PROVO MUNICIPAL COUNCIL and REDEVELOPMENT AGENCY GOVERNING BOARD

Work Meeting

12:00 PM, Tuesday, July 16, 2024
Council Chambers (Room 100)
Hybrid meeting: 445 W. Center Street, Provo, UT 84601 or
https://www.youtube.com/provocitycouncil

The in-person meeting will be held in the **Council Chambers**. The meeting will be available to the public for live broadcast and on-demand viewing on YouTube and Facebook at: youtube.com/provocitycouncil and facebook.com/provocouncil. If one platform is unavailable, please try the other. If you do not have access to the Internet, you can join via telephone following the instructions below.

To listen to the meeting by phone: July 16 Work Meeting: Dial 346-248-7799. Enter Meeting ID 864 7590 3015 **and press #. When asked for a participant ID, press #.**

Agenda

Roll Call

Approval of Minutes

April 30, 2024 Council Meeting
May 14, 2024 Work Meeting

Business

1 Discussion regarding a resolution to place a 1.18 acre parcel of ground located at approx. 200 North Lakeview Parkway on the Surplus Property List and authorize the Mayor to dispose of the property (24-061)

2 Discussion regarding a resolution to place a 0.375 acre parcel of ground located at 1992 North Geneva Road on the surplus property list and authorizing the Mayor to dispose of the property (24-062)

3 Discussion regarding an ordinance to amend the Critical Hillside (CH) Overlay Zone – Citywide Application (PLOTA20240176)

4 Discussion regarding a resolution approving the appropriation of $383,000 in the Rental Housing Rehab Fund for an affordable senior housing project (24-046)

5 Discussion regarding code clean up language to address recreational vehicles/trailers and vehicles (24-058)

6 Discussion regarding an ordinance to address parking in front of mailboxes (24-060)

7 Discussion regarding an ordinance to amend the Hillsides and Canyons Plan to include a new appendix (24-059)

8 Discussion of a resolution appropriating $175,000 in the Water Fund for the purchase of property and funding service line improvements applying to the fiscal year ending June 30, 2025 (24-063)

9 Discussion regarding a resolution to adopt the proposed Provo City Water Master Plan (24-065)

Closed Meeting

The Municipal Council or the Governing Board of the Redevelopment Agency will consider a motion to close the meeting for the purposes of holding a strategy session to discuss pending or reasonably imminent litigation, and/or to discuss the purchase, sale, exchange, or lease of real property, and/or the character, professional competence, or physical or mental health of an individual in conformance with 52-4-204 and 52-4-205 et. seq., Utah Code.

Adjournment

If you have a comment regarding items on the agenda, please contact Councilors at council@provo.org or using their contact information listed at: provo.org/government/city-council/meet-the-council

Materials and Agenda: agendas.provo.org
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To send comments to the Council or weigh in on current issues, visit OpenCityHall.provo.org.

The next Work Meeting will be held on Tuesday, August 6, 2024. The meeting will be held in the Council Chambers, 445 W. Center Street, Provo, UT 84601 with an online broadcast. Work Meetings generally begin between 12 and 4 PM. Council Meetings begin at 5:30 PM. The start time for additional meetings may vary. All meeting start times are noticed at least 24 hours prior to the meeting.

Notice of Compliance with the Americans with Disabilities Act (ADA)

In compliance with the ADA, individuals needing special accommodations (including auxiliary communicative aids and services) during this meeting are invited to notify the Provo Council Office at 445 W. Center, Provo, Utah 84601, phone: (801) 852-6120 or email rcaron@provo.org at least three working days prior to the meeting. Council meetings are broadcast live and available for on demand viewing at youtube.com/ProvoCityCouncil.

Notice of Telephonic Communications

One or more Council members may participate by telephone or Internet communication in this meeting. Telephone or Internet communications will be amplified as needed so all Council members and others attending the meeting will be able to hear the person(s) participating electronically as well as those participating in person. The meeting will be conducted using the same procedures applicable to regular Municipal Council meetings.

Notice of Compliance with Public Noticing Regulations

This meeting was noticed in compliance with Utah Code 52-4-207(4), which supersedes some requirements listed in Utah Code 52-4-202 and Provo City Code 14.02.010. Agendas and minutes are accessible through the Provo City website at agendas.provo.org. Council meeting agendas are available through the Utah Public Meeting Notice website at utah.gov/pmn, which also offers email subscriptions to notices.

DRAFT MINUTES

Please Note – These minutes have been prepared with a timestamp linking the agenda items to the video discussion. Electronic version of minutes will allow citizens to view discussion held during council meeting.

PROVO MUNICIPAL COUNCIL

Regular Meeting Agenda

5:30 PM, Tuesday, April 30, 2024
Council Chambers
Hybrid meeting: 445 W. Center Street, Provo, UT 84601 or
https://www.youtube.com/provocitycouncil

Roll Call

THE FOLLOWING MEMBERS OF THE COUNCIL AND ADMINISTRATION WERE PRESENT:

Councilor Becky Bogdin	Councilor Craig Christensen
Councilor Gary Garrett	Councilor George Handley
Councilor Travis Hoban	Councilor Katrice MacKay
Councilor Rachel Whipple	Mayor Michelle Kaufusi
Chief Administrative Officer Scott Henderson	City Attorney Brian Jones
Council Executive Director Justin Harrison	City Recorder Heidi Allman

Conducting: Chair Katrice MacKay

Prayer – David Sewell

Pledge of Allegiance – Councilor Whipple

Chair MacKay said "Today we gather in this chamber with heavy hearts as we remember and honor the life of George Stewart, former mayor and dedicated member of this council. George passed away last week leaving behind a legacy of service and commitment to the city he chose to call home and tirelessly worked to improve. George Stewart served as the mayor of Provo from 1984 to 1997, during which time he oversaw significant projects that have shaped our community, including the development of the Riverwoods mall and the Provo Towne Center Mall and the revitalization of the Academy Square. His vision and leadership have left an indelible mark on our city. George also served on the Provo city council from 2006 to 2008 and again from 2016 to 2019, demonstrating his unwavering dedication to public service. His decision to resign during his second term to serve a mission Mexico with his wife Joanne spoke volumes about his character his commitment to his faith and humanitarian service. George's life was a testament to the power of community and service. On behalf of the Provo City Council, I extend our deepest condolences to the Stewart family. We are grateful for George's profound contributions to our city and his example of service. Let us honor George Stewart's memory by continuing to serve our community with the same passion and dedication he exhibited. He will be deeply missed by his legacy will continue to inspire and guide us."

Presentations, Proclamations, and Awards

1. Police Badge Pinning Ceremony 0:12:05

Chief Beebe spoke of the significance of the badge pinning ceremony. He explained that the badge is more than just a piece of metal; it symbolizes dedication, commitment to justice, and public trust. Pinning the badge on the officers acknowledges the heavy responsibility they, and their families,

willingly accept. He highlighted that the badge represents the citizens' trust in the officers to uphold the law, ensure justice, and safeguard liberties. Chief Beebe shared his personal experience, reflecting on the honor and weight of wearing the badge, and expressed his pride in the officers for their hard work to reach this point in their careers. He read a short biography of each officer while their badge was pinned on their uniform. The officers recognized were Andrew Olson, Fernando Santana, McLane Beckstead, Brodyn Carr, Taryn Tonga, Kylie Robison, Collin Lyons, Scott Williams, Kavika Fonua, and Jonathan Rodriguez.

Heidi Allman, City Recorder, administered the oath of office to the group.

Public Comment 0:27:54

Chair MacKay read the public comment preamble and opened the public comment period.

Gabriella Sabalones, of Provo, addressed the council regarding proposed language changes for the dog ordinances. She emphasized that the current law allows the council to avoid prosecuting off-leash charges as a Class B misdemeanor under any circumstances, despite contrary statements in previous meetings. Gabrielle argued that reducing the severity of the offense would benefit Provo citizens, noting that less severe punishments are available and more appropriate for low-malice offenses, such as increasing fines for repeated infractions. She pointed out that harsher penalties, like Class C misdemeanors, are unlikely to prevent repeat offenses and could harm employment prospects for residents. Gabrielle also advocated for clarifying conflicting sections of the ordinance and suggested considering off-leash hours in the statute. She urged the council to read her detailed email and consider her points before voting.

With no other comments, Chair MacKay closed public comment.

Action Agenda

2. A public hearing opening the comment period for the 2024-25 Annual Action Plan (24-046) 0:31:30

Melissa McNalley, Community Grant Administrator, presented. She highlighted the proposed CDBG and HOME entitlement amounts and clarified the numbers are estimates. She stated once final numbers are provided by HUD; the plan will be updated. She explained the comment period will continue until June 4 and encouraged residents to provide comments.

Chair MacKay opened the item for public comment, with none, she brought the discussion back to council for discussion.

Councilor Christensen thanked Ms. McNalley for her hard work on this plan.

3. A resolution appointing public members to a Council standing committee (24-051) 0:34:34

Motion: An implied motion to approve Resolution 2024-20, as currently constituted, has been made by council rule.

Justin Harrison, Council Executive Director presented. He reminded that in January of this year, the Council formally created the Council Audit Committee and approved a charter. He said that Councilor Hoban and Councilor Garrett currently sit on the committee. He added the charter states that the committee must include at least two members of the public and this resolution would complete that charge by formally appointing members. He named David Shipley and Rick Anderson as the appointed members with their terms expiring on April 30, 2026.

With no council discussion, Chair MacKay called for a vote on the implied motion.

Vote: The motion was approved 7:0 with Councilors Bogdin, Christensen, Garrett, Handley, Hoban, MacKay, and Whipple in favor.

4. A resolution approving the selection of an audit firm to provide audit services and authorizing the Council Chair to execute a contract with the audit firm (24-052) 0:36:53

Motion: An implied motion to approve Resolution 2024-21, as currently constituted, has been made by council rule.

Mr. Harrison presented. He said during the December 6, 2023, Council Audit Committee Meeting, committee members directed staff to prepare a Request for Proposals for audit services. He stated the only respondent, HBME, was the city's current auditor who has served in this capacity for 18 years. He added that this new contract would remain in effect for 5 years.

Councilor Christensen asked if the city was certain that the RFP was posted and accessible to other vendors. He found it odd that only one response was received.

Mr. Harrison confirmed that after the item was placed on the State's website, and multiple vendors viewed the request, only one response was received.

Councilor Hoban emphasized that the HBME firm has done an excellent job and said the council should have no reservations moving forward with them again.

With no other council discussion, Chair MacKay called for a vote.

Vote: The motion was approved 7:0 with Councilors Bogdin, Christensen, Garrett, Handley, Hoban, MacKay, and Whipple in favor.

5. An ordinance updating the name of the Utility Transportation Fund and removing exemptions (24-050) 0:40:46

Motion: An implied motion to approve Ordinance 2024-23, as currently constituted, has been made by council rule.

Brian Jones, City Attorney, presented. He reviewed the 11–12-year history of addressing road maintenance funding in Provo. In 2012-2013, then-Mayor John Curtis explored alternatives to tax

increases for funding road maintenance, which typically burdened taxpayers exclusively, despite roads being used by non-taxpayers as well. The city considered implementing a Transportation Utility Fund (TUF), a method used in other states to treat roads as a utility funded by user fees, like sewer or water systems. Provo adopted a trip generation model to allocate these fees. In October 2013, the City Council passed the TUF, initially called the Utility Transportation Fund to avoid negative acronyms. He said following the TUF's approval, the city engaged with potential payers, including tax-exempt entities that expressed concerns about the fee's impact on them. Legal challenges in other states over whether such fees were taxes or fees influenced Provo's cautious approach. Some tax-exempt entities agreed to make voluntary payments, leading to a temporary exemption for certain entities like hospitals, colleges, and religious organizations. He stated in February 2014, the ordinance was amended to include these exemptions, though this compromise was never intended to be permanent. With changes in the legal landscape, including a 2023 Utah Supreme Court ruling that upheld Pleasant Grove's transportation utility fee as a fee rather than a tax, the current proposal aims to remove the exemptions, returning to the original intent of the TUF. Mr. Jones acknowledged that while not all legal questions are resolved, the recent court ruling provides significant clarity and support for the TUF's legality.

Chair MacKay opened the item for public comment.

Eric Davis, a Provo resident and legal counsel for Brigham Young University, appreciated Brian Jones' balanced and accurate summary of the Transportation Utility Fund (TUF) issue. He expressed BYU's concerns about the proposed amendment to impose the TUF on institutions like BYU. Davis argued that, despite the Utah Supreme Court ruling it as a fee, the TUF is not like other utility fees because it is tied to land ownership and use and funds the maintenance of public lands, which benefit everyone, not just landowners or road users. He suggested that using this fee circumvents state-provided mechanisms specifically designed to raise revenue for road maintenance.

Kyle Hanson, President of Utah Valley Hospital and representative of Intermountain Health, requested additional time for discussion on the proposed changes to the Transportation Utility Fund (TUF). He noted that his organization has been paying the fee consistently, so the change would not significantly affect them. He emphasized the value of their relationship with city leaders and their commitment to improving Provo. He acknowledged the complexity of the issue but refrained from discussing legal aspects or the proposed name change of the fund.

Chair MacKay closed public comment and brought the discussion back to council.

Councilor Garrett asked what the implications would be if this item was continued.

Mr. Jones explained that even if the proposal passes tonight, there would be necessary billing system changes, and he recommended starting at the beginning of a billing cycle to avoid partial charges. Implementation would not be immediate. Delaying the decision would extend the discussion period and add two weeks to the overall timeline for starting the new billing process.

Councilor Handley asked Mr. Davis why the discussion about this issue six months ago did not provide sufficient advance notice.

Mr. Davis expressed surprise when the issue appeared on the agenda six months ago, mentioning they were fortunate to catch it then. Subsequently, there were discussions, and he noted a bill in the Utah legislature that could clarify the implementation of transportation utility fees, potentially shielding cities from legal challenges like those faced by Pleasant Grove. However, the bill did not pass due to concerns about bypassing public notice and comment periods and constitutional protections for nonprofit organizations against property taxes. Mr. Davis emphasized a preference for direct discussion with the city to find a mutually agreeable solution, highlighting the need for awareness among affected parties who may not realize their rights or ability to object. He suggested that a delay would benefit everyone by ensuring a thorough understanding of the issue.

Chair MacKay called for a vote on the implied motion.

Vote: The motion was approved 7:0 with Councilors Bogdin, Christensen, Garrett, Handley, Hoban, MacKay, and Whipple in favor.

6. A resolution removing the Telecom Debt Charge (24-039) 1:00:08

Motion: An implied motion to approve Resolution 2024-22, as currently constituted, has been made by council rule.

John Borget, Director of Administrative Services, presented. He said in 2011, Provo City implemented a telecom debt charge as part of the Energy rate structure to make the required payments on bonds that provided funding for the telecom network. The telecom debt charge impacted all electric utility customers. The charge was structured to ensure Provo City could adequately pay the annual telecom bond payment of $3.2 million. When approved, the telecom debt charge was set to automatically expire upon the final payment of the debt, which was anticipated to occur in February of 2026. Due to additional revenue from new developments, on May 1st, nearly two years ahead of schedule, Provo City will be able to meet its remaining bond obligations and will take the necessary steps to remove the charge. He added that Customer Service was prepared to remove the fee effective immediately if the item was approved. He highlighted that this achievement reflects our commitment to responsible fiscal management and the vibrant growth of our community. He extended a heartfelt gratitude to all residents for the support and contributions to this milestone.

Councilor Garrett asked what this means for the average household per month on their bill.

Mr. Borget responded that the average household pays $5.35 per month.

Chair MacKay opened the item for public comment. With none, she closed the public comment period and said it is lovely to vote for something that decreased fees for residents. She called for a vote.

Vote: The motion was approved 7:0 with Councilors Bogdin, Christensen, Garrett, Handley, Hoban, MacKay, and Whipple in favor.

7. A resolution approving the appropriation of $20,000 in the General Fund for a Business License and Rental Unit Fee Study (24-027) 1:03:12

Motion: An implied motion to approve Resolution 2024-23, as currently constituted, has been made by council rule.

Mr. Borget presented. He said that several years ago, Zions Public Finance conducted a study for Provo on business licensing and rental dwellings, showcasing their extensive knowledge of the city. He stated that Zions is recognized as a premier firm and now enthusiastically proposes a new study for Provo on business license fees and rental dwelling licenses. He mentioned that they have a broad portfolio of clients, including numerous cities across Utah, and their studies are known for being thorough and defensible, backed by interviews, budgets, and data. He noted that the proposed timeline for this study is approximately three months: two months for the initial study and one month for the report. Mr. Borget added that if the council approves the appropriation, the study will commence immediately.

Chair MacKay opened the item for public comment. With none, she invited a council discussion. She added that the council and administration are interested in fixing the fees in Provo. She emphasized that those operating without a rental dwelling license should not be subsidizing those who do, and that fees should only cover the actual cost of services. She noted that Provo's fees are very low compared to other municipalities and the cost of doing business. Therefore, they are looking into these issues to ensure they address them correctly and get a proper study in place. With no other discussion she called for a vote.

Vote: The motion was approved 7:0 with Councilors Bogdin, Christensen, Garrett, Handley, Hoban, MacKay, and Whipple in favor.

8. An ordinance amending the Zone Map classification of real property located at 5610 N University Avenue from the Agricultural (A1.5) Zone to the Arbors on the Avenue Project Redevelopment (PRO-A10) Zone - North Timpview Neighborhood (PLRZ20230325) 1:06:39

Motion: An implied motion to approve Ordinance 2024-24, as currently constituted, has been made by council rule.

Aaron Ardmore, Planning Supervisor, presented. He identified the property at the mouth of the canyon, discussed the current zoning, and the proposal for a 66-condo project under the proposed PRO-A10 zone, like the nearby Arbors on the Avenue. He mentioned that the applicant, Mr. Bragonje, had created various renderings for the project. He noted that the Planning Commission received the project well, appreciating the idea and concept plan. However, they recommended denial to the City Council due to a lack of sewer capacity. Staff held the same position, pointing out that the existing sewer lines could not accommodate the additional load when considering the already zoned and entitled properties. He added that as a result, the applicant's project likely cannot move forward at this time.

David Bragonje, applicant, discussed the project. He said he has been working on the property for years and explained that he was unaware of the sewer issue until the day he completed all his work. He showed slides of the property, detailing its history and his development plans, which include a mix of two- and three-bedroom condos with underground parking, aimed at older residents and first-time homebuyers. He discussed challenges with access and road design, collaborating with the city and UDOT to find solutions, and negotiating boundary adjustments with Provo Power. The property's proximity to the Bonneville Shoreline Trail was highlighted as a significant benefit, and he proposed deeding over

some trail areas to the city. Despite utility complications, Mr. Bragonje emphasized his commitment to the project and alignment with the city's master plan for residential use. He affirmed his good faith work with the city and the potential of the property as a modern gateway to the city.

Councilor Christensen asked for clarification on the road access and whether UDOT had already agreed to his plans regarding the roads.

Mr. Bragonje confirmed that UDOT had agreed to the plans and added that the lack of funding was an issue. He also mentioned that the water lines in the area were built in 1930 and would need to be replaced.

Councilor Garrett asked if the current sewer lines could handle a smaller capacity.

Mr. Ardmore said 10-12 units would be feasible but not fiscally sound for the applicant.

Councilor Garrett asked Mr. Bragonje if he considered a smaller project that could be accommodated with the current infrastructure.

Mr. Bragonje said that he did not opt for a smaller development because the fixed utility costs remain the same regardless of the number of units built. Building fewer units would not make financial sense due to the high per-unit cost of site improvements. Additionally, he felt that the site's steep slope was unsuitable for smaller structures like townhomes, which would result in a steep slope behind the residences. Primarily, a larger project is necessary to cover the costs of all the required improvements, which would benefit the city's overall system.

Councilor Whipple asked Mr. Ardmore about the size and unit count allowed for a residential facility for elderly persons or persons with disabilities under the current zoning.

Mr. Ardmore admitted he had not looked into it but explained that such facilities do not have a unit count limit but would face similar sewer capacity issues as the proposed condo project if they had multiple rooms with bathrooms and kitchens. He added that the zone does not limit the size or unit count of such residential facilities; they are typically regulated by site capacity and parking availability. Even if the project were a residential facility for 66 units, it would still face issues with adequate public facilities, such as sewer capacity, which could affect permits.

Councilor Hoban asked if there are improvements planned to upgrade the sewage capacity in the area.

Gordon Haight, Public Works Director, responded optimistically, saying there is always hope for future improvements. He mentioned that Development Services is currently conducting a study of the area, which will help shape the city's sewer master plan. He noted that no improvements are planned for the next six years because the current sewer capacity meets the existing general plan. If the city council adopts a new plan, they would adjust their focus and sewer improvement plans accordingly.

Chair MacKay opened the item for public comment.

Sharron Memmott, Neighborhood District chair, reported on the latest neighborhood meeting regarding the high-density project proposal. She said most attendees opposed high-density development, preferring a medium-density option, though some supported maintaining the current zoning of agriculture and Open Space Preservation (OSP), which aligns with the general plan for the area. Memmott emphasized that the neighborhood appreciates its single-family homes, agriculture, and open space, and that the proposed high-rise development does not match their vision. She noted that the current proposal for a prozone increases the project's height, which is a concern for many neighbors. Memmott questioned whether the four-story height limit includes the two levels of parking, given that the project shows six stories, including parking. She also mentioned discrepancies in the project area and unit count, seeking clarity on what the neighborhood will ultimately face. Ms. Memmott urged that any changes be deferred until the Northeast Area Plan is completed, aligning development with the general plan. She highlighted existing issues like the gravel pit and traffic problems and referenced the sewer capacity problem mentioned in the staff report. She concluded by asking the council not to approve the project.

Ginny Smith, of Provo, shared her and her husband's concerns about the gravel pit near their property, detailed in an email sent to the mayor in 2018. Initially uninvolved due to their county residency, they later met with city officials to discuss their issues. They advocated for the property to be part of the Northeast Area neighborhood, rather than Riverwoods, due to access and environmental concerns. The meeting led to the agreement that the gravel pit needed reclamation and that the property would indeed belong to the Northeast Area. She said by early 2019, the property was officially included in the Northeast Area, and the neighborhood plan was initiated. Ms. Smith emphasized that any reclamation should wait for the completion of this neighborhood plan to ensure careful and responsible development. She acknowledged that while the current project might address some concerns, other issues, such as road intersections, need attention before proceeding with reclamation.

Sharron Memmott read comments of Bonnie Morrow, who serves as the North Timpview Executive Board Member. She read “I’m very concerned about the utilities I’ve been told by Provo City that there is no sewer capacity. Zero. By changing the zoning to a higher density than it is now only makes the property worth more to the banks and potential subsequent future developers, puts the city in an awkward position of an under the table agreement and a wink implying that in the future the city will get new sewer. Otherwise, there is no point in Provo City granting this zone change to higher density with no utilities available. Until the situation is remedied, I urge the council to vote no.”

Angela Maurick, of Provo, strongly urged the council to deny any zone change for the project or any other in the Northeast Timpview area until a neighborhood plan is added as an amendment to the general plan. She highlighted that this area has been awaiting the development of such a plan for years and is currently in the process of creating it. Ms. Maurick argued that approving a zoning change before the plan is completed would be counterproductive and could misalign with the future land use guidelines. She emphasized the importance of addressing detailed issues like transportation, land use, geographic concerns, and infrastructure in the plan. She expressed disappointment that the developer had engaged in discussions with city staff before the plan was made, stating that having the plan in place would guide these conversations appropriately.

Todd Franks, of Provo and a member of the technical advisory committee working on the northeast neighborhood plan, emphasized the importance of postponing any decision to rezone the parcel in

question. He explained that the committee, consisting of diverse residents from northeast Provo, aims to create a plan that aligns with the general plan but provides more detailed guidance on policies and recommendations for land use, infrastructure, and other issues. Franks expressed concern that making a zoning decision now could be inconsistent with the future direction of the completed plan. He also noted that the parcel has been undeveloped for years, so a postponement would not likely cause undue hardship. He urged the council to wait until the plan is finished before making any rezoning decisions.

Mr. Bragonje clarified two key points. First, he confirmed that there is current sewer capacity, referencing a 2021 study that detailed the existing capacity, projects completed since, and what remains. However, this capacity does not account for entitled units, highlighting a larger issue affecting a significant part of the city. Second, he addressed the calls to delay the project, stating that he has already invested four years of effort and resources into finding a workable solution. He questioned how much longer the wait would be and how many more years would be required.

Chair MacKay closed public comment and invited a council discussion.

Councilor Handley expressed empathy for the difficulty of the situation and acknowledged not knowing all details due to not being part of all prior conversations. He indicated that, in his view, the council has no choice but to reject the proposal because of current capacity issues. He recalled the history of the site and the efforts since 2018 to reclaim it, recognizing its previous state as an embarrassment. Councilor Handley emphasized the importance of proper planning and agreed with others that the northeast neighborhood plan needs to be completed before moving forward. He apologized for the slow progress of government bureaucracy and suggested that the neighborhood plan should consider the best use for the property, given its unique nature. He expressed a preference for as much open space as possible but acknowledged the need for some form of development to replace the gravel pit. He encouraged the committee to produce creative ideas and acknowledged the frustration the developer must feel due to the delays.

Councilor Christensen acknowledged the developer's long wait but emphasized that the neighborhood has also waited a long time for a neighborhood plan. He stated that even without the sewer issue, he could not support proceeding without the neighborhood plan in place. Councilor Christensen stressed the importance of respecting the planning processes and communicating them to developers. He said he believes the neighborhood plan should guide future development and expressed a strong view that decisions should not be made prematurely.

Councilor Hoban asked for a timeline from the applicant.

Mr. Bragonje explained that he acquired partial ownership of the property at the end of 2019 and full ownership in early 2022. He had initial meetings with city officials in 2020, focusing on road issues for the first few years. In 2023, he worked on boundary adjustments and met with engineering staff. Just before Christmas 2023, he submitted his formal application to the city and received comments, including concerns about sewer capacity, in early January. He addressed these comments and submitted revisions, but only five or six weeks ago, he received a memo highlighting the sewer capacity issue. He expressed frustration with the process and the timing of the city's feedback.

Councilor Hoban noted that developers sometimes encounter significant issues late in the process, such as in this case with sewer capacity. He questioned how someone could get so far without knowing about such problems, suggesting that this information should be communicated earlier. He emphasized that his intention was not to criticize but to examine if the city's process could be improved to prevent developers from making substantial investments before discovering critical issues.

Mr. Ardmore agreed and said most of the work that had been done by the applicant took place prior to them submitting their application in December, which was when the city reviewed the full application for the first time.

Gordon Haight expressed sympathy for the concerns raised. He mentioned that a few months ago, Bill and his team began creating a memo specifically addressing sewer capacity along University and Canyon Road. This effort has expanded to a citywide memo detailing all capacities, including sewer and water. He also highlighted the possibility of a future meeting where the City Council could discuss sewer and water capacity citywide. The plan aims to identify deficiencies and include associated costs, allowing developers to see if their projects could help address these issues. He believes this comprehensive approach will address the concerns raised.

Chair MacKay expressed gratitude to David for his professionalism throughout the process and acknowledged the neighborhood's long wait for the plan. As a resident of the neighborhood, MacKay voiced support for the project, noting its appropriateness for density in an area that is not suited for single-family homes. She praised the aesthetic improvements, including the trail to Bonneville and the willingness to deed over the trail line. MacKay emphasized the project's contribution to providing housing for empty nesters and young people, stressing the importance of owner-occupied condos. She acknowledged the traffic concerns but expressed confidence in the city's engineers to resolve them. While the sewer capacity issue was a setback, MacKay expressed hope that it could be resolved soon, reiterating her support for the project's thoughtful design and community benefits.

Councilor Whipple expressed a range of emotions, including frustration and shame, but aimed to focus on gathering useful information. She questioned why initial meetings in 2020 involved discussions about road capacity, wondering if it were due to planning for a higher density project that would require accommodating more traffic. She highlighted the difference in traffic impact between building just two houses versus 66 condos.

Mr. Bragonje explained that during the planning process, there were considerations about what type of development to pursue on the site. They discussed various access options and capacities needed, highlighting that the current access off the acceleration lane on the road was insufficient, especially for higher density projects like condos. He mentioned meetings involving himself, the city, and UDOT, where UDOT conducted traffic studies and determined the necessity for a traffic light at the site.

Councilor Whipple inquired about the costs incurred by Mr. Bragonje for boundary cleanup, conveyance of easements for utilities, and identifying water lines. She sought clarification on whether such expenses would have been necessary regardless of the project's size, emphasizing the financial considerations and the scope of preparatory work involved irrespective of project scale.

Mr. Bragonje highlighted that the cost for potholing to locate water lines alone was $30,000. He explained that understanding the utility locations was crucial for road layout and feasibility, as the proximity to the water line affected construction plans. He also mentioned a joint survey with the city to readjust property lines, emphasizing that the engineering and architectural work constituted the most significant expenses in the project.

Councilor Whipple acknowledged that when someone spends money voluntarily without a formal contract or agreement, they cannot expect compensation for those voluntary expenditures. She noted that there seemed to be an expectation in this case. She highlighted Aaron's point that departments find it challenging to act without a clear, concrete plan in place. She questioned whether there had been prior discussions with the city council or staff regarding the need for a zone change before submitting the application.

Mr. Bragonje affirmed that they were actively pursuing the zone change. He referenced early discussions about infrastructure, noting that as recently as 2023, there was agreement on certain aspects. He mentioned that initially, city staff indicated support for the project, but this changed when sewer issues arose. He acknowledged that the zoning eventually agreed upon helped address concerns about the density of units being built. He emphasized his thorough examination and collaboration with engineers throughout the process.

Councilor Whipple expressed frustration with the current situation, noting that both Development Services and Public Works are likely equally unhappy. She criticized the absence of a neighborhood plan and disagreed with delaying developers who are ready to proceed with projects while waiting for such plans to be formulated. She emphasized that ongoing progress and real efforts should be considered, especially when no concrete timeline for neighborhood planning exists. She highlighted the significant financial implications of delays in construction due to issues like sewer capacity and inflation, stressing that such uncertainties can jeopardize the viability of projects. Councilor Whipple also empathized with the developer's situation, regretting the inability to approve their project due to potential future entitlements of other properties that could disrupt infrastructure plans. She concluded by expressing personal regret over the situation.

Chair MacKay called for a vote.

Vote: The motion failed 1:6 with Councilor Whipple in favor and Councilors Bogdin, Christensen, Garrett, Handley, Hoban, and MacKay opposed.

9. An ordinance enacting penalties for animal control generally and amending portions of the Municipal Code with respect to Park Use regulations for dog owners (24-049) 2:10:14

Motion: An implied motion to approve Ordinance 2024-25, as currently constituted, has been made by council rule.

Michael Sanders, Council Policy Analyst, presented. He said several council meetings ago, the council directed staff to take two actions regarding dog regulations. First, they were tasked with collaborating with the legal department to draft language that would reduce penalties for dog violations from a class B misdemeanor to an infraction, aligning with state code. This proposal is currently under consideration.

Second, the staff was instructed to consult with the Parks and Recreation Department to gather recommendations on additional dog-related park policies. A memo containing these recommendations was distributed to council members the previous Thursday by the Executive Director.

Chair MacKay sought clarification on the language concerning third offenses. She remembered discussing it as a misdemeanor, but noticed the current wording referred to "three or more times within twelve months." She suggested that instead of a specific period like twelve months, it should be a general requirement because these offenses are difficult to detect.

Mr. Jones remarked that this was the city's adoption of state law into its municipal code, mirroring exactly what the state law stipulates.

Councilor Handley expressed support for a suggestion regarding off-leash hours from 6am to 9am and 6pm to 9pm, finding it thoughtful. He expressed confusion over why this issue is so complex. Councilor Handley also raised concerns about enforcing leash requirements on the Bonneville Shoreline Trail, noting that parts of the trail are not within city jurisdiction. He referenced communication from Eliza Hawkins about discussions with animal control, questioning how leash regulations would be enforced effectively on sections of the BST that are not under city authority.

Mr. Jones stated that he did not personally speak with animal control, but another attorney did. He emphasized the issue of evidence, noting that officers must patrol within city jurisdiction to enforce regulations. If relying on witness statements, witnesses must accurately identify where and when violations occurred within city limits. Mr. Jones acknowledged the complexity of this issue and expressed uncertainty about the solution, suggesting one option could be amending the animals at large section to exclude the Bonneville Shoreline Trail within Provo city limits.

Councilor Handley expressed conflicting feelings about the issue, acknowledging the experiences of both sides involved. He felt that a recent proposal for designated off-leash hours seemed like a reasonable compromise to meet the community's need for dog exercise spaces. He noted that while potential spaces are being discussed, none are currently available, yet strict rules are being imposed without interim solutions. Councilor Handley emphasized the lack of options for people to exercise their dogs, suggesting a need for temporary measures like allowing early morning or late evening park use until designated parks are developed.

Chair MacKay opened the item for public comment. With none, she invited discussion from council.

Councilor Whipple pointed out an error in one of the references to the State Code and suggested updating it prior to the vote.

Councilor Hoban inquired about the possibility of having a for-profit dog park business that could operate legally within the city. He wondered if someone could purchase agricultural property and convert it into a dog park.

Mr. Sanders indicated that establishing a for-profit dog park business could be feasible depending on the zoning regulations. He recalled the existence of a website called Snip Spot, which operates similarly to

Airbnb but for backyard dog running. He added that there are approximately five properties in Provo that are currently renting their backyards to allow people to exercise their dogs on an hourly basis.

Councilor Hoban expressed that there appears to be a significant need for a solution and emphasized the urgency for either the city or a private entity to act and find a resolution.

With no other council discussion, Chair MacKay called for a vote.

Vote: The motion was approved 7:0 with Councilors Bogdin, Christensen, Garrett, Handley, Hoban, MacKay, and Whipple in favor.

Adjournment

The meeting was adjourned by unanimous consent at approximately 7:49 PM.

Please Note – These minutes have been prepared with a timestamp linking the agenda items to the video discussion. Electronic version of minutes will allow citizens to view discussion held during council meeting.

PROVO MUNICIPAL COUNCIL
Work Meeting Minutes

11:45 AM, Tuesday, May 14, 2024
Council Chambers
Hybrid meeting: 445 W. Center Street, Provo, UT 84601 or
https://www.youtube.com/provocitycouncil

Agenda

The following elected officials participated:

Council Chair Katrice McKay, Conducting
Council Vice-Chair Rachel Whipple
Councilor Travis Hoban
Councilor Gary Garrett
Councilor Becky Bogdin
Councilor Craig Christensen (Zoom/Remote)
George Handley (Zoom/Remote)

Business

1. A discussion regarding the Fiscal Year 2024 to 2025 Budget Process (24-007) (0:10:50)

Justin Harrison, City Council Office Executive Director, presented. A graphic was shown from the budget packet giving an overview of the budget timeline. Harrison wanted to make the Council aware of the deadlines between now and the end of June, particularly whether the Council would like to change any property tax rates, which would have to be submitted to the County and State Tax Commission by June 22nd, as well as the balanced budget, which must be passed by June 30th. If the Council chooses to go to Truth in Taxation, that deadline will be extended. The Council can also hold a special budget meeting on June 11th. The Council will not have the Certified Tax Rates Valuation and Certified Rate Revenue from County or the State Tax Commission until June 8th. If the Council does go to Truth in Taxation, a hearing would be held on August 13th, and the Council would be required to adopt a final budget on August 20th.

Councilor Becky Bogdin requested that these dates be emailed to the Council or placed on the Council Calendar.

Councilor Rachel Whipple asked whether there will be enough time, after receiving the numbers from the County on June 8th, to review and consider them all before the meeting on June 11th. Justin Harrison said that he believed so.

At the request of the Administration, the Council tabled items 2, 3, and 4 to hear item 5 at this time.

5. A presentation regarding the Fiscal Year 2025 Tentative Budget (24-007) (0:16:01)

Mayor Michelle Kaufusi and John Borget, Director of Administrative Services, presented. Mayor Kaufusi read the letter given in the beginning of the FY 2025 Budget, introducing the ideas including the budget. The Mayor then turned the time over to John Borget.

John Borget mentioned that the budget invests in capital improvements, vehicle improvements, and employees. Department directors met in two extended meetings to find creative ways to increase revenues and decrease expenses city-wide. Borget showed a table listing these ideas, included in the FY 2025 budget, identifying about $6 million in savings.

Councilor Katrice McKay asked whether this will be emailed to the Council. John Borget responded that it was sent out to the council prior to the meeting and is also included in the budget packet.

Borget then discussed funding sources and opportunities in the budget, including fees, grants, point of sales tax, and employee recruitment and retention. There are no recommended utility rate increases in the budget. Point of sale sales tax will also be added.

Councilor Bogdin asked whether the funding sourced from the ARPA savings will have to be found from another source next year. Borget explained that this was a one-time source of revenue and was the best source which Provo had for this year. Finding this funding may be a challenge next year. Councilor Bogdin pointed out that many revenues in the General Fund Opportunities are one-time sources.

Borget noted that using the COLA has made market adjustments much smaller, saving money in employee compensation for the City. He also discussed turnover and savings from positions being left vacant, which will now be considered part of the General Fund. This will continue to benefit the General Fund and Provo City in the future.

Councilor Rachel Whipple asked whether these savings becoming part of the General Fund will cause the departments to have shortfall. Borget explained that department heads will be required to operate within their budget or ask the council for more funding, losing this cushioning. This promotes transparency in how departments are spending money. Councilor Whipple noted that this will be difficult for the departments, as they are accustomed to having these extra savings.

Councilor Whipple asked whether it was known how much of these savings was spent and how much was not. Borget explained that his department had done an analysis on where the turnovers were coming from and where they were spent. He asked to be able to share this information with the Council. Councilor Whipple agreed that she did not know where or how much of this money had been spent.

Councilor Travis Hoban commented on the efforts of the Financial Department and thanked them for the work they put into this budget. Councilor Bogdin agreed that this was more transparent and clean, albeit more complicated. Scott Henderson, Chief Administrative Officer added his experience in replacing the Parks & Rec Director and Assistant Director, explaining that separation between operations and personnel creates better management. Councilor Craig Christensen expressed his appreciation for the Administration's creativity and commitment to stay within the budget and thanked them on behalf of the citizens.

Justin Harrison asked for clarification on the zoning update on page 1.

Borget mentioned payroll costs related to capital improvement costs. He proposed including these costs as part of the project costs. Before, these were included as payroll expenses in the General Fund. This gives a better picture of the true costs of these projects.

Councilor Bogdin asked whether this would mean using grants to pay for payroll costs, as well as project costs. Borget said that it would. Councilor Bogdin clarified that, these payroll costs would not be pulled from grants, not from taxes and other General Fund revenues.

Borget mentioned some of the changes, increases, and savings in the CIP funds. Scott Henderson noted that some of these have their own funding sources and do not impact the General Fund.

Borget mentioned revenues from the Rec Center and General Fund assets and what these funds will be set aside for.

Councilor Garrett asked whether the RAP tax will expire this year. Isaac Paxman, Deputy Mayor, clarified that it will go to election next year. Councilor McKay asked whether there will be efforts to educate the public on what this tax is used for. Paxman explained that Parks & Rec will go through the same process used for a general obligations bond.

Councilor Garrett asked for an explanation on utility rate increases being handled separately from the budget. Paxman answered that it was difficult to handle so many different budget processes, and that the Council could set up a meeting in the coming months to discuss tiered water rates, wastewater rates, etc. He believes that the six months or so after the budget process would be a great time for the Council to consider these things and take their time to think about them. Henderson mentioned price increases in the community and that this decision reflects sensitivity to those increases.

Councilor Whipple asked about ARPA funds and using them for parking near City Hall. She asked how negotiations were going for the property and what the City would do without that money. Paxman answered that the $1.3 million would not build the planned parking garage and that Development Services and Administration would be discussing some options with the Council soon.

At this time, the Council pulled items 2, 3, and 4 from the table and continued with the agenda as posted.

2. A presentation regarding the projected revenues for Fiscal Year 2024 to 2025 (24-007) (1:22:37)

Kelsey Zarbock, Budget Officer, presented. Zarbock summarized Citywide Budget Revenues and where the different fund types (General Fund, Enterprise Fund, etc.) are sourced from, as well as what they are used for. She mentioned internal service funds, which covers departments that help other departments, such as vehicle replacement or facilities.

Zarbock gave a more specific breakdown of the General Fund revenues. She mentioned that property tax revenues for the General Fund have gone down.

Councilor McKay asked whether the road fees shown are the utility/transportation fee. Zarbock explained that roads revenues were taxes received from the state that were then transferred to the General Fund. McKay asked where utility/transportation fees will be shown in the budget. Zarbock answered that they will show up as part of the Enterprise Fund.

Zarbock explained the General Fund further. She mentioned that there is significant transfer revenue as well.

Zarbock gave a breakdown of the Enterprise Fund. Energy, wastewater, and water are the three largest revenue sources for the Enterprise Fund. Citywide, Enterprise Funds have decreased. This is because of one-time grants for the airport and water which the City received last year.

She mentioned other increases and decreases in revenue. She showed changes in revenue for the General Fund specifically. She mentioned public safety chargebacks for the Airport, which is payments from the Airport for police and fire services. This shows the progress the Airport has made in the past years, when it used to be subsidized by the General Fund for these services.

Councilor Whipple asked for clarification on the decrease in revenue from property taxes. Zarbock explained that vehicle taxes and prior year tax redemptions have been less in actuals in previous years, and so have been budgeted less this year.

Councilor Garrett asked whether property taxes have to be increased for the library to increase its budget. Zarbock answered that the library does have other funding sources, but that these are small compared to property taxes. Therefore, yes; a large boost in library funding would require an increase in property tax. Councilor Katrice asked whether funding could be given to them from the General Fund that was not property taxes. John Borget answered that this is not traditionally done, but that it could be. If it was done, he recommends that it be done in such a way that the General Fund still be balanced. Councilor Hoban mentioned that this has not been done because there has not yet been a need yet, but that one-time transfers should be used for capital improvement projects and other such items, not for operating costs.

3. A presentation regarding the Fiscal Year 2024 to 2025 Consolidated Fee Schedule (24-007) (1:38:48)

Kelsi Zarbock presented. She summarized the new or adjusted fees in the Consolidated Fee Schedule.

Every year, departments are asked in January to analyze revenues and determine whether there are any fees that should be adjusted.

Fee changes were submitted from Public Works, the Library, Customer Service, and Parks & Rec.

Zarbock summarized new fees for the Airport, Water, and Wastewater. Councilor McKay asked whether these fees were new fees that did not exist before. Jimmy McKnight, Public Works Business Manager, mentioned that the new Wastewater fee was a change of a previously existing fee, but believed that all others mentioned were new.

Councilor Bogdin asked for clarification on vac truck fees and backflow noncompliance fees. McKnight clarified that vac truck fees are to cover the cost of fixing a mistake in construction and using the required equipment. Backflow noncompliance fees ensure that people are following regulations to prevent water from flowing back into the water system. The City also rents backflow meters for fire hydrants and charges a fee for rental, as well as the water used.

Councilor Bogdin asked for clarification on food service establishment pre-treatment non-compliance fees. David Torgersen, Water Reclamation Manager, answered that this refers to grease traps and other regulations that keep food waste out of the water system. Wastewater monitors compliance with these regulations with restaurants and other foodservice facilities.

Zarbock summarized changes in Parks & Rec fees, the most extensive of all the departments.

4. A presentation regarding transfers in the Proposed Tentative Fiscal Year 2024 to 2025 Budget. (24-007) (1:53:45)

Daniel Follet, Finance Division Director, presented. He showed a notice being prepared for sending to all utility payers in May with their utility bill. This notice will disclose funds transferred from Utility Enterprise Funds to other funds. Follett gave a summary of these transfers.

Brian Jones, City Attorney, clarified that these transfers do not include the Utility/Transportation Fund. Rather, the Utility/Transportation Fund is transferred directly to Roads.

John Borget mentioned an interfund loan used to pay the implementation costs of the WorkDay system, and that this transfer system was used to pay this loan. This is the last year that loan would be paid.

6. A discussion regarding property tax (24-003) (2:01:29)

Justin Harrison presented. He explained how certified tax rates are calculated and valuations are assessed.

Councilor Garrett asked whether the auditor certified tax rate will be provided on June 8th. Harrison confirmed that it will, and that the Council would then have until June 22nd to adopt or go to Truth in Taxation. Councilor Whipple mentioned building in a ceiling that the Council could increase rates to as a buffer. She also pointed out that the spending power of money decreases. Therefore, although revenue remains the same year to year, what can be done with it does not. Councilor Whipple also asked whether there was an estimate on growth revenue for the year. Harrison said that those numbers should be released by June 8th.

Councilor McKay asked whether new growth accounts for large development and remodels. Justin answered that it does.

Harrison reviewed the Truth in Taxation process.

He spoke about requests from the Library to increase the Library property tax rate by $500,000. This would mean an average increase of $12.31/year per home in Provo. Councilor Whipple commented that, last year, the Library wanted to increase gradually each year. However, this did not increase Library funding fast enough, and so it was decided that a one-time increase was better. She said that the smaller increases seemed easier over time, but that the larger increase was surer and better in the long run.

Harrison reviewed the General Operations portion of the property tax. Over recent years, the Council has increased this portion by roughly 2.93%. Harrison asked whether the Council wanted to continue to do this, or whether they wanted Council Staff to come back with more information. If the Council chose to continue this, it would mean an average increase of $3.43/year per home in Provo.

Councilor Handley pointed out that cost of living increases by 3% every year, decreasing buying power by at least 25% in 10 years without an increase in property taxes. This means that $100 today will be worth only $75 in 10 years. He suggested that the Council carefully consider this, or future Councils will have to make difficult choices and make large increases.

Councilor Hoban commented on the optics of raising taxes by $12 or $15. He reminded the Council of the frustration citizens feel over tax rate increases. The Council has raised taxes the last two years and Hoban feels that the Council can give the citizens a break this year, just as the School Board, the County, and other taxing entities are.

Councilor Whipple expressed her appreciation for Councilor Hoban's sensitivity but stated that her priority is to be prudent and consistent in the long-term, setting regular expectations. She prefers continuing the path of very modest increases, so that the Council never has to make immodest increases. Because other taxing entities are not increasing this year, a tax rate increase

from the Council will not be felt as strongly. She feels that being pragmatic matters more than looking good, and that being responsible is good optics.

Councilor Christensen stated that he liked to require the Council to be more creative and look for ways to balance the budget without increasing. He feels that the Council has been more creative this year, by not subsidizing businesses and people, and adjusting fees. All of this is driven by the creativity of wanting to live within a flat budget. He likes the discipline of living within a budget and creating value rather than raising taxes.

Councilor Hoban said that he appreciates everyone's opinions and doesn't feel that anybody is wrong; it is simply a matter of preference. He said that he can absolutely appreciate where everybody is coming from in their discussion.

Harrison suggested that, if the Council wants to see the certified rate from the County, they should schedule a special budget meeting on June 11th, which will allow the staff to prepare the tax rate information.

Councilor Handley stated that creativity and tax increases are not mutually exclusive, and that increasing rates does not diminish the creativity the Council has been taking.

Councilor Handley made a motion: To have the Council Staff prepare a proposal examining a COLA-like (about 3%) increase to be discussed in the upcoming dates detailed by Justin Harrison.

Councilor Whipple seconded the motion.

Melia Dayley, Policy Analyst, asked for clarification on whether this discussion was only on General Operations, or also included the Library.

Councilor Handley answered that he was only proposing this for General Operations.

Councilor Bogdin asked whether the revenues gained from the proposed increase and the ARPA fund would be sufficient.

John Borget explained that the library is an independent issue.

Scott Henderson suggested not getting too deep into the one-time funding. These one-time funds were the solution that was decided on this year, but in the coming years, other changes and possible solutions will be found: revenues, sales tax, debt payoff, and numerous others. Other problems will arise, but also other solutions.

Councilor Hoban commented that the Mayor and her team have done an excellent job of balancing the budget this year. The police officers are funded for this year, and so he has difficulty finding the impetus to move forward with Truth in Taxation. He does not believe the Council has identified a goal that they really need to increase taxes for.

Councilor Garrett said that he found it difficult to vote with the incomplete information which the Council has at this time.

Councilor Handley asked Councilor Garrett whether it would be prudent, knowing that their information was incomplete, to be prepared to have that discussion in the future, rather than saying now that they shouldn't have it. Councilor Garret responded that he would like to know how the staff could further refine the current model of the $3.43/year increase.

Councilor Whipple commented that it would be useful to know the numbers from County. She also commented that she has not yet seen the Mayor's budget, and asked what the Mayor's Office has done with the Library and their request.

Mayor Kaufusi clarified that the Library is a separate entity that is not included in the Administration Budget.

Councilor Whipple asked whether the increase in property tax was the only way to give the Library the increase which it was requesting. Mayor Kaufusi did not respond. She also stated that she would like to continue this conversation after receiving the numbers from County and that this was meant to ensure all of their bases were covered.

Councilor Christensen affirmed Councilor Whipple's point that it was good to see all the numbers and stated that he did not want to go to Truth in Taxation.

The Council voted on Councilor Handley's motion:

Craig Christensen: Yes
George Handley: Yes
Travis Hoban: No
Gary Garret: Yes
Katrice McKay: Yes
Rachel Whipple: Yes
Becky Bogdin: Yes

The motion passed 6-1.

Harrison asked whether the Council wanted the staff to prepare any information to address the question of the Library.

Councilor Whipple commented that she would like to have a conversation about the Library after receiving the numbers from County. Councilor Christensen agreed.

Councilor Whipple made a motion: To have staff prepare Truth in Taxation operations for the Library, preparing several different scenarios, including that which the Library has presented, so as to continue the conversation after receiving numbers from County.

Councilor Christensen seconded the motion.

Councilor Handley said that he was in favor of the motion, but the Library staff should be consulted to find out their specific ideas on what could be done with smaller increases if the Council did not approve the requested $500,000 increase. Harrison responded that he had been in contact with Carla Gordon, Director of Library Operations, and that the Library would be holding a board meeting next week and will be sending an official recommendation to the Council.

The council voted on Councilor Whipple's motion:

George Handley: Yes
Travis Hoban: No
Gary Garrett: Yes
Katrice McKay: Yes
Rachel Whipple: Yes
Becky Bogdin: Yes
Craig Christensen: Yes

The motion passed 6-1.

7. A discussion regarding tiered water rate recommendations (24-045) (3:04:47)

Gordon Haight, Director of Public Works, presented. He commented on the Mayor's wisdom in separating the fee and rate schedule from the budget.

Keith Larson, a Consultant from Bowen Collins & Associates, came forward. He pointed out to the Council that the packet given to the Councilors included an analysis of options for a 15% and 3% increase. He explained five different alternatives to the Council and their comparisons in dollars/month change and percentage change.

Councilor Bogdin commented that it would help to see the total increase on a monthly bill in dollar amounts, including Energy, Sanitation, Water, Wastewater, and TUF.

Haight stated that his recommendation was that the Council go through the budget cycle with no increases, then come back after receiving the Water Master Plan.

Councilor Handley commented that the goal was to address issues in the Master Plan regarding anticipated infrastructure expenses. He asked Haight to clarify the difference between the 15% and 3% increases in meeting the goals for the Master Plan.

Larson clarified that Haight's goal was to come back to discuss in further detail. In summary, a 15% increase is recommended, but supporting the Master Plan requires no less than 7%.

Haight explained that what the Council adopts in the Master Plan will drive what money is spent on moving forward. That Plan will be the decision-making document. He stated that the right choice is to settle the Budget, then processing of the Water Master Plan will begin immediately, which will be brought to the Council, along with the fees.

Councilor Handley asked whether the process was being slowed down so that the Council could return to it later, and asked what was needed from the Councilors right now. Haight answered that his recommendation was to not make a recommendation today, but to ask questions and give more thoughts and ask questions to be addressed.

Councilor McKay asked when the Master Plan will be presented. Gary Calder, Public Works Water Division Director, answered that the plan was to return with the Master Plan on June 18th.

Councilor Bogdin asked whether the capacity issues to be discussed will be concerning freshwater only, or whether sewer will also be involved. Calder answered that he wanted to discuss water in one discussion and sewer in another, to avoid having one long, overwhelming meeting.

Councilor Whipple asked whether the recommended 15% was based on the previous Master Plan. Larson answered that it was based on the updated Plan, and that he had not been given the chance yet to present on the background behind that recommendation. He stated further that, when he comes together with the Council again, he will be able to give further details and explain the decisions that the Council will need to make.

8. A discussion regarding a resolution approving an amended development agreement related to property generally located at 2050 North Canyon Road – Pleasant View Neighborhood (PLRZ20220302) (3:24:38)

Aaron Ardmore, Development Services Planning Supervisor, presented. He reviewed what was approved in the previous year and what is still being requested.

Councilor McKay clarified that the maximum height in an NDR zone is 45 feet, and 35 feet in residential R1 zone. Ardmore said that the presented agreement stayed within the required height limit.

Councilor Hoban pointed out that several of the one-bedroom units are actually two-bedroom units, as they include an extra room marked as an office. He asked what the parking requirements would be if they all were marked as two-bedroom units. Ardmore answered that, if all units were two-bedroom, the parking requirement would be 2.25/unit, or 31.5 in total, 1.5 more than the current total.

Councilor McKay asked whether this requirement included visitor parking. Ardmore answered that it did.

Councilor McKay also pointed out that, if some of these units become student apartments, occupancy becomes 4 people/unit. She said that, although these units are not planned to become student apartments, that does not guarantee that they will not. Ardmore said that the property owner is willing to discuss owner occupancy in the development agreement. Councilor McKay expressed her concern that these units will become student apartments and cause a large parking shortage.

Councilor Christensen asked why this new concept plan is not going through Planning and Zoning and why the Council is spending time discussing fundamental Planning and Zoning questions. Ardmore answered that it is because this is a proposed amendment to the Development Agreement. Brian Jones added that the Council always holds authority to request a recommendation from Planning Commission, but, legally, a Development Agreement does not require it. According to state law, a city may put anything in a Development Agreement that they believe is beneficial to that city. In this scenario, a developer is asking the Council to amend a contract, but this issue is not under Development Services' jurisdiction.

Councilor Christensen asked whether there are changes to the plan that will take the property from medium density to high density. Ardmore answered that there were not. He explained that the setback was originally 20 feet with the initial approval, was reduced to 14 feet, and this new amendment will reduce it further to about 8 feet.

Councilor Bogdin pointed out that the lanes on the adjacent street are very narrow and asked whether there was concern about future expansion to accommodate UVX transit or high traffic. Gordon Haight answered that this road was not going to be a UVX bus route for a long time; there are higher priorities that are still decades away. He also stated his support for Development Services' recommendation regarding the setback.

Ardmore reaffirmed that the planned units were family-occupied condos with, at most, 3 single individuals living inside. He stated that parking, height, and number of units should not be concerns.

Councilor McKay asked to see the layout of the 1-bedroom units.

Councilor Handley mentioned that there is a high demand and low supply of 1-bedroom units throughout Provo. He said that he knew plenty of young professionals that would prefer this type of unit as a housing option. For this reason, he believed that the 1-bedroom units would be rented as such and that the Council does not have to assume all of these units would turn into student housing. Councilor McKay agreed, but asked the Council to keep this possibility in mind, as it has happened all over the city.

Councilor Christensen asked whether there may be a need for additional parking spaces. Ardmore answered that, according to standards, there was not.

Councilor Hoban expressed that he was sensitive to the parking issue. He told the Council that he has seen the property personally and felt comfortable with the parking accommodations in this plan. He said that the planned 30 parking spots seemed good compared to other things the Council has approved. He also said that he saw no need to delay approving this amendment.

Councilor Bogdin asked that, in the future, a memo be provided to the Council summarizing proposed changes in a development agreement.

Councilor McKay said that, if owner occupancy was guaranteed, she felt comfortable with the issue of parking. If it was not guaranteed, however, parking could become an issue. She also asked whether sidewalks would be required to be 6 feet wide.

Councilor McKay also asked for clarification on Bill Peperone's reasons for the changes to the setback. Bill Peperone, Development Services Director, answered that he felt the setback was proportionate to the height of the building. Councilor McKay expressed that she did not want another "College Place incident." Councilor Christensen agreed, expressing that he felt the setback in College Place is far too close and that it was tragic.

Councilor Garrett summarized the changes to the agreement: the height was changed from 26.5 feet to 28.5 feet, and the setback was changed from 14 feet to 8 feet. Ardmore confirmed that this assessment was correct.

Councilor Whipple agreed with Councilor Hoban, saying that this was a local developer who has been very responsive to input from the Council and the neighborhood. She said that she wanted to encourage such developers to have projects in the City.

Councilor Handley commented that he would not be available for the evening meeting, but that he fully supported approving this agreement.

Councilor Garrett asked whether the setback for Timp Towers was less than 8 feet. Ardmore answered that he would find out.

9. A discussion regarding an ordinance amending the Zone Map Classification of real property, generally located at 1354 N Geneva Road, from the Agricultural (A1.5) Zone to the One-Family Residential (R1.8) Zone – Lakeview North Neighborhood (PLRZ20240018) (3:55:40)

Nancy Robison, Development Services Planner, presented.

Councilor Bogdin mentioned comments from the Planning Commission that Geneva Road was filled with driveways that sometimes cause congestion.

Robison explained the reasons for changing to R1.8 zoning. Councilor Hoban asked whether, in the future, higher density building could be done. Robison said that it was possible to build flagship properties in the future, depending on where the owners chose to build their home on each lot. Councilor Bogdin said that she was not concerned about flagship properties, as each property had a limited number of access points.

Councilor Garrett asked for clarification on the 8,000 square foot home size. Robison clarified that this square footage was the minimum requirement according to zoning law.

10. A discussion regarding an ordinance amending the Zone Map classification of property located at 1098 N Geneva Road, from the A1.5 (Agricultural) Zone to the R1.6 (One Family Residential) Zone – Lakeview North Neighborhood (PLRZ20230227) (4:02:04)

Nancy Robison presented. A presentation was made previously to the Planning Commission to create 31 lots on this property. Staff determined that it would be helpful to have more lots, prompting the pursuit of Transferrable Development Rights.

Councilor McKay asked whether there were any changes except in the highlighted areas of property shown on the screen. Robison said that there were not.

Robison said that, according to Engineering, these changes would not exceed sewer capacity. She also said that the 4 units/acre limit would not be exceeded.

Councilor Bogdin asked whether plans were being made to change the direction of the sewer in the area. Gordon Haight answered that the sewers would be going south. He further clarified the reasoning behind the additional units.

Councilor Bogdin also asked why the connection with Reese Drive to the new subdivision must be allowed. Haight explained that there is value in having multiple routes in and out of the subdivision, including balanced traffic patterns.

Brian Jones explained that this was one of the City's first attempts at a Transfer of Development Rights and explained the process that would be required. He wanted the Council to know that, if they were opposed to the plan, they should oppose it now, before the lengthy process begins.

11. A discussion regarding a resolution approving the appropriation of $28,400 in the General Fund for Slate Canyon Parking Enforcement costs (24-006) (4:13:00)

Melia Dayley presented. She gave a summary of the cost of signs and parking enforcement officers.

12. A discussion regarding a resolution approving the appropriation of $200,000 in the Legacy CIP Fund for a Zoning re-write (24-006) (4:13:01)

Bill Peperone presented. He reviewed the history of this request and noted that Staff met together to reduce the cost of this request by optimizing the required work.

Councilor McKay asked whether Peperone was satisfied with the applicants for the RFP. Peperone answered that he was.

Councilor McKay noted that this would help to clean up City code and would make the process easier for developers and Staff.

Councilor Christensen asked whether this appropriation would helped to rationalize the number of PRO Zones in the City. Peperone answered that it would not. He explained changes in zoning law by previous City Councils.

Councilor Garrett asked how long studies were expected to take. Peperone said that the current estimate was 11 months, but that he anticipated a timeline closer to 18 months.

Councilor Whipple adjourned the meeting by unanimous consent.

Councilor Whipple convened the meeting of the RDA Governing Board by unanimous consent. Brian Jones presented the reasons to close the RDA meeting to discuss strategies regarding the potential sale of property owned by the RDA.

Councilor McKay motioned to close the meeting.

Councilor Hoban seconded the motion.

The Board voted on the motion:

Travis Hoban: Yes
Gary Garret: Yes
Katrice McKay: Yes
Rachel Whipple: Yes
Becky Bogdin: Yes
Craig Christensen: Yes
George Handley: Yes

The meeting was closed.

PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: TARAR
Department: Development Services
Requested Meeting Date: 07-16-2024

SUBJECT: A resolution to place a 1.18 acre parcel of ground located at approx. 200 North Lakeview Parkway on the Surplus Property List and authorize the Mayor to dispose of the property. (24-061)

RECOMMENDATION: Approval of resolution to place a 1.18 acre parcel of ground at approx. 200 North Lakeview Parkway on the Surplus Property List and authroize the Mayor to dispose of the property.

BACKGROUND: In 2017, Provo City acquired a parcel of ground at approximately 200 North Lakeview Parkway to accommodate the development of Lakeview Parkway. Now that the project is completed, there was a departmental review completed that indicated that this property is not needed for any future Provo City projects and can be surplused. The property owner to the south is looking to develop their property and would like to include this 1.18 acre parcel as part of their open space. Because of the setbacks from the river, they will not be able to build structures on it, but can use it for parking and open space. The city is going to retain a 40 ft. public utility easement for access to the river for maintenance purposes.

FISCAL IMPACT: Revenue of $126,500 which will be reimbursed to MAG for the Corridor Preservation Fund

PRESENTER'S NAME: Tara Riddle

REQUESTED DURATION OF PRESENTATION: 10 Minutes

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES: The surplusing and sale of this property to be developed with the adjoining property owner is compatible with General Plans, Policies, Goals, and Objectives.

CITYVIEW OR ISSUE FILE NUMBER: 24-061

RESOLUTION 2024 -

A RESOLUTION TO PLACE A 1.180 ACRE PARCEL OF GROUND LOCATED AT APPROXIMATELY 200 NORTH LAKEVIEW PARKWAY ON THE SURPLUS PROPERTY LIST AND AUTHORIZE THE MAYOR TO DISPOSE OF THE PROPERTY. (24-061)

RECITALS:

Provo City Corporation (the City) owns a 1.180 acre parcel of ground located generally at 200 North Lakeview Parkway and identified as a portion of Utah County Tax ID # 21-029-0077, which is further described in Exhibits A and B;

This property is vacant and has not been identified for future use by Provo City;

Provo City is desirous of selling this property for inclusion in a future development;

The Mayor has recommended that this parcel be placed on the surplus property list and sold subject to the conditions set in Provo City Code 3.04.030;

On July 16, 2024, the Municipal Council held a duly noticed public meeting to receive public comment and ascertain the facts regarding this matter, which facts and comments are found in the meeting record;

After considering the Mayor's recommendation, and facts and comments presented to the Municipal Council, the Council finds (i) the real Property described in Exhibit A should be added to the Surplus Property List for sale subject to the conditions set forth below, and (ii) the sale of such Property reasonably furthers the health, safety, and general welfare of the citizens of Provo City.

THEREFORE, the Municipal Council of Provo City, Utah resolves as follows:

PART I:

The real Property described in the attached Exhibit A is hereby placed on the Surplus Property list and the Mayor is authorized to dispose of the property by selling the property subject to the conditions set in Provo City Code 3.04.030.

PART II:

This resolution takes effect immediately.

END OF RESOLUTION.

EXHIBIT A

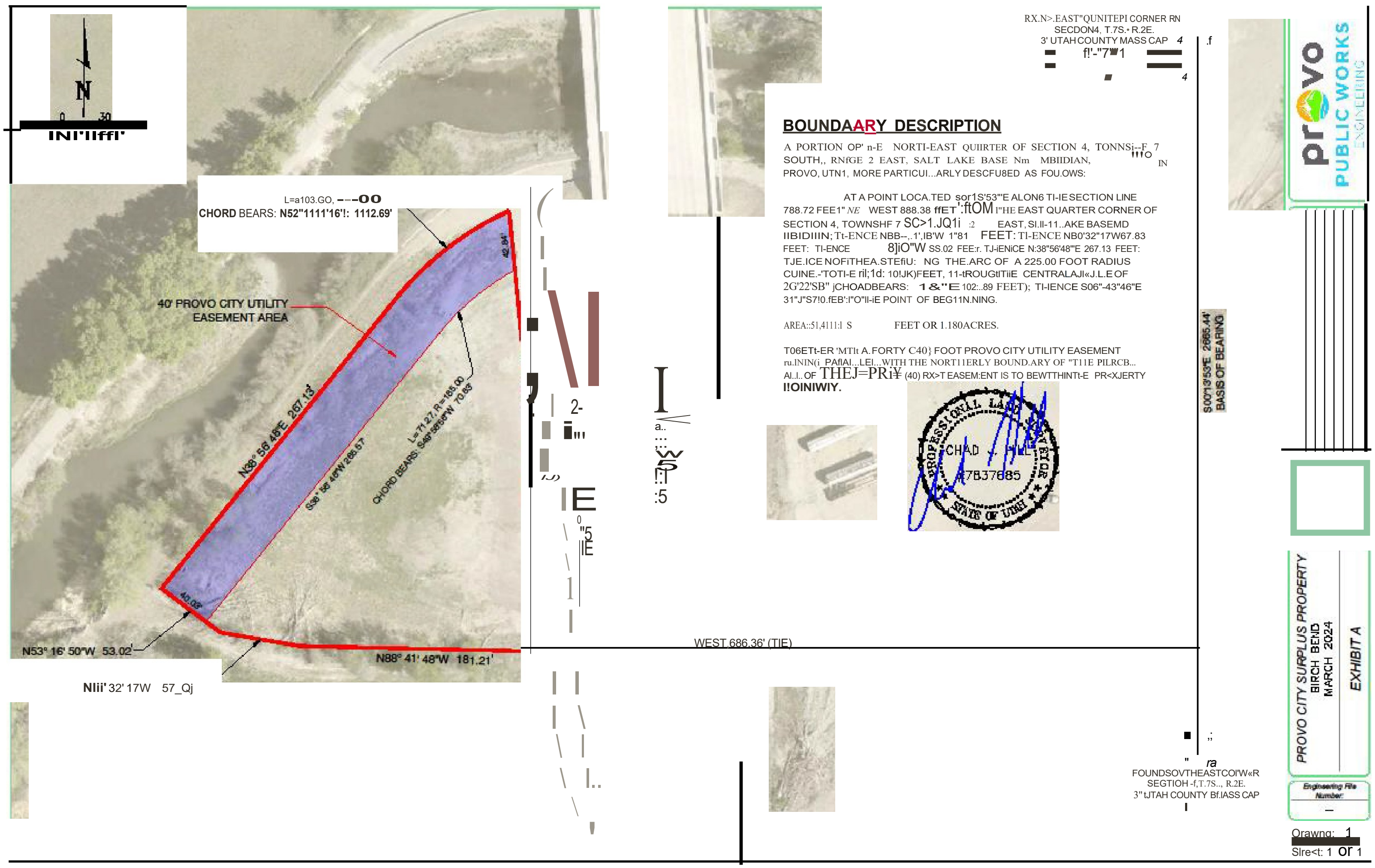
A PORTION OF THE NORTHEAST QUARTER OF SECTION 4, TOWNSHIP 7 SOUTH, RANGE 2 EAST, SALT LAKE BASE AND MERIDIAN, LOCATED IN PROVO, UTAH, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT LOCATED S00°13'53"E ALONG THE SECTION LINE 768.72 FEET AND WEST 686.36 FEET FROM THE EAST QUARTER CORNER OF SECTION 4, TOWNSHIP 7 SOUTH, RANGE 2 EAST, SALT LAKE BASE AND MERIDIAN; THENCE N88°41'48"W 181.21 FEET; THENCE N80°32'17"W 57.83 FEET; THENCE N53°16'50"W 53.02 FEET; THENCE N38°56'48"E 267.13 FEET; THENCE NORTHEASTERLY ALONG THE ARC OF A 225.00 FOOT RADIUS CURVE TO THE right 103.60 FEET, THROUGH THE CENTRAL ANGLE OF 26°22'58" (CHORD BEARS: N52°08'16"E 102.69 FEET); THENCE S05°43'46"E 317.70 FEET TO THE POINT OF BEGINNING.

