

2016 CAMPUS MASTER PLAN





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The 2016 Weber State University Master Plan would not have been possible without a robust working relationship between the University's master plan steering committee and the consultant team. The level of trust and engagement by all involved created an environment in which good ideas could, and did, come from any quarter. Those ideas were then explored and converted into important elements of the master plan. Our hope and belief is that this document and the principles and ideas contained herein reflect that collaborative process. VCBO and Sasaki Associates, and the professional subconsultants for engineering and traffic/transportation, would like to thank Madonne Miner, Provost and Vice President for Academic Affairs, Bruce Davis, Vice Provost and Dean of Continuing Education, Norm Tarbox, Vice President for Administrative Services, Kevin Hansen, Associate Vice President for Facilities and Campus Planning, Mark Halverson, Director of Campus Planning*, and Jacob Cain, Energy and Sustainability Manager, for their high level of engagement and input during this process. We also thank other key WSU stakeholders and staff who participated in our workshops and provided invaluable input. Last, but not least, we thank WSU's President, Charles A. Wright, and his President's Council, for providing insightful commentary and feedback to the draft master plan presented to them on February 17, 2016, and for supporting this master planning initiative to continue a tradition of long-range strategic planning for the future of WSU's physical assets and environment, in support of the University's mission.

The professional team of consultants was able to rely consistently on the steering committee for decades of institutional knowledge, which was invaluable both on a technical and anecdotal level. Discussion about perceived issues and opportunities, past initiatives, and works already underway, provided a solid foundation for the master planning work. In addition, the master plan's steering committee's firm belief that any decisions taken must be made with due consideration of the full range of WSU's student, faculty and staff ensured a strong grounding for all explorations and eventual decisions.

*In the course of this master plan, Mark Halverson was promoted to the position of Associate Vice President for Facilities and Campus planning, following the retirement of Kevin Hansen.

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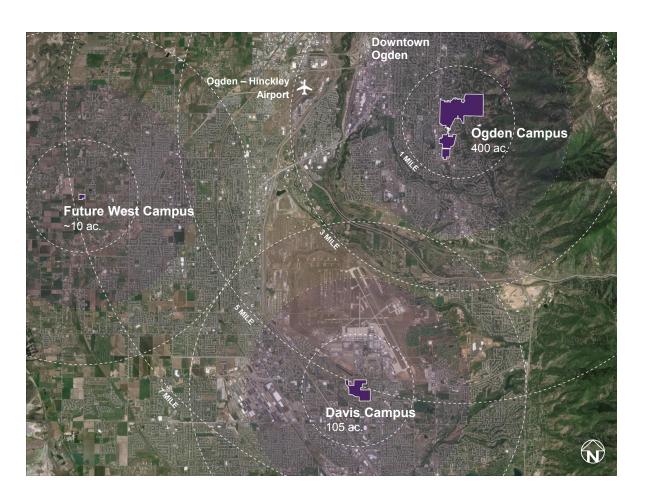
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Weber State University Ogden Campus ADA Assessment
Weber State University Storm and Sewer System Study
Weber State University Ogden Campus Traffic Impact Analysis
Weber State University Davis County Traffic Study

EXECUTIVE SUMMARY





Weber State University undertook the 2016 master plan with the intention of creating a 20 year framework within which sound decisions relating to the three primary campuses that constitute the University may be made. These are the Ogden Campus, the Davis Campus, and a future "West Campus" in Hooper. The goal of the master plan was to create a vision for the campuses that would enable Weber State to evolve over the next two decades in a manner that is responsive to their social and educational missions, their physical composition, their stature in the communities they serve and, in the case of West Campus, in the community it will serve. This plan will also enable WSU to implement initiatives related to the University's energy use and sustainability goals in alignment with the broader institutional vision.







Ogden Campus Davis Campus West Campus

Each of the three campuses possess (or in the case of the future West Campus, will possess), a distinct set of criteria, issues, and opportunities befitting the differing types and levels of service each provides within the WSU network. In addition, each of the campuses differs greatly in terms of age, with Ogden having been established

many decades ago, Davis established but still a "young" campus, and with West Campus not yet established. The master plan has taken into account these diverse conditions and requirements, tailoring strategies and solutions accordingly.

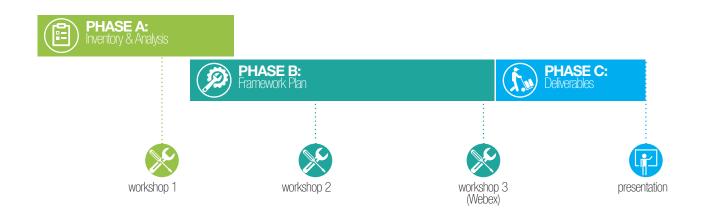
ENABLING WSU'S EDUCATIONAL MISSION

Weber State University serves a student body that is broad, with a mission that extends well beyond a simple focus on full-time on-campus students. The non-traditional nature of many of the University's students, and a mission statement that fully embraces this diversity, suggested from the outset that the master planning process must not only support, but should enhance, the experience of this diverse student group. There is much in the master plan for the three campuses that is aspirational - particularly in relation to the creation or support of a "sense of place" - but that is strongly underwritten by practical measures that ensure the continued and/or future planned operational measures necessary to support nontraditional students.

One key consideration that came up time and again in this regard was the need for each campus to provide ample parking, given the heavy reliance on single-occupant vehicles in the University's service area, and also given the non-traditional classroom (and often work) schedules of many students served by WSU. The team felt strongly that while it is important to look to alternative modes of transportation - and these were examined and incorporated in some detail - it was essential to find practical ways to engage with the de facto condition relating to transportation that exists in the University service areas.



SCHEDULE AND GENERAL SCOPE





Phase A

- review existing data
- kick-off work session
- stakeholder interviews
- site reconnaissance
- goal setting
- develop guiding principles
- compile previous documentation
- site analysis
- incorporate WSU-provided growth profile
- development program



Phase B

- prepare preliminary concepts and alternatives for each campus
- workshop and webex work session review of analysis concepts, alternatives

 incorporate WSU comments

 refine the preliminary plan

- complete civil site analysis
 complete traffic and transportation analysis
- complete ADA analysis



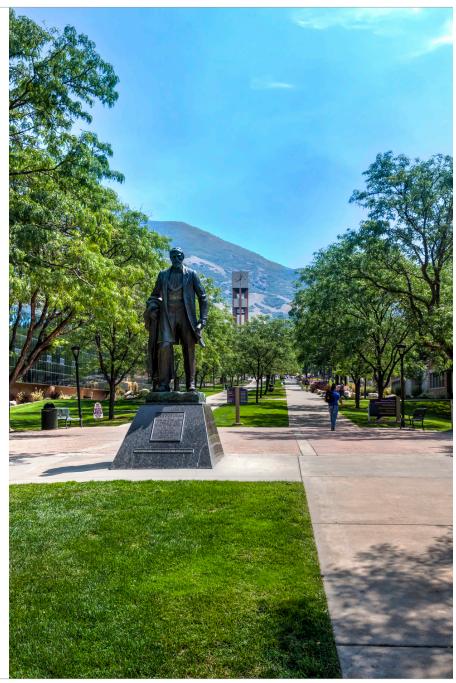
- develop final plan
- prepare graphics to support plan ideas
- compose and deliver the final master plan document

MASTER PLAN PRINCIPLES

The development of guiding principles for the master planning process allowed for the creation of a decision-making framework within in which ideas could be tested and re-tested to insure compatibility with the overall vision.

MASTER PLAN PROCESS

The current master plan's concept phase began at the end of 2015 through early 2016, culminating in presentation of findings and recommendations to President's Council on February 17, 2016, at which time the general intentions and designs were validated. Subsequent to that, a more detailed study by the professional team's consultants occurred, with engineering and traffic/transportation disciplines carrying out studies to determine the feasibility of items developed during the workshop phase (engineering and traffic/transportation consultants participated at all workshops during the initial three month concept phase of the master plan). The concept phase was characterized by full-day workshops on campus, with the entire client steering committee, the consultant team, and other key stakeholders (athletics, sustainability, etc.). A full campus ADA assessment was also completed during this time.



MASTER PLAN OUTCOMES



The final master plan is the culmination of months of study of options, and testing of the preferred option presented to President's Council. This document represents the cumulative thought and input that went into deriving the preferred direction, capturing myriad concerns and considerations that emerged during the iterative process of the master plan. Certain elements remain somewhat unknown at the time of completion of this master plan (eg. full picture of land acquisition to make elements such as the Dee Events Center connection a reality, detailed design of the future Bus Rapid Transit across campus, etc.), but it is the master plan team's belief that the framework developed is flexible and robust enough to accommodate not only the "known unknowns", but also a considerable number of "unknown unknowns" into the future. Essentially, what this master plan does is provide a framework rather than a fixed design, and as such, it is inherently flexible. Key principles have been established and articulated, and if future implementation teams connect with and understand those principles, this master plan should remain relevant well into the future.

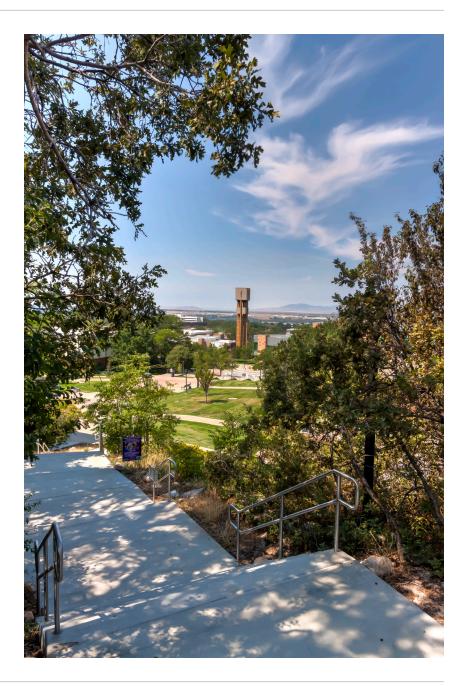
OGDEN CAMPUS

OVERVIEW

The Ogden Campus is the flagship of WSU, and enjoys both a spectacular physical setting and the advantages of having been established several decades ago. As a result, it has the physical appearance and functionality of the mature campus that it is, from the point of view of general environment, landscape, and infrastructure. One of the key discussion points early on was the high-degree of fidelity to the original master plan that has been maintained by the University's Facilities Department over the decades since the original master plan was implemented, with a strategy that has largely focused on replacement-in-place of facilities when they become outdated, as well as a careful strategy of insertion of new buildings on previously un-built sites, when called for.

OBJECTIVES

The overall vision for the Ogden Campus is to continue the tradition of developing in a way that maintains a high level of fidelity to the original campus master plan, particularly as relates to the many positive existing aspects and to current and prior good stewardship of the campus. A component of this is to put in place a vision that encourages coordinated action, and that provides a road map for this action, enabling implementation of individual projects to understand the overall vision and intent for localized or macro conditions on the campus. Another key goal of the master plan for the Ogden Campus is to identify opportunities for improvement of various existing conditions, through the identification of opportunities for modest future physical growth, and, most importantly, to identify opportunities for synergies between campus and building systems.



Specific broad goals of the master plan are as follows:

- Strengthen existing pedestrian routes E-W and N-S, including addressing accessibility issues where possible, and connecting the campus to its "backyard" east of Skyline Drive.
- Create a strong pedestrian connection between the Dee Events Center and the main campus, binding these two important nodes closer together. This path should be clear, easy to use, safe, and well-integrated into the landscape.
- Identify the means to provide a slight increase in the amount of parking within a twenty year time frame so that the University can continue to carry out its mission to a diverse constituent group, including commuters.
- Identify sites for modest physical expansion of conditioned teaching space, either within new or replacement buildings.
- Consolidate residential life. Augment Wildcat Village to concentrate and rationalize all on-campus residential life in a defined residential village. Relocation of the existing University Village housing to Wildcat Village within a 20-year time frame is deemed to be achievable and desirable.
- Complete the loop road on-campus to improve traffic control and pedestrian safety.
- Augment parking in a modest way at sites around the ring road, to support the original vision of easy vehicle access at the edges of campus, with pedestrian routes moving inwards from the edges.

- Identify a limited number of development sites to accommodate modest physical space growth in the 20 year time frame of this master plan.
- Strengthen campus "gateways" from the ring road to create a greater sense of arrival and transition from parking to the pedestrian heart of the campus, particularly from visitor lots.
- Identify development parcels and a cohesive structure for their future development, within the primary academic core.
- Improve the fan experience at the stadium, making provisions for modest seating capacity increase, as well as an integrated entry and support facility to the north, and landscape and general site reorganization outside the stadium to improve usability and pedestrian safety.
- Create an "Athletics cluster" around the Dee Events Center, including on the Avondet Property and on the University Housing property (at such time as residences on the latter are decommissioned and housing is consolidated at Wildcat Village).
- Generally continue to utilize the Dee Events Center as a "parking bank" for the entire campus, while improving connectivity between Dee Events and the main campus.



EXISTING CONDITIONS

The Ogden Campus is a high-functioning campus that is well-maintained. Buildings are well cared for, and public areas are beautifully landscaped. Existing condition challenges for the Ogden Campus are as follows:

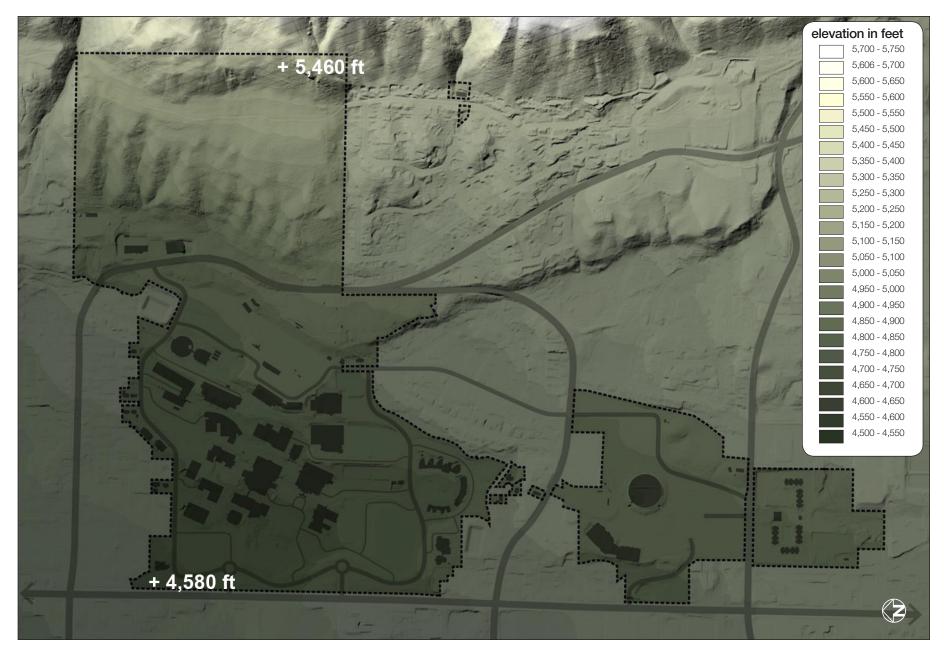
- Relative lack of connectivity to public transportation. (This will be improved greatly when the proposed Bus Rapid Transit line is implemented. The master plan has attempted to anticipate the BRT and its planned route).
- A shortfall of parking spaces close to the academic core presents challenges for commuter students. This issue prevents quick turnaround times for students balancing families and work lives off-campus, and is not easy to rectify given the density of the core campus. The master plan identifies some modest additional parking opportunities (on land acquired north of the loop road, at Skyline Drive, etc.), as well as strengthened connections between the Dee Events Center (the de facto parking bank for the campus) and the core campus.

- Topography, as relates to accessibility and utilities. Topography is part of the beauty and identity of the campus, but also poses some challenges whose solutions are often costly to implement.
- The lack of a true utility "loop" that would provide redundancy in all conditions (ie. allowing feed from two possible directions) to all major buildings.

EXISTING OGDEN CAMPUS



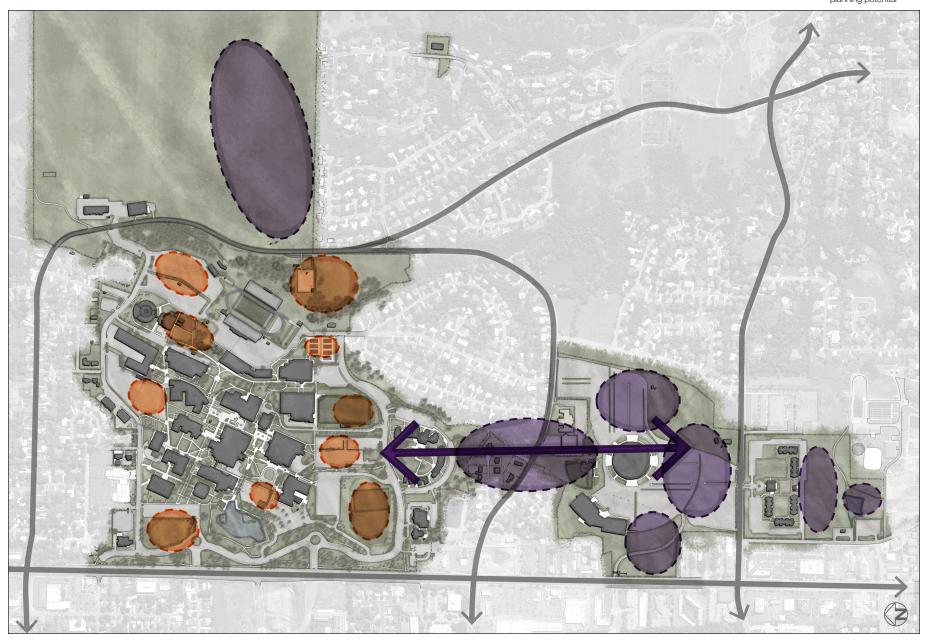
TOPOGRAPHY



percent slope: 10 - 20 > 50% 20 - 30 0 - 10

OGDEN CAMPUS PRINCIPLES

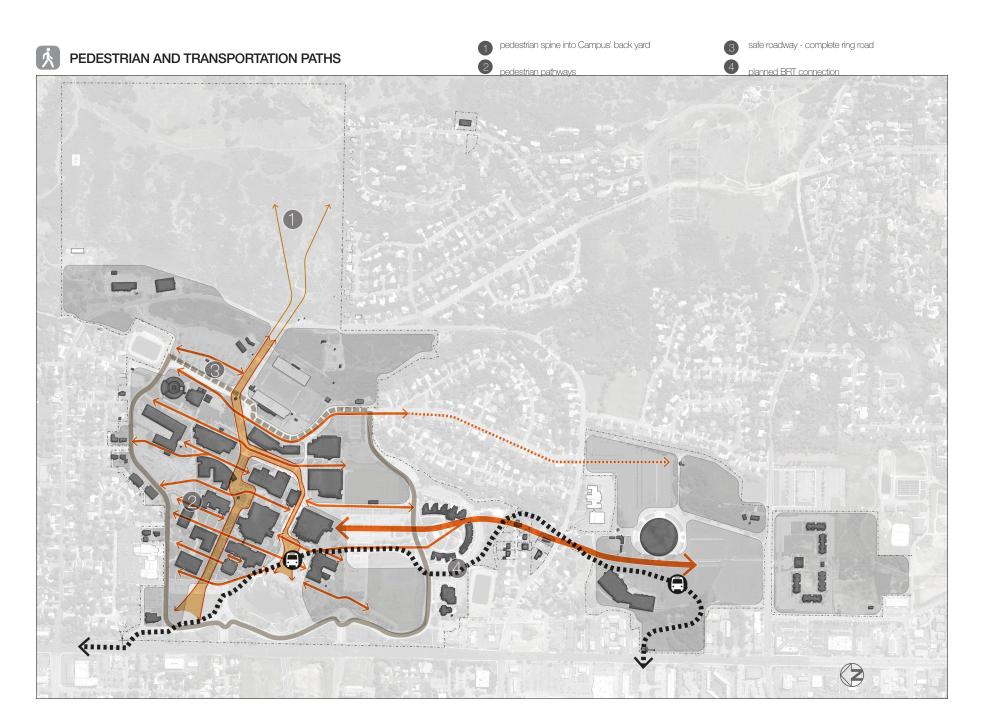
- Continue the tradition of accommodating change and growth on the Ogden Campus in a manner that respects the original master plan, and that makes new connections
- Create a 20 year plan that anticipates modest built-space growth, moderate parking requirement growth, increased cohesion of residential life, and increased cohesion of campus-wide systems
- Incorporate energy and general sustainability goals as described in the Energy Savings and Investment Plan (ESIP II)



