**$330,757**

5.11 Alternative Summary

The capital cost, operation and maintenance, and anticipated monthly bill per ERU are summarized in Table 5-23. Although the capital cost is high for the options with ABNR, operations and maintenance could be less than other options because they will have some revenue from the algae sales. The price of dried algae is anticipated to be between $0.50 and $2.00 per pound, depending on the market. The cost estimate table was developed under the assumption of $0.75 per pound of dried algae.

Table 5-23 Summary Alternative

		5 MGD				3 MGD			
	Do Nothing	Conventional Treatment	ABNR	ABNR +Aerobic Stabalization	Conventional +Aerobic Stabalization	Conventional Nut. Removal	ABNR	ABNR +AD	Conventional +Aerobic Stabalization
Capital Cost	-	$ 22,533,440	$40,277,663	$37,225,466	$ 19,757,984	$ 13,436,618	$26,453,306	$25,136,493	$12,476,138
O&M (annual)	$2,023,145	$ 4,590,192	$ 7,417,160	$ 7,212,004	$ 4,403,638	$ 3,157,687	$ 4,539,536	$ 4,451,025	$ 2,995,405
Monthly Bill (per ERU)	$ 25.75	$ 58.43	$ 94.41	$ 91.80	$ 56.05	$ 40.19	$ 57.78	$ 56.65	$ 38.13

CHAPTER 6 - RECOMMENDATION

6.1 Historical Review

6.1.1 Flow

The treatment facility was upgraded about 20 years ago and the anticipated growth at that time projected the design flow to be 3 MGD now. However, the current flow is only about 1.8 MGD so the anticipated growth in flow was not as much as originally predicted. Therefore, the treatment facility has additional hydraulic capacity. Figure 2-4 shows that the capacity will be reached in about 2027 based on the conservative design assumptions. However, the actual flow is lower than the design assumptions so it may be 2030 before the design flow is actually reached.

6.1.2 BOD and TSS loading

The loadings from BOD and TSS have grown closer to anticipated. However, there is still additional capacity for growth in the current system.

6.2 Current Needs

The primary needs for the treatment plant are:

1. Repair existing equipment that is reaching its anticipated life.
2. Redundancy
3. Meet the new nutrient standards

6.3 User Costs

6.3.1 5 MGD Expansion

The 5 MGD alternatives would accommodate future growth until about 2058. However, the current residents would be paying a higher monthly bill to pay for the future growth. This would reduce the need for a facility upgrade for a longer time but would burden the current residents.

6.3.2 3 MGD Expansion

The 3 MGD alternatives do not extend the life of the plant as long as the 5 MGD alternatives. It is estimated that the 3 MGD alternative will add an additional 10 years of life. At that time a new addition would be required to account for growth in the City. This would reduce the cost burden on the existing residents until the expansion was needed.

6.4 Preferred Plan: 3 MGD Expansion with Aerobic Stabilization

With the 3 MGD Expansion with Redundancy the City will be able to extend the operation for about 10 more years. This option will include several upgrades to the facility to meet the regulation updates including Phosphorus limits for the State of Utah as well as other nutrient limits for the tributaries of the Utah Lake. Anticipated capital cost of the project is $12.5 million and annual operational cost is expected to be about $3.0 million. With the ERU of 6,457, monthly bill should be $38.13.

6.5 Future Expansion

There are several different things that will trigger the future expansion.

1. Growth – As the City grows the plant will reach capacity.
2. Permit Changes – The discharge permit is renewed every 5 years. There are new regulations that are coming down from EPA all the time and as the permit requirements change the plant may need modifications to meet the new requirements.

6.5.1 Expansion timing

The timing is shown in dates that are estimated by population growth. However, the treatment facility has several design parameters that each have a design capacity. Flow, BOD, TSS, Nitrogen, and Phosphorus. Each of these parameters could change differently than anticipated over time. Once any of the parameters reach 80% of design capacity this should trigger a planning process to determine the best alternative for the future.

6.6 Net Present Value

Table 6-1 NPV

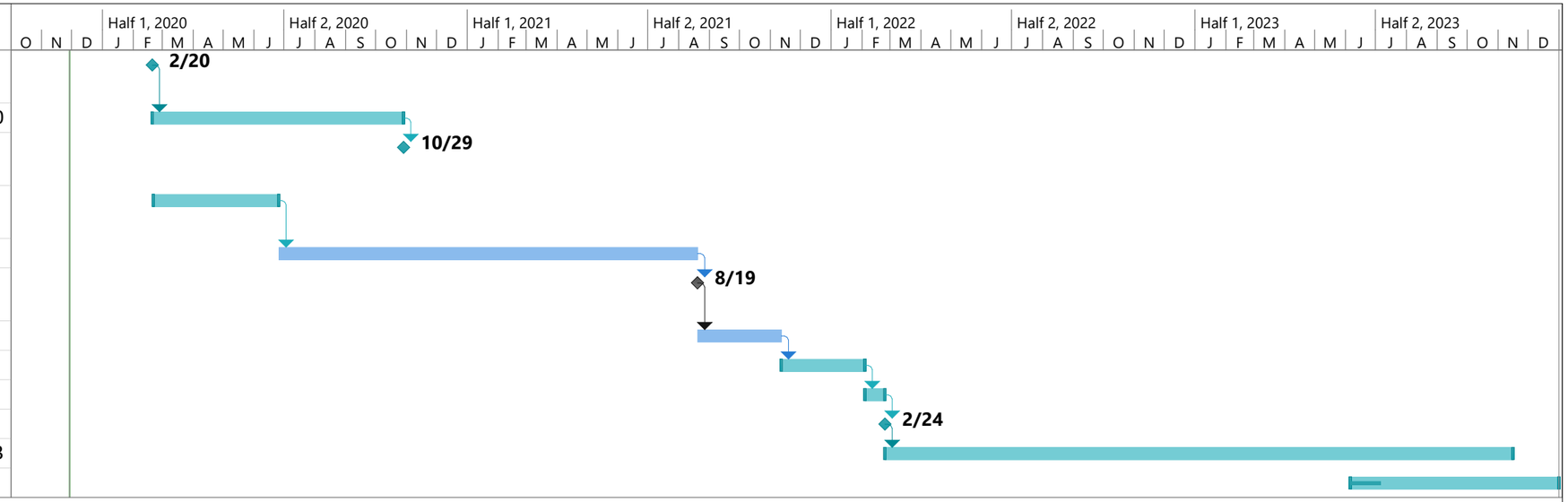
3 MGD 20 Year NPV				
Year	Capital Expense	Current Debt Service	Operational Cost	Net Annual Cost
2020	$12,476,138	$891,892	$1,816,812	$15,184,843
2021		$890,526	$1,871,317	$2,761,842
2022		$897,292	$1,927,456	$2,824,748
2023		$339,375	$1,985,280	$2,324,655
2024		$340,888	$2,044,838	$2,385,726
2025		$351,108	$2,106,183	$2,457,291
2026		$344,734	$2,169,369	$2,514,103
2027		$347,820	$2,234,450	$2,582,270
2028			$2,301,483	$2,301,483
2029			$2,370,528	$2,370,528
2030	$10,922,769		$2,441,644	$13,364,413
2031			$2,514,893	$2,514,893
2032			$2,590,340	$2,590,340
2033			$2,668,050	$2,668,050
2034			$2,748,092	$2,748,092
2035			$2,830,534	$2,830,534
2036			$2,915,450	$2,915,450
2037			$3,002,914	$3,002,914
2038			$3,093,001	$3,093,001
2039			$3,185,791	$3,185,791
NET Present Value				$59,252,476
Discount Rate				3%

Table 6-1 shows the cost for the 3MGD upgrade with the anticipated cost to expand the facility to 5MGD in 2030. The NPV for the project would be almost $60 million. This alternative will help keep the monthly user fees as low as possible. However, it will require an additional expansion sometime in the near future.

6.7 Schedule

The schedule is shown on the next page. This schedule will allow the plant to be operating and meet the nutrient removal requirements

ID	Task Name	Duration	Start	Finish
1	Facility Plan Approval	0 days	Thu 2/20/20	Thu 2/20/20
2	Financial Planning	180 days	Thu 2/20/20	Wed 10/28/20
3	Submit Financial Plan To DWQ	0 days	Thu 10/29/20	Thu 10/29/20
4	Design Grant Application	90 days	Fri 2/21/20	Thu 6/25/20
5	Design Engineering	300 days	Fri 6/26/20	Thu 8/19/21
6	Submit Drawings To DWQ For Review	0 days	Thu 8/19/21	Thu 8/19/21
7	DWQ Plan Review	60 days	Fri 8/20/21	Thu 11/11/21
8	Project Bidding	60 days	Fri 11/12/21	Thu 2/3/22
9	Award Bid	14 days	Fri 2/4/22	Wed 2/23/22
10	Notice to Proceed	0 days	Thu 2/24/22	Thu 2/24/22
11	Project Construction	450 days	Thu 2/24/22	Wed 11/15/23
12	Project Startup	150 days	Tue 6/6/23	Sun 12/31/23



Project: Project1
Date: Fri 11/29/19

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

Appendix A

Soil Resource Report

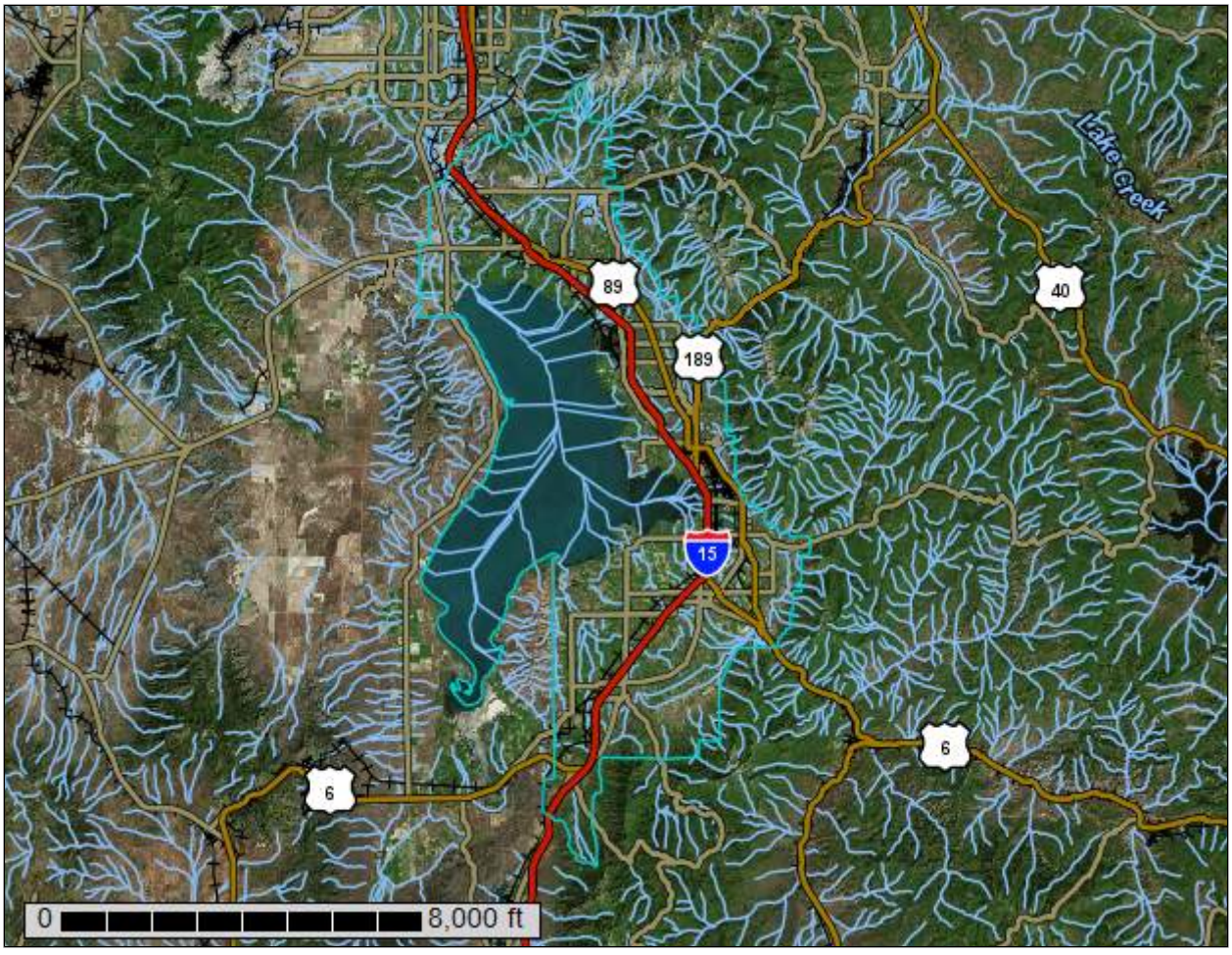
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Utah County, Utah - Central Part