AREA: 51,416 SQUARE FEET OR 1.180 ACRES.

THE CITY RETAIN A FORTY (40) FOOT PROVO CITY UTILITY EASEMENT RUNNING PARALLEL WITH THE NORTHERLY BOUNDARY OF THE PARCEL. ALL OF THE FORTY (40) FOOT EASEMENT IS TO BE WITHIN THE PROPERTY BOUNDARY.

EXHIBIT B


N
0 30
L=a103.GO,
CHORD BEARS: N52"1111'16'!: 1112.69'
40' PROVO CITY UTILITY
EASEMENT AREA
N38° 56' 48"E 267.13'
S38° 56' 48"W 286.57'
L=71.27, R=185.00
CHORD BEARS: S49°58'58"W 70.83'
42.84'
40.02'
N53° 16' 50"W 53.02'
N88° 41' 48"W 181.21'
Nlii' 32' 17W 57_Qj
WEST 686.36' (TIE)
RX.N>.EAST"QUNITEPI CORNER RN
SECDON4, T.7S.• R.2E.
3' UTAH COUNTY MASS CAP
BOUNDAARY DESCRIPTION
A PORTION OP' n-E NORTI-EAST QUIIRTER OF SECTION 4, TONNSi--F 7 SOUTH,, RNfGE 2 EAST, SALT LAKE BASE Nm MBIIDIAN, IN PROVO, UTN1, MORE PARTICUI...ARLY DESCFU8ED AS FOU.OWS:
AT A POINT LOCA.TED sor1S'53"'E ALON6 TI-IE SECTION LINE 788.72 FEE1" NE WEST 888.38 ffET':ftOM l"HE EAST QUARTER CORNER OF SECTION 4, TOWNSHF 7 SC>1.JQ1i :2 EAST, SI.II-11..AKE BASEMD IIBIDIIIN; Tt-ENCE NBB--,.1',IB'W 1"81 FEET: Tl-ENCE NB0'32"17W67.83 FEET: TI-ENCE 8]iO"W SS.02 FEE:r. TJ-iENiCE N:38"56'48"'E 267.13 FEET: TJE.ICE NOFiTHEA.STEfiU: NG THE.ARC OF A 225.00 FOOT RADIUS CUINE.-'TOTI-E ril;1d: 10!JK)FEET, 11-tROUGtITiiE CENTRALAJI«J.L.E OF 2G'22'SB" jCHOADBEARS: 1&"E 102:..89 FEET); TI-IENCE S06"-43"46"E 31"J"S7!0.fEB':l"O"ll-iE POINT OF BEG11N.NING.
AREA::51,4111:l S FEET OR 1.180ACRES.
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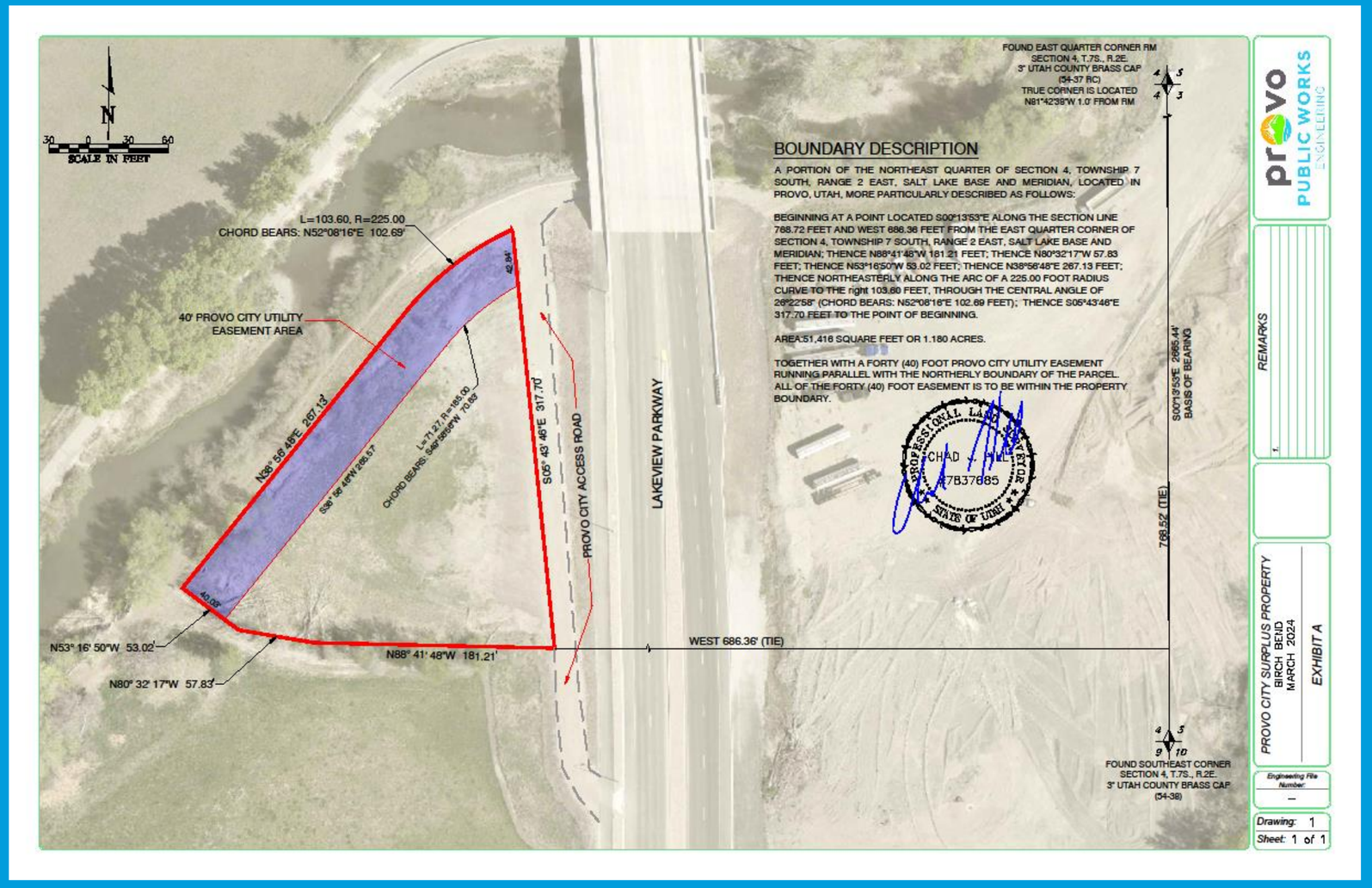
CHAD J. HILL
7B37685
STATE OF UTAH
S00°13'53"E 2665.44'
BASIS OF BEARING
FOUNDSOVTHEASTCOl'W«R
SEGTIOH -f,T.7S.., R.2E.
3" tJTAH COUNTY Bf.IASS CAP
PUBLIC WORKS
ENGINEERING
PROVO CITY SURPLUS PROPERTY
BIRCH BEND
MARCH 2024
EXHIBIT A
Engineering File Number:
Drawing: 1
Sheet: 1 of 1

Subject is a remnant piece from property acquired in 2017 for the development of Lakeview Parkway



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The Details

- Parcel contains 1.180 Acres
- Departmental Review was completed and no future need for the property was identified
- Appraised Value is $126,500

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The Details continued…..

- Adjoining property owner, Kirkland Family Investment LLC, has made an offer at appraised value to include property in their overall project plan known as “Birch Bend “with the closing date of December 3, 2024
- Proceeds from sale will be reimbursed to MAG
- Provo City will retain a 40’ Utility Easement along the river frontage

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PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: TARAR
Department: Development Services
Requested Meeting Date: 07-16-2024

SUBJECT: A resolution placing a 0.375 acre parcel of ground located at 1992 North Geneva Road on the surplus property list and authorizing the Mayor to dispose of the property. (24-062)

RECOMMENDATION: Approval of resolution to place a 0.375 acre parcel of ground at 1992 North Geneva Road on the Surplus Property List and authorize the Mayor to dispose of the property.

BACKGROUND: In 2015, Provo City acquired the property to facilitate the expansion of 2000 North and Geneva Road, including the new traffic control lights.

The expansion has been completed and there is remnant property. A departmental review was conducted and it indicated that the remainder of this property is not needed for any future Provo City projects and can be surplused.

The City intends to sell the property to the Provo City Housing Authority for $210,000 which was the original purchase price. The RDA will be providing the funding through their affordable housing fund.

The intent is to provide the land to the Provo City Housing Authority in a partnership to develop the property into townhomes for low-income housing.

FISCAL IMPACT: Revenue of $210,000

PRESENTER'S NAME: Tara Riddle

REQUESTED DURATION OF PRESENTATION: 10 Minutes

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES:
The surplusing and deeding of this property to be developed by the Provo City Housing Authority is compatible with General Plans, Policies, Goals, and Objectives.

CITYVIEW OR ISSUE FILE NUMBER: 24-062

RESOLUTION 2024 -

A RESOLUTION PLACING A 0.375 ACRE PARCEL OF GROUND LOCATED AT 1992 NORTH GENEVA ROAD ON THE SURPLUS PROPERTY LIST AND AUTHORIZING THE MAYOR TO DISPOSE OF THE PROPERTY. (24-062)

RECITALS:

Provo City Corporation (the "City") owns a 0.375 acre parcel of ground located at 1992 North Geneva Road and identified by Utah County Tax ID # 19-043-0074, which is further described in Exhibits A and B;

This property is vacant and has not been identified for future use by Provo City;

Provo City desires to sell this property to the Provo City Housing Authority for development into low-income housing with funding for the property purchase coming from the Redevelopment Agency of Provo City's affordable housing fund;

The Mayor has recommended that this parcel be placed on the surplus property list and sold subject to the conditions set in Provo City Code 3.04.030;

On July 16, 2024, the Municipal Council held a duly noticed public meeting to receive public comment and ascertain the facts regarding this matter, which facts and comments are found in the meeting record; and

after considering the facts and comments presented to the Municipal Council, the Council finds (i) the real Property described in Exhibit A should be added to the Surplus Property List for sale subject to the conditions set forth below, and (ii) the sale of such Property reasonably furthers the health, safety, and general welfare of the citizens of Provo City.

THEREFORE, the Municipal Council of Provo City, Utah resolves as follows:

PART I:

The real Property described in the attached Exhibit A is hereby placed on the Surplus Property list and the Mayor is authorized to dispose of the property by selling the property subject to the conditions in Provo City Code 3.04.030.

PART II:

This resolution takes effect immediately.

END OF RESOLUTION.

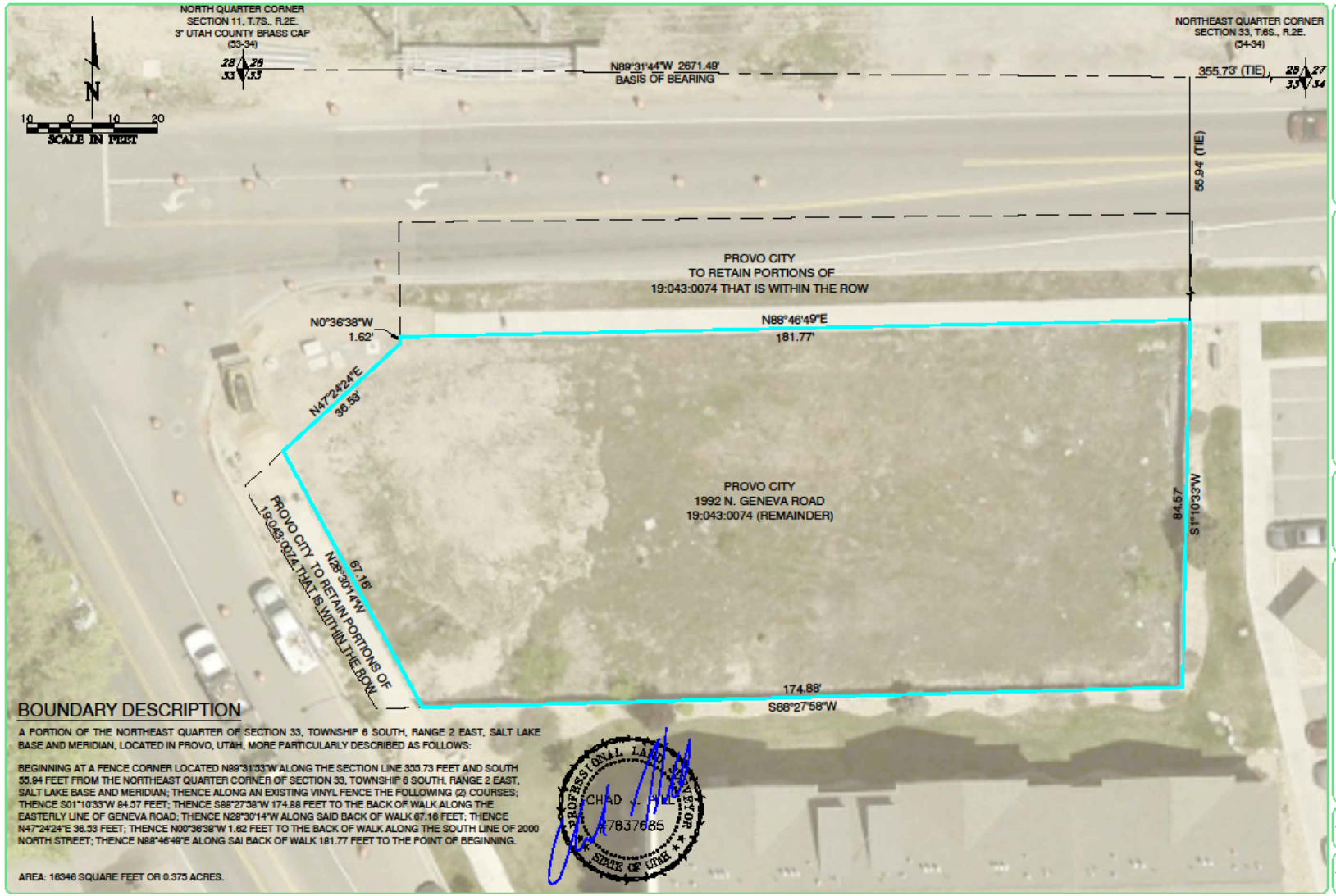
EXHIBIT A

A PORTION OF THE NORTHEAST QUARTER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 2 EAST, SALT LAKE BASE AND MERIDIAN, LOCATED IN PROVO, UTAH, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

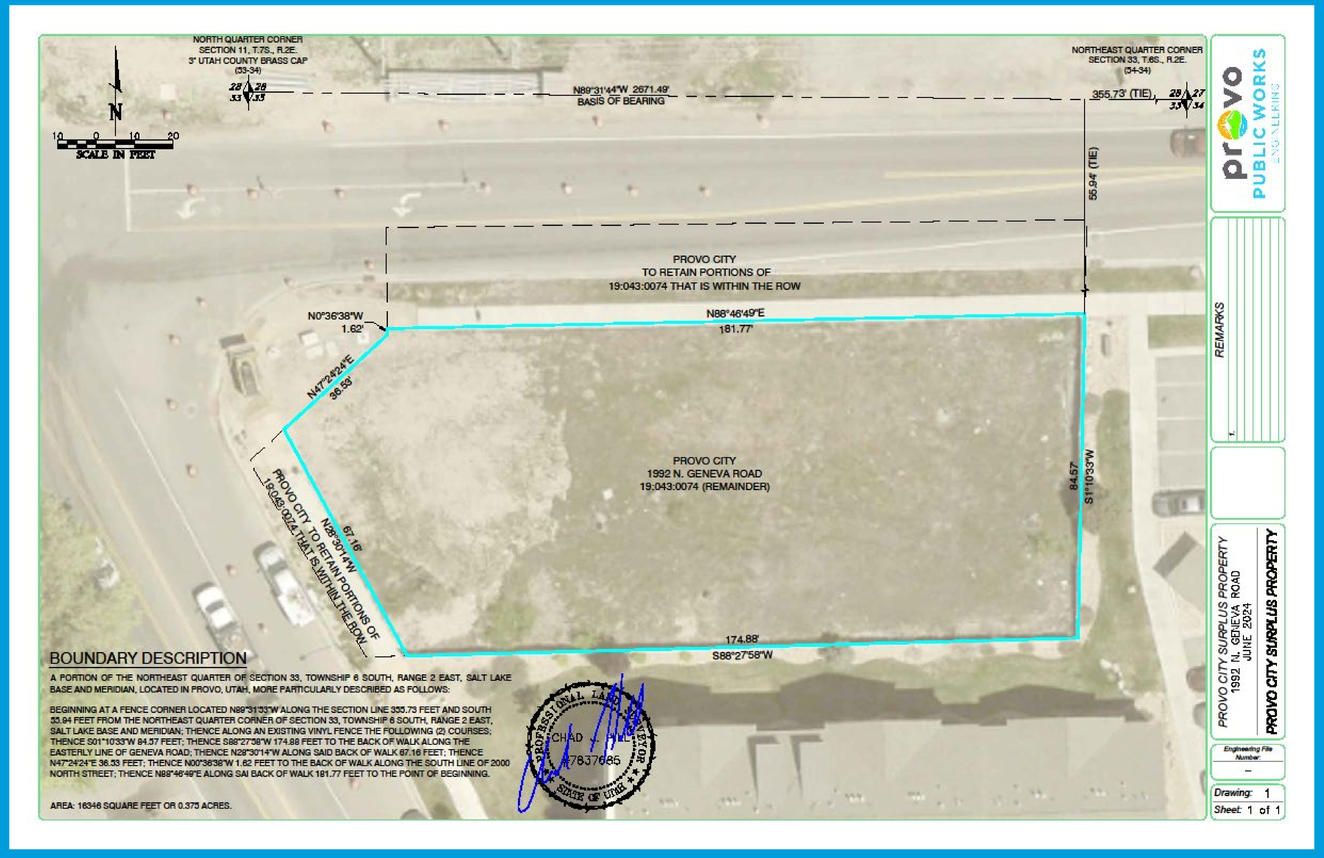
BEGINNING AT A FENCE CORNER LOCATED N89°31'53"W ALONG THE SECTION LINE 355.73 FEET AND SOUTH 55.94 FEET FROM THE NORTHEAST QUARTER CORNER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 2 EAST, SALT LAKE BASE AND MERIDIAN; THENCE ALONG AN EXISTING VINYL FENCE THE FOLLOWING (2) COURSES; THENCE S01°10'33"W 84.57 FEET; THENCE S88°27'58"W 174.88 FEET TO THE BACK OF WALK ALONG THE EASTERLY LINE OF GENEVA ROAD; THENCE N28°30'14"W ALONG SAID BACK OF WALK 67.16 FEET; THENCE N47°24'24"E 36.53 FEET; THENCE N00°36'38"W 1.62 FEET TO THE BACK OF WALK ALONG THE SOUTH LINE OF 2000 NORTH STREET; THENCE N88°46'49"E ALONG SAI BACK OF WALK 181.77 FEET TO THE POINT OF BEGINNING.

16346 SQUARE FEET OR 0.375 ACRES.

EXHIBIT B


NORTH QUARTER CORNER
SECTION 11, T.7S., R.2E.
3" UTAH COUNTY BRASS CAP
(33-34)
NORTHEAST QUARTER CORNER
SECTION 33, T.6S., R.2E.
(34-34)
N89°31'44"W 2671.49'
BASIS OF BEARING
355.73' (TIE)
55.94' (TIE)
N
SCALE IN FEET
PROVO CITY
TO RETAIN PORTIONS OF
19:043:0074 THAT IS WITHIN THE ROW
N0°36'38"W
1.62'
N88°46'49"E
181.77'
N47°24'24"E
36.53'
PROVO CITY
1992 N. GENEVA ROAD
19:043:0074 (REMAINDER)
84.57'
S1°10'33"W
PROVO CITY TO RETAIN PORTIONS OF
19:043:0074 THAT IS WITHIN THE ROW
67.16'
N28°30'14"W
174.88'
S88°27'58"W
BOUNDARY DESCRIPTION
A PORTION OF THE NORTHEAST QUARTER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 2 EAST, SALT LAKE BASE AND MERIDIAN, LOCATED IN PROVO, UTAH, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT A FENCE CORNER LOCATED N89°31'33"W ALONG THE SECTION LINE 355.73 FEET AND SOUTH 55.94 FEET FROM THE NORTHEAST QUARTER CORNER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 2 EAST, SALT LAKE BASE AND MERIDIAN; THENCE ALONG AN EXISTING VINYL FENCE THE FOLLOWING (2) COURSES; THENCE S01°10'33"W 84.57 FEET; THENCE S88°27'58"W 174.88 FEET TO THE BACK OF WALK ALONG THE EASTERLY LINE OF GENEVA ROAD; THENCE N28°30'14"W ALONG SAID BACK OF WALK 67.16 FEET; THENCE N47°24'24"E 36.53 FEET; THENCE N00°36'38"W 1.62 FEET TO THE BACK OF WALK ALONG THE SOUTH LINE OF 2000 NORTH STREET; THENCE N88°46'49"E ALONG SAI BACK OF WALK 181.77 FEET TO THE POINT OF BEGINNING.
AREA: 16346 SQUARE FEET OR 0.375 ACRES.
PROFESSIONAL LAND SURVEYOR
CHAD
7837685
STATE OF UTAH
provo PUBLIC WORKS ENGINEERING
REMARKS
PROVO CITY SURPLUS PROPERTY
1992 N. GENEVA ROAD
JUNE 2024
PROVO CITY SURPLUS PROPERTY
Engineering File Number:
–
Drawing: 1
Sheet: 1 of 1

Subject is a remnant piece from property acquired in 2015 for the development of Geneva Road and 2000 North



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WELCOME HOME

The Details

- Parcel contains 0.375 Acres
- Departmental Review was completed and no future need for the property was identified
- Property was originally acquired for $210,000

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The Details continued…..

- The Redevelopment Agency of Provo City will provide the funding to the Provo City Housing Authority for the purchase of the property through their affordable housing fund
- Property will be sold to the Provo City Housing Authority for $210,000
- Housing Authority will develop the property into townhomes for low-income housing

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ORDINANCE 2024-____.

AN ORDINANCE AMENDING THE CRITICAL HILLSIDE (CH) OVERLAY ZONE. CITYWIDE APPLICATION. (PLOTA20240179) (24-____)

RECITALS:

It is proposed that Provo City Code Section 14.33A.040 be amended regarding development in the critical hillside overlay zone;

On July 10th, 2024, the Planning Commission held a public hearing to consider the proposed amendment;

As part of the Planning Commission's consideration, modified language was proposed to the applicant, the Provo City Development Services Department. The applicant adopted the modified language as part of its application, and after the hearing, the Planning Commission recommended approval of the application to the Municipal Council by a vote of 5:0;

On July 16th, 2024, the Municipal Council met to ascertain the facts regarding this matter and receive public comment, which facts and comments are found in the public record of the Council's consideration; and

After considering the facts presented to the Municipal Council, the Council finds that (i) Provo City Code should be amended as set forth below, and (ii) such action furthers the health, safety, and general welfare of the citizens of Provo City.

THEREFORE, the Municipal Council of Provo City, Utah ordains as follows:

PART I:

Provo City Code Section 14.33A.040 is hereby amended as set forth in exhibit A.

PART II:

A. If a provision of this ordinance conflicts with a provision of a previously adopted ordinance, this ordinance prevails.

B. This ordinance and its various sections, clauses, and paragraphs are severable. If any part, sentence, clause, or phrase is adjudged to be unconstitutional or invalid, the remainder of the ordinance is not affected by that determination.

C. This ordinance takes effect immediately after it has been posted or published in accordance with Utah Code Section 10-3-711, presented to the Mayor in accordance with Utah Code Section 10-3b-204, and recorded in accordance with Utah Code Section 10-3-713.

D. The Municipal Council directs that the official copy of Provo City Code be updated to reflect the provisions enacted by this ordinance.

EXHIBIT A

14.33A.040
Development in Critical Hillside (CH) Overlay Zone.

(1) All development in the CH Zone, including, but not limited to, grading, clearing, and excavation, shall comply with the applicable provisions of this Chapter.

(2) The submittal of maps, plans, narratives, or any other document necessary to demonstrate compliance with this Chapter shall be submitted to the Coordinator Review Committee for review.

(3) The provisions of this Chapter shall not apply in the following situations:

(a) For lots created prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(b) For developed parcels (not lying in a development plat) developed prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(c) For parcels or lots actively and solely used in the operation of a public or private cemetery; and

(d) For public parks.

(4) Subject to verification by Provo City Engineering of the requirements of this Subsection and the execution of an agreement documenting the terms of any exceptions granted under this Subsection, the provisions of this Chapter may be modified for parcels that do not have any of the following development constraints:

(i) Slopes steeper than a 20% grade covering more than 15% of the parcel;

(ii) Hazardous or unstable soils;

(iii) Faults;

(iv) Ridgelines; or

(v) Other hazardous building conditions.

DEVELOPMENT SERVICES

Planning Commission Hearing Staff Report
Hearing Date: July 10, 2024

****ITEM 3** Development Services request an Ordinance Text Amendment to the Critical Hillside Overlay (CH) Zone, Section 14.34.040, to add additional language on exceptions. Citywide application. Aaron Ardmore (801) 852-6404 aardmore@provo.org PLOTA20240176

Applicant: Development Services

Staff Coordinator: Aaron Ardmore

ALTERNATIVE ACTIONS

1. **Continue** to a future date to obtain additional information or to further consider information presented. *The next available meeting date is August 14th, 2024, at 6:00 P.M.*

2. **Recommend Denial** of the requested ordinance text amendment. *This action would not be consistent with the recommendations of the Staff Report. The Planning Commission should state new findings.*

Relevant History: During the June 2024 review of the Buckley Draw project (application PLRZ20240047) it was found that a text amendment to the CH Overlay Zone would be needed. Both the Planning Commission and City Council were comfortable allowing the Buckley Draw rezone to move forward, directing Planning Staff to return quickly with an amendment to the CH regulations that allow for careful exceptions. Staff have been working to create the proposed language since that time.

Neighborhood Issues: This is a citywide application that could affect multiple neighborhoods. However, there were neighborhood concerns with the Buckley project that instigated these changes.

Summary of Key Issues:

- The CH Overlay was applied to multiple undeveloped properties in 2020 with a broad brush.
- There are some properties zoned CH which do not have all the characteristics that the Critical Hillside zone is meant to address.
- Staff suggests adding additional language in Section 14.33A.040(3) to empower the city to modify standards or add exceptions to certain properties that do not meet the intent of the CH zone.

Staff Recommendation: That the Planning Commission recommend approval of the proposed amendments to the City Council.

OVERVIEW

Development Services is requesting an ordinance text amendment to the CH Overlay Zone, as directed by the City Council. This proposed change will help give the Council and staff more flexibility on properties that were zoned with the CH Overlay in 2020.

The key motivation for this proposed change was the review of the Buckley Draw rezone and concept plan. This property was shown to be in the CH Overlay zone but does not have the typical characteristics or hazards associated with most hillside properties. There is very little slope greater than 30% (none in the proposed improvement areas), no ridgelines or faults, and has shown to have stable soils. Properties like this should be able to seek some relief from the stringent CH Overlay regulations, specifically, with the limits of disturbance (LOD) standards found in Section 14.33A.090.

Currently within the CH chapter, there are four listed exceptions to CH Overlay standards. Among the existing exceptions are public parks, cemeteries, and lots created prior to the enactment of the overlay zone. Staff proposes adding the ability to still apply the CH standards but modify them with this proposed fifth exception (14.33A.040(e)) for parcels that do not meet certain criteria, such as steep slopes, slides, faults, and ridgelines.

STAFF ANALYSIS

Staff have used the criteria below from Section 14.02.020(2), Provo City Code, to evaluate this staff proposal against the goals and objectives of the General Plan, ensuring compatibility with the vision of the city.

(a) Public purpose for the amendment in question.

Staff response: The public purpose of the amendment is to enable development on buildable land within the city, to provide additional needed housing.

(b) Confirmation that the public purpose is best served by the amendment in question.

Staff response: Staff believes that the proposed amendments are the best way to address the above public purpose.

(c) Compatibility of the proposed amendment with General Plan policies, goals, and objectives.

Staff response: The proposed amendments help to meet goals of the General Plan, specifically, Chapter 3, goal 3, to “review and revise Provo City Code to make it more consistent and accessible” as well as Chapter 4, goal 1b, to

"consider revising regulations to encourage development of a mix of housing types."

(d) Consistency of the proposed amendment with the General Plan's "timing and sequencing" provisions on changes of use, insofar as they are articulated.

Staff response: There are no timing and sequencing issues related to this request.

(e) Potential of the proposed amendment to hinder or obstruct attainment of the General Plan's articulated policies.

Staff response: Staff believe that this proposal would not hinder or obstruct General Plan policies. In truth, due to the characteristics of the Buckley Draw parcel, it is questionable whether it should have been included in the CH Overlay Zone. Modifying certain regulations to both protect the intent and spirit of the CH zone while allowing for desperately needed housing on the site should meet the goals and policies of the Provo General Plan.

(f) Adverse impacts on adjacent landowners.

Staff response: Staff do not anticipate any adverse impacts resulting from the proposed amendment.

(g) Verification of correctness in the original zoning or General Plan for the area in question.

Staff response: Does not apply.

(h) In cases where a conflict arises between the General Plan Map and General Plan Policies, precedence shall be given to the Plan Policies.

Staff response: Does not apply.

CONCLUSIONS

Staff are confident that this amendment provides a reasonable solution to an obstacle to good development and would hope that the Planning Commission and City Council approve the proposed language.

ATTACHMENTS

1. Proposed Amendments

ATTACHMENT 1 – PROPOSED AMENDMENTS

14.33A.040

Development in Critical Hillside (CH) Overlay Zone.

(1) All development in the CH Zone, including, but not limited to, grading, clearing, and excavation, shall comply with the applicable provisions of this Chapter.

(2) The submittal of maps, plans, narratives, or any other document necessary to demonstrate compliance with this Chapter shall be submitted to the Coordinator Review Committee for review.

(3) The provisions of this Chapter shall not apply or may be modified in the following situations:

(a) For lots created prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(b) For developed parcels (not lying in a development plat) developed prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(c) For parcels or lots actively and solely used in the operation of a public or private cemetery; and

(d) For public parks.

(e) For parcels that do not have more than 15% of land covered in slopes over 20% and that do not have any of the following development constraints (to be confirmed by Provo City Engineering), subject to approval of a Development Agreement:

(i) hazardous soils;

(ii) faults; or

(iii) ridgelines.

Provo City Planning Commission

Report of Action

July 10, 2024

ITEM 3	Development Services request an Ordinance Text Amendment to the Critical Hillside Overlay (CH) Zone, Section 14.33A.040, to add additional language on exceptions. Citywide application. Aaron Ardmore (801) 852-6404 aardmore@provo.org PLOTA20240176

The following action was taken by the Planning Commission on the above-described item at its regular meeting of July 10, 2024:

RECOMMENDED APPROVAL

On a vote of 5:0, the Planning Commission recommended that the Municipal Council approve the above noted application and made the following specific recommendations to the Council.

Recommendations for Council:

1. That the language be modified to reflect the proposal as its own subsection and to clarify language within (staff supported this motion).

Motion By: Jonathon Hill
Second By: Melissa Kendall
Votes in Favor of Motion: Jonathon Hill, Melissa Kendall, Jeff Whitlock, Barbara DeSoto, Adam Shin
Jeff Whitlock was present as Chair.

- Includes facts of the case, analysis, conclusions and recommendations outlined in the Staff Report, with any changes noted; Planning Commission determination is generally consistent with the Staff analysis and determination.

TEXT AMENDMENT

The text of the proposed amendment is attached as Exhibit A. *The Planning Commission Recommended version is attached as Exhibit B.*

STAFF PRESENTATION

The Staff Report to the Planning Commission provides details of the facts of the case and the Staff's analysis, conclusions, and recommendations.

CITY DEPARTMENTAL ISSUES

- The Coordinator Review Committee (CRC) has reviewed the application and given their approval.

NEIGHBORHOOD MEETING DATE

- Citywide application; all Neighborhood District Chairs received notification.

NEIGHBORHOOD AND PUBLIC COMMENT

- This item was Citywide or affected multiple neighborhoods.

CONCERNS RAISED BY PUBLIC

Any comments received prior to completion of the Staff Report are addressed in the Staff Report to the Planning Commission. Key issues raised in written comments received subsequent to the Staff Report or public comment during the public hearing included the following: No public comments were received or heard.

APPLICANT RESPONSE

Key points addressed in the applicant's presentation to the Planning Commission included the following:

- Staff responded to questions from the Planning Commission regarding application of the CH Overlay Zone, and the history of the zone.
- Staff confirmed the goal of making these changes is to still provide protection for CH parcels, while allowing for development to occur, where safe. Staff also explained that the proposal would give staff discretion in applying the CH regulations to development proposals to ensure that land is developed in a safe and attractive way, and that rezones in the overlay will still come to the PC and City Council.

PLANNING COMMISSION DISCUSSION

Key points discussed by the Planning Commission included the following:

- The Planning Commission noted that the list provided in the proposal may not be fully inclusive of all issues or hazards that could affect the CH parcel and expressed a desire to clarify the proposed language. Staff agreed with this notion.
- The Commission expressed support for the amendment that will be a good compromise to make additional land available for development, where appropriate.
- Further discussion on how to revise the proposed language was offered by the Commission.

Planning Commission Chair

Bill Peperone

Director of Development Services

See Key Land Use Policies of the Provo City General Plan, applicable Titles of the Provo City Code, and the Staff Report to the Planning Commission for further detailed information. The Staff Report is a part of the record of the decision of this item. Where findings of the Planning Commission differ from findings of Staff, those will be noted in this Report of Action.

Legislative items are noted with an asterisk (*) and require legislative action by the Municipal Council following a public hearing; the Planning Commission provides an advisory recommendation to the Municipal Council following a public hearing.

Administrative decisions of the Planning Commission (items not marked with an asterisk) **may be appealed** by submitting an application/notice of appeal, with the required application and noticing fees to the Development Services Department, 445 W Center Street, Provo, Utah, **within fourteen (14) calendar days of the Planning Commission's decision** (Provo City office hours are Monday through Thursday, 7:00 a.m. to 6:00 p.m.).

BUILDING PERMITS MUST BE OBTAINED BEFORE CONSTRUCTION BEGINS

14.33A.040

Development in Critical Hillside (CH) Overlay Zone.

(1) All development in the CH Zone, including, but not limited to, grading, clearing, and excavation, shall comply with the applicable provisions of this Chapter.

(2) The submittal of maps, plans, narratives, or any other document necessary to demonstrate compliance with this Chapter shall be submitted to the Coordinator Review Committee for review.

(3) The provisions of this Chapter shall not apply or may be modified in the following situations:

(a) For lots created prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(b) For developed parcels (not lying in a development plat) developed prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(c) For parcels or lots actively and solely used in the operation of a public or private cemetery; and

(d) For public parks.

(e) For parcels that do not have more than 15% of land covered in slopes over 20% and that do not have any of the following development constraints (to be confirmed by Provo City Engineering), subject to approval of a Development Agreement:

(i) hazardous soils;

(ii) faults; or

(iii) ridgelines.

EXHIBIT B

14.33A.040

Development in Critical Hillside (CH) Overlay Zone.

(1) All development in the CH Zone, including, but not limited to, grading, clearing, and excavation, shall comply with the applicable provisions of this Chapter.

(2) The submittal of maps, plans, narratives, or any other document necessary to demonstrate compliance with this Chapter shall be submitted to the Coordinator Review Committee for review.

(3) The provisions of this Chapter shall not apply in the following situations:

(a) For lots created prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(b) For developed parcels (not lying in a development plat) developed prior to the effective date of the ordinance establishing the Critical Hillside (CH) Overlay Zone;

(c) For parcels or lots actively and solely used in the operation of a public or private cemetery; and

(d) For public parks.

(4) Subject to verification by Provo City Engineering of the requirements of this Subsection and the execution of an agreement documenting the terms of any exceptions granted under this Subsection, the provisions of this Chapter may be modified for parcels that so not have any of the following development constraints:

(i) Slopes steeper than 20% grade covering more than 15% of parcel;

(ii) Hazardous or unstable soils;

(iii) Faults;

(iv) Ridgelines; or

(v) Other hazardous building conditions.

PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: MMCNALLEY
Department: Development Services
Requested Meeting Date: 07-16-2024

SUBJECT: A resolution approving the appropriation of $383,000 in the F272- Rental Housing Rehab Fund for affordable senior housing project. (24-046)

RECOMMENDATION: Approve appropriation of funding for a loan to finish development of a senior housing project.

BACKGROUND: HOME funding was granted to Mountain Country Home Solutions (Neighborworks Provo) for a senior housing project in Orem. The project has been delayed due to construction cost increases and other increases and the amount of HOME funding that may be used in the project is maxed. Funding is crutial for the project to continue. The funding would be a loan paid back by Mountain Country Home Solutions. This funding would come from Fund 272, which was previously used for rental rehab.

FISCAL IMPACT: $383,000

PRESENTER'S NAME: Melissa McNalley

REQUESTED DURATION OF PRESENTATION: 15 Minutes

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES: Contribute to affordable housing.

CITYVIEW OR ISSUE FILE NUMBER: 24-046

RESOLUTION 2024-__

A RESOLUTION APPROVING THE APPROPRIATION OF $383,000.00 IN THE RENTAL HOUSING REHAB FUND FOR AN AFFORDABLE SENIOR HOUSING PROJECT. (24-046)

RECITALS:

It is proposed that $383,000.00 be appropriated in the Rental Housing Rehab Fund to help fund an affordable senior housing project by using the funds to provide a loan for the project to Neighborworks Mountain County Home Solutions;

On July 16 and August 6, 2024, the Municipal Council met to consider the facts regarding this matter and receive public comment, which facts and comments are found in the public record of the Council's consideration; and

After considering the facts presented to the Municipal Council, the Council finds that (i) the appropriation should be approved, and (ii) such action furthers the health, safety, and general welfare of the citizens of Provo City.

THEREFORE, the Municipal Council of Provo City, Utah resolves as follows:

PART I:

The Mayor is authorized to appropriate $383,000.00 in the Rental Rehab Fund to fund a loan to Neighborworks Mountain County Home Solutions for an Affordable Senior Housing project.

PART II:

This resolution takes effect immediately.

MEMO

TO: Provo City Council

FROM: Melissa McNalley, Community Grants Administrator – Development Services

CC: Mayor Michelle Kaufusi, Scott Henderson, Issac Paxman

DATE: July 8, 2024

RE: Appropriation of funds in the Rental Rehab fund for loan

Background:

In fiscal year 2020-2021 Neighborworks Mountain Country Home Solutions was awarded a total of $400,000 in HOME funding to construct an affordable senior housing project in Orem.

In fiscal year 2023-2024 they were awarded an additional $776,000 after increased construction costs delayed the project and necessitated more funding to ensure the project's success.

In the spring of 2024, when reviewing contracts to ensure HUD compliance, I realized the project was funded more than the allowable amount of HOME funds by HUD (maximum subsidy per unit is $198,331.20 for a single bedroom unit. The senior housing project is four single room units). The maximum HOME investment may not exceed $793,324.80 for the entire project. This creates a shortfall of $382,675.20.

I am asking for an appropriation in the Rental Rehab fund of $383,000 to loan the needed funds to Neighborworks Mountain Country Home Solutions in order to ensure the project may proceed to completion.

PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: MISANDERS
Department: Council
Requested Meeting Date:

SUBJECT: A discussion regarding a code clean-up regarding recreational vehicles/trailers and vehicles (24-058)

RECOMMENDATION: Council Staff is seeking feedback regarding the clean up language. In addition, Council Staff is seeking feedback on if the Council wishes to continue to treat vehicles and trailers differently or would like to regulate them the same.

BACKGROUND: On July 18, 2023, the Council approved Ordinance 2023-30 which enacted a new regulation for street parking of recreational vehicles, boats, and trailers. An issue tracker request was submitted directing Council Staff to investigate options for resolving the conflicts in Provo City Code 9.31.050 and 9.31.055 and an additional policy question of the treatment of vehicles and recreational vehicles/trailers (trailers).

FISCAL IMPACT:

PRESENTER'S NAME: Michael Sanders, Policy Analyst

REQUESTED DURATION OF PRESENTATION: 20

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES:

CITYVIEW OR ISSUE FILE NUMBER: 24-058

PROVO CITY MUNICIPAL COUNCIL

Staff Memorandum

Michael Sanders, Policy Analyst

Trailer Issues

July 08, 2024

On July 18, 2023, the Council approved Ordinance 2023-30 which enacted a new regulation for street parking of recreational vehicles, boats, and trailers.

An issue tracker request was submitted directing Council Staff to look into options for resolving the conflicts in Provo City Code 9.31.050 and 9.31.055 and an additional policy question of the treatment of vehicles and recreational vehicles/trailers (trailers).

RECOMMENDATIONS

Council Staff recommends the language found in Appendix I to resolve the conflict between 9.31.050 and 9.31.055. This amendment would allow the City to both cite owners and tow trailers if a trailer remains on the same block face for more than 72 consecutive hours.

As for the policy question regarding the treatment of vehicles and trailers, please see the response from Parking Enforcement in the section entitled Treatment of Trailers and Vehicles paragraph two and the section Comparable City Requirements. Parking Enforcement recommends continuing to treat vehicles and trailers the same as found in Appendix I.

CONFLICT BETWEEN 9.31.050 AND 9.31.055

Provo City Code 9.31.050 declares trailers that are not moved at least 400 feet within a 72-hour period to be a nuisance and authorizes towing them and 9.31.055 makes it unlawful to keep a trailer on the same block face for more than 72 hours.

As the code is currently written, a trailer owner could comply with 9.31.050 by moving their trailer 400 feet while still remaining on the same block face, thus avoiding towing. However, this same action could violate 9.31.055, as the trailer has not been moved to a different block face.

This conflict creates confusion for trailer owners, who may believe they are complying with one section of the code while unknowingly violating another.

TREATMENT OF TRAILERS AND VEHICLES

The nuisance provisions in 9.31.050 currently treat vehicles and trailers the same. But trailers are treated differently with regard to citations in 9.31.055. Some Councilors have inquired as to why we treat trailers and vehicles differently. In other words, why is a vehicle required to move 400 feet every 72 hours while a trailer is required to move to a different block face.

According to Parking Enforcement, the reason trailers and vehicles are treated differently is to restrict individuals from storing trailers on the public street. Neighborhoods were reporting trailers being stored on the public street. Parking Enforcement would respond, mark the trailers, and the owners would move them up the block or across the street still occupying on-street parking. Most trailers are not being used on a regular basis and are occupying on-street parking. It is Parking Enforcement's opinion that trailers used for work should be stored on private property. As cars are moved much more frequently, they are required to move only 400 feet rather than to a new block face.

COMPARABLE CITY REQUIREMENTS

Below are parking regulations for other high population cities in Utah:

- SLC requires all types of vehicles to be moved every 48 hours. Motor homes, boats, and trailers are required to move to another block face. Cars are required to move, but there is no designated distance.
- West Jordan completely prohibits the parking of recreational vehicles (except for emergencies) on the street. Other vehicles are only required to move within 48 hours if they are "snowbound." Snowbound means "snowplows plowing around the vehicle."
- West Valley prohibits recreational vehicles, boats, or camping trailers from being parked, placed or stored on the public street for longer than 24 hours. Cars cannot be parked in the same place for more than 72 hours.
- St. George treats vehicles and trailers the same and has a 96-hour parking limit.

POLICY OPTIONS SUMMARY

If the Council would like to continue treating vehicles and trailers differently, the Council Office has identified the below policy option.

1. Maintain the status quo, while eliminating the current conflict between the towing and citation provisions for trailers. That is, require vehicles to move 400 feet every 72 hours

and trailers to move to a different block face every 72 hours, but make trailers that do not do so subject to towing as well as citation. (See Language in Appendix I)

If the Council would like to treat vehicles and trailers the same, the Council Office has identified the following possible policy options. Each one would be appropriate depending on the goals of the Council.

2. Require both vehicles and trailers to move 400 feet every 72 hours. (See language in Appendix II)
3. Require both vehicles and trailers to move to a different block face every 72 hours. (See language in Appendix III)

Below is a table summarizing the pros and cons of each option.

Policy Options		
Policy	**Pros**	**Cons**
Option 1	Tailored approach Balance	Potential fairness issues
Option 2	Uniformity Reduced Confusion	Insufficient deterrence Minimal Impact
Option 3	Effective space turnover Reduces "merry-go-round" effect	Inconvenience Enforcement Challenges

POLICY ANALYSIS

OPTION 1

This option entails maintaining the status quo of treating trailers and vehicles the same and addressing the current conflict. This tailored approach recognizes the different impacts that trailers and vehicles have on parking congestion. As vehicles move more frequently and utilize less space, they are required to move a smaller distance and vice versa for trailers.

As there are distinct rules for different vehicles, there may be confusion amongst residents. Additionally, residents may perceive the differentiation as unequal treatment of vehicle types.

Trailer Issues

OPTION 2

Implementing this option would treat vehicles and trailers the same. It *reduces* the burden of *trailer owners* by requiring them to move their trailer 400 feet rather than to another block face every 72 hours. It would encourage uniformity among parking regulations and simplify enforcement by having a single rule for both vehicles and trailers. Enforcement officers could easily ensure compliance with simple measurement tools. Residents would be required to keep track of one single rule rather than separate ones for each type of vehicle.

A potential issue with this proposal is that moving only 400 feet may not be a large enough distance to effectively free up parking spaces, especially in high demand areas. Vehicles and trailers could move relatively short distances, which does not address the core issue of long-term parking in congested areas.

OPTION 3

Implementing this option would treat vehicles and trailers the same. It *increases* the burden of *vehicle owners* by requiring them move their vehicle to a different block face rather than 400 feet every 72 hours. This option could be more effective in encouraging a more frequent turnover of parking spaces which could potentially increase availability. Additionally, it could reduce the "merry-go-round" effect by minimizing the number of vehicles that move only slightly.

Residents would likely see this option as burdensome, especially those who have limited access to off-street parking spaces.

Parking Enforcement would also likely encounter challenges and potential budget increases if this option were implemented as robust tracking systems such as GPS enabled software are often required to effectively enforce block-face parking regulations on a wide scale. It is also more labor-intensive, requiring officers to possibly visit multiple locations to confirm compliance.

APPENDIX I – STATUS QUO WITH RESOLVED CONFLICT

1. The following are hereby declared to be a nuisance and detrimental to the safe and proper regulation of traffic:
    a. Any unattended vehicle or trailer stopped, standing, or parked in violation of the provisions of this Chapter;
    b. Any unattended vehicle or trailer found upon the streets or alleys of this City with faulty or defective equipment;
    c. Any vehicle or trailer left unattended upon any bridge or viaduct where such vehicle or trailer constitutes an obstruction to traffic;
    d. Any vehicle or trailer left upon a street so disabled so as to constitute an obstruction to traffic where the person or persons in charge of the vehicle or trailer are incapacitated to such an extent as to be unable to provide for its custody or removal;
    e. Any vehicle or trailer left unattended upon a street or alley and so parked illegally as to constitute a hazard or obstruction to the normal movement of traffic;
    f. Any vehicle ~~or trailer~~ left parked in a public highway or street in the same place continuously for seventy-two (72) hours and which has not been moved a minimum of four hundred (400) feet prior to returning to the same location;
    g. Any vehicle or trailer, the driver or custodian of which has been taken into custody by the Police Department under such circumstances as would leave such vehicle or trailer unattended in a public street, alley, or restricted parking area; and
    h. Any vehicle or trailer found being driven or towed on the streets not in lawful condition to be driven or towed.
    i. Any trailer parked in a public highway or street in violation of Provo City Code 9.31.055
2. A motor vehicle or trailer in the public streets in violation of this Section may be towed from the public streets at the direction of a police officer.

APPENDIX II – VEHICLES AND TRAILERS TREATED THE SAME (400 FEET)

9.31.050 Unattended Vehicles

1. The following are hereby declared to be a nuisance and detrimental to the safe and proper regulation of traffic:
    a. Any unattended vehicle or trailer stopped, standing, or parked in violation of the provisions of this Chapter;
    b. Any unattended vehicle or trailer found upon the streets or alleys of this City with faulty or defective equipment;
    c. Any vehicle or trailer left unattended upon any bridge or viaduct where such vehicle or trailer constitutes an obstruction to traffic;
    d. Any vehicle or trailer left upon a street so disabled so as to constitute an obstruction to traffic where the person or persons in charge of the vehicle or trailer are incapacitated to such an extent as to be unable to provide for its custody or removal;
    e. Any vehicle or trailer left unattended upon a street or alley and so parked illegally as to constitute a hazard or obstruction to the normal movement of traffic;
    f. Any vehicle, recreational vehicle, or trailer, left parked in a public highway or street in the same place continuously for seventy-two (72) hours and which has not been moved a minimum of four hundred (400) feet prior to returning to the same location;
    g. Any vehicle or trailer, the driver or custodian of which has been taken into custody by the Police Department under such circumstances as would leave such vehicle or trailer unattended in a public street, alley, or restricted parking area; and
    h. Any vehicle or trailer found being driven or towed on the streets not in lawful condition to be driven or towed.
2. A motor vehicle or trailer in the public streets in violation of this Section may be towed from the public streets at the direction of a police officer.

9.31.055 Using Streets for Parking of ~~Recreational Vehicles, Trailers, and~~ Boats.

1. It is unlawful for any person to park a ~~recreational vehicle, trailer,~~ boat~~,~~ or similar conveyance whether attached or unattached to a motor vehicle, upon any public street or alley for more than seventy-two (72) consecutive hours. Any of the above which are moved from a parking spot and then reparked on the same block face within seventy-two (72) hours from the time of said removal shall be deemed to have been continuously parked. For purposes of this Section, the term "block face" shall have the same meaning as in Section 14.06.020, Provo City Code.

APPENDIX III – VEHICLES AND TRAILERS TREATED THE SAME (BLOCK-FACE)

9.31.050 Unattended Vehicles.

1. The following are hereby declared to be a nuisance and detrimental to the safe and proper regulation of traffic:
    a. Any unattended vehicle or trailer stopped, standing, or parked in violation of the provisions of this Chapter;
    b. Any unattended vehicle or trailer found upon the streets or alleys of this City with faulty or defective equipment;
    c. Any vehicle or trailer left unattended upon any bridge or viaduct where such vehicle or trailer constitutes an obstruction to traffic;
    d. Any vehicle or trailer left upon a street so disabled so as to constitute an obstruction to traffic where the person or persons in charge of the vehicle or trailer are incapacitated to such an extent as to be unable to provide for its custody or removal;
    e. Any vehicle or trailer left unattended upon a street or alley and so parked illegally as to constitute a hazard or obstruction to the normal movement of traffic;
    ~~f. Any vehicle or trailer left parked in a public highway or street in the same place continuously for seventy-two (72) hours and which has not been moved a minimum of four hundred (400) feet prior to returning to the same location;~~

    ~~g.~~f. Any vehicle or trailer, the driver or custodian of which has been taken into custody by the Police Department under such circumstances as would leave such vehicle or trailer unattended in a public street, alley, or restricted parking area; and

    ~~h.~~g. Any vehicle or trailer found being driven or towed on the streets not in lawful condition to be driven or towed.

    h. Any vehicle or trailer parked in a public highway or street in violation of 9.31.055

9.31.055 Using Streets for Parking of Vehicles, Recreational Vehicles, Trailers, and Boats.

1. It is unlawful for any person to park a vehicle, recreational vehicle, trailer, boat, or similar conveyance whether attached or unattached to a motor vehicle, upon any public street or alley for more than seventy-two (72) consecutive hours. Any of the above which are moved from a parking spot and then reparked on the same block face within seventy-two (72) hours from the time of said removal shall be deemed to have been continuously parked. For purposes of this Section, the term "block face" shall have the same meaning as in Section 14.06.020, Provo City Code.

Trailer Amendments

Michael Sanders, Policy Analyst

July 16, 2024

The Request

- How to solve the conflict between 9.31.050 and 9.31.055
- Policy Question on the treatment of vehicles and trailers

Conflict

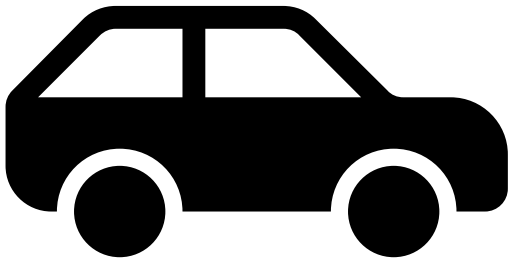
9.31.050 – Trailers must move 400 feet within 72 hours

9.31.055 – Trailers must move to a different block face within 72 hours

Recommended Language

1. The following are hereby declared to be a nuisance and detrimental to the safe and proper regulation of traffic:
    a. Any unattended vehicle or trailer stopped, standing, or parked in violation of the provisions of this Chapter;
    b. Any unattended vehicle or trailer found upon the streets or alleys of this City with faulty or defective equipment;
    c. Any vehicle or trailer left unattended upon any bridge or viaduct where such vehicle or trailer constitutes an obstruction to traffic;
    d. Any vehicle or trailer left upon a street so disabled so as to constitute an obstruction to traffic where the person or persons in charge of the vehicle or trailer are incapacitated to such an extent as to be unable to provide for its custody or removal;
    e. Any vehicle or trailer left unattended upon a street or alley and so parked illegally as to constitute a hazard or obstruction to the normal movement of traffic;
    f. Any vehicle ~~or trailer~~ left parked in a public highway or street in the same place continuously for seventy-two (72) hours and which has not been moved a minimum of four hundred (400) feet prior to returning to the same location;
    g. Any vehicle or trailer, the driver or custodian of which has been taken into custody by the Police Department under such circumstances as would leave such vehicle or trailer unattended in a public street, alley, or restricted parking area; and
    h. Any vehicle or trailer found being driven or towed on the streets not in lawful condition to be driven or towed.
    i. Any trailer parked in a public highway or street in violation of Provo City Code 9.31.055
2. A motor vehicle or trailer in the public streets in violation of this Section may be towed from the public streets at the direction of a police officer.

Treatment of Vehicles and Trailers



VS.

Parking Enforcement Recommendation

Maintain the Status Quo

- Trailers = move to a different block face
- Vehicles = move 400 feet

Comparable Cities

Salt Lake City: All vehicles move every 48 hours; trailers to a different block face

West Jordan: Recreational vehicles prohibited on streets

West Valley: 24-hour limit for recreational vehicles

St. George: 96- hours limit for all vehicles

Policy Options

Option 1	Maintain the Status Quo (while eliminating the conflict)
Option 2	Uniform 400 feet movement
Option 3	Uniform block face movement

PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: MDAYLEY
Department: Recorder
Requested Meeting Date:

SUBJECT: An ordinance reagrding parking in front of mailboxes. (24-060)

RECOMMENDATION: Draft ordinance discussion- Council motion needed for further action.

BACKGROUND: The City has received complaints from residents who cannot receive their daily mail because their mailbox is obstructed by parked vehicles. Staff has done some preliminary research and prepared a couple of options for the Council to consider, should they choose to pursue the issue.

FISCAL IMPACT: N/A

PRESENTER'S NAME: David Pyle, Council Intern

REQUESTED DURATION OF PRESENTATION: 20 minutes

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES:

CITYVIEW OR ISSUE FILE NUMBER: 24-060

9.31.010
Stopping, Standing or Parking Prohibited – No Signs Required.

It shall be unlawful to stop, stand or park a vehicle, except when necessary to avoid conflict with other traffic or in compliance with law or the directions of a police officer or traffic-control device, in any of the following places:

(1) On or over a sidewalk;

(2) In front of a public or private driveway;

(3) Within an intersection;

(4) Within fifteen (15) feet of a fire hydrant;

(5) On or over any portion of a crosswalk;

(6) Within twenty (20) feet of a crosswalk at an intersection;

(7) Within thirty (30) feet upon the approach to any flashing beacon, stop sign or traffic-control signal located at the side of a roadway;

(8) On a traffic island in the middle of a street, or in any place in the middle of a divided highway;

(9) Within fifty (50) feet of the nearest rail of a railroad crossing;

(10) Within twenty (20) feet of the driveway entrance to any fire station;

(11) Alongside or opposite any street excavation or obstruction when stopping, standing, or parking would obstruct traffic; and

(12) In a bike lane;

(13) On a public street within ten (10) feet of a mailbox. OR between the hours of 7 am and 5 pm, Monday through Friday.

The provisions of this Chapter prohibiting the standing or parking of a vehicle shall apply at all times, or at those times herein specified, or as indicated on official signs, except when it is necessary to stop a vehicle to avoid conflict with other traffic rules and regulations or in compliance with the directions of a police officer or official traffic-control device.

(Enacted 1985-62, Am 1993-34, Am 1998-40, Am 2019-41)


Mailbox Parking
I
Provo

The Issue

Complaints

Complaints from residents that mailboxes are blocked by parked cars

Most concentrated in Timpview

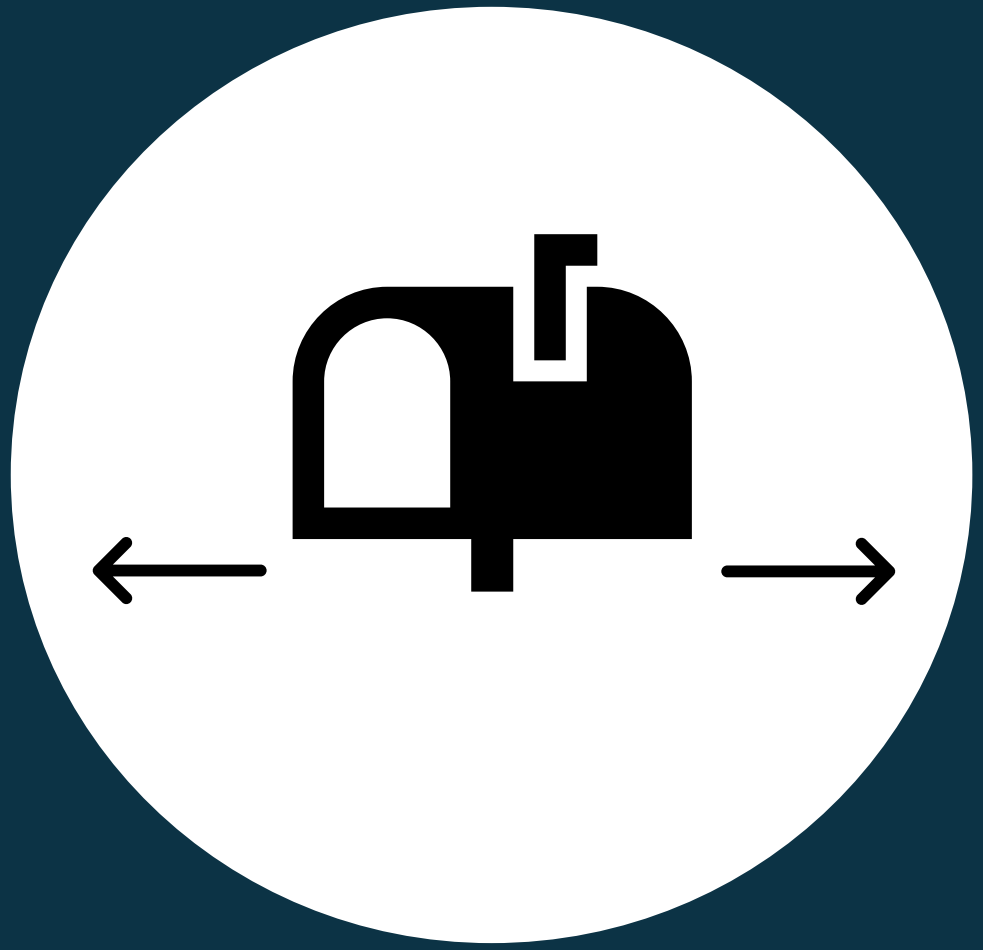
USPS won’t deliver to obstructed boxes

What Is Needed

Enough space for a mail deliverer to access a mailbox without exiting their vehicle

15 feet is the recommended standard

10 feet should be the minimum



What Other Cities are Doing

West Valley City

Within 15 feet of mailbox

8AM – 5PM

South Salt Lake

Within 10 feet of mailbox

Salt Lake

Within 10 feet of private driveway

7AM to 6PM

Recommendation

Ban 24/7

Option 1

10 Foot Clearance

Ban
Mon – Fri
7AM – 5PM

Option 2

10 Foot
Clearance

PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: MISANDERS
Department: Council
Requested Meeting Date:

SUBJECT: A discussion regarding an ordinance amending the Hillsides and Canyons Plan to include a new appendix (24-059)

RECOMMENDATION: Council Staff is seeking feedback regarding the language prior to the submittal of the ordinance to the Planning Commission.

BACKGROUND: During the December 12th Council Meeting, the Council motioned to approve the Hillsides and Canyons Plan and directed Council Staff to come back as soon as possible with proposed language in the form of a resolution stating the Council's intent and desires with regards to City-owned properties in Provo Canyon that lay outside Provo City boundaries and to include it as an appendix of the plan.

As this is considered a General Plan amendment, following approval of the language during a Work Meeting, the Planning Commission is required to provide a recommendation before a final vote can be taken by the Council.

The full plan can be found online.

FISCAL IMPACT: N/A

PRESENTER'S NAME: Michael Sanders, Policy Analyst

REQUESTED DURATION OF PRESENTATION: 20 minutes

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES:

CITYVIEW OR ISSUE FILE NUMBER: 24-059

ORDINANCE 2024-XX.

AN ORDINANCE AMENDING THE HILLSIDES AND CANYONS PLAN TO INCLUDE A NEW APPENDIX. (24-059)

RECITALS:

It is proposed that the Hillsides and Canyons Plan be amended to include a statement from the Municipal Council regarding City-owned properties outside City jurisdiction;

Provo City owns lands in Provo Canyon east of the area described in the Hillsides and Canyons Plan, which are outside the official city limits;

The Provo Municipal Council does not have direct land use authority over these parcels as they are located outside of Provo City's jurisdictional boundaries;

These City-owned properties hold significant value for the residents of Provo in regard to the conservation, recreation, and ecological health of the region;

The Hillsides and Canyons Plan seeks to address the demands associated with growth, enhance recreational use, conserve environmentally sensitive areas, and ensure the safety and enjoyment of these natural resources for future generations;

Declaring the Municipal Council's preferred future land use scenarios for these properties in the Hillsides and Canyons Plan will help guide future actions and decisions regarding their use, management, and conservation;

On _____, the Planning Commission held a duly noticed public hearing to consider the proposed amendment, and after such meeting, the Planning Commission recommended [approval/denial] to the Municipal Council by a vote of _____;

On _____, the Municipal Council met to ascertain the facts regarding this matter and receive public comment, which facts and comments are found in the public record of the Council's consideration; and

After considering the facts presented to the Municipal Council, the Council finds that (i) the Hillsides and Canyon Plan should be amended as set forth below, and (ii) such action furthers the health, safety, and general welfare of the citizens of Provo City.

THEREFORE, the Municipal Council of Provo City, Utah ordains as follows:

PART I:

The Hillsides and Canyon Plan is amended by adding the language shown in Exhibit A to the Hillsides and Canyons Plan as an exhibit.

PART II:

The Municipal Council directs Council Staff to transmit an official copy of this ordinance with its accompanying exhibit in addition to the fully updated Hillsides and Canyon Plan to Utah Department of Natural Resources, Utah Division of Forestry, Fire, and State Lands, Utah Division of Outdoor Recreation, U.S. Forrest Service, and Utah County.

PART II:

A. If a provision of this ordinance conflicts with a provision of a previously adopted ordinance, this ordinance prevails.

B. This ordinance and its various sections, clauses, and paragraphs are severable. If any part, sentence, clause, or phrase is adjudged to be unconstitutional or invalid, the remainder of the ordinance is not affected by that determination.

C. This ordinance takes effect immediately after it has been posted or published in accordance with Utah Code Section 10-3-711, presented to the Mayor in accordance with Utah Code Section 10-3b-204, and recorded in accordance with Utah Code Section 10-3-713.

D. The Municipal Council directs that the official copy of Provo City Code be updated to reflect the provisions enacted by this ordinance.

Exhibit A

The Provo Municipal Council acknowledges and recognizes the existence of City-owned parcels that are outside of Provo City limits and outside the scope of the Hillsides and Canyons Plan. A map of these and other city owned properties can be found at the Utah County Parcel Map.

We commit to working collaboratively with relevant stakeholders including neighboring jurisdictions, state and federal agencies, and local conservation groups to ensure that these properties are preserved for the public in perpetuity and are managed in a manner that reflects the guiding principles of the Hillsides and Canyons Plan, including:

1. **Conservation of Environmentally Sensitive Areas:** Prioritize the preservation and restoration of natural habitats, landforms, and ecological features.
2. **Enhancement of Recreational Opportunities:** Encourage the development and maintenance of recreational facilities that interact with the natural environment while minimizing impact.
3. **Mitigation of Hazards:** Address and manage potential natural hazards such as wildfires, seismic activity, and soil erosion to ensure public safety.

We call on the governments or agencies that hold land use authority over these properties to develop land use statements for said properties that align with the spirit of the Hillsides and Canyons Plan's principles and goals to ensure that the value of these lands is preserved for current and future generations

PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: JMCKNIGHT
Department: Public Works
Requested Meeting Date: 07-16-2024

SUBJECT: A resolution appropriating $175,000 in the Water Fund for the purchase of property and funding service line improvements applying to the fiscal year ending in June 30, 2025. (24-063)

RECOMMENDATION: Staff recommends approval of a resolution appropriating in the Water Fund $125,000 for property next to the main and gallery water reservoirs, and $50,000 for water lateral upgrades in the Quail Valley subdivision.

BACKGROUND: When Provo City was negotiating with the Church of Jesus Christ of Latter-day Saints on the reconstruction of the Provo Rock Canyon Temple the City agreed to abandon Temple Hill Drive. At the time Public Works wanted to trade the road property for property by nearby water tanks to accommodate future reconstruction of the tanks. The Church requested the items be treated separately. The City sold the portion of the road for $175,000, and would like to use $125,000 of that for the property purchase. In addition, Public Works has been working with the Quail Valley HOA to bring their water system up to City standards so that it can be transferred to the City for maintenance. The City is seeking to split the costs of improving some water laterals to homes in the HOA that were excluded from the original agreement to improve the infrastructure in the neighborhood. Public Works would like to appropriate $50,000 to contribute to the needed lateral upgrades.