KEY CONSIDERATIONS

GENERAL

- FTE growth accommodated in traditional ways will be modest, but some development sites should be identified
- Consolidate Student Village near P.T. Fields (Relocate 500 from Univ. Village, add approx. 500 new - Total approx. 1,500 including Wildcat Village)
- Study creation of an Athletics area anchored by Dee Events Center, on Avondet Property and elsewhere. Indoor tennis and basketball practice may be included
- Improve connections between Dee Events & main campus; provide a comfortable, well-lit pathway
- Modify stadium north end to increase capacity & improve amenities; relocate track to Athletics cluster
- Link the campus to its "back yard" on the mountain. Study possibility of pedestrian route, and relocation of Outdoor Center to Skyline Drive



KEY CONSIDERATIONS: INFRASTRUCTURE & UTILITIES

- Define permanent ground coupled heat [ump (GCHP) field locations (and confirm sufficient capacity)
- Create true utility loops for redundancy
- Study options for tunnel system extension (timing to coincide with BRT projects)
- Develop a strategy for dealing with "dark corners" of the network (either connecting to loops, or stand-alone)

KEY CONSIDERATIONS: TRANSPORTATION

- Examine intersection of Edvalson Street & Skyline Drive for safety and flow improvements
- Study potential for parking lot at trail head on Skyline (civic amenity and student parking)
- Study roadway through Lot A-6, west of the stadium to complete campus loop
- Study creation of parking lot along Birch Ave., northeast of the Campus Services Building
- General parking re-calibration after development sites identified
- Incorporate the future BRT line into the campus framework plan

parking lots on campus edges

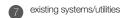
future expansion / replacement sites

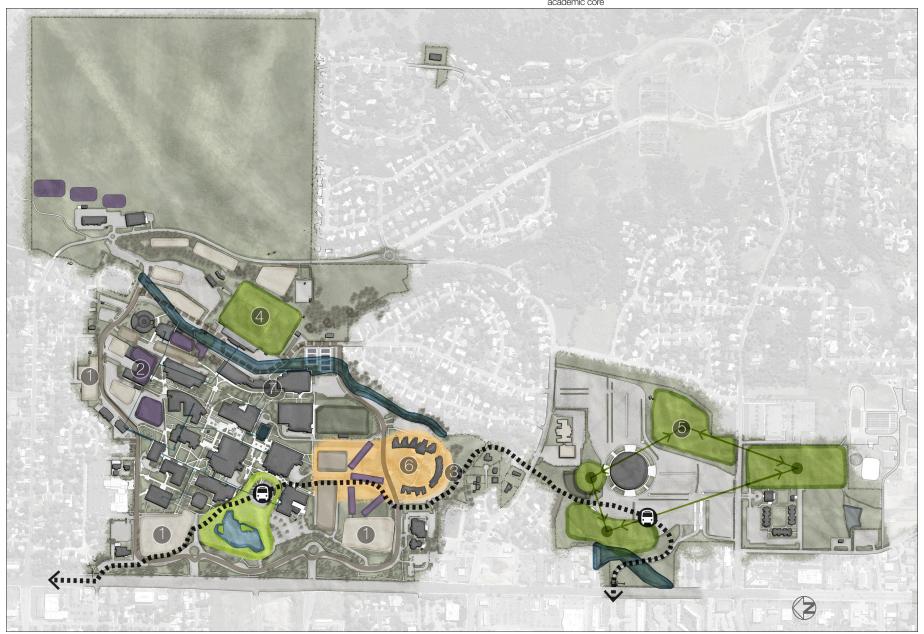
green connector

4 create football cluster

athletics cluster at Dee Event Center

6 Wildcat Village expanded closer to academic core

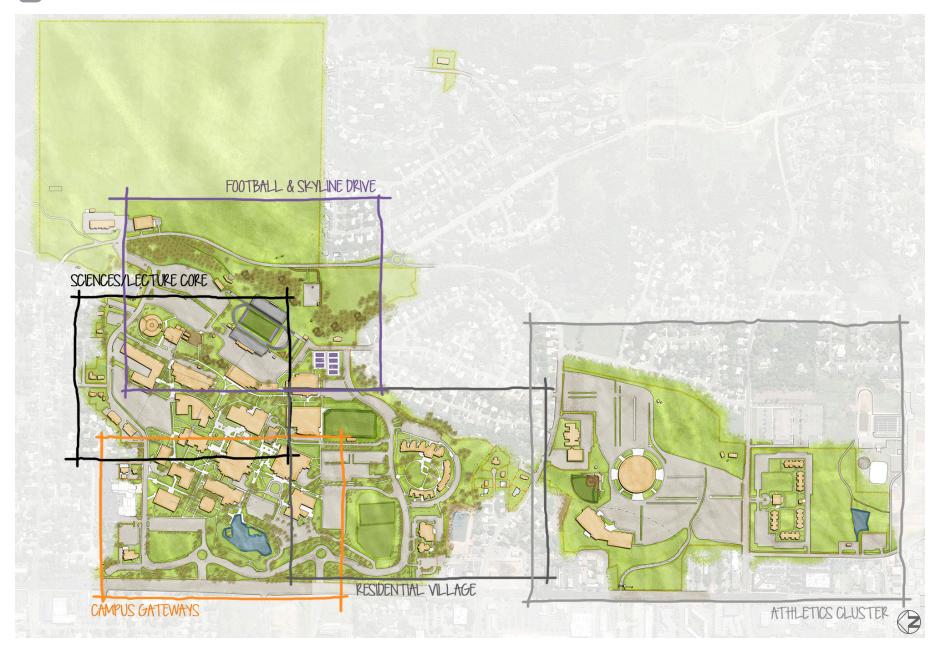




OGDEN CAMPUS STUDY AREAS

For purposes of studying options for the Ogden Campus, the key zones of study were identified as follows:

- Campus Gateways (from the loop road, facing Harrison Boulevard) 1.
- 2. Sciences/Lecture Core
- 3. Football Stadium and Skyline Drive
- Residential Village 4.
- 5. Athletics Cluster - Dee Events Center



CAMPUS GATEWAYS:

For the purposes of the master plan, these have been identified as the "south" and "north" gateways, corresponding with the general areas occurring at the base of the ascent onto the campus in two locations. In the south, this is the area defined by the visitor pay lot, the Shepherd Union and the Browning Center. In the north, it is the open space of the existing recreation field and parking lot adjacent to Miller Administration and Social and Behavioral Sciences. In both cases, there is unexploited opportunity to improve the experience of arriving to, and departing from the campus, at these two nodes where the original campus planners created important moments of transition onto the campus, and opportunities to accentuate those moments. The

north gateway was studied in greater detail during the course of the master plan, as this area is currently more open, and hence has more latent opportunity for change at this time. The southern gateway is strongly defined by essential vehicle routes that would be extremely challenging to remove due to operational and accessibility considerations. Future implementation of the proposed Bus Rapid Transit line will create additional complexities for both gateways, but also additional opportunities, particularly from the point of view of possible co-implementation of underground utilities, as well as rationalization of pedestrian pathways.

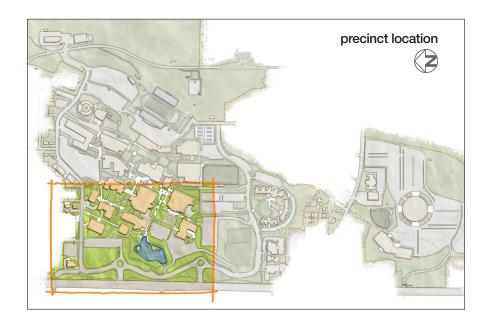


NORTH GATEWAY:

The grand axis leading up to the clock tower is one of the most visually powerful elements on campus. Currently, however, it dies out unceremoniously at its bottom end at the edge of the existing permit lot. Opportunity exists in this location to utilize site works to reorganize parking, pathways, and open space to achieve a greater sense of entry as well as to increased amenity. Recommendations for this location are:

- Remove the existing A1 parking lot, and create two new lots on the site of the existing lot and the recreation field (one permit, one pay), aligned to the grand axis leading up to the clock tower. Create a strong sense of arrival through a defined drop-off and waiting area for several cars, bringing visitors to the base of the grand staircase, as well as an adjacent pedestrian plaza at the base of the grand stairs (the current condition does not provide any gathering space between the base of the stairs and the parking lot). Provide loading area for delivery and service vehicles in this same drop-off area. The two new parking lots should be separated by a zone of contoured ground where snow removed from the lots can be placed in winter, and where vegetation can be used to soften the visual impact of the lots from the ring road.
- Extend the main pedestrian path of the existing grand axis through the two lots, utilizing steps and ramps to navigate changes in level. Utilize the borders of this pedestrian pathway to provide landscape elements, including trees, to provide pedestrians with a safe and amenable walkway through the parking lots.
- Leave a green corridor of sufficient width to allow for the future path of the Bus Rapid Transit line in this location.

Note: At present, Army helicopters utilize the recreation field in this location as a landing zone for military-related events. Consideration should be given as to where these helicopters will land in future when the recreation field in this location is removed.





NORTH GATEWAY







Artist rendering of the parking lot expansion at the north gateway. The parking lot is envisioned to be covered in photovoltaic panels that generate electricity for the campus and provide a visual representation of Weber State's exemplary goal of carbon neutrality.



SOUTH GATEWAY



SOUTH GATEWAY:

This "gateway" provides an important transition space onto campus for those parking in the Public Pay Lot (PPL), and is the open space that most directly provides easy access into the Shepherd Union. One major challenge for this space is that it ideally wants to function as a pedestrian quad, but is also the space that vehicles must traverse to pick up and drop off attendees at Browning Center events, and also the space that service vehicles must traverse to access the loading docks and service yard of the Shepherd Union. As such, it performs both classic academic front-of-house functions as well as back-of-house functions. In addition, given the change in elevation upwards between the western and eastern edges of this open space, the drop-off area for the Browning Center provides one of the few handicap accessible access points that give direct access to important buildings such as the Shepherd Union, Stewart Library (via elevators in the Shepherd Union), and the Browning Center itself.

Given the continued vehicle-access requirements of this "gateway", as well as projection that a major stop for the BRT will be located here in future, the master plan indicates that a comprehensive landscape design is required for this area at some time in the future. Consideration to the following should be given to the following:

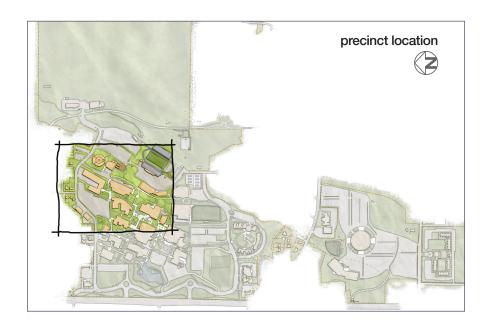
- The Public Pay Lot should be visually screened from the outdoor space of this "quad", utilizing trees and other landscape elements. It is possible that the existing pay lot could potentially be halved in size when the new pay lot is constructed at the north gateway, creating more flexibility for landscape solutions to make this "quad" feel more like a campus amenity rather than simply a large zone of transition overall.
- Vehicular paths through the "guad" should be more carefully integrated into the surface of the pedestrian realm. A higher grade of paving (ie. other than asphalt) should be considered, with a blurring of the distinction between roadway and walkway, with the two perhaps separated by bollards, or not at all.

SCIENCES/LECTURE CORE:

The "academic core," for the purposes of identifying opportunities for creating new academic space within a 20-year time frame, was identified as being the area of campus within the loop road, north and east of the new Science building. This land is comprised of the existing (ie. "old") Science building, Engineering Technology, Technology Education, and parking lot A2. During the course of master plan workshops, these buildings, as well as this location in general, were identified as the most likely location for future academic expansion, if such is required beyond existing conditioned space available on-campus in the 20-year time frame. The reasons for this were the age of the old Science building, Tech. Ed., and Engineering Tech., as well as the close proximity of these parcels to the new Science building and the pedestrian core of campus. Robust growth nationwide in STEM subjects in higher education does mesh well as this portion of the Ogden Campus's past and current role as the location of the sciences. Specifically, a new Inter-Professional Education Building (IPE) is anticipated in this area.

Several options were studied for the placement of future buildings in the locations indicated on accompanying diagrams, with consideration being given to the following criteria:

- Footprint and height of buildings: In a more detailed phase of study for any future buildings here, carefully study of sight lines (particularly from the interior of the new Science building) will need to be considered, along with appropriate footprint, massing, and overall height. The master plan anticipates that new buildings will generally be larger floor plate in keeping with current trends (and distinct from buildings of prior generations), with more focus on building performance (energy, sustainability) and flexibility of internal use.
- Pedestrian access: The buildings are envisioned as forming a framing edge to the large triangle of open space bisected by the important pedestrian route that leads from Wattis Business to Lind Lecture. Primary building entryways should front onto the open spaces adjacent to this walkway. In addition, major primary entries should be planned per the accompanying diagrams, to provide front-door access facing the loop road, where applicable.







SCIENCES AND LECTURE CORE - PROPOSED



- Parking: The A2 lot provides a considerable amount of parking for the campus, but is in an extremely prominent position visually and geographically. As such, the master plan took the position that at least some study options should look at the possibility of displacing parking out of this lot strategically, into other locations, in a balancing of convenience against highest-and-best use for the land occupied by the A6 lot. One of the locations suggested for parking relocation is comprised by ongoing acquisition of parcels adjacent to Edvalson Street, on either side of Birch Ave. Careful consideration will need to be given to placement of a crossing at Edvalson to provide safe pedestrian access to/from the new lot or lots. Overall, the breaking up of the A6 lot from a large expanse of asphalt into smaller parking lots with a greater amount of landscape buffering is a positive step at this visually prominent location on campus, despite being inherently less efficient.
- Loading, emergency access: During the design of future buildings, care will have to be taken to maintain existing fire vehicle access routes in the general N-S

- direction. Loading for each building should be studied in terms of its relationship to parking areas, and the ability of large vehicles to execute movements as needed.
- Daycare Drop-off: Provision is made for maintaining drop-off functions and a small amount of short-term parking for the daycare to the west of lot A2.

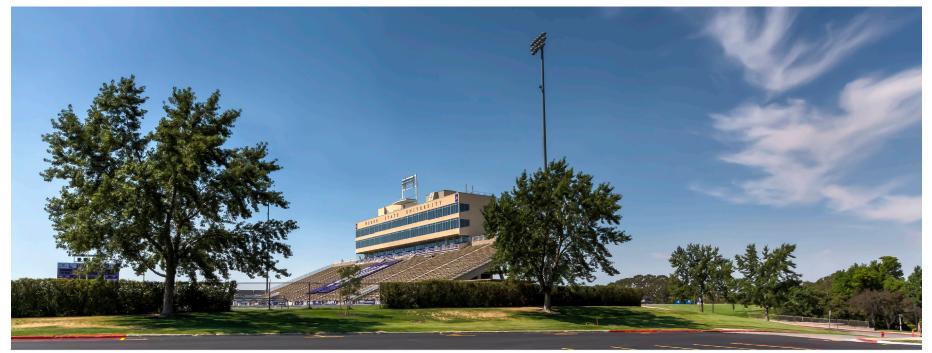
Lind Lecture is an important structure on the campus, and is widely utilized. It has, however, benefitted in the past by being anchored directly to the "old" Science building, which is scheduled for removal. In addition, the building is difficult to make fully accessible, and houses the University's museum, which is a piece of program that is visited broadly by people from far beyond the WSU campus community (school groups, general public, etc.). As such, future consideration should be given to replacement of the functions of Lind Lecture in other buildings, as well as the possibility that the Museum could, if funds are available, be worthy of occupying its own building, or a prominent anchor portion of a major new building.

FOOTBALL & SKYLINE DRIVE:

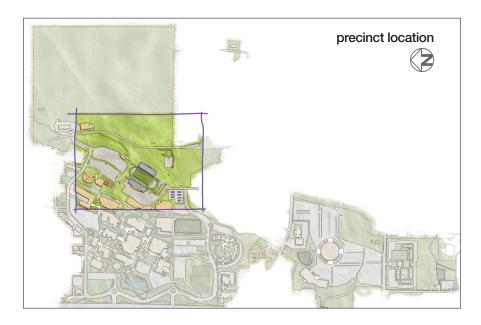
The intention in this location is to make provision for modestly augmenting the seating capacity of the existing Stewart Stadium, to identify a site for a future anchor-amenity building for football at the stadium, to provide a segment of a new pedestrian path linking the main E-W campus pedestrian axis with Skyline Drive and the campus's "backyard" to the east of Skyline Drive, and to formalize the existing de-facto completion of the on-campus loop road between the stadium and the Marriott Health building. Recommendations are as follows:

FOOTBALL STADIUM AND SURROUNDS:

• The existing roadway that passes through the A6 parking lot between the stadium and Marriott Health should be formalized to create a defined, lowspeed path through the lot in a way that improves pedestrian safety. In particular, the roadway should be moved further westward, away from the immediate face of the stadium, to create a buffer space that prevents people exiting the stadium in this location from stepping directly into the roadway. Curbs, islands (with planting), and possibly raised crossings should be utilized to differentiate these lots from the parking lot it passes through. Parking spaces will be lost to achieve this, but they will be made up elsewhere in this area (see below regarding relocation of running track).

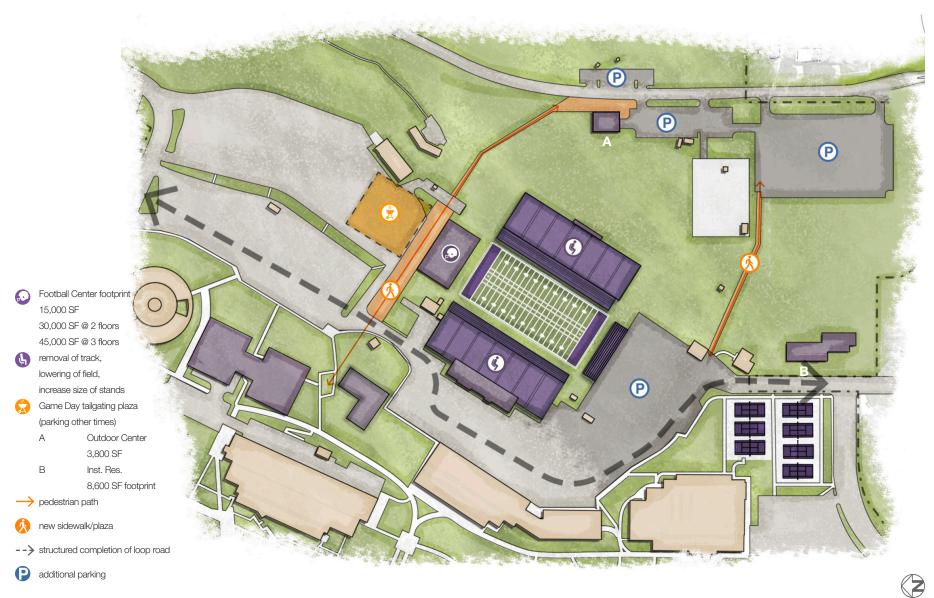


- Track-and-field elements should be relocated to the "Athletics Cluster" that this master plan proposes, generally focused around the Dee Events Center. Removal of the track from the Stadium will allow for lowering of the playing field and the creation of addition bleachers on the east and west sides of the stadium to bring the front row of seating closer to the field of play. A new small bleacher stand can similarly be created on the south end of the playing field when the field level is lowered. Behind this southern stand, a new extension of parking lot A6 can be created.
- A new two or three story football building should be sited north of the playing field, accommodating hosting and other key functions, including a major spectator entry to the stadium on the first floor level, enabling this new building to serve as a key gateway to the stadium from the W5 parking lots to the north. The master plan recommends that a generous public plaza be created north of this building, with a sophisticated landscape design so that the plaza can function as a gathering space on game days, and can also serve as a segment of the E-W pedestrian route between the main campus and the campus's "backyard" east of Skyline Drive on all days.
- With the Outdoor Center relocated to Skyline Drive, the master plan recommends that the current site of the Outdoor Center be repurposed as the site of a new Institutional Residence. The buildable area on this site is limited due to topography, so acquisition of adjacent properties would assist greatly with realizing this part of the plan. This location is ideal for the Institutional Residence, as it is at a campus edge, close to the stadium, and is well-connected to important functions on campus. Care should be taken during the planning phase to consider whether older plans for the extension of the campus loop road to the east of the stadium, up to Skyline Drive, will ever be implemented, as the construction of the Institutional Residence in this location could foreclose on that option.





