

Washington State University
Northwestern Washington Research
& Extension Center
Mount Vernon, Washington (NWREC)



Master Plan

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Washington State University
Capital Planning & Development

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Executive Summary

Washington State University's, Northwestern Washington Research and Extension Center (NWREC) fills an important niche in supporting Washington State's agricultural industry. Located in the Skagit Valley, this center provides research and outreach addressing major agricultural commodities, produced primarily east of the Cascades. Core research emphasizes protection of crops and seed production for the broad range of commodities grown in this unique environment. Additionally, NWREC research scientists advance environmental protection, production practices for high value agricultural and horticultural crops, and the wise use of natural resources. In coming years, NWREC will play an increasingly important role as a focal point for supporting and directing research and outreach programs for the five counties surrounding the Skagit Valley.

With completion of the new Agricultural Research and Technology Building in 2006, new faculty joined the center and research programs have expanded into these new facilities. Increases in the number of faculty are expected to continue, resulting in expansion of the number of graduate students on campus; and in concomitant increases in the number of student Interns, support staff, and field workers at the center. Current numbers could double within the 10 years scope of this plan.

The impact on requirements for infrastructure, facilities, and support activities is already being felt. Immediate needs include new plant growth facilities, expanded equipment storage, construction of sanitary and personnel support facilities, addition of office space, increased access, and enhanced security. Ten year projections identify the need for additional laboratory, office and plant growth facility space; modern graduate student housing; modern maintenance facilities for both laboratory and field research equipment; expanded equipment storage; and integration of Campus Core functionality.

NWREC is located in one of the fastest growing regions in the state, and its role in protecting agricultural commodities is well established. With engagement of new technologies and emergence of future challenges, expansion of this center's size and importance is both likely and advisable.

Master Plan Goals & Assumptions

Master Plan Goals

Goal 1. To promote a vision for developing the campus at NWREC over the next ten years, that will successfully anticipate opportunities at this growing center.

Goal 2. To plan for future campus construction that will develop this vision, and support an expanding range of programs located on campus.

Goal 3. To recognize the growth and change in surrounding communities, and provide for a campus that maintains traditional emphasis while addressing critical and emerging needs.

Goal 4. To maintain open space and pedestrian areas, and provide opportunities for public discourse and education.

Goal 5. To promote sustainable practices *via* energy conservation and technological innovations.



Master Plan Assumptions

The importance of NWREC to Washington State's agricultural industry is both historic and ongoing. NWREC is at the forefront of meeting current industry challenges and is both evolving with, and contributing to, possibilities made available by new research and technology. In developing this Master Plan a number of assumptions will be used:

- The rates of growth, change and innovation in the agricultural industries of Washington State will continue at their current pace.
- The Skagit Valley of northwestern Washington will remain a healthy and productive, regional agricultural environment.
- Faculty led programs based at NWREC will continue to reflect major agricultural commodities; and associated research will be aimed toward these products.
- The rate of funding and opportunities for expanding research, outreach and renovation will continue at, or above, current rates.
- Research done at NWREC will employ new technologies, placing new demands on capacity and the design of facilities.
- Research discoveries will translate into practical applications and outreach activities, generating an evolution in support needs.
- Natural resource conservation will continue to be a driving factor in the development of rural communities in Washington State.
- NWREC will continue to host volunteer groups and gardening organizations; and will continue to nurture relationships that are mutually supportive and beneficial.

Background

Mission

The principal mission of the Northwestern Washington Research and Extension Center (NWREC) is to serve the agricultural, horticultural and natural resource science interests of the state through research and outreach activities that are focused on the unique climatic conditions of western Washington; the region's diverse, small- and mid-sized farms; and the expanding rural-urban interface.

The mission is being accomplishing through:

Research Discoveries –

Making new discoveries that benefit growers, in such areas as:

- Environmentally sound and economically feasible control measures for pathogens, pests and weeds.
- Cultivar adaptation and disease and pest resistance under mild, marine climatic conditions.
- Methods for growing alternative and bio-fuel crops.
- Cultural practices unique and appropriate to western Washington and British Columbia.
- New information for a variety of agricultural crop production systems.

Leadership –

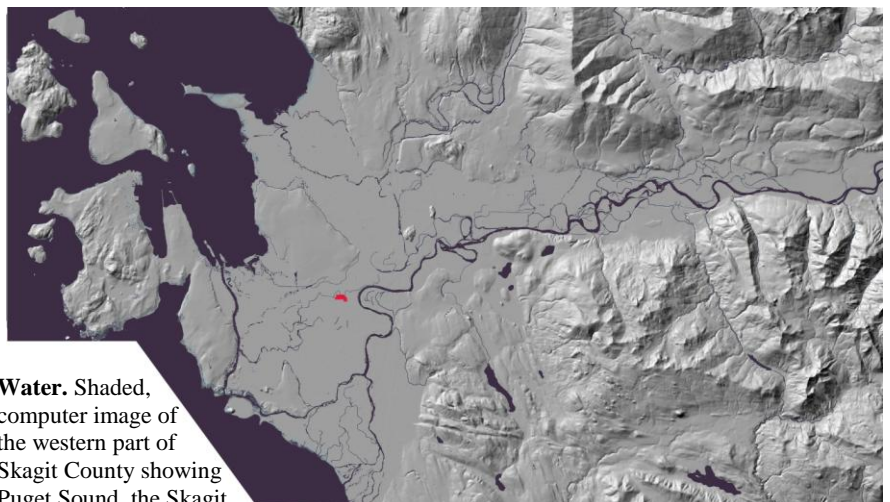
Providing leadership on critical issues associated with agricultural practices at expanding urban/rural interfaces.



Aerial View. View looking northeast across the Skagit River Delta toward Mount Vernon, WA, at upper left. NWREC (outlined in red) is in foreground. The Skagit River meanders across the delta at upper right. State Route 536 bisects the northeast quarter of campus.

Outreach Information Dissemination –

Informing stakeholders through training programs, demonstration plots and through written and web-based publications. Providing proper diagnosis of plant pathogens, insect and weed problems.



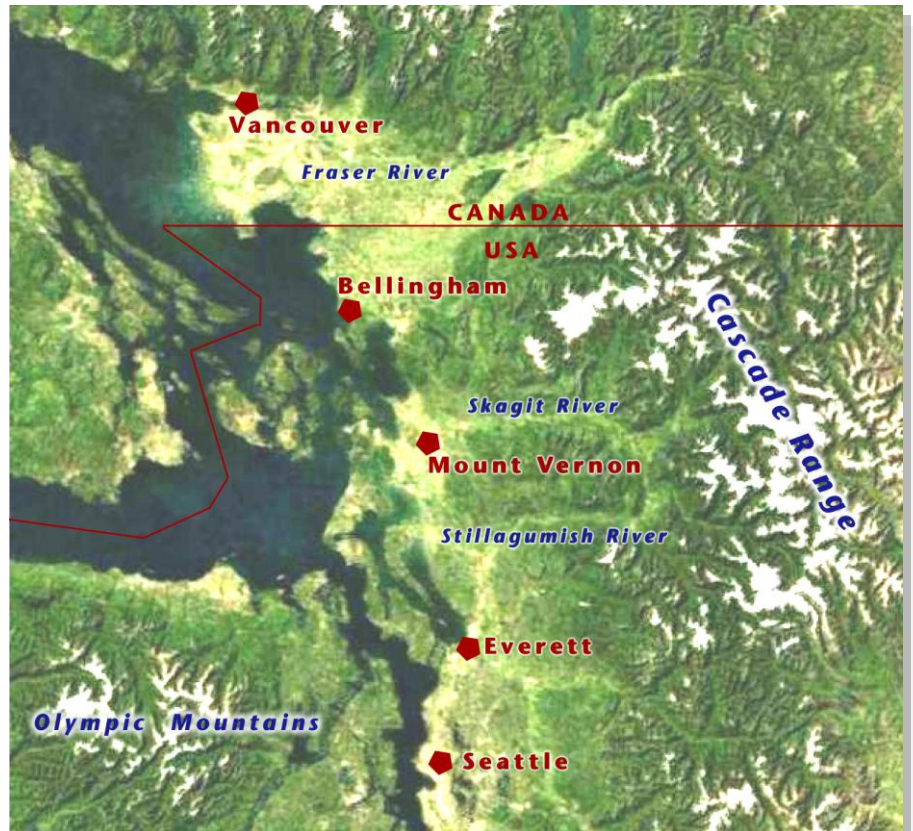
Water. Shaded, computer image of the western part of Skagit County showing Puget Sound, the Skagit River Valley and Delta. The image illustrates the defining role of water and mountains in the agriculture and urban development of such flood plains in western Washington. NWREC shown in red, water in black.

Location

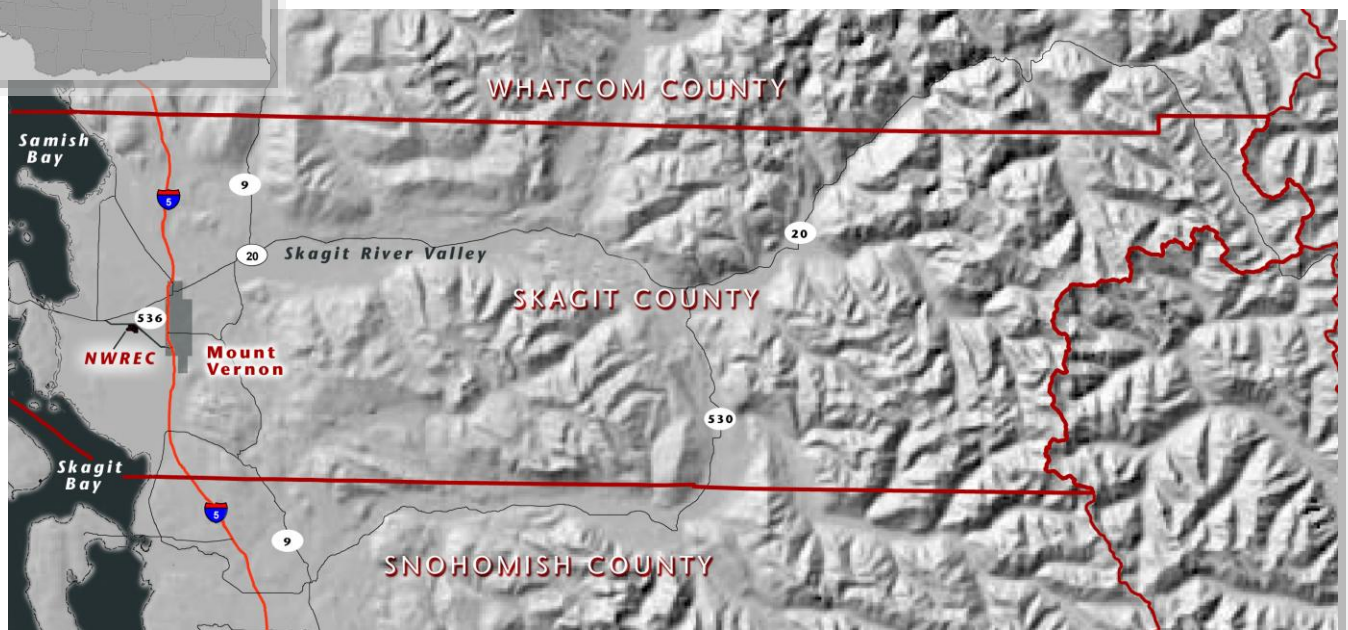
NWREC is situated in northwestern Washington on the broad plane of the lower Skagit River Basin. The Skagit River emerges from the Cascade Mountains and flows into the eastern end of Skagit Bay, approximately 10 miles south of Mount Vernon. NWREC is located 2.4 miles west of Mount Vernon on State Route 536 (SR 536, Old Memorial Highway).

Skagit County lies midway between Seattle, WA, and Vancouver, BC; and encompasses most of the drainage of the Skagit River Basin, the Skagit Valley and Delta. NWREC and Mount Vernon are centrally located in this coastal region.

Defining features of this location are the moderate, maritime climate and abundant rainfall developing from the surrounding



Regional Agriculture. The broad range of agricultural products grown west of the Cascades is due in large part to: i) farming on alluvial fans of river deltas (light green in this satellite image), ii) location between two major mountain ranges, and iii) proximity to the ocean. Maritime trade has also supported development of growing urban centers that both compete with the agricultural industry for resources and provide infrastructure and growing markets. The NWREC Mission provides research based information to agricultural and natural resource stakeholders.



Olympic Mountains and Cascade Range. Deep alluvial soils are characteristic of the seismically active glacial basins of the Puget Sound lowlands. The lower Skagit Valley alluvial fan covers roughly 250 square miles, with agriculture forming one of the area's leading industries. The favorable conditions of the region include mild winters, a long growing season and relatively dry summers.

The region's agriculture includes a very broad range of products: livestock and dairy, fresh and processed fruits and vegetables, specialty produce, grains, turf grass, vegetable and grass seed; and ornamental, nursery and greenhouse crops.

The vegetable seed production industry, alone, supplies a major portion of the world's vegetable seed. Washington's seed industry contributes over \$65 M to the state's economy. And, vegetable seed production, by itself, generates \$12.4 M annually (1989 dollars).

Agriculture in Washington State is an industry generating over 5 billion dollars annually (2006 dollars). It is also one of the most diverse in the nation, producing over 200 crop species.



Skagit Valley. Characterized by the nearly flat Skagit River Basin, and abrupt transitions into the forests of the Cascade Range.

In northwest Washington, alone, over 100,000 acres support more than 60 fresh-market and processed foods. In Skagit and adjacent counties, over 363,000 acres produce more than \$640 M in annual, farm gate value. (14% of state total value).

Impact

Many current products and practices used in the region's agriculture today derive from research conducted at NWREC.

Nearly all crops in western Washington are produced on small acreages. Addressing the needs of such a diverse industry has produced an impact on Washington agriculture significantly greater than the historic size of NWREC facilities and staff might otherwise suggest.

This tradition of using basic science to address problems, then translating findings into real world solutions has characterized the center's heritage.



NWREC, circa 1960. View looking South, across SR 536. The new Agricultural Research and Technology Building, constructed in 2006, replaced core buildings seen in this photo.

In the beginning, 1940's -

The vegetable seed production industry in Skagit County dates from 1885. In the 1930's cabbage seed production was threatened by mosaic virus, devastating seed yields. Dr. G.S. Pound, then of the U.S. Bureau of Plant Industries, discovered the disease etiology and control measures that returned this industry to the Skagit Valley by 1944. The value of such work to the region's producers was so significant that it became the impetus to create NWREC. Close collaboration between the center and regional growers has been a hallmark of NWREC over the decades.

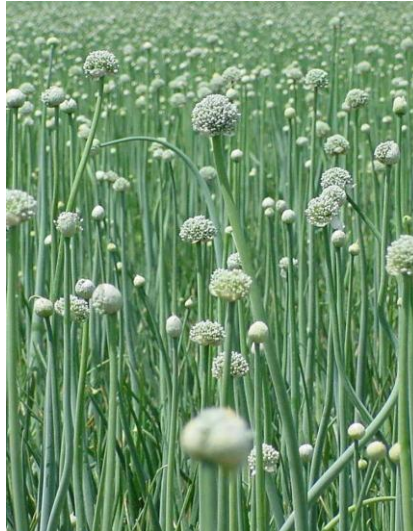
Through the 1960's -

With establishment of NWREC in 1947, the tradition of applied research and outreach continued as a major focus. Through the 1960's work done by Dr. Louis Getzin resulted in improved insect control of important seed crops such as radish and spinach.



NWREC Cabbage Seed Production Trials.

Work by Dr. William Haglund developed pea cultivars that were resistant to a fungal wilting disease that was infecting green peas. Dr. Richard Gabrielson



Onion Seed Crop.

developed seed inspection and treatment techniques that assured quality, and allowed development of a Pacific Northwest seed crop industry with global marketability.