August 16, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

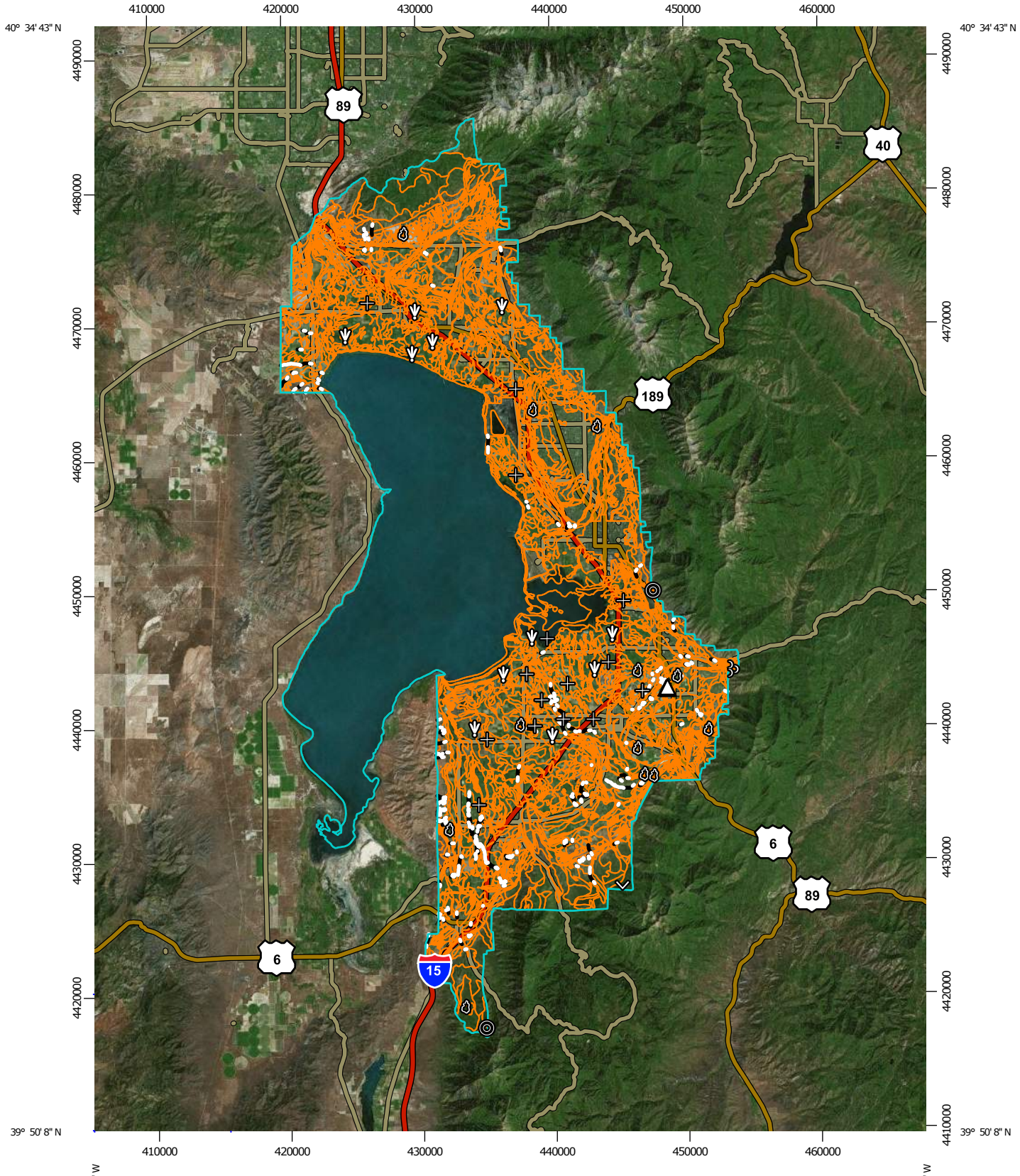
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:402,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5000 10000 20000 30000

Feet
0 15000 30000 60000 90000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Utah County, Utah - Central Part
Survey Area Data: Version 8, Sep 23, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Utah County, Utah - Central Part (UT621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
AR	Arave silt loam, 0 to 1 percent slopes	1,216.5	0.4%
BC	Beaches	826.0	0.3%
Bd	Benjamin silty clay	3,820.0	1.3%
Be	Benjamin silty clay, moderately alkali	2,978.5	1.0%
Bf	Benjamin silty clay, strongly alkali	1,067.6	0.4%
Bg	Benjamin silty clay, sandy substratum	1,589.0	0.5%
BhB	Bingham loam, 1 to 3 percent slopes	3,456.4	1.2%
BkB	Bingham gravelly loam, 1 to 3 percent slopes	8,765.5	3.0%
BmC	Bingham cobbly loam, 3 to 6 percent slopes	773.6	0.3%
BmD	Bingham cobbly loam, 6 to 10 percent slopes	358.1	0.1%
Br	Bramwell silty clay loam	2,489.2	0.9%
Bs	Bramwell silty clay loam, drained	2,529.7	0.9%
Ch	Chipman loam	394.3	0.1%
Ck	Chipman silty clay loam	4,845.0	1.7%
Cm	Chipman silty clay loam, moderately deep water table	2,594.4	0.9%
Cn	Chipman silty clay loam, moderately saline	1,616.7	0.6%
Co	Chipman silty clay loam, strongly saline	716.8	0.2%
Cp	Chipman-McBeth complex	1,063.5	0.4%
CrD	Cleverly cobbly sandy loam, 6 to 15 percent slopes	1,813.6	0.6%
CsB	Cleverly gravelly fine sandy loam, 1 to 3 percent slopes	109.9	0.0%
CsC	Cleverly gravelly fine sandy loam, 3 to 6 percent slopes	1,005.3	0.3%
CsD	Cleverly gravelly fine sandy loam, 6 to 15 percent slopes	1,129.2	0.4%
CU	Cobbly alluvial land	954.9	0.3%
Da	Dagor loam	977.4	0.3%
Db	Dagor silt loam	239.2	0.1%
DCF	Dry Creek cobbly loam, 10 to 30 percent slopes	1,967.8	0.7%

Utah County, Utah - Central Part (UT621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
DEF	Dry Creek extremely stony loam, stony subsoil variant, 6 to 30 percent slopes	514.5	0.2%
DRG2	Dry Creek cobbly loam, thin surface variant, 30 to 60 percent slopes, eroded	1,716.7	0.6%
GAG	Gappmayer cobbly loam, 50 to 70 percent slopes	976.2	0.3%
HEG	Henefer loam, 35 to 70 percent slopes	203.0	0.1%
HFF	Henefer-McPhie association, 5 to 30 percent slopes	1,961.0	0.7%
HFG2	Henefer-McPhie association, 30 to 60 percent slopes	2,700.1	0.9%
HKG	Henefer-Rake association, 35 to 70 percent slopes	2,304.0	0.8%
HmE	Hillfield silt loam, 10 to 20 percent slopes	622.6	0.2%
HmF	Hillfield silt loam, 20 to 30 percent slopes	248.9	0.1%
HNG	Hillfield-Layton complex, 30 to 60 percent slopes	704.0	0.2%
HOF	Hillfield-Sterling complex, 20 to 35 percent slopes	1,482.0	0.5%
HpF	Hillfield-Welby silt loams, 6 to 35 percent slopes	852.1	0.3%
Hr	Holdaway silt loam	3,283.1	1.1%
Hs	Holdaway silt loam, strongly saline-alkali	791.0	0.3%
Ir	Ironton loam	260.7	0.1%
Is	Ironton loam, moderately saline-alkali	350.8	0.1%
Jo	Jordan silt loam	385.2	0.1%
KeA	Keigley silty clay loam, 0 to 1 percent slopes	1,001.4	0.3%
KeB	Keigley silty clay loam, 1 to 3 percent slopes	395.9	0.1%
KgA	Keigley silty clay loam, extended season, 0 to 2 percent slopes	767.4	0.3%
KmA	Kidman very fine sandy loam, 0 to 1 percent slopes	637.3	0.2%
KmB	Kidman very fine sandy loam, 1 to 3 percent slopes	1,678.2	0.6%
KmC	Kidman very fine sandy loam, 3 to 6 percent slopes	346.8	0.1%
KNG2	Kilburn very gravelly sandy loam, 30 to 50 percent slopes, eroded	1,991.2	0.7%

Utah County, Utah - Central Part (UT621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
KOD	Kilburn stony sandy loam, 3 to 15 percent slopes	917.7	0.3%
KRE2	Kilburn gravelly fine sandy loam, 15 to 30 percent slopes, eroded	592.9	0.2%
Ks	Kirkham silty clay loam	4,196.2	1.4%
Kt	Kirkham silty clay loam, moderately saline-alkali	1,580.5	0.5%
Ku	Kirkham silty clay loam, strongly saline-alkali	628.2	0.2%
LaC	Lakewin gravelly fine sandy loam, 1 to 6 percent slopes	3,360.1	1.2%
LaD	Lakewin gravelly fine sandy loam, 6 to 15 percent slopes	760.8	0.3%
LcE	Lakewin cobbly fine sandy loam, 15 to 30 percent slopes	623.2	0.2%
LeD	Layton loamy fine sand, 6 to 15 percent slopes	434.5	0.1%
LfC	Layton fine sandy loam, 1 to 6 percent slopes	1,660.6	0.6%
LmA	Layton fine sandy loam, slowly permeable substratum, 0 to 1 percent slopes	343.3	0.1%
LnB	Layton fine sandy loam, water table, 1 to 3 percent slopes	1,258.7	0.4%
Lo	Logan silty clay loam	1,287.3	0.4%
Ls	Logan silty clay loam, heavy variant	1,230.7	0.4%
MAF	Manila silt loam, 10 to 30 percent slopes	1,504.2	0.5%
Mf	Martini fine sandy loam	471.9	0.2%
Mh	McBeth silt loam	4,415.1	1.5%
Mn	McBeth silt loam, moderately saline	562.3	0.2%
MrC	McMurdie silt loam, 3 to 6 percent slopes	269.6	0.1%
MtE2	McMurdie-Taylorsville complex, 6 to 20 percent slopes, eroded	390.2	0.1%
MU	Mixed alluvial land	3,398.2	1.2%
MX	Mixed alluvial land, saline	915.4	0.3%
PaB	Parleys loam, 0 to 4 percent slopes	3,178.4	1.1%
PaC	Parleys loam, 3 to 8 percent slopes	1,092.7	0.4%
PbC	Parleys gravelly loam, overwashed, 3 to 6 percent slopes	238.8	0.1%

Utah County, Utah - Central Part (UT621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
PcB	Parleys silty clay loam, 0 to 3 percent slopes	1,887.6	0.7%
Pd	Payson silty clay loam	824.4	0.3%
PEE	Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded	1,133.0	0.4%
Pf	Peteetneet peat	1,296.7	0.4%
Pg	Peteetneet-Holdaway complex	535.8	0.2%
PHG2	Picayune cobbly silt loam, 35 to 70 percent slopes, eroded	1,183.8	0.4%
PIF	Picayune cobbly loam, red variant, 30 to 60 percent slopes	887.5	0.3%
PJG2	Picayune-Rake association, 35 to 70 percent slopes, eroded	576.3	0.2%
PK	Pits and dumps	1,639.4	0.6%
PlC	Pleasant Grove gravelly loam, 3 to 6 percent slopes	2,071.3	0.7%
PlD	Pleasant Grove gravelly loam, 6 to 10 percent slopes	2,069.9	0.7%
PmE2	Pleasant Grove stony loam, 10 to 25 percent slopes, eroded	4,449.9	1.5%
PnA	Pleasant Vale loam, 0 to 2 percent slopes	2,342.5	0.8%
PNG2	Pleasant Grove-Terrace escarpments complex, 30 to 60 percent slopes, eroded	2,357.9	0.8%
PoA	Pleasant Vale loam, extended season, 0 to 2 percent slopes	920.4	0.3%
PoC	Pleasant Vale loam, extended season, 3 to 6 percent slopes	446.2	0.2%
PpB	Pleasant Vale gravelly loam, extended season, 1 to 3 percent slopes	651.6	0.2%
PrD	Pleasant Vale gravelly sandy loam, extended season, 6 to 10 percent slopes	554.1	0.2%
PsB	Pleasant Vale silty clay loam, 1 to 3 percent slopes	596.2	0.2%
PtB	Pleasant View fine sandy loam, 1 to 3 percent slopes	944.3	0.3%
PuD	Preston fine sand, 1 to 10 percent slopes	572.0	0.2%
Pv	Preston loamy fine sand, high water table variant	284.6	0.1%
Pw	Provo gravelly fine sandy loam	224.4	0.1%
Px	Provo-Sunset complex	1,359.6	0.5%
PY	Provo Bay peaty silt loam	301.9	0.1%