FISCAL IMPACT: $175,000

PRESENTER'S NAME: Gordon Haight, Public Works Director

REQUESTED DURATION OF PRESENTATION: 10 minutes

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES:

CITYVIEW OR ISSUE FILE NUMBER: 24-063

RESOLUTION 2024-

A RESOLUTION APPROPRIATING $175,000 IN THE WATER FUND FOR THE PURCHASE OF PROPERTY AND FUNDING SERVICE LINE IMPROVEMENTS APPLYING TO THE FISCAL YEAR ENDING JUNE 30, 2025. (24-063)

RECITALS:

Provo City Public Works intended to exchange property with the Church of Jesus Christ of Latter-day Saints in conjunction with the abandonment of Temple Hill Drive in order to accommodate future reconstruction of the nearby water tanks, but was requested to separate the two property transactions;

the City received $175,000 for the abandonment of Temple Hill Drive which was deposited in the General Fund;

Provo City Public Works would like to purchase property next to the Main and Gallery water tanks in the amount of $150,000 from the Water Fund: and

Provo City Public Works would like to participate in water service line upgrades in the amount of $50,000 in the Quail Valley subdivision to bring them up to standard;

on August 6, 2024 the Municipal Council held a duly noticed public hearing to receive public comment and ascertain the facts regarding this matter, which facts and comments are found in the hearing record;

all persons for and against the proposed appropriation were given an opportunity to be heard; and

after considering the Mayor's recommendation, and facts and comments presented to the Municipal Council, the Council finds the proposed appropriation reasonably furthers the health, safety, and general welfare of the citizens of Provo City.

THEREFORE, the Municipal Council of Provo City, Utah resolves as follows:

PART I:

The Mayor is authorized to transfer $175,000 from the General Fund to the Water Fund and to appropriate the $175,000 in the Water Fund.

PART II:

This resolution takes effect immediately.

END OF RESOLUTION.

PROVO MUNICIPAL COUNCIL STAFF REPORT

Submitter: JMCKNIGHT
Department: Public Works
Requested Meeting Date: 07-16-2024

SUBJECT: A discussion regarding the proposed Provo City Water Master Plan. (24-065)

RECOMMENDATION: Recommend approval of the Water Master Plan by resolution.

BACKGROUND: Bowen Collins and Associates has compiled a new Water Master Plan that identifies deficiencies and recommended improvments in the culinary water system. This plan takes into account the adopted General Plan and its impact on the water system. When adopted the master plan becomes an appendix to the General Plan

FISCAL IMPACT: The master plan identifies needed capital improvements that will have a fiscal impact if constructed.

PRESENTER'S NAME: Gordon Haight-Public Works Director & Keith Larson-Bowen Collins and Associates

REQUESTED DURATION OF PRESENTATION: 90 minutes

COMPATIBILITY WITH GENERAL PLAN POLICIES, GOALS, AND OBJECTIVES: Planning document compatible with the General Plan and adopted neighborhood plans.

CITYVIEW OR ISSUE FILE NUMBER: 24-065

Resolution 2024-

A RESOLUTION ADOPTING A WATER MASTER PLAN. (24-065)

RECITALS:

It is proposed that the Provo City Water Mater Plan be adopted;

On July 16, 2024 and August 6, 2024, the Municipal Council met to ascertain the facts regarding this matter and receive public comment, which facts and comments are found in the public record of the Council's consideration; and

After considering the facts and comments presented to the Municipal Council, the Council finds the Provo City Water Master Plan reasonably furthers the health, safety, and general welfare of the citizens of Provo City.

THEREFORE, the Municipal Council of Provo City, Utah resolves as follows:

PART I:

The Provo City Water Master Plan is adopted as shown in Exhibit A.

PART II:

This resolution takes effect immediately.

END OF RESOLUTION

WATER MASTER PLAN

Prepared by:

BOWEN COLLINS & ASSOCIATES

Prepared for:

provo

JANUARY 2024

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PROVO CITY
WATER MASTER PLAN
EXECUTIVE SUMMARY

February 2024

Prepared for:

provo
PUBLIC WORKS
WATER RESOURCES

Prepared by:

BOWEN COLLINS
& ASSOCIATES

EXECUTIVE SUMMARY

INTRODUCTION

Provo City is expecting to see significant future growth both through development of currently undeveloped land and redevelopment and increased densification of existing properties. This Water Master Plan is an examination of water demands expected in the City and development of a plan to meet those demands and the ongoing needs of existing customers. This plan contains three components:

- **Supply and Demand Master Plan** – A projection of future water demands and an evaluation of available supplies to meet those needs.
- **Storage and Conveyance Master Plan** – An evaluation of those physical facilities needed to deliver water to customers throughout Provo City.
- **Implementation and Capital Facilities Plan** – A plan for implementing the capital facility improvements identified as part of the analysis above.

The following sections summarize the results for each of these components of the Water Master Plan.

SUPPLY AND DEMAND MASTER PLAN

State law requires that municipal water sources legally and physically meet water demands under two separate conditions. First, source capacity must be adequate to provide one year's supply of water, the average annual production requirement. Second, source capacity must be adequate to meet peak day production requirements.

Annual Supply and Demand

Projected Provo City annual demands and the needed supplies to meet these demands are shown in Figures ES-1 and ES-2. Demands in these figures are based on projected City growth and include conservation in accordance with the State of Utah's current conservation goal. Supplies are based on the projected reliable yield of existing and future City sources. Figure ES-1 shows projected supply in average year conditions. Figure ES-2 shows the same information during dry year conditions. Included in both figures is a recommended supply planning scenario. This scenario includes projected demands with an additional amount of supply redundancy to provide the City with protection against future risk including source failure, contamination, climate change, etc.

From these figures and other analysis contained in this report, major conclusions regarding Provo City annual supply and demand include the following:

1. **Declining Groundwater Levels** – Existing City supplies have historically been inadequate to meet projected demands in dry years. In the past, this deficiency has been eliminated through conservation by residents and by pumping wells above the currently estimated sustainable yield of the aquifer. While using extra groundwater has allowed the City to avoid any water shortfalls in the past, groundwater table levels in the aquifer below the City are showing decline and continuing to pump at elevated levels is not sustainable. The estimated dry year deficit in recent years has been about 4,000 acre-ft/year.
2. **Managed Aquifer Recharge –** Satisfying the identified dry year deficit can be met through Managed Aquifer Recharge (MAR). Overall, the City has surface water rights equal to about 35,000 acre-ft in average years and 16,300 acre-ft in years equal to the 25-year drought event that can be used for future supply. With the construction of a new treatment plant and other

MAR facilities, this is adequate water to meet all the City's projected long-term needs. In average years, the surface water is adequate to satisfy projected demands directly. In dry years, additional volume will be acquired by pulling water stored in the aquifer from previous years.

3. **Well Capacity –** Only about 9,000 acre-ft of water treated and put into the City's aquifer through MAR can currently be recovered through existing wells. Approximately 9,000 gpm of new well capacity will be needed to access the remaining water.

Peak Day Supply and Demand

Projected Provo City peak day demands and the needed supplies to meet these demands are shown in Figure ES-3. From this figure and other analysis contained in this report, major conclusions regarding Provo City peak day supply and demand include the following:

1. **Existing Production Capacity –** The City has adequate peak production capacity from its existing sources to meet existing peak demand needs.
2. **Needed Additional Well Capacity –** At 2065, the City has a projected peak day deficiency of about 9,000 gpm. This can likely be addressed through the construction of additional UMPA wells. For planning purposes, it has been assumed that this capacity will be added in 3,000 gpm increments approximately every 10 years (2028, 2040, and 2052). Size and timing of actual new wells may vary as long as capacity stays ahead of demand.
3. **MAR Treatment Plant Capacity –** Construction of the new treatment plant will obviously add a significant amount of redundant production capacity. However, since the City's redundancy criteria requires adequate capacity to meet demands even when the plant is out of service, this capacity should not be used to address the deficiency.

Figure ES-1
Annual Projection Production Requirement with Aggressive Growth (Average Year)

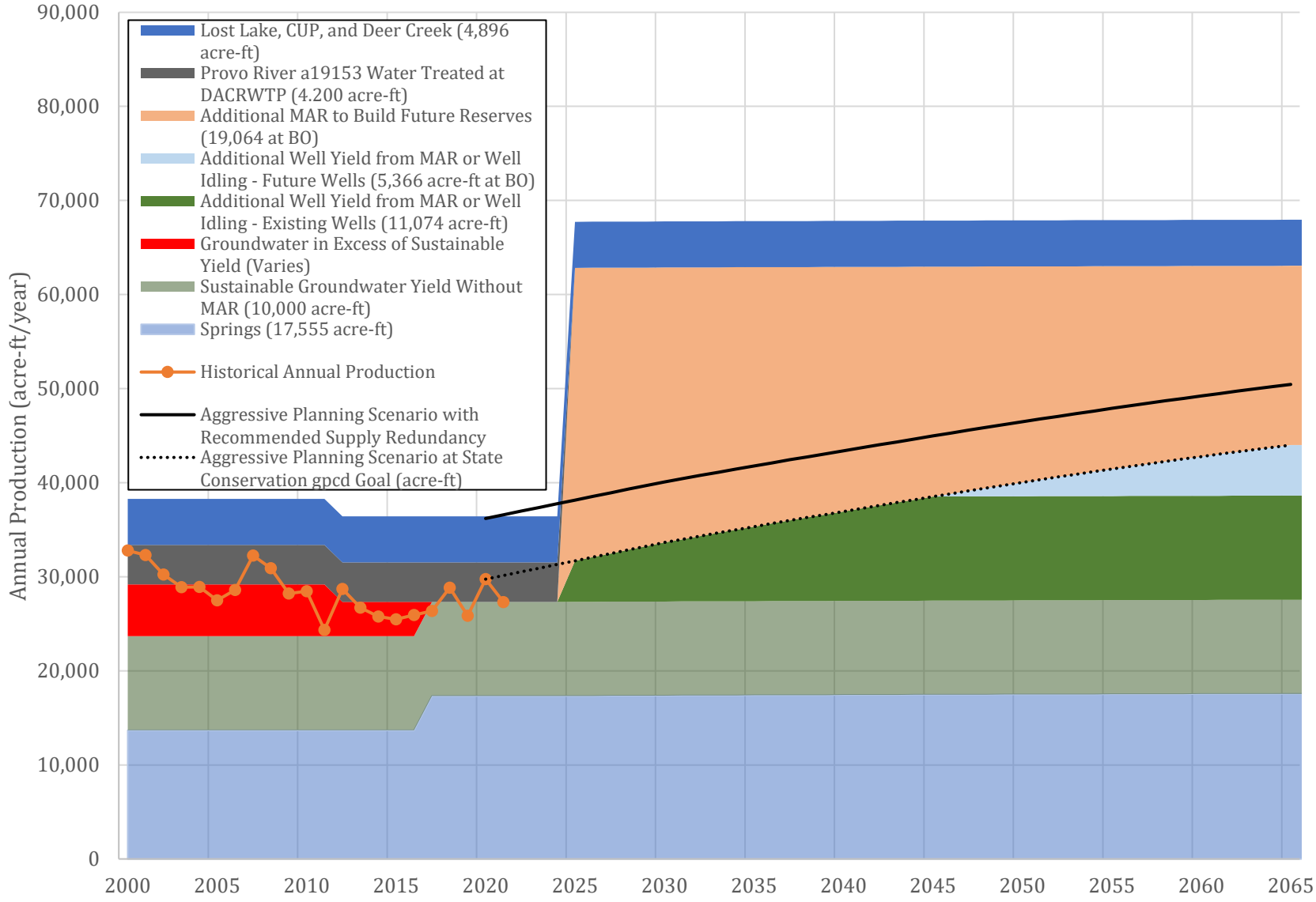


Figure ES-2
Annual Projection Production Requirement with Aggressive Growth
(25-Year Drought)

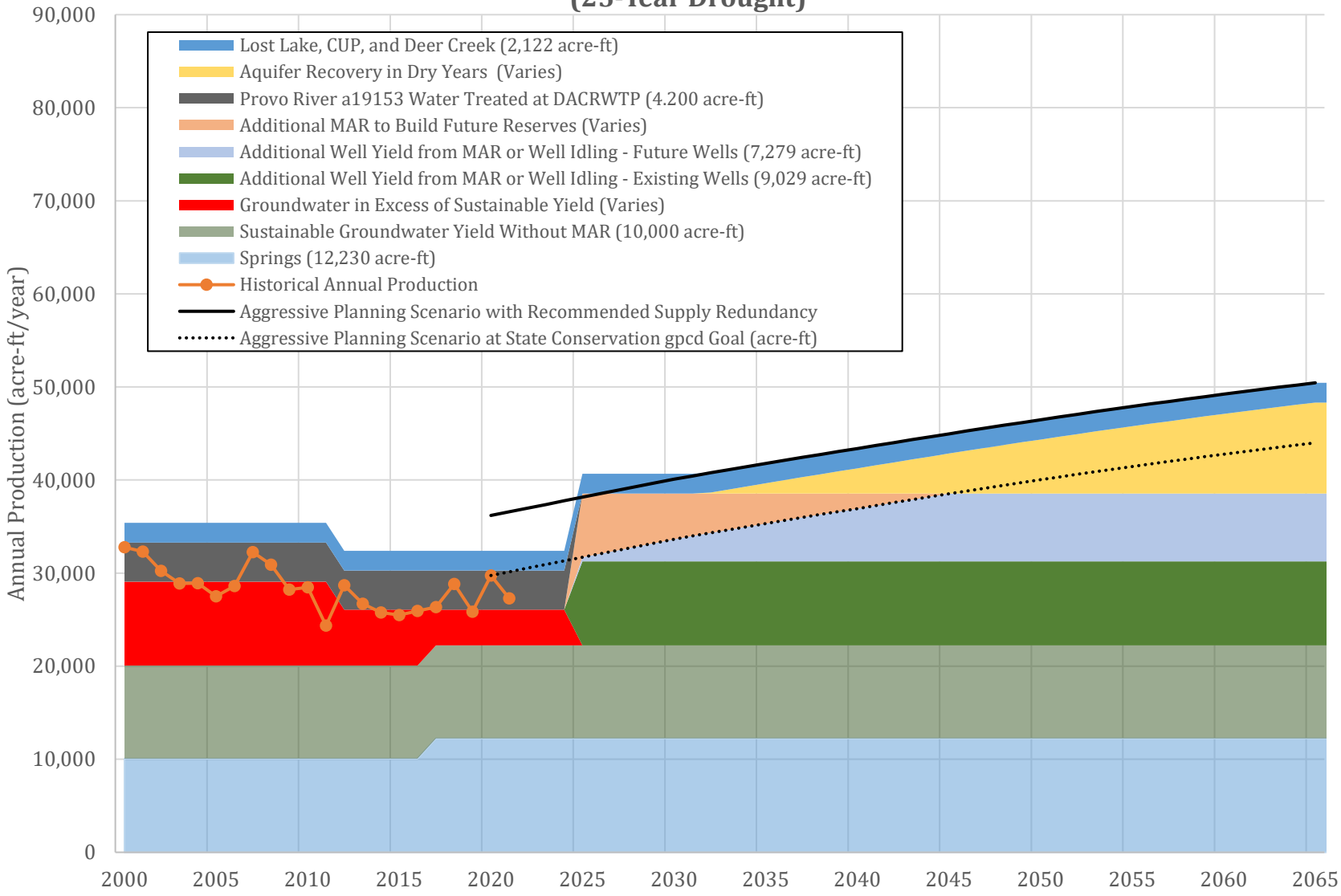
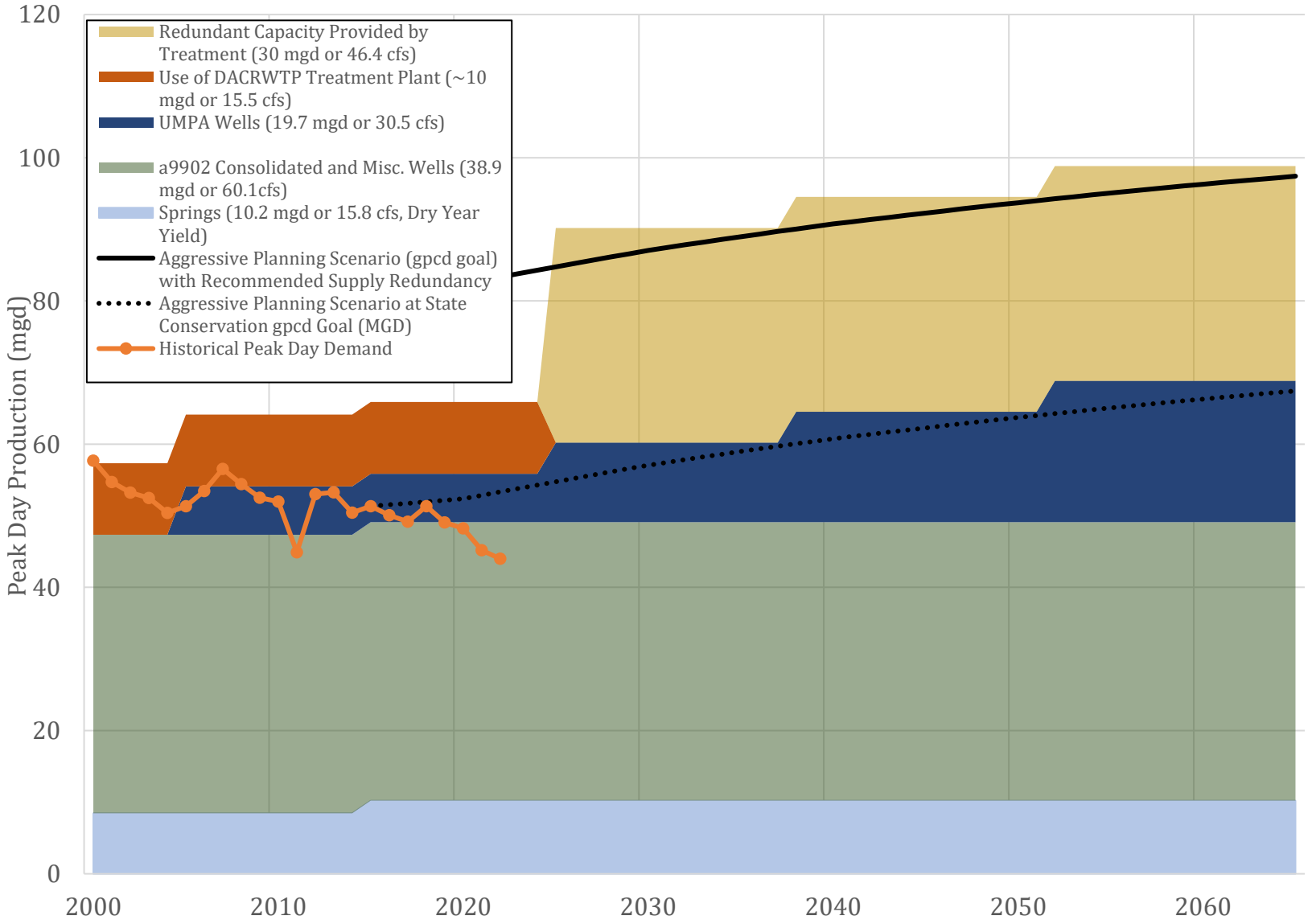


Figure ES-3
Projected Peak Day Production Requirements vs Source Capacity (25-Year Drought)



Supply Recommendations

Based on this analysis, the following major actions are recommended:

1. **Pursue MAR Using Existing Surface Water Resources** – An essential part of the City's future supply plan is the development of a viable MAR program. Essential components of this program will be constructing new MAR facilities for 6.5 mgd of raw water infiltration capacity and 30 mgd of new treatment plant capacity.
2. **Solidify 10,000 Acre-ft Jordanelle Storage** – Storage from Jordanelle is not shown as adding to volume in the supply analysis figures. This is because it does not add to the City's volume of supply. However, having access to the full 10,000 acre-ft of storage in Jordanelle Reservoir is essential to the City's ability to fully utilize its surface water rights. This is especially critical in dry years.
3. **Continue Development of UMPA Wells** – To utilize the City's ground water rights and meet peak demands, additional wells will be needed. Correspondingly, it is recommended that the City continue to develop its UMPA well capacity. Approximately 3,000 gpm of additional capacity is needed every 10 years up to a total of 9,000 gpm.
4. **Conservation** – Conservation is an essential part of the City's long-term water supply plan. While the City has done an excellent job of reducing demands through conservation over the last 18 years, additional efforts will be required to sustain and expand these savings moving forward. The City must continue to focus and invest in conservation to meet its goals.
5. **Water Rights** – Provo City has sufficient volume under existing water rights to meet production requirements through 2065 with conservation. Therefore, it is not necessary for the City to aggressively pursue any new water rights beyond those identified here. With this said, it should also be noted that all the water rights currently held by the City are an essential part of meeting long-term demands. Thus, the City does need to be aggressive in protecting its existing rights and securing their continued use for the purposes identified here.

STORAGE AND CONVEYANCE MASTER PLAN

Planning for the City's storage and conveyance needs is complicated by the fact that it is expected to face challenges in the following areas:

- **Growth –** While some areas of the City are fully developed, there is still major potential for growth in other areas, both in the form of new development and increased density through redevelopment. The City currently has significant pressure to expand development to new areas on the west side of the City. The City's general plan also calls for increased development densities in the historic downtown area, areas near the BYU campus, and other target areas of the City.
- **Aging Infrastructure** – Much of the City's infrastructure was built in the 1950s and 60s and is nearing the end of its useful life. As part of this master plan, a rehabilitation and replacement plan for its existing storage facilities and pipelines was developed to ensure system renewal is adequately funded, and aging infrastructure issues are addressed.

Existing and 2065 Storage Evaluations

After determining future water demands, a storage and conveyance evaluation was performed. Tables ES-1 and ES-2 show the City's water storage needs for existing and future conditions. This includes storage needs for equalization (daily fluctuations in demand), emergency (reserve storage for unforeseen events), and firefighting purposes. For the purpose of this storage analysis, individual

pressure zones have all been grouped into areas of common storage. The tables include a summary of the storage evaluation for each storage zone itself and a summary of the storage evaluation when available excess storage from higher pressure zones is considered.

Based on the tables above, the following conclusions can be made regarding storage needs in the Provo City water distribution system:

- **Total Storage -** Overall, the City has enough storage to meet its future needs (the City has 42 MG of storage and is projected to need 40.7 MG at buildout).
- **Storage in Individual Zones –** When considering individual zones, there are deficits in Zones 27, 34, and 17:
    - **Zone 27 (Rock Canyon) –** The Rock Canyon Tank is at the top of the system and does not have access to any upstream storage. It is recommended that 1 MG of additional storage be constructed at the Rock Canyon storage reservoir.
    - **Zone 34 (Main) –** There is an existing shortfall of 2 MG and a buildout shortfall of 5 MG in Zone 34 (Main). However, with the consideration of surplus upstream storage, no deficit exists. Correspondingly, no specific project has been identified for increased storage at this location. However, when tanks in this zone are eventually rebuilt, up to 5 MG of additional storage should be considered.
    - **Zone 17 (West) –** Under buildout conditions there is a shortage of approximately 1.3 MG within this zone. However, using surplus storage in the Slate Canyon Reservoir eliminates the deficit and no project has been identified for increased storage at this location.

Storage Condition Assessment

As part of this master plan, field inspections were conducted for several storage tanks. Although the inspections were limited to exterior observations only, a useful amount of information was able to be gathered and Table E-3 summarizes condition assessment results. Table E-4 shows the recommended improvement projects based on both capacity needs and field inspections.

Table ES-1
Existing Culinary Storage Facilities Evaluation

Zone	Name	Total Peak Day Demand (gpm) in Zone	Equalization/ Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Storage Requirement (gallons)	Available Storage (Million Gallons)	Equalization Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) Total (gallons)
23	Sherwood	94	67,640	240,000	307,640	0.5	466,180	192,360	192,360
18	Northeast	2,044	1,471,360	240,000	1,711,360	5.0	4,264,320	3,288,640	3,481,000
27	Rock Canyon	1,225	882,178	240,000	1,122,178	0.5	58,911	-622,178	-622,178
13	Intermediate	6,146	4,425,138	1,440,000	5,865,138	8.0	5,787,431	2,134,862	4,993,684
25	Southeast	386	277,584	240,000	517,584	2.0	1,861,208	1,482,416	1,482,416
34	Main	16,063	11,565,603	1,440,000	13,005,603	11.0	5,217,198	-2,005,603	4,470,496
24	Slate	2,864	2,062,381	240,000	2,302,381	5.0	3,968,810	2,697,619	7,168,115
17	West	8,548	6,154,803	720,000	6,874,803	10.0	6,922,599	3,125,197	10,293,313
Total		**37,370**	**26,906,687**	**4,800,000**	**31,706,687**	**42.0**	**28,546,656**	**10,293,313**	

Table ES-2
Buildout Culinary Storage Facilities Evaluation

Zone	Name	Total Peak Day Demand (gpm) in Zone	Equalization / Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Storage Requirement (gallons)	Available Storage (Million Gallons)	Equalization Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) Total (gallons)
23	Sherwood	214	154,040	240,000	394,040	0.5	422,980	105,960	105,960
18	Northeast	2,269	1,633,362	240,000	1,873,362	5.0	4,183,319	3,126,638	3,232,598
27	Rock Canyon	1,429	1,028,786	240,000	1,268,786	0.5	-14,393	-768,786	-768,786
13	Intermediate	7,671	5,523,005	1,440,000	6,963,005	8.0	5,238,497	1,036,995	3,500,806
25	Southeast	524	377,353	240,000	617,353	2.0	1,811,324	1,382,647	1,382,647
34	Main	19,803	14,258,192	1,440,000	15,698,192	11.0	3,870,904	-4,698,192	185,261
24	Slate	3,284	2,364,232	240,000	2,604,232	5.0	3,817,884	2,395,768	2,581,029
17	West	14,699	10,583,279	720,000	11,303,279	10.0	4,708,361	-1,303,279	1,277,751
Total		**49,892**	**35,922,249**	**4,800,000**	**40,722,249**	**42.0**	**24,038,875**	**1,277,751**	

Table ES-3
Culinary Storage Facility Observation Summary

Tank Inspected	Age (years)	Storage Capacity (MG)	ERU's Served	Seismic Risk	Condition Rating	Field Observation Notes
North Intermediate	40	5	551	Moderate	Very Good	• Minimal coverage • Good drainage • No evidence of problems • The metals are galvanized and likely rotted out
Sherwood Hills	44	0.5	337	Low	Good	• Only 60 -70s homes served • Metals are corroded • Outlet mechanical is in poor condition • Outlet vault without ventilation • Little cover (6-12 inches)
Northeast	~40	5	3,574	Moderate	Good	• Drainage challenges • Minimal cover – spalling, especially on west edge • Exposed prestressed anchors • Seismic concerns - roof not connected to wall
Intermediate	55	3	12,084	Moderate	Very Good	• Steel - inside last painted in 2008 • Outside is A588 steel (natural) • Seismic concerns – not anchored at foundation • Tank shell in good condition
Rock Canyon	57	0.5	2,251	Moderate	Good	• Exposed roof with cracks • Corroded metals • Spalling at entryway • Good drainage
Gallery	94	5	14,467	High	Fair	• Seismic concerns - roof not connected to wall • Surrounded by trees but no roots noticed
Main	68	6	17,360	High	Fair	• Welded Steel – inside last painted in 2006 • Concrete floor • Thickness of concrete was recently tested and is okay
Slate Canyon	55	5	4,543	High	Poor	• Double T design likely has problems with connections • Drainage issues - significant bird baths • Prestressed top is only a cap (3-inches thick) • Dangerous ladder for interior access
Southeast	28	2	826	Moderate	Good	• Concrete is in good condition • Minimal surface corrosion inside vault • Thin cover but okay - minor drainage issues

Table ES-4
Recommended Culinary Storage Facility Improvements

Project No.	Storage Facility	Additional Volume (MG)	Improvement	Approximate Year of Construction	Construction Cost	Total Facility Cost
S-1a	North Intermediate (concrete)	-	Replacement of miscellaneous metals	2026	$100,000	$105,000
S-1b			Plan interior inspection	2025	$5,000	
S-2a	Sherwood Hills (concrete)	-	Replacement of miscellaneous metals	2024	$60,000	$130,000
S-2b			Outlet vault improvements including new ventilation	2024	$50,000	
S-2c			Reroute trail around top of tank and regrade	2024	$15,000	
S-2d			Plan interior inspection	2025	$5,000	
S-3a	Northeast (concrete)	-	Regrade to improve drainage	2028	$15,000	$155,000
S-3b			Repair spalling along west edge	2028	$80,000	
S-3c			Pin lid to the wall for seismic protection	2028	$50,000	
S-3d			Plan interior inspection and seismic evaluation	2025	$10,000	
S-4a	Intermediate (steel)	-	Repaint interior	2030	$845,000	$1,010,000
S-4b			Install magnesium anode for corrosion resistance	2030	$50,000	
S-4c			Replace stringers/other misc. metals inside tank	2030	$100,000	
S-4d			Plan interior inspection and seismic evaluation	2025	$15,000	
S-5a	Rock Canyon (concrete)	1	Replace with 1.5 MG tank to provide additional volume	2027	$4,000,000	$4,000,000
S-6a	Gallery (concrete)	-	Roof rehab for leakage and freeze thaw	2026	$15,000	$530,000
S-6b			Seismic protection	2026	$500,000	
S-6c			Plan interior inspection & seismic evaluation	2025	$15,000	
S-7a	Main (steel)	-	Repaint interior	2032	$1,555,000	$2,510,000
S-7b			Repaint exterior	2031	$940,000	
S-7c			Plan interior inspection and seismic evaluation	2025	$15,000	
S-8a	Slate Canyon (concrete)	-	Inspect Double T design and plan interior inspection	2025	$5,000	$10,006,000
S-8b			Replace access ladder to tank interior	2025	$1,000	
S-8c			Expected tank replacement	2033	$10,000,000	
S-9a	Southeast (concrete)	-	Inspect and monitor surface corrosion inside vault	2033	$15,000	$20,000
S-9b			Plan interior inspection	2025	$5,000	
Total Cost						**$18,466,000**

Distribution System Evaluation

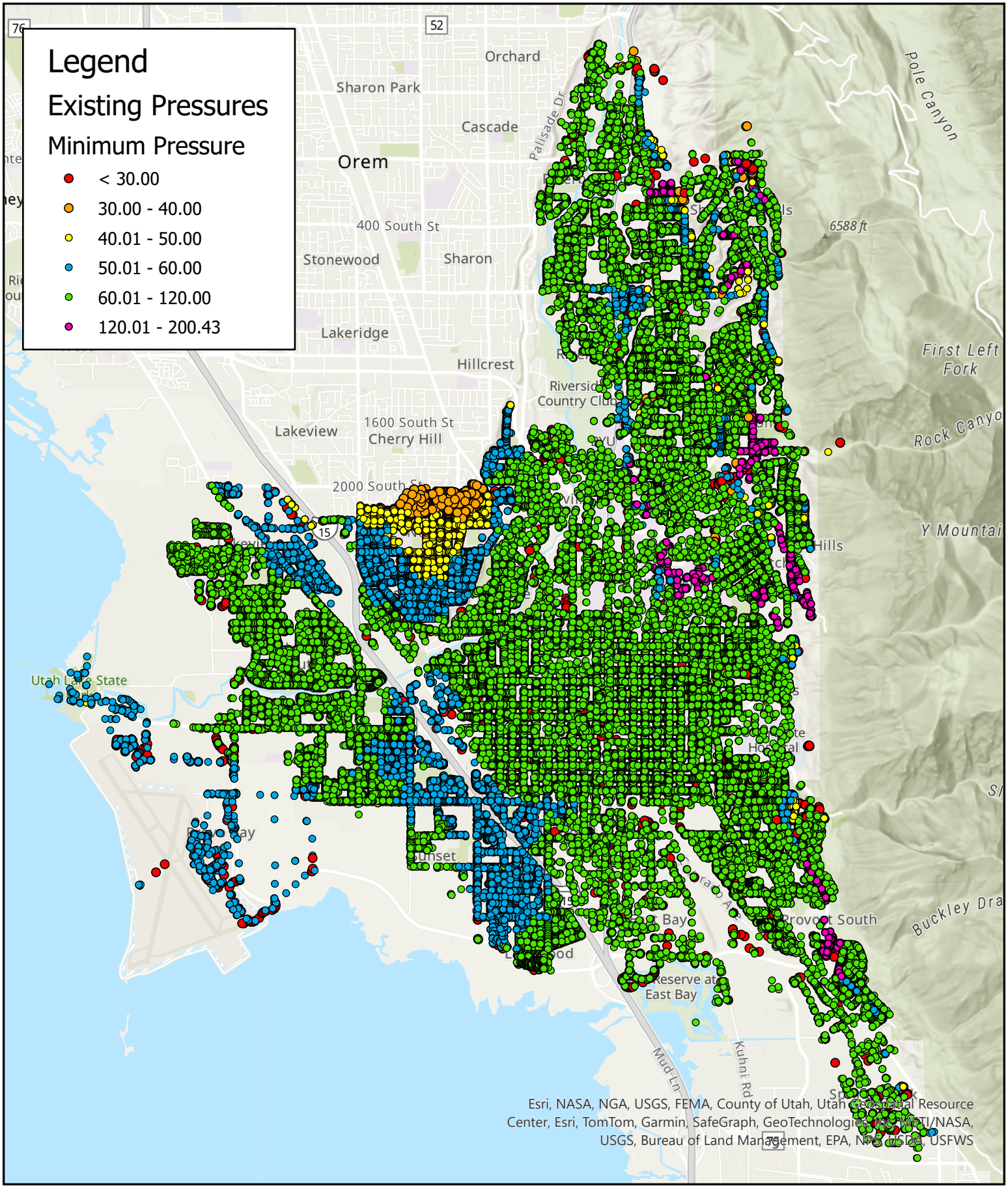
A computer based hydraulic model of the City's water distribution system was assembled and calibrated. Modeling scenarios were assembled for existing, 10-year, and buildout demands and included consideration of both wet year and dry year supply conditions. Model results without improvements are shown in Figures ES-4 (existing minimum pressures), ES-5 (existing fire flows), and ES-6 (buildout minimum pressures).

Major observations from the figures include:

- **Existing System Pressures –** The City distribution system generally performs very well under existing demands. Minimum pressures within the City are nearly all within the ideal range of pressure established by operations personnel. The exceptions include a few isolated areas in the foothills of the City where pressures are slightly higher than ideal. These are areas where there is significant change in elevation over a short distance and pressures cannot be kept within the target range without an excessive number of pressure zones. No changes are recommended in association with these areas at this time. There is also an existing area of low pressure in the vicinity of the Grandview Area. The area meets State of Utah pressure requirements but falls below the City's ideal system pressure.
- **Future System Pressures –** As can be seen in the figure, the existing distribution system is not sufficiently sized to meet the projected growth in demand at buildout. While some upper zones (where little growth is expected) are just fine, the Main and West Pressure Zones, are showing significant and widespread pressure problems. Additional capacity is needed to convey water to areas of projected future demand.
- **Fire Flows –** The vast majority of the City distribution system has adequate fire flow capacity to meet projected needs. There are a few isolated areas that do not meet fire flow requirements. Nearly all the areas of fire flow deficiencies appear to be the result of dead end connections, 4-inch pipes or are at the top of a pressure zone. Improvements should be implemented to increase fire flows at these locations.

Distribution Conveyance Improvements

Improvements for correcting the identified deficiencies under projected future conditions were identified. The projects have been separated into three groups depending on the expected timing of the project: 0-5 year, 5-10 year, or greater than 10 year. Figure ES-7 shows the location and size of the improvements. Table ES-5 shows timing and cost estimates for each distribution improvement project.



BOWEN COLLINS & ASSOCIATES

Existing Demand Minimum Pressures

Provo City

Water Master Plan Update

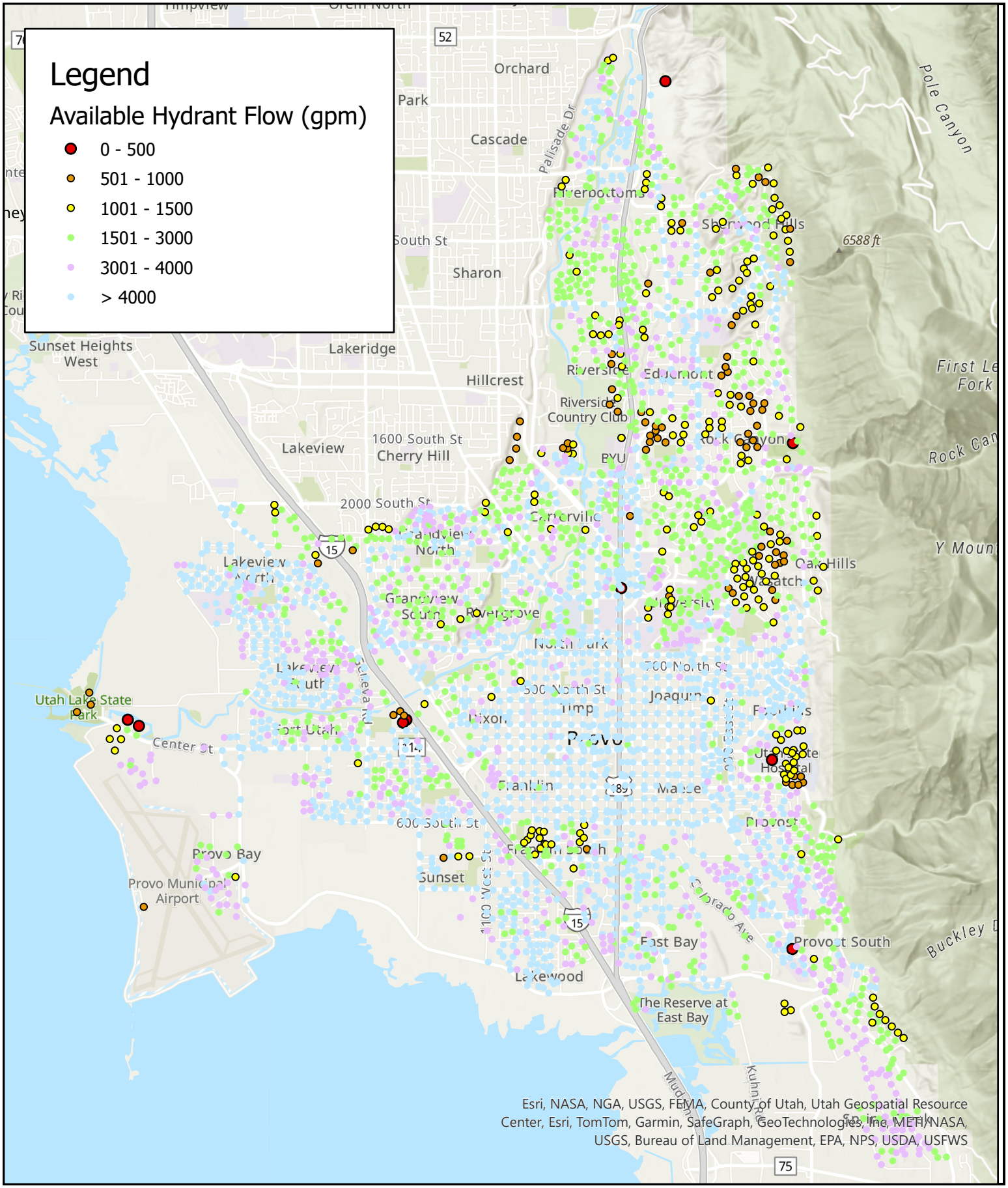
NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO.

ES-4

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Executive Summary Figures.aprx aharris 4/4/2024



BOWEN COLLINS & ASSOCIATES

Existing Fire Flow Results

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO.

ES-5

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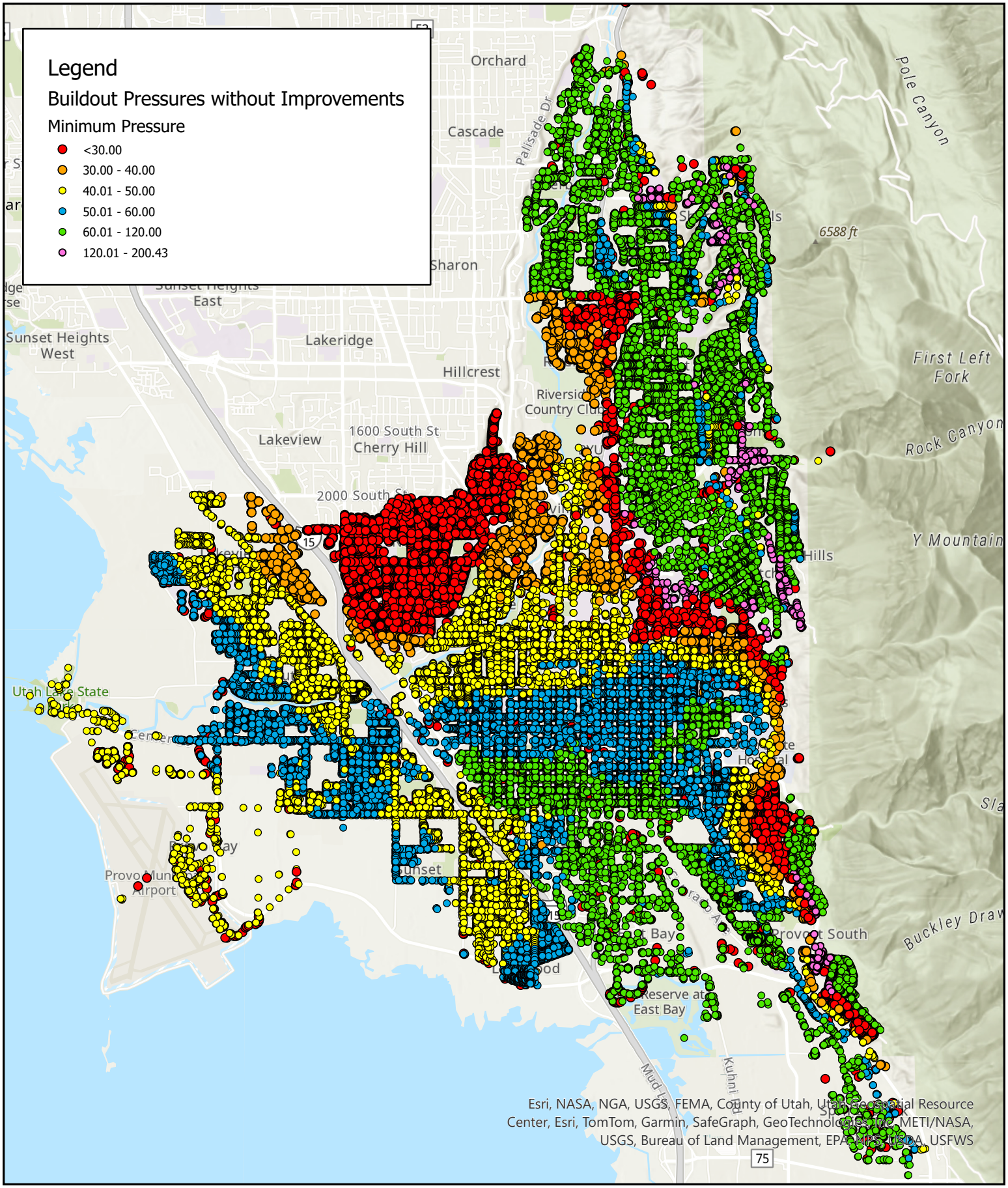

BOWEN COLLINS & ASSOCIATES

Buildout Demand Minimum Pressures Without Recommended Improvements

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. ES-6

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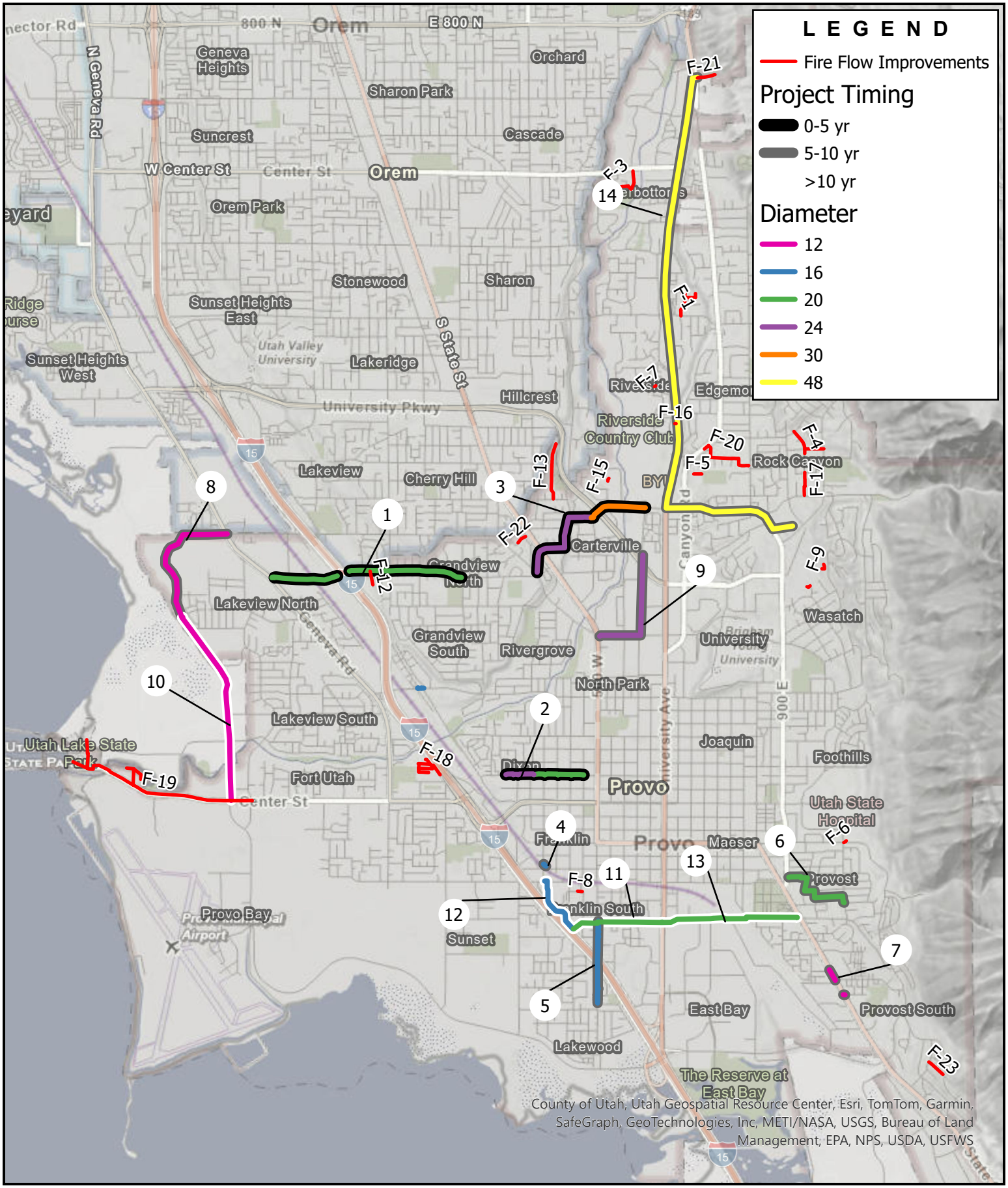


BOWEN COLLINS & ASSOCIATES

Improvement Projects

Provo City

Provo City Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. ES-7

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Executive Summary Figures.aprx aharris 4/4/2024

Table ES-5
Distribution System Improvements

Project No.	Construction Timeframe	Description	Project Cost
Distribution Improvements			
P1	0 – 5	1730 N. Freeway Crossing	$8,000,000
P2	0 – 5	200 N. Upgrade	$1,517,000
P3	0 – 5	Treatment Plant to Grand View	$6,952,000
P4	0 – 5	PRV From Main Zone to West Zone	$414,000
P15a	0 – 5	Oversizing of Distribution Mains for Future Growth	$344,000
P5	5 – 10	600 West Upsize	$1,018,000
P6	5 – 10	Parallel 20" to Slate Canyon Tank	$1,551,000
P7	5 – 10	State Street 12" Connections	$264,000
P8	5 – 10	12" Northwest System Connection	$815,000
P15b	5 – 10	Oversizing of Distribution Mains for Future Growth	$344,000
Varies	5 – 10	High Priority Fire Flow Projects	
P9	>10	Redundant 30" to Grand View	$3,145,000
P10	>10	Lakeview Parkway 12" Connection	$2,820,000
P11	>10	900 S. 20" East to West Connection	$2,536,000
P12	>10	16" Stubbs Avenue	$1,024,000
P13	>10	900 S. Parallel 20" Crossing	$2,592,000
P14	>10	48" Redundant Pipeline	$27,309,000
P15c	>10	Oversizing of Distribution Mains for Future Growth	$687,000
Varies	>10	Medium and Low Priority Fire Flow Projects	
0-5 Yr Total			**$17,227,000**
5-10 Yr Total			**$3,992,000**
> 10 Yr Total			**$40,113,000**
TOTAL of All Improvements			**$61,332,000**

IMPLEMENTATION AND CAPITAL FACILITIES PLAN

The purpose of the last part of this water master plan is to provide an implementation plan for all the recommended water improvements over the next ten years. This includes specific projects as identified previously along with general rehabilitation and replacement needs.

Rehabilitation and Replacement

It is critical that all capital facility plans include budget for addressing rehabilitation or replacement of existing facilities due to age or condition related concerns. The recommended rehabilitation and replacement investment needed to sustainably maintain the City's water system was examined and compared to the recommended improvements listed previously. This was done by considering the cost of replacement for facilities in the system and then dividing them by their expected service life as summarized in Table ES-6 in 2024 dollars.

Table ES-6
Recommended Total Budget to Sustainably Maintain the Water System

System Component	Replacement Value	Service Life (years)	Annual Investment Range	
Source	$71,000,000	60 - 100	$1,104,167	$840,000
Storage	$93,000,000	80 - 100	$1,162,500	$930,000
Pump Stations	$16,500,000	40 - 50	$412,500	$330,000
Conveyance	$929,000,000	60 - 80	$15,483,333	$11,612,500
Total	**$1,109,500,000**		**$18,162,500**	**$13,712,500**

As summarized in the table, the recommended capital budget needed to sustainably maintain the City's water system facilities is between $14 million and $18 million per year. Even at the lower end of this range, this represents a significant increase over historic system funding in the City. City investment over the last several years has been approximately $6 million per year.

This large increase in recommended funding is a function of the massive amount of construction inflation observed over the last few years. Because much of the City's infrastructure is still in relatively good condition, it may be acceptable to transition rehabilitation and replacement funding to these higher levels over a period of time. However, if the system is not funded near these levels in the relatively near future, system degradation will begin to occur and the City will not be able to maintain the level of service it has historically provided its residents.

It is recommended that the City gradually increase its capital budget over the next several years until it reaches the sustainable level of funding. The implementation plan presented here assumes that the City will linearly increase its funding until it reaches the lower end of the recommended level of funding at the end of the 10-year planning window.

Recommended 10-Year Capital Improvement Program

After prioritizing the recommended improvements to the City's water system (source production, storage, distribution, etc.), Table ES-7 and Figure ES-8 were created to show the improvement projects that are recommended within the next 10-years, the budget required to complete those projects, and the recommended timing of those projects.

Table ES-7
Recommended 10-Year Capital Improvement Plan

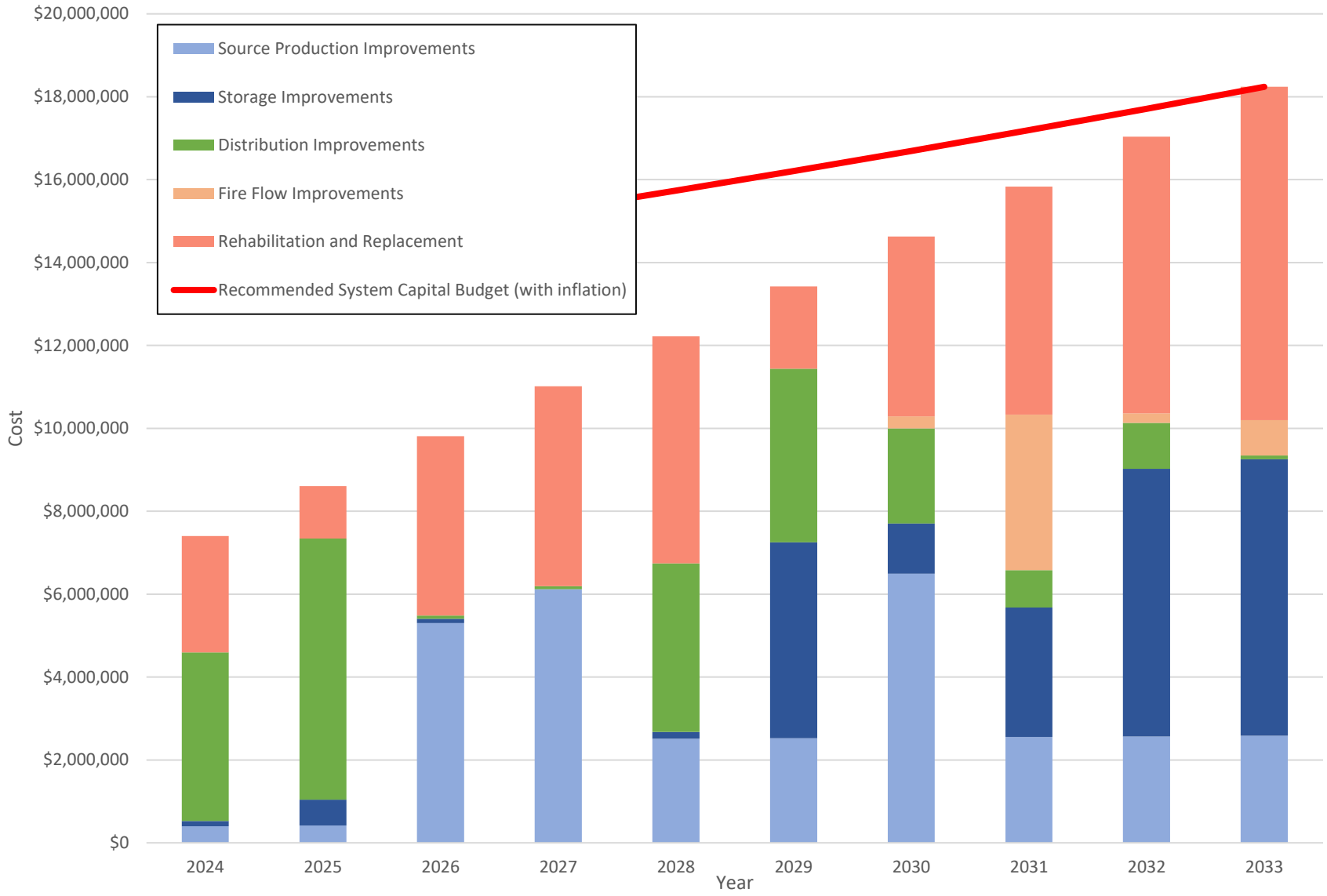
Project ID	Project Description	Project Total (2024 $s)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-yr Total
Source Production Improvements													
WS-1	Raw Water Infiltration Facilities	$4,000,000	$400,000	$420,000	$432,600	$445,578	$458,945	$472,714	$486,895	$501,502	$516,547	$532,043	$4,666,825
WS-2	MAR Treatment Facility	$37,000,000				$2,050,367	$2,050,367	$2,050,367	$2,050,367	$2,050,367	$2,050,367	$2,050,367	$14,352,567
WS-3	Treated Water Infiltration Facilities	$6,500,000				$3,620,321			$3,956,023				$7,576,344
WS-4	Additional Well 1	$4,500,000			$4,866,750								$4,866,750
Subtotal		***$52,000,000***	***$400,000***	***$420,000***	***$5,299,350***	***$6,116,266***	***$2,509,312***	***$2,523,080***	***$6,493,285***	***$2,551,869***	***$2,566,914***	***$2,582,410***	***$31,462,485***
Storage Improvements													
S-1a	North Intermediate - Replacement of miscellaneous metals	$100,000			$108,150								$108,150
S-1b	North Intermediate - Plan interior inspection	$5,000		$5,250									$5,250
S-2a	Sherwood Hills - Replacement of miscellaneous metals	$60,000	$60,000										$60,000
S-2b	Sherwood Hills - Outlet vault improvements including new ventilation	$50,000	$50,000										$50,000
S-2c	Sherwood Hills - Reroute trail around top of tank and regrade	$15,000	$15,000										$15,000
S-2d	Sherwood Hills - Plan interior inspection	$5,000		$5,250									$5,250
S-3a	Northeast - Regrade to improve drainage	$15,000					$17,210						$17,210
S-3b	Northeast - Repair spalling along west edge	$80,000					$91,789						$91,789
S-3c	Northeast - Pin lid to the wall for seismic protection	$50,000					$57,368						$57,368
S-3d	Northeast - Plan interior inspection and seismic evaluation	$10,000		$10,500									$10,500
S-4a	Intermediate - Repaint interior	$845,000							$1,028,566				$1,028,566
S-4b	Intermediate - Install magnesium anode for corrosion resistance	$50,000							$60,862				$60,862
S-4c	Intermediate - Replace stringers/other misc. metals inside tank	$100,000							$121,724				$121,724

Project ID	Project Description	Project Total (2024 $s)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-yr Total
S-4d	Intermediate - Plan interior inspection and seismic evaluation	$15,000		$15,750									$15,750
S-5a	Rock Canyon - Replace with 1.5 MG tank to provide additional volume	$4,000,000						$4,727,137					$4,727,137
S-6a	Gallery - Roof rehab for leakage and freeze thaw	$15,000		$15,750									$15,750
S-6b	Gallery - Seismic protection	$500,000		$525,000									$525,000
S-6c	Gallery - Plan interior inspection & seismic evaluation	$15,000		$15,750									$15,750
S-7a	Main - Repaint interior	$1,555,000								$1,949,589			$1,949,589
S-7b	Main - Repaint exterior	$940,000								$1,178,530			$1,178,530
S-7c	Main - Plan interior inspection and seismic evaluation	$15,000		$15,750									$15,750
S-8a	Slate Canyon - Inspect Double T design and plan interior inspection	$5,000		$5,250									$5,250
S-8b	Slate Canyon - Replace access ladder to tank interior	$1,000		$1,050									$1,050
S-8c	Slate Canyon - Plan replacement	$10,000,000									$6,456,838	$6,650,543	$13,107,381
S-9a	Southeast - Inspect and monitor surface corrosion inside vault	$15,000										$19,952	$19,952
S-9b	Southeast - Plan interior inspection	$5,000		$5,250									$5,250
Subtotal		***$18,466,000***	***$125,000***	***$620,550***	***$108,150***	***$0***	***$166,368***	***$4,727,137***	***$1,211,152***	***$3,128,119***	***$6,456,838***	***$6,670,495***	***$23,213,807***
Distribution Improvements													
P1	1730 N. Freeway Crossing	$8,000,000	$4,000,000	$4,200,000									$8,200,000
P2	200 N. Upgrade	$1,517,000		$1,592,850									$1,592,850
P3	Treatment Plant to Grand View	$6,952,000					$3,988,235	$4,107,882					$8,096,117
P4	PRV From Main Zone to West Zone	$414,000		$434,700									$434,700
P15a	Oversizing of Distribution Mains for Future Growth	$344,000	$68,800	$72,240	$74,407	$76,639	$78,939						$371,025
P5	600 West Upsize	$1,018,000									$1,018,000		$1,018,000
P6	Parallel 20" to Slate Canyon Tank	$1,551,000							$1,887,936				$1,887,936
P7	State Street 12" Connections	$264,000							$321,351				$321,351

Project ID	Project Description	Project Total (2024 $s)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-yr Total
P8	12" Northwest System Connection	$815,000								$815,000			$815,000
P15b	Oversizing of Distribution Mains for Future Growth	$344,000						$81,307	$83,746	$86,258	$88,846	$91,511	$431,669
Subtotal		***$21,219,000***	***$5,585,800***	***$4,706,940***	***$74,407***	***$76,639***	***$4,067,174***	***$4,189,189***	***$2,293,033***	***$901,258***	***$1,106,846***	***$91,511***	***$23,168,647***
Fire Flow Improvements													
FF-6	50ft of 8" pipe and PRV to connect Zone 24 to 34 near 300 South roundabout.	$112,000							$136,331				$136,331
FF-12	500 ft of 8" pipe from 2200 N. south along 2300 W.	$129,000							$157,024				$157,024
FF-13	2,050 ft of 8" pipe from 2300 N. running north along 850 W.	$527,000								$660,729			$660,729
FF-18	2,500 ft of 8" pipe within KOA campground to replace 4" pipes.	$642,000										$853,930	$853,930
FF-19	6,000 ft of 12" and 3,600 ft of 8" from Center St. and 3110 W. west to boat harbor and campground. 8" pipe is within campground and boat harbor.	$2,464,000								$3,089,252			$3,089,252
FF-21	700 ft of 8" pipe near intersection of Canyon Rd and University Ave. east.	$180,000									$232,446		$232,446
Subtotal		***$4,054,000***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$293,354***	***$3,749,981***	***$232,446***	***$853,930***	***$5,129,711***
Rehabilitation and Replacement Improvements													
	Source Rehabilitation and Replacement	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Storage Rehabilitation and Replacement	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Pump Station Rehabilitation and Replacement	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Distribution Rehabilitation and Replacement	$31,135,659	$2,019,675	$475,231	$3,541,135	$4,030,533	$4,687,131	$1,192,924	$3,544,853	$4,708,796	$5,882,324	$7,253,368	$37,335,969
	Bond Payments for Historic R&R	$6,810,295	$786,525	$788,775	$785,650	$789,600	$787,400	$789,400	$790,400	$790,400	$789,400	$787,400	$7,884,950
Subtotal		***$37,945,954***	***$2,806,200***	***$1,264,006***	***$4,326,785***	***$4,820,133***	***$5,474,531***	***$1,982,324***	***$4,335,253***	***$5,499,196***	***$6,671,724***	***$8,040,768***	***$45,220,919***
TOTAL		**$133,684,954**	**$7,400,000**	**$8,604,346**	**$9,808,692**	**$11,013,038**	**$12,217,384**	**$13,421,730**	**$14,626,076**	**$15,830,422**	**$17,034,768**	**$18,239,114**	**$128,195,570**

Note: Costs include 5% inflation for 2025 and 3% inflation thereafter.

Figure ES-8
10-Year Revenue and Expenditures - Provo City Capital Improvements



FINAL RECOMMENDATIONS

Based on the analysis contained in this report and the conclusions above, the following actions are recommended:

- **Adopt the Proposed Implementation Plan –** The 10-year capital improvement plan summarized in Table ES-7 represents the best available assessment of City capital needs in the upcoming years. It is recommended that this plan be adopted for budgeting, staffing, rate making and impact fee calculation purposes.
- **Update Water Rates to Support System Investment Needs –** As noted above, historic funding levels will not be adequate to address projected City needs over the next several years. The City will need to explore options for funding the recommended projects. This will likely include increasing rates, bonding for projects, or some combination of the two. It is recommended that the City complete a detailed rate study to explore their options.
- **Develop a Plan for Project Completion –** In addition to having adequate funding to complete the needed projects in upcoming years, the City will also need to make sure it has adequate help to manage and execute the needed projects. The City will likely need to hire engineering design and construction help when executing the majority of the improvement projects.
- **Update this Water Master Plan Regularly –** This water master plan should be viewed as a living document. The conclusions contained herein are based on several assumptions that will assuredly change from time to time. Examples of this include assumptions associated with development patterns, regulatory requirements, conservation, economic conditions, etc. As changes occur in these areas, the conclusions and recommendations in this report may need to be revised. For this reason, it is recommended that this report be updated on a regular basis. This should be at least once every 5 years and more often if necessitated by a major change in the City (e.g. major new regulatory requirement, annexation of a new area, etc.)

SUPPLY & DEMAND MASTER PLAN

PART 1 OF WATER MASTER PLAN

provo

BOWEN COLLINS & ASSOCIATES

PROVO CITY
SUPPLY AND DEMAND MASTER PLAN

JANUARY 2024

Prepared for:

provo
PUBLIC WORKS
WATER RESOURCES

Prepared by:

BOWEN COLLINS
& ASSOCIATES

CHAPTER 1
INTRODUCTION

INTRODUCTION

Provo City desires to develop an updated master plan for its water system. This is the first in a series of three expected reports that will comprise the planning documents for the City's water system. The expected reports will be:

- **Supply and Demand Master Plan** – An examination of water demands expected in the City and the existing and future supplies available to meet these demands.
- **Storage and Conveyance Master Plan** – An evaluation of the City's existing conveyance and distribution system and its ability to deliver water when and where it is needed.
- **Implementation and Capital Facilities Plan –** A plan for completing the necessary improvements identified in the supply and conveyance master plans.

BACKGROUND

The focus of this report is supply and demand. Previous master planning documents addressing supply and demand include:

- Water System Master Plan – Prepared by Bowen Collins & Associates in April 2013.
- Supply and Demand Master Plan - Prepared by Bowen Collins & Associates in June 2019.

Since the completion of those studies, a number of changes have occurred. Changes that need to be evaluated and addressed for the City to meet its future water supply commitments include:

- **Limitations on Water Supply –** The biggest single change that has occurred since the last comprehensive master plan in 2013 is a greater understanding of potential limitations on the City's existing water sources. Most specifically, the City has recently recognized that there are significant observed declines in the groundwater table throughout the City. Whereas the 2013 study assumed that development of groundwater wells would be limited primarily by water rights, it is now believed that the sustainable yield of the aquifer will be a far greater limitation on groundwater development. This limitation was added in the 2019 study, but additional information gathered during recent drought years suggests sustainable aquifer yield is even less than previously estimated.
- **Land Use Changes –** The City is receiving significant interest in developing currently undeveloped properties west of I-15. The City also is experiencing densification within the downtown area and near the campus of Brigham Young University (BYU). While much of this growth was anticipated in the previous studies, expected densities are better understood and can be updated as part of this study.
- **Conservation –** The City has made tremendous steps in reducing per capita water use over the last several years. With continued emphasis on the prudent use of water, it is expected that this will continue to be an important part of the City's overall strategy for meeting future water needs. This report will evaluate the effect of conservation on water supply plans.
- **Drought –** Recent years of drought have emphasized the importance of planning for drought scenarios. Multiyear droughts affect water supplies most critically and additional extended periods of drought have been observed since the completion of the previous studies.

Consideration of these more frequent drought periods may change how the City plans for drought in the future.

- **Climate Change –** Climate change has the potential to affect both demand (e.g. irrigation season becomes longer and evapotranspiration increases with higher temperatures) and supply (e.g. less precipitation in the form of snow affects how water is available in the system). To be prepared for these impacts, the City needs to consider the potential effects of climate change in its demand and supply planning.
- **Managed Aquifer Recharge –** The largest change since the 2019 study is the further development of a Managed Aquifer Recharge (MAR) program. While the City contemplated some form of this activity in its 2019 study, additional planning and design now allows for better estimates of how this water will be used. This includes the construction of a new advanced water treatment plant to facilitate use of existing Provo River water rights for aquifer management.

To consider these and other issues relative to the City's future water supply commitments, the City has retained Bowen, Collins & Associates (BC&A) to evaluate demand and supply needs within the District.

REPORT ASSUMPTIONS

As a long-term planning document, this report is based on a number of assumptions relative to future growth patterns, service area expansion, and source availability. Of special significance to the City are a number of assumptions relative to the availability of groundwater and other water rights. If any variables are significantly different than what has been assumed, the results of this report will need to be adjusted accordingly. Because of these uncertainties, this report and the associated recommendations should be updated every five to ten years.

CHAPTER 2
DEMAND PROJECTIONS

There are several methods that can be used to estimate future water demand. This study developed demand projections based on two primary factors: population growth, and irrigated acreage. The methodology of this approach can be summarized by the following tasks.

1. Define the service area.
2. Project permanent residential population based on existing and projected patterns of development.
3. Project irrigated acreage based on existing land use, the City's general plan, and projected patterns of development.
4. Estimate the contribution of each component based on a statistical analysis of historic water use.
5. Convert projections of each demand component (population and irrigated acreage) to water demands based on their historic contributions.
6. Adjust projected demands as necessary to account for conservation trends and goals.