These pioneering contributions have supported development of a seed crop industry in Washington that now produces seed for a significant proportion of global production of 35 vegetable crops. Over 70% of U.S. production of carrot, spinach, radish and beet seed is located in Washington. These crops, alone, account for approximately 50% of world wide seed production.

Less than 1% of vegetable seed produced is used in Washington, and a major portion is sold overseas, making Washington's \$65M annual seed production industry an important component to our balance of trade.



Raspberry Cultivars.

Through the 1970's and 1980's -

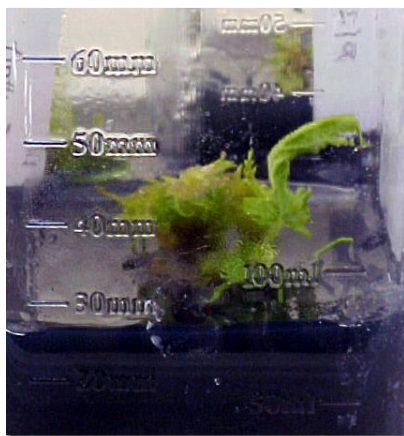
In the 1970's, among a number of important findings, the Jonagold variety of apple was developed at NWREC by Dr. Bob Norton.

Environmental concerns arising in the 1980's brought challenges to regional producers when effective herbicides were banned by EPA. Losses due to weeds were devastating throughout the Pacific Northwest. However, immediate work on alternative herbicides by Dr. Stot Howard at NWREC brought back these industries. And, Dr. Kassim Al-Khatib's showed that several different herbicides could be used on northwestern Washington small acreage crops.



Blueberry Cultivars.

The 80's also saw the emergence of new biochemical and molecular techniques. NWREC scientists were the first in developing new *in vitro* tissue culturing methods, primarily for ornamental, woody species.



***In vitro* Cultures.**

Through the 1990's -

During the 1990's the private Western Washington Fruit Research Foundation provided funding for evaluation of fruit crops. These trials have resulted in commercial potential for a number of new varieties, including the Lupin cherry and Taylor's Gold pears, as well as plums and kiwis.



Liberty Variety Of Apples.

Developed for the northwestern Washington cider industry.

Those initiatives later evolved into expansion of wine grape and apple cider varieties adapted to the region's marine climate. NWREC is providing advances in viticulture, enology and in education to the growing western Washington wine grape industry.

Among states, Washington ranks second in production of premium

wines, and is first in production of Concord grape juice. Washington's wine industry has grown 20% per year for the last quarter century.

Led by Dr. Gary Moulton's Fruit Horticulture Program, NWREC is contributing to grower education, identification of fruit and rootstock varieties, and development of cultivation practices for both wine and cider production.



Northwestern Washington Wine Grape Cultivars.

Work done at NWREC has stimulated development of new vineyards, wineries and cideries in northwestern Washington. In Skagit County alone, twenty new vineyards have been established in the last four years. In 2000 Vancouver Island had eight wineries; today they have over 32. Education and outreach activities carried on at NWREC over the last five years have significantly contributed to this growth.

During this same period, Dr. Debra Inglis' Vegetable Pathology Program addressed the challenge of a new, fungicide-resistant potato blight. This new blight put the region's \$70 M potato industry at risk. Work at NWREC identified the etiology of the disease and developed new control methods. The program's findings allowed advances toward commercial development of resistant varieties.



Storage Rot of Potatoes. Caused by fungus.

2000 and onward -

The last several years have also seen development at NWREC of solutions to land management problems through pest and weed management strategies. The region's climate allows weeds to flourish and act as significant competition to profitable food production.

Methods developed at NWREC have introduced cultivation techniques, that protect the environment, control noxious weeds, and have supported the emergence of organic and sustainable farming practices.

And, continuing the long tradition of protecting the vegetable seed crop industry in western Washington, Dr Lindsey duToit's Seed Pathology Program has recently identified five pathogens of vegetables and seed crops new to Washington and the Pacific Northwest; and one pathogen not previously found in the U.S.. Research and outreach activities at NWREC are currently addressing these emerging challenges to the vegetable industry.



Plant Pathogens. Pea fields, root infection showing as yellow areas.

History

Given this history of accomplishment, it is not surprising that regional growers have been instrumental both in establishing NWREC and in insuring its continuing support.

NWREC was born out of a growing need to protect regional farmers from plant diseases that threatened their crops. The vegetable seed production industry in Skagit County dates from 1885. Climate and geography make the five northwest counties of Washington ideal for growing vegetable seed crops, and today this area is the most important vegetable seed producing region in the U.S.

But, by the 1930's this industry was in decline due to insect pests, plant diseases and poor cultivation practices.

The need for reliable seed production during World War II spurred establishment of a cooperative research program in 1942; involving local, state and federal agencies. In 1943, Dr T.E. Randall from Washington State College (subsequently WSU) and Dr. Glenn S. Pound with the Bureau of Plant Industries (subsequently the USDA) began research at Mount Vernon. By 1943 their findings had addressed a number of problems, and by December of that year growers had organized to raise money for a permanent center.

From 1944 through 1946, growers, packers and other industry and government representatives developed the organizational and financial framework for establishing the Northwest Seed and Truck Crop Laboratory.

Site selection and construction were underway by 1947. And by that year the center was placed under the direction of the State College of Washington and renamed the Northwest Washington Experiment Station.

Since 1947, NWREC has received strong support from the allied agricultural and horticultural industries, as well as small farmers, horticulturalists and garden enthusiasts.

Today, NWREC is a 165 acre center with over 18,000 square feet (sf) of laboratory and office space, and an additional 13,000 sf of greenhouse space.



The Olson Heritage House.

The Olson Heritage House was originally built in 1913. The house, outbuildings and surrounding eight acres were purchased by the Skagit Farm Bureau in 1999 as part of their Land Security program to ensure the future of research at NWREC. The Farm Bureau was reimbursed by HUD, and in 2003 the property was transferred to WSU. The house was remodeled to current standards in 2004, using private donations, and is now used as graduate student housing.

While the barn is not maintained, individuals in the local community have sentimental attachment to the structure and the agricultural emblem it creates.



Olson Heritage Farm House

Introduction

Current Programs

The complexity of agricultural products and practices in Washington, and especially those west of the Cascades, constantly challenges NWREC programs to keep pace with change. Traditional research has addressed fruit and vegetable crop processing, vegetable seed crops, fruit and vegetable variety evaluation, and disease, insect and weed control practices. More recent research has addressed emerging needs in bio-fuel crops, irrigation management, organic farming practices, environmental buffers for protecting rivers and streams, and value-added product development. A number of these projects are multidisciplinary, while others involve public and private research organizations, nationally. Outreach programs serve to convey on-site research findings to the growers and allied industries.

Biologically Intensive Agriculture and Organic Farming (BIOAg) Program.

This nascent program was started in January, 2008, as part of the Center for Sustainable Agriculture and Natural Resources (CSANR) program at WSU. This program distributes information that facilitates development of new products, processes, or markets for businesses in the agricultural products value chain. Primary constituents are agricultural producers, related service providers, new production and processing entrepreneurs and businesses handling agricultural products.

See:
<http://csanr.wsu.edu/BIOAg/>



Olson Barn.

Historic Preservation. Preserving open space, small farms and productive land in a region with fast growing urbanization is a key regional issue. Public expectation of open space and agrarian landscapes has helped ensure a healthy and productive agricultural environment.



Entomology Program. The Entomology program investigates the biology of arthropod pests of berry crops and methods for their control. Research on pests that attack strawberries, especially spider mites, has been ongoing in western Washington for several years. Researchers are testing the field release of mass-produced predators of spider mites, and training regional growers on how to use these biological control strategies.



Strawberries.

Fruit Horticulture. The Fruit Horticulture Program encompasses a range of research projects covering grapes, fruit trees, exotic fruit, and ornamental fruit trees. The program has two missions: variety evaluation and improvements in techniques for growing fruit producing plants. Variety evaluations identify those best suited to the cool, humid climate of the Puget Sound region. Testing of various cultivation methods supports optimizing growth and productivity of those cultivars in commercial settings.

See:
<http://mountvernon.wsu.edu/FruitHorticulture/AboutUs.html>

Vegetable Seed Pathology. The Vegetable Seed Pathology program was initiated in 2000 as part of the WSU Safe Food Initiative. The objective of this program is to contribute to a sustainable and secure food supply. Research and outreach activities focus on vegetable seed crop diseases caused by a number of fungal, viral and bacterial diseases in the Pacific Northwest. This is important to growers, because the competitive nature of the seed production industry requires growers to market high quality seed that is pathogen free for global markets.

The Pacific Northwest produces a significant percentage of the global supply of vegetable seed, supplying seed for 35 vegetable crops. The climatic conditions found in the region are key to this productivity. While the acreage dedicated to vegetable seed production in Washington is just under 15,000 acres, the value is significant. Using cabbage as an example, one acre of seed production can provide seed for about ten thousand acres of cabbage production.

Securing seed production has global impact and implications.



WSU Cider.



Carrot Seed. Seed head suffering from blight.

See:
<http://mtvernon.wsu.edu/VSP/Ind exSP.htm>

Small Fruit Horticulture. The Small Fruit Horticulture program conducts research and outreach activities to support growers of small fruit. Research is conducted on the effects of various cultivation methods on plant diseases. Trials on blueberries and raspberries have led to the introduction of over 100 new varieties since 1994. Investigations on growing small fruit varieties under "high tunnel" greenhouse systems started in 2008

See:
http://mountvernon.wsu.edu/Small_Fruit/indexSF.html



Pressing Cider Apples In The Field.

Vegetable Horticulture. The Vegetable Horticulture Program addresses vegetable production in the climate conditions of western Washington. The use of plastics and biodegradable mulches as row cover are in the forefront of this research; as are the studies of soil and water management methods and, organic pest management practices.

See:
<http://vegetables.wsu.edu/>



Experimental Plastic Mulching.

Weed Science. The Weed Science Program focuses on outreach services to growers, providing numerous education programs on controlling weeds of specialty crops, on evaluation of herbicides, and on a wide variety of weed control techniques in western Washington.

See:
http://mountvernon.wsu.edu/WeedScience/index_WS.html



High Tunnel Greenhouse



Canadian Thistle. An important weed.

Vegetable Pathology. The Vegetable Pathology Program focuses on fungal and nematode diseases of fresh and processed vegetables in western Washington. Research emphasis is on fresh market potatoes, tomatoes, peas, carrots and lettuce. Outreach services assist growers with diagnosis and control of vegetable diseases.

Control of these diseases has significant implications for securing the domestic food supply

See
http://mountvernon.wsu.edu/plant_pathology/plant_path.htm



Potato Blight. Fungus sprouting from inside the tuber, appears as white spots.



Outreach. NWREC programs provide Leadership and Outreach to Washington farmers.

Volunteer Display Gardens.

WSU Outreach and CAHNRS work with the Skagit County Master Gardener Foundation, and other groups, to maintain the Volunteer Display Gardens at NWREC. Located immediately west of the ARTB, these gardens have developed since 1986, to:

- demonstrate environmentally and scientifically sound gardening practices,
- provide hands-on experience for volunteers, and
- interest, inspire and educate the public, including youth, in science-based horticulture and related topics.

Programs, events and garden management are provided by several volunteer groups. The Discovery Garden is managed by the Skagit County WSU Outreach Master Gardeners. The Native Plants Garden is managed by the Salal Chapter of the Washington State Native Plants Society. The Demonstration Orchard is managed by the Western Washington Tree Fruit Research Foundation (WWTFRF). The Rose Garden is managed by the Skagit Valley Rose Society. An apiary is located at the western boundary of NWREC and is managed by four chapters of the Washington State Beekeepers Association, in conjunction with Dr. Steven Sheppard's WSU Queen Bees program.

Until recently, some of these volunteer organizations operated independently of WSU. And, while these popular programs garnered substantial political support for NWREC in the local community, their activity on WSU property raised a number of issues relative to access, program management, safety and liability. In 2006, an agreement between WSU and



the Skagit County Master Gardener Foundation addressed many of these longstanding issues.

See:
http://mtvernon.wsu.edu/display_garden.htm

Faculty and Staff.

Research scientists and outreach specialists at NWREC are faculty in the College of Agriculture, Human and Natural Resource Sciences (CAHRNS),

The center currently supports eight faculty, and has the capacity to house up to eight laboratory based research programs.

Fifteen current staff positions are equally divided between support and technical staff roles. The center can also support up to eight graduate students, and an additional eight student interns. Currently, as many as five of these students can be housed on campus.

With recent construction completed, and the addition of new programs, faculty numbers could increase to 10, and student numbers are expected to increase to as many as 10 graduate students, as well as additional interns.

With program expansion over the next 10 years, these numbers could double. Especially desirable would be addition of graduate student programs that could increase the number of students on campus in the near future. In this eventuality, need for providing campus housing could quadruple the number of living spaces required, and add the need for providing married student residences. Such impact would also include providing ADA accessibility campus wide.

Seasonal workers are drawn from the local area. Many are undergraduate students. Approximately 15 seasonal employees currently work at NWREC, primarily in the summer months. This number could also expand as newly acquired

research fields, located north of SR 536, come into use for the first time in 2008.

Offices and laboratories for these programs are housed in the Agriculture Research Technology Building (ARTB). However, this building is fully utilized with respect to its office, laboratory, employee support and sanitary facilities capacity. Growth over the next few years will start to put a strain on the capacities of this facility.



ARTB Lobby.

Future Visions.

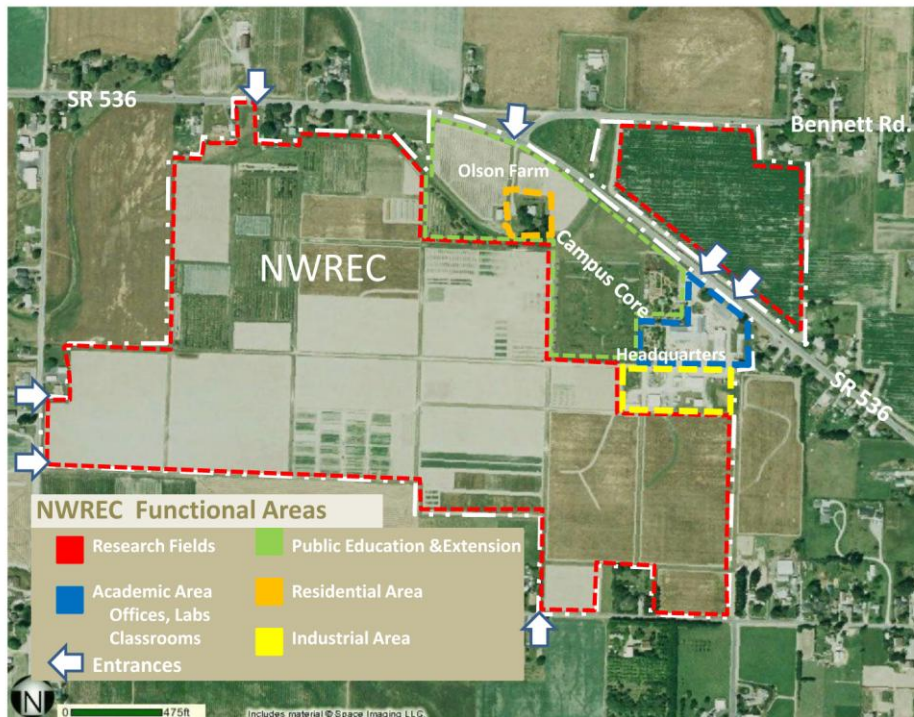
Core, faculty-led research at NWREC reflects major agricultural commodities and emphasizes protection of crops and seeds from pests and disease. Environmental protection, production of high value agricultural and horticultural crops, and wise use of natural resources are a public expectation that will be advanced at NWREC

To address these needs, faculty will be expected to conduct cutting edge science and deliver programs addressing the most critical issues of stakeholders. Accomplishing this over the coming decade will result in the involvement of more graduate students, collaboration with colleagues across many disciplines, and effective

engagement with stakeholders. Assessment of the effectiveness of program delivery on actual practices by stakeholders will continue to be fundamental to prioritization of programs and acquisition of new assets. Among these assets will be hiring of new faculty members and the resulting need for appropriate facilities to support core programs.