Utah County, Utah - Central Part (UT621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Pz	Provo Bay silty clay loam	2,668.6	0.9%
RAG2	Rake extremely stony loam, 20 to 70 percent slopes, eroded	2,735.7	0.9%
RdA	Redola loam, 0 to 3 percent slopes	1,710.1	0.6%
ReC	Redola gravelly loam, 3 to 6 percent slopes	709.7	0.2%
RV	Riverwash	552.3	0.2%
RW	Rock land	3,506.8	1.2%
Sd	Steed sandy loam	999.6	0.3%
Se	Steed gravelly sandy loam	3,134.9	1.1%
SgB	Sterling gravelly fine sandy loam, 1 to 3 percent slopes	1,077.1	0.4%
SgC	Sterling gravelly fine sandy loam, 3 to 6 percent slopes	732.9	0.3%
SgD	Sterling gravelly fine sandy loam, 6 to 10 percent slopes	1,106.7	0.4%
SNG	Sterling-Terrace escarpments complex, 30 to 70 percent slopes	1,531.6	0.5%
So	Sunset loamy fine sand	205.1	0.1%
Sr	Sunset loam	6,426.6	2.2%
Ss	Sunset loam, gravelly substratum	1,518.9	0.5%
St	Sunset loam, clay substratum	697.2	0.2%
Su	Sunset loam, moderately saline	846.5	0.3%
TaA	Taylorsville silty clay loam, 0 to 1 percent slopes	2,507.7	0.9%
TaB	Taylorsville silty clay loam, 1 to 3 percent slopes	3,646.7	1.3%
TcA	Taylorsville silty clay loam, extended season, 0 to 1 percent slopes	384.5	0.1%
TcB	Taylorsville silty clay loam, extended season, 1 to 3 percent slopes	1,148.5	0.4%
TcC2	Taylorsville silty clay loam, extended season, 3 to 6 percent slopes, eroded	1,553.9	0.5%
TmB	Timpanogos loam, 0 to 3 percent slopes	4,575.2	1.6%
TmC	Timpanogos loam, 3 to 6 percent slopes	748.2	0.3%
ToB	Timpanogos loam, water table, 0 to 3 percent slopes	607.2	0.2%
UL	Urban land	4,129.0	1.4%

Utah County, Utah - Central Part (UT621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
VnA	Vineyard fine sandy loam, 0 to 2 percent slopes	2,800.3	1.0%
VsA	Vineyard fine sandy loam, moderately saline, 0 to 2 percent slopes	1,083.8	0.4%
W	Water	85,940.3	29.6%
WbA	Welby silt loam, 0 to 1 percent slopes	1,002.9	0.3%
WbB	Welby silt loam, 1 to 3 percent slopes	2,362.6	0.8%
WbC	Welby silt loam, 3 to 6 percent slopes	498.4	0.2%
WeA	Welby silt loam, extended season, 0 to 1 percent slopes	612.1	0.2%
WeB	Welby silt loam, extended season, 1 to 3 percent slopes	1,400.7	0.5%
WeC	Welby silt loam, extended season, 3 to 6 percent slopes	1,417.6	0.5%
WeD2	Welby silt loam, extended season, 6 to 10 percent slopes	736.1	0.3%
WhD	Welby-Hillfield silt loams, 6 to 10 percent slopes	1,215.4	0.4%
WhE	Welby-Hillfield silt loams, 10 to 30 percent slopes	955.4	0.3%
Totals for Area of Interest		**290,382.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties

and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Utah County, Utah - Central Part

AR—Arave silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6wb
Elevation: 4,450 to 4,500 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 45 to 51 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Arave and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arave

Setting

Landform: Beach plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

A11 - 0 to 2 inches: silt loam
A12 - 2 to 5 inches: silt loam
B2tca - 5 to 9 inches: silty clay loam
B3ca - 9 to 13 inches: silty clay loam
C1ca - 13 to 28 inches: silty clay loam
A11b - 28 to 32 inches: silt loam
A12b - 32 to 42 inches: silt loam
C2 - 42 to 60 inches: loamy very fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 20 to 40 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 100.0
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 7w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

BC—Beaches

Map Unit Setting

National map unit symbol: j6wc
Elevation: 4,490 to 4,510 feet
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Setting

Landform: Beach plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

H1 - 0 to 60 inches: fine sand

Properties and qualities

Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Frequent
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 3.6 inches)

Bd—Benjamin silty clay

Map Unit Setting

National map unit symbol: j6wd
Elevation: 4,700 to 5,000 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Benjamin and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Benjamin

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone and shale

Typical profile

Ap1 - 0 to 1 inches: silty clay
Ap2 - 1 to 4 inches: silty clay
A1 - 4 to 17 inches: silty clay
C1 - 17 to 25 inches: silty clay
C2G - 25 to 38 inches: silty clay
C3 - 38 to 46 inches: silty clay loam
C4 - 46 to 52 inches: silty clay
IIC5 - 52 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Pleasant vale

Percent of map unit: 5 percent

Kirkham

Percent of map unit: 5 percent

Depressional soils

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Strongly saline-alkali soils
Percent of map unit: 2 percent

Be—Benjamin silty clay, moderately alkali

Map Unit Setting
National map unit symbol: j6wf
Elevation: 4,700 to 5,000 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Benjamin and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Benjamin

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone and shale

Typical profile
Ap1 - 0 to 1 inches: silty clay
Ap2 - 1 to 4 inches: silty clay
A1 - 4 to 17 inches: silty clay
C1 - 17 to 25 inches: silty clay
C2g - 25 to 38 inches: silty clay
C3 - 38 to 46 inches: silty clay loam
C4 - 46 to 52 inches: silty clay
IIC5 - 52 to 60 inches: sandy loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 60.0

Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Depressional soils

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Strongly saline-alkali soils

Percent of map unit: 2 percent

Bf—Benjamin silty clay, strongly alkali

Map Unit Setting

National map unit symbol: j6wg
Elevation: 4,700 to 5,000 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Benjamin and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Benjamin

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone and shale

Typical profile

Ap1 - 0 to 1 inches: silty clay
Ap2 - 1 to 4 inches: silty clay
A1 - 4 to 17 inches: silty clay
C1 - 17 to 25 inches: silty clay
C2G - 25 to 38 inches: silty clay

C3 - 38 to 46 inches: silty clay loam
C4 - 46 to 52 inches: silty clay
IIC5 - 52 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 7w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Depressional soils

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Bg—Benjamin silty clay, sandy substratum

Map Unit Setting

National map unit symbol: j6wh
Elevation: 4,700 to 5,000 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Benjamin and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Benjamin

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone and shale

Typical profile

Ap1 - 0 to 1 inches: silty clay
Ap2 - 1 to 4 inches: silty clay
A1 - 4 to 17 inches: silty clay
C1 - 17 to 25 inches: silty clay
C2G - 25 to 38 inches: silty clay
C3 - 38 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Depressional soils

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Strongly saline-alkali soils

Percent of map unit: 2 percent

BhB—Bingham loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6wj
Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bingham and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bingham

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear, convex
Parent material: Alluvium and/or lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 6 inches: gravelly loam
B21t - 6 to 12 inches: gravelly sandy clay loam
B22t - 12 to 18 inches: gravelly fine sandy loam
IIIB3ca - 18 to 27 inches: very gravelly sandy loam
IICca - 27 to 60 inches: very gravelly sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

BkB—Bingham gravelly loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tjsk
Elevation: 4,320 to 5,350 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 150 to 180 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bingham and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bingham

Setting

Landform: Lake terraces, fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, side slope, tread
Down-slope shape: Linear, concave
Across-slope shape: Convex
Parent material: Fine-loamy slope alluvium derived from quartzite and/or limestone over sandy and gravelly lacustrine deposits derived from quartzite and/or limestone

Typical profile

Ap - 0 to 6 inches: gravelly loam
Bt1 - 6 to 12 inches: gravelly sandy clay loam
Bt2 - 12 to 18 inches: gravelly fine sandy loam
2Btk - 18 to 27 inches: very gravelly sandy loam
2Ck - 27 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 20 to 34 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4s

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

BmC—Bingham cobbly loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6wl
Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Bingham and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bingham

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Parent material: Alluvium and/or lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 6 inches: cobbly loam
B21t - 6 to 12 inches: gravelly sandy clay loam
B22t - 12 to 18 inches: gravelly fine sandy loam
IIIB3ca - 18 to 27 inches: very gravelly sandy loam
IICca - 27 to 60 inches: very gravelly sand

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

BmD—Bingham cobbly loam, 6 to 10 percent slopes

Map Unit Setting

National map unit symbol: j6wm
Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Bingham and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bingham

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Parent material: Alluvium and/or lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 6 inches: cobbly loam
B21t - 6 to 12 inches: gravelly sandy clay loam
B22t - 12 to 18 inches: gravelly fine sandy loam
IIIB3ca - 18 to 27 inches: very gravelly sandy loam
IICca - 27 to 60 inches: very gravelly sand

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

Br—Bramwell silty clay loam

Map Unit Setting

National map unit symbol: j6wn
Elevation: 4,320 to 4,600 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bramwell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bramwell

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 6 inches: silty clay loam
A1 - 6 to 11 inches: silty clay loam
C1 - 11 to 20 inches: silty clay loam
C2ca - 20 to 31 inches: silty clay loam
C3ca - 31 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Chipman
Percent of map unit: 5 percent

Strongly saline soils
Percent of map unit: 3 percent

Taylorsville
Percent of map unit: 3 percent

Depressional soils
Percent of map unit: 2 percent
Landform: Depressions on lake terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Hardpan soils
Percent of map unit: 2 percent

Bs—Bramwell silty clay loam, drained

Map Unit Setting
National map unit symbol: j6wp
Elevation: 4,320 to 4,600 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Bramwell and similar soils: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bramwell

Setting
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile
Ap - 0 to 6 inches: silty clay loam
A1 - 6 to 11 inches: silty clay loam
C1 - 11 to 20 inches: silty clay loam
C2ca - 20 to 31 inches: silty clay loam

C3ca - 31 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 36 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Taylorsville

Percent of map unit: 5 percent

Depressional soils

Percent of map unit: 3 percent
Landform: Depressions on lake terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Ch—Chipman loam

Map Unit Setting

National map unit symbol: j6wr
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Chipman and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chipman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Apca - 0 to 8 inches: loam
Alg - 8 to 16 inches: silty clay loam
C1cag - 16 to 20 inches: silty clay loam
C2ca - 20 to 27 inches: silty clay loam
C3ca - 27 to 44 inches: loam
C4cag - 44 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Depressional soils

Percent of map unit: 3 percent
Landform: Depressions on lake terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Ck—Chipman silty clay loam

Map Unit Setting

National map unit symbol: j6ws
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Chipman and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chipman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Apca - 0 to 8 inches: silty clay loam
Alg - 8 to 16 inches: silty clay loam
C1cag - 16 to 20 inches: silty clay loam
C2ca - 20 to 27 inches: silty clay loam
C3ca - 27 to 44 inches: loam
C4cag - 44 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C

Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Mcbeth

Percent of map unit: 5 percent
Landform: Lake terraces, alluvial fans, flood plains
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, convex, concave
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Ironton

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Bramwell

Percent of map unit: 5 percent

Cm—Chipman silty clay loam, moderately deep water table

Map Unit Setting

National map unit symbol: j6wt
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chipman and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chipman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Apca - 0 to 8 inches: silty clay loam
Alg - 8 to 16 inches: silty clay loam
C1cag - 16 to 20 inches: silty clay loam

C2ca - 20 to 27 inches: silty clay loam
C3ca - 27 to 44 inches: loam
C4cag - 44 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Depressional soils

Percent of map unit: 5 percent
Landform: Depressions on lake terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Cn—Chipman silty clay loam, moderately saline

