

## **SITE W27 BUILDING PROJECT**

### **SEPA Checklist / Consistency Paper – June 30, 2022**

#### **PURPOSE**

The purpose of this paper is to document the relationship of the proposed Site W27 Building Project with the SEPA EIS prepared for the University of Washington 2019 Seattle Campus Master Plan (Final EIS issued on July 5, 2017), and to inform the University of Washington’s decision on SEPA compliance as SEPA Lead Agency.

#### *Executive Summary*

- *The proposal relates to Potential Development Site W27 in the West Campus Area.*
- *The Site W27 area is identified as “Low” potential to encounter sensitive environmental conditions for the majority of the elements of the environment evaluated in the EIS.*
- *The Site W27 area is identified as “Medium” potential to encounter sensitive environmental conditions for Environmental Health-Noise (the entire University of Washington campus is identified as “Medium” potential).*
- *The Site W27 proposal is consistent with building sq.ft. and height considered in the EIS.*
- *Impacts with the Site W27 Building Proposal are within impacts identified in the EIS.*
- *No new mitigation measures required.*

#### **BACKGROUND**

Published on July 5, 2017, the *2018 Seattle Campus Master Plan Final EIS* evaluates environmental conditions associated with development on a total of 86 potential development sites with a development capacity of approximately 12 million gross square feet (gsf) of net new building space. However, during the 10-year planning horizon of the Seattle Campus Master Plan, the University would develop a total of 6 million gsf of building space to meet the anticipated growth in demand for building space. Therefore, only a portion of the 86 potential development sites would be developed over the planning horizon.

The *2018 Seattle Campus Master Plan Final EIS* analyzes environmental conditions under 17 elements of the environment, including: *Earth; Air Quality; Wetlands/Plants & Animals; Energy Resources; Environmental Health (including Noise); Land Use/Relationship to Plans and Policies; Population; Housing; Light, Glare and Shadows; Aesthetics; Recreation and Open Space; Cultural Resources; Historic Resources; public Services; Utilities; Transportation; and Construction.*

For each element of the environment analyzed in the EIS a “sensitivity map” is provided that identifies portions of the campus that have a “High”, “Medium”, or “Low” potential to encounter sensitive environmental conditions. Specific mitigation or additional studies associated with High, Medium and Low sensitivity areas on campus are defined for each element of the environment.

## SITE W27 BUILDING

### Project Description

The Site W27 Building is proposed to be located on an approximately three-acre site<sup>1</sup> identified as Potential Development Site W27 in the *February 2019 Compiled Campus Master Plan* and analyzed in the *2018 Seattle Campus Master Plan Final EIS*. Site W27 is bounded on the west by Brooklyn Avenue NE, the north by *UW Campus Master Plan* Site W26, the south by NE Pacific Street, and the east by University Avenue NE (see **Figures 1 and 2** at the end of this paper). Site W27 currently contains the Purchasing & Accounting Building and University of Washington surface parking lots W12 and W13. The 3935 University Way NE (Columbia Lumber) Building is located to the immediate NE.

The proposed Site W27 Building includes demolition of the existing building and surface lots on the site as well as the demolition of the 3935 University Way NE Building to accommodate construction, and development of an 11-story building (with rooftop mechanical area above) with one level of underground parking, hardscape plaza area, a mid-block pedestrian corridor, and landscaping (see **Figure 3** at the end of this document). The proposed building height (including rooftop mechanical area) would be approximately 195 feet, which would be below the 200-foot height limit established for the site under the *2019 Seattle Campus Master Plan*. The academic building would include space for classrooms, auditorium, conference rooms, offices, laboratories, ground level food and beverage service, and gathering space.

The Site W27 Building Project includes the provision of landscaping associated with the Belvedere open space at the southern portion of the site. The Site W27 Building proposal also includes improvements along the two-block segment of the Burke-Gilman Trail between Brooklyn Avenue NE and 15<sup>th</sup> Avenue NE. The proposed Belvedere open space includes widened and separated Burke-Gilman Trail bike and pedestrian lanes, connections to W27's south entry and open space, an outdoor seating area, and a view space. The mature street trees along Brooklyn Avenue NE, University Way NE and NE Pacific Street would be retained with two new street trees proposed along Brooklyn Avenue NE, two new street trees proposed along NE Pacific Street, and eight new street trees proposed along University Way NE to create a continuous tree canopy.

### Relationship of the Site W27 Building Proposal to the 2018 Seattle Campus Master Plan EIS

**Table 1** provides a summary of the relationship of the proposed Site W27 Building to the *2018 Seattle Campus Master Plan EIS*, including the following: a summary of the discussion and analysis in the EIS related to Potential Development Site W27; and, the relationship of the proposed Site W27 Building to the analysis for each element of the environment presented in the EIS (i.e. are there any potential environmental impacts associated with the proposed Site W27 Building that were not considered in the EIS).

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<sup>1</sup> Includes Site W27, the area associated with the 3935 University NE Building, and off-site improvements.

As indicated in **Table 1**, the proposed Site W27 Building Project is within the range of impacts analyzed in the EIS. No new mitigation measures are required beyond those identified in the EIS, and there are no significant impacts that cannot be mitigated.

**TABLE 1**  
**Relationship of the Site W27 Building Project**  
**to the 2018 Seattle Campus Master Plan EIS**

2018 Seattle Campus Master Plan EIS	Potential Development Site W27
<b>3.1 Earth</b>	
<ul style="list-style-type: none"> <li>• <i>SMC 25.09 environmentally critical areas, including Steep Slope area identified in West Campus Area.</i></li> <li>• <i>Up to 600,000 cu.yd. excavation in West Campus.</i></li> <li>• <i>Construction-related earth impacts include short-term localized erosion. Compliance with existing regulations would minimize impacts.</i></li> <li>• <i>Earth Sensitivity map indicates majority of West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Site W27 does <b>not</b> contain any geologic critical area designation; identified Steep Slope area in West Campus located west of the University Bridge. The <b>Geotechnical Report</b> is on file with the University of Washington</i></li> <li>• <i>Approximately 45,000 cu.yds. of cut and 1,000 cu.yd. fill; consistent with EIS.</i></li> <li>• <i>Construction of Site W27 Building would result in similar short-term localized erosion. Compliance with existing regulations would minimize impacts.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<b>3.2 Air Quality</b>	
<ul style="list-style-type: none"> <li>• <i>Lifetime GHG emissions of 6,272,882 MTCO<sub>2</sub>e campus-wide and 3,136,441 MTCO<sub>2</sub>e in West Campus.</i></li> <li>• <i>Air Quality Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Lifetime GHG emissions of approximately 458,777 MTCO<sub>2</sub>e under proposed development on Site W27; within the range identified in the EIS.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<b>3.3 Wetlands/Plants and Animals</b>	
<ul style="list-style-type: none"> <li>• <i>No wetlands are known to be located in the West Campus Area and no impacts are anticipated.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>No wetlands are known to be located on Potential Development Site W27.</i></li> </ul>