The impact on requirements for infrastructure, facilities and support activities is already being felt at NWREC. Immediate needs include new plant growth facilities, expanded equipment storage, sanitary and personnel support facilities, office space, increased access, and enhanced security. The advancements in methodologies and programs potentiated by completion of the ARTB will see expansion beyond these needs to include additional laboratory and office space, additional plant growth facility space, modern graduate student housing, modern maintenance facilities for both laboratory and field research equipment, additional equipment storage, and the functional integration of Campus Core areas.

In coming years NWREC will play an increasingly important role as a focal point for supporting and directing research and outreach programs for the five county region. The center will continue to involve volunteers in advancing outreach derived from focused research programs. And, faculty will continue to identify emerging needs for program expansion. Each will mold a vision for the future and presage campus development requirements.



Campus Analysis

Campus Organization.

NWREC is organized into functional areas. The 165 acre campus is structured around a Campus Core and surrounding Cultivated Research Fields.

The Campus Core runs parallel to SR 536, and is comprised of an:

- **Academic Area** (~3 acres), supporting all of the office, laboratory and greenhouse space on campus,
- **Industrial Area** (~4 acres), supporting the maintenance, storage and utility services on campus,
- **Residential Area** (~ 1 acre), developed from the Olson Heritage House and surrounding residential grounds,

- **Public Education Area** (~12 acres), which encompasses the Volunteer Display Gardens, a volunteer parking lot and a turf area used for volunteer events and overflow parking.

The Academic and Industrial Areas make up the Headquarters at NWREC. The Residential Area is contained within the original Olson farm property.

Defining Features.

Defining features of the site are SR 536 and the slough. The highway forms a formidable geographic, functional and psychological barrier defining the northern boundary of the Campus Core. The slough defines the Olson farm property, presenting a strong historic and psychological boundary. It also presents a physical barrier to movement within the Core.

SR 536 cuts across NWREC property an ~45° angle to the north-south orientation of constructed elements. Past development has ignored this feature, and continued to orient construction on old U.S. Public Land Survey (USPLS) property boundaries. While connectivity within the Campus Core has been improved by recent construction and placement of new utilities, even these have zigzagged through campus, following vestigial USPLS lines.

As a consequence, a striking feature of campus is the evolution of discontinuity in layout between mutually dependent areas. An important example of this is, that while the student residence is ADA accessible, there is no ADA accessible route between the Residential and Academic areas of campus

While it is clear that future development should occur along SR 536, a significant challenge will be overcoming barriers to re-orienting access, circulation, security and infrastructural elements relative to this feature.

Placing the slough in piping, underground, would remove this rift. And, constructing an Axis Road between the Residential Area and Headquarters would re-define the orientation of the core. This would allow internal access to areas south of Headquarters and relieving the current bottleneck at the ARTB, where parking lots connect directly to the high-speed, state highway.

As part of long term planning, reorienting future growth and campus organization will enhance campus function. It will also help resolve issue of access, circulation and functional connection that will otherwise

continue to impact development. As an example, removing the requirement that traffic use driveways connecting directly with SR536, would alleviate safety concerns and possibly avoid costly studies and highway revisions.

Academic Area. The Academic Area is anchored by the Agricultural Research and Technology Building (ARTB). This 18,750 sf building opened in December, 2006. It provides faculty office and laboratory space, and includes a research library, 6000 sf auditorium and a demonstration kitchen.

The adjacent parking lot and service drive are the only paved surfaces on campus. Two greenhouses are adjacent to the ARTB; and the Screenhouse and the Tree House meeting room complete this area.

Industrial Area. The Industrial Area houses support facilities in five major and nine minor structures. Agricultural and field research equipment are stored, maintained, repaired and fueled in this area. The new sewage treatment and dispersal facilities are located here, along with an old pond, chemical mixing and storage buildings and a weather station. The area is almost entirely graveled and can serve as additional, overflow parking.

Public Education Area. Adjacent to the Academic Area is approximately 12 acres open to the public. Display Gardens support programs run by WSU and by local organizations that sponsor many public field events. To accommodate these activities, a graveled parking lot and an adjacent turf field have been dedicated to event activities and parking.

Residential Area. The Olson Heritage House provides on-campus housing for up to five students. It additionally has a meeting room that can be scheduled for public use.

currently maintained and is not carried on the WSU Facilities Roster.



Main Entrance. (above) Main campus entrance, parking lot and front of ARTB. View looking southwest across SR 536.



General Storage Quonset. Building 4006 dates from 1949. View looking northwest.



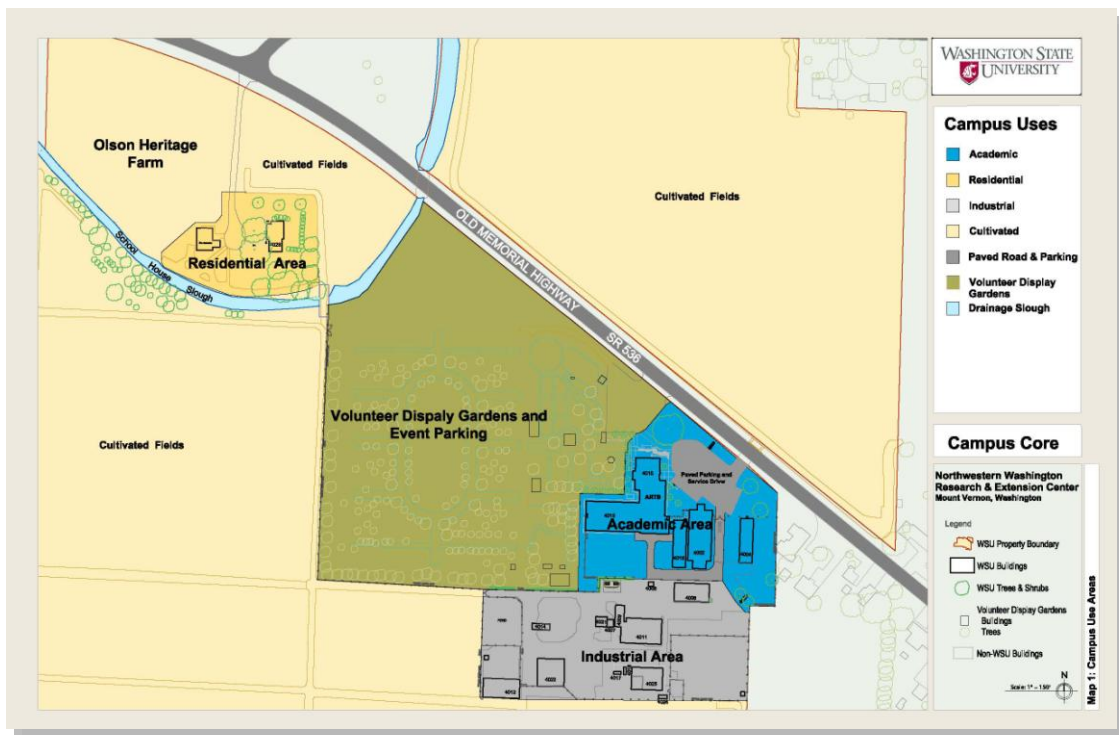
Modular Units. Buildings 4017 & 4018.

Located on the old Olson Farm, the Residential Area includes the maintained yard and farm property adjacent to the Olson barn. The dilapidated barn is not



Mechanical Harvester. This \$ 100,000+ raspberry picker is too large for existing storage and maintenance facilities.

Cultivated Research Fields. The cultivated research fields include numerous research plots, orchards, an apiary, and a research geologic tiltmeter.

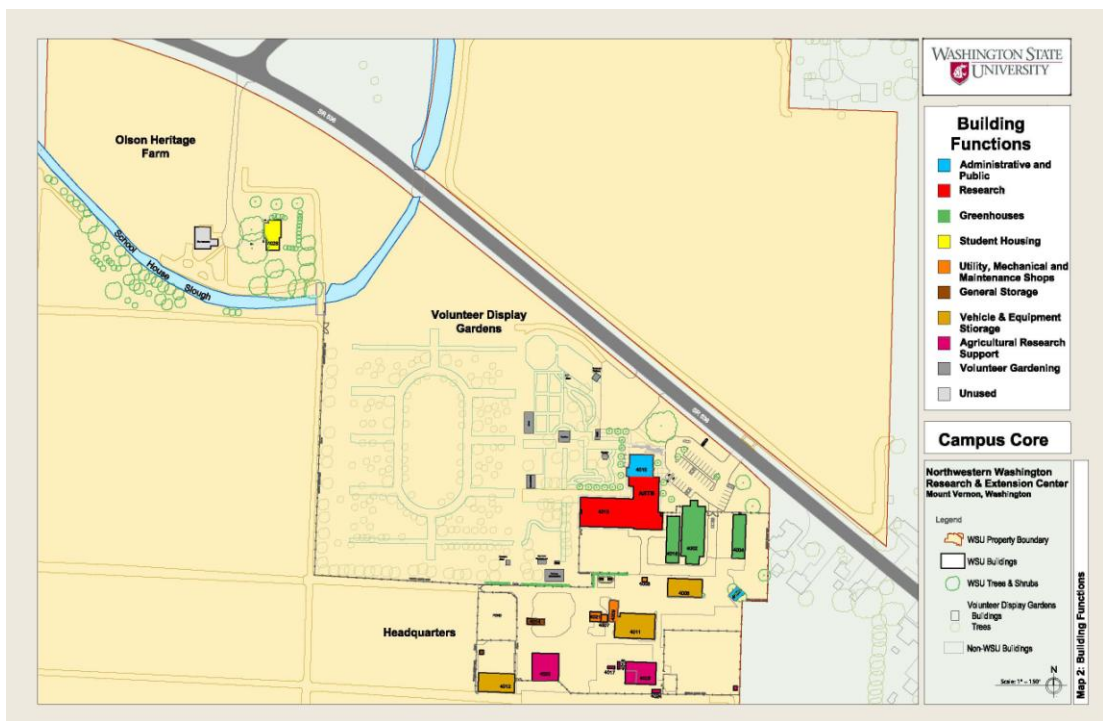


Relationship of Location and Function.

The Headquarters at NWREC occupies approximately 7 acres in the northeast quarter of campus. With the exception of the Olson Heritage House, all buildings are located at Headquarters.

Small size and central location of office, laboratory and greenhouse space means that research activities that transition through basic, applied and field phases can be conducted in one central building or in immediately adjacent buildings. Research fields are contiguous with both Academic and Industrials areas.

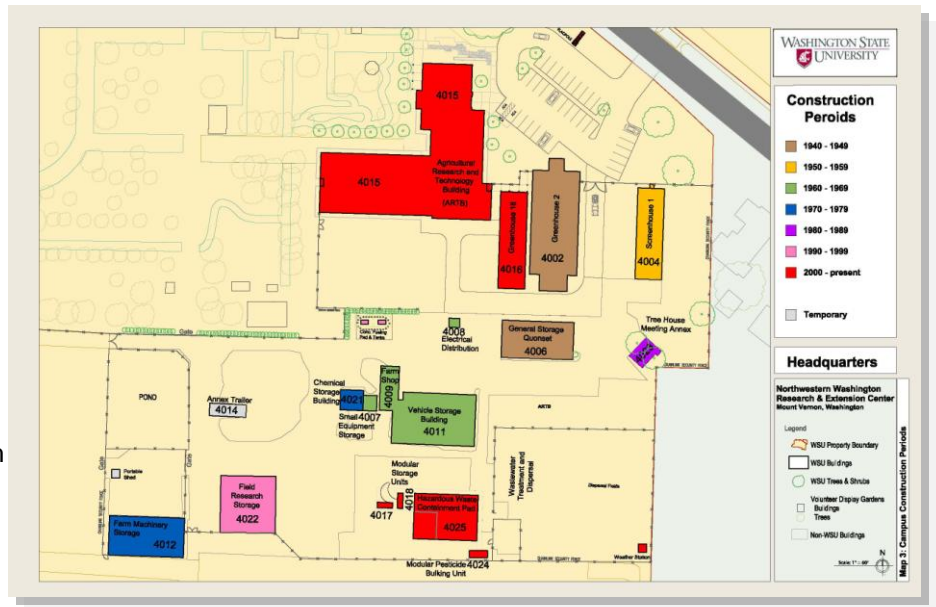
The Olson house is situated approximately 0.2 miles west of the main campus entrance, along SR 536. As part of the Campus Core, the Olson property and the remainder of NWREC property are contiguous. However, this area is physically isolated from the remainder of campus by the School House Slough.

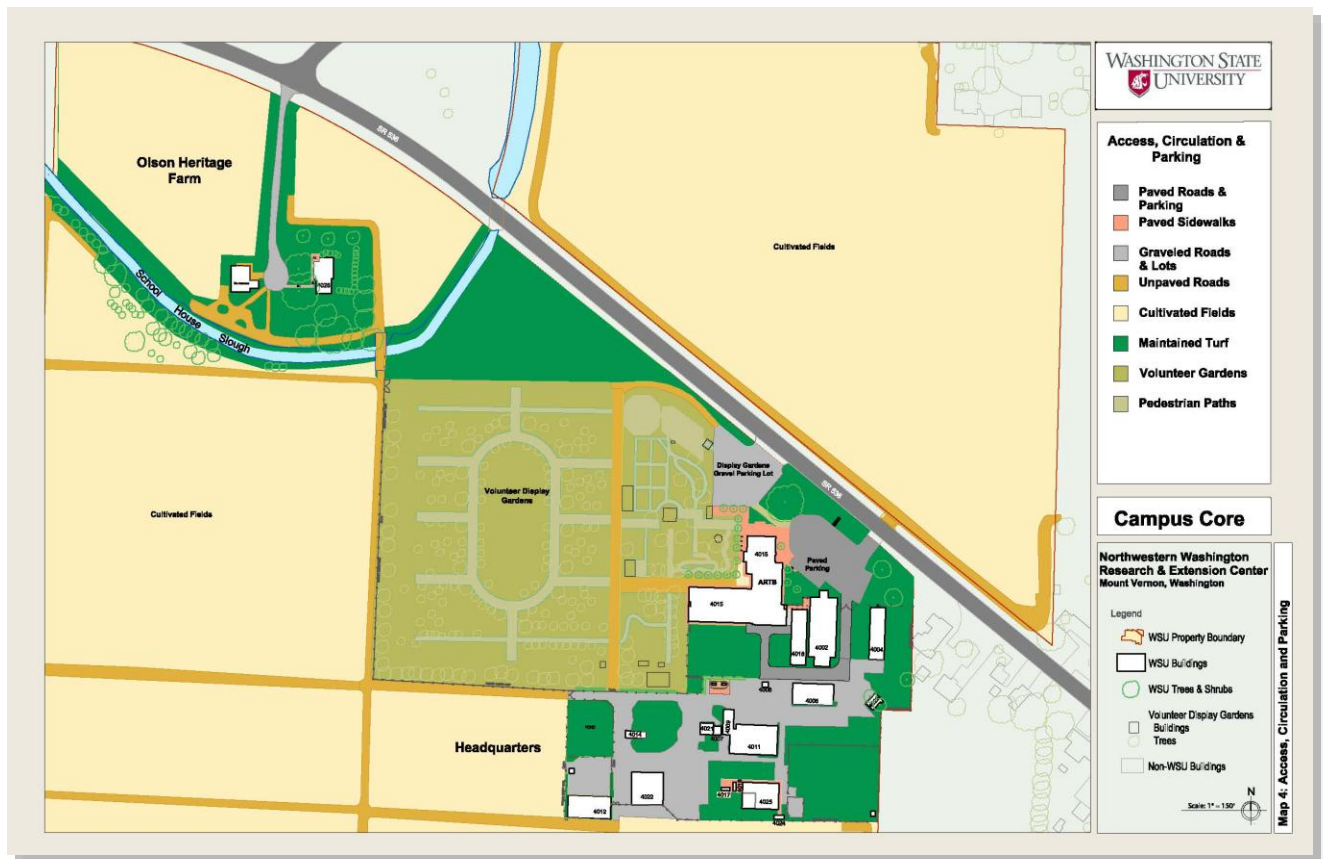


Historic Development

NWREC is a small campus, supporting only 19 permanent structures. Although it was established in 1947, today the Academic Area is virtually new. Most of the older structures are those located in the Industrial Area.

NWREC has reflected the traditional phases for development of the nation's agricultural research centers; with major expansions in the 1950's and 1960's. Today, however, about half of these older structures at NWREC are gone. Completion of the ARTB in 2006 replaced virtually all pre-existing office and laboratory research space dating from the 1960's and older.





Campus Core. Aerial view of most of the Campus Core, looking northwest along SR 536 (on right). The ARTB is large "L-shaped" structure lower

center. Volunteer gardens are adjacent, to the west. Olson farm and slough are just visible at top.

approximately 50' from the house. The Olson Heritage House was fully renovated in 2004 and a new concrete ramp and walk provide ADA compliant access to the first floor of the house. However the gravel parking area is not ADA compliant and visitors who require use of the ramp must be dropped off at the paved sidewalk.

Unimproved Farm Roads.

The main property can be accessed by road at only four other points, all on unimproved farm (dirt) roads. A single, 250' drive provides access from SR 536 to a 0.5 acre, turf field that is not currently used for research. Two points of access are from Beaver Marsh Road on the western boundary of NWREC. The fourth access point is from the south, off of Donnelly Road, at the southwest corner of NWREC property adjoining that road.



Paved Walks.

Only two paved sidewalks serve the Headquarters. The largest is adjacent to the north and east sides of the ARTB and connects this building with both the new parking lot and with Greenhouses number 16 and 2 via a covered veranda across their north face. This walk is ADA compliant.

A smaller service walk connects components of the chemical storage and handling area: buildings 4017, 4018, 4024 and 4025. These modular units and containment pads were upgraded and connected as part of the ARTB construction in 2006.

The Olson house is served by the paved, ADA accessible ramp connecting the parking area with the front entrance to the house.

Paths.

All other pedestrian traffic is accommodated by paths, usually surfaced in bark chips and turf, or by the gravel lot of the Industrial

Area. Most of these interior paths are located in the Display Gardens. The terrain at NWREC is virtually flat, with few obstructions to an interior flow of pedestrian traffic.

The Olson farm is connected to the Headquarters by an unimproved farm road that is also used as a pedestrian path. This road crosses the slough southeast of the farmhouse and is the only pedestrian access to this property from the interior of campus.

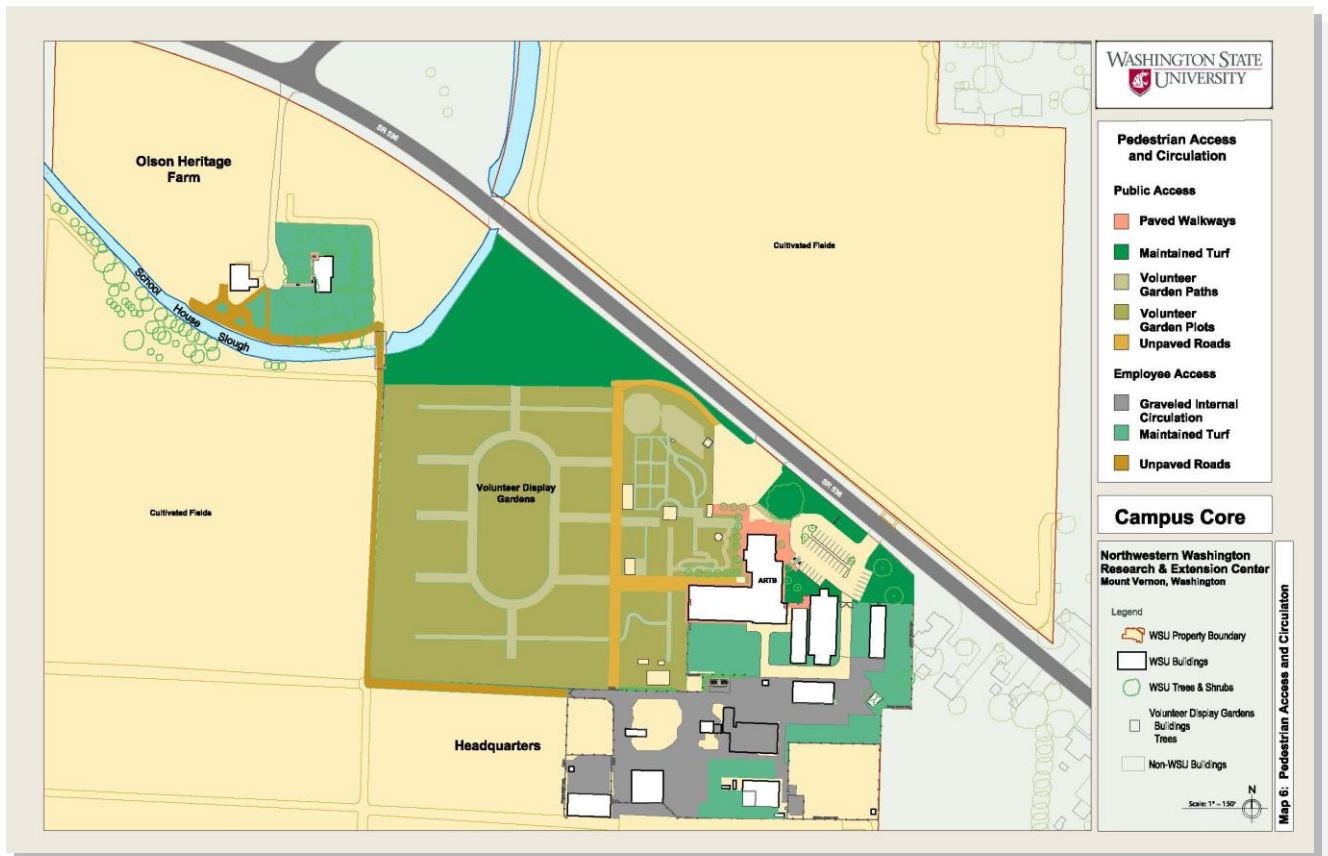
Circulation.

Circulation within the Headquarters is facilitated by the large, graveled lot surrounding most structures in the Industrial Area. Gated access to this fenced area is available from both the south and west on farm roads. However, the principal means of entry is on the paved service road from the new parking lot.

Vehicles entering the graveled area have almost complete access to all sides of maintenance and storage buildings. Delivery, maintenance and emergency vehicles entering this area have large, relatively unencumbered avenues of circulation with few requirements to back up. Restrictions occur along: i) the single paved entrance from SR 536, through the parking lot and funneling along the drive west of building 4002, and ii) at the gated western exit, funneling between the pond and volunteer gardens.

The west side of the ARTB is accessed by unimproved tracks through the Display Gardens

Numerous interior roads and tracks connect the interior Cultivated Fields of the Farm Area.



Perimeter

The north boundary of campus along SR 536 is unfenced along most of the perimeter. A 6' high chain linked fence is in place around all of the Industrial Area and includes the southern half of the Academic Area. This fenced perimeter includes Greenhouses 16 and 2, and Screenhouse 1; and runs along the eastern edge of Headquarters, where center property joins private property. The southwestern corner of the ARTB is connected to the Industrial Area by fencing, securing the south (back) side of this building and separating the Volunteer Display Gardens from this side of the ARTB and from the Industrial Area. Fencing internal to the Industrial Area further secures and isolates the pond and the wastewater treatment and dispersal leach field. An additional fence borders the WWTFRF Display Orchard

on its south and west sides, tying into the slough on the north, and on the south, into the Industrial Area fence at its west gate.

The Olson farm is not otherwise fenced.

Access to research fields from Beaver Marsh Road or Donnelly Road is unencumbered. Most of the perimeter of the cultivated fields borders private, agricultural fields. However, interior roads and tracks provide full access to research plots. Student housing at the Olson farm, the Volunteer Display Gardens, and the west sides of the ARTB are accessible from the north. This has the effect of leaving all but the Industrial Area open to public access.



Unimproved Access to ARTB.

Unimproved lane through display gardens provides the only vehicular access to the west end of the ARTB. View looking due east.

Infrastructure

Water.

Domestic water is provided by the Skagit Public Utility District. A single line serves Headquarters, providing water for domestic use, for fire sprinkler systems and hydrants, to greenhouses and to irrigation of cultivated fields south of the Headquarters area.

The Olson house is also served by the Skagit Public Utility District.

Wells. Wells are not used.

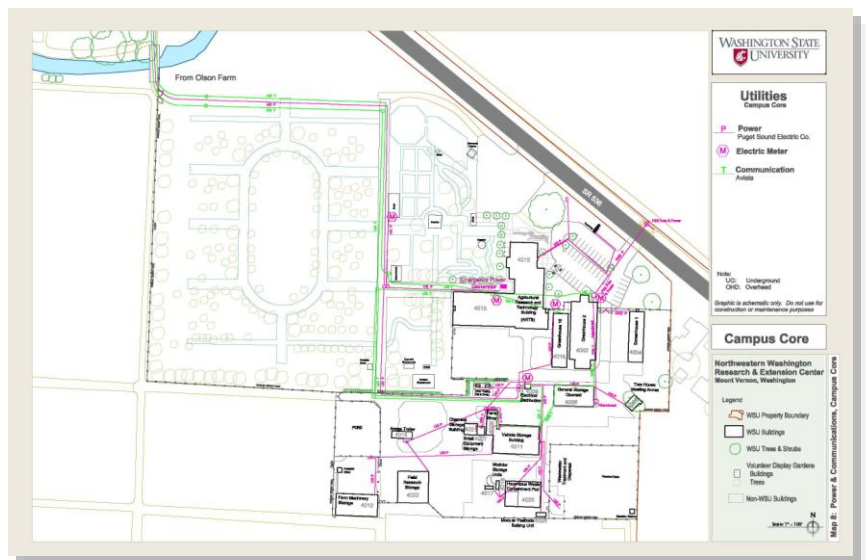
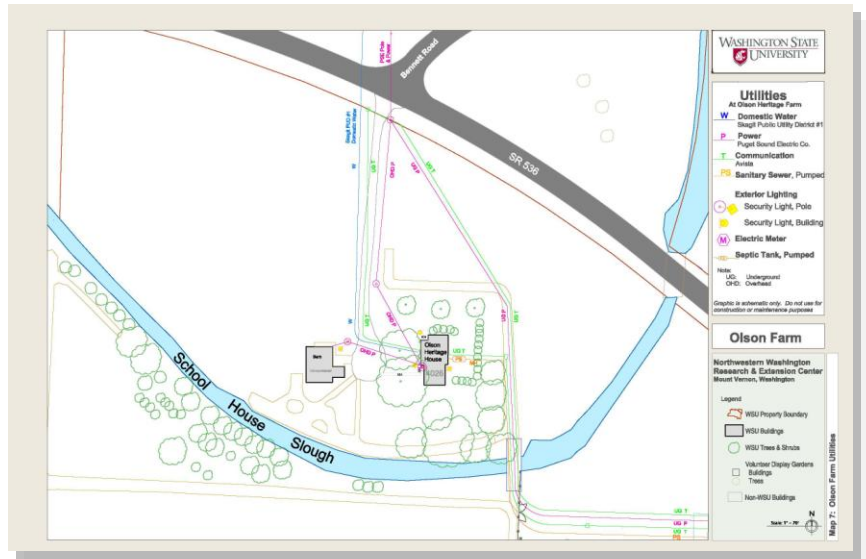
Power.

Electric power is provided by Puget Sound Energy. Upgrades to primary lines serving campus were made in 2006 as part of the ARTB construction. Both Headquarters and the Olson house were upgraded at this time.

Natural Gas and Liquid Propane.

In addition to electricity, a number of activities including research laboratories require natural gas for their applications. Natural gas is purchased from the Cascade Natural Gas Co. and provided by underground lines. Two above-ground, liquid propane (LPG) tanks are also rented, one by WSU (located at the Vehicle Storage Building, #4011) and a second by the Skagit County Master Gardeners Foundation (located at the greenhouse in the Master Gardener Discovery Gardens.)

Steam. Steam is not utilized at the facilities level.



Sewers.

Sewage treatment and disposal at NWREC is complicated by the elevation of groundwater in the valley, the absence of a nearby municipal sanitary sewer line, and fine textured clay in the upper seven feet of soils. Ground water is only four feet below the surface at NWREC, and percolation through the clay layer is poor.

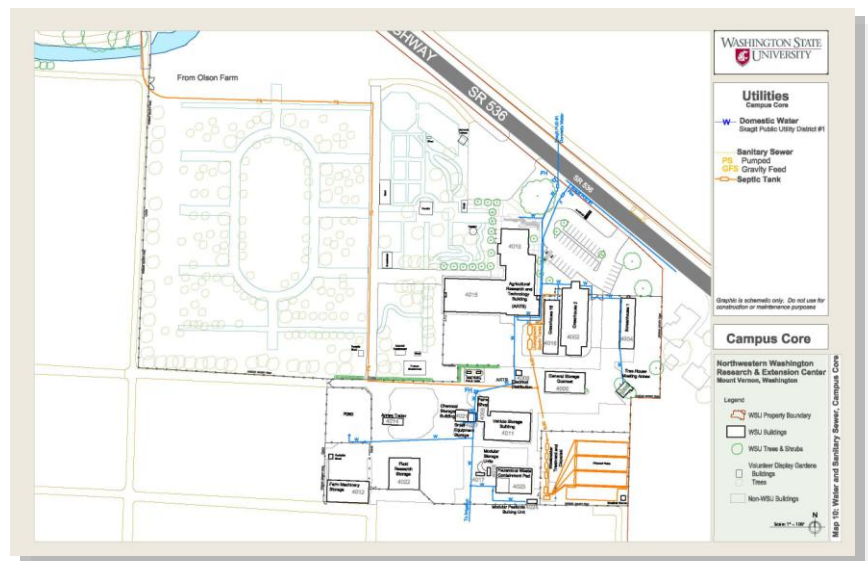
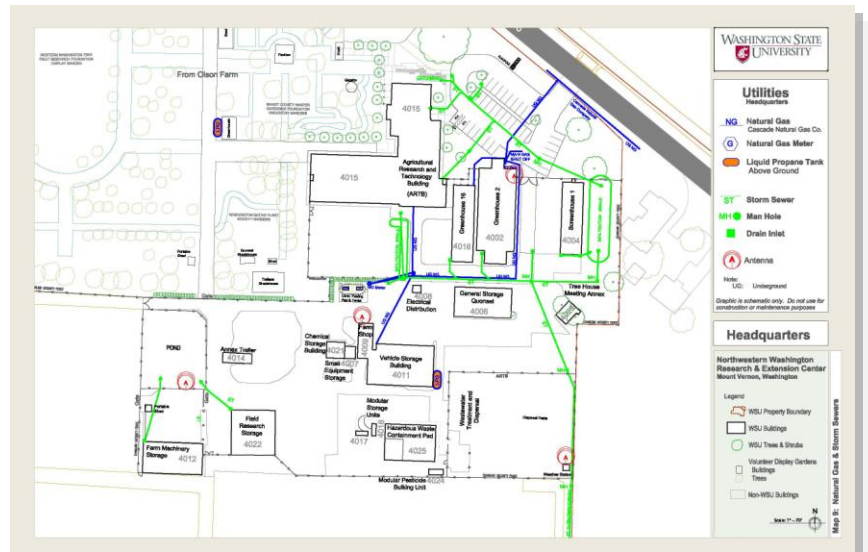
In 2005 a new wastewater treatment and dispersal system was constructed on a fenced, half acre in the southeast corner of the Industrial Area. Primary treatment is by septic tank, with effluent then transferred to the new treatment facility. Once there, a second stage of treatment is provided in sludge tanks, followed by disinfection using ultraviolet light. Effluent is then pumped onto a raised drip field where water evaporates or soaks into the ground.

The new system is designed to handle 2,500 gallons/day; which will accommodate 80 staff and up to 150 visitors. In 2006 the Olson house was connected with this system.

However, indoor facilities are available only in the ARTB, the Olson house and at one very old restroom in the headhouse of Greenhouse 2. No permanent restroom facilities are located in the Industrial Area or on any of the cultivated fields. Farm crews use a single porta-pottie year round.

Stormwater.

The alluvial, clay soils at NWREC also provide poor infiltration of stormwater. Except at swales and where construction has raised the elevation around buildings, the slope across the entire campus rarely reaches 1%.



Surface drainage is generally from northeast to southwest, interrupted only by roads and the Slough. Elevations range from 20.5' above mean sea level, northeast of SR 536, to 15' above mean sea level, nearly a mile away, at the southwest corner of campus. Average grade is 0.1%

Runoff is directed off of the Headquarters area by a 12" storm sewer pipe connecting to a Dike District collection system, approximately a quarter mile south, along the eastern boundary of campus. Within headquarters, storm flow is collected from roofs and the paved parking lot, and conveyed by pipe to two detention swales.

Overflow from the swales enters the Dike District system. Runoff from the Industrial area either infiltrates into the gravel lot or is collected in the pond.

Swales bordering cultivated fields provide catchment for field runoff. And, the School House Slough provides drainage for most of the runoff from this flat site.

To facilitate drainage around buildings, new construction has been raised approximately two and a half feet above existing grade.



Landscaping.

Landscaping at NWREC is divided into distinct areas based on historic use.

Academic Area.

Academic Area landscaping consists of large, deciduous, specimen trees dating from the 1950's and 1960's and a few foundation plantings.

Of significance is the Red Oak specimen tree which has become an NWREC icon, and marks the main entrance to the Headquarters Area. This tree was planted, and a plaque set, in 1961 by the local agricultural community to commemorate Dr. Martin Carstens. Dr. Carstens was instrumental in establishing the Northwest Washington Experiment Station (later NWREC) and served as its Superintendent from 1947 until 1961.

A second memorial tree is located just northeast of Screenhouse1. This honey locust and plaque commemorate the work of Dr. Paul M. Eddy, an Entomologist at NWREC from 1947 until 1980.

A few new trees have been added as a result of new construction. And, foundation plantings have been added around the paved walk and verandas at the north end of the ARTB. Shrubs have been planted in the median strip of the parking lot. But, the majority of the Academic Area is in turf, most notably the 0.3 acres immediately south of the ARTB. A Planting Plan has been proposed for this area.

Tree House.

The Tree House is a free standing structure, situated between two birch trees south of Greenhouse 4. Dating from 1986, this unique building was

constructed by Dr. Robert Norton with funding from the Skagit Men's Garden Club. The area east of Screenhouse1 was originally developed as a demonstration garden for ornamental and fruit trees. While these plantings were removed in the 1990's, the idea of an on-site demonstration garden was originated. The Tree House provides a unique meeting room and defines a small park, tucked away in the south east corner of the Academic Area.



The Tree House. Greenhouse 4 is in back.



NWREC Signature Red Oak.

Display Gardens.

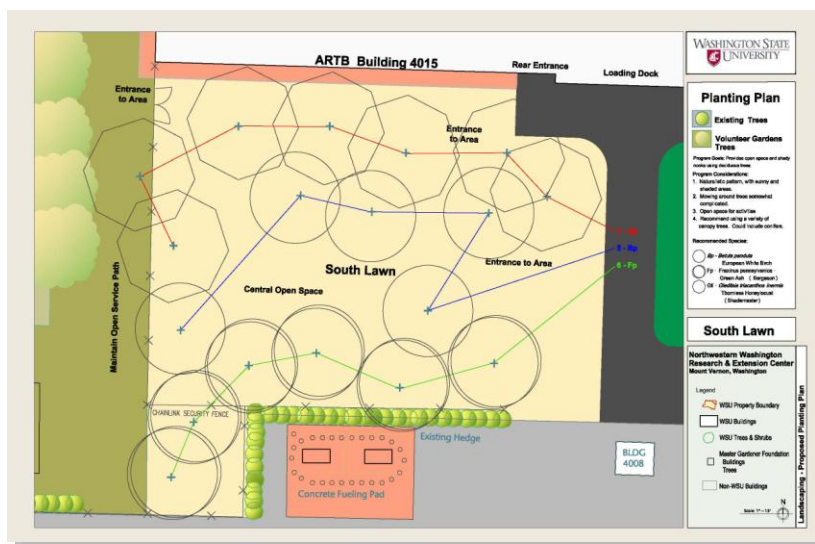
To the west of the Academic Area, the Display Gardens provide a 12 acre site for outreach education opportunities. Hands-on gardening experience is provided by volunteer organizations.

Display gardens kept by these volunteer groups feature a large number of specimen plantings. Several permanent buildings have been constructed over the years.

Olson Heritage House.

The Olson farm property is largely in cultivated fields. However, around the farm house, a number of large willow trees border the slough, and remnants of established, formal plantings remain within the well manicured lawn.

Several outbuildings have been removed, leaving concrete pad remnants and gravel farm roads between the house and slough. The remaining barn is old and dilapidated, with seriously cracked and battered foundation walls. The inability to conduct maintenance near this structure provides a challenge for weed and rodent management at the site.



Proposed Planting Plan. Plan to provide shade trees on South Lawn of ARTB.

Industrial Area.

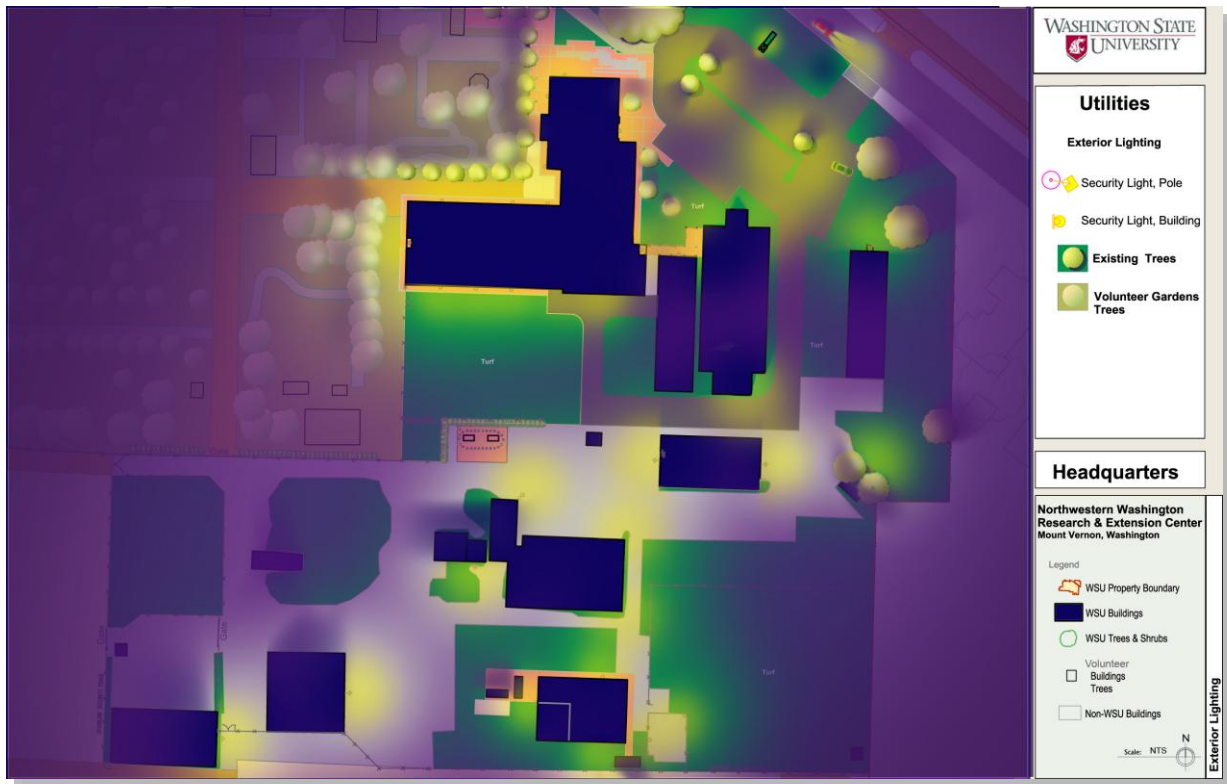
Landscaping in the Industrial Area is sparse. Maintained patches of turf persist around the periphery of most buildings, with no established trees. Within the parking area and pond, unmaintained areas persist.

The fence line between the Academic and Industrial Areas is lined with columnar junipers, providing a screen between these two sectors.

The remainder of NWREC acreage is either under cultivation, kept as maintained turf, or allowed to grow native vegetation.



Hedge. Columnar junipers screening Industrial Area on south side of South Lawn.



Lighting.

Lighting of the campus core is accomplished by both pedestrian street lights and building security lights. The quality and placement of such lighting reflects the periods of campus development. Few older building have illuminated doors and grounds. Recent construction or renovation has provided a higher density of lights at doors and sensitive areas. The majority of lighting is in the Academic Area, with larger security lights placed on poles in the Industrial Area.

Of significance is the absence of lighting at the intersection of SR536, Bennett Rd. and the Olson house driveway.

A schematic representation of exterior lighting suggests only a few poorly lit portions of the Academic and Industrial Areas. Greenhouses will contribute some lighting while their interior lights are on. At the Olson Farm, the house and surrounding grounds are well lit, although there are numerous areas of shadow due to existing shrubbery and the old barn.

Olson House Driveway.

View looking north across SR 536 from Olson house drive to intersection with Bennett Rd. This intersection provides the only egress from the Residential Area for WSU students.

Safety and Security

Olson House Driveway.

As a consequence of poor lighting, the intersection of SR 536, Benner Rd. and the Olson House driveway is of concern at night. The highway supports speeds, posted as high as 50 mph.

Main parking Driveway. The entrance drive from SR 536 into the new, paved parking lot is also hard to identify at night.



Display Gardens.

An important safety and security issue at NWREC is the presence of a relatively large number of volunteers and public visitors in the Volunteer Display Gardens, at any time of day, throughout the week.

Historically, these volunteer organizations have constructed buildings and install utilities without necessarily having WSU Facilities Operations supervision. Volunteer facilities were once managed and maintain outside of WSU prevue. While this relationship began to change in 2004, there are still a number of structures and utilities that are not managed or maintained by WSU. Some utilities may not even be known to WSU, although recent attempts to map this infrastructure have been made.



Volunteer Greenhouse

Note should be taken of the potential for injury accident, or medical emergency among the gardening volunteers, or public, attending field days and plant fairs.

Likewise, screening of volunteer group members is handled entirely by the volunteer organizations.

There is no fence separating the Display Garden area from the new ARTB on the west side. And, volunteers and the general public routinely enter the public, end of the ARTB to use restroom facilities during business hours. Movement from public to research areas is controlled by key-card access, however.

Availability of Sanitary Facilities

Facilities available for sanitary disposal of human waste are inadequate at NWREC. While the new wastewater treatment facility serves the ARTB, Greenhouse 2, and the Olson house; no other WSU sanitary facilities exist on campus. One, rented porta-potty serves WSU employees in the Industrial Area, and another single porta-potty serves all of the Volunteer Display Gardens, year round. Difficulties should be anticipated, with the potential for unsanitary situations to develop both among WSU employees and the general public.

WSU seasonal field workers are given breaks and transportation back to the ARTB morning, noon and afternoon. However, accommodating up to 25 field workers in a research laboratory setting is less than optimal.

Single Porta-potty.

One porta-potty serves all WSU employees and students in the Industrial Area, year round.

The situation with sanitary facilities at the Volunteer Display Gardens is potentially more difficult. While the gardeners have an ADA compliant porta-potty, volunteers routinely use facilities in the ARTB.

However, the ARTB is open only during business hours. The numerous field days held on Saturday place indoor facilities out of reach. Field days typically attract from 50 to 150 visitors. However, Master Gardener Plant Fairs typically attracts up to 1500 visitors at any given time. A single porta-pottie is inadequate during these events and volunteer organizations rent extras.

The existing Wastewater Treatment and Disposal facility can accommodate a campus population of up to 230. For events, temporary rental of porta-potties by the sponsoring volunteer organizations appears preferable to either opening the ARTB or creating a permanent "rest-stop" for travelers on SR 536. Planning for access and circulation north of the gardens should include placement of such temporary facilities for the immediate future.



Perimeter Access

Mt Vernon is entirely open on all sides to access from surrounding roads. There is no gate or light at any property entrances. Entry to the property from Donnelly Rd., Beaver Marsh Road or SR 536 is not restricted except by the slough and some drainage ditches next to roads.

A gated fence does bisect campus, extending along the west and south sides of the Display Gardens, and connecting to the Industrial Area at its west gate. This fence has the effect of preventing access into the Headquarters Area from points west. However, access from east of this fence is also unrestricted, except to the fully enclosed Industrial Area.

Student Housing

Student housing on campus is entirely open from SR 536. While 911 service is available, there is no resident staff on duty after hours.

Emergency Response

Ambulance response to campus is from the McLean Road Fire Department, with a response time of three to four minutes. An additional ambulance responding from Mt. Vernon could arrive in 10 minutes. The nearest emergency hospital is about five miles away, in Mt. Vernon.

The McLean Road FD is two miles away, with an advance party response time of five minutes and a full department response of six to eight minutes.

The Skagit County Sheriff Department and the Washington State Highway Patrol are active in the area and provide a routine presence on SR 536.

Air ambulance is provided by Airlift Northwest from Arlington or

Bellingham, WA. Response time is 15-20 min. after notification. Skagit County landing sites for Airlift Northwest are predetermined, and coordinated through Skagit County fire chiefs. None are on campus.

At present, NWREC has no full time employee who is EMT certified. However, first aid kits are located throughout campus and in each vehicle that travels off campus.

First Aid and CPR classes are offered at NWREC, and at present, at least one person per academic program has First Aid certification.

And, both earthquake drills and fire drills are held for employees and volunteers. However, only the ARTB and Hazardous Waste Containment Pad (4025) has a built in fire suppression system.

Pond

The pond north of the Farm Machinery Storage Building (4012) has seen the Headquarters grow around it over the decades. New construction has continued this trend, and today this area is no longer a peripheral sump for stormwater and chemical disposal. As a consequence the location poses several difficulties:

- It brings standing water into close proximity to the populated center of campus. This either requires application of pesticides in the campus core or risk of breeding insect pests, including mosquitoes that could carry West Nile Virus.
- Its location forms a choke point for access and circulation from the Industrial Area to cultivated fields.
- It limits westward expansion of either the Industrial Area or the Academic Area.

- And, it poses a hazard in proximity to the volunteer gardens that requires security fencing.
- It is insufficient in size to act as a viable reservoir for fire suppression.

Planning should consider conversion of this pond to a smaller and shallower stormwater collection bio-swale that subsequently conveys storm flow to a new pond and wetlands located much further to the west.



Fenced Pond. Area presents challenges for maintenance, health and safety.

Flooding and Earthquakes

NWREC is prone to flooding and earthquakes. The campus is, for the most part, less than 18 feet above mean sea level. Further it is within a half mile of the Skagit River and situated over glacial outwash, on the river's flood plain. Its location places it in the FEMA 100-year flood frequency zone. Previous flooding at Headquarters has not been frequent. However, cultivated fields are frequently ponded due to the high water table and saturated soils, especially in winter months.

NWREC also sits in a region with significant seismic activity. USGS seismic hazard maps place NWREC in a zone where a magnitude 7.5 earthquake has a 2% chance of occurring every 50 years. This probability was used for design of the ARTB and such analysis should be considered in all planning.

Construction of the ARTB in 2006 has mitigated some risk of flooding to the Academic Area. Grading raised the elevation of the ARTB and adjacent structures to above 19 feet, elevating the new buildings into the FEMA 500-year flood zone for the present time.

However, geotechnical analysis has shown that a number of soil strata, including the upper 12' to 25' of soils on campus, can be prone to liquefaction and allow building settlement, loss of foundation support and spreading. From 4" to 6" of total settlement is possible on campus during a magnitude 7.5 earthquake. Subsidence is anticipated to be evenly distributed across the site. Such geologic activity is a likely cause for cracking, and displacement seen in the Olson barn foundation.

As a result, planning should anticipate loss of elevation during the lifecycle of new construction, and the probability that buildings could subside back into the 100-year flood plain under seismic conditions. In addition to designing for geotechnical and structural earthquake resistance, significantly raising the elevations of new construction, should be a priority.



Cultivated Research Fields. NWREC is virtually flat, with elevations varying from only 20 ft. down to 15 ft. above mean sea level, across the entire campus. Fields frequently pond.

New Facilities



ARTB Demonstration Kitchen



Greenhouse 16, Exterior



ARTB, Laboratories



ARTB, Support Services

Campus Plan

NWREC is growing. New employees, support of successful programs, and future research opportunities will require continued improvements in utilities, access, circulation, parking, security, land availability and modern research and office space.

Recent Construction

Recent construction of the ARTB, Greenhouse #16, the wastewater treatment facility, and remodeling of the Olson Heritage House has made a major impact at NWREC. Research and office space, new greenhouse space and student residence have been brought to current standards. A significant challenge with wastewater management has been ameliorated.

During the previous five years, a number of smaller renovation and addition projects have made important improvements. These include:

- enclosure and upgrading of the Hazardous Waste Containment Pad (4025),
- reconfiguration and upgrading of pesticide mixing and storage modular units (4024, 4017 & 4018),
- toxic waste remediation at the pond,
- upgrading and relocation of the AgWeatherNet weather station,
- security fencing of the south and west borders of the volunteer display gardens, and
- installation of new video surveillance cameras.



ARTB. Reception area of public space in new ARTB. View looking through security doors into hallway of research wing.



New Hazardous Material Containment Pad (4025). Storage modular units are at right. View looking southwest, across new wastewater leachfield

Proposed New Construction

New construction in Support of Existing Programs

Academic Area

A. New Greenhouse/Plant Growth Facility.

Planned replacement of Greenhouse 2 (4002) will require construction of a modern plant growth facility of approximately 6,500 sf, in order to maintain the *status quo*, and anticipate immediate program growth and new technologies.

Location is anticipated to be at the present site of Greenhouse 2, and presumes that additional plant growth facility space can be developed to accommodate ongoing research needs during the construction period.

The recently constructed Greenhouse 16 (4016), and early replacement of Screenhouse 1 (4004) will help to support this transition. Screenhouse 1 dates from 1953, and this structure has recently been converted from a greenhouse to a screenhouse that requires less maintenance and operating expense.

However, planning should consider that additional greenhouse space, beyond that available in Greenhouse 16 (3200 sf) and Screenhouse 1 (3000 sf) might be needed during transition, and as program growth continues. Program growth over the next 10 years could require a doubling of current plant growth capacity and support facilities.

B. WSU Outreach Office.

A new Outreach and Extension Office is proposed. This complex should provide space for a reception area, offices, teaching class rooms, conference rooms accommodating modern communications technologies, a demonstration kitchen, teaching laboratories and adequate parking.

The Master Plan shows approximate locations of building and parking areas. Revision of the intersection with SR 536 and Bennett Rd is a consideration.

Industrial Area

C. Equipment Maintenance

A modern farm shop, vehicle repair facility, employee support facility, and office space are needed to replace the cluster of significantly outdated sheds currently serving these purposes (4007, 4009 & 4021).

New programs added at NWREC in the last two years have required storage and maintenance of a significant number of new vehicles and farm implements as well as the modern shop tools required for their maintenance.

Current sheds date from 1960, and are patently inadequate.

A new maintenance building located adjacent to the Vehicle Storage Building (4011) would provide needed functional connectivity to this existing, 5500 sf storage building.

The new facility could include the employee support facility. At present, only an exterior "porta-potty" is available at the shop, an unacceptable situation for

employees working year round in these sheds. Restroom facilities are needed, along with showers, modern offices space and current communications technologies.



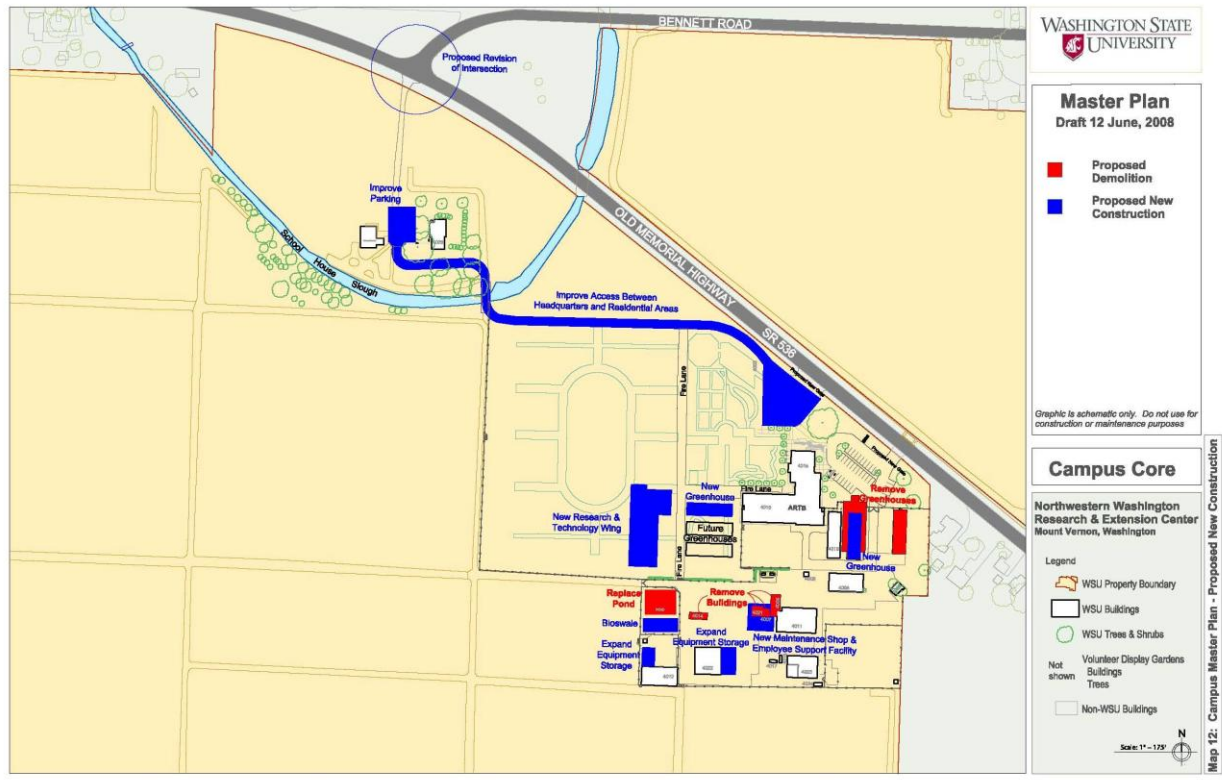
Existing Farm Shop (4021)

D1 & D2. Equipment Storage.

So much equipment is currently on hand at NWREC, even the Vehicle Storage Building, the 3900 sf Field Research Storage Building (4022), and the 3600 sf Farm Machinery Storage Building (4012) are not able to accommodate and protect this investment. A minimum (D1) of one new bay, of at least 1200 sf, is needed as an addition to the Farm Machinery Storage Building (4012). And, approximately 2400 sf (D2) is also needed to expand the Field Research Storage Building (4022).

Anticipating future expansion, planning should consider positioning these additions so that further expansion can be facilitated and the open space of the Industrial Area can be preserved. Expansion of the industrial Area, rather than continued infill is recommended.

recently constructed in the Academic Area.



E. Employee Support Facility. A support facility is need to provide modern, sanitary facilities to faculty, staff, students and field workers who must transition to and from field work. The ability to change clothes, shower and conduct meetings in a clean, safe setting is desirable, especially for individuals handling chemicals.

The urgent need for sanitary facilities in the Industrial Area suggest location of these facilities in that area. The facility should include restrooms, showers and locker rooms for both sexes, as well as a laundry, first aid area or small clinic, a meeting room and offices.

A support facility, either free standing or included as part of other capital construction, could provide this capacity.

F. The Pond.

Removal of health and safety hazards associated with having a unmaintained pond in the center of campus indicates that this area should be brought under routine maintenance that does not require the significant use of chemicals. With completion of current hazardous chemical remediation, the pond should be back-filled to an elevation preventing standing water. Storm flow should be conveyed to a located at a distance from Headquarters.

Decreasing the current area occupied by the pond would also alleviate the choke point north of the pond, while continuing to use this depression as an access control structure. Required maintenance should not differ from that of other bio-swales

New construction in Support of Expanding Programs

Academic Area

G. Research and Technology Addition.

Additional research laboratory and office space is anticipated to support expanding programs. Office space in the new ARTB is already fully committed, with little room for program expansion. Utilities installed in 2006 have anticipated this need. Proximity to the ARTB and research greenhouse space suggests locating an additional research and technology building west of the ARTB. The anticipated, 10-year need is for a building of approximately the same size and design as the existing facility.

Industrial Area

H. Additional Wastewater Treatment and Dispersal Facility.
Expansion of NWREC population will require additional wastewater treatment. Current capacity is sufficient as long as it is not required to support over 230 individuals, or process more than 2,500 gallons in a day. This can be exceeded at the present time during specific events. Future growth could exceed capacity.

I. Additional Plant Growth Facilities.

Anticipate the need for additional plant growth facilities and shadehouse space. Planning should consider doubling current plant growth facility space over 10 years. Consideration should be given to placing new facilities on the west side of the ARTB.

J. Expansion of Industrial Area.
Extending the boundary of the Industrial Area to the south would accommodate addition of a bay to building 4012 and facilitate access and circulation at the new ARTB research wing.

Residential Area

K. Expanding Residential Area.
Planning for the Residential Area will need to address additional student housing, ADA compliant access, circulation and parking, within the Campus Core. These plans should integrate with proposed revision of the intersection at the Olson Farm.

L. Cover Slough.

The slough should be placed underground in piping. This would remove a significant barrier between the Residential and Academic areas, and support long term development along SR536.

Demolition

Seven existing structures have reached the end of their service life, and need to be removed.

Academic Area.

1. Greenhouse 2.

Greenhouse 2 (4002) was constructed in 1947 and is the oldest structure remaining at NWREC. Although providing functional space, this structure remains marginal, and should be replaced with modern facilities at the same location.



Greenhouse 2 Dates From 1947.

While the attached, 1947 headhouse might require only remodeling, utility upgrades made in 2006 have anticipated a new structure which could include a totally new building. New construction should anticipate new technologies and expanding program needs.

Screenhouse 1. In conjunction with replacement of Greenhouse 2, early replacement of Screenhouse 1 should be considered as bridging capacity, in order to maintain research functions during demolition and re-construction. Replacement in its current location should be avoided in order to sustain open space on the east side of the Academic Area.



Screenhouse 1 dates from 1953.

Industrial Area

2. Farm Shops Complex

A cluster of small shop and storage buildings, dating from the 1960's, also needs to be replaced. The Chemical Storage Building (4021), Farm Shop (4009) and Small Equipment Storage Building (4007) need to be replaced with a modern, secure storage building in the same location. A modern structure could address a number of operational concerns relating to the age and configuration of these old sheds.



Farm Shop Complex. Sheds date from 1960's.

Opening this space would provide opportunity to upgrade utilities that have evolved around these buildings, and to widen an access lane between the fueling pumps and Farm Shop. This area is currently a choke point to circulation.

3. Annex Trailer.

The house trailer (4014) is a temporary structure used for storage. It is currently placed in a small material and equipment park in the middle of the Industrial Area. With availability of additional, modern, clean storage in this area, this trailer should be removed.



Annex Trailer. Temporary building not carried on WSU Facilities Roster.

Residential Area

4. Olson Barn.

The barn next to the Olson Heritage House needs to be either demolished or moved to a location where it can be refurbished. Civic organizations interested in preservation of farmland and historic structures may provide opportunities for removal, and renovation of this structure. If retained on NWREC property, future use should only be for activities that directly support the research and outreach missions of this center.

Opening space next to the Olson house provides opportunities for expansion and development of the Residential.

Remodeling

Much of the need for remodeling has been addressed by demolition of older buildings in association with construction of the ARTB. The Olson house has been remodeled and major upgrades over the last five years have provided much needed modernization.

Olson Heritage House Driveway

Of immediate concern is revision of the intersection of the Olson house driveway with SR 536. This driveway intersects at an acute angle, immediately across from the intersection of Bennet Rd. with SR 536. Revision should assure that the driveway and intersection meet state and county highway standards.

This revision will have consequences for capital improvements in the future. If the entrance needs to be moved, then this will affect future development locations. If the drive is straightened, then this impacts existing functions and will make resolution of the barn location a priority. Bringing the drive across a new bridge and constructing a new core axis road paralleling SR 536, would be a long term development solution to both access and circulation needs on this campus.

Security and Access Between Olson House and Headquarters.

A new paved road and ADA compliant walkway are needed, connecting the Headquarters Area to the student residence at the Olson farm. Likewise, parking at the residence should be made ADA compliant. A paved parking area for volunteer events and a paved road along the north boundary of the Volunteer Display Gardens would connect the residential and Academic areas of campus. This would provide a near term, temporary solution to the absence of a Campus Core Axis Road. Fencing for control of traffic and access from SR 536 would address some of the current security concerns.

Security Fence.

Hazardous Materials Buildings.

A security fence should be considered for structures that house, or could potentially house, dangerous materials (e.g. 4014, 4017, 4018, 4024, & 4025). While all building in the Industrial Area should be locked outside of business hours, a fence would provide an extra element of security when the public was present.

Security Fence.

Headquarters, Along Hy 536.

A gated security fence should be considered to control unrestricted access of the Headquarters Area from Hy 536. The absence of any residence staff on campus, outside of business hours, and the absence of dedicated campus security suggest that increased access control is advisable. With completion of the new ARTB, securing the valuable and potentially dangerous equipment and materials, associated with laboratory and agricultural research, should be an ongoing priority.



Southwest Corner Foundation, Olson Barn.

Future Development Sites

Olson Farm.

Expansion of the Residential area to the north, from Olson house to SR536, would provide locations for future student housing.

Orchards.

The northern half of the WWTRF Orchards would provide areas for future building. This location would be supported by existing infrastructure recently installed during construction of the ARTB. Likewise, access, circulation and parking associated with this future building site would provide

needed connectivity between Headquarters and the Residential Area. Security would be enhanced by using constructed elements to separate public space from research and industrial activities.

Consolidation of the Campus Core would be supported by developing an Axis Road paralleling SR 536.

Native Plants Garden.

The area immediately to the west of the ARTB joins the Academic and Industrial areas, and is supported by existing utilities . Anticipated expansion of research programs requiring new facilities would be best supported if they were kept in close proximity to existing facilities. This reduces redundant support requirements, and keeps the technologies needing these facilities in close proximity.

Expanded Utilities.

Restroom facilities are currently needed in the Industrial Area. Future growth will add to the need to expand the existing Wastewater Treatment and Dispersal Fields. Location of future facilities is proposed

adjacent to the south side of the existing dispersal field, and west of the proposed Axis Road, in conjunction with new construction of Outreach and Extension offices in the northwest end of the Campus Core.

Industrial Area.

Expansion of the Industrial Area is proposed to the south of buildings 4012, 4022 and 4025.

Slough.

The slough should be piped underground to remove this barrier and its fragmentation of the Campus Core.

Axis Road.