Map Unit Setting

National map unit symbol: j6wv
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chipman and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chipman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Apca - 0 to 8 inches: silty clay loam
Alg - 8 to 16 inches: silty clay loam
C1cag - 16 to 20 inches: silty clay loam
C2ca - 20 to 27 inches: silty clay loam
C3ca - 27 to 44 inches: loam
C4cag - 44 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Depressional soils

Percent of map unit: 3 percent
Landform: Depressions on lake terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Strongly saline-alkali soils

Percent of map unit: 2 percent

Co—Chipman silty clay loam, strongly saline

Map Unit Setting

National map unit symbol: j6ww
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Chipman and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chipman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Apca - 0 to 8 inches: silty clay loam
Alg - 8 to 16 inches: silty clay loam
C1cag - 16 to 20 inches: silty clay loam
C2ca - 20 to 27 inches: silty clay loam
C3ca - 27 to 44 inches: loam
C4cag - 44 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 60.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D

Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Depressional soils

Percent of map unit: 3 percent
Landform: Depressions on lake terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Cp—Chipman-McBeth complex

Map Unit Setting

National map unit symbol: j6wx
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chipman and similar soils: 60 percent
Mcbeth and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chipman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Apca - 0 to 8 inches: silty clay loam
Alg - 8 to 16 inches: silty clay loam
C1cag - 16 to 20 inches: silty clay loam
C2ca - 20 to 27 inches: silty clay loam
C3ca - 27 to 44 inches: loam
C4cag - 44 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches

Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Description of Mcbeth

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 8 inches: silt loam
A1 - 8 to 12 inches: silt loam
C1g - 12 to 18 inches: silt loam
C2g - 18 to 24 inches: very fine sandy loam
C3g - 24 to 53 inches: silt loam
C4g - 53 to 68 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

CrD—Cleverly cobbly sandy loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: j6wy
Elevation: 4,650 to 5,580 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Cleverly and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cleverly

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Slope alluvium derived from quartzite and/or sandstone

Typical profile

Ap - 0 to 7 inches: cobbly sandy loam
A1 - 7 to 16 inches: gravelly loam
B21 - 16 to 29 inches: gravelly loam
B3 - 29 to 42 inches: gravelly loam
Cca - 42 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

CsB—Cleverly gravelly fine sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6wz
Elevation: 4,650 to 5,580 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cleverly and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cleverly

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Slope alluvium derived from quartzite and/or sandstone

Typical profile

Ap - 0 to 7 inches: gravelly fine sandy loam
A1 - 7 to 16 inches: gravelly loam
B21 - 16 to 28 inches: gravelly loam
B3 - 28 to 42 inches: gravelly loam
Cca - 42 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

CsC—Cleverly gravelly fine sandy loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6x0
Elevation: 4,650 to 5,580 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cleverly and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cleverly

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Slope alluvium derived from quartzite and/or sandstone

Typical profile

Ap - 0 to 7 inches: gravelly fine sandy loam
A1 - 7 to 16 inches: gravelly loam
B21 - 16 to 29 inches: gravelly loam
B3 - 29 to 42 inches: gravelly loam
Cca - 42 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

CsD—Cleverly gravelly fine sandy loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: j6x1
Elevation: 4,650 to 5,580 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Cleverly and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cleverly

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Slope alluvium derived from quartzite and/or sandstone

Typical profile

Ap - 0 to 7 inches: gravelly fine sandy loam
A1 - 7 to 16 inches: gravelly loam
B21 - 16 to 29 inches: gravelly loam
B3 - 29 to 42 inches: gravelly loam
Cca - 42 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

Minor Components

Kilburn

Percent of map unit: 5 percent

CU—Cobbly alluvial land

Map Unit Setting

National map unit symbol: j6wq
Elevation: 4,200 to 4,600 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 120 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Aquic xerofluvents and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aquic Xerofluvents

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

H1 - 0 to 60 inches: extremely cobbly coarse sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B

Minor Components

Depressional soils

Percent of map unit: 5 percent
Landform: Depressions on lake terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Da—Dagor loam

Map Unit Setting

National map unit symbol: j6x5
Elevation: 4,800 to 5,200 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Dagor and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dagor

Setting

Landform: Alluvial fans, flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave, linear
Across-slope shape: Convex, concave
Parent material: Alluvium derived from granite, quartzite and schist

Typical profile

Ap - 0 to 6 inches: loam
C1 - 6 to 24 inches: loam
C2 - 24 to 36 inches: loam
C3 - 36 to 60 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Db—Dagor silt loam

Map Unit Setting

National map unit symbol: j6x6
Elevation: 4,800 to 5,200 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Dagor and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dagor

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave, convex
Parent material: Alluvium derived from granite, quartzite and schist

Typical profile

Ap - 0 to 6 inches: silt loam
C1 - 6 to 24 inches: loam
C2 - 24 to 36 inches: loam
C3 - 36 to 60 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

DCF—Dry Creek cobbly loam, 10 to 30 percent slopes

Map Unit Setting

National map unit symbol: j6x2
Elevation: 5,200 to 5,700 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Dry creek and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dry Creek

Setting

Landform: Hills, alluvial fans
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile

A1 - 0 to 5 inches: cobbly loam
A3 - 5 to 9 inches: cobbly loam
B21t - 9 to 15 inches: cobbly clay
B22t - 15 to 26 inches: cobbly clay
B3ca - 26 to 29 inches: very cobbly clay loam
Cca - 29 to 60 inches: very cobbly clay loam

Properties and qualities

Slope: 10 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Picayune

Percent of map unit: 5 percent

DEF—Dry Creek extremely stony loam, stony subsoil variant, 6 to 30 percent slopes

Map Unit Setting

National map unit symbol: j6x3
Elevation: 5,200 to 6,000 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Dry creek variant and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dry Creek Variant

Setting

Landform: Lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile

A1 - 0 to 4 inches: extremely stony loam
B1 - 4 to 10 inches: very cobbly clay loam
B21t - 10 to 14 inches: extremely cobbly clay loam
B22t - 14 to 20 inches: extremely cobbly clay loam
B3 - 20 to 30 inches: extremely cobbly sandy clay loam
C1ca - 30 to 43 inches: extremely cobbly sandy loam
C2 - 43 to 60 inches: extremely cobbly sandy loam

Properties and qualities

Slope: 6 to 30 percent
Percent of area covered with surface fragments: 20.0 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

DRG2—Dry Creek cobbly loam, thin surface variant, 30 to 60 percent slopes, eroded

Map Unit Setting
National map unit symbol: j6x4
Elevation: 5,200 to 5,700 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Dry creek and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dry Creek

Setting
Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountainflank, interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile
A1 - 0 to 5 inches: cobbly loam
B21t - 5 to 15 inches: cobbly clay
B22t - 15 to 26 inches: cobbly clay
B3ca - 26 to 29 inches: very cobbly clay loam
Cca - 29 to 60 inches: very cobbly clay loam

Properties and qualities
Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Gravelly Loam (Oak) (R047XA410UT)

Minor Components

Picayune

Percent of map unit: 5 percent

GAG—Gappmayer cobbly loam, 50 to 70 percent slopes

Map Unit Setting

National map unit symbol: j6x7
Elevation: 5,500 to 7,100 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 80 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Gappmayer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gappmayer

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from mixed sources

Typical profile

A1 - 0 to 6 inches: cobbly loam
A12 - 6 to 10 inches: very cobbly loam
A21 - 10 to 19 inches: very cobbly loam
A22 - 19 to 30 inches: very cobbly loam
B1 - 30 to 44 inches: very cobbly loam
B2t - 44 to 56 inches: extremely cobbly loam
B3 - 56 to 63 inches: extremely cobbly loam

Properties and qualities

Slope: 50 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Mountain Gravelly Loam (Oak) (R047XA410UT)

Minor Components

Shallow soils

Percent of map unit: 8 percent

Rock outcrop

Percent of map unit: 7 percent

HEG—Henefer loam, 35 to 70 percent slopes

Map Unit Setting

National map unit symbol: j6x8
Elevation: 5,500 to 7,100 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 80 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Henefer and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henefer

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile

A11 - 0 to 3 inches: loam
A12 - 3 to 7 inches: loam
B11 - 7 to 15 inches: clay loam

B21t - 15 to 25 inches: cobbly clay
B22t - 25 to 33 inches: cobbly clay
B23t - 33 to 43 inches: cobbly clay
B3 - 43 to 58 inches: extremely cobbly clay
C - 58 to 65 inches: extremely cobbly clay

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

HFF—Henefer-McPhie association, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: j6x9
Elevation: 5,500 to 7,100 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 80 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Henefer and similar soils: 60 percent
Mcphie and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henefer

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile

A11 - 0 to 3 inches: loam
A12 - 3 to 7 inches: loam
B11 - 7 to 15 inches: clay loam
B21t - 15 to 25 inches: cobbly clay

B22t - 25 to 33 inches: cobbly clay
B23t - 33 to 43 inches: cobbly clay
B3 - 43 to 58 inches: extremely cobbly clay
C - 58 to 65 inches: extremely cobbly clay

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Description of Mcphie

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from granite

Typical profile

A11 - 0 to 7 inches: sandy loam
A12 - 7 to 12 inches: loam
A2 - 12 to 24 inches: gravelly sandy loam
B&A - 24 to 30 inches: cobbly sandy loam
B21t - 30 to 38 inches: cobbly loam
B22t - 38 to 55 inches: cobbly loam
B3 - 55 to 60 inches: very cobbly sandy loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Mountain Gravelly Loam (Oak) (R047XA410UT)

HFG2—Henefer-McPhie association, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: j6xb
Elevation: 5,500 to 7,100 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 80 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Henefer and similar soils: 80 percent
Mcphie and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henefer

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile

A11 - 0 to 3 inches: loam
A12 - 3 to 7 inches: loam
B11 - 7 to 15 inches: clay loam
B21t - 15 to 25 inches: cobbly clay
B22t - 25 to 33 inches: cobbly clay
B23t - 33 to 43 inches: cobbly clay
B3 - 43 to 58 inches: extremely cobbly clay
C - 58 to 65 inches: extremely cobbly clay

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Description of Mcphie

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from granite

Typical profile

A12 - 0 to 7 inches: cobbly sandy loam
A11 - 7 to 12 inches: cobbly sandy loam
A2 - 12 to 24 inches: gravelly sandy loam
B&A - 24 to 30 inches: cobbly sandy loam
B21t - 30 to 38 inches: cobbly loam
B22t - 38 to 55 inches: cobbly loam
B3 - 55 to 60 inches: very cobbly sandy loam

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: Mountain Gravelly Loam (Oak) (R047XA410UT)

HKG—Henefer-Rake association, 35 to 70 percent slopes

Map Unit Setting

National map unit symbol: j6xc
Elevation: 5,100 to 7,100 feet
Mean annual precipitation: 15 to 25 inches
Mean annual air temperature: 41 to 47 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Rake and similar soils: 35 percent
Henefer and similar soils: 30 percent
Henefer and similar soils: 30 percent
Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rake

Setting

Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountainflank, interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and quartzite

Typical profile

A1 - 0 to 6 inches: stony loam
B2t - 6 to 13 inches: extremely cobbly clay loam
C1cam - 13 to 32 inches: indurated
C2ca - 32 to 37 inches: extremely stony sandy loam

Properties and qualities

Slope: 35 to 70 percent
Percent of area covered with surface fragments: 6.0 percent
Depth to restrictive feature: 10 to 20 inches to petrocalcic
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 70 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Mountain Shallow Loam (Mountain Big Sagebrush) (R047XA446UT)

Description of Henefer

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile

A11 - 0 to 3 inches: loam
A12 - 3 to 7 inches: loam
B11 - 7 to 15 inches: clay loam
B21t - 15 to 25 inches: cobbly clay
B22t - 25 to 33 inches: cobbly clay
B23t - 33 to 43 inches: cobbly clay
B3 - 43 to 58 inches: very cobbly clay, extremely cobbly clay

B3 - 43 to 58 inches: very cobbly clay, extremely cobbly clay
C - 58 to 65 inches:
C - 58 to 65 inches:

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Description of Henefer

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile

A11 - 0 to 3 inches: cobbly loam
A11 - 3 to 7 inches: cobbly loam
B11 - 7 to 15 inches: cobbly clay loam
B21t - 15 to 25 inches: cobbly clay
B22t - 25 to 33 inches: cobbly clay
B23t - 33 to 43 inches: cobbly clay
B3 - 43 to 58 inches: extremely cobbly clay
C - 58 to 65 inches: extremely cobbly clay