<b>2018 Seattle Campus Master Plan EIS</b>	<b>Potential Development Site W27</b>
<ul style="list-style-type: none"> <li>• <i>Construction could result in temporary impacts such as the removal of lawns, trees and shrubs; replanting would occur in certain areas.</i></li> <li>• <i>Potential impacts to fish and fish habitat relate to sedimentation, turbidity, and shoreline development or alteration.</i></li> <li>• <i>Minimal impacts to terrestrial species are anticipated since the West Campus Area provides little natural habitat.</i></li> <li>• <i>The Wetlands, Plants and Animals Sensitivity Map indicates West Campus as ‘Low’ potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Construction would result in similar temporary impacts such as removal of grass, trees and shrubs; replanting would occur as part of the project; consistent with EIS.</i></li> <li>• <i>Potential impacts to fish and fish habitat would be minimal with the proposed Site W27 Building project; consistent with EIS.</i></li> <li>• <i>Minimal impacts to terrestrial species are anticipated, consistent with the EIS. A modest increase to habitat may result due to new, native species landscaping.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions</i></li> </ul>
<b>3.4 Energy Resources</b>	
<ul style="list-style-type: none"> <li>• <i>Full development of up to 3.0 million gsf of new building development in the West Campus could be accommodate by the 1.5 to 2.0 million gsf of available electrical system capacity. Electricity to portions of West Campus provided by Seattle City Light.</i></li> <li>• <i>The Energy Resources Sensitivity Map indicates West Campus as ‘Low’ potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Development of the approximately 340,000 gsf<sup>2</sup> for the W27 Building, would be within the range identified for the West Campus in the EIS, and that could be accommodated by the available electrical system capacity.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<b>3.5 Environmental Health</b>	
<ul style="list-style-type: none"> <li>• <i>New development including research and/or medical facilities, would increase use of chemicals, hazardous materials/waste.</i></li> <li>• <i>Environmental Health Sensitivity Map indicates much of West Campus north of NE</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>The proposed Site W27 Building would include academic classrooms, auditorium, conference rooms, offices, laboratories, ground level food and beverage service, and gathering space. The laboratory space would include the potential for use of hazardous materials and generation of hazardous waste; consistent with EIS.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>

<sup>2</sup> Above ground space.

<b>2018 Seattle Campus Master Plan EIS</b>	<b>Potential Development Site W27</b>
<p><i>Pacific Street as “Low” potential to encounter Hazardous Materials sensitive conditions.</i></p> <ul style="list-style-type: none"> <li>• <i>UW would continue to manage hazardous materials on campus in accordance with applicable federal, state and UW policies and standards.</i></li> <li>• <i>The Noise Sensitivity Map indicates the entire University of Washington campus (including West Campus) as “Medium” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Operation of the Site W27 Building, including laboratory use, would comply with applicable federal, state, and UW policies; consistent with EIS.</i></li> <li>• <i>Site W27 is identified as “Medium” potential to encounter sensitive conditions. Consistent with the EIS, the UW would coordinate with adjacent noise sensitive uses (as necessary) prior to construction. See discussion on <b>Mitigation Measures</b> following this table.</i></li> </ul>
<b>3.6 Land Use/Relationship to Plans and Policies</b>	
<ul style="list-style-type: none"> <li>• <i>Up to 3.0 million gsf of net new building space would be developed in West Campus.</i></li> <li>• <i>The types of proposed land uses in the West Campus would include uses similar to those currently in West Campus including instructional, research, administrative, student support, and other uses.</i></li> <li>• <i>Land Use Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>The Site W27 Building Project would include up to 340,000 gsf of net new building space; consistent with EIS.</i></li> <li>• <i>The Site W27 Building would include academic classrooms, auditorium, conference rooms, offices, laboratories, ground level food and beverage service, and gathering space use; consistent with EIS.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive uses.</i></li> </ul>
<b>3.7 Population</b>	
<ul style="list-style-type: none"> <li>• <i>West Campus population would increase by approximately 6,660 people over exiting conditions.</i></li> <li>• <i>Population Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Occupancy of the Site W27 Building would represent a portion of the projected increase in UW campus population; consistent with EIS.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<b>3.8 Housing</b>	
<ul style="list-style-type: none"> <li>• <i>Up to 1,000 student housing beds would be provided on campus; no specific locations identified.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Site W27 Building would provide classrooms, auditorium, conference rooms, offices, laboratories, ground level retail (food), and gathering space, with no housing units</i></li> </ul>

2018 Seattle Campus Master Plan EIS	Potential Development Site W27
<ul style="list-style-type: none"> <li>• <i>Housing Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<p><i>provided and none removed; consistent with EIS.</i></p> <ul style="list-style-type: none"> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<p><b>3.9 Light, Glare and Shadows</b></p>	
<ul style="list-style-type: none"> <li>• <i>New sources of light would be generated by development including interior/exterior building lighting, pedestrian lighting and vehicle headlights.</i></li> <li>• <i>Glare would be generated by vehicles and new buildings. All buildings would comply with the University’s design process to review factors that could influence glare.</i></li> <li>• <i>Due to the highly developed nature of West Campus, the potential for shadow impacts associated with West campus development is low. Shadow sensitive uses include Portage Bay Park, Sakuma Viewpoint, and planned West Campus Green.</i></li> <li>• <i>The Light, Glare and Shadows Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>New light sources associated with the proposed Site W27 Building would be similar to those described for the West Campus in the EIS.</i></li> <li>• <i>New glare sources would be similar to those described for the West Campus in the EIS.</i></li> <li>• <i>The proposed Site W27 Building would include 11 above grade levels with partial mechanical penthouse, and shadows from the building would not be anticipated to affect Portage Bay Park, Sakuma Viewpoint, or planned West Campus Green; consistent with EIS.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<p><b>3.10 Aesthetics</b></p>	
<ul style="list-style-type: none"> <li>• <i>Potential development of new buildings would change the aesthetic character of West Campus to reflect newer facilities with increased open space opportunities.</i></li> <li>• <i>Potential development would modify views to reflect increased density and building heights. Development near the NE Campus Parkway and 15<sup>th</sup> Avenue NE scenic routes could change the view of the area adjacent to the routes but existing views through the routes would be maintained.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Development of the Site W27 Building would change the aesthetic character of the site to reflect a newer facility in the West Campus and respect open space/pedestrian corridors and setbacks identified in the Campus Master Plan; consistent with the EIS.</i></li> <li>• <i>Development of the Site W27 Building would modify views of the site to reflect new building development. Development would not affect views through or adjacent to the NE Campus Parkway and 15<sup>th</sup> Avenue NE scenic routes; consistent with EIS.</i></li> </ul>