Each step of this process is summarized in the sections below.

SERVICE AREA

Provo City currently provides all retail water service within its corporate boundaries. No significant changes in the service area are expected in the future. It is expected that the water system will continue to expand within the City's boundaries to serve new areas of development such as the northwest area of the City. However, the City is essentially bounded by Utah Lake, the Wasatch Mountains, and other water providers. As a result, it is not expected that the system will serve any additional areas outside of the City's corporate boundary. The projected future service area is shown in Figure 2-1.

POPULATION COMPONENT PROJECTIONS

Population Growth

With the goal of preparing a long-term plan for the City, the planning window of this study is through projected buildout. Population projections were prepared through the year 2070 in three steps:

1. From 2022 to 2050, the population projections used in this analysis are based on population growth projections developed by the Mountainlands Association of Governments (MAG) for its Transportation Analysis Zones (TAZ) for the Provo area.
2. The projected Provo City population at buildout was estimated by BC&A personnel based on projected land use as identified in the City's General Plan and with feedback from Provo City planning personnel. Two buildout scenarios were developed, moderate and aggressive, but for the purposes of this study only the aggressive buildout scenario will be used. The aggressive build-out population for Provo City is estimated to be 253,000.
3. Population growth between the 2050 and buildout-out was estimated by BC&A by using a logistic-growth model with an initial growth rate set to match projected growth through 2050. Based on this procedure, it is estimated that the City will not reach build-out before 2070.

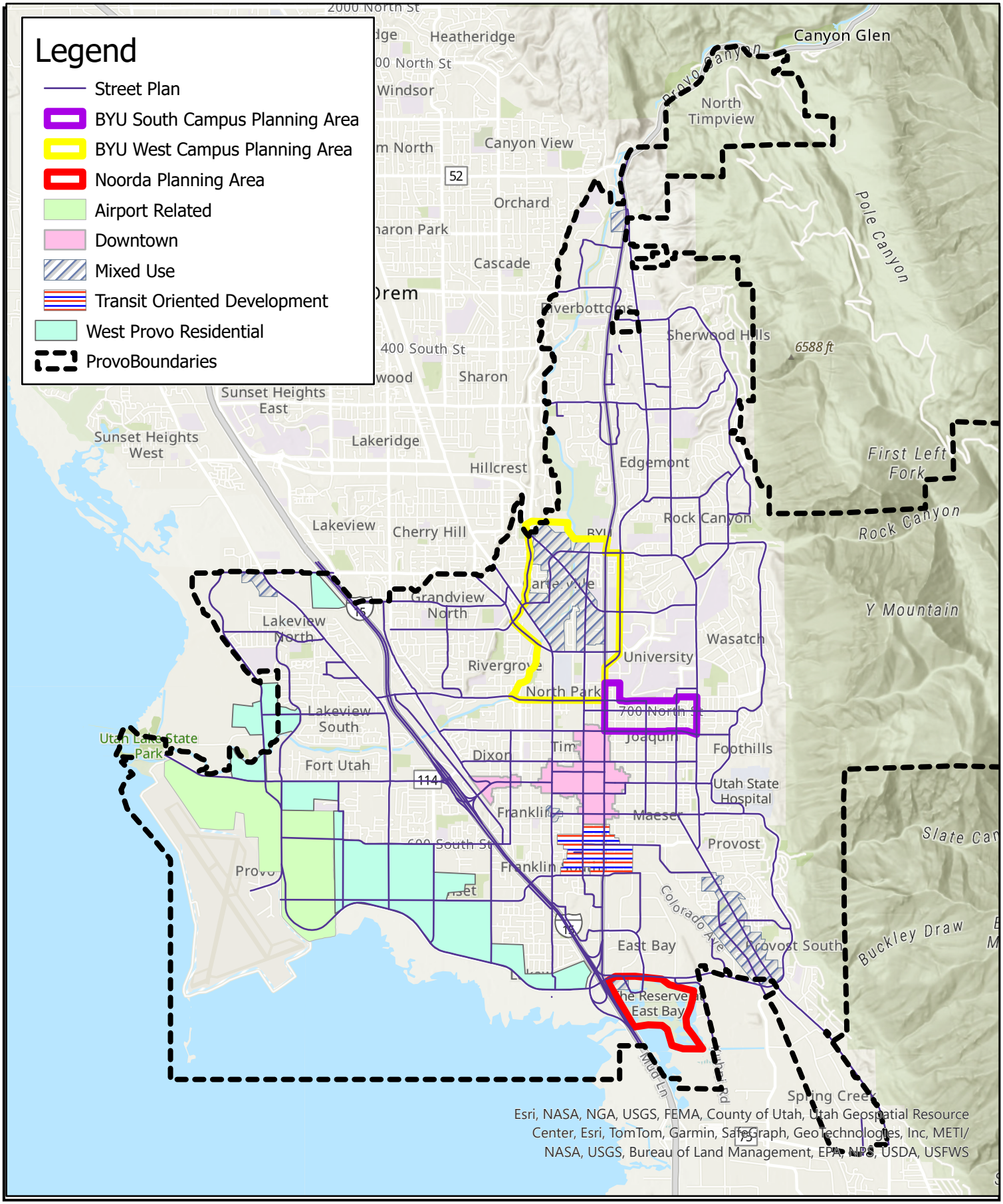
Buildout Population Projections

While the first and third step of this process are relatively self-explanatory, the second step merits additional discussion. When the City's last water master planning efforts were completed in 2018, it was estimated that the future build-out population of the City would be approximately 197,000. This projection was based on an assumption of growth in undeveloped areas ranging between three to four equivalent residential units (ERUs) per acre and plans at the time for re-densification in some existing areas of development. Figure 2-2 shows the City's most recent General Plan and Figures 2-3 and 2-4 show the development plans in the Southwest and Southeast areas of the City. These figures can also be found in the City's 2023 General Plan.

Over the last ten years, the City has permitted the construction of many housing developments with densities notably higher than historic planning densities. The City has also expanded the areas where high density redevelopment might be expected. If this trend continues, the City's buildout population could be significantly higher than previously planned. As a result, this master plan includes an aggressive build-out scenario with higher densities deemed possible by City personnel.

Figure 2-1 shows areas of specific interest as identified by City personnel. For the purposes of this study, the greatest changes fall under one of two categories. First, there has been a large increase in potential development densities on the City's west side. Areas now shown as residential, industrial, and airport related zones in the figure were previously designated as agricultural or developmentally sensitive. Many of these changes were made associated with the construction or planning of Lakeview Parkway. Second, the figure identifies a number of new areas to encourage re-development at higher densities. Development of buildout population scenarios has focused on expected density in mainly the following areas:

- **Westside Area –** The City anticipates that densities may increase on the City's westside. Historical plans, including the City's most recently adopted General Plan (2023) have identified maximum densities of 4 units per acre in this area. However, more recent development plans show a desire to for 6 units per acre and even higher densities may be considered in the future. Though the density is restricted to 4 units per acre by the existing General Plan, higher density should be considered for planning purposes for this area.
- **Downtown Area** – The General Plan includes designation of a downtown area at the City's center. This area has recently been rezoned to encourage greater densities for redevelopment.
- **Transit Oriented Development** – Immediately south of the City's downtown is an area that has been designated for transit-oriented development. This area is centered on a proposed intermodal hub and has been zoned to encourage high density housing. Current zoning in this area will allow development up to 6 stories in height and density of up to 80 units per acre.
- **BYU South Campus Area** – An area of re-development that has been in the City's plans for many years is the neighborhood immediately south of the BYU campus (to about 500 North). In 2000, a conceptual proposal was prepared to increase housing density in this area by revising standards for parking, landscaping, and setbacks to make it easier to develop new housing. This proposal was called the South Campus Area Master Plan (SCAMP). Although the SCAMP proposal was never adopted, the general concepts of the plan are still being used to assist in reviewing development proposals in the area.



BOWEN COLLINS & ASSOCIATES

Future Service Area and Specific Areas of Growth

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 3,000 6,000

FIGURE NO. 2-1

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Provo City General Plan Map

as amended by Ordinance 2023-1 and as subsequently amended: June 6, 2023

provo

Downtown Planning Area
This designation consists of a mix of urban uses including office, retail, commercial, facilities, and residential. Vertical uses and pedestrian scale design is encouraged.

Mixed Use Development
This designation includes commercial, office, and residential uses, and mix of all uses vertically or horizontally is encouraged.

Transit-Oriented Development
This designation includes commercial, office and residential uses developed adjacent to alternative modes of transportation, and encouraging pedestrian and bicycle facilities.

Commercial
This designation is intended to promote areas for both local and regional goods and services as well as job centers. Certain light industrial that offer products may also be appropriate.

Residential
This designation is intended to offer a broad mix of housing types across the city. Neighborhoods should be mixed to provide a wide range of housing opportunities.

Agricultural
This designation is intended to offer a location where agricultural pursuits are encouraged and supported. This designation is intended to protect agricultural uses from encroachment of other development until such time other uses become necessary and desirable.

Facilities and Institutions
This designation is intended for governmental facilities, public and private educational institutions, public and private hospitals, private institutions, and public buildings and operations.

Parks, Recreation, and Open Space
This designation includes a variety of regional, community, and neighborhood-scale parks, natural lands, and agricultural areas with minimal use or activity.

Industrial
This designation includes manufacturing, warehousing, processing, and other uses for the creation or production of goods.

Airport Related Activities
This designation is intended for airport-related activities and future growth including commercial and industrial uses.

See: Future Land Use Area Maps
The areas outlined in red indicate a Future Land Use Area Map exists for that neighborhood or region. These plans may be viewed at: https://www.provo.org/neighborhoodplans

Developmentally Sensitive
This designation serves as a "flag" to put prospective purchasers, land developers, and City representatives on notice that there may be physical limitations or hazards associated with development of these lands.

Current Provo City Boundary

Conservation Easement
Easement restricting a landowner to land uses that are compatible with long-term conservation and environmental values.

South Campus Planning Area
An area south of the Brigham Young University campus anticipated to redevelop for student-oriented housing and amenities.

Gateway

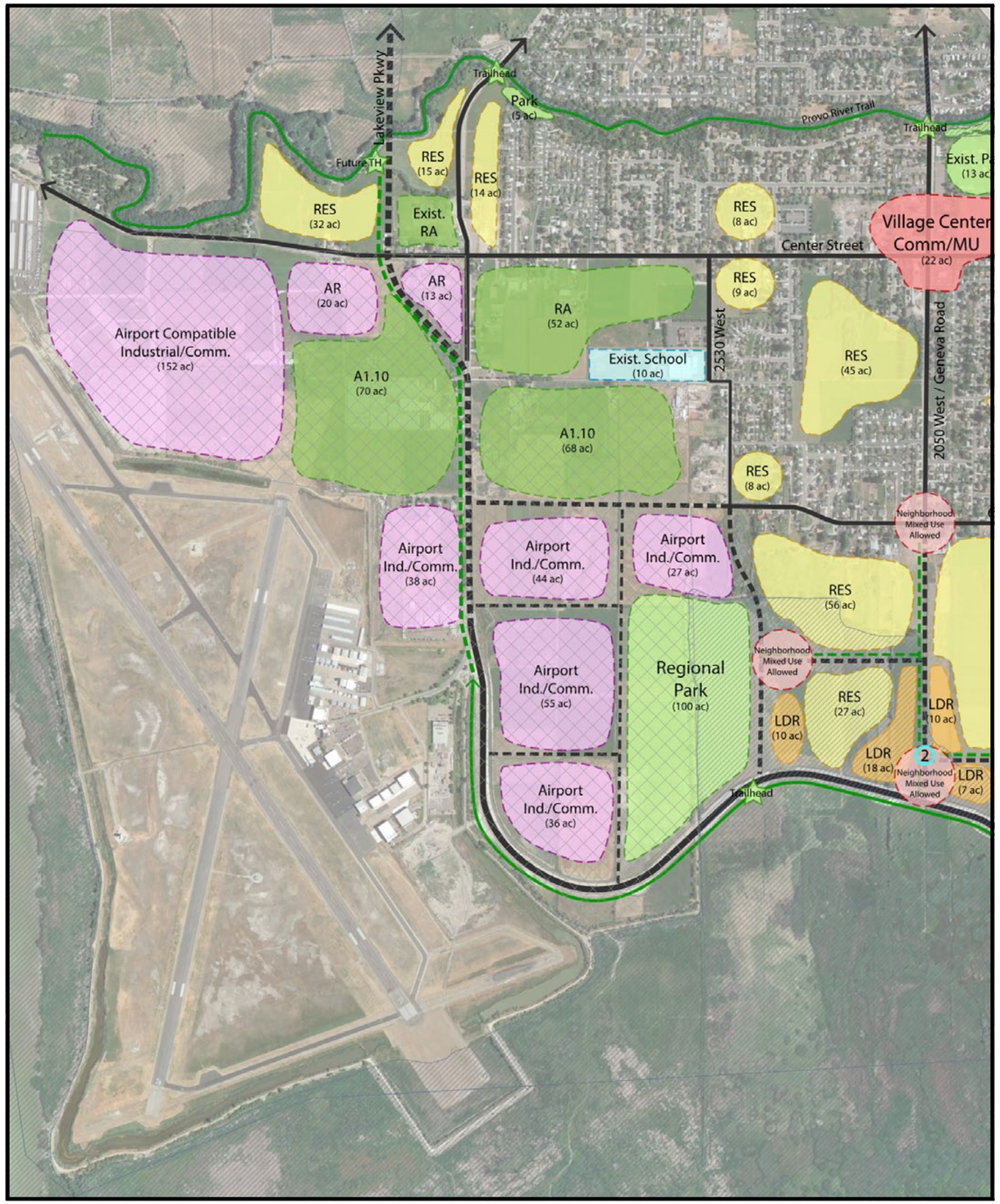
0 0.13 0.25 0.5 0.75 1 Miles

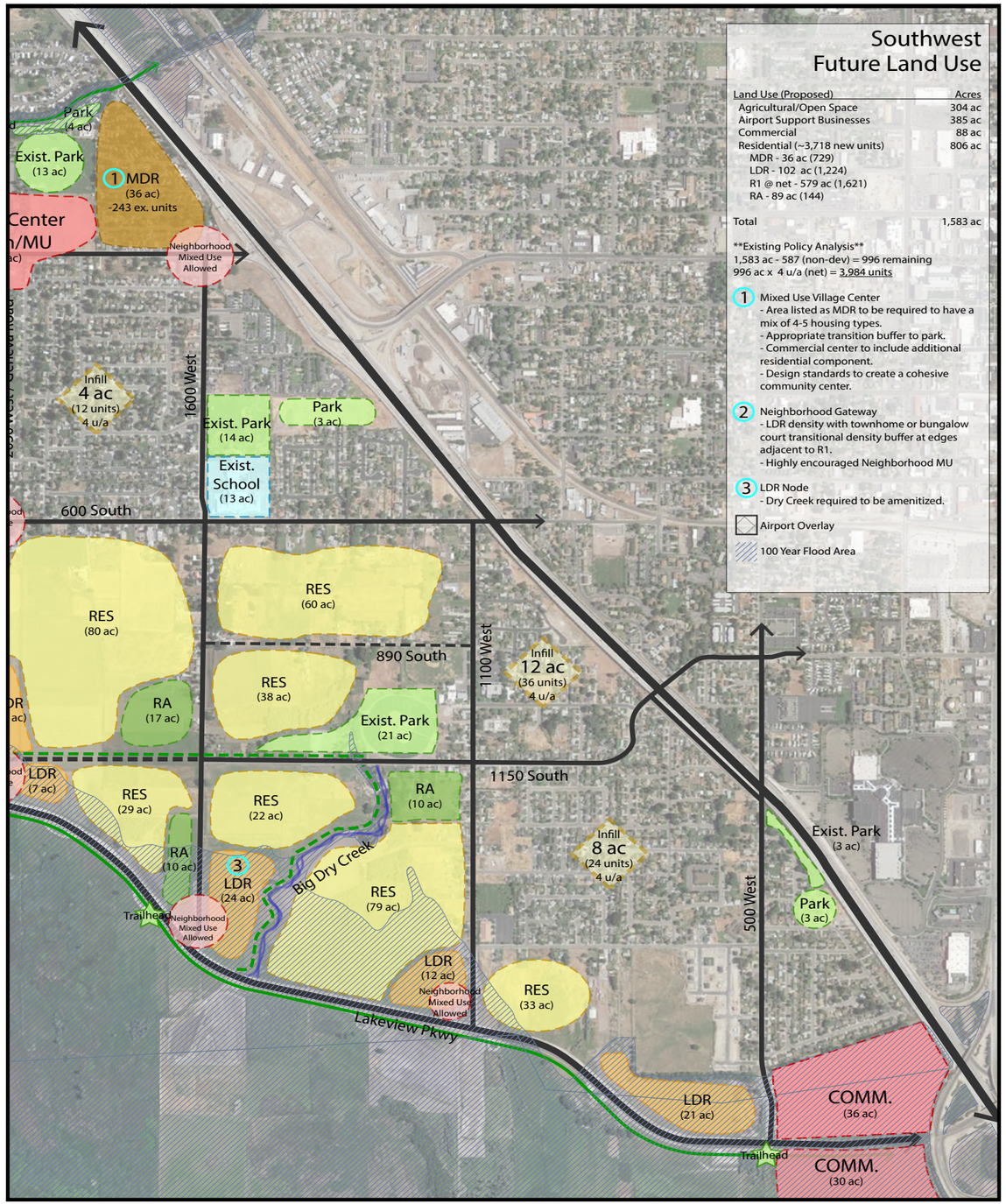
N W E S

Map prepared pursuant to Title 10 Land Use and Development. The General Plan Land Use Map is not intended to be used as a stand-alone reference. The neighborhood policies in Chapter 6 of the General Plan are intended to be used in conjunction with the map. Where there seems to be a discrepancy between the two, the written policies are generally considered to carry the stronger weight. For more information on Provo's General Plan, including the full text of the plan, please visit planning.provo.org or call 801-852-6400. For detailed online mapping information, you may also visit maps.provo.org. This map was created by the Provo City GIS, 445 W Center St.

Maps are provided as a public resource for general informational purposes only. Provo City does not guarantee their accuracy and assumes no liability for inaccuracies. Please seek verification of map details from City staff.

Figure 2-3





Southwest Future Land Use

Land Use (Proposed)	Acres
Agricultural/Open Space	304 ac
Airport Support Businesses	385 ac
Commercial	88 ac
Residential (~3,718 new units)	806 ac
MDR - 36 ac (729)	
LDR - 102 ac (1,224)	
R1 @ net - 579 ac (1,621)	
RA - 89 ac (144)	
Total	1,583 ac

Existing Policy Analysis
1,583 ac - 587 (non-dev) = 996 remaining
996 ac x 4 u/a (net) = 3,984 units

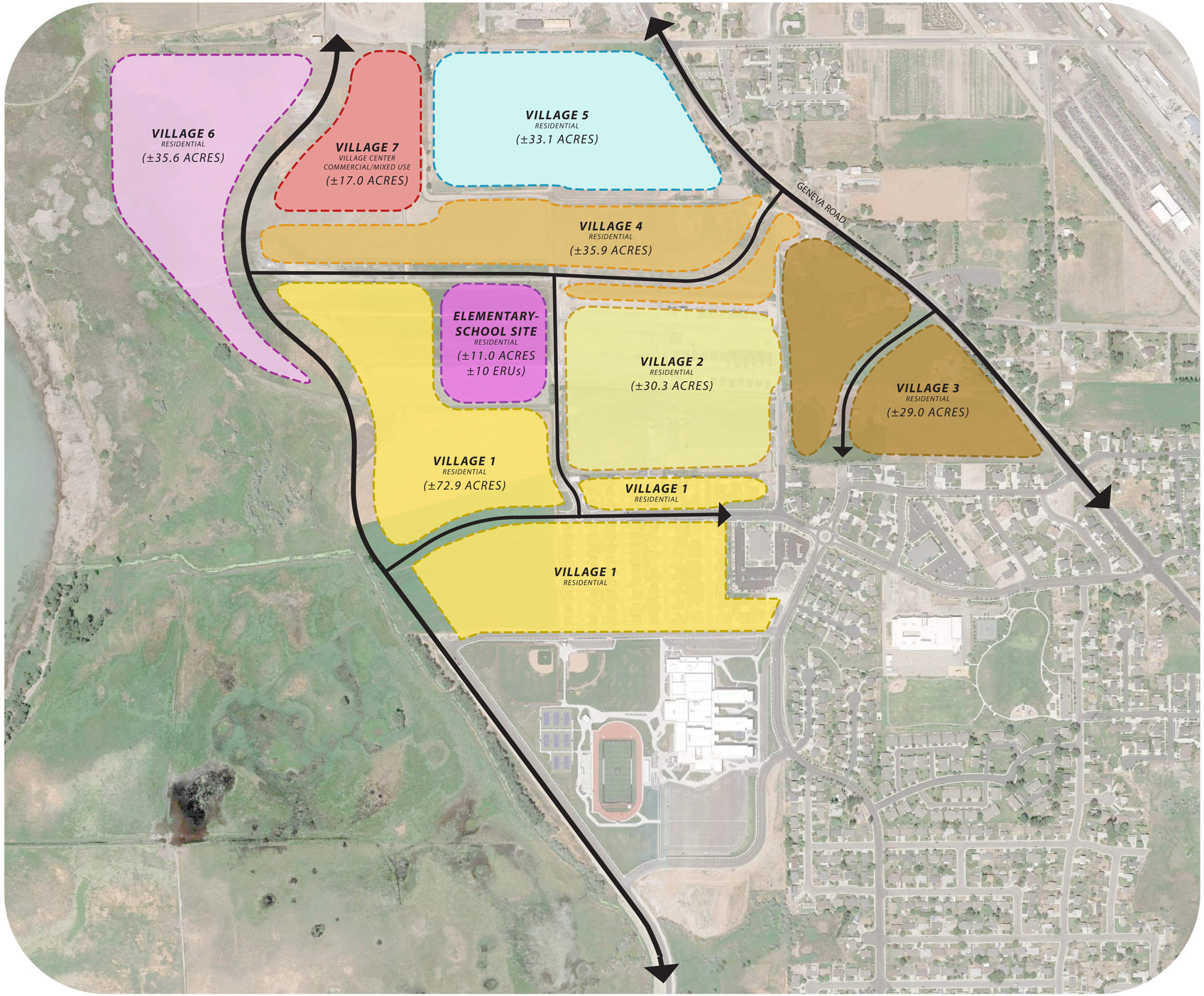
1. Mixed Use Village Center
   - Area listed as MDR to be required to have a mix of 4-5 housing types.
   - Appropriate transition buffer to park.
   - Commercial center to include additional residential component.
   - Design standards to create a cohesive community center.
2. Neighborhood Gateway
   - LDR density with townhome or bungalow court transitional density buffer at edges adjacent to R1.
   - Highly encouraged Neighborhood MU
3. LDR Node
   - Dry Creek required to be amenitized.

Airport Overlay

100 Year Flood Area

Figure 2-3

VILLAGE	ACRES	UNITS/ACRE
VILLAGE 1 - RESIDENTIAL	73 ACRES	225 ERUs
VILLAGE 2 - RESIDENTIAL	30 ACRES	3 TO 6 ERUs/AC
VILLAGE 3 - RESIDENTIAL	29 ACRES	3 TO 3.5 ERUs/AC
VILLAGE 4 - RESIDENTIAL	36 ACRES	5 TO 15 ERUs/AC (Max 475 ERUs)
VILLAGE 5 - RESIDENTIAL	33 ACRES	3 TO 3.5 ERUs/AC
VILLAGE 6 - RESIDENTIAL	36 ACRES	10 TO 25 ERUs/AC (Max 500 ERUs)
VILLAGE 7 - VILLAGE CENTER, COMMERCIAL/M.U.	17 ACRES	3 TO 4 ERUs/AC
ELEMENTARY SCHOOL SITE	11 ACRES	10 ERUs
MAX UNITS		1,600 ERUs



N

S

GRAPHIC SCALE

300 0 150 300 600 1,200

(IN FEET)
1 inch = 300ft.

BROADVIEW SHORES land use map

PROVO CITY, UTAH COUNTY
4/19/22
18-446

FOCUS ENGINEERING AND SURVEYING, LLC

Figure 2-4

- **BYU West Campus Area** – BYU purchased the old Provo High School in 2016 and is beginning to make plans for the area which could include expanding campus facilities. The City anticipates that additional redevelopment in the area around the BYU West Campus may be expected as the campus facilities are upgraded by BYU.
- **Noorda –** The Noorda College of Osteopathic Medicine will be expanding campus facilities and housing in the near future as they obtained permission to recruit students from its accreditation association in July 2020.
- **Ironton -** The City expects that this industrial area will continue to grow with similar users and manufacturers.

To consider the City's potential for additional densification, BC&A collected data and prepared an analysis of population density for various land use types based on observed densities from housing developments over the last ten years. Results of this analysis indicate that average densities for different types of land use are as follows:

- Single Family Residential Subdivisions = 3.27 units/acre
- Townhomes Residential = 8.42 units/acre
- Multifamily Residential = 43.13 units/acre
- Commercial = 5 units/acre

These calculated densities were then compared to projected densities in the 2050 TAZ population projections (assuming an average of 3.2 persons per unit). Table 2-1 summarizes the projected TAZ densities. As can be seen in the table, TAZ densities are significantly less than what has been observed for recent developments. This suggests including some additional densification is a prudent approach for future planning. Thus, also included in Table 2-1 are recommended planning densities for a more aggressive buildout scenario. This scenario represents the maximum realistic density expected for each area based on past development practices.

Table 2-1
Provo Water Service Area Aggressive Buildout Densities

Land Use Type	TAZ 2050 Density Units/Acre	Aggressive Buildout Density Units/Acre
West Provo	3	8
South Campus	13	43
West Campus	7	21
Transit	20	43
Multi-Use	6	21
Downtown	24	43
Noorda*	0	24

*Values reflect permanent residential population only, additional flows accounted separately.

With these revised planning densities, total population for each land use type can be estimated by multiplying the estimated density by the average household size and the total area within each planning area. Following this procedure, the revised build-out population for the City is 253,000.

Residential Population Projection

The final residential population projections developed for the Provo City service area are summarized in Table 2-2.

Table 2-2
Provo Water Service Area Projected Residential Population

Year	Estimated Service Area Population - Maximum Buildout Scenario	Aggressive Average Annual Residential Growth Rate
2020	116,616	--
2030	142,452	2.02%
2040	165,994	1.65%
2050	186,674	1.25%
2060	203,683	0.91%
2070	216,933	0.65%
Buildout	253,000	--

Employment Population Projections

In addition to residential population, the City also expects to see non-residential growth. The future employment population was projected by following the same basic approach as used for residential growth. Projections through 2050 were taken directly from the TAZ projections, with buildout populations estimated by assuming that the 2050 residential to employment population ratio observed in the TAZ projections will continue to be applicable for the aggressive buildout residential populations (i.e. the ratio of residential to non-residential development beyond 2050 stays roughly the same). The employment population projections are shown in Table 2-3.

Table 2-3
Provo Water Service Area Projected Employment Population

	Estimated Service Area Employment Population - Aggressive Buildout Scenario	Aggressive Average Annual Employment Growth Rate
2020	90,158	-
2030	105,484	1.70%
2040	119,049	1.29%
2050	130,280	0.94%
2060	139,074	0.68%
2070	145,665	0.47%

Population Projection Results

Following the procedures above, population projections were developed for the City through 2070. The total projected population of the Provo City service area is summarized in Table 2-4. Projections are provided each year for the next 10 years and then for each decade thereafter.

Table 2-4
Estimated Provo City Service Area Residential Population

Year	Residential Population	Employment Population
2022	121,783	93,320
2023	124,367	94,887
2024	126,950	96,442
2025	129,534	97,986
2026	132,118	99,516
2027	134,701	101,032
2028	137,285	102,532
2029	139,868	104,017
2030	142,452	105,484
2031	144,896	106,933
2032	147,325	108,363
2040	165,994	119,049
2050	186,674	130,280
2060	203,683	139,074
2070	216,933	145,665

IRRIGATED AREA COMPONENT PROJECTIONS

The other component of demand that is important to quantify separately is outdoor water use. Whereas indoor water use is relatively constant throughout the year, outdoor water use for irrigation ranges from extremely high during a few peak summer months to virtually zero during the winter months.

Irrigated acreage projections rely on an analysis of zoning and land use maps. This analysis was done in two steps: estimating irrigated acreage based on full development for each zoning classification; and then estimating the percentage of area developed in each individual zoning area.

Estimating the irrigated acreage based on full development was done by examining 2 or 3 fully developed areas in each zoning classification. In these areas, GIS mapping and an aerial photo were used to calculate the total acreage of the zoning area and the percent of each area that was irrigated. Table 2-5 summarizes the results of this analysis. It will be noted that some of the general plan categories used are relatively broad and include a range of potential irrigated acreage (e.g. the residential category may have a wide range of irrigated acreage depending on the size and nature of residential lot). In these cases, the value shown in Table 2-5 represents the best estimate of average percent irrigated for the entire category.

Table 2-5
Percent of Fully Developed Land Irrigated By Land Use Type

General Plan Code	Description	Percent Irrigated
C	Commercial	15%
D	Downtown	20%
PF	Public Facilities	50%
R	Residential	40%
M	Mixed Use	40%
I	Industrial	10%
TOD	Transit Oriented	40%
AR	Airport Related	10%

The City's general plan is broken into smaller subareas associated with these land use types. With the factors given in the table above, the irrigated acreage for each subarea across the City could be calculated based on full development for current zoning. To convert this to current irrigated acreage, a percent developed was needed for each subarea. GIS mapping and an aerial photo were examined to estimate the percentage of full development in each zoning area. The total acreage of land currently irrigated is calculated by multiplying the acreage of irrigated land at full development by the estimated percent currently developed.

Based on the updated analysis, approximately 5,281 acres in the Provo City service area will be irrigated at full development (including the new regional sports park). Approximately 87 percent of this total is currently irrigated (4,609 acres). It should be noted that these totals refer to culinary irrigation of M&I properties only. Irrigation of agricultural properties using secondary water is not included.

There are no current projections regarding how quickly irrigated acreage will develop. To conservatively assess future demand, this report assumes that irrigated area will continue to grow proportional to population growth through the year 2040 at which point it will reach full development. From there, it is assumed that irrigated acreage will remain constant as population growth will come primarily from redevelopment and densification, and not the development of new property. In reality, densification tends to result in decreased irrigated acreage over time, but since little information exists on the details of densification, assuming no change in irrigated acreage seems prudently conservative for this study.

Irrigated Area Projection Results

Following the procedures above, irrigated area projections were developed for the City through 2070. The total projected irrigated acreage in the Provo City service area is summarized in Table 2-6. Projections are provided each year for the next 10 years and then for each decade thereafter.

Table 2-6
Estimated Irrigated Acreage for the Provo City Service Area

Year	Irrigated Acreage
2022	4,609
2023	4,653
2024	4,698
2025	4,743
2026	4,788
2027	4,833
2028	4,878
2029	4,924
2030	4,970
2031	5,001
2032	5,032
2040	5,281
2050	5,281
2060	5,281
2070	5,281

PRODUCTION REQUIREMENTS

The final step in developing water production requirement projections is to convert the projections of each use component (described above) into actual water production requirement by multiplying each projected component by the water production requirement of each component (i.e. the "Production Requirement Factor"). The production requirement factor is the amount of water required to be produced for each component with allowance for system losses and other system inefficiencies. In other words, the production requirement factors answer the question, "How much water must be produced for the demands of each component of water use?" Because production requirement factors are subject to change through conservation, several scenarios of use factors are addressed in this report below.

Historic Production Requirement without Conservation

For the purpose of estimating the historic contribution to production requirement by each component (population vs. irrigated acreage), a statistical analysis of demand was performed for both winter and summer water sales records. The contribution of each component (without conservation) was calculated. The results are reported in Table 2-7.

Table 2-7
Historic 2020 Production Requirement Factors of Demand Components

Component	Production Requirement Factor (Average Day)	Production Requirement Factor (Peak Day)
Population (Indoor Use Based on Permanent Residents)	114.4 gpcd	143.0 gpcd
Irrigated Acreage (Outdoor Water Use)	113.3 gpcd	297.2 gpcd
Total Per Capita Use	227.7 gpcd	440.2 gpcd

Irrigated Acreage (Outdoor Water Use) Production Requirement Factor: Average Day = 3.3 acre-ft/acre
Peak Day = 7,670 gpd/acre
gpcd = gallons per capita per day
gpd = gallons per day

It should be noted that the population per capita number here includes all indoor use in the City. This includes residential use along with commercial, institutional, and industrial uses. As a result, the per capita value is significantly larger than would be expected for a residential connection alone. Ideally, assessment of existing demands and development of future projections would be broken into these various categories. However, because available data regarding these other types of water use is limited, all indoor use has been aggregated as shown. This will still produce accurate projections of future use as long as the overall mix of development types stays roughly the same moving forward as is expected in Provo City.

For the reader's convenience in understanding the different types of use, a calculation of per capita outdoor demand has been included in the table. However, it should be emphasized that outdoor demand will not be projected based on population. Instead, it will be projected based on irrigated acreage. This is necessary to properly account for increasing density (and the corresponding decrease in irrigated acreage per person) as the City continues to grow.

Future Production Requirement Factors with Conservation

The production requirement factors shown above in Table 2-7 represent the past water use practices in the City in the year 2020. Since that time:

- The City has actively promoted conservation among its residents and businesses;
- Economic and cultural shifts have favored conservation due to drought messaging; and
- Development patterns in the City (like most areas experiencing densification) have tended to favor the conversion of previously irrigated acreage to buildings and hardscape (which often lowers the water demand, especially relative to peak summer demands).

These factors appear to have influenced water use because conservation has been observed in the City's water production data since 2020. The critical next question for projecting the future water production requirement is predicting what level of conservation the City will achieve in the future. The more conservation realized, the less water production capacity required.

Conservation Planning Scenario. Water production data shows that efforts made by City staff and residents have already been effective in achieving a significant amount of conservation. Per capita water use is slightly reduced from where it was in 2020 and is even ahead of State of Utah Conservation goals in most years. To date, conservation efforts have primarily focused on education

and pricing to motivate the voluntary efforts of customers to conserve. While the observed results are impressive, there are still additional conservation measures that can further reduce water use. Provo City personnel understand that additional conservation in the City is possible and are committed to making further progress in this area. However, to continue the trend of increasing conservation in the City, it is likely that a more aggressive effort and level of investment will be required[1].

To consider the potential for additional conservation in the City, this study is currently based on the State's current water conservation goal of a per capita water use of no more than 152 gallons per day (gpd) after the year 2065. It should be noted that, based on water system production data over the past decade, the City appears to have almost reached the State's 2030 per capita goal of 179 gpd. However, it is expected that additional efforts will be required to sustain the conservation achieved.

Table 2-8 summarizes the revised production requirements at the current State of Utah Regional Conservation Goal of a reduction in water use to 152 gpcd (sales) by 2065.

Table 2-8
Production Requirement Factors of Demand Components at 2065 State Conservation Goal

Component	Production Requirement Factor (Average Day)	Production Requirement Factor (Peak Day)
Population (Indoor Use Based on Permanent Residents)	126.4 gpcd	158.0 gpcd
Culinary Irrigated Acreage (Outdoor Water Use)	59.9 gpcd	157.3 gpcd
Total Per Capita Use (2065)	186.3 gpcd	315.2 gpcd

Culinary Irrigated Acreage (Outdoor Water Use) Production Requirement Factor: Average Day = 2.7 acre-ft/acre
Peak Day = 6,276 gpd/acre
gpcd = gallons per capita day
gpd = gallons per day

Calculating Production Requirements

The final step in developing overall City water demands is to multiply the projections of each demand component by its production requirement factor (including consideration of conservation) and then to aggregate each component's demand into an overall City demand for each conservation scenario. For example, consider the calculation for overall irrigation demand in 2025:

5,281 acres (projected total irrigated acres in 2065)
X 2.70 acre-ft per irrigated acre per year (projected production requirement)
= 14,259 acre-ft (Total 2065 production requirement for the irrigation component)

The calculation above was repeated for each component of water demand (population and irrigated acreage). These results were then added together for each year to obtain overall water demand projections.

[1] For additional information on the City's conservation efforts see the 2023 Water Conservation Plan.

Annual Production Requirement Results

The results of these projections are shown in Figure 2-5 and Table 2-9. Projections are provided each year for the next 10 years and then for each decade thereafter.

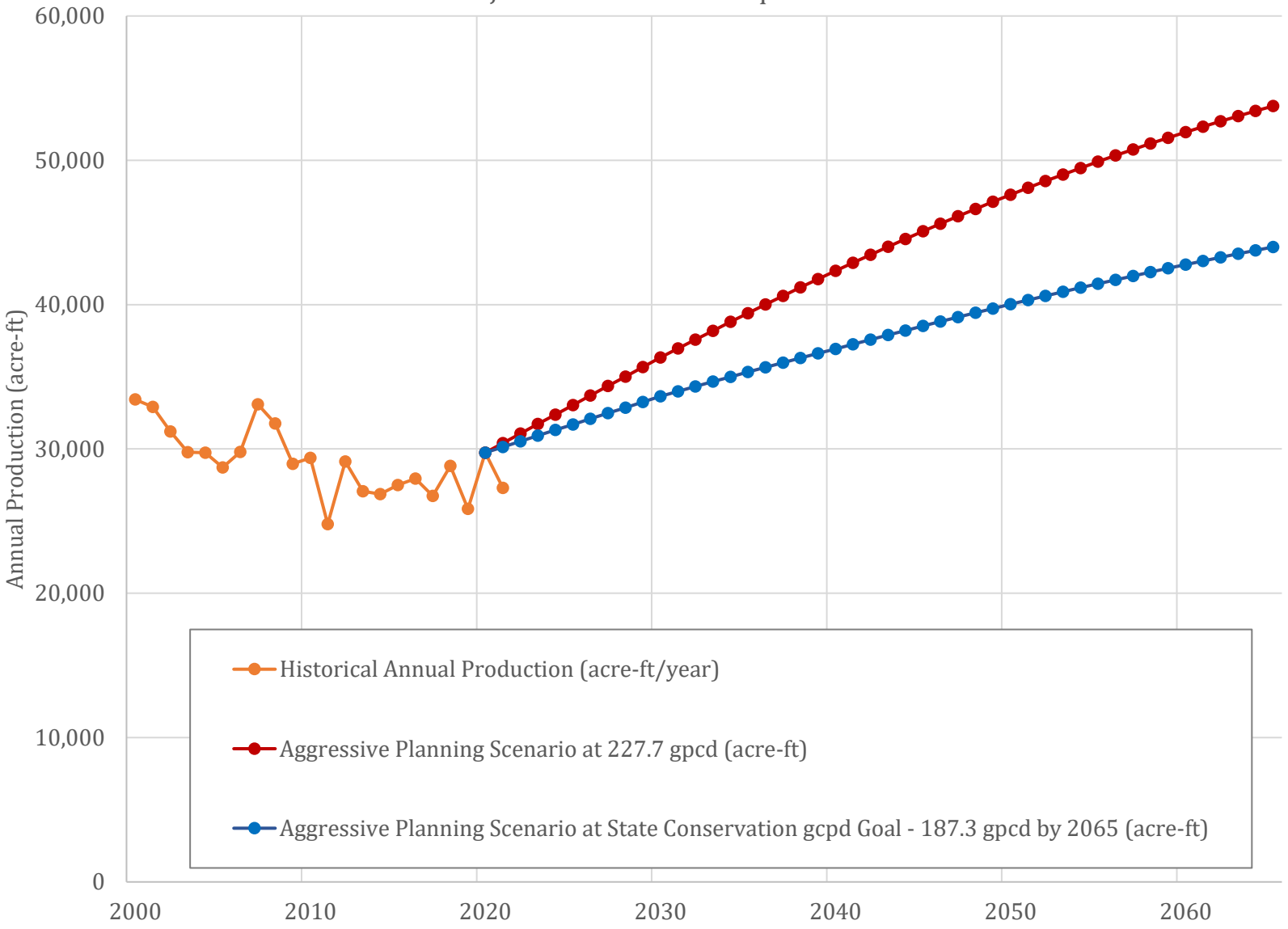
Table 2-9
Projected Annual Production Requirement (acre-ft)

Year	Projected Production Based on Year 2020 Demands	Projected Production With Conservation
2020	31,063	30,532
2021	31,722	30,921
2022	32,381	31,312
2023	33,040	31,702
2024	33,699	32,091
2025	34,358	32,479
2026	35,017	32,866
2027	35,676	33,254
2028	36,335	33,643
2030	36,958	33,986
2040	42,340	36,932
2050	47,614	40,026
2060	51,953	42,773
2065	53,758	43,995

Included in the figure is the historic water use since 2020. Annual production in recent years is significantly less than historic annual production. Some of the conservation observed in recent years may be the result of increased publicity during recent drought periods and may not be indicative of permanent, long-term reductions in consumption. However, conservation in recent years is an indication that the City has made great progress towards the current state conservation goals.

With that said, sustaining the conservation achieved to date is not guaranteed without continued efforts. Continued focus and funding will be needed in future City capital budgets to encourage ongoing conservation efforts.

Figure 2-5
Annual Projection Production Requirement



Peak Day Production Requirement

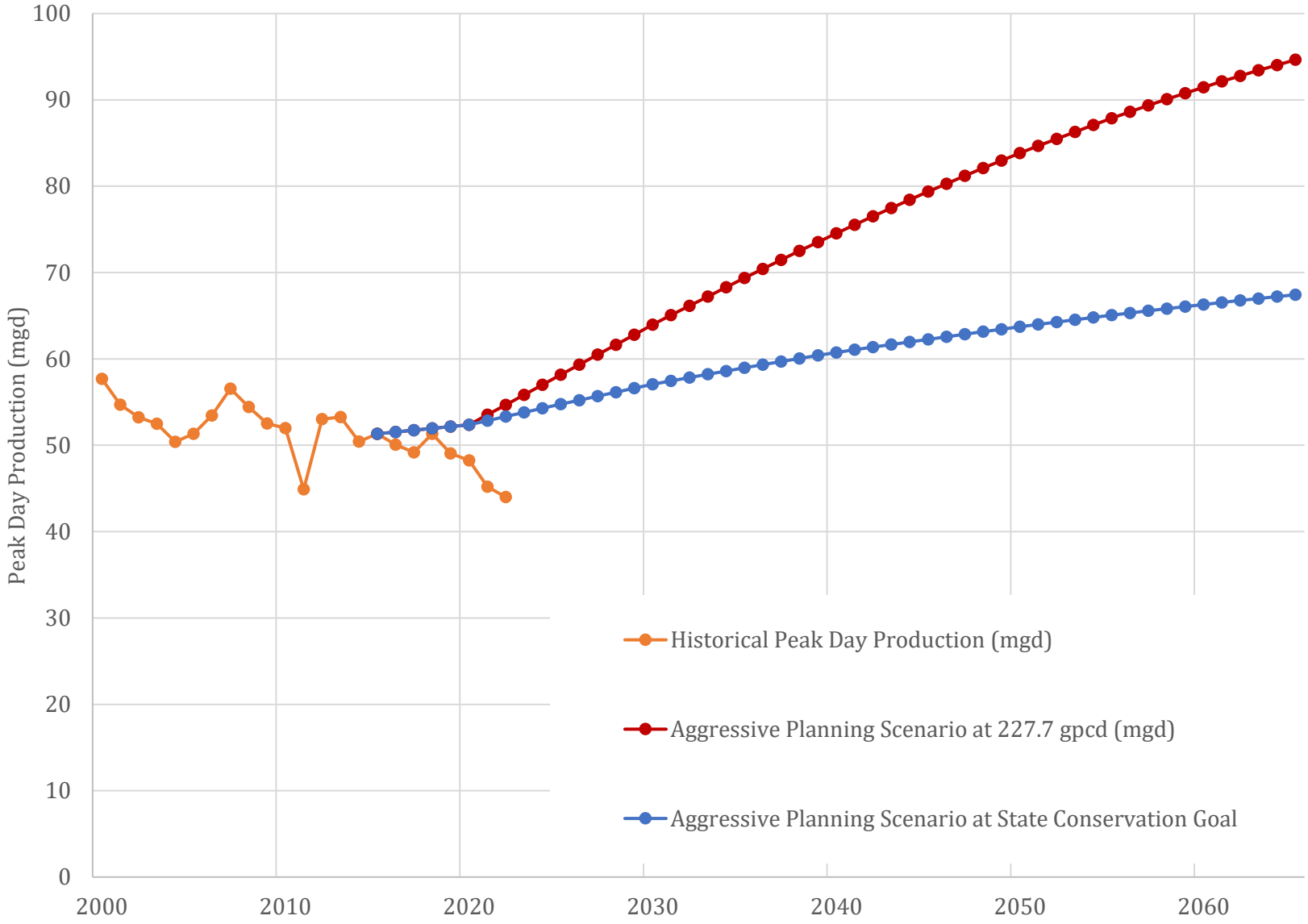
Consideration of water system production requirements on an annual volumetric basis is insufficient to fully address the question of overall system adequacy for planning purposes. Water system production must also be addressed on a peak day basis. In other words, the system must be able to supply sufficient water over the course of a year, but also must be able to supply sufficient water on the peak day of demand during that year. Therefore, this study has included an analysis of peak day production requirements in Provo City.

Following the same procedure used for annual demands, peak day demands were projected and are shown in Figure 2-6 and Table 2-10. Projections are provided each year for the next 10 years and then for each decade thereafter.

Table 2-10
Projected Peak Day Production Requirement (Million Gallons Per Day)

Year	Projected Production Without Additional Conservation	Projected Production With Conservation
2022	54.7	53.3
2023	55.8	53.8
2024	57.0	54.3
2025	58.2	54.8
2026	59.3	55.2
2027	60.5	55.7
2028	61.6	56.1
2029	62.8	56.6
2030	64.0	57.1
2031	65.1	57.5
2032	66.2	57.8
2040	74.5	60.8
2050	83.8	63.7
2060	91.5	66.3
2065	94.6	67.4

Figure 2-6
Peak Day Production Requirement



CHAPTER 3
WATER SUPPLY PROJECTIONS

This chapter will describe the City's sources and discuss the adequacy of existing and future supplies to meet the projected demand discussed in Chapter 2.

ANNUAL WATER SUPPLY

State law requires that municipal water sources legally and physically meet water demands under two separate conditions. First, source capacity must be adequate to provide one year's supply of water, the average annual production requirement. Second, source capacity must be adequate to meet peak day production requirements. This section discusses the first of these conditions – annual supply.

Included in this discussion is consideration of how the yield of each source might vary during different climatic conditions (dry and average water years). Yields under varying climate conditions were determined by looking at past extremes in available historic water production records and discussions with City personnel. Unfortunately, detailed records of yield from each source are only available since 2000. However, this does give some indication of potential variation in the yield of each supply. Thus, average year water production is represented by average metered production during the past 10 years. Dry year production for City springs is represented by metered production during the water year 2002 (the year during the period of record with the lowest spring production). Dry year production for Provo River sources is representative of expected conditions in a 25-year drought event (i.e. drought conditions which are expected to have a 5 percent chance of occurring in any given year). The 25-year drought conditions have been based on data prepared by Hansen Allen & Luce as part of an evaluation of water rights in the Provo River. Potential implications of more severe droughts and longer-term variability in climate are discussed in Chapter 4.

For purposes of evaluating annual production capacity, existing Provo City sources can be grouped into three categories; springs, wells, and surface water.

Springs

Much of Provo City's municipal water originates from springs located in Provo Canyon and Rock Canyon. Springs are the City's first choice for culinary water due to their low cost of production. They do not require treatment (except for the addition of chlorine) and do not need to be pumped into the system. For the purpose of this discussion, water from the springs can be divided into two groups – those springs that have their own water rights via decree or application, and those springs whose flow is obtained via change application for Provo River direct flow rights and storage rights in Deer Creek Reservoir:

- **Springs With Their Own Water Rights:**
    - **Rock Canyon Springs** – Through its ownership in Rock Canyon Water Company, Provo City has direct access to water from Rock Canyon Springs.
    - **Provo Canyon Springs** – While most of the water in South Fork Springs must be obtained via change application or exchange, the City does have a number of its own decreed water rights that can be taken from other springs in Provo Canyon. This category refers to all Provo Canyon spring water not under exchange agreement or change application as reported in the City's annual water report.

- **Springs With Flow Obtained Via Exchange or Change Applications:**
    - **South Fork Springs –** The City also receives spring water from springs in South Fork. Water from these springs is primarily obtained via change application on Provo River direct flow rights and exchange of storage rights in Deer Creek Reservoir. The City also has some decreed rights associated with these springs.
    - **Big Springs –** A few years ago, Provo City completed the development of the Big Springs area in the South Fork of Provo Canyon to help meet growing demands on its water system. Water from this group of springs is obtained though the same type of exchange or change applications used for other springs in South Fork.[2]

Over the past 20 years, historic spring production has varied from 10,070 acre-ft in 2002 to over 17,000 acre-ft in 2005 and 2017. The production is dependent on soil moisture and yearly snowpack. Based on historic data for Rock Canyon, Provo Canyon, and South Fork, along with initial flow measurements for Big Springs, the projected yield of currently developed Provo City spring sources is 17,555 acre-ft in average water years (based on the average production from the springs from 2000 to 2016 plus projected new flows from Big Springs) and 12,230 acre-ft in dry years (based on the annual metered production for the dry year of 2002 plus projected new flows from Big Springs). Spring production is summarized in Table 3-1.

Table 3-1
Source Summary of Existing Spring Yields

Source	Average Year (acre-ft)	Dry Year (acre-ft)
Provo Decreed Spring Rights		
Rock Canyon	635	240
Provo Canyon (Provo Water Rights)	6,450	3,330
Subtotal (Provo Rights)	7,085	3,570
Change Application or Exchange		
South Fork	6,600	6,500
Big Springs	3,870	2,160
Subtotal (Change Application or Exchange)	10,470	8,660
Total Spring Source	**17,555**	**12,230**

Important to the discussion of spring yield is also an identification of sources of water that will be used to satisfy the required change and exchange applications. Historically, the City has used different water rights for this purpose during the irrigation season and outside of the irrigation season. To assist with this discussion in subsequent sections of this report, Table 3-2 summarizes the volume of water needed for spring change and exchange applications based on time of year.

[2] The Big Springs category has been broken out and accounted for separately from the other South Fork Springs because of its newness. This group of springs is so new that there is not enough historical data to accurately estimate yields based on past flows as is being done for South Fork. Thus, Big Springs has been broken out and estimated separately based on values developed during the design of the springs.

Table 3-2
Summary of Spring and Exchange Values

	Average Year (acre-ft)	Dry Year (acre-ft)
Irrigation Season Change Application (a19153)	6,530	5,057
Non-Irrigation Season Exchange (E85) of Other Change Application	3,940	3,603
Total Needed Exchange Water (Table 3-1)	10,470	8,660

Wells

Provo City wells can largely be grouped into four categories:

- *a9902 Consolidated Rights* – In 1977, Provo City consolidated 16 separate water rights into Change Application a9902. The change application provides Provo City with the right to pull 33.97 mgd (52.56 cfs) from any of 11 different municipal water wells with no limitation on the annual volume of water.
- *UMPA Wells* – In 1991, Provo City purchased six water rights from the Utah Municipal Power Agency (UMPA). This water originated from Spring Creek in Springville and was historically used for irrigation and industrial use. In 1999, the City successfully moved the point of diversion for this water to a number of proposed municipal well locations (Change Application a22983). Under this change application, the City was awarded up to 16,720 acre-ft annually for municipal purposes, but will be limited to the yield of the right based on actual flows in Spring Creek. For planning purposes, Provo City personnel estimate that no more than 10,000 acre-ft will be available from UMPA well rights in average years with potentially less water available in dry years. The City has begun to drill the wells required to use the UMPA rights. Three have been completed and are in service. Several other have been drilled, but are not currently in service for water quality or capacity reasons. Several additional sites are under consideration for future wells.
- *BYU Well* – Brigham Young University and the LDS Church are the named owners of a water right associated with the BYU Well on the Provo campus. BYU and Provo City have an agreement in which Provo City uses the water right and maintains the BYU Well in return for municipal water from the City's distribution system. The right is for 5.0 cfs of flow.
- *Miscellaneous Other Municipal Well Rights* – Provo City and its partner Metropolitan Water District of Provo have acquired a number of other small ground water rights. The most significant of these is the Thorn Well, with a 1948 priority right to 1.0 cfs.

Estimated Annual Usable Yield from Wells. If the wells produced the full water right owned by Provo City, they could yield over 59,000 acre-ft annually. However, it is not recommended that this maximum source yield be used for planning purposes. The actual usable yield of the wells will be limited to much less volume by three issues:

- **Mechanical Reliability.** It is not reasonable to expect that all of the City's wells will always run perfectly during peak demand periods. Instead, it is recommended that the reliable yield for planning purposes be reduced to include no more than 80 percent of maximum well production capacity to account for potential problems that may arise regarding water quality or pump maintenance at individual wells.
- **System Demand.** Although well water is a good source of culinary water, it will always be a lower priority source than spring water because of the costs associated with pumping it out

of the ground. As a result, wells will be pumped only as needed to augment spring water. In the winter months, most of the Provo City demand is satisfied from spring water sources. Thus, the potential usable yield from Provo City wells will be limited to the amount of additional demand above the spring water production.

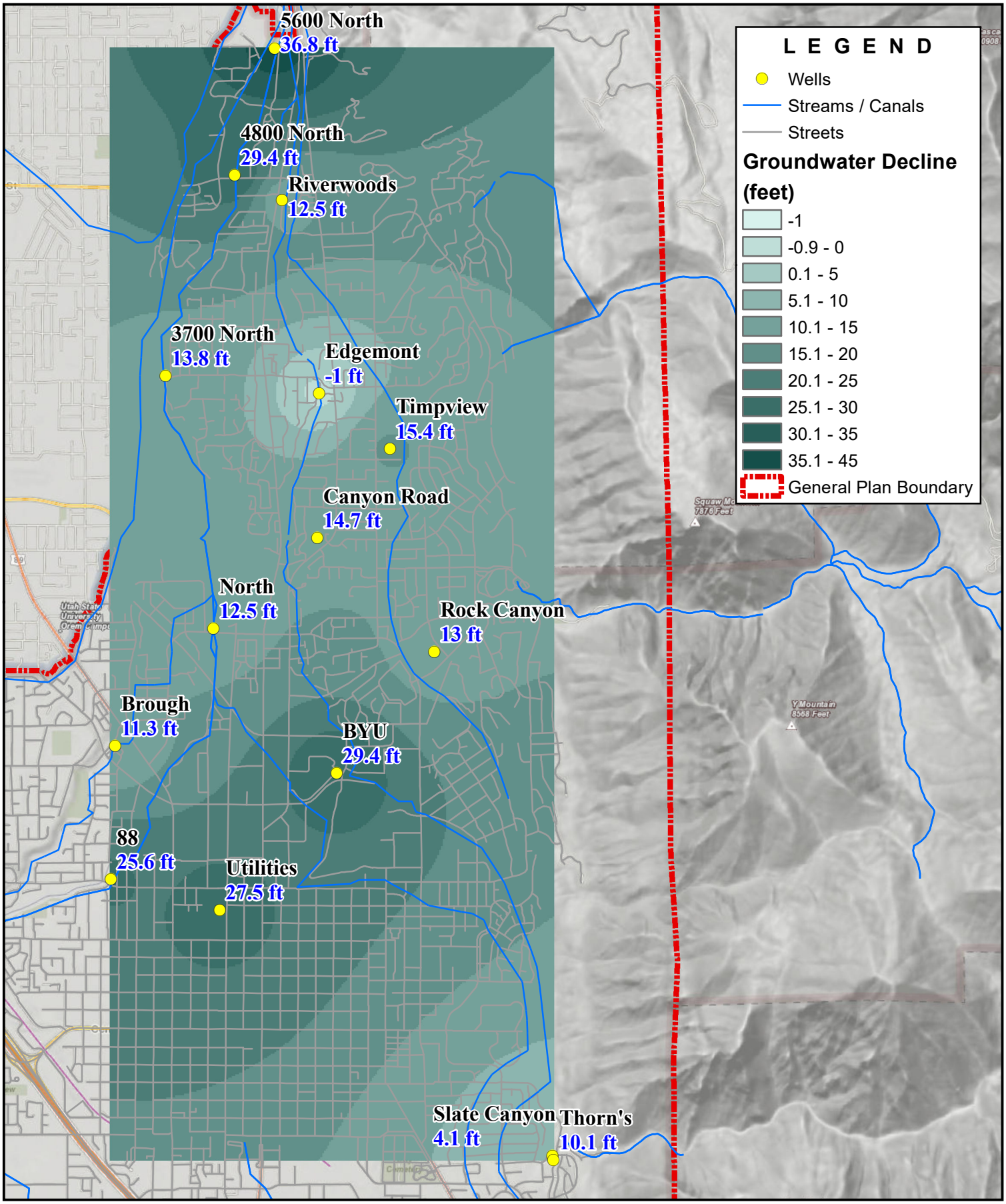
- **Aquifer Yield.** Perhaps the most significant limitation on usable yield from wells will be the actual water available in the aquifer. Regardless of what water rights are identified on paper, only the wet water that is actually in the ground can be accessed for use. The City has been actively evaluating sustainable yield from its aquifer over the last several years. While it does not have a concrete estimate of sustainable yield, there is good reason to believe that aquifer yield will be a limiting factor on well production in the near future. Figure 3-1 shows the estimated decrease in water table in the City based on historic observations at City wells. Most of the City's wells show groundwater declines of between 10 and 30 feet since data started being collected at each well (typically 1980's for most wells). As an example of how this has been occurring, Figure 3-2 shows the observed decline over time for the 4800 North Well. Based on this information, it can be concluded that groundwater withdrawals already exceed the current recharge into the aquifer. Increasing groundwater withdrawals in the future would likely result in additional declines in the water table.

These limitations to annual well yield can be observed in the historic production records. Over the past 10 years, only a portion of the potential maximum yield has been used. Historic well production has varied from just under 9,932 acre-ft in 2005 to almost 17,800 acre-ft in 2001. This is far less than the estimated volume of ground water that could be produced with all wells at full well production capacity. While past limitations on yield have probably been primarily a function of system demand, aquifer yield is expected to be the greater constraint moving forward.

When the limitations above are considered, the recommended maximum planning yield for all Provo City wells is 10,000 acre-ft. The average production from wells since 2000 is about 13,200 acre-ft. Until additional studies are completed regarding the safe yield of the aquifer, groundwater production should be limited to no more than has been produced historically with an additional small reduction to minimize further aquifer decline. With that said, it is understood that short-term increases in groundwater production can be accommodated as long as the long-term average is kept at a sustainable level. Thus, it is fully expected that well production could be increased to offset the projected decreases in spring sources during dry years. However, for planning purposes, the recommended dry year yield will still be reported as 10,000 acre-ft with any increased withdrawals in dry years accounted for from other sources (see Managed Aquifer Recharge below). Correspondingly, Table 3-3 summarizes existing well yields.

Table 3-3
Source Summary of Existing Well Yields

Source	Average Year (acre-ft)	Dry Year (acre-ft)
Combined Provo City Wells	10,000	10,000
Total Well Source	**10,000**	**10,000**



BOWEN COLLINS & ASSOCIATES

GROUNDWATER DECLINE

PROVO CITY
WATER MASTER PLAN

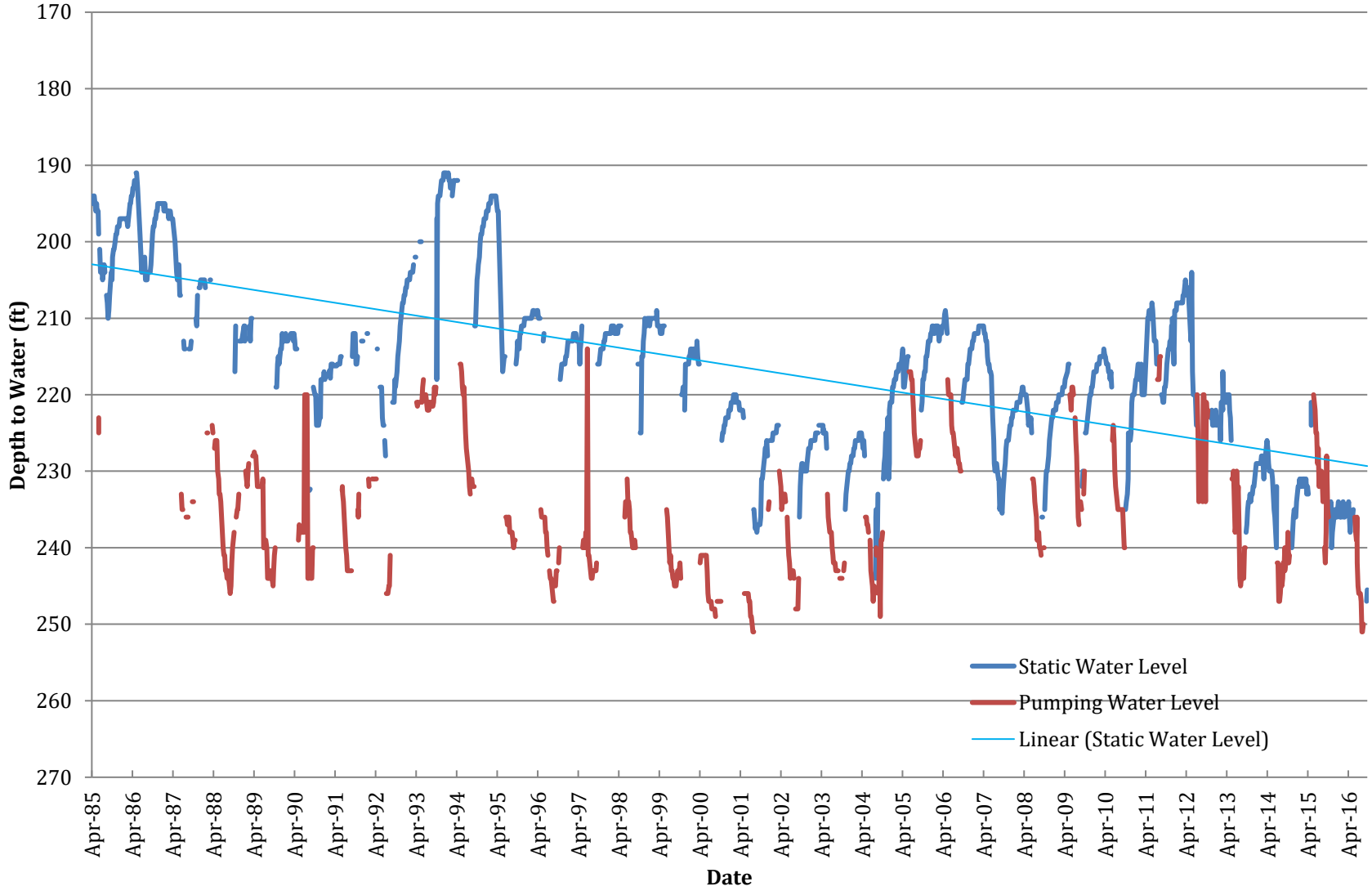
NORTH:

SCALE: 0 2,000 4,000 Feet

FIGURE NO. 3-1

P:\Provo City\2018 Water Master Plan\4.0 GIS\4.1 Projects\Figure 4-1 - gROUNDWATER.mxd amckinnon 1/16/2019

Figure 3-2
4800 North Well Static Water Level Decline



Surface Water

The final category of water used by Provo City is surface water. Historically, this has been used in the form of treated water from the Don A. Christiansen Regional Water Treatment Plant[3] (DACRWTP) or as exchange water for springs. In the future, surface water will also be used for managed aquifer recharge. Surface water can be grouped into two categories: Provo River direct flow rights or storage rights in several different mountain reservoirs in the Provo River Drainage.

Provo River Direct Flow Rights. Provo City owns a number of water rights in the Provo River. For the purposes of this analysis, these water rights have been consolidated into three major groups:

- **Provo River a19153 Water –** Provo City's largest claim to water rights in the Provo River is the result of "The Provo River Decree". In this decree, the City received several Class A water rights. A portion of these rights are typically referred to as Paragraph 4(a), 4(b), and 4(c) water. These water rights were combined in change application a19153. This change application allows Provo City to exchange up to 17,444 acre-ft of Provo River Water for water from springs in South Fork during the irrigation season. This water can also be treated to culinary quality for direct use.
- **Provo River Non-Irrigation Season Water –** In addition to the a19135 water discussed above, the City also has Class A water rights in the Provo River associated with Paragraph 4 of the decree for use outside the irrigation season. Paragraph 4(d) indicates the City may take up to 65 cfs of water outside the irrigation season. To our knowledge, a specific volume award has never been identified for this right.
- **Miscellaneous Provo River Water Rights –** Provo City also owns other miscellaneous direct flow rights in the Provo River and in South Fork. It is estimated that these miscellaneous water rights will yield 2,520 acre-ft in average years (870 acre-ft approved for culinary use) and 2,020 acre-ft in dry years (695 acre-ft approved for culinary use).

The maximum theoretical volume associated with the City's surface water rights exceeds 55,000 acre-ft. However, the useable yield from these rights can be limited by several factors. In addition to defined water right limitations, use of the water can be limited by availability of actual, wet water in the river, system demands, and treatment and conveyance capacity. This will be discussed subsequently.

Storage Water. Provo City currently holds water rights in several reservoirs in the Provo River Drainage:

- **Deer Creek Storage –** Provo City has access to up to 8,000 acre-ft in Deer Creek Reservoir via a contract with Provo River Water Users Association. In an average year, it is expected that this full volume will be available. Dry year available storage from this source has been estimated at 3,480 acre-ft. This is based on a 43.5% percent allotment from Deer Creek Reservoir as was experienced during a recent drought (2013).

  Provo City also has an obligation to supply up to 1,824.2 acre-ft of water from this storage to the Hamblin water right (Water Right 55-11091). When this right is called for, it will reduce the available water from Deer Creek storage to 6,175.8 acre-ft in average years and 1,655.8 acre-ft in dry years. Both average and dry year yields assume the City continues their contract for this water.

[3] Owned and operated by the Central Utah Water Conservancy District.

- **Lost Lake Storage (Jordanelle) –** A second storage right held by Provo City is in Jordanelle Reservoir. Up to 860 acre-ft of water is available from the Lost Lake water rights that are stored in this reservoir. Approximately 322 acre-ft of this right is available in all years and has been used as the estimate for the dry year yield of this water source. The remaining 538 acre-ft is available only under certain water year conditions but has been assumed to be available in average years for supply planning purposes. While this water is associated with Jordanelle, it does not have dedicated storage in the reservoir that allows it to be held over from year to year. However, it can be put in the City's other Jordanelle storage (see next section).
- **Additional Jordanelle Storage –** Provo City also has an additional 10,000 acre-ft storage right in the Jordanelle Reservoir. Historically, despite its best efforts, the City has not been able to use the full extent of this storage. The City is currently pursuing alternatives with the intent of using this storage in the future. Use of this storage will be an important part of allowing the City to optimally use its Provo River rights.
- **CUP Water –** Provo City has a contract through Provo Metropolitan Water District (PMWD) with Central Utah Water Conservancy District (CUWCD) for up to 1,800 acre-ft of Central Utah Project (CUP) water stored in the Jordanelle Reservoir. This contract includes priority in all CUP facilities such as the DACRWTP. The contract requires PMWD to send notification to CUWCD early each water year regarding its intents on using the water. PMWD is only obligated to pay for the water once the water is requested, but once requested, the water must be paid for every year thereafter whether it is used or not. To date, the City has never used any of this water, but can use it as necessary to meet future needs.