Properties and qualities

Slope: 35 to 50 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Minor Components

Picayune

Percent of map unit: 5 percent

HmE—Hillfield silt loam, 10 to 20 percent slopes

Map Unit Setting

National map unit symbol: j6xg
Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hillfield and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hillfield

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 4 inches: silt loam
AC - 4 to 12 inches: silt loam
C1ca - 12 to 26 inches: silt loam
C2ca - 26 to 35 inches: loam
C3ca - 35 to 40 inches: loam
IIC4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 10 to 20 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Taylorsville
Percent of map unit: 5 percent

Welby
Percent of map unit: 5 percent

HmF—Hillfield silt loam, 20 to 30 percent slopes

Map Unit Setting
National map unit symbol: j6xh
Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition
Hillfield and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hillfield

Setting
Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile
Ap - 0 to 4 inches: silt loam
AC - 4 to 12 inches: silt loam
C1ca - 12 to 26 inches: silt loam
C2ca - 26 to 35 inches: loam
C3ca - 35 to 40 inches: loam
IIC4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

HNG—Hillfield-Layton complex, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: j6xd
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 12 to 17 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hillfield and similar soils: 60 percent
Layton and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hillfield

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 4 inches: silt loam
AC - 4 to 12 inches: silt loam
C1ca - 12 to 26 inches: silt loam
C2ca - 26 to 35 inches: loam

C3ca - 35 to 40 inches: loam
IIC4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Description of Layton

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sandstone and quartzite

Typical profile

A11 - 0 to 2 inches: loamy fine sand
A12 - 2 to 7 inches: loamy fine sand
AC - 7 to 14 inches: loamy fine sand
C1 - 14 to 26 inches: loamy fine sand
C2ca - 26 to 39 inches: loamy fine sand
C3ca - 39 to 60 inches: fine sand

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A
Ecological site: Upland Sand (Black Greasewood, Indian Ricegrass) (R028AY330UT)

HOF—Hillfield-Sterling complex, 20 to 35 percent slopes

Map Unit Setting

National map unit symbol: j6xf
Elevation: 4,600 to 5,200 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Sterling and similar soils: 50 percent
Hillfield and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hillfield

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 4 inches: silt loam
AC - 4 to 12 inches: silt loam
C1ca - 12 to 26 inches: silt loam
C2ca - 26 to 35 inches: loam
C3ca - 35 to 40 inches: loam
IIC4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Description of Sterling

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 5 inches: gravelly fine sandy loam
A1 - 5 to 11 inches: gravelly sandy loam
C1ca - 11 to 16 inches: gravelly sandy loam
C2ca - 16 to 21 inches: very gravelly sandy loam
C3ca - 21 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 20 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Upland Stony Loam (Wyoming Big Sagebrush) (R028AY334UT)
Other vegetative classification: Upland Stony Loam (Mountain Big Sagebrush) (028AY334UT)

HpF—Hillfield-Welby silt loams, 6 to 35 percent slopes

Map Unit Setting

National map unit symbol: j6xj
Elevation: 4,500 to 5,200 feet

Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Hillfield and similar soils: 60 percent
Welby and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hillfield

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 4 inches: silt loam
AC - 4 to 12 inches: silt loam
C1ca - 12 to 26 inches: silt loam
C2ca - 26 to 35 inches: loam
C3ca - 35 to 40 inches: loam
IIC4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Description of Welby

Setting

Landform: Lake terraces, escarpments
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca - 22 to 40 inches: silt loam
C2ca - 40 to 54 inches: silt loam
C3 - 54 to 65 inches: silt loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Hr—Holdaway silt loam

Map Unit Setting

National map unit symbol: j6xk
Elevation: 4,400 to 4,500 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Holdaway and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holdaway

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 13 inches: silt loam
C1cag - 13 to 20 inches: silt loam
C2camg - 20 to 28 inches: indurated
C3cag - 28 to 32 inches: silt loam
C4cam-C6camg - 32 to 67 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to petrocalcic
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 75 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 15.0
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Wet Fresh Meadow (R028AY020UT)

Hs—Holdaway silt loam, strongly saline-alkali

Map Unit Setting

National map unit symbol: j6xl
Elevation: 4,400 to 4,500 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Holdaway and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holdaway

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 13 inches: silt loam
C1cag - 13 to 20 inches: silt loam
C2camg - 20 to 28 inches: indurated
C3cag - 28 to 32 inches: silt loam
C4cam-C6camg - 32 to 67 inches: cemented material

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to petrocalcic
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 75 percent
Salinity, maximum in profile: Strongly saline (16.0 to 40.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Ir—Ironton loam

Map Unit Setting

National map unit symbol: j6xm
Elevation: 4,500 to 4,550 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ironton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ironton

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 8 inches: loam
C1,2,3,cag - 8 to 32 inches: loam
IIC4g - 32 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Is—Ironton loam, moderately saline-alkali

Map Unit Setting

National map unit symbol: j6xn
Elevation: 4,500 to 4,550 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ironton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ironton

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 8 inches: loam
C1,2,3cag - 8 to 32 inches: loam
IIC4g - 32 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Jo—Jordan silt loam

Map Unit Setting

National map unit symbol: j6xp
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 48 degrees F
Farmland classification: Not prime farmland

Map Unit Composition

Jordan and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jordan

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

A1,A2 - 0 to 7 inches: silt loam
B2tsaca - 7 to 15 inches: clay
C1saca,C2ca - 15 to 55 inches: silty clay loam
C3 - 55 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 90.0
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Payson

Percent of map unit: 5 percent

KeA—Keigley silty clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6xt
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Keigley and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keigley

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silty clay loam
A12,A13 - 7 to 27 inches: silty clay loam
C1,C2 - 27 to 65 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

KeB—Keigley silty clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6xv
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Keigley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keigley

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silty clay loam
A12,A13 - 7 to 27 inches: silty clay loam
C1,C2 - 27 to 65 inches: silty clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Pleasant vale
Percent of map unit: 5 percent

Taylorsville
Percent of map unit: 5 percent

Strongly saline soils
Percent of map unit: 5 percent

KgA—Keigley silty clay loam, extended season, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: j6xw
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Keigley and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keigley

Setting
Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silty clay loam
A12,A13 - 7 to 27 inches: silty clay loam
C1,C2 - 27 to 65 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

KmA—Kidman very fine sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6xx
Elevation: 4,700 to 5,100 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kidman and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kidman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from quartzite and/or sandstone

Typical profile

Ap - 0 to 8 inches: very fine sandy loam

B2 - 8 to 20 inches: very fine sandy loam
C1,C2 - 20 to 44 inches: very fine sandy loam
C3ca - 44 to 60 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Layton

Percent of map unit: 5 percent

Timpanogos

Percent of map unit: 5 percent

KmB—Kidman very fine sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6xy
Elevation: 4,700 to 5,100 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kidman and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kidman

Setting

Landform: Lake terraces

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from quartzite and/or sandstone

Typical profile

Ap - 0 to 8 inches: very fine sandy loam
B2 - 8 to 20 inches: very fine sandy loam
C1,C2 - 20 to 44 inches: very fine sandy loam
C3ca - 44 to 60 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

KmC—Kidman very fine sandy loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6xz
Elevation: 4,700 to 5,100 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kidman and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kidman

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from quartzite and/or sandstone

Typical profile

Ap - 0 to 8 inches: very fine sandy loam
B2 - 8 to 20 inches: very fine sandy loam
C1,C2 - 20 to 44 inches: very fine sandy loam
C3ca - 44 to 60 inches: loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Layton

Percent of map unit: 5 percent

KNG2—Kilburn very gravelly sandy loam, 30 to 50 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6xq
Elevation: 4,600 to 5,700 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Kilburn and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kilburn

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from granite and quartzite

Typical profile

A11 - 0 to 8 inches: very gravelly sandy loam
A12 - 8 to 15 inches: very gravelly sandy loam
B2,B3 - 15 to 36 inches: very gravelly sandy loam
C1 - 36 to 40 inches: extremely gravelly sandy loam
C2ca - 40 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

Minor Components

Cleverly

Percent of map unit: 5 percent

Rock outcrop

Percent of map unit: 5 percent

KOD—Kilburn stony sandy loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: j6xr
Elevation: 4,600 to 5,700 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Kilburn and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kilburn

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from granite and quartzite

Typical profile

A11 - 0 to 8 inches: stony sandy loam
A12 - 8 to 15 inches: very stony sandy loam
A12 - 15 to 36 inches: very stony sandy loam
C1 - 36 to 40 inches: extremely stony sandy loam
C2ca - 40 to 60 inches: extremely stony sandy loam

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 12.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

KRE2—Kilburn gravelly fine sandy loam, 15 to 30 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6xs
Elevation: 4,600 to 5,700 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Kilburn and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kilburn

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from granite and quartzite

Typical profile

A11 - 0 to 8 inches: gravelly fine sandy loam
A12 - 8 to 15 inches: very gravelly sandy loam
B2,B3 - 15 to 36 inches: very gravelly sandy loam
C1 - 36 to 40 inches: extremely gravelly sandy loam
C2ca - 40 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

Ks—Kirkham silty clay loam

Map Unit Setting

National map unit symbol: j6y0
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kirkham and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kirkham

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, dip

Down-slope shape: Linear, concave
Across-slope shape: Concave, convex
Parent material: Alluvium derived from sandstone, quartzite and granite

Typical profile

Ap - 0 to 11 inches: silty clay loam
C1,C2 - 11 to 28 inches: silty clay loam
C3 - 28 to 42 inches: silty clay
C4,C5 - 42 to 65 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Benjamin

Percent of map unit: 5 percent

Pleasant vale

Percent of map unit: 5 percent

Kt—Kirkham silty clay loam, moderately saline-alkali

Map Unit Setting

National map unit symbol: j6y1
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kirkham and similar soils: 95 percent
Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kirkham

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave, convex
Parent material: Alluvium derived from sandstone, quartzite and granite

Typical profile

Ap - 0 to 11 inches: silty clay loam
C1,C2 - 11 to 28 inches: silty clay loam
C3 - 28 to 42 inches: silty clay
C4,C5 - 42 to 65 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Strongly saine soils

Percent of map unit: 5 percent

Ku—Kirkham silty clay loam, strongly saline-alkali

Map Unit Setting

National map unit symbol: j6y2
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 150 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Kirkham and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kirkham

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave, convex
Parent material: Alluvium derived from sandstone, quartzite and granite

Typical profile

Ap - 0 to 11 inches: silty clay loam
C1,C2 - 11 to 28 inches: silty clay loam
C3 - 28 to 42 inches: silty clay
C4,C5 - 42 to 65 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 60.0
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Depressional soils

Percent of map unit: 5 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

LaC—Lakewin gravelly fine sandy loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6y3
Elevation: 4,600 to 5,100 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Lakewin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lakewin

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

A11,A12 - 0 to 10 inches: gravelly fine sandy loam
B21 - 10 to 17 inches: gravelly fine sandy loam
B22 - 17 to 27 inches: very gravelly sandy loam
IIC1&IIC2ca - 27 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

Minor Components

Sterling
Percent of map unit: 5 percent

Bingham
Percent of map unit: 5 percent

LaD—Lakewin gravelly fine sandy loam, 6 to 15 percent slopes

Map Unit Setting
National map unit symbol: j6y4
Elevation: 4,600 to 5,100 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Farmland of unique importance

Map Unit Composition
Lakewin and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lakewin

Setting
Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile
A11,A12 - 0 to 8 inches: gravelly fine sandy loam
B21 - 8 to 17 inches: gravelly fine sandy loam
B22 - 17 to 27 inches: very gravelly sandy loam
IIC1&C2ca - 27 to 60 inches: extremely gravelly sand

Properties and qualities
Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

LcE—Lakewin cobbly fine sandy loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: j6y5
Elevation: 4,600 to 5,100 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Lakewin and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lakewin

Setting

Landform: Lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

A11,A12 - 0 to 10 inches: cobbly fine sandy loam
B21 - 10 to 17 inches: gravelly fine sandy loam
B22 - 17 to 27 inches: very gravelly sandy loam
IIC1&C2ca - 27 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

Minor Components

Sterling
Percent of map unit: 5 percent

LeD—Layton loamy fine sand, 6 to 15 percent slopes

Map Unit Setting
National map unit symbol: j6y6
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Farmland of unique importance

Map Unit Composition
Layton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Layton

Setting
Landform: Escarpments, terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sandstone and quartzite