<b>2018 Seattle Campus Master Plan EIS</b>	<b>Potential Development Site W27</b>
<ul style="list-style-type: none"> <li>• <i>The Aesthetics Sensitivity Map indicates West Campus as “Low” to “High” potential to encounter sensitive conditions (“High” potential areas located adjacent to the NE Campus Parkway and 15<sup>th</sup> Avenue NE scenic routes).</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>EIS Potential Development Site W27 is not located immediately adjacent to NE Campus Parkway and 15<sup>th</sup> Avenue NE, and is identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<b>3.11 Recreation and Open Space</b>	
<ul style="list-style-type: none"> <li>• <i>Increased population associated with building development would increase demand for open space and recreation facilities. The potential West Campus Green connecting to Portage Bay Park and other improvements would help fulfill that demand.</i></li> <li>• <i>The Recreation and Open Space Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>The Site W27 Building would represent a portion of the projected increase in UW campus population and associated increase in demand for open space and recreation facilities; consistent with EIS. The Site W27 Building Project would include improvement to a two-block segment of the Burke-Gilman Trail and construction of the Belvedere portion of the West Campus Green.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<b>3.12 Cultural Resources</b>	
<ul style="list-style-type: none"> <li>• <i>Cultural Resources Sensitivity Map indicates West Campus as containing “Low”, “Medium”, and “High” potential to encounter sensitive conditions; area identified as “Low” or “Medium” are not likely to impact cultural resources.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<b>3.13 Historic Resources</b>	
<ul style="list-style-type: none"> <li>• <i>Impacts in West Campus low due to limited historic resources.</i></li> <li>• <i>Historic Resources Sensitivity Map indicates West Campus contains “Low”, “Medium” and “High” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>No identified historic sites on or in the immediate vicinity of Site W27.</i></li> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>

2018 Seattle Campus Master Plan EIS	Potential Development Site W27
<ul style="list-style-type: none"> <li>Projects proposed in areas identified and “Low” would continue to follow University of Washington Historic Resources process for buildings over 50 years old.</li> </ul>	<ul style="list-style-type: none"> <li>The Purchasing &amp; Accounting Building on Site W27, which contains approximately 40,000 sq.ft. of space, was constructed in 1959 and is over 50 years old. A Historic Property report was prepared for the Purchasing &amp; Accounting Building, and the Report indicates that “due to lack of significance and inability to convey significance, it is recommended that the Purchasing &amp; Accounting Building is not eligible for listing in the National Register of Historic Places”. EIS Potential Development Site W27 is identified as having a “Low” potential to encounter sensitive conditions. The <b>Historic Property Report</b> is on file with the University of Washington.</li> <li>The 3935 University Way NE Building (also referred to as the Columbia Lumber Company Office Building) is located to the immediate north of Site W27. The 3935 University Way NE Building, which contains approximately 5,500 sq.ft. of space, was constructed in 1930 and is over 50 years old. A Historic Property Report was prepared for the 3935 University Way NE Building. The Report indicates that interior and exterior alterations to the building occurred in 1962, 1964, 1986, 1988, 1992, and 2009, as well as several undated alterations. It is the University’s determination that based on the Historic Property Report, and to be confirmed through the City of Seattle Appendix A process, that significant historic resources impacts associated with demolition of the 3935 University Way NE Building are not anticipated. The <b>Historic Property Report</b> is on file with the University of Washington</li> </ul>
<p><b>3.14 Public Services</b></p>	
<ul style="list-style-type: none"> <li>Increased development would result in an associated increased demand for police and fire/emergency services. The West Campus would have the second highest percentage of building space and would be anticipated to have the second highest demand for public services.</li> </ul>	<ul style="list-style-type: none"> <li>The Site W27 Building Project would represent a portion of the projected increase in UW campus population and associated increase in demand for public services; consistent with the EIS.</li> </ul>



2018 Seattle Campus Master Plan EIS	Potential Development Site W27
<ul style="list-style-type: none"> <li><i>The Public Services Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li><i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<p><b>3.15 Utilities</b></p>	
<ul style="list-style-type: none"> <li><i>The West Campus would have the second highest percentage of building space and would be anticipated to have the second highest demand for utilities. Increase in stormwater demand would be negligible given the area of future development is currently hard surface and development would connect to existing SPU Public Storm Drain System.</i></li> <li><i>The Utilities Sensitivity Map indicates West Campus as “Low” potential to encounter sensitive conditions.</i></li> </ul>	<ul style="list-style-type: none"> <li><i>The Site W27 Building Project would represent a portion of the projected increase in UW campus population and associated increase in demand for utilities, and the site is currently mostly in impervious surface; consistent with the EIS.</i></li> <li><i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>
<p><b>3.16 Transportation</b></p>	
<ul style="list-style-type: none"> <li><i>Development under the Campus Master Plan would result in approximately 6,195 net new daily University trips and approximately 15 intersections would operate poorly (LOS E or F).</i></li> <li><i>Parking demand under the Campus Master Plan would increase by approximately 1,660 vehicles and would be accommodated by the existing parking supply.</i></li> <li><i>The University maintains a Transportation Management Plan (TMP) for the campus which includes the U-Pass Program and other strategies.</i></li> </ul>	<ul style="list-style-type: none"> <li><i>The Site W27 Building would represent a portion of the projected trip generation under the Campus Master Plan; consistent with the EIS.</i></li> <li><i>The Site W27 Building would represent a portion of the projected increase in parking demand under the Campus Master Plan; consistent with the EIS.</i></li> <li><i>The University’s TMP would remain in effect and apply to the proposed development on Site W27.</i></li> </ul>
<p><b>3.17 Construction</b></p>	
<ul style="list-style-type: none"> <li><i>Construction of up to 3.0 million gsf of net new development (and associated demolition) in West Campus would result in potential for impacts to adjacent uses including noise, pollution/dust, and vibration.</i></li> </ul>	<ul style="list-style-type: none"> <li><i>The Site W27 Building would include construction conditions associated with up to 340,000 gsf of net new development (as well as proposed demolition of approximately 45,500 sq.ft. of existing building space associated with the Purchasing &amp; Accounting Building and the 3935 University Way NE Building); consistent with EIS.</i></li> </ul>

2018 Seattle Campus Master Plan EIS	Potential Development Site W27
<ul style="list-style-type: none"> <li>• <i>Construction Sensitivity Map indicates West Campus contains “Low” and “High” potential to encounter sensitive conditions (“High” potential relates to proximity to potentially vibration sensitive research uses).</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>EIS Potential Development Site W27 identified as “Low” potential to encounter sensitive conditions.</i></li> </ul>

## Mitigation Summary

As indicated earlier, the proposed Site W27 Building Project is within the range of impacts analyzed in the EIS, and no new mitigation measures beyond those identified in the EIS are required.