Surface water projected yield is summarized in Table 3-4. Dry year yield is based on the estimated 25-year drought event.

Table 3-4
Source Summary of Existing Surface Water Projected Yield

Source	Average Year (acre-ft)	Dry Year (acre-ft)
Provo River Direct Flow		
Morse Decree Provo River Rights - Paragraph 4	54,528	23,312
Misc. Provo River Rights	870	695
Subtotal (Provo River Direct Flow)	55,398	24,007
Storage		
Deer Creek Storage[1]	6,175.80	1,655.80
Lost Lake Storage (Jordanelle)	860	322
Additional Jordanelle Storage[2]	0	0
CUP Water	1,800	1,800
Subtotal (Storage)	8,836	3,778
Total Surface Water Source	**64,234**	**27,785**

[1] Does not include 1,824.2 acre-ft of water associated with Hamblin Right.
[2] 10,000 acre-ft of storage but does not include an annual water supply.

Use of Surface Water. Provo City currently uses its surface water for two primary purposes:

- **Spring Water Change Application –** One use of this water is as water taken via change application from South Fork and Big Springs. During the irrigation season, the water coming

from these springs is primarily from Provo River direct flow rights via change application. Outside of the irrigation season, this exchange has normally been met through Deer Creek water rights. Unfortunately, with the additional need for exchange water associated with all the South Fork Springs including Big Springs, and the reduced reliable yield of Deer Creek in dry years, the available water from Deer Creek in dry years (1,655.8 acre-ft) will not be adequate to meet projected exchange needs outside the irrigation season (3,603 acre-ft per Table 3-2). The City will need an additional source (or sources) of exchange water to make up this deficit.

- **Treated Water –** Provo City has historically treated some of its surface water at the DACRWTP. Treated surface water is used mainly to meet demands during the peak summer months. The quantity varies depending on demand and climate conditions. Provo City's use has ranged from as high as 6,090 ac-ft in 2007 to as low as 1,360 ac-ft in 2008.

  To date, all of the water Provo City has received from the DACRWTP is from Provo City rights in the Provo River, and is not CUP water. Because it is not CUP water, Provo City has a lower priority in the treatment plant than other entities. Running non-CUP water through a CUP facility is only an option when there is capacity available. If any CUP water is needed in the plant, it takes first priority over the non-CUP water rights.

  For this reason, the City is constructing its own advanced water treatment facility. The purpose of this facility will be to treat water from the Provo River that can then be used to recharge the aquifer (see next section) or be used directly in the City system, allowing the City to idle wells and similarly achieve aquifer recharge. The planned design capacity for this treatment plant is 30 MGD.

In addition to these historic uses, the City may use surface water in three additional ways in the future to meet its expected needs:

- **Managed Aquifer Recharge** – The City has adequate groundwater rights to meet its future needs but actual availability of wet water in the aquifer is a concern. The City also has extensive surface water flows that are being reserved for future growth, but currently does not have capacity to treat and deliver these flows. Managed aquifer recharge (MAR) can be used to address both these issues. If the City can infiltrate its surface water into the primary recharge zone of the aquifer, this water would then be available to be pulled out through the City's existing and planned future groundwater wells or raise the groundwater level to ensure Provo could divert its existing rights from its existing wells.

  Preliminary analysis indicates that the City will be able to directly infiltrate up to 6.5 mgd (10 cfs) of raw water from the Provo River into the aquifer through existing or planned facilities in the City. Additionally, the City is planning to construct a new 30 MGD water treatment plant (as described above) that will allow it to use its existing culinary system facilities to achieve additional aquifer infiltration and/or injection. It is assumed that infiltration facilities for treated water will have capacity for at least the 30 MGD of the new treatment plant.

  It will be noted that the term MAR is being used rather than aquifer storage and recovery (ASR). This is because the City has adequate ground water rights to meet its future needs. It does not need to rely on achieving a new right through storing and then recovering water as is done in a typical ASR program. It simply needs to make sure it maintains its aquifer health sufficiently to allow it to use the existing groundwater rights it has.

- **Using Jordanelle Storage** – As noted previously, the City has 10,000 acre-ft of Jordanelle storage. Utilizing this storage in the future will be an essential component of meeting City's

projected needs, especially in dry years. During the winter and early spring, available water in the Provo River will be in excess of the City's capacity to use in its MAR program. Conversely, during the late summer and fall months, treatment and MAR capacity will often be in excess of available Provo River rights. Thus, Jordanelle storage will be needed to store water early in the year for use during later low flow periods.

Projected need for storage at 2065 is expected to range from 1,500 acre-ft to 10,000 acre-ft depending on water year conditions. Peak use of storage actually occurs in years that are just slightly drier than average. In wet years, flows in the river are generally high enough to meet demands throughout the season, with only a little storage needed in the late summer. In extremely dry years, there is not enough excess runoff in the spring to completely fill the storage. Thus, maximum storage occurs when there is enough runoff to fill the storage early in the year, but not enough flow to satisfy demands later in the year. This situation occurs in years that are a little bit drier than average. For the 25-year drought planning scenario, required minimum storage is about 3,600 acre-ft.

It will be noted that this proposed use of storage is internal to each water year. While year-to-year storage may be beneficial in in extreme drought events, it cannot be counted on and has correspondingly not been relied upon as part of this supply and demand master plan.

- **Wastewater Reuse –** Wastewater reuse includes the use of treated wastewater effluent for irrigation and other purposes throughout the City. While the underlying water right sources for reuse are not strictly limited to surface water sources, reuse is discussed here because of its potential interaction with other surface water source decisions. Specifically, any irrigation or industrial demand that can be satisfied through reuse will reduce the overall need from other sources. The City does not currently have any specific plans for reuse but continues to reserve this source as a possibility for the future if needed.

Evaluation of Annual Supply Availability

Based on the discussion above, annual supply has been evaluated based on water rights, source availability, conveyance and treatment capacity, and system demand. Figures 3-3 through 3-5 show results for one scenario – 25-year drought event for 2065 demand conditions. Information contained in the figures include:

- Figure 3-3 illustrates how water would be used in the system if there is no direct, culinary use from the new treatment plant. In this case, all system demand would be satisfied from spring or well water. This is representative of how demands would be satisfied if all water from the treatment plant is infiltrated into the aquifer. It also represents system operation in the event the treatment plant is down for repairs or other reasons.
- Figure 3-4 illustrates how water would be used if the new treatment plant is used directly in the culinary system. In this case, treated water would be used to allow City wells to idle, achieving MAR indirectly. This is expected to be the more typical mode of operation as it achieves the same aquifer health benefits while saving pumping costs out of the aquifer. As can be seen in the figure, a large portion of demand in the late irrigation season will be met though treatment of water stored in Jordanelle during peak periods.

Figure 3-3
Projected Seasonal Use at Buildout - 25-Year Drought, No Culinary from Surface Water

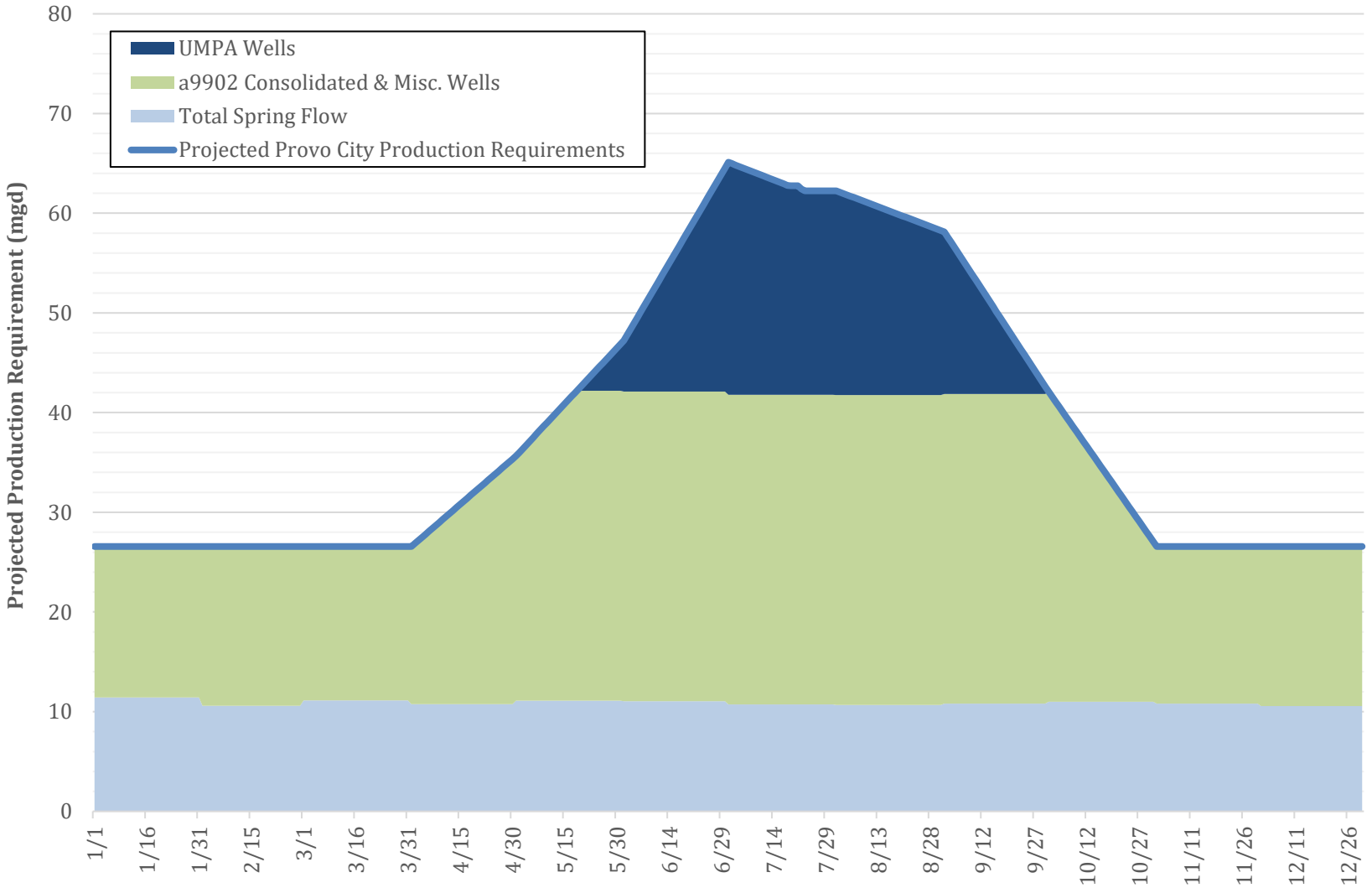


Figure 3-4
Projected Seasonal Use at Buildout - 25-Year Drought, With Well Idling and Storage

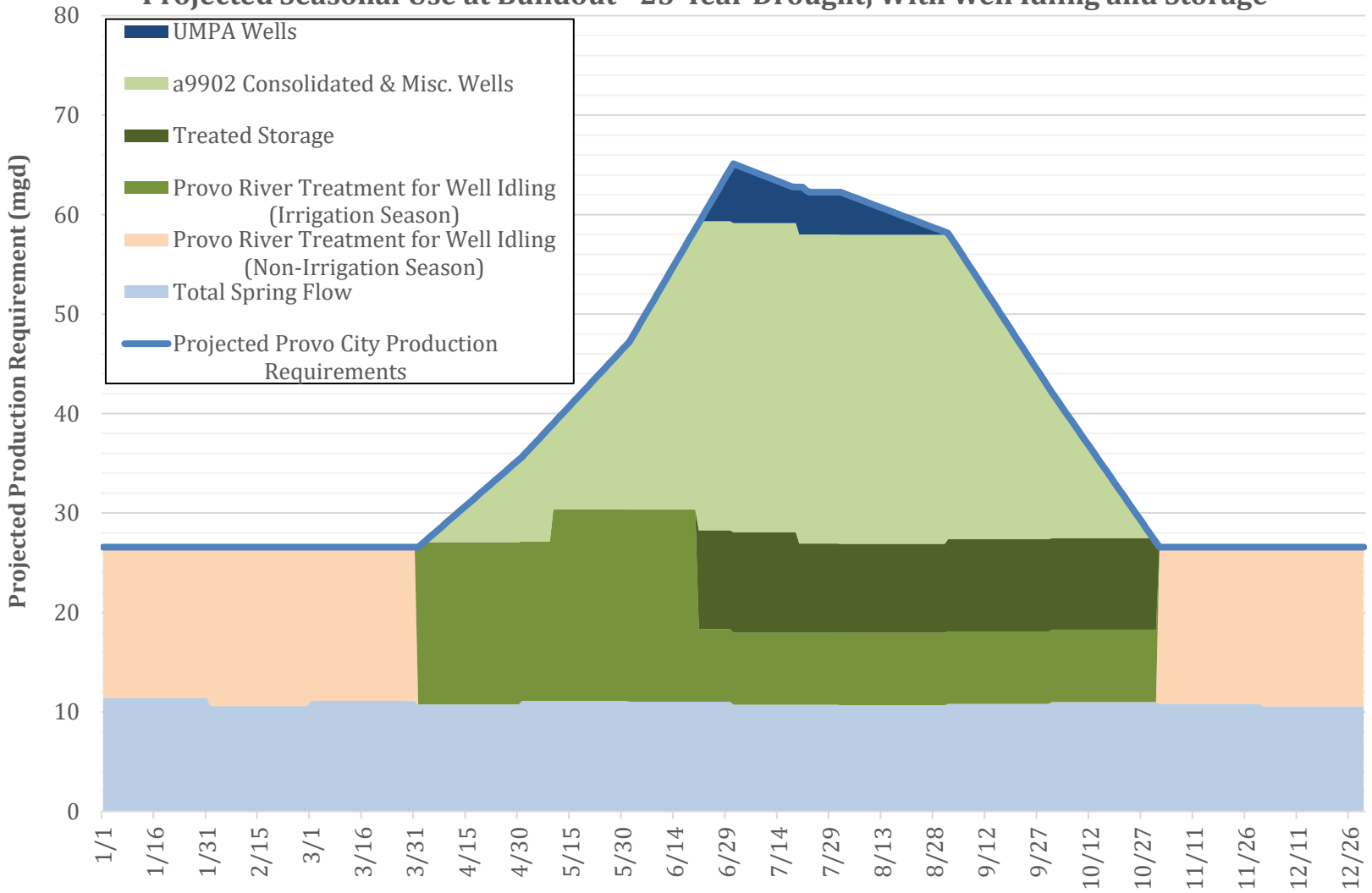
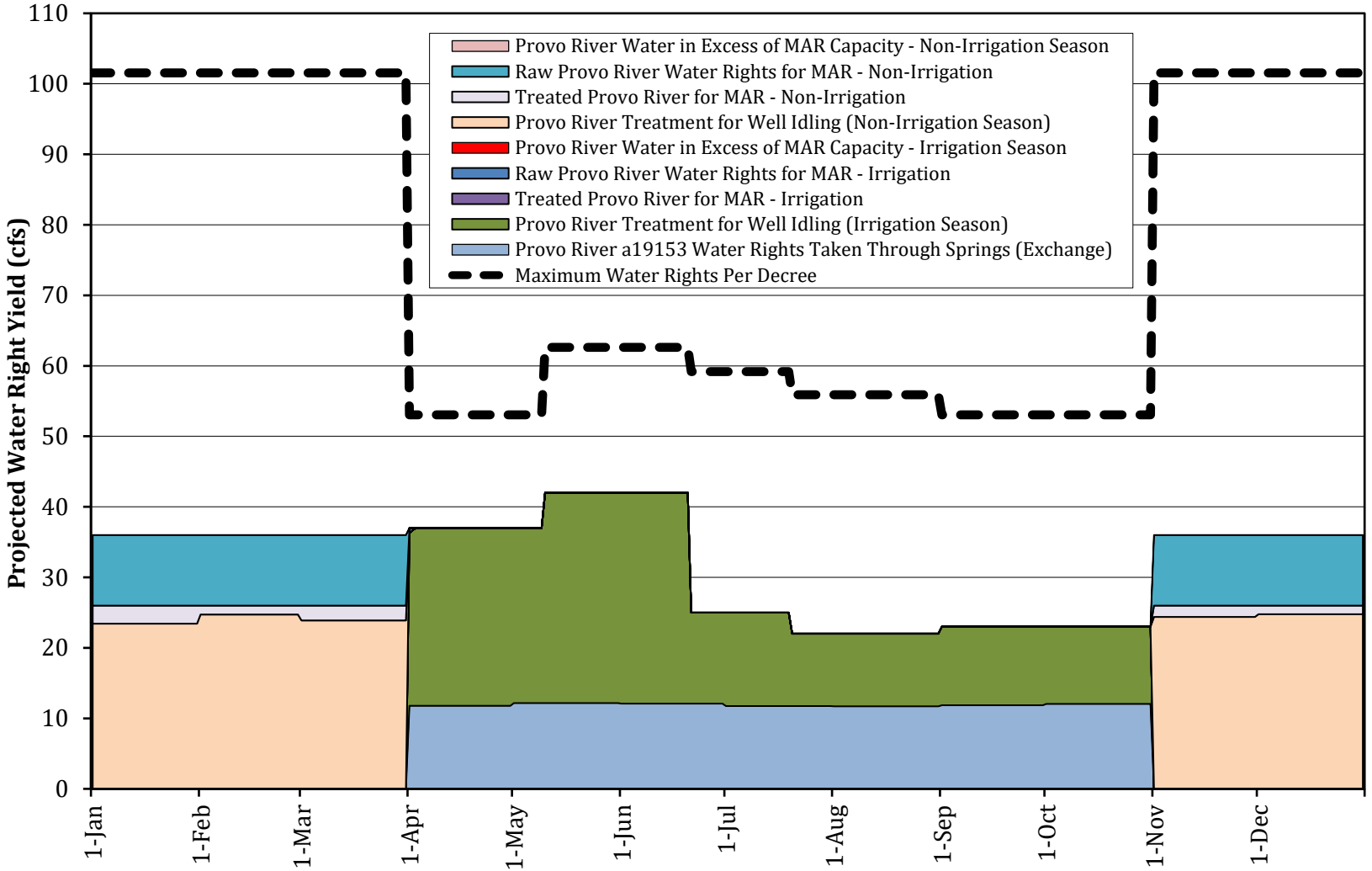


Figure 3-5
Use of Provo River Rights at Buildout - 25-year Drought



- Figure 3-5 provides additional details on how Provo River water would be used. As can be seen, available water in this drought scenario is significantly less than potential maximum water rights identified in the decree. In this case, proposed facilities have adequate capacity to use all of the available water either through direct culinary use, treatment and MAR infiltration, or raw water infiltration. Although not shown, a portion of the water identified for potential MAR in the non-irrigation season would first be used to refill storage at Jordanelle Reservoir for use later in the year.

Following this same type of analysis, availability of water for all the various water year scenarios has been summarized in Table 3-5.

Table 3-5
Source Summary of Provo River Surface Water Yields (at 2065)

Water Year Conditions	Total Water Rights (acre-ft)	Estimated Available Water (acre-ft)	Estimated Usable (acre-ft)	Spring Exchange (acre-ft)	Maximum Usable Volume Based on Demand (acre-ft)	Additional Usable Volume Through Storage (acre-ft)	Additional Usable Volume For MAR (acre-ft)
Wet Year	54,528	54,528	42,144	6,530	21,314	1,223	13,078
Average Year	54,528	52,686	42,034	6,530	21,013	1,523	12,967
Dry Year (5-year Event)	54,528	42,354	41,097	7,004	20,591	4,768	8,734
Dry Year (25-year Event)	54,528	23,312	23,312	7,004	12,757	3,550	0
Dry Year (100-year Event)	54,528	16,507	16,507	7,004	9,410	93	0

Total Supply

Tables 3-6 summarizes the total amount of water available to Provo City. Estimated usable yield is provided for both average and dry years (25-year drought event). Please note that this is not the full water right amount but represents the expected maximum usable yield of each source. In assembling this table, available flow has been organized into two sections:

- **Summary by Source of Water Right** – Provo has many exchanges in place that will affect where the City receives its water from. However, it is important to understand where the underlying rights come from that the City has available for its use. This section summarizes the origin of water rights to be used in meeting the City's needs.
- **Summary by Source of Wet Water** – It is also useful to understand where the wet water will actually come from. This section summarizes the actual sources where the City's water comes from. Where applicable, these totals have been broken into the underlying rights that are used to supply the water from each source. Also included in this section is a summary of how storage will be used to manage the City's resources between average and dry years.

Included in the table is the allocation of surface water to MAR and Jordanelle storage. The need for the volumes shown in the table and how they were calculated are discussed in Chapter 5 but are included here to provide a full summary of the City's overall water supply portfolio.

Table 3-6
Usable Yield of Current Provo City Culinary Water Sources

Source Category	Usable Yield in Average Year (acre-ft)	Usable Yield in Dry Year (acre-ft)
Summary by Source of Water Right		
Springs (Provo rights only)	7,085	3,570
Wells	10,000	10,000
Paragraph 4 Provo River Rights	41,163	22,617
Misc. Provo River Rights	870	695
Deer Creek Storage[1]	6,175.8	1,655.8
Lost Lake Storage (Jordanelle)	860	322
CUP Water	1,800	1,800
Total - Source of Water Right	**67,954**	**40,660**
Summary by Source of Wet Water		
Available Water		
Springs		
Provo Decreed Rights	7,085	3,570
Irrigation Season Change Application (a19153)	6,530	5,057
Non-Irrigation Season Exchange (Deer Creek)	3,940	1,655.8
Non-Irrigation Season Exchange (Provo River)	0	1,947.2
Subtotal Springs	***17,555***	***12,230***
Wells		
Sustainable Yield without MAR	10,000	10,000
Additional Yield from MAR or Well Idling	16,440	16,308
Aquifer Recovery in Dry Years	0	5,457
Subtotal Wells	***26,440***	***31,765***
Total Water Used	**43,995**	**43,995**
Aquifer Storage Changes (MAR and ASR)		
Provo River Direct Treatment	33,980	12,758
From Jordanelle Storage	1,523	3,550
Deer Creek Storage	2,236	-
Subtotal Water into Aquifer	*37,739*	*16,308*
Water from MAR or Well Idling	-16,440	-16,308
Water from Aquifer Recovery	-	-5,457
Subtotal Water out of Aquifer	*-16,440*	*-21,765*
Subtotal Storage Changes	**21,299**	**-5,457**
Potential Additional Treatment		
Lost Lake Storage (Jordanelle)	860	322
CUP Water	1,800	1,800
Subtotal Potential Additional Treatment	**2,660**	**2,122**
Total - Source of Wet Water	**67,954**	**40,660**

[1] Does not include 1,824.2 acre-ft of water associated with Hamblin Right.

PEAK DAY PRODUCTION CAPACITY

In additional to annual supply, it is important to consider the maximum production capacity of Provo City water supplies compared to the City's Peak Day Production Requirement (see Chapter 2). For purposes of evaluating peak production capacity, the Provo City sources have again been grouped into three categories: springs, wells, and surface water.

Springs

As discussed previously, the total production from the springs is 12,230 ac-ft during dry years and 17,555 ac-ft during average years. This includes a large portion of exchange water as was illustrated in Table 3-2. The output of the springs varies slightly over the year as shown in Table 3-7 for both average and dry years.

Table 3-7
Historical Monthly Spring Production

Month	Average Year Production (ac-ft)[1]	Average Year Production (mgd)	Dry Year Production (ac-ft)[2]	Dry Year Production (mgd)
January	1,427	15.0	1,044	11.0
February	1,327	15.4	896	10.4
March	1,335	14.0	860	9.0
April	1,320	14.3	872	9.5
May	1,386	14.6	970	10.2
June	1,491	16.2	954	10.4
July	1,566	16.5	971	10.2
August	1,576	16.6	1,038	10.9
September	1,575	17.1	1,159	12.6
October	1,597	16.8	1,218	12.8
November	1,495	16.2	1,141	12.4
December	1,461	15.4	1,107	11.6
Total	17,555	15.7	12,230	10.9

[1] Average year production is based on average spring production flows since 2000 as calculated from records provided by Provo City staff. Includes estimated average flows from Big Springs since historic records are limited for those springs.
[2] Dry year production is from 2002 spring production records. Includes estimated dry year flows from Big Springs since those springs were not developed in 2002.

Since peak production requirements have historically been observed in July, metered flow in this month has been selected as the basis for reliable peak day production. When converted to a flow rate, the reliable peak day production for the springs is 16.5 mgd (25.5 cfs) in average years and 10.2 mgd (15.8 cfs) in dry years.

Wells

As discussed previously, Provo City has a number of existing wells and has plans to drill several additional new wells. Table 3-8 lists the location and capacity of wells owned by Provo City under its various water right types.

Table 3-8
Municipal Water Wells and Well Capacity

Well	Location	Well Pumping Capacity (gpm)
a9902 Consolidated Wells		
1. Rock Canyon Well (a9902)	2000 North West Temple Dr.	3,400
2. North Well (a9902)	2230 North 350 West	5,000
3. Edgemont Well (a9902)	3600 North 200 East	4,000
4. Brough Well (a9902)	1300 Columbia Lane	1,200
5. 4800 North Well (a9902)	4800 North Approx. 350 West	2,300
6. 5600 North Well (a9902)	5600 North 300 West	1,100
7. City Center Well (a9902)	City Center	For cooling only
8. 3700 North Well (a9902)	3700 North 350 West	3,750
9. 88 Well (a9902)	800 North 800 West	2,100
10. Utility Well (a9902)	700 North 225 West	1,100
11.Slate Canyon Well (a9902)	742 South Slate Canyon Drive	450
a22983 UMPA Wells		
12.Fort Utah		Drilled, but not used for water quality reasons
13. Riverwoods	4750 North University Ave.	1,300
14. Canyon Road	2737 North Canyon Rd.	2,500
15. Timpview	750 East 3280 North	900
16. Intermediate		Drilled but not equipped
17. Columbia		Future
18. Bicentennial		Future
19. Kiwanis		Future
20. Lions Park		Drilled but not equipped
21. Exchange Park		Future
22. Rotary		Drilled but not equipped
23. North Intermediate		Future
Other Wells		
24. BYU Well (Helaman Halls)	2100 North 3rd East	2,200
25. Thorn Well	754 South Slate Canyon	400
a9902 Consolidated Well Capacity:		**24,400 gpm**
A22983 UMPA Well Capacity:		**4,700 gpm**
Other Well Capacity:		**2,600 gpm**
Approximate Existing Well Capacity for Provo City:		**31,700 gpm**
Expected Future Well Capacity for Provo City:		**40,700 gpm**

Provo City and PMWD currently own 16 wells as shown in Table 3-7. A seventeenth is owned by BYU but operated by Provo City. Of these, two (City Center and Fort Utah) are not actively used for municipal supply. The maximum production for the 15 active wells currently used in the system is 31,700 gpm (45.6 mgd or 70.6 cfs). Of this, 27,000 gpm (38.9 mgd or 60.1 cfs) comes from the a9902 Consolidated Wells and other miscellaneous wells, while 4,700 gpm (6.8 mgd or 10.5 cfs) comes from existing UMPA Wells. With the addition of future UMPA wells, production from UMPA Wells is planned to increase to 13,700 gpm (19.7 mgd or 30.5 cfs). This will bring the total well production in the City to 40,700 gpm (58.6 mgd or 90.7 cfs).

Surface Water

Provo City use of treated water from the DACRWTP is physically limited to approximately 25.9 mgd (40 cfs). However, the City has only historically used about 10 mgd (15.5 cfs) from this source. Moving forward, Provo City has no guaranteed capacity in the DACRWTP outside of its CUP water. Thus, for planning purposes, no capacity associated with this plant will be relied upon as part of the City's supply plans.

The new treatment plant being constructed by the City is planned to have a capacity of 30 mgd.

Total Peak Day Production Capacity

The total projected peak production capacity of each supply described above is summarized below in Table 3-9.

Table 3-9
Projected Dry Year Peak Day Production Capacity
Existing and Future Sources

Source	Existing Peak Day Production (mgd)	Future Peak Day Production (mgd)
Springs	10.2	10.2
a9902 Consolidated Wells	38.9	38.9
UMPA Wells	6.8	19.7
DACRWTP	10	0
New Provo WTP	0	30
Total	**65.9**	**98.8**

Note: MAR is not listed as a peak day production source because the annual volume produced via MAR is expected to be pumped by existing and new wells, whose peak day production capacity is already accounted for above.

CHAPTER 4
WATER SUPPLY VARIATION – NOW AND IN THE FUTURE

The information presented in Chapters 2 and 3 of this report is based on the some of the most up-to-date data available. This includes statistical analysis of the modern period of record to estimate "dry" and "average" water year production. Intrinsic to this analysis is that assumption that sources are expected to produce well into the future in accordance with past performance. This begs questions such as:

- Is the modern historical record sufficient to describe the "dry" and "average" years that should be used for planning purposes?
- Will climate change or other factors likely affect water availability or system demands and, if so, in what ways?

This chapter is dedicated to considering these types of questions to better inform the conclusions reached elsewhere in this report, and ultimately to assist the City in understanding the long-term water supply and demand characteristics of their system inclusive of these types of considerations.

MEASURED STREAM FLOWS

Weber River

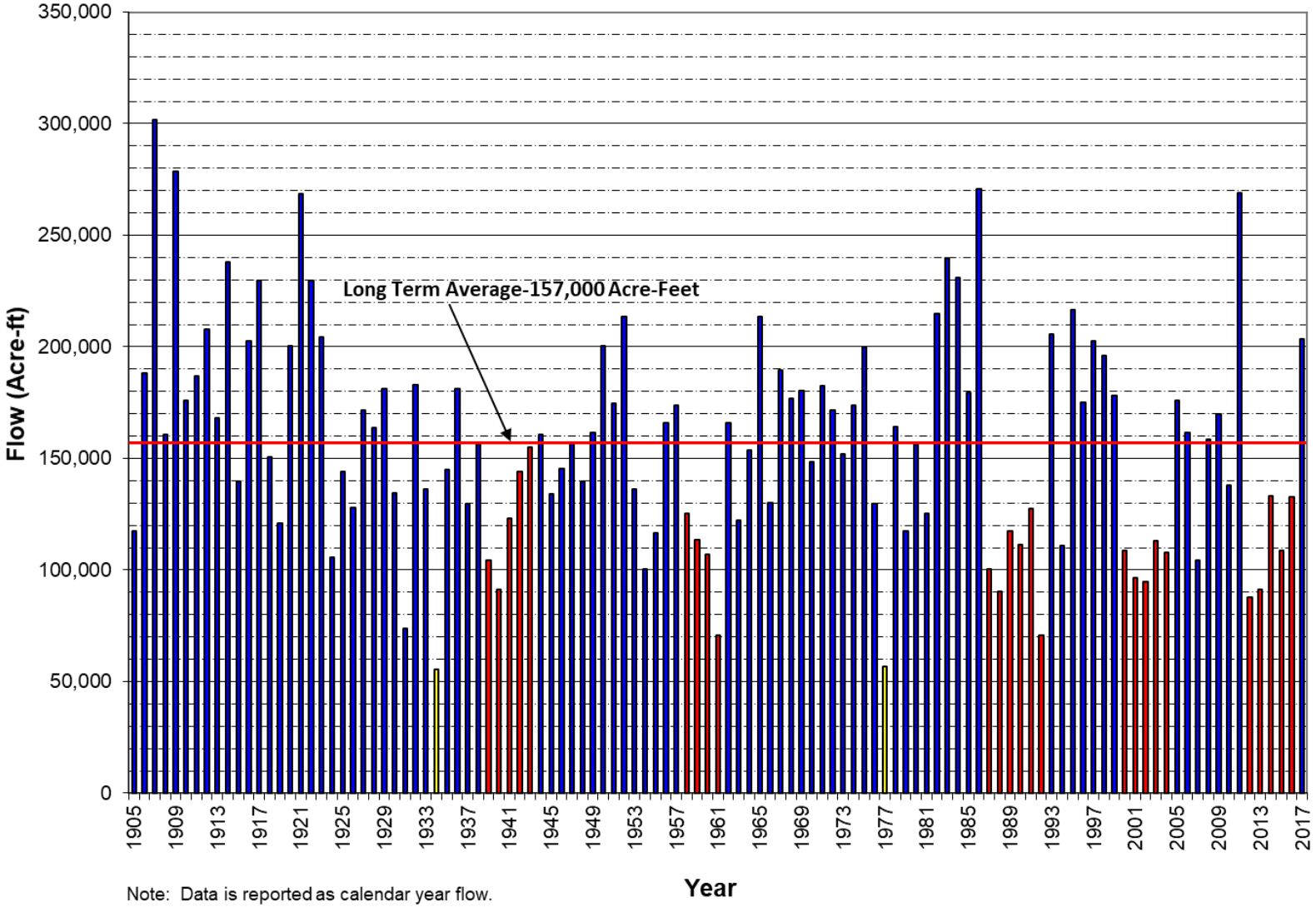
The longest continual record of a stream flow in the watershed that contributes to the Provo River system (and thus Provo City's water supply) is the Weber River at Oakley. Flow at this location has been measured since 1905. In addition, the watershed above this point is only slightly regulated. The only major storage or diversion above this location is the Smith Morehouse Reservoir which, when full, stores 8,350 acre-feet. This is very small in comparison to the long-term average flow volume of 157,000 acre-feet measured at the gauge at Oakley. Water at this location is diverted through the Weber Provo Canal to the Provo River and ultimately to Deer Creek Reservoir as part of the Provo River Project. This basin is also adjacent to the upper Provo River basins. Thus, it is also a good indicator of the long-term precipitation in that drainage that also contributes to Provo's water supply. Given these advantages, analysis of flow at this location can provide some important insights into projected Provo City water supply.

Figure 4-1 shows the annual flow volume of the Weber River at Oakley.

Several observations can be made from this figure:

- The average annual flow volume for the period of record has been 157,000 ac-ft.
- The figure shows that the early 1900's were a very wet period.
- Since the late 1980's, the average flow has been less than the long-term average. The last thirty-one years of record have had an average flow volume of 140,576 ac-ft. For these last thirty-one years, only twelve years have had flows above the long-term average flow volume.
- The two driest years on record were 1934 and 1977. However, both of these years were followed by years close to or above average. The City's water supply plan is not generally driven by a one-year drought.

Figure 4-1
Historical Flows for Weber River near Oakley
1905-2017



Note: Data is reported as calendar year flow.

Multi-year droughts are summarized in Table 4-1 below. These are periods of time when the annual flow does not reach average in any one year for an extended period. Note that, since 1987 (30 Years), there have been three such periods of extended drought. Before that time (1905-1986, 81 years), there were only two such events.

Table 4-1
Multi-Year Droughts during Period of Measured Stream Flows
Weber River at Oakley

Period	Years	Average Flow	% Average Flow
1939-1943	5	123,509	79%
1958-1961	4	104,143	66%
1987-1992	6	103,020	66%
2000-2004	5	104,106	66%
2012-2016	5	110,732	71%

It appears from this analysis that water supplies from the Weber and Provo Rivers can be subject to long term dry periods of 4-6 years. During those periods, the long-term storage of water in Deer Creek and Jordanelle Reservoirs (as well as recharge into the City's aquifer) has been and will be reduced. This needs to be considered in planning for water supplies to the City during dry years. It is not so much planning for dry years as planning for dry periods.

PALEOHYDROLOGY

A question that is often asked is – has the last 110 years been indicative of long-term water availability trends? To answer that question, we examined an analysis of tree ring data to extend the record of the Weber River at Oakley site back beyond the last 110 years.

A study was performed entitled "A 576-Year Weber River Stream Flow Reconstruction from Tree Rings for Water Resource Risk Assessment in the Wasatch Front, Utah", Bekker, DeRose, Buckley, Kjelgren, and Gill. This study used tree ring growth data to develop estimates of long-term flow volumes for the Weber River at the Oakley gage site. The study compared available tree ring data to the available flow data and developed a relationship between the two that was calibrated for the measured gage record as described above. This relationship could then be used to reconstruct estimated flow values beyond the period of record. Their reconstruction extended from 1428 to 2004. Figure 4-3 shows the reconstructed record and Figure 4-4 shows the data using a ten-year running average in order to smooth out the data and reflect drought periods.

The study examined severe drought periods over the period of record. The record shows dry periods extending up to 16 years. They ranked the 25 worst drought periods of the record. The 1930-1936, 1958-1961, and 2000-2004 periods that exist in the measured stream flow record were ranked in the top 25. The top ten drought periods and their length are shown in Table 4-2.

Table 4-2
Top 10 Ranked Periods of Drought Weber River at Oakley Stream Flow – Reconstructed from Tree Rings

Period	Drought Duration (Years)
1492-1500	9
1470-1475	6
1528-1534	7
1504-1507	4
1459-1461	3
1626-1632	7
1583-1586	4
1579-1581	3
1776-1783	8
1930-1936	7

These flow periods were ranked based on a total score that considered a combination of duration and magnitude of the drought. It is important to note that the period in the 1930's within the measured period of record is ranked in the top ten. As can be seen from the table, long-term droughts in the watershed have occurred over the entire period of record. What has been observed in the last 30 years may be more reflective of the long-term record on the Weber River than the measured record before the late 1980's.

Figure 4-2
Weber River at Oakley Reconstruction of Annual Flow Based on Tree Ring Data 1429-2004

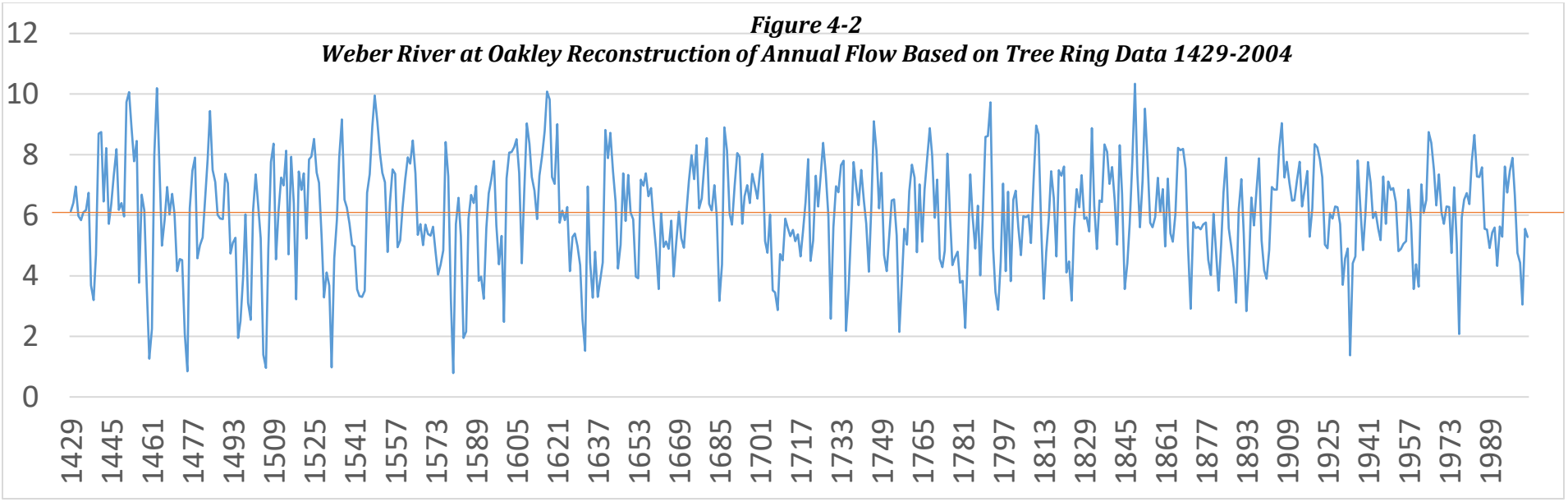
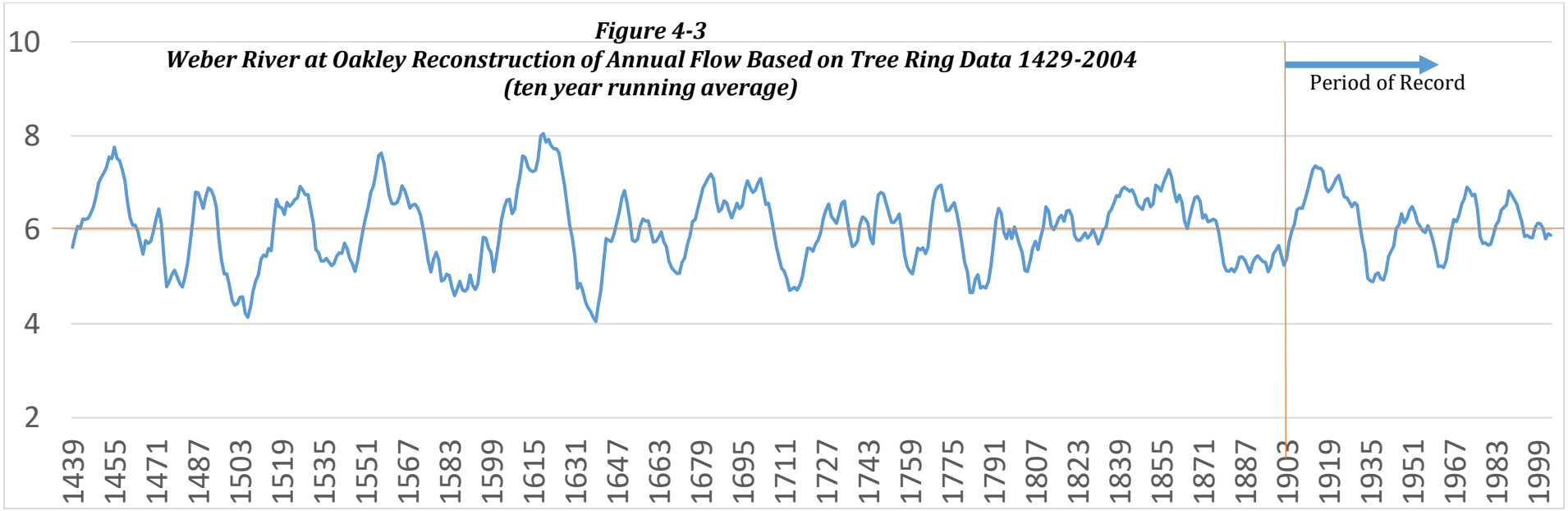


Figure 4-3
Weber River at Oakley Reconstruction of Annual Flow Based on Tree Ring Data 1429-2004
(ten year running average)



CLIMATE CHANGE

The earth is presently undergoing a warming trend. The warming appears to coincide with the results of many climate models predicting global warming. Locally, if you examine Salt Lake City Airport average temperatures in June, July, and August from 1948 to the present it shows an average temperature increase of 4.7 degrees Fahrenheit. Climate change can affect water supplies in a number of different ways. It can cause a change in overall precipitation in the watershed, less precipitation in the form of snow, earlier spring runoffs, and increases in outdoor demand because of the longer and warmer growing season.

Impact on Supply

A local study has been completed examining the effects of climate change on the water supply in the watersheds of the Central Utah Project (CUP). This study is titled "Water Supply Variability Study Draft Report", 2015, performed by Central Utah Water Conservancy District (CUWCD) and HDR. This study examined climate change impacts to the watersheds contributing to CUP supplies. The study looked at three scenarios:

1. Historic Hydrology
2. Worst Case Paleohydrology analysis based on a 60-year period from 1450 to 1509 using the same tree ring data discussed above.
3. A selected 10% drier climate model scenario for a future 2020-2079 period based on the long-term paleo record.

The model of their system, called CUPSIM, projected flows for these three scenarios and determined their impact on water supplies of the CUP.

Table 4-3 (Table 22 from their report) shows the projected impacts to various sources from the adverse climate change scenario they modeled (Scenario 3 from above). As can be seen in the table, it shows an impact of 2 to 35 percent less flow depending on the system component. While much of Provo City's water rights in the Provo System have higher priority than most of those listed here, the results are still indicative of a significantly negative effect of climate change on water supply.

Table 4-3
Modeled Impact of Climate Change on Various Sources - CUP Study

CUPSIM Diversion	Description	Average Annual Volume (acre-feet)		Difference (%)
		Historic	Scenario 3	
3.1	Upper Provo – Provo River Project	1,600	1,040	-35
4	Provo Aqueduct – PRP	56,700	54,700	-4
5.3	Olmsted/Provo River Aqueduct – PRP	22,900	20,800	-9
6.1	Lower Provo – PRP	13,500	12,200	-10
	Total PRP	**94,700**	**88,740**	**-6**
3.4	Heber Valley – CUP	17,900	17,500	-2
5.2	Olmsted – CUP	86,500	84,900	-2
9.1	ULS to Santaquin – CUP	21,500	19,300	-10
9.2	ULS to JVWCD – CUP	22,000	19,400	-12
11.2	Duchesne – CUP	24,900	24,900	0
	Total CUP	**172,800**	**166,000**	**-4**
10.1	Strawberry Valley Project	61,000	52,700	-14

Impact on Demand

Another recent study looked at the impact of climate change on demand. "Preparing for Climate Change-A Management Plan", 2017, was prepared by Jordan Valley Water Conservancy District (JVWCD) with assistance from CUWCD. As part of this plan, Western Water Assessment was commissioned to determine the impacts of climate change on demand. The results of this study showed that demand on their system could increase from between 2 and 17.4 percent. JVWCD used a number of 9.7% for climate change impacts to water demand, which was the midpoint of that range.

Climate Change Implications for Provo City

While the available data is limited, it appears that climate change could have a significant impact on the City's water supply plan. Expected impacts could include an increase in demand of 2 to 17 percent and a significant drop in supply. For planning purposes, it is recommended that the City consider the potential effect of a net change of 10 to 20 percent (through any combination of increased demand or reduced supply) in its long-term supply plan.

WATER SUPPLY VARIATION CONCLUSIONS

The following conclusions can be made about the City's water supply relative to drought and climate change:

- The water supply of the City will be most affected by long-term droughts.
- Even though the last 30 years have been much dryer than the long-term measured period of record, examining paleo data from tree rings show that long-term droughts occur on a regular basis and that the most recent 30 years are pretty typical of the long-term Paleo record drought periods.
- Climate change may significantly decrease water supplies on the Weber and Provo River systems based on CUWCD's study of its system.
- Recent studies estimate climate change may increase demand between 2 and 17 percent
- For planning purposes, the City should consider the potential effect of a net change of 10 to 20 percent (through any combination of increased demand or reduced supply) in its long-term supply plan.

CHAPTER 5
WATER SUPPLY RISK AND PLANNING

Water is one of the most, if not the most, important utilities for all communities. Therefore, it is requisite that water providers, like Provo City, consider water supply risk in their planning efforts to provide reasonable assurance of continuity of service in the case of unexpected source loss or failure. This chapter will describe and address water supply risks.

RISK TO WATER SUPPLY

Supply has the potential for being adversely affected in several ways. The risk associated with water supply is that it may be reduced so much that it can no longer satisfy production requirements.

The City's water supply could be reduced if a source were lost—either temporarily or permanently. While there are many ways this could occur, the most likely imaginable ways at this time are:

- An earthquake disables conveyance infrastructure, treatment infrastructure, or disturbs water availability by diverting surface water or adversely affecting aquifer characteristics.
- A water source becomes suddenly contaminated – intentionally through an act of terrorism, accidentally through an industrial spill or similar event, or from septic systems.
- A wildfire disables or destroys infrastructure—or even more likely—burns extensive vegetation leading to subsequent debris flows and contamination of a surface water source temporarily.
- Unexpected mechanical failure of pumps or other system components limit the City's ability to treat or convey water temporarily.
- Climate or other environmental changes reduce water supply, increase water demand, or both. (See Chapter 4 above for a detailed discussion on this topic.)

For discussion purposes, water supply risk is categorized into two scenarios: Minor Source Loss and Catastrophic Source Loss. The management of these risk scenarios will define the Recommended Supply Planning Scenario for the City's long-term annual water supply planning.

Minor Source Loss Scenario

This scenario covers the vast majority of potential source loss situations such as mechanical failure, pipe breaks, a well becoming contaminated, etc. For this type of scenario, it has been assumed that the City will have a buffer of water supply that is sufficient to handle this type of loss without disruption to customers, even during peak periods of demand. In other words, the City will always have enough extra supply that it can weather the loss of sources that are the most vulnerable to any of the risks listed above.

Based on an evaluation of potential source failure in the City, the recommended minor source loss buffers to be included for supply planning purposes are as follows:

- **Peak Capacity** – The most likely events that will affect peak capacity is mechanical equipment failure. Individual wells and treatment facilities have many mechanical components that are subject to failure from time to time. To account for these inevitable interruptions in well production, it is recommended that the City maintain sufficient reliable capacity to allow for the loss of one of two possibilities:

- Failure of up to 20% of of the City's well capacity. This is approximate 9 mgd based on current well capacity but will increase to 13.0 mgd at 2065 based on projected future well capacity.
- Failure of the City's new major treatment facility. This has a planned capacity of 30 mgd.

In this case, the controlling condition appears to be failure of the new treatment plant. City sources should be adequate to have the treatment plant out of commission and still be able to satisfy peak demands from other sources.

- **Annual Supply** – Because of the diversity of the City's water portfolio, it seems unlikely that interruptions to individual wells will have a major effect on total annual supply numbers. Even if 20% of the wells were down for maintenance, the City still has more than enough capacity for the remaining wells to produce water equal to the sustainable yield of the aquifer. Treatment plant interruptions can have large impacts for a short period of time but can generally be repaired quickly and brought back online.

  Thus, the greater risk to the City on an annual basis appears to be potential interruption to its spring supplies. Of greatest concern are the City's existing springs in Provo Canyon where a contamination event (e.g. tanker truck spill, landslide in the canyon, etc.) could result in a long-term or even permanent interruption in supply. To accommodate this potential loss of source, it is recommended that the City maintain an annual supply buffer of 6,450 acre-ft. This is equal to the average year yield of the City's Provo Canyon springs (see Table 3-1).

  In addition to protecting the City against source failure, this buffer also appears adequate to approximately offset the potential impacts of climate change. As noted in Chapter 4, the recommended planning contingency for the combined impact of increases in demand or decreases in supply associated with climate change is between 10 and 20 percent. Based on this estimate, the recommended buffer of 6,450 equates to an extra supply of about 17 percent at 2065, consistent with potential needs associated with climate change. While not all of this will be needed immediately, it would be prudent to secure this volume to offset foreseeable impacts to supply and demand associated with climate change.

Catastrophic Source Loss Scenario

It is conceivable to think that an extremely large earthquake on the Wasatch Front or other extreme event could cause the loss of more supply than discussed in the section above. However, in such a situation, it is not reasonable to expect the City to deliver water at the same level of service as it was prior to the catastrophic event. In these cases, it has been assumed that the City would move to an emergency mode of operation. This would include limiting water delivery to essential indoor functions.

The primary sources of concern under this scenario would be the springs and surface water treatment facilities. These sources would be vulnerable to breaks in the pipelines up Provo Canyon that supply this water to the City. Wells would also have some vulnerability to damage in an earthquake, but because they are more distributed across the system, it seems more likely that at least a portion of the wells would be functional after a catastrophic event. In the event that spring water and treated water is lost, the City plans to provide emergency backup from wells at a rate sufficient to meet indoor only demands (15.7 mgd for existing conditions, 21.5 mgd at 2065). The existing wells have the capacity to support this demand.

RECOMMENDED SUPPLY PLANNING SCENARIO

Based on the discussion above, the recommended supply development plans for the City are shown in Figures 5-1 to 5-3. The figures include: annual water supply in an average year, annual water supply in a dry year, and peak capacity, respectively. To avoid interruption in service during the most probable source failure events, all three figures include recommended supply redundancy buffer for the Minor Source Loss Scenario as defined above.

There are several principal conclusions that can be drawn from these figures:

1. **Annual Supply – Average Year (Figure 5-1)**.
    a. In order to discontinue use of the DACRWTP and avoid pumping more water than can be sustainably withdrawn from the Provo City aquifer, a new treatment plant and Managed Aquifer Recharge (MAR) facilities need to be built by 2026.
    b. In average years and with the completion of the new treatment plant, existing City supplies are adequate to meet projected demands through 2065. However, this requires relying directly on production from the treatment plant. If the treatment plant is unavailable for some reason, existing well capacity can supply projected needs through the year 2045. However, with recommended supply redundancy, existing City supplies can only produce enough culinary water to meet requirements through about 2026.
    c. The average year supply deficit (without the treatment plant) is projected to increase with growth in the future. At 2065, the City needs an additional 5,400 acre-ft of well production each year to meet demands. This increases to 11,900 acre-ft with the recommended supply redundancy. Construction of additional wells is recommended to satisfy the expected needs.
    d. With a new treatment plant and MAR facilities in place, it is projected that the City will have about 14,500 acre-ft of additional surface water beyond projected demands in average years that can be used for MAR or storage in Jordanelle Reservoir.
2. **Annual Supply – Dry Year (Figure 5-2).**
    a. Existing City supplies have historically been inadequate to meet projected demands in dry years. In the past, this deficiency has been eliminated through conservation by residents and by pumping wells above the currently estimated sustainable yield of the aquifer. While using extra groundwater has allowed the City to avoid any water shortfalls in the past and may work for a few years into the future, this is not a sustainable long-term solution to this deficiency. The deficit in recent years has been about 4,000 acre-ft/year.
    b. Once the City constructs its new treatment plant, it will almost have enough supply through MAR and its existing wells to supply projected demands. With an additional 3,000 gpm of well capacity, it will have capacity through 2037. With 2,000 gpm more (5,000 gpm total), it will have capacity through 2045.
    c. Once the recommended new wells are constructed and all the City's remaining Provo River water is accessible, projected City supplies in a 25-year drought event are still about 5,500 acre-ft short of meeting projected demands in 2065. This additional volume will need to be met by pulling water stored in the aquifer in previous years. Additional well capacity will be needed to access this water. Total needed new well capacity is about 9,000 gpm (this includes the 5,000 gpm above).

Figure 5-1
Annual Projection Production Requirement with Aggressive Growth (Average Year)

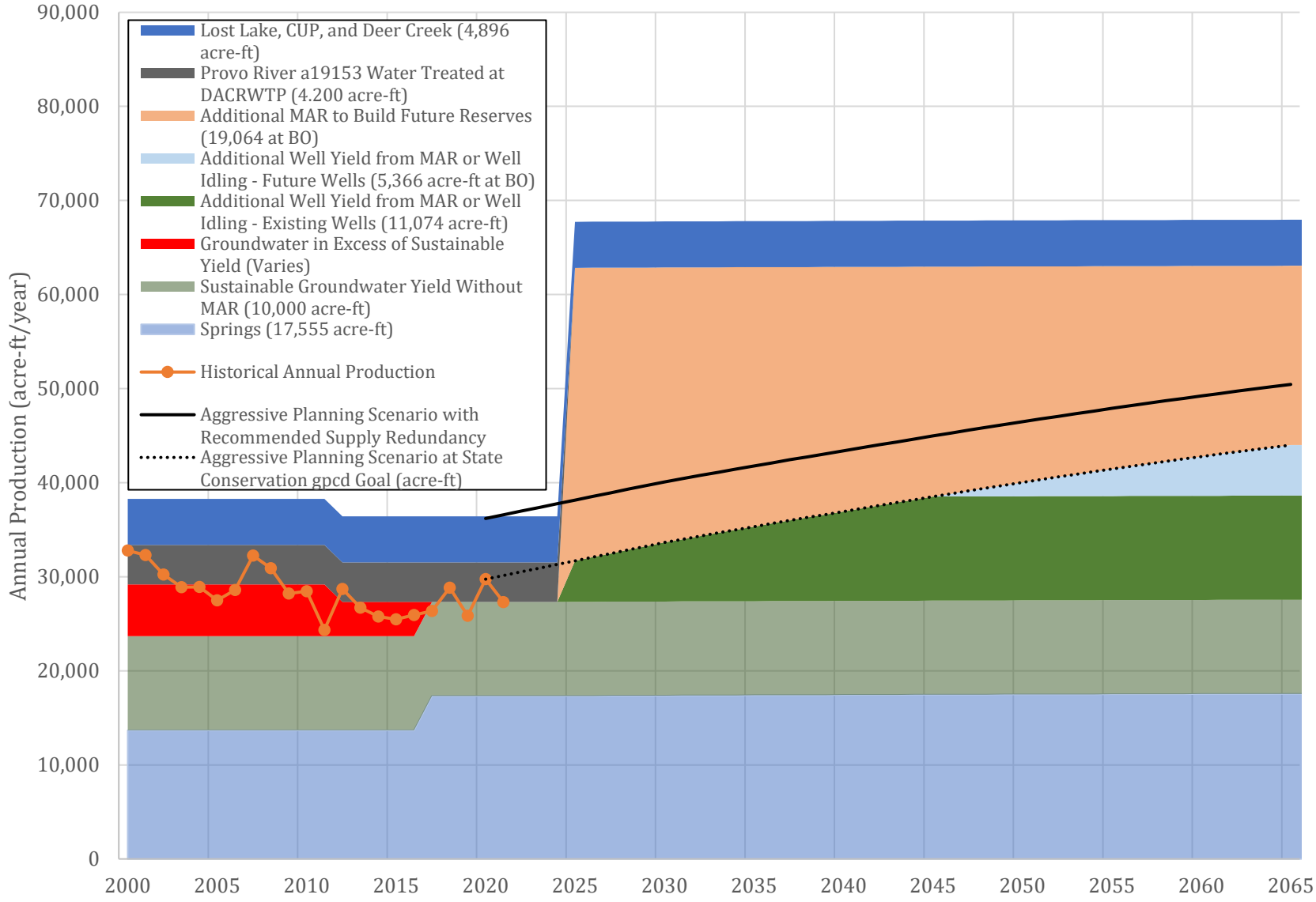


Figure 5-2
Annual Projection Production Requirement with Aggressive Growth
(25-Year Drought)

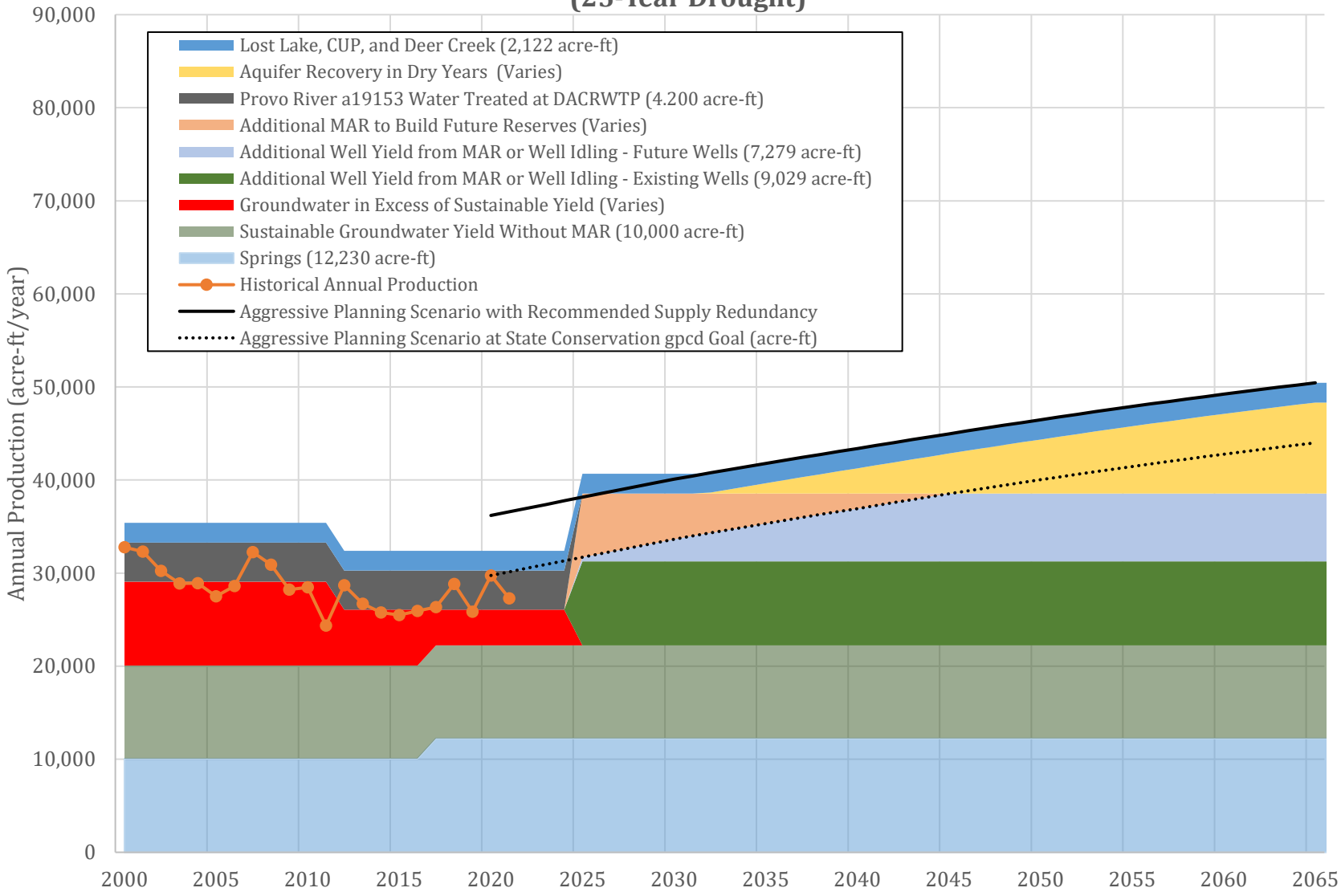
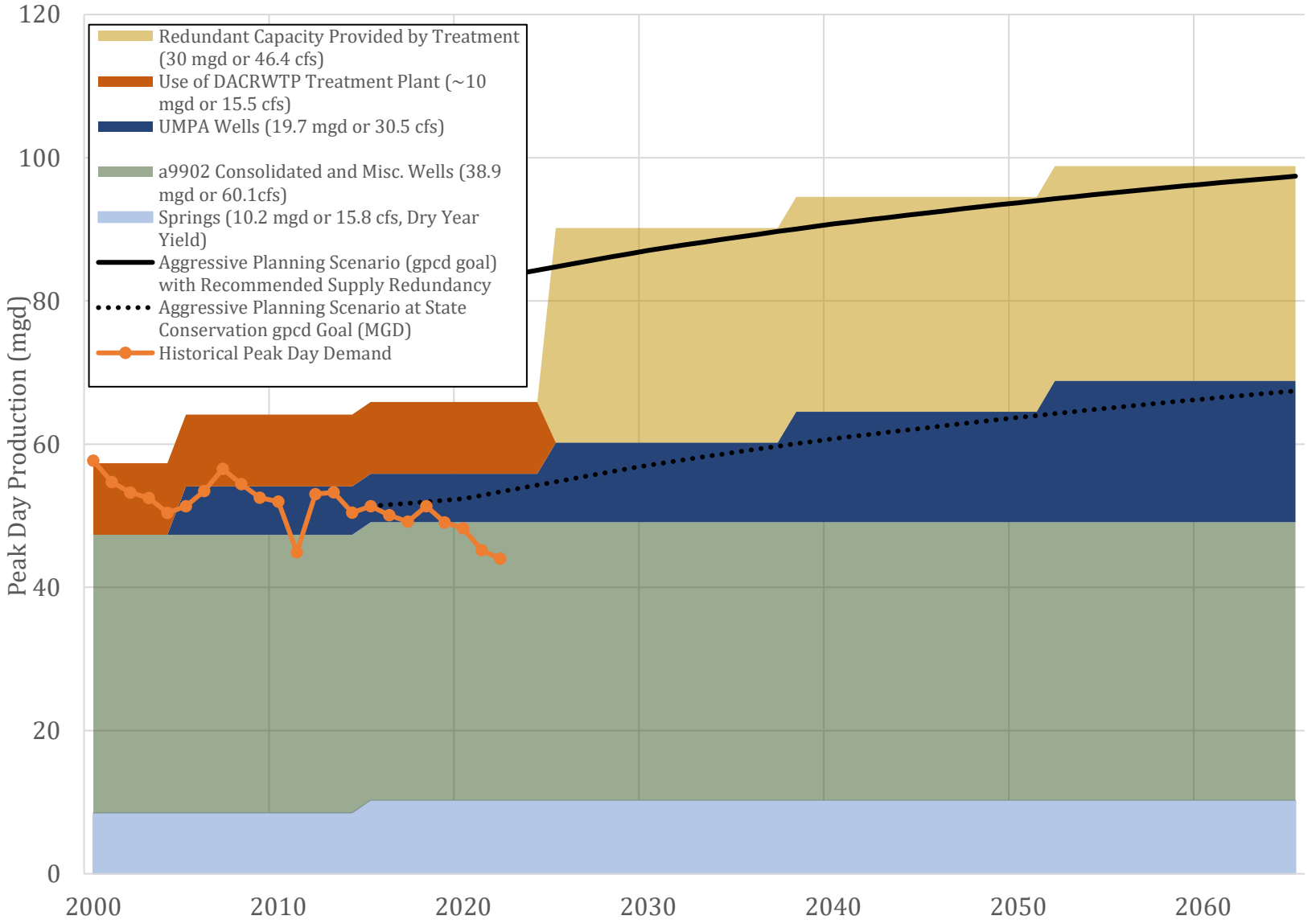


Figure 5-3
Projected Peak Day Production Requirements vs Source Capacity (25-Year Drought)



d. The conclusions above are generally based on projected demands without supply redundancy. In the event of a supply interruption, the City will meet its projected needs through treatment of other storage water (Lost Lake, CUP, and Deer Creek) as well as increased use of aquifer recharge as shown in the figure (up to 9,800 acre-ft).

e. Storage from Jordanelle is not shown as adding to volume in the figure. This is because it does not add to the City's volume of supply. However, having access to the full 10,000 acre-ft of storage in Jordanelle Reservoir is essential to the City's ability to fully utilize its surface water rights.

3. **Peak Capacity (Figure 5-3).**

   a. The City has adequate peak production capacity from its existing sources to meet existing peak demand needs.

   b. At 2065, the City has a projected peak day deficiency of about 9,000 gpm. This can likely be addressed through the construction of additional UMPA wells. For planning purposes, it has been assumed that this capacity will be added in 3,000 gpm increments approximately every 10 years (2028, 2040, and 2052). Size and timing of actual new wells may vary as long as capacity stays ahead of demand.

   c. Construction of the new treatment plant will obviously add a significant amount of capacity. However, since the City's redundancy criteria requires adequate capacity to meet demands even when the plant is out of service, this capacity can't be used to address the deficiency.