${\sf FOOTBALL-PROPOSED}$





${\sf FOOTBALL-PROPOSED}$



The view above and on the next page illustrate the potential massing concepts for the north end zone expansion. The view above is looking toward the expansion from the east side of the field.

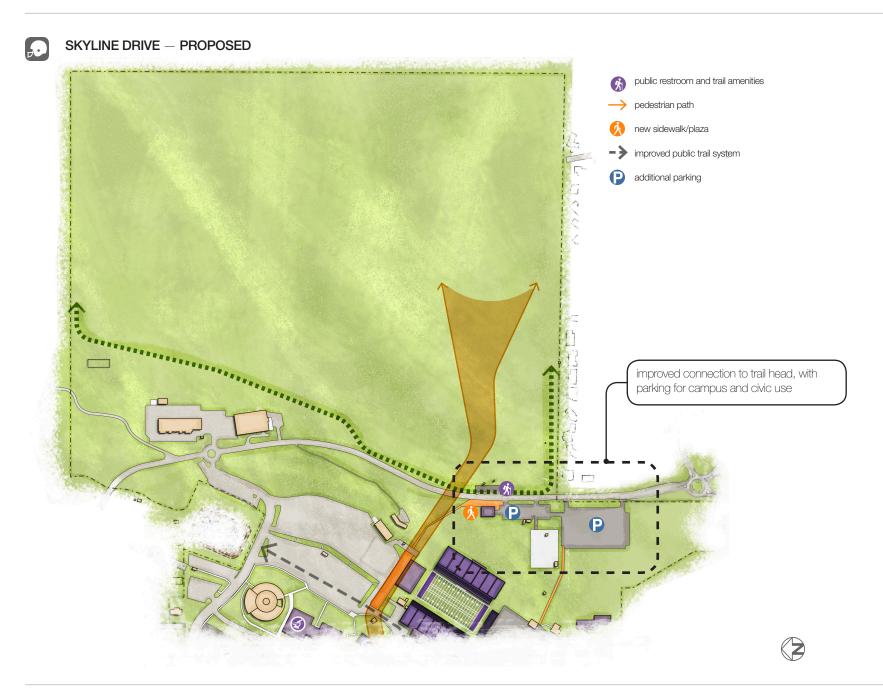


The view above is looking toward the expansion from the north side of the field, looking toward the main entry point.

SKYLINE DRIVE AND SURROUNDS:

- Land to the east of Skyline Drive should be generally land-banked for the foreseeable future, and should be utilized in an environmentally sensitive manner as a "backyard" for the campus, as a recreational amenity. Maintenance and perhaps also augmentation of existing trails should be a part of the plan. Indigenous flora of the Wasatch Range benches should be maintained and restored where possible. This land has considerable value (in a context of rapid surrounding development) to both the campus and general community as a natural amenity. Some previously-utilized sites, in the vicinity of the old oil tank and the Facilities yard, should be reutilized as new building pads and/ or parking locations in future, if such are required east of Skyline Drive, but these should be closely controlled to prevent expansion into currently unutilized land. Preventing ad-hoc developmental expansion of campus requirements into currently unutilized land east of Skyline Drive will be highly beneficial in the long run, whether the land is utilized in perpetuity as a natural environment, or whether it is developed in the future.
- This campus "backyard" should be strongly connected to the main campus, via a series of pathways, stairs and ramps extending through the parking lots to the east of the existing Science Building and the stadium, past the cooling towers to Skyline Drive and beyond. The connecting route should be part of a comprehensive landscape design that focuses on safety, accessibility, and amenity. The design should take into account an increase in foot traffic between Skyline Drive and the main part of campus once the project is complete, from people parking on Skyline Drive and from members of the campus community utilizing the route as a way to access hillside trails.
- The Outdoor Center should be located convenient for both campus and public access, to enable it to function as a campus and civic amenity at the point

- where it will be of greatest use. It's siting and design should be low-impact, enabling it to be easily accessed from the E-W campus route up to Skyline Drive as well as from the new parking lot(s) at Skyline (see below).
- A parking lot or lots should be constructed on the more level portions of the west side of Skyline Drive on portions of land that are of sufficiently low-slope to make this practicable (ie. roughly in line with the stadium). Care should be taken to minimize impacts to scrub oak and other vegetation, and to link the parking lot via a clear and well-lit path to the stair/ramps leading to the main campus. Consideration should be given to screening the lot from Skyline Drive with existing or new vegetation, though security considerations should take precedence in terms of user safety, particularly in the evening hours.
- Consideration should be given to breaking up the new parking lot(s) into a series of lined "parking courts" to minimize visual impact and maximize stormwater retention through the use of vegetation and bioswales. Safety and security considerations for users must be taken into account through clear, well-lit pathways with emergency pillars located at regular intervals.
- The new parking lot(s) and Outdoor Center should be made available to the general public at certain hours, as the "backyard" area of the campus is a significant campus and civic asset, as well as a route directly into the Wasatch Range. Inviting the public to make use of the Outdoor Center and the Skyline Drive parking lot(s) will serve to underpin and underscore the prominent role that WSU's Ogden Campus fills within the context of Ogden.
- Large vehicle access to the existing transformers west of Skyline Drive is to be maintained, and incorporated into the design of the parking lot(s).



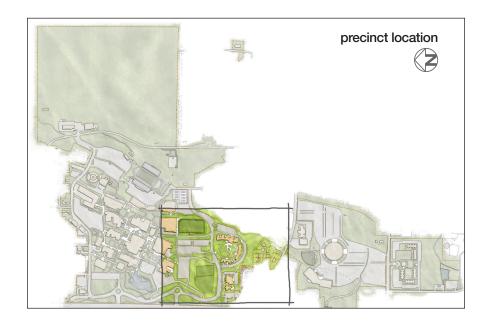
RESIDENTIAL VILLAGE

During master planning workshops it became evident that consideration should be given to the creation of a consolidated residential village on-campus. This emerged for two reasons. First, the existing University Village was identified by the master planning team as being too distant from the academic core for its occupants to feel that they are meaningfully a part of campus life, and the buildings at University Village are deemed by Facilities to have a limited number of years remaining in terms of physical condition.

The concept of creating a consolidated residential village is an essential step towards creating a consolidated athletics cluster around Dee Events Center, as the land currently occupied by University Village is essential to the full realization of that athletics cluster (although in the short- and mid-term many aspects of the athletics cluster can be realized on other land in the vicinity of the Dee Events Center).

Numerous potential arrangements for a consolidated residential village at Wildcat Village were studied during the course of the master planning process. Important considerations during the study period were:

- Create approximately 800-1,000 new beds (500 relocated from University Village, plus 500 expansion) in the new location, to augment the approximately 500 beds of Wildcat Village.
- Make provision for the future route of the proposed Bus Rapid Transit line.
- Relocate the "Promontory Tower Fields" (recreation fields) that would be displaced to create the expanded residential village to other locations (most likely to the Athletics Cluster at the Dee Events Center).
- Utilize a plan form for the residential blocks similar to that of the crescent-shapes of Wildcat Village.
- Maintain large parking lots to the greatest extent possible north of the new residential village, to serve the needs of the Browning Center.
- Use the creation of the new residential village as an opportunity to create a strong pedestrian link from Shepherd Union to the Dee Events Center.

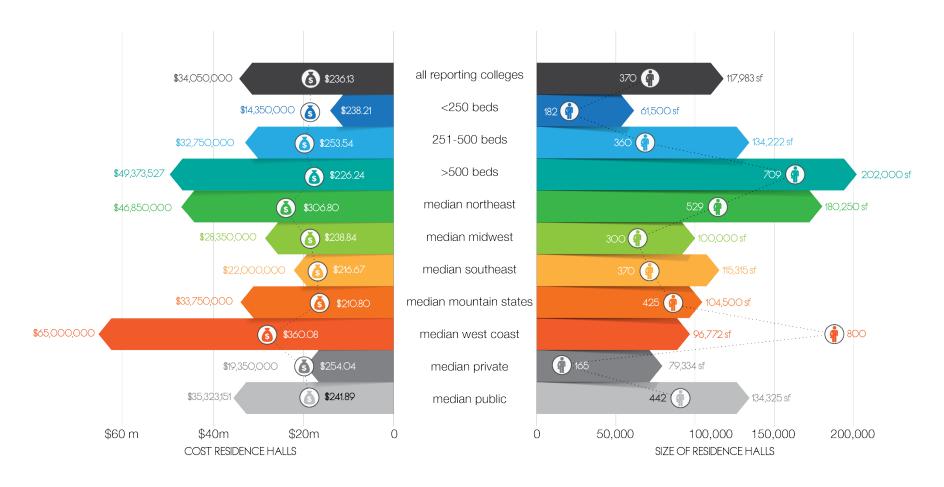




RESIDENTIAL VILLAGE



COST AND SIZE OF RESIDENCE HALLS





Detailed considerations for future residence halls are follows:

- Buildings: It is expected that the new residential buildings will be 3 stories, though detailed study will be required to determine whether opportunities exist to use topography to achieve greater height without greater visual impact. The master planning team felt that the physical stature of Wildcat Village was appropriate, and this should generally be carried through into any future residential buildings in this location.
- Open Space and Pathways: With the crescent-shaped buildings strongly framing the open space, these areas should be developed as a residential amenity, similar to that of Wildcat Village. Ideally, the various open spaces in the residential village should be linked to one another, to the main campus, and to Dee Events through a series of clear, safe pathways. The heavily utilized existing pathway.
- Parking: The existing W7 and A9 parking lots (southwest of the Wildcat Center) will be greatly reduced in size to accommodate new residential buildings in this area, but a large amount of this displaced parking will be recaptured at a new lot (or lots west of the residential village, inside the loop road. Bus parking currently part of W7 should be be relocated elsewhere (possibly to the Dee Events Center site). Lot W8 (south of the Kimball Visual Arts Center) is maintained at or close to its existing size. An important consideration going forwards is whether it will be necessary to link W7 & W8 across the major pedestrian path from Shepherd Union to Wildcat Village. W7 will, as part of this plan, lose one of its two driveways, and as a result a link with W8 may be necessary to provide with alternate egress during large Browning Center events.

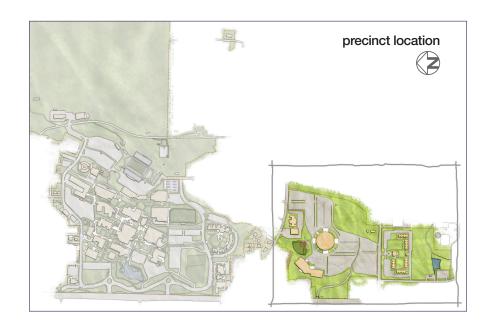
ATHLETICS CLUSTER

A major component of this master plan is the creation of a dedicated "athletics cluster" around the Dee Events Center. This big-picture move creates a considerable number of positive outcomes, as follows:

- Potential expansion of football-activities at Stewart Stadium, enabling the stadium to be much more flexible for football uses in the future (growth, additional amenity, etc.), created primarily through the removal of track and field functions from the stadium.
- Relocation of recreation fields away from the current "Promontory Field" location, enabling the construction of a consolidated residential village closer to the heart of campus.

Broadly speaking, the elements of the Athletics Cluster will be arranged around the Dee Events Center and its parking areas, with some restructuring of the open spaces of the parking areas to facilitate connectivity between the various elements of the athletics cluster.

Essential to the success of the Athletics Cluster is the creation of a strong, safe, well-lit and well-landscaped pedestrian (and potentially also electric vehicle) pathway linking the main campus, residential village, and Dee Events Center. This move alone will radically transform the campus in positive ways, as it will enable both athletics and Dee Events users an improved access path to campus, while allowing the large "parking bank" that exists at Dee Events to function efficiently for its users.





ATHLETICS CLUSTER



Basketball Practice: 2 Courts 36,380 SF Footprint (200 x 190')

Track & Field Lockers 4,500 SF

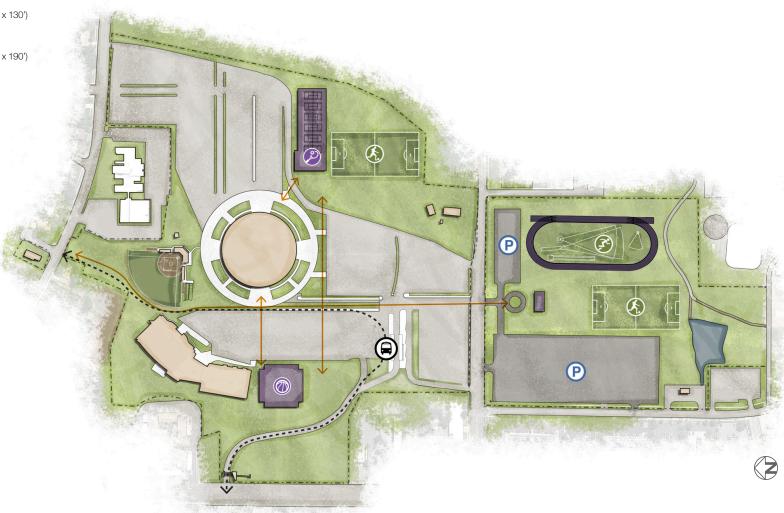
relocation of track & field

playing / practice field

new parking

projected BRT route

pedestrian path



Key features of the Athletics Cluster plan are:

- Connectivity: The creation of dedicated, landscaped pedestrian ways within the existing parking areas of the Dee Events Center. These elements will be essential to protect pedestrians and bicyclists from vehicle movements in the parking lots, and will greatly improve the general environment around the Dee Events Center. Some number of parking spaces will be lost to achieve this, but these will be more than made up with additional parking capacity on the site of the existing University Village when that residential element is relocated the the new residential village. Walkways should clearly and safely link all major elements of the Athletics Cluster, with crossings of roadways rationalized and generally kept to a minimum, at clear intersections. The primary pathway should extend all the way to the site of the current University Village (future track and field location).
- Avondet Property: This land east of Dee Events is projected to be utilized by an indoor tennis facility comprising 6 courts and supporting facilities, as well as a possible full-size playing field (that can be used as a football turf practice field

- when required). Some re-grading at the Avondet Property will be necessary to achieve these aims. The front entry of the tennis facility should have a good relationship to a vehicle drop-off and also to the Dee Events Center overall.
- Existing Football Building and Ice Sheet: There is flexibility in how this large existing building can be utilized in the future. One option is to create a basketball facility within the existing building envelope, with a new indoor football barn (fullsize field) constructed adjacent. Another option is to leave the functionality of the existing building largely as it currently is, and to construct a stand-alone basketball building adjacent. Both options were studied as part of the concept alternatives phase.
- University Village Property: Track and field functions should be relocated to this site when University Village is relocated, along with additional recreation and practice fields as required, and additional parking provision to replace parking lost when Dee Events Center lots are given more structure to improve pedestrian amenity.

ADA STUDY

STUDY OBJECTIVES

Weber State University retained VCBO Architecture to complete an ADA Assessment of the primary campus building on the Ogden Campus. This ADA Assessment and Survey includes an analysis of (19) buildings on the Ogden Campus of Weber State University. This Assessment studied the following accessibility conditions: egress into and out of each building, accessible routes within each building, life safety access through the buildings, accessibility clearances including doors, public space millwork, corridors and hallways, accessibility within restrooms, and access in public spaces, including counters and plumbing fixtures. The study excluded the analysis of the electrical fixture locations, non-public millwork, and non-public plumbing fixtures, all of which are out of the public realm of each building.

The goal of the survey was to identify existing accessibility restrictions that occur within the (19) buildings and provide possible solutions to the noted restrictions. VCBO Architecture was charged to evaluate the facilities against the current State of Utah adopted Accessibility Code and Code Requirements. Since many of the buildings were constructed before the Americans with Disabilities Act (ADA) was signed in to law in 1990, many items that were not restrictions when the buildings were designed and constructed are now considered restrictions based on the current codes of today. This Assessment provides a broad analysis of the buildings and identifies common deficiencies throughout each building.

It would be unrealistic for this Assessment to recommend Weber State University immediately address all of the deficiencies identified in this survey. As noted above, most of the buildings assessed were constructed under older building codes which allowed some of these deficiencies and Weber State University is not required to address some of these pre-existing conditions. However, it is recommended that Weber State University consider systematically addressing the Priority 1 restrictions in each building in a timely manner. Additional information on the ADA Assessment and recommendations can be found in the appendix of this master plan.



WEBER STATE UNIVERSITY INFRASTRUCTURE MASTER **PLANNING ANALYSIS**

OGDEN CAMPUS

Existing Conditions

The Weber State University Ogden Campus is located generally between 36th Street and 4600 South and between Harrison Blvd and Skyline Drive. The 400-acre campus sits along the foothills of the Wasatch Front Range in Ogden City. The site generally slopes aggressively from southwest to northeast. The campus is comprised of 18 academic facilities, 7 housing facilities, 5 athletic facilities, roadways, parking lots, walkways, and support/utility infrastructure. The approximate population of the WSU main campus during the term is 27,000.

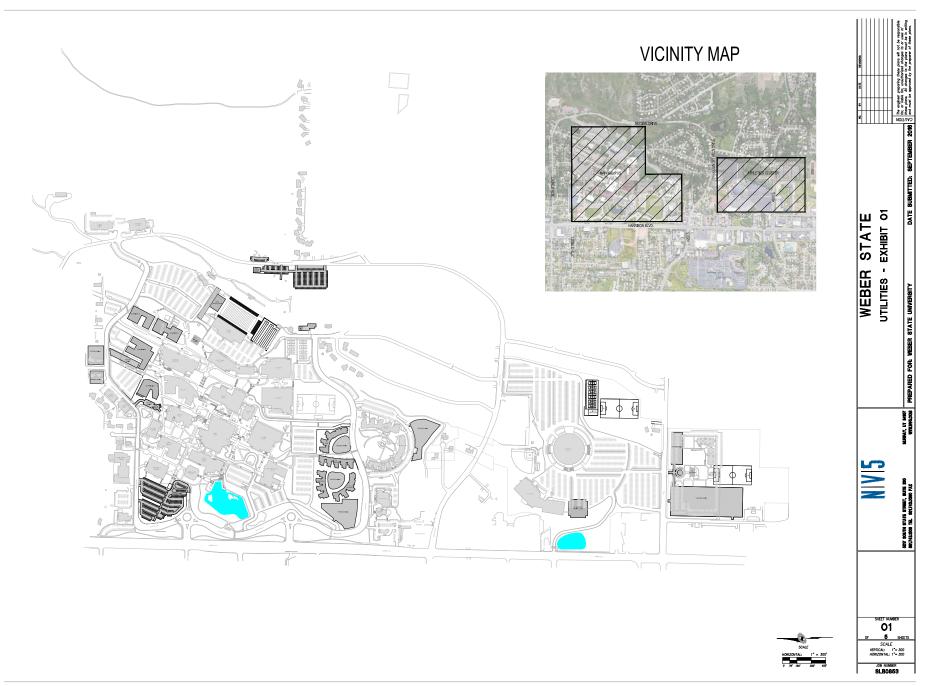
Future Development Plans

The current development master plan calls for various new facilities within the existing campus. These developments are clustered into the following groups:

- Athletics Cluster (AC)
- Football Cluster & Skyline Drive (FC/SD),
- North Gateway, (Parking Expansion Only)
- Residential Village (RV)
- Sciences/Lecture Core (S/LC).