For each element of the environment evaluated in the EIS, a range of mitigation measures are identified that differ depending on whether the project site is located in an area identified as having a “Low”, “Medium”, or “High” potential to encounter sensitive conditions. For areas of campus identified as having a “Low” potential to encounter sensitive conditions, it is anticipated that standard best practices and code compliance would be adequate; all applicable mitigation measures identified in the EIS for “Low” potential to encounter sensitive conditions would be applicable to the Site W27 Building Project. For areas identified as “Medium” or “High” potential to encounter sensitive conditions, site specific study or additional mitigation measures may be appropriate.

The Site W27 Building Project site (EIS Potential Development Site W27) is identified as having a “Medium” potential to encounter sensitive conditions for the EIS element of Environmental Health (Noise). The mitigation for “Medium” areas identified in the EIS that is applicable to the Site 27W Building Project is provided below.

### Environmental Health - Noise (Applicable Measures for Medium Campus Areas)

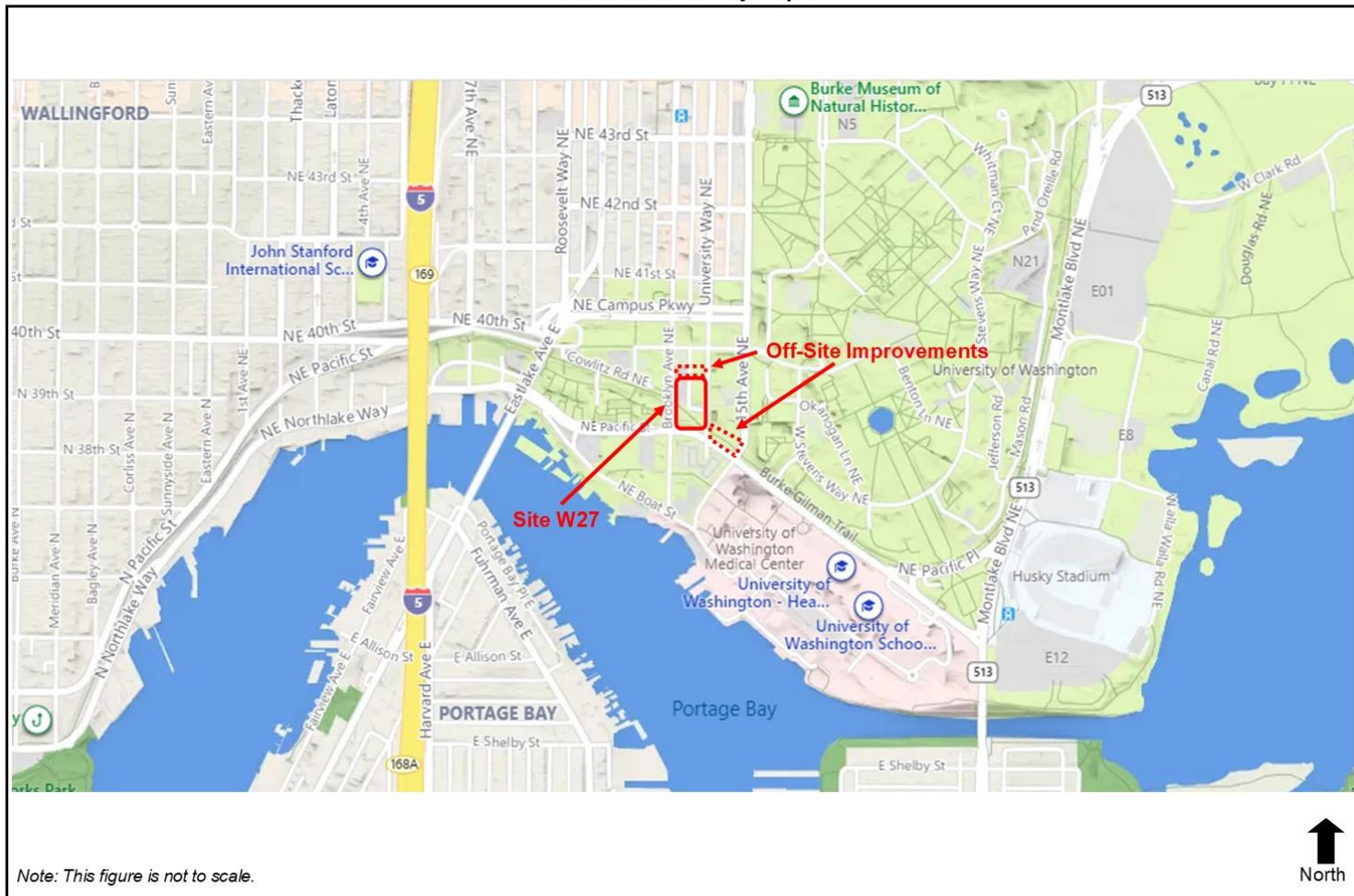
- *Potential future development projects under the 2018 Seattle Campus Master Plan that are located in areas that are proximate to noise-sensitive uses would require project-specific coordination with adjacent noise sensitive users to determine potential noise-related issues associated with construction on those sites and could require additional mitigation measures (if necessary).*

Discussion: Prior to the initiation of construction, the Site W27 Building Project will coordinate with applicable adjacent noise sensitive users regarding construction details, timing, and methods to minimize the potential for disturbance.

**FIGURES**

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Site W27 Building Project  
SEPA Consistency Paper



Source: Bing Maps and EA Engineering, 2022.