Based on these observations, the following actions are recommended as part of the City's supply plan to meet future demands:

1. **Pursue MAR Using Existing Surface Water Resources** – An essential part of the City's future supply plan is the development of a viable MAR program. Essential components of this program will be:

   a. The City must secure a change application to allow use of some of its available water rights for recharge of the aquifer. The most likely source of this water is the City's existing Paragraph 4 water rights as part of the Morse Decree. Other water might also be considered for this purpose.

   b. Construct new MAR facilities:

      i. Raw water infiltration capacity = 6.5 mgd (10 cfs)

      ii. New treatment plant capacity = 30 mgd (46.4 cfs)

   c. Average year required performance - Annual MAR

      i. Existing Conditions = 35,100 acre-ft

         1. Potential Well Idling = 12,800 acre-ft

         2. Additional MAR = 22,300 acre-ft

      ii. 2065 Conditions = 35,500 acre-ft

         1. Potential Well Idling = 22,500 acre-ft

         2. Additional MAR = 13,000 acre-ft

   d. Dry year required performance - Annual MAR

i. Existing Conditions = 16,300 acre-ft
    1. Potential Well Idling = 16,000 acre-ft
    2. Additional MAR = 300 acre-ft
ii. 2065 Conditions = 16,300 acre-ft
    1. Potential Well Idling = 16,300 acre-ft
    2. Additional MAR = 0 acre-ft

2. **Solidify 10,000 Acre-ft Jordanelle Storage** – Useable volumes calculated above assume that the City will have access to storage in Jordanelle Reservoir. Needed storage is as follows:
    a. Average year required Jordanelle storage
        i. Existing Conditions = 1,100 acre-ft
        ii. 2065 Conditions = 1,500 acre-ft
    b. Dry year required Jordanelle storage (25-year event)
        i. Existing Conditions = 8,100 acre-ft
        ii. 2065 Conditions = 3,600 acre-ft
3. **Secure Supply for Non-Irrigation Season Spring Exchange Water in Dry Years** – The City does not have enough water from existing approved sources to exchange for spring water outside the irrigation season during a dry year. The City must secure a change application for this water use in order for this recommended supply plan to meet projected needs. The projected need for exchange water during the dry year scenario is approximately 1,950 acre-ft.
4. **Continue Development of UMPA Wells** – To utilize the City's ground water rights and meet peak demands, additional wells will be needed. Correspondingly, it is recommended that the City continue to develop its UMPA well capacity. Approximately 3,000 gpm of additional capacity is needed every 10 years up to a total of 9,000 gpm.

CHAPTER 6
CONCLUSIONS

CONCLUSIONS AND RECOMMENDATIONS

A number of principal conclusions and recommendations can be made regarding projected available supply and demand:

1. **Demand Projections** – Through the planning window of this study, the City is expected to see significant growth. This will come in the form of both development of new property and redevelopment of existing property. This growth will cause increased demand on the water system. Thus, both water system annual production requirements and peak day production requirements will increase. The magnitude of increases will depend on what level of conservation is realized in the City. Projections associated with current conservation goals indicate a total annual water demand (including supply redundancy needs) of 50,445 acre-ft and a peak day production requirement of 97.4 mgd in 2065.
2. **Conservation** – Conservation in an essential part of the City's long-term water supply plan. While the City has done an excellent job of reducing demands through conservation over the last 18 years, additional efforts will be required to sustain and expand these savings moving forward. The City must continue to focus and invest in conservation to meet its goals. Failure to do so may result in insufficient water to meet projected needs.
3. **Water Supply Reliability (Historic Perspective)** – The past 30 years are not atypical of historic dry periods based on the available record (gauge data going back to 1905 and calibrated tree ring data going back to the late 1400s). This implies that, from a historical perspective, the modern-age records that have defined both the "average" and "dry" years in terms of source availability are not unreasonable for future projections.
4. **Water Supply and Demand Reliability (Considering Climate Change)** – In terms of projected source availability long into the future (climate change being the primary concern at the current time), decreases in water supply and increases in demand are expected. This is based on two climate change studies, which focused on watersheds that are local to, or contribute to, City sources. These studies indicate a potential supply decrease of 2% to 12% and a potential demand increase of 2% to 17%. While it is obvious from these broad ranges that there is significant uncertainty in the magnitude of climate change's effect on water supply, preparing for possible changes in supply and demand is prudent. At the recommended supply planning scenario, the City system will have a sufficient buffer to accommodate about a 15% overall climate change effect based on current projections. If climate change affects supply and demand by more than 15%, additional conservation or new supplies may become necessary. It is recommended that the City continue to monitor water supply and demand and modify this plan to address changing circumstances if they become a reality.
5. **Water Rights** – If current growth and conservation patterns continue, Provo City water rights produce sufficient volume to meet production requirements through 2065 with conservation. Therefore, it is not necessary for the City to aggressively pursue any new water rights beyond those identified here. This is true only as long as the City is able to develop an MAR project and use its full Jordanelle storage as described here. With this said, it should also be noted that all of the water rights currently held by the City are an essential part of meeting long-term demands. Thus, the City does need to be aggressive in protecting its existing rights and securing their continued use for the purposes identified here.

6. **Water Supply** – The City will require all identified water supply improvements identified in Chapter 5 to accommodate future growth with adequate buffer to address reasonable risk to the water supply. This includes:
    a. Developing a managed aquifer recharge (MAR) program. This will need to include securing continued use of all the City's Provo River rights to provide a source for the MAR project.
    b. As part of the MAR project, constructing a 30 mgd treatment plant and developing 6.5 mgd of raw water infiltration capacity.
    c. Securing additional supply for non-irrigation season spring exchange water in dry years by utilizing the City's full storage rights in Jordanelle Reservoir.
    d. Continuing to develop UMPA wells

STORAGE & CONVEYANCE MASTER PLAN

PART 2 OF WATER MASTER PLAN

provo

BOWEN COLLINS & ASSOCIATES

PROVO CITY STORAGE & CONVEYANCE MASTER PLAN

JANUARY 2024

Prepared for:

provo
PUBLIC WORKS
WATER RESOURCES

Prepared by:

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& ASSOCIATES

CHAPTER 7
INTRODUCTION

INTRODUCTION

Provo City desires to develop an updated master plan for its water system. This is the second in a series of three expected reports that will comprise the planning documents for the City's water system. The expected reports will be:

- **Supply and Demand Master Plan** – An examination of water demands expected in the City and the existing and future supplies available to meet these demands.
- **Storage and Conveyance Master Plan** – An evaluation of the City's existing conveyance and distribution system and its ability to deliver water when and where it is needed.
- **Implementation and Capital Facilities Plan –** A plan for completing the necessary improvements identified in the supply and conveyance master plans.

As this is the second report in the series, the reader will notice that it starts with Chapter 7. Each report has been given unique chapter numbers to avoid confusion with chapters in one of the other two reports. Chapters 1 through 6 are located in the first report, Supply and Demand Master Plan.

BACKGROUND

The focus of this report is storage and conveyance requirements for the City. Previous master planning documents addressing storage and conveyance include:

Water System Master Plan – Prepared by Bowen Collins & Associates in April 2013.

Since the completion of the previous study, a number of changes have occurred. Changes that need to be evaluated and addressed for the City to meet its future water storage and conveyance requirements include:

- **New Infrastructure –** Some new infrastructure has been constructed since the previous master plan, including two new storage tanks. The City is has also designed and will begin construction on a new water treatment plant.
- **Land Use Changes –** Since the preparation of the last master plan, several areas adjacent to the City's service area have begun development planning and are either in the process or expected to enter the process in the near future. While much of this growth was anticipated in the previous master plan, expected development location, timing, and densities are better understood and can be updated as part of this study.
- **Continued Growth and Additional Density –** The City also is experiencing densification within the downtown area and near the campus of Brigham Young University (BYU). Densities for other new developments have been trending higher and are a change from densities included in the previous master plan.
- **Conservation and Water Management Efforts –** The City's new water treatment plant is part of various efforts to use water and aquifer storage/recover more effectively. These conservation efforts along with waterwise fixtures and less outdoor watering have resulted in changes in water use throughout the City.

SCOPE OF SERVICES

The scope of the work documented in this report includes three major tasks:

Task 1 – Calibrate the City's Existing Hydraulic Water Model

City staff had already been working on updating its existing culinary water model including the addition of new pipelines constructed since the last update. The existing model was further updated as part of this project to troubleshoot and calibrate operation of the model and to identify updated system demands. Future model scenarios were created with expected increases in demand for both the 10-year and buildout periods. Existing facilities included in the hydraulic models were documented as part of this report.

Task 2 – Storage Evaluation

Existing and future storage requirements were evaluated based on existing and potential future demand patterns within the City.

Task 3 – Major Conveyance Evaluation

Existing and future hydraulic deficiencies were identified within the City's water system. Improvements to address deficiencies were recommended along with cost estimates for the recommended improvements.

CHAPTER 8
EXISTING WATER FACILITIES

INTRODUCTION

As part of this Master Plan, BC&A has assembled an inventory of existing infrastructure within the culinary water system. The purpose of this chapter is to present a summary of the inventory of City's existing water distribution system that can be used as a reference for City personnel and future studies.

EXISTING SERVICE AREA AND TOPOGRAPHY

Provo City provides culinary water for all residents within its corporate boundaries as shown in Figure 8-1. The City's existing service area is approximately 44 square miles and is bordered by the following: the Wasatch Mountain Range to the east, Orem City to the North, Utah Lake to the West, and Springville City to the South. The topography of the City generally slopes from east to west from the Wasatch Mountains to Utah Lake. Most of the City's storage reservoirs are located along the Wasatch Mountains.

The City's population in the 2020 Census included approximately 116,000 permanent residents. Provo City is considered a college town as it is home to Brigham Young University with over 34,000 students. The City is continually growing with development on the west side of the freeway and redevelopment plans on the east side.

SOURCES

Springs

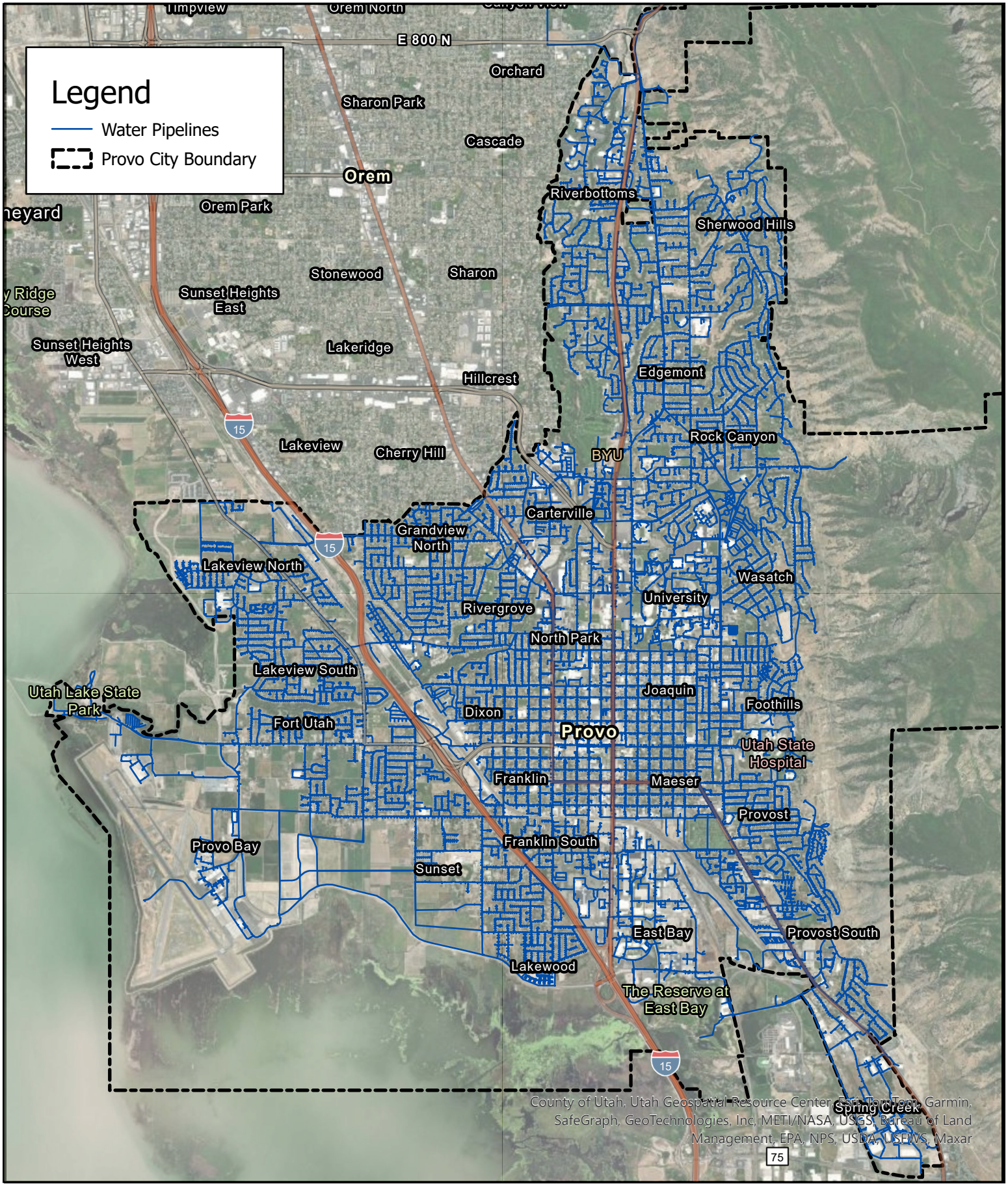
Much of Provo City's municipal water originates from springs located in Provo Canyon and Rock Canyon. Production capacity and annual yield vary depending on water year conditions. Additional information about the City's springs is contained in the Supply and Demand Master Plan.

Wells

The City has 15 culinary production wells that are actively used in the water system. Table 8-1 lists the production capacity of each of the wells along with the system zone it services. Figure 8-2 shows the location of each City well.

Provo City Water Treatment Plant

The City is currently in the process of designing and constructing a new water treatment plant to meet the future demands of it water users while also addressing the issue of aquifer recharge. Groundwater levels in the aquifer under the City have declined in recent years and the treatment plant will be used to recharge the aquifer. The treatment capacity of the plant is expected to be 30 mgd. The treatment plant construction will allow for both direct delivery into the City's system to meet culinary demands and aquifer recharge near Rock Canyon.



BOWEN COLLINS & ASSOCIATES

Provo City Boundary and Water Pipelines

Provo City

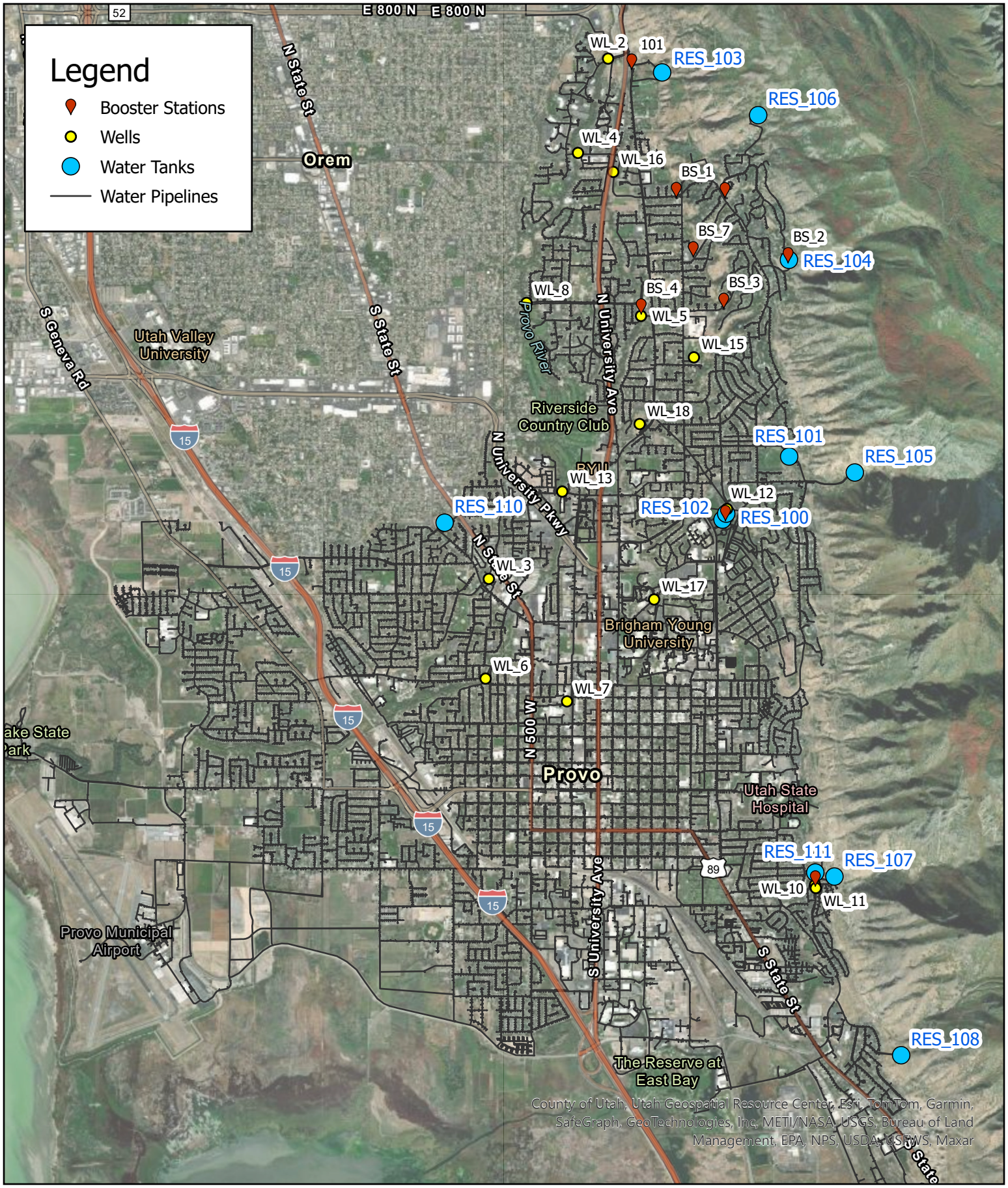
Water Master Plan Update

NORTH:

SCALE: 0 50 100 Feet

FIGURE NO. 8-1

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Figure 8-1 - City System.aprx aharris 4/4/2024



BOWEN COLLINS & ASSOCIATES

Existing Booster Stations, Tanks, and Wells

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. 8-2

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Figure 8-1 - Service Area.aprx aharris 1/22/2024

Table 8-1
Existing Wells

Name	Production Capacity (gpm)	Zone	Model ID
4800 North Well (a9902)	2,300	13 (Intermediate)	WL_4
Riverwoods (a22983 UMPA)	1,300	13 (Intermediate)	WL_16
Timpview (a22983 UMPA)	900	13 (Intermediate)	WL_15
3700 North Well (a9902)	3,750	34 (Main)	WL_8
5600 North Well (a9902)	1,100	34 (Main)	WL_189
88 Well (a9902)	2,100	34 (Main)	WL_6
Brough Well (a9902)	1,200	34 (Main)	WL_3
BYU Well (Helaman Halls)	2,200	34 (Main)	WL_17
Canyon Road (a22983)	2,500	34 (Main)	WL_18
Edgemont Well (a9902)	4,000	34 (Main)	WL_5
North Well (a9902)	5,000	34 (Main)	WL_13
Rock Canyon Well (a9902)	3,400	34 (Main)	WL_12
Utility Well (a9902)	1,100	34 (Main)	WL_7
Slate Canyon Well (a9902)	450	24 (Slate Canyon)	WL_10
Thorn's Well	400	24 (Slate Canyon)	WL_11
Total Well Capacity	**31,700**		

STORAGE FACILITIES

The City has 12 water storage tanks with three being constructed after the completion of the 2010 master plan. Figure 8-2 shows the location of each storage tank in the City. The new tanks include Slate Canyon 2, and Columbia Lane which all service the new West Zone. This zone was created to serve the significant amount of development occurring on the west side of the City.

Table 8-2
Culinary Storage Facilities

Tank Name	Zone	Model ID	Size (MG)	Floor Elevation (ft)	Overflow Elevation (ft)
Intermediate	13 (Intermediate)	RES_101	3.0	4,992	5,021
North Intermediate	13 (Intermediate)	RES_103	5.0	4,989	5,015
Main	34 (Main)	RES_102	6.0	4,803	4,832
Gallery	34 (Main)	RES_100	5.0	4,813	4,833
Northeast	18 (Northeast)	RES_104	5.0	5,368	5,397
Sherwood Hills	23 (Sherwood Hills)	RES_106	0.5	5,581	5,595
Slate Canyon	24 (Slate Canyon)	RES_107	5.0	4,788	4,817
Slate Canyon 2	17 (West)	RES_111	4.0		4,750
Southeast	25 (Southeast)	RES_108	2.0	4,923	4,947
Rock Canyon	27 (Rock Canyon)	RES_105	0.5	5,311	5,330
Columbia Lane	17 (West)	RES_110	6.0		4,733
Total			42.0		

BOOSTER PUMPING FACILITIES

Table 8-5 summarizes the characteristics of the booster pumps within the City's water system and Figure 8-2 shows the location of each. Booster pumps are required when water must be moved from a lower pressure zone to a higher pressure zone. Although not yet included in the table, a future pump station is expected to be added that will pump water from the water treatment plant into the City's conveyance system.

Table 8-5
Culinary Booster Pump Station Equipment

Booster Stations	Address	Suction Zone	Discharge Zone	Pump #	Horsepower (hp)	Production Capacity (gpm)	Reliable Capacity (gpm)[1]
Edgemont	290 E 3630 N	34 (Main)	13 (Intermediate)	1	50	700	1,700
				2	75	1,000	
				3	75	1,200	
Gillespie	Gillespie Weir House	28 (Gillespie Weir House)	13 (Intermediate)	1	75	1,500	4,500
				2	75	1,500	
				3	75	1,500	
				4	75	1,500	
Intermediate	900 E Temple View Dr.	34 (Main)	13 (Intermediate)	1	60	700	1,260
				2	50	560	
				3	75	1,090	
Northeast	650 E 4525 N	13 (Intermediate)	18 (Northeast)	1	250	1,600	1,600
				2	250	1,600	
Quail Valley	900 E Quail Valley Dr.	13 (Intermediate)	18 (Northeast)	1	250	1,850	2,550
				2	250	1,850	
				3	250	700	
Imperial	Near Northeast Tank	18 (Northeast)	23 (Sherwood Hills)	1	40	500	500
				2	40	500	
Sherwood	Osmond Ln. & Foothill Dr.	18 (Northeast)	23 (Sherwood Hills)	1	40	500	500
				2	40	500	
Southeast	800 S Slate Canyon Dr.	34 (Main)	25 (Southeast)	1	125	2,000	2,000
				2	125	2,000	
Intermediate (Rock Canyon)	900 E Temple View Dr.	34 (Main)	27 (Rock Canyon)	1	125	850	1,600
				2	125	750	
				3	250	1,100	
Total						**27,550**	**16,210**

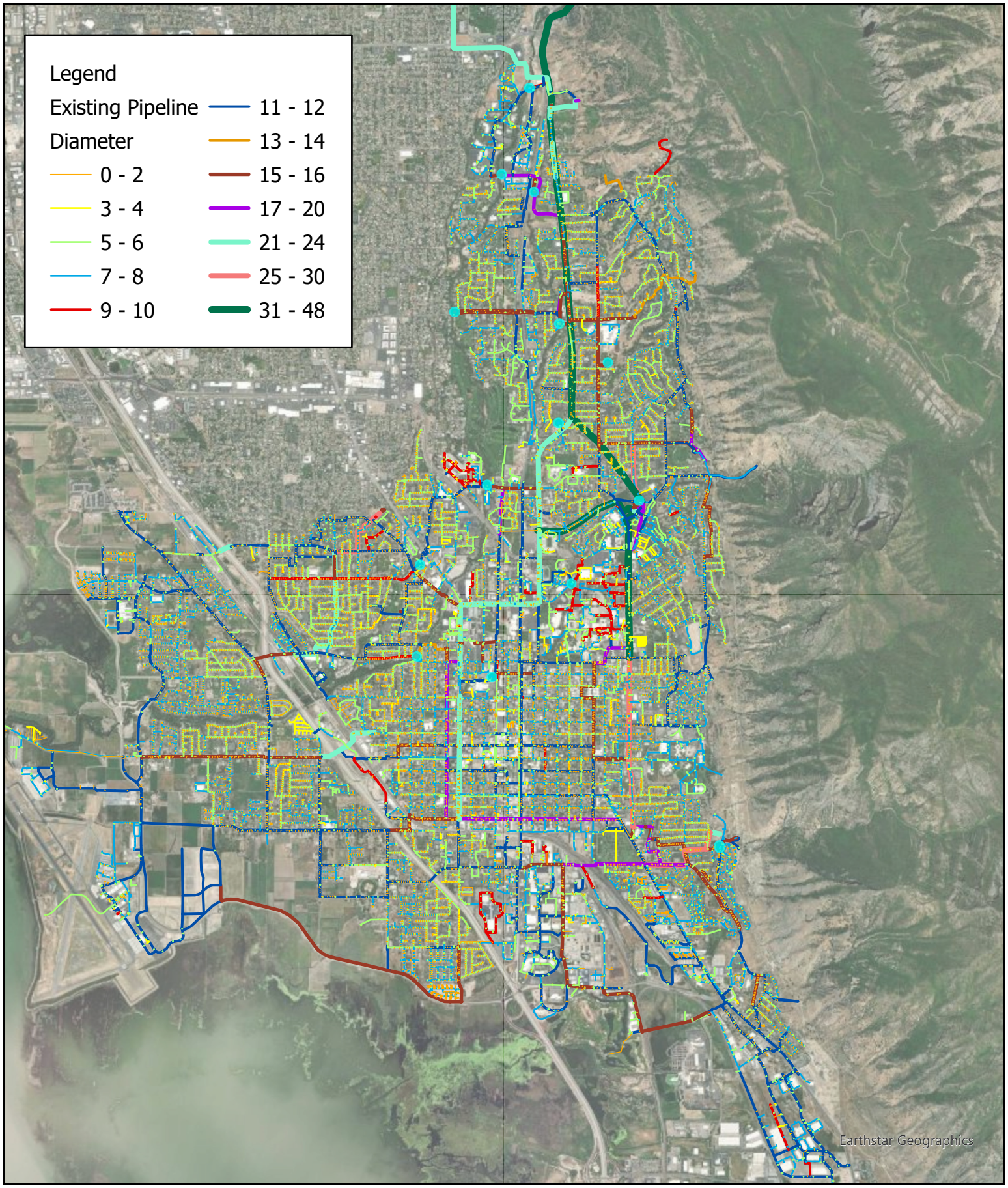
[1] Reliable Capacity is the pump station capacity with the larges pump in the facility out of service.

DISTRIBUTION PIPING

The Provo City distribution system is composed of distribution and transmission pipelines up to 48 inches in diameter. Table 8-6 summarizes the total length of pipe in the system for diameters from 4 to 48 inches. The location and size of the distribution pipes are shown in Figure 8-3. Most pipes in the system are ductile or cast iron. Other pipeline materials include PVC, concrete, and steel.

Table 8-6
Culinary Distribution Piping

Diameter (inch)	Length (ft)	Length (miles)	Percentage
<=4	779,461	147.63	26.01%
6	676,655	128.15	22.58%
8	847,636	160.54	28.28%
10	58,258	11.03	1.94%
12	367,988	69.69	12.28%
14	7,052	1.34	0.24%
16	103,737	19.65	3.46%
18	7,056	1.34	0.24%
20	35,544	6.73	1.19%
21	287	0.05	0.01%
24	54,621	10.34	1.82%
30	18,556	3.51	0.62%
36	22,745	4.31	0.76%
48	17,272	3.27	0.58%
TOTAL	**2,996,868**	**567.59**	**100.00%**



BOWEN COLLINS & ASSOCIATES

Existing Pipes

Provo City

Water Master Plan Update

NORTH:

NORTH

SCALE:

0 2,500 5,000 Feet

FIGURE NO.

8-3

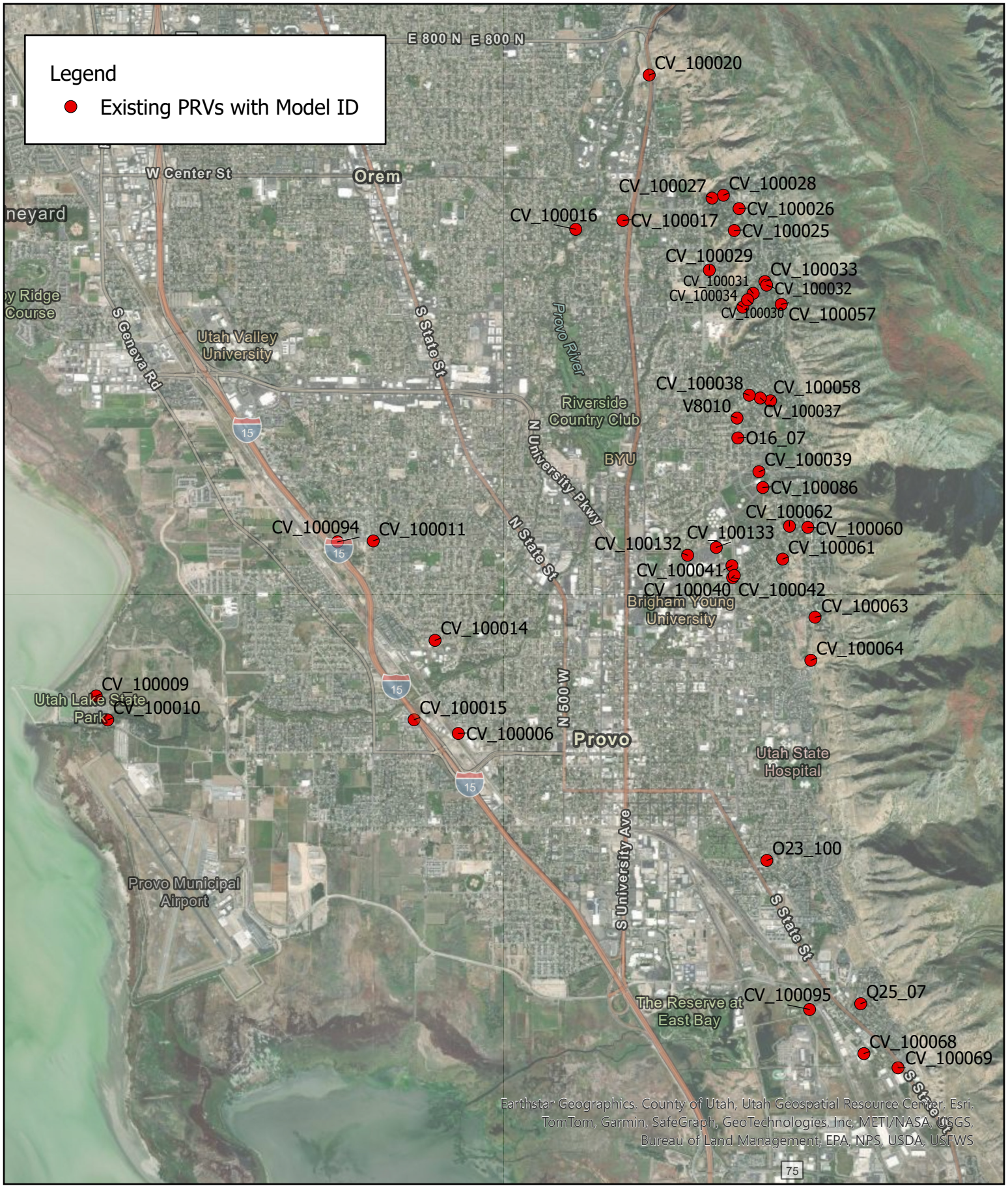
P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Figure 8-3 - Pipe Summary.aprx aharris 4/4/2024

PRESSURE REGULATING VALVES

Pressure zones in the distribution system are separated by pressure reducing or pressure sustaining valves (PRVs or PSVs). Table 8-7 and Figure 8-4 show the location and characteristics of pressure regulating valves in the system. It also lists the hydraulic grade line of each zone that the valve is in. In addition to these PRV's, the City has a 24" energy dissipation valve at the Gillespie Weir House.

Table 8-7
Culinary Distribution PRV's

Low Side Zone	High Side Zone	Address	Model ID	Elevation (ft)	PRV Size	Setting (psi)	Static HGL (ft)
1	3	750 E Foothill Dr.	CV_100027	4,990	12	65	5,140
2	18	920 E Quail Valley Dr.	CV_100034	4,912	3	80	5,097
3	18	850 E Foothill Dr.	CV_100028	5,055	12	63	5,200
4	18	970 E Quail Valley Dr.	CV_100030	4,943	6	83	5,135
5	18	1020 E Quail Valley Dr.	CV_100031	4,980	6	84	5,173
6	27	1100 E North Temple Dr.	CV_100039	4,892	6	79	5,075
7	27	1450 E 1850 N	CV_100060	5,100	8	70	5,262
8	7	1300 E Oak Ln.	CV_100062	4,997	6	71	5,161
9	15	Chippewa Way & Appache Ln.	CV_100038	4,939	8	78	5,120
10	18	3720 N Foothill Dr. (Coventry)	CV_100057	5,107	10	63	5,252
12	15	Cherokee Ln. & Indian Hills Dr.	CV_100037	4,925	6	82	5,115
13	9	930 E 2620 N	O16_07	4,846	6	Closed	Closed
13	9	930 E Indian Hills Dr.	V8010	4,836	8	Closed	Closed
13	22	700 E Scenic Dr.	CV_100029	4,843	6	77	5,021
13	30	5600 N & University Avenue	CV_100020	4,795	12	98	5,021
14	34	Mt Vistas Prkwy & Ironton Blvd.	CV_100068	4,507	8	81	4,695
15	10	Cherokee Ln. & Irquois Dr.	CV_100058	4,931	12	105	5,172
16	18	Little Rock Dr. & Quail Valley Dr.	CV_100032	5,055	8	71	5,218
-	34	4200 W Center St.	CV_100010	4,495	6	75	4,668
-	34	Utah Lake Campground	CV_100009	4,490	6	50	4,606
20	18	Osmond Ln. & Foothill Dr.	CV_100026	5,112	6	81	5,300
21	18	Quail Run Dr. & Quail Valley Dr.	CV_100033	5,055	6	85	5,251
22	18	950 E Scenic Dr.	CV_100025	4,995	8	61	5,137
26	27	1450 E Oak Cliff Dr.	CV_100063	4,867	6	51	4,985
32	13	900 E & Fir Avenue	CV_100040	4,709	4	54	4,833
29	13	Sheffield Dr. & Sheffield Crossing	CV_100016	4,724	8	87	4,925
29	13	75 W Stone Gate Ln.	CV_100017	4,731	12	84	4,925
31	13	900 E 1430 N (BYU)	CV_100042	4,714	8	87	4,915
31	13	900 E 1500 N (BYU)	CV_100041	4,729	8	81	4,915
19	13	Wymount Terrace (BYU)	CV_100061	4,796	8	79	4,970
14	34	Valley Vista Way State Street	CV_100069	4,551	12	61	4,692
34	34	900 N 1550 W	CV_100014	4,628	2	80	4,813
17	17	330 N 1600 W	CV_100015	4,530	4	70	4,692
34	34	2100 W 1700 N	CV_100011	4,640	8	80	4,825
34	26	1540 E Seven Peaks Blvd	CV_100064	4,746	8	66	4,899
17	34	200 N & Independence Avenue	CV_100006	4,537	12	80	4,722
-	-	2200 N Temple Hill Dr.	-	-	unknown	65	
17	34	1730 N & Sandhill Road	CV_100094	4,578	8	63	4,723
17	34	2000 S & Industrial Pkwy.	CV_100095	4,505	8	95	4,725
34	13	495 E Univertsity Pkwy.	CV_100132	4,689	10	100	4,920
31	13	715 E Univertsity Pkwy.	CV_100133	4,734	8	80	4,918
25	13	California Ave & Nevada Ave	Q25_07	4,641	8	80	4,826
17	24	1640 S 1300 E	O23_100	4,586	8	92	4,799



BOWEN COLLINS & ASSOCIATES

Existing PRVs

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. 8-4

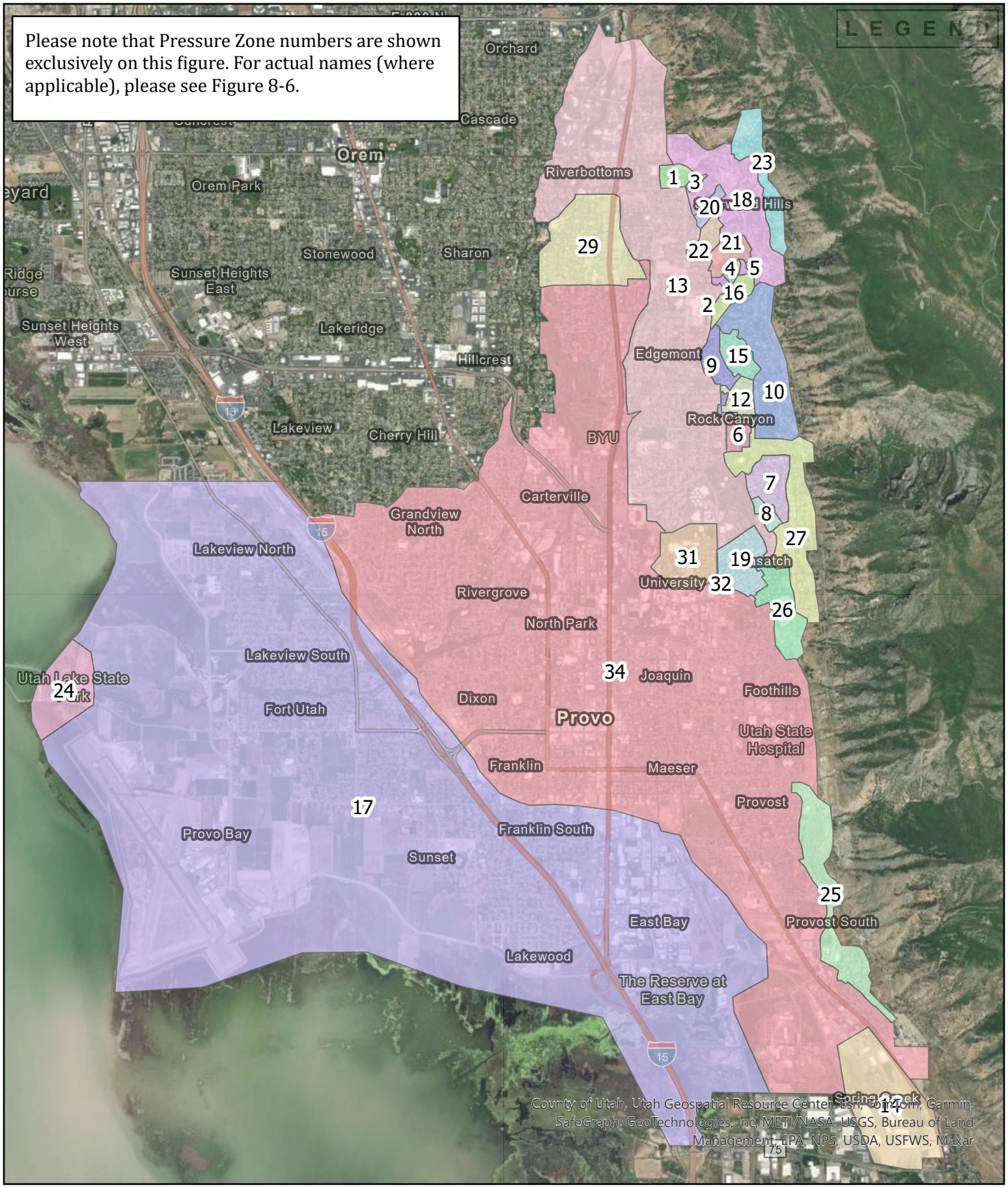
P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Figure 8-4 - PRVs.aprx aharris 2/15/2024

PRESSURE ZONES

The Provo City water distribution system is divided into 34 major pressure zones as shown in Figure 8-5. The system has a total of 11 storage tanks with several of them servicing multiple pressure zones. Figure 8-6 shows the approximate hydraulic grade setting for each pressure zone and Table 8-8 lists which tank services the zone and the approximate service percentage of the zone based on current demands.

Table 8-8
Culinary Distribution Piping

Zone	Peak Day Demand (gpm)	Service Percentage	Equalization/Emergency Storage (gallons)	Zone of Tank Serving This Zone
1	46	0.09%	33,094	18
2	14	0.03%	9,783	18
3	18	0.04%	12,631	18
4	11	0.02%	8,044	18
5	12	0.02%	8,287	18
6	132	0.27%	95,372	27
7	239	0.48%	172,244	27
8	47	0.09%	33,571	27
9	140	0.28%	100,690	18
10	547	1.10%	393,542	18
12	129	0.26%	92,923	18
13	5,795	11.61%	4,172,288	13
14	129	0.26%	92,812	34
15	298	0.60%	214,517	18
16	61	0.12%	44,207	18
17	14,699	29.46%	10,583,279	17
18	768	1.54%	552,644	18
19	326	0.65%	234,995	13
20	58	0.12%	41,947	18
21	93	0.19%	66,676	18
22	76	0.15%	54,378	18
23	214	0.43%	154,040	23
24	603	5.78%	434,006	24
25	524	1.05%	377,353	25
26	211	0.42%	151,689	13
27	1,011	2.03%	727,599	27
29	1,283	2.57%	923,877	13
32	6	0.01%	4,210	13
33	50	0.10%	35,947	13
34	22,355	40.24%	16,095,606	34
Total (gpm)	49,892	100%	35,922,249	



BOWEN COLLINS & ASSOCIATES

Pressure Zone Boundaries

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. 8-5

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Figure 8-5 - Pressure Zones.aprx aharris 4/1/2024

Zone 18 (Northeast)
HGL = 5,397

Tanks:
Northeast (5.0 MG, 5,397 ft)

Sherwood Hills B.S.

Imperial B.S.

Zone 23 (Sherwood)
HGL = 5,595

Tanks:
Sherwood Hills (0.5 MG, 5,595 ft)

Zone 20
HGL = 5,300

Zone 16
HGL = 5,218

Zone 10
HGL = 5,252

Zone 15
HGL = 5,175

Zone 3
HGL = 5,200

Zone 1
HGL = 5,140

Zone 21
HGL = 5,251

Zone 5
HGL = 5,173

Zone 22
HGL = 5,137

Zone 4
HGL = 5,135

Zone 9
HGL = 5,120

Zone 12
HGL = 5,115

Zone 2
HGL = 5,097

Rock Canyon Springs

Scenic B.S.

Zone 27 (Rock Canyon)
HGL = 5,330

Tanks:
Rock Canyon (0.5 MG, 5,330 ft)

Zone 13 (Intermediate)
HGL = 5,021

Tanks:
North Intermediate (5.0 MG, 5,015 ft)
Intermediate (3.0 MG, 5,021 ft)

Wells:
4800 North (2,300 gpm)
Riverwoods (1,300 gpm)
Timpview (900 gpm)

Northeast B.S.

Quail Valley B.S.

Zone 7
HGL = 5,262

Zone 8
HGL = 5,161

Zone 6
HGL = 5,075

Zone 19
HGL = 4,962

Zone 26
HGL = 4,985

Zone 29
HGL = 4,925

Provo Canyon Springs

Gillespie Weir House

Zone 28 (Gillespie Weir House)
HGL = 4,867.5

Zone 31
HGL = 4,915

Zone 32
HGL = 4,915

Zone 34 (Low/Main Zone)
HGL = 4,833

Tanks:
Main (5.0 MG, 4,883 ft)
Gallery (6.0 MG, 4,833 ft)
Slate Canyon (5.0 MG, 4,817 ft)

Wells:
3700 North (3,750 gpm)
88 (2,100 gpm)
Brough (1,200 gpm)
BYU (2,200 gpm)
Canyon Road (2,500 gpm)
North (5,000 gpm)
Utilities (1,100 gpm)
Edgemont (4,000 gpm)
Rock Canyon (3,400 gpm)
5600 North (1,100 gpm)
Slate Canyon (540 gpm)
Thorn (400 gpm)

Zone 25 (Southeast)
HGL = 4,947

Tanks:
Southeast (2.0 MG, 4,947 ft)

Edgemont B.S.

Intermediate B.S.

Rock Canyon B.S.

Zone 14
HGL = 4,695

New Water Treatment Plant

Rock Canyon B.S.

Zone 17 (West)
HGL = 4,730.4

Tanks:
Columbia Lane (5.0 MG, 5,397 ft)
Slate 2 West (4.0 MG,

Zone 24
HGL = 4,662

LEGEND

PRESSURE ZONE NAME
HYDRAULIC GRADE LINE (HGL)
TANKS, WELLS, SPRINGS, PRV'S

PUMP STATION

PRESSURE REDUCING VALVE

CLOSED SYSTEM VALVE

PRV REGULATED TRANSMISSION LINE

PUMP FED TRANSMISSION LINE

GRAVITY FED TRANSMISSION LINE

GRAVITY OVERFLOW LINE

Figure 8-6
Distribution System Schematic
Water Master Plan Update
Provo City

CHAPTER 9
HYDRAULIC MODEL

HYDRAULIC MODEL

In order to evaluate the ability of Provo City's water distribution system to serve the needs of its existing and future customers, the City created a hydraulic model using GIS data. The model allows the effects that various demand and water production scenarios have on the distribution system to be simulated. Based on the results of the model simulations, improvements can then be evaluated to remedy any identified deficiencies. The purpose of this chapter is to document the results of the distribution system evaluation based on hydraulic modeling.

InfoWater Pro

InfoWater Pro developed by Innovyze was the hydraulic modeling program used for this water study. A hydraulic computer model is a digital representation of physical features and characteristics of the water system, including pipes, valves, storage tanks, and pumps. Key physical components of a water system are represented by a set of user-defined parameters that represent the characteristics of the system. The computer model utilizes the digital representation of physical system characteristics to mathematically simulate operating conditions of a water distribution system. Model output includes pressure at each junction and flow rates for each pipe in the model.

Computer models are excellent tools that can be used to elevate operating conditions in water systems. Models can identify where deficiencies in the system are located and can be used to evaluate alternatives to remedy identified problems. Computer models are valuable in examining future operating conditions and can also be used during extreme events such as fires or power failures.

Geometric Model Data

There are two major types of data required to create a hydraulic model of a water system: geometric data and flow data. Geometric data consists of information on the location and size of system facilities including pipes, storage reservoirs, sources, pump stations, etc. It also includes the physical characteristics of the facilities including pipe roughness, delivery point elevations, pump settings, and tank levels. This information is generally collected from system inventory data or through direct field measurement.

The City previously developed a running hydraulic model with information such as pipe size, node elevation, pipe roughness, sources, pumps, and valves. The Provo City model is unique in that it contains detailed geometric data of every customer service in the City. Bowen Collins and Associates (BC&A) received the model from the City and began the calibration process with the aid of City personnel.

Model Calibration

The following sections describe how the model was assembled and calibrated:

Pipes and Demand Nodes:

- Pipe sizes and node elevations were assembled by City staff from Provo City's GIS database.
- Pipe roughness values were also assembled by City staff based on pipeline size and material. Darcy-Weisbach values were used in units of 10^{-3} ft. The majority of values range from 1.0 to 3.0 milli-ft (or 0.001 to 0.003 ft).

Sources:

- All sources (including wells) were modeled as fixed elevation reservoirs with a flow control valve or pump to provide a constant inflow that can be easily set by the user. This allows the sources to be easily adjusted based on the various source scenarios. Elevations of the source reservoirs were set at a head which ensured there would be sufficient pressure to push water into the system at any flow.
- The City's new water treatment plan was added to the model as a fixed elevation reservoir with a flow control valve to easily adjust the amount of treated water entering the system from the plant.

Pumps:

- In this model, pump curves have been included for each pump to ensure that the production capacity in gallons per minute can be reached or adjusted depending on the scenario being considered. Previously published pump curves were used to calibrate the pumps in the model.

Regulating Valves:

- The model includes both general purpose valves and pressure regulating valves (PRVs). The pressure regulating valves have been modeled in Infowater Pro as PRVs meaning that they are controlled by downstream pressures and open only as necessary to maintain a minimum pressure on the downstream side. Regulating valve sizes and settings are as outlined in Chapter 8.
- The divisions between pressure zones were determined by the City and included in the model before BC&A began the calibration.

Flow Data

Once all required geometric data is collected and a physical model of the system is created, the second type of data needed to model the system is flow data. Two basic types of flow information are required for hydraulic modeling: flow out of the system (demand) and flow into the system (supply).

Demand – Demands for hydraulic modeling must be defined in at least two ways: total demand (production requirement) and distribution of demand across the City service area.

- **Total Production Requirement –** Of primary interest for modeling purposes are peak day and peak hour production requirements. Peak day production projections for the Provo City service area have been presented in detail in Chapter 2. Peak hour production requirements are generated from peak day production requirements and the application of a diurnal curve in the extended period simulation. Diurnal curve information is contained in Chapter 10. All production requirements must be considered for both existing (2023) and future (buildout) conditions.
- **Distribution of Demand –** Each node or junction in the model can contain a demand. The City has developed a hydraulic model containing each individual connection and thus the water use data for each service can be directly incorporated into the model. The distribution of existing demand throughout the model was generated by linking the City's GIS database of meters and the utility billing software so that historic usage could be imported into the GIS database and subsequently into the model as demands at each junction. The water use data for July 11, 2022 (Provo's Peak Day Demand) was loaded into

the model. Additional demand was then included for future soccer fields on the west side of the City. The resulting demand was then scaled up by a constant factor to equal the design Peak Day Production of 53.8 MGD (shown in Table 2-9 of this report).

Because billing data is not available for the future demands, demand associated with growth was distributed by summing the projected demand in a given area and assigning the total demand to a single junction. For the purposes of this plan, the demand areas were based on sanitary sewer drainage areas to be consistent with growth projections in the City's sewer master plan. This distribution method is more practical as the exact locations of the future demands are unknown. Indoor and outdoor demands were projected and assigned to undeveloped or re-developable areas throughout the City.

Supply – Because Provo has a number of different sources, supply into the system can vary depending on system conditions and the desires of the operators. After looking at the full range of different supply options, BC&A determined that Provo City has some flexibility in how to supply water during peak production periods. The supply scenarios modeled reflect the most conservative conditions from a water transmission and distribution stand point.

- **Source Scenarios –** Two source scenarios were considered:
    - **Max Surface Water –** Used to simulate a wet year when the City has a maximum amount of surface water sources (springs and treated water).
    - **Spring Failure –** Used to simulate a very dry year when surface water sources are limited and wells will be needed near their maximum capacity to meet peak day demands. To be conservative, this scenario assumes full failure of the City springs.

Modeling Flow Scenarios – As noted above, there are several different demand and supply scenarios that could be considered in the model. For the purpose of analysis, these options have been organized into a set of model flow scenarios. The following flow scenarios have been included with the water system model:

1. Max Surface Water 2023 Existing – The purpose of this scenario is to identify current deficiencies in the water distribution system with the springs and the new water treatment plant providing the majority of the water. Production requirements for this scenario correspond to the predicted peak day production requirements found in this report for 2023 (Total production requirement = 53.8 mgd or 37,366 gpm).
2. Max Surface 10-Year – This scenario is identical to the Max Surface 2023 Existing scenario, except that total production requirement is increased to 60.8 mgd or 42,223 gpm.
3. Max Surface Buildout – This scenario is identical to the two previous scenarios, except that total production requirement is increased to 71.8 mgd or 49,888 gpm.
4. Spring Failure 2023 Existing – This purpose of this scenario is to identify current deficiencies in the water distribution system when meeting the City's 2023 existing demand of 53.8 MGD when flow is maximized from the City's wells. This is achieved by assuming available production of the springs is zero. Remaining demand beyond the capacity of the wells is met through the use of the City's new water treatment plant.
5. Spring Failure 10-Year – This scenario is identical to the Spring Failure 2023 Existing scenario, except that total production requirement is increased to 60.8 mgd or 42,223 gpm.
6. Spring Failure Buildout – This scenario is identical to the two previous scenarios, except that total production requirement is increased to 71.8 mgd or 49,888 gpm.

Table 9-1 summarizes the production requirements and the assumed source production for each scenario based on current conservation levels.

Table 9-1
Model Scenario Summary

Scenario	Production Requirement (mgd)	Production Requirement (gpm)	Springs Production (gpm)	Well Production (gpm)	New Water Treatment Plant (gpm)
Max Surface					
2023 Existing	53.8	37,366	11,458	18,650	7,258
10-Year	60.8	42,223	11,458	9,950	20,816
Buildout	71.8	49,888	11,458	17,550	20,881
Spring Failure					
2023 Existing	53.8	37,366	0	31,700	5,666
10-Year	60.8	42,223	0	34,700	7,523
Buildout	71.8	49,888	0	40,700	9,188

CHAPTER 10
STORAGE AND BOOSTING EVALUATION

The purpose of this chapter is to evaluate the City's water storage capacity. This chapter provides an overview of State rules and regulations pertaining to public water system storage facilities. As part of this evaluation, the size and location of existing storage reservoirs was analyzed to determine if the Water has sufficient storage to adequately meet peak demands and to provide emergency and fire flow storage.

STORAGE EVALUATION CRITERIA

Regulations regarding required system storage are found in Section R309-510-8 of the Utah Administrative Code. The first portion of the code outlines the types of storage required:

> "(1) General. Each public water system, or storage facility serving connections within a specific area, shall provide:
>
> (a) equalization storage volume, to satisfy average day demands for water for indoor use and irrigation use,
>
> (b) fire flow storage volume, if the water system is equipped with fire hydrants intended to provide fire suppression water or as required by the local fire code official, and
>
> (c) emergency storage, if deemed appropriate by the water supplier or the Director."

Each of these storage components is discussed below.

Equalization Storage

The State of Utah has recently adopted new regulations for defining equalization storage with respect to drinking water (culinary water). Under these new regulations, system-specific source and storage requirements will be defined for each system. Under historic regulations, equalization storage requirements were defined in the code as follows:

> "(2) Equalization Storage.
>
> (a) All public drinking water systems shall provide equalization storage. The amount of equalization storage varies with the nature of the water system, the extent of irrigation use, and the location and configuration of the water system.
>
> (b) Table 510-4 lists required equalization storage for indoor use. Storage requirements for non-community systems not listed in this table shall be determined by calculating the average day demands from the information given in Table 510-2."

From this section of code, there are two important issues to highlight. The first is described in the following sentence:

> "The amount of equalization storage varies with the nature of the water system, the extent of irrigation use, and the location and configuration of the water system."

Staff at the Division of Drinking Water have interpreted this to mean that the need for equalization storage will vary between systems. This means that, where reliable water use data exists, the volume of equalization storage needed should be calculated based on actual water use patterns. Based on City storage tank levels and source production records, Provo City calculated a demand pattern for its system using five minute increments over a twenty four hour period. Table 10-1 shows an hourly summary of the City's daily demand pattern and Figure 10-1 shows the entire

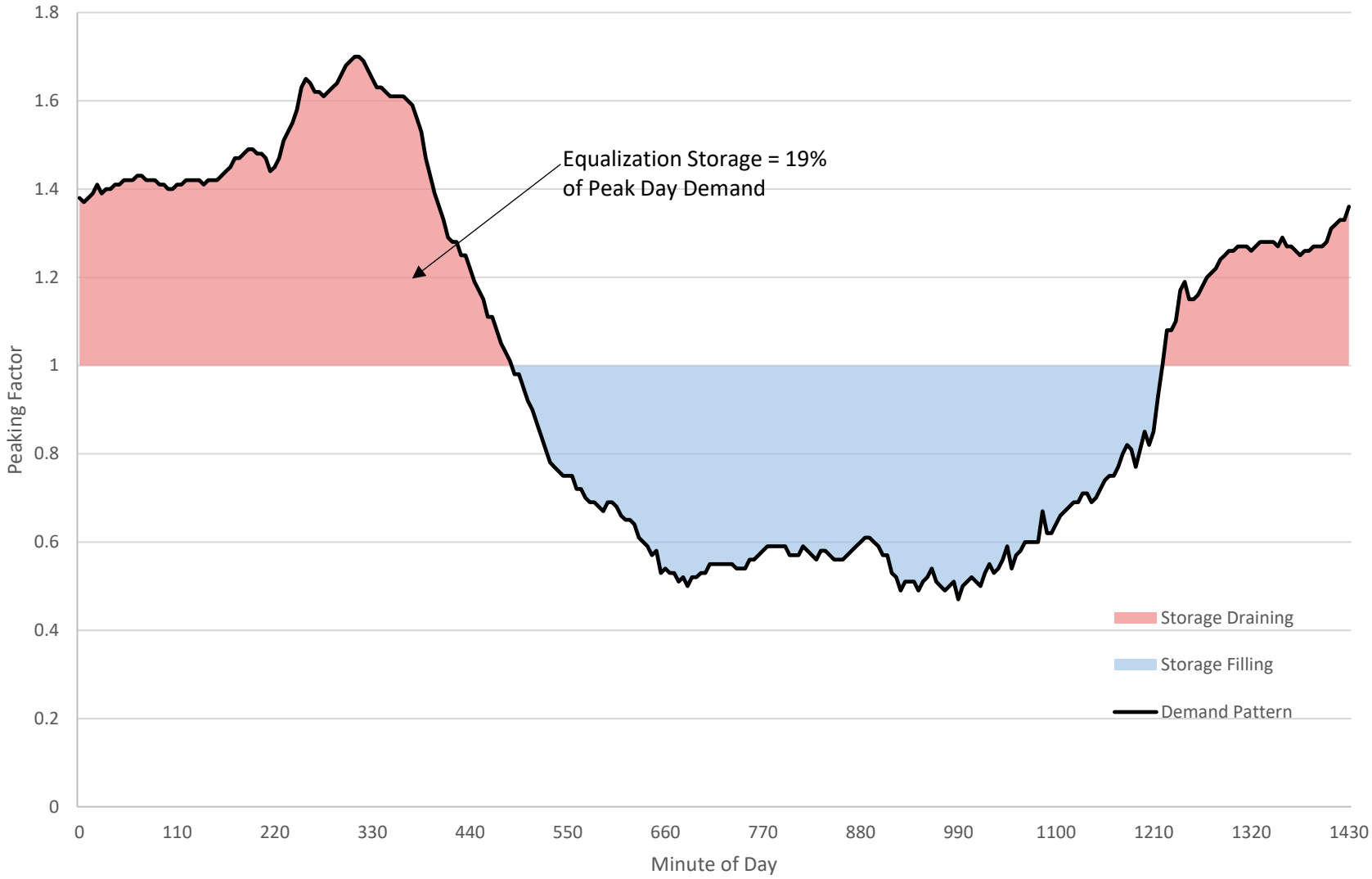
demand pattern for the City. As can be seen in the figure, water demands peak in the early morning hours when most people are irrigating their lawns. Demand then drops off significantly during the day as water use is primarily limited to smaller indoor uses.

Table 10-1
Summarized Hourly Culinary Demand Pattern

Hour	Peaking Factor
0	1.38
1	1.42
2	1.41
3	1.47
4	1.53
5	1.66
6	1.61
7	1.29
8	1.05
9	0.77
10	0.69
11	0.53
12	0.55
13	0.59
14	0.58
15	0.60
16	0.52
17	0.50
18	0.60
19	0.71
20	0.81
21	1.15
22	1.27
23	1.25
24	1.38

While demands vary significantly during the day, the same is not true for most supplies. It is usually most economical to size sources, major conveyance pipelines, and pump stations to produce water at a relatively constant rate throughout the day. Storage is then used to satisfy any demands above the rate of supply.

Figure 10-1
Existing Culinary Water Demand Pattern



With this in mind, Figure 10-1 shows the difference between demand and supply throughout a peak day of demand. During the hours of greatest demand, water from storage is used to meet demand in excess of supply (as shown in red). During periods of lower demand, supply continues at its steady pace to refill storage reservoirs in preparation for peak demands the next day (as shown in blue). Based on the measured flows and as shown in the figure, the required equalization storage for the City was calculated to be approximately 19 percent of average peak day demands. Due to future growth within the City and additional demand on the storage facilities, the City plans on using a minimum value of 25 percent of its average peak day demands to define required equalization storage for existing conditions. Based on projections of current peak day demand, this equates to 13.45 million gallons.

Fire Flow Storage

Fire flow storage requirements are defined in the code as follows:

"(3) Fire Flow Storage.

(a) Fire flow storage shall be provided if fire flow is required by the local fire code official or if fire hydrants intended for fire flow are installed.

(b) Water systems shall consult with the local fire code official regarding needed fire flows in the area under consideration. The fire flow information shall be provided to the Division during the plan review process.

(c) When direction from the local fire code official is not available, the water system shall use Appendix B of the International Fire Code, 2015 edition, for guidance. Unless otherwise approved by the local fire code official, the fire flow and fire flow duration shall not be less than 1,000 gallons per minute for 60 minutes."

As stated in the code, the primary authority responsible for establishing needed fire flows and fire flow storage is the local fire code official. Provo Fire and Rescue is the fire marshal for the City. In a recent ISO survey, the maximum fire flow requirements vary by development type and size and ranges from 1,500 gpm in predominantly residential areas to 6,000 gpm in commercial areas. For the purposes of this master plan, fire flows in residential areas have been established as 1,500 gpm for 2 hours, while commercial areas require 6,000 gpm for 4 hours. Although not specifically outlined in the code, State Division of Drinking Water officials have historically allowed for fire flow for individual water pressure zones to come from storage within the zone itself or from storage in higher zones in the system. For the system as a whole, the required fire flow volume is equal to the combined fire flow storage for each zone and is equal to 4.8 million gallons.

Emergency Storage

Emergency storage is the volume of water required to meet water demand during an emergency situation. Emergency storage requirements are defined in the code as follows:

"(4) Emergency Storage.
Emergency storage shall be considered during the design process. The amount of emergency storage shall be based upon an assessment of risk and the desired degree of system dependability. The Director may require emergency storage when it is warranted to protect public health and welfare."

It will be noted that no specific requirement is given for emergency storage in the code. The determination of required emergency storage is left largely to the entity designing and operating the water system.

For the City, the most common water supply emergencies relative to storage analysis are power outages. During power outages, water supplies are unable to produce needed water. In the event of an extended City-wide outage, all wells and the treatment plant would not be able to operate. While some water delivery during a power outage can be accomplished through auxiliary power to selected water system facilities, it is also wise to include some additional emergency water at storage reservoirs. This also gives system operators the benefit of a little extra buffer for system operations.

Based on conversations with City personnel and common practice in the industry, it is recommended that all zones include emergency storage adequate to supply the system during a 6 hour power outage during peak day demands (or roughly 25 percent of peak day demand). This results in an existing emergency storage need of 13.45 million gallons for existing conditions.

State Minimum Requirements for Culinary Storage

As noted previously, there is a second important issue in the section of the Utah Administrative Code regarding equalization storage that needs to be discussed. This is highlighted in the following section of the code:

> "Table 510-4 lists required equalization storage for indoor use. Storage requirements for non-community systems not listed in this table shall be determined by calculating the average day demands from the information given in Table 510-2."

This section is then followed by a series of tables that can be used to estimate average demands if a system does not have reliable flow data. While the tables provide some interesting information regarding typical average day water demands, the most important issue to note is that the minimum equalization storage allowed by the State is equal to the average day demand. Where reliable data exists, the entity is not required to use the values in the tables but may use actual average day demands.

Based on historic use patterns, the highest average day demand observed in the City was 26.5 million gallons in 2020. This is nearly identical to the equalization/emergency storage calculated previously. Therefore, it is expected that the master plan values will satisfy State minimum requirements. As will be noted in the excerpt above, the specified State value is for equalization storage only, but since the State does not specifically require emergency storage, this becomes the defacto minimum for all storage excluding fire flow storage which is always addressed separately.

Total Recommended Storage

The combined equalization/emergency storage required for the City is 50 percent of peak day demand or 26.9 million gallons (existing conditions). In addition to the recommended equalization/emergency storage, 4.8 million gallons is recommended for fire flow bringing the total recommended storage to 31.7 million gallons. This need falls within the available 42 million gallons in the City's system with all storage facilities.

EXISTING AND FUTURE STORAGE REQUIREMENTS

An evaluation of the City water storage needs for existing and future conditions is shown in Tables 10-2 and 10-3. For the purpose of storage analysis, individual pressure zones have all been grouped into areas of common storage. Included in the tables is a summary of the storage evaluation for the zone itself and a summary of the storage evaluation when available excess storage from higher pressure zones is considered. Since water produced and stored in higher-pressure zones can be

Table 10-2
Existing Culinary Storage Facilities Evaluation

Zone	Name	Total Peak Day Demand (gpm) in Zone	Equalization / Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Storage Requirement (gallons)	Available Storage (Million Gallons)	Equalization Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) Total (gallons)
23	Sherwood	94	67,640	240,000	307,640	0.5	466,180	192,360	192,360
18	Northeast	2,044	1,471,360	240,000	1,711,360	5.0	4,264,320	3,288,640	3,481,000
27	Rock Canyon	1,225	882,178	240,000	1,122,178	0.5	58,911	-622,178	-622,178
13	Intermediate	6,146	4,425,138	1,440,000	5,865,138	8.0	5,787,431	2,134,862	4,993,684
25	Southeast	386	277,584	240,000	517,584	2.0	1,861,208	1,482,416	1,482,416
34	Main	16,063	11,565,603	1,440,000	13,005,603	11.0	5,217,198	-2,005,603	4,470,496
24	Slate	2,864	2,062,381	240,000	2,302,381	5.0	3,968,810	2,697,619	7,168,115
17	West	8,548	6,154,803	720,000	6,874,803	10.0	6,922,599	3,125,197	10,293,313
Total		**37,370**	**26,906,687**	**4,800,000**	**31,706,687**	**42.0**	**28,546,656**	**10,293,313**	

Table 10-3
Buildout Culinary Storage Facilities Evaluation

Zone	Name	Total Peak Day Demand (gpm) in Zone	Equalization / Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Storage Requirement (gallons)	Available Storage (Million Gallons)	Equalization Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) Total (gallons)
23	Sherwood	214	154,040	240,000	394,040	0.5	422,980	105,960	105,960
18	Northeast	2,269	1,633,362	240,000	1,873,362	5.0	4,183,319	3,126,638	3,232,598
27	Rock Canyon	1,429	1,028,786	240,000	1,268,786	0.5	-14,393	-768,786	-768,786
13	Intermediate	7,671	5,523,005	1,440,000	6,963,005	8.0	5,238,497	1,036,995	3,500,806
25	Southeast	524	377,353	240,000	617,353	2.0	1,811,324	1,382,647	1,382,647
34	Main	19,803	14,258,192	1,440,000	15,698,192	11.0	3,870,904	-4,698,192	185,261
24	Slate	3,284	2,364,232	240,000	2,604,232	5.0	3,817,884	2,395,768	2,581,029
17	West	14,699	10,583,279	720,000	11,303,279	10.0	4,708,361	-1,303,279	1,277,751
Total		**49,892**	**35,922,249**	**4,800,000**	**40,722,249**	**42.0**	**24,038,875**	**1,277,751**	

conveyed to and utilized in lower pressure zones, storage for each zone does not necessarily have to be contained in that zone. Excess storage capacity in the upper zones can be used to supply shortages in lower ones. While it is strongly preferred that each zone have adequate storage for its own equalization needs (to avoid pumping water up to higher zones during lower demands only to have to bleed it back down during higher demands), carry over of emergency and fire flow storage from higher zones is acceptable.

Based on the tables, the following conclusions can be made regarding storage in the Provo City water distribution system:

1. Total Storage – The Provo City water system currently has a total of 42.0 MG of storage. Based on the criteria described previously, the water system needs 31.7 MG of storage currently and 40.7 MG of storage at buildout. Overall, the City has enough total storage to meet all its future needs. Unfortunately, these totals only reflect the system as a whole. When storage is considered for individual zones, there are existing deficits in Zones 27, and 34.
2. Zone 27 (Rock Canyon) – The Rock Canyon storage reservoir provides storage to Zones 6, 7, 8, and 27. Approximately 625,000 gallons of additional storage is required now, with an additional 145,000 needed by buildout. One thing that may help with this deficit is a normally closed connection with between Zone 27 (Rock Canyon) and Zone 18 (Northeast). As can be seen above, the Northeast Reservoir has a large surplus of storage for both existing and future conditions. In an emergency, this connection could be opened to bring water from the Northeast Reservoir into Zone 27.
3. Zone 34 (Main) – The Main and Gallery storage reservoirs provides storage to Zones 14 and 34 (Main). There is an existing shortfall of 2 MG and a buildout shortfall of 5 MG when looking at the zone by itself. However, the south end of Zone 34 (Main) can be served from surplus storage in Zone 13 (Intermediate) and Zone 25 (Southeast). When surplus storage is considered, there is no deficit.
4. Zone 17 (West) – The Columbia Lane and Slate Canyon 2 storage reservoirs provide storage to Zone 17 (West). No existing shortfall exists under current conditions. However, under buildout conditions, there is a shortage of approximately 1.3 gallons when looking at the zone by itself. However, the City can utilize 2.8 MG of surplus storage in the Slate Canyon storage reservoir to eliminate the deficit.

