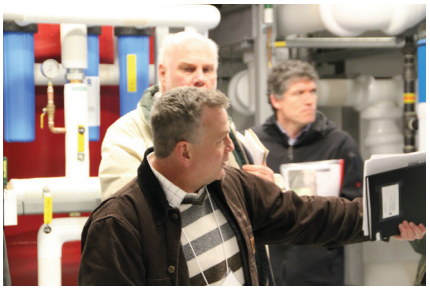
2 APPROACH+METHODOLOGY



The UBCO *Whole Systems Infrastructure Plan* intends to define and support a long-term vision for creating a sustainable campus using a whole systems approach and to create a roadmap for successful implementation. The process undertaken to complete the *Whole Systems Infrastructure Plan* is based on a collaborative and integrated design approach that is grounded in the principles of whole systems thinking which support the following key factors:

- Enables optimized performance of buildings and infrastructure.
- Fosters interdisciplinary collaboration among diverse teams to understand how pieces work together as a system, and how to leverage potential synergies between systems.
- Results in optimization of an entire system as a whole, rather than its parts in isolation—a key principle of integrated design.
- Solves many problems at once; creating multiple benefits from single expenditures, and yields more diverse and widely distributed benefits.

Certain challenges and limitations exist when analyzing an existing campus as compared to designing a new campus. Regardless, this process and approach used for this planning effort has uncovered many day-to-day operational and occupant engagement challenges, and present a range of options for short and long-term performance improvements for the UBCO Campus. There are certainly many points of connectivity which largely exist between biodiversity, water, and stormwater, and between water, energy and waste. Key synergies between performance areas are reflected in each chapter, and are captured in an overall *Whole Systems Infrastructure Plan* matrix, presented in Appendix A.

The process for creating a near and long-term vision for sustainable infrastructure included the following key steps prior to the project commencing and throughout the project schedule:

1. **Whole Systems Presentation at the Campus Plan Design Charrette:** Held in June 2014, the purpose of this presentation was to introduce the whole systems concept and guiding principles of the emergent UBC Okanagan Campus Plan, 2015.
2. **Whole Systems Scoping Workshop:** Facilitated by UBC, a workshop was held in August 2014 that engaged key technical stakeholders across both campuses. The workshop allowed for meaningful exchange to take stock of existing system conditions, assets, constraints, trigger points for expansion, relevant studies and supportive documents, and systems integration opportunities. A key outcome of the workshop was the establishment of a preliminary list of whole systems plan objectives and key criteria for decision making.
3. **Integrated design workshops:** A series of workshops were held January 14-15, 2015, March 24, 2015, and May 27, 2015 in order to understand

the baseline conditions, explore a range of strategies shared, tested, and refined based on feedback from UBCO's team.

4. **Background Assessment:** An extensive review of UBCO's technical information and data related to buildings, systems, utilities, infrastructure on campus and supporting documentation describing the campus was undertaken to support the analysis through the lens of achieving the long-term regenerative sustainability goals and objectives.
5. **Performance Assumptions and Modeling:** Building upon the background assessment, performance assumptions related to campus growth rate and phasing of development were developed in consultation with UBCO. A range of measures for improvement were identified for the various building typologies and campus scale infrastructure, and for restoring, protecting, and managing the overall ecological system of the campus.
6. **Economic Modeling:** A Class C cost analysis was performed to review the trade-offs between the capital cost and the cost savings to be gained from implementing each specific measure. The analysis employed a life-cycle cost analysis over a study period of 15 years and applied criteria such as Net Present Cost (NPC) and payback period to provide useful information for decision making, i.e. for selecting certain measures above others.
7. **Evaluation of performance measures:** Based on the goals and objectives established for the project, a refined set of multi-attribute evaluation criteria were established in collaboration with UBCO to assist with evaluating the performance measures beyond simply evaluating them through a single lens of financial feasibility.
8. **Roadmap and Implementation development:** As a final step, the recommendations for achieving the sustainability goals for the Okanagan Campus form a long-term roadmap for the University for optimizing its performance. In addition, actions recommended for immediate implementation within the next 5 years are summarized within the study.

A detailed summary of the approach and methodology is included in Part 2.