Figure 1  
Vicinity Map

Site W27 Building Project  
SEPA Consistency Paper

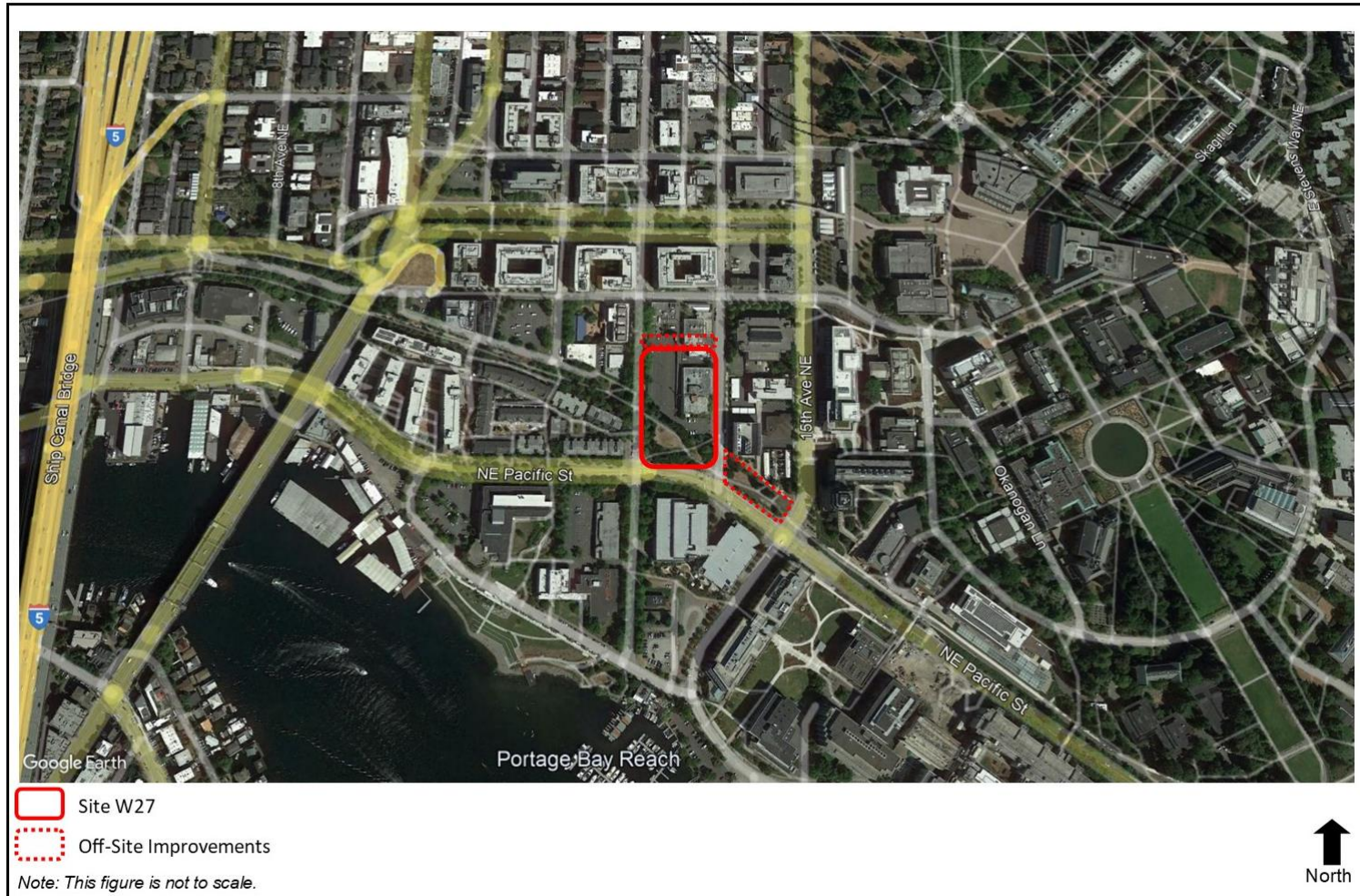


Figure 2  
Aerial Map

**Site W27 Building Project  
SEPA Consistency Paper**



Source: ZGF, 2022  
**EA** EA Engineering,  
Science, and  
Technology, Inc., PBC

**Figure 3**  
Site Plan

**Appendix A**

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**GHG Emissions Worksheet**

**City of Seattle Department of Planning and Development**  
**SEPA GHG Emissions Worksheet**  
**Version 1.7 12/26/07**

Introduction

The Washington State Environmental Policy Act (SEPA) requires environmental review of development proposals that may have a significant adverse impact on the environment. If a proposed development is subject to SEPA, the project proponent is required to complete the SEPA Checklist. The Checklist includes questions relating to the development's air emissions. The emissions that have traditionally been considered cover smoke, dust, and industrial and automobile emissions. With our understanding of the climate change impacts of GHG emissions, the City of Seattle requires the applicant to also estimate these emissions.

Emissions created by Development

GHG emissions associated with development come from multiple sources:

- The extraction, processing, transportation, construction and disposal of materials and landscape disturbance (Embodied Emissions)
- Energy demands created by the development after it is completed (Energy Emissions)
- Transportation demands created by the development after it is completed (Transportation Emissions)

GHG Emissions Worksheet

This GHG Emissions Worksheet has been developed to assist applicants in answering the SEPA Checklist question relating to GHG emissions. The worksheet was originally developed by King County, but the City of Seattle and King County are working together on future updates to maintain consistency of methodologies across jurisdictions.

The SEPA GHG Emissions worksheet estimates all GHG emissions that will be created over the life span of a project. This includes emissions associated with obtaining construction materials, fuel used during construction, energy consumed during a buildings operation, and transportation by building occupants.

Using the Worksheet

1. Descriptions of the different residential and commercial building types can be found on the second tabbed worksheet ("Definition of Building Types"). If a development proposal consists of multiple projects, e.g. both single family and multi-family residential structures or a commercial development that consists of more than one type of commercial activity, the appropriate information should be estimated for each type of building or activity.



2. For paving, estimate the total amount of paving (in thousands of square feet) of the project.
3. The Worksheet will calculate the amount of GHG emissions associated with the project and display the amount in the "Total Emissions" column on the worksheet. The applicant should use this information when completing the SEPA checklist.
4. The last three worksheets in the Excel file provide the background information that is used to calculate the total GHG emissions.
5. The methodology of creating the estimates is transparent; if there is reason to believe that a better estimate can be obtained by changing specific values, this can and should be done. Changes to the values should be documented with an explanation of why and the sources relied upon.
6. Print out the "Total Emissions" worksheet and attach it to the SEPA checklist. If the applicant has made changes to the calculations or the values, the documentation supporting those changes should also be attached to the SEPA checklist.

## Site W27 Greenhouse Gas Emissions Worksheet

### Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO <sub>2</sub> e)			Lifespan Emissions (MTCO <sub>2</sub> e)
			Embodied	Energy	Transportation	
Single-Family Home.....	0		98	672	792	0
Multi-Family Unit in Large Building .....	0		33	357	766	0
Multi-Family Unit in Small Building .....	0		54	681	766	0
Mobile Home.....	0		41	475	709	0
Education .....		0.0	39	646	361	0
Food Sales .....		0.0	39	1,541	282	0
Food Service .....		0.0	39	1,994	561	0
Health Care Inpatient .....		0.0	39	1,938	582	0
Health Care Outpatient .....		0.0	39	737	571	0
Lodging .....		0.0	39	777	117	0
Retail (Other Than Mall).....		0.0	39	577	247	0
Office .....		340.0	39	723	588	458777
Public Assembly .....		0.0	39	733	150	0
Public Order and Safety .....		0.0	39	899	374	0
Religious Worship .....		0.0	39	339	129	0
Service .....		0.0	39	599	266	0
Warehouse and Storage .....		0.0	39	352	181	0
Other .....		0.0	39	1,278	257	0
Vacant .....		0.0	39	162	47	0