Typical profile
A11,A12,AC - 0 to 12 inches: loamy fine sand
C1 - 12 to 26 inches: loamy fine sand
C2ca - 26 to 39 inches: loamy fine sand
C3ca - 39 to 60 inches: fine sand

Properties and qualities
Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification (irrigated): 4s

Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Upland Sand (Black Greasewood, Indian Ricegrass) (R028AY330UT)

LfC—Layton fine sandy loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6y7
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Layton and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Layton

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sandstone and quartzite

Typical profile

A11,A12,AC - 0 to 7 inches: fine sandy loam
C1 - 7 to 26 inches: loamy fine sand
C2CA - 26 to 39 inches: loamy fine sand
C3CA - 39 to 60 inches: fine sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Upland Sand (Black Greasewood, Indian Ricegrass) (R028AY330UT)

Minor Components

Preston
Percent of map unit: 5 percent

Kidman
Percent of map unit: 5 percent

LmA—Layton fine sandy loam, slowly permeable substratum, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: j6y8
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Layton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Layton

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sandstone and quartzite

Typical profile
A11,A12,AC - 0 to 14 inches: fine sandy loam
C1 - 14 to 36 inches: loamy fine sand
C2ca - 36 to 48 inches: sandy clay loam
C3ca - 48 to 60 inches: fine sand

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: Upland Sand (Black Greasewood, Indian Ricegrass) (R028AY330UT)

LnB—Layton fine sandy loam, water table, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6y9
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 42 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Layton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Layton

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sandstone and quartzite

Typical profile

A11,A12,AC - 0 to 14 inches: fine sandy loam
C1 - 14 to 36 inches: loamy fine sand
C2ca - 36 to 48 inches: sandy clay loam
C3ca - 48 to 60 inches: fine sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C

Ecological site: Upland Sand (Black Greasewood, Indian Ricegrass) (R028AY330UT)

Lo—Logan silty clay loam

Map Unit Setting

National map unit symbol: j6yb
Elevation: 4,450 to 4,550 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Logan and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Logan

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

O2 - 0 to 8 inches: peat
A11g,12g&O - 8 to 21 inches: silty clay loam
C123cag - 21 to 44 inches: silty clay loam
C4cag - 44 to 64 inches: silt loam
C5g - 64 to 85 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Ecological site: Wet Fresh Meadow (R028AY020UT)

Minor Components

Chipman
Percent of map unit: 5 percent

Ironton
Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Ls—Logan silty clay loam, heavy variant

Map Unit Setting
National map unit symbol: j6yc
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 44 to 46 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Logan variant and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Logan Variant

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile
Ap - 0 to 7 inches: silty clay loam
A12 - 7 to 16 inches: silty clay loam
ACca, C1ca - 16 to 39 inches: silty clay
A1b - 39 to 46 inches: silty clay loam
C2 - 46 to 60 inches: silty clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches

Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Ecological site: Wet Saline Meadow (Saltgrass) (R028AY024UT)

MAF—Manila silt loam, 10 to 30 percent slopes

Map Unit Setting
National map unit symbol: j6yd
Elevation: 5,000 to 6,000 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition
Manila and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Manila

Setting
Landform: Mountain slopes, fans
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex, concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from mixed sources

Typical profile
H1 - 0 to 6 inches: silt loam
H2 - 6 to 17 inches: clay loam
H3 - 17 to 42 inches: silty clay
H4 - 42 to 63 inches: cobbly clay loam
H5 - 63 to 73 inches: cobbly loam

Properties and qualities
Slope: 10 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Minor Components

Henefer

Percent of map unit: 5 percent

Mf—Martini fine sandy loam

Map Unit Setting

National map unit symbol: j6yh
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Martini and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Martini

Setting

Landform: Alluvial fans, flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave, linear
Across-slope shape: Convex, concave
Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 9 inches: fine sandy loam
A1 - 9 to 12 inches: fine sandy loam
C1 - 12 to 17 inches: fine sandy loam
C2 - 17 to 50 inches: sandy loam
C3 - 50 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: About 42 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Depressional soils
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Sunset
Percent of map unit: 3 percent

Strongly saline-alkali soils
Percent of map unit: 3 percent

Mh—McBeth silt loam

Map Unit Setting
National map unit symbol: j6yj
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Mcbeth and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbeth

Setting
Landform: Lake terraces, alluvial fans, flood plains
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, convex, concave

Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 8 inches: silt loam
A1 - 8 to 12 inches: silt loam
C1g - 12 to 18 inches: silt loam
C2g - 18 to 24 inches: very fine sandy loam
C3g,C4g - 24 to 68 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Chipman

Percent of map unit: 5 percent

Mn—McBeth silt loam, moderately saline

Map Unit Setting

National map unit symbol: j6yk
Elevation: 4,500 to 4,600 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mcbeth and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbeth

Setting

Landform: Lake terraces, alluvial fans, flood plains
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, convex, concave
Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 8 inches: silt loam
A1 - 8 to 12 inches: silt loam
C1g - 12 to 18 inches: silt loam
C2g - 18 to 24 inches: very fine sandy loam
C3g,C4g - 24 to 68 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

MrC—McMurdie silt loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6yl
Elevation: 4,800 to 5,100 feet
Mean annual precipitation: 16 to 20 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mcmurdie and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcmurdie

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silt loam
B1 - 7 to 11 inches: silt loam
B2t - 11 to 25 inches: silty clay
B3ca&C1ca - 25 to 47 inches: silty clay
C2ca - 47 to 63 inches: silty clay loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Minor Components

Parleys

Percent of map unit: 5 percent

MtE2—McMurdie-Taylorsville complex, 6 to 20 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6ym
Elevation: 4,500 to 5,100 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Taylorsville and similar soils: 50 percent
Mcmurdie and similar soils: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcmurdie

Setting

Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silt loam
B1 - 7 to 11 inches: silt loam
B2t - 11 to 25 inches: silty clay
B3ca&C1ca - 25 to 47 inches: silty clay
C2ca - 47 to 63 inches: silty clay loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Description of Taylorsville

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile

Ap - 0 to 7 inches: silty clay loam
AC - 7 to 13 inches: silty clay loam
C1,C2 - 13 to 36 inches: silty clay loam
C3ca - 36 to 56 inches: silty clay loam

C4 - 56 to 62 inches: silty clay loam

Properties and qualities

Slope: 6 to 20 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

MU—Mixed alluvial land

Map Unit Setting

National map unit symbol: j6yf
Elevation: 4,450 to 4,550 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Mixed alluvial land and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mixed Alluvial Land

Setting

Landform: Channels, streams
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 6 inches: loam

H2 - 6 to 60 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: D
Ecological site: Wet Fresh Streambank (R028AY022UT)

Minor Components

Depressional soils

Percent of map unit: 5 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

MX—Mixed alluvial land, saline

Map Unit Setting

National map unit symbol: j6yg
Elevation: 4,450 to 4,550 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Mixed alluvial land saline and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mixed Alluvial Land Saline

Setting

Landform: Channels, streams
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 60 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: D
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Depressional soils

Percent of map unit: 5 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

PaB—Parleys loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2tjtg
Elevation: 4,210 to 5,400 feet
Mean annual precipitation: 12 to 18 inches

Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 160 to 190 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Parleys and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parleys

Setting
Landform: Lake terraces, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits and/or alluvium derived from igneous and sedimentary rock

Typical profile
Ap - 0 to 6 inches: loam
A - 6 to 15 inches: loam
Bt - 15 to 26 inches: clay loam
Bk - 26 to 33 inches: silty clay loam
CBk - 33 to 48 inches: silt loam
C - 48 to 60 inches: stratified fine sand to silty clay loam

Properties and qualities
Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PaC—Parleys loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2tjsx

Elevation: 4,210 to 5,910 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 160 to 190 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Parleys and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parleys

Setting

Landform: Lake terraces, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Lacustrine deposits and/or alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 6 inches: loam
A - 6 to 11 inches: loam
Bt1 - 11 to 15 inches: silty clay loam
Bt2 - 15 to 19 inches: silty clay loam
Btk - 19 to 26 inches: silty clay loam
Bk - 26 to 30 inches: silty clay loam
CBk - 30 to 42 inches: silty clay loam
C1 - 42 to 52 inches: silty clay loam
C2 - 52 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PbC—Parleys gravelly loam, overwashed, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6yy
Elevation: 4,650 to 5,000 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Parleys and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parleys

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 10 inches: gravelly loam
B2t - 10 to 20 inches: silty clay loam
B3ca - 20 to 35 inches: silty clay loam
C1ca&C2 - 35 to 67 inches: silt loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PcB—Parleys silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6yz
Elevation: 4,650 to 5,000 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Parleys and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parleys

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silty clay loam
B2t - 7 to 20 inches: silty clay loam
B3ca - 20 to 35 inches: silty clay loam
C1ca&C2 - 35 to 67 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Pd—Payson silty clay loam

Map Unit Setting

National map unit symbol: j6z0
Elevation: 4,550 to 4,600 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Payson and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Payson

Setting

Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile

A21,A22 - 0 to 9 inches: silty clay loam
B1 - 9 to 14 inches: silty clay
B2t - 14 to 21 inches: clay
B3ca&C1ca - 21 to 33 inches: clay
C2ca - 33 to 48 inches: clay
C3 - 48 to 68 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 36 to 54 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 90.0
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

PEE—Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6yn
Elevation: 4,550 to 4,600 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 47 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Payson and similar soils: 45 percent
Terrace escarpments: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Payson

Setting

Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile

A21,A22 - 0 to 9 inches: silty clay loam
B1 - 9 to 14 inches: silty clay
B2t - 14 to 21 inches: clay
B3ca&c1ca - 21 to 33 inches: clay
C2ca - 33 to 48 inches: clay
C3 - 48 to 68 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 36 to 54 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 90.0
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Description of Terrace Escarpments

Setting
Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Minor Components

Saline-alkali soils
Percent of map unit: 25 percent

Pf—Peteetneet peat

Map Unit Setting
National map unit symbol: j6z1
Elevation: 4,450 to 4,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Peteetneet and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peteetneet

Setting
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material

Typical profile
011,012,021 - 0 to 15 inches: peat
022,023 - 15 to 60 inches: muck

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 13.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: Wet Fresh Meadow (R028AY020UT)

Minor Components

Logan

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Fresh Meadow (R028AY020UT)

Ironton

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Pg—Peteetneet-Holdaway complex

Map Unit Setting

National map unit symbol: j6z2
Elevation: 4,400 to 4,500 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Peteetneet and similar soils: 55 percent
Holdaway and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peteetneet

Setting

Landform: Depressions
Landform position (three-dimensional): Dip

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material

Typical profile

011,012,021 - 0 to 15 inches: peat
022,023 - 15 to 60 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 13.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: Wet Fresh Meadow (R028AY020UT)

Description of Holdaway

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 13 inches: silt loam
C1cag - 13 to 20 inches: silt loam
C2camg - 20 to 28 inches: indurated
C3cag - 28 to 32 inches: silt loam
C4cam-C6camg - 32 to 67 inches: cemented material

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to petrocalcic
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 75 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 15.0
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Wet Fresh Meadow (R028AY020UT)

Minor Components

Logan

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Fresh Meadow (R028AY020UT)

PHG2—Picayune cobbly silt loam, 35 to 70 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6yp
Elevation: 5,500 to 7,500 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Picayune and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Picayune

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and quartzite

Typical profile

A1 - 0 to 6 inches: cobbly silt loam
B2 - 6 to 12 inches: cobbly silty clay loam
B31ca - 12 to 23 inches: cobbly silt loam
B32ca - 23 to 29 inches: cobbly clay loam
C1ca - 29 to 60 inches: cobbly silt loam

Properties and qualities

Slope: 35 to 70 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Minor Components

Rake

Percent of map unit: 5 percent

PIF—Picayune cobbly loam, red variant, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: j6yq
Elevation: 5,500 to 7,500 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Picayune and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Picayune

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and quartzite

Typical profile

A1&B2 - 0 to 10 inches: cobbly loam
B3ca - 10 to 16 inches: cobbly clay loam
C1ca - 16 to 24 inches: clay loam

Cr - 24 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Minor Components

Rake

Percent of map unit: 5 percent

Picayune

Percent of map unit: 5 percent

PJG2—Picayune-Rake association, 35 to 70 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6yr
Elevation: 5,100 to 7,500 feet
Mean annual precipitation: 15 to 24 inches
Mean annual air temperature: 43 to 48 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Picayune and similar soils: 60 percent
Rake and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Picayune

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Colluvium derived from limestone and quartzite

Typical profile

A1 - 0 to 6 inches: cobbly silt loam
B2 - 6 to 12 inches: cobbly silty clay loam
B31ca - 12 to 23 inches: cobbly silt loam
B32ca - 23 to 29 inches: cobbly clay loam
C1ca - 29 to 60 inches: cobbly silt loam

Properties and qualities

Slope: 35 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Mountain Loam (Mountain Big Sagebrush) (R047XA430UT)

Description of Rake

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and quartzite

Typical profile

A1 - 0 to 6 inches: extremely stony loam
B2t - 6 to 13 inches: extremely cobbly clay loam
C1cam - 13 to 32 inches: indurated
C2ca - 32 to 37 inches: extremely stony sandy loam

Properties and qualities

Slope: 20 to 70 percent
Percent of area covered with surface fragments: 12.0 percent
Depth to restrictive feature: 10 to 20 inches to petrocalcic
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 70 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Mountain Shallow Loam (Mountain Big Sagebrush) (R047XA446UT)

Minor Components

Rock outcrop

Percent of map unit: 5 percent

PK—Pits and dumps

Map Unit Setting

National map unit symbol: j6ys
Elevation: 4,490 to 4,900 feet
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

PIC—Pleasant Grove gravelly loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6z3
Elevation: 4,600 to 5,700 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant grove and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Grove

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex

Parent material: Colluvium and/or slope alluvium derived from limestone, quartzite and shale

Typical profile

A11,A12 - 0 to 6 inches: gravelly loam
A13 - 6 to 21 inches: cobbly loam
C1ca - 21 to 38 inches: very cobbly loam
C2ca - 38 to 49 inches: very cobbly fine sandy loam
C3ca - 49 to 60 inches: very cobbly loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

PlD—Pleasant Grove gravelly loam, 6 to 10 percent slopes

Map Unit Setting

National map unit symbol: j6z4
Elevation: 4,600 to 5,700 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant grove and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Grove

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from limestone, quartzite and shale

Typical profile

A11&A12 - 0 to 6 inches: gravelly loam
A13 - 6 to 21 inches: cobbly loam
C1ca - 21 to 38 inches: very cobbly loam
C2ca - 38 to 49 inches: very cobbly fine sandy loam
C3ca - 49 to 60 inches: very cobbly loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

PmE2—Pleasant Grove stony loam, 10 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6z5
Elevation: 4,600 to 5,700 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Pleasant grove and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Grove

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from limestone, quartzite and shale

Typical profile

A11&A12 - 0 to 2 inches: stony loam

A13 - 2 to 21 inches: cobbly loam
C1ca - 21 to 38 inches: very cobbly loam
C2ca - 38 to 49 inches: very cobbly fine sandy loam
C3ca - 49 to 60 inches: very cobbly loam

Properties and qualities

Slope: 10 to 25 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

PnA—Pleasant Vale loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: j6z6
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant vale and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Vale

Setting

Landform: Alluvial fans, flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave, linear
Across-slope shape: Convex, concave
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 6 inches: loam
A1 - 6 to 17 inches: loam

C1 - 17 to 24 inches: very fine sandy loam
C2 - 24 to 40 inches: very fine sandy loam
C3&C4 - 40 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PNG2—Pleasant Grove-Terrace escarpments complex, 30 to 60 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6yt
Elevation: 4,600 to 5,700 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Pleasant grove and similar soils: 80 percent
Terrace escarpments: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Grove

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Colluvium and/or slope alluvium derived from limestone, quartzite and shale

Typical profile

A11&A12 - 0 to 2 inches: stony loam
A13 - 2 to 21 inches: cobbly loam
C1ca - 21 to 38 inches: very cobbly loam
C2ca - 38 to 49 inches: very cobbly fine sandy loam
C3ca - 49 to 60 inches: very cobbly loam

Properties and qualities

Slope: 30 to 60 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: Upland Gravelly Loam (Bonneville Big Sagebrush) (R028AY306UT)

Description of Terrace Escarpments

Setting

Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

PoA—Pleasant Vale loam, extended season, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: j6z7
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant vale and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Vale

Setting

Landform: Alluvial fans, flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave, linear
Across-slope shape: Convex, concave
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 6 inches: loam
A1 - 6 to 17 inches: loam
C1 - 17 to 24 inches: very fine sandy loam
C2 - 24 to 40 inches: very fine sandy loam
C3,C4 - 40 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PoC—Pleasant Vale loam, extended season, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6z8
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant vale and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Vale

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 6 inches: loam
A1 - 6 to 12 inches: loam
C1 - 12 to 24 inches: very fine sandy loam
C2 - 24 to 40 inches: very fine sandy loam
C3,C4 - 40 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PpB—Pleasant Vale gravelly loam, extended season, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6z9
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant vale and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Vale

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 6 inches: gravelly loam
A1 - 6 to 17 inches: gravelly sandy loam
C1 - 17 to 24 inches: very fine sandy loam
C2 - 24 to 40 inches: very fine sandy loam
C3,C4 - 40 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PrD—Pleasant Vale gravelly sandy loam, extended season, 6 to 10 percent slopes

Map Unit Setting

National map unit symbol: j6zb
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Pleasant vale and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Vale

Setting

Landform: Hills, lake terraces
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 6 inches: gravelly sandy loam
A1 - 6 to 17 inches: gravelly sandy loam
C1 - 17 to 24 inches: very fine sandy loam
C2 - 24 to 40 inches: very fine sandy loam
C3,C4 - 40 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PsB—Pleasant Vale silty clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6zc
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant vale and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant Vale

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 8 inches: silty clay loam
A1 - 8 to 14 inches: loam
C1 - 14 to 24 inches: very fine sandy loam
C2 - 24 to 40 inches: very fine sandy loam
C3,C4 - 40 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

PtB—Pleasant View fine sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6zd
Elevation: 4,800 to 5,100 feet
Mean annual precipitation: 17 to 20 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasant view and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasant View

Setting

Landform: Channels
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

Ap - 0 to 6 inches: fine sandy loam
C1,C2 - 6 to 23 inches: fine sandy loam
IIC3ca - 23 to 30 inches: gravelly sandy loam
IIC4ca - 30 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Semimoist Streambank (Narrowleaf Cottonwood) (R047XA002UT)

PuD—Preston fine sand, 1 to 10 percent slopes

Map Unit Setting

National map unit symbol: j6zf
Elevation: 4,500 to 4,750 feet
Mean annual precipitation: 14 to 19 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Preston and similar soils: 95 percent
Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Preston

Setting

Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind worked lacustrine deposits derived from sandstone and quartzite

Typical profile

A11 - 0 to 3 inches: fine sand
A12 - 3 to 17 inches: fine sand
C2,A1b.C2 - 17 to 60 inches: fine sand

Properties and qualities

Slope: 1 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to strongly saline (0.0 to 20.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Upland Sand (Black Greasewood, Indian Ricegrass) (R028AY330UT)

Minor Components

Layton

Percent of map unit: 5 percent

Pv—Preston loamy fine sand, high water table variant

Map Unit Setting

National map unit symbol: j6zg
Elevation: 4,500 to 4,650 feet
Mean annual precipitation: 14 to 19 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Preston, wet, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Preston, Wet

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind worked lacustrine deposits derived from sandstone and quartzite

Typical profile

A1 - 0 to 3 inches: loamy fine sand
C1 - 3 to 8 inches: fine sand
A1b - 8 to 15 inches: loamy fine sand
C2,C3,C4 - 15 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Pw—Provo gravelly fine sandy loam

Map Unit Setting

National map unit symbol: j6zh
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Provo and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Provo

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 7 inches: gravelly fine sandy loam
A1g - 7 to 15 inches: gravelly fine sandy loam
C1g - 15 to 25 inches: extremely gravelly sand
IIC2 - 25 to 40 inches: extremely gravelly loamy sand
IIC3 - 40 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Ecological site: Semiwet Fresh Streambank (R028AY014UT)

Minor Components

Sunset

Percent of map unit: 5 percent

Px—Provo-Sunset complex

Map Unit Setting

National map unit symbol: j6zj
Elevation: 4,500 to 4,900 feet

Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Provo and similar soils: 70 percent
Sunset and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Provo

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

Ap - 0 to 7 inches: gravelly fine sandy loam
Alg - 7 to 15 inches: gravelly fine sandy loam
C1g - 15 to 25 inches: extremely gravelly sand
IIC2 - 25 to 40 inches: extremely gravelly loamy sand
IIC3 - 40 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Ecological site: Semiwet Fresh Streambank (R028AY014UT)

Description of Sunset

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, granite and shale

Typical profile

Ap - 0 to 7 inches: loam
A1 - 7 to 14 inches: loam

C1,C2,C3 - 14 to 41 inches: stratified very fine sandy loam to loam
C4,C5 - 41 to 60 inches: stratified loam to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

PY—Provo Bay peaty silt loam

Map Unit Setting

National map unit symbol: j6yv
Elevation: 4,450 to 5,000 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Provo bay and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Provo Bay

Setting

Landform: Valley floors, flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

A11ca,A12gca - 0 to 8 inches: peaty silt loam
A13gca - 8 to 13 inches: silty clay loam
A14gca - 13 to 22 inches: clay loam

C1 - 22 to 33 inches: loam
C2 - 33 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: C/D
Ecological site: Wet Fresh Meadow (R028AY020UT)

Pz—Provo Bay silty clay loam

Map Unit Setting

National map unit symbol: j6zk
Elevation: 4,450 to 5,000 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Provo bay and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Provo Bay

Setting

Landform: Depressions on valley floors
Landform position (three-dimensional): Dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Alluvium derived from mixed sources

Typical profile

A11ca,A12gca - 0 to 8 inches: silty clay loam
A13gca - 8 to 13 inches: silty clay loam
A14gca - 13 to 22 inches: clay loam
C1 - 22 to 33 inches: loam
C2 - 33 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: Wet Fresh Meadow (R028AY020UT)

RAG2—Rake extremely stony loam, 20 to 70 percent slopes, eroded

Map Unit Setting

National map unit symbol: j6zl
Elevation: 5,100 to 6,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Rake and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rake

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and quartzite

Typical profile

A1 - 0 to 6 inches: extremely stony loam
B2t - 6 to 13 inches: extremely cobbly clay loam
C1cam - 13 to 32 inches: indurated
C2ca - 32 to 37 inches: very stony sandy loam, extremely stony sandy loam
C2ca - 32 to 37 inches:

Properties and qualities

Slope: 20 to 70 percent
Percent of area covered with surface fragments: 13.0 percent
Depth to restrictive feature: 10 to 20 inches to petrocalcic
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 70 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Mountain Shallow Loam (Mountain Big Sagebrush) (R047XA446UT)

Minor Components

Rock outcrop

Percent of map unit: 3 percent

RdA—Redola loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6zp
Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Redola and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Redola

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave, convex
Parent material: Alluvium derived from limestone and sandstone

Typical profile

Ap - 0 to 8 inches: loam
C1,C2 - 8 to 30 inches: loam
C3 - 30 to 50 inches: stratified gravelly coarse sand to very fine sandy loam
IIC4 - 50 to 60 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: Loamy Bottom (Great Basin Wildrye) (R028AY006UT)
Other vegetative classification: Loamy Bottom (Great Basin Wildrye) (028AY006UT)

Minor Components

Martin

Percent of map unit: 5 percent

ReC—Redola gravelly loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6zq
Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Redola and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Redola

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, dip

Down-slope shape: Linear, concave
Across-slope shape: Concave, convex
Parent material: Alluvium derived from limestone and sandstone

Typical profile

Ap - 0 to 8 inches: gravelly loam
C1,C2 - 8 to 30 inches: loam
C3 - 30 to 50 inches: stratified gravelly coarse sand to very fine sandy loam
IIC4 - 50 to 60 inches: gravelly coarse sand

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Loamy Bottom (Great Basin Wildrye) (R028AY006UT)
Other vegetative classification: Loamy Bottom (Great Basin Wildrye) (028AY006UT)

RV—Riverwash

Map Unit Setting

National map unit symbol: j6zm
Elevation: 4,500 to 4,800 feet
Farmland classification: Not prime farmland

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from sandstone and quartzite

Typical profile

H1 - 0 to 60 inches: extremely cobbly coarse sandy loam

Properties and qualities

Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

RW—Rock land

Map Unit Setting

National map unit symbol: j6zn
Elevation: 4,500 to 4,800 feet
Farmland classification: Not prime farmland

Map Unit Composition

Rock land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Land

Setting

Landform: Cliffs, ledges
Down-slope shape: Linear
Across-slope shape: Linear

Minor Components

Rake

Percent of map unit: 5 percent

Pleasant grove

Percent of map unit: 5 percent

Sd—Steed sandy loam

Map Unit Setting

National map unit symbol: j6zs
Elevation: 4,550 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Steed and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Steed

Setting

Landform: Alluvial fans
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

A1 - 0 to 7 inches: sandy loam
C1 - 7 to 31 inches: extremely gravelly loamy sand
C2,C3 - 31 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Semiwet Fresh Streambank (R028AY014UT)

Se—Steed gravelly sandy loam

Map Unit Setting

National map unit symbol: j6zt
Elevation: 4,550 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Steed and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Steed

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, sandstone, quartzite, and shale

Typical profile

A1 - 0 to 7 inches: gravelly sandy loam
C1 - 7 to 31 inches: extremely gravelly loamy sand
C2,C3 - 31 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Semiwet Fresh Streambank (R028AY014UT)

Minor Components

Provo

Percent of map unit: 5 percent

SgB—Sterling gravelly fine sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j6zv
Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Sterling and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sterling

Setting

Landform: Benches, lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 5 inches: gravelly fine sandy loam
A1 - 5 to 11 inches: gravelly sandy loam
C1ca - 11 to 16 inches: gravelly sandy loam
C2ca - 16 to 21 inches: very gravelly sandy loam
C3ca - 21 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Upland Stony Loam (Wyoming Big Sagebrush) (R028AY334UT)
Other vegetative classification: Upland Stony Loam (Mountain Big Sagebrush) (028AY334UT)

SgC—Sterling gravelly fine sandy loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j6zw
Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Sterling and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sterling

Setting

Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 5 inches: gravelly fine sandy loam
A1 - 5 to 11 inches: gravelly sandy loam
C1ca - 11 to 16 inches: gravelly sandy loam
C2ca - 16 to 21 inches: very gravelly sandy loam
C3ca - 21 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: Upland Stony Loam (Wyoming Big Sagebrush) (R028AY334UT)
Other vegetative classification: Upland Stony Loam (Mountain Big Sagebrush) (028AY334UT)

SgD—Sterling gravelly fine sandy loam, 6 to 10 percent slopes

Map Unit Setting

National map unit symbol: j6zx
Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Sterling and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sterling

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 5 inches: gravelly fine sandy loam
A1 - 5 to 11 inches: gravelly sandy loam
C1ca - 11 to 16 inches: gravelly sandy loam
C2ca - 16 to 21 inches: very gravelly sandy loam
C3ca - 21 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Upland Stony Loam (Wyoming Big Sagebrush) (R028AY334UT)
Other vegetative classification: Upland Stony Loam (Mountain Big Sagebrush) (028AY334UT)

SNG—Sterling-Terrace escarpments complex, 30 to 70 percent slopes

Map Unit Setting

National map unit symbol: j6zr
Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Sterling and similar soils: 60 percent
Terrace escarpments: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sterling

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 5 inches: cobbly fine sandy loam
A1 - 5 to 11 inches: gravelly sandy loam
C1ca - 11 to 16 inches: gravelly sandy loam
C2ca - 16 to 21 inches: very gravelly sandy loam
C3ca - 21 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 30 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Upland Stony Loam (Wyoming Big Sagebrush) (R028AY334UT)
Other vegetative classification: Upland Stony Loam (Mountain Big Sagebrush) (028AY334UT)

Description of Terrace Escarpments

Setting

Landform: Escarpments, lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

So—Sunset loamy fine sand

Map Unit Setting

National map unit symbol: j6zy

Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Sunset and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunset

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, granite and shale

Typical profile
Ap - 0 to 7 inches: loamy fine sand
A1 - 7 to 14 inches: loam
C1,C2,C3 - 14 to 41 inches: stratified very fine sandy loam to loam
C4,C5 - 41 to 60 inches: stratified loam to silty clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Sr—Sunset loam

Map Unit Setting
National map unit symbol: j6zz
Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches

Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Sunset and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunset

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, granite and shale

Typical profile
Ap - 0 to 7 inches: loam
A1 - 7 to 14 inches: loam
C1,C2,C3 - 14 to 41 inches: stratified very fine sandy loam to loam
C4,C5 - 41 to 60 inches: stratified loam to silty clay loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Ss—Sunset loam, gravelly substratum

Map Unit Setting
National map unit symbol: j700
Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Sunset and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunset

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, granite and shale

Typical profile

Ap - 0 to 7 inches: loam
A1 - 7 to 14 inches: loam
C1,C2,C3 - 14 to 20 inches: very fine sandy loam
C4,C5 - 20 to 60 inches: stratified gravelly loamy sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Sunset

Percent of map unit: 25 percent

St—Sunset loam, clay substratum

Map Unit Setting

National map unit symbol: j701

Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Sunset and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunset

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, granite and shale

Typical profile
Ap - 0 to 7 inches: loam
A1 - 7 to 14 inches: loam
C1,C2,C3 - 14 to 20 inches: very fine sandy loam
C4,C5 - 20 to 60 inches: clay

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Su—Sunset loam, moderately saline

Map Unit Setting
National map unit symbol: j702
Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F

Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sunset and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunset

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from limestone, granite and shale

Typical profile

Ap - 0 to 7 inches: loam
A1 - 7 to 14 inches: loam
C1,C2,C3 - 14 to 41 inches: stratified very fine sandy loam to loam
C4,C5 - 41 to 60 inches: stratified loam to silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Minor Components

Strongly saline-alkali soils

Percent of map unit: 5 percent

Kirkham

Percent of map unit: 5 percent

TaA—Taylorsville silty clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j703
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Taylorsville and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Taylorsville

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile

Ap - 0 to 7 inches: silty clay loam
AC - 7 to 13 inches: silty clay loam
C1,C2 - 13 to 36 inches: silty clay loam
C3ca - 36 to 56 inches: silty clay loam
C4 - 56 to 62 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C

Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Bramwell
Percent of map unit: 5 percent

TaB—Taylorsville silty clay loam, 1 to 3 percent slopes

Map Unit Setting
National map unit symbol: j704
Elevation: 4,500 to 4,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Taylorsville and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Taylorsville

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile
Ap - 0 to 7 inches: silty clay loam
AC - 7 to 13 inches: silty clay loam
C1,C2 - 13 to 36 inches: silty clay loam
C3ca - 36 to 56 inches: silty clay loam
C4 - 56 to 62 inches: silty clay loam

Properties and qualities
Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent

Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Bramwell
Percent of map unit: 5 percent

TcA—Taylorsville silty clay loam, extended season, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: j705
Elevation: 4,530 to 4,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Taylorsville and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Taylorsville

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile
Ap - 0 to 7 inches: silty clay loam
AC - 7 to 13 inches: silty clay loam
C1,C2 - 13 to 36 inches: silty clay loam
C3ca - 36 to 56 inches: silty clay loam
C4 - 56 to 62 inches: silty clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

TcB—Taylorsville silty clay loam, extended season, 1 to 3 percent slopes

Map Unit Setting
National map unit symbol: j706
Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Taylorsville and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Taylorsville

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile
Ap - 0 to 7 inches: silty clay loam
AC - 7 to 13 inches: silty clay loam
C1,C2 - 13 to 36 inches: silty clay loam
C3ca - 36 to 56 inches: silty clay loam
C4 - 56 to 62 inches: silty clay loam

Properties and qualities
Slope: 1 to 3 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

TcC2—Taylorsville silty clay loam, extended season, 3 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: j707
Elevation: 4,530 to 4,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Taylorsville and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Taylorsville

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone and shale

Typical profile

Ap - 0 to 7 inches: silty clay loam
AC - 7 to 13 inches: silty clay loam
C,C2 - 13 to 36 inches: silty clay loam
C3ca - 36 to 56 inches: silty clay loam
C4 - 56 to 62 inches: silty clay loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

TmB—Timpanogos loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: j708
Elevation: 4,700 to 4,900 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Timpanogos and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timpanogos

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, quartzite and granite

Typical profile

Ap - 0 to 9 inches: loam
B2t - 9 to 14 inches: loam
B3ca - 14 to 18 inches: loam

C1ca,C2ca - 18 to 48 inches: silt loam
IIC3 - 48 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Parleys

Percent of map unit: 5 percent

Kidman

Percent of map unit: 5 percent

TmC—Timpanogos loam, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j709
Elevation: 4,700 to 4,900 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Timpanogos and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timpanogos

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, quartzite and granite

Typical profile

Ap - 0 to 9 inches: loam
B2t - 9 to 14 inches: loam
B3ca - 14 to 18 inches: loam
C1ca,C2ca - 18 to 48 inches: silt loam
IIC3 - 48 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Welby

Percent of map unit: 5 percent

Parleys

Percent of map unit: 5 percent

ToB—Timpanogos loam, water table, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: j70b
Elevation: 4,700 to 4,900 feet

Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Timpanogos and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timpanogos

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, quartzite and granite

Typical profile

Ap - 0 to 9 inches: loam
B2t - 9 to 14 inches: loam
B3ca - 14 to 18 inches: loam
C1ca,C2ca - 18 to 48 inches: silt loam
IIC3 - 48 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Welby

Percent of map unit: 5 percent

UL—Urban land

Map Unit Setting

National map unit symbol: j6w9
Elevation: 4,480 to 4,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

VnA—Vineyard fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: j70c
Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Vineyard and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vineyard

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: fine sandy loam
AC - 7 to 13 inches: fine sandy loam
C1ca,C2ca - 13 to 35 inches: fine sandy loam
C3ca - 35 to 42 inches: very fine sandy loam
C4 - 42 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: About 30 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups
Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: Semiwet Fresh Meadow (R028AY012UT)

Minor Components

Timpanogos
Percent of map unit: 5 percent

Welby
Percent of map unit: 5 percent

VsA—Vineyard fine sandy loam, moderately saline, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: j70d
Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Vineyard and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vineyard

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile
Ap - 0 to 7 inches: fine sandy loam
B2t - 7 to 13 inches: fine sandy loam
B3ca - 13 to 35 inches: fine sandy loam
C1ca,C2ca - 35 to 42 inches: very fine sandy loam
IIC3 - 42 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 10.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

W—Water

Map Unit Setting

National map unit symbol: j70s
Elevation: 4,470 to 4,720 feet
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WbA—Welby silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j70f
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Welby and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
Ac - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Taylorsville

Percent of map unit: 5 percent

Vineyard

Percent of map unit: 5 percent

WbB—Welby silt loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j70g
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches

Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Welby and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile
Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities
Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

WbC—Welby silt loam, 3 to 6 percent slopes

Map Unit Setting
National map unit symbol: j70h
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F

Frost-free period: 130 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Welby and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Taylorsville

Percent of map unit: 5 percent

WeA—Welby silt loam, extended season, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j70j
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Welby and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)

Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Timpanogos

Percent of map unit: 5 percent

WeB—Welby silt loam, extended season, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: j70k
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Welby, c3, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby, C3

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Timpanogos

Percent of map unit: 5 percent

WeC—Welby silt loam, extended season, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: j70l
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Welby and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

WeD2—Welby silt loam, extended season, 6 to 10 percent slopes

Map Unit Setting
National map unit symbol: j70m
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Welby and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile
Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities
Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Minor Components

Hillfield
Percent of map unit: 5 percent

Timpanogos
Percent of map unit: 5 percent

WhD—Welby-Hillfield silt loams, 6 to 10 percent slopes

Map Unit Setting
National map unit symbol: j70n
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Welby and similar soils: 60 percent
Hillfield and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile
Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Description of Hillfield

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 4 inches: silt loam
AC - 4 to 12 inches: silt loam
C1ca - 12 to 26 inches: silt loam
C2ca - 26 to 35 inches: loam
C3ca - 35 to 40 inches: loam
IIC4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

WhE—Welby-Hillfield silt loams, 10 to 30 percent slopes

Map Unit Setting

National map unit symbol: j70p
Elevation: 4,500 to 5,200 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Welby and similar soils: 60 percent
Hillfield and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting

Landform: Lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 12 inches: loam
AC - 12 to 22 inches: silt loam
C1ca,C2ca,C3 - 22 to 65 inches: silt loam

Properties and qualities

Slope: 10 to 20 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

Description of Hillfield

Setting

Landform: Lake terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from mixed sources

Typical profile

Ap - 0 to 4 inches: silt loam
AC - 4 to 12 inches: silt loam
C1ca - 12 to 26 inches: silt loam
C2ca - 26 to 35 inches: loam
C3ca - 35 to 40 inches: loam
IIC4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)

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