Connected and re-oriented the campus along an interior, axis road should be considered. Reducing use of multiple driveways connecting directly with SR536, would alleviate safety concerns and possibly avoid costly revisions. A new road connecting the Residential Area with Headquarters would provide this element, support a unifying vision, and facilitate future planning, construction and campus operations.

Future Challenges

Evolution of Research Programs, Impact of Technologies and Funding.

The interrelationship of funding sources, research program development and emerging technologies will impact campus planning and development. Most grants are obtained from state and federal sources (~60%) and from commodity commissions and other industrial sources (~30%). As a consequence program development at NWREC will reflect priorities of the regional agricultural community. As emerging technologies become increasingly important to funding sources, success of grant funding will reflect the success of NWREC in being prepared to support new research initiatives.

Moreover, the history of NWREC as a bulwark against acute challenges to regional agricultural productivity and to food safety means that future development should recognize the need to have extra capacity available. And, this capacity should continue to support scientists with cutting edge methodologies to anticipate, detect and address these challenges.

Campus planning for the next decades should reflect the importance and impact of these evolving priorities in a global context.

Growing Resident Population and Security

Success of research and teaching programs is being reflected in a growing student population on campus. At a given time, from two to five WSU students are pursuing degrees while conducting research at NWREC. There is currently spaces for 5 single students to live at the Olson house. Expanding programs will almost certainly result in an increase in graduate student populations over the next 10 years. As many as 20 students should be considered in planning.

In the immediate future, current new construction and new programs could support up to 10 resident students. The need to accommodate additional numbers and the opportunity to provide married student housing suggests that expansion of the Residential Area should include capital construction in the near term.

As NWREC grows, the absence of permanent WSU staff on campus after hours, the open nature of the campus, and absence of after-hours medical and security presence should be addressed.

Future Issues

The future of Mt. Vernon research will certainly include traditional projects in support of the agriculture industry in Washington State. New challenges, new technologies and new markets will open additional opportunities for research and development. In turn, these will require expanding infrastructure and facilities specifically designed to support these 21st Century challenges.

Among these are:

- Addressing challenges presented by plant disease and food safety issues deriving from evolving global, geopolitical situations.
- Development of new plant varieties using both traditional breeding methods and new biotechnologies.
- Employ cutting edge molecular biology in screening and diagnostic capacities, as well as in genetic development approaches.
- Developing production practices for crops that may be used as bio-fuels.
- Developing biologically intensive agriculture production methodologies.
- Developing value added and organic farming practices.
- Expanding the northwest wine and cider industries through education, development of adapted varieties, cultivation practices and market penetration.
- Integration of new technologies and agricultural practices for farm production.
- Development of methods for recycling or disposal of agricultural wastes.

Recommendations

The following recommendations offer some guidance to support future growth:

- **New Construction:**
Continue to place new construction to the west of the ARTB, along SR 536; filling in the Campus Core between Headquarters and the Olson Farm. Develop the campus axis parallel to SR 536 and orient new construction along an internal, axis road.
- **Anticipate Needs Globally:**
Conduct ongoing evaluation of future challenges that NWREC might be requested to address with little or no lead-time. Anticipate technical and facilities needs to address fast moving, situations.
- **Safety and Security:**
Prepare a Safety and Security Plan for the campus to include:
 - securing chemicals, buildings, information, programs and personnel.
 - addressing continuing challenges presented by the large numbers of volunteers and public visitors on campus,
 - addressing safety relative to traffic entering and leaving NWREC parking directly onto SR 536
 - securing the open and isolated nature of the Residential Area, in anticipation of growth in a

campus residential population.

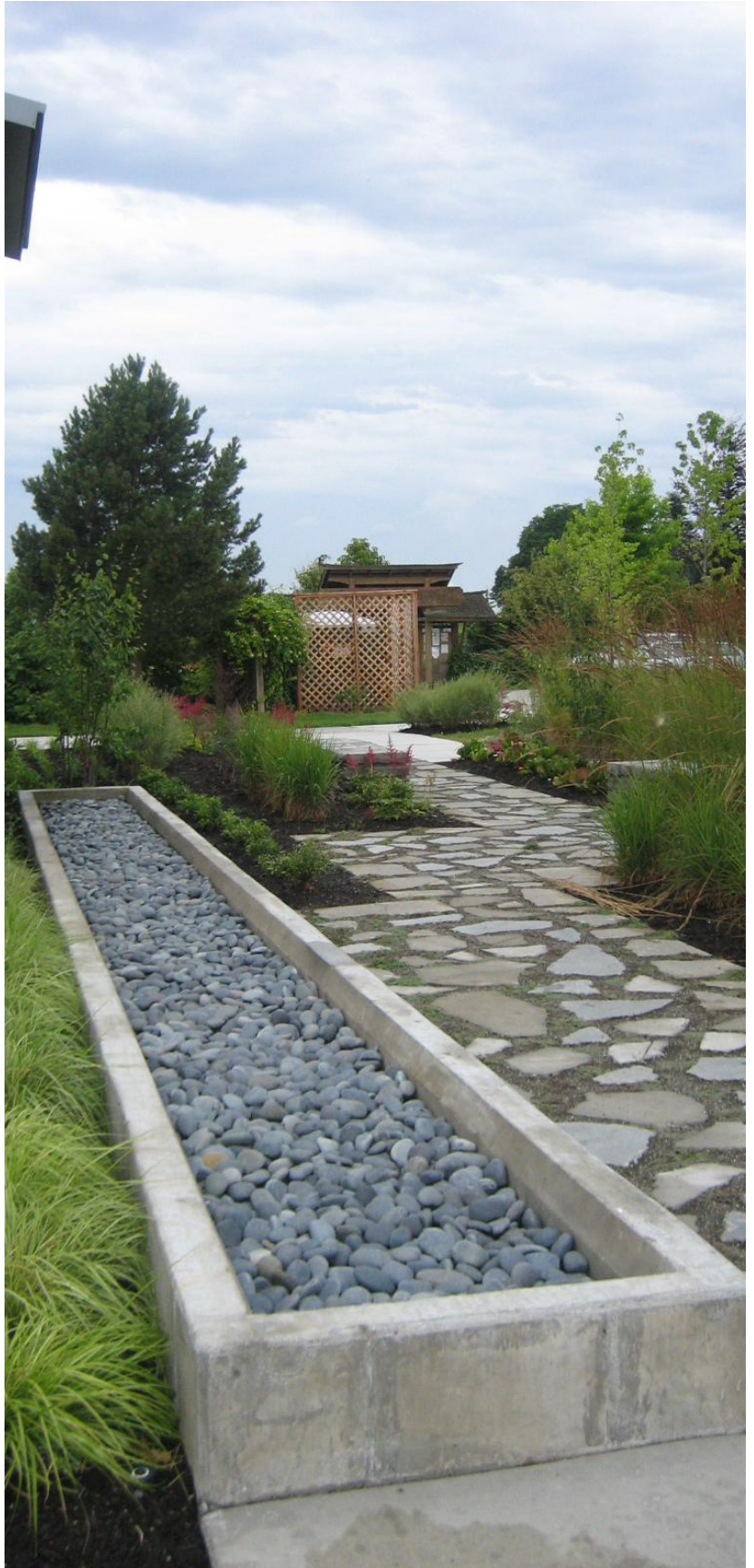
- addressing perimeter security,
- addressing the Olson Barn structure in its present condition and location in the Campus Core, and
- identifying future security challenges as programs and campus expansion continues. Integrate solutions into security planning at the earliest stages of capital development.

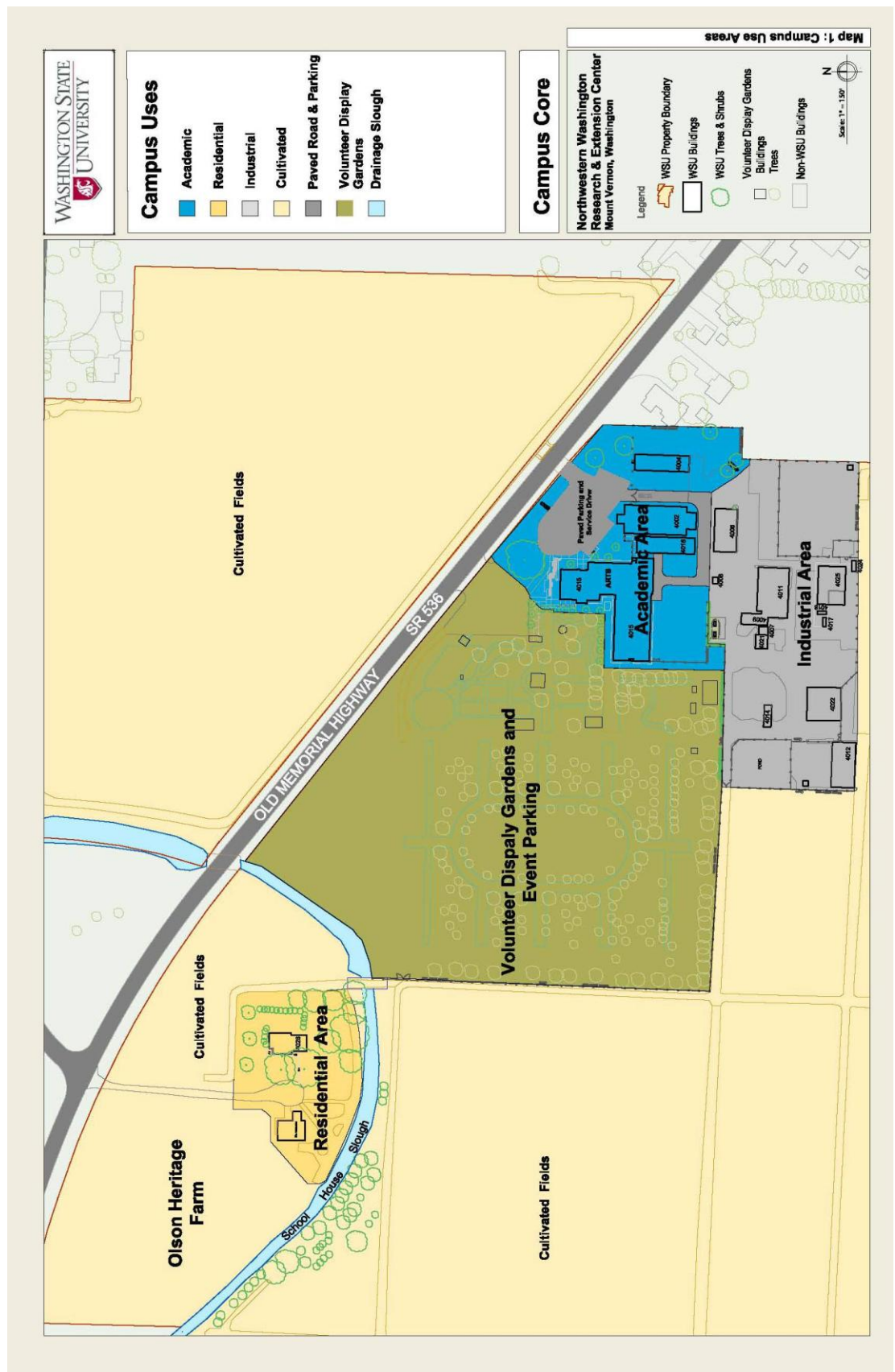
- **Enforcement:** Coordinate with local law enforcement and emergency responders to prepare contingency plans and enhance security presence on campus, especially after hours and in the Residential Area.
- **Sanitation:** Prepare a plan for providing sanitary waste disposal at NWREC. Construct an employee support facility providing modern, clean, safe facilities for employees and students working in the Industrial Area and fields. Address disposal of large volumes of sanitary waste during volunteer events.
- **Landscaping & Lighting:** Preserve existing landscaping within the Academic Area. Expand landscaping into the Industrial Area. New construction will require the addition of landscaping and exterior lighting.

Landscaping should be developed to:

- Integrate with a campus lighting plan,
- Integrate with and support a campus wayfinding system,
- complement a campus security plan,
- create open space, parks and plazas to sustain the gardening traditions and opportunities on campus, while addressing the problems caused by volunteer and public activities in intimate proximity to research and industrial activities, and
- define public space, separate from research and industrial space.
- **Wayfinding and Signage:**
As NWEC grows, a signage and way finding system should be established and followed.

The opportunities for growth at NWREC are evident when the surrounding community and region are considered. For example, growth in the specialty fruit and vegetable industry, and in value-added agriculture will have an immediate impact on development. Based on emerging technologies and the ability of NWREC to secure funding, the future for campus development is promising.

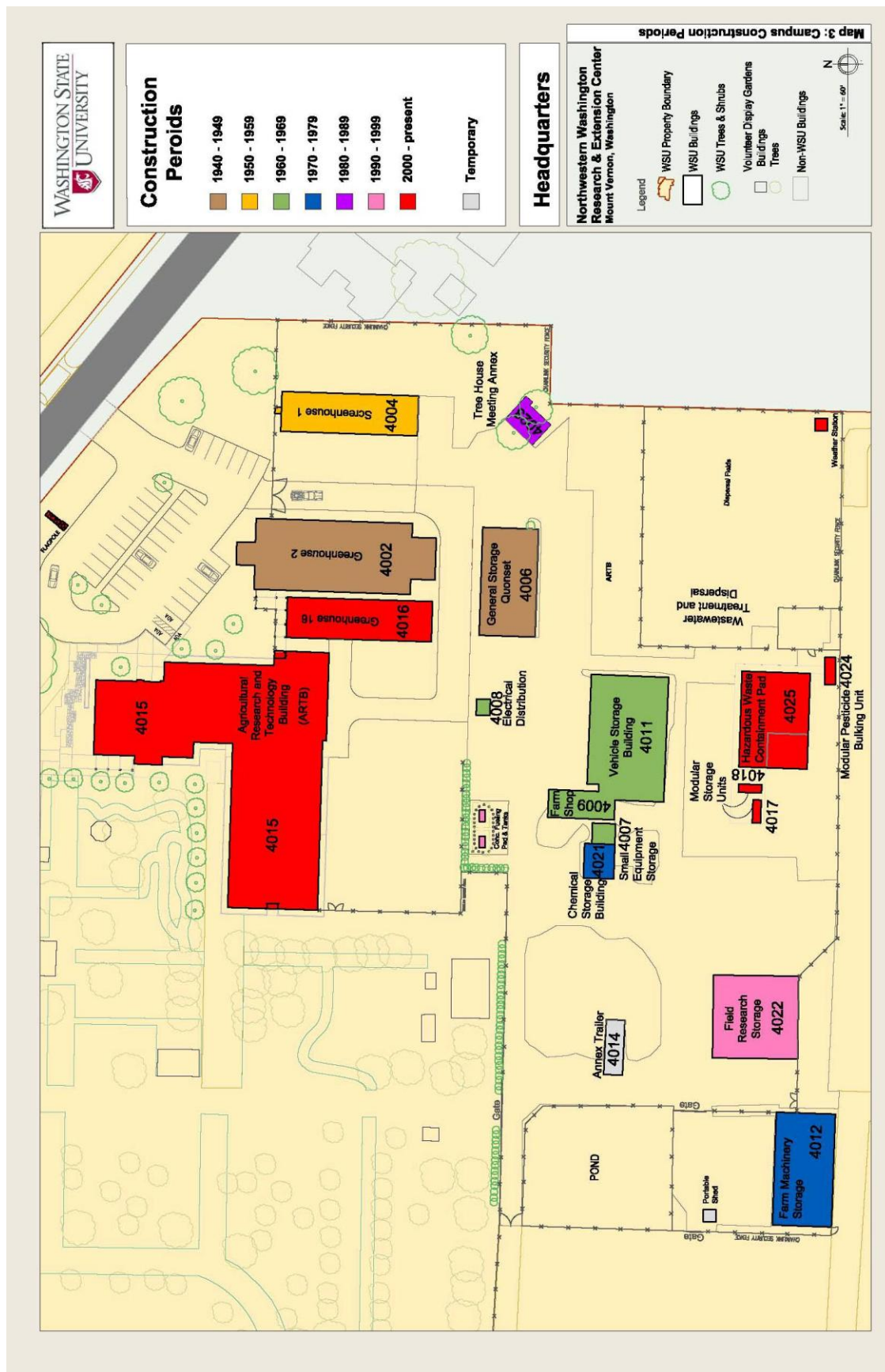




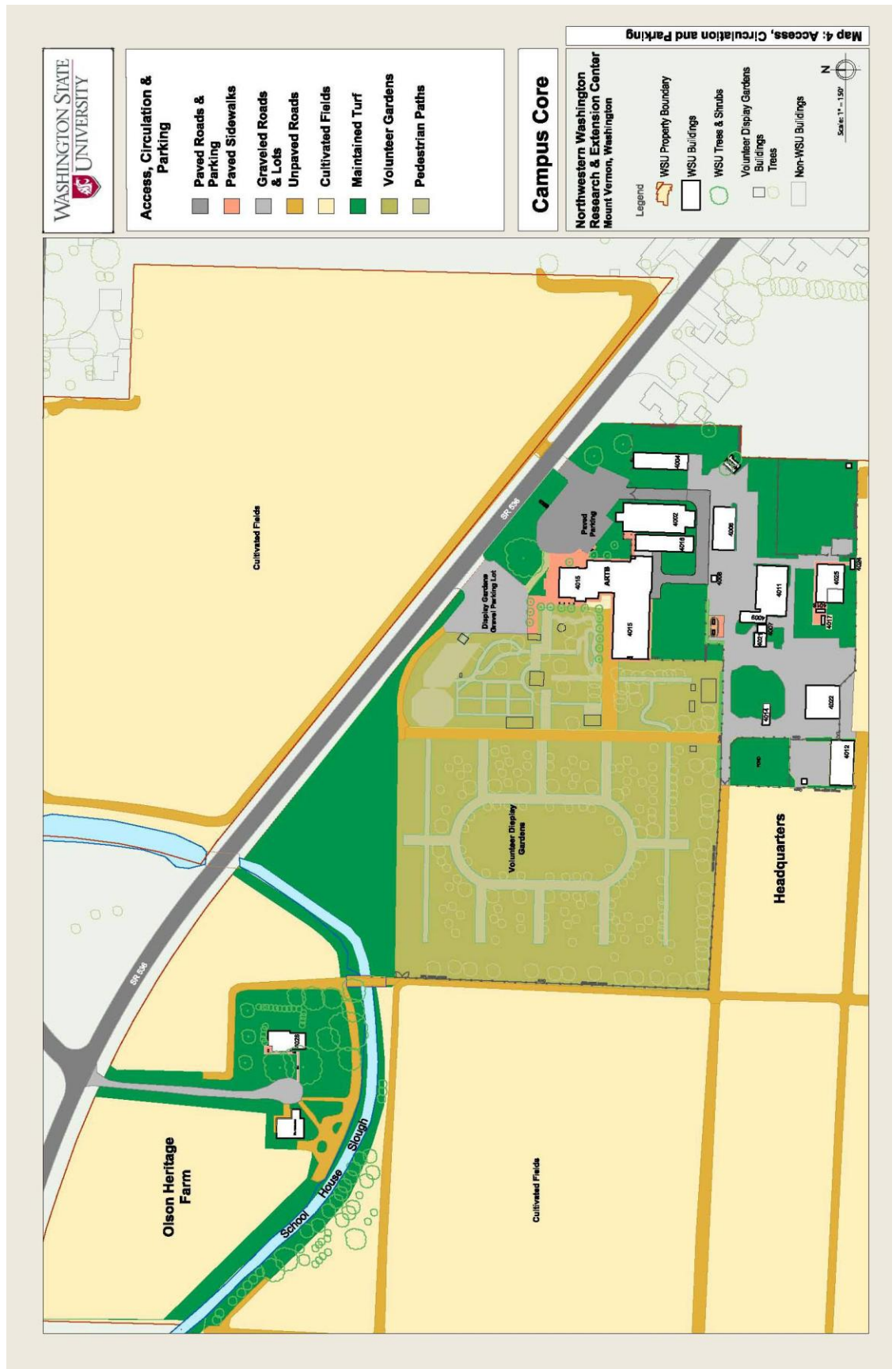
Map 1: Campus Use Areas



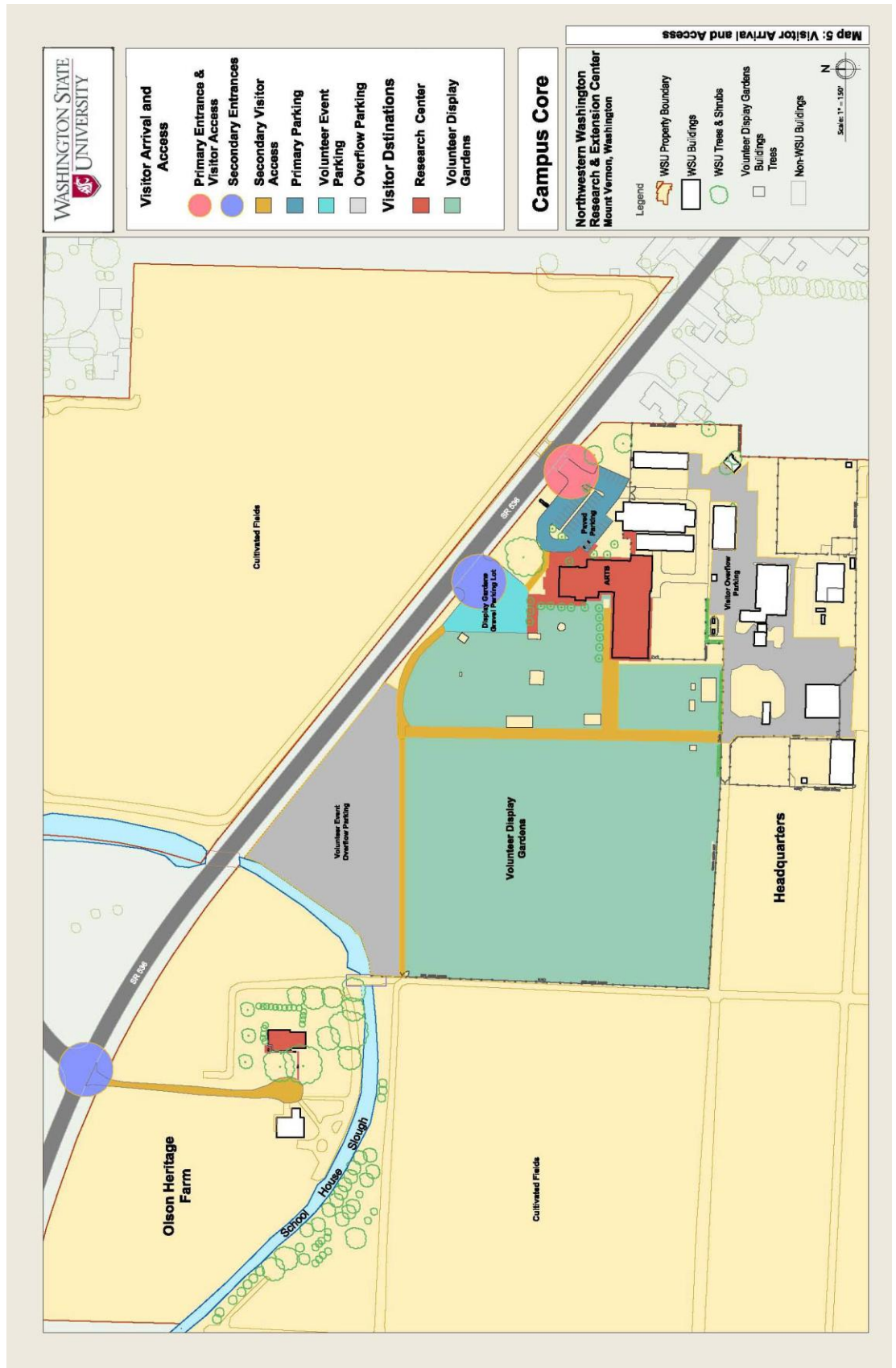
Map 2: Building Functions



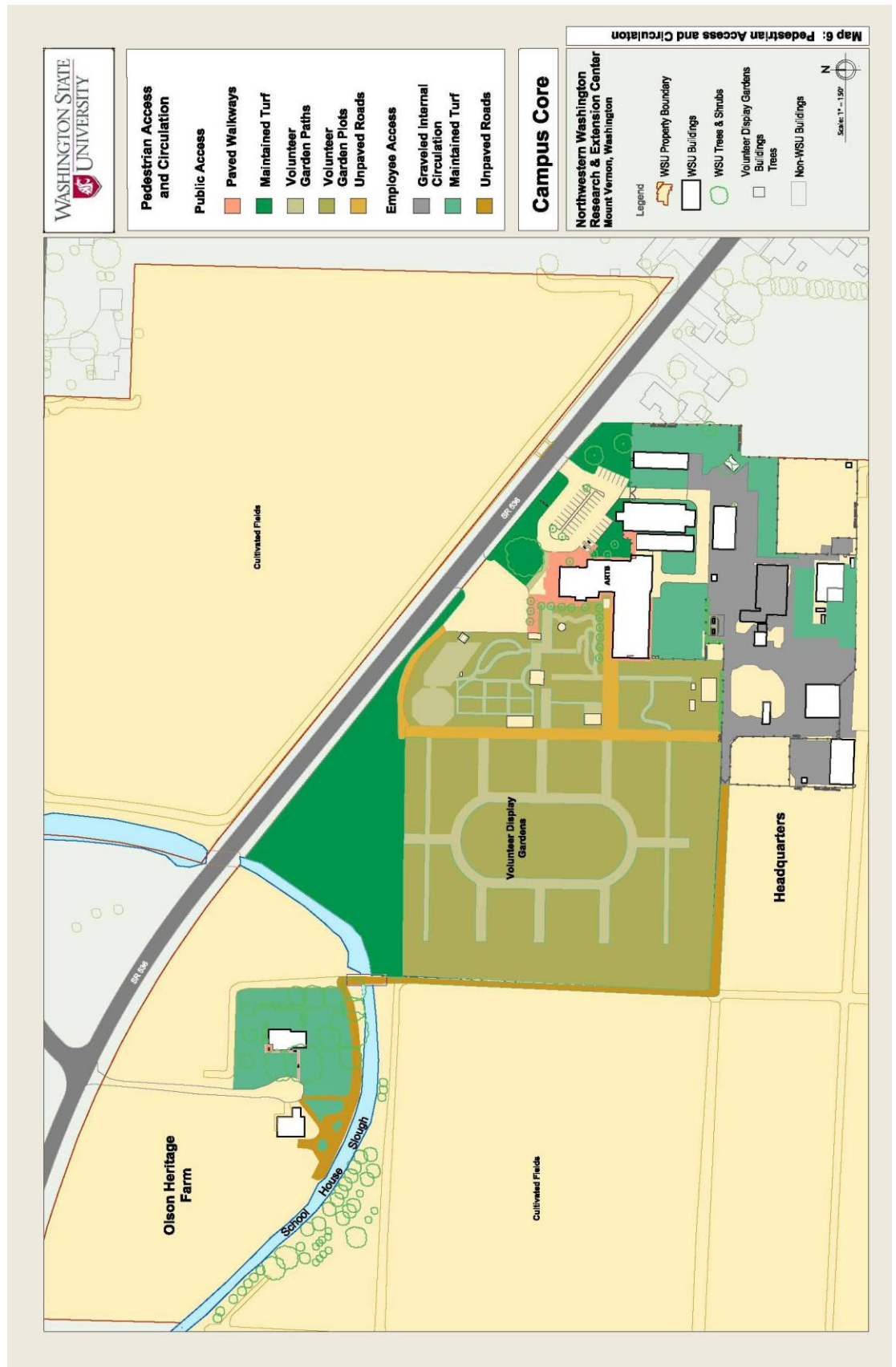
Map 3: Construction Periods



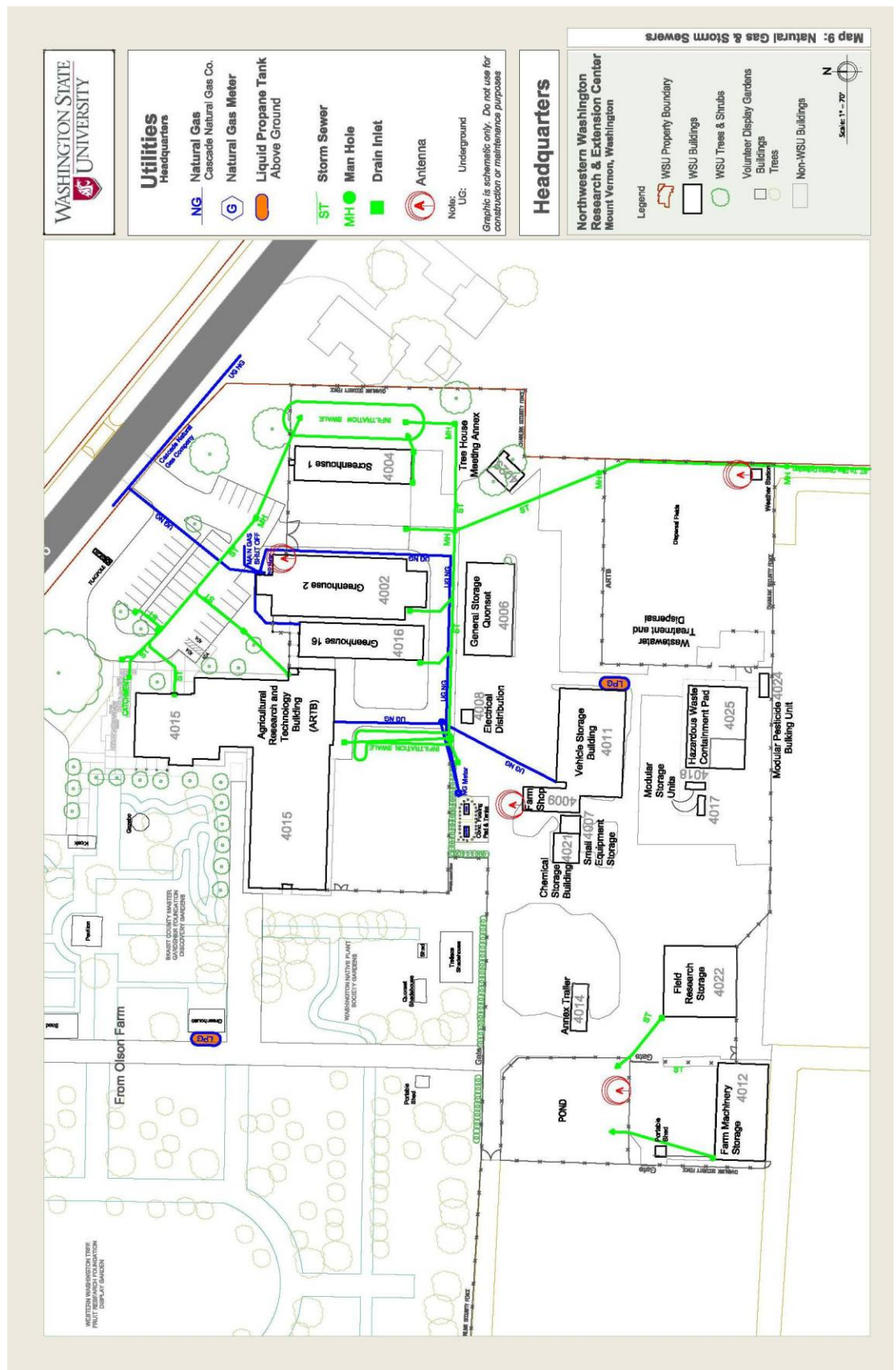
Map 4: Access Circulation & Parking



Map 5: Visitor Arrival and Access



Map 6: Pedestrian Access and Circulation



Map 9: Utilities- Natural Gas and Storm Sewers in Campus Core



Map 11: Landscaping