Based on these conclusions, BC&A would recommend the following actions:

1. **Construct New Storage in Zone 27 (Rock Canyon) –** As noted above, Zone 27 has an existing storage deficiency when considering storage surplus but can be served from excess storage at the Northeast Reservoir. The current arrangement is probably acceptable for the short-term. The presence of surplus storage in the Northeast Reservoir satisfies all State requirements and the existing 500,000 gallons of storage at Rock Canyon is adequate to meet equalization storage needs alone. However, this does mean there will be less room for error in this zone and that operators will need to be more attentive in watching reservoir levels. After reviewing this issue with Provo City staff, it was decided that the City would continue to use storage in the Northeast Reservoir for the immediate future. Another possible option would be to add a 1,000 gpm pump station from the Main or Intermediate Zones and construct a pipeline up to the Rock Canyon Zone. This would help the City meet peak day demands should spring production be insufficient.
2. **Maintain Storage Volumes Elsewhere, Especially in Zone 34 (Main) –** As summarized in the table, there is only a small amount of excess storage available in the system as a whole.

It will be important to maintain the total volume of storage the City has to meet future needs. This is especially important in the vicinity of Zone 34 (Main). This zone is the heart of the City's water system and would already be storage deficient without a little help from excess storage from the Slate Canyon and Intermediate Zones. As the City considers needed replacement of existing storage reservoirs (discussed subsequently), it should be careful to maintain or increase available storage within or above Zone 34.

EXISTING STORAGE CONDITION ASSESSMENT

As part of this master plan, field inspections were conducted for several storage tanks. A detailed inspection report of the tanks is included in Appendix A. While these filed inspections were limited to exterior observations only, a useful amount of information was able to be gathered. These observations were combined with interviews of City staff and review of available as-built drawings to project upcoming asset management needs associated with nine of the City's existing tanks. All other City tanks are relatively new and are expected to be in excellent condition.

A brief summary of condition assessment results are shown in Table 10-4. Included in the table are seismic risk and condition ratings for each tank inspected to best determine timing and need of improvement projects. These ratings can be defined as follows:

- Seismic Risk - The likelihood and consequence of structural damage in a seismic event was evaluated for each facility based on total capacity, usage, criticality, landslide risk, flotation risk, structural failure risk, and connection failure risk. A total score between 0 and 30 was calculated and assigned a rating as follows:
  - Low – 7 or less, Likelihood of damage in a seismic event is low or consequences are minimal. Seismic considerations are low priority.
  - Moderate – 7 to 15, Larger tanks affecting a significant number of people where increased likelihood of damage is anticipated but the tank should still be able to provide service after all but the most extreme seismic events. Schedule regular inspections to monitor items of concern and make repairs as needed.
  - High – 16 to 22, Critical structure affecting a large number of people where there is a high likelihood that it will be out of service after a significant earthquake and will probably be destroyed in a major event (M7.0 design quake). Make plans to upgrade or replace.
  - Critical – 23 to 30, Likelihood of failure in a seismic event is very high and consequences are severe. Immediate attention is recommended.
- Condition Rating - Based on a field inspection of each tank's exterior condition, review of available design drawings, and age the following condition ratings were assigned by a structural engineer with over 40 years of experience in storage tank design:
  - Very Good – Tank is in very good condition and no action is recommended.
  - Good – Tank is in generally good condition but showing some signs of age. Tank is expected to be serviceable for the foreseeable future.
  - Fair – Tank is still serviceable but showing the effects of age. Plans for replacement are not needed immediately but should be considered in the immediate term.
  - Poor – Tank is near or beyond the end of its useful life and should be considered for replacement as soon as possible.

Table 10-5 shows all recommended improvement projects based on model results and field inspections.

Table 10-4
Culinary Storage Facility Observation Summary

Tank Inspected	Age (years)	Storage Capacity (MG)	ERU's Served	Seismic Risk	Condition Rating	Field Observation Notes
North Intermediate	40	5	551	Moderate	Very Good	• Minimal coverage • Good drainage • No evidence of problems • The metals are galvanized and likely rotted out
Sherwood Hills	44	0.5	337	Low	Good	• Only 60 -70s homes served • Metals are corroded • Outlet mechanical is in poor condition • Outlet vault without ventilation • Little cover (6-12 inches)
Northeast	~40	5	3,574	Moderate	Good	• Drainage challenges • Minimal cover – spalling, especially on west edge • Exposed prestressed anchors • Seismic concerns - roof not connected to wall
Intermediate	55	3	12,084	Moderate	Very Good	• Steel - inside last painted in 2008 • Outside is A588 steel (natural) • Seismic concerns – not anchored at foundation • Tank shell in good condition
Rock Canyon	57	0.5	2,251	Moderate	Good	• Exposed roof with cracks • Corroded metals • Spalling at entryway • Good drainage
Gallery	94	5	14,467	High	Fair	• Seismic concerns - roof not connected to wall • Surrounded by trees but no roots noticed
Main	68	6	17,360	High	Fair	• Welded Steel – inside last painted in 2006 • Concrete floor • Thickness of concrete was recently tested and is okay
Slate Canyon	55	5	4,543	High	Poor	• Double T design likely has problems with connections • Drainage issues - significant bird baths • Prestressed top is only a cap (3-inches thick) • Dangerous ladder for interior access
Southeast	28	2	826	Moderate	Good	• Concrete is in good condition • Minimal surface corrosion inside vault • Thin cover but okay - minor drainage issues

Table 10-5
Recommended Culinary Storage Facility Improvements

Project No.	Storage Facility	Additional Volume (MG)	Improvement	Approximate Year of Construction	Construction Cost	Total Facility Cost
S-1a	North Intermediate (concrete)	-	Replacement of miscellaneous metals	2026	$100,000	$105,000
S-1b			Plan interior inspection	2025	$5,000	
S-2a	Sherwood Hills (concrete)	-	Replacement of miscellaneous metals	2024	$60,000	$130,000
S-2b			Outlet vault improvements including new ventilation	2024	$50,000	
S-2c			Reroute trail around top of tank and regrade	2024	$15,000	
S-2d			Plan interior inspection	2025	$5,000	
S-3a	Northeast (concrete)	-	Regrade to improve drainage	2028	$15,000	$155,000
S-3b			Repair spalling along west edge	2028	$80,000	
S-3c			Pin lid to the wall for seismic protection	2028	$50,000	
S-3d			Plan interior inspection and seismic evaluation	2025	$10,000	
S-4a	Intermediate (steel)	-	Repaint interior	2030	$845,000	$1,010,000
S-4b			Install magnesium anode for corrosion resistance	2030	$50,000	
S-4c			Replace stringers/other misc. metals inside tank	2030	$100,000	
S-4d			Plan interior inspection and seismic evaluation	2025	$15,000	
S-5a	Rock Canyon (concrete)	1	Replace with 1.5 MG tank to provide additional volume	2027	$4,000,000	$4,000,000
S-6a	Gallery (concrete)	-	Roof rehab for leakage and freeze thaw	2026	$15,000	$530,000
S-6b			Seismic protection	2026	$500,000	
S-6c			Plan interior inspection & seismic evaluation	2025	$15,000	
S-7a	Main (steel)	-	Repaint interior	2032	$1,555,000	$2,510,000
S-7b			Repaint exterior	2031	$940,000	
S-7c			Plan interior inspection and seismic evaluation	2025	$15,000	
S-8a	Slate Canyon (concrete)	-	Inspect Double T design and plan interior inspection	2025	$5,000	$10,006,000
S-8b			Replace access ladder to tank interior	2025	$1,000	
S-8c			Plan replacement	2033	$10,000,000	
S-9a	Southeast (concrete)	-	Inspect and monitor surface corrosion inside vault	2033	$15,000	$20,000
S-9b			Plan interior inspection	2025	$5,000	
Total Cost						**$18,466,000**

CHAPTER 11
DISTRIBUTION SYSTEM EVALUATION

The purpose of this chapter is to document the results of the culinary distribution system evaluation based on hydraulic modeling.

MODEL SCENARIOS

The City's hydraulic model has been setup to run multiple supply and demand scenarios.

Supply Scenarios

Supply scenarios were discussed in Chapter 9. In evaluating the distribution system, it was determined that the controlling supply scenario for most areas of the model is when supply from springs is at its maximum. In this case, much of the City's water is coming in at a few concentrated points and distributed supplies such as wells are reduced. This results in the need for more capacity to distribute the water throughout the system. Consequently, all results shown in this chapter are for that specific supply scenario. However, results from other supply scenarios have been considered and are included in the final results.

Demand Scenarios

The model results that are most useful for evaluating the distribution system performance include consideration of several operating conditions: static or low demand periods, peak day demands with fire flow, and peak instantaneous demands. To consider these several conditions, model results were assembled for the following scenarios:

- **Peak Day Extended Period Simulation** – This scenario represents expected demands over a peak day. This includes modeling of expected diurnal demand variations as described in Chapter 9. Because the extended period simulation captures the full range of demands the system might see, the model is valuable for considering several conditions. First, it allows for evaluation of minimum pressures under peak hour demand conditions. Second, it allows for evaluation of potentially high system pressures during periods of low demand. Finally, the model is run for a period of 120 hours. This allows for evaluation of storage utilization trends. This tells the City whether or not the system has the capacity needed to convey adequate water to each storage zone. It also tells the City how effectively storage is being utilized in each zone.
- **Peak Day Demand Steady State with Fire Flow** – State standards require that fire flow capacity be evaluated at peak days demands. To efficiently identify available fire flows at each hydrant, this steady state scenario at peak day demands has been created and evaluated.

These two basic demand scenarios were evaluated for existing conditions, projected 10-year growth, and potential demand at buildout. For simplicity, this report will present results for the existing and buildout conditions, but 10-year growth results were used to assist with identifying the needed timing of recommended improvements.

EVALUATION CRITERIA

The performance of the system was evaluated using the following criteria:

- **Culinary pressure within the system during peak demands** - The State of Utah requires that a public water system maintain system pressures of no less than 30 psi during peak

hour demands and 40 psi during peak day demands. This is the minimum design standard for City facilities. However, the City tries to maintain pressures between 60 psi and 120 psi for most of the distribution system and only makes exceptions for areas with topography challenges that would require excessive additional pressure zones to otherwise resolve.

- **Pressure within the system during peak day demands with fire flow –** The State of Utah requires that a public water system be capable of conveying required fire flow with a residual pressure of 20 psi. Any node in a residential area incapable of supplying 1,500 gpm with a 20 psi residual was identified as deficient. Commercial areas were evaluated with a fire flow of at least 3,000 gpm with a 20 psi residual. In some industrial areas with large structures, up to 6,000 gpm of fire flow was used as the standard.
- **Maximum pipe velocities –** While high instantaneous velocities in a pipeline are not generally as much of a concern to the system as low pressures, they can cause damage to pipes and potentially lead to pipe failure. High velocities also indicate areas where additional conveyance improvements will have the most benefit. Thus, pipelines with velocities above 7 ft/sec are not considered deficiencies but do indicate areas where additional conveyance improvements would be beneficial. Any pipeline which displayed a maximum velocity greater than 10 ft/sec was flagged as a deficient pipe.

SYSTEM EVALUATION RESULTS

Boosting Evaluation

The City's existing booster stations were analyzed in the water model. In order to verify that the system had enough source capacity for each zone, pump capacities were compared with peak day production requirements to ensure that there was sufficient pump capacity. From this comparison, it was determined that the existing pump capacity is sufficient to meet production requirements through buildout. No pump station improvements are recommended as part of this master plan update. However, it should be noted that there is no redundancy provided for the Rock Canyon and Southeast booster stations. Both booster stations are single pump stations with single supply lines. It is recommended that the City consider redundant capacity in the distant future.

Existing Distribution Evaluation

The hydraulic computer model was used to simulate system conditions for existing demands. Model results for critical model scenarios under existing demands are included in the following figures:

1. Figure 11-1 shows the minimum pressures for the Existing Peak Day Extended Period Simulation. Observations are as follows:
    a. Grandview Area – There is an existing area of low pressures between State Street and I-15. This area is generally referred to as the Grandview Area. The area meets State of Utah peak hour demand requirements, but falls below 40 psi, significantly below the City's target minimum system pressure of 50 psi. The deficiency is primarily caused by the area being too high in elevation to be efficiently served within the Main Pressure Zone.
    b. Isolated Pockets of High Pressure – The figure includes a number of isolated pockets of high pressure along the east bench. These are areas where there is significant change in elevation over a short distance and pressures cannot be kept within the target range without an excessive number of pressure zones. No changes are recommended in association with these areas at this time.

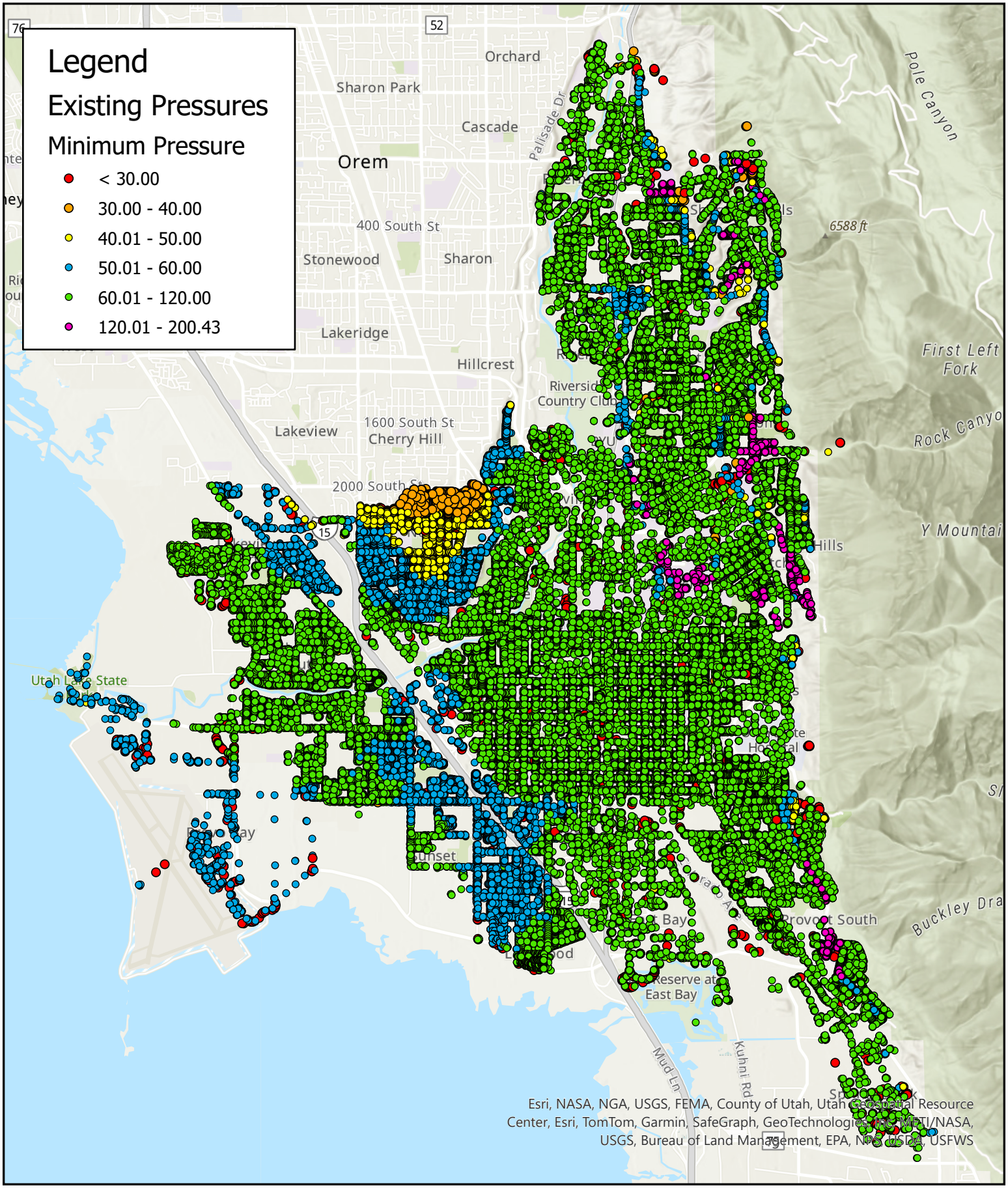
2. Figure 11-2 shows the available fire flow in the steady state model with Existing Peak Day Demands. Observations are as follows:

    a. While the vast majority of the distribution system is adequate to meet projected needs, there are a number of isolated areas of the distribution system that do not meet fire flow requirements. In general, most fire flow deficiencies are caused by the following concerns:

        i. Dead Ends – Dead end connections often have fire flow deficiencies because forcing all the flow through a single pipe can result in high velocities and pressure losses. Dead end connections frequently require oversized pipes to meet fire flow requirements unless the connection can be looped another way.

        ii. 4-inch Pipes – The City has a number of areas with 4-inch pipes. Even in areas that are looped, high velocities in these pipelines often result in insufficient pressure to meet modern fire flow demands.

        iii. Upper Elevations in Pressure Zones – Because of their lower pressures to begin with, junctions near the upper end of pressure zones can have difficulty meeting fire flow requirements without large supply pipes and looping.



BOWEN COLLINS & ASSOCIATES

Existing Demand Minimum Pressures

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. 11-1

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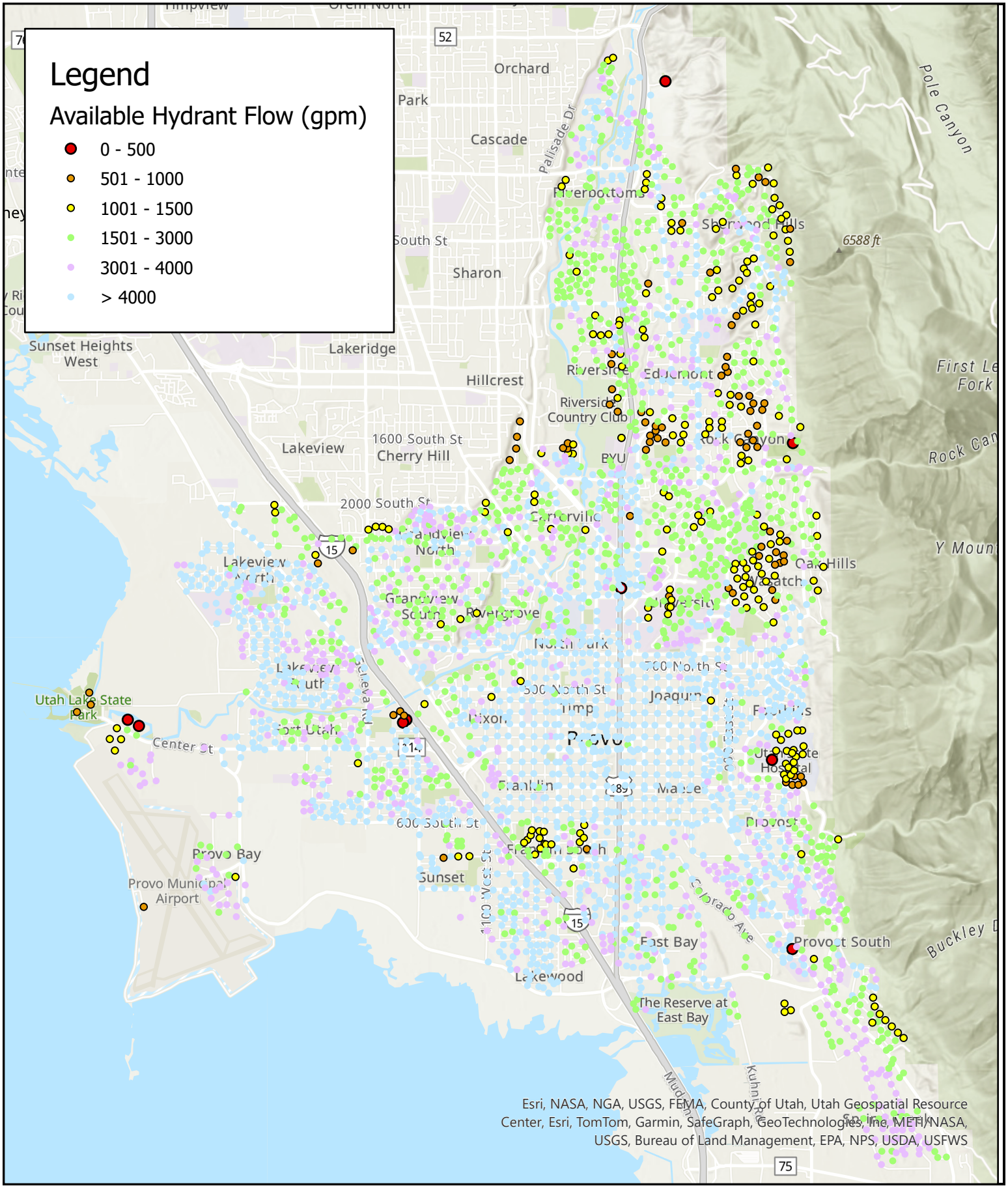


BOWEN COLLINS & ASSOCIATES

Existing Fire Flow Results

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

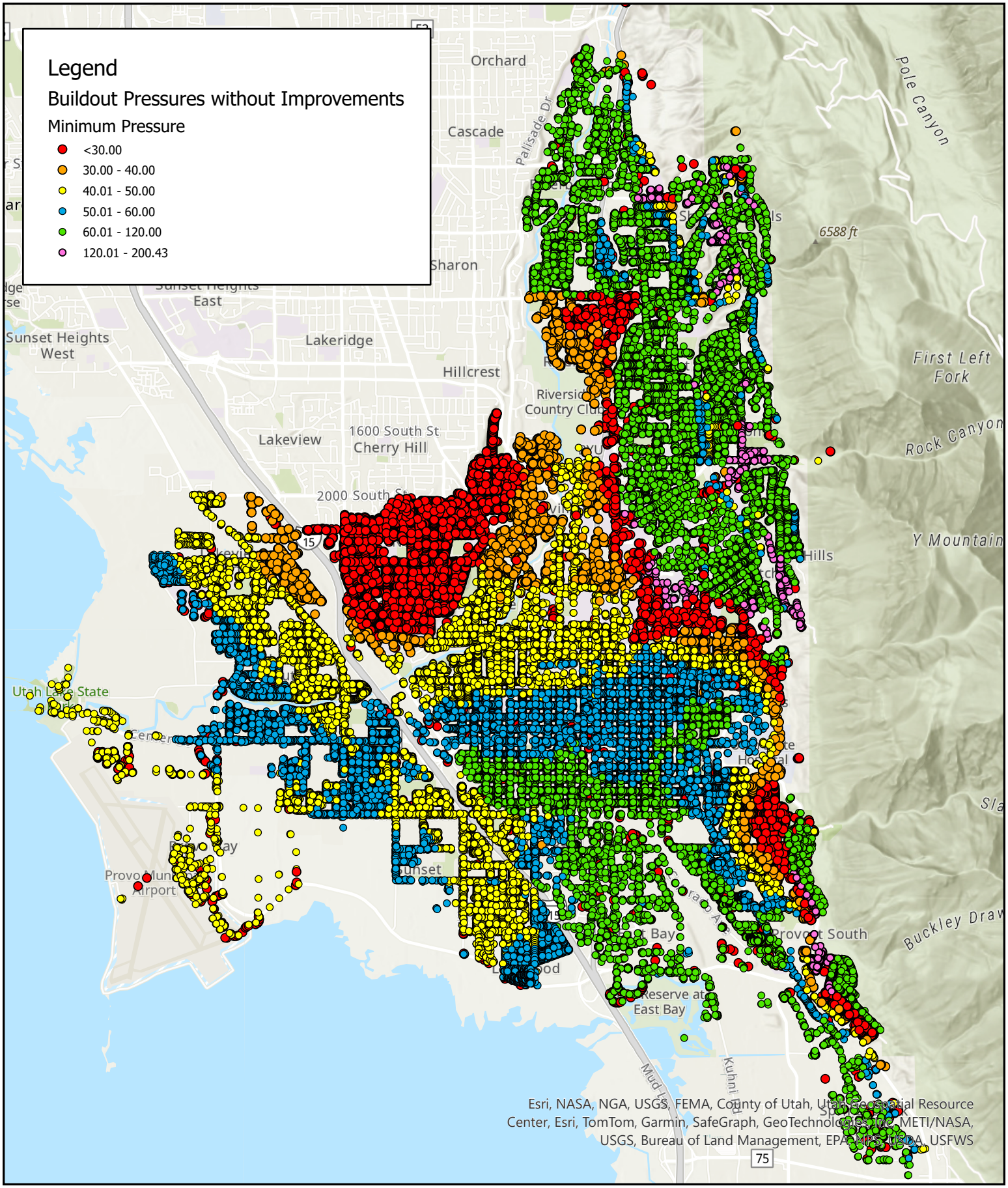
FIGURE NO. 11-2

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Fire Flow Results.aprx aharris 4/4/2024

Buildout Distribution Evaluation

The hydraulic computer model was used to simulate system conditions for buildout demand conditions on primarily existing facilities (a few new facilities were added, but only where current improvement projects are already in progress or where needed to distribute future demands). Figure 11-3 shows minimum pressures throughout the City.

1. Figure 11-3 shows minimum pressures for the Buildout Peak Day Extended Period Simulation. Observations are as follows:
    a. Widespread Pressure Deficiencies – As can be seen in the figure, the existing distribution system is not sufficiently sized to meet the projected growth in demand at buildout. While some upper zones (where little growth is expected) are just fine, the Main and West Pressure Zones, are showing significant and widespread pressure problems. Additional capacity is needed to convey water to areas of projected future demand.



BOWEN COLLINS & ASSOCIATES

Buildout Demand Minimum Pressures Without Recommended Improvements

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. 11-3

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Provo Water Model Scenarios.aprx aharris 3/25/2024

CHAPTER 12
DISTRIBUTION SYSTEM IMPROVEMENTS

The purpose of this chapter is to document recommended distribution system improvements for the water system. For the purposes of discussion, the improvements have been grouped by whether they are needed for overall conveyance or fire flow.

DISTRIBUTION CONVEYANCE IMPROVEMENTS

The hydraulic model was used to evaluate various alternatives for correcting the identified deficiencies under projected future conditions. The projects have been separated into three groups: 0-5 year, 5-10 year, or greater than 10 year depending on the expected timing of the project. Figure 12-1 shows the location and size of the improvements. Proposed sizes for pipes have been included based on model results but should be verified as part of final design.

0-5 Year Improvements

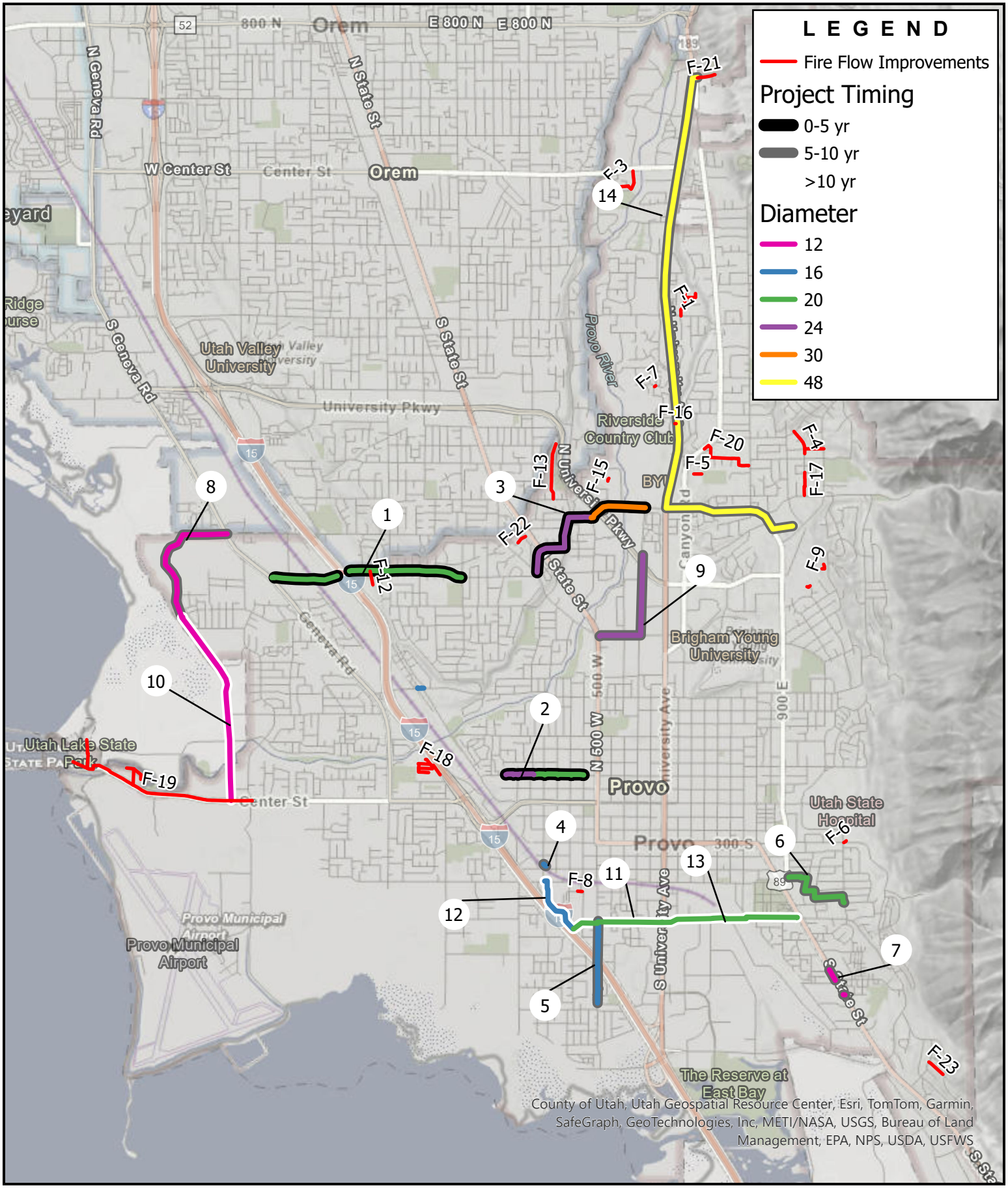
Improvements that are needed to address existing deficiencies under current demands and should be constructed within 0 to 5 years are as follows:

P1. 1730 North Freeway Crossing – With rapid development occurring on the west side of the freeway, additional capacity in the City's system is needed to deliver water from the storage facilities on the east side of I-15 to where growth is occurring on the west. It is anticipated that approximately 6,500 feet of 20-inch pipe will be needed for this project along with two railroad crossings which have been included in the cost estimate included in this chapter.

P2. 200 North Upgrade – Additional capacity is required along 200 N. to meet the demands of the growing west side. Approximately 1,900 LF of 20-inch pipe and 1,090 LF of 24-inch pipe are recommended.

P3. Treatment Plant to Grand View – The City is currently constructing a new water treatment plant that will supply much of the City with drinking water and replenish the City's aquifer. With increased buildout demands, the Grand View area will require additional water supply that is best provided by the new treatment plant. It is proposed that a 30-inch (3,000 LF) and 24-inch (4,300 LF) pipeline be constructed to supply water to this area.

P4. PRV from Main Zone to West Zone – Additional projects are recommended to convey flows from east to west for the development in projection of the City southwest of I-15 (see projects 11, 12, and 13); however, these projects are expensive and can be delayed for several years with the construction of a new PRV connecting the Main Zone to the West Zone. This 16-inch PRV is recommended as a temporary improvement to meet projected demands to the west until the other improvements can be constructed.



BOWEN COLLINS & ASSOCIATES

Improvement Projects

Provo City

Provo City Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. 12-1

5-10 Year Improvements

Improvements that are needed to address deficiencies under projected demands within 5 to 10 years are as follows:

P5. 600 West Upsize – Again, due to the development occurring on the west side of the freeway, the City plans to upsize the 6-inch pipeline on 600 West under the freeway overpass to a 16-inch pipe. This will allow additional flow from eastern storage facilities to be conveyed to the increased demand out west. The project will require approximately 2,400 feet of 16-inch pipe.

P6. Parallel 20-inch to Slate Canyon Tank – To meet expected demand out west, the City constructed a Slate Canyon 2 water storage tank. For this to operate successfully, additional capacity will be needed to deliver the flows from the Main and Gallery tanks to the Slate Canyon tanks. This project will require 3,200 feet of a parallel 20-inch pipe to the already existing pipeline.

P7. State Street 12-inch Connections – Near the Ironton area of the city, certain neighborhoods are projected to experience lower than ideal water pressure because of the increased demand on the Slate Canyon tanks. There are multiple pipelines along this reach, but they are isolated from each other and most of the projected future flow is being forced through just one of them. To reduce velocities, increase pressures, and meet the buildout demands, it is recommended that two 12-inch connections totaling approximately 700 feet be made along and across State Street to better interconnect the system as shown in Figure 12-1.

P8. 12-inch Northwest System Connections – For fire flow purposes, a 12-inch loop should be constructed in the Northwest corner of the City to provide service to future development. The exact routing and timeline for this pipeline will depend on developer plans and timing. However, it is estimated that the pipeline will need to be about 2,100 feet in length.

>10 Year Improvements

Improvements that are needed to address deficiencies under projected demands beyond 10 years have been identified. Because these projects are not needed within the planning window of this master plan, it is recommended that the City monitor the pipelines where these future deficiencies are expected to occur. They can then be reassessed as part of the City's next master plan. These improvements include:

P9. Redundant 30-inch to Grand View – Once complete, Project 3 will be the primary source of water supply to the Grand View area during peak demands. However, it is additionally recommended that a redundant line be installed along Freedom and Cougar Boulevards to ensure that demands in this area are always met. A 30-inch line is recommended with a length of approximately 4,500 feet.

P10. Lakeview Parkway 12-inch Connection – Similar to Project 8, it is important that 12-inch backbone lines are included throughout the west side development to ensure that future fire flows can be met in commercial areas. It is recommended that approximately 7,300 feet of pipe be installed on Lakeview Parkway.

P11. 900 South 20-inch East to West Connection – As mentioned in the description for Project 4, a more permanent, reliable source should be constructed to deliver flow from the Slate Canyon tanks to the west side. Project 11 (5,200 feet of 20-inch pipe)

is the first of three projects recommended to deliver the flow across the south end of the City.

P12. 16-inch Stubbs Avenue – To maximize the flow to the west side of the City, additional capacity should be included along Stubbs Avenue. This provides interconnection between both the 920 South and 600 South freeway crossings. It is recommended that 2,400 feet of 16-inch pipe be constructed.

P13. 900 South Parallel 20-inch Crossing – This Project is proposed in conjunction with Projects 11 and 12 to convey additional water from Slate Canyon storage to the developing west side of the City. This project has been separated from Project 11 because it requires tunneling under the Union Pacific Railroad and Front Runner tracks. It will also parallel an existing 20-inch line with existing capacity. The cost estimate included in this chapter include 3,200 feet of 20-inch pipe and additional cost for railroad crossings.

P14. 48-inch Redundant Pipeline – The vast majority of the City's spring water is delivered through a single 48-inch pipeline from the Gillespie Weir House to the Gallery and Main storage reservoirs. This project would provide a backup feed for the existing 48-inch pipeline. The new redundant pipeline could follow the route of the existing pipeline or use a different alignment (with the goal of providing increased physical separation of the redundant facilities). Total length of the pipeline would be approximately 21,000 ft long.

P15. Oversizing of Distribution Mains for Future Growth – Provo City policy for all new development is that it must install its own 8-inch distribution mains. However, to service larger areas and meet commercial fire flows, it is often advantageous to oversize some of these mains to augment the transmission system. As a result, a budget item has been included in this master plan for the oversizing of distribution mains as necessary to meet future growth:

- The budget for this item has been based on upsizing approximately 48,500 feet of 8-inch pipeline to 12- or 16-inch pipeline. Based on the area within the City's service area that is currently undeveloped or planned for redevelopment, model results indicate that this should be adequate to create the conveyance capacity needed in addition to the specific transmission projects identified above.
- No specific locations are shown for this project on Figure 12-1 because the exact location of the oversized mains will not be known until more concrete development plans are submitted to the City for currently undeveloped areas.
- The total budget for this group of projects is estimated to be $1.37 million. It is estimated that this work will be spread out over a 20-year period. Thus, it is recommended that $68,500 be budgeted annually for this purpose (with adjustment for inflation).

Table 12-1 shows a combined summary table of the proposed improvements with estimated costs.

Table 12-1
Distribution System Improvements

Project No.	Construction Timeframe	Description	Project Cost
Distribution Improvements			
P1	0 – 5	1730 N. Freeway Crossing	$8,000,000
P2	0 – 5	200 N. Upgrade	$1,517,000
P3	0 – 5	Treatment Plant to Grand View	$6,952,000
P4	0 – 5	PRV From Main Zone to West Zone	$414,000
P15a	0 – 5	Oversizing of Distribution Mains for Future Growth	$344,000
P5	5 – 10	600 West Upsize	$1,018,000
P6	5 – 10	Parallel 20" to Slate Canyon Tank	$1,551,000
P7	5 – 10	State Street 12" Connections	$264,000
P8	5 – 10	12" Northwest System Connection	$815,000
P15b	5 – 10	Oversizing of Distribution Mains for Future Growth	$344,000
P9	>10	Redundant 30" to Grand View	$3,145,000
P10	>10	Lakeview Parkway 12" Connection	$2,820,000
P11	>10	900 S. 20" East to West Connection	$2,536,000
P12	>10	16" Stubbs Avenue	$1,024,000
P13	>10	900 S. Parallel 20" Crossing	$2,592,000
P14	>10	48" Redundant Pipeline	$27,309,000
P15c	>10	Oversizing of Distribution Mains for Future Growth	$687,000
0-5 Yr Total			**$17,227,000**
5-10 Yr Total			**$3,992,000**
> 10 Yr Total			**$40,113,000**
TOTAL of All Improvements			**$61,332,000**

Table 12-2
Fire Flow Improvements

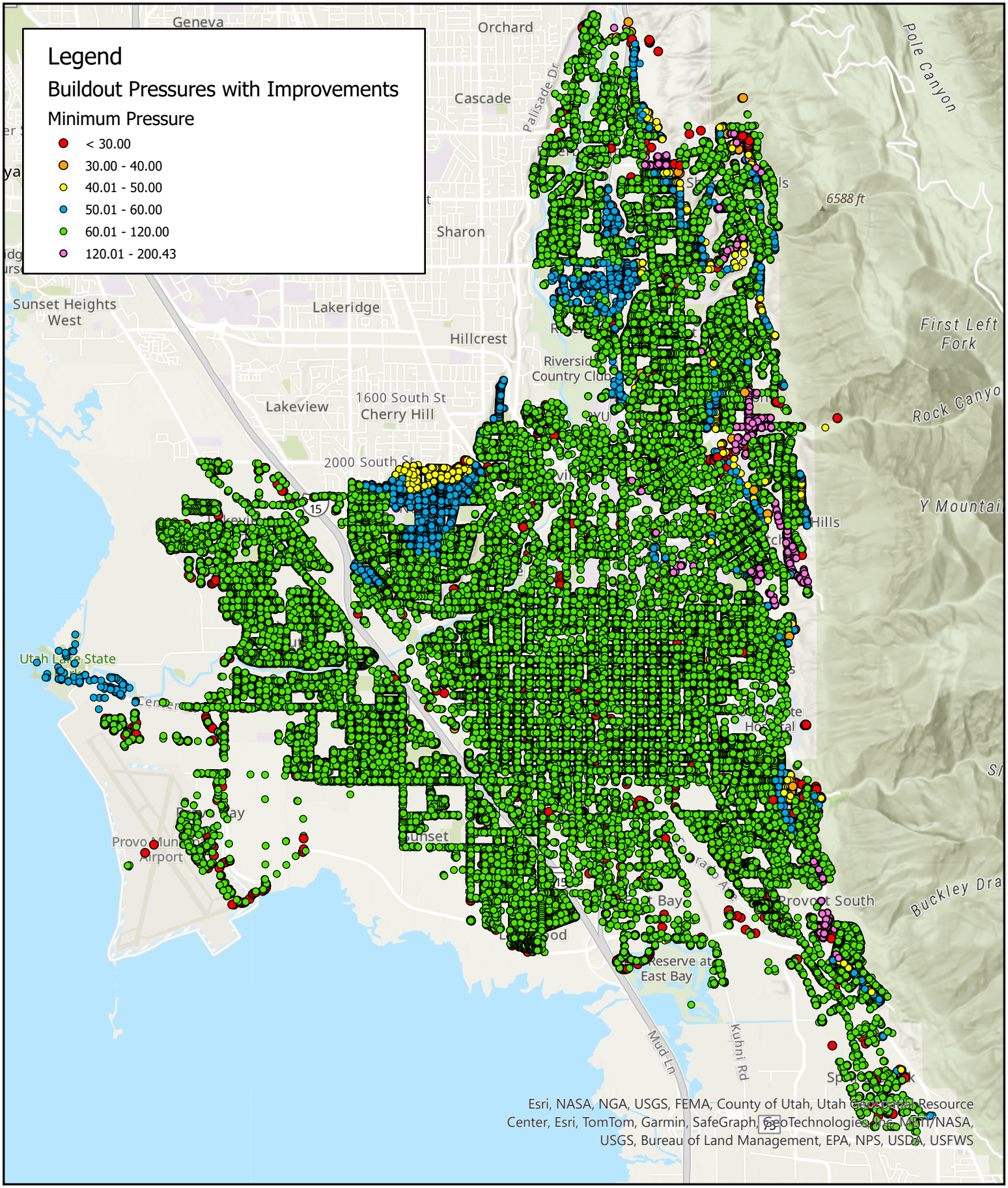
Improvements to Increase Fire Flow				
Project	**Description**	**Priority**	**Length (ft)**	**MP Cost Estimate**
Fire Flow Improvement Projects				
F-1	1,600 ft of 8" pipe from 3500 N to 3900 N. between Univ. Ave. and Canyon Rd.	medium	1,600	$411,000
F-2	250 ft of 8" pipe from Crestview west along 4630 N. then south along 450 W.	medium	250	$65,000
F-3	1,500 ft of 10" pipe along 300 W then west along 4630 N. then south along 450 W.	low	1,500	$385,000
F-4	6" PRV and 1,700 ft of 8" pipeline along Oneida and 2680 N.	medium	1,700	$437,000
F-5	300 ft of 8" pipe at approximately 200 E. and 2500 N.	medium	300	$77,000
F-6	50ft of 8" pipe and PRV to connect Zone 24 to 34 near 300 South roundabout.	high	50	$112,000
F-7	50 ft of 8" pipe to connect 140 E. and 3200 N. with apartment complex.	medium	50	$13,000
F-8	200 ft of 8" pipe to loop Meadow Drive.	medium	200	$52,000
F-9	Ensure there's multiple connections for pipe connecting Wymount to Oak Lane.	medium	100	$26,000
F-10	150 ft of 8" pipe and 6" PRV to Connect Wymount to Locust.	medium	150	$39,000
F-11	6" PRV from Zone 15 to 11 on Mohawk Lane.	medium	-	$26,000
F-12	500 ft of 8" pipe from 2200 N. south along 2300 W.	high	500	$129,000
F-13	2,050 ft of 8" pipe from 2300 N. running north along 850 W.	high	2,050	$527,000
F-14	850 ft of 8" along Brentwood Dr.	medium	850	$219,000
F-15	100 ft of 8" pipe to business on 2250 N.	low	100	$26,000
F-16	250 ft of 8" pipe to loop Marrcrest North	low	250	$65,000
F-17	6" PRV on 1060 E. and 2570 N.	medium	-	$99,000
F-18	2,500 ft of 8" pipe within KOA campground to replace 4" pipes.	high	2,500	$642,000
F-19	6,000 ft of 12" and 3,600 ft of 8" from Center St. and 3110 W. west to boat harbor and campground. 8" pipe is within campground and boat harbor.	high	9,600	$2,464,000
F-20	1,400 ft of 8" pipe and 500 ft of 10" pipe from Timpview and 2550 N. west and north to 530 E. and 2600 N.	medium	1,900	$750,000
F-21	700 ft of 8" pipe near intersection of Canyon Rd and University Ave. east.	high	700	$180,000
F-22	100 ft of 8" pipe to connect system near State Street and Cove Point	medium	100	$26,000
F-23	500 ft of 8" pipe along Montana Avenue.	medium	500	$129,000
Total Fire Flow Project Costs				**$6,899,000**

Buildout Distribution Evaluation with Improvements

The hydraulic model was used to show pressures throughout the system at buildout demand with the recommended improvements. Figure 12-2 shows minimum pressures throughout the City with all the recommended improvement projects listed above:

1. Figure 12-2 shows minimum pressures throughout the City of the Buildout Peak Day Extended Period Simulation after recommended improvement projects are implemented. Observations are as follows:

    a. The Grandview Area has lower pressures shown with a minimum pressure between 40 and 50 psi. Although this is lower than desired, it meets state minimum standard, and the pressure is only this low for a short duration during the early morning.



BOWEN COLLINS & ASSOCIATES

Buildout Demand Minimum Pressures With Recommended Improvements

Provo City

Water Master Plan Update

NORTH:

SCALE: 0 2,500 5,000 Feet

FIGURE NO. 12-2

P:\Provo City\011-22-01 Water Master Plan Update\4.0 GIS\4.4 APRX\Provo Water Model Scenarios.aprx aharris 3/25/2024

IMPLEMENTATION & CAPITAL FACILITIES PLAN

PART 3 OF WATER MASTER PLAN

provo

BOWEN COLLINS & ASSOCIATES

PROVO CITY IMPLEMENTATION & CAPITAL FACILITIES PLAN

FEBRUARY 2024

Prepared for:

provo
PUBLIC WORKS
WATER RESOURCES

Prepared by:

BOWEN COLLINS
& ASSOCIATES

CHAPTER 13
IMPLEMENTATION AND CAPITAL FACILITIES PLAN INTRODUCTION

INTRODUCTION

Provo City desires to develop an updated master plan for its water system. This is the third in a series of three reports that will comprise the planning documents for the City's water system. The reports are:

- **Supply and Demand Master Plan** – An examination of water demands expected in the City and the existing and future supplies available to meet these demands.
- **Conveyance and Storage Master Plan** – An evaluation of the City's existing conveyance and distribution system and its ability to deliver water when and where it is needed.
- **Implementation and Capital Facilities Plan –** A plan for completing the necessary improvements identified in the supply and conveyance master plans.

As this is the third report in the series, the reader will notice that it starts with Chapter 13. Each report has been given unique chapter numbers to avoid confusion with chapters in one of the other two reports.

BACKGROUND

The purpose of the last part of this water master plan is to discuss overall system investment needs (including rehabilitation and replacement projects that the City would like to accomplish in the next ten years) then provide an implementation plan for all the recommended water improvements. Chapter 13 summarizes the recommended improvements identified in the previous two reports. Chapter 14 will discuss the recommended rehabilitation and replacement projects and Chapter 15 will discuss the recommended implementation plan.

SOURCE PRODUCTION IMPROVEMENTS

Based on the recommendations of the Supply and Demand Master Plan, meeting the future water source needs of the City will require improvements in two major areas:

- **Managed Aquifer Recovery (MAR) –** An essential part of the City's future supply program is the development of a viable MAR program. This will improve the use of existing City surface water assets and allow the City to maintain the health of its aquifer. Required capital improvements include:
    - **Raw Water Infiltration Facilities –** Construct capacity to infiltrate/inject 6.5 mgd of raw water into the aquifer.
    - **MAR Treatment Facility –** Construct capacity to treat 30 mgd of water from existing surface water rights.
    - **Treated Water Infiltration Facilities –** Construct capacity to infiltrate/inject 20 mgd of treated water into the aquifer (above and beyond the 6.5 mgd for raw water).
- **Additional Well Development** – With the MAR Program in place, additional wells will be needed to utilize the City's groundwater rights and meet peak demands. Required capital improvements include three new wells, each with a capacity of approximately 3,000 gpm, constructed approximately every ten years.

Source production improvements are summarized in Table 13-1. More detailed descriptions of the projects are contained in the Supply and Demand Master Plan.

Table 13-1
Source Production Improvements

Project Number	Improvement	Approximate Year of Construction	Project Cost (2024 Dollars)
WS-1	Raw Water Infiltration Facilities	2025	$4,000,000
WS-2	MAR Treatment Facility	2025	$104,000,000
WS-3	Treated Water Infiltration Facilities	2025	$25,000,000
WS-4	Additional Well 1	2026	$4,500,000
WS-5	Additional Well 2	2038	$4,500,000
WS-6	Additional Well 3	2052	$4,500,000
	Total		**$146,500,000**

In addition to the capital improvements summarized above, the City's overall water supply plan includes continuing to focus and invest in conservation, aggressively protect its existing water rights, and securing flexibility in the use of its water assets to meet future needs.

CONVEYANCE AND STORAGE IMPROVEMENTS

Based on existing water demand and projected growth in water demand, the existing and future demands were simulated in a hydraulic model of the City's distribution system. For existing demands, model results indicate that there are a limited number of existing deficiencies in a few areas of the system. For future demands, some significant deficiencies are predicted, especially in the Main and West Pressure Zones where most of the growth in the City is projected to occur. While much of the system has some excess capacity for future growth, several transmission lines moving water from east to west and north to south will need to be replaced or paralleled with larger pipes to meet future demands. Additional other improvements area needed in association with fire flow and storage needs.

To resolve potential deficiencies identified as part of the system evaluation, several projects have been proposed. Tables 13-2, 13-3, and 13-4 summarize the recommended projects and associated costs for projects associated with storage, conveyance, and fire flow respectively. More detailed descriptions of the projects are contained in the Conveyance and Storage Master Plan.

Table 13-2
Storage Facility Improvements

Project No.	Storage Facility	Additional Volume (MG)	Improvement	Approximate Year of Construction	Construction Cost	Total Facility Cost
S-1a	North Intermediate (concrete)	-	Replacement of miscellaneous metals	2026	$100,000	$105,000
S-1b			Plan interior inspection	2025	$5,000	
S-2a	Sherwood Hills (concrete)	-	Replacement of miscellaneous metals	2024	$60,000	$130,000
S-2b			Outlet vault improvements including new ventilation	2024	$50,000	
S-2c			Reroute trail around top of tank and regrade	2024	$15,000	
S-2d			Plan interior inspection	2025	$5,000	
S-3a	Northeast (concrete)	-	Regrade to improve drainage	2028	$15,000	$155,000
S-3b			Repair spalling along west edge	2028	$80,000	
S-3c			Pin lid to the wall for seismic protection	2028	$50,000	
S-3d			Plan interior inspection and seismic evaluation	2025	$10,000	
S-4a	Intermediate (steel)	-	Repaint interior	2030	$845,000	$1,010,000
S-4b			Install magnesium anode for corrosion resistance	2030	$50,000	
S-4c			Replace stringers/other misc. metals inside tank	2030	$100,000	
S-4d			Plan interior inspection and seismic evaluation	2025	$15,000	
S-5a	Rock Canyon (concrete)	1	Replace with 1.5 MG tank to provide additional volume	2027	$4,000,000	$4,000,000
S-6a	Gallery (concrete)	-	Roof rehab for leakage and freeze thaw	2026	$15,000	$530,000
S-6b			Seismic protection	2026	$500,000	
S-6c			Plan interior inspection & seismic evaluation	2025	$15,000	
S-7a	Main (steel)	-	Repaint interior	2032	$1,555,000	$2,510,000
S-7b			Repaint exterior	2031	$940,000	
S-7c			Plan interior inspection and seismic evaluation	2025	$15,000	
S-8a	Slate Canyon (concrete)	-	Inspect Double T design and plan interior inspection	2025	$5,000	$10,006,000
S-8b			Replace access ladder to tank interior	2025	$1,000	
S-8c			Plan replacement	2034	$10,000,000	
S-9a	Southeast (concrete)	-	Inspect and monitor surface corrosion inside vault	2034	$15,000	$20,000
S-9c			Plan interior inspection	2025	$5,000	
Total Cost						**$18,466,000**

Table 13-3
Conveyance Improvements

Project No.	Construction Timeframe	Description	Project Cost
Distribution Improvements			
P1	0 – 5	1730 N. Freeway Crossing	$8,000,000
P2	0 – 5	200 N. Upgrade	$1,517,000
P3	0 – 5	Treatment Plant to Grand View	$6,952,000
P4	0 – 5	PRV From Main Zone to West Zone	$414,000
P15a	0 – 5	Oversizing of Distribution Mains for Future Growth	$344,000
P5	5 – 10	600 West Upsize	$1,018,000
P6	5 – 10	Parallel 20" to Slate Canyon Tank	$1,551,000
P7	5 – 10	State Street 12" Connections	$264,000
P8	5 – 10	12" Northwest System Connection	$815,000
P15b	5 – 10	Oversizing of Distribution Mains for Future Growth	$344,000
P9	>10	Redundant 30" to Grand View	$3,145,000
P10	>10	Lakeview Parkway 12" Connection	$2,820,000
P11	>10	900 S. 20" East to West Connection	$2,536,000
P12	>10	16" Stubbs Avenue	$1,024,000
P13	>10	900 S. Parallel 20" Crossing	$2,592,000
P14	>10	48" Redundant Pipeline	$27,309,000
P15c	>10	Oversizing of Distribution Mains for Future Growth	$687,000
0-5 Yr Total			**$17,227,000**
5-10 Yr Total			**$3,992,000**
> 10 Yr Total			**$40,113,000**
TOTAL of All Improvements			**$61,332,000**

Table 13-4
Fire Flow Improvements

Improvements to Increase Fire Flow				
Project	**Description**	**Priority**	**Length (ft)**	**MP Cost Estimate**
Fire Flow Improvement Projects				
F-1	1,600 ft of 8" pipe from 3500 N to 3900 N. between Univ. Ave. and Canyon Rd.	medium	1,600	$411,000
F-2	250 ft of 8" pipe from Crestview west along 4630 N. then south along 450 W.	medium	250	$65,000
F-3	1,500 ft of 10" pipe along 300 W then west along 4630 N. then south along 450 W.	low	1,500	$385,000
F-4	6" PRV and 1,700 ft of 8" pipeline along Oneida and 2680 N.	medium	1,700	$437,000
F-5	300 ft of 8" pipe at approximately 200 E. and 2500 N.	medium	300	$77,000
F-6	50ft of 8" pipe and PRV to connect Zone 24 to 34 near 300 South roundabout.	high	50	$112,000
F-7	50 ft of 8" pipe to connect 140 E. and 3200 N. with apartment complex.	medium	50	$13,000
F-8	200 ft of 8" pipe to loop Meadow Drive.	medium	200	$52,000
F-9	Ensure there's multiple connections for pipe connecting Wymount to Oak Lane.	medium	100	$26,000
F-10	150 ft of 8" pipe and 6" PRV to Connect Wymount to Locust.	medium	150	$39,000
F-11	6" PRV from Zone 15 to 11 on Mohawk Lane.	medium	-	$26,000
F-12	500 ft of 8" pipe from 2200 N. south along 2300 W.	high	500	$129,000
F-13	2,050 ft of 8" pipe from 2300 N. running north along 850 W.	high	2,050	$527,000
F-14	850 ft of 8" along Brentwood Dr.	medium	850	$219,000
F-15	100 ft of 8" pipe to business on 2250 N.	low	100	$26,000
F-16	250 ft of 8" pipe to loop Marrcrest North	low	250	$65,000
F-17	6" PRV on 1060 E. and 2570 N.	medium	-	$99,000
F-18	2,500 ft of 8" pipe within KOA campground to replace 4" pipes.	high	2,500	$642,000
F-19	6,000 ft of 12" and 3,600 ft of 8" from Center St. and 3110 W. west to boat harbor and campground. 8" pipe is within campground and boat harbor.	high	9,600	$2,464,000
F-20	1,400 ft of 8" pipe and 500 ft of 10" pipe from Timpview and 2550 N. west and north to 530 E. and 2600 N.	medium	1,900	$750,000
F-21	700 ft of 8" pipe near intersection of Canyon Rd and University Ave. east.	high	700	$180,000
F-22	100 ft of 8" pipe to connect system near State Street and Cove Point	medium	100	$26,000
F-23	500 ft of 8" pipe along Montana Avenue.	medium	500	$129,000
Total Fire Flow Project Cost				**$6,899,000**

SUMMARY OF IMPROVEMENTS

All improvements identified in this chapter have been summarized in Table 13-5. It should be noted that this includes only those projects identified through hydraulic analysis. It does not include regular rehabilitation and replacement projects (to be discussed in Chapter 14)[1].

Table 13-5
Summary of Provo Water System Improvements

Improvement Type	Project Cost
Source Improvements	$146,500,000
Storage Improvements	$18,466,000
Booster Station Improvements	$0
Conveyance Improvements	$61,332,000
Fire Flow Improvements	$6,899,000
Total	**$233,197,000**

[1] The one exception to this is storage. The table does include rehabilitation projects identified through the initial condition assessment activities conducted at the storage tanks as described previously.

CHAPTER 14
REHABILITATION AND REPLACEMENT

INTRODUCTION

Most of the projects recommended in the Supply and Demand and Conveyance and Storage Master Plans have been focused on meeting the capacity needs of the City's overall water system. However, a few of the projects also address the rehabilitation or replacement of existing facilities due to age or condition related concerns. The purpose of this chapter is to examine the recommended rehabilitation and replacement investment needed to sustainably maintain the City's water system and then compare this budget to recommended improvements from the other plans. This is not a comprehensive evaluation of system conditions, nor is it a complete asset management plan. Instead, it is a collection of general observations assembled during the master planning process relative to system rehabilitation and replacement.

REHABILITATION AND REPLACEMENT – SOURCE AND TREATMENT

As with all utilities, each component of a water system has a finite service life. Therefore, it is necessary to continually spend money towards the rehabilitation or replacement of these components. If adequate funds are not set aside for regular system renewal, the water system will fall into a state of disrepair and be incapable of providing the level of service that customers expect.

While it is beyond the scope of this study to identify a detailed list of all rehabilitation projects that will be required by the City, it is important that future financial planning include a sustainable budget that can then be used for rehabilitation as specific projects are identified. One of the best ways to identify a recommended level of system renewal funding is to consider system service life. An appropriate average annual budget can then be estimated based on the replacement value of the asset divided by the expected service life.

The City's existing sources include 15 groundwater wells and an extensive spring collection system. The total cost to replace all of the City's existing water sources would be approximately $71 million based on 2024 construction costs[1]. Expected life for sources will vary depending on the type and nature of source. Table 14-1 shows the reasonable range of sustainable annual budget based on estimated service life for the City's various water source facilities.

Table 14-1
Recommended Source Renewal Budget

System Component	Replacement Value	Service Life (years)	Annual Investment Range	
Wells	$52,000,000	60 - 80	$866,667	$650,000
Springs	$19,000,000	80 - 100	$237,500	$190,000
Total	**$71,000,000**	**-**	**$1,104,167**	**$840,000**

[1] Note that this does not include the new treatment plant currently planned for the City. Rehab and replacement will eventually need to be budgeted for this facility as well but has not been included here as the plant will be brand new and have limited needs for several years.

The City's proposed budget for water source and treatment for the next ten years includes improvements totaling $137,500,000. It should be noted, however, that nearly all of this is associated with the construction of new MAR facilities. Only $4.5 million is associated with wells and springs resulting in an average investment of $450,000 per year. While this is significantly below the recommended investment range of $840,000 to $1.1 million, this seems acceptable with so much money going toward the investment in MAR. Thus, it has been assumed that the City will postpone significant additional investments in source renewal to beyond the current planning window.

REHABILITATION AND REPLACEMENT – STORAGE

The City has eleven existing tanks that comprise of 42.0 million gallons of storage. The total cost to replace all of the storage facilities in the City's water system would be approximately $93 million based on 2024 construction costs. Table 14-2 shows the reasonable range of sustainable annual budget based on service life for the City's storage.

Table 14-2
Recommended Storage Renewal Budget

System Component	Replacement Value	Service Life (years)	Annual Investment Range	
Storage	$93,000,000	80 - 100	$1,162,500	$930,000

The current cost of identified storage improvements that the City would like to complete in the next ten years is $18.5 million as summarized in Chapter 13. This equates to $1.85 million per year. This is quite a bit higher than the range of recommended annual system investment but is reflective of the larger investment needed to replace the Slate Canyon Tank. Bonding might be considered for replacement of the Slate Canyon Tank to even out the system spending.

REHABILITATION AND REPLACEMENT – PUMPING

The City has nine existing booster stations that comprise 2,850 HP and 16,000 gpm of reliable pumping capacity. The total cost to replace all of the pump station facilities in the City's water system would be approximately $16.5 million based on 2024 construction costs. Table 14-3 shows the reasonable range of sustainable annual budget based on service life for the City's pump stations.

Table 14-3
Recommended Pump Station Renewal Budget

System Component	Replacement Value	Service Life (years)	Annual Investment Range	
Pump Stations	$16,500,000	40 - 50	$412,500	$330,000

There are no identified pump station improvements associated with capacity needs. However, the City should still be budgeting somewhere between $350,000 and $400,000 per year for regular maintenance and eventual replacement of pumping facilities.

REHABILITATION AND REPLACEMENT – CONVEYANCE

The City has over 570 miles of conveyance pipeline. The total cost to replace all of the storage facilities in the City's water systems would be approximately $929 million based on 2024 construction costs. Table 14-4 shows the reasonable range of sustainable annual budget based on service life for the City's conveyance system.

Table 14-4
Recommended Conveyance System Renewal Budget

System Component	Replacement Value	Service Life (years)	Annual Investment Range	
Conveyance	$929,000,000	60 - 80	$15,483,333	$11,612,500

The current cost of identified conveyance and fire flow improvements that the City would like to complete in the next ten years is approximately $22 million as summarized in Chapter 13. This equates to $2.2 million per year. This is only a fraction of even the minimum recommended annual system investment. This would suggest the City should set aside a significant amount of additional budget for investment into its distribution facilities. Because much of the system is still in excellent condition, some rehabilitation and replacement activities might be deferred for a period of time so that a portion of this budget might be used for immediate treatment and storage needs as highlighted above. However, the City can't postpone investment for too long without risking significant degradation in system performance.

TOTAL RECOMMENDED INVESTMENT

Based on this analysis, the recommended City budget for the 10-year planning window of this implementation plan based on sustainable funding levels is summarized in Table 14-5.

Table 14-5
Recommended Total Budget to Sustainably Maintain the Water System

System Component	Replacement Value	Service Life (years)	Annual Investment Range	
Source	$71,000,000	60 - 100	$1,104,167	$840,000
Storage	$93,000,000	80 - 100	$1,162,500	$930,000
Pump Stations	$16,500,000	40 - 50	$412,500	$330,000
Conveyance	$929,000,000	60 - 80	$15,483,333	$11,612,500
Total	**$1,109,500,000**		**$18,162,500**	**$13,712,500**

As summarized in the table, the recommended capital budget needed to sustainably maintain the City's water system facilities is between $14 million and $18 million per year. Even at the lower end of this range, this represents a significant increase over historic system funding in the City. City investment over the last several years has been approximately $6 million per year.

This large increase in recommended funding is a function of the massive amount of construction inflation observed over the last few years. Because much of the City's infrastructure is still in relatively good condition, it may be acceptable to transition rehabilitation and replacement funding to these higher levels over a period of time. However, if the system is not funded near these levels in

the relatively near future, system degradation will begin to occur and the City will not be able to maintain the level of service it has historically provided its residents.

It should be noted that these values are reported in 2024 dollars and should be adjusted for construction inflation over time. These budget levels should also be revisited from time to time and refined as part of future asset management planning.

CHAPTER 15
IMPLEMENTATION PLAN

Previous chapters of this water master plan have identified improvements to resolve future deficiencies and to accommodate water demand from future growth while providing an acceptable level of service. The purpose of this chapter is to assemble a 10-year capital improvement program to implement the recommended improvements. This plan should be updated at least every five years to re-prioritize system improvements to best achieve City goals.

CAPITAL IMPROVEMENT PRIORITIZATION

A discussion of each of the major budget categories and how they will be prioritized in the 10-year implementation plan is included below:

- **Water Distribution, Source Production, Storage, and Fire Flow Improvements –** BC&A used the growth projections discussed in the Supply and Demand Master Plan of this report and the City's system hydraulic model to determine when system capacity improvements are needed. There is not much flexibility with the scheduling of many of these projects. While moving a project a few years forward or a few years back may be a possibility, major changes in timing cannot be accommodated. Unless growth occurs at rates significantly different that those projected, failure to complete the projects at the recommended dates will result in the City running out of available capacity and being forced to implement restrictions on development.
- **Rehabilitation and Replacement Improvements** - A recommended budget level for system investment was developed in Chapter 14. As part of this, the City should be spending money toward rehabilitation and replacement improvements. Although the full recommended budget amount does not need to be spent in every single year, failure to invest in the system at approximately the recommended level over time will result in system degradation and costly system failures. Because the City does have some flexibility with these expenditures, a yearly budget has been incorporated to ensure that the City can cover unexpected rehab and replacement projects. Other rehabilitation and replacement projects have some flexibility to be moved forward or back as budget is available.

RECOMMENDED 10-YEAR CAPITAL IMPROVEMENT PROGRAM

Based on the system improvements identified in Chapter 12 and the recommended prioritization approach discussed above, Table 15-1 lists improvement projects that are recommended within the next 10-years, the budget required to complete those projects, and the recommended timing of those projects.

These recommended expenditures are summarized graphically in Figure 15-1. Expenditures have been grouped by major category for reference. For comparison purposes, Figure 15-1 also includes the base recommended level of funding for capital improvements based on the system's current value as discussed in Chapter 14. The recommended minimum inflation adjusted system investment for capital improvements in the City is $13.7 million as shown in the figure. The figure also includes an estimate of annual system investment with inflations (assumed to be 5% in 2025 and 3% per year thereafter).