### Section II: Pavement.....

Pavement.....		0.00				0
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**Total Project Emissions:**

**458777**

Definition of Building Types

Type (Residential) or Principal Activity (Commercial)	Description
Single-Family Home.....	Unless otherwise specified, this includes both attached and detached buildings
Multi-Family Unit in Large Building .....	Apartments in buildings with more than 5 units
Multi-Family Unit in Small Building .....	Apartments in building with 2-4 units
Mobile Home.....	
Education .....	Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."
Food Sales .....	Buildings used for retail or wholesale of food.
Food Service .....	Buildings used for preparation and sale of food and beverages for consumption.
Health Care Inpatient .....	Buildings used as diagnostic and treatment facilities for inpatient care.
Health Care Outpatient .....	Buildings used as diagnostic and treatment facilities for outpatient care. Doctor's or dentist's office are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).
Lodging .....	Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.
Retail (Other Than Mall).....	Buildings used for the sale and display of goods other than food.
Office .....	Buildings used for general office space, professional office, or administrative offices. Doctor's or dentist's office are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).
Public Assembly .....	Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.
Public Order and Safety .....	Buildings used for the preservation of law and order or public safety.
Religious Worship .....	Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).
Service .....	Buildings in which some type of service is provided, other than food service or retail sales of goods
Warehouse and Storage .....	Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).
Other .....	Buildings that are industrial or agricultural with some retail space; buildings having several different commercial activities that, together, comprise 50 percent or more of the floorspace, but whose largest single activity is agricultural, industrial/ manufacturing, or residential; and all other miscellaneous buildings that do not fit into any other category.
Vacant .....	Buildings in which more floorspace was vacant than was used for any single commercial activity at the time of interview. Therefore, a vacant building may have some occupied floorspace.

Sources: .....

Residential 2001 Residential Energy Consumption Survey  
 Square footage measurements and comparisons  
<http://www.eia.doe.gov/emeu/recs/sqft-measure.html>

Commercial Commercial Buildings Energy Consumption Survey (CBECS),  
 Description of CBECS Building Types  
<http://www.eia.doe.gov/emeu/cbeecs/pba99/bldgtypes.html>

Embodied Emissions Worksheet

**Section I: Buildings**

Type (Residential) or Principal Activity (Commercial)	# thousand sq feet/ unit or building	Life span related embodied GHG missions (MTCO2e/ unit)	Life span related embodied GHG missions (MTCO2e/ thousand square feet) - See calculations in table below
Single-Family Home.....	2.53	98	39
Multi-Family Unit in Large Building .....	0.85	33	39
Multi-Family Unit in Small Building .....	1.39	54	39
Mobile Home.....	1.06	41	39
Education .....	25.6	991	39
Food Sales .....	5.6	217	39
Food Service .....	5.6	217	39
Health Care Inpatient .....	241.4	9,346	39
Health Care Outpatient .....	10.4	403	39
Lodging .....	35.8	1,386	39
Retail (Other Than Mall).....	9.7	376	39
Office .....	14.8	573	39
Public Assembly .....	14.2	550	39
Public Order and Safety .....	15.5	600	39
Religious Worship .....	10.1	391	39
Service .....	6.5	252	39
Warehouse and Storage .....	16.9	654	39
Other .....	21.9	848	39
Vacant .....	14.1	546	39

**Section II: Pavement.....**

All Types of Pavement.....			50
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	Columns and Beams	Intermediate Floors	Exterior Walls	Windows	Interior Walls	Roofs	Total Embodied Emissions (MTCO2e)	Total Embodied Emissions (MTCO2e/ thousand sq feet)
Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building	5.3	7.8	19.1	51.2	5.7	21.3		
Average Materials in a 2,272-square foot single family home	0.0	2269.0	3206.0	285.0	6050.0	3103.0		
MTCO2e	0.0	8.0	27.8	6.6	15.6	30.0	88.0	38.7

**Sources**

All data in black text

King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)  
 Square footage measurements and comparisons  
<http://www.eia.doe.gov/emeu/recs/sqft-measure.html>

Floorspace per building

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)  
 Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003  
[http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/2003set9/2003excel/c3.xls](http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls)

Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building

Athena EcoCalculator  
 Athena Assembly Evaluation Tool v2.3- Vancouver Low Rise Building  
 Assembly Average GWP (kg) per square meter  
<http://www.athenasmi.ca/tools/ecoCalculator/index.html>  
 Lbs per kg 2.20  
 Square feet per square meter 10.76

Average Materials in a 2,272-square foot single family home

Buildings Energy Data Book: 7.3 Typical/Average Household  
 Materials Used in the Construction of a 2,272-Square-Foot Single-Family Home, 2000  
[http://buildingsdatabook.eren.doe.gov/?id=view\\_book\\_table&TableID=2036&t=xls](http://buildingsdatabook.eren.doe.gov/?id=view_book_table&TableID=2036&t=xls)  
 See also: NAHB, 2004 Housing Facts, Figures and Trends, Feb. 2004, p. 7.

Average window size

Energy Information Administration/Housing Characteristics 1993  
 Appendix B, Quality of the Data. Pg. 5.  
<ftp://ftp.eia.doe.gov/pub/consumption/residential/rx93hcf.pdf>

### **Embodied GHG Emissions.....Worksheet Background Information**

#### *Buildings*

Embodied GHG emissions are emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass).

Estimating embodied GHG emissions is new field of analysis; the estimates are rapidly improving and becoming more inclusive of all elements of construction and development.

The estimate included in this worksheet is calculated using average values for the main construction materials that are used to create a typical family home. In 2004, the National Association of Home Builders calculated the average materials that are used in a typical 2,272 square foot single-family household. The quantity of materials used is then multiplied by the average GHG emissions associated with the life-cycle GHG emissions for each material.

This estimate is a rough and conservative estimate; the actual embodied emissions for a project are likely to be higher. For example, at this stage, due to a lack of comprehensive data, the estimate does not include important factors such as landscape disturbance or the emissions associated with the interior components of a building (such as furniture).

King County realizes that the calculations for embodied emissions in this worksheet are rough. For example, the emissions associated with building 1,000 square feet of a residential building will not be the same as 1,000 square feet of a commercial building. However, discussions with the construction community indicate that while there are significant differences between the different types of structures, this method of estimation is reasonable; it will be improved as more data become available.

Additionally, if more specific information about the project is known, King County recommends two online embodied emissions calculators that can be used to obtain a more tailored estimate for embodied emissions: [www.buildcarbonneutral.org](http://www.buildcarbonneutral.org) and [www.athenasmi.ca/tools/ecoCalculator/](http://www.athenasmi.ca/tools/ecoCalculator/).

#### *Pavement*

Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle. For specifics, see the worksheet.

### **Special Section: Estimating the Embodied Emissions for Pavement**

Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle.