Facility Name	Cluster	Usage Type	Estimated size	
Basketball Practice	AC	Athletic Facility	36,380 Square Feet	
Court				
Indoor Tennis Courts	AC	Athletic Facility	50,150 Square Feet	
Institutional Practice Field	AC	Athletic Facility	TBD	
Track & Field Facility	AC	Athletic Facility	TBD	
Potential Fields	AC	Athletic Facility	TBD	
Football Center	FC/SD	Athletic Facility	45,000 Square Feet	
Institutional Residence	FC/SD	Residential	8,600 Square Feet	
Outdoor Recreation	FC/SD	Commercial/Retail	3,800 Square Feet	
Center				
Stadium Expansion	FC/SD	Athletic Facility	TBD	
Central Residences	RV	Residential	244 Beds	
East Residences	RV	Residential	231 Beds	
Northwest Residences	RV	Residential	191 Beds	
Southwest Residences	RV	Residential	214 Beds	
Building A	S/LC	Academic	67,000 Square Feet	
Building B	S/LC	Academic	137,250 Square Feet	
Building C	S/LC	Academic	106,500 Square Feet	
Building D	S/LC	Academic	TBD	

See attached Exhibit O1 for the map of the planned location of the proposed facilities.



Sanitary Sewer

The Ogden Campus discharges sewer to the 8" Ogden City Sewer lines located in Harrison Blvd. The current records indicate that the majority of mainlines are 8" in diameter. This is the current state minimum for mainlines and is likely sufficient for current development and most planned facilities. All developments in the AC, FC/ SD, and S/LC clusters are close to existing 8" mainlines and are relatively low water use facilities. Therefore, there is little initial concern about the ability to provide sewer service to these facilities.

However, the Residential Village cluster development is planned such that relocation of the existing 8" mainline that service the Wildcat Village will likely be necessary. In addition, the development of approximately 880 new residences on top of the existing approximately 600 units is likely to exceed the capacity of the 8" mainline. That mainline also serves a substantial portion of campus, including Stewart Library, The Wildcat Center, Union Center, Browning Center, Kimball Arts, Student Services, and Administration. Therefore, sewer mainline should be studied from the intersection of 3950 south and Harrison Blvd through the planned Residential Village development prior to design of any new buildings.

The current record drawings for the Ogden campus are incomplete and have conflicting linework in some places. Therefore, some assumptions have been made regarding the actual configuration of the existing sewer network. Sewer basins have been drawn on Exhibit O2. All assumptions regarding the identification of the basins have been labeled on the Exhibit.

It is currently unclear from the campus records how the Institutional Residence facility will be sewered. It is assumed that there is a nearby mainline with an existing lateral to the facility that can be used in the future.

See Exhibit O2 for mapping of the existing sewer collection system and planned infrastructure.



Storm Drain

The WSU Ogden campus collect stormwater into a dense network of pipelines throughout campus. Stormwater runoff is collected and conveyed generally northwest toward Ogden City mainlines in Harrison Blvd. Most pipelines in the campus records do not have an identification of pipe size, however, pipes are labeled as small as 6" and as large as 30" in diameter.

The current record drawings for the Ogden campus are incomplete and have conflicting linework in some areas. Therefore, some assumptions have been made regarding the actual configuration of the existing storm drain network. Drainage basins have been drawn on Exhibit O3. All assumptions regarding the identification of the basins have been labeled on the Exhibit.

Approximately 7 primary drainage basins have been identified based on the current campus record drawings. Those basins include 4 primary basins on the portion of campus north of Country Hills Dr. There is a small north western most drainage basin discharges directly to Harrison Blvd. via a 36" trunkline from the area west of the Social Science Building. That basin is approximately 13 acres and appears to have no detention throughout the basin. The remaining major basins account for approximately 212 acres and they drain to the Duck Pond on campus.

The Duck Pond is utilized for detention during minor storm events. The pond is a wet detention pond; therefore, it has water in it at all times. During storm events runoff fills the pond beyond the normal water line. The pond fills until it reaches an outlet structure on the west side of the pond then water is discharged from the pond into the storm drain trunkline in Harrison Blvd. through the outlet structure. Anecdotal evidence from campus maintenance staff indicates that the duck pond fills to the point that it discharges through the outlet structure 1-2 times per year on average. Maintenance staff have indicated that there is not orifice or other flow limiting feature on the outlet structure. Therefore, it is assumed that there is no detention capacity above the pond outlet. Detailed records for the storage volume of the pond are not available. However, it is estimated from aerial imagery that the pond it approximately

3.4 acres in surface area and 4 feet between the outlet structure and the normal water elevation. Therefore, the pond is estimated to store approximately 14 acre feet.

All existing campus south of Country Hill Drive has been divided into three additional drainage basins. The north portion of the Dee Events Center parking lot appears to discharge to a trunkline in Country Hills Drive. Campus records are unclear about the location of the trunkline, however, it is assumed to extend east into Harrison Blvd. There is no evidence of detention for this drainage basin.

The Dee Events Center, Marquardt Field House, surrounding parking, and future developments are included in the second drainage basin. This basin drains through 12' and 15" trunklines to a detention pond at the west side of campus near Harrison Blvd. The outlet structure configuration of this Athletic Pond is unknown, however, it is understood that this pond discharges to a pipeline that parallels Harrison Blvd and ultimately discharges to the Duck Pond. The Athletics Pond is estimated to have a storage capacity of 1.3 acre-feet based on existing topography.

The southernmost basin on the Ogden campus includes University Village. This drainage basin discharges to 4600 South. The is no apparent detention in this basin. Records are unclear about the trunkline in 4600 South. It appears to extend to the west based on existing topography. However, at Harrison Blvd it is unclear whether this line connects to the Ogden City trunkline or turns north paralleling Harrison Blvd and discharging to the Athletic Pond.

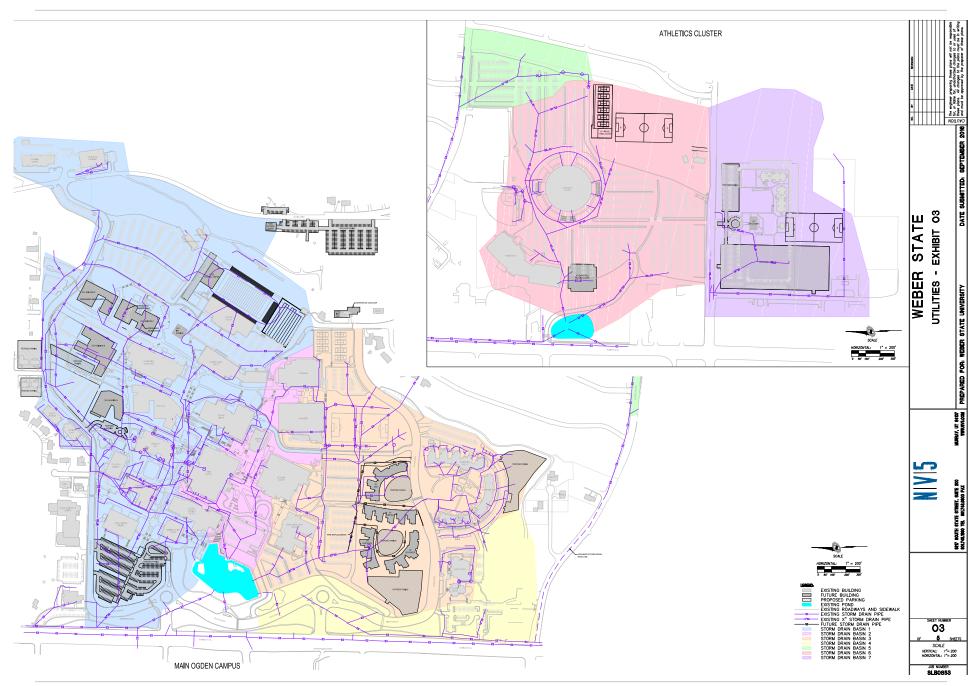
Current Ogden City development guidelines require detention of the 25-year 24-hour storm event to a discharge rate of 0.2 cubic feet per second per acre. State owned facilities are not required to design to local ordinances or guidelines. However, since offsite stormwater discharge will be to Ogden City facilities it is highly recommended to accommodate their design requirements as a minimum. More progressive stormwater management techniques are recommended to provide low impact developments.

The currently planned developments throughout campus add relatively little additional impervious area to their respective drainage basis. The is because most of the planned developments replace existing impervious areas such as parking lots of existing buildings. The result of this is that the existing conveyance system on campus is unlikely to change its current level of performance dramatically due to future development. There is not enough information in the current campus records to identify the amount of capacity in the existing system, however, the currently planned developments are unlikely to require substantial additional capacity unless the existing system is already above capacity. Therefore, from a conveyance perspective most new developments will simply provide laterals to the nearby existing systems. Most new facilities are in locations where storm drain connections are convenience and inexpensive.

The developments that will cause substantial additional stormwater runoff include the Residential Village, Indoor Tennis, the North Gateway Parking Lot, and the Outdoor Center with its parking lot. These developments will require the development of additional storage to use the existing trunklines or possibly improvements to develop additional capacity in the existing trunklines. In addition, the Residential Village is located such that an existing 21" trunkline will need to be re-routed.

In general, the campus does not have enough stormwater storage. Three of the seven drainage basins do not appear to have any detention. The other four basins are directed to the Athletics Pond or the Duck Pond, both of which appear to be insufficient to manage 10 year or 100 year events. Therefore, it is recommended that all new facilities provide stormwater storage to develop additional storage throughout campus. If storage is provided with all new developments it is unlikely that pipelines will need to be replaced unless they are currently significantly above capacity.

See Exhibit O3 for mapping of the existing storm drain collection system, detention/ retention system and planned infrastructure.



Culinary Water

The Ogden Campus receives water service primarily from Ogden City. Water service for the Ogden campus enters Campus through Ogden City Water Mainline connections exist at Harrison Blvd, on the west, Edvalson St, at the north side of campus and Taylor Ave at the south side of the main campus. The network of Ogden City pipes throughout the campus appears to loop in several locations.

Water Services are provided to the Athletics Cluster through an Ogden City Water mainline connection at Country Hills Drive, 4600 South, and Old Post Road. Looping in the Athletics Cluster appears to be sufficient.

There are some South Ogden City mainlines that run through campus however it appears that the South Ogden City Mainline do not provide any service connections. An existing 5.0-million-gallon tank is located on the hillside northeast of campus which is fed by water from South Ogden City. The tank is used to provide water to South Ogden City, not Weber State University. There are no services connection or hydrants on campus that are served by South Ogden City mainlines.

Mainlines should be a minimum of 8", however in most places the existing linework does not identify sizes.

The currently planned developments throughout campus add approximately 310,000 square feet of academic facilities, 145,000 square feet of indoor athletic facilities, and 880 beds. Most of these developments are in locations that are convenient for connections to the existing culinary water pipe network. Most developments require minor service lateral additional to connect to the existing network. Some of the planned developments replace existing facilities. Therefore, there is some offsetting reduction of existing demands associated with some developments, however it is assumed that all developments will result in net additional demand on the culinary water system. The existing and future demands should be thoroughly reviewed and modeled against the capacity of the existing network of pipelines. There is not enough information in the current campus records to identify the amount of capacity in the existing system. However, there are several trunklines where future development is likely to require modifications to the existing pipe network. Those locations include the Science & Lecture Core, and the Residential Village.

The additional square footage associated with the Science & Lecture Core is substantial, however, the water use characteristics is relative low and there is some existing demand that will be removed in this area. Therefore, the peak day demands are unlikely to require additional mainline capacity. However, due to the overall size of the largest proposed building it is likely that fire flow protection will be approximately 4,000 GPM assuming Type 1A or 1B construction. With the additional of peak day demands, the will probably require a 14" mainline. The closest mainline with size data shows a 12" mainline just east of the Science & Lecture Core. Therefore, it is possible that 14" mainlines are nearby. Additional data gathering is necessary to identify pipeline diameters conclusively.

The planned Residential Village development is located such that one to two existing mainlines will need to be relocated. In addition, the only pipeline diameter that is identified in campus records shows a 6" diameter mainline. This mainline is insufficient supply fire hydrants per current state rules. It is also unlikely that the current waterlines in the area have capacity to provide flow for 880 new beds in addition to the existing approximately 600 beds. Therefore, it is anticipated that mainline improvements will be necessary upon development of the Residential Village.

The developments in the North Gateway, Athletics Cluster, and Football Center & Skyline Drive Cluster are not anticipated to require additional mainline capacity, do to insignificant building sizes, robust existing networks nearby, or removal of existing demand overall.

Water pressure on campus is a particular challenge. Recent fire hydrant testing has shown static pressure readings of 135 psi at approximate elevation 4640 feet near the Northwest corner of the Student Services Building. Typical culinary water pressure zones range from 50-100 psi. It is understood that there are no mainline PRV stations on campus. Therefore, the campus currently has a single pressure zone. Based on existing topography the lowest service in the system is at the Public Safety Building at an elevation of 4590 feet. This corresponds to a static pressure of 157 psi. The highest existing service in the main campus is Annex 9 at an approximate elevation of 4765 feet. This corresponds to a static pressure of 80 psi. It is possible to split campus into two, upper and lower, pressure zones. This could be achieved by placing mainline PRV stations throughout campus and potentially

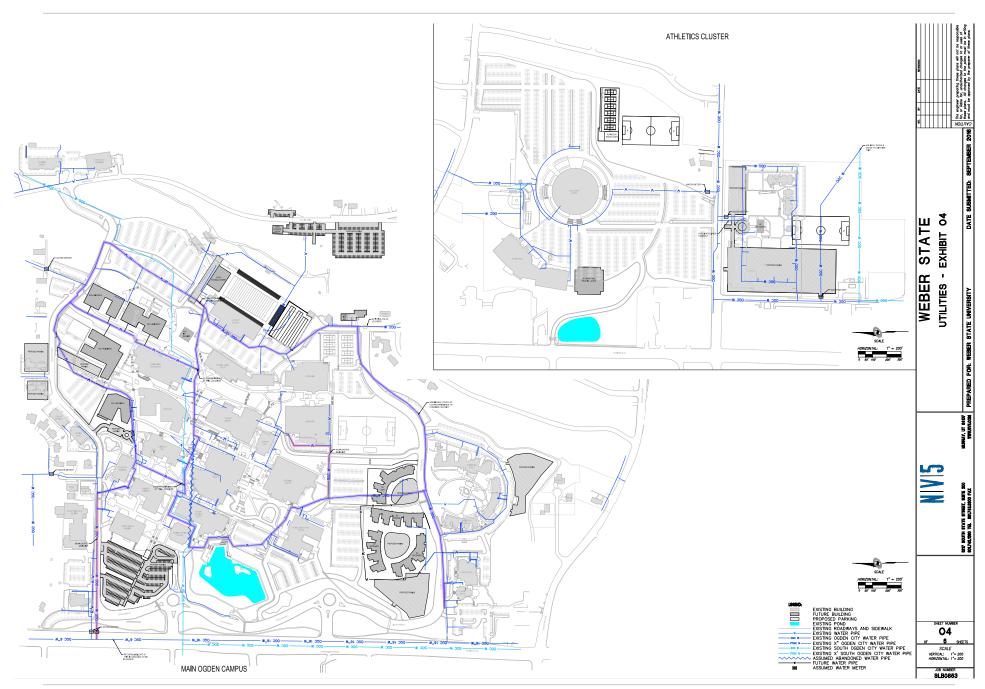
at connection points at Harrison Blvd. This conversion will help reduce problems with pipeline breaks and operation issues associated with high pressure system. However, this will be a major modification to the campus system overall. Modification of this nature should be modeled thoroughly considering existing and future delivery pressures of each facility and fire flow requirements throughout campus.

The future Outdoor Center may have problems with the pressure due to its elevation if served from the WSU campus pipe network. This facility is anticipated to be at 4860 feet elevation. This corresponds to a pressure of approximately 40 pounds per square inch (PSI) in the WSU mainlines. State minimum pressure is 40 PSI, however, a minimum of 50 PSI is preferred. The Outdoor Center will probably need to get culinary water service from mainlines that service the residential lots along skyline drive.

The campus record drawing appears to indicate that the mainline system is looped in several places, however it is perfectly clear. Mainline looping is critical to the water system for the purposes of redundancy and hydraulic efficiency. The attached Exhibit O4 indicates locations where mainline looping connections should be verified. If these locations do not actually interconnect I recommend completion of these looping connections.

Existing campus records to not identify campus main meter locations. However, anticipated main meter locations have been identified near campus connection point in Harrison Blvd, Edvalson St., Taylor Ave., Country Hills Dr., 4600 South, and Old Post Rd. These primary connection points should be confirmed and meter data should be assessed in the development of hydraulic modeling to help understand culinary water use throughout the year. It appears that approximately 9 master meters should be needed to record all identified campus connections. This excludes outlying parcels that are likely metered individually. It is recommended that WSU sub-meter all facilities to better understand water use of each facility throughout campus.

See Exhibit O4 for mapping of the existing culinary water system and planned infrastructure.



Secondary Water

Secondary Water service is provided to WSU through Pineview Water Company. The majority of the main Ogden Campus is located within the South Ogden Conservation District. See Exhibit O5.1 for a map of the existing district. A canal owned by Pineview Water Company extends through the east side of campus, just west of Stewart Stadium. The canal is a buried pipeline in most places, however, there is a 30' easement centered along the centerline of the canal. WSU draws secondary water from the canal at a pump station that is located between The Old Science Lab Building and Stewart Stadium. It is understood that secondary water is then pumped from that location to a storage tank above Skyline Parkway. The storage tank is understood to be 500,000 gallons and is at an approximate elevation of 5010 feet. Most of the campus is irrigated from the secondary water storage tank above Skyline Parkway. There is also a Weber Basin Water Connection in Harrison Blvd. It appears that most of the west side of campus is served by Weber Basin Water. In addition, Stormwater runoff and groundwater seepage that is collection in the Duck Pond is also pumped up campus and is used to too set secondary water demands.

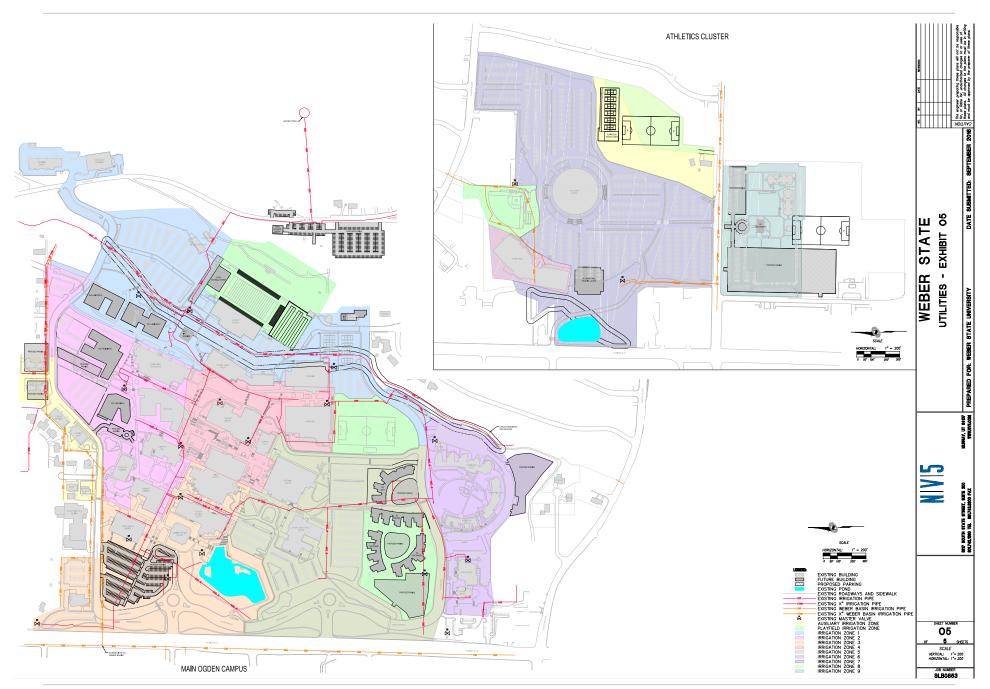
The secondary water system that is supplied by Pineview Water is pressurized by the tank above campus. It is understood that the campus secondary water mainlines do not have pressure reducing valves (PRVs) anywhere. Therefore, the secondary water system is also one single pressure zone. This results in extremely high pressures at the bottom of campus. Preliminary calculations anticipate pressures in excess of 170 psi at the bottom of campus. It is assumed that the majority of lower campus is supplied by Weber Basin Water's secondary water system or some pressure reducing features at the distribution system master valves is being used to manage the high pressures. Otherwise line breaks and sprinkler head breaks would be unmanageable at the low elevations of campus.