Table 15-1
Recommended 10-Year Capital Improvement Plan

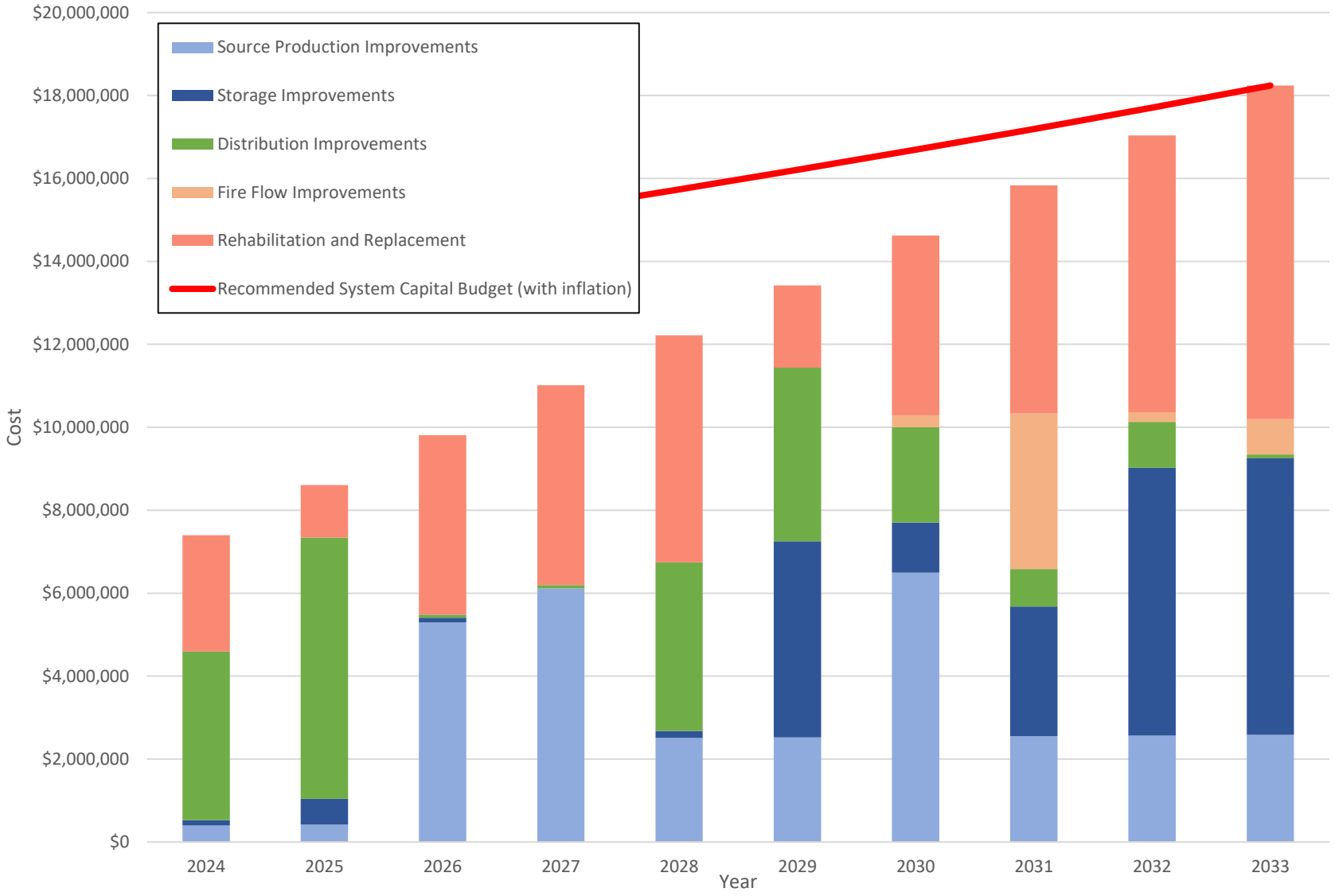
Project ID	Project Description	Project Total (2024 $s)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-yr Total
Source Production Improvements													
WS-1	Raw Water Infiltration Facilities	$4,000,000	$400,000	$420,000	$432,600	$445,578	$458,945	$472,714	$486,895	$501,502	$516,547	$532,043	$4,666,825
WS-2	MAR Treatment Facility	$37,000,000				$2,050,367	$2,050,367	$2,050,367	$2,050,367	$2,050,367	$2,050,367	$2,050,367	$14,352,567
WS-3	Treated Water Infiltration Facilities	$6,500,000				$3,620,321			$3,956,023				$7,576,344
WS-4	Additional Well 1	$4,500,000			$4,866,750								$4,866,750
Subtotal		***$52,000,000***	***$400,000***	***$420,000***	***$5,299,350***	***$6,116,266***	***$2,509,312***	***$2,523,080***	***$6,493,285***	***$2,551,869***	***$2,566,914***	***$2,582,410***	***$31,462,485***
Storage Improvements													
S-1a	North Intermediate - Replacement of miscellaneous metals	$100,000			$108,150								$108,150
S-1b	North Intermediate - Plan interior inspection	$5,000		$5,250									$5,250
S-2a	Sherwood Hills - Replacement of miscellaneous metals	$60,000	$60,000										$60,000
S-2b	Sherwood Hills - Outlet vault improvements including new ventilation	$50,000	$50,000										$50,000
S-2c	Sherwood Hills - Reroute trail around top of tank and regrade	$15,000	$15,000										$15,000
S-2d	Sherwood Hills - Plan interior inspection	$5,000		$5,250									$5,250
S-3a	Northeast - Regrade to improve drainage	$15,000					$17,210						$17,210
S-3b	Northeast - Repair spalling along west edge	$80,000					$91,789						$91,789
S-3c	Northeast - Pin lid to the wall for seismic protection	$50,000					$57,368						$57,368
S-3d	Northeast - Plan interior inspection and seismic evaluation	$10,000		$10,500									$10,500
S-4a	Intermediate - Repaint interior	$845,000							$1,028,566				$1,028,566
S-4b	Intermediate - Install magnesium anode for corrosion resistance	$50,000							$60,862				$60,862
S-4c	Intermediate - Replace stringers/other misc. metals inside tank	$100,000							$121,724				$121,724

Project ID	Project Description	Project Total (2024 $s)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-yr Total
S-4d	Intermediate - Plan interior inspection and seismic evaluation	$15,000		$15,750									$15,750
S-5a	Rock Canyon - Replace with 1.5 MG tank to provide additional volume	$4,000,000						$4,727,137					$4,727,137
S-6a	Gallery - Roof rehab for leakage and freeze thaw	$15,000		$15,750									$15,750
S-6b	Gallery - Seismic protection	$500,000		$525,000									$525,000
S-6c	Gallery - Plan interior inspection & seismic evaluation	$15,000		$15,750									$15,750
S-7a	Main - Repaint interior	$1,555,000								$1,949,589			$1,949,589
S-7b	Main - Repaint exterior	$940,000								$1,178,530			$1,178,530
S-7c	Main - Plan interior inspection and seismic evaluation	$15,000		$15,750									$15,750
S-8a	Slate Canyon - Inspect Double T design and plan interior inspection	$5,000		$5,250									$5,250
S-8b	Slate Canyon - Replace access ladder to tank interior	$1,000		$1,050									$1,050
S-8c	Slate Canyon - Plan replacement	$10,000,000									$6,456,838	$6,650,543	$13,107,381
S-9a	Southeast - Inspect and monitor surface corrosion inside vault	$15,000										$19,952	$19,952
S-9b	Southeast - Plan interior inspection	$5,000		$5,250									$5,250
Subtotal		***$18,466,000***	***$125,000***	***$620,550***	***$108,150***	***$0***	***$166,368***	***$4,727,137***	***$1,211,152***	***$3,128,119***	***$6,456,838***	***$6,670,495***	***$23,213,807***
Distribution Improvements													
P1	1730 N. Freeway Crossing	$8,000,000	$4,000,000	$4,200,000									$8,200,000
P2	200 N. Upgrade	$1,517,000		$1,592,850									$1,592,850
P3	Treatment Plant to Grand View	$6,952,000					$3,988,235	$4,107,882					$8,096,117
P4	PRV From Main Zone to West Zone	$414,000		$434,700									$434,700
P15a	Oversizing of Distribution Mains for Future Growth	$344,000	$68,800	$72,240	$74,407	$76,639	$78,939						$371,025
P5	600 West Upsize	$1,018,000									$1,018,000		$1,018,000
P6	Parallel 20" to Slate Canyon Tank	$1,551,000							$1,887,936				$1,887,936

Project ID	Project Description	Project Total (2024 $s)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-yr Total
P7	State Street 12" Connections	$264,000							$321,351				$321,351
P8	12" Northwest System Connection	$815,000								$815,000			$815,000
P15b	Oversizing of Distribution Mains for Future Growth	$344,000						$81,307	$83,746	$86,258	$88,846	$91,511	$431,669
Subtotal		***$21,219,000***	***$5,585,800***	***$4,706,940***	***$74,407***	***$76,639***	***$4,067,174***	***$4,189,189***	***$2,293,033***	***$901,258***	***$1,106,846***	***$91,511***	***$23,168,647***
Fire Flow Improvements													
FF-6	50ft of 8" pipe and PRV to connect Zone 24 to 34 near 300 South roundabout.	$112,000							$136,331				$136,331
FF-12	500 ft of 8" pipe from 2200 N. south along 2300 W.	$129,000							$157,024				$157,024
FF-13	2,050 ft of 8" pipe from 2300 N. running north along 850 W.	$527,000								$660,729			$660,729
FF-18	2,500 ft of 8" pipe within KOA campground to replace 4" pipes.	$642,000										$853,930	$853,930
FF-19	6,000 ft of 12" and 3,600 ft of 8" from Center St. and 3110 W. west to boat harbor and campground. 8" pipe is within campground and boat harbor.	$2,464,000								$3,089,252			$3,089,252
FF-21	700 ft of 8" pipe near intersection of Canyon Rd and University Ave. east.	$180,000									$232,446		$232,446
Subtotal		***$4,054,000***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$293,354***	***$3,749,981***	***$232,446***	***$853,930***	***$5,129,711***
Rehabilitation and Replacement Improvements													
	Source Rehabilitation and Replacement	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Storage Rehabilitation and Replacement	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Pump Station Rehabilitation and Replacement	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Distribution Rehabilitation and Replacement	$31,135,659	$2,019,675	$475,231	$3,541,135	$4,030,533	$4,687,131	$1,192,924	$3,544,853	$4,708,796	$5,882,324	$7,253,368	$37,335,969
	Bond Payments for Historic R&R	$6,810,295	$786,525	$788,775	$785,650	$789,600	$787,400	$789,400	$790,400	$790,400	$789,400	$787,400	$7,884,950
Subtotal		***$37,945,954***	***$2,806,200***	***$1,264,006***	***$4,326,785***	***$4,820,133***	***$5,474,531***	***$1,982,324***	***$4,335,253***	***$5,499,196***	***$6,671,724***	***$8,040,768***	***$45,220,919***
TOTAL		**$133,684,954**	**$7,400,000**	**$8,604,346**	**$9,808,692**	**$11,013,038**	**$12,217,384**	**$13,421,730**	**$14,626,076**	**$15,830,422**	**$17,034,768**	**$18,239,114**	**$128,195,570**

Note: Costs include 5% inflation for 2025 and 3% inflation thereafter.

Figure 15-1
10-Year Revenue and Expenditures - Provo City Capital Improvements



A few conclusions can be made based on Table 15-1 and Figure 15-1:

- **Short-term Level of Funding** – The City is facing some significant expenditures in the near future. This is the result of three factors. First, taking advantage of existing surface water resources and securing the long-term health of the City's groundwater supply will require several expensive source production improvements. Second, there are a number of high priority projects for both storage and conveyance that are needed to support pending growth. Finally, completion of needed projects is expected to cost significantly more than in the past due to the dramatic inflation that has been experienced industry wide over the last few years.
- **Long-term Level of Funding –** The City has been funding capital improvements in the water system at approximately $6 million per year, This historic level of funding will not sustainably meet recommended long-term levels. As can be seen in Figure 15-1, even once the City addresses short-term needs, historic levels of funding will still need a substantial increase to meet projected project needs moving forward and cover the cost of rehabilitation and replacement for the value of the City's system.

RECOMMENDATIONS

Based on the analysis contained in this report and the conclusions above, the following actions are recommended:

- **Adopt the Proposed Implementation Plan –** The 10-year capital improvement plan summarized in Table 15-1 represents the best available assessment of City capital needs in the upcoming years. It is recommended that this plan be adopted for budgeting, staffing, rate making and impact fee calculation purposes.
- **Update Water Rates to Support System Investment Needs –** As noted above, historic funding levels will not be adequate to address projected City needs over the next several years. The City will need to explore options for funding the recommended projects. This will likely include increasing rates, bonding for projects, or some combination of the two. It is recommended that the City complete a detailed rate study to explore their options.
- **Develop a Plan for Project Completion –** In addition to having adequate funding to complete the needed projects in upcoming years, the City will also need to make sure it has adequate help to manage and execute the needed projects. The City will likely need to hire engineering design and construction help when executing the majority of the improvement projects.
- **Update this Water Master Plan Regularly –** This water master plan should be viewed as a living document. The conclusions contained herein are based on several assumptions that will assuredly change from time to time. Examples of this include assumptions associated with development patterns, regulatory requirements, conservation, economic conditions, etc. As changes occur in these areas, the conclusions and recommendations in this report may need to be revised. For this reason, it is recommended that this report be updated on a regular basis. This should be at least once every 5 years and more often if necessitated by a major change in the City (e.g. major new regulatory requirement, annexation of a new area, etc.)

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Water Master Plan
Status Update and Overview

Keith Larson and Andee Harris

Bowen Collins & Associates

Summary of Planning Activities

Provo City Water Master Plan Update Document Status				
	Planning Document	**Responsibility**	**Last Publish Date**	**Status**
Water Master Plan	Executive Summary	BC&A	Jan-24	Draft
	Supply & Demand Master Plan*	BC&A	Nov-22	Previously presented & adopted by City Council
	Storage and Conveyance Master Plan*	BC&A	Jan-24	Draft
	Implementation and Capital Facilities Plan*	BC&A	Jan-24	Draft
Financial Planning Documents	Impact Fee Facility Plan*	BC&A	May-24	Draft
	Impact Fee Analysis*	Zions		In Progress
	Revenue Needs Analysis**	Jimmy	May-24	Complete
	Tiered Rate Analysis*	BC&A	May-24	Complete
Regulatory/Compliance Documents	40-Year Water Supply Plan**	BC&A	Jan-24	Previously presented to City Council
	Conservation Plan*	BC&A	Apr-23	Reviewed by staff & state
	Drought Contingency Plan**	BC&A	Mar-23	Reviewed by staff
Future Planning Efforts	Detailed Assett Management Plan	TBD		Not Started
	Integrated Watershed Management Plan	BC&A & SWCA		Not Started

*Documents to be adopted by City Council

**To be presented to City Council but not adopted

BOWEN COLLINS & ASSOCIATES

Projected Growth

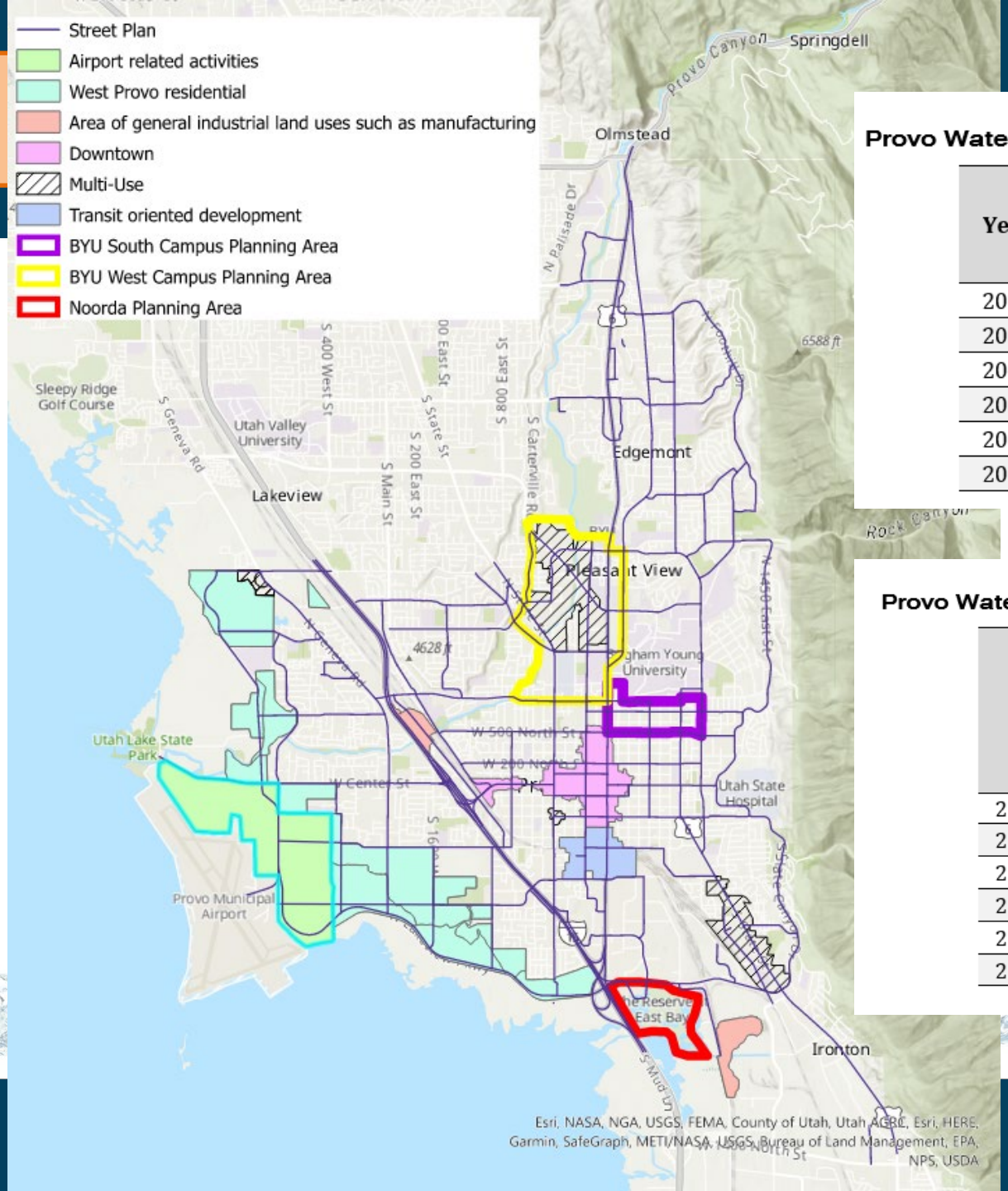


Table 2-2
Provo Water Service Area Projected Residential Population

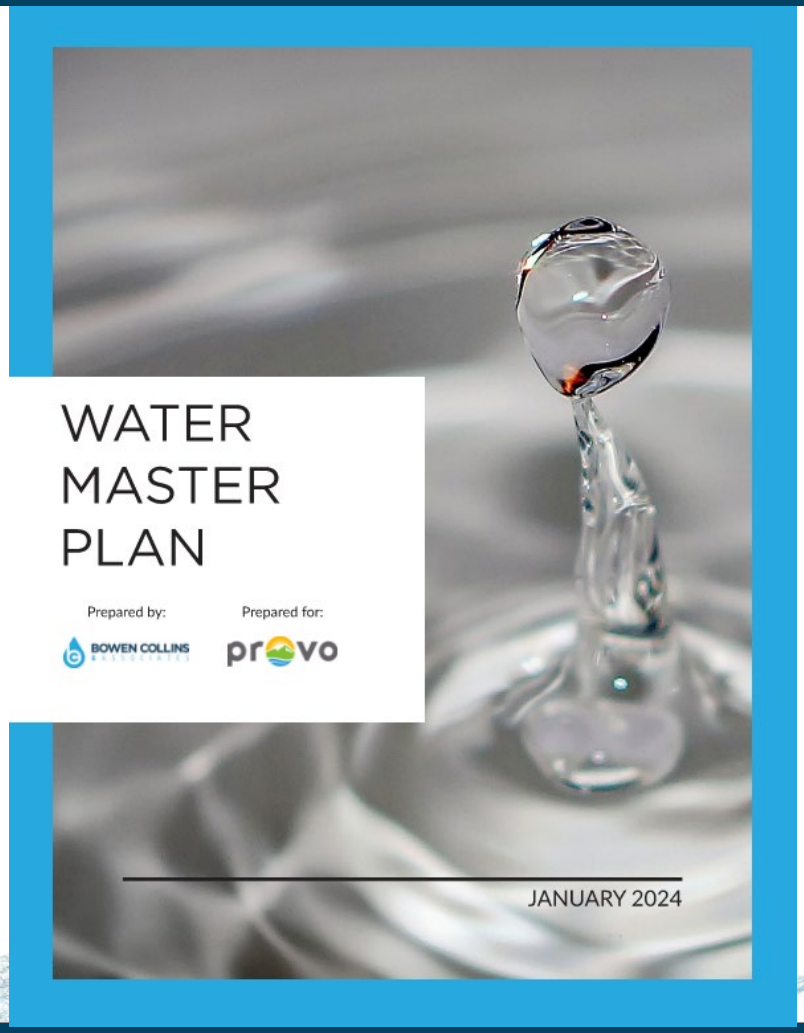
Year	Estimated Service Area Population - Maximum Buildout Scenario	Aggressive Average Annual Residential Growth Rate
2020	116,616	--
2030	142,452	2.02%
2040	165,994	1.65%
2050	186,674	1.25%
2060	203,683	0.91%
2070	216,933	0.65%

Table 2-3
Provo Water Service Area Projected Employment Population

	Estimated Service Area Employment Population - Aggressive Buildout Scenario	Aggressive Average Annual Employment Growth Rate
2020	90,158	-
2030	105,484	1.70%
2040	119,049	1.29%
2050	130,280	0.94%
2060	139,074	0.68%
2070	145,665	0.47%

2023 General Plan

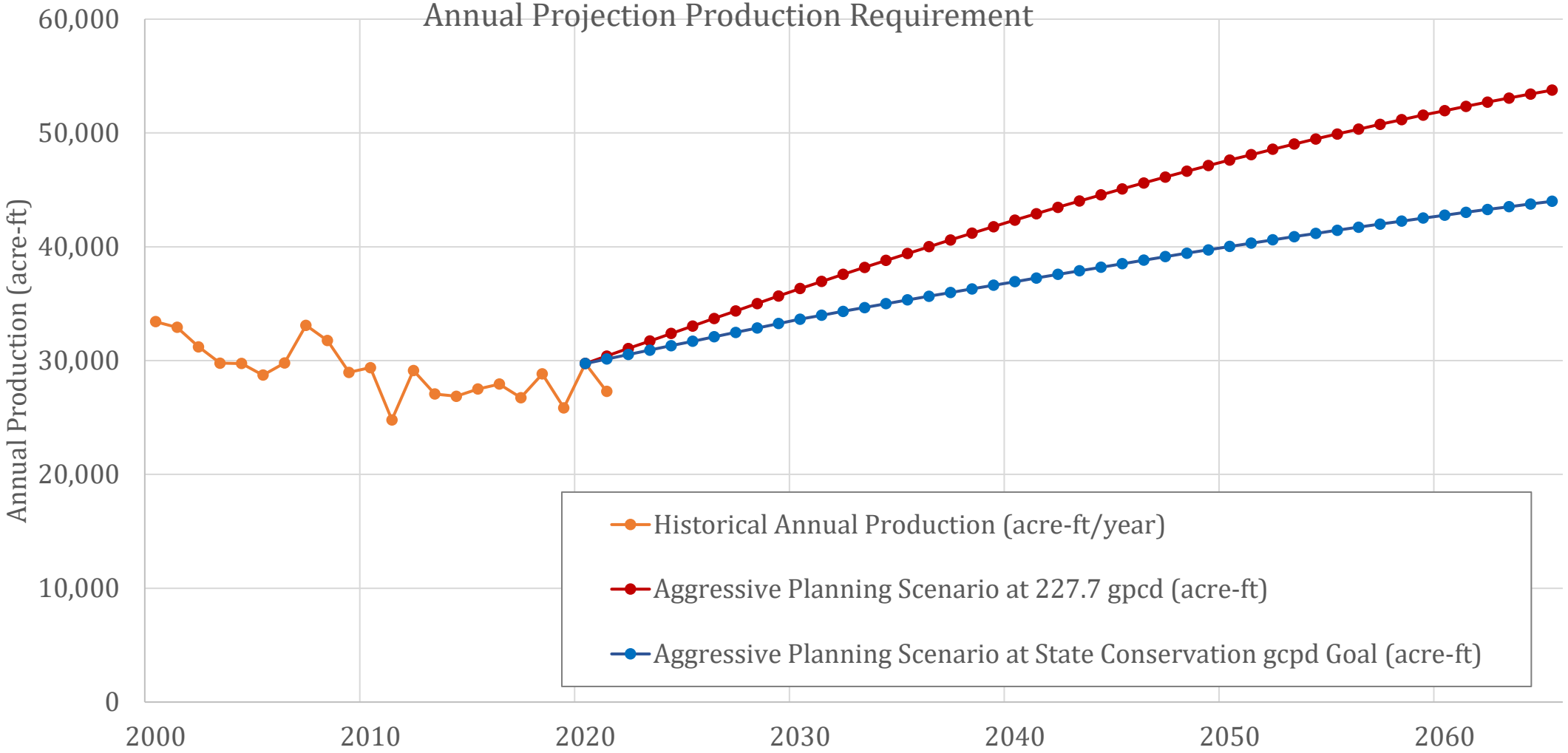
- The City has recently adopted a 2023 General Plan showing development plans throughout the City, including specific state mandates for areas of increased densities.
- The Water Master Plan incorporates all adopted and mandated densities.
- Does not include unadopted potential neighborhood plans such as Northeast and Mall areas.



Water Master Plan – Supply and Demand

Projected Demand

Figure 2-2
Annual Projection Production Requirement

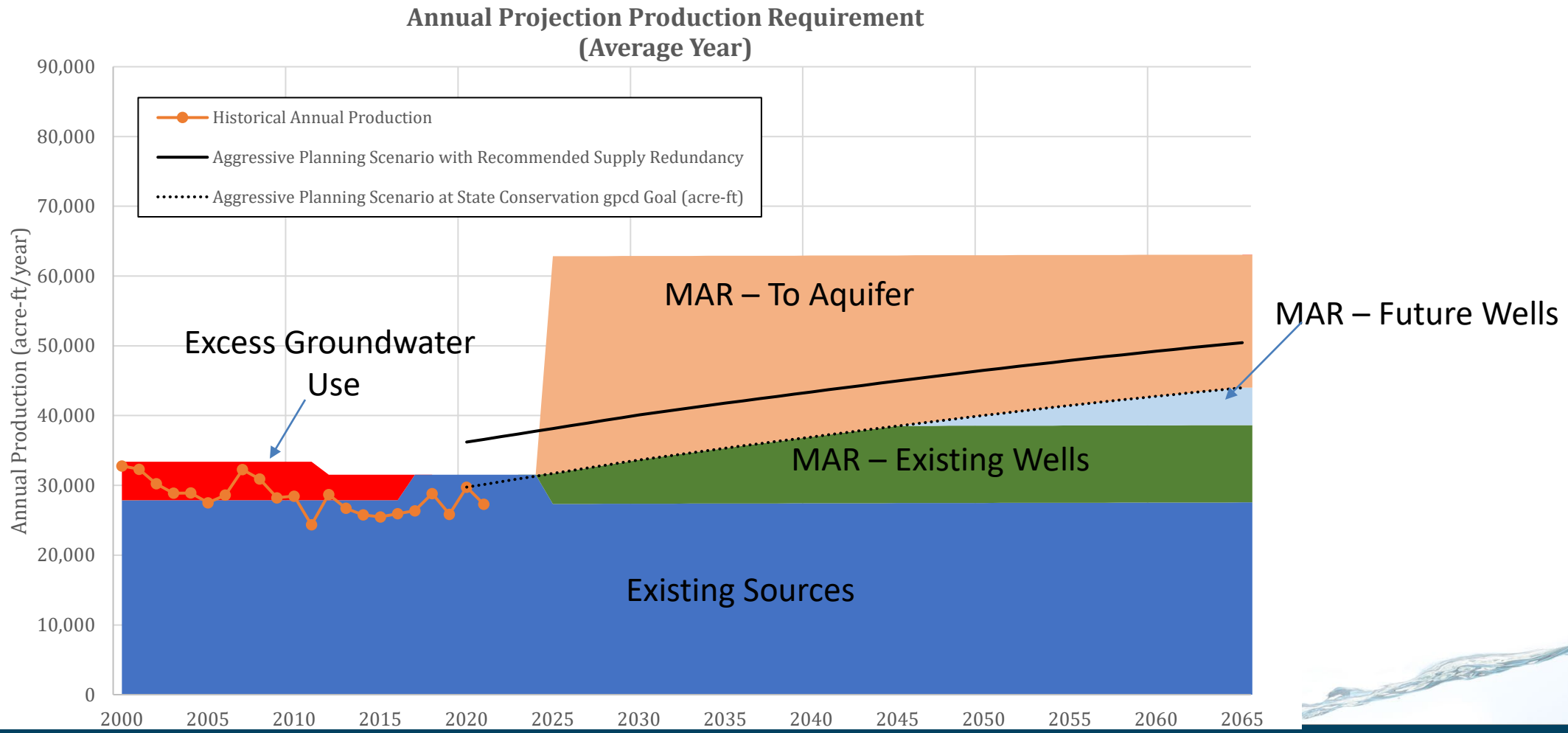


Supply Conclusions

- Previously discussed supply conclusions
  - The Bad News: Aquifer capacity (falling groundwater table) may limit the City's ability to use its groundwater rights
  - The Good News: Provo has significant additional surface water rights available to meet future demands
  - Recommendation – To take advantage of available surface water rights:
    - Managed Aquifer Recharge (MAR or Aquifer Storage and Recovery (ASR))
      - New treatment facility
      - Aquifer infiltration facilities
      - Additional wells

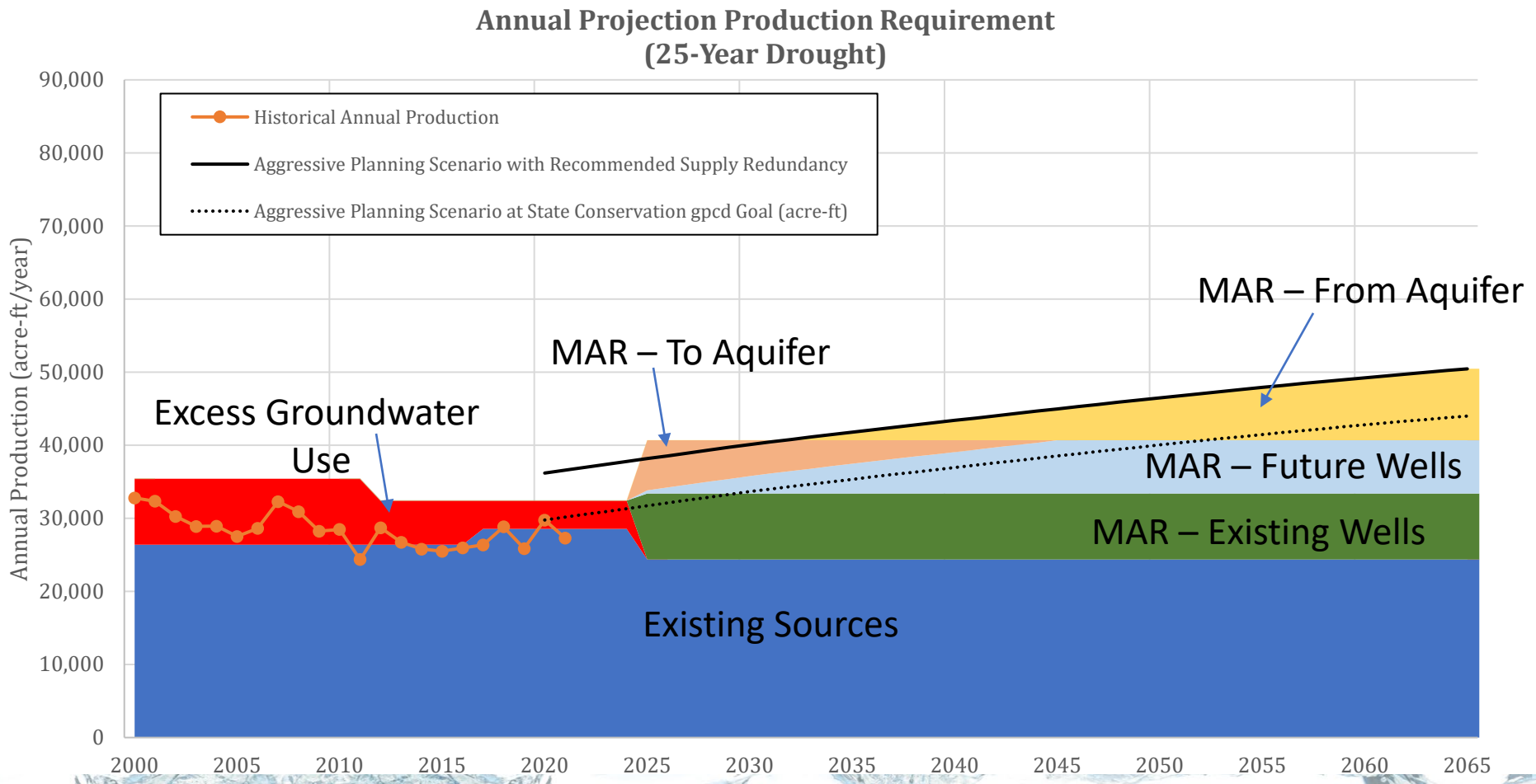
Water Master Plan – Supply and Demand

Average Year Supply Plan



Water Master Plan –
Supply and Demand

Dry Year Supply Plan



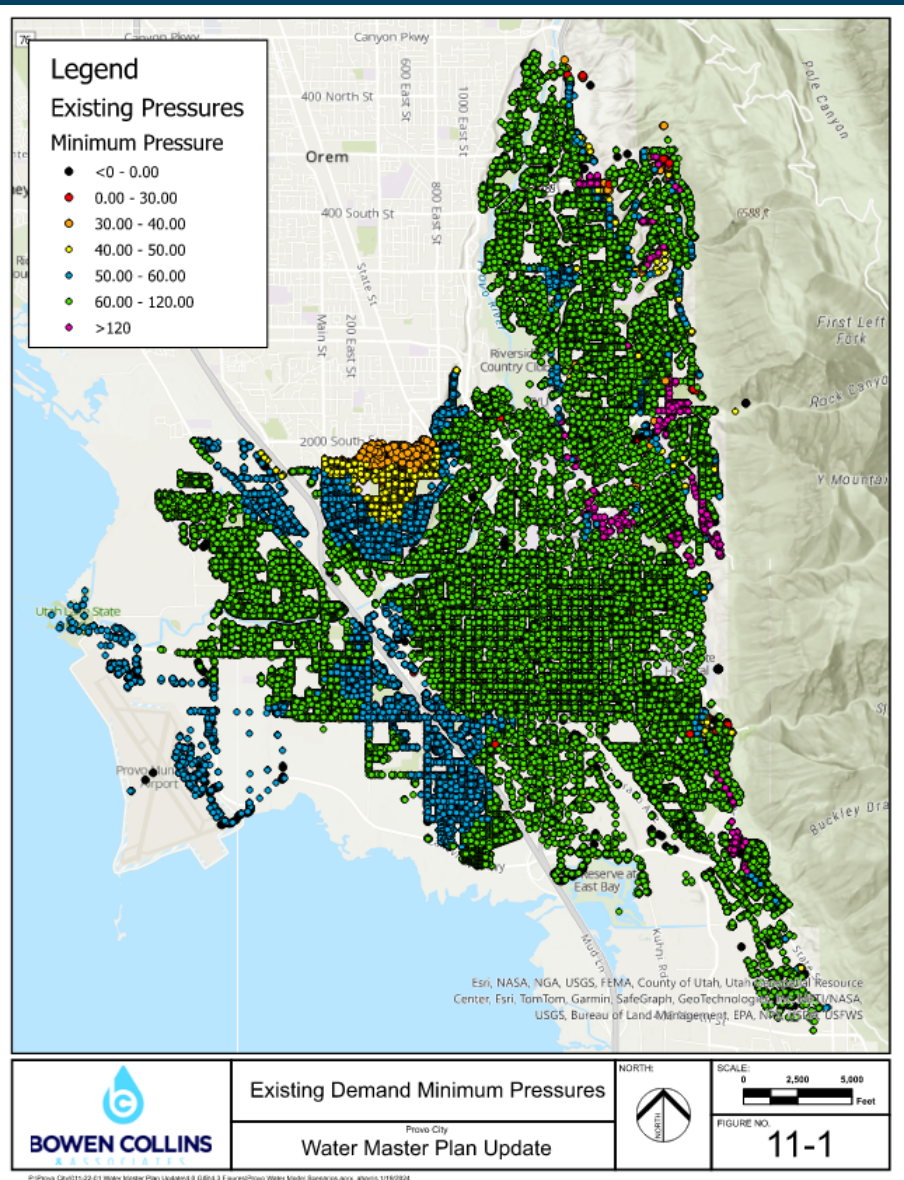
BOWEN COLLINS & ASSOCIATES

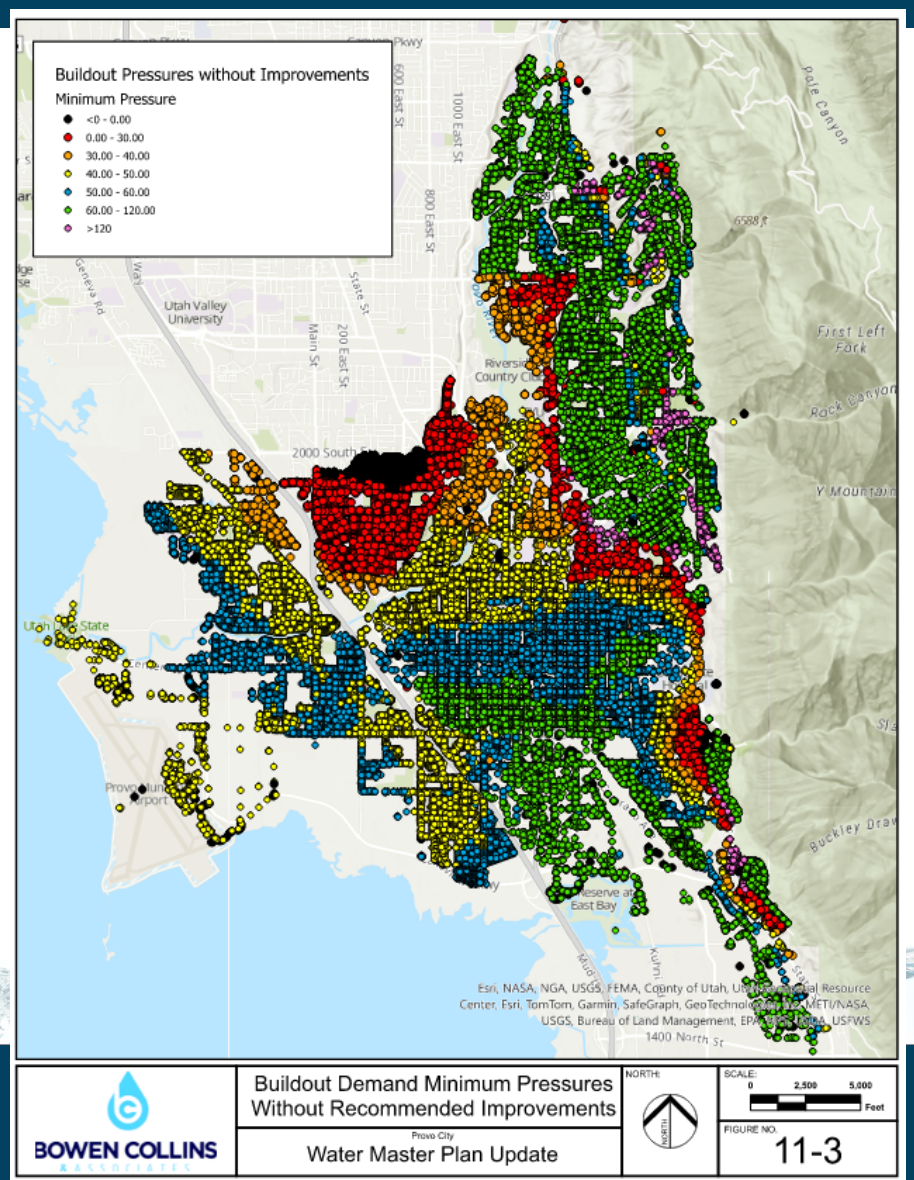
Storage Analysis

- Storage Capacity Evaluation:
  - Storage requirements = Equalization (or daily fluctuation), emergency, and fire flow
  - Conclusion: Rock Canyon Zone needs an additional 750,000 gallons
- Storage Condition Evaluation:
  - Most tanks in “very good” or “good” condition
  - Main and Gallery in “fair” condition (MTC/Temple Tanks)
  - Old Slate Canyon in “poor” condition
- Major Recommended Improvements
  - Increase storage at Rock Canyon Tank ($4,000,000)
  - Replace Slate Canyon Tank ($10,000,000)
  - Other minor maintenance projects needed on storage tanks ($4,466,000)
  - **Total Recommended improvements = $18,466,000**

Water Master Plan –
Storage and Conveyance

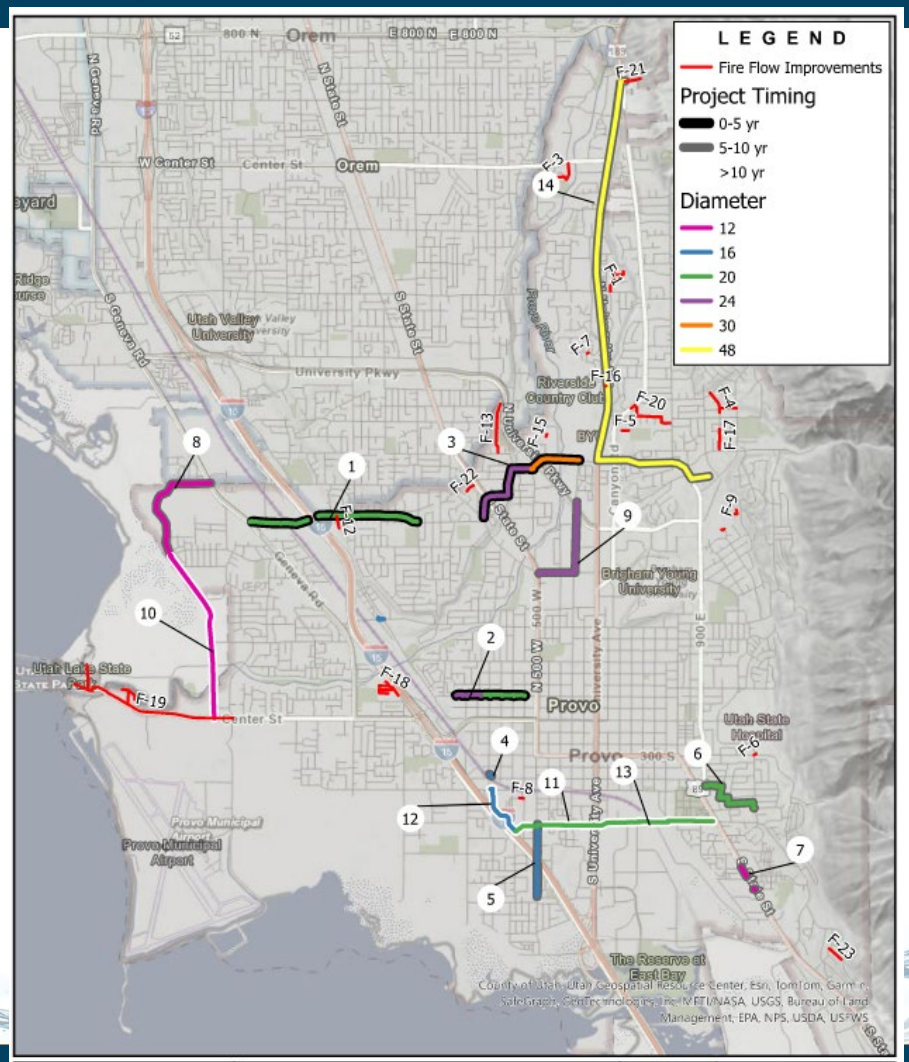
Minimum Pressure Results

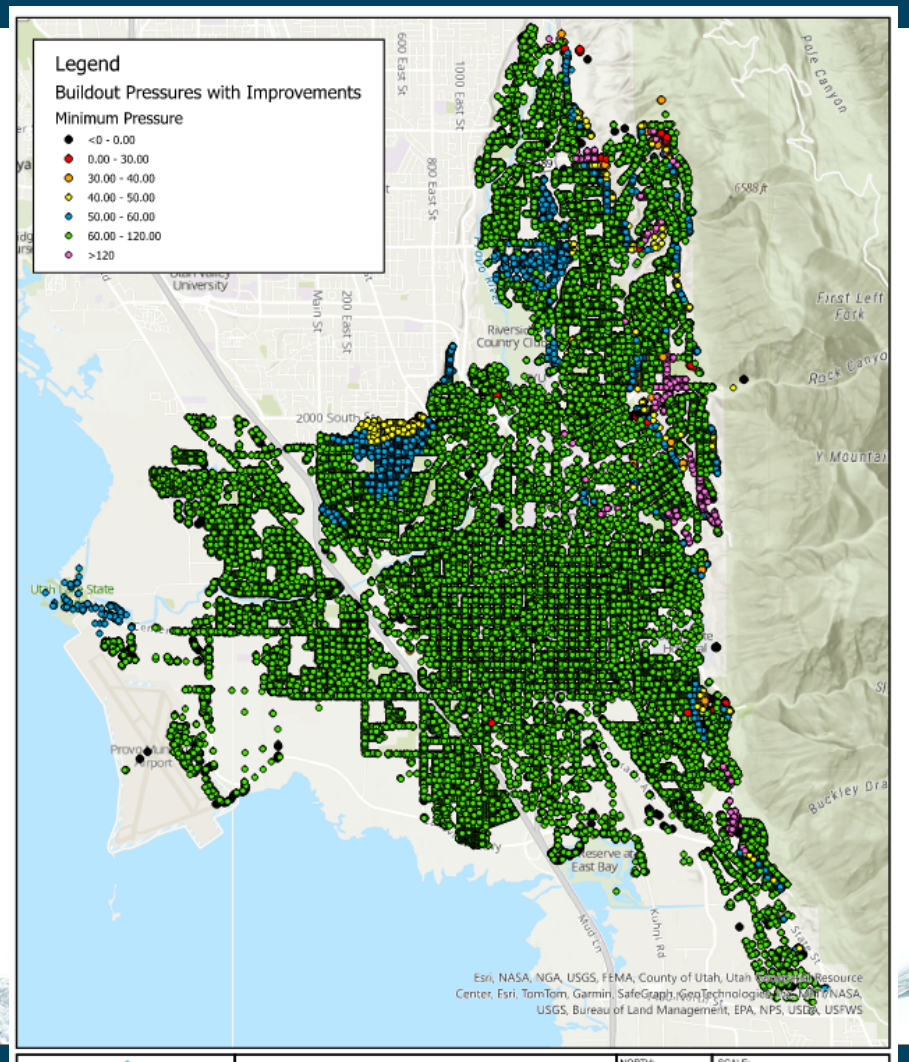




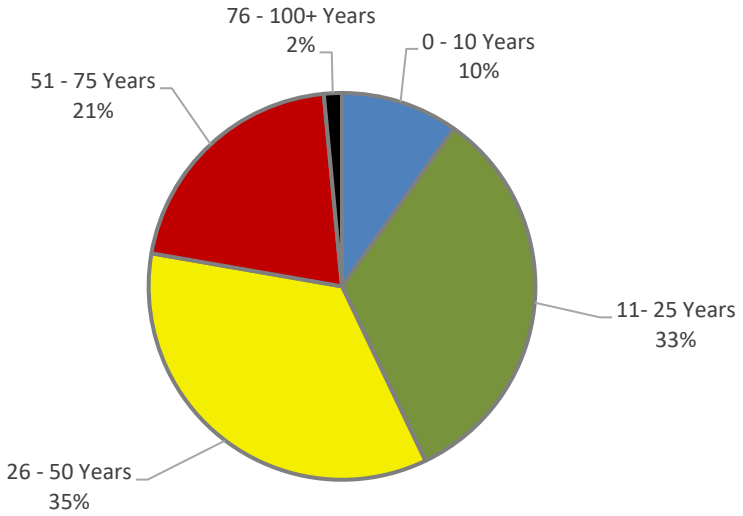
Water Master Plan –
Storage and Conveyance

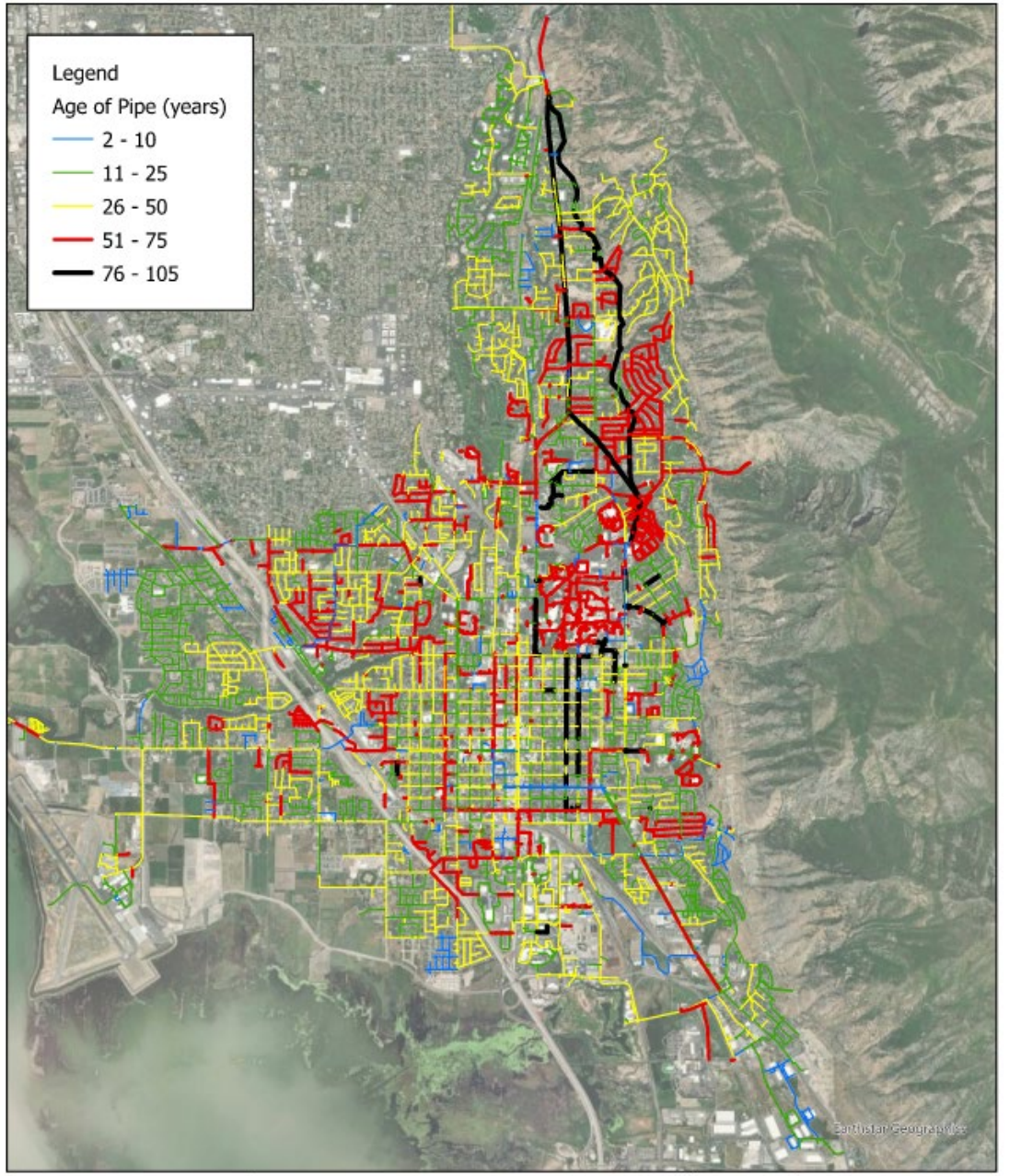
Recommended Conveyance Improvements





Age of Distribution Pipelines





Recommended 10-Year Improvements

- Recommended Source Improvements:
  - Infiltration Facilities
  - MAR Treatment Facility
  - Additional Well
  - **Total = $137,500,000**
- Recommended Storage Improvements:
  - Rock Canyon Tank Replacement
  - Slate Canyon Tank Replacement
  - Miscellaneous Tank Rehabilitation
  - **Total = $18,466,000**
- Recommended Distribution Improvements:
  - Installing new or upsizing existing pipe
  - Addressing fire flow needs
  - **Total = $28,118,000**

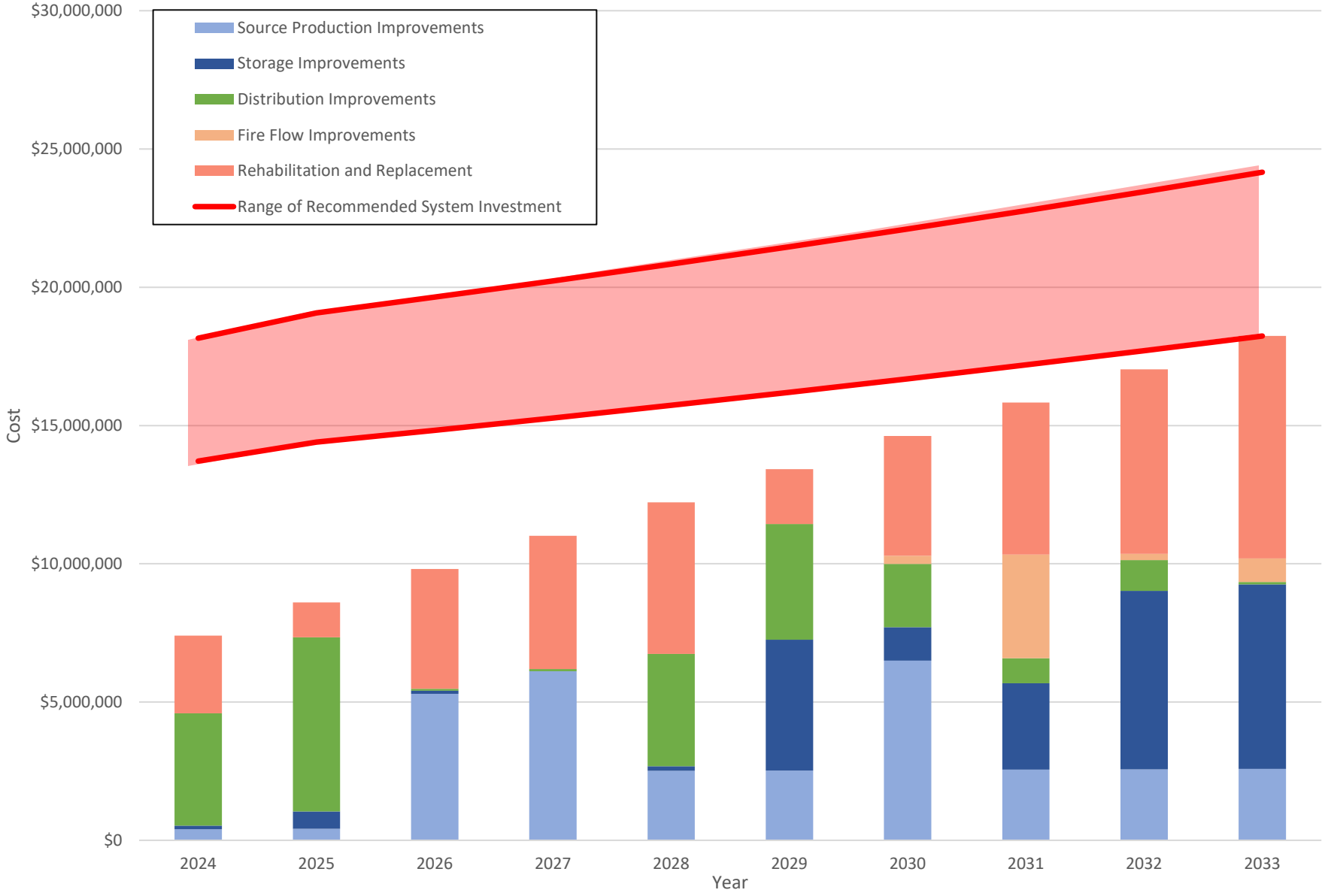
- Total Recommended Improvements = $184 million
  - Based on 2024 dollars (excludes inflation)
  - Excludes regular rehabilitation and replacement
  - $85 million of treatment plant to be paid for by grants or other contributions
  - $37 million loan for treatment facility

Recommended System Investment

- Range of Recommended System Investment
  - Based on replacement value of existing source, storage, pump station, and distribution system components divided by expected service life
  - **Minimum Annual Investment = $13,700,000**
    - Based on service life of 80 years for existing pipelines
  - **Preferred Annual Investment = $18,200,000**
    - Based on service life of 60 years for existing pipelines

Water Master Plan – Implementation and CFP

Figure 15-1
10-Year Revenue and Expenditures - Provo City Capital Improvements




Questions?

Recommended Source Improvements

Project Number	Improvement	Approximate Year of Construction	Project Cost (2024 Dollars)
WS-1	Raw Water Infiltration Facilities	2025	$4,000,000
WS-2	MAR Treatment Facility	2025	$104,000,000
WS-3	Treated Water Infiltration Facilities	2025	$25,000,000
WS-4	Additional Well 1	2026	$4,500,000
WS-5	Additional Well 2	2038	$4,500,000
WS-6	Additional Well 3	2052	$4,500,000
	Total		$146,500,000

Water Master Plan – Storage and Conveyance

Recommended Storage Improvements

Project No.	Storage Facility	Additional Volume (MG)	Improvement	Approximate Year of Construction	Construction Cost	Total Facility Cost
S-1a	North Intermediate (concrete)	-	Replacement of miscellaneous metals	2026	$100,000	$105,000
S-1b			Plan interior inspection	2025	$5,000	
S-2a	Sherwood Hills (concrete)	-	Replacement of miscellaneous metals	2024	$60,000	$130,000
S-2b			Outlet vault improvements including new ventilation	2024	$50,000	
S-2c			Reroute trail around top of tank and regrade	2024	$15,000	
S-2d			Plan interior inspection	2025	$5,000	
S-3a	Northeast (concrete)	-	Regrade to improve drainage	2028	$15,000	$155,000
S-3b			Repair spalling along west edge	2028	$80,000	
S-3c			Pin lid to the wall for seismic protection	2028	$50,000	
S-3d			Plan interior inspection and seismic evaluation	2025	$10,000	
S-4a	Intermediate (steel)	-	Repaint interior	2030	$845,000	$1,010,000
S-4b			Install magnesium anode for corrosion resistance	2030	$50,000	
S-4c			Replace stringers/other misc. metals inside tank	2030	$100,000	
S-4d			Plan interior inspection and seismic evaluation	2025	$15,000	
S-5a	Rock Canyon (concrete)	1	Replace with 1.5 MG tank to provide additional volume	2027	$4,000,000	$4,000,000
S-6a	Gallery (concrete)	-	Roof rehab for leakage and freeze thaw	2026	$15,000	$530,000
S-6b			Seismic protection	2026	$500,000	
S-6c			Plan interior inspection & seismic evaluation	2025	$15,000	
S-7a	Main (steel)	-	Repaint interior	2032	$1,555,000	$2,510,000
S-7b			Repaint exterior	2031	$940,000	
S-7c			Plan interior inspection and seismic evaluation	2025	$15,000	
S-8a	Slate Canyon (concrete)	-	Inspect Double T design and plan interior inspection	2025	$5,000	$10,006,200
S-8b			Replace access ladder to tank interior	2025	$1,200	
S-8c			Plan replacement	2034	$10,000,000	
S-9a	Southeast (concrete)	-	Inspect and monitor surface corrosion inside vault	2034	$15,000	$20,000
S-9b			Plan interior inspection	2025	$5,000	
Total Cost						$18,466,000

Water Master Plan – Storage and Conveyance

System Distribution Improvements

Project No.	Construction Timeframe	Description	Project Cost
Distribution Improvements			
P1	0 - 5	1730 N. Freeway Crossing	$8,000,000
P2	0 - 5	200 N. Upgrade	$1,517,000
P3	0 - 5	Treatment Plant to Grand View	$6,952,000
P4	0 - 5	PRV From Main Zone to West Zone	$414,000
P15a	0 - 5	Oversizing of Distribution Mains for Future Growth	$344,000
P5	5 - 10	600 West Upsize	$1,018,000
P6	5 - 10	Parallel 20" to Slate Canyon Tank	$1,551,000
P7	5 - 10	State Street 12" Connections	$264,000
P8	5 - 10	12" Northwest System Connection	$815,000
P15b	5 - 10	Oversizing of Distribution Mains for Future Growth	$344,000
P9	>10	Redundant 30" to Grand View	$3,145,000
P10	>10	Lakeview Parkway 12" Connection	$2,820,000
P11	>10	900 S. 20" East to West Connection	$2,536,000
P12	>10	16" Stubbs Avenue	$1,024,000
P13	>10	900 S. Parallel 20" Crossing	$2,592,000
P14	>10	48" Redundant Pipeline	$27,309,000
P15c	>10	Oversizing of Distribution Mains for Future Growth	$687,000
		0-5 Year Total	**$17,227,000**
		5-10 Year Total	**$3,992,000**
		> 10 Year Total	**$40,113,000**
		Total All Improvements	**$61,332,000**

Recommended System Investment

System Component	Replacement Value	Service Life (years)	Annual Investment Range	
Source	$71,000,000	60 - 100	$1,104,167	$840,000
Storage	$93,000,000	80 - 100	$1,162,500	$930,000
Pump Stations	$16,500,000	40 - 50	$412,500	$330,000
Conveyance	$929,000,000	60 - 80	$15,483,333	$11,612,500
Total	$1,109,500,000		$18,162,500	$13,712,500

Recommended 10-yr CIP

System Improvements	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	TOTAL
Source Production Improvements	$400,000	$420,000	$5,299,350	$6,116,266	$2,509,312	$2,523,080	$6,493,285	$2,551,869	$2,566,914	$2,582,410	$31,462,485
Storage Improvements	$125,000	$620,550	$108,150	$0	$166,368	$4,727,137	$1,211,152	$3,128,119	$6,456,838	$6,670,495	$23,213,807
Distribution Improvements	$4,068,800	$6,299,790	$74,407	$76,639	$4,067,174	$4,189,189	$2,293,033	$901,258	$1,106,846	$91,511	$23,168,647
Fire Flow Improvements	$0	$0	$0	$0	$0	$0	$293,354	$3,749,981	$232,446	$853,930	$5,129,711
Rehabilitation and Replacement	$2,806,200	$1,264,006	$4,326,785	$4,820,133	$5,474,531	$1,982,324	$4,335,253	$5,499,196	$6,671,724	$8,040,768	$45,220,919
TOTAL	**$7,400,000**	**$8,604,346**	**$9,808,692**	**$11,013,038**	**$12,217,384**	**$13,421,730**	**$14,626,076**	**$15,830,422**	**$17,034,768**	**$18,239,114**	**$128,195,570**
Recommended System Capital Budget (with inflation)	$13,712,500	$14,398,125	$14,830,069	$15,274,971	$15,733,220	$16,205,217	$16,691,373	$17,192,114	$17,707,878	$18,239,114	$159,984,580

Water Master Plan – Storage and Conveyance

Existing Storage Evaluation

Zone	Name	Total Peak Day Demand (gpm) in Zone	Equalization/ Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Storage Requirement (gallons)	Available Storage (Million Gallons)	Equalization Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) Total (gallons)
23	Sherwood	94	67,640	240,000	307,640	0.5	466,180	192,360	192,360
18	Northeast	2,044	1,471,360	240,000	1,711,360	5.0	4,264,320	3,288,640	3,481,000
27	Rock Canyon	1,225	882,178	240,000	1,122,178	0.5	58,911	-622,178	-622,178
13	Intermediate	6,146	4,425,138	1,440,000	5,865,138	8.0	5,787,431	2,134,862	4,993,684
25	Southeast	386	277,584	240,000	517,584	2.0	1,861,208	1,482,416	1,482,416
34	Main	16,063	11,565,603	1,440,000	13,005,603	11.0	5,217,198	-2,005,603	4,470,496
24	Slate	2,864	2,062,381	240,000	2,302,381	5.0	3,968,810	2,697,619	7,168,115
17	West	8,548	6,154,803	720,000	6,874,803	10.0	6,922,599	3,125,197	10,293,313
Total		37,370	26,906,687	4,800,000	31,706,687	42.0	28,546,656	10,293,313	

Water Master Plan – Storage and Conveyance

Buildout Storage Evaluation

Zone	Name	Total Peak Day Demand (gpm) in Zone	Equalization/ Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Storage Requirement (gallons)	Available Storage (Million Gallons)	Equalization Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) by Zone (gallons)	Storage Surplus/ (shortage) Total (gallons)
23	Sherwood	214	154,040	240,000	394,040	0.5	422,980	105,960	105,960
18	Northeast	2,269	1,633,362	240,000	1,873,362	5.0	4,183,319	3,126,638	3,232,598
27	Rock Canyon	1,429	1,028,786	240,000	1,268,786	0.5	-14,393	-768,786	-768,786
13	Intermediate	7,671	5,523,005	1,440,000	6,963,005	8.0	5,238,497	1,036,995	3,500,806
25	Southeast	524	377,353	240,000	617,353	2.0	1,811,324	1,382,647	1,382,647
34	Main	19,803	14,258,192	1,440,000	15,698,192	11.0	3,870,904	-4,698,192	185,261
24	Slate	3,284	2,364,232	240,000	2,604,232	5.0	3,817,884	2,395,768	2,581,029
17	West	14,699	10,583,279	720,000	11,303,279	10.0	4,708,361	-1,303,279	1,277,751
Total		49,892	35,922,249	4,800,000	40,722,249	42.0	24,038,875	1,277,751	

Water Master Plan – Storage and Conveyance

Storage Facility Observations

Tank Inspected	Age (years)	Storage Capacity (MG)	ERU's Served	Seismic Risk	Condition Rating	Field Observation Notes
North Intermediate	40	5	551	Moderate	Very Good	• Minimal coverage • Good drainage • No evidence of problems • The metals are galvanized and likely rotted out
Sherwood Hills	44	0.5	337	Low	Good	• Only 60 -70s homes served • Metals are corroded • Outlet mechanical is in poor condition • Outlet vault without ventilation • Little cover (6-12 inches)
Northeast	~40	5	3,574	Moderate	Good	• Drainage challenges • Minimal cover – spalling, especially on west edge • Exposed prestressed anchors • Seismic concerns - roof not connected to wall
Intermediate	55	3	12,084	Moderate	Very Good	• Steel - inside last painted in 2008 • Outside is A588 steel (natural) • Seismic concerns – not anchored at foundation • Tank shell in good condition
Rock Canyon	57	0.5	2,251	Moderate	Good	• Exposed roof with cracks • Corroded metals • Spalling at entryway • Good drainage
Gallery	94	5	14,467	High	Fair	• Seismic concerns - roof not connected to wall • Surrounded by trees but no roots noticed
Main	68	6	17,360	High	Fair	• Welded Steel – inside last painted in 2006 • Concrete floor • Thickness of concrete was recently tested and is okay
Slate Canyon	55	5	4,543	High	Poor	• Double T design likely has problems with connections • Drainage issues - significant bird baths • Prestressed top is only a cap (3-inches thick) • Dangerous ladder for interior access
Southeast	28	2	826	Moderate	Good	• Concrete is in good condition • Minimal surface corrosion inside vault • Thin cover but okay - minor drainage issues

Hydraulic Model Flow Scenarios

Scenario	Production Requirement (mgd)	Production Requirement (gpm)	Springs Production (gpm)	Well Production (gpm)	New Water Treatment Plant (gpm)
Max Surface					
2023 Existing	53.8	37,366	11,458	18,650	7,258
10-Year	60.8	42,223	11,458	9,950	20,816
Buildout	71.8	49,888	11,458	17,550	20,881
Spring Failure					
2023 Existing	53.8	37,366	0	31,700	5,666
10-Year	60.8	42,223	0	34,700	7,523
Buildout	71.8	49,888	0	40,700	9,188