The results of the studies are presented in different units and measures; considerable effort was undertaken to be able to compare the results of the studies in a reasonable way. For more details about the below methodology, contact [matt.kuharic@kingcounty.gov](mailto:matt.kuharic@kingcounty.gov).

The four studies, Meil (2001), Park (2003), Stripple (2001) and Treolar (2001) produced total GHG emissions of 4-34 MTCO<sub>2</sub>e per thousand square feet of finished paving (for similar asphalt and concrete based pavements). This estimate does not including downstream maintenance and repair of the highway. The average (for all concrete and asphalt pavements in the studies, assuming each study gets one data point) is ~17 MTCO<sub>2</sub>e/thousand square feet.

Three of the studies attempted to thoroughly account for the emissions associated with long term maintenance (40 years) of the roads. Stripple (2001), Park et al. (2003) and Treolar (2001) report 17, 81, and 68 MTCO<sub>2</sub>e/thousand square feet, respectively, after accounting for maintenance of the roads.

Based on the above discussion, King County makes the conservative estimate that 50 MTCO<sub>2</sub>e/thousand square feet of pavement (over the development's life cycle) will be used as the embodied emission factor for pavement until better estimates can be obtained. This is roughly equivalent to 3,500 MTCO<sub>2</sub>e per lane mile of road (assuming the lane is 13 feet wide).

It is important to note that these studies estimate the embodied emissions for roads. Paving that does not need to stand up to the rigors of heavy use (such as parking lots or driveways) would likely use less materials and hence have lower embodied emissions.

#### Sources:

Meil, J. A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential. 2006. Available:

[http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/\\$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf](http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf)

Park, K, Hwang, Y., Seo, S., M.ASCE, and Seo, H. , "Quantitative Assessment of Environmental Impacts on Life Cycle of Highways," Journal of Construction Engineering and Management , Vol 129, January/February 2003, pp 25-31, (DOI: 10.1061/(ASCE)0733-9364(2003)129:1(25)).

Stripple, H. Life Cycle Assessment of Road. A Pilot Study for Inventory Analysis. Second Revised Edition. IVL Swedish Environmental Research Institute Ltd. 2001. Available: <http://www.ivl.se/rapporter/pdf/B1210E.pdf>

Treolar, G., Love, P.E.D., and Crawford, R.H. Hybrid Life-Cycle Inventory for Road Construction and Use. Journal of Construction Engineering and Management. P. 43-49. January/February 2004.

Energy Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	Energy consumption per building per year (million Btu)	Carbon Coefficient for Buildings	MTCO2e per building per year	Floorspace per Building (thousand square feet)	MTCE per thousand square feet per year	MTCO2e per thousand square feet per year	Average Building Life Span	Lifespan Energy Related MTCO2e emissions per unit	Lifespan Energy Related MTCO2e emissions per thousand square feet
Single-Family Home.....	107.3	0.108	11.61	2.53	4.6	16.8	57.9	672	266
Multi-Family Unit in Large Building .....	41.0	0.108	4.44	0.85	5.2	19.2	80.5	357	422
Multi-Family Unit in Small Building .....	78.1	0.108	8.45	1.39	6.1	22.2	80.5	681	489
Mobile Home.....	75.9	0.108	8.21	1.06	7.7	28.4	57.9	475	448
Education .....	2,125.0	0.124	264.2	25.6	10.3	37.8	62.5	16,526	646
Food Sales .....	1,110.0	0.124	138.0	5.6	24.6	90.4	62.5	8,632	1,541
Food Service .....	1,436.0	0.124	178.5	5.6	31.9	116.9	62.5	11,168	1,994
Health Care Inpatient .....	60,152.0	0.124	7,479.1	241.4	31.0	113.6	62.5	467,794	1,938
Health Care Outpatient .....	985.0	0.124	122.5	10.4	11.8	43.2	62.5	7,660	737
Lodging .....	3,578.0	0.124	444.9	35.8	12.4	45.6	62.5	27,826	777
Retail (Other Than Mall).....	720.0	0.124	89.5	9.7	9.2	33.8	62.5	5,599	577
Office .....	1,376.0	0.124	171.1	14.8	11.6	42.4	62.5	10,701	723
Public Assembly .....	1,338.0	0.124	166.4	14.2	11.7	43.0	62.5	10,405	733
Public Order and Safety .....	1,791.0	0.124	222.7	15.5	14.4	52.7	62.5	13,928	899
Religious Worship .....	440.0	0.124	54.7	10.1	5.4	19.9	62.5	3,422	339
Service .....	501.0	0.124	62.3	6.5	9.6	35.1	62.5	3,896	599
Warehouse and Storage .....	764.0	0.124	95.0	16.9	5.6	20.6	62.5	5,942	352
Other .....	3,600.0	0.124	447.6	21.9	20.4	74.9	62.5	27,997	1,278
Vacant .....	294.0	0.124	36.6	14.1	2.6	9.5	62.5	2,286	162

Sources

All data in black text

King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Energy consumption for residential buildings

2007 Buildings Energy Data Book: 6.1 Quad Definitions and Comparisons (National Average, 2001)  
 Table 6.1.4: Average Annual Carbon Dioxide Emissions for Various Functions  
<http://buildingsdatabook.eren.doe.gov/>  
 Data also at: [http://www.eia.doe.gov/emeu/recs/recs2001\\_ce/ce1-4c\\_housingunits2001.html](http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce1-4c_housingunits2001.html)

Energy consumption for commercial buildings and Floorspace per building

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)  
 Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003  
[http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/2003set9/2003excel/c3.xls](http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls)

Note: Data in plum color is found in both of the above sources (buildings energy data book and commercial buildings energy consumption survey).

Carbon Coefficient for Buildings

Buildings Energy Data Book (National average, 2005)  
 Table 3.1.7. 2005 Carbon Dioxide Emission Coefficients for Buildings (MMTCE per Quadrillion Btu)  
[http://buildingsdatabook.eere.energy.gov/?id=view\\_book\\_table&TableID=2057](http://buildingsdatabook.eere.energy.gov/?id=view_book_table&TableID=2057)  
 Note: Carbon coefficient in the Energy Data book is in MTCE per Quadrillion Btu.  
 To convert to MTCO2e per million Btu, this factor was divided by 1000 and multiplied by 44/12.

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)  
 Square footage measurements and comparisons  
<http://www.eia.doe.gov/emeu/recs/sqft-measure.html>

average life span of buildings,  
estimated by replacement time method

	Single Family Homes	Multi-Family Units in Large and Small Buildings	All Residential Buildings
New Housing Construction, 2001	1,273,000	329,000	1,602,000
Existing Housing Stock, 2001	73,700,000	26,500,000	100,200,000
Replacement time:	57.9	80.5	62.5

(national average, 2001)

Note: Single family homes calculation is used for mobile homes as a best estimate life span.