WSU does not currently have accurate mapping of secondary water mainline and service zones. It is recommended that a map is created to show mainlines, source connection points, pump stations, sprinkler system master valves and their corresponding distribution areas.

Improvements and system modifications due to future planned developments are anticipated to be sprinkler system design and mainline rerouting incidental to the design of each facility. Development of additional capacity is not anticipated since most developments reduce irrigation demands by replacing existing play fields or have no impact by replacing existing buildings or parking lots. The developments in the Athletics Cluster is an exception. New play fields are anticipated and new irrigation demands associated with that. The Athletics Cluster receives secondary water from Weber Basin Water. The mainlines feeding the athletics cluster should be assessed prior to development of new fields so that capacity can be confirmed.

Currently irrigation supply is the only use of the secondary water systems. It is recommended that WSU consider additional uses of the secondary water supply to offset current and future culinary water demands. The existing system may easily be converted to provide water for flushing toilets, supply for water features, or cooling tower water. Coordination with water suppliers may be necessary to identify permissible uses.

See Exhibit O5 for mapping of current information for the existing secondary water system.



OGDEN CAMPUS RECOMMENDATIONS

- Sanitary Sewer
 - Develop a hydraulic model for the existing and future campus infrastructure
 - Develop a database with all pipeline sizes, materials, installation dates, manhole locations, invert elevations, etc.
- Storm Drain
 - Develop hydraulic model of existing detention ponds, conveyance system, and future campus infrastructure.
 - Develop a database with all pipeline sizes, materials, installation dates, manhole locations, invert elevations, etc.
 - Create campus design requirements
 - Develop a plan to provide additional detention throughout campus
 - Develop a plan to address current retention requirements.
- Culinary Water
 - Develop a hydraulic model for the existing and future campus infrastructure
 - Develop a database with all pipeline sizes, materials, installations dates,
 - Loop existing mainlines where redundancy is needed
 - Study and consider splitting the campus into two pressure zone
 - Create campus design requirements

Secondary Water

- Develop complete mapping of existing secondary water mainlines, source connection points, pump stations, sprinkler system master valves, and corresponding distribution areas.
- Develop an irrigation plan and hydraulic model for the campus.
- Identify additional uses for secondary water



IN-DEPTH STORMWATER ANALYSIS

Overview

Talisman Civil Consultants (TCC, formerly NV5 Salt Lake) was tasked by Weber State University to conduct research, produce a hydraulic model and analysis of storm drain and sanitary sewer conveyance and capacities for the Ogden campus and the Davis campus.

Goals

Goals for this study include:

- 1. Obtain information on how existing storm water system for both Ogden and Davis perform in 1, 2, 5, 10, 25, 50, and 100 year storms using hydraulic modeling software.
- 2. Obtain information on how existing sanitary sewer system for the Ogden campus performs under existing conditions.
- 3. Implement future masterplan development to models and observe how future developments affect storm drain & sanitary sewer networks.
- 4. Assess areas in the models that are overcapacity
- 5. Provide recommendations that effectively mitigate over capacitated lines for existing conditions and future development. There are several analyses which are important with respect to the overall functionality of existing storm/sewer infrastructure. The information that has been identified as important for this study is as follows:

- An analysis of the capacity of the existing and future storm system with respect to the 10 year, 24-hour storm event.
- An analysis on the WSU duck pond to see if the pond will overflow during a major storm event, and identify if there is sufficient storage volume and an acceptable discharge rate from the WSU Duck Pond.
- Off-campus catchment areas contributing to storm system inflow.
- An analysis of the volumes and flow rates entering and leaving the system including:
 - Existing system volumes and flow rates compared to future-development volumes and flow rates.
- An analysis of the capacity of the existing and future sanitary sewer system with respect to the WSU master plan.

Findings

Storm Drain

Keeping future development of the Weber State master plan in mind, TCC recommends the following changes to storm drain lines to ensure that the Ogden and Davis campuses storm drain systems will adequately handle at least a 10-year storm with respect to current and future infrastructure.

Table 1 – Ogden Campus Recommended Pipe Diameters

Recommended Pipe Diameters					
Pipe ID	Current Pipe Diameter (in)	Recommended Pipe Diameter (in)	Length (ft)	Location	
862	24	36	465	Between the Social Science Building and Wattis Business Building	
766	18	30	280	Quad Field	
1090	24	42	51	Parking Lot A-10	
1018	24	42	267	Parking Lot A-10	
1016	24	42	63	Parking Lot A-10	
1014	24	42	178	Parking Lot A-10	

There are no outstanding problems or concerns with the Ogden Campus sanitary sewer system with respect to its capacity to service current or future flow. Because of this, the relative age of the pipe becomes the primary concern. TCC recommends replacing the following oldest pipes in the network first:

- Replace 1,400' of the approximately 70-year-old trunk line that runs underneath the W-5 Parking lot and north eastern stretch of Evalson Street that services the north-east part of campus.
- Replace 1,500' of the approximately 70-year-old trunk line running along Village Drive north of the Wildcat Village servicing south campus.
- Upsize 850' of the approximately 70-year-old trunk line servicing outflow to O-3 from central/south campus from an 8" to 10" line. This line is modeled at 60% maximum capacity for an 8" line for future development. Upgrading this line to 10" will result in a max service capacity of less than 50%
- Replace 1900' of the approximately 70-year-old trunk line under Edvalson servicing outflow to O-2 from north campus.

Additional information on the storm drain and sanitary sewer assessment and recommendations can be found in the appendix of this master plan.

TRAFFIC IMPACT ANALYSIS

Purpose

The purpose of this study is to provide a summary of the potential traffic-related impacts from the proposed closure of the Edvalson St./Birch Ave. intersection, located directly to north of the Weber State campus, in Ogden Utah. Utah. This intersection is proposed to be closed in coordination with the construction of two new student parking lots.

This study analyzes the traffic operations and impacts for existing 2016 conditions and future 2021 conditions at key intersections, described below in the Scope section.

The future 2021 conditions were analyzed for both redistributed trips and a sensitivity analysis that relocated all vehicles displaced by the closure of the Edvalson St./Birch Ave. to the adjacent Edvalson St./Skyline Dr. intersection. The two 2021 scenarios were also analyzed with the Edvalson St./Skyline Dr. intersection redesigned as a single lane roundabout.

Scope

This study analyzed the traffic impacts of the project in conjunction with adjacent intersections. Impacts are specifically addressed at the following study intersections:

- Edvalson St./Birch Ave. (2016)
- Edvalson St/ Skyline Dr. (2016 and 2021)

Conclusion

All study intersections operate at acceptable LOS under the existing conditions. For future 2021 conditions the Edvalson St./Skyline Dr. intersection operates at an acceptable LOS. For the future 2021 sensitivity analysis conditions the Edvalson St./ Skyline Dr. intersection operates at an acceptable LOS for the PM period and an unacceptable LOS for the AM period. As described, the sensitivity analysis represents a "worst case" scenario. Although a roundabout is not required for acceptable traffic operations, it is an intersection control alternative that increases the capacity of the Edvalson St./Skyline Dr. over the existing two-way stop control.

Although the Edvalson St./Skyline Dr. intersection operates at an acceptable LOS after the closure of the Edvalson St./Birch Ave. intersection and the addition of new parking lots, there are other potentially negative impacts. Birch Ave. is the only connection to 36th St. before Skyline Dr. and closing it as an access could discourage pedestrians and cyclists. As such, if this roadway is closed to vehicular traffic, a pedestrian and bicycle path should continue through the parking area to encourage alternative modes of transportation. Additionally, a gate to enable egress from the lot during large campus events should be considered to enable improved traffic flow should be considered.

Additional information on the Traffic Impact Analysis and recommendations can be found in the appendix of this master plan.

MECHANICAL

- With minor capital improvements, the existing campus chilled water distribution system can be converted to a condenser water distribution system.
- Based on the predicted thermal performance of subsurface conditions, there is adequate space on the campus to install ground-coupled heat exchangers that can serve all thermal needs. Actual results from the first project, which will become operational in the fall of 2016, will inform this conclusion.
- It is not cost-effective to extend the condenser loop to the south, beyond the current Wildcat Village. If the Dee Event Center and adjoining projects become condenser loop projects, then an independent loop should be installed

PROJECT OBJECTIVES

Weber State University has made a campus goal of eliminating fossil fuel consumption and meeting all electric needs from renewable sources. One component of the strategy is to convert all campus buildings from traditional steam and chilled water to water-source VRF or heat pump, or water-source heat pump chillers. The thermal source and sink for the water-source equipment is the campus chilled water loop, and as fewer buildings require cold chilled water and more can use relatively warmer condenser water, the campus chillers can be de-commissioned.

As the campus moves from chilled water to condenser water, there are also plans to add multiple ground-coupled loops to the chilled water system. Initially, the loops will pre-cool the return chilled water in the summer and pre-heat the loop in the winter, but eventually they will serve as the primary heat source/sink for the campus. The existing cooling towers will remain to reject excess heat not handled by the ground loops.

The questions to be answered by this study are:

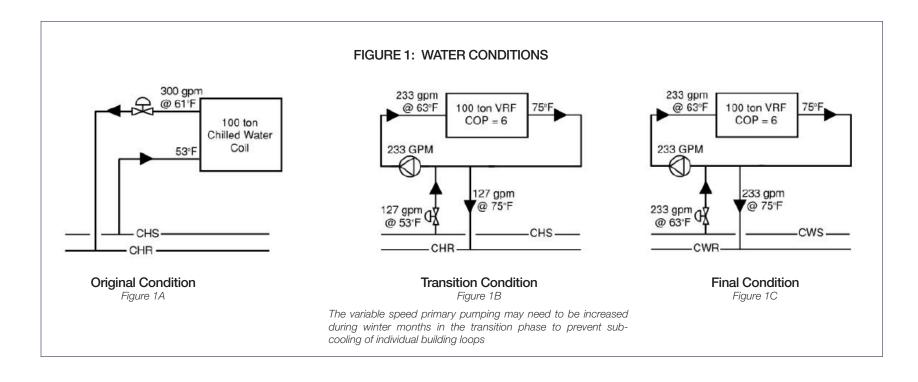
- Can the campus chilled water distribution system transition to a condenser water distribution system, able to accommodate simultaneous chilled and condenser water demands, and provide the required heating capacity as well? If not, can the deficiencies be corrected with capital improvements, and if so, what are the required improvements, and when should they occur?
- Is the existing campus distribution system adequate for the future growth of the campus?
- Should growth at the southern end of the campus be accommodated with the current distribution system, or should there be a separate system?
- Is there adequate space on campus for enough ground-coupled bore fields to accommodate future heating and cooling demands without using fossil fuels or central chillers?
- Can the campus be broken into sub-zones so that if there is a failure or shutdown at some point in the system, the entire campus is not affected?

FXISTING CONDITIONS

The campus chilled water system originally operated from mid-April to mid-October from a single central plant at the northeast edge of the campus. Variable speed centrifugal chillers operate to maintain a constant chilled water supply temperature of 53.

Distribution is through piping that is either direct-buried or in a tunnel, and the current distribution system is adequate. Pumping is variable speed primary-only, with a modulating bypass to maintain minimum chiller flow. Buildings are directly served by the chilled water system, and are not separated by heat exchangers. Control valves at the air handlers are generally two-way modulating (Figure 1a).

Two buildings have been converted to water-source VRF, and three will be converted soon. All of these buildings use an injection system to mix the chilled water temperature up to a warmer temperature suitable for VRF condensing units (Figure 1b). Before conversion, the chilled water temperature rise was approximately 8 - 10 degrees (from 53 to 61 - 63), but because of the injection system, the temperature rise at the building is closer to 22 degrees (from 53 to 75). As a result, the building chilled flow rates are lower than they originally were. When the campus converts entirely to condenser water, the required flow rate will increase again, but the condenser flow rates will be lower than the original chilled water flow rates overall (Figure 1c).



The buildings that have been converted to VRF also use the chilled water loop as a heat source, which requires the chilled water system to operate year-round. In this condition, the chillers are bypassed and the variable speed pumps are able to operate at minimum speed to accomplish the required flow. Although the chilled water loop is being cooled by the VRF systems extracting heat from it, by circulating in relatively hot steam tunnels, the chilled water loop has not needed an explicit source of heat.

Tracy Hall represents a new load that operates differently than the other buildings. As a laboratory building it has high and continuous ventilation loads. In the heating mode, heat pump chillers in the building cool campus chilled water from 53 to 42, and inject the chilled water into the return side of the distribution loop, while using the chiller condenser heat as the heat source for the building. In the cooling mode, the primary source of cooling is heat recovery coupled with indirect and direct evaporative cooling, with the small remaining chilled water demand met from the campus system. In this scenario, the chillers are left off in the summer, and only operated in cooler weather. However, the magnitude of the heating load requires supplemental heat be added to the chilled water loop, to raise the temperature from 42 up to 53. It is anticipated that the first ground loop will provide some of this heating, and the balance will be met with new condensing boilers at the central plant. As more ground loop capacity comes on line, it is anticipated that all winter warming of the loop will be from the ground loops and the boilers will no longer be required.

MODELING RESULTS

The flow characteristics of the campus were modeled using AFT Fathom, a fluid dynamic simulation program that calculates pressure drop and flow distribution in piping systems. The flow requirements for each building were estimated from existing drawings and site surveys, and a piping network that incorporated the distribution pipe size and length was developed. The system as it currently operates was modeled to verify the validity of the model, and then expanded to include future buildings and ground loops.

Future ground loops were modeled based on the preliminary information available from the first ground loop project. The ground loops were modeled with separate pumps that serve the ground loop and provide motive force to the central distribution system.

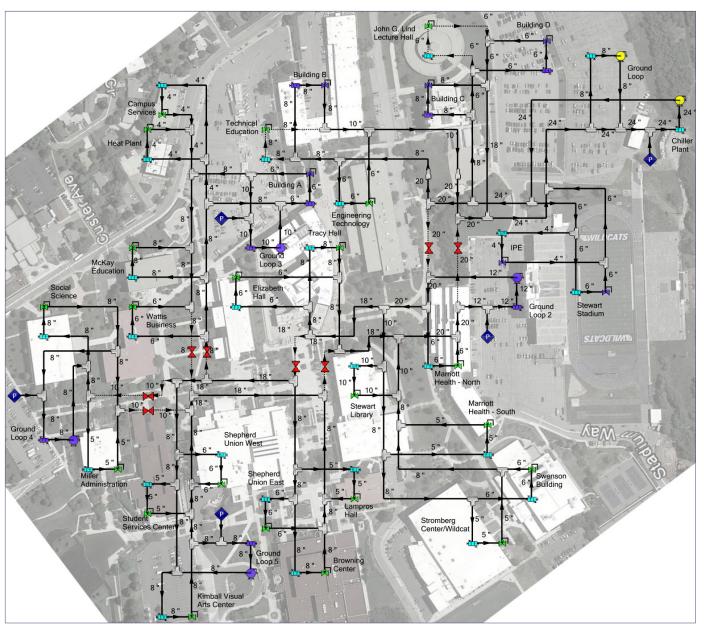
Future buildings were modeled based on the footprint approximations and scaled proportionately to similar existing buildings.

Subzones (five total) of the Ogden campus were developed by matching estimated building loads with adjacent ground loop surface area. These subzones utilize isolation valves for separation from other zones during maintenance or emergency circumstances and can prevent a complete campus shutdown. Each subzone will be served by their own dedicated ground loop.

CAPITAL IMPROVEMENTS

project	description	time	budget
Ground Loop 1	Chiller Plant: 160,000 sf surface, 1,500 gpm, 210 boreholes @ 275' each	In progress	
Ground Loop 4	Miller Administration: 75,000 sf surface, 700 gpm, 100 boreholes @ 275' each 1 pair 10" isolation valves	Next ground loop, refine with results of first loop. Coordinate with Social Science remodel.	100 holes @ 275 ft/hole @ \$18/ft \$ 495,000 Pumps/isolation valves 75,000 Contingency (~10%) 55,000 Total \$ 625,000
Ground Loop 2	Stewart Stadium: 280,000 sf surface, 2,600 gpm, 370 boreholes @ 275' each 1 pair each 18" and 20" isolation valves	Four of the seven buildings on this zone are transitioned, or will be within 5 years. Coordinate with resurfacing of Stewart parking lot	370 holes @ 275 ft/hole @ \$18/ft 1,831,500 Pumps/isolation valves 200,000 Contingency (~10%) 208,500 Total \$ 2,240,000
Ground Loop 3	Heat Plant/Building A: 140,000 sf surface, 1,300 gpm, 185 boreholes @ 275' each 1 pair 8" isolation valves Replace approximately 420 ft run (840 ft total) of 4" CHW with 8" CW	Companion to Building A project	185 holes @ 275 ft/hole @ \$18/ft 915,750 Pumps/isolation valves 65,000 840' 8" HDPE CW pipe @ \$55/ft 46,200 Contingency (~10%) 103,500 Total \$1,130,000
Housing Expansion/ Ground Loop 6	Ground Loop: 90,000 sf surface, 800 gpm, 120 boreholes @ 275' each 1 pair 10" isolation valves Housing/Expansion: Replace approximately 840 ft run (1,680 ft total) of 8" CHW with 10" CW	In order to connect central campus to housing. The piping associated with housing should be included in the housing project, and is not included here.	120 holes @ 275 ft/hole @ \$18/ft 594,000 Pumps/isolation valves 75,000 1,680' 10" HDPE CW pipe @ \$65/ft 109,200 Contingency (10%) 71,800 Total \$ 850,000
Ground Loop 5	Kimball Center: 150,000 sf surface, 1,400 gpm, 200 boreholes @ 275' each 1 pair 8" isolation valves	All the buildings on this loop are longer-term transition projects, so the loop can be long term as well	200 holes @ 275 ft/hole @ \$18/ft 990,000 Pumps/isolation valves 65,000 Contingency (10%) 105,000 Total \$1,160,000

FATHOM MODEL SCHEMATIC



pump

control valve
heat exchanger

isolation valve

PHASES, GROUND LOOP SIZES AND BUILDINGS SERVED

Phasing

Phase	Buildings on VRF		Building Tie-ins	GL Tie-ins
Base	Science Lab	P	Building C	GL 2
	Marriott Health - North	Phase		
	Stewart Library	Ğ.		
	Tracy Hall			
	Miller Administration			
	Miller Administration			
	Campus Services			
	IPE Building			
Short-term	Jon G. Lind Lecture Hall		Building D	
	Stewart Stadium			GL 2
	Marriott Health - South			
	Social Science			GL 4
Mid-term	Technical Education	P	Building B	
	Engineering Technology	Phase		
	Lampros Hall	Ø 22		
	Student Services Center	'		GL 5
	McKay Education		Building A	GL 3
	Heat Plant			
Long-term	Swenson Building	P		
	Stromberg Center/Wildcat	Phase		
	Elizabeth Hall	Ö		
	Browning Center			
	Shepherd Union East			
	Shepherd Union West			
	Kimball Visual Arts Center			GL 5

Ground Loop Sizes

Ground Loop #	Location	Area (SF)	Flow (GPM)	Pipe Size (in)	# Bores	Eq. Length (ft)
1	Chiller Plant	160000	1500	8	210	119720
2	Stewart Stadium	280000	2625	10	370	210920
3	Heat Plant/Building A	140000	1315	8	185	105470
4	Miller Addition	75000	705	6	100	57020
5	Kimball Center	150000	1405	8	195	111170

Bore Depth	275	ft
Bore Spacing	20	ft

Ruildings Served

Buildings Served		
Ground Loop	Buildings	Flow
1 - Chiller Plant		1500
	Stewart Stadium	25
	Building C	350
	Building D	265
	Building B	455
	Engineering Technology	150
	IPE	45
		1290
2 - Stadium		2625
	NA	050

2 - Stadium		2625
	Marriott Health - North	350
	Marriott Health - South	270
	Stewart Library	395
	Swenson Building	220
	Stromberg Center/Wild-	250
	cat	
	Tracy Hall	240
	Elizabeth Hall	385
		2110

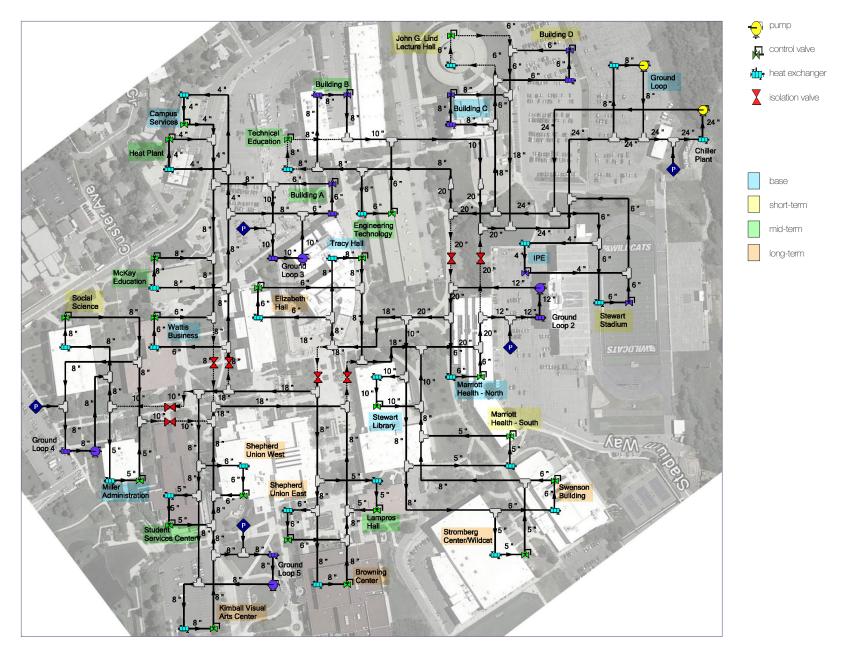
3 - Building A		1315
	Wattis Business	285
	McKay Education	340
	Building A	225
	Heat Plant	30
	Campus Services	95
		975

		510
4 - Miller Admin		705
	Miller Administration	170
	Social Science	330
		500

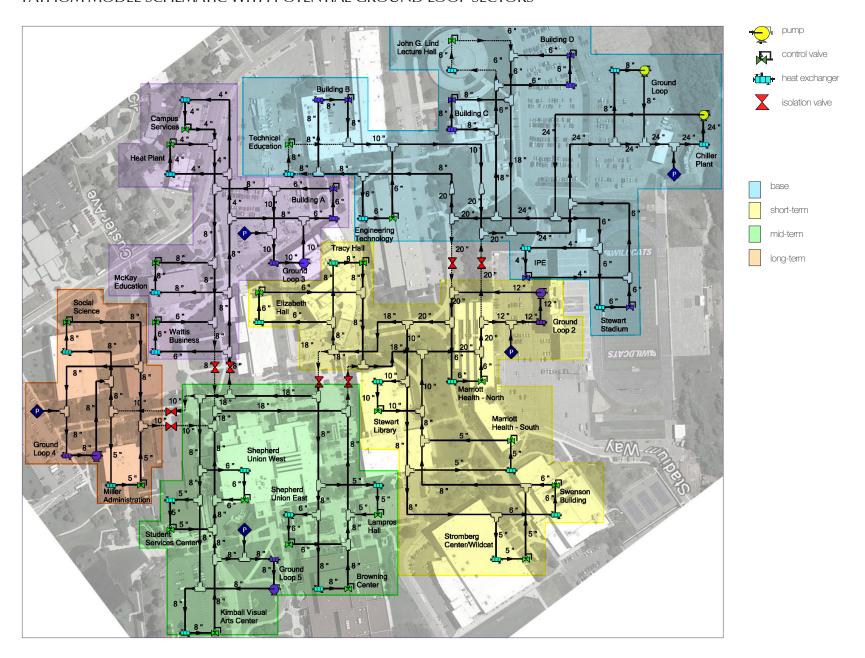
5 - Kimball Center		1405
	Shepherd Union - West	175
	Student Services Center	185
	Kimball Visual Arts	250
	Center	
	Lampros Hall	45
	Shepherd Union - East	180
	Browning Center	280
		755

755

FATHOM MODEL SCHEMATIC WITH VRF PHASING INTO BUILDINGS



FATHOM MODEL SCHEMATIC WITH POTENTIAL GROUND LOOP SECTORS



Phase 1: Building Flows

Building Name	Timeline	Pipe Size (In)	Flow (GPM)	K Factor
Chiller Plant	-	24	4275	6
Jon G. Lind Lecture Hall	2	6	100	1512
Science Lab	Demo	8	-	-
Stewart Stadium	5		15	2
Technical Education	5-10	8	295	133
Engineering Technology	5-10	6	150	453
Marriott Health - North		6	175	739
Marriott Health - South	5	5	135	303
Stewart Library	Now	10	200	1965
Swenson Building	20	6	220	155
Stromberg Center/Wildcat	20	5	250	63
Tracy Hall	Done	8	120	1392
Elizabeth Hall	20	6	385	43
Lampros Hall	10	5	45	2996
Browning Center	20	8	280	128
Shepherd Union East	20	6	180	39
Shepherd Union West	20	6	175	55
Student Services Center	7	5	185	27
Kimball Visual Arts Center	15	8	250	91
Miller Administration	Done	5	85	1248
Social Science	2	8	165	1230
Wattis Business	Now	6	140	1529
McKay Education	10	8	340	295
Heat Plant	5-10	4	30	2070
Campus Services	Done		45	736
Building A	5	6	110	413
	Sum of Bu	ilding Flow	4075	

Phase	Buildings on VRF	
Base	Marriott Health - North	
	Stewart Library	
	Tracy Hall	
	Miller Administration	_
	Wattis Business	hase
	Campus Services	se
Short-term	Jon G. Lind Lecture Hall	_
	Stewart Stadium	
	Marriott Health - South	
	Social Science	
Mid-term	Technical Education	
	Engineering Technology	_
	Lampros Hall	hase
	Student Services Center	se (
	McKay Education	10
	Heat Plant	
Long-term	Swenson Building	
	Stromberg Center/Wildcat	
	Elizabeth Hall	P
	Browning Center	Phase 3
	Shepherd Union East	ဒိ
	Shepherd Union West	
	Kimball Visual Arts Center	

Phase 2: Building Flows

Building Name	Timeline	Pipe Size (In)	Flow (GPM)	K Factor		
Chiller Plant	-	24	4275	6		
Jon G. Lind Lecture Hall	2	6	100	1512		
Science Lab	Demo	8	-	-		
Stewart Stadium	5	4	15	2		
Technical Education	5-10	8	145	533		
Engineering Technology	5-10	6	75	1813		
Marriott Health - North	1	6	175	739		
Marriott Health - South	5	5	135	303		
Stewart Library	Now	10	200	12264		
Swenson Building	20	6	220	155		
Stromberg Center/Wildcat	20	5	250	63		
Tracy Hall	Done	8	120	1392		
Elizabeth Hall	20	6	385	43		
Lampros Hall	10	5	20	11984		
Browning Center	20	8	280	128		
Shepherd Union East	20	6	180	39		
Shepherd Union West	20	6	175	55		
Student Services Center	7	5	95	110		
Kimball Visual Arts Center	15	8	250	91		
Miller Administration	Done	5	85	1248		
Social Science	2	8	165	1230		
Wattis Business	Now	6	140	1529		
McKay Education	10	8	170	1181		
Heat Plant	5-10	4	15	8280		
Campus Services	Done	4	45	736		
Building A	5	6	110	413		
Building B	10	8	225	299		
Sum of Building Flow 3775						

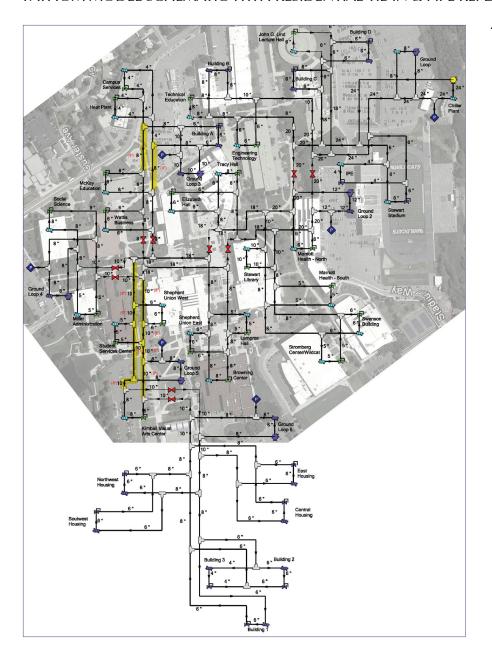
Phase	Buildings on VRF		
Base	Marriott Health - North		
	Stewart Library		
	Tracy Hall		
	Miller Administration		
	Wattis Business	hase	
	Campus Services	se	
Short-term	Jon G. Lind Lecture Hall	_	
	Stewart Stadium		
	Marriott Health - South		
	Social Science		
Mid-term	Technical Education		
	Engineering Technology		
	Lampros Hall	hase '	
	Student Services Center	se í	
	McKay Education	10	
	Heat Plant		
Long-term	Swenson Building		
	Stromberg Center/Wildcat		
	Elizabeth Hall		
	Browning Center		
	Shepherd Union East		
	Shepherd Union West		
	Kimball Visual Arts Center		

Phase 3: Building Flows

Building Name	Timeline	Pipe Size (In)	Area (SF)	Flow (GPM)	K Factor
Chiller Plant	-	24	12000	4275	6
Jon G. Lind Lecture Hall	2	6	46737	200	13
Science Lab	Demo	8	60000	-	-
Stewart Stadium	5	6	71270	25	8
Technical Education	5-10	8	87976	295	18
Engineering Technology	5-10	6	74886	150	24
Marriott Health - North	1	6	44898	350	4
Marriott Health - South	5	5	44898	270	3
Stewart Library	Now	10	159062	395	25
Swenson Building	20	6	94082	220	11
Stromberg Center/Wildcat	20	5	122054	250	4
Tracy Hall	Done	8	175000	240	27
Elizabeth Hall	20	6	94751	385	4
Lampros Hall	10	5	21892	45	133
Browning Center	20	8	177429	280	20
Shepherd Union East	20	6	186840	180	16
Shepherd Union West	20	6	21892	175	17
Student Services Center	7	5	84346	185	7
Kimball Visual Arts Center	15	8	74420	250	25
Miller Administration	Done	5	43094	170	9
Social Science	2	8	120000	330	15
Wattis Business	Now	6	53855	285	7
McKay Education	10	8	63377	340	14
Heat Plant	5-10	4	10520	30	102
Campus Services	Done	4	16671	95	11
IPE Building	Now	4	6000	25	185
Building A	5	6	67500	225	11
Building B	10	8	137250	455	8
Building C	15	8	106500	350	13
Building D	20	6	80850	265	7
		Sum of Bu	ilding Flow	6465	

Phase	Buildings on VRF			
Base	Marriott Health - North			
	Stewart Library			
	Tracy Hall			
	Miller Administration			
	Wattis Business	Phase		
	Campus Services	se		
Short-term	Jon G. Lind Lecture Hall			
	Stewart Stadium			
	Marriott Health - South			
	Social Science			
Mid-term	Technical Education			
	Engineering Technology Lampros Hall Student Services Center			
	Lampros Hall			
	Student Services Center			
	McKay Education			
	Heat Plant			
Long-term	Swenson Building			
	Stromberg Center/Wildcat			
	Elizabeth Hall	P		
	Browning Center	Phase 3		
	Shepherd Union East	ω		
	Shepherd Union West			
	Kimball Visual Arts Center			

FATHOM MODEL SCHEMATIC WITH RESIDENTIAL TIE-IN & PIPE REPLACEMENTS



Ground Loop Sizes — **Including Residential (Browning Center) & Dee Events Center**

Ground Loop #	Location	Area (SF)	Available Flow (GPM)	Pipe Size Min (in)	# Bores	Eq. Length (ft)
1	Chiller Plant	160000	1500	8	210	119720
2	Stewart Stadium	280000	2625	10	370	210920
3	Heat Plant/Building A	140000	1315	8	185	105470
4	Miller Admin	75000	705	6	100	57020
5	Kimball Center	150000	1405	8	195	111170
6	Browning Center	90000	845	8	120	68420
7	Dee Events Center*	1200000	11250	20	1575	897770

Bore Depth	275	ft
Bore Spacing	20	ft

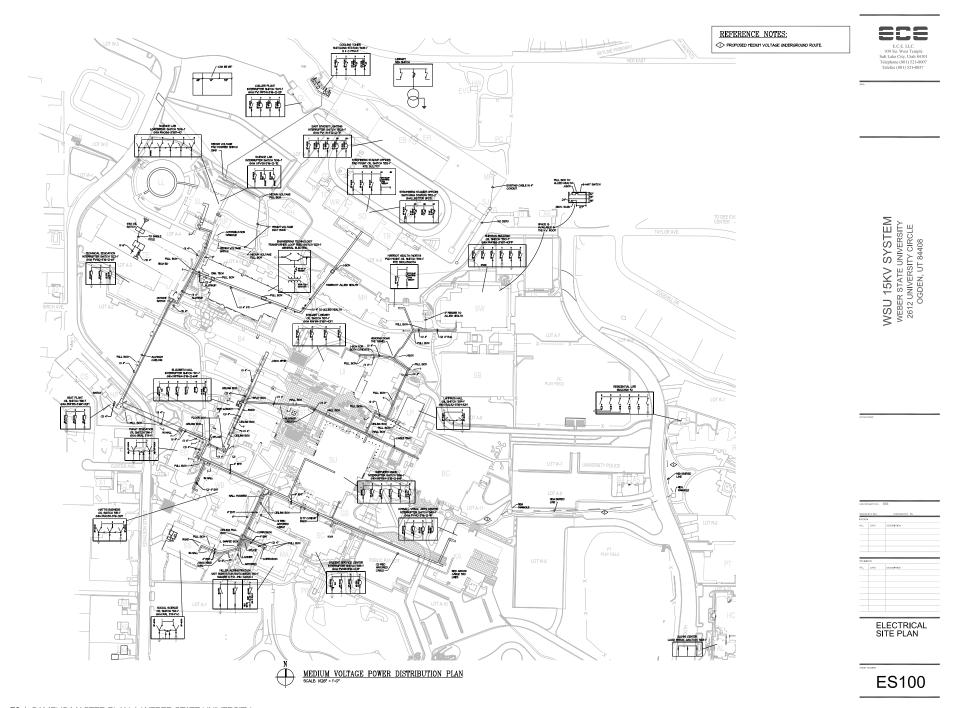
^{*} The Dee Event Center poses a number of unique challenges, including the size and load characteristics of the building. As a ground loop is considered for this facility, the system sizing and potential to supplement with alternative systems should be considered.

ELECTRICAL

- Existing campus medium voltage distribution system loop can be complete by tying the existing medium voltage switch at Kimball Visual Arts Center to existing switch at Residential Life Building #2.
- As projects to the south around the Dee Event Center develops the consideration of tying the medium voltage loop down to the south shall be looked at.
- Extension of existing campus telecommunication shall be considered as the projects to the south around the Dee Event Center develops. Communication lines shall be installed with vicinity of the medium voltage line.

PROJECT OBJECTIVES

- Weber State University has made a campus goal of eliminating single point of failure in medium voltage power distribution and make the distribution system as reliable as possible. During past years, significant effort has been put to complete the existing medium voltage loop and also reducing the amount of the splices in the medium voltage lines.
- As of now, the medium voltage loop is not complete. By tying the switch in Kimball Visual Art to the medium voltage switch in Residential Life Building the loop will be complete.
- Currently, existing communication line runs through the neighborhood to Dee Event Center. The goal is as the project are being developed around Dee Event Center's new communication lines to be installed.





DAVIS CAMPUS

OVERVIEW

The Davis Campus is young in relation to the Ogden Campus, and has been developed thus far in accordance with a master plan completed in 2002 Davis currently accounts for approximately 10% of the total gross square feet of built space of the entire WSU inventory, but unlike the Ogden Campus, a demand for the construction of considerably more physical space at Davis is expected.

The creation of the Davis Campus in the first instance responded to a strong demand for higher education in the Layton area, supported by the campus's proximity to Hill Airforce Base and Highway 15.

The Davis Campus was seen, from the outset, as much more of a commuter campus than even Ogden was (or is today). As such, the physical arrangement of the original master plan was focused considerably more on ease of access, a highly practical and efficient arrangement of buildings to utility infrastructure, and generous parking provisions. The initial build-out of Davis, consisting of new-build Buildings D02 & D03, as well as two acquisitions - CCE & D13 - has been focused on implementing the original master plan, and has very successfully served the needs of the current users of the Davis Campus.

The current master planning process was, however, an opportunity to reappraise the future of the Davis Campus. It was felt that while Davis will continue strongly in its mission to provide services to a large commuter constituency, its location is so advantageous, and there is such robust demand for its services, to suggest that there should be a strategic pivot at this time to redirect the campus somewhat without losing any of the strong moves inherent in the original master plan – to enable the creation of a strong "sense of place" that would support the future identity of the campus, as well as a greater sense of overall amenity for students, faculty and staff.



OBJECTIVES

Many of the goals of the prior 2002 master plan – a strong commitment to sustainable storm water management, leading-edge energy goals, efficient utilization of space, a strong gateway on State Route 193 - are carried forwards into the new one. The primary goal of the new master plan is to enable continued robust growth on the Davis Campus while adding into the mix a strong "sense of place". In addition to this somewhat abstract goal – one that will be achieved through subtle relationships between buildings and open space, the level of amenity offered to users, and the overall experience of arrival at the campus - the new master plan strives to attain the following:

- Exceed the overall gross floor area provisions of the prior master plan by 100,000 gross square feet or more (ie. one additional large building);
- Create outdoor space that is an amenity for the campus community and the overall Layton community. This is an important new addition to the way of thinking about the Davis Campus.

- · Provide a level of parking that is generally consistent with the original master plan, though taking into account some amount of shared use with other on-site functions.
- Study the possibility of anchoring the Davis Campus along the State Route 193 edge with a strong civic anchor, such as a music performance hall (with parking shared with the campus).

The overall objective of the current Davis Campus master plan is to create a campus that is capable of functioning in a stand-alone manner as a full campus. The Davis Campus should be able to accommodate the needs of commuter-users seamlessly but not be branded in its physical form as a "commuter campus".

2002 MASTER PLAN ILLUSTRATIVE





EXISTING CONDITIONS

The existing condition of the Davis Campus is that beyond the CCE and D13 buildings, construction of the first two new large buildings, construction of the large south parking lot, a utility tunnel along the previously-planned main pedestrian spine, and stormwater provisions, have almost entirely been focused along the southern portion of the site. Recent siteworks have been commenced to flatten out the grade difference between SR-193 and the campus, in anticipation of a future connection to SR-193.

EXISTING DAVIS CAMPUS



KEY CONSIDERATIONS

GENERAL

- Currently accounts for ~280,000 GSF of total WSU of ~2.8 million GSF
- More robust physical growth anticipated than at Ogden
- Future buildings ~90,000 GSF each (average)
- Study vehicular connection to SR193 (likely as far from existing traffic light as possible)
- Study potential increase in solar (due to lack of reliability of public utility)
- Study options for increasing on-site storm water retention capacity
- No significant athletics contemplated, but with growth and student mix changes possible, recreation to be studied
- Establishing physical presence along edge of SR193
- Study potential major anchors for Davis, including:
 - Terminus of tree-lined entry drive
 - Terminus of main campus pedestrian axis
 - -Potentially accommodating a ~1,500 seat performing arts center

PARKING CAPACITY STUDY

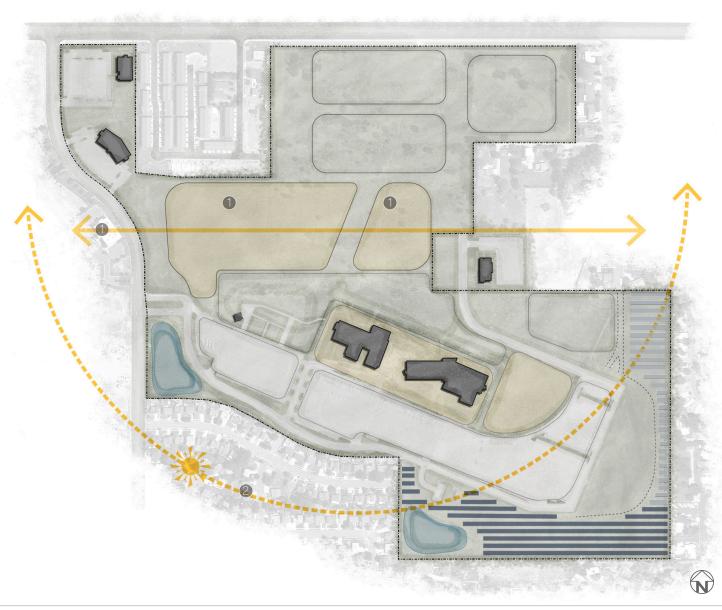
A detailed analysis of parking capacity in the prior and proposed new master plans was carried out as part of the master planning process. The diagrams that formed that analysis are contained herein. The analysis demonstrates that it will be generally possible with the new master plan to maintain high parking ratios per 1000 square feet of built space into the future, if such is deemed necessary. The suggestion of the master planning team is that the current levels of parking should be reviewed periodically so that parking is not eventually overbuilt. This will be of particular importance if there is a gradual shift in the type of academic and support space housed on the Davis Campus.



CAMPUS ORIENTATION

1 re-align buildings for efficiency







MASTER PLAN RECOMMENDATIONS

The intention of the new master plan for the Davis Campus is to effectively open up the central space of the campus, between primary rows of buildings, to create a generous open space amenity. While there is a fall in topography from north to south at Davis, it is considerably more gentle than on the Ogden Campus, enabling the creation of some building pads that do not have to strictly adhere to the precise northwest-southeast line of the contours (indeed, there is a large portion of the center of the campus that has been flattened by prior owners of the property). This creates the opportunity for a campus that is defined both by the existing contours and by terraced areas of open space between them.

${\sf DAVIS\ CAMPUS-PROPOSED}$



existing buildings

future parking / roads

jogging / walking path around campus

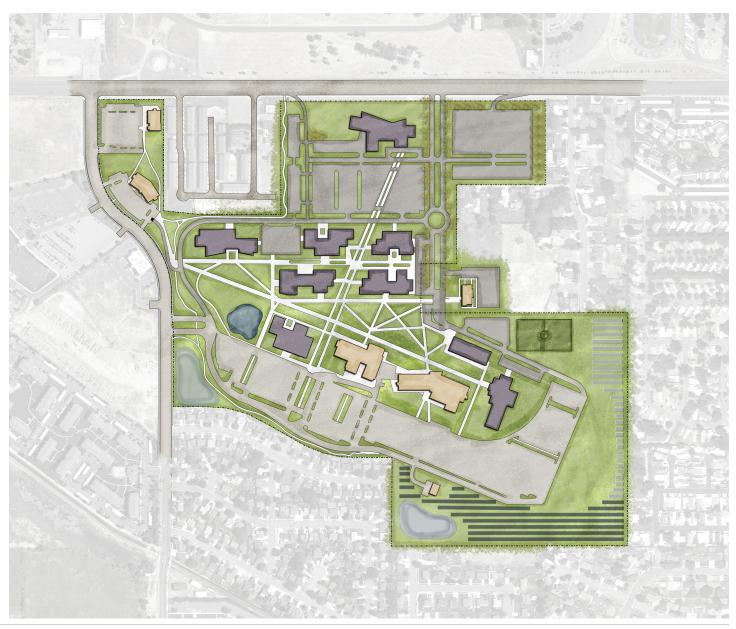
green pathways & storm water swells

playing field

community outdoor space

current pv array

future pv array



The new Davis Campus master plan addresses several considerations as follows:

- Entry from SR-193: A new traffic signal on SR-193 is anticipated, to create the primary address in future for the Davis Campus. The master plan indicates this driveway being located as far east as possible on the Davis property to allow as much distance as possible between the new traffic signal and the existing signal at University Park Blvd. The new driveway onto campus should have a median with a major signage opportunity on the median at SR-193. The driveway should form a grand, tree-lined entry leading downslope onto the campus, and becoming a loop road on-campus, connecting to the existing primary entry on University Park Blvd.
- Campus Loop Road: A full loop road should be constructed on campus, linking the new SR-193 gateway with the large south parking lot and existing University Park Blvd. main entry. Detailed study should be carried out to determine whether Building D13's parking lot can be linked via a driveway to the new loop road.
- Civic Anchor Building and Northern Parking Lots: Consideration should be given to creating a strong civic anchor, such as a music performance hall (as indicated on the site plan of the master plan), at the edge of SR-193. This use would be highly complementary to the campus, and would be capable of utilizing a shared parking strategy. While land up at SR-193 may naturally appear to be a natural place to site actual campus buildings, due to its prominence on the major road, the heart of the campus is at the center of the site and to the south. That is not to say that important campus buildings could not in future be sited at the edge of SR-193, but the current master plan anticipates a strong civic anchor building at that edge, and favors consolidation of the campus more at the center of the

- site, within the 20 year timeframe of this master plan. Northern lots to either side of the SR-193 entry driveway should be a shared amenity between the civic anchor building and the campus. Detailed traffic studies should be carried out to determine whether these lots - and the campus overall - can benefit from dedicated right-in-right-out entries and exits (as shown in the site plan) to and from these lots, to ease pressure during major events on the main SR-193 entry driveway.
- General Parking Strategy: It is expected that the large southern lot will continue to meet the overall parking requirement well into the future. As buildings are developed in the center of the site, however, it will be desirable to have parking near them. The new master plan proposes that the best way to satisfy the high ratios of parking for the Davis Campus will be to construct large lots in the northern portion of the site (to be shared with a future civic anchor institution), to intersperse smaller lots where feasible for amenity and additional capacity, and to potentially implement the previously-planned extension of the large southern lot.



CAMPUS ACCESS AND PARKING

- create on-campus ring road
- new entry view anchored by new pond
- a entry & tree-lined boulevard at SR193
- make space for civic building at the SR193 edge
- add parking at SR 193 edge





- Campus Heart: By aligning a new double row of buildings at the heart of the site directly N-S (as indicated on the accompanying site plan) some major new objectives will be achieved. First, these new buildings will have a pure N-S orientation, which is desirable for solar orientation, particularly in light of WSU's aspirational energy-use goals implemented after the original master plan was created. Second, a large series of open spaces - a "green heart" - will be created at the center of the campus. Due to topography in this location, an opportunity exists to treat these open spaces as a series of interrelated terraces, with pathways, stairs and ramps carefully choreographed to link buildings and open spaces to one another.
- Connection to CCE & D13 Buildings: These two buildings are, by their precise location, not simple to integrate into the life of the campus, and indeed much of their functionality is stand-alone. However, it is desirable to link them to

- the campus. To achieve this, fully accessible pathways from both should be implemented, linking the buildings and their parking lots to the new primary open space of the campus. A driveway link to the loop road from the D13 parking lot should be studied.
- Connection to the LDS Seminary: The new master plan creates a strong opportunity to meaningfully connect to the existing LDS Seminary and make that building an anchor element of the campus composition. This will also have the effect of improving pedestrian access to and from the Seminary.
- Individual Buildings: Similar to D02 & D03, it is anticipated that new buildings within the master plan will generally be 2-3 stories in height and 90,000-100,000 gross square feet each.

CONNECTIONS AND GREEN SPACE

- create campus green
- playing fields
- 3 pedestrian spine
- 4 connection to Institute/Seminary





Storm Water Management: One of the primary advantages of creating larger open space at the heart of the campus is that storm water management can be integrated into the landscape design. The new master plan proposes a retention pond that would double as a water feature adjacent to the existing major vehicle entry/exit at University Park Blvd., with potential for an adjacent dry basin that would be capable of serving as recreation space as well as additional retention capacity. A major N-S walkway linking the campus with a civic performance hall at SR-193 is indicated in the site plan; this walkway should generally run parallel to a storm water management channel (constructed as a series of bioswales).

STORM WATER AND ENERGY

- existing storm water
- 2 augmented storm water / water feature
- 3 existing pv array
- 4 future pv/geothermal field







WEBER STATE UNIVERSITY INFRASTRUCTURE MASTER **PLANNING ANALYSIS**

DAVIS CAMPUS

Existing Conditions

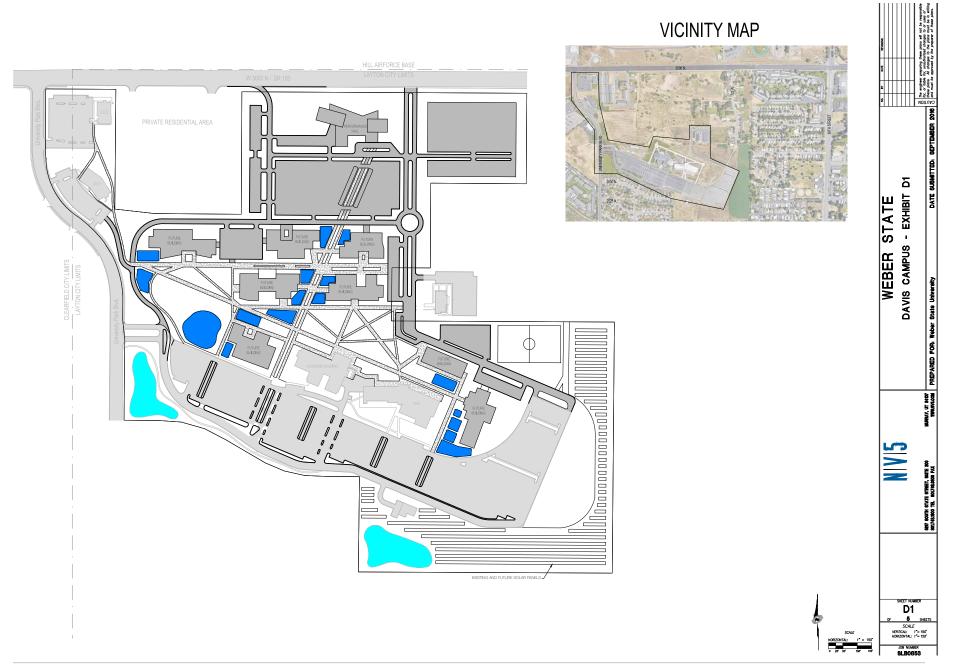
The Weber State University Davis Campus sits generally between 36th Street and 4600 South and between Harrison Blvd and Skyline Drive. The 100-acre campus sites along the foothills of the Wasatch Front Range. The majority of the campus is in Layton City, however, two existing facilities are within Clearfield City boundaries. Those two facilities are the Center for Continuing Education (CCE) and Building D13. The existing site generally slopes moderately from northeast to southwest at an average slope of 4-6%. The campus is currently comprised of 4 existing academic facilities, roadways, parking lots, walkways, and support/utility infrastructure. The approximate population of the WSU Davis Campus during the term is 6,000

Future Development Plans

The current development master plan calls for eight new academic facilities and one new performing arts hall. The new facilities are planned to be the following:

Facility Name	Usage Type	Estimated size		
Academic #1	Academic / Classroom	90,000 Gross Square Feet		
Academic #2	Academic / Classroom	90,000 Gross Square Feet		
Academic #3	Academic / Classroom	90,000 Gross Square Feet		
Academic #4	Academic / Classroom	90,000 Gross Square Feet		
Academic #5	Academic / Classroom	90,000 Gross Square Feet		
Academic #6	Academic / Classroom	90,000 Gross Square Feet		
Academic #7	Academic / Classroom	90,000 Gross Square Feet		
Academic #8	Academic / Classroom	90,000 Gross Square Feet		
Performing Arts Hall	Theatre	1,500 Seats		

See attached Exhibit D1 for the map of the planned location of the existing site improvements, planned future facilities and planned future site improvements.



Sanitary Sewer

The WSU Davis Campus has a primary sewer mainline that discharges to University Park Blvd. The mainline is recorded to be 12" at University Park Blvd. There is record of the mainline reducing in size as it approaches the existing buildings on the campus. However, the remainder of the sizes in the system are unclear. The mainline tees at the west side of the DO2 building. The branch that extends north from this tee is anticipated to be the primary mainline the serves all new facilities. It is estimated that 1400 linear feet of new mainline will need to be installed in order the serve the planned facilities in their current location. This new mainline will range be 10", 8" and 6" diameters. Preliminary calculations of the capacity of the existing system indicate that there is sufficient capacity for the full buildout of the campus as currently planned. The order of development has little impact on the alignments of mainline sizing. However, coordination with Layton City should be carried out to confirm capacity in downstream facilities.

There are two existing academic facilities that do not connect to the primary 12" mainline. Those two facilities are CCE and D13, in the northwest corner of the campus. Both facilities have an individual lateral that connects directly to the collection main in University Park Blvd.

The chiller building at the south end of the site is too low to connect to the primary 12" mainline. Therefore, that facility discharges to the sewer mainline in the residential development directly west of the facility.

The WSU Davis campus has no facilities for on-site wastewater treatment, capture, reuse, or scalping. In the event that WSU is interested in pursuing any of those options the single primary mainline provides a convenient point to divert wastewater into new facilities.

See Exhibit D2 for mapping of the existing sewer collection system and planned infrastructure.



Storm Drain

The majority of the WSU Davis Campus drains to two existing detention ponds. Current records do not identify the capacity of the existing drainage basins. A survey of the existing ponds to identify their existing capacity is recommended. There is a network of pipes that convey stormwater to the existing ponds. Records are unclear about the size of the existing mainlines and location/depth of manholes. The locations of the existing detention ponds are convenient to collect all runoff from the site for current and buildout conditions.

Current Layton City development guidelines require detention of the 100-year 24hour storm event to a discharge rate of 0.2 cubic feet per second per acre. This is a very common detention requirement in Davis County. State owned facilities are not required to design to local ordinances or guidelines. However, since offsite stormwater discharge will be to Layton City facilities it is highly recommended to accommodate their design requirements as a minimum. More progressive stormwater management techniques are recommended to provide low impact developments.

It is clear that the current campus strategy for stormwater management is to collect runoff and direct it to the existing detention ponds. Current techniques in stormwater management and low impact development recommend management of stormwater prior to collection and detention. Therefore, it is recommended to implement bioswales, infiltration trenches and vegetated buffers throughout future developments. The mall-way that runs diagonally north and south through the site provides an excellent opportunity to implement these techniques in an attractive way that also provides an opportunity for the public to experience it. In general, the current development plan provides enough open space that low impact development techniques can probably be implemented to an extent that the existing stormwater

conveyance system and detention ponds can be utilized without the development of additional capacity.

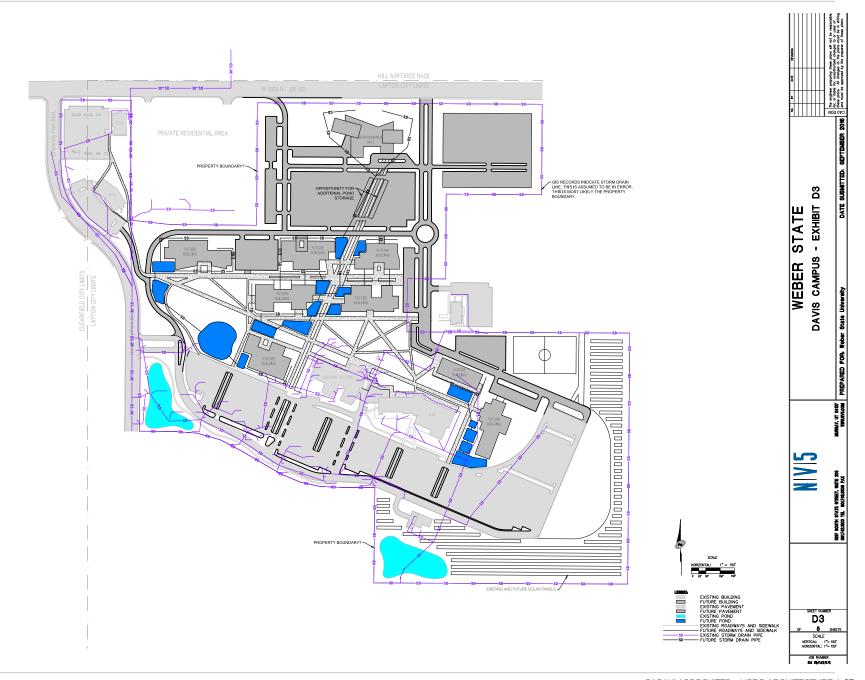
In addition, a permanent pond amenity is planned near the University Park Blvd. access road, at the west end of the core of the facilities. This pond may provide capacity for any additional storage that may be needed. This can be achieved by considering some area of the pond that can fill beyond the normal high water level, then direct runoff to the pond.

In January 2016 Utah Department of Water Quality permitting changed to require on site retention of the 90th percentile storm event. This requirement probably results in modifications to the existing detention ponds prior to construction of the next facility. It is recommended that a detailed assessment of each detention pond is prepared to help understand existing commitments, capacity, and modifications necessary to accommodate current retention requirements.

The portion of campus that includes CCE and D13 appears to collect stormwater and convey it to a detention pond at the south side of D13's parking lot. The size of this detention pond should be assessed against current retention and detention requirements.

There is currently no FEMA Floodplain map for the area of the Davis Campus. Therefore, it is assumed that all property is currently in FEMA Floodplain Zone X. This is defined as areas determined to be outside the 0.2% annual chance of floodplain.

See Exhibit D3 for mapping of the existing sewer collection system and planned infrastructure.



Culinary Water

The WSU Davis Campus receives water service primarily from Layton City. The academic facilities D3 and D4 receive culinary water for Clearfield City though individual laterals from University Park Blvd. Both Cities provide water from mainlines in University Park Blvd. Layton City records indicate at 24" mainline runs through the site. This mainline is owned by Layton City and they restrict services that are connected to the line. However, Layton City Engineering has indicated that WSU will be allowed to connect to this line. The 24" mainline is looped between 3000 North and University Park Blvd. In addition, the static pressure in the existing line is

about 85 psi near the existing campus connection points. This pressure is sufficient for the needs of the campus. It is currently unclear how campus is metered. It is assumed that each facility is metered separately. It is unlikely that this will be feasible in future development. Therefore, WSU should work with Layton City to identify future metering plans prior to design of new buildings.

2000 linear feet of new 8" mainline is anticipated to complete the current development plan and provide appropriate looping and redundancy. See Exhibit D4 for mapping of the existing culinary water system and planned infrastructure.



Secondary Water

It is assumed that all irrigation demands are being supplied by the Weber Basin Water Conservancy District. See Exhibit D5 for the map of the campus secondary water mainlines.

WSU does not currently have accurate mapping of secondary water service zones. It is recommended that a map is created to show mainlines, source connection points, sprinkler system master valves and their corresponding distribution areas.

In addition, a plan for the development of future buildings should be prepared to assess the existing system and its capacity to service future developments.

DAVIS CAMPUS RECOMMENDATIONS

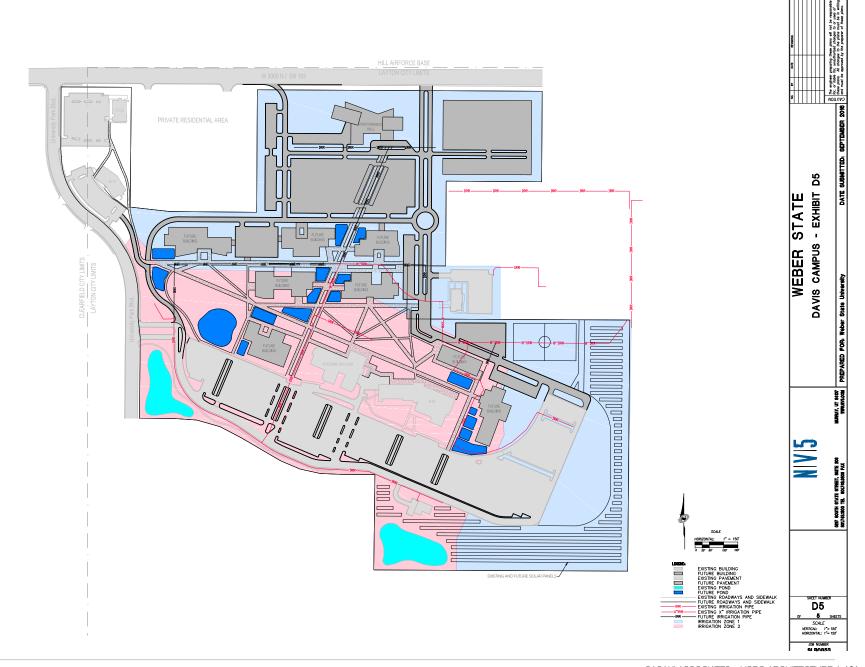
- Sanitary Sewer
 - Develop a hydraulic model for the existing and future campus infrastructure
 - Develop a database with all pipeline sizes, materials, installation dates, manhole locations, invert elevations, etc.
- Storm Drain
 - Survey the existing ponds to identify their capacity.
 - Develop hydraulic model of existing detention ponds, conveyance system, and future campus infrastructure.
 - Develop a database with all pipeline sizes, materials, installation dates, manhole locations, invert elevations, etc.
 - Identify percolation rates throughout the site.
 - Develop a plan to address current retention requirements.

Culinary Water

- Develop a hydraulic model for the existing and future campus infrastructure
- Develop a database with all pipeline sizes, materials, installations dates, etc.
- Loop existing mainlines
- Develop at least one more connection to municipal infrastructure
- Install valves on all legs of tees and crosses

Secondary Water

- Design improvements necessary to connect to Weber Basin Water Conservancy District's secondary water system.
- Develop an irrigation plan and hydraulic model for the campus.
- Identify additional uses for secondary water.





IN-DEPTH STORMWATER ANALYSIS

Overview

Talisman Civil Consultants (TCC, formerly NV5 Salt Lake) was tasked by Weber State University to conduct research, produce a hydraulic model and analysis of storm drain and sanitary sewer conveyance and capacities for the Ogden campus and the Davis campus.

Goals

Goals for this study include:

- 1. Obtain information on how existing storm water system for both Ogden and Davis perform in 1, 2, 5, 10, 25, 50, and 100 year storms using hydraulic modeling software.
- 2. Implement future master plan development to models and observe how future developments affect storm drain & sanitary sewer networks.
- 3. Assess areas in the models that are overcapacity
- 4. Provide recommendations that effectively mitigate over capacitated lines for existing conditions and future development. There are several analyses which are important with respect to the overall functionality of existing storm/sewer infrastructure. The information that has been identified as important for this study is as follows:
- An analysis of the capacity of the existing and future storm system with respect to the 10 year, 24-hour storm event.
- Off-campus catchment areas contributing to storm system inflow.
- An analysis of the volumes and flow rates entering and leaving the system including:
 - Existing system volumes and flow rates compared to future-development volumes and flow rates.

An analysis of the capacity of the existing and future sanitary sewer system with respect to the WSU master plan.

Findings

Storm Drain

Keeping future development of the Weber State master plan in mind, TCC recommends the following changes to storm drain lines to ensure that the Ogden and Davis campuses storm drain systems will adequately handle at least a 10-year storm with respect to current and future infrastructure.

Table 1 – Davis Campus Recommended Pipe Diameters

Racommo	babaa	Pina	Diameters

Pipe ID	Current Pipe Diameter (in)	Recommended Pipe Diameter (in)	Length (ft)	Location
1734	18	30	313	Southern Campus Drive
1733	18	30	315	Southern Campus Drive
1732	18	30	55	Southern Campus Drive
1731	18	30	100	Southern Campus Drive
1730	18	30	250	Southern Campus Drive
1724	24	30	317	Southern Campus Drive
1713	24	30	225	Southern Campus Drive

It is recommended that WSU take advantage of detention opportunities upstream in the future developed areas of Davis campus, and if possible, direct flow towards the large proposed detention pond located on the west of Davis Building 2 for the existing system is will not be effective in handling additional flow from future development



TRAFFIC IMPACT ANALYSIS

Purpose

The purpose of this study is to provide a summary of the potential traffic-related impacts from the proposed Weber State development located along University Park Blvd. in Layton, Utah. This study analyzes the traffic operations and impacts for existing 2016 conditions and future 2021 conditions at key intersections. Two scenarios were analyzed for each peak AM and PM time periods: existing and future plus project (2021). The plus project analysis includes project trips generated from the additional Weber State Davis Campus development.

STUDY INTERSECTIONS

The following intersections were included in this study:

- 1) University Park Blvd. / Antelope Dr.
- 2) University Park Blvd. / West Campus Driveway
- 3) University Park Blvd. / SR-193
- 4) SR-193/ North Campus Driveway (2021 Scenario)

TRAFFIC VOLUMES

Traffic counts at the study intersections were collected to establish a baseline of existing conditions and operations for the area. AM peak period traffic counts were recorded from 7:00 AM to 9:00 AM and PM peak period traffic counts were recorded from 4:00 PM to 6:00 PM on January, 27 2016.

FXISTING CONDITIONS

All intersections operate within acceptable levels of delay during the AM and PM peak hour, except for the University Park Blvd. / SR-193 intersection during the peak AM period which operates at unacceptable levels of delay. This delay is due to the westbound left movement experiencing insufficient gaps to complete their turn movement because of high volume in the eastbound SR-193 traffic.d in the appendix of this master plan.

PROJECT CONDITIONS

The existing Weber State Davis campus is located 2750 University Park Blvd, The proposed additional campus development will add 793,540 square feet of classroom and related uses. After the additional campus development the Campus will consist of 1,021,190 square feet of classroom and related uses. The project will be accessed at two locations: the exiting University Park Blvd. driveway (western) and a new driveway accessed off SR-193.

FUTURE 2021 PLUS PROJECT CONDITIONS

All intersections operate within acceptable levels of delay during the AM and PM peak hour with the exception of the following intersections:

- University Park Blvd/ West Driveway (AM and PM peak periods). This delay is due to the westbound left movement experiencing insufficient gaps to complete their movement.
- University Park Blvd./ Antelope Dr. (PM peak period) operates at a LOS D/E.

CONCLUSION

All study intersections operate at acceptable LOS except for the following:

- University Park Blvd. / SR-193
- University Park Blvd. / West Campus Driveway 2021 plus project conditions (AM & PM)

MECHANICAL

The central plant at the Davis Campus generates cooling tower water for use in indirect cooling coils at the building level, and chilled water for supplemental cooling.

The current heat rejection system is a two cell counter flow concrete tower, with each cell rated to cool 1,500 gpm from 82.6 F to 66.7 F, at 63.7 F ambient wet bulb (12,000 mbh). There is room to add two more cells, for total future capacity of 48,000 mbh, and a total of 6,000 gpm.

The cooling tower is separated from the campus distribution loop with a plate and frame heat exchanger rated to cool 6,000 gpm from 88.1 to 69, using 6,000 gpm of 67 degree water. It is currently operating at reduced capacity because there are only two cooling tower cells active, but was selected at the future conditions.

Condenser water is leaves the plant in 12" PVC pipe, and is circulated through a campus tunnel system via distributed variable speed pumps at the building level. Currently, there are two buildings, with combined peak flow of 870 gpm, but the system is anticipated to provide 3,500 gpm at full build-out

Two constant speed centrifugal chillers are piped such that at low load, either chiller can operates (lead/lag), and as load increases, they can operate in series. Constant volume primary only pumps circulate through the chillers, but pump speed modulates in response to changing primary loop pressure requirements as two chillers in series become active.

Chilled water leaves the plant in 8" PVC pipe, and is circulated through a campus tunnel system via distributed variable speed pumps at the building level. Currently, there are two buildings, with combined peak flow of 375 gpm, but the system is anticipated to provide 1,800 gpm at full build-out

The two current buildings have central station VAV air handlers with indirect and direct evaporative cooling. Neither air handler has required chilled water since 2014 in order to meet their cooling demands, so the chillers do not operate, except for periodic cycling.

There is adequate capacity in the current plant to accommodate approximately 400,000 sf of new buildings, and there is room to install new chillers and cooling towers that would accommodate an additional 300,000 sf, for a total campus conditioned space of approximately 900,000 sf.

It is also possible that future buildings could be designed with water-source heat pumps or VRF systems, as the main campus is currently doing. In this case, the condenser water system would continue to run in the summer as the primary source of cooling for the two existing buildings, while serving as the heat sink for the new buildings. One or both of the abandoned chillers could be replaced with condensing boilers, and the condenser loop would continue to operate as a heat source in the winter for the new buildings.

Additionally, the condenser system could be integrated with a ground-coupled system. It would still need to be controlled to make water cold enough to accomplish indirect evaporative cooling, but it could reduce load on the cooling tower, and potentially offset some or all of the natural gas consumption.

ELECTRICAL

Currently, power to the existing Davis Campus buildings is provided by Rocky Mountain Power. Pad mounted transformers are installed by each building.

- As new buildings are developed, Rocky Mountain Power will install new pad mounted transformer by each building similar to existing building.
- Existing underground conduit is being utilized to run communication cables to building from the road to the west of the campus. Weber State University would like a second pathway to the north and tie to the existing tunnel by installing communication manholes as needed. Communication conduit also should run to the new building as a secondary path.
- Additional solar PV system will be installed to offset the electrical demand load for the new buildings.

PROJECT OBJECTIVES

- Weber State University's goal is to offset the new building electrical demand loads by installing additional solar PV system. The current PV system supports the electrical demand load of the existing building.
- Currently communication connection to Davis Campus is from the west. Weber State University's goal is to have a second path to the campus from the north. Also the existing communication lines run through underground conduit. The goal is to tie the building (existing and new) to existing utility tunnel and use conduit as second path to buildings.
- Also Weber State University's goal is to have a secondary path from campus to two buildings on University Park Blvd (D13 and CCE) via the back side out of the road easement area.



WEST CAMPUS ("HOOPER CAMPUS")

OVERVIEW

West Campus will be a satellite campus offering educational instruction to a commuter population in a part of the Greater Ogden area that is expanding rapidly. A future north-south highway will link the land acquired for the future West Campus to Layton in the south, and will enable a large population group to access the offerings of West Campus. This campus will form an important part of WSU's goal to provide strong offerings to non-traditional students wherever they may be located in the service area of WSU.

OBJECTIVES

The primary objective for West Campus is to provide a strong presence, flexible instruction space, and user amenity in an area that is developing rapidly but that does not currently have strong urban definition. Much discussion was given to the subject of how the University can establish a presence along a main road whose future form will alter considerably, given current growth in the Hooper area.

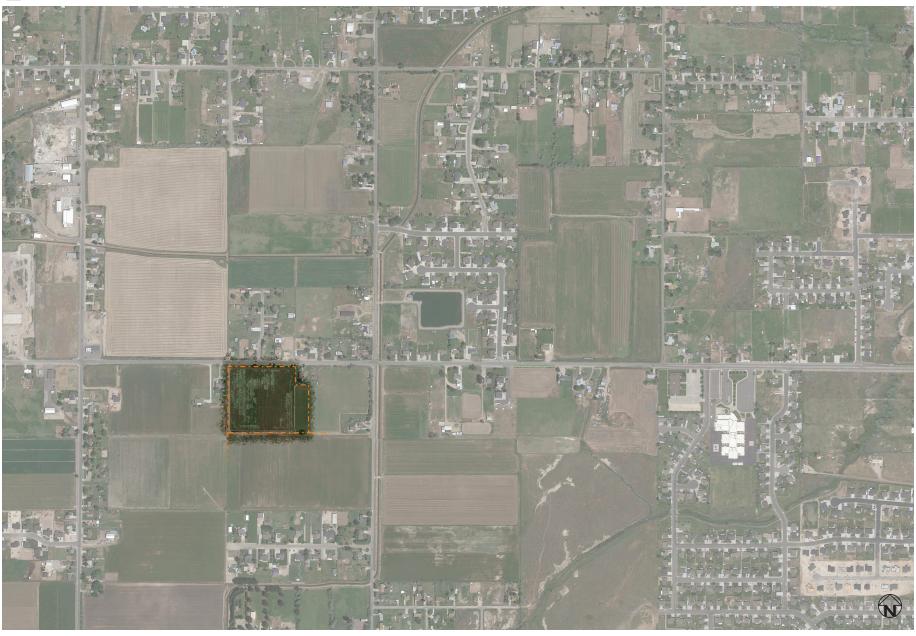


Welcome sign from the Davis County side of Hooper. Image from The Mystery Of Utah History. blogspot.com.



The existing condition at the future West Campus is an open agricultural field with frontage onto a main road that is expected to change in character considerably as the surrounding area develops and as the Legacy Highway is implemented. The land is believed to fall slightly to the west (though this was not visually confirmed, and should be prior to any detailed design).

EXISTING HOOPER CAMPUS



KEY CONSIDERATIONS

- Legacy Highway will pass near to site N-S, probably along 5100 West; access driveway to site should be located as far west from anticipated highway path as possible (due to offramps, etc.)
- Satellite center with some associate degrees & certificates
- 2-3 buildings, with parking
- "Front" building should be close to 5500 roadway (rather than being fronted by parking); this creates a more private, calm zone behind, and establishes WSU presence; second building may be in L-shape arrangement with first, to create shared amenity location at elbow
- First building 25-30,000 GSF, 2 stories; second building similar
- Utility needs will be electrical, water, sewer
- Timeline could be some years out for commencement (highway, sewer issues to be resolved first by others)





MASTER PLAN RECOMMENDATIONS

The intention of the West Campus master plan is to create a strong "sense of place" where none currently exists in any way at present. As such, consideration was given to creating a sheltered environment with a strong presence fronting onto W5500S.

Key considerations in the West Campus master plan are as follows:

- Initial Presence: Rather than have the campus fronted by a parking area (as will likely be the condition with the surrounding commercial developments that will appear in time), West Campus will have a strong physical presence on W5500S, with the first phase building providing an anchor to the entire future campus. This building is anticipated to have a highly-transparent first floor (at least at the corners), offering a visual connection with W5500S. The first phase building is expected to be approximately 35,000 gross square feet on two levels, with a generous communal space attached to it. This space can serve as a cafeteria, gathering space, and informal use space.
- Vehicle Access and Parking: The expected Legacy Highway is anticipated to pass to the east of the future campus, potentially in close proximity. With this in mind, the master plan proposes that the vehicle driveway should occur as far west as possible on the property, leading to a large, efficient, internal parking lot capable of accommodating approximately 4500 vehicles. Loading and emergency access would be handled through this area, with drive lanes defined by medians, curbs, etc.

- Phasing: West Campus is expected to be built out in three phases (though any or all of the phases could be combined if needed). The master plan has been laid out to enable the phases to stand alone or to be connected as a single large building of approximately 100,000 gross square feet. Indoor connectivity may provide certain advantages, particularly in winter, for access to the communal phase.
- Amenity: The master plan is laid out to enable a preferred north-south orientation for the majority of building space, and the creation of outdoor amenity areas adjacent to the buildings.
- Storm Water Management: A linear retention element should parallel the entry driveway to retain water and allow for infiltration.



WEBER STATE UNIVERSITY INFRASTRUCTURE MASTER PLANNING ANALYSIS

WEST CAMPUS

Existing Conditions

The Weber State University West Campus is located at 5250 West 5500 South in Hooper, Utah. The 10-acre campus exists on the Historic Lake Bonneville bottom flats east of the current Great Salt Lake limits. The site generally slopes very gently to the west. There is approximately 2 feet of fall from the east side of the property to the west. Average slopes throughout the site are consistently 0.25%. The property is currently agricultural land and is actively being farmed. It is assumed that the site will have high relatively groundwater.

Future Development Plans

The site is planned to be developed for the purposes of a Weber State University satellite campus. The development on the site is anticipated to include an approximately 120,000 square foot facility that may be developed in several phases. The site is also planned to have roadway access, parking and utilities to support the future building. Due to the low slope throughout the property earthwork will have to be completed to ensure positive drainage away from buildings and off of parking lots. Depending on soil conditions, soil import can be offset by excavation for new buildings and retention ponds.

See attached Exhibit W1 for the map of the location of the site and planned future facilities and utility improvements.

Sanitary Sewer

Sanitary sewer service for the property will be provided by Hooper City. However, due to the limited development in the surrounding area, there is no sanitary sewer mainlines in 5500 South. Therefore, the future development will be required to develop sanitary sewer conveyance improvements. The high groundwater in the area makes on-site treatment (septic systems) infeasible. Due to the extremely flat topography in the area and high groundwater a traditional gravity sewer system is not possible either. Therefore, Hooper City has master planned a vacuum sewer collection system. A system of this type is a pumped based system with force mainlines and collection vaults. Typically a vacuum system requires users to gravity flow or pump sewage into a collection vault that is sized to accommodate clusters of development. Sewage is then vacuumed (sucked) out of the collection vault to a centralized pump station. Multiple collection vaults will be be vacuumed to the same pump station. At the pump station sewage for all parts of the system will be combined together in a tank or wet well. Sewage will then be pumped out of the wet well to a municipal treatment facility or a gravity line that will convey to a treatment facility.

Generally, a vacuum system requires additional on-site cost but it is not substantial since the additional improvements is only an additional vault. However, in discussions with Hooper City official it was explained that the pump station for the entire system is planned to be located on the Weber State University property. It was explained that this master plan was identified when Weber State University purchased the property and WSU has agreed to include the pump station on the property. It is unclear at this time exactly how the campus development will connect to the pump station. Depending on the final design of the pump station WSU may be able to install gravity laterals that discharge directly to the pump station's wet well or a collection station may be needed to vacuum into the pump station tank. The on-site cost difference to the development is not substantial (estimated to be less than \$10,000). However, close coordination with Hooper City will be required in the future.

It is currently unclear who will pay for the pump station and mainline improvements. It is also unclear what the overall costs of the pump station is and how much force mainline needs to be installed to get to the nearest treatment facility. These pump station and mainline improvements may be a substantial cost and may be a barrier to development of the property since there are no other realistic options for sewer.

Storm Drain

Due to the extremely flat nature of the property and the surrounding area, there is very little existing stormwater conveyance infrastructure. There are no existing pipes within 5500 South. It is anticipated that any development on the property will have to manage stormwater up to the 100 year even on site. Therefore, it is anticipated that the future development will include several bioswales around the perimeter of the site. Based on NOAA Atlas 14 precipitation data the 10-year 2-hour storm event has a depth of 0.986 inches. Therefore, the 10-acre site will require 0.822 acre-feet of storage in order to manage the 10-year 2-hour storm event on site per Weber County standards.

The property is currently in FEMA Floodplain Zone 49857C0425E. This is defined as areas determined to be outside the 0.2% annual chance of floodplain.

Culinary Water

Culinary water services for the satellite campus will be provided by Hooper Water Improvement District. There are two existing culinary water mainlines in 5500 South roadway, along the north boundary of the property. These are also an existing hydrants on 5500 South on the east and west side of the project. The existing mainlines are 10" and 18" in diameter. Both hydrants are serviced by the 18" mainline with a 6" hydrant lateral. Based on discussions with a Hooper City official it I understood that both existing mainlines has sufficient capacity to service the planned facility. Since the 18" mainline is newer and closer to the site we have anticipated that Weber State University will connect to it for the water supply needs of the future development. Based on the planned square footage of the future building it is anticipated that a 4"-6" culinary service lateral will be necessary. In addition, a 6-8" fire service lateral and an 8" mainline loop around the building with at least one additional hydrant is currently anticipated. During conversations with the city there were no system pressure concerns that were identified. It is assumed that the existing system has sufficient pressure to serve the future WSU campus development.

Secondary Water

Hooper Irrigation Company provides the municipal secondary water system in this area. A map of the current Hooper Irrigation Company is not available at this time. Therefore it is unclear if the proposed development will be able to secure secondary water service. If secondary water service is available to the site, it is anticipated that it will come from a mainline in 5500 South or a canal south of the site. In either case. a lateral, meter, and possibly a pump will need to be extended into the campus site. If secondary water service is not available irrigation for the site will be provided from the culinary water service lateral.

WEST CAMPUS RECOMMENDATIONS

- Sanitary Sewer
 - Coordinate with Hooper City regarding vacuum system, pump station and connection requirements.
- Storm Drain
 - Prepare program and design for future facility.
- Culinary Water
 - Prepare program and design for future facility.
- Secondary Water
 - Prepare program and design for future facility.