Note: At this time, KC staff could find no reliable data for the average life span of commercial buildings.

Therefore, the average life span of residential buildings is being used until a better approximation can be ascertained.

Sources:

**New Housing Construction,**

2001 Quarterly Starts and Completions by Purpose and Design - US and Regions (Excel)  
[http://www.census.gov/const/quarterly\\_starts\\_completions\\_cust.xls](http://www.census.gov/const/quarterly_starts_completions_cust.xls)  
 See also: <http://www.census.gov/const/www/newresconstindex.html>

**Existing Housing Stock,**

2001 Residential Energy Consumption Survey (RECS) 2001  
 Tables HC1:Housing Unit Characteristics, Million U.S. Households 2001  
 Table HC1-4a. Housing Unit Characteristics by Type of Housing Unit, Million U.S. Households, 2001  
 Million U.S. Households, 2001  
[http://www.eia.doe.gov/emeu/recs/recs2001/hc\\_pdf/housunits/hc1-4a\\_housingunits2001.pdf](http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/housunits/hc1-4a_housingunits2001.pdf)

Transportation Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	# people/ unit or building	# thousand sq feet/ unit or building	# people or employees/ thousand square feet	vehicle related GHG emissions (metric tonnes CO2e per person per year)	MTCO2e/ year/ unit	MTCO2e/ year/ thousand square feet	Average Building Life Span	Life span transportation related GHG emissions (MTCO2e/ per unit)	Life span transportation related GHG emissions (MTCO2e/ thousand sq feet)
Single-Family Home.....	2.8	2.53	1.1	4.9	13.7	5.4	57.9	792	313
Multi-Family Unit in Large Building .....	1.9	0.85	2.3	4.9	9.5	11.2	80.5	766	904
Multi-Family Unit in Small Building .....	1.9	1.39	1.4	4.9	9.5	6.8	80.5	766	550
Mobile Home.....	2.5	1.06	2.3	4.9	12.2	11.5	57.9	709	668
Education .....	30.0	25.6	1.2	4.9	147.8	5.8	62.5	9247	361
Food Sales .....	5.1	5.6	0.9	4.9	25.2	4.5	62.5	1579	282
Food Service .....	10.2	5.6	1.8	4.9	50.2	9.0	62.5	3141	561
Health Care Inpatient .....	455.5	241.4	1.9	4.9	2246.4	9.3	62.5	140506	582
Health Care Outpatient .....	19.3	10.4	1.9	4.9	95.0	9.1	62.5	5941	571
Lodging .....	13.6	35.8	0.4	4.9	67.1	1.9	62.5	4194	117
Retail (Other Than Mall).....	7.8	9.7	0.8	4.9	38.3	3.9	62.5	2394	247
Office .....	28.2	14.8	1.9	4.9	139.0	9.4	62.5	8696	588
Public Assembly .....	6.9	14.2	0.5	4.9	34.2	2.4	62.5	2137	150
Public Order and Safety .....	18.8	15.5	1.2	4.9	92.7	6.0	62.5	5796	374
Religious Worship .....	4.2	10.1	0.4	4.9	20.8	2.1	62.5	1298	129
Service .....	5.6	6.5	0.9	4.9	27.6	4.3	62.5	1729	266
Warehouse and Storage .....	9.9	16.9	0.6	4.9	49.0	2.9	62.5	3067	181
Other .....	18.3	21.9	0.8	4.9	90.0	4.1	62.5	5630	257
Vacant .....	2.1	14.1	0.2	4.9	10.5	0.7	62.5	657	47

**Sources**

All data in black text

King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

# people/ unit

Estimating Household Size for Use in Population Estimates (WA state, 2000 average)  
 Washington State Office of Financial Management  
 Kimpel, T. and Lowe, T. Research Brief No. 47. August 2007  
<http://www.ofm.wa.gov/researchbriefs/brief047.pdf>  
 Note: This analysis combines Multi Unit Structures in both large and small units into one category; the average is used in this case although there is likely a difference

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)  
 Square footage measurements and comparisons  
<http://www.eia.doe.gov/emeu/recs/sqft-measure.html>

# employees/thousand square feet

Commercial Buildings Energy Consumption Survey commercial energy uses and costs (National Median, 2003)  
 Table B2 Totals and Medians of Floorspace, Number of Workers, and Hours of Operation for Non-Mall Buildings, 2003  
[http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/2003set1/2003excel/b2.xls](http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set1/2003excel/b2.xls)

Note: Data for # employees/thousand square feet is presented by CBECS as square feet/employee.  
 In this analysis employees/thousand square feet is calculated by taking the inverse of the CBECS number and multiplying by 1000.



vehicle related GHG emissions

Estimate calculated as follows (Washington state, 2006)\_

56,531,930,000 2006 Annual WA State Vehicle Miles Traveled

Data was daily VMT. Annual VMT was 365\*daily VMT.

<http://www.wsdot.wa.gov/mapsdata/tdo/annualmileage.htm>

6,395,798 2006 WA state population

<http://quickfacts.census.gov/qfd/states/53000.html>

8839 vehicle miles per person per year

0.0506 gallon gasoline/mile

This is the weighted national average fuel efficiency for all cars and 2 axle, 4 wheel light trucks in 2005. This includes pickup trucks, vans and SUVs. The 0.051 gallons/mile used here is the inverse of the more commonly known term "miles/per gallon" (which is 19.75 for these cars and light trucks).

Transportation Energy Data Book. 26th Edition. 2006. Chapter 4: Light Vehicles and Characteristics. Calculations based on weighted average MPG efficiency of cars and light trucks.

[http://cta.ornl.gov/data/tedb26/Edition26\\_Chapter04.pdf](http://cta.ornl.gov/data/tedb26/Edition26_Chapter04.pdf)

Note: This report states that in 2005, 92.3% of all highway VMT were driven by the above described vehicles.

[http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3\\_04.xls](http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3_04.xls)

24.3 lbs CO2e/gallon gasoline

The CO2 emissions estimates for gasoline and diesel include the extraction, transport, and refinement of petroleum as well as their combustion.

Life-Cycle CO2 Emissions for Various New Vehicles. RENew Northfield.

Available: <http://renewnorthfield.org/wpcontent/uploads/2006/04/CO2%20emissions.pdf>

Note: This is a conservative estimate of emissions by fuel consumption because diesel fuel, with a emissions factor of 26.55 lbs CO2e/gallon was not estimated.

2205

4.93 lbs/metric tonne

vehicle related GHG emissions (metric tonnes CO2e per person per year)

average life span of buildings, estimated by replacement time method

See Energy Emissions Worksheet for Calculations

Commercial floorspace per unit

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)

Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003

[http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/2003set9/2003excel/c3.xls](http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls)