



AGENDA

STAFF PRESENTATIONS

PUBLIC COMMENT

SHORELINE CITY COUNCIL VIRTUAL/ELECTRONIC REGULAR MEETING

Monday, December 6, 2021
7:00 p.m.

Held Remotely on Zoom
<https://zoom.us/j/95015006341>

In an effort to curtail the spread of the COVID-19 virus, the City Council meeting will take place online using the Zoom platform and the public will not be allowed to attend in-person. You may watch a live feed of the meeting online; join the meeting via Zoom Webinar; or listen to the meeting over the telephone.

The City Council is providing opportunities for public comment by submitting written comment or calling into the meeting to provide oral public comment. To provide oral public comment you must sign-up by 6:30 p.m. the night of the meeting. Please see the information listed below to access all of these options:



[Click here to watch live streaming video of the Meeting on shorelinewa.gov](https://www.shorelinewa.gov)



Attend the Meeting via Zoom Webinar: <https://zoom.us/j/95015006341>



Call into the Live Meeting: 253-215-8782 | Webinar ID: 950 1500 6341



[Click Here to Sign-Up to Provide Oral Testimony](#)

Pre-registration is required by 6:30 p.m. the night of the meeting.



[Click Here to Submit Written Public Comment](#)

Written comments will be presented to Council and posted to the website if received by 4:00 p.m. the night of the meeting; otherwise they will be sent and posted the next day.

	<u>Page</u>	<u>Estimated Time</u>
1. CALL TO ORDER		7:00
2. ROLL CALL		
3. APPROVAL OF THE AGENDA		
4. REPORT OF THE CITY MANAGER		
5. COUNCIL REPORTS		
6. PUBLIC COMMENT		

Members of the public may address the City Council on agenda items or any other topic for three minutes or less, depending on the number of people wishing to speak. The total public comment period will be no more than 30 minutes. If more than 10 people are signed up to speak, each speaker will be allocated 2 minutes. Please be advised that each speaker's testimony is being recorded. Speakers are asked to sign up by 6:30 p.m. the night of the meeting via the [Remote Public Comment Sign-in form](#). Individuals wishing to speak to agenda items will be called to speak first, generally in the order in which they have signed up.

7. CONSENT CALENDAR

- (a) Approval of Minutes of Regular Meeting of November 8, 2021 7a-1
- (b) Authorize the City Manager to Obligate \$3,575,520 of Connecting Washington Funding for Design of the SR523 (N/NE 145th Street) Aurora Avenue N to I-5 Project 7b-1
- (c) Authorize the City Manager to Approve Real Property Acquisition for the 145th Corridor Phase 1 Project for Property Located at 104-126 NE 145th Street and 14512-14526 1st Avenue NE 7c-1
- (d) Authorize the City Manager to Obligate \$8,924,480 of Connecting Washington Funding for Right-of-Way & Construction for Phase 1 of the SR523 (N/NE 145th Street) Aurora Avenue N to I-5 Project 7d-1
- (e) Authorize the City Manager to Execute the Second Amendment to the 2016-2025 Water Resource Inventory Area (WRIA) 8 Interlocal Agreement 7e-1

8. ACTION ITEMS

- (a) Action on Ordinance No. 948 – Amending the Washington State Energy Code, as Adopted by Shoreline Municipal Code Chapter 15.05, to Reduce Carbon Emissions from New Commercial Construction 8a-1 7:20
- (b) Action on Ordinance No. 950 - Speed Limit Reductions 8b-1 7:35

9. STUDY ITEMS

- (a) Discussion of Utility Undergrounding for the 175th Street (Stone to I-5) Project 9a-1 7:55

10. ADJOURNMENT

8:35

Any person requiring a disability accommodation should contact the City Clerk's Office at 206-801-2230 in advance for more information. For TTY service, call 206-546-0457. For up-to-date information on future agendas, call 206-801-2230 or visit the City's website at shorelinewa.gov/councilmeetings. Council meetings are shown on the City's website at the above link and on Comcast Cable Services Channel 21 and Zply Fiber Services Channel 37 on Tuesdays at 12 noon and 8 p.m., and Wednesday through Sunday at 6 a.m., 12 noon and 8 p.m.

CITY OF SHORELINE
SHORELINE CITY COUNCIL
SUMMARY MINUTES OF REGULAR MEETING

Monday, November 8, 2021
7:00 p.m.

Held Remotely via Zoom

PRESENT: Deputy Mayor Scully, Councilmembers McConnell, McGlashan, Chang, Robertson, and Roberts

ABSENT: Mayor Hall

1. CALL TO ORDER

At 7:00 p.m., the meeting was called to order by Deputy Mayor Scully who presided.

2. ROLL CALL

Upon roll call by the City Clerk, all Councilmembers were present except for Mayor Hall.

Councilmember McConnell moved to excuse Mayor Hall for personal reasons. The motion was seconded by Councilmember Robertson and approved by unanimous consent.

(a) Proclamation of Veterans Appreciation Day

Deputy Mayor Scully announced the proclamation of Veterans Appreciation Day in Shoreline.

3. APPROVAL OF THE AGENDA

The agenda was approved by unanimous consent.

4. REPORT OF CITY MANAGER

Debbie Tarry, City Manager, provided an update on COVID-19 and reported on various City meetings, projects, and events.

5. COUNCIL REPORTS

Councilmember Chang said the meeting of the Sound Cities Association Caucus for the Regional Transit Committee was spent reviewing Metro's comments on amendments proposed by the Caucus.

Councilmember McGlashan said at the SeaShore Transportation Forum they heard updates on the Lynnwood Link Connections Mobility Project.

6. PUBLIC COMMENT

Jackie Kurle, Shoreline resident, spoke regarding the need for full transparency regarding operations of the Enhanced Shelter. She expressed hope for its success and asked for regular updates to the public on its happenings.

Bruce Amundson, Shoreline resident, spoke in support of increasing the Public Art Coordinator position to 1.0 FTE and listed reasons for the recommendation.

7. CONSENT CALENDAR

Upon motion by Councilmember Robertson and seconded by Councilmember McGlashan and unanimously carried, 6-0, the following Consent Calendar items were approved:

(a) Approval of Minutes of Regular Meeting of October 18, 2021

(b) Approval of Expenses and Payroll as of October 22, 2021 in the Amount of \$2,966,026.64

***Payroll and Benefits:**

Payroll Period	Payment Date	EFT Numbers (EF)	Payroll Checks (PR)	Benefit Checks (AP)	Amount Paid
9/19/21-10/2/21	10/8/2021	99148-99350	17620-17634	83703-83706	\$578,499.05
9/19/21-10/2/21	10/13/2021			WT1215-WT1216	\$104,463.76
					<u>\$682,962.81</u>

***Wire Transfers:**

Expense Register Dated	Wire Transfer Number	Amount Paid
	1214	(Not issued) \$0.00
10/15/2021	1217	\$2,335.05
		<u>\$2,335.05</u>

***Accounts Payable Claims:**

Expense Register Dated	Check Number (Begin)	Check Number (End)	Amount Paid
10/13/2021	83651	83663	\$670,307.00
10/13/2021	83664	83669	\$56,267.43
10/13/2021	83670	83684	\$31,608.08

10/13/2021	83685	83702	\$952,115.35
10/18/2021	82 void checks for unclaimed property		(\$2,222.93)
10/20/2021	83707	83707	\$1,151.38
10/20/2021	83708	83709	\$75,783.76
10/20/2021	83710	83721	\$11,402.80
10/20/2021	83722	83738	\$32,113.79
10/20/2021	83739	83756	\$360,102.99
10/20/2021	83757	83775	\$92,099.13
			<u>\$2,280,728.78</u>

(c) Authorize the City Manager to Execute the Extension of the Sewer Use Agreement Between the City of Shoreline and Olympic View Water and Sewer District

8. ACTION ITEMS

(a) Public Hearing on the 2021-2022 Biennial Budget and the 2021-2026 Capital Improvement Plan Mid-Biennial Update

Rick Kirkwood, Budget and Tax Manager, delivered the staff presentation. Mr. Kirkwood reviewed the budget update process preceding tonight's Public Hearing and stated that the adoption of the 2021-2022 Mid-Biennial Budget modifications and 2022 property tax levies is scheduled for November 15, 2021. He recapped the updates, adjustments, and related policy issues presented by staff at a previous meeting and reviewed the purpose of proposed Ordinances No. 945, 946, and 947 and Resolution No. 484. He said many questions posed by the Council have been responded to via the Council Question Matrix and introduced Randy Witt, Public Works Director, to answer questions posed by Laura Mork. Mr. Witt highlighted the talking points of the questions submitted and said staff has been working on the plan for two years, since it was not certain when the assumption of the Wastewater District would occur. He stated that Public Works sees an immediate need to manage the Wastewater Utility and District Engineer duties, transitioning from a consultant-led, to a staff-led approach, and have modeled this on the format in which the Surface Water Utility is managed. He described the staffing requests for the Wastewater Utility. He said the City relies on consultants for expert support, and the current consulting firm holds historical knowledge of the Utility.

Mr. Kirkwood described the purpose of the Public Hearing, and said staff recommends that City Council conduct the public hearing to take comment on the 2021-2022 Biennial Budget and the 2021-2026 Capital Improvement Plan.

Deputy Mayor Scully opened the public hearing.

He recognized that Mr. Amundson's comments regarding the Public Art Coordinator FTE would be incorporated into the record of the public hearing.

Seeing no additional members of the public wishing to comment, Deputy Mayor Scully closed the public comment period.

The Council agreed to postpone discussion on this agenda item until the second Public Hearing scheduled for the evening was concluded.

- (b) Public Hearing on the 2021-2022 Biennial Budget and 2021-2026 Capital Improvement Plan with Special Emphasis on the 2022 Regular and Excess Property Tax Levies, to be Set by Ordinance No. 946, and Other Revenues

Rick Kirkwood, Budget and Tax Manager, delivered the staff presentation. Mr. Kirkwood explained that the emphasis of this public hearing is on the revenue sources, including consideration of increases in property tax revenues. He said Proposition 1, passed in 2016, allows the City to increase the property tax levy by the change in CPI-U index, and the fee schedules generally keep pace with inflation. He highlighted a required fee schedule change of an addition to the Surface Water Management Rate Table and stated that staff recommends that the City Council conduct the public hearing to take public comment on the 2022 Property Tax Levy and the 2021-2022 Revenue Sources.

Deputy Mayor Scully opened the public hearing. Seeing no members of the public wishing to comment, Deputy Mayor Scully closed the public comment period.

In consideration of the staffing increases for the wastewater utility, Councilmember Chang asked for clarification on whether moving from consultant, to in-house, staffing was a cost savings. She asked what duties the engineers would perform, and Mr. Witt described the roles they would hold. He said the City would prefer to do a chunk of the design in house but there are limitations with staff capacity. Councilmember Chang asked how the institutional memory from the design team would be transferred, and Mr. Witt shared examples of ways to share and document that information. Councilmember Robertson asked for clarification on the financial bump mentioned in the transition, and Mr. Witt described the process and associated costs, which includes initial overlap of duties during the hand off from consultant to in-house management. Councilmember Robertson asked if this departmental increase in staff should happen all at once, or incrementally. Mr. Witt said these four positions will help identify additional needs and that he anticipates future requests for staffing increases, as well as identification of opportunities to streamline processes. Mr. Witt shared the costs for the existing two-year contract and elaborated on the anticipated costs and project work during the transition from consultant to in-house support. Councilmember McConnell reflecting that with the assumption, there was a promise to residents that there would be some savings, and she would like to stick to that commitment. She commented on the value of Laura Mork's comments, especially as she is a Councilmember-elect. Mr. Witt added that if the City were to retain the current contracted consultant, the contract should be reviewed and updated. Councilmember Roberts asked what the impact on expenses would be if no action on the wastewater management is taken, and Mr. Witt replied that estimating that would require assessment. Councilmember asked why the recommendation is to move forward with staffing in advance of the rate study. Mr. Witt said that while the rate study will include evaluation of the master plan work done by Ronald Wastewater District last year, staff feels the recommended positions are essential to running the utility as a city-run entity, rather than a contracted service. However, the needs associated with meeting the identified level of service will continue to be evaluated. There was discussion on approaches to soliciting

contracted services for specialty items moving forward. Mr. Witt said the existing contract with the consultant could be put out for proposal when it expires but emphasized that the historical knowledge held by the current consultant is valuable. Ms. Tarry emphasized that the dollars are going to be spent either through contract services or staffing, but the goal is to gain efficiencies.

In discussing the permitting times, Councilmember Robertson expressed a desire to decrease permitting times and wondered how this could be done. Ms. Tarry said the City has been filling positions as people leave the permitting department, but there is transition time, and that is why supplemental support has been contracted. Councilmember Robertson asked if staff levels need to be increased and Ms. Tarry said that after conversation, the recommendation was not to increase staffing at this point, but Council could certainly make that change. She said there was an influx in permit applications prior to a recent code change, and staff have worked through that backlog. She explained that the impacts of the pandemic affected staff productivity and any potential staffing needs would be better analyzed at a future time.

Councilmember Robertson asked why taking the Public Arts Director position to full time and was not a part of the current recommendation. Ms. Tarry said staff believes that the existing half time allocation is adequate to accomplish the current art plan.

In discussing the Transportation Impact Fees, Councilmember Chang observed that Shoreline is proposing fees that are higher than many surrounding cities. She asked if that is a change, and if there are any concerns from Council. Mr. Witt emphasized that the fees are wrapped around a set of projects that support development. Councilmember McConnell suggested future conversation on whether lowering the fees would jumpstart more projects. Councilmember Robertson said they seemed a little high.

Councilmember Roberts asked what will happen with the wall mural when the Shoreline Pool is demolished. Ms. Lane described ideas to memorialize the mural since it cannot be preserved.

Deputy Mayor Scully said for him, mid-biennial budget adjustments are to address unforeseen needs. He is concerned about the needs for a GIS full time employee and asked if the shift from extra help would change the funding paradigm from external to internal. Ms. Lane said it is anticipated that the funding for this position would continue to be from projects, and it makes sense to turn it into an FTE because many years of projects are predicted.

Deputy Mayor Scully summarized that Council has questions about the move from a consultant based, to staff based, model for the wastewater utility. He is concerned with the ask coming mid-budget, since the intent of a two-year budget cycle is to allow a comprehensive look at the needs for all departments. He asked for more detail on the impact if Council were to decide against acting on staffing changes for wastewater at this point. Ms. Tarry clarified that The wastewater staffing is paid out of the utility, so would not impact services covered by the General Fund.

Deputy Mayor Scully reminded the Council that they can put forward proposals or addendums to the budget. Ms. Tarry said it would be helpful that amendments be submitted by Wednesday to allow staff time to research and respond.

9. STUDY ITEMS

(a) Discussion of State Legislative Priorities and Issues of Shared Interest with the 32nd District Delegation

Deputy Mayor Scully welcomed Senator Jesse Salomon and Representatives Cindy Ryu and Lauren Davis. Jim Hammond, Intergovernmental/City Manager's Office Program Manager, introduced the delegation and asked for updates on issues of shared interest, including whether the delegates had any idea of how the federal money that will be coming to Washington for infrastructure projects might be allocated between specific cities and specific projects.

Councilmember McGlashan ask how a municipality could best set themselves up to receive federal transportation funding. Representative Ryu said every dime in funding is already spoken for, and it is a very competitive area. She explained that the federal funds are sorely needed, and the transportation committee teams are putting together a statewide transportation funding budget proposal. She said the House Democrats are concentrating on reliability and adaptability, prioritizing maintenance and preservation and delivering projects of statewide importance. She said restoring fish passages is a priority, and shared information on the costs associated with the culvert repair required. She shared details on how any remaining funds may be allocated.

Representative Davis gave a preview of topics to be addressed in the upcoming session, stating that issues with fiscal implications will be tackled. She said there is a lot still unknown as to how the session is going to operate in the House, but it probably will not be back to pre-pandemic operations. Senator Salomon said the Senate will have a hybrid approach for the next session, and shared specifics on adjustments to committee hearings and voting.

Mr. Hammond asked the delegates to share their top priorities for 2022. Representative Ryu said she expects to do a lot of work on structure and funding of broadband and telecom. She is also focused on housing and her pet project is a personal floatation device bill. Senator Salomon will be working on permit streamlining for housing developments. He said there needs to be continued work on police reform. He is working on police arbitration reform and shared his concerns and perspective. Senator Salomon hopes to secure more money for stormwater funding and he shared some ways in which a healthier environment for salmon can be promoted. Representative Davis gave an update on her efforts to secure support for behavioral health needs for youth, as well as working toward stabilizing and securing continued funding for substance abuse/behavioral health services, statewide. She continues to work on issues regarding the cannabis industry in Washington.

Councilmember Roberts said as Shoreline continues to work on building affordable housing in the city he wonders if the State can reimburse developers for the transportation and park impact fees to help stimulate development. Representative Ryu said there may be avenues to explore. Senator Salomon said it might be reachable, but he would have logistical questions regarding this.

In consideration of the intersection of police and behavioral health services, Councilmember Chang observed that there has been some success with the RADAR program, but it is underfunded. She wondered if there is any activity at the state level to help municipalities figure out how to create these supports. Senator Salomon said there is potential for support, and that while policing is a local government cost, there are grants available for innovative ideas, however he needs to learn more about RADAR. He recognizes that there are some calls for service that would be best handled by mental health professionals as the lead responder. Representative Davis said there are several funding models available, and she shared details on current and planned support for mobile crisis teams and co-response programs. She said there is expected to be an uptick in calls regarding mental health distress when 9-8-8 goes into service.

With an update on the Fircrest Campus, Representative Ryu spoke to the committee work to plan development of a portion of the southeast corner as a welcoming, vibrant community for non-profit affordable housing with new construction and infrastructure investments on the entire campus. She hopes that non-profit and state funded investments will jumpstart the private development interest nearby. She said she will be formally asking the Council to support the efforts to create a community of affordable, middle income, and higher housing units along with supportive services for multi-cultural, multi-generational, and multi-ability community members. Councilmember Chang asked if this development would create jobs. Representative Ryu said she envisions that most developers will be non-profits, and service jobs are likely to be created. Councilmember Robertson asked if within the vision, there could be a portion of the acreage that will be designated as open space. Representative Ryu said if density can be maximized it will free up open space, which is her goal. Senator Salomon said he appreciates Representative Ryu's diligent work on this vision.

Senator Salomon gave an update on the upcoming redistricting of the 32nd District, stating that in all mapping models Shoreline will stay in the District.

Deputy Mayor Scully thanked the delegation for their time and advocacy.

(b) Discussing the 2022 State Legislative Priorities

Jim Hammond, Intergovernmental/City Manager's Office Program Manager, delivered the staff presentation, and was joined by Debora Munguia of Capitol Consulting, who serves as the City's state lobbyist. Ms. Munguia shared specifics of the actions planned for the upcoming short session. She said a continued focus on COVID-19 recovery and relief is expected, as well an emphasis on affordable housing, homelessness, and climate change. She said the Senate's session will be a hybrid of remote and in person meetings, and the House has yet to announce the meeting plan.

Mr. Hammond said in Ms. Munguia's tenure in working with Shoreline she has brought a wealth of experience and support for the City's work in Olympia. He explained that the City's legislative priorities are drafted to articulate general policy positions, guide staff during the session, and are generally aligned with the Association of Washington Cities (AWC) and Sound Cities Association (SCA). Ms. Munguia gave an overview of the AWC priorities of a

transportation revenue package, basic infrastructure funding, and Transportation Benefit District funding authority changes.

Mr. Hammond identified the Shoreline-specific interests of the North 148th Street non-motorized bridge project and a regional crisis triage center. He said the bridge project was in both the State and Senate packages for potential funding, so it important to keep it on the State-level radar. He said in assessing the need for support for behavioral health issues there is a gap in where to take people, and several cities in North King County are working together for a solution. He listed the Shoreline policy issues as transportation, Blake decision follow up, financial sustainability and flexibility, climate change, fish-blocking culverts, affordable housing and homelessness, and police reform clarification.

Councilmember Roberts asked what groundwork is being done to ensure the eventual completion of a pool and community center. Mr. Hammond this issue has not been identified as a current City priority and there is work to be done to better understand what a facility would look like, and in turn, be successfully advocated for. Councilmember Roberts asked what the strategy is to elevate this project as a priority and Ms. Tarry said that a joint grant request for a joint aquatics facility study was submitted to King County and this may provide a basis for future advocacy.

Councilmember Roberts suggested adding a priority of granting the ability for a local jurisdiction to amend and go beyond the State Energy Code legislation for residential buildings. Councilmember Chang is concerned that if individual municipalities have the authority to make changes it could cause inconsistencies. Ms. Munguia said there was a bill introduced last session on this topic, and it will be re-introduced in 2022.

It was suggested by Councilmember Roberts that it would be appropriate to add explicit support for development at the Fircrest Campus. Mr. Hammond said right now there does not seem to be any legislation under consideration for the site, but the City has a long-term commitment to monitoring development at Fircrest. Deputy Mayor Scully summarized that it was his understanding that Representative Ryu was asking for Shoreline's support, but the Council would like to gather further information prior to taking action.

Deputy Mayor Scully said there is a tremendous need for a regional crisis triage center and he expressed support for continued work towards this. Councilmember Chang emphasized that it is important to look regionally at sites for a crisis center. She wants to make sure Shoreline is not the only city that takes on social services needs. Mr. Hammond said there are five cities partnering collaboratively in this work.

Deputy Mayor Scully encouraged staff to proceed cautiously on police reform clarification because there needs to be a balance in support of competing perspectives.

10. ADJOURNMENT

At 9:15 p.m., Deputy Mayor Scully declared the meeting adjourned.

Jessica Simulcik Smith, City Clerk

DRAFT

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Authorizing the City Manager to Obligate \$3,575,520 of Connecting Washington Funding for Design of the SR523 (N/NE 145 th Street) Aurora Avenue N to I-5 Project		
DEPARTMENT:	Public Works		
PRESENTED BY:	Tricia Juhnke, City Engineer		
ACTION:	<input type="checkbox"/> Ordinance	<input type="checkbox"/> Resolution	<input checked="" type="checkbox"/> Motion
	<input type="checkbox"/> Discussion	<input type="checkbox"/> Public Hearing	

PROBLEM/ISSUE STATEMENT:

Staff is requesting that Council authorize the City Manager to execute Supplement No. 4 to local agency agreement LA-8901 with Washington State Department of Transportation (WSDOT) to obligate \$3,575,520 of 2022-2023 State Connecting Washington (CWA) funding to complete design on the SR523 (N/NE 145th Street) Aurora Avenue N to I-5 Project (145th Corridor Project).

In accordance with the City’s Grants Management Policy and Procedure, grant agreements for Capital Improvement Program projects require Council authorization for City Manager signature/approval authority following the dollar allocations for Small Works Projects, which is currently set at \$350,000. Additionally, WSDOT requires formal authorization of their contracts prior to execution. WSDOT administers Federal and State funds awarded to the City of Shoreline. Approval of these State Connecting Washington funds will allow the City to complete the design for the 145th Corridor Project.

RESOURCE/FINANCIAL IMPACT:

This project is included in the City’s adopted 2021-2026 Capital Improvement Plan. The project budget summary is as follows:

SUMMARY OF PROJECT COSTS	
DESIGN	
Consultant (CH2M Hill/Jacobs)	
Preliminary Design	\$3,250,747
100% Design (Phase 1)	\$1,539,366
100% Design (Phase 2)	\$1,140,000
100% Design (Phase 3)	\$1,040,000
Off-Corridor Design	\$110,000
City Staff	\$1,834,727
WSDOT Staff	\$90,000
Contingency	\$130,255
TOTAL DESIGN EXPENDITURES	\$9,135,095

SUMMARY OF PROJECT REVENUES		
REVENUES	Roads Capital Fund	\$660,954
	Federal STP – Design	\$4,235,000
	CWA Grant (21-22) – Design	\$709,125
	CWA Grant (22-23) – Design	\$3,530,016
	TOTAL DESIGN REVENUES	\$9,135,095

The City has previously obligated \$663,621 in 2020-2021 State CWA funding, \$4,235,000 in Federal STP funding, with a City match of \$660,954 in Roads Capital Funds. The State CWA funds to be obligated at this time require no local match. The total project budget for design of the 145th Corridor Project is \$9,135,095.

Tonight, under a separate agenda item, staff is requesting an amount of \$8,924,480 from 2022-2023 State CWA funds of to be obligated to complete Phase 1 Right-of-Way & Construction for the 145th Corridor Project (no local match is required).

If the Council chooses not to authorize this Supplement No. 4, which adds \$3,575,520 of 2022-2023 State CWA funding to LA-8901 for design of the 145th Corridor Project, the completion of design could be jeopardized. It is unlikely the City would be able to replace that funding with another source, and if the City were not able to complete the 145th Corridor Project, all federal funds reimbursed to date would need to be paid back to the State.

RECOMMENDATION

Staff recommends that Council authorize the City Manager to execute Supplement No. 4 to Local Agency Agreement LA-8901 to obligate \$3,575,520 of 2022-2023 State Connecting Washington funds for the SR523 (N/NE 145th Street) Aurora Avenue to I-5 Project.

Approved By: City Manager ***DT*** City Attorney ***MK***

INTRODUCTION

The City of Shoreline is currently designing improvements for the SR523 (N/NE 145th Street) Aurora Avenue N to I-5 Project (145th Corridor Project). State Connecting Washington (CWA) funds and Federal Surface Transportation Program (STP) funds were obligated previously for this work. It has been determined that a portion of the State CWA funds available in the 2021-2023 biennium will be needed to complete design of the 145th Corridor Project.

BACKGROUND

When it was determined that a future Sound Transit light rail station would be located in Shoreline along 5th Avenue NE adjacent to 145th Street with service coming online in 2024, the City looked to address congestion and lack of facilities on the 145th Street Corridor. An initial 145th Street Multimodal Corridor Study preferred concept was approved by the City Council on [April 11, 2016](#).

Since this initial study, several projects have been identified along the 145th Street Corridor and are currently in design phases, which are further defining the actual improvements. These include:

1. Sound Transit's [SR 522/NE 145th BRT Project](#)
2. The City's SR 523 (145th Street) & I-5 [Interchange Project](#)
3. The City's SR 523 (N/NE 145th Street), Aurora Ave N to I-5 Project ([145th Corridor Project](#))

The 145th Corridor Project referred to in this staff report is currently under design and utilizing both Federal STP and local funds. These funds were discussed and approved for obligation on [May 2, 2016](#). WSDOT agreement LA-8901 was executed and funding became effective June 9, 2016.

Supplement No. 1 was executed on November 12, 2019, to extend the project agreement end date to December 31, 2024. Supplement No. 2 was executed on October 8, 2020, to obligate a portion of the 2020-2021 State CWA funding in the amount of \$663,621. This supplement was approved by the City Council on [September 28, 2020](#). Supplement No. 3 was executed on November 2, 2021, to reallocate funding from agency costs to consultant costs to cover increased design costs and update the Project Prospectus.

DISCUSSION

Tonight's Council action addresses obligating a portion of the 2022-2023 State CWA funding in order to complete the design on the 145th Corridor Project. Under WSDOT agreement LA-8901, final design will be completed for this entire segment of corridor. This total design cost is estimated to be \$9,135,095.

The City has worked with our Metropolitan Planning Organization, the Puget Sound Regional Council (PSRC), which conducts long range planning for growth management and transportation in our region. City projects must be included as part of PSRC

planning in order to be eligible for various funding. Both PSRC and WSDOT have confirmed the City's approach to phase the 145th Corridor Project for right-of-way (ROW) and construction.

The phases are as follows:

- Phase 1: I-5 to Corliss Avenue (145th Interchange Project Interface to Corliss Avenue)
- Phase 2: Corliss Avenue to Wallingford Avenue
- Phase 3: Wallingford Avenue to SR-99 (Aurora Ave/Interurban Trail)

Design of the 145th Corridor Project has passed the 60% design stage and is progressing towards completing 100% final design for the entire corridor. Final design will be progressed for each phase, or segment, sequentially. Final design for Phase 1 is anticipated to be completed near the end of September 2022.

This staff report requests approval of Supplement No. 4 to Local Agency Agreement LA-8901 to obligate \$3,575,520 of 2022-2023 State CWA funds for the SR523 (N/NE 145th Street) Aurora Avenue to I-5 Project (Attachment A) to complete design for the 145th Corridor Project. The remaining balance of the \$12.5 million available this biennium of State CWA funding will be obligated under a separate agreement also being considered by the City Council tonight.

In accordance with the City's Grants Management Policy and Procedure, grant agreements for Capital Improvement Program projects require Council action for City Manager signature/approval authority following the dollar allocation for Small Works Projects which is currently set at \$350,000.

COUNCIL GOAL(S) ADDRESSED

The 145th Street project directly supports two of the City Council's goals:

- Goal 2 - Continue to deliver highly-valued public services through management of the City's infrastructure and stewardship of the natural environment.
- Goal 3 - Continue preparation for regional transit in Shoreline.

RESOURCE/FINANCIAL IMPACT

This project is included in the City's adopted 2021-2026 Capital Improvement Plan. The project budget summary is as follows:

SUMMARY OF PROJECT COSTS		
DESIGN	Consultant (CH2M Hill/Jacobs)	
	Preliminary Design	\$3,250,747
	100% Design (Phase 1)	\$1,539,366
	100% Design (Phase 2)	\$1,140,000
	100% Design (Phase 3)	\$1,040,000
	Off-Corridor Design	\$110,000
	City Staff	\$1,834,727
	WSDOT Staff	\$90,000
	Contingency	\$130,255
	TOTAL DESIGN EXPENDITURES	\$9,135,095

SUMMARY OF PROJECT REVENUES		
REVENUES	Roads Capital Fund	\$660,954
	Federal STP – Design	\$4,235,000
	CWA Grant (21-22) – Design	\$709,125
	CWA Grant (22-23) – Design	\$3,530,016
	TOTAL DESIGN REVENUES	\$9,135,095

The City has previously obligated \$663,621 in 2020-2021 State CWA funding, \$4,235,000 in Federal STP funding with a City match of \$660,954 in Roads Capital Funds. The State CWA funds to be obligated at this time require no local match. The total project budget for design of the 145th Corridor Project is \$9,135,095.

Tonight, under a separate agenda item, staff is requesting an amount of \$8,924,480 from 2022-2023 State CWA funds of to be obligated to complete Phase 1 Right-of-Way & Construction for the 145th Corridor Project (no local match is required).

If the Council chooses not to authorize this Supplement No. 4 which adds \$3,575,520 of 2022-2023 State CWA funding to LA-8901 for design of the 145th Corridor Project, the completion of design could be jeopardized. It is unlikely the City would be able to replace that funding with another source, and if the City were not able to compete the 145th Corridor Project, all federal funds reimbursed to date would need to be paid back to the State.

RECOMMENDATION

Staff recommends that Council authorize the City Manager to execute Supplement No. 4 to Local Agency Agreement LA-8901 to obligate \$3,575,520 of 2022-2023 State Connecting Washington funds for the SR523 (N/NE 145th Street) Aurora Avenue to I-5 Project.

ATTACHMENTS

Attachment A – WSDOT Local Agency Agreement Supplement No. 4



Agency City of Shoreline		Supplement Number 04
Federal Aid Project Number STPUL - 0523 (010)	Agreement Number LA 8901	CFDA No. 20.205 (Catalog of Federal Domestic Assistance)

The Local Agency requests to supplement the agreement number noted above.
 All provisions in the basic agreement remain in effect except as modified by this supplement.
 The Local Agency certifies that it is not excluded from receiving Federal funds by a Federal suspension or debarment (2 CFR Part 180). Additional changes to the agreement are as follows:

Project Description

Name SR 523 (N/NE 145th Street), Aurora Avenue N to I-5 Length 0.9 miles
 Termini Aurora Avenue to I-5

Description of Work ✓ No Change

Reason for Supplement

Supplement No. 4 is to obligate Connecting Washington funds for 100% design.

Are you claiming indirect cost rate? Yes No Project Agreement End Date December 31, 2024

Does this change require additional Right of Way or Easements? Yes No Advertisement Date: TBD

Type of Work		Estimate of Funding				
		(1) Previous Agreement/Suppl.	(2) Supplement	(3) Estimated Total Project Funds	(4) Estimated Agency Funds	(5) Estimated Federal Funds
PE %	a. Agency			0.00		
	b. Other					
See Attached Spreadsheet						
Federal Aid Participation Ratio for PE	c. Other			0.00		
	d. State			0.00		
	e. Total PE Cost Estimate (a+b+c+d)	0.00	0.00	0.00	0.00	0.00
Right of Way %	f. Agency			0.00		
	g. Other			0.00		
Federal Aid Participation Ratio for RW	h. Other			0.00		
	i. State			0.00		
	j. Total R/W Cost Estimate (f+g+h+i)	0.00	0.00	0.00	0.00	0.00
Construction %	k. Contract			0.00		
	l. Other			0.00		
	m. Other			0.00		
Federal Aid Participation Ratio for CN	n. Other			0.00		
	o. Agency			0.00		
	p. State			0.00		
	q. Total CN Cost Estimate (k+l+m+n+o+p)	0.00	0.00	0.00	0.00	0.00
	r. Total Project Cost Estimate (e+j+q)	0.00	0.00	0.00	0.00	0.00

The Local Agency further stipulates that pursuant to said Title 23, regulations and policies and procedures, and as a condition to payment of the Federal funds obligated, it accepts and will comply with the applicable provisions.

Agency Official
By

**Washington State
Department of Transportation**
By Director, Local Program

Title City Manager, City of Shoreline

Date Executed

Agency City of Shoreline	Supplement Number 04
Federal Aid Project Number STPUL - 0523 (010)	Agreement Number LA 8901
CFDA No. 20.205 (Catalog of Federal Domestic Assistance)	

VI. Payment and Partial Reimbursement

The total cost of the project, including all review and engineering costs and other expenses of the State, is to be paid by the Agency and by the Federal Government. Federal funding shall be in accordance with the Federal Transportation Act, as amended, 2 CFR Part 200. The State shall not be ultimately responsible for any of the costs of the project. The Agency shall be ultimately responsible for all costs associated with the project which are not reimbursed by the Federal Government. Nothing in this agreement shall be construed as a promise by the State as to the amount or nature of federal participation in this project.

The Agency shall bill the state for federal aid project costs incurred in conformity with applicable federal and state laws. The agency shall minimize the time elapsed between receipt of federal aid funds and subsequent payment of incurred costs. Expenditures by the Local Agency for maintenance, general administration, supervision, and other overhead shall not be eligible for federal participation unless a current indirect cost plan has been prepared in accordance with the regulations outlined in 2 CFR Part 200 - Uniform Admin. Requirements, Cost Principles and Audit Requirements for Federal Awards, and retained for audit.

The State will pay for State incurred costs on the project. Following payment, the State shall bill the Federal Government for reimbursement of those costs eligible for federal participation to the extent that such costs are attributable and properly allocable to this project. The State shall bill the Agency for that portion of State costs which were not reimbursed by the Federal Government (see Section IX).

VII. Audit of Federal Consultant Contracts

The Agency, if services of a consultant are required, shall be responsible for audit of the consultant's records to determine eligible federal aid costs on the project. The report of said audit shall be in the Agency's files and made available to the State and the Federal Government.

An audit shall be conducted by the WSDOT Internal Audit Office in accordance with generally accepted governmental auditing standards as issued by the United States General Accounting Office by the Comptroller General of the United States; WSDOT Manual M 27-50, Consultant Authorization, Selection, and Agreement Administration; memoranda of understanding between WSDOT and FHWA; and 2 CFR Part 200.501 - Audit Requirements.

If upon audit it is found that overpayment or participation of federal money in ineligible items of cost has occurred, the Agency shall reimburse the State for the amount of such overpayment or excess participation.

IX. Payment of Billing

The Agency agrees that if payment or arrangement for payment of any of the State's billing relative to the project (e.g., State force work, project cancellation, overpayment, cost ineligible for federal participation, etc.) is not made to the State within 45 days after the Agency has been billed, the State shall effect reimbursement of the total sum due from the regular monthly fuel tax allotments to the Agency from the Motor Vehicle Fund. No additional Federal project funding will be approved until full payment is received unless otherwise directed by the Director, Local Programs.

Project Agreement End Date - This date is based on your projects Period of Performance (2 CFR Part 200.309).

Any costs incurred after the Project Agreement End Date are NOT eligible for federal reimbursement. All eligible costs incurred prior to the Project Agreement End Date must be submitted for reimbursement within 90 days after the Project Agreement End Date or they become ineligible for federal reimbursement.

VIII. Single Audit Act

The Agency, as a subrecipient of federal funds, shall adhere to the federal regulations outlined in 2 CFR Part 200.501 as well as all applicable federal and state statutes and regulations. A subrecipient who expends \$750,000 or more in federal awards from all sources during a given fiscal year shall have a single or program-specific audit performed for that year in accordance with the provisions of 2 CFR Part 200.501. Upon conclusion of the audit, the Agency shall be responsible for ensuring that a copy of the report is transmitted promptly to the State.

XVII. Assurances

Local Agencies receiving Federal funding from the USDOT or its operating administrations (i.e., Federal Highway Administration, Federal Transit Administration, Federal Aviation Administration) are required to submit a written policy statement, signed by the Agency Executive and addressed to the State, documenting that all programs, activities and services will be conducted in compliance with Section 504 and the Americans with Disabilities Act (ADA).

Federal Aid Number: STPUL-0523(010)
Agreement Number: LA 8901
Project Title: SR 523 (N/NE 145th Street), Aurora Avenue N to I-5
Supplement Number: 4

Type of Work			Estimate of Funding					
			(1) PREVIOUS AGREEMENT/ SUPPLEMENT	(2) SUPPLEMENT	(3) ESTIMATED TOTAL PROJECT FUNDS	(4) ESTIMATED AGENCY FUNDS	(5) ESTIMATED STATE FUNDS	(6) ESTIMATED FEDERAL FUNDS
P.E. STP 86.5% Federal Aid CWA 100% State	a.	Agency (STP):	\$486,595		\$486,595	\$65,690		\$420,905
	b.	Other, Consultant (STP):	\$4,379,359		\$4,379,359	\$591,213		\$3,788,146
	c.	State (STP):	\$30,000		\$30,000	\$4,050		\$25,950
	d.	Agency (CWA):	\$232,867	\$1,115,265	\$1,348,132		\$1,348,132	
	e.	Other, Consultant (CWA):	\$410,754	\$2,420,255	\$2,831,009		\$2,831,009	
	f.	State (CWA):	\$20,000	\$40,000	\$60,000		\$60,000	
	g.	Total PE Cost Est. (a thru f)	\$5,559,575	\$3,575,520	\$9,135,095	\$660,954	\$4,239,141	\$4,235,000
Right of Way % Federal Aid Participation Ratio for RW	h.	Agency						
	i.	Other						
	j.	Other						
	k.	State						
l.	Total R/W Cost Est. (h thru k)	\$0	\$0	\$0	\$0	\$0	\$0	
Construction % Federal Aid Participation Ratio for CN	m.	Contract						
	n.	Contract (State Fund)						
	o.	Contract _Non-Participate						
	p.	Other _Consultant						
	q.	Other _Consultant (State Fund)						
	r.	Agency						
	s.	Agency - (State Fund)						
	t.	Other _Non-Participate						
	u.	State						
	v.	State - (State Fund)						
	w.	Total Const. Cost Est. (m thru v)	\$0	\$0	\$0	\$0	\$0	\$0
x.Total Project Cost Estimate (g+i+w)			\$5,559,575	\$3,575,520	\$9,135,095	\$660,954	\$4,239,141	\$4,235,000


**Local Agency Federal Aid
Project Prospectus**

Prefix	Route	()	Date	11/08/2021
Federal Aid Project Number	STPU	0523	DUNS Number	961859345
Local Agency Project Number	2916322	(WSDOT Use Only)	Federal Employer Tax ID Number	91-1683888
Agency City of Shoreline	CA Agency <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Federal Program Title <input checked="" type="checkbox"/> 20.205 <input type="checkbox"/> Other		
Project Title SR 523 (N/NE 145th Street), Aurora Ave to I-5		Start Latitude N47.73 End Latitude N47.73	Start Longitude W 122.35 End Longitude W 122.32	
Project Termini From-To Aurora Ave N (SR99) Interstate 5		Nearest City Name Shoreline	Project Zip Code (+4) 98133-6722	
Begin Mile Post SR523MP0	End Mile Post MP 1.0	Length of Project 0.9 miles	Award Type <input checked="" type="checkbox"/> Local <input type="checkbox"/> Local Forces <input type="checkbox"/> State <input type="checkbox"/> Railroad	
Route ID SR 523	Begin Mile Point SR 523 MP 0	End Mile Point SR 523 MP 1.0	City Number 1169	County Number 17 County Name King
WSDOT Region Northwest Region <input type="checkbox"/>	Legislative District(s) 32	Congressional District(s) 7		Urban Area Number 1

Phase	Total Estimated Cost (Nearest Hundred Dollar)	Local Agency Funding (Nearest Hundred Dollar)	Federal Funds (Nearest Hundred Dollar)	Phase Start Date	
				Month	Year
P.E.	\$9,135,095	\$4,900,095	\$4,235,000	June	2016
R/W	\$14,303,885	\$14,303,885	\$0	September	2020
Const.	\$12,019,817	\$7,099,817	\$4,920,000	June	2023
Total	\$35,458,797	\$26,303,797	\$9,155,000		

Description of Existing Facility (Existing Design and Present Condition)

Roadway Width 60 feet	Number of Lanes 4
--------------------------	----------------------

145th Street is an existing 4-lane roadway. It lacks a sidewalk system that complies with ADA requirements. There are no bicycle lanes along the corridor. Accident rates are high for this type of facility.

Description of Proposed Work

Description of Proposed Work (Attach additional sheet(s) if necessary)

Design/PE and environmental phase of the 145th Street Improvement Project from Aurora Ave (SR99) to I-5. This project is phased as follows: Phase 1 (I-5 to Corliss Ave) - SL16A; Phase 2 (Corliss Ave to Wallingford Ave) - SL16B; Phase 3 (Wallingford Ave to Aurora Ave) - SL16C.

Local Agency Contact Person Cory Nau, PE	Title Engineer II	Phone (206) 801-2325
Mailing Address 17500 Midvale Avenue N	City Shoreline	State WA Zip Code 98133-4905
Project Prospectus	By _____ Approving Authority	
	Title City Manager	Date

Agency City of Shoreline	Project Title SR 523 (N/NE 145th Street), Aurora Ave to]	Date 11/08/2021
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Type of Proposed Work		
Project Type (Check all that Apply)	Roadway Width 48-60 feet	Number of Lanes 4-5
<input type="checkbox"/> New Construction <input type="checkbox"/> Path / Trail <input type="checkbox"/> 3-R <input checked="" type="checkbox"/> Reconstruction <input checked="" type="checkbox"/> Pedestrian / Facilities <input type="checkbox"/> 2-R <input type="checkbox"/> Railroad <input type="checkbox"/> Parking <input type="checkbox"/> Other <input type="checkbox"/> Bridge		

Geometric Design Data		
Description	Through Route	Crossroad
Federal Functional Classification	<input checked="" type="checkbox"/> Principal Arterial <input type="checkbox"/> Minor Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Major Collector <input type="checkbox"/> Minor Collector <input type="checkbox"/> Local Access	<input checked="" type="checkbox"/> Principal Arterial <input checked="" type="checkbox"/> Minor Arterial <input checked="" type="checkbox"/> Collector <input type="checkbox"/> Major Collector <input type="checkbox"/> Minor Collector <input type="checkbox"/> Local Access
	<input checked="" type="checkbox"/> Urban <input type="checkbox"/> Rural <input type="checkbox"/> NHS	<input checked="" type="checkbox"/> Urban <input type="checkbox"/> Rural <input type="checkbox"/> NHS
Terrain	<input type="checkbox"/> Flat <input checked="" type="checkbox"/> Roll <input type="checkbox"/> Mountain	<input checked="" type="checkbox"/> Flat <input type="checkbox"/> Roll <input type="checkbox"/> Mountain
Posted Speed	35 mph	Varies, 25 - 40 mph
Design Speed	35 mph	Varies, 25 - 40 mph
Existing ADT	23,000 - 30,000	Varies, 120 - 34,000
Design Year ADT	30,000 - 38,000	Varies, 150 - 42,000
Design Year	2040	2040
Design Hourly Volume (DHV)	2,800 - 3,600	20 - 4,200

Performance of Work		
Preliminary Engineering Will Be Performed By Consultant Services	Others 85 %	Agency 15 %
Construction Will Be Performed By	Contract %	Agency %

Environmental Classification	
<input type="checkbox"/> Class I - Environmental Impact Statement (EIS) <input type="checkbox"/> Project Involves NEPA/SEPA Section 404 Interagency Agreement <input type="checkbox"/> Class III - Environmental Assessment (EA) <input type="checkbox"/> Project Involves NEPA/SEPA Section 404 Interagency Agreements	<input checked="" type="checkbox"/> Class II - Categorically Excluded (CE) <input checked="" type="checkbox"/> Projects Requiring Documentation (Documented CE)

Environmental Considerations None.

Agency City of Shoreline	Project Title SR 523 (N/NE 145th Street), Aurora Ave to]	Date 11/08/2021
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Right of Way

<input type="checkbox"/> No Right of Way Needed * All construction required by the contract can be accomplished within the exiting right of way.	<input checked="" type="checkbox"/> Right of Way Needed <input type="checkbox"/> No Relocation	<input checked="" type="checkbox"/> Relocation Required
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Utilities

No utility work required
 All utility work will be completed prior to the start of the construction contract
 All utility work will be completed in coordination with the construction contract

Railroad

No railroad work required
 All railroad work will be completed prior to the start of the construction contract
 All the railroad work will be completed in coordination with the construction contract

Description of Utility Relocation or Adjustments and Existing Major Structures Involved in the Project
 Will be determined as part of design.

FAA Involvement

Is any airport located within 3.2 kilometers (2 miles) of the proposed project? Yes No

Remarks

The purpose of this revised Prospectus is to update the Local Agency Contact Person.

This project has been reviewed by the legislative body of the administration agency or agencies, or it's designee, and is not inconsistent with the agency's comprehensive plan for community development.

Agency City of Shoreline

Date

By _____ Mayor/Chairperson

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Authorize the City Manager to Approve Real Property Acquisition for the 145 th Corridor Phase 1 Project for Property Located at 104-126 NE 145 th Street and 14512-14526 1 st Avenue NE		
DEPARTMENT:	Public Works		
PRESENTED BY:	Tricia Juhnke		
ACTION:	<input type="checkbox"/> Ordinance	<input type="checkbox"/> Resolution	<input checked="" type="checkbox"/> Motion
	<input type="checkbox"/> Discussion	<input type="checkbox"/> Public Hearing	

PROBLEM/ISSUE STATEMENT:

City Council authorization is requested to allow the City Manager to approve three real property acquisitions in excess of the authority delegated to the City Manager. The City Manager’s authority to approve real property acquisitions is established in Shoreline Municipal Code (SMC) Section 2.60 and has been amended for the State Route 523 (N/NE 145th Street), Aurora Avenue N to I-5, Phase 1 (I-5 Corliss Avenue) project, referred to as to the 145th Corridor (Phase 1) Project. The City Manager’s purchasing authority for the 145th Corridor (Phase 1) Project is now at \$1,000,000 or less, with the approval of [Resolution No. 476](#) on May 24, 2021.

Previously, Council approved the increased signing authority for three property acquisitions that were appraised at more than \$1,000,000, exceeding the City Manager’s authority. As right-of-way (ROW) acquisition progressed for the project, there has been a change in property ownership on several properties. Eight properties have been purchased by a developer, referred to as Shoreline TOD Multifamily. With the assemblage located at 104-126 NE 145th Street and 14512-14526 1st Avenue NE, the property has been appraised at more than \$1,000,000. In order for the City to proceed with acquisition of this property, including offering possession and use agreements, the City Council must authorize the City Manager to approve this purchase.

RESOURCE/FINANCIAL IMPACT:

As with all the acquisitions of property for the 145th Corridor (Phase 1) Project, the value of the property acquisition that needs specific approval has been determined by an independent appraisal firm as hired for the project by the City’s contracted and WSDOT approved right-of-way consultant. The appraisal was also reviewed by the review appraiser hired for the Project. The total appraised value of the acquisition is \$1,606,000. Funding is being provided by the State Connecting Washington funds and is within the project budget.

RECOMMENDATION

Staff recommends that Council authorize the City Manager to execute the necessary documents to acquire the property identified in this Staff Report at the appraised value for the 145th Corridor (Phase 1) Project with an allowed contingency of ten (10) percent above the appraised value.

Approved By: City Manager ***DT*** City Attorney ***MK***

BACKGROUND

On September 28, 2020, [Council authorized obligation of \\$11,836,379](#) of the \$12.5 million State Connecting Washington funding available this biennium for right-of-way (ROW) acquisition for the State Route 523 (N/NE 145th St), Aurora Avenue N to I-5, Phase 1 (I-5 Corliss Avenue) project, referred to as to the 145th Corridor (Phase 1) Project. An additional approximately \$1.74 million of Connecting Washington funding will be used when it becomes available in the next biennium to complete ROW acquisition for Phase 1. No City money is being used to acquire the ROW for Phase 1.

The City is currently in the process of acquiring ROW for the 145th Corridor (Phase 1) Project. The City Manager's purchasing authority for the 145th Corridor (Phase 1) Project is now at \$1,000,000 or less, with the adoption of [Resolution No. 476](#) on May 24, 2021.

DISCUSSION

As ROW acquisitions have progressed, there has been a change in property ownership to several parcels. Eight properties have been purchased by a developer, referred to as Shoreline TOD Multifamily. With the assemblage located at 104-126 NE 145th Street and 14512-14526 1st Avenue NE, the total property value has been appraised at more than \$1,000,000, exceeding the City Manager's current authority. Attachment A to this staff report provides the ROW Plans showing the subject properties included in the City's ROW acquisition. In order for the City to proceed with acquisition of this property, including offering possession and use agreements, the City Council must authorize the City Manager to approve this purchase.

The additional acquisition within the current project limits (Interstate 5 – Corliss Avenue) has an appraised value of \$1,606,000. These are partial acquisitions as shown in Attachment A.

In order for the City to proceed with acquisition, including offering possession and use agreements, the City Council must authorize the City Manager to approve these purchases. An offer has been made to the identified property owner. Staff is requesting that Council authorize the City Manager to approve purchase of these properties as long as the cost does not exceed ten percent (10%) of the above appraised value. This approval does not guarantee payment above the appraised value. These acquisition costs also do not include reimbursement of relocation costs to property owners that qualify under state and federal guidelines.

RESOURCE/FINANCIAL IMPACT

As with all the acquisitions of the 145th Corridor (Phase 1) Project, the value of the property acquisitions that needs specific approval has been determined by an independent appraisal firm as hired for the project by the City's contracted and WSDOT approved right-of-way consultant. The appraisal was also reviewed by the review appraiser hired for the Project. The total appraised value of the acquisition is \$1,606,000. Funding is being provided by the State Connecting Washington funds and is within the project budget.

RECOMMENDATION

Staff recommends that Council authorize the City Manager to execute the necessary documents to acquire the property identified in the Staff Report at the appraised value for the 145th Corridor (Phase 1) Project with an allowed contingency of ten (10) percent above the appraised value.

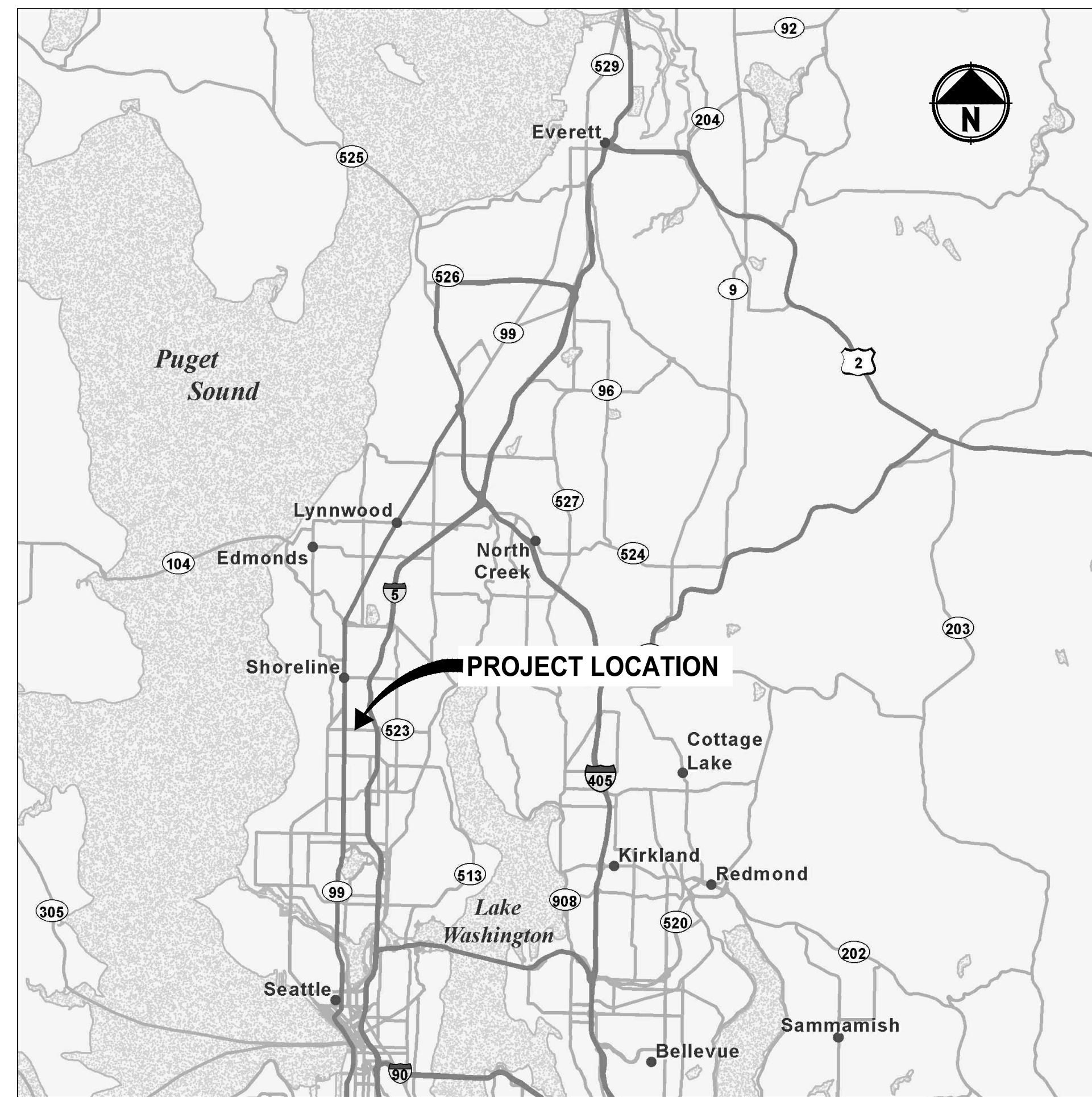
ATTACHMENTS

Attachment A: Right-of-Way Plans of the Acquisition Properties - 104-126 NE 145th Street and 14512-14526 1st Avenue NE

CITY OF SHORELINE SR 523 (N/NE 145TH STREET) AURORA TO I-5 (PHASE 1) RIGHT OF WAY PLANS FEDERAL AID # STPUL-0523(010)

PARCEL INFORMATION:

PLAN DESIGNATION	ASSESSOR PARCEL #	ZONING USE CODE	ZONE DESCRIPTION
101	765590-0249	R8	SINGLE FAMILY
102	765590-0054	R6	SINGLE FAMILY
103	765590-0038	R6	SINGLE FAMILY
104	765590-0034	R6	SINGLE FAMILY
105	765590-0048	R6	SINGLE FAMILY
106	765590-0031	R6	SINGLE FAMILY
107	645030-1675	SF 5000	SINGLE FAMILY
108	645030-1955	SF 5000	SINGLE FAMILY
109	645030-1920	SF 5000	SINGLE FAMILY
110	645030-2185	SF 5000	SINGLE FAMILY
111	645030-2175	SF 5000	SINGLE FAMILY
112	765590-0053	R6	SINGLE FAMILY
113	765590TR-X	N/A	N/A
114	765590-0039	R6	SINGLE FAMILY
115	288170-0544	MUR-45	SINGLE FAMILY
116	288170-0540	MUR-45	SINGLE FAMILY
117	288170-0546	MUR-45	SINGLE FAMILY
118	288170-0547	MUR-45	SINGLE FAMILY
119	645030-2325	SF 5000	SINGLE FAMILY
120	645030-2295	SF 5000	SINGLE FAMILY
121	769760-0005	SF 7200	SINGLE FAMILY
122	442560-0005	SF 7200	SINGLE FAMILY
123	738150-0030	MUR-45	SINGLE FAMILY
124	738150-0035	MUR-45	SINGLE FAMILY
125	738150-0040	MUR-45	SINGLE FAMILY
126	738150-0050	MUR-45	SINGLE FAMILY
127	275600-0070	MUR-45	MULTI-FAMILY
128	275600-0060	MUR-45	SINGLE FAMILY
129	275600-0050	MUR-45	SINGLE FAMILY
130	541110-0005	MUR-45	SINGLE FAMILY
131	202604-9130	SF 7200	SINGLE FAMILY
132	202604-9155	SF 7200	SINGLE FAMILY
133	202604-9069	SF 7200	SINGLE FAMILY
134	541110-0045	MUR-45	SINGLE FAMILY
135	288170-0544	MUR-45	SINGLE FAMILY
136	288170-0556	MUR-45	SINGLE FAMILY
137	288170-0362	MUR-70	SINGLE FAMILY
138	288170-0361	MUR-70	SINGLE FAMILY
139	288170-0364	MUR-70	SINGLE FAMILY
140	207510-0005	SF 7200	SINGLE FAMILY
141	202604-9026	SF 7200	SINGLE FAMILY
142	283210-0190	SF 7200	EDUCATIONAL SERVICES
143	288170-0359	MUR-70	SINGLE FAMILY
144	288170-0372	MUR-70	SINGLE FAMILY
145	288170-0366	MUR-70	SINGLE FAMILY
146	288170-0367	MUR-70	SINGLE FAMILY
147	288170-0370	MUR-70	SINGLE FAMILY
148	288170-0373	MUR-70	SINGLE FAMILY
149	288170-TRCT	N/A	N/A
150	288170-0371	MUR-70	SINGLE FAMILY
151	288170-0383	R8	SINGLE FAMILY



VICINITY MAP
NOT TO SCALE

CONTACT INFORMATION:

APPLICANT:
CITY OF SHORELINE
PUBLIC WORKS DEPARTMENT
17500 MIDVALE AVE. N.
SHORELINE, WA 98133
(425) 806-6829
CONTACT: DON RANGER

ENGINEER: JACOBS
1100 112th AVE NE
SUITE 500
BELLEVUE, WA 98004
(425) 233-3369
CONTACT: JOHN MCKENZIE, P.E.

SURVEYOR: PARAMETRIX
719 2ND AVENUE
SUITE 200
SEATTLE, WA 98104
(206) 394-3700
CONTACT: ROBERT PUSEY, PLS

RIGHT OF WAY REFERENCES

- (RR1) WSDOT RIGHT OF WAY PLAN
SEATTLE FREEWAY E. 75TH ST. TO E. 145TH ST.
SEPTEMBER 20, 1960
- (RR2) WSDOT RIGHT OF WAY PLAN
SEATTLE FREEWAY E. 145TH ST. TO E. 200TH ST.
OCTOBER 23, 1961
- (RR3) WSDOT RIGHT OF WAY PLAN
SR 523, JCT. SR 99 TO JCT. SR 522
JULY 19, 1996

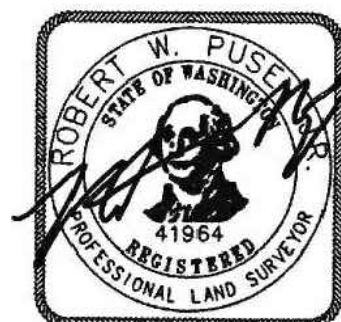
RIGHT OF WAY NOTES

RIGHT OF WAY DETERMINATIONS FOR THIS PLAN SET, WERE MADE BY ANALYZING A COMBINATION OF EXISTING RIGHT OF WAY PLANS LISTED HEREON IN THE RIGHT OF WAY REFERENCES, TOGETHER WITH RECORDED SURVEYS, SUBDIVISION PLATS, DEEDS & DEDICATIONS, AND FOUND MONUMENTS. ALL MEASUREMENTS SHOWN ARE IN U.S. SURVEY FEET, GROUND DISTANCES.

WRITTEN DESCRIPTION OF THE PROJECT:

THE CITY OF SHORELINE PROPOSES TO WIDEN NORTH 145TH STREET FROM J INTERSTATE 5 INTERCHANGE, TO AURORA AVENUE NORTH, BEING KNOWN AS 145TH STREET CORRIDOR PROJECT. PHASE 1 & 2 OF THE PROJECT IS FROM I-5 TO WALLINGFORD AVENUE NORTH. NORTH 145TH STREET IS THE BOUNDARY LINE BETWEEN THE CITY OF SHORELINE AND THE CITY OF SEATTLE WITH ACQUISITIONS BEING IN BOTH JURISDICTIONS.

08/26/2021



PROJECT NAME
**SR 523 (N/NE 145TH STREET)
AURORA TO I-5
PHASE 1**
SHORELINE, WA

**RIGHT OF WAY PLAN
COVER SHEET**

DRAWING NO.
1 OF 5
RW1

REVISIONS	DATE	BY	DESIGNED
			DRAWN D. THIBODEAU
			CHECKED D. THIBODEAU
			APPROVED B. PUSEY

**ONE INCH AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY**
FILE NAME
145th RW Plans Ph 1
JOB No.
247-2211-038
DATE
08-2021

PATH: U:\PDSO\Projects\Clients\2211-021_145th St ROW Plans\995\ca\Survey\00\current\Drawn PLOTTED BY: allihkr DATE: Thursday, August 26, 2021 4:06:39 PM LAYOUT: SHT.1 COVER

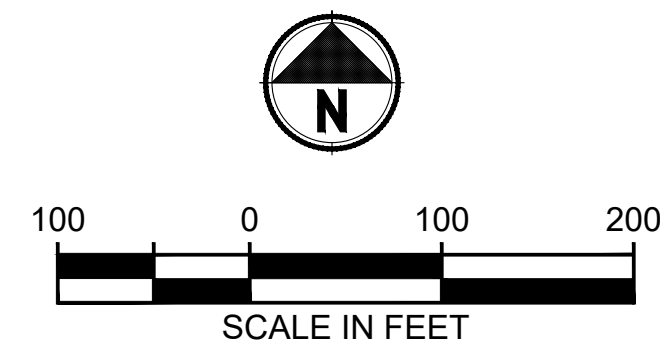
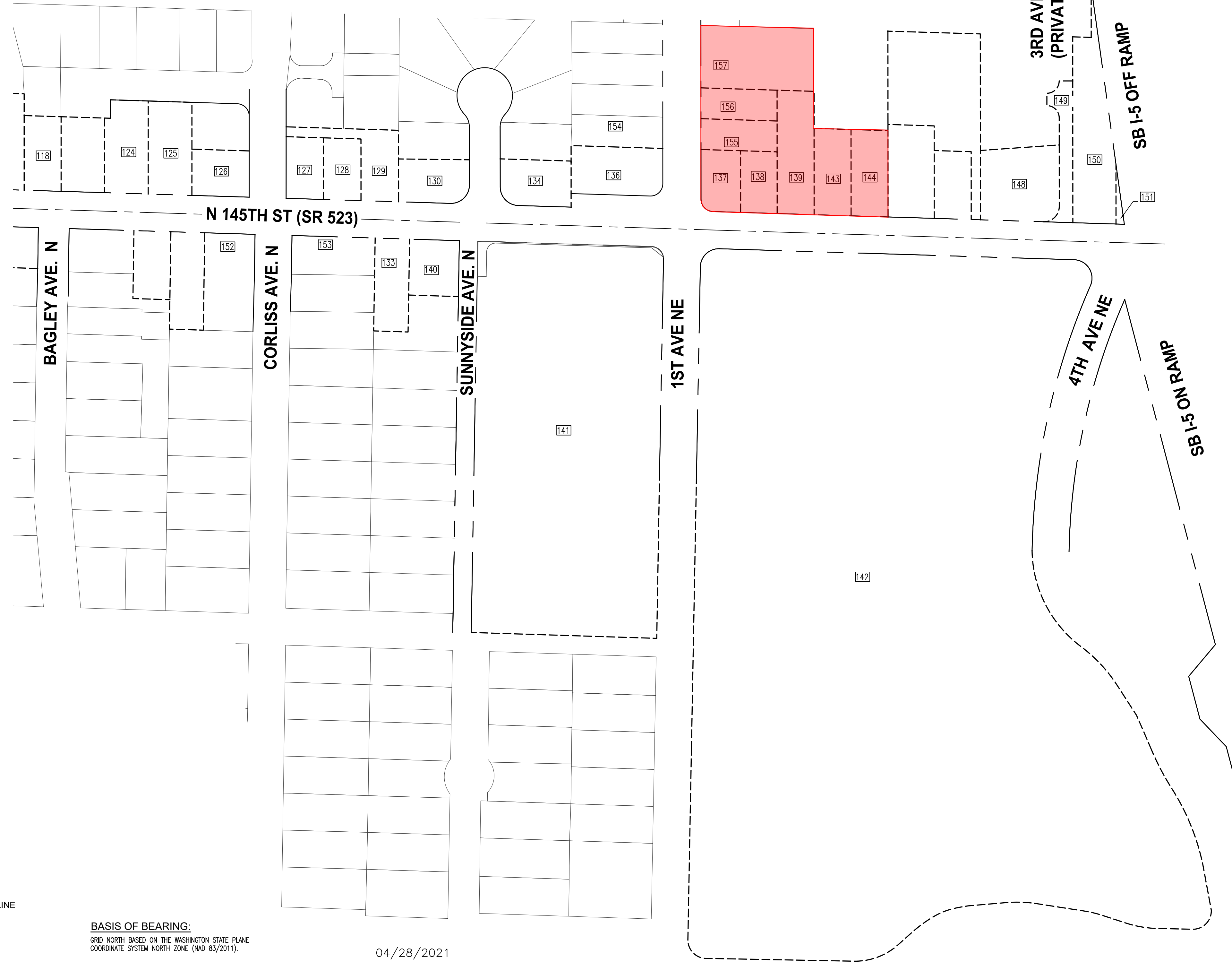
SR 523 (N/NE 145TH STREET, AURORA TO I-5 (PHASE 1) RIGHT OF WAY PLANS

Attachment A

TOTAL PARCEL DETAIL

KING COUNTY, WASHINGTON

NE 1/4 SECTION 19, T.26 N., R.4 E., W.M.
 NW 1/4 SECTION 20, T.26 N., R.4 E., W.M.
 SE 1/4 SECTION 18, T.26 N., R.4 E., W.M.
 SW 1/4 SECTION 17, T.26N., R.4 E., W.M.

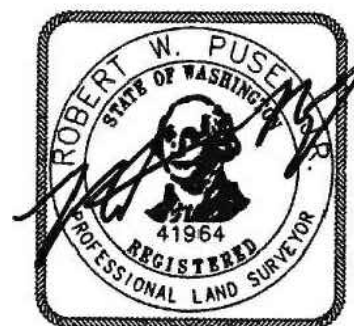


LEGEND

- 100 IMPACTED PARCEL IDENTIFIER
- - - - - IMPACTED PARCEL BOUNDARY LINE
- — — — — GIS PARCEL LINES
- — — — — STREET CENTERLINE
- — — — — EXISTING RIGHT OF WAY

BASIS OF BEARING:
 GRID NORTH BASED ON THE WASHINGTON STATE PLANE
 COORDINATE SYSTEM NORTH ZONE (NAD 83/2011).

04/28/2021



JACOBS
Parametrix
 ENGINEERING · PLANNING · ENVIRONMENTAL SCIENCES

PROJECT NAME
**SR 523 (N/NE 145TH STREET)
 AURORA TO I-5
 PHASE 1**
 SHORELINE, WA

**RIGHT OF WAY PLAN
 TOTAL PARCEL DETAIL**

DRAWING NO.
 2 OF 5
RW2

PATH: U:\PSO\Projects\Clients\2211-Jacob Eng\247-2211-021_145th St ROW Plans\995\Surveys\Current\Draws PLOTTED BY: jllhkrf DATE: Thursday, August 26, 2021 4:07:03 PM
 LAYOUT: SHIT 2.TPD

REVISIONS	DATE	BY	DESIGNED
			DRAWN D.THIBODEAU
			CHECKED D.THIBODEAU
			APPROVED B.PUSEY

**ONE INCH AT FULL SCALE.
 IF NOT, SCALE ACCORDINGLY**
 FILE NAME
145th RW Plans Ph 1
 JOB No.
247-2211-038
 DATE
08-2021

MATCHLINE A: SEE DETAIL A1 (THIS SHEET)

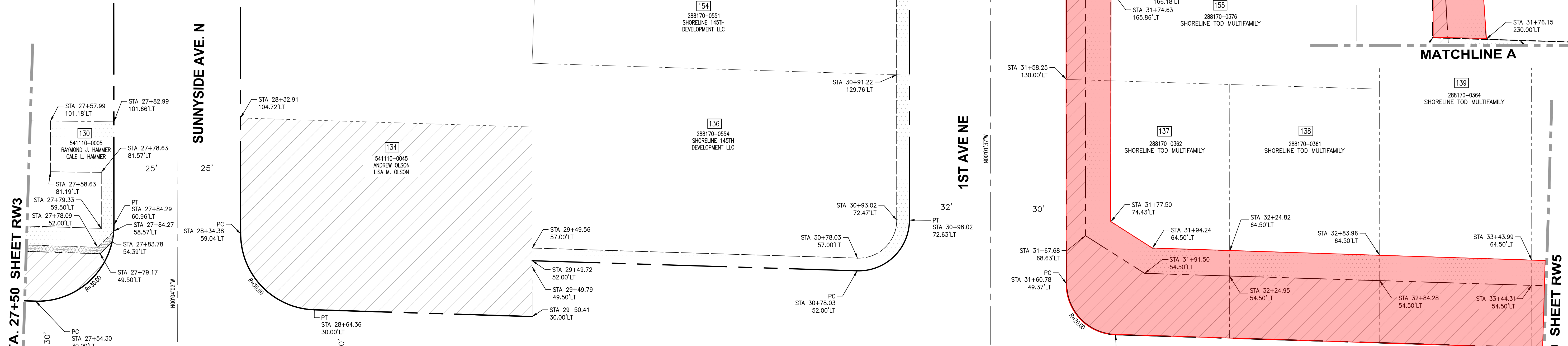
DETAIL A1

PARCEL NUMBER	TAX PARCEL NO.	OWNER NAME	TOTAL AREA	FEE ACQUISITION	REMAINDER AREA	TCE AREA
154	288170-0551	SHORELINE 145TH DEVELOPMENT LLC	10,184	0	10,184	220
155	288170-0376	SHORELINE TOD MULTIFAMILY	6,183	375	5,808	639
156	288170-0368	SHORELINE TOD MULTIFAMILY	6,182	355	5,827	1,235
157	288170-0369	SHORELINE TOD MULTIFAMILY	18,636	269	18,367	955

PARCEL TOTAL AREAS WERE DERIVED FROM KING COUNTY ASSESSOR REPORTS AND DOES NOT REFLECT A BOUNDARY CALCULATION BY PARAMETRIX

ALL AREAS SHOWN IN SQUARE FEET

NW 1/4 SECTION 20, T.26 N., R.4 E., W.M.
SW 1/4 SECTION 17, T.26N., R.4 E., W.M.



MATCHLINE A

MATCHLINE STA. 27+50 SHEET RW3

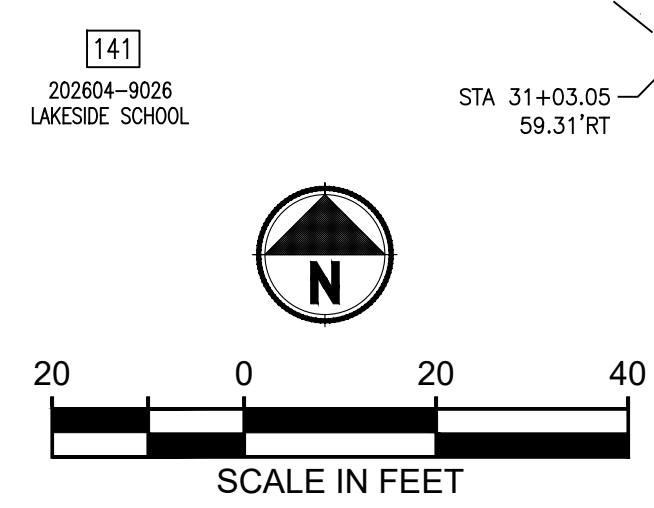
MATCHLINE STA. 33+50 SHEET RW5

OWNERSHIPS

PARCEL NUMBER	TAX PARCEL NO.	OWNER NAME	TOTAL AREA	FEE ACQUISITION	REMAINDER AREA	TCE AREA
134	541110-0045	ANDREW & LISA OLSON	8,408	8,408	0	0
135	-	-	-	-	-	-
136	288170-0554	SHORELINE 145TH DEVELOPMENT LLC	11,027	0	11,027	1,068
137	288170-0362	SHORELINE TOD MULTIFAMILY	6,344	2,228	4,116	1,141
138	288170-0361	SHORELINE TOD MULTIFAMILY	6,000	1,453	4,547	593
139	288170-0364	SHORELINE TOD MULTIFAMILY	12,000	1,471	10,529	600
140	207510-0005	KISNER & REBEKAH SANTIAGO	7,195	4	7,191	96
141	202604-9026	LAKESIDE SCHOOL	191,228	1,509	189,719	455
142	283210-0190	LAKESIDE SCHOOL	896,089	893	895,196	784

PARCEL TOTAL AREAS WERE DERIVED FROM KING COUNTY ASSESSOR REPORTS AND DOES NOT REFLECT A BOUNDARY CALCULATION BY PARAMETRIX

ALL AREAS SHOWN IN SQUARE FEET



BASIS OF BEARING:
GRID NORTH BASED ON THE WASHINGTON STATE PLANE COORDINATE SYSTEM NORTH ZONE (NAD 83/2011).

LEGEND

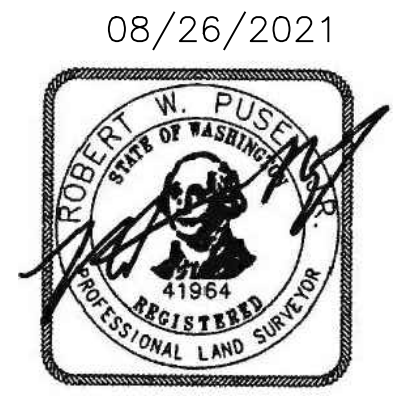
	DEED PARCEL LINE
	GIS PARCEL LINES
	STREET CENTERLINE
	EXISTING RIGHT OF WAY
	PROPOSED RIGHT OF WAY
	TEMPORARY CONSTRUCTION LIMIT
	PERMANENT EASEMENT
	ACQUISITION AREA
	TEMPORARY CONSTRUCTION EASEMENT (TCE)
	PERMANENT EASEMENT
	PARCEL NUMBER

LAYOUT: SHIT 4 27+50-33+50
 PATH: U:\PDSO\Projects\Clients\2211-jacob Eng\247-2211-021 145th St ROW Plans\995\Survey\Occurrent\Draw
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REVISIONS	DATE	BY	DESIGNED

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FILE NAME: 145th RW Plans Ph 1
 JOB No.: 247-2211-038
 DATE: 08-2021



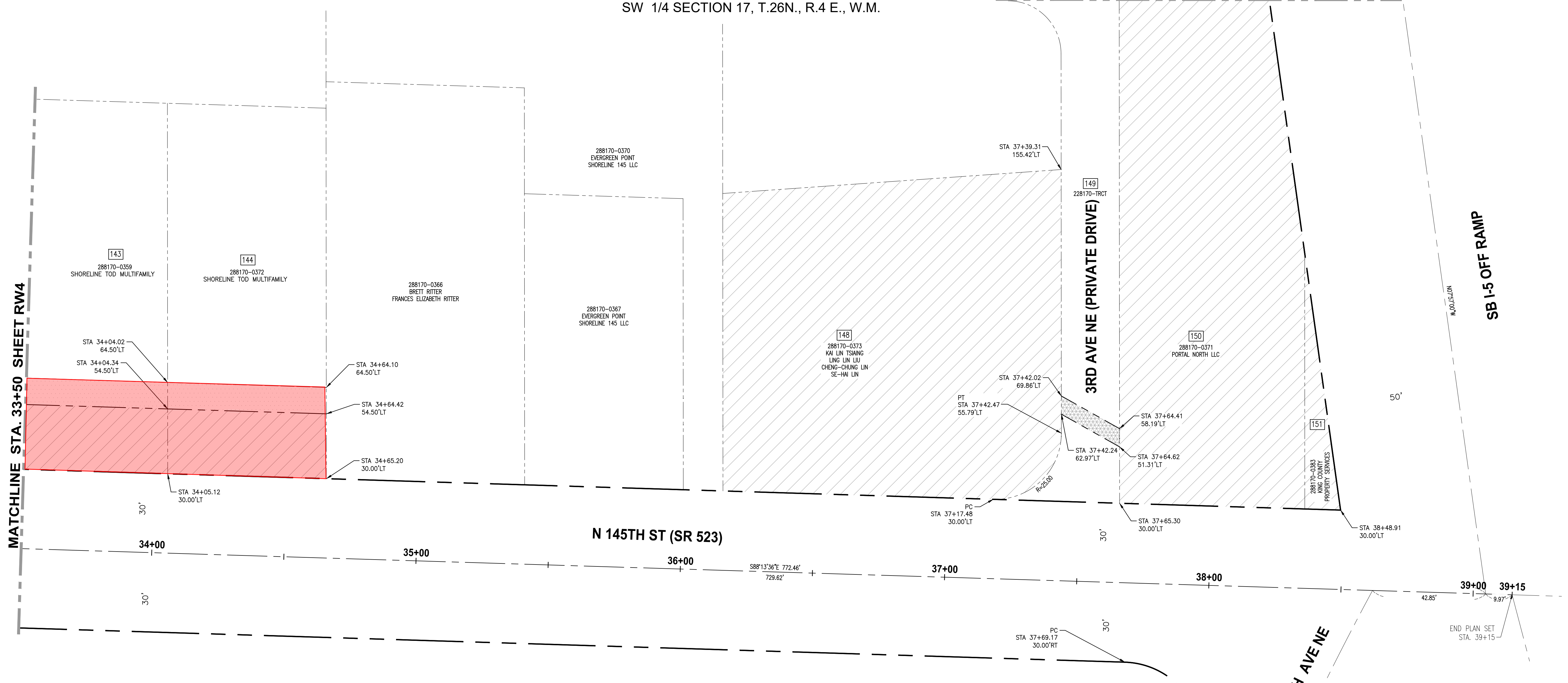
PROJECT NAME
**SR 523 (N/NE 145TH STREET)
 AURORA TO I-5
 PHASE 1
 SHORELINE, WA**

**RIGHT OF WAY PLAN
 STA. 27+50 - STA. 33+50**

DRAWING NO.
 4 OF 5
RW4

NW 1/4 SECTION 20, T.26 N., R.4 E., W.M.
SW 1/4 SECTION 17, T.26N., R.4 E., W.M.

MATCHLINE A: SEE DETAIL A1 (THIS SHEET)

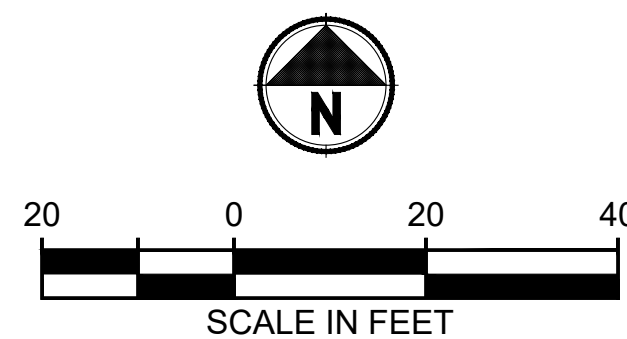


OWNERSHIPS

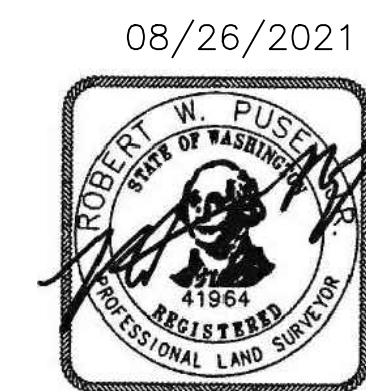
PARCEL NUMBER	TAX PARCEL NO.	OWNER NAME	GROSS AREA	FEE ACQUISITION	REMAINDER AREA	PERMANENT EASEMENT AREA	TCE AREA
143	288170-0359	SHORELINE TOD MULTIFAMILY	8,400	1,471	6,929	0	600
144	288170-0372	SHORELINE TOD MULTIFAMILY	8,400	1,471	6,929	0	600
148	288170-0373	LIN TSIANG & LIN LIU & LIN & LIN	15,085	15,085	0	0	0
149	288170-TRCT	-	-	-	-	152	-
150	288170-0371	PORTAL NORTH LLC	17,486	17,486	0	0	0
151	288170-0383	KING COUNTY PROPERTY SERVICES	654	654	0	0	0

PARCEL TOTAL AREAS WERE DERIVED FROM KING COUNTY ASSESSOR REPORTS AND DOES NOT REFLECT A BOUNDARY CALCULATION BY PARAMETRIX

ALL AREAS SHOWN IN SQUARE FEET



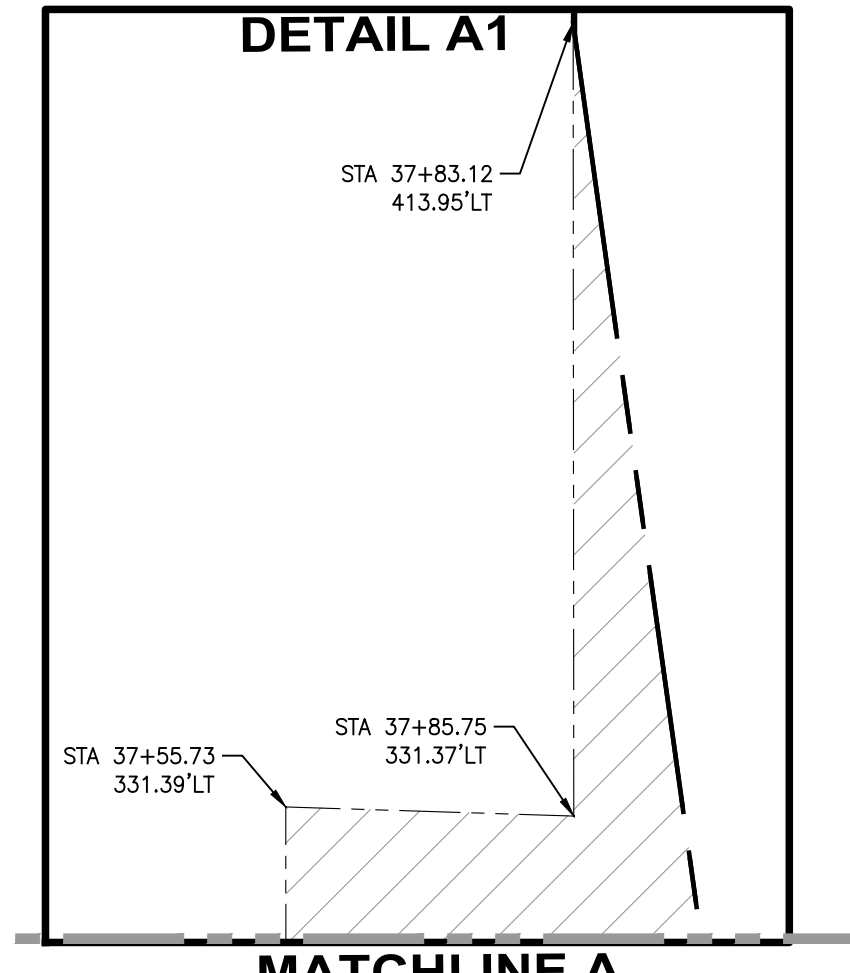
BASIS OF BEARING:
GRID NORTH BASED ON THE WASHINGTON STATE PLANE COORDINATE SYSTEM NORTH ZONE (NAD 83/2011).



142
283210-0190
LAKESIDE SCHOOL

LEGEND

- DEED PARCEL LINE
- GIS PARCEL LINES
- STREET CENTERLINE
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- TEMPORARY CONSTRUCTION LIMIT
- PERMANENT EASEMENT
- ACQUISITION AREA
- TEMPORARY CONSTRUCTION EASEMENT (TCE)
- PERMANENT EASEMENT
- 100 PARCEL NUMBER



REVISIONS	DATE	BY	DESIGNED

ONE INCH AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

FILE NAME: 145th RW Plans Ph 1
JOB No.: 247-2211-038
DATE: 08-2021



PROJECT NAME
SR 523 (N/NE 145TH STREET) AURORA TO I-5 PHASE 1 SHORELINE, WA

RIGHT OF WAY PLAN STA. 33+50 - STA. 39+15

DRAWING NO. 5 OF 5
RW5

LAYOUT: SHIT_5_33+50-39+15 PATH: U:\P50\Projects\Clients\2211-0383_Eng\247-2211-0383_Survey\995\Drawings\Survey\00\Current\Drawings\Drawings\082621\082621.dwg PLOTTED BY: gllfkl DATE: Thursday, August 26, 2021 4:08:36 PM

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Authorizing the City Manager to Obligate \$8,924,480 of Connecting Washington Funding for Right-of-Way Acquisition and Construction for Phase 1 of the SR523 (N/NE 145 th Street) Aurora Avenue N to I-5 Project
DEPARTMENT:	Public Works
PRESENTED BY:	Tricia Juhnke, City Engineer
ACTION:	<input type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input checked="" type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

PROBLEM/ISSUE STATEMENT:

Staff is requesting that Council authorize the City Manager to execute Supplement No. 1 to Local Agency Agreement LA-9999 with the Washington State Department of Transportation (WSDOT) to obligate \$8,924,480 of 2022-2023 State Connecting Washington (CWA) funding for Right-of-Way (ROW) acquisition for the SR523 (N/NE 145th Street) Aurora Avenue N to I-5 Project, Phase 1 (I-5 to Corliss Avenue).

In accordance with the City’s Grants Management Policy and Procedure, grant agreements for Capital Improvement Program projects require Council action for City Manager signature/approval authority following the dollar allocation for Small Works Projects, which is currently set at \$350,000. Additionally, WSDOT requires formal authorization of their contracts prior to execution. WSDOT administers Federal and State funds awarded to the City of Shoreline. Approval of these State Connecting Washington funds will allow the City to begin the ROW acquisition for Phase 1 of the 145th Corridor Project.

RESOURCE/FINANCIAL IMPACT:

This project is included in the adopted 2019-2024 Capital Improvement Plan. The project budget summary is as follows:

SUMMARY OF PROJECT COSTS		
RIGHT-OF-WAY (ROW)	Right-of-Way Acquisition	\$13,213,935
	City Staff	\$203,544
	Consultant (CH2M Hill/Jacobs)	\$408,006
	Property Management	\$78,400
	Building Demolition	\$400,000
	SUBTOTAL	
CONSTRUCTION	Construction Cost	\$11,395,046
	Contingency	\$749,792 ¹
	SUBTOTAL	
TOTAL ROW & CONSTRUCTION EXPENDITURES		\$26,523,701

SUMMARY OF PROJECT REVENUES		
REVENUES	Roads Capital Fund	\$767,863
	Roads Capital Fund – Municipal Arts	\$74,979
	CWA Grant (21-22) – ROW	\$11,790,875
	CWA Grant (22-23) – ROW & Construction	\$8,969,984
	Federal STP Grant – Construction	\$4,270,000
	CMAQ Grant – Construction	\$650,000
SUBTOTAL		\$26,523,701
TOTAL ROW & CONSTRUCTION REVENUES		\$26,523,701

¹Available revenues result in a construction contingency of less than a standard 10%.

The City has previously obligated \$11,836,379 in 2020-2021 State CWA funding for ROW acquisition on Phase 1 of the SR523 (N/NE 145th Street) Aurora Avenue N to I-5 Project. The 2022-2023 State CWA funds to be obligated at this time require no local match. Tonight, under a separate agenda item, staff is requesting an amount of \$3,575,520 from State CWA funds of to be obligated to complete design (no local match is required). The total project budget for ROW acquisition and construction of the 145th Corridor Project, Phase 1 is \$26,523,701.

The City has received \$12.5 million in State CWA funds for the 2022-2023 biennium. This agenda item would obligate the balance of the \$12.5 million in State CWA funding, in the amount of \$8,924,480, for ROW acquisition and construction for Phase 1 of the 145th Corridor Project. There is no local match for these State funds.

If the Council chooses not to authorize this agreement which obligates \$8,924,480 of 2022-2023 State CWA funding for ROW acquisition and construction for Phase 1, the entire project funding could be jeopardized. It is unlikely the City would be able to replace that funding with another source, and if the City were not able to complete the 145th Corridor Project through construction, all federal funds reimbursed to date would need to be paid back to the State

RECOMMENDATION

Staff recommends that the City Council authorize the City Manager to execute Supplement No. 1 to Local Agency Agreement LA-9999 to obligate \$8,924,480 of 2022-2023 State Connecting Washington funds for right-of-way acquisition and construction for SR523 (N/NE 145th Street) Aurora Avenue to I-5 Project, Phase 1 (I-5 to Corliss Avenue).

Approved By: City Manager **DT** City Attorney **MK**

BACKGROUND

When it was determined that a future Sound Transit light rail station would be located in Shoreline along 5th Avenue NE adjacent to 145th Street with service coming online in 2024, the City looked to address congestion and lack of facilities on the 145th Street Corridor. An initial 145th Street Multimodal Corridor Study preferred concept was approved by the City Council on [April 11, 2016](#).

Since this initial study, several projects have been identified along the 145th Street Corridor and are currently in design phases, which are further defining the actual improvements. These include:

1. Sound Transit's [SR 522/NE 145th BRT Project](#)
2. The City's SR 523 (145th Street) & I-5 [Interchange Project](#)
3. The City's SR 523 (N/NE 145th Street), Aurora Ave N to I-5 Project [\(145th Corridor Project\)](#)

The 145th Corridor Project is currently under design (utilizing both Federal STP and local funds) and ROW acquisition (utilizing State CWA funds). WSDOT agreement LA-8901 was executed and funding became effective June 9, 2016, for design and WSDOT agreement LA-9999 became effective on October 20, 2020, for ROW acquisition.

The City has developed a strategy similar to the Aurora Corridor Project to make the construction of the 145th Corridor Project financially achievable. It has been determined that acquiring ROW and completing construction of the corridor in separate phases would spread out costs and resource needs and better affords the possibility of additional grant funding.

The City has worked with our Metropolitan Planning Organization, the Puget Sound Regional Council (PSRC), which conducts long range planning for growth management and transportation in our region. City projects must be included as part of PSRC planning in order to be eligible for various funding. Both PSRC and WSDOT have confirmed the City's approach to phase the delivery of the 145th Corridor Project for ROW and construction.

The phases are as follows:

- Phase 1: I-5 to Corliss Avenue (145th Interchange Project Interface to Corliss Avenue)
- Phase 2: Corliss Avenue to Wallingford Avenue
- Phase 3: Wallingford Avenue to SR-99 (Aurora Ave/Interurban Trail)

Tonight, the balance of \$8,924,480 from the \$12.5 million available in the 2022-2023 biennium for State CWA funding is being requested to obligate for ROW acquisition and construction for Phase 1 (I-5 to Corliss Avenue).

DISCUSSION

Tonight's Council action addresses obligating a portion of the 2022-2023 State CWA funding in order to complete the ROW acquisition and construction on the 145th Corridor

Project, Phase 1 (I-5 to Corliss Avenue). Under WSDOT agreement LA-9999, ROW and construction will be completed for the first segment of corridor. Supplement No. 1 to Local Agency Agreement LA-9999 which obligates CWA funding for ROW acquisition can be found in Attachment A. The second and third segments will be finished at a later date when funding sources are identified. The total ROW acquisition and construction cost for Phase 1 is estimated to be \$20,760,859.

Design of the 145th Corridor Project has passed the 60% design stage and is progressing towards completing 100% final design for the entire corridor. Final design will be progressed for each phase, or segment, sequentially. Final design for Phase 1 is anticipated to be completed near the end of September 2022. Final design for the entire corridor is currently scheduled to be complete by December 31, 2024.

Phase 1 is fully funded for ROW acquisition with State CWA funding. Shoreline has \$12.5 million in each of two consecutive biennia (2020-2021 and 2022-2023) to be applied anywhere along the corridor. The City will continue to pursue any available grant funding. If State CWA funds can be replaced with another grant source, some State funding can be utilized on another phase.

As noted above, staff is requesting obligation of a portion of the 2022-2023 State CWA funds in the amount of \$8,924,480 to complete ROW acquisition and construction for Phase 1 of the Corridor Project. In accordance with the City's Grants Management Policy and Procedure, grant agreements for Capital Improvement Program projects require Council action for City Manager signature/approval authority following the dollar allocation for Small Works Projects which is currently set at \$350,000.

COUNCIL GOAL(S) ADDRESSED

The 145th Corridor Project directly supports two of the City Council goals:

- Goal 2 - Continue to deliver highly-valued public services through management of the City's infrastructure and stewardship of the natural environment.
- Goal 3 - Continue preparation for regional transit in Shoreline.

RESOURCE/FINANCIAL IMPACT

This project is included in the adopted 2019-2024 Capital Improvement Plan. The project budget summary is as follows:

SUMMARY OF PROJECT COSTS		
RIGHT-OF-WAY (ROW)	Right-of-Way Acquisition	\$13,213,935
	City Staff	\$203,544
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If the Council chooses not to authorize this agreement which obligates \$8,924,480 of 2022-2023 State CWA funding for ROW acquisition and construction for Phase 1, the entire project funding could be jeopardized. It is unlikely the City would be able to replace that funding with another source, and if the City were not able to complete the 145th Corridor Project through construction, all federal funds reimbursed to date would need to be paid back to the State

RECOMMENDATION

Staff recommends that the City Council authorize the City Manager to execute Supplement No. 1 to Local Agency Agreement LA-9999 to obligate \$8,924,480 of 2022-2023 State Connecting Washington funds for right-of-way acquisition and construction for SR523 (N/NE 145th Street) Aurora Avenue to I-5 Project, Phase 1 (I-5 to Corliss Avenue).

ATTACHMENTS

Attachment A – WSDOT Local Agency Agreement Supplement No. 1



Supplement - Local Programs State Funding Agreement

Agency City of Shoreline		Supplement Number
Project Number HLP-CNWA-(021)	Agreement Number LA 9999	01

This supplemental agreement is made and entered into
All provisions in the AGREEMENT identified above remain in effect except as expressly modified by this supplement.
The changes to the agreement are described as follows:

Project Description No Change

Name State Route 523 (N/NE 145th Street), Aurora Avenue N to I-5, Phase 1 (I-5 to Corliss Avenue)

Location N/NE 145th Street; Interstate 5 to Corliss Avenue N

Description of Work No Change

Reason for Supplement

Obligating 2022-2023 Connecting Washington (CWA) funding to ROW and Construction.

Type of Work	Estimate of Funding				
	(1) Previous Agreement/Suppl.	(2) Supplement	(3) Estimated Total Project Funds	(4) Estimated Agency Funds	(5) Estimated State Funds
PE a. Agency					
b. Other					
c. Other					
d. State					
e. Total PE Cost Estimate (a+b+c+d)	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
RW f. Agency	\$ 120,000.00	\$ 83,544.00			\$ 203,544.00
g. Other Consultant	\$ 378,510.00	\$ 29,496.00			\$ 408,006.00
h. Other ROW Acquisition	\$ 11,337,869.00	\$ 2,354,466.00			\$ 13,692,335.00
i. State					
j. Total R/W Cost Estimate (f+g+h+i)	\$ 11,836,379.00	\$ 2,467,506.00	\$ 0.00	\$ 0.00	\$ 14,303,885.00
CN k. Contract		\$ 6,316,974.00			\$ 6,316,974.00
l. Other					
m. Other					
n. Other					
o. Agency		\$ 140,000.00			\$ 140,000.00
p. State					
q. Total CN Cost Estimate (k+l+m+n+o+p)	\$ 0.00	\$ 6,456,974.00	\$ 0.00	\$ 0.00	\$ 6,456,974.00
r. Total Project Cost Estimate (e+j+q)	\$ 11,836,379.00	\$ 8,924,480.00	\$ 0.00	\$ 0.00	\$ 20,760,859.00

Agency Official

By

Title City Manager, City of Shoreline

Washington State

Department of Transportation

By Director, Local Program

Date Executed


**Local Agency Federal Aid
Project Prospectus**

Prefix	Route	()	Date	11/08/2021
Federal Aid Project Number HLP	CNWA	021	DUNS Number	961859345
Local Agency Project Number 2916322	(WSDOT Use Only)		Federal Employer Tax ID Number	91-1683888

Agency City of Shoreline	CA Agency <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Federal Program Title <input checked="" type="checkbox"/> 20.205 <input type="checkbox"/> Other			
Project Title SR 523 (N/NE 145th Street), Ph. 1 (I5 to Corliss)	Start Latitude N47.73 End Latitude N47.73	Start Longitude W 122.35 End Longitude W 122.32			
Project Termini From-To Interstate 5 Corliss Avenue	Nearest City Name Shoreline	Project Zip Code (+4) 98133-6729			
Begin Mile Post ~ MP 0.87	End Mile Post ~ MP 0.60	Length of Project 0.27 miles	Award Type <input checked="" type="checkbox"/> Local <input type="checkbox"/> Local Forces <input type="checkbox"/> State <input type="checkbox"/> Railroad		
Route ID SR 523	Begin Mile Point SR 523 ~ MP 0.87	End Mile Point ~ MP 0.60	City Number 1169	County Number 17	County Name King
WSDOT Region Northwest Region <input type="checkbox"/>	Legislative District(s) 32	Congressional District(s) 7	Urban Area Number 1		

Phase	Total Estimated Cost (Nearest Hundred Dollar)	Local Agency Funding (Nearest Hundred Dollar)	Federal Funds (Nearest Hundred Dollar)	Phase Start Date	
				Month	Year
P.E.	\$9,135,095	\$4,900,095	\$4,235,000	July	2016
R/W	\$14,303,885	\$14,303,885	\$0	September	2020
Const.	\$12,019,817	\$7,099,817	\$4,920,000	June	2023
Total	\$35,458,797	\$26,303,797	\$9,115,000		

Description of Existing Facility (Existing Design and Present Condition)

Roadway Width 60 feet	Number of Lanes 4
--------------------------	----------------------

145th Street is an existing 4-lane roadway. It lacks a sidewalk system that complies with ADA requirements. There are no bicycle lanes along the corridor. Accident rates are high for this type of facility.

Description of Proposed Work

Description of Proposed Work (Attach additional sheet(s) if necessary)

Work includes ROW and CN for Phase 1 (I-5 to Corliss Avenue), SL-16A. Design elements include roadway/intersection, signal, channelization, pedestrian, and bicycle facility improvements. PE for the full length of the corridor is programmed under LA 8901, SR523 (N/NE 145th Street), Aurora to I-5 (SL-16).

Local Agency Contact Person Cory Nau, PE	Title Engineer II	Phone (206) 801-2325	
Mailing Address 17500 Midvale Avenue N	City Shoreline	State WA	Zip Code 98133-4905
Project Prospectus	By _____ Approving Authority		
	Title City Manager	Date	

Agency City of Shoreline	Project Title SR 523 (N/NE 145th Street), Ph. 1 (I5 to Coi	Date 11/08/2021
-----------------------------	---	--------------------

Type of Proposed Work		
Project Type (Check all that Apply)	Roadway Width 48-60 feet	Number of Lanes 4-5
<input type="checkbox"/> New Construction <input type="checkbox"/> Path / Trail <input type="checkbox"/> 3-R <input checked="" type="checkbox"/> Reconstruction <input checked="" type="checkbox"/> Pedestrian / Facilities <input type="checkbox"/> 2-R <input type="checkbox"/> Railroad <input type="checkbox"/> Parking <input type="checkbox"/> Other <input type="checkbox"/> Bridge		

Geometric Design Data		
Description	Through Route	Crossroad
Federal Functional Classification	<input checked="" type="checkbox"/> Urban <input type="checkbox"/> Rural <input type="checkbox"/> NHS	<input checked="" type="checkbox"/> Urban <input type="checkbox"/> Rural <input checked="" type="checkbox"/> NHS
	<input checked="" type="checkbox"/> Principal Arterial <input type="checkbox"/> Minor Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Major Collector <input type="checkbox"/> Minor Collector <input type="checkbox"/> Local Access	<input checked="" type="checkbox"/> Principal Arterial <input checked="" type="checkbox"/> Minor Arterial <input checked="" type="checkbox"/> Collector <input type="checkbox"/> Major Collector <input type="checkbox"/> Minor Collector <input checked="" type="checkbox"/> Local Access
Terrain	<input type="checkbox"/> Flat <input checked="" type="checkbox"/> Roll <input type="checkbox"/> Mountain	<input checked="" type="checkbox"/> Flat <input type="checkbox"/> Roll <input type="checkbox"/> Mountain
Posted Speed	35 mph	Varies, 25 - 35 mph
Design Speed	35 mph	Varies, 25 - 35 mph
Existing ADT	26,000 - 30,000	3,900: 1st Ave; 14,000: I-5 SBramp
Design Year ADT	30,000 - 38,000	5,800: 1st Ave; 20,000: I-5 SBramp
Design Year	2040	2040
Design Hourly Volume (DHV)	2,800 - 3,600	640: 1st Ave; 1,500: I-5 SBramp

Performance of Work		
Preliminary Engineering Will Be Performed By Consultant Services	Others 70 %	Agency 30 %
Construction Will Be Performed By	Contract %	Agency %

Environmental Classification	
<input type="checkbox"/> Class I - Environmental Impact Statement (EIS) <input type="checkbox"/> Project Involves NEPA/SEPA Section 404 Interagency Agreement <input type="checkbox"/> Class III - Environmental Assessment (EA) <input type="checkbox"/> Project Involves NEPA/SEPA Section 404 Interagency Agreements	<input checked="" type="checkbox"/> Class II - Categorical Excluded (CE) <input checked="" type="checkbox"/> Projects Requiring Documentation (Documented CE)

Environmental Considerations
None.

Agency City of Shoreline	Project Title SR 523 (N/NE 145th Street), Ph. 1 (I5 to Co1	Date 11/08/2021
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Right of Way

<input type="checkbox"/> No Right of Way Needed * All construction required by the contract can be accomplished within the exiting right of way.	<input checked="" type="checkbox"/> Right of Way Needed <input type="checkbox"/> No Relocation	<input checked="" type="checkbox"/> Relocation Required
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Utilities

No utility work required
 All utility work will be completed prior to the start of the construction contract
 All utility work will be completed in coordination with the construction contract

Railroad

No railroad work required
 All railroad work will be completed prior to the start of the construction contract
 All the railroad work will be completed in coordination with the construction contract

Description of Utility Relocation or Adjustments and Existing Major Structures Involved in the Project

Will be determined as part of design (LA-8901, SL-16).

FAA Involvement

Is any airport located within 3.2 kilometers (2 miles) of the proposed project? Yes No

Remarks

Updating Local Agency Point of Contact.

This project has been reviewed by the legislative body of the administration agency or agencies, or it's designee, and is not inconsistent with the agency's comprehensive plan for community development.

Agency City of Shoreline

Date

By _____ Mayor/Chairperson

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Authorizing the City Manager to Execute the Second Amendment to the 2016-2025 Water Resource Inventory Area (WRIA) 8 Interlocal Agreement
DEPARTMENT:	Public Works – Surface Water Utility
PRESENTED BY:	John Featherstone, Surface Water Utility Manager
ACTION:	<input type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input checked="" type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

PROBLEM/ISSUE STATEMENT:

Since 1999, Council has authorized the City Manager to participate in the Water Resource Inventory Area (WRIA) Region 8 Forum of 27 local jurisdictions in King and Snohomish counties. The goal of the Forum is to jointly fund the development and implementation of a Chinook Salmon Conservation Plan to protect and restore the species and meet the requirements of the Endangered Species Act (ESA).

On January 8, 2001, Council authorized the City Manager to execute the initial WRIA 8 Interlocal Agreement (ILA); on October 16, 2006, Council authorized execution of the 2007 – 2015 WRIA 8 ILA; and on October 26, 2015, Council authorized execution of the current 2016-2025 WRIA 8 ILA. On September 14, 2020, Council authorized the First Amendment to the 2016-2025 WRIA 8 ILA to enable Snohomish County to rejoin the WRIA 8 ILA as a cost share partner in 2020 and future years.

The City received a recent request from WRIA 8 to authorize a Second Amendment to the 2016-2025 WRIA 8 ILA for the City of Everett to join the WRIA 8 ILA as a cost share partner in 2022 and future years. The amendment has been signed by City of Everett and now needs to be signed by all other parties to the 2016-2025 WRIA 8 ILA. Tonight, staff is seeking Council authorization for the City Manager to execute this amendment.

RESOURCE/FINANCIAL IMPACT:

The addition of the City of Everett to the WRIA 8 ILA reapportions the partner cost shares resulting in a relatively small reduction for all partners, which for Shoreline equals roughly \$250 in savings for 2022.

RECOMMENDATION

Staff recommends that Council authorize the City Manager to execute the Second Amendment to the 2016-2025 WRIA 8 Interlocal Agreement for the City of Everett to join WRIA 8 as a cost share partner.

Approved By: City Manager **DT** City Attorney **MK**

BACKGROUND

Puget Sound Chinook salmon are found within Shoreline in McAleer Creek and in Shoreline's marine near-shore area. When Chinook salmon were listed as a "threatened" species under the Endangered Species Act (ESA) in 1999, Council authorized the City Manager to execute an Interlocal Agreement (ILA) to create the Water Resource Inventory Area (WRIA) Region 8 Forum of 27 local jurisdictions in King and Snohomish counties. The goal of the Forum is to jointly fund the development and implementation of a Chinook Salmon Conservation Plan to protect and restore the species and meet the requirements of the ESA.

On January 8, 2001, Council authorized the City Manager to execute the initial WRIA 8 ILA, and on October 16, 2006, Council authorized execution of the 2007 – 2015 WRIA 8 ILA. On October 26, 2015, Council authorized City execution of the current 2016-2025 WRIA 8 ILA, which was Amended in 2020 for Snohomish County to re-join WRIA 8 as a cost share partner after leaving in 2018 (Attachment A).

DISCUSSION

A portion of the City of Everett is within the WRIA 8 watershed boundary, and the City of Everett wishes to join the WRIA 8 ILA as a new cost share partner in 2022 and future years. The Amendment has been signed by the City of Everett and now needs to be signed by all other parties to the 2016-2025 WRIA 8 ILA. Tonight, staff is seeking Council authorization for the City Manager to execute this Amendment (Attachment B). The final cost share for the 2022 WRIA 8 budget as modified by this Amendment is also attached to this report as Attachment C.

COUNCIL GOAL ADDRESSED

Participation in and support of the WRIA 8 ILA supports City Council's commitment to "stewardship of the natural environment" as stated in Council Goal 2 from the 2020-2022 work plan.

RESOURCE/FINANCIAL IMPACT

The addition of the City of Everett to the WRIA 8 ILA reapportions the partner cost shares resulting in a relatively small reduction for all partners, which for Shoreline equals roughly \$250 in savings for 2022.

RECOMMENDATION

Staff recommends that Council authorize the City Manager to execute the Second Amendment to the 2016-2025 WRIA 8 Interlocal Agreement for the City of Everett to join WRIA 8 as a cost share partner.

ATTACHMENTS

- Attachment A: Current 2016-2025 WRIA 8 Interlocal Agreement, including First Amendment
- Attachment B: Proposed Second Amendment to 2016-2025 WRIA 8 Interlocal Agreement
- Attachment C: WRIA 8 Final Cost Share for 2022 Budget

I-16-005



Receiving # 8453
(obtain from City Clerk)

CONTRACT ROUTING FORM

DESCRIPTION	Originator:	Rika Cecil	Routed by:	Tina Kendall
	Department/Division:	Public Works / SWES	Date:	February 4, 2016
	Name of Consultant/Contractor:	King County Water Resource Inventory Area 8 (WRIA 8) Forum		
	CONTRACT TITLE:	INTERLOCAL: Agreement for the Watershed Basins within Water Resource Inventory Area 8 (WRIA 8) Forum.		

CONTRACT CONTENT	Type of Contract: <input type="checkbox"/> (GR) Grants <input checked="" type="checkbox"/> (I) Intergovernmental Agreement <input type="checkbox"/> (L) Lease Agreement		
	<input type="checkbox"/> (S) Purchase of Services <input type="checkbox"/> (W) Public Works <input type="checkbox"/> (O) Other		
	Bid/RFP Number:		
	Effective Date:	October 28, 2015	Completion Date: December 31, 2025
	Has the original contract boilerplate language been modified? <input type="radio"/> Yes <input checked="" type="radio"/> No		
If yes, specify which sections have been modified:			
Description of Services:	Revised WRIA 8 Interlocal Agreement to jointly fund the development and implementation of a Chinook Salmon Conservation Plan.		

FINANCIAL DETAILS	Total Amount of Contract: \$16,693.00			
	Org Key – Obj #	2709000-5510	Amount:	\$16,693.00
	J/L # – Task #			
	Org Key – Obj #		Amount:	
	J/L # – Task #			
	Org Key – Obj #		Amount:	
J/L # – Task #				
Are there sufficient funds in the current budget to cover this contract? <input checked="" type="radio"/> Yes <input type="radio"/> No				
Remarks: Total reflects WRIA 8 Salmon Recovery Council decision (March 19, 2015) to provide for an annual increase in the ILA cost share not to exceed the Consumer Price Index for Wages, which is estimated to be 2.18% in 2016. Jurisdictional area, population, and assessed value is to be recalculated every three years per the WRIA 8 interlocal agreement for 2016-2025.				

FORMS	For Public Works/Small Works Contracts:		For Service Contracts:	
	<input type="checkbox"/> Selection Form	<input type="checkbox"/> Business License	<input type="checkbox"/> Selection Form	<input type="checkbox"/> Business License
	<input type="checkbox"/> Contractor Responsibility Form	<input type="checkbox"/> Certificate of Insurance	<input type="checkbox"/> Certificate of Insurance	<input type="checkbox"/> W-9 Form
	<input type="checkbox"/> Contract Bond/In Lieu of Form	<input type="checkbox"/> W-9 Form		

SIGNATURE	Authorization Level:	Supervisor
	<input checked="" type="checkbox"/> 1. Project Manager	<i>EC 2/4/16</i>
	<input type="checkbox"/> 2. Risk Management/Budget	<i>UD 2/4/16</i>
<input type="checkbox"/> 3. City Attorney		
<input type="checkbox"/> 4. Consultant/Contractor		
<input checked="" type="checkbox"/> 5. Supervisor		
	<input type="checkbox"/> 6. City Council (if required)	
	<input type="checkbox"/> 7. City Manager	
	<input checked="" type="checkbox"/> 8. City Clerk	<i>CH 2/10/16</i>
	<input checked="" type="checkbox"/> 9. Originating Department	



INTERLOCAL AGREEMENT
For the Watershed Basins within Water Resource Inventory Area 8

PREAMBLE

THIS AGREEMENT ("Agreement") is entered into pursuant to Chapter 39.34 RCW by and among the eligible county and city governments signing this agreement that are located in King and Snohomish Counties, lying wholly or partially within the management area of Watershed Resource Inventory Area ("WRIA") 8, which includes all or portions of the Lake Washington, Cedar River, and Sammamish River basins, all political subdivisions of the State of Washington (individually for those signing this Agreement, "party", and collectively "parties"). The parties share interests in and responsibility for addressing long-term watershed planning and conservation.

WHEREAS, the parties share interests in and responsibility for addressing long-term watershed planning and conservation of the aquatic ecosystems and floodplains for purposes of implementing the Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan ("WRIA 8 Plan") and improving watershed health for the watershed basins in WRIA 8 and wish to provide for funding and implementation of various activities and projects therein; and

WHEREAS, Puget Sound Chinook salmon, including the WRIA 8 Cedar and Sammamish populations, were listed as threatened under the Endangered Species Act (ESA) in 1999; and

WHEREAS, the parties recognize their participation in this Agreement demonstrates their commitment to proactively working to address the ESA listing of Chinook salmon; and

WHEREAS, the parties recognize achieving WRIA 8 salmon recovery and watershed health goals requires a recommitment to, and acceleration of, the collaborative implementation and funding of salmon recovery actions, and

WHEREAS, the parties have participated in an Interlocal Agreement for the years 2001-2005 to develop the WRIA 8 Plan, contributed to the federally-approved Puget Sound Salmon Recovery Plan, and desire to continue providing efficient participation in the implementation of such plans; and

WHEREAS, the parties took formal action in 2005 and 2006 to ratify the WRIA 8 Plan, and

WHEREAS, the parties have participated in an extension of the 2001-2005 Interlocal Agreement and an Interlocal Agreement for the years 2007-2015 to implement the WRIA 8 Plan; and

WHEREAS, the parties seek information on watershed conditions and salmon conservation and recovery needs to inform local decision-making bodies regarding actions in response to listings under the ESA; and

WHEREAS, the parties have prioritized and contributed resources and funds for implementing projects and programs to protect and restore salmon habitat; and

WHEREAS, the parties wish to monitor and evaluate implementation of the WRIA 8 Plan through adaptive management; and

WHEREAS, the parties wish to continue to use adaptive management for identifying, coordinating and implementing basin plans and water quality, flood hazard reduction, water quantity, and habitat projects in the watersheds; and

WHEREAS, the parties recognize climate change is likely to affect watershed ecosystem function and processes, and salmon habitat restoration actions are a proactive approach to making the watershed ecosystem more resilient to changing conditions, which supports watershed health for human communities and salmon populations; and

WHEREAS, the parties have an interest in participating on the Puget Sound Salmon Recovery Council and other groups associated with Puget Sound recovery because of the contributions of the Lake Washington/Cedar/Sammamish Watershed to the overall health of Puget Sound and to collectively seek funding to implement the WRIA 8 Plan; and

WHEREAS, the parties have an interest in participating on the Washington Salmon Coalition and other groups associated with the Salmon Recovery Funding Board to collectively seek funding to implement the WRIA 8 Plan; and

WHEREAS, the parties have an interest in supporting implementation of the Puget Sound Partnership Action Agenda to restore the health of Puget Sound as it relates to salmon recovery and WRIA 8 priorities; and

WHEREAS, the parties recognize the importance of efforts to protect and restore habitat for multiple species in the Lake Washington/Cedar/Sammamish Watershed, including Lake Sammamish kokanee, and will seek opportunities to partner and coordinate Chinook recovery efforts with these other efforts where there are overlapping priorities and benefits; and

WHEREAS, the parties have an interest in achieving multiple benefits by integrating salmon recovery planning and actions with floodplain management, water quality and agriculture; and

WHEREAS, the parties recognize that identification of watershed issues, and implementation of salmon conservation and recovery actions may be carried out more efficiently if done cooperatively than if carried out separately and independently;

NOW, THEREFORE, in consideration of the mutual promises, benefits and covenants contained herein, the parties hereto do mutually covenant and agree as follows:

MUTUAL COVENANTS AND AGREEMENTS

1. **DEFINITIONS.** For purposes of this Agreement, the following terms shall have the meaning provided for below:
 - 1.1. **ELIGIBLE JURISDICTIONS:** The governments eligible for participation in this Agreement as parties are the Counties of King and Snohomish; the cities of Bellevue, Bothell, Brier, Clyde Hill, Edmonds, Everett, Issaquah, Kenmore, Kent, Kirkland, Lake Forest Park, Lynnwood, Maple Valley, Medina, Mercer Island, Mill Creek, Mountlake Terrace, Mukilteo, Newcastle, Redmond, Renton, Sammamish, Seattle, Shoreline, Woodinville; the towns of Beaux Arts, Hunts Point, Woodway and Yarrow Point; and other interested public agencies and tribes.
 - 1.2. **WRIA 8 SALMON RECOVERY COUNCIL:** The *WRIA 8 Salmon Recovery Council* created herein is the governing body responsible for implementing this Agreement and is comprised of members who are designated representatives of eligible jurisdictions who have authorized the execution of and become parties to this Agreement. In addition, the *WRIA 8 Salmon Recovery Council* includes members who are not representatives of the parties and are comprised of a balance of stakeholder representatives and any other persons who are deemed by the parties to this Agreement to be appropriate for the implementation and adaptive management of the *WRIA 8 Plan*. The appointed representatives of parties will appoint the members who are not representing parties, using the voting provisions of Section 5 of this Agreement.
 - 1.3. **LAKE WASHINGTON/CEDAR/SAMMAMISH WATERSHED (WRIA 8) CHINOOK SALMON CONSERVATION PLAN, JULY 2005:** *WRIA 8 Plan* as referred to herein is the three volume document, and any subsequent updates adopted in accordance with the procedures provided for in Section 6 below, developed in partnership with stakeholder representatives and ratified by the parties to this Agreement for the purposes of preserving, protecting, and restoring habitat with the intent to recover listed species, including sustainable, genetically diverse, harvestable populations of naturally spawning Chinook salmon.
 - 1.4. **MANAGEMENT COMMITTEE:** *Management Committee* as referred to herein consists of five (5) elected officials or their designees which elected officials are chosen by the party members of the *WRIA 8 Salmon Recovery Council*, according to the voting procedures in Section 5, and charged with staff oversight and administrative duties on the *WRIA 8 Salmon Recovery Council's* behalf.
 - 1.5. **SERVICE PROVIDER(S):** *Service Provider(s)*, as used herein, means that agency, government, consultant or other entity which supplies staffing or other resources to and for the *WRIA 8 Salmon Recovery Council*, in exchange for payment. The *Service Provider(s)* may be a party to this Agreement.

- 1.6 **FISCAL AGENT:** The *Fiscal Agent* refers to that agency or government which performs all accounting services for the **WRIA 8 Salmon Recovery Council**, as it may require, in accordance with the requirements of Chapter 39.34 RCW.
- 1.7 **STAKEHOLDERS:** Stakeholders refers to those public and private entities within the WRIA who reflect the diverse interests integral for planning, implementation, and adaptive management for the recovery of the listed species under the Endangered Species Act, and may include but are not limited to environmental and business interests.
2. **PURPOSES.** The purposes of this Agreement include the following:
- 2.1 To provide a mechanism and governance structure for the implementation and adaptive management of the implementation of the **WRIA 8 Plan**
- 2.2 To share the cost of the WRIA 8 Service Provider team to coordinate and provide the services necessary for the successful implementation and management of the **WRIA 8 Plan**. The maximum financial or resource obligation of any participating eligible jurisdiction under this Agreement shall be limited to its share of the cost of the Service Provider staff and associated operating costs.
- 2.3 To provide a mechanism for securing technical assistance and funding from state agencies or other sources.
- 2.4 To provide a mechanism for the implementation of other multiple benefit habitat, water quality and floodplain management projects with local, regional, state, federal and non-profit funds as may be contributed to or secured by the **WRIA 8 Salmon Recovery Council**.
- 2.5 To annually recommend WRIA 8 salmon recovery programs and projects for funding by the King County Flood Control District through the District's Cooperative Watershed Management grant program.
- 2.6 To serve as the salmon recovery "Lead Entity" as designated by state law (Chapter 77.85 RCW) for WRIA 8, The Lead Entity is responsible for developing a salmon recovery strategy, working with project sponsors to develop projects, convening local technical and citizen committees to annually recommend WRIA 8 salmon habitat restoration and protection projects for funding by the State of Washington Salmon Recovery Funding Board, and representing WRIA 8 in Puget Sound region and state wide salmon recovery forums.
- 2.7 To provide a framework for cooperation and coordination among the parties on issues relating to the implementation and management of the implementation of the **WRIA 8 Plan** and to meet the requirement or a commitment by any party to participate in WRIA-based or watershed basin planning in response to any state or federal law which may require such participation as a condition of any funding, permitting or other program of state or federal agencies, at the discretion of such party to this Agreement.

- 2.8 To develop and articulate WRIA-based positions on salmon habitat, conservation and funding to state and federal legislators.
- 2.9 To provide for the ongoing participation of citizens and other stakeholders in such efforts and to ensure continued public outreach efforts to educate and garner support for current and future ESA efforts.
- 2.10 To provide information for parties to use to inform land use planning, regulations, and outreach and education programs.
- 2.11 To provide a mechanism for on-going monitoring and adaptive management of the **WRIA 8 Plan** as defined in the Plan.

It is not the purpose or intent of this Agreement to create, supplant, preempt or supersede the authority or role of any individual jurisdiction or water quality policy bodies such as the Regional Water Quality Committee.

- 3. **EFFECTIVE DATE AND TERM.** This Agreement shall become effective on January 1, 2016 provided it has been signed by that date by at least nine (9) of the eligible jurisdictions within WRIA 8 representing at least seventy percent (70%) of the affected population, as authorized by each jurisdiction's legislative body, and further provided that after such signatures this Agreement has been filed by King County and Snohomish County in accordance with the terms of RCW 39.34.040 and .200. If such requirements are not met by January 1, 2016, then the effective date of this Agreement shall be the date on which such requirements are met. This Agreement provides the mechanism and governance structure for implementation of the **WRIA 8 Plan** from January 1, 2016 through December 31, 2025. Once effective, this Agreement shall remain in effect through December 31, 2025; provided, however, that this Agreement may be extended for such additional terms as the parties may agree to in writing, with such extension being effective upon its execution by at least nine (9) of the eligible jurisdictions within WRIA 8 representing at least seventy per cent (70%) of the affected population.
- 4. **ORGANIZATION AND NATURE OF WRIA 8 SALMON RECOVERY COUNCIL.** The parties hereby establish a governing body for WRIA 8 and the Lake Washington-Cedar and Sammamish watershed basins and associated Puget Sound drainages (hereinafter the "**WRIA 8 Salmon Recovery Council**") the precise boundaries of which are established in Chapter 173-500 WAC, or as determined by the **WRIA 8 Salmon Recovery Council**, to serve as the formal governance structure for carrying out the purposes of this Agreement in partnership with non-party members. Each party to this agreement shall appoint one (1) elected official to serve as its representative on the **WRIA 8 Salmon Recovery Council**. The **WRIA 8 Salmon Recovery Council** is a voluntary association of the county and city governments, and other interested public agencies and tribes, located wholly or partially within the management area of WRIA 8 and the Lake Washington/Cedar/Sammamish watershed basins and associated Puget Sound drainages who

choose to be parties to this Agreement. Representatives from stakeholder entities who are selected under the voting provisions of Section 5.2 of this agreement are also part of this association.

4.1 Upon the effective execution of this agreement and the appointment of representatives to the **WRIA 8 Salmon Recovery Council**, the party members of the **WRIA 8 Salmon Recovery Council** shall meet and choose from among its members, according to the voting provisions of Section 5, five (5) elected officials or their designees, to serve as a **Management Committee** to oversee and direct the funds and personnel contributed under this Agreement, in accordance with the adopted annual budget and such other directions as may be provided by the party members of the **WRIA 8 Salmon Recovery Council**. Representatives of the **Fiscal Agent** and **Service Provider** may serve as non-voting ex officio members of the Management Committee. The **Management Committee** shall act as an executive subcommittee of the **WRIA 8 Salmon Recovery Council**, responsible for oversight and evaluation of any **Service Providers** or consultants, for administration of the budget, and for providing recommendations on administrative matters to the **WRIA 8 Salmon Recovery Council** for action, consistent with the other subsections of this section.

4.1.1 Services to the **WRIA 8 Salmon Recovery Council** for the term of this agreement shall be provided by King County Department of Natural Resources which shall be the primary **Service Provider** unless the party members pursuant to the voting provisions of Section 5 choose another primary **Service Provider**. The **Management Committee** shall prepare a Memorandum of Understanding to be signed by an authorized representative of King County and an authorized representative of WRIA 8, which shall set out the expectations for services to be provided. Services should include, without limitation, identification of and job descriptions for dedicated staff in increments no smaller than .5 FTE, description of any supervisory role retained by the **Service Provider** over any staff performing services under this Agreement, and a method of regular consultation between the **Service Provider** and the **Management Committee** concerning the performance of services hereunder.

4.1.2 The **Management Committee** shall make recommendations to the party members of the **WRIA 8 Salmon Recovery Council** for action, including decisions related to work program, staffing and service agreements, and budget and financial operations, annually for each year of this Agreement. All duties of the **Management Committee** shall be established by the party members of the **WRIA 8 Salmon Recovery Council**.

- 4.2 The party members of the **WRIA 8 Salmon Recovery Council** shall have the authority and mandate to establish and adopt the following:
- 4.2.1 By September 1 of each year, establish and approve an annual budget, establishing the level of funding and total resource obligations of the parties which are to be allocated on a proportional basis according to the average of the population, assessed valuation and area attributable to each party to the Agreement, in accordance with the formula set forth in Exhibit A, which formula shall be updated every third year by the **WRIA 8 Salmon Recovery Council**, as more current data become available, and in accordance with Section 2.2. Individual party cost shares may change more frequently than every three years for parties involved in an annexation that changes the area, population, and assessed value calculation of such party to the extent that the cost shares established by the formula set forth in Exhibit A would be changed by such annexation. For parties that are not county or city governments, the level of funding and resource obligation will be determined in communications with the **Management Committee**, which will develop a recommendation for review and approval by, the **WRIA 8 Salmon Recovery Council**.
- 4.2.2 Review and evaluate annually the duties to be assigned to the **Management Committee** hereunder and the performance of the **Fiscal Agent** and **Service Provider(s)** to this Agreement, and provide for whatever actions it deems appropriate to ensure that quality services are efficiently, effectively and responsibly delivered in the performance of the purposes of this Agreement. In evaluating the performance of any **Service Provider(s)**, at least every three (3) years, the **WRIA 8 Salmon Recovery Council** may retain an outside consultant to perform a professional assessment of the work and services so provided. Evaluations of the **Service Provider(s)** shall occur in years 3, 6, and 9 of the Agreement
- 4.2.3 Oversee and administer the expenditure of budgeted funds and allocate the utilization of resources contributed by each party or obtained from other sources in accordance with an annual prioritized list of implementation and adaptive management activities within the WRIA during each year of this Agreement.
- 4.3 The **WRIA 8 Salmon Recovery Council** through the primary **Service Provider** may contract with similar watershed forum governing bodies or any other entities for any lawful purpose related hereto, including specific functions and tasks which are initiated and led by another party to this Agreement beyond the services provided by the primary **Service Provider**. The parties may choose to create a separate legal or administrative entity under applicable state law, including without limitation a nonprofit corporation or

general partnership, to accept private gifts, grants or financial contributions, or for any other lawful purposes.

4.4 The party members of the **WRIA 8 Salmon Recovery Council** shall adopt other rules and procedures that are consistent with its purposes as stated herein and are necessary for its operation.

5. **VOTING.** The party members on the **WRIA 8 Salmon Recovery Council** shall make decisions; approve scope of work, budget, priorities and any other actions necessary to carry out the purposes of this Agreement as follows:

5.1 No action or binding decision will be taken by the **WRIA 8 Salmon Recovery Council** without the presence of a quorum of active party members. A quorum exists if a majority of the party members are present at the **WRIA 8 Salmon Recovery Council** meeting, provided that positions left vacant on the **WRIA 8 Salmon Recovery Council** by parties shall not be included in calculating the quorum. In addition, positions will be considered vacant on the third consecutive absence and shall not be included in calculating a quorum until that time in which the party member is present. The voting procedures provided for in 5.1.1 through 5.1.2 are conditioned upon there being a quorum of the active party members present for any action or decision to be effective and binding.

5.1.1 Decisions shall be made using a consensus model as much as possible. Each party agrees to use its best efforts and exercise good faith in consensus decision-making. Consensus may be reached by unanimous agreement of the party members at the meeting, or by a majority recommendation agreed upon by the active party members, with a minority report. Any party who does not accept a majority decision may request weighted voting as set forth below.

5.1.2 In the event consensus cannot be achieved, as determined by rules and procedures adopted by the **WRIA 8 Salmon Recovery Council**, the **WRIA 8 Salmon Recovery Council** shall take action on a dual-majority basis, as follows:

5.1.2.1 Each party, through its appointed representative, may cast its weighted vote in connection with a proposed **WRIA 8 Salmon Recovery Council** action.

5.1.2.2 The weighted vote of each party in relation to the weighted votes of each of the other parties shall be determined by the percentage of the annual contribution by each party set in accordance with Subsection 4.2.1 in the year in which the vote is taken.

5.1.2.3 For any action subject to weighted voting to be deemed approved, an affirmative vote must be cast by both a majority of the active party members to this Agreement and by a majority of the weighted votes of the active party members to this Agreement. No action shall be valid

and binding on the parties to this Agreement until it shall receive majority of votes of both the total number of active party members to the Agreement and of the active members representing a majority of the annual budget contribution for the year in which the vote is taken. A vote of abstention shall be recorded as a "no" vote.

- 5.2 The party members on the **WRIA 8 Salmon Recovery Council** may deem it appropriate to appoint to the **WRIA 8 Salmon Recovery Council** non-party stakeholder representatives and other persons who are appropriate for the implementation and adaptive management of the **WRIA 8 Plan**.
- 5.2.1 Nomination of such non-party members may be made by any member of the **WRIA 8 Salmon Recovery Council**. Appointment to the **WRIA 8 Salmon Recovery Council** of such non-party members requires either consensus or dual majority of party members as provided in Section 5.1.
- 5.2.2 The party members on the **WRIA 8 Salmon Recovery Council** may deem it appropriate to allow non-party members to vote on particular **WRIA 8 Salmon Recovery Council** decisions. The party members may determine which issues are appropriate for non-party voting by either consensus or majority as provided in Sections 5.1, except in the case where legislation requires non-party member votes.
- 5.2.3 Decisions of the entire **WRIA 8 Salmon Recovery Council**, both party and non-party members, shall be made using a consensus model as much as possible. Voting of the entire **WRIA 8 Salmon Recovery Council** will be determined by consensus or majority as provided in Sections 5.1 and a majority of the non-party members.

6. **ADAPTIVE MANAGEMENT OF THE WRIA 8 CHINOOK SALMON CONSERVATION PLAN.**

The **WRIA 8 Plan** shall be implemented with an adaptive management approach. Such an approach anticipates updates and amendments to the **WRIA 8 Plan**. Such amendments to be effective and binding must comply with the following provisions:

- 6.1 The **WRIA 8 Salmon Recovery Council** shall act to approve or remand any **WRIA 8 Plan** amendments prepared and recommended by the committees of the **WRIA 8 Salmon Recovery Council** within ninety (90) calendar days of receipt of the plan amendments, according to the voting procedures described in Section 5.
- 6.2 In the event that any amendments are not so approved, they shall be returned to the committees **of the WRIA 8 Salmon Recovery Council** for further consideration and amendment and thereafter returned to the **WRIA 8 Salmon Recovery Council** for decision.

- 6.3 After approval of the **WRIA 8 Plan** amendments by the **WRIA 8 Salmon Recovery Council**, the plan amendments shall be referred to the parties to this Agreement for ratification prior to the submission to any federal or state agency for further action. Ratification means an affirmative action, evidenced by a resolution, motion, or ordinance of the jurisdiction's legislative body, by at least nine (9) jurisdictions within WRIA 8 representing at least seventy per cent (70%) of the total population of WRIA 8. Upon ratification, the **WRIA 8 Salmon Recovery Council** shall transmit the **updated WRIA 8 Plan** to any state or federal agency as may be required for further action.
- 6.4 In the event that any state or federal agency to which the **WRIA 8 Plan** or amendments thereto are submitted shall remand the **WRIA 8 Plan** or amendments thereto for further consideration, the **WRIA 8 Salmon Recovery Council** shall conduct such further consideration and may refer the plan or amendments to the committees of the **WRIA 8 Salmon Recovery Council** for recommendation on amendments thereto.
- 6.5 The parties agree that any amendments to the **WRIA 8 Plan** shall not be forwarded separately by any of them to any state or federal agency unless it has been approved and ratified as provided herein.

7. **OBLIGATIONS OF PARTIES; BUDGET; FISCAL AGENT; RULES.**

- 7.1 Each party shall be responsible for meeting its financial obligations hereunder as described in Section 2.2, and established in the annual budget adopted by the **WRIA 8 Salmon Recovery Council** under this Agreement and described in Section 4.2.1. The maximum funding responsibilities imposed upon the parties during the first year of this Agreement shall not exceed the amounts set forth in Exhibit A, which shall be updated every third year as described in Section 4.2.1, or as annexations result in changes to the area, population, and assessed value calculation for those parties involved in the annexation to the extent that the cost shares established by the formula set forth in Exhibit A would be changed for such parties by the annexation.
- 7.2 No later than September 1 of each year of this Agreement, the **WRIA 8 Salmon Recovery Council** shall adopt a budget, including its overhead and administrative costs, for the following calendar year. The budget shall propose the level of funding and other responsibilities (e.g. staffing) of the individual parties for the following calendar year and shall propose the levels of funding and resources to be allocated to specific prioritized implementation and adaptive management activities within the WRIA. The parties shall thereafter take whatever separate legislative or other actions that may be necessary to timely address such individual responsibilities under the proposed budget, and shall have done so no later than December 1st of each such year.

- 7.3 Funds collected from the parties or other sources on behalf of the **WRIA 8 Salmon Recovery Council** shall be maintained in a special fund by King County as **Fiscal Agent** and as *ex officio* treasurer on behalf of the **WRIA 8 Salmon Recovery Council** pursuant to rules and procedures established and agreed to by the **WRIA 8 Salmon Recovery Council**. Such rules and procedures shall set out billing practices and collection procedures and any other procedures as may be necessary to provide for its efficient administration and operation. Any party to this Agreement may inspect and review all records maintained in connection with such fund at any reasonable time.
8. **LATECOMERS**. A county or city government, or other interested public agency or tribe in King or Snohomish County lying wholly or partially within the management area of WRIA 8 and the Lake Washington-Cedar and Sammamish watershed basins and adjacent Puget Sound drainages which has not become a party to this Agreement within twelve (12) months of the effective date of this Agreement may become a party only with the written consent of all the parties. The provisions of Section 5 otherwise governing decisions of the **WRIA 8 Salmon Recovery Council** shall not apply to Section 8. The parties and the county, city, or other public agency or tribe seeking to become a party shall jointly determine the terms and conditions under which the county, city, or other public agency or tribe may become a party. These terms and conditions shall include payment by such county, city, or other public agency or tribe to the **Fiscal Agent** of the amount determined jointly by the parties and the county, city, or other public agency or tribe to represent such county, city, or other public agency or tribe's fair and proportionate share of all costs associated with activities undertaken by the **WRIA 8 Salmon Recovery Council** and the parties on its behalf as of the date the county, city, or other public agency or tribe becomes a party. Any county, city, or other public agency or tribe that becomes a party pursuant to this section shall thereby assume the general rights and responsibilities of all other parties to this Agreement. After the inclusion of such entity as a party to this Agreement, the formula for party contribution shall be adjusted for the following year to reflect the addition of this new party.9.

TERMINATION. This Agreement may be terminated by any party, as to that party only, upon sixty (60) calendar days' written notice to all other parties. The terminating party shall remain fully responsible for meeting all of its funding and other obligations through the end of the calendar year in which such notice is given, together with any other costs that may have been incurred on behalf of such terminating party up to the effective date of such termination. This Agreement may be terminated at any time by the written agreement of all parties. It is possible that the makeup of the parties to this Agreement may change from time to time. Regardless of any such changes, the parties choosing not to exercise the right of termination shall each remain obligated to meet their respective share of the obligations of the **WRIA 8 Salmon Recovery Council** as reflected in the annual budget.

10. **HOLD HARMLESS AND INDEMNIFICATION.** To the extent permitted by state law, and for the limited purposes set forth in this agreement, each party shall protect, defend, hold harmless and indemnify the other parties, their officers, elected officials, agents and employees, while acting within the scope of their employment as such, from and against any and all claims (including demands, suits, penalties, liabilities, damages, costs, expenses, or losses of any kind or nature whatsoever) arising out of or in any way resulting from such party's own negligent acts or omissions related to such party's participation and obligations under this Agreement. Each party agrees that its obligations under this subsection extend to any claim, demand and/or cause of action brought by or on behalf of any of its employees or agents. For this purpose, each party, by mutual negotiation, hereby waives, with respect to the other parties only, any immunity that would otherwise be available against such claims under the industrial insurance act provisions of Title 51 RCW. The provisions of this subsection shall survive and continue to be applicable to parties exercising the right of termination pursuant to Section 9.
11. **NO ASSUMPTION OF LIABILITY.** In no event do the parties to this Agreement intend to assume any responsibility, risk or liability of any other party to this Agreement or otherwise with regard to any party's duties, responsibilities or liabilities under the Endangered Species Act, or any other act, statute or regulation of any local municipality or government, the State of Washington or the United States.
12. **VOLUNTARY AGREEMENT.** This is a voluntary agreement and it is acknowledged and agreed that, in entering into this Agreement, no party is committing to adopt or implement any actions or recommendations that may be contained in the *WRIA 8 Plan* pursuant to this Agreement.
13. **NO PRECLUSION OF ACTIVITIES OR PROJECTS.** Nothing herein shall preclude any one or more of the parties to this Agreement from choosing or agreeing to fund or implement any work, activities or projects associated with any of the purposes hereunder by separate agreement or action, provided that any such decision or agreement shall not impose any funding, participation or other obligation of any kind on any party to this Agreement which is not a party to such decision or agreement.
14. **NO THIRD PARTY RIGHTS.** Nothing contained in this Agreement is intended to, nor shall it be construed to, create any rights in any third party, including without limitation the non-party members, NMFS, USFWS, any agency or department of the United States, or the State of Washington, or to form the basis for any liability on the part of the *WRIA 8 Salmon Recovery Council* or any of the parties, or their officers, elected officials, agents and employees, to any third party.
15. **AMENDMENTS.** This Agreement may be amended, altered or clarified only by the unanimous consent of the parties to this Agreement, represented by affirmative action by their legislative bodies.
16. **COUNTERPARTS.** This Agreement may be executed in counterparts.

- 17. **APPROVAL BY PARTIES' GOVERNING BODIES.** The governing body of each party must approve this Agreement before any representative of such party may sign this Agreement.
- 18. **FILING OF AGREEMENT.** This Agreement shall be filed by King County and Snohomish County in accordance with the provisions of RCW 39.34.040 and .200 and with the terms of Section 3 herein.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the dates indicated below:

Approved as to form:

TOWN OF BEAUX ARTS VILLAGE:

By: _____

By:  _____

Title: _____

Title: Mayor _____

Date: _____

Date: 8 Sept 2015 _____

Approved as to form:

CITY OF BELLEVUE:

By: [Signature]

By: [Signature]

Title: Dep. City Atty

Title: Dep. City Mgr

Date: 10/22/15

Date: 10/22/2015

Approved as to form:

CITY OF BOTHELL:

By: Pat O'Connell for Joe Beck

By: 

Title: Assoc City Mgr

Title: City Manager

Date: 10/27/15

Date: 10-28-15

Approved as to form:

By: _____

Title: _____

Date: _____

CITY OF CLYDE HILL:

By: Allen

Title: Mayor

Date: 8/13/15

Approved as to form:

CITY OF EDMONDS:

By: Sharon Catta

By: Wain D. Early

Title: CITY ATTORNEY

Title: Mayor

Date: 11-5-15

Date: 11.4.15

Approved as to form:

TOWN OF HUNTS POINT:

By: _____

By:  _____

Title: _____

Title: Mayor _____

Date: _____

Date: 14 Sept 2015 _____

Approved as to form:

CITY OF ISSAQUAH:

By: _____

By:  _____

Title: _____

Title: *Mayor* _____

Date: _____

Date: *7/24/15* _____

Approved as to form:

CITY OF KENMORE:

By: _____

By: 

Title: _____

Title: CITY MANAGER

Date: _____

Date: 12/18/2015

Approved as to form:

CITY OF KENT:

By: Jim Bullock

By: Ezette Cook

Title: CITY ATTORNEY

Title: Mayor

Date: 8/21/15

Date: 8/26/15

Approved as to form:

KING COUNTY:

By: *Joseph B. ...*

By: *[Signature]*

Title: *Deputy Association Mgr*

Title: *Director, KCDNRSP*

Date: *12/1/15*

Date: *12/1/2015*

Approved as to form:

CITY OF KIRKLAND:

By: _____

By: Marilyn Beard

Title: _____

Title: Deputy City Manager

Date: _____

Date: 12/3/15

Approved as to form:

CITY OF LAKE FOREST PARK:

By: K. Q. Pratt

By: Catherine Stanford

Title: Interim City Attorney

Title: Deputy Mayor

Date: 7-23-15

Date: 7-23-15

Approved as to form:


By: PTau
Title: City Attorney
Date: 10-15-15

CITY OF MAPLE VALLEY:
By: [Signature]
Title: City Manager
Date: 10/15/2015

Approved as to form:

CITY OF MEDINA:

By: _____

By:  _____

Title: _____


Title: City Manager


Date: _____

Date: 1-13-2016

Approved as to form:

CITY OF MERCER ISLAND:

By: 
Kari L. Sand
Title: City Attorney
Date: 11.23.15

By: 
Title: City Manager
Date: 11-30-15

Approved as to form:

CITY OF MOUNTLAKE TERRACE:

By: Greg Sch
Title: City Attorney
Date: 9-21-2015

By: [Signature]
Title: INTERIM CITY MGR
Date: 9/21/15

Approved as to form:

CITY OF MUKILTEO:

By: _____

By: Jeffrey _____

Title: _____

Title: Mayor _____

Date: _____

Date: 9.29.15 _____

Approved as to form:

CITY OF NEWCASTLE:

By: *Dawn Perkins*
Title: *City Attorney*
Date: *11/10/15*

By: *[Signature]*
Title: *City Manager*
Date: *11/17/15*

Approved as to form:

By: James E. Haney
JAMES E. HANEY

Title: CITY ATTORNEY

Date: November 5, 2015

CITY OF REDMOND:

By: Michael B. O'Connell for
John Marchione

Title: Mayor

Date: November 4, 2015

Approved as to form:

By: Lawrence J. Warner

Title: City Attorney

Date: 9/21/15

CITY OF RENTON:

By: Dennis Far

Title: Mayor

Date: 9/21/15

Attest: Jason Seth

Jason Seth, City Clerk



Approved as to form:

CITY OF SAMMAMISH:

By: Michael Kyr

By: [Signature]

Title: City Attorney

Title: City Manager

Date: October 7, 2015

Date: October 7, 2015

Approved as to form:

CITY OF SEATTLE:

By: 

By: 


Title: Timothy Harris
Asst City Attorney

Title: DIRECTOR, SPU


Date: 7/21/15

Date: 7/23/15

Approved as to form:

By: 
Title: City Attorney
Date: 10-28-15

CITY OF SHORELINE:

By: 
Title: Acting City Manager
Date: 10-28-15

Approved as to form:

By: [Signature]

Title: Deputy Pros. Atty

Date: 9/14/15

SNOHOMISH COUNTY:

By: [Signature]

Title: EXECUTIVE

Date: 12-18-15

COUNCIL USE ONLY	
Approved:	<u>12-16-15</u>
Docfile:	<u>D-20</u>

Approved as to form:

By: [Signature]

Title: City Attorney

Date: 10/6/2015

CITY OF WOODINVILLE:

By: [Signature]

Title: Interim City Manager

Date: 10/9/15

Approved as to form:

TOWN OF WOODWAY:

By: Wagner Stuebel

By: Carla A. Nichols

Title: Town attorney

Title: MAYOR

Date: 9/22/15

Date: Sep. 21, 2015

Approved as to form:

TOWN OF YARROW POINT:

By: Masjasiya Warhol

By: ABChed

Title: Clerk Treasurer

Title: Mayor

Date: October 19 2015

Date: October 19 2015

Exhibit A

Regional Watershed Funding

WRIA Based Cost-share: WRIA 8

For 2016

Total : \$553,713

Note: Total reflects WRIA 8 Salmon Recovery Council decision (March 19, 2015) to provide for an annual increase in the ILA cost share not to exceed the Consumer Price Index for Wages, which is estimated to be 2.18% in 2016. Jurisdictional area, population, and assessed value is to be recalculated every three years per the WRIA 8 interlocal agreement for 2016-2025.

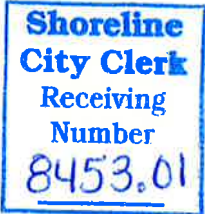
WRIA 8 Salmon Recovery Council approved 3-19-15

WRIA 8 Jurisdiction	Population (Pop)	Assessed Value (AV)	Area (Sq. Mi.)	Cost-Share Amount (Average of Pop, AV, Area)	WRIA 8 Jurisdiction
Beaux Arts	290	\$104,734,000	0.0%	0.0%	Beaux Arts
Bellevue	132,100	\$33,167,992,493	9.3%	7.2%	Bellevue
Bothell	40,540	\$5,955,222,655	2.9%	2.9%	Bothell
Clyde Hill	2,980	\$1,714,510,000	0.2%	0.2%	Clyde Hill
Edmonds	39,950	\$7,512,735,402	2.8%	1.9%	Edmonds
Hunts Point	395	\$784,473,000	0.3%	0.1%	Hunts Point
Issaquah	32,130	\$6,132,631,583	2.3%	2.4%	Issaquah
Kenmore	21,170	\$2,835,378,679	1.1%	1.3%	Kenmore
Kent	0	\$1,714,000	0.0%	0.0%	Kent
King County (Uninc.)	129,665	\$16,265,512,387	9.2%	35.7%	King County (Uninc.)
Kirkland	81,730	\$14,356,215,877	5.8%	3.8%	Kirkland
Lake Forest Park	12,680	\$1,844,674,400	0.9%	0.8%	Lake Forest Park
Maple Valley	2,454	\$357,899,600	0.2%	0.3%	Maple Valley
Medina	3,000	\$2,822,326,500	0.2%	0.3%	Medina
Mercer Island	22,720	\$9,132,580,404	1.6%	1.3%	Mercer Island
Mill Creek	18,600	\$3,048,481,121	1.3%	1.0%	Mill Creek
Mountlake Terrace	20,160	\$2,269,630,481	1.4%	0.9%	Mountlake Terrace
Mukilteo	20,440	\$3,843,580,393	1.4%	1.3%	Mukilteo
Newcastle	10,640	\$1,888,944,600	0.8%	1.0%	Newcastle
Redmond	55,840	\$11,941,569,998	3.9%	3.5%	Redmond
Renton	59,193	\$6,961,057,377	4.2%	3.0%	Renton
Sammamish	48,060	\$8,110,684,304	3.4%	3.7%	Sammamish
Seattle	435,487	\$92,061,834,922	30.7%	11.4%	Seattle
Shoreline	53,670	\$7,322,409,100	3.8%	2.5%	Shoreline
Sno. Co. (Uninc.)	159,369	\$20,454,964,615	11.3%	11.9%	Snoh. Co. (Uninc.)
Woodinville	10,990	\$2,507,893,071	0.8%	1.2%	Woodinville
Woodway	1,300	\$441,766,909	0.1%	0.2%	Woodway
Yarrow Point	1,015	\$838,037,500	0.1%	0.1%	Yarrow Point
Totals	1,416,568	\$264,679,455,371	100.0%	100.0%	Totals
					\$553,713

NOTE: King County land area excludes the Upper Cedar basin

DATA SOURCES:

- Parcels with 2013 Assessment data
- 2010 Census Tracts
- 2013 Population
- King County Cities
- Snohomish County Cities



FIRST AMENDMENT TO INTERLOCAL AGREEMENT

For the Watershed Basins within Water Resource Inventory Area 8

PREAMBLE

THIS FIRST AMENDMENT ("Amendment") to the Interlocal Agreement ("Agreement") for the Watershed Basins within Water Resource Inventory Area 8 ("WRIA 8") is entered into by the Parties and Snohomish County ("County") to authorize the County to rejoin the Agreement as a member of the WRIA 8 Salmon Recovery Council ("Council"). The County terminated its participation effective December 31, 2018, and now wishes to rejoin.

AMENDMENT

Upon the effective date of this Amendment, the County shall be a member of the Council, and shall have all of the rights, privileges, duties and obligations afforded the Parties under the terms of the Agreement. Per Section 7 of the Agreement, the County agrees to pay its annual cost share for 2020 and future years.

IN WITNESS WHEREOF, Snohomish County and the Parties have executed this Amendment as of the last date of signature below:

Town of Woodway
By: [Signature]
Title: Mayor
Date: 21 July 2020
Date: [Signature]

Town of Beaux Arts Village
By: [Signature]
Title: Mayor
Date: 8/14/2020

38 Date: _____

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42 City of Bellevue

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43 By: *Brod My*

44

44 Title: City Manager

45

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46 Date: 2/23/2021

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50 City of Bothell

51

51 By: *Jennifer Phillips*
Jennifer Phillips (Oct 5, 2020 1:32 PDT)

52

52 Title: City Manager

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54 Date: Oct 5, 2020

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59 City of Clyde Hill

60

60 By: *Marianne Klaus*

61

62 Title: Mayor

63

63 Date: 8/12/2020

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67

68 City of Edmonds

69

69 By: *[Signature]*

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71 Title: Mayor

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73 Date: 7/30/20

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TOWN of Hunts Point

By: 

Title: Mayor

Date: 7-31-20

85 City of Issaquah
 86 DocuSigned by:
 87 By: Mayor Paisley
 88 CEFF20862CD7468
 89 Title: Mayor
 90 Date: 10/6/2020
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 94 City of Kenmore
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 96 By: RD Kaly
 97
 98 Title: City Manager
 99
 100 Date: 8/10/20
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 103 City of Kent
 104
 105 By: Dana Rapp
 106
 107 Title: Mayor
 108
 109 Date: 09/22/2020
 110

111
 112 King County DocuSigned by:
 113 Christie True 18D1551E72A5450
 114 By: _____
 115
 116 Title: Director, King County Department of Natural Resources and Parks
 117 Date: 7/17/2020
 118

119 CITY OF KIRKLAND

120

121 City of Kirkland

122 By: Ineey Dumlay

123 Title: Deputy City Manager

124 Date: 9/1/2020

126

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128 City of Lake Forest Park

129 By: [Signature]

131 Title: Jeff Johnson, Mayor

132

133 Date: 07.28.2020

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137 City of Maple Valley

138

139 By: Laura Philpot
Laura Philpot (Oct 5, 2020 17:07 PDT)

140

141 Title: City Manager

142

143 Date: Oct 5, 2020

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147 City of Medina

148 By: [Signature]

149 Title: City Manager

151 Date: 8-6-2020

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City of Mercer Island

By: 

Title: City Manager

Date: September 15, 2020

City of Mill Creek

By: 

Title: City Manager

Date: SEP - 4 2020

City of Mountlake Terrace

By: 

Title: CITY MANAGER

Date: 10/6/2020

City of Mukilteo

By: 

Title: Mayor

Date: 8.20.20

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City of Newcastle

Robert Wyman

By: Robert Wyman (Sep 3, 2020 10:49 PDT)

Title: City Manager

Date: 9/2/2020

CITY OF REDMOND

CocSigned by

Angela Binney

By:

Title: Mayor

Date: 10/1/2020

City of Renton

[Signature]

By:

Title: Mayor Armondo Pavone

Date: 12-2-2020

City of Sammamish

[Signature]

By:

Title: City Mgr

Date: 11-4-20

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City of Seattle

By: 
Mami Hara (Aug 18, 2020 07:20 PDT)

Title: GM/CEO

Date: 08/18/20

CITY OF SHORELINE

By: of  ne
Title: City Manager
Date: 9/22/2020


SNOHOMISH COUNTY

By:  Ken Klein
Title: Executive Director

Date: 6/26/2020

COUNCIL USE ONLY	
Approved	<u>June 24, 2020</u>
Doc File	<u>D-32</u>

City of Woodinville

By: 
Title: City Manager
Date: August 12, 2020

260 Town of Yarrow Point

261
262 By: 

263
264 Title: Mayor

265
266 Date: 8-18-2020

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ADDENDUM TO
INTERLOCAL AGREEMENT
For the Watershed Basins within Water Resource Inventory Area 8 (“WRIA 8”)

PREAMBLE

THIS ADDENDUM ("Addendum") to that certain Interlocal Agreement for the Watershed Basins within Water Resource Inventory Area 8 ("Agreement") is entered into by the Parties to that Agreement and the City of Everett ("City"), for the purposes of allowing the City to become a member, with full rights and obligations under the Agreement, of the WRIA 8 Salmon Recovery Council, as described in the Agreement ("Council"). This Addendum sets forth the rights and obligations of the City and memorializes the unanimous consent of all Parties to the Agreement to the City's joining the Council as a voting member, in accordance with the terms of Section 8 of the Agreement. The City is identified in Section 1.1 of the Agreement as an eligible jurisdiction for participation in the Council. The Parties and the City share interests in and responsibility for addressing long-term watershed planning and conservation for the watershed basins in WRIA 8 and wish to provide for funding and implementation of various activities and projects therein.

TERMS FOR THE CITY OF EVERETT'S PARTICIPATION IN THE COUNCIL

1. The City of Everett's legislative authority, by City Council Action, has authorized the City's becoming a member of the WRIA 8 Salmon Recovery Council in accordance with the terms of the Agreement and has authorized the City's appointed representative (Mayor) to sign this Addendum on behalf of the City.
2. In order to become a voting member of the WRIA 8 Salmon Recovery Council, the City of Everett and the Parties agree to the following conditions:
 - 2.1. The City's annual cost share contribution for 2022 is projected to be \$8,447 for the programs and activities of the Council, which is subject to change for 2022 and future years based on changes in one or more parameters of the formula, or by agreement of the parties, including Everett, changing the total dollar amount of the assessment to be collected. The City's cost share is based on the portion of the City that falls within the geographic boundary of WRIA 8, including a population of 32,846 (1.96% of the watershed), assessed value within the City of \$4,850,621,800 (0.86% of the watershed), and an area in square miles of 5.2 (1.10% of the watershed).
 - 2.2. For the City to become a member of the Council, all existing members must unanimously express their consent to the City's becoming a member. The City becomes a member of the Council on the date when this Addendum is last signed by the Party representing the final signature of unanimity. The date of such signing shall be the effective date of this

20 Addendum. Representatives of the Parties shall sign this Addendum after the City has
21 signed it in accordance with the provisions of Section 1 above.

22 3. Upon the effective date of this Addendum, the City of Everett shall be a member of the Council,
23 and shall have all the rights, privileges, duties, and obligations afforded the Parties under the
24 terms of the Agreement.

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44 **IN WITNESS WHEREOF**, the City of Everett and the Parties have executed this Addendum on the
45 dates indicated below:

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75 City of Shoreline

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77 By: _____

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79 Title: _____

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81 Date: _____

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Exhibit A
Regional Watershed Salmon Recovery Funding
WRIA Based Cost-share: WRIA 8 2022

Final Cost Share for 2022 Budget

Approved by WRIA 8 Salmon Recovery Council on July 15, 2021

**Provisionally updated to reflect adding City of Everett as a WRIA 8 ILA cost share partner.*

WRIA 8 Jurisdiction	Population (Pop)	Assessed Value (AV)	Area (Sq. Mi.)	2022 Cost-Share 2.50% CPI-W (Average of Pop, AV,		WRIA 8 Jurisdiction
Beaux Arts	300	\$208,514,000	0.08	0.02%	\$155	Beaux Arts
Bellevue	148,100	\$74,838,792,986	33.53	7.12%	\$62,914	Bellevue
Bothell	48,400	\$13,106,236,599	13.28%	2.33%	\$17,458	Bothell
Clyde Hill	3,055	\$3,149,415,600	1.06	0.22%	\$2,078	Clyde Hill
Edmonds	42,470	\$12,541,911,424	8.99	1.91%	\$14,352	Edmonds
Everett	32,846	\$4,850,621,800	5.20	1.10%	\$8,447	Everett
Hunts Point	420	\$1,233,059,997	0.29	0.06%	\$658	Hunts Point
Issaquah	38,690	\$13,081,740,305	12.06	2.56%	\$15,476	Issaquah
Kenmore	23,450	\$5,703,318,890	6.16	1.31%	\$8,002	Kenmore
Kent	0	\$2,235,000	0.45	0.10%	\$206	Kent
King County (Uninc.)	102,975	\$25,919,862,544	163.25	34.68%	\$97,742	King County (Uninc.)
Kirkland	90,660	\$34,006,772,937	17.83	3.79%	\$32,774	Kirkland
Lake Forest Park	13,280	\$3,551,406,290	3.51	0.75%	\$4,666	Lake Forest Park
Maple Valley	3,783	\$781,109,784	0.94	0.20%	\$1,213	Maple Valley
Medina	3,300	\$4,819,674,900	1.41	0.30%	\$2,909	Medina
Mercer Island	24,690	\$16,066,459,509	6.29	1.34%	\$12,180	Mercer Island
Mill Creek	20,590	\$4,954,912,900	4.68	0.99%	\$6,676	Mill Creek
Mountlake Terrace	21,660	\$4,224,120,200	4.16	0.88%	\$6,296	Mountlake Terrace
Mukilteo	21,146	\$5,760,401,300	6.00	1.28%	\$7,658	Mukilteo
Newcastle	12,870	\$3,974,264,059	4.46	0.95%	\$5,209	Newcastle
Redmond	69,900	\$26,784,821,298	16.47	3.50%	\$26,731	Redmond
Renton	69,756	\$14,120,541,683	13.92	2.96%	\$20,710	Renton
Sammamish	58,239	\$18,407,727,267	19.09	4.06%	\$23,232	Sammamish
Seattle	544,907	\$211,043,680,079	53.01	11.26%	\$174,767	Seattle
Shoreline	56,980	\$13,891,857,596	11.58	2.46%	\$17,916	Shoreline
Sno. Co. (Uninc.)	207,936	\$39,793,160,300	55.44	11.78%	\$67,235	Snoh. Co. (Uninc.)
Woodinville	12,790	\$4,615,076,274	5.66	1.20%	\$5,990	Woodinville
Woodway	1,360	\$806,423,000	1.16	0.25%	\$1,013	Woodway
Yarrow Point	1,030	\$1,462,047,900	0.36	0.08%	\$856	Yarrow Point
Totals	1,675,583	\$563,700,166,421	470.71	100.0%	\$645,518	
				2022 TOTAL	\$645,518	

Population:

- Population estimates by jurisdiction sourced from WA OFM data for 2020.
 - Jurisdictions entirely within a WRIA are assigned the the WA OFM estimate directly.
 - Parcels are allotted to jurisdictions (cities and unincorporated King County) and WRIsAs based on the location of the parcel centerpoint.
- Population estimates are calculated for each parcel using the table generated by KC Assessments named "localscape demographics." This is a newer and more accurate method than the prior method of proportioning by area within census tracts.

How the population calculations are sourced and applied:

Source:https://www5.kingcounty.gov/sdc/Metadata.aspx?Layer=localscape_demographics

Applied:<https://localscape.property/ - kingcountypassessor/Overview>

*** Note:**

King County land area excludes the Upper Cedar basin, which is Seattle's protected municipal watershed
City of Kent jurisdiction in WRIA 8 is solely the Kent Watershed and no population is attributed to this area

***Assessed Value based on:**

Snohomish County: Assessed value is based on Snohomish County Assessor's data March 2021, for market land value + market improvements value
King County: Assessed value is based on King County Assessor's data February 2021, land + improvements value
Assessed value and area (sq. miles) excludes the Upper Cedar River subwatershed.

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Action on Ordinance No. 948 – Amending Chapter 15.05, Construction and Building Codes, of the Shoreline Municipal Code, to Provide Amendments to the Washington State Energy Code - Commercial, as Adopted by the State of Washington
DEPARTMENT:	Planning and Community Development
PRESENTED BY:	C. Ray Allshouse, Building Official
ACTION:	<input checked="" type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

PROBLEM/ISSUE STATEMENT:

Increasing concerns about the environmental and public health impacts of fossil fuels used in buildings have led some municipalities to ban fossil fuel hookups in new construction. The City Council discussed this topic on August 16, 2021 and November 15, 2021, and indicated general support for an ordinance to limit the use of fossil fuels for commercial construction and multi-family projects over three stories in height since Washington State prohibits local governments from passing electrification ordinances for new residential construction.

To this end, the Council discussed incorporating similar language used in the City of Seattle’s 2018 Energy Code Update, which began as the Regional Code Collaboration Suggested Commercial Energy Code Amendments, regarding the ban of the use of fossil fuels in new commercial and large multi-family construction projects for space heating and most water heating as well as numerous other increases in energy efficiency requirements. These commercial energy code amendments were presented to Council on November 15th as proposed Ordinance No. 948 (Attachment A).

Tonight, the City Council will consider adoption of proposed Ordinance No. 948, which would amend SMC Title 15 by adding a new section to the SMC – 15.05.090 - that provides local amendments to the State Energy Code Commercial Provisions.

RESOURCE/FINANCIAL IMPACT:

There is no direct financial impact to this proposed action, other than City staff time being required to implement the proposed changes to SMC Title 15 and provide outreach to local builders.

RECOMMENDATION

Staff recommends that Council move to adopt Ordinance No. 948 amending SMC Title 15 to include amendments to the Washington State Energy Code Commercial provisions.

Approved By: City Manager ***DT*** City Attorney ***MK***

BACKGROUND

The Puget Sound region is already experiencing the impacts of a changing climate and is likely to see more extreme weather due to climate change, including extreme heat, wildfires, rising sea levels, and more-frequent flooding, all of which can harm public health. Direct effects, such as breathing problems from long exposure to wildfire smoke and heat-related illness from lasting heat waves, are already being seen. The communities in Shoreline that are most likely to be harmed by climate change include people of color, immigrants, and/or refugees; people with low incomes; and those who are experiencing homelessness. These communities are also the least likely to have resources to respond to climate change.

In Shoreline, buildings are largely heated by three fuel sources: electricity from Seattle City Light, natural gas from Puget Sound Energy, and heating oil from private companies. Electricity from Seattle City Light is considered carbon neutral and thus is the preferred energy source from both a carbon emissions reduction and public health perspective.

The City Council discussed this topic on August 16, 2021 and November 15, 2021 indicating support for an ordinance to limit the use of fossil fuels for commercial construction and multi-family projects over three stories in height. The respective staff reports can be found at the following links:

- August 16, 2021 Council Discussion:
<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport081621-8a.pdf>.
- November 15, 2021 Council Discussion of Proposed Ordinance No. 948:
<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport111521-9a.pdf>.

As was discussed with Council on August 16th, while local jurisdictions have free reign to modify the State commercial Energy Code, state law restricts local jurisdictions from making the residential Energy Code anything other than equivalent to the State Code.

DISCUSSION

As noted above, the City Council discussed this topic on August 16, 2021 and November 15, 2021 and confirmed support for a natural gas ban on space/water heating solely for new commercial construction as well as numerous other increases in energy efficiency requirements. A Shoreline Municipal Code envisioned ban for the use of fossil fuels for space/water heating in new commercial construction, including multi-family dwelling unit buildings that are four stories or more, is included in proposed Ordinance No. 948 (Attachment A). This proposed ordinance would amend SMC Title 15 and provide local amendments to the State Construction Codes, specifically amending the State Energy Code Commercial Provisions and adding them to a new section of the SMC – 15.05.090. This approach provides consistency for builders operating in Seattle, Shoreline and King County and yields regional emission reduction

benefits. Adoption of essentially the same amendments on the whole will also help to validate electric utility projections.

Council Discussion on November 15, 2021

Council was generally supportive of proposed Ordinance No. 948 when it was discussed with Council on November 15, 2021. At this meeting, Council directed staff to bring back this proposed Ordinance tonight for potential adoption.

During this discussion, a Councilmember also had a question regarding how the proposed code applied to existing buildings. The language under Section C501.2 states that: “this code shall not be used to require the removal, alteration or abandonment of, nor prevent the continued use and maintenance of, an existing building system lawfully in existence...” Furthermore, to clarify what is found in proposed amendment Section C503.4.6 New and replacement HVAC heating system equipment... where a building’s central HVAC heating system equipment is augmented or replaced, the (existing) building shall comply (with the fossil fuel-fired ban)... However, under the Exception... where only one heating appliance is failing and is replaced by another having the same or lesser heating capacity... this provision does not apply.”

Therefore, practical application would dictate that a planned substantial building alteration project that includes HVAC system replacement as a scope component would be expected to comply, whereas an experienced failure of a single boiler would be allowed to replace in kind as an exception to this requirement. A similar scoped provision for hot water systems is included under proposed amendment to Section C503.5 as an exception. It is acknowledged that conversion from natural gas to electric cannot typically be accomplished in short order due to the associated necessary electrical system upgrade.

Staff Recommendation

Given the State’s Mini-Maxi restrictions for the residential Energy Code, and the fact that the Regional Code Collaboration Suggested 2018 Energy Code Amendment Package continues to be pursued in other jurisdictions, albeit at a slower pace, staff recommends that Council move forward with adoption of proposed Ordinance No. 948. It is also currently proposed that if enacted, these requirements would become effective July 1, 2022. This will provide building industry stakeholders time to be educated on these new Code provisions.

RESOURCE/FINANCIAL IMPACT

There is no direct financial impact to this proposed action, other than City staff time being required to implement the proposed changes to SMC Title 15 and provide outreach to local builders.

RECOMMENDATION

Staff recommends that Council move to adopt Ordinance No. 948 amending SMC Title 15 to include amendments to the Washington State Energy Code Commercial provisions.

ATTACHMENTS

Attachment A: Proposed Ordinance No. 948, including Exhibit A

ORDINANCE NO. 948

AN ORDINANCE OF THE CITY OF SHORELINE, WASHINGTON AMENDING CHAPTER 15.05, CONSTRUCTION AND BUILDING CODES, OF THE SHORELINE MUNICIPAL CODE, TO PROVIDE AMENDMENTS TO THE WASHINGTON STATE ENERGY CODE - COMMERCIAL, AS ADOPTED BY THE STATE OF WASHINGTON.

WHEREAS, the City of Shoreline is a non-charter optional municipal code city as provided in Title 35A RCW, incorporated under the laws of the state of Washington, and planning pursuant to the Growth Management Act, Chapter 36.70A RCW; and

WHEREAS, the Washington State Building Code Council has adopted the State Amendments to the 2018 International Energy Conservation Code; these amendments are contained in Chapter 51-11C (Commercial) and Chapter 51-11R (Residential) of the Washington Administrative Code (“WAC”), collectively the Washington State Energy Code; and

WHEREAS, Section 15.05.010(H) of the Shoreline Municipal Code (“SMC”) adopts the Washington State Energy Code for the City of Shoreline, referencing WAC 51-11; which was repealed and replaced with WAC 51-11C and WAC 51-11R; and

WHEREAS, the City of Shoreline has a long-standing commitment to promote environmental sustainability in municipal operations and throughout the community as a whole, including adoption of a Climate Action Plan to reduce climate change-causing greenhouse gas (GHG) emissions in Shoreline and participation in the King County-Cities Climate Collaboration; and

WHEREAS, the City’s current Energy Code set forth in SMC 15.05.010(H) consists solely of the International Energy Conservation Code with Washington state amendments; and

WHEREAS, by adding amendments for commercial buildings, the City will advance towards its climate goals as these buildings will incrementally improve their building insulation, space heating, water heating, lighting, and renewable energy systems so as to reduce building energy use and carbon emissions; and

WHEREAS, Chapter 15.05 SMC needs to be amended to reflect the repeal of WAC 51-11 and the creation of WAC chapters for residential and commercial, and to add a new section to reflect the City’s amendments to the commercial provisions of the State Energy Code contained in WAC 51-11C;

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON DO ORDAIN AS FOLLOWS:

Section 1. Amendment. Shoreline Municipal Code Section 15.05.010(H), is amended to read as follows:

H. The current edition of the ~~Washington State Energy Code~~ International Energy Conservation Code published by the International Code Council, Inc., as adopted by the

Washington State Building Code Council in Chapter 51-11C WA and Chapter 51-11R WAC, as now or hereafter amended.

Section 2. New Section – SMC 15.05.090 Commercial Energy Code Amendments. A new section, Section 15.05.090, Commercial Energy Code Amendments, is hereby added to Chapter 15.05 as set forth in Exhibit A, which is attached hereto and incorporated herein.

Section 3. Corrections by City Clerk or Code Reviser. Upon approval of the City Attorney, the City Clerk and the code reviser are authorized to make necessary corrections to this Ordinance, including the correction of clerical errors; references to other local, state, or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering.

Section 4. Severability. Should any section, subsection, paragraph, sentence, clause, or phrase of this Ordinance or its application to any person or situation be declared unconstitutional or invalid for any reason, such decision shall not affect the validity of the remaining portions of this Ordinance or its application to any person or situation.

Section 5. Publication and Effective Date. A summary of this Ordinance consisting of the title shall be published in the official newspaper. This Ordinance shall take effect at 12:01 a.m. on July 1, 2022. All permit applications received after the effective date are subject the 2018 International Energy Conservation Code, as amended by the State Building Code Council and modified by the City’s local amendments set forth in SMC 15.05.090.

PASSED BY THE CITY COUNCIL ON DECEMBER 6, 2021.

Mayor Will Hall

ATTEST:

APPROVED AS TO FORM:

Jessica Simulcik Smith
City Clerk

Julie Ainsworth-Taylor
Assistant City Attorney on behalf of
Margaret King, City Attorney

Date of publication: , 2021
Effective date: , 2021

NOTE: Only the following provisions of the Washington State Energy Code - Commercial, as adopted by the Washington State Building Code Council, WAC 51-11C, are added, amended, or deleted as provided in this exhibit. All other provisions of the Energy Code – Commercial remain as stated in WAC 51-11C.

A NEW SECTION, SECTION 15.05.090 COMMERCIAL ENERGY CODE AMENDMENTS IS ADDED TO CHAPTER 15.05 BUILDING CODES

AMENDMENTS TO CHAPTER 1 SCOPE AND ADMINISTRATION

SECTION C101 SCOPE AND GENERAL REQUIREMENTS

Section C101.1 is amended to read as follows:

C101.1 Title. This code, consisting of Chapter 1 [CE] through Chapter ((5)) 6 [CE] and Appendices A through D, shall be known as the *Washington State Energy Code*, and shall be cited as such. It is referred to herein as “this code.”

Section C101.3 is amended to read as follows:

C101.3 Intent. This code shall regulate the design and construction of buildings for the use and conservation of energy and the reduction of carbon emissions over the life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

SECTION C102 ALTERNATIVE MATERIALS, DESIGN AND METHODS OF CONSTRUCTION AND EQUIPMENT

Section C102.1 is amended to read as follows:

C102.1 General. The provisions of this code (~~(are not intended to)~~) do not prevent the installation of any material, or to prohibit any design or method of construction prohibited by this code or not specifically ((prescribed)) allowed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the

provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons why the alternative was not approved.

The *code official* may require that sufficient evidence or proof be submitted to reasonably substantiate any claims regarding the use or suitability of the alternate. The *code official* may, but is not required to, record the approval of modifications and any relevant information in the files of the building official or on the *approved* permit plans.

A new section, Section C102.2 Modifications is added and shall read as follows:

C102.2 Modifications. The *code official* may modify the requirements of this code for individual cases provided the *code official* finds: (1) there are practical difficulties involved in carrying out the provisions of this code; (2) the modification is in conformity with the intent and purpose of this code; (3) the modification will provide a reasonable level of fire protection and structural integrity when considered together with other safety features of the building or other relevant circumstances, and (4) the modification maintains or improves the energy efficiency of the building. The *code official* may, but is not required to, record the approval of modifications and any relevant information in the files of the *code official* or on the *approved* permit plans.

AMENDMENTS TO CHAPTER 2 DEFINITIONS

SECTION C202 GENERAL DEFINITIONS

The following new definitions are added to Section C202 and shall read as follows:

AFFORDABLE HOUSING. Affordable housing for the purposes of this code shall have the same meaning as set forth in SMC Chapter 3.27 Property Tax Exemption, as amended, except for affordable housing located within the City's MUR zoning districts. Affordable housing in the MUR zoning districts shall have the same meaning as set forth in SMC 20.40.325.

AUTOMATIC CONTROL DEVICE. A device capable of automatically turning loads off and on without manual intervention.

CONTROLLED RECEPTACLE. An electrical receptacle that is controlled by an *automatic control device*.

IT (INFORMATION TECHNOLOGY) ENERGY. Electrical energy consumed by UPS (uninterruptible power supply) units, servers, and associated electronic data storage and data processing equipment, but not by lighting or HVAC equipment.

MULTI-PASS. A heat pump water heater control strategy requiring multiple passes of water through the heat pump to reach the final target storage water temperature.

SINGLE-PASS. A heat pump water heater control strategy using variable flow or variable capacity to deliver water from the heat pump at the final target storage water temperature in a single pass through the heat exchanger with variable incoming water temperatures.

SOLAR ZONE. A clear area or areas reserved solely for current and future installation of photovoltaic or solar hot water systems.

TEMPERATURE MAINTENANCE. The system used to maintain the temperature of the building domestic hot water delivery system, typically by circulation and reheating or by a heat trace system.

The following EXISTING definitions are amended to read as follows:

ATTIC AND OTHER ROOFS. ~~All other roofs,~~ Roofs other than roofs with insulation entirely above deck and metal building roofs, including roofs with insulation entirely below (inside of) the roof structure (i.e., attics, cathedral ceilings, and single-rafter ceilings), roofs with insulation both above and below the roof structure, and roofs without insulation ~~but excluding roofs with insulation entirely above deck and metal building roofs.~~

BUILDING ENTRANCE. Any doorway, set of doors, revolving door, vestibule, or other form of portal (including elevator doors such as in parking garages) that is ordinarily used to gain access to the building or to exit from the building by its users and occupants. This does not include doors solely used to directly enter mechanical, electrical, and other building utility service equipment rooms, or doors for emergency egress only. Where buildings have separate one-way doors to enter and leave, this also includes any doors ordinarily used to leave the building.

COMPUTER ROOM. A room whose primary function is to house equipment for the processing and storage of electronic data and that has a design total *information technology equipment (ITE)* equipment load less than or equal to 20 watts per square foot of conditioned floor area (215 watts/m²) or a design *ITE* equipment load less than or equal to 10 kW. See also data center.

CONDITIONED SPACE. An area, room or space that is enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling. Elevator shafts, stair enclosures, enclosed corridors connecting conditioned spaces, and enclosed spaces through which conditioned air is transferred at a rate exceeding three air changes per hour are considered conditioned spaces for the purposes of the building thermal envelope requirements.

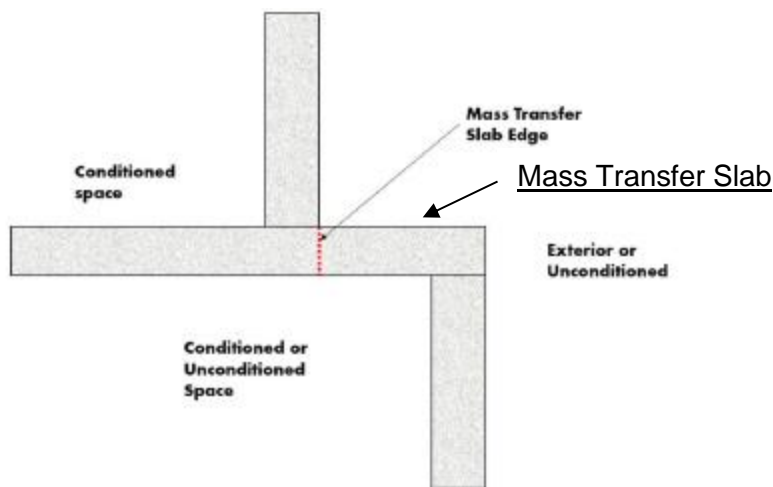
CONTINUOUS INSULATION (ci). Insulating material that is continuous across all structural members without metal thermal bridges other than fasteners that have a total cross-sectional area not greater than 0.04 percent (0.12 percent where all metal thermal bridges are stainless steel) of the envelope surface through which they penetrate, and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope.

CONTROLLED PLANT GROWTH ENVIRONMENT. Group F and U buildings or spaces that are used exclusively for and specifically controlled to facilitate and enhance plant growth and production by manipulating various indoor environmental conditions. Technologies include indoor agriculture,

cannabis growing, hydroponics, aquaculture and aquaponics. Controlled indoor environment variables include, but are not limited to, temperature, air quality, humidity and carbon dioxide.

LUMINAIRE-LEVEL LIGHTING CONTROL. A lighting system consisting of one or more *luminaires* where each *luminaire* has embedded lighting control logic, occupancy and ambient light sensors, and local override switching capability, where required. Each *luminaire* shall also have local or central wireless networking capabilities to detect and share information with other *luminaires* to adjust to occupancy and/or daylight in the space.

MASS TRANSFER DECK SLAB ((EDGE)). ~~That portion of the above-grade wall made up of the concrete slab where it extends past the footprint of the floor above.)~~ A concrete slab designed to transfer structural load from the building perimeter wall or column line above, laterally to an offset wall or column line below, and which has conditioned or semi-heated space on the inside of the upper wall and exterior or unconditioned space on the outside of the upper wall. The area of the slab edge shall be defined as the thickness of the slab multiplied by the ~~((perimeter))~~ length of the edge condition. Examples of this condition include, but are not limited to, the transition from an above-grade structure to a below-grade structure or the transition from a tower to a podium. A cantilevered concrete balcony does not constitute a mass transfer deck slab.



SPACE CONDITIONING CATEGORY Categories are based on the allowed peak space conditioning output capacity per square foot of *conditioned floor area*, or the design set point temperature, for a building or space. Space conditioning categories from lowest to highest include: low energy, semi-heated, conditioned, refrigerated walk-in and warehouse coolers, and refrigerated walk-in and warehouse freezers.

AMENDMENTS TO CHAPTER 3 GENERAL REQUIREMENTS

SECTION C302 DESIGN CONDITIONS

Section C302.2 is amended to read as follows:

C302.2 Exterior design conditions. The heating or cooling outdoor design temperatures shall be selected from Appendix G 24°F for heating and 86°F dry bulb and 67°F wet bulb for cooling.

AMENDMENTS TO CHAPTER 4 COMMERCIAL ENERGY EFFICIENCY

SECTION C401 GENERAL

Section 401.2 is amended to read as follows:

C401.2 Application. Commercial buildings shall comply with one of the following:

1. **Prescriptive Path.** The requirements of ~~Sections C402, C403, C404, C405, C406, C408, C409, C410 and C411~~ all of Chapter 4, other than Section C407.
2. **Total Building Performance Path.** The requirements of Section C407.
3. **Appendix F is not adopted by the City.** ~~When adopted by the local jurisdiction, the requirements of Appendix F, Outcome-Based Energy Budget, Sections C408, C409, C410, C411 and any specific section in Table C407.2 as determined by the local jurisdiction. The Proposed Total UA of the proposed building shall be no more than 20 percent higher than the Allowed Total UA as defined in Section C402.1.5.~~

SECTION C402 BUILDING ENVELOPE REQUIREMENTS

Section 402.1 General is amended to include the following Informative Note:

C402.1 General.

<p>City Informative Note: For the application of the building envelope requirements to elevator shafts and stair enclosures, see the definition of <i>conditioned space</i> in Chapter 2 and the exception to Section C402.1.3.</p>
--

Section 402.1.12 is amended to read as follows:

C402.1.1.2 Semi-heated buildings and spaces. The building envelope of *semi-heated* buildings, or portions thereof, shall comply with the same requirements as that for *conditioned spaces* in Section C402, except as modified by this section. The total installed output capacity of mechanical space conditioning systems serving a *semi-heated* building or space shall comply with Section C202, except as modified by this section. Building envelope assemblies separating *conditioned space* from semi-heated space shall comply with the exterior envelope insulation requirements. Semi-heated spaces heated by mechanical systems that do not include electric resistance heating equipment are not required to comply with the opaque wall insulation provisions of Section C402.2.3 for walls that separate semi-heated spaces from the exterior or low energy spaces. Fenestration that forms part of the *building thermal envelope* enclosing semi-heated spaces shall

comply with Section C402.4. Semi-heated spaces shall be calculated separately from other *conditioned spaces* for compliance purposes.

Opaque walls in semi-heated spaces shall be calculated as fully code compliant opaque walls for both the target and proposed for the Target UA calculations for the component performance alternative in Section C402.1.5, and for the ~~Standard Reference~~ Baseline Building Design for Total Building Performance compliance per Section C407. The capacity of heat trace temperature maintenance systems complying with Section C404.7.2 that are provided for freeze protection of piping and equipment only, shall not be included in the total installed output capacity of mechanical space conditioning systems.

Exception: Building or space may comply as *semi-heated* when served by ~~one or more of~~ the following system alternatives:

1. Electric infrared heating equipment for localized heating applications controlled by occupant sensing devices in compliance with Section C403.11.1.
2. ~~Heat pumps with cooling capacity permanently disabled, as pre-approved by the jurisdiction.~~

City Informative Note: There is no separate “freeze protection” space conditioning category for unoccupied utility buildings. Spaces with no cooling and less than 3.4 BTU/h-ft² heating capacity are not required to be insulated. The opaque walls of spaces that meet the definition of “semiheated” in Chapter 2 are not required to be insulated, but otherwise the thermal envelope of semiheated spaces must meet all requirements for *conditioned space*. Spaces with any mechanical cooling or with more than 8 BTU/h-ft² heating capacity must meet all the *building thermal envelope* requirements for *conditioned space*.

Section C402.1.3 is amended to read as follows:

C402.1.3 Insulation component *R*-value method. *Building thermal envelope* opaque assemblies shall comply with the requirements of Section C402.2 based on the climate zone specified in Chapter 3. For opaque portions of the building thermal envelope intended to comply on an insulation component *R*-value basis, the *R*-values for insulation shall not be less than that specified in Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing Group R occupancies shall use the *R*-values from the "Group R" column of Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing occupancies other than Group R shall use the *R*-values from the "All other" column of Table C402.1.3.

Exception: For stair and elevator shafts that do not comply with Section C402.1.2.1 and that are located within enclosed garages or other enclosed non-conditioned spaces and without conditioned supply air or cooling or heating appliances rated higher than 2 kW in any shaft, walls enclosing the shafts are permitted to be:

1. Concrete or masonry with minimum R-5 *continuous insulation*;
2. Metal studs with R-15 *cavity insulation* and without *continuous insulation*; or
3. Other assemblies with a maximum U-value of 0.120.

Slab floors, intermediate mass floor edges and elevator pits within shafts using this exception are excluded from envelope insulation requirements. Shaft surfaces using this exception shall not be included in the gross exterior wall area for purposes of maximum fenestration area calculations in

Section C402.4.1 component performance calculations in Section C402.1.5, or for the total building performance calculation of Section C407.

Table C402.1.3 is amended to read as follows:

**TABLE C402.1.3
 OPAQUE THERMAL ENVELOPE INSULATION COMPONENT
 MINIMUM REQUIREMENTS, R-VALUE METHOD^{a, i}**

CLIMATE ZONE	5 AND MARINE 4	
	All Other	Group R
Roofs		
Insulation entirely above deck	R-38ci	R-38ci
Metal buildings ^b	R-25 .+ R-14 R-22 LS	R-25 .+ R-14 R-22 LS
Attic and other	R-49	R-49
Walls, Above Gradeⁱ		
Mass ^h	R-9.5 ^c -ci Exterior: R-16 c.i. Interior: R-13 + R-6 ci wood stud, or R-13 + R-10 ci metal stud	R-13.3ci Exterior: R-16 c.i. Interior: R-13 + R-6 ci wood stud, or R-13 + R-10 ci metal stud
Mass transfer deck slab edge	R-5 N/R	R-5 N/R
Metal building	R-19ci or R-13+13ci	R-19ci or R-13+13ci
Steel framed	R-13 .+ R-10ci	R-19 .+ R-8.5ci
Wood framed and other	R-21 int or R-15+5ci std R-13 + R-7.5 ci	R-13+7.5ci std or R-20+3.8ci std or R-25 std
Walls, Below Grade		
Below-grade wall ^{d, h}	Same as above grade Exterior: R-10 ci Interior: R-19 wood stud, or R-13 + R-6 ci metal stud	Same as above grade Exterior: R-10 ci Interior: R-19 wood stud, or R-13 + R-6 ci metal stud
Floors		
Mass ^f	R-30ci	R-30ci
Joist/framing	R-30 ^e Steel frame: R-38 +R-10 ci Wood frame: R-38	R-30 ^e Steel frame: R-38 +R-10 ci Wood frame: R-38

CLIMATE ZONE	5 AND MARINE 4	
	All Other	Group R
Slab-on-Grade Floors		
Unheated slabs	R-10 for 24" below	R-10 for 24" below
Heated slabs ^d	R-10 perimeter & under entire slab	R-10 perimeter & under entire slab
Opaque Doors^g		
<i>Swinging</i>	<u>U-0.37</u>	<u>U-0.37</u>
<i>Nonswinging</i>	R-4.75	R-4.75

Keys for Table C402.1.3

For SI: 1 inch = 25.4 mm. ci = Continuous insulation. NR = No requirement. LS = Liner system

Footnotes for Table C402.1.3

- a. Assembly descriptions can be found in Chapter 2 and Appendix A.
- b. Where using R-value compliance method, a thermal spacer block with minimum thickness of ½ inch and minimum R-value of R-3.5 shall be provided, otherwise use the U-factor compliance method in Table C402.1.4.
- c. ~~(Reserved) ((Exception: Integral insulated concrete block walls complying with ASTM C90 with all cores filled and meeting both of the following:~~
 - 1. ~~At least 50 percent of cores must be filled with vermiculite or equivalent fill insulation; and~~
 - 2. ~~The building thermal envelope encloses one or more of the following uses: Warehouse (storage and retail), gymnasium, auditorium, church chapel, arena, kennel, manufacturing plant, indoor swimming pool, pump station, water and waste water treatment facility, storage facility, storage area, motor vehicle service facility. Where additional uses not listed (such as office, retail, etc.) are contained within the building, the exterior walls that enclose these areas may not utilize this exception and must comply with the appropriate mass wall R-value from Table C402.1.3/U-factor from Table C402.1.4.)~~
- d. Where heated slabs are below grade, they shall comply with the insulation requirements for heated slabs.
- e. ~~(Reserved) ((Steel floor joist systems shall be insulated to R-38 + R-10ci.))~~
- f. "Mass floors" shall include floors weighing not less than:
 - 1. 35 pounds per square foot of floor surface area; or
 - 2. 25 pounds per square foot of floor surface area where the material weight is not more than 120 pounds per cubic foot.
- g. Not applicable to *garage doors*. See Table C402.1.4.
- h. Peripheral edges of intermediate concrete floors are included in the above grade mass wall category and therefore must be insulated as above grade mass walls unless they meet the definition of Mass Transfer Deck Slab Edge. The area of the peripheral edges of concrete floors shall be defined as the thickness of the slab multiplied by the perimeter length of the edge condition. See Table A103.3.7.2 for typical default u-factors for above grade slab edges and footnote c for typical conditions of above grade slab edges.
- i. Where the total area of through-wall mechanical equipment is greater than 1 percent of the opaque above-grade wall area, use of the R-value method is not permitted. See Section C402.1.4.2.
- ~~((i))~~ j. For roof, wall or floor assemblies where the proposed assembly would not be *continuous insulation*, ~~((an))~~ alternate nominal R-value compliance ~~((option))~~ options for assemblies with isolated metal ~~((penetrations of))~~ fasteners that penetrate otherwise continuous insulation ((is)) are as shown in Columns B and C of Table C402.1.3(i):

Table C402.1.3(j) is amended to read as follows:

Table C402.1.3(j)
Continuous Insulation Equivalents

<u>Column A</u>	<u>Column B</u>	<u>Column C</u>
Assemblies with continuous insulation (see definition)	Alternate option for assemblies with metal penetrations, greater than 0.04% but less than 0.08%	Alternate option for assemblies with metal penetrations, greater than or equal to 0.08% but less than 0.12%

R-9.5ci	R-11.9ci	R-13ci
R-11.4ci	R-14.3ci	R-15.7ci
R-13.3ci	R-16.6ci	R-18.3ci
R-15.2ci	R-19.0ci	R-21ci
R-30ci	R-38ci	R-42ci
R-38ci	R-48ci	R-53ci
R-13 + R-7.5ci	R-13 + R-9.4ci	R-13 + R-10.3ci
R-13 + R-10ci	R-13 + R-12.5ci	R-13 + R-13.8ci
R-13 + R-12.5ci	R-13 + R-15.6ci	R-13 + R-17.2ci
R-13 + R-13ci	R-13 + R-16.3ci	R-13 + R-17.9ci
R-19 + R-8.5ci	R-19 + R-10.6ci	R-19 + R-11.7ci
R-19 + R-14ci	R-19 + R-17.5ci	R-19 + R-19.2ci
R-19 + R-16ci	R-19 + R-20ci	R-19 + R-22ci
R-20 + R-3.8ci	R-20 + R-4.8ci	R-20 + R-5.3ci
R-21 + R-5ci	R-21 + R-6.3ci	R-21 + R-6.9ci

Footnotes for Table C402.1.3(j)

~~(This)~~ These alternate nominal R-value compliance ~~(option is)~~ options are allowed for projects complying with all of the following:

1. The ratio of the cross-sectional area, as measured in the plane of the surface, of metal penetrations of otherwise *continuous insulation* to the opaque surface area of the assembly is greater than 0.0004 (0.04%), but less than 0.0008 (0.08%), for use of Column B equivalents, and greater than or equal to 0.0008 (0.08%), but less than 0.0012 (0.12%), for use of Column C equivalents.

a. Where all metal penetrations are stainless steel, Column B is permitted to be used for penetrations greater than 0.12% but less than 0.24% of opaque surface area, and Column C is permitted to be used for penetrations greater than or equal to 0.24% but less than 0.48% of opaque surface area.

2. The metal penetrations of otherwise *continuous insulation* are isolated or discontinuous (e.g., brick ties or other discontinuous metal attachments, offset brackets supporting shelf angles that allow insulation to go between the shelf angle and the primary portions of the wall structure). No continuous metal elements (e.g., metal studs, z-girts, z-channels, shelf angles) penetrate the otherwise continuous portion of the insulation.

3. Building permit drawings shall contain details showing the locations and dimensions of all the metal penetrations (e.g., brick ties or other discontinuous metal attachments, offset brackets, etc.) of otherwise *continuous insulation*. In addition, calculations shall be provided showing the ratio of the cross-sectional area of metal penetrations of otherwise *continuous insulation* to the overall opaque wall area.

For other cases where the proposed assembly is not *continuous insulation*, see Section C402.1.4 for determination of U-factors for assemblies that include metal other than screws and nails.

Section C402.1.4.1 is amended to read as follows:

C402.1.4.1 Thermal resistance of cold-formed steel stud walls. *U*-factors of walls with cold-formed steel studs shall be permitted to be determined either by using the values in Table C402.1.4.1, or in accordance with Equation 4-1:

$$U = 1/[R_s + (ER)] \quad \text{(Equation 4-1)}$$

where:

R_s = The cumulative *R*-value of the wall components along the path of heat transfer, excluding the cavity insulation and steel studs.

ER = The effective *R*-value of the cavity insulation with steel studs.

A new section, Section C402.1.4.2 is added and shall read as follows:

C402.1.4.2 Thermal resistance of mechanical equipment penetrations. When the total area of penetrations from through-wall mechanical equipment or equipment listed in Table C403.3.2(3) exceeds 1 percent of the opaque above-grade wall area, the mechanical equipment penetration area shall be calculated as a separate wall assembly with a default U-factor of 0.5. Mechanical system ducts and louvers, including those for supply, exhaust and relief, and for condenser air intake and outlet, are not considered to be mechanical equipment for the purposes of this section.

Exception: Where mechanical equipment has been tested in accordance with approved testing standards, the mechanical equipment penetration area is permitted to be calculated as a separate wall assembly using the U-factor determined by such test.

Table C402.1.4 is amended to read as follows:

**TABLE C402.1.4
 OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS,
 U-FACTOR METHOD^{a, f}**

	CLIMATE ZONE 5 AND MARINE 4	
	All Other	Group R
Roofs		
Insulation entirely above deck	U-0.027	U-0.027
Metal buildings	U-0.034 <u>U-0.027</u>	U-0.034 <u>U-0.027</u>
Attic and other	U-0.021	U-0.021
Joist or single rafter	U-0.027	U-0.027
Walls, Above Grade		
Mass ^{g,k}	U-0.104^d <u>U-0.057</u>	U-0.078 <u>U-0.057</u>
Mass transfer deck slab edge ⁱ	U-0.20	U-0.20
<u>Slab penetrating thermal envelope wall^h</u>	<u>U-0.10</u>	<u>U-0.10</u>
Metal building ^k	U-0.052	U-0.052
Steel framed ^k	U-0.055	U-0.055
Wood framed and other ^k	U-0.054 <u>U-0.051</u>	U-0.051
Walls, Below Grade		
<i>Below-grade wall^{p,g}</i>	Same as above grade <u>U-0.070</u>	Same as above grade <u>U-0.070</u>
Floors		
Mass ^e	U-0.031	U-0.031
Joist/framing	U-0.029 <u>U-0.029 steel joist</u> <u>U-0.025 wood joist</u>	U-0.029 <u>U-0.029 steel joist</u> <u>U-0.025 wood joist</u>

Concrete column or concrete wall penetrating thermal envelope floor ⁱ	<u>U-0.55</u>	<u>U-0.55</u>
Concrete slab floor directly above an electrical utility vault	<u>N.R.</u>	<u>N.R.</u>
Slab-on-Grade Floors		
Unheated slabs	F-0.54	F-0.54
Heated slabs ^c	F-0.55	F-0.55
Opaque Doors		
<i>Swinging door</i>	U-0.37	U-0.37
<i>Nonswinging door</i>	U-0.34	U-0.34
<i>Garage door <14% glazing</i>	U-0.31	U-0.31

Footnotes for Table C402.1.4

- a. Use of opaque assembly *U*-factors, *C*-factors, and *F*-factors from Appendix A is required unless otherwise allowed by Section C402.1.4.
- ~~b. (Reserved) (Where heated slabs are below grade, they shall comply with the *F*-factor requirements for heated slabs.)~~
- c. Heated slab *F*-factors shall be determined specifically for heated slabs. Unheated slab factors shall not be used.
- d. ~~(Reserved) ((Exception: Integral insulated concrete block walls complying with ASTM C90 with all cores filled and meeting both of the following:

 1. At least 50 percent of cores must be filled with vermiculite or equivalent fill insulation; and
 2. The building thermal envelope encloses one or more of the following uses: Warehouse (storage and retail), gymnasium, auditorium, church chapel, arena, kennel, manufacturing plant, indoor swimming pool, pump station, water and waste water treatment facility, storage facility, storage area, motor vehicle service facility. Where additional uses not listed (such as office, retail, etc.) are contained within the building, the exterior walls that enclose these areas may not utilize this exception and must comply with the appropriate mass wall R-value from Table C402.1.3/U-factor from Table C402.1.4.))~~
- e. "Mass floors" shall include floors weighing not less than:
 - 35 pounds per square foot of floor surface area; or
 - 25 pounds per square foot of floor surface area where the material weight is not more than 120 pounds per cubic foot.
- f. Opaque assembly *U*-factors based on designs tested in accordance with ASTM C1363 shall be permitted. The *R*-value of *continuous insulation* shall be permitted to be added or subtracted from the original test design.
- g. Peripheral edges of intermediate concrete floors are included in the above grade mass wall category and therefore must be insulated as above grade mass walls unless they meet the definition of Mass Transfer Deck Slab Edge. The area of the peripheral edges of concrete floors shall be defined as the thickness of the slab multiplied by the perimeter length of the edge condition. See Table A103.3.7.2 for typical default *u*-factors for above grade slab edges and footnote c for typical conditions of above grade slab edges.
- h. Intermediate concrete floor slabs penetrating the *building thermal envelope* shall comply with Section C402.2.9. The area of such penetrating concrete floor slabs shall be defined as the thickness of the slab multiplied by the length of the penetration. The "exposed concrete" row in Table A103.3.7.2 shall be used for typical default *U*-factors for the penetrating concrete slab.
- i. Value applies to concrete columns and concrete walls that interrupt mass floor insulation, but not to perimeter walls or columns separating interior *conditioned space* from exterior space.
- j. A mass transfer deck, due to its configuration, is not insulated. The table value (U-0.20) shall be used as the baseline value for component performance or total building performance path calculations. For the proposed value, the appropriate value from the top line of Table A104.3.7.2 shall be used.
- k. Through-wall mechanical equipment subject to Section C402.1.4.2 shall be calculated at the *U*-factor defined in Section C402.1.4.2. The area-weighted *U*-factor of the wall, including through-wall mechanical equipment, shall not exceed the value in the table.

Section C402.1.5 is amended to read as follows:

C402.1.5 Component performance alternative. Building envelope values and fenestration areas determined in accordance with Equation 4-2 shall be permitted in lieu of compliance with the *U*-factors and *F*-factors in Table C402.1.4 and C402.4 and the maximum allowable fenestration areas in Section

C402.4.1.

For buildings with more than one *space conditioning category*, component performance compliance shall be demonstrated separately for each space conditioning category. Interior partition ceilings, walls, fenestration and floors that separate space conditioning areas shall be applied to the component performance calculations for the space conditioning category with the highest level of space conditioning.

Proposed Total UA ≤ Allowable Total UA **(Equation 4-2)**

Where:

Proposed Total UA	=	UA-glaz-prop + UA sky-prop + UA-opaque-prop + FL-slab-prop
Allowable Total UA	=	UA-glaz-allow + UA-glaz-excess + UA sky-allow + UA-sky-excess + UA-opaque-allow + FL-slab-allow
UA-glaz-prop	=	Sum of (proposed U-value x proposed area) for each distinct vertical fenestration type, up to code maximum area
UA-sky-prop	=	Sum of (proposed U-value x proposed area) for each distinct skylight type, up to the code maximum area
UA-opaque-prop	=	Sum of (proposed U-value x proposed area) for each distinct opaque thermal envelope type
FL-slab-prop	=	Sum of (proposed F-value x proposed length) for each distinct slab on grade perimeter assembly
UA-glaz-allow	=	Sum of (code maximum vertical fenestration U-value from Table C402.4, or Section C402.4.1.1.2 if applicable, x proposed area) for each distinct vertical fenestration type, not to exceed the code maximum area ¹
UA-glaz-excess	=	U-value for the proposed wall type from ((Table C402.4) <u>Table C402.1.4</u> ² x vertical fenestration area in excess of the code maximum area
UA-sky-allow	=	Sum of (code maximum skylight U-value from Table C402.4 x proposed area) for each distinct skylight type proposed, not to exceed the code maximum area
UA-sky-excess	=	U-value for the proposed roof type from Table C402.4 ³ x skylight area in excess of the code maximum area
UA-opaque-allow	=	Code maximum opaque envelope U-value from Table C402.1.4 for each opaque door, wall, roof, and floor assembly x proposed area
FL-slab-allow	=	Code maximum F-value for each slab-on-grade perimeter assembly x proposed length

Notes

1. Where multiple vertical fenestration types are proposed and the code maximum area is exceeded, the U-value shall be the average Table C402.1.4 U-value weighted by the proposed vertical fenestration area of each type.
2. Where multiple wall types are proposed the U-value shall be the average Table C402.1.4 U-value weighted by the proposed above grade wall area of each type.
3. Where multiple roof types are proposed the U-value shall be the average Table C402.1.4 U-value weighted by the proposed roof area of each type.

Section C402.1.5.1 is amended to read as follows:

C402.1.5.1 Component U-factors and F-factors. The U-factors and F-factors for typical construction assemblies are included in Chapter 3 and Appendix A. These values shall be used for all calculations. Where proposed construction assemblies are not represented in Chapter 3 or Appendix A, values shall be calculated in accordance with the ASHRAE *Handbook of Fundamentals*, using the framing factors listed in Appendix A.

For envelope assemblies containing metal framing, the U-factor shall be determined by one of the following methods:

1. Results of laboratory measurements according to acceptable methods of test.
2. ASHRAE *Handbook of Fundamentals* where the metal framing is bonded on one or both sides to a metal skin or covering.
3. The zone method as provided in ASHRAE *Handbook of Fundamentals*.
4. Effective framing/cavity *R*-values as provided in Appendix A. When return air ceiling plenums are employed, the roof/ceiling assembly shall:
 - a. For thermal transmittance purposes, not include the ceiling proper nor the plenum space as part of the assembly; and
 - b. For gross area purposes, be based upon the interior face of the upper plenum surface.
5. Tables in ASHRAE 90.1 Normative Appendix A.
6. Calculation method for steel-framed walls in accordance with Section C402.1.4.1 and Table C402.1.4.1.

Section C402.2 is amended to read as follows:

C402.2 Specific building thermal envelope insulation requirements. Insulation in building thermal envelope opaque assemblies shall comply with Sections C402.2.1 through ~~C402.2.6~~ C402.2.10 and Table C402.1.3.

Where this section refers to installing insulation levels as specified in Section C402.1.3, assemblies complying with ~~Section C402.1.5~~ C402.1.4 and buildings complying with ~~Section C402.1.5~~ are allowed to install alternate levels of insulation so long as the U-factor of the insulated assembly is less than or equal to the U-factor required by the respective path.

Section C402.2.1 is amended to read as follows:

C402.2.1 Roof assembly. The minimum thermal resistance (*R*-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3, based on construction materials used in the roof assembly. Continuous insulation board shall be installed in not less than 2 layers and the edge joints between each layer of insulation shall be staggered. Insulation installed on a suspended ceiling with removable ceiling tiles shall not be considered part of the minimum thermal resistance of the roof insulation.

Exceptions:

1. Continuously insulated roof assemblies where the thickness of insulation varies 1 inch (25 mm) or less and where the area-weighted *U*-factor is equivalent to the same assembly with the *R*-value specified in Table C402.1.3.
2. ~~(Reserved) Where tapered insulation is used with insulation entirely above deck, those roof assemblies shall show compliance on a *U*-factor basis per Section C402.1.4. The effective *U*-factor shall be determined through the use of Tables A102.2.6(1), A102.2.6(2) and A102.2.6(3).~~
3. Two layers of insulation are not required where insulation tapers to the roof deck, such as at roof drains. At roof drains, the immediate 24" x 24" plan area around each roof drain has a minimum insulation requirement of R-13, but otherwise is permitted to be excluded from roof insulation area-weighted calculations.

A new section, Section C402.2.9 is added and shall read as follows:

C402.2.9 Above-grade exterior concrete slabs. Above-grade concrete slabs that penetrate the building thermal envelope, including but not limited to decks and balconies, shall each include a minimum R-10 thermal break, aligned with the primary insulating layer in the adjoining wall assemblies. Stainless steel (but not carbon steel) reinforcing bars are permitted to penetrate the thermal break. If the Total Building Performance path or the component performance alternative in Section C402.1.5 is utilized and the thermal break required by this section is not provided where concrete slabs penetrate the building thermal envelope, the sectional area of the penetration shall be assigned the default U-factors from the “exposed concrete” row of Table A103.3.7.2.

Exception: Mass transfer deck slab edges.

A new section, Section C402.2.10 is added and shall read as follows:

C402.2.10 Vertical fenestration intersection with opaque walls. Vertical fenestration shall comply with items 1, 2 and 3, as applicable:

1. Where wall assemblies include continuous insulation, the exterior glazing layer of vertical fenestration and any required thermal break in the frame shall each be aligned within 2 inches laterally of either face of the continuous insulation layer.
2. Where wall assemblies do not include continuous insulation, the exterior glazing layer of vertical fenestration and any required thermal break in the frame shall each be aligned within the thickness of the wall insulation layer and not more than 2 inches laterally from the exterior face of the outermost insulation layer.
3. Where the exterior face of the vertical fenestration frame does not extend to the exterior face of the opaque wall rough opening, the exposed exterior portion of the rough opening shall be covered with either a material having an R-value not less than R-3, or with minimum 1.5-inch thickness wood.

Section C402.4 is amended to read as follows:

C402.4 Fenestration. Fenestration shall comply with Sections C402.4 through C402.4.4 and Table C402.4. Daylight responsive controls shall comply with this section and Section C405.2.4.4.

Exception: For prescriptive envelope compliance, single-pane glazing is permitted for security purposes and for revolving doors, not to exceed 1 percent of the gross exterior wall area. Where Section C402.1.5, component performance alternative, is used, the single glazing shall be included in the percentage of the total glazing area, U-factor and SHGC requirements.

Table C402.4 is amended to read as follows:

**TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC
REQUIREMENTS**

CLIMATE ZONES 5 AND MARINE 4

U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical curtain walls and site-built fenestration products^a		
Fixed ^b U-factor	U-0.38 <u>U-0.34</u>	
Operable ^c U-factor	U-0.40 <u>U-0.36</u>	
Entrance doors^d		
U-factor	U-0.60	
U-factor for all other vertical fenestration		
Fixed U-factor	U-0.30 <u>U-0.26</u>	
Operable ^c U-factor	<u>U-0.28</u>	
SHGC for all vertical fenestration		
Orientation^{e,f}	SEW	N
PF < 0.2	0.38	0.51
0.2 ≤ PF < 0.5	0.46	0.56
PF ≥ 0.5	0.61	0.61
Skylights		
U-factor	U-0.50 <u>U-0.45</u>	
SHGC	0.35 <u>0.32</u>	

Footnotes for Table C402.4

- a. U-factor and SHGC shall be rated in accordance with NFRC 100.
- b. "Fixed" includes *curtain wall*, storefront, picture windows, and other fixed windows.
- c. "Operable" includes operable fenestration products other than "entrance doors."
- d. "Entrance door" includes glazed *swinging* entrance doors and *automatic glazed sliding entrance doors*. Other doors which are not entrance doors, including *manually operated* sliding glass doors, are considered "operable."
- e. "N" indicates vertical fenestration oriented within 30 degrees of true north. "SEW" indicates orientations other than "N."
- f. Fenestration that is entirely within the *conditioned space* or is between conditioned and other *enclosed space* is exempt from solar heat gain coefficient requirements and not included in the SHGC calculation.

City Informative Note: The category at the top of Table C402.4, labeled "*U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical curtain walls and site-built fenestration products,*" includes *curtain wall*, storefront, ribbon wall, window wall, and similar site-assembled systems, but does not include typical punched-opening manufactured windows except for "Class AW" windows. Class AW is the AAMA designation for windows typically used in mid-rise and high-rise buildings to resist high wind and water intrusion loads.

Section C402.4.1 is amended to read as follows:

C402.4.1 Maximum area. The total building vertical fenestration area (not including opaque doors and opaque spandrel panels) shall not exceed ~~30~~ 35 percent of the total building gross above-grade wall area. The skylight area shall not exceed 5 percent of the total building gross roof area (skylight-to-roof ratio).

For buildings with more than one *space conditioning category*, compliance with the maximum

allowed window-to-wall ratio and skylight-to-roof ratio shall be demonstrated separately for each *space conditioning category*. Interior partition ceiling, wall, fenestration and floor areas that separate space conditioning areas shall not be applied to the window-to-wall ratio and skylight-to-roof ratio calculations.

Section C402.4.1.1 is amended to read as follows:

C402.4.1.1 Vertical fenestration maximum area with high performance alternates. For buildings that comply with Section C402.4.1.1.1 or C402.4.1.1.2, the total building vertical fenestration area is permitted to exceed ~~30~~ 35 percent but shall not exceed 40 percent of the gross above grade wall area for the purpose of prescriptive compliance with Section C402.1.4.

When determining compliance using the component performance alternative in accordance with Section C402.1.5, the total building vertical fenestration area allowed in Equation 4-2 is 40 percent of the above grade wall area for buildings that comply with the vertical fenestration alternates described in this section.

Section C402.4.1.1.2 is amended to read as follows:

C402.4.1.1.2 High-performance fenestration. All of the following requirements shall be met:

1. All *vertical fenestration* in the building shall comply with the following maximum U-factors:
 - a. U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical *curtain walls* and site-built fenestration products (fixed) = ~~0.34~~ 0.30
 - b. U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical *curtain walls* and site-built fenestration products (operable) = 0.36
 - c. Entrance doors = 0.60
 - d. U-factor for all other vertical fenestration, fixed = ~~0.28~~ 0.22
 - e. U-factor for all other vertical fenestration, operable = 0.24
2. The SHGC of the vertical fenestration shall be ~~less than or equal to 0.35, adjusted for projection factor in compliance with C402.4.3~~ no more than 0.90 times the maximum SHGC values listed in Table C402.4.

An area-weighted average shall be permitted to satisfy the U-factor requirement for each fenestration product category listed in Item 1 of this section. Individual fenestration products from different fenestration product categories shall not be combined in calculating the area-weighted average *U-factor*.

Section C402.4.2 is amended to read as follows:

C402.4.2 Minimum skylight fenestration area. For buildings with single story enclosed spaces greater than 2,500 square feet (232 m²) in floor area that are directly under a roof and have a ceiling height greater than 15 feet (4572 mm) for no less than 75 percent of the ceiling area; these single-story spaces shall be provided with *skylights* and *daylight responsive controls* in accordance with Section C405.2.4. Space types required to comply with this provision include office, lobby, atrium, concourse, corridor, gymnasium/exercise center, convention center, automotive service, manufacturing, nonrefrigerated warehouse, retail store, distribution/sorting area, transportation,

and workshop. Skylights in these spaces are required to provide a total toplit zone area not less than 50 percent of the floor area and shall provide one of the following:

1. A minimum ratio of skylight area to toplit *daylight zone* area of not less than 3 percent where all skylights have a VT of at least 0.40 as determined in accordance with Section C303.1.3
2. A minimum skylight effective aperture of at least 1 percent determined in accordance with Equation 4-5.

(Equation 4-5)

$$\text{Skylight Effective Aperture} = \frac{(0.85 \times \text{Skylight Area} \times \text{Skylight VT} \times \text{WF})}{\text{Toplit zone}}$$

Where:

Skylight area = Total fenestration area of skylights.

Skylight VT = Area weighted average visible transmittance of skylights.

WF = Area weighted average well factor, where well factor is 0.9 if light well depth is less than 2 feet (610 mm), or 0.7 if light well depth is 2 feet (610 mm) or greater, or 1.0 for *tubular daylighting devices* with *VT-annual* ratings measured according to NFRC 203.

Light well depth = Measure vertically from the underside of the lowest point of the skylight glazing to the ceiling plane under the skylight.

Exceptions:

1. Skylights above daylight zones of enclosed spaces are not required in:
 - 1.1. Reserved.
 - 1.2. Spaces where the designed *general lighting* power densities are less than 0.5 W/ft² (5.4 W/m²) and at least 10 percent lower than the lighting power allowance in Section C405.4.2.
 - 1.3. Areas where it is documented that existing structures or natural objects block direct beam sunlight on at least half of the roof over the enclosed area for more than 1,500 daytime hours per year between 8 a.m. and 4 p.m.
 - 1.4. Spaces where the daylight zone under rooftop monitors is greater than 50 percent of the enclosed space floor area.
 - 1.5. Spaces where the total floor area minus the sidelit zone area is less than 2,500 square feet (232 m²), and where the lighting in the daylight zone is controlled in accordance with Section ~~C405.2.3.1~~.C405.2.4
2. The skylight effective aperture, calculated in accordance with Equation 4-5, is permitted to be 0.66 percent in lieu of one percent if the *VT-annual* of the skylight or *TDD*, as measured by NFRC 203, is greater than 38 percent.

Section C402.4.2.1 is amended to read as follows:

C402.4.2.1 Lighting controls in daylight zones under skylights. *Daylight responsive controls*

complying with Section ~~C405.2.4.1~~ C405.2.4 shall be provided to control all electric lights within toplit zones.

Section C402.5.1.1 is amended to read as follows:

C402.5.1.1 Air barrier construction. The *continuous air barrier* shall be constructed to comply with the following:

1. The air barrier shall be continuous for all assemblies that are the thermal envelope of the building and across the joints and assemblies.
2. Air barrier joints and seams shall be sealed, including sealing transitions in places and changes in materials. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.
3. Penetrations of the air barrier shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and location. Sealing shall allow for expansion, contraction and mechanical vibration. Joints and seams associated with penetrations shall be sealed in the same manner or taped. Sealing materials shall be securely installed around the penetrations so as not to dislodge, loosen or otherwise impair the penetrations' ability to resist positive and negative pressure from wind, stack effect, and mechanical ventilation. Sealing of concealed fire sprinklers, where required, shall be in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.
4. Recessed lighting fixtures shall comply with Section C402.5.8. Where similar objects are installed which penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.
5. Construction documents shall contain a diagram showing the building's pressure boundary in plan(s) and section(s) and a calculation of the area of the pressure boundary to be considered in the test.

City Informative Note: The continuous air barrier is intended to control the air leakage into and out of the *conditioned space*. The definition of *conditioned space* includes semi-heated spaces, so these spaces are included when detailing the continuous air barrier and when determining the pressure boundary for conducting the air leakage test. However, unheated spaces are not included when determining the pressure boundary.

Section C402.5.1.2 is amended to read as follows:

C402.5.1.2 Building test. The completed building shall be tested and the air leakage rate of the *building envelope* shall not exceed 0.25 cfm/ft² at a pressure differential of 0.3 inches water gauge (~~2.0~~ 1.27 L/s x m² at 75 Pa) at the upper 95 percent confidence interval in accordance with ASTM E 779 or an equivalent method approved by the *code official*. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the building owner and the *code official*. If the tested rate exceeds that defined here by up to 0.15 cfm/ft², a visual inspection of the air barrier shall be conducted and any leaks noted shall be sealed to the extent practicable. An additional report identifying the corrective actions taken to seal air leaks shall be submitted to the building owner and the Code Official and any further requirement to

meet the leakage air rate will be waived. If the tested rate exceeds 0.40 cfm/ft², corrective actions must be made and the test completed again. A test above 0.40 cfm/ft² will not be accepted.

1. Test shall be accomplished using either (1) both pressurization and depressurization or (2) pressurization alone, but not depressurization alone. The test results shall be plotted against the correct P for pressurization in accordance with Section 9.4 of ASTM E779.
2. The test pressure range shall be from 25 Pa to 80 Pa per Section 8.10 of ASTM E779, but the upper limit shall not be less than 50 Pa, and the difference between the upper and lower limit shall not be less than 25 Pa.
3. If the pressure exponent n is less than 0.45 or greater than 0.85 per Section 9.6.4 of ASTM E779, the test shall be rerun with additional readings over a longer time interval.

Section C402.5.7 is amended to read as follows:

C402.5.7 Vestibules. All building entrances shall be protected with an enclosed vestibule, with all doors opening into and out of the vestibule equipped with self-closing devices. Vestibules shall be designed so that in passing through the vestibule it is not necessary for the interior and exterior doors to open at the same time. The installation of one or more revolving doors in the building entrance shall not eliminate the requirement that a vestibule be provided on any doors adjacent to revolving doors. For the purposes of this section, “building entrances” shall include exit-only doors in buildings where separate doors for entering and exiting are provided.

Interior and exterior doors shall have a minimum distance between them of not less than 7 feet. The exterior envelope of conditioned vestibules shall comply with the requirements for a conditioned space. Either the interior or exterior envelope of unconditioned vestibules shall comply with the requirements for a conditioned space. The building lobby is not considered a vestibule.

Exception: Vestibules are not required for the following:

1. Doors not intended to be used as building entrances.
2. Unfinished ground-level space greater than 3,000 square feet (298 m²) if a note is included on the permit documents at each exterior entrance to the space stating “Vestibule required at time of tenant build-out if entrance serves a space greater than 3,000 square feet in area.”
3. Doors opening directly from a *sleeping unit* or dwelling unit.
4. Doors between an enclosed space smaller than 3,000 square feet (298 m²) in area and the exterior of the building or the building entrance lobby, where those doors do not comprise one of the primary building entrance paths to the remainder of the building. The space must be enclosed and separated without transfer air paths from the primary building entrance paths. If there are doors between the space and the primary entrance path then the doors shall be equipped with self-closing devices so the space acts as a vestibule for the primary building entrance.
5. Revolving doors.
6. Doors used primarily to facilitate vehicular movement or material handling and adjacent personnel doors.
7. In buildings less than three stories above grade or in spaces that do not directly connect with the building elevator lobby, doors that have an air curtain with a velocity of not less than 6.56 feet per second (2 m/s) at the floor that have been tested in accordance with ANSI/AMCA 220 and installed in accordance with the manufacturer’s instructions. *Manual*

- or *automatic* controls shall be provided that will operate the air curtain with the opening and closing of the door. Air curtains and their controls shall comply with Section C408.2.3
8. Building entrances in buildings that are less than four stories above grade and less than 10,000 square feet in area.
 9. Elevator doors in parking garages provided that the elevators have an enclosed lobby at each level of the garage.
 10. Entrances to semi-heated spaces.
 11. Doors that are used only to access outdoor seating areas that are separated from adjacent walking areas by a fence or other barrier.

City Informative Note: *Building entrance* is defined as the means ordinarily used to gain access to the building. Doors other than *building entrances*, such as those leading to service areas, mechanical rooms, electrical equipment rooms, outdoor seating areas or exits from fire stairways, are not covered by this requirement. There is less traffic through these doors, and the vestibule may limit access for large equipment. Note that enclosed lobbies in parking garages also serve to reduce the flow of vehicle exhaust into the building.

SECTION C403 MECHANICAL SYSTEMS

Section 403.1.1 is amended to read as follows:

C403.1.1 HVAC total system performance ratio (*HVAC TSPR*). For systems serving office, retail, library and education occupancies and buildings, and the *dwelling units* and *residential common areas* within R-2 multifamily buildings, which are subject to the requirements of Section C403.3.5 without exceptions, the *HVAC total system performance ratio (HVAC TSPR)* of the *proposed design* HVAC system shall be more than or equal to the *HVAC TSPR* of the *standard reference design* as calculated according to Appendix D, Calculation of HVAC Total System Performance Ratio.

Exceptions:

1. Buildings with *conditioned floor area* less than 5,000 square feet.
2. HVAC systems using district heating water, chilled water or steam.
3. HVAC systems not included in Table D601.11.1.
4. HVAC systems with chilled water supplied by absorption chillers, heat recovery chillers, water to water heat pumps, air to water heat pumps, or a combination of air and water cooled chillers on the same chilled water loop- with no more than 10 percent of the cooling capacity of the combination being supplied by air cooled chillers.
5. HVAC system served by heating water plants that include air to water or water to water heat pumps.
6. Underfloor air distribution HVAC systems.
7. Space conditioning systems that do not include *mechanical cooling*.
8. Alterations to existing buildings that do not substantially replace the entire HVAC system.
9. HVAC systems meeting all the requirements of the *standard reference design* HVAC system in Table D602.11, Standard Reference Design HVAC Systems.
10. HVAC systems serving laundry rooms, elevator rooms, mechanical rooms, electrical rooms, data centers, computer rooms, and kitchens.
11. Buildings or areas of medical office buildings that comply fully with ASHRAE Standard 170,

including but not limited to surgical centers, or that are required by other applicable codes or standards to provide 24/7 air handling unit operation.

Section C403.1.3 is amended to read as follows:

C403.1.3 Data centers. *Data center systems shall comply with Sections 6 and 8 of ASHRAE Standard 90.4 (2019).* with the following changes:

- ~~1. Replace design MLC in ASHRAE Standard 90.4 Table 6.2.1.1 “Maximum Design Mechanical Load Component (Design MLC)” with the following per applicable climate zone:
Zone 4C Design MLC = 0.22 Zone 5B Design MLC = 0.24~~
- ~~2. Replace annualized MLC values of Table 6.2.1.2 “Maximum Annualized Mechanical Load Component (Annualized MLC)” in ASHRAE Standard 90.4 with the following per applicable climate zone:
Zone 4C Annual MLC = 0.18 Zone 5B Annual MLC = 0.17~~

A new section, Section C403.1.4 is added and shall read as follows:

C403.1.4 Use of electric resistance and fossil fuel-fired HVAC heating equipment. HVAC heating energy shall not be provided by electric resistance or fossil fuel combustion appliances. For the purposes of this section, electric resistance HVAC heating appliances include but are not limited to electric baseboard, electric resistance fan coil and VAV electric resistance terminal reheat units and electric resistance boilers. For the purposes of this section, fossil fuel combustion HVAC heating appliances include but are not limited to appliances burning natural gas, heating oil, propane, or other fossil fuels.

Exceptions:

- 1. Low heating capacity.** Buildings or areas of buildings, other than *dwelling units* or sleeping units, that meet the interior temperature requirements of IBC Chapter 12 with a total installed HVAC heating capacity no greater than 8.5 BTU/h (2.5 watts) per square foot of *conditioned space* are permitted to be heated using electric resistance appliances. For the purposes of this exception, overhead or wall-mounted radiant heating panels installed in an unheated or semi-heated space, insulated in compliance with Section C402.2.8 and controlled by occupant sensing devices in compliance with Section C403.11.1 need not be included as part of the HVAC heating energy calculation.
- 2. Dwelling and sleeping units.** Dwelling or sleeping units having an installed HVAC heating capacity no greater than 750 watts in any separate habitable room with exterior fenestration are permitted to be heated using electric resistance appliances.
 - a. Corner rooms.** A room within a dwelling or sleeping unit that has two primary walls facing different cardinal directions, each with exterior fenestration, is permitted to have an installed HVAC heating capacity no greater than 1000 watts. Bay windows and other minor offsets are not considered primary walls.
- 3. Small buildings.** Buildings with less than 2,500 square feet of *conditioned floor area* are permitted to be heated using electric resistance appliances.
- 4. Defrost.** Heat pumps are permitted to utilize electric resistance as the first stage of heating when a heat pump defrost cycle is required and is in operation.
- 5. Air-to-air heat pumps.** Buildings are permitted to utilize internal electric resistance heaters to supplement heat pump heating for air-to-air heat pumps that meet all of the following

conditions:

- a. Internal electric resistance heaters have controls that prevent supplemental heater operation when the heating load can be met by the heat pump alone during both steady-state operation and setback recovery.
 - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower.
 - c. The heat pump complies with one of the following:
 1. Controlled by a digital or electronic thermostat designed for heat pump use that energizes the supplemental heat only when the heat pump has insufficient capacity to maintain set point or to warm up the space at a sufficient rate.
 2. Controlled by a multistage space thermostat and an outdoor air thermostat wired to energize supplemental heat only on the last stage of the space thermostat and when outdoor air temperature is less than 32°F.
 3. The minimum efficiency of the heat pump is regulated by NAECA, its rating meets the requirements shown in Table C403.3.2(2), and its rating includes all usage of internal electric resistance heating.
 - d. The heat pump rated heating capacity is sized to meet the heating load at an outdoor air temperature of 32°F or lower and has a rated heating capacity at 47°F no less than 2 times greater than supplemental internal electric resistance heating capacity, or utilizes the smallest available factory-available internal electric resistance heater.
- 6. Air-to-water heat pumps, up to 2,000 MBH.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems that have air-to-water heat pump heating capacity no greater than 2000 kBTU/hr at 47°F, and that meet all of the following conditions:
- a. Controls for the auxiliary electric resistance heating are configured to lock out the supplemental heat when the outside air temperature is above 32°F, unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
 - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower except during startup or defrost operation.
 - c. The heat pump rated heating capacity at 47°F is no less than 2 times greater than supplemental electric resistance heating capacity.
- 7. Air-to-water heat pumps, up to 3,000 MBH.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems that have air-to-water heat pump heating capacity greater than 2000 KBTU/hr and no greater than 3000 kBTU/hr at 47°F, and that meet all of the following conditions:
- a. Controls for the auxiliary electric resistance heating are configured to **lock out the supplemental heat when the outside air temperature is above 36°F**, unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
 - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower except during startup or defrost operation.
 - c. The heat pump rated heating capacity at 47°F is no less than 1.75 times greater than supplemental electric resistance heating capacity.
- 8. Air-to-water heat pumps, over 3,000 MBH.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems that have air-to-water heat pump heating capacity greater than 3000 kBTU/hr at 47°F and that meet all of the following conditions:
- a. Controls for the auxiliary resistance heating are configured to **lock out the supplemental**

- heat when the outside air temperature is above 40°F unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
- b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower except during startup or defrost operation.
 - c. The heat pump rated heating capacity at 47°F is no less than 1.5 times greater than supplemental electric resistance heating capacity.
9. **Ground source heat pumps.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems with ground source heat pump equipment that meets all of the following conditions:
- a. Controls for the auxiliary resistance heating are configured to lock out the supplemental heat when the outdoor air temperature is above 32°F, unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
 - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor temperature of 17°F or lower.
 - c. The heat pump rated heating capacity at 32°F entering water conditions is no less than 2 times greater than supplemental electric resistance heating capacity.
10. **Small systems.** Buildings in which electric resistance or fossil fuel appliances, including decorative appliances, either provide less than 5 percent of the total building HVAC system heating capacity or serve less than 5 percent of the conditioned floor area.
11. **Specific conditions.** Portions of buildings that require fossil fuel or electric resistance space heating for specific conditions approved by the code official for research, health care, process or other specific needs that cannot practicably be served by heat pump or other space heating systems. This does not constitute a blanket exception for any occupancy type.
12. **Kitchen exhaust.** Make-up air for commercial kitchen exhaust systems required to be tempered by Section 508.1.1 of the International Mechanical Code is permitted to be heated using electric resistance appliances.
13. **District energy.** Steam or hot water district energy systems that utilize fossil fuels as their primary source of heat energy, that serve multiple buildings, and that were already in existence prior to the effective date of this code, including more energy-efficient upgrades to such existing systems, are permitted to serve as the primary heating energy source.
14. **Heat tape.** Heat tape is permitted where it protects water-filled equipment and piping located outside of the building thermal envelope, provided that it is configured and controlled to be automatically turned off when the outside air temperature is above 40°F.
15. **Temporary systems.** Temporary electric resistance heating systems are permitted where serving future tenant spaces that are unfinished and unoccupied, provided that the heating equipment is sized and controlled to achieve interior space temperatures no higher than 40°F.
16. **Emergency generators.** Emergency generators are permitted to use fossil fuels.
17. **Pasteurization.** Electric resistance heat controls are permitted to reset the supply water temperature of hydronic heating systems that serve service water heating heat exchangers during pasteurization cycles of the service hot water storage volume. The hydronic heating system supply water temperature shall be configured to be 145°F or lower during the pasteurization cycle.

Section C403.2.1 is amended to read as follows:

C403.2.1 Zone isolation required. HVAC systems serving ~~zones~~ areas that are intended to

operate or be occupied nonsimultaneously shall be divided into isolation areas. *Zones* may be grouped into a single isolation area provided it does not exceed 25,000 square feet (2323 m²) of *conditioned floor area* nor include more than one floor. Each isolation area shall be equipped with isolation devices and controls configured to automatically shut off the supply of conditioned air and outdoor air to and exhaust air from the isolation area. Each isolation area shall be controlled independently by a device meeting the requirements of Section C403.4.2.2. Central systems and plants shall be provided with controls and devices that will allow system and equipment operation for any length of time while serving only the smallest isolation area served by the system or plant.

Exceptions:

1. Exhaust air and outdoor air connections to isolation areas where the fan system to which they connect is not greater than 5,000 cfm (2360 L/s).
2. Exhaust airflow from a single isolation area of less than 10 percent of the design airflow of the exhaust system to which it connects.
3. Isolation areas intended to operate continuously or intended to be inoperative only when all other isolation areas in a *zone* are inoperative.

Section C403.2.3 is amended to read as follows:

C403.2.3 Variable flow capacity. For fan and pump motors ~~7.5~~ 5 hp and greater including motors in or serving custom and packaged air handlers serving variable air volume fan systems, constant volume fans, parking garaged ventilation fans, heating and cooling hydronic pumping systems, pool and service water pumping systems, domestic water pressure-booster systems, cooling tower fan, and other pump or fan motors where variable flows are required, there shall be:

1. Variable speed drives; or
2. Other controls and devices that will result in fan and pump motor demand of no more than 30 percent of design wattage at 50 percent of design air volume for fans when static pressure set point equals 1/3 the total design static pressure, and 50 percent of design water flow for pumps, based on manufacturer's certified test data. Variable inlet vanes, throttling valves (dampers), scroll dampers or bypass circuits shall not be allowed.

Exception: Variable speed devices are not required for motors that serve:

1. Fans or pumps in packaged equipment where variable speed drives are not available as a factory option from the equipment manufacturer.
2. Fans or pumps that are required to operate only for emergency fire-life-safety events (e.g., stairwell pressurization fans, elevator pressurization fans, fire pumps, etc.).

Section 403.3.2 is amended to read as follows:

C403.3.2 HVAC equipment performance requirements. Equipment shall meet the minimum efficiency requirements of Tables C403.3.2(1) through ~~C403.3.2(12)~~ C4-3/3/2(13) when tested and rated in accordance with the applicable test procedure. Plate-type liquid-to-liquid heat exchangers shall meet the minimum requirements of Table C403.3.2(10). The efficiency shall be verified through certification and listed under an *approved* certification program or, if no certification program exists, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements. Where components, such as indoor or outdoor coils,

from different manufacturers are used, calculations and supporting data shall be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the requirements herein.

Gas-fired and oil-fired forced air furnaces with input ratings of 225,000 Btu/h (65 kW) or greater and all unit heaters shall also have an intermittent ignition or interrupted device (IID), and have either mechanical draft (including power venting) or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input ratings of 225,000 Btu/h (65 kW) or greater, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75 percent of the input rating.

Air-to-water heat pump manufacturers shall report the hourly heating output or heating efficiency with and without defrost operation at 32°F, in addition to meeting the efficiency requirements of Table C403.3.2(13) at the AHRI 550/590 applicable leaving water temperatures. The hourly heating output or heating efficiency with and without defrost operation shall be documented on the mechanical permit drawings.

Exception:

Heat recovery chillers and air-to-water heat pumps covered under Table C403.3.2(13), are not required to be listed in the AHRI certification program for AHRI 550/590. The equipment heating and cooling efficiency ratings shall be supported by data furnished by the manufacturer at AHRI 550/590 conditions. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements.

City Informative Note: Table C403.3.2(13) is from ASHRAE 90.1-2019. At the time of the adoption of the 2018 SEC there were no air-to-water heat pumps or heat recovery chillers listed in the AHRI Certified Product Directory. <https://www.ahridirectory.org/> According to AHRI 550/590 Section 5.3, "Full and part-load application ratings shall include the range of Rating Conditions listed in Table 2 or be within the operating limits of the equipment."

Section C403.3.2.1 is amended to read as follows:

C403.3.2.1 Chillers. Chilled water plants and buildings with more than 500 tons total capacity shall not have more than 100 tons provided by air-cooled chillers.

Exceptions:

1. Where the designer demonstrates that the water quality at the building site fails to meet manufacturer's specifications for the use of water-cooled equipment.
2. Air-cooled chillers with minimum efficiencies at least 10 percent higher than those listed in Table C403.3.2(7).
3. Replacement of existing air-cooled chiller equipment.
4. Air-to-water heat pump units that are configured to provide both heating and cooling and that are rated in accordance with AHRI 550/590. ~~Where the air-to-water heat pumps are designed for a maximum supply leaving water temperature of less than 140°F, the efficiency rating will be calculated and reported at the maximum unit leaving water temperature for this test condition.~~

Table C403.3.2(1)B is amended to read as follows:

**TABLE C403.3.2(1)B
 MINIMUM EFFICIENCY REQUIREMENTS:
 ELECTRICALLY OPERATED VARIABLE REFRIGERANT FLOW AIR CONDITIONERS**

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
VRF Air Conditioners, Air Cooled	<65,000 Btu/h	All	VRF Multi-split System	13.0 SEER	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.2 EER 15.5 IEER	
	≥135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.0 EER 14.9 IEER	
	≥240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	10.0 EER 13.9 EER 13.9 IEER	

Table C403.3.2(7) is amended to read as follows:

**TABLE C403.3.2(7)
 MINIMUM EFFICIENCY REQUIREMENTS: WATER CHILLING PACKAGES^{a, b}**

EQUIPMENT TYPE	SIZE CATEGORY	UNITS	PATH A		PATH B		TEST PROCEDURE ^c
			FULL LOAD	IPLV	FULL LOAD	IPLV	
Air-cooled chillers	< 150 tons	EER	≥ 10.100	≥ 13.700	≥ 9.700	≥ 15.800	AHRI 550/590
	≥ 150 tons	EER	≥ 10.100	≥ 14.000	≥ 9.700	≥ 16.100	
Air cooled without condenser, electrical operated	All capacities	EER	Air-cooled chillers without condensers shall be rated with matching condensers and comply with the air-cooled chiller efficiency requirements				
Water cooled, electrically operated, positive displacement	< 75 tons	kW/ton	≤ 0.750	≤ 0.600	≤ 0.780	≤ 0.500	
	≥ 75 tons and < 150 tons	kW/ton	≤ 0.720	≤ 0.560	≤ 0.750	≤ 0.490	
	≥ 150 tons and < 300 tons	kW/ton	≤ 0.660	≤ 0.540	≤ 0.680	≤ 0.440	
	≥ 300 tons and < 600 tons	kW/ton	≤ 0.610	≤ 0.520	≤ 0.625	≤ 0.410	
	≥ 600 tons	kW/ton	≤ 0.560	≤ 0.500	≤ 0.585	≤ 0.380	
Water cooled, electrically operated, centrifugal	< 150 tons	kW/ton	≤ 0.610	≤ 0.550	≤ 0.695	≤ 0.440	
	≥ 150 tons and < 300 tons	kW/ton	≤ 0.610	≤ 0.550	≤ 0.695	≤ 0.400	
	≥ 300 tons and < 400 tons	kW/ton	≤ 0.560	≤ 0.520	≤ 0.595	≤ 0.390	
	≥ 400 tons	kW/ton	≤ 0.560	≤ 0.500	≤ 0.585	≤ 0.380	
Air cooled, absorption single effect	All capacities	COP	≥ 0.600	NR	NA	NA	AHRI 560
Water cooled, absorption single effect	All capacities	COP	≥ 0.700	NR	NA	NA	
Absorption double effect, indirect fired	All capacities	COP	≥ 1.000	≥ 1.050	NA	NA	

Absorption double effect, direct fired	All capacities	COP	≥ 1.000	≥ 1.000	NA	NA	
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Keys for Table C403.3.2(7)

For SI: 1 ton = 3517 W, 1 British thermal unit per hour = 0.2931 W, °C = [(°F) - 32]/1.8.

NA = Not applicable, not to be used for compliance; NR = No requirement.

Footnotes for Table C403.2.3(7)

- a. ~~The centrifugal chiller equipment requirements, after adjustment in accordance with Section C403.3.2.2 or Section C403.3.2.3, do not apply to chillers used in low-temperature applications where the design leaving fluid temperature is less than 36°F. The requirements do not apply to positive displacement chillers with leaving fluid temperatures less than or equal to 32°F. The requirements do not apply to absorption chillers with design leaving fluid temperatures less than 40°F. The requirements for air-cooled, water-cooled positive displacement, and absorption chillers are at standard rating conditions defined in the reference test procedure. The requirements for centrifugal chillers shall be adjusted for nonstandard rating conditions per Section C403.2.3.1 and are only applicable for the range of conditions listed there.~~
- b. Compliance with this standard can be obtained by meeting the minimum requirements of Path A or B. However, both the full load and IPLV shall be met to fulfill the requirements of Path A or B.
- c. Chapter 12 of the referenced standard contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

A new table, Table C403.3.2(13) is added and reads as follows:

Table C403.3.2(13) f, g, h, i
HEAT PUMP AND HEAT RECOVERY CHILLER PACKAGES – MINIMUM EFFICIENCY REQUIREMENTS

<u>Equipment Type</u>	<u>Size Category</u> (tons ^R)	<u>Cooling only Operation</u> <u>Cooling Efficiency^a</u> (Air EER FL/IPLV-Btu/W-h)	<u>Heating Operation</u>			<u>Test Procedure</u>
			<u>Heating Source Conditions</u>	<u>Heat Pump Heating Full Load Efficiency</u> (COP _H) ^b (W/W)	<u>Heat Recovery Chiller Full Load Efficiency</u> Full Load Efficiency (COP _{HR}) ^{b,c} (W/W)	

		Water Source Power Input per Capacity FL/IPLV-(kW/ton ^R)		(Entering/leaving water) or OAT (db/wb) °F	Leaving Heating Water Temperature				Simultaneous Cooling and Heating Full Load Efficiency (COP _{SHC}) ^b , (W/W)						
		Path A	Path B		Leaving Heating Water Temperature				Leaving Heating Water Temperature						
					Low	Medium	High	Boost	Low	Medium	High	Boost			
		105°F	120°F		140°F	140°F	105°F	120°F	140°F	140°F					
Air Source	All sizes	≥ 9.595 FL ≥ 13.02 IPLV.IP	≥ 9.215 FL ≥ 15.01 IPLV.IP	47 db 43 wb ^d	≥ 3.290	≥ 2.770	≥ 2.310	NA	NA	NA	NA	NA	AHRI 550/590		
		≥ 9.595 FL ≥ 13.30 IPLV.IP	≥ 9.215 FL ≥ 15.30 IPLV.IP	17 db 15 wb ^d	≥ 2.230	≥ 1.950	≥ 1.630	NA	NA	NA	NA	NA			
Water Source electrically operated positive displacement	< 75	≤ 0.7885 FL	≤ 0.7875 FL	54/44 ^e	≥ 4.640	≥ 3.680	≥ 2.680	NA	≥ 8.330	≥ 6.410	≥ 4.420	NA	AHRI 550/590		
		≤ 0.6316 IPLV.IP	≤ 0.5145 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.550	NA	NA	NA	6.150			
	≥ 75 and < 150	≤ 0.7579 FL	≤ 0.7140 FL	54/44 ^e	≥ 4.640	≥ 3.680	≥ 2.680	NA	≥ 8.330	≥ 6.410	≥ 4.420	NA			
		≤ 0.5895 IPLV.IP	≤ 0.4620 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.550	NA	NA	NA	6.150			
	≥ 150 and < 300	≤ 0.6947 FL	≤ 0.7140 FL	54/44 ^e	≥ 4.640	≥ 3.680	≥ 2.680	NA	≥ 8.330	≥ 6.410	≥ 4.420	NA			
		≤ 0.5684 IPLV.IP	≤ 0.4620 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.550	NA	NA	NA	6.150			
	≥ 300 and < 600	≤ 0.6421 FL	≤ 0.6563 FL	54/44 ^e	≥ 4.930	≥ 3.960	≥ 2.970	NA	≥ 8.900	≥ 6.980	≥ 5.000	NA			
		≤ 0.5474 IPLV.IP	≤ 0.4305 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.900	NA	NA	NA	6.850			
	≥ 600	≤ 0.5895 FL	≤ 0.6143 FL	54/44 ^e	≥ 4.930	≥ 3.960	≥ 2.970	NA	≥ 8.900	≥ 6.980	≥ 5.000	NA			
		≤ 0.5263 IPLV.IP	≤ 0.3990 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.900	NA	NA	NA	6.850			
	Water source electrically operated centrifugal	< 75	≤ 0.6421 FL	≤ 0.7316 FL	54/44 ^e	≥ 4.640	≥ 3.680	≥ 2.680	NA	≥ 8.330	≥ 6.410	≥ 4.420		NA	AHRI 550/590
			≤ 0.5789 IPLV.IP	≤ 0.4632 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.550	NA	NA	NA		6.150	
≥ 75 and < 150		≤ 0.5895 FL	≤ 0.6684 FL	54/44 ^e	≥ 4.640	≥ 3.680	≥ 2.680	NA	≥ 8.330	≥ 6.410	≥ 4.420	NA			
		≤ 0.5474 IPLV.IP	≤ 0.4211 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.550	NA	NA	NA	6.150			
≥ 150 and < 300		≤ 0.5895 FL	≤ 0.6263 FL	54/44 ^e	≥ 4.640	≥ 3.680	≥ 2.680	NA	≥ 8.330	≥ 6.410	≥ 4.420	NA			
		≤ 0.5263 IPLV.IP	≤ 0.4105 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.550	NA	NA	NA	6.150			
≥ 300 and < 600		≤ 0.5895 FL	≤ 0.6158 FL	54/44 ^e	≥ 4.930	≥ 3.960	≥ 2.970	NA	≥ 8.900	≥ 6.980	≥ 5.000	NA			
		≤ 0.5263 IPLV.IP	≤ 0.4000 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.900	NA	NA	NA	6.850			
≥ 600		≤ 0.5895 FL	≤ 0.6158 FL	54/44 ^e	≥ 4.930	≥ 3.960	≥ 2.970	NA	≥ 8.900	≥ 6.980	≥ 5.000	NA			
		≤ 0.5263 IPLV.IP	≤ 0.4000 IPLV.IP	75/65 ^e	NA	NA	NA	≥ 3.900	NA	NA	NA	6.850			

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Footnotes:

- a. Cooling-only rating conditions are standard rating conditions defined in AHRI 550/590, Table 1.
- b. Heating full-load rating conditions are at rating conditions defined in AHRI 550/590, Table 1.
- c. For water-cooled heat recovery chillers that have capabilities for heat rejection to a heat recovery condenser and a tower condenser, the COP_{HR} applies to operation at full load with 100% heat recovery (no tower rejection). Units that only have capabilities for partial heat recovery shall meet the requirements of Table 6.8.1-3
- d. Outdoor air entering dry-bulb (db) temperature and wet-bulb (wb) temperature.
- e. Source-water entering and leaving water temperature.
- f. AHRI ratings are not required for equipment sizes larger than those covered by the test standard.

- g. Air-to-water heat pumps that are configured to operate only in heating and not in cooling only need to comply with the minimum heating efficiencies.
- h. Units that are both an air-to-water heat pump and an heat recovery chiller are required to comply with either the applicable air source efficiency requirements or the heat recovery chiller requirements but not both.
- i. Heat pumps and heat recovery chillers are only required to comply with one of the four leaving heating water temperature criteria. The leaving heater water temperature criteria that is closest to the design leaving water temperature shall be utilized.

Section 403.3.2.2 is amended to read as follows:

C403.3.2.2 Water-cooled centrifugal chilling package. Equipment not designed for operation at AHRI Standard 550/590 test conditions of 44°F (7°C) leaving chilled-water temperature and 2.4 gpm/ton evaporator fluid flow and 85°F (29°C) entering condenser water temperature with 3 gpm/ton (0.054 L/s x kW) condenser water flow shall have maximum full-load kW/ton (*FL*) and part-load ratings adjusted using Equations 4-7 and 4-8.

Exception: Centrifugal chillers designed to operate outside of these temperature ranges are not regulated by this section.

$$FL_{adj} = FL/K_{adj} \quad \text{(Equation 4-7)}$$

$$PLV_{adj} = IPLV/K_{adj} \quad \text{(Equation 4-8)}$$

Where:

$$K_{adj} = A \times B$$

FL = Full-load kW/ton values as specified in Table C403.3.2(7)

FL_{adj} = Maximum full-load kW/ton rating, adjusted for nonstandard conditions

IPLV = Values as specified in Table C403.3.2(7)

PLV_{adj} = Maximum NPLV rating, adjusted for nonstandard conditions.

$$A = 0.00000014592 \times (\text{LIFT})^4 - 0.0000346496 \times (\text{LIFT})^3 + 0.00314196 \times (\text{LIFT})^2 - 0.147199 \times \text{LIFT} + 3.9302$$

$$B = 0.0015 \times L_{vg}^{Evap} (\text{°F}) + 0.934$$

$$\text{LIFT} = L_{vg}^{Cond} - L_{vg}^{Evap}$$

L_{vg}^{Cond} = Full-load condenser leaving fluid temperature (°F)

L_{vg}^{Evap} = Full-load evaporator leaving temperature (°F)

The FL_{adj} and PLV_{adj} values are only applicable for centrifugal chillers meeting all of the following full-load design ranges:

1. Minimum evaporator leaving temperature: 36°F.
2. Maximum condenser leaving temperature: 115°F.
3. LIFT is not less than 20°F and not greater than 80°F.

Section C403.3.2.4 is amended to read as follows:

C403.3.2.4 Packaged and split system electric heating and cooling equipment. Packaged and split system electric equipment providing both heating and cooling, and cooling-only equipment with electric heat in the main supply duct before VAV boxes, in each case with a total cooling capacity

greater than 6,000 Btu/h shall be a heat pump.

Exception: Unstaffed equipment shelters or cabinets used solely for personal wireless service facilities.

Section C403.3.5 is amended to read as follows:

C403.3.5 Dedicated outdoor air systems (DOAS). For buildings with occupancies as shown in Table C403.3.5, outdoor air shall be provided to each occupied space by a dedicated outdoor air system (DOAS) which delivers 100 percent outdoor air without requiring operation of the heating and cooling system fans for ventilation air delivery.

Exceptions:

1. Occupied spaces that are not ventilated by a mechanical ventilation system and are only ventilated by a natural ventilation system in accordance with Section 402 of the *International Mechanical Code*.
2. High efficiency variable air volume (VAV) systems complying with Section C403.6.10 for occupancy classifications other than Groups A-1, A-2 and A-3 as specified in Table C403.3.5, and high efficiency VAV systems complying with Section C403.12 for occupancy classifications Groups A-1, A-2 and A-3 as specified in Table C403.3.5. This exception shall not be used as a substitution for a DOAS per Section C406.6.
3. Spaces that are within building types not subject to the requirements of Section C403.3.5, and that qualify as accessory occupancies according to Section 508.2 of the International Building Code, are not required to comply with this section.

Section C403.3.5.1 is amended to read as follows:

C403.3.5.1 Energy recovery ventilation with DOAS. The DOAS shall include *energy recovery ventilation*. The energy recovery system shall have a ~~60 percent minimum sensible recovery effectiveness or have 50~~ 60 percent enthalpy recovery effectiveness in accordance with Section C403.7.6. For DOAS having a total fan system motor nameplate hp less than 5 hp, total combined fan power shall not exceed 1 W/cfm of outdoor air. For DOAS having a total fan system motor hp greater than or equal to 5 hp, refer to fan power limitations of Section C403.8.1. This fan power restriction applies to each dedicated outdoor air unit in the permitted project, but does not include the fan power associated with the zonal heating/cooling equipment. The airflow rate thresholds for energy recovery requirements in Tables C403.7.6(1) and C403.7.6(2) do not apply.

Exceptions:

1. Occupied spaces with all of the following characteristics:
 - a. Complying with Section C403.7.6;
 - b. Served by equipment less than 5000 cfm;
 - c. With an average occupant load ~~greater than 25~~ 15 people or greater per 1000 square feet (93 m²) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*);
 - d. That include *demand control ventilation* configured to reduce outdoor air by at least 50% below design minimum ventilation rates when the actual occupancy of the space served by the system is less than the design occupancy; and

- e. Smaller than 650 square feet.
- 2. Systems installed for the sole purpose of providing makeup air for systems exhausting toxic, flammable, paint, or corrosive fumes or dust, dryer exhaust, or commercial kitchen hoods used for collecting and removing grease vapors and smoke.
- 3. The energy recovery systems for R-1 and R-2 occupancies are permitted to provide 60 percent minimum sensible heat recovery effectiveness in lieu of 60 percent enthalpy recovery effectiveness. The return/exhaust air stream temperature for heat recovery device selection shall be 70°F or as determined by an *approved* calculation procedure.

Section C403.3.6 is amended to add an Informative Note:

City Informative Note. When an H/ERV (heat recovery ventilator or energy recovery ventilator) that is rated and listed in accordance with HVI 920 is used to comply with the "sensible recovery effectiveness" requirement in Section C403.3.6 or C403.7.6 Exception 2, use the product's Adjusted Sensible Recovery Efficiency (ASRE) at 32°F, as listed in the HVI Section 3 H/ERV Directory. Select the ASRE for a flow rate that is no less than the design flow rate, or interpolate between two listed flow rates. HVI refers to the Home Ventilating Institute.

A new section, Section C403.3.7 with Table C403.3.7 is added and shall read as follows:

C403.3.7 Hydronic System flow rate. Chilled water and condenser water piping shall be designed such that the design flow rate in each pipe segment shall not exceed the values listed in Table C403.3.7 for the appropriate total annual hours of operation. Pipe sizes for systems that operate under variable flow conditions (e.g., modulating two-way control valves at coils) and that contain variable speed pump motors are permitted to be selected from the "Variable Flow/Variable Speed" columns. All others shall be selected from the "Other" columns.

EXCEPTION. Design flow rates exceeding the values in Table C403.3.7 are permitted in specific sections of pipe if the pipe is not in the critical circuit at design conditions and is not predicted to be in the critical circuit during more than 30 percent of operating hours.

City Informative Note. The flow rates listed here do not consider noise or erosion. Lower flow rates are often recommended for noise sensitive locations.

TABLE C403.3.7
PIPING SYSTEM DESIGN MAXIMUM FLOW RATE IN GPM¹

<u>Pipe Size</u>	<u><= 2000 hours/yr</u>		<u>>2000 and <= 4400 hours/year</u>		<u>> 4400 hours/year</u>	
	<u>Other</u>	<u>Variable Flow/ Variable Speed</u>	<u>Other</u>	<u>Variable Flow/ Variable Speed</u>	<u>Other</u>	<u>Variable Flow/ Variable Speed</u>
<u>2 1/2</u>	<u>120</u>	<u>180</u>	<u>85</u>	<u>130</u>	<u>68</u>	<u>110</u>
<u>3</u>	<u>180</u>	<u>270</u>	<u>140</u>	<u>210</u>	<u>110</u>	<u>170</u>
<u>4</u>	<u>350</u>	<u>530</u>	<u>260</u>	<u>400</u>	<u>210</u>	<u>320</u>
<u>5</u>	<u>410</u>	<u>620</u>	<u>310</u>	<u>470</u>	<u>250</u>	<u>370</u>

<u>6</u>	<u>740</u>	<u>1100</u>	<u>570</u>	<u>860</u>	<u>440</u>	<u>680</u>
<u>8</u>	<u>1200</u>	<u>1800</u>	<u>900</u>	<u>1400</u>	<u>700</u>	<u>1100</u>
<u>10</u>	<u>1800</u>	<u>2700</u>	<u>1300</u>	<u>2000</u>	<u>1000</u>	<u>1600</u>
<u>12</u>	<u>2500</u>	<u>3800</u>	<u>1900</u>	<u>2900</u>	<u>1500</u>	<u>2300</u>

1. There are no requirements for pipe sizes smaller than the minimum size or larger than the maximum size shown in the table.

Section C403.4.1 is amended to read as follows:

C403.4.1 Thermostatic controls. The supply of heating and cooling energy to each *zone* shall be controlled by individual thermostatic controls capable of responding to temperature within the *zone*. Controls in the same *zone* or in neighboring *zones* connected by openings larger than 10 percent of the floor area of either *zone* shall not allow for simultaneous heating and cooling. At a minimum, each floor of a building shall be considered as a separate *zone*. Controls on systems required to have economizers and serving single *zones* shall have multiple cooling stage capability and activate the economizer when appropriate as the first stage of cooling. See Section C403.5 for further economizer requirements. Where humidification or dehumidification or both is provided, at least one humidity control device shall be provided for each humidity control system.

Exceptions:

1. Independent perimeter systems that are designed to offset only building envelope heat losses or gains or both serving one or more perimeter *zones* also served by an interior system provided:
 - 1.1. The perimeter system includes at least one thermostatic control *zone* for each building exposure having exterior walls facing only one orientation (within +/-45 degrees) (0.8 rad) for more than 50 contiguous feet (15,240 mm);
 - 1.2. The perimeter system heating and cooling supply is controlled by a thermostat located within the *zones* served by the system; and
 - 1.3. Controls are configured to prevent the perimeter system from operating in a different heating or cooling mode from the other equipment within the *zones* or from neighboring *zones* connected by openings larger than 10 percent of the floor area of either *zone*.
2. ~~Any interior *zone* open to a perimeter *zone* shall have set points and dead bands coordinated so that cooling in the interior *zone* shall not operate while the perimeter *zone* is in heating until the interior *zone* temperature is 5°F (2.8°C) higher than the perimeter *zone* temperature, unless the interior and perimeter *zones* are separated by a partition whose permanent openings are smaller than 10 percent of the perimeter *zone* floor area. Where an interior *zone* and a perimeter *zone* are open to each other with permanent openings larger than 10 percent of the floor area of either *zone*, cooling in the interior *zone* is permitted to operate at times when the perimeter *zone* is in heating and the interior *zone* temperature is at least 5°F (2.8°C) higher than the perimeter *zone* temperature. For the purposes of this exception, a permanent opening is an opening without doors or other operable closures.~~
3. Dedicated outdoor air units that provide *ventilation air*, make-up air or *replacement air* for exhaust systems are permitted to be controlled based on supply air temperature. The supply air temperature shall be controlled to a maximum of 65°F (18.3°C) in heating and a minimum of 72°F (22°C) in cooling unless the supply air temperature is being reset based on the status of cooling or heating in the *zones* served or it being reset based on outdoor air temperature.

Section C403.4.1.1 is amended to read as follows:

C403.4.1.1 Heat pump supplementary heat. ~~Unitary air-cooled heat pumps shall include microprocessor controls that minimize supplemental heat usage during start-up, set-up, and defrost conditions. These controls shall anticipate need for heat and use compression heating as the first stage of heat. Controls shall indicate when supplemental heating is being used through visual means (e.g., LED indicators). Heat pumps equipped with supplementary heaters shall be installed with controls that prevent supplemental heater operation above 40°F (4.4°C). Heat pumps equipped with internal electric resistance heaters shall have controls that prevent supplemental heater operation when the heating load can be met by the heat pump alone during both steady-state operation and setback recovery. Supplemental heater operation is permitted during outdoor coil defrost cycles. Heat pumps equipped with supplementary heaters shall comply with all conditions of Section C403.1.4.~~

Exception: ~~Packaged terminal heat pumps (PTHPs) of less than 2 tons (24,000 Btu/hr) cooling capacity provided with controls that prevent supplementary heater operation above 40°F. Heat pumps whose minimum efficiency is regulated by NAECA and whose ratings meet the requirements shown in Table C403.3.2(2) and include all usage of internal electric resistance heating.~~

Section 403.4.2 is amended to read as follows:

C403.4.2 Off-hour controls. For all occupancies other than Group R and for conditioned spaces other than dwelling units within Group R occupancies, each zone shall be provided with thermostatic setback controls that are controlled by either an *automatic* time clock or programmable control system.

Exceptions:

1. Zones that will be operated continuously.
2. Zones with a full HVAC load demand not exceeding 6,800 Btu/h (2 kW) and having a manual shutoff switch located with *ready access*.

A new section, Section C403.4.12 is added and reads as follows:

C403.4.12 Pressure Independent Control Valves. Where design flow rate of heating water and chilled water coils is 10 GPM or higher, modulating pressure independent control valves shall be provided.

Section C403.5 is amended to read as follows:

C403.5 Economizers. Air economizers shall be provided on all new cooling systems including those serving computer server rooms, electronic equipment, radio equipment, and telephone switchgear. Economizers shall comply with Sections C403.5.1 through C403.5.5.

Exception: Economizers are not required for the systems listed below:

1. Cooling systems not installed outdoors nor in a mechanical room adjacent to outdoors and

- installed in conjunction with DOAS complying with Section C403.3.5 and serving only spaces with year-round cooling loads from lights and equipment of less than 5 watts per square foot.
2. Unitary or packaged systems serving one zone with dehumidification ~~that affect other systems so as to where an economizer would~~ increase the overall building energy consumption. New humidification equipment shall comply with Section C403.3.2.5.
 3. Unitary or packaged systems serving one zone where the cooling efficiency meets or exceeds the efficiency requirements in Table C403.5.(3).

TABLE C403.5(3)
EQUIPMENT EFFICIENCY PERFORMANCE EXCEPTION FOR ECONOMIZERS

<u>Climate Zone</u>	<u>Efficiency Improvement^a</u>
4C	64%
5B	59%

a. If a unit is rated with an IPLV, IEER or SEER then to eliminate the required air or water economizer, the minimum cooling efficiency of the HVAC unit must be increased by the percentage shown. If the HVAC unit is only rated with a full load metric like EER or COP cooling, then these must be increased by the percentage shown.

4. Equipment serving chilled beams and chilled ceiling space cooling systems only which are provided with a water economizer meeting the requirements of Section C403.5.4.
5. For Group R occupancies, cooling units installed outdoors or in a mechanical room adjacent to outdoors with a total cooling capacity less than 20,000 Btu/h and other cooling units with a total cooling capacity less than 54,000 Btu/h provided that these are high-efficiency cooling equipment with IEER, CEER, SEER, and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.3.2(1) through (3), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. For split systems, compliance is based on the cooling capacity of individual fan coil units.
6. Equipment used to cool *Controlled Plant Growth Environments* provided these are high-efficiency cooling equipment with SEER, EER and IEER values a minimum of 20 percent greater than the values listed in Tables C403.3.2(1), (3) and (7).
7. Equipment serving a space with year-round cooling loads from lights and equipment of 5 watts per square foot or greater complying with the following criteria:
 - 7.1. Equipment serving the space utilizes chilled water as the cooling source; and
 - 7.2. The chilled water plant includes a condenser heat recovery system that meets the requirements of Section C403.9.5 or the building and water-cooled system meets the following requirements:
 - 7.2.1. A minimum of 90 percent (capacity-weighted) of the building space heat is provided by hydronic heating water.
 - 7.2.2. Chilled water plant includes a heat recovery chiller or water-to-water heat pump capable of rejecting heat from the chilled water system to the hydronic heating equipment capacity.
 - 7.2.3. Heat recovery chillers shall have a minimum COP of 7.0 when providing heating and cooling water simultaneously.
8. Water-cooled equipment served by systems meeting the requirements of Section C403.9.2.4, Condenser heat recovery.
9. Dedicated outdoor air systems that include energy recovery as required by Section C403.7.6 but that do not include mechanical cooling.
10. Dedicated outdoor air systems not required by Section C403.7.6 to include energy recovery

that modulate the supply airflow to provide only the minimum outdoor air required by Section C403.2.2.1 for ventilation, exhaust air make-up, or other process air delivery.

11. Equipment used to cool any dedicated server room, electronic equipment room, elevator machine room or telecom switch room provided the system complies with Option a, b, c, d, or e in the table C403.5(11) below. The total cooling capacity of all fan systems qualifying under this exception without economizers shall not exceed 240,000 Btu/h per building or 10 percent of its air economizer capacity, whichever is greater. This exception shall not be used for Total Building Performance.

Table C403.5(11)
Server room, electronic equipment room or telecom room cooling equipment

	Equipment Type	Higher Equipment Efficiency	Part-Load Control	Economizer
Option a	Tables C403.3.2(1) and C403.3.2(2) ^a	+15% ^b	Required over 85,000 Btu/h ^c	None Required
Option b	Tables C403.3.2(1) and C403.3.2(2) ^a	+5% ^d	Required over 85,000 Btu/h ^c	Water-side Economizer ^e
Option c	ASHRAE Standard 127 ^f	+0% ^g	Required over 85,000 Btu/h ^c	Water-side Economizer ^e
<u>Option d</u>	<u>Table C403.3.2(7)^h</u>	<u>+ 25%ⁱ</u>	<u>Required for all chillers^j</u>	None Required
<u>Option e</u>	<u>Table C403.3.2(7)^h</u>	<u>+ 10/15%^k</u>	<u>Required over 85,000 Btu/h^c</u>	<u>Dedicated waterside Economizer^e</u>

Notes for Exception 11/Footnotes for Table C403.5(11):

- For a system where all of the cooling equipment is subject to the AHRI standards listed in Tables C403.3.2(1) and C403.3.2(2), the system shall comply with ~~all of the following~~ the higher equipment efficiency, part-load control and economizer requirements of the row in which this footnote is located, including the associated footnotes (note that if the system contains any cooling equipment that exceeds the capacity limits in Table C403.3.2(1) or C403.3.2(2), or if the system contains any cooling equipment that is not included in Table C403.3.2(1) or C403.3.2(2), then the system is not allowed to use this option).
- The cooling equipment shall have an SEER/EER value and an IEER/IPLV value that ~~((is))~~ are each a minimum of 15 percent greater than the value listed in Tables C403.3.2(1) and C403.3.2(2).
- For units with a total cooling capacity over 85,000 Btu/h, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less that results in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, dual tandem scrolls, but hot gas bypass is not credited as a compressor unloading system).
- The cooling equipment shall have an SEER/EER value and an IEER/IPLV value that ~~((is))~~ are each a minimum of 5 percent greater than the value listed in Tables C403.3.2(1) and C403.3.2(2).
- The system shall include a water economizer in lieu of air economizer. Water economizers shall meet the requirements of Sections C403.5.1 and C403.5.2 and be capable of providing the total concurrent cooling load served by the connected terminal equipment lacking airside economizer, at outside air temperatures of 50°F dry-bulb/45°F wet-bulb and below. For this calculation, all factors including solar and internal load shall be the same as those used for peak load calculations, except for the outside temperatures. The equipment shall be served by a dedicated condenser water system unless a non-dedicated condenser water system exists that can provide appropriate water temperatures during hours when water-side economizer cooling is available.
- For a system where all cooling equipment is subject to ASHRAE Standard 127, the system shall comply with the higher equipment efficiency, part-load control, and economizer requirements of the row in which this footnote is located, including the associated footnotes.
- The cooling equipment subject to ASHRAE Standard 127 shall have an ~~((EER value and an IPLV))~~ SCOP value that is ~~((equal or))~~ a minimum of 10 percent greater than the value listed in Tables C403.3.2(1) and C403.3.2(2) (1.10 x values in these tables) when determined in accordance with the rating conditions in ASHRAE Standard 127 (i.e., not the rating conditions in AHRI Standard 210/240 or 340/360). This information shall be provided by an independent third party.
- For a system with chillers subject to the AHRI standards listed in Table C403.3.2(7) (e.g., a chilled water system with fan coil units), the system shall comply with the higher equipment efficiency, part-load control and economizer requirements of the row in which this footnote is located, including the associated footnotes.

- i. The cooling equipment shall have an full-load EER value and an IPLV value that is a minimum of 25 percent greater than the value listed in Table C403.3.2(7) (1.25 x value in Table C403.3.2(7) or a full-load and IPLV kW/ton that is at least 25 percent lower than the value listed in Table C403.3.2(7) (0.75 x value in Table C403.3.2(7)). For all chillers, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less and that result in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, or dual tandem scrolls, but hot gas bypass is not a qualifying compressor unloading system).
- j. For air-cooled chillers, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less and that result in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, or dual tandem scrolls, but hot gas bypass is not a qualifying compressor unloading system).
- k. For air-cooled chillers, the cooling equipment shall have an IPLV EER value that is a minimum of 10 percent greater than the IPLV EER value listed in Table C403.3.2(7) (1.10 x values in Table C403.3.2(7)). For water-cooled chillers, the cooling equipment shall have an IPLV kW/ton that is at least 15 percent lower than the IPLV kW/ton value listed in Table C403.3.2(7) (0.85 x values in Table C403.3.2(7)).

12. Medical and laboratory equipment that is directly water-cooled and is not dependent upon space air temperature.

Section 403.6.10 is amended to read as follows:

C403.6.10 High efficiency variable air volume (VAV) systems. For HVAC systems subject to the requirements of Section C403.3.5 but utilizing Exception 2 of that section, a high efficiency multiple-zone VAV system may be provided without a separate parallel DOAS when the system is designed, installed, and configured to comply with all of the following criteria in addition to the applicable requirements of Sections C403.8.6 through C403.8.8. (This exception shall not be used as a substitution for a DOAS per Section C406.6 or C406.7:

1. Each VAV system must serve a minimum of 3,000 square feet (278.7 m²) and have a minimum of five VAV zones.
2. The VAV systems are provided with airside economizer per Section C403.5 without exceptions.
3. A direct-digital control (DDC) system is provided to control the VAV air handling units and associated terminal units per Section C403.4.11 regardless of sizing thresholds of Table C403.4.11.1.
4. Multiple-zone VAV systems with a minimum outdoor air requirement of 2,500 cfm (1180 L/s) or greater shall be equipped with a device capable of measuring outdoor airflow intake under all load conditions. The system shall be capable of increasing or reducing the outdoor airflow intake based on feedback from the VAV terminal units as required by Section C403.6.5, without exceptions, and Section C403.7.1, Demand controlled ventilation.
5. Multiple-zone VAV systems with a minimum outdoor air requirement of 2,500 cfm (1180 L/s) or greater shall be equipped with a device capable of measuring supply airflow to the VAV terminal units under all load conditions.
6. In addition to meeting the zone isolation requirements of C403.2.1 a single VAV air handling unit shall not serve more than 50,000 square feet (4645 m²) unless a single floor is greater than 50,000 square feet (4645 m²) in which case the air handler is permitted to serve the entire floor.
7. The primary maximum cooling air for the VAV terminal units serving interior cooling load driven zones shall be sized for a supply air temperature that is a minimum of 5°F greater than the supply air temperature for the exterior zones in cooling.
8. Air terminal units with a minimum primary airflow set point of 50 percent or greater of the

maximum

primary airflow set point shall be sized with an inlet velocity of no greater than 900 feet per minute.

Allowable fan motor horsepower shall not exceed 90 percent of the allowable HVAC fan system bhp

(Option 2) as defined by Section C403.8.1.1.

9. All fan powered VAV terminal units (series or parallel) shall be provided with electronically commutated motors. The DDC system shall be configured to vary the speed of the motor as a function of the heating and cooling load in the space. Minimum speed shall not be greater than 66 percent of design airflow required for the greater of heating or cooling operation. Minimum speed shall be used during periods of low heating and cooling operation and ventilation-only operation.

Exception: For series fan powered terminal units where the volume of primary air required to deliver the ventilation requirements at minimum speed exceeds the air that would be delivered at the speed defined above, the minimum speed set point shall be configured to exceed the value required to provide the required ventilation air.

10. Fan-powered VAV terminal units shall only be permitted at perimeter zones with an envelope heating load requirement. All other VAV terminal units shall be single duct terminal units.

Exception: Fan powered VAV terminal units are allowed at interior spaces with an occupant load greater than or equal to 25 people per 1000 square feet of floor area (as established in Table

403.3.1.1 of the *International Mechanical Code*) with demand control ventilation in accordance with Section C403.7.1.

11. When in occupied heating or in occupied dead band between heating and cooling all fan powered VAV terminal units shall be configured to reset the primary air supply set point, based on the VAV air handling unit outdoor air vent fraction, to the minimum ventilation airflow required per *International Mechanical Code*.

12. Spaces that are larger than 150 square feet (14 m²) and with an occupant load greater than or equal to ~~25~~ 15 people per 1000 square feet (93 m²) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*) shall be provided with all of the following features:

12.1.A dedicated VAV terminal unit capable of controlling the space temperature and minimum ventilation shall be provided. Demand control ventilation (DCV) shall be provided that utilizes a carbon dioxide sensor to reset the ventilation set point of the VAV terminal unit from the design minimum to design maximum ventilation rate as required by Chapter 4 of the *International Mechanical Code*.

12.2. Occupancy sensors shall be provided that are configured to reduce the minimum ventilation rate to zero and setback room temperature set points by a minimum of 5°F, for both cooling and heating, when the space is unoccupied.

13. Dedicated data centers, computer rooms, electronic equipment rooms, telecom rooms, or other similar spaces with cooling loads greater than 5 watts/ft² shall be provided with separate, cooling systems to allow the VAV air handlers to turn off during unoccupied hours in the office space and to allow the supply air temperature reset to occur.

Exception: The VAV air handling unit and VAV terminal units may be used for secondary backup cooling when there is a failure of the primary HVAC system.

Additionally, computer rooms, electronic equipment rooms, telecom rooms, or other similar spaces shall be provided with airside economizer in accordance with Section

C403.5 without using the exceptions to Section C403.5.

Exception: Heat recovery per exception 9 of Section C403.5 may be in lieu of airside economizer for the separate, independent HVAC system.

14. HVAC system central heating or cooling plant will include a minimum of one of the following options:
 - 14.1. VAV terminal units with hydronic heating coils connected to systems with hot water generation equipment limited to the following types of equipment: gas-fired hydronic boilers with a thermal efficiency, E_t , of not less than 92 percent, air-to-water heat pumps or heat recovery chillers. Hydronic heating coils shall be sized for a maximum entering hot water temperature of 120°F (48.9°C) for peak anticipated heating load conditions.
 - 14.2. Chilled water VAV air handling units connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than the minimum part load efficiencies listed in Table C403.3.2(7), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify. The smallest chiller or compressor in the central plant shall not exceed 20 percent of the total central plant cooling capacity or the chilled water system shall include thermal storage sized for a minimum of 20 percent of the total central cooling plant capacity.
15. The DDC system shall include a fault detection and diagnostics (FDD) system complying with the following:
 - 15.1. The following temperature sensors shall be permanently installed to monitor system operation:
 - 15.1.1. Outside air.
 - 15.1.2. Supply air.
 - 15.1.3. Return air.
 - 15.2. Temperature sensors shall have an accuracy of $\pm 2^\circ\text{F}$ (1.1°C) over the range of 40°F to 80°F (4°C to 26.7°C).
 - 15.3. The VAV air handling unit controller shall be configured to provide system status by indicating the following:
 - 15.3.1. Free cooling available.
 - 15.3.2. Economizer enabled.
 - 15.3.3. Compressor enabled.
 - 15.3.4. Heating enabled.
 - 15.3.5. Mixed air low limit cycle active.
 - 15.3.6. The current value of each sensor.
 - 15.4. The VAV air handling unit controller shall be capable of manually initiating each operating mode so that the operation of compressors, economizers, fans and the heating system can be independently tested and verified.
 - 15.5. The VAV air handling unit shall be configured to report faults to a fault management application able to be accessed by day-to-day operating or service personnel or annunciated locally on zone thermostats.
 - 15.6. The VAV terminal unit shall be configured to report if the VAV inlet valve has failed by performing the following diagnostic check at a maximum interval of once a month:
 - 15.6.1. Command VAV terminal unit primary air inlet valve closed and verify that primary airflow goes to zero or other approved means to verify that the VAV terminal unit damper actuator and flow ring are operating properly.

- 15.6.2. Command VAV thermal unit primary air inlet valve to design airflow and verify that unit is controlling to within 10% of design airflow.
- 15.7. The VAV terminal unit shall be configured to report and trend when the zone is driving the following VAV air handling unit reset sequences. The building operator shall have the capability to exclude zones used in the reset sequences from the DDC control system graphical user interface:
 - 15.7.1. Supply air temperature set point reset to lowest supply air temperature set point for cooling operation.
 - 15.7.2. Supply air duct static pressure set point reset for the highest duct static pressure set point allowable.
- 15.8. The FDD system shall be configured to detect the following faults:
 - 15.8.1. Air temperature sensor failure/fault.
 - 15.8.2. Not economizing when the unit should be economizing.
 - 15.8.3. Economizing when the unit should not be economizing.
 - 15.8.4. Outdoor air or return air damper not modulating.
 - 15.8.5. Excess outdoor air.
 - 15.8.6. VAV terminal unit primary air valve failure.

Section 403.7.1 is amended to read as follows:

C403.7.1 Demand control ventilation. Demand control ventilation (DCV) shall be provided for spaces larger than 500 square feet (46 m²) and with an occupant load greater than or equal to ~~25~~ 15 people per 1000 square feet (93 m²) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*) and served by systems with one or more of the following:

1. An air-side economizer.
2. *Automatic* modulating control of the outdoor air damper.
3. A design outdoor airflow greater than 3,000 cfm (1416 L/s).

Exception: Demand control ventilation is not required for systems and spaces as follows:

1. Systems with energy recovery complying with Section C403.7.6.1 or Section C403.3.5.1. This exception is not available for space types located within the "inclusions" column of Groups A-1 and A-3 occupancy classifications of Table C403.3.5.
2. Multiple-zone systems without direct digital control of individual zones communicating with a central control panel.
3. System with a design outdoor airflow less than 750 cfm (354 L/s).
4. ~~Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1,200 cfm (566 L/s).~~ Spaces, including but not limited to dining areas, where more than 75 percent of the space design outdoor airflow is transfer air required for makeup air supplying an adjacent commercial kitchen.
5. Ventilation provided for process loads only.
6. Spaces with one of the following occupancy categories (as defined by the *International Mechanical Code*): Correctional cells, daycare sickrooms, science labs, barbers, beauty and nail salons, and bowling alley seating.
7. Dormitory sleeping areas.

Section 403.7.5 is amended to read as follows:

C403.7.5 Enclosed loading dock, motor vehicle repair garage and parking garage exhaust ventilation system controls. Mechanical ventilation systems for enclosed loading docks, motor vehicle repair garage and parking garages shall be designed to exhaust the airflow rates (maximum and minimum) determined in accordance with the *International Mechanical Code*.

Ventilation systems shall be equipped with a control device that operates the system automatically by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Controllers shall be configured to shut off fans or modulate fan speed to 50 percent or less of design capacity, or intermittently operate fans less than 20 percent of the occupied time or as required to maintain acceptable contaminant levels in accordance with the *International Mechanical Code* provisions.

Gas sensor controllers used to activate the exhaust ventilation system shall stage or modulate fan speed upon detection of specified gas levels. All equipment used in sensor controlled systems shall be designed for the specific use and installed in accordance with the manufacturer's recommendations. The system shall be arranged to operate automatically by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Garage Parking garages, repair garages and loading docks shall be equipped with a controller and a full array of carbon monoxide (CO) sensors set to maintain levels of carbon monoxide below 35 parts per million (ppm). Additionally, a full array of nitrogen dioxide detectors shall be connected to the controller set to maintain the nitrogen dioxide level below the OSHA standard for eight hour exposure.

Spacing and location of the sensors shall be installed in accordance with manufacturer recommendations.

Section C403.7.5.1 is amended to read as follows:

C403.7.5.1 System activation devices for enclosed loading docks. Ventilation systems for enclosed loading docks shall operate continuously during unoccupied hours at the minimum ventilation rate required by Section 404 of the *International Mechanical Code* and shall be activated to the full required ventilation rate by one of the following:

1. Gas sensors installed in accordance with the *International Mechanical Code*; or
2. Occupant detection sensors used to activate the system that detects entry into the loading area along both the vehicle and pedestrian pathways.

Section C403.7.5.2 is amended to read as follows:

C403.7.5.2 System activation devices for enclosed parking garages. Ventilation systems for enclosed parking garages shall be activated by gas sensors.

Exception: A parking garage ventilation system having a total design capacity under 8,000 cfm may use occupant sensors to activate the full required ventilation rate.

Section 403.7.6 is amended to read as follows:

C403.7.6 Energy recovery ventilation systems. Any system with minimum outside air requirements at design conditions greater than 5,000 cfm or any system where the system's supply airflow rate exceeds the value listed in Tables C403.7.6(1) and C403.7.6(2), based on the climate zone and percentage of outdoor airflow rate at design conditions, shall include an energy recovery system. Table C403.7.6(1) shall be used for all ventilation systems that operate less than 8,000 hours per year, and Table C403.7.6(2) shall be used for all ventilation systems that operate 8,000 hours or more per year. The energy recovery system shall have the capability to provide a change in the enthalpy of the outdoor air supply of not less than ~~50~~ 60 percent of the difference between the outdoor air and return air enthalpies, at design conditions. Where an air economizer is required, the energy recovery system shall include a bypass of the energy recovery media for both the outdoor air and exhaust air or return air dampers and controls which permit operation of the air economizer as required by Section C403.5. Where a single room or space is supplied by multiple units, the aggregate ventilation (cfm) of those units shall be used in applying this requirement. The return/exhaust air stream temperature for heat recovery device selection shall be 70°F (21°C) at 30 percent relative humidity, or as calculated by the registered design professional.

City Informative Note: In Shoreline, the energy recovery effectiveness is determined typically by the winter heat recovery condition. See example below for how the minimum supply air enthalpy leaving the energy recovery media is calculated for the winter condition:

1. In Shoreline, the winter outdoor design air temperature is 24°F as specified in Appendix C. The registered design professional shall determine the coincident winter wet bulb temperature or percent relative humidity at the anticipated design conditions. Based on these conditions the outdoor design air enthalpy is determined from a psychrometric chart.

2. Determine the return/exhaust air stream enthalpy from a psychrometric chart based on the 70°F (21°C) at 30 percent relative humidity.

3. Calculate the 60% difference between the outside air and return air enthalpies at design winter conditions.

4. See example below:

a. OA Enthalpy at 24°F / 23°F (drybulb / wetbulb) = 8.2 BTU/LB

b. RA/EA Enthalpy at 70°F and 30% RH = 21.9 BTU/LB

c. SA Enthalpy Minimum Leaving Energy Recovery Media

= (8.2 + (21.9 – 8.2)*60%)

= 16.42 BTU/LB

(Note that this example represents 60% enthalpy recovery. For an equivalent sensible-only recovery system, it would take 73.9% effectiveness (increasing from 24°F DB to 58°F DB) to achieve the same enthalpy recovery.)

Exceptions:

1. The energy recovery systems for occupancy type I-2 hospitals, medical office buildings, and buildings that primarily consist of technical laboratory spaces, are permitted to provide a change of enthalpy of the outdoor air and return air of not less than 50 percent of the difference between the outdoor air and return air enthalpies, at design conditions. These occupancies are also permitted to utilize exception #3.

2. The energy recovery systems for R-1 and R-2 occupancies shall have a 60 percent

minimum sensible heat recovery effectiveness, in lieu of 60 percent enthalpy recovery effectiveness. The return/exhaust air stream temperature for heat recovery device selection shall be 70°F (21°C), or as calculated by the registered design professional.

3. An energy recovery ventilation system shall not be required in any of the following conditions:

4. 3.1 Where energy recovery systems are restricted per Section 514 of the *International Mechanical Code* to sensible energy, recovery shall comply with one of the following:
 - 4.1. 3.1.1 Kitchen exhaust systems where they comply with Section C403.7.7.1.
 - 4.2. 3.1.2 Laboratory fume hood systems where they comply with Exception 2 of Section C403.7.6.
 - 4.3. 3.1.3 Other sensible energy recovery systems with the capability to provide a change in dry bulb temperature of the outdoor air supply of not less than 50 percent of the difference between the outdoor air and the return air dry bulb temperatures, at design conditions.
2. 3.2 Laboratory fume hood systems that include at least one of the following features and also comply with Section C403.7.7.2:
 - 2.1. 3.2.1 Variable-air-volume hood exhaust and room supply systems capable of reducing exhaust and makeup air volume to 50 percent or less of design values.
 - 2.2. 3.2.2 Direct makeup (auxiliary) air supply equal to at least 75 percent of the exhaust rate, heated no warmer than 2°F (1.1°C) above room set point, cooled to no cooler than 3°F (1.7°C) below room set point, no humidification added, and no simultaneous heating and cooling used for dehumidification control.
3. 3.3 Systems serving spaces that are heated to less than 60°F (15.5°C) and are not cooled.
4. 3.4 Where more than 60 percent of the outdoor air heating energy is provided from site-recovered energy.
5. 3.5 Systems exhausting toxic, flammable, paint or corrosive fumes or dust.
6. 3.6 Cooling energy recovery in Climate Zones 3C, 4C, 5B, 5C, 6B, 7 and 8.
7. 3.7 Systems requiring dehumidification that employ energy recovery in series with the cooling coil.
8. 3.8 Multi-zone systems where the supply airflow rate is less than the values specified in Tables C403.7.6(1) and C403.7.6(2) for the corresponding percent of outdoor air. Where a value of NR is listed, energy recovery shall not be required.
9. 3.9 Equipment which meets the requirements of Section C403.9.2.4.
40. 3.10 Systems serving Group R-1 and R-3 dwelling or sleeping units where the largest source of air exhausted at a single location at the building exterior is less than 25 percent of the design outdoor air flow rate.

Section C403.7.8.1 is amended to read as follows:

C403.7.8.1 Shutoff dampers for building isolation. Outdoor air supply, exhaust openings and relief outlets and stairway and elevator hoistway shaft vents shall be provided with Class I motorized dampers. See Sections C403.10.1 and C403.10.2 for ductwork insulation requirements upstream and downstream of the shutoff damper.

Exceptions:

1. Gravity (nonmotorized) dampers shall be permitted in lieu of motorized dampers as follows:

- 1.1. Relief dampers serving systems less than ~~5,000~~ 300 cfm total supply shall be permitted in ~~buildings less than three stories in height~~.
- 1.2. Gravity (nonmotorized) dampers where the design outdoor air intake or exhaust capacity does not exceed ~~400~~ 300 cfm (189 L/s).
- 1.3. Systems serving areas which require continuous operation for 24/7 occupancy schedules.
2. Shutoff dampers are not required in:
 - 2.1. Combustion air intakes.
 - 2.2. Systems serving areas which require continuous operation in animal hospitals, kennels and pounds, laboratories, and Group H, I and R occupancies.
 - 2.3. Subduct exhaust systems or other systems that are required to operate continuously by the *International Mechanical Code*.
 - 2.4. Type I grease exhaust systems or other systems where dampers are prohibited by the *International Mechanical Code* to be in the airstream.
 - 2.5. Unconditioned stairwells or unconditioned elevator hoistway shafts that are only connected to unconditioned spaces.

Section 403.8.1 is amended to read as follows:

C403.8.1 Allowable fan motor horsepower. Each HVAC system having a total fan system motor nameplate horsepower exceeding 5 hp (3.7kW) at fan system design conditions shall not exceed the allowable *fan system motor nameplate hp* (Option 1) or *fan system bhp* (Option 2) as shown in Table C403.8.1(1). This includes supply fans, exhaust fans, return/relief fans, and fan-powered VAV air terminal units associated with systems providing heating or cooling capability. Single zone variable-air-volume systems shall comply with the constant volume fan power limitation. Zone heating and/or cooling terminal units installed in conjunction with a dedicated outdoor air system (DOAS) shall be evaluated as separate HVAC systems for allowable fan motor horsepower.

Exceptions:

1. Hospital, vivarium and laboratory systems that utilize flow control devices on exhaust or return to maintain space pressure relationships necessary for occupant health and safety or environmental control shall be permitted to use variable volume fan power limitation.
2. Individual exhaust fans with motor nameplate horsepower of 1 hp or less are exempt from the allowable fan motor horsepower requirements, but must meet the requirements of Section C405.8 for fractional hp fan motors.

Section 403.8.3 is amended to read as follows:

C403.8.3 Fan efficiency. Fans shall have a fan efficiency grade (FEG) of 67 or higher based on manufacturers' certified data, as defined by AMCA 205. The total efficiency of the fan at the design point of operation shall be within 15 percentage points of the maximum total efficiency of the fan.

Exception: The following fans are not required to have a fan efficiency grade:

1. Individual fans with a motor nameplate horsepower of 5 hp (3.7 kW) or less that are not part of a group operated as the functional equivalent of a single fan.
2. Multiple fans in series or parallel that have a combined motor nameplate horsepower of 5 hp (3.7 kW) or less and are operated as the functional equivalent of a single fan.
3. Fans that are part of equipment covered under Section C403.3.2.
4. Fans included in an equipment package certified by an approved agency for air or energy performance.
5. Powered wall/roof ventilators.
6. Fans outside the scope of AMCA 205.
7. Fans that are intended to operate only during emergency conditions.
8. Fans and fan arrays having a fan energy index (FEI) of not less than 1.00, or 0.95 for VAV systems, at the design point of operation, as determined in accordance with AMCA 208 by an approved, independent testing laboratory and labeled by the manufacturer. The FEI for fan arrays shall be calculated in accordance with AMCA 208 Annex C.

Section C403.8.4 is amended to read as follows:

C403.8.4 Group R occupancy exhaust ventilation fan efficacy. The Group R occupancies of the building shall be provided with ventilation that meets the requirements of the *International Mechanical Code*, as applicable, or with other approved means of ventilation. Mechanical ventilation system fans with 400 cfm or less in capacity shall meet the efficacy requirements of Table C403.8.4 at one or more rating points. Air flow shall be tested in accordance with Home Ventilating Standard (HVI) Standard 916 and listed. Fan efficacy shall be listed or shall be derived from listed power and airflow. Fan efficacy for fully ducted HRV, ERV, balanced, and in-line fans shall be determined at a static pressure of not less than 0.2 inch w.c. Fan efficacy for other exhaust fans shall be determined at a static pressure of not less than 0.1 inch w.c.

Exceptions:

- ~~1. Group R heat recovery ventilator and energy recovery ventilator fans that are less than 400 cfm.~~
2. 1. Where whole house ventilation fans are integrated with forced-air systems that are tested and listed HVAC equipment, provided they are powered by an electronically commutated motor where required by Section C405.8
3. 2. Domestic clothes dryer booster fans, domestic range hood exhaust fans, and domestic range booster fans that operate intermittently.
- 4.

**TABLE C403.8.4
 GROUP R EXHAUST FAN EFFICACY**

Fan location	Air Flow Rate Minimum (cfm)	Minimum Efficacy (cfm/watt)	Air Flow Rate Minimum (cfm)
Exhaust fan: Bathroom, utility room, whole house	40	2.8	< 90
Exhaust fan: Bathroom, utility room, whole house	90	3.5	Any ≥ 90

In-line (single-port and multi-port) fans	Any	3.8	Any
<u>ERV, HRV or balanced fan</u>		<u>1.2</u>	<u>Any</u>

Section 403.9.1 is amended to read as follows:

C403.9.1 Heat rejection equipment. Heat rejection equipment, including air-cooled condensers, dry coolers, open-circuit cooling towers, closed-circuit cooling towers and evaporative condensers, shall comply with this section.

Exception: Heat rejection devices where energy use is included in the equipment efficiency ratings listed in Tables C403.3.2(1)A, C403.3.2(1)B, C403.3.2(1)C, C403.3.2(2), C403.3.2(3), C403.3.2(7) and C403.3.2(9).

Heat rejection equipment shall have a minimum efficiency performance not less than values specified in Table C403.3.2(8).

Cooling towers serving chilled water systems shall be selected to maintain a return condenser water temperature to the tower of 86°F (30°C) or less at peak design conditions.

EXCEPTION: In existing buildings where physical constraints preclude a change from the original design, replacement cooling towers of the same or smaller capacity are exempt from this requirement.

Single-pass water cooling systems that use domestic water only one time before dumping it to waste shall not be used for hydronic heat pump and other cooling and refrigeration equipment, including but not limited to icemakers and walk-in coolers.

EXCEPTIONS:

1. Replacement of existing icemakers is exempt from this requirement.
2. Use of single-pass cooling for medical and dental equipment during power outages and other emergencies is exempt from this requirement.

Section 403.9.2.2 is amended to read as follows:

C403.9.2.2 Steam condensate systems. On-site steam heating systems shall have condensate water heat-recovery. On-site includes a system that is located within or adjacent to one or more buildings within the boundary of a contiguous area or campus under one ownership and which serves one or more of those buildings.

Buildings using steam generated off-site with steam heating systems which do not have condensate water recovery shall have condensate ~~water~~ heat recovery.

Section 403.9.2.3 is amended to read as follows:

C403.9.2.3 Refrigeration condenser heat recovery. Facilities having food service, meat or deli departments and having 500,000 Btu/h or greater of remote refrigeration condensers shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, space heating or for dehumidification reheat. Facilities having a gross *conditioned floor area* of 40,000 ft² or greater and 1,000,000 Btu/h or greater of remote refrigeration shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, and either for space heating or for dehumidification reheat for maintaining low space humidity. The required heat recovery system shall have the capacity to provide the smaller of:

1. 60 percent of the peak heat rejection load at design conditions, or
2. 50 percent of the sum of the service water heating load plus space heating load.

Section C403.10.2 is amended to read as follows:

C403.10.2 Duct construction. Ductwork shall be constructed and erected in accordance with the *International Mechanical Code*. For the purposes of this section, longitudinal seams are joints oriented in the direction of airflow. Transverse joints are connections of two duct sections oriented perpendicular to airflow. Duct wall penetrations are openings made by any screw, fastener, pipe, rod or wire. All other connections are considered transverse joints, including but not limited to spin-ins, taps and other branch connections, access door frames and jambs, and duct connections to equipment.

Section C 403.10.2.3 is amended to read as follows:

C403.10.2.3 High-pressure and exterior duct systems. Ducts designed to operate at static pressures equal to or greater than 3 inches water gauge (w.g.) (750 Pa) and all supply and return ductwork located outside the *building thermal envelope* that serves a *conditioned space* shall be insulated and sealed in accordance with Section C403.10.4. In addition, ducts and plenums shall be leak-tested in accordance with the SMACNA *HVAC Air Duct Leakage Test Manual* and shown to have a rate of air leakage (*CL*) less than or equal to 4.0, regardless of the Design Construction Pressure Class level, as determined in accordance with Equation 4-9. Ducts shall be tested using a pressure equal to the average operating pressure or the design Duct Construction Pressure Class level in accordance with the SMACNA HVAC Air Duct Leakage Test Manual.

$$CL = F/P^{0.65} \quad \text{(Equation 4-9)}$$

Where:

- F* = The measured leakage rate in cfm per 100 square feet of duct surface.
P = The static pressure of the test.

Documentation shall be furnished by the designer demonstrating that representative sections totaling at least 25 percent of the duct area have been tested and that all tested sections meet the requirements of this section.

Section C403.10.3 is amended to read as follows:

C403.10.3 Piping insulation. All piping, other than refrigerant piping, serving as part of a heating or cooling system shall be thermally insulated in accordance with Table C403.10.3.

Exceptions:

1. Factory-installed piping within HVAC equipment tested and rated in accordance with a test procedure referenced by this code.
2. Factory-installed piping within room fan-coils and unit ventilators tested and rated according to AHRI 440 (except that the sampling and variation provisions of Section 6.5 shall not apply) and 840, respectively.
3. Piping that conveys fluids that have a design operating temperature range between 60°F (15°C) and 105°F (41°C).
4. Piping that conveys fluids that have not been heated or cooled through the use of fossil fuels or electric power.
5. Strainers, control valves, and balancing valves associated with piping 1 inch (25 mm) or less in diameter.
6. Direct buried piping that conveys fluids at or below 60°F (15°C).

Section C403.10.3.1 is amended to read as follows:

C403.10.3.1 Protection of piping insulation. Piping insulation exposed to weather shall be protected from damage, including that due to sunlight, moisture, equipment maintenance and wind, and shall provide shielding from solar radiation that can cause degradation of the material. Adhesives tape shall not be permitted.

A new section, Section C403.10.4 is added and shall read as follows:

C403.10.4 Insulation of refrigerant piping. Refrigerant piping, other than piping factory installed in HVAC equipment, shall have minimum 1/2-inch insulation within conditioned spaces and 1-inch insulation outside of conditioned spaces, at a conductivity rating of 0.21 to 0.26 Btu x in/(h x ft² x °F) with a mean temperature rating of 75°F.

Section C403.12 is amended to read as follows:

C403.12 High efficiency single-zone variable air volume (VAV) systems. For HVAC systems subject to the requirements of Section C403.3.5 but utilizing Exception 2 of that section, a high efficiency single-zone VAV system may be provided without a separate parallel DOAS when the system is designed, installed, and configured to comply with all of the following criteria (this ~~exception~~ option shall not be used as a substitution for a DOAS per Section C406.6 or as a modification to the requirements for the *Standard Reference Design* in accordance with Section C407):

1. The single-zone VAV system is provided with airside economizer in accordance with Section 403.3 without exceptions.
2. A direct-digital control (DDC) system is provided to control the system as a single zone in

- accordance with Section C403.4.11 regardless of sizing thresholds of Table C403.4.11.1.
3. Single-zone VAV systems with a minimum outdoor air requirement of 1,000 cfm (472 L/s) or greater shall be equipped with a device capable of measuring outdoor airflow intake under all load conditions. The system shall be capable of increasing or reducing the outdoor airflow intake based on Section C403.7.1, Demand controlled ventilation.
 4. Allowable fan motor horsepower shall not exceed 90 percent of the allowable HVAC fan system *bhp* (Option 2) as defined by Section C403.8.1.1.
 5. Each single-zone VAV system shall be designed to vary the supply fan airflow as a function of heating and cooling load and minimum fan speed shall not be more than the greater of:
 - 5.1. 30 percent of peak design airflow; or
 - 5.2. The required ventilation flow assuming no occupants.
 6. Spaces that are larger than 150 square feet (14 m²) and with an occupant load greater than or equal to 25 people per 1000 square feet (93 m²) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*) shall be provided with all of the following features:
 - 6.1. Demand control ventilation (DCV) shall be provided that utilizes a carbon dioxide sensor to reset the ventilation set point of the single-zone VAV system from the design minimum to design maximum ventilation rate as required by Chapter 4 of the *International Mechanical Code*.
 - 6.2. Occupancy sensors shall be provided that are configured to reduce the minimum ventilation rate to zero and setback room temperature set points by a minimum of 5°F, for both cooling and heating, when the space is unoccupied.
 7. Single-zone VAV systems shall comply with one of the following options:
 - 7.1. Single-zone VAV air handling units with a hydronic heating coil connected to systems with hot water generation equipment limited to the following types of equipment: gas-fired hydronic boilers with a thermal efficiency, E_t , of not less than 92 percent, air-to-water heat pumps or heat recovery chillers. Hydronic heating coils shall be sized for a maximum entering hot water temperature of 120°F for peak anticipated heating load conditions.
 - 7.2. Single-zone VAV air handling units with a chilled water coil connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than the minimum part load efficiencies listed in Table C403.3.2(7), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify. The smallest chiller or compressor in the central plant shall not exceed 20 percent of the total central plant cooling capacity or the chilled water system shall include thermal storage sized for a minimum of 20 percent of the total central cooling plant capacity.
 - 7.3. Single-zone VAV air handling units with DX cooling, heat pump heating or gas-fired furnace shall comply with the following requirements as applicable:
 - 7.3.1. Have a DX cooling coil with cooling part load efficiency that are a minimum of 15 percent higher than the minimum SEER or IEER listed in Tables C403.3.2(1) and C403.3.2(2).
 - 7.3.2. Have a gas-fired furnace with a thermal efficiency, E_t , of not less than 90 percent or heat pump with a minimum heating HSPF or COP efficiency that are a minimum of 10 percent higher than the minimum heating efficiency in Tables C403.3.2(1) and C403.3.2(2).
 - 7.3.3. Heating coils or burner output shall be modulating or have a minimum of 2 stages with the first stage being less than 50 percent of total heating capacity. Cooling coils shall be modulating or have a minimum of 2 stages with the first stage being less than 50

- percent of the total cooling capacity.
8. The DDC system shall include a fault detection and diagnostics (FDD) system complying with the following:
 - 8.1. The following temperature sensors shall be permanently installed to monitor system operation:
 - 8.1.1. Outside air.
 - 8.1.2. Supply air.
 - 8.1.3. Return air.
 - 8.2. Temperature sensors shall have an accuracy of $\pm 2^{\circ}\text{F}$ (1.1°C) over the range of 40°F to 80°F (4°C to 26.7°C).
 - 8.3. The single-zone VAV air handling unit controller shall be configured to provide system status by indicating the following:
 - 8.3.1. Free cooling available.
 - 8.3.2. Economizer enabled.
 - 8.3.3. Compressor enabled.
 - 8.3.4. Heating enabled.
 - 8.3.5. Mixed air low limit cycle active.
 - 8.3.6. The current value of each sensor.
 - 8.4. The single-zone VAV air handling unit controller shall be capable of manually initiating each operating mode so that the operation of compressors, economizers, fans and the heating system can be independently tested and verified.
 - 8.5. The single-zone VAV air handling unit shall be configured to report faults to a fault management application able to be accessed by day-to-day operating or service personnel or annunciated locally on zone thermostats.
 - 8.6. The FDD system shall be configured to detect the following faults:
 - 8.6.1. Air temperature sensor failure/fault.
 - 8.6.2. Not economizing when the unit should be economizing.
 - 8.6.3. Economizing when the unit should not be economizing.
 - 8.6.4. Outdoor air or return air damper not modulating.
 - 8.6.5. Excess outdoor air.

A new Section, Section C403.14 is added and shall read as follows:

C403.14 Compressed air and vacuum air. Compressed air and vacuum air systems shall comply with all of the following:

EXCEPTION: Compressed air and vacuum air systems used for medical purposes are exempt from this section.

1. Air Compressors (50-150 PSI), General: Air compressors operating at 50-150 PSI shall comply with the following:
 - a. All water drains shall be “no air loss” drains.
 - b. Timed unheated desiccant air driers shall not be allowed.
2. Rotary Screw Air Compressors over 10 hp (50-150 PSI): Rotary screw air compressors over 10 hp operating at 50-150 PSI shall not rely on modulation control and shall have one of the following:
 - a. Receiver capacity greater than three gallons per cfm to allow efficient load/unload control;
 - b. Variable speed drive controlled air compressor; or
 - c. Multiple air compressors using a smaller trim-air compressor to trim. The trim compressor shall use variable speed drive control, or shall use load/unload control with greater than three gallon receiver capacity per cfm for the trim air compressor.

A new section, Section C403.15 is added and shall read as follows:

C403.15 Commercial food service. The following types of equipment within the scope of the applicable Energy Star program shall comply with the energy-efficiency and water-efficiency criteria required to achieve the Energy Star label:

- a. Commercial fryers: Energy Star Program Requirements for Commercial Fryers.
- b. Commercial hot food holding cabinets: Energy Star Program Requirements for Hot Food Holding Cabinets.
- c. Commercial steam cookers: Energy Star Program Requirements for Commercial Steam Cookers.
- d. Commercial dishwashers: Energy Star Program Requirements for Commercial Dishwashers.

**SECTION C404
 SERVICE WATER HEATING AND PRESSURE-BOOSTER SYSTEMS**

Table C404.2 is amended to read as follows:

**TABLE C404.2
 MINIMUM PERFORMANCE OF WATER-HEATING EQUIPMENT**

EQUIPMENT TYPE	SIZE CATEGORY (input)	SUBCATEGORY OR RATING CONDITION	PERFORMANCE REQUIRED ^{a, b}	TEST PROCEDURE
Water heaters, electric	≤ 12 kW ^d	Tabletop ^e , ≥ 20 gal and < 120 gal	0.93 - 0.00132 V, EF	DOE 10 CFR Part 430
		Resistance ≥ 20 gal and ≤ 55 gal	0.960 - 0.0003 V, EF	
		Grid-enabled ^f > 75 gal and ≤ 120 gal	1.061 - 0.00168 V, EF	
	> 12 kW	Resistance ≥ 20 gal	$\frac{((0.3 + 27)/V_m \% / h^g)}$ $(0.3 + 27/V_m), \% / h^g$	Section G.2 of ANSI Z21.10.3
	≤ 24 amps and ≤ 250 volts	Heat pump	2.057 - 0.00113 V, EF	DOE 10 CFR Part 430
Instantaneous water heaters, electric	All	Resistance	0.93 - 0.00132 V, EF	DOE 10 CFR Part 430
Storage water heaters, gas	≤ 75,000 Btu/h	≥ 20 gal and ≤ 55 gal	0.675 - 0.0015 V, EF	DOE 10 CFR Part 430
		>55 gal and ≤ 100 gal	0.8012 – 0.00078 V, EF	
	> 75,000 Btu/h	< 4,000 Btu/h/gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$, Btu/h	Section G.1 and G.2 of ANSI Z21.10.3
Instantaneous water heaters, gas	> 50,000 Btu/h and < 200,000 Btu/h	≥ 4,000 (Btu/h)/gal and < 2 gal	0.82 - 0.0019 V, EF	DOE 10 CFR Part 430
	≥ 200,000 Btu/h ^c	≥ 4,000 Btu/h/gal and < 10 gal	$80\% E_t$	Section G.1 and G.2 of ANSI Z21.10.3

	$\geq 200,000$ Btu/h	$\geq 4,000$ Btu/h/gal and ≥ 10 gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$, Btu/h	
Storage water heaters, oil	$\leq 105,000$ Btu/h	≥ 20 gal	0.68 - 0.0019V, EF	DOE 10 CFR Part 430
	$> 105,000$ Btu/h	$< 4,000$ Btu/h/gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$, Btu/h	Section G.1 and G.2 of ANSI Z21.10.3
Instantaneous water heaters, oil	$\leq 210,000$ Btu/h	$\geq 4,000$ Btu/h/gal and < 2 gal	0.59 - 0.0019V, EF	DOE 10 CFR Part 430
	$> 210,000$ Btu/h	$\geq 4,000$ Btu/h/gal and < 10 gal	$80\% E_t$	Section G.1 and G.2 of ANSI Z21.10.3
	$> 210,000$ Btu/h	$\geq 4,000$ Btu/h/gal and ≥ 10 gal	$78\% E_t$ $(Q/800 + 110\sqrt{V})SL$, Btu/h	
Hot water supply boilers, gas and oil	$\geq 300,000$ Btu/h and $< 12,500,000$ Btu/h	$\geq 4,000$ Btu/h/gal and < 10 gal	$80\% E_t$	Section G.1 and G.2 of ANSI Z21.10.3
Hot water supply boilers, gas	$\geq 300,000$ Btu/h and $< 12,500,000$ Btu/h	$\geq 4,000$ Btu/h/gal and ≥ 10 gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$, Btu/h	
Hot water supply boilers, oil	$\geq 300,000$ Btu/h and $< 12,500,000$ Btu/h	$\geq 4,000$ Btu/h/gal and > 10 gal	$78\% E_t$ $(Q/800 + 110\sqrt{V})SL$, Btu/h	
Pool heaters, gas and oil	All	—	$82\% E_t$	ASHRAE 146
Heat pump pool heaters	All	—	4.0 COP	AHRI 1160
Unfired storage tanks ^h	All	—	Minimum insulation requirement $R-12.5$ $(h \times ft^2 \times ^\circ F)/Btu$	(none)

For SI: °C = [(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W, 1 gallon = 3.785 L, 1 British thermal unit per hour per gallon = 0.078 W/L.

- a. Energy factor (EF) and thermal efficiency (E_t) are minimum requirements. In the EF equation, V is the rated volume in gallons.
- b. Standby loss (SL) is the maximum Btu/h based on a nominal 70°F temperature difference between stored water and ambient requirements. In the SL equation, Q is the nameplate input rate in Btu/h. In the SL equation for electric water heaters, V is the rated volume in gallons and V_m is the measured volume in gallons. In the SL equation for oil and gas water heaters and boilers, V is the rated volume in gallons.
- c. Instantaneous water heaters with input rates below 200,000 Btu/h must comply with these requirements if the water heater is designed to heat water to temperatures 180°F or higher.
- d. Electric water heaters with an input rating of 12kW (40,950 Btu/h) or less that are designed to heat water to temperatures of 180°F or greater shall comply with the requirements for electric water heaters that have an input rating greater than 12 kW.
- e. A tabletop water heater is a water heater that is enclosed in a rectangular cabinet with a flat top surface not more than three feet (0.91 m) in height.
- f. A grid-enabled water heater is an electric resistance water heater that meets all of the following:
 1. Has a rated storage tank volume of more than 75 gallons.
 2. Is manufactured on or after April 16, 2015.
 3. Is equipped at the point of manufacture with an activation lock.
 4. Bears a permanent label applied by the manufacturer that complies with all of the following:
 - 4.1 Is made of material not adversely affected by water.
 - 4.2 Is attached by means of non-water soluble adhesive.
 - 4.3 Advises purchasers and end-users of the intended and appropriate use of the product with the following notice printed in 16.5 point Arial Narrow Bold font: "IMPORTANT INFORMATION: This water heater is intended only for use as a part of an electric thermal storage or demand response program. It will not provide adequate hot water unless enrolled in such a program and activated by your utility company or another program operator. Confirm the availability of a program in your local area before purchasing or installing this product."
- g. %/h is the energy consumed to replace the heat lost from the tank while on standby, expressed as a percentage of the total energy in the stored water per hour.
- h. In accordance with Section C404.6.1

A new section, Section C404.2.3 is added as shall read as follows:

C404.2.3 Group R-1 and R-2 occupancies with central service water heating systems. In buildings with central service water heating systems serving four or more Group R-1 or R-2 dwelling or sleeping units, the primary water heating equipment shall not use fossil fuel combustion or electric resistance. Service hot water shall be provided by an air-source heat pump water heating (HPWH) system meeting the requirements of this section. Supplemental service water heating equipment is permitted to use electric resistance in compliance with Section C404.2.3.4.

Exceptions.

1. Permits applied for prior to January 1, 2022.
2. Solar thermal, wastewater heat recovery, other approved waste heat recovery, ground source heat pump, watersource heat pump system utilizing waste heat, and combinations thereof, are permitted to offset all or any portion of the required HPWH capacity where such systems comply with this code and the Uniform Plumbing Code.
3. Systems meeting the requirements of the Northwest Energy Efficiency Alliance (NEEA) Advanced Water Heater Specifications for central service water heating systems.

City Informative Note: As of the publication of this code, publication of the NEEA AWHs for central service water heating systems is still pending. See <https://neea.org/resources/advanced-water-heating-specification> for updated information.

A new section, Section C404.2.3.1 is added and shall read as follows:

C404.2.3.1 Primary heat pump system sizing. The system shall include a primary service minimum output at 40°F outdoor air temperature that provides sufficient hot water for R-1 and/or R-2 occupancy uses as calculated using the equipment manufacturer's selection criteria or another *approved* methodology. Air source heat pumps shall be sized to deliver no less than 50 percent of the calculated demand for hot water production during the peak demand period when entering air temperature is 24°F.

Exception. 50 percent sizing at 24°F is not required for heat pumps located in a below-grade enclosed parking structure or other ventilated and unconditioned space that is not anticipated to fall below 40°F at any time.

<u>City Informative Note:</u> Estimates of the appropriate heat pump system sizing and hot water storage volume for HPWH systems, calculated per bedroom or per occupant, vary widely, depending on type of use, output capacity of the heat pumps, and other factors.

A new section, Section C404.2.3.2 is added and shall read as follows:

C404.2.3.2 Primary hot water storage sizing. The system shall provide sufficient hot water, as calculated using a *approved* methodology, to satisfy peak demand period requirements.

A new section, Section C404.2.3.3 and C404.2.3.3.1 is added and shall read as follows:

C404.2.3.3. System Design. The service water heating system shall be configured to conform to one of the following provisions.

1. For *single-pass* HPWHs, *temperature maintenance* heating provided for reheating return water from the building's heated water circulation system shall be physically decoupled from the primary service water heating system storage tank(s) in a manner that prevents destratification of the primary system storage tanks. *Temperature maintenance* heating is permitted to be provided by electric resistance or a separate dedicated heat pump system.
2. For *multi-pass* HPWHs, recirculated *temperature maintenance* water is permitted to be returned to the primary water storage tanks for reheating.

C404.2.3.3.1 Mixing valve. A thermostatic mixing valve capable of supplying hot water to the building at the user temperature set point shall be provided, in compliance with requirements of the Uniform Plumbing Code and the HPWH manufacturer's installation guidelines. The mixing valve shall be sized and rated to deliver tempered water in a range from the minimum flow of the *temperature maintenance* recirculation system up to the maximum demand for the fixtures served.

A new section, Section C404.2.3.4 is added and shall read as follows:

C404.2.3.4. Supplemental Water Heaters. Total supplemental electric resistance water heating equipment shall not have an output capacity greater than the primary water heating equipment at 40°F entering air temperature. Supplemental electric resistance heating is permitted for the following uses:

1. Temperature maintenance of heated-water circulation systems, physically separate from the primary service water heating system. Temperature maintenance heating capacity shall be no greater than the primary water heating capacity at 40°F.
2. Defrost of compressor coils.
3. Heat tracing of piping for freeze protection or for temperature maintenance in lieu of recirculation of hot water.
4. Backup or low ambient temperature conditions, where all of the following are true:
 - a. The supplemental heating capacity is no greater than the primary service water heating capacity at 40°F.
 - b. During normal operations the supplemental heating is controlled to operate only when the entering air temperature at the air-source HPWH is below 40°F, and the primary HPWH compressor continues to operate together with the supplemental heating when the entering air temperature is between 17°F and 40°F.
 - c. The primary water heating equipment cannot satisfy the system load due to equipment failure or entering air temperature below 40°F.
5. Supplemental heating downstream from a multi-pass HPWH system.
6. Stand-alone electric water heaters serving single zones not served by the central water heating system.

A new section, Section C404.2.3.5 is added and shall read as follows:

C404.2.3.5 Alarms. The control system shall be capable of and configured to send automatic error alarms to building or maintenance personnel upon detection of equipment faults, low leaving water temperature from primary storage tanks, or low hot water supply delivery temperature to building distribution system.

Table C404.3.1 is amended to read as follows:

**TABLE C404.3.1
 PIPING VOLUME AND MAXIMUM PIPING LENGTHS**

NOMINAL PIPE SIZE (inches)	VOLUME (liquid ounces per foot length)	MAXIMUM PIPING LENGTH (feet)	
		Public lavatory faucets	Other fixtures and appliances
¼	0.33	6	50
5/16	0.5	4	50
3/8	0.75	3	50
½	1.5	2 8	43
5/8	2	4 8	32
¾	3	0.5	21
7/8	4	0.5	16
1	5	0.5	13

11/4	8	0.5	8
11/2	11	0.5	6
2 or larger	18	0.5	4

Section C404.4 is amended to read as follows:

C404.4 Heat traps for hot water storage tanks. Storage tank-type water heaters and hot water storage tanks that have vertical water pipes connecting to the inlet and outlet of the tank shall be provided with integral heat traps such vertical at those inlets and outlets or shall have pipe-configured heat traps in the piping connected to those inlets and outlets. Tank inlets and outlets associated with solar water heating system circulation loops shall not be required to have heat traps.

A new Section, Section C404.6.1 is added and shall read as follows:

C404.6.1 Storage tank insulation. Unfired storage tanks used to store service hot water at temperatures above 130°F shall be wrapped with an insulating product, installed in accordance with the insulation manufacturer's instructions and providing a minimum of R-2 additional insulation for every 10°F increase in stored water temperature above 130°F. Such additional insulation is also permitted to be integral to the tank. The insulation is permitted to be discontinuous at structural supports.

Section C404.7.1 shall be amended to read as follows:

C404.7.1 Circulation systems. Heated-water circulation systems shall be provided with a circulation pump. The system return pipe shall be a dedicated return pipe. Gravity and thermo-syphon circulation systems shall be prohibited. Controls shall start the pump based on the identification of a demand for hot water within the occupancy, according to the requirements of Sections C404.7.1.1 and C404.7.1.2.

C404.7.1.1 Single riser systems. Where the circulation system serves only a single domestic hot water riser or zone, the following controls shall be provided:

1. Control to automatically turn off the pump when the water in the circulation loop is at the supply temperature and shall not turn the pump back on until the temperature is a minimum of 10°F lower than the supply temperature or have controls equipped with *automatic* time switches or other controls that can be set to switch off the pump during unoccupied hours when hot water is not required.
2. Control shall be equipped with manual switch or other controls that can be used to turn off the pump during extended periods when hot water is not required.

C404.7.1.2 Multiple riser systems. Where the circulation system serves multiple domestic hot water risers or piping zones, controls shall be provided such that they can be set to switch off the pump during extended periods when hot water is not required. System shall include means for balancing the flow rate through each individual hot water supply riser or piping zone. For heated water circulation systems that have multiple risers and use a variable flow circulation pump, each riser shall have a self-actuating thermostatic balancing valve.

C404.7.1.3 Electronic thermostatic mixing valve (TMV). Where a heated water circulation system utilizes an electronic TMV to control the temperature of hot water supplied to the building, the TMV shall be configured so that it either reverts closed (fully COLD) or maintains its current valve position upon power failure or cessation of circulation flow.

A new section C404.7.3.1 is added and shall read as follows:

C404.7.3.1 Pipe insulation. For heated water circulation systems, both supply and return pipe insulation shall be at minimum 1.0 inch thicker than that required by Table C403.10.3.

Exception. Where piping is centered within a wall, ceiling, or floor framing cavity with a depth at least 4" greater than the diameter of the pipe and that is completely filled with batt or blown-in insulation, additional pipe insulation is not required.

Section C404.8 is added to read as follows:

C404.8 Demand recirculation controls. ~~Demand recirculation water systems are not permitted.~~ shall have controls that comply with both of the following:

- ~~1. The controls shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture or sensing the flow of hot or tempered water to a fixture fitting or appliance.~~
- ~~2. The controls shall limit the temperature of the water entering the cold water piping to not greater than 104°F (40°C)~~

Section C404.11.1 is amended to read as follows:

C404.11.1 Heaters. Pool water heaters using electric resistance heating as the primary source of heat are prohibited for pools over 2,000 gallons. Heat pump pool heaters shall have a minimum COP of 4.0 at 50°F db, 44.2°F wb outdoor air and 80°F entering water, determined in accordance with ASHRAE Standard 146 AHRI Standard 1160, Performance Rating of Heat Pump Pool Heaters. Other pool heating equipment shall comply with the applicable efficiencies in Section C404.2.

The electric power to all heaters shall be controlled by an on-off switch that is an integral part of the heater, mounted on the exterior of the heater, or external to and within 3 feet of the heater in a location with ready access. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas fired heaters shall not be equipped with constant burning pilot lights.

**SECTION C405
ELECTRICAL POWER AND LIGHTING SYSTEMS**

Section C405.1 is amended to read as follows:

C405.1 General. This section covers lighting system controls, the maximum lighting power for interior and exterior applications, electrical energy consumption, vertical and horizontal transportation systems, and minimum efficiencies for motors and transformers. Receptacles shall be controlled according to Section C405.10. Controlled receptacles and lighting systems shall be commissioned according to Section C405.12. Solar readiness shall be provided according to Section C411 and renewable energy shall be provided according to Section C412.

Dwelling units within multi-family buildings shall comply with Sections C405.1.1 and C405.7. All other dwelling units in dormitory, hotel and other residential occupancies that are not classified as multi-family residential occupancies shall comply with Section C405.2.5 and Section C405.1.1 or Section C405.4. *Sleeping units* shall comply with Section C405.2.5 and Section C405.1.1 or Section C405.4.

Lighting installed in *walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers* shall comply with the lighting requirements of Section C410.2.

Transformers, uninterruptable power supplies, motors and electrical power processing equipment in *data center* systems shall comply with Section 8 of ASHRAE Standard 90.4 in addition to this code.

Section C405.2 is amended to read as follows:

C405.2 Lighting controls. Lighting systems shall be provided with controls that comply with ~~one~~ Item 1 or Item 2 of the following:

1. Lighting controls as specified in Sections C405.2.1 through C405.2.7. In addition, any contiguous open office area larger than 5,000 square feet shall have its general lighting controlled by either:
 - 1.1. An enhanced digital lighting control system conforming to the requirements of Section C406.4;
 - or
 - 1.2. Luminaire-level lighting controls (LLLC) conforming to the requirements in Item 2 of this subsection.
2. Luminaire level lighting controls (LLLC) for all areas and lighting controls as specified in Sections C405.2.1, C405.2.3 and C405.2.5. The LLLC luminaires shall be independently configured to:
 - 2.1 Monitor occupant activity to brighten or dim lighting when occupied or unoccupied, respectively.
 - 2.2 Monitor ambient light, both electric and daylight, and brighten or dim artificial light to maintain desired light level. A maximum of 8 fixtures are permitted to be controlled together to maintain uniform light levels within a single daylight zone.
 - 2.3 For each control strategy, be capable of configuration and re-configuration of performance parameters including: bright and dim set points, timeouts, dimming fade rates, sensor sensitivity adjustments, and wireless zoning configuration.

Exception to Section C405.2: Except for specific application controls required by Section C405.2.5, lighting controls are not required for the following:

1. Areas designated as security or emergency areas that are required to be continuously lighted.
2. Means of egress illumination serving the exit access that does not exceed ~~0.02~~ 0.01 watts per square foot of building area is exempt from this requirement.
3. Emergency egress lighting that is normally off.
4. Industrial or manufacturing process areas, as may be required for production and safety.

Section 405.2.1.3 is amended to read as follows:

C405.2.1.3 Occupant sensor control function in open plan office areas. Occupant sensor controls in open plan office spaces less than 300 square feet (28 m²) in area shall comply with Section C405.2.1.1. Occupant sensor controls in all other open plan office spaces shall be configured to comply with all of the following:

1. General lighting is controlled separately in control zones with floor areas not greater than 600 square feet (55 m²) within the open plan office space.

2. Automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the open plan office space.
3. General lighting power in each control zone is reduced by not less than 80 percent of the full zone general lighting power within 20 minutes of all occupants leaving that control zone. Control functions that switch control zone lights completely off when the zone is unoccupied meet this requirement.
4. Daylight responsive controls activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected.
5. Lighting controls in open plan office areas larger than 5,000 square feet must also comply with Section C405.2(1).

Section C405.2.2.1 is amended to read as follows:

C405.2.2.1 Time switch control function. Time switch controls shall comply with the following:

1. Have a minimum 7 day clock.
2. Be capable of being set for 7 different day types per week.
3. Incorporate an *automatic* holiday "shut-off" feature, which turns off all controlled loads for at least 24 hours and then resumes normally scheduled operations.
4. Have program back-up capabilities, which prevent the loss of program and time settings for at least 10 hours, if power is interrupted.
5. Include an override switching device that complies with the following:
 - 5.1 The override switch shall be a manual control.
 - 5.2 The override switch, when initiated, shall permit the controlled lighting to remain on for not more than 2 hours.
 - 5.3 Any individual override switch shall control the lighting for an area not larger than ~~5,000~~ 2,500 square feet (~~465 232~~ m²).
6. Time switch controls are allowed to automatically turn on lighting to full power in corridors, lobbies, restrooms, storage rooms less than 50 square feet, and medical areas of healthcare facilities. In all other spaces, time switch controls are allowed to automatically turn on the lighting to not more than 50 percent power.

Exception: Within mall concourses, auditoriums, sales areas, manufacturing facilities, pools, gymnasiums, skating rinks and sports arenas:

- 1.1. The time limit shall be permitted to be greater than 2 hours provided the switch is a captive key device.
- 1.2. The area controlled by the override switch shall not be limited to 5,000 square feet (465 m²) provided that such area is less than 20,000 square feet (1860 m²).

Section C405.2.3 is amended to read as follows:

C405.2.3 Manual controls. Stairwells and parking garages are not permitted to use manual switches. All other lighting shall have manual controls complying with the following:

1. They shall be in a location with *ready access* to occupants.
2. They shall be located where the controlled lights are visible, or shall identify the area served by the lights and indicate their status.
3. Each control device shall control an area no larger than a single room or 2,500 square feet, whichever is less, if the room area is less than or equal to 10,000 square feet; or one-quarter

of the room or 10,000 square feet, whichever is less, if the room area is greater than 10,000 square feet.

Exceptions:

1. A manual control may be installed in a remote location for the purpose of safety or security provided each remote control device has an indicator pilot light as part of or next to the control device and the light is clearly labeled to identify the controlled lighting.
2. Restrooms.

Section C405.2.3.1 is amended to read as follows:

C405.2.3.1 Light reduction controls. Manual controls shall be configured to provide light reduction control that allows the occupant to reduce the connected lighting load between 30 and 70 percent. Lighting reduction shall be achieved by one of the following *approved* methods:

1. Controlling all lamps or luminaires.
2. Dual switching of alternate rows of luminaires, alternate luminaires or alternate lamps.
3. Switching the middle in three-lamp lamp luminaires independently of the outer lamps.
4. Switching each luminaire or each lamp.

Exceptions:

1. Light reduction controls are not required in daylight zones with *daylight responsive controls* complying with Section C405.2.4.
2. Where provided with manual control, the following areas are not required to have light reduction control:
 - 2.1. Spaces that have only one luminaire with a rated power of less than 100 watts.
 - 2.2. Spaces that use less than 0.6 watts per square foot (6.5 W/m²).
 - 2.3. Lighting in corridors, lobbies, electrical rooms, restrooms, storage rooms, airport concourse baggage areas, dwelling and sleeping rooms and mechanical rooms.

Section C405.2.4 is amended to read as follows:

C405.2.4 Daylight responsive controls. *Daylight responsive controls* complying with Section C405.2.4.1 shall be provided to control the lighting within *daylight zones* in the following spaces:

1. Sidelit zones as defined in Section C405.2.4.2 with more than two general lighting fixtures within the combined primary and secondary sidelit zones.
2. Toplit zones as defined in Section C405.2.4.3 with more than two general lighting fixtures within the *daylight zone*.

Exception: *Daylight responsive controls* are not required for the following:

1. Spaces in health care facilities where patient care is directly provided.
2. Lighting that is required to have specific application control in accordance with Section C405.2.5.
3. Sidelit zones on the first floor above grade in Group A-2 and Group M occupancies where the fenestration adjoins a sidewalk or other outdoor pedestrian area, provided that the light fixtures are controlled separately from the general area lighting.
4. *Daylight zones* where the total proposed lighting power density is less than 35 percent of the lighting power allowance per Section C405.4.2.

Section C405.2.4.1 is amended to read as follows:

C405.2.4.1 Daylight responsive controls function. Where required, *daylight responsive controls* shall be provided within each space for control of lights in that space and shall comply with all of the following:

1. Lights in primary sidelit zones shall be controlled independently of lights in secondary sidelit zones in accordance with Section C405.2.4.2.
Exception: Spaces enclosed by walls or ceiling height partitions with no more than three general lighting fixtures may have combined daylight zone control of primary and secondary *daylight zones* provided *uniform illumination* can be achieved.
2. Lights in toplit zones in accordance with Section C405.2.4.3 shall be controlled independently of lights in sidelit zones in accordance with Section C405.2.4.2.
3. *Daylight responsive controls* within each space shall be configured so that they can be calibrated from within that space by authorized personnel.
4. Calibration mechanisms shall be in a location with *ready access*.
5. *Daylight responsive controls* shall be configured to completely shut off all controlled lights in that zone.
6. Lights in sidelit zones in accordance with Section C405.2.4.2 facing different cardinal orientations (i.e., within 45 degrees of due north, east, south, west) shall be controlled independently of each other.

Exception: Up to two light fixtures in each space are permitted to be controlled together with lighting in a *daylight zone* facing a different cardinal orientation.

7. Incorporate time-delay circuits to prevent cycling of light level changes of less than three minutes.
8. The maximum area a single *daylight responsive control* device serves shall not exceed 2,500 square feet (232 m²) and no more than 60 lineal feet (18.3 m) of facade.
9. Occupant override capability of daylight dimming controls is not permitted, other than a reduction of light output from the level established by the daylighting controls.
10. *Daylight responsive controls* shall be set initially to activate at 30 footcandles (323 lux) or not more than 110 percent of the illuminance level specified on the construction documents.

Section C405.2.5 is amended to read as follows:

C405.2.5 Additional lighting controls. Specific application lighting shall be provided with controls, in addition to controls required by other sections, for the following:

1. The following lighting shall be controlled by an occupant sensor complying with Section C405.2.1.1 or a time-switch control complying with Section C405.2.2.1 In addition, a manual control shall be provided to control such lighting separately from the general lighting in the space:
 - 1.1. Display and accent.
 - 1.2. Lighting in display cases.
 - 1.3. Supplemental task lighting, including permanently installed under-shelf or under-cabinet lighting.
 - 1.4. Lighting equipment that is for sale or demonstration in lighting education.
2. *Sleeping units* shall have control devices or systems configured to automatically switch off all permanently installed luminaires and switched receptacles, including those installed within

furniture, within 20 minutes after all occupants have left the unit.

Exceptions:

1. Lighting and switched receptacles controlled by card key controls.
2. Spaces where patient care is directly provided.
3. Permanently installed luminaires within *dwelling units* shall be provided with controls complying with either Section C405.2.1.1 or C405.2.3.1.
4. Lighting for nonvisual applications, such as plant growth and food warming, shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space. ~~Each control zone shall be no greater than the area served by a single luminaire or 4,000 square feet, whichever is larger.~~
5. Luminaires serving the exit access and providing means of egress illumination required by Section 1006.1 of the *International Building Code*, including luminaires that function as both normal and emergency means of egress illumination shall be controlled by a combination of listed emergency relay and occupancy sensors, or signal from another building control system, that automatically shuts off the lighting when the areas served by that illumination are unoccupied.

Exception: Means of egress illumination serving the exit access that does not exceed ~~0.02~~ 0.01 watts per square foot of building area is exempt from this requirement.

Section C405.2.6.2 is amended to read as follows:

C405.2.6.2 Facade and landscape lighting shutoff. Building façade and landscape lighting shall be configured to automatically shut off ~~for a minimum of 6 hours per night or from not later than one hour after business closing to not earlier than one hour before business opening, whichever is less~~ between midnight or business/facility closing, whichever is later, and 6 a.m. or business/facility opening, whichever is earlier.

Exception: Areas where an *automatic* shutoff would endanger safety or security.

Section C405.4.1 is amended to read as follows:

C405.4.1 Total connected interior lighting power. The total connected interior lighting power shall be determined in accordance with Equation 4-10.

As an option, in areas of the building where all interior lighting equipment is fed from dedicated lighting branch circuits, the total connected interior lighting power is permitted to be calculated as the sum of the capacities of the lighting branch circuits serving those areas. For the purposes of this section, the connected interior lighting power of a 20-ampere circuit is considered to be 16 amperes, and that of a 15-ampere circuit is 12 amperes. Use of this alternative and the boundaries of the applicable areas shall be clearly documented on the electrical construction documents.

(Equation 4-10)

$$TCLP = [LVL + BLL + TRK + POE + Other]$$

Where:

$$TCLP = \text{Total connected lighting power (watts)}$$

- LVL* = For luminaires with lamps connected directly to building power, such as line voltage lamps, the rated wattage of the lamp, which must be minimum 60 lumen/watt.
- BLL* = For luminaires incorporating a ballast or transformer, the rated input wattage of the ballast or transformer when operating the lamp.
- TRK* = For lighting track, cable conductor, rail conductor and plug-in busway systems that allow the addition and relocation of luminaires without rewiring, the wattage shall be one of the following:
1. The specified wattage of the luminaires, but not less than 16 W/lin. ft. (52 W/lin. m).
 2. The wattage limit of the permanent current-limiting devices protecting the system.
 3. The wattage limit of the transformer supplying the system.
- POE* = For other modular lighting systems served with power supplied by a driver, power supply or transformer, including but not limited to low-voltage lighting systems, the wattage of the system shall be the maximum rated input wattage of the driver, power supply or transformer published in the manufacturer's catalogs, as specified by UL 2108 or 8750. For power-over-Ethernet lighting systems, power provided to installed non-lighting devices may be subtracted from the total power rating of the power-over-Ethernet system.
- Other = The wattage of all other luminaires and lighting, sources not covered above and associated with interior lighting verified by data supplied by the manufacturer or other *approved* sources.

The connected power associated with the following lighting equipment and applications is not included in calculating total connected lighting power

1. Television broadcast lighting for playing areas in sports arenas
2. Emergency lighting automatically off during normal building operation.
3. Lighting in spaces specifically designed for use by occupants with special lighting needs including those with visual impairment and other medical and age-related issues.
4. Casino gaming areas.
5. General area lighting power in industrial and manufacturing occupancies dedicated to the inspection or quality control of goods and products.
6. Mirror lighting in dressing rooms.
7. Task lighting for medical and dental purposes that is in addition to general lighting and controlled by an independent control device.
8. Display lighting for exhibits in galleries, museums and monuments that is in addition to general lighting and controlled by an independent control device.
9. Lighting for theatrical purposes, including performance, stage, film production and video production.

10. Lighting for photographic processes.
11. Lighting integral to equipment or instrumentation and installed by the manufacturer.
12. ~~((Task lighting))~~ Lighting for plant growth or maintenance where the lamp ~~((efficacy is not less than 90 lumens per watt))~~ has a tested photosynthetic photon efficacy (PPE) per watt of not less than 1.70 micromoles per joule for greenhouses and 1.90 micromoles per joule for indoor plant growth spaces.
13. Advertising signage or directional signage.
14. Lighting for food warming.
15. Lighting equipment that is for sale.
16. Lighting demonstration equipment in lighting education facilities.
17. Lighting *approved* because of safety considerations.
18. Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions.
19. Furniture mounted supplemental task lighting that is controlled by *automatic* shutoff.
20. Exit signs.
21. Lighting used for aircraft painting.
22. Germicidal lighting that is in addition to and controlled independently from the general lighting.

The connected power associated with the following lighting equipment and applications is not included in calculating total connected lighting power

1. Television broadcast lighting for playing areas in sports arenas
2. Emergency lighting automatically off during normal building operation.
3. Lighting in spaces specifically designed for use by occupants with special lighting needs including those with visual impairment and other medical and age-related issues.
4. Casino gaming areas.
5. General area lighting power in industrial and manufacturing occupancies dedicated to the inspection or quality control of goods and products.
6. Mirror lighting in dressing rooms.
7. Task lighting for medical and dental purposes that is in addition to general lighting and controlled by an independent control device.
8. Display lighting for exhibits in galleries, museums and monuments that is in addition to general lighting and controlled by an independent control device.
9. Lighting for theatrical purposes, including performance, stage, film production and video production.
10. Lighting for photographic processes.
11. Lighting integral to equipment or instrumentation and installed by the manufacturer.
12. ~~Task lighting~~ for plant growth or maintenance where the lamp ~~efficacy is not less than 90 lumens per watt~~ has a tested photosynthetic photon efficacy (PPE) per watt of not less than 1.70 micromoles per joule for greenhouses and 1.90 micromoles per joule for indoor plant growth spaces.
13. Advertising signage or directional signage.
14. Lighting for food warming.
15. Lighting equipment that is for sale.
16. Lighting demonstration equipment in lighting education facilities.
17. Lighting approved because of safety considerations

18. Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions.
19. Furniture mounted supplemental task lighting that is controlled by automatic shutoff.
20. Exit signs.
21. Lighting used for aircraft painting.
22. Germicidal lighting that is in addition to and controlled independently from the general lighting.

Section C405.4.2.2 is amended to read as follows:

C405.4.2.2 Space-by-space method. For the Space-by-Space Method, the interior lighting power allowance is determined by multiplying the floor area of each space times the value for the space type in Table C405.4.2(2) that most closely represents the proposed use of the space, and then summing the lighting power allowances for all spaces. Tradeoffs among spaces other than covered parking areas are permitted.

Each area enclosed by partitions that are 80 percent of the ceiling height or taller shall be considered a separate space and assigned the appropriate space type from Table C405.4.2(2). If a space has multiple functions where more than one space type is applicable, that space shall be broken up into smaller subspaces, each using their own space type. Any of these subspaces that are smaller in floor area than 20 percent of the enclosed space and less than 1,000 square feet need not be broken out separately.

Table C405.4.2(1) is amended to read as follows:

**TABLE C405.4.2(1)
 INTERIOR LIGHTING POWER ALLOWANCES: BUILDING AREA METHOD**

Building Area Type	LPD (w/ft ²)	<u>LPD (w/ft²)</u>
Automotive facility	0.64	<u>0.58</u>
Convention center	0.64	<u>0.58</u>
Court house	0.79	<u>0.71</u>
Dining: Bar lounge/leisure	0.79	<u>0.71</u>
Dining: Cafeteria/fast food	0.72	<u>0.65</u>
Dining: Family	0.71	<u>0.64</u>
Dormitory ^{a,b}	0.46	<u>0.41</u>
Exercise center	0.67	<u>0.60</u>
Fire station ^a	0.54	<u>0.49</u>
Gymnasium	0.75	<u>0.68</u>
Health care clinic	0.70	<u>0.63</u>

Building Area Type	LPD (w/ft²)	<u>LPD (w/ft²)</u>
Hospital ^a	0.84	0.84
Hotel/motel ^{a,b}	0.56	<u>0.50</u>
Library	0.83	<u>0.75</u>
Manufacturing facility	0.82	<u>0.74</u>
Motion picture theater	0.44	<u>0.40</u>
Multifamily ^c	0.41	<u>0.37</u>
Museum	0.55	<u>0.50</u>
Office	0.64	<u>0.58</u>
Parking garage	0.14	<u>0.13</u>
Penitentiary	0.65	0.65
Performing arts theater	0.84	<u>0.76</u>
Police station	0.66	<u>0.60</u>
Post office	0.65	<u>0.59</u>
Religious building	0.67	<u>0.60</u>
Retail	0.84	<u>0.76</u>
School/university	0.70	<u>0.63</u>
Sports arena	0.62	<u>0.54</u>
Town hall	0.69	<u>0.62</u>
Transportation	0.50	<u>0.45</u>
Warehouse	0.40	<u>0.36</u>
Workshop	0.91	<u>0.82</u>

- a. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, neither the area of the sleeping units nor the wattage of lighting in the sleeping units is counted.
- b. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.
- c. Dwelling units are excluded. Neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

Table C405.4.2(2) is amended to read as follows:

**TABLE C405.4.2(2)
 INTERIOR LIGHTING POWER ALLOWANCES: SPACE-BY-SPACE METHOD**

Common Space-by-Space Types^a	LPD-w/ft²	<u>LPD (w/ft²)</u>
Atrium - Less than 20 feet in height	0.39	<u>0.35</u>

Atrium - 20 to 40 feet in height	0.48	0.43
Atrium - Above 40 feet in height	0.60	0.54
Audience/seating area - Permanent		
In an auditorium	0.64	0.55
In a gymnasium	0.23	0.21
In a motion picture theater	0.27	0.24
In a penitentiary	0.67	0.67
In a performing arts theater	1.16	1.04
In a religious building	0.72	0.65
In a sports arena	0.33	0.30
Otherwise	0.23	0.21
Banking activity area	0.64	0.55
Breakroom (see lounge/breakroom)		
Classroom/lecture hall/training room		
In a penitentiary	0.89	0.89
Otherwise ^m	0.74	0.64
Computer room, data center	0.94	0.85
Conference/meeting/multipurpose	0.97	0.87
Confinement cell	0.70	0.63
Copy/print room	0.34	0.28
Corridor		
In a facility for the visually impaired (and not used primarily by the staff) ^b	0.74	0.71
In a hospital	0.74	0.71
In a manufacturing facility	0.44	0.37
Otherwise ^{c,q}	0.44	0.37
Courtroom ^c	1.20	1.08
Dining area		
In a penitentiary	0.42	0.42
In a facility for the visually impaired (and not used primarily by the staff) ^b	1.27	1.27
In a bar/lounge or leisure dining ⁿ	0.86	0.77
In cafeteria or fast food dining	0.40	0.36
In a family dining area ⁿ	0.60	0.54
Otherwise	0.43	0.39
Electrical/mechanical	0.43	0.39
Emergency vehicle garage	0.52	0.47
Food preparation	1.09	0.98
Guest room ^{a,b}	0.44	0.37
Laboratory		
In or as a classroom	1.14	1.00
Otherwise	1.33	1.20
Laundry/washing area	0.53	0.48
Loading dock, interior	0.88	0.79
Lobby ^c		
In a facility for the visually impaired (and not used primarily by the staff) ^b	1.69	1.69
For an elevator	0.65	0.59
In a hotel	0.54	0.46
In a motion picture theater	0.23	0.21
In a performing arts theater	1.25	1.13
Otherwise	0.84	0.76
Locker room	0.52	0.47
Lounge/breakroom ⁿ		
In a health care facility	0.42	0.42
Otherwise	0.59	0.53
Office		
Enclosed ≤ 250	0.74	0.67
Enclosed > 250	0.66	0.59
Open plan	0.64	0.55
Parking area, interior	0.15	0.14
Pharmacy area	1.66	1.66
Restroom		
In a facility for the visually impaired (and not used primarily by the staff) ^b	1.26	1.26
Otherwise ⁿ	0.63	0.57
Sales area	1.05	0.95
Seating area, general	0.23	0.21

((Stairway (see space containing stairway)))		
Stairwell ⁿ	0.49	0.44
Storage room		
< 50 ft2	0.51	0.46
50-100 ft2	0.38	0.34
All other storage	0.38	0.34
Vehicular maintenance	0.60	0.54
Workshop	1.26	1.13

Building Specific Space-by-Space Types ^a	LPD (w/ft2)	LPD (w/ft2)
Automotive (see vehicular maintenance)	0.60	
Convention center - Exhibit space	0.61	0.55
Dormitory living quarters ^{a,b}	0.50	0.45
Facility for the visually impaired ^b		
In a chapel (and not used primarily by the staff)	0.70	0.70
In a recreation room (and not used primarily by the staff)	1.77	1.77
Fire stations ^g		
Sleeping quarters	0.23	0.21
Gymnasium/fitness center		
In an exercise area	0.90	0.83
In a playing area	0.85	0.77
Health care facility		
In an exam/treatment room	1.40	1.40
In an imaging room	0.94	0.94
In a medical supply room	0.62	0.62
In a nursery	0.92	0.92
In a nurse's station	1.17	1.17
In an operating room	2.26	2.26
In a patient room ^g	0.68	0.68
In a physical therapy room	0.91	0.91
In a recovery room	1.25	1.25
Library ^f		
In a reading area ⁿ	0.96	0.86
In the stacks	1.10	0.99
Manufacturing facility		
In a detailed manufacturing area	0.80	0.72
In an equipment room	0.76	0.68
In an extra high bay area (greater than 50-foot floor-to-ceiling height)	1.42	1.28
In a high bay area (25 - 50-foot floor-to-ceiling height)	1.24	1.12
In a low bay (< 25-foot floor-to-ceiling height)	0.86	0.77
Museum		
In a general exhibition area	0.31	0.28
In a restoration room	1.10	0.99
Performing arts theater dressing/fitting room	0.41	0.37
Post office - Sorting area	0.76	0.69
Religious buildings		

	In a fellowship hall ⁿ	0.54	<u>0.49</u>
	In a worship/pulpit/choir area ⁿ	0.85	<u>0.77</u>
Retail facilities			
	In a dressing/fitting room	0.54	<u>0.46</u>
	In a mall concourse	0.82	<u>0.74</u>
Sports arena - Playing area			
	For a Class 1 facility ⁱ	2.94	<u>2.94</u>
	For a Class 2 facility ^j	2.01	<u>2.01</u>
	For a Class 3 facility ^k	1.30	<u>1.30</u>
	For a Class 4 facility ^l	0.86	<u>0.86</u>
Transportation			
	In a baggage/carousel area	0.39	<u>0.35</u>
	In an airport concourse	0.25	<u>0.23</u>
	At a terminal ticket counter ⁿ	0.54	<u>0.46</u>
Warehouse - Storage area			
	For medium to bulky palletized items	0.33	<u>0.30</u>
	For smaller, hand-carried items	0.69	<u>0.62</u>

Keys to Table C405.4.2(2)

For SI: 1 foot = 304.8 mm, 1 watt per square foot = 11 W/m².

Footnotes to Table C405.4.2(2)

- a. In cases where both a common space type and a building area specific space type are listed, the building area specific space type shall apply.
- b. A facility for the visually impaired is a facility that is licensed or will be licensed by local or state authorities for senior long-term care, adult daycare, senior support or people with special visual needs.
- c. For spaces in which lighting is specified to be installed in addition to, and controlled separately from, the general lighting for the purposed of highlighting art or exhibits, provided that the additional lighting power shall not exceed 0.5 W/ft² of such spaces.
- d. RESERVED.
- e. RESERVED.
- f. RESERVED.
- g. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, neither the area of the sleeping units nor the wattage of lighting in the sleeping units is counted.
- h. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.
- i. Class I facilities consist of professional facilities; and semi-professional, collegiate or club facilities with seating for 5,000 or more spectators.
- j. Class II facilities consist of collegiate and semi-professional facilities with seating for fewer than 5,000 spectators; club facilities with seating between 2,000 and 5,000 spectators; and amateur league and high school facilities with seating for more than 2,000 spectators.
- k. Class III facilities consist of club, amateur league and high school facilities with seating for 2,000 or fewer spectators.
- l. Class IV facilities consist of elementary school and recreational facilities; and amateur league and high school facilities without provisions for spectators.
- m. For classrooms, additional lighting power allowance of 4.50 W/lineal foot of white or chalk boards for directional lighting dedicated to white or chalk boards.
- n. Additional lighting power allowance of 0.30 W/square foot for ornamental lighting. Qualifying ornamental lighting includes luminaires such as chandeliers, sconces, lanterns, neon and cold cathode, light emitting diodes, theatrical projectors, moving lights and light color panels when any of those lights are used in a decorative manner that does not serve as display lighting or general lighting.
- o. For scientific laboratories, additional lighting power allowance of 0.35 Watts per square foot for specialized task work – lighting that provides for small-scale, cognitive or fast performance visual tasks: lighting required for operating specialized equipment associated with pharmaceutical/laboratorial activities.
- p. For offices, additional lighting power allowance of 0.20 W/square foot for portable lighting, which includes under shelf or furniture-mounted supplemental task lighting qualifies when controlled by a time clock or an occupancy sensor.

- g. For corridors, additional lighting power allowance of 0.25 W/square foot for display lighting and decorative lighting where provided for aesthetic purposes. Decorative lighting fixtures in corridors are also permitted to provide general lighting. This additional allowance is not permitted to be used together with the allowance in footnote c for highlighting art or exhibits.

Section C405.4.2.2.1 is amended to read as follows:

C405.4.2.2.1 Additional interior lighting power. Where using the Space-by-Space Method, an increase in the interior lighting power allowance is permitted for specific lighting functions. Additional power shall be permitted only where the specified lighting is installed and automatically controlled separately from the general lighting, to be turned off during nonbusiness hours. This additional power shall be used only for the specified luminaires and shall not be used for any other purpose. An increase in the interior lighting power allowance is permitted for lighting equipment to be installed in sales areas specifically to highlight merchandise. The additional lighting power shall be determined in accordance with Equation 4-11:

Additional interior lighting power allowance = 500 watts + (Retail Area 1 x 0.45 W/ft²) + (Retail Area 2 x 0.45 W/ft²) + (Retail Area 3 x 1.05 W/ft²) + (Retail Area 4 x 1.87 W/ft²)

Where:

(Equation 4-11)

- Retail Area 1 = The floor area for all products not listed in Retail Area 2, 3 or 4.
- Retail Area 2 = The floor area used for the sale of vehicles, sporting goods and small electronics.
- Retail Area 3 = The floor area used for the sale of furniture, clothing, cosmetics and artwork.
- Retail Area 4 = The floor area used for the sale of jewelry, crystal and china.

Exception: Other merchandise categories are permitted to be included in Retail Areas 2 through 4, provided that justification documenting the need for additional lighting power based on visual inspection, contrast, or other critical display requirement is *approved* by the *code official*.

Section C405.5.2 is amended to read as follows:

C405.5.2 Total connected exterior building lighting power. The total exterior connected lighting power shall be the total maximum rated wattage of all exterior lighting that is powered through the energy service for the building.

Exception: Lighting used for the following applications shall not be included:

1. Lighting *approved* because of safety considerations.
2. Emergency lighting automatically off during normal business operation.
3. Exit signs.
4. Specialized signal, directional and marker lighting associated with transportation.
5. Advertising signage or directional signage.
6. Integral to equipment or instrumentation and is installed by its manufacturer.
7. Theatrical purposes, including performance, stage, film production and video production.
8. Athletic playing areas.
9. Temporary lighting.
10. Industrial production, material handling, transportation sites and associated storage areas.
11. Theme elements in theme/amusement parks.
12. Lighting integrated within or used to highlight features of art, public monuments and the national flag.
13. Lighting for water features and swimming pools.
14. Lighting that is controlled from within *dwelling units*, where the lighting complies with Section R404.1.

Section C405.5.3 is amended to read as follows:

C405.5.3 Exterior lighting power allowance. The total exterior lighting power allowance is the sum of the base site allowance plus the individual allowances for areas that are to be illuminated by lighting that is powered through the energy service for the building. Covered parking garage lighting is not considered exterior lighting for the purposes of this calculation. Lighting power allowances are as specified in Table C405.5.3(2). The lighting zone for the building exterior is determined in accordance with Table C405.5.3(1) unless otherwise specified by the *code official*.

Table C405.5.3(1) is amended to read as follows:

TABLE C405.5.3(1) EXTERIOR LIGHTING ZONES

LIGHTING ZONE	DESCRIPTION
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed use areas
3	All other areas not classified as lighting zone 1, 2 or 4

4-(Not Used)	High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority
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A new Section, Section C405.5.5 is added and shall read as follows:

C405.5.5 Full cutoff luminaires. For open parking and outdoor areas and roadways, luminaires mounted more than 15 feet above the ground shall have a luminaire light distribution in which zero candela intensity occurs at an angle of 90 degrees above nadir, and all greater angles from nadir.

A new section, Section C 405.7.1 is added and shall read as follows:

C405.7.1 Electric receptacles at dwelling unit gas appliances. Where *dwelling unit* appliances are served by natural gas, an electrical receptacle and circuit shall be provided at each gas appliance with sufficient capacity to serve a future electric appliance in the same location. The receptacles and circuits shall be included in the electrical service load calculation and shall meet the requirements of items 1 through 3 below. The receptacle for each gas appliance shall be located within 12 inches of the appliance and without obstructions between the appliance and the outlet. An electric receptacle is not required for a decorative gas fireplace.

1. Each gas range, cooktop, or oven, or combination appliance, location shall be served by a dedicated 240/208-volt, 40-amp receptacle connected to the *dwelling unit* electric panel with a 3-conductor branch circuit complying with 210.19(A)(3) of the electrical code and a minimum included load of 9600 VA for 240-volt systems or 8000 VA for 208-volt systems.
2. Each gas clothes dryer location shall be served by a dedicated 240/208-volt, 30-amp receptacle connected to the *dwelling unit* electric panel with a 3-conductor branch circuit and a minimum included load of 5000 VA.
3. Each gas domestic water heater location shall be served by a dedicated 240/208 volt, 30-amp outlet connected to the *dwelling unit* electrical panel with a 3-conductor branch circuit and a minimum included load of 4500 VA.

Section C405.8 is amended to read as follows:

C405.8 Electric motor efficiency. All electric motors, fractional or otherwise, shall meet the minimum efficiency requirements of Tables C405.8(1) through C405.8(4) when tested and rated in accordance with DOE 10 CFR. The efficiency shall be verified through certification under an *approved* certification program, or, where no certification program exists, the equipment efficiency rating shall be supported by data furnished by the motor manufacturer.

Exception: The standards in this section shall not apply to the following exempt electric motors.

1. Air-over electric motors.
2. Component sets of an electric motor.
3. Liquid-cooled electric motors.
4. Submersible electric motors.
5. Inverter-only electric motors.

Fractional hp fan motors that are 1/12 hp or greater and less than 1 hp (based on output power)

which are not covered by Tables C405.8(3) and C405.8(4) shall be electronically commutated motors or shall have a minimum motor efficiency of 70 percent when rated in accordance with DOE 10 CFR 431. These motors shall also have the means to adjust motor speed for either balancing or remote control. Belt-driven fans may use sheave adjustment for airflow balancing in lieu of a varying motor speed.

Exceptions:

1. Motors that are an integral part of specialized process equipment.
2. Where the motor is integral to a listed piece of equipment for which no complying motor has been *approved*.
3. Motors used as a component of the equipment meeting the minimum efficiency requirements of Section C403.3.2 and Tables C403.3.2(1) through C403.3.2(4213), provided that the motor input is included when determining the equipment efficiency.
4. Motors in the airstream within fan coils and terminal units that operate only when providing heating to the space served.
5. Fan motors that are not covered by Tables C405.8(1) through C405.8(4) and are used to power heat recovery ventilators, energy recovery ventilators, or local exhaust fans in Group R subject to the efficacy requirements of Section C403.8.4.
6. Domestic clothes dryer booster fans, range hood exhaust fans, and domestic range booster fans that operate intermittently.
7. Radon and contaminated soil exhaust fans.
8. Group R heat recovery ventilator and energy recovery ventilator fans that are less than 400 cfm.

Section C405.9.2 is amended to read as follows:

C405.9.2 Escalators and moving walks. Escalators and moving walks shall comply with ASME A17.1/CSA B44 and shall have *automatic* controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.

Exception: A variable voltage drive system that reduces operating voltage in response to light loading conditions ~~may~~ is permitted to be provided in place ~~lieu~~ lieu of the variable speed function.

Section C405.10 is amended to read as follows:

C405.10 Controlled receptacles. At least 50 percent of all 125 volt 15- and 20-ampere receptacles installed in private offices, open offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, individual workstations and classrooms, including those installed in modular partitions and modular office workstation systems, shall be controlled as required by this section. In rooms larger than 200 square feet (19 m²), either split receptacles shall be provided, with the top receptacle(s) controlled, or a controlled receptacle shall be located within 72 12 inches (4.8 0.3 m) of each uncontrolled receptacle. Controlled receptacles shall be visibly differentiated from standard receptacles using the standard symbol required by the Electrical Code and shall be controlled by one of the following automatic control devices:

1. An occupant sensor that turns receptacle power off when no occupants have been detected

for a maximum of 20 minutes.

2. A time-of-day operated control device that turns receptacle power off at specific programmed times and can be programmed separately for each day of the week. The control device shall be configured to provide an independent schedule for each portion of the building not to exceed 5,000 square feet (465 m²) and not to exceed one full floor. The device shall be capable of being overridden for periods of up to two hours by a timer in a location with access to occupants. Any individual override switch shall control the *controlled receptacles* for a maximum area of 5,000 square feet (465 m²). Override switches for *controlled receptacles* are permitted to control the lighting within the same area.

Exceptions:

1. Receptacles designated for specific equipment requiring 24-hour operation, for building maintenance functions, or for specific safety or security equipment are not required to be controlled by an *automatic* control device and are not required to be located within ~~72~~ 12 inches of a controlled receptacle.
2. Within a single modular office workstation, non-controlled receptacles are permitted to be located more than 12 inches, but not more than 72 inches, from the controlled receptacles serving that workstation.

City Informative Note: The requirements of this section also apply to rooms and spaces that have substantially similar functions to those listed even when they are labeled with different names. For example, an area designed for office functions that is labeled “work room,” or a room used as a classroom that is labeled “student learning” would each be required to provide controlled receptacles.

**SECTION C406
EFFICIENCY PACKAGES**

Section C406.1 is amended to read as follows:

C406.1 Additional energy efficiency credit requirements. New buildings and changes in space conditioning, *change of occupancy* and building *additions* in accordance with Chapter 5 shall comply with sufficient packages from Table C406.1 so as to achieve a minimum number of ~~six~~ eight credits. Each area shall be permitted to apply for different packages provided all areas in the building comply with the requirement for ~~six~~ eight credits. Areas included in the same permit within mixed use buildings shall be permitted to demonstrate compliance by an area weighted average number of credits by building occupancy achieving a minimum number of ~~six~~ eight credits.

Exceptions:

1. Low energy spaces in accordance with Section C402.1.1.1 and equipment buildings in accordance with Section C402.1.2 shall comply with sufficient packages from Table C406.1 to achieve a minimum number of ~~three~~ four credits.
2. Building additions that have less than 1,000 square feet of *conditioned floor area* shall comply with sufficient packages from Table C406.1 to achieve a minimum number of ~~three~~ four credits.

Section C406.1.1 is amended to read as follows:

C406.1.1 Tenant spaces. Initial tenant improvement shall comply with sufficient packages from Table C406.1 to achieve a minimum number of ~~six~~ eight credits. In buildings with multiple tenant spaces, each tenant space is permitted to apply for different packages provided all areas in the building comply with the requirement for ~~six~~ eight credits.

City Informative Note: In this section “tenant space” means any conditioned area within a new building that is constructed for first occupancy under a separate permit from the shell and core permits.

Table C406.1 is amended to read as follows:

TABLE C406.1 EFFICIENCY PACKAGE CREDITS

Code Section	Commercial Building Occupancy					
	Group R-1	Group R-2	Group B	Group E	Group M	All Other
	Additional Efficiency Credits					
1. More efficient HVAC performance in accordance with Section C406.2	2.0	3.0	3.0	2.0	1.0	2.0
2. Reduced lighting power: Option 1 in accordance with Section C406.3.1	1.0	1.0	2.0	2.0	3.0	2.0
3. Reduced lighting power: Option 2 in accordance with Section C406.3.2 ^a	2.0	3.0	4.0	4.0	6.0	4.0
4. Enhanced lighting controls in accordance with Section C406.4	NA	NA	1.0	1.0	1.0	1.0
5. On-site supply of renewable energy in accordance with C406.5	3.0	3.0	3.0	3.0	3.0	3.0
5.1. 1/3 of renewable energy required by C406.5	1.0	1.0	1.0	1.0	1.0	1.0
5.2. 2/3 of renewable energy required by C406.5	2.0	2.0	2.0	2.0	2.0	2.0
6. Dedicated outdoor air system in accordance with Section C406.6 ^b	4.0	4.0 <u>2.0</u> ^d	4.0	NA	NA	4.0
7. High performance dedicated outdoor air system in accordance with Section C406.7	4.0	4.0	4.0	4.0	4.0	4.0
8. High-efficiency service water heating in accordance with Sections C406.8.1 and C406.8.2	4.0 <u>NA after 1/1/2022</u>	5.0 <u>NA after 1/1/2022</u>	NA	NA	NA	8.0
9. High performance service water heating in ((multi-family)) R-1 and R-2 buildings	<u>7.0 prior to 1/1/2022</u>	<u>8.0 prior to 1/1/2022</u>	NA	NA	NA	NA

in accordance with Section C406.9	<u>5.0 after 1/1/2022</u>	<u>5.0 after 1/1/2022</u>				
10. Enhanced envelope performance in accordance with Section C406.10 ^c	3.0	6.0	3.0	3.0	3.0	4.0
11. Reduced air infiltration in accordance with Section C406.11 ^c	1.0	2.0	1.0	1.0	1.0	1.0
12. Enhanced commercial kitchen equipment in accordance with Section C406.12	5.0	NA	NA	NA	5.0	5.0 (Group A-2 only)

- a. Projects using this option may not use Item 2.
- b. This option is not available to buildings subject to the prescriptive requirements of Section C403.3.5 or C403.6.
- c. Buildings or building areas that are exempt from thermal envelope requirements in accordance with Sections C402.1.1 and C402.1.2 do not qualify for this package.
- d. 4.0 credits, instead of 2.0 credits, are permitted to be applied to areas of R-2 occupancy buildings other than dwelling units, including corridors, lobbies and tenant amenity spaces, where those areas comply with the requirements for this credit.

Section C406.2 is amended to read as follows:

C406.2 More efficient HVAC equipment and fan performance. No less than 90 percent of the total HVAC capacity serving the total *conditioned floor area* of the entire building, building addition, building area, occupancy type, or tenant space in accordance with Section C406.1.1, shall comply with Sections C406.2.1 through C406.2.3. For In addition, systems required to comply with Section C403.1.1, HVAC total system performance ratio, shall exceed the minimum requirement HVAC TSPR of the standard reference design by 10 percent. This credit shall not be utilized for low energy or semi-heated space conditioning categories.

~~**Exception:** In low energy spaces complying with Section C402.1.1 and semi-heated spaces complying with Section C402.1.1.2, no less than 90 percent of the installed heating capacity is provided by electric infrared or gas-fired radiant heating equipment for localized heating applications. Stand-alone supply, return and exhaust fans shall comply with Section C406.2.3.~~

Section C406.2.1 is amended to read as follows:

C406.2.1 HVAC system selection. Equipment installed shall be types that are listed in Tables C403.3.2(1) through C403.3.2(12) or a combination thereof. Electric resistance heating does not meet this requirement. No HVAC systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

~~**Exception:** Allowed equipment not listed in Tables C403.3.2(1) through C403.3.2(12):~~

- ~~1. Air-to-water heat pumps.~~
- ~~2. Heat recovery chillers.~~

Section C406.2.2 is amended to read as follows:

C406.2.2 Minimum equipment efficiency. Equipment shall exceed the minimum efficiency requirements listed in Tables C403.3.2(1) through C403.3.2(~~4213~~) by 15 percent, in addition to the requirements of Section C403. Where multiple performance requirements are provided, the equipment shall exceed all requirements by 15 percent.

Exceptions:

1. Equipment that is larger than the maximum capacity range indicated in Tables C403.3.2(1) through C403.3.2(~~4213~~) shall utilize the values listed for the largest capacity equipment for the associated equipment type shown in the table.
2. Equipment complying with the exception to Section C406.2.1 is not required to comply with the minimum equipment efficiency requirement.
3. Compliance may be demonstrated by calculating a total weighted average percentage for all heating and cooling equipment combined. All equipment shall have efficiency that is no less than 5 percent better than the minimum required efficiency in Tables C403.3.2(1) through C403.3.2(~~4213~~), and the resulting weighted average percentage for all equipment performance requirements shall exceed 15 percent. Calculation shall include heating and cooling capacities for all equipment, percentage better or worse than minimum required efficiency per Tables C403.3.2(1) through C403.3.2(~~4213~~) for each performance requirement (SEER, EER/IEER, COP, HSPF, Et, Ec and AFUE), and the total weighted average efficiency percentage.
- ~~4. Hot water boilers with input capacity greater than 2,500,000 Btu/h shall be considered to comply with this section with a minimum thermal efficiency of 95 percent Et per the test procedure in 10 CFR Part 431.~~

Section C406.3 is amended to read as follows:

C406.3 Reduced lighting power. Interior lighting within the whole building, building area, occupancy type, building addition or tenant space shall comply with Section C406.3.1 or C406.3.2. Dwelling units and sleeping units within the building shall comply with Section C406.3.3.

Section C 406.3.3 is amended to read as follows:

C406.3.3 Lamp fraction. No less than 95 percent of the permanently installed light fixtures in dwelling units and sleeping units shall be provided by high efficacy lamps with a minimum efficacy of 65 lumens per watt. Where the conditioned floor area of residential dwelling units or sleeping units is separated from other building occupancies or building areas for the purposes of the C406 area weighted credit calculation, these dwelling or sleeping unit areas receive the credit weighting for reduced lighting power Option 1, referencing Section C406.3.1, in Table C406.1.

Section C406.4 is amended to read as follows:

C406.4 Enhanced digital lighting controls. ~~No~~ Not less than 90 percent of the total installed interior lighting power within the whole building, building addition or tenant space shall comply with Section C406.4.1. Open office areas subject to Section C405.2, item 1 are not permitted to take

credit for this option.

Section C406.4.1 is amended to read as follows:

C406.4.1 Lighting controls function. Interior lighting shall be located, scheduled and operated in accordance with Section C405.2, and shall be configured with the following enhanced control functions:

1. Luminaires shall be configured for continuous dimming.
2. Each luminaire shall be individually addressed.

Exceptions to Item 2:

1. Multiple luminaires mounted on no more than 12 linear feet of a single lighting track and addressed as a single luminaire.
2. Multiple linear luminaires that are ganged together to create the appearance of a single longer fixture and addressed as a single luminaire, where the total length of the combined luminaires is not more than 12 feet.
3. No more than eight luminaires within a *daylight zone* are permitted to be controlled by a single *daylight responsive control*.
4. Luminaires shall be controlled by a digital control system configured with the following capabilities:
 - 4.1. Scheduling and illumination levels of individual luminaires and groups of luminaires are capable of being reconfigured through the system.
 - 4.2. Load shedding.
 - 4.3. In open and enclosed offices, the illumination level of overhead general illumination luminaires are configured to be individually adjusted by occupants.
 - 4.4. Occupancy sensors and *daylight responsive controls* are capable of being reconfigured through the system.
5. Construction documents shall include submittal of a Sequence of Operations, including a specification outlining each of the functions required by this section.
6. These control functions shall be commissioned in accordance with Sections C408.1 and C408.3.

Section C 406.5 is amended to read as follows:

C406.5 On-site renewable energy. In addition to the renewable energy required by Section C412 and to renewable energy used to comply with any other requirement of this code, a whole building, building addition, building area, occupancy type, or tenant space shall be provided with on-site renewable energy systems with a rated peak renewable energy generating capacity an annual production per square foot of no less than the value specified in Table C406.5 0.25 watts (or 0.85 BTU/h) per square foot of conditioned floor area based on the total conditioned floor area of the whole building, building addition or tenant space. The on-site renewable used in provided to comply with this option shall be separate from on-site renewables used as part of Section C406.7 provided to comply with C406.8 or used to qualify for any exception in this code.

Table C406.5 is deleted in its entirety

**TABLE C406.5
ON-SITE RENEWABLE ENERGY SYSTEM RATING (PER SQUARE FOOT)**

Building Area Type	kBTU per year	kWh per year
Assembly	1.8	0.53
Dining	10.7	3.14
Hospital	3.6	1.06
Hotel/Motel	2.0	0.59
Multi-family residential	0.50	0.15
Office	0.82	0.24
Other	2.02	0.59
Retail	1.34	0.38
School/University	1.17	0.34
Supermarket	5.0	1.47
Warehouse	0.43	0.13

Section C406.6 is amended to read as follows:

C406.6 Dedicated outdoor air system (DOAS). No less than 90 percent of the total *conditioned floor area* of the whole building, building area, occupancy type, building addition or tenant space, excluding floor area of unoccupied spaces that do not require ventilation per the *International Mechanical Code*, shall be served by DOAS installed in accordance with Section C403.3.5. This option is not available to buildings subject to the prescriptive requirements of Section C403.3.5. No HVAC systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

Section C406.7 is amended to read as follows:

C406.7 High performance dedicated outdoor air system (DOAS). A whole building, building area, occupancy type, building addition or tenant space which includes a DOAS complying with Section C406.6 shall also provide minimum sensible effectiveness of heat recovery of 80 percent and DOAS total combined fan power less than 0.5 W/cfm of outdoor air. For the purposes of this section, total combined fan power includes all supply, exhaust, recirculation and other fans utilized for the purpose of ventilation. No HVAC systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

Section C406.8 is amended to read as follows:

C406.8 Reduced energy use in service water heating. Buildings with service hot water heating equipment that serves the whole building, *building addition* or tenant space shall comply with Sections C406.8.1 and C406.8.2. No service water heating systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

Section C 406.8.1 is amended to read as follows:

C406.8.1 Building type. Not less than 90 percent of the *conditioned floor area* of the whole building, building area, occupancy type, building addition or tenant space shall be of the following types:

1. Group R-1: Boarding houses, hotels or motels. (Not applicable after 1/1/2022)
2. Group I-2: Hospitals, psychiatric hospitals and nursing homes.
3. Group A-2: Restaurants and banquet halls or buildings containing food preparation areas.
4. Group F: Laundries.
5. Group R-2. (Not applicable after 1/1/2022)
6. Group A-3: Health clubs and spas.
7. Buildings with a service hot water load of 10 percent or more of total building energy loads, as shown with an energy analysis as described in Section C407 or as shown through alternate service hot water load calculations showing a minimum service water energy use of 15 k/Btu per square foot per year, as approved by the building official.

Section C406.8.1 is amended to read as follows:

C406.8.2 Load fraction. Not less than 60 percent of the annual service hot water heating energy use, or not less than 100 percent of the annual service hot water heating energy use in buildings with water-cooled systems subject to the requirements of Section C403.9.5 or qualifying for one of its exceptions, shall be provided by one or more of the following:

1. Service hot water system delivering heating requirements using heat pump technology with a minimum COP of 3.0. For air-source equipment, the COP rating will be reported at the design leaving heat pump water temperature with an entering air temperature of 60°F (15.6°C) or lower. For water-source equipment, the COP rating will be reported at the design leaving load water temperature with an entering water temperature of 74°F (23.3°C) or lower.
2. Waste heat recovery from service hot water, heat recovery chillers, building equipment, process equipment, or other *approved* system. Qualifying heat recovery must be above and beyond heat recovery required by other sections of this code.
3. On site renewable energy water-heating systems, where those systems are in addition to the renewable energy required by Section C412 and any renewable energy used to comply with other requirements of this code.

Section C406.9 is amended to read as follows:

C406.9 High performance service water heating in hotels and multifamily buildings. For a whole building, building area, occupancy type, building addition, or tenant space with not less than 90 percent of the conditioned floor area being Group R-1 or R-2 occupancy, not less than 90 percent of the annual building service hot water energy use shall be provided by a heat pump system with a minimum COP of 3.0 meeting the requirements of Section C404.2.3 plus the following:

1. The refrigerant used in the heat pump system shall have a global warming potential (GWP) no greater than 675.
2. No electric resistance heating capacity shall be provided.

Exceptions to item 2.

1. Electric resistance heating is permitted for circulating system temperature maintenance and heat tracing of service hot water supply and return piping.
2. On-demand electric resistance water heaters for hand washing facilities are permitted in public toilet rooms.

Prior to January 1, 2022, this efficiency package is allowed be taken in addition to Section C406.8-2.

Section C406.10 is amended to read as follows:

C406.10 Enhanced envelope performance. The Proposed Total UA of the thermal envelope of the whole building, building area, occupancy type or building *addition* shall be 15 percent lower than the Allowable Total UA for an area of identical configuration and fenestration area in accordance with Section C402.1.5 and Equation 4-2. Where exception 3 for Section C412 is also being used, the Proposed Total UA shall be 30 percent lower than the than the Allowable Total UA as defined in Section C402.1.5.

Section C406.11 is amended to read as follows:

C406.11 Reduced air infiltration ~~leakage~~. Measured air infiltration of the total *conditioned floor area* of the whole building, fully isolated building ~~addition or tenant space~~, building area, or occupancy type shall comply with Section C406.11.1.

Section C406.11.1 is amended to read as follows:

C406.11.1 Air leakage testing and verification. Air infiltration ~~leakage~~ shall be verified by whole building pressurization testing conducted in accordance with ASTM E779 or ASTM E1827, or an equivalent method approved by the code official, by an independent third party. The measured air leakage rate of the *building envelope* shall not exceed 0.17 cfm/ft² under a pressure differential of 0.3 in. water (75 Pa), with the calculated surface area being the sum of the above and below grade building envelope. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the *code official* and the building owner.

~~**Exception:** Where the *conditioned floor area* of the building is not less than 250,000 ft² (25,000 m²), air leakage testing shall be permitted to be conducted on representative above grade sections of the building provided the *conditioned floor area* of tested areas is no less than 25 percent of the *conditioned floor area* of the building and are tested in accordance with this section.~~

The following Informative Note shall be added to C406.11

<p>City Informative Note: Energy Star commercial kitchen equipment is required for all commercial kitchen projects by Section C403.15.</p>

Section C406.12 is deleted in its entirety.

~~**C406.12 Enhanced commercial kitchen equipment.** For buildings and spaces designated as Group A-2, or facilities whose primary business type involves the use of a commercial kitchen with at least one gas or electric fryer, all fryers, dishwashers, steam cookers and ovens shall comply with all of the following:~~

- ~~1. Achieve the ENERGY STAR label in accordance with the specifications current as of January 1, 2018.~~
- ~~2. Be installed prior to the issuance of the certificate of occupancy.~~
- ~~3. Have the ENERGY STAR qualified model number listed on the construction documents submitted for permitting.~~

**SECTION C407
TOTAL BUILDING PERFORMANCE**

Section C407.2 is amended to read as follows:

C407.2 Mandatory requirements. Compliance with this section C407 also requires compliance with those sections shown in Table C407.2.

The building permit application for projects utilizing this method shall include in one submittal all building and mechanical drawings and all information necessary to verify that the building envelope and mechanical design for the project corresponds with the annual energy analysis. If credit is proposed to be taken for lighting energy savings, then an electrical permit application shall also be submitted and approved prior to the issuance of the building permit. If credit is proposed to be taken for energy savings from other components, then the corresponding permit application (e.g., plumbing, boiler, etc.) shall also be submitted and approved prior to the building permit application. Otherwise, components of the project that would not be approved as part of a building permit application shall be modeled the same in both the proposed building and the *standard reference design* and shall comply with the requirements of this code.

Section C407.3 is amended to read as follows:

C407.3 Performance-based compliance. Compliance with this section requires compliance with ASHRAE Standard 90.1 Appendix G, Performance Rating Method, in accordance with Standard 90.1 Section 4.2.1 with the following modifications..

1. The mandatory requirements of Section G1.2.1a of Standard 90.1 are not required to be met.
2. The reduction in annual carbon emissions of the proposed building design associated with on-site renewable energy shall not be more than 3 percent of the total carbon emissions of the baseline building design. This limitation only applies to onsite renewable energy provided in excess of the renewable energy required by Section C412.
 - a. The equation $PCI + [(PBP_{nre} - PBP)/BBP] - 0.05 < PCI$ in Section 4.2.1.1 shall be modified to read $PCI + [(PBP_{nre} - PBP)/BBP] - 0.03 < PCI$.
 - b. The term PBP_{nre} shall be defined as the proposed building performance without credit for reduced annual energy emissions from on-site renewable energy generation system capacity in excess of that installed to satisfy the requirements of Section C412.
3. References to energy cost in Section 4.2.1.1 and Appendix G shall be replaced by carbon emissions calculated by multiplying site energy consumption by the carbon emission factor from Table C407.3(1).
4. The building performance factors in Table C4.2.1.1 shall be replaced with those in Table C407.3(2).
5. Schedules and plug and process loads shall be modeled using the default values listed in Appendix B or in the ASHRAE 90.1 User's Manual and shall be assumed to be identical in the proposed design and baseline building design.

Exception to item 5. Alternative schedules and plug and process loads shall be permitted where *approved by the code official*.
6. Documentation requirements in Section G1.3.2.d shall be replaced by a list showing compliance with the mandatory provisions of Table C407.2.
7. Documentation requirements in Section G1.3.2.e shall be replaced by a list of aspects of the proposed design that are less stringent than the prescriptive requirements of the Energy Code.

8. References to yet-to-be-designed future building components in the Proposed Building Performance column of Table G3.1 shall be modified to reference the corresponding sections of the Energy Code in lieu of the requirements of Standard 90.1, in the following sections of the table:
- 1. Design Model, subclause c.
 - 6. Lighting, subclause c
 - 11. Service Water-Heating Systems, subclause c.
 - 12. Receptacle and Other Loads, subclause b.
9. HVAC Systems, subclauses c and d of Table G3.1, shall meet the following requirements:
- a. For yet-to-be-designed systems in office, retail, library, education, and multifamily buildings and occupancies subject to the TSPR requirements of Section C403.1.1, the system type and efficiency parameters shall meet but not exceed those shown in Table D602.11 Standard Reference Design HVAC Systems.
 - b. For all other buildings and occupancies, the system type shall be the same as the system modeled in the baseline design and shall comply with but not exceed the requirements of Section C403 in lieu of Standard 90.1.
 - c. For HVAC systems serving future tenant spaces, where the current building permit applies to only a portion of an HVAC system, and future components will receive HVAC services from systems included in the current building permit, those future components shall be modeled as the type required to complete the HVAC system portions under the current permit and shall meet but not exceed the requirements found in Section C403.

City Informative Note. The permit applicant is encouraged to schedule a pre-application meeting to discuss the modeling approach for any yet-to-be designed areas that are not included in the C407 permit submissions. In general, future permit submissions should not contribute energy savings to the C407 submission beyond prescriptive code requirements, assuming use of the base building HVAC systems. Future systems must be modeled for the base building permit as being no better than the current prescriptive code, because plans often change and the City does not have a mechanism for ensuring that future tenant projects meet any beyond-code performance modeled in the original C407 submission.

Table C407.2 is amended to read as follows:

**TABLE C407.2
 MANDATORY COMPLIANCE MEASURES
 FOR TOTAL BUILDING PERFORMANCE METHOD^a**

Section	Title	Comments
Envelope		
C402.5	Air Leakage	
Mechanical		
C403.1.2	Calculation of heating and cooling loads	
C403.1.3	<i>Data centers</i>	
C403.1.4	<u>Use of electric resistance and fossil fuel-fired heating equipment</u>	
C403.2	System design	
C403.3.1	Equipment and system sizing	

C403.3.2	HVAC equipment performance requirements	
C403.3.6	Ventilation for Group R occupancy	
<u>C403.3.7</u>	<u>Hydronic system flow rate</u>	
C403.4	HVAC system controls	
C403.4.1	Thermostatic controls	Except for C403.4.1.4
C403.4.2	Off-hour controls	Except for Group R
C403.4.7	Combustion heating equipment controls	
C403.4.8	Group R-1 hotel/motel guestrooms	See Section C403.7.4
C403.4.9	Group R-2 and R-3 <i>dwelling units</i>	
C403.4.10	Group R-2 sleeping units	
C403.4.11	Direct digital control systems,	
<u>C403.4.12</u>	<u>Pressure independent control valves</u>	
C403.5.5	Economizer fault detection and diagnostics (FDD)	
C403.7	Ventilation and exhaust systems	Except for C403.7.6
C403.8	Fan and fan controls	
<u>C403.9.1</u>	<u>Heat rejection equipment (partial)</u>	<u>Only the prohibition on single-pass water cooling systems is mandatory</u>
C403.9.1.1	Variable flow controls	For cooling tower fans ≥ 7.5 hp
C403.9.1.2	Limitation on centrifugal fan cooling towers	For open cooling towers
C403.10	Construction of HVAC elements	
C403.11	Mechanical systems located outside of the <i>building thermal envelope</i>	
<u>C403.15</u>	<u>Commercial food service</u>	
Service Water Heating		
C404	Service Water Heating	
Lighting and Electrical		
C405.1	General	
C405.2	Lighting controls	
C405.3	Exit signs	
C405.4	Interior lighting power	
C405.5	Exterior building lighting power	
C405.6	Electrical transformers	
C405.7	<i>Dwelling unit</i> energy consumption	
C405.8	Electric motor efficiency	
C405.9	Vertical and horizontal transportation	
C405.10	<i>Controlled receptacles</i>	
C405.11	Voltage drop in feeders	
Other Requirements		
Section	Title	Comments
C407	Total Building Performance	
C408	System commissioning	
C409	Energy metering	
C410	Refrigeration requirements	
C411	Solar readiness	
<u>C412</u>	<u>Renewable energy</u>	<u>All on-site renewable energy production is included in the proposed building</u>

		<u>performance, but not in the baseline building performance.</u>
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Table C407.3(1) is amended to read as follows:

TABLE C407.3(1) CARBON EMISSIONS FACTORS

Type	CO2e (lb/unit)	Unit
Electricity	0.70	kWh
Natural Gas	11.7	Therm
Oil	19.2	Gallon
Propane	10.5	Gallon
Other ^a	195.00	mmBtu
On-site renewable energy ^b	0.00	

- a. District energy systems may use alternative emission factors supported by calculations approved by the *code official*.
- b. The TSPR calculation does not separately account for the use of renewable energy.

Table C407.3(2) is amended to read as follows:

**TABLE C407.3(2)
 BUILDING PERFORMANCE FACTORS (BPF)
 TO BE USED FOR COMPLIANCE WITH SECTION C407.3**

Building Area Type	Building Performance Factor
Multifamily	0.58 <u>0.52</u>
Healthcare/hospital	0.54 <u>0.49</u>
Hotel/motel	0.64 <u>0.58</u>
Office	0.56 <u>0.51</u>
Restaurant	0.70 <u>0.63</u>
Retail	0.47 <u>0.43</u>
School	0.36 <u>0.32</u>
Warehouse	0.48 <u>0.43</u>
All Others	0.54 <u>0.49</u>

Section C407.3.1 is amended to read as follows:

C407.3.1 Limits on non-mandatory measures substandard building envelopes. The Proposed Total UA of the proposed building shall be no more than ~~20~~ 10 percent higher than the Allowed Total UA as defined in Section C402.1.5. Where either Section C402.4.1.1.1 or C402.4.1.1.2 is used to establish the maximum allowable fenestration area for compliance with this section, all of the requirements of the selected section shall be met.

**SECTION C408
 SYSTEM COMMISSIONING**

Section C408.1 shall be amended to read as follows:

C408.1 General. A building commissioning process led by a *certified commissioning professional* and functional testing requirements shall be completed for mechanical systems in Section C403; service water heating systems in Section C404; controlled receptacle and lighting control systems in Section C405; equipment, appliance and systems installed to comply with Section C406 or C407; ~~energy~~ energy metering in Section C409; and refrigeration systems in Section C410.

Exception: Buildings, or portions thereof, which are exempt from Sections C408.2 through C408.7 may be excluded from the commissioning process.

1. Mechanical systems are exempt from the commissioning process where the installed total mechanical equipment capacity is less than 240,000 Btu/h cooling capacity and less than 300,000 Btu/h heating capacity.
2. Service water heating systems are exempt from the commissioning process in buildings where the largest service water heating system capacity is less than 200,000 Btu/h and where there are no pools or permanent spas.
3. Lighting control systems are exempt from the commissioning process in buildings where both the total installed lighting load is less than 20 kW and the lighting load controlled by occupancy sensors or *automatic* daylighting controls is less than 10 kW.
4. Refrigeration systems are exempt from the commissioning process if they are limited to self-contained units.

Section C408.4 is amended to read as follows:

C408.4 Controlled receptacle and lighting control system commissioning. Controlled receptacles and lighting control systems subject to Section C405 shall be included in the commissioning process required by Section C408.1. The configuration and function of controlled receptacles and lighting control systems required by this code shall be tested and shall comply with Section C408.4.1.

Exception: Lighting control systems and controlled receptacles are exempt from the commissioning process in buildings where:

1. The total installed lighting load is less than 20 kW, and
2. The lighting load controlled by occupancy sensors or *automatic* daylighting controls is less than 10 kW.

**SECTION C409
ENERGY METERING AND ENERGY CONSUMPTION MANAGEMENT**

Section C409.1 is amended to read as follows:

C409.1 General. All new buildings and additions shall have the capability of metering source energy for on-site renewable energy production in accordance with Section C409.2.4 and the end-use energy usage for electric vehicle charging in accordance with Section C409.3.4. New buildings and additions with a gross *conditioned floor area* over ~~50,000~~ 20,000 square feet shall comply with Section C409. Buildings shall be equipped to measure, monitor, record and display energy consumption data for each energy source and end use category per the provisions of this section, to enable effective energy management. For Group R-2 buildings, the floor area of dwelling units and sleeping units shall be

excluded from the total *conditioned floor area* for the purposes of determining the 20,000 square foot threshold. *Alterations* and *additions* to existing buildings shall conform to Section C506.

Exceptions:

1. Tenant spaces smaller than ~~50,000 ft²~~ 20,000 square feet within buildings if the tenant space has its own utility service and utility meters.
2. Buildings in which there is no gross *conditioned floor area* over ~~25,000~~ 10,000 square feet, including building common area, that is served by its own utility services and meters.

Section C409.1.2 is amended to read as follows:

C409.1.2 Conversion factor. Any threshold stated in kW or kVA shall include the equivalent BTU/h heating and cooling capacity of installed equipment at a conversion factor of 3,412 Btu per kW ~~at 50 percent demand~~ or 2,730 Btu per kVA.

Section C409.2.1 is amended to read as follows:

C409.2.1 Electrical energy. This category shall include all electrical energy supplied to the building and its associated site, including site lighting, parking, recreational facilities, and other areas that serve the building and its occupants.

Exception: Where site lighting and other exterior non-building electrical loads are served by an electrical service and meter that are separate from the building service and meter, the metering data from those loads is permitted to be either combined with the building's electrical service load data or delivered to a separate *data acquisition system*.

Section 409.2.4 is amended to read as follows:

C409.2.4 Site-generated renewable energy. This category shall include all net energy generated from on- site solar, wind, geothermal, tidal or other natural sources, and waste heat reclaimed from sewers or other off-site sources. For buildings exempt from data collection systems, the data from these meters is permitted to either be stored locally using a manual totalizing meter or other means at the meter or fed into a central data collection system.

Section C409.3 is amended to read as follows:

C409.3 End-use metering. Meters shall be provided to collect energy use data for each end-use category listed in Sections C409.3.1 through C409.3.7. These meters shall collect data for the whole building or for each separately metered portion of the building where not exempted by the exception to Section C409.1. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections C409.3.1 through C409.3.6 is permitted to be excluded from that end-use data collection. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections C409.3.1 through C409.3.6 is permitted to consist of loads not part of that category. Multiple meters may be used for any end-use category, provided that the data acquisition system totals all of the energy used by that category. Full-floor tenant space submetering data shall be provided to the tenant in accordance with Section C409.7, and the data shall not be required to be included in other end-use categories.

Exceptions:

1. HVAC and service water heating equipment serving only an individual dwelling unit or sleeping unit does not require end-use metering.
2. Separate metering is not required for fire pumps, stairwell pressurization fans or other life safety systems that operate only during testing or emergency.
3. End use metering is not required for individual tenant spaces not exceeding 2,500 square feet in floor area when a dedicated source meter meeting the requirements of Section C409.4.1 is provided for the tenant space.
4. Healthcare facilities with loads in excess of 150 kVA are permitted to have submetering that measures electrical energy usage in accordance with the normal and essential electrical systems except that submetering is required for the following load categories:
 - 4.1. HVAC system energy use in accordance with the requirements of Section C409.3.1.
 - 4.2. Service water heating energy use in accordance with the requirements of Section C409.3.2.
 - 4.3. Process load system energy in accordance with the requirements of Section C409.3.56 for each significant facility not used in direct patient care, including but not limited to, food service, laundry and sterile processing facilities, where the total connected load of the facility exceeds 100 kVA.
5. End-use metering is not required for electrical circuits serving only land guest suites within Group R-1 occupancies. This exception does not apply to common areas or to equipment serving multiple sleeping rooms.

Section C409.4.3 is amended to read as follows:

C409.4.3 Energy display. For each building subject to Section C409.2 and C409.3, either a visible display in a location with *ready access*, or a single web page or other electronic document available for access to building management or to a third-party energy data analysis service shall be provided in the building available for access to building operation and management personnel. The display shall graphically provide the current energy consumption rate for each whole building energy source, plus each end use category, as well as the total and peak maximum hourly consumption values for any day, week, month and year.

The display shall graphically provide the current energy consumption rate for each whole building energy source, plus each end-use category, as well as the total and peak values for any day, week, month and year be capable of and configured to graphically display the energy use data for any source or end use category or any combination of sources and end uses for any selected daily, weekly, monthly or annual time period, and to view the selected time period simultaneously with another selected time period or a reference benchmark time period. The display shall be capable of weather-normalizing data in the comparison time periods and facilitate display of energy use trends and identification of anomalies.

Section C409.4.4 is amended to read as follows:

C409.4.4 Commissioning. Energy metering and energy consumption management systems shall be commissioned in accordance with Section ~~C408~~ C408.6.

Section C409.5 regarding metering for existing buildings is relocated to Section 506.1.

~~C409.5 Metering for existing buildings.~~

~~C409.5.1 Existing buildings that were constructed subject to the requirements of this section.~~

~~Where new or replacement systems or equipment are installed in an existing building that was constructed subject to the requirements of this section, metering shall be provided for such new or replacement systems or equipment so that their energy use is included in the corresponding end-use category defined in Section C409.3. This includes systems or equipment added in conjunction with additions or alterations to existing buildings.~~

~~C409.5.1.1 Small existing buildings. Metering and data acquisition systems shall be provided for additions over 25,000 square feet to buildings that were constructed subject to the requirements of this section, in accordance with the requirements of Sections C409.2 and C409.3.~~

**SECTION C410
REFRIGERATION SYSTEM REQUIREMENTS**

Section C410.2 is amended to read as follows:

C410.2 Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers. *Refrigerated warehouse coolers, refrigerated warehouse freezers, and all walk-in coolers and walk-in freezers including site assembled, site constructed and prefabricated units shall comply with the following: Where they comprise any portion of the thermal envelope of the building, they shall comply with the requirements of Section C402, using the R-values or U-values listed in this Section C410.2. Section C402.1.5 component performance alternative is permitted to be used where approved by the code official.*

1. *Automatic door-closers shall be provided that fully close walk-in doors that have been closed to within 1 inch (25 mm) of full closure.*
Exception: *Automatic closers are not required for doors more than 45 inches (1143 mm) in width or more than 7 feet (2134 mm) in height.*
2. *Doorways shall be provided with strip doors, curtains, spring-hinged doors or other method of minimizing infiltration when doors are open.*
3. *Walk-in coolers and refrigerated warehouse coolers shall be provided with wall, ceiling, and door insulation of not less than R-25 or have wall, ceiling and door assembly U-factors no greater than U-0.039. Walk-in freezers and refrigerated warehouse freezers shall be provided with wall, ceiling and door insulation of not less than R-32 or have wall, ceiling and door assembly U-factors no greater than U-0.030.*
Exception: *Insulation is not required for glazed portions of doors or at structural members associated with the walls, ceiling or door frame.*
4. *The floor of walk-in coolers shall be provided with floor insulation of not less than R-25 or have a floor assembly U-factor no greater than U-0.040. The floor of walk-in freezers shall be provided with floor insulation of not less than R-28 or have a floor assembly U-factor no greater than U-0.035.*
Exception: *Insulation is not required in the floor of a walk-in cooler that is mounted directly on a slab on grade.*
5. *Transparent fixed windows and reach-in doors for walk-in freezers and windows in walk-in freezer doors shall be provided with triple-pane glass, with the interstitial spaces filled with inert gas, or be provided with heat-reflective coated glass.*

6. Transparent fixed windows and reach-in doors for *walk-in coolers* and windows for *walk-in cooler* doors shall be provided with double-pane or triple-pane glass, with interstitial spaces filled with inert gas, or be provided with heat-reflective treated glass.
7. Evaporator fan motors that are less than 1 hp (0.746 kW) and less than 460 volts shall be provided with electronically commutated motors, brushless direct-current motors, or 3-phase motors.
8. Condenser fan motors that are less than 1 hp (0.746 kW) shall use electronically commutated motors, permanent split capacitor-type motors or 3-phase motors.
9. Antisweat heaters that are not provided with antisweat heater controls shall have a total door rail, glass and frame heater power draw of not greater than 7.1 W/ft² (76 W/m²) of door opening for *walk-in freezers* and not greater than 3.0 W/ft² (32 W/m²) of door opening for *walk-in coolers*.
10. Where antisweat heater controls are provided, they shall be capable of reducing the energy use of the antisweat heater as a function of the relative humidity in the air outside the door or to the condensation on the inner glass pane.
11. Lights in *walk-in coolers*, *walk-in freezers*, *refrigerated warehouse coolers* and *refrigerated warehouse freezers* shall either be provided with light sources with an efficacy of not less than 40 lumens per watt, including ballast losses, or shall be provided with a device that turns off the lights within 15 minutes of when the *walk-in cooler* or *walk-in freezer* space is not occupied.
12. Evaporator fans in refrigerated warehouses shall be variable speed, and the speed shall be controlled in response to space conditions.

EXCEPTION: Evaporators served by a single compressor without unloading capability.

Section C410.3 is amended to read as follows:

C410.3 Refrigeration systems. Refrigerated display cases, *walk-in coolers* or *walk-in freezers* that are served by remote compressors and remote condensers not located in a *condensing unit*, shall comply with Sections C410.3.1, C410.3.2, and C403.9.2.3.

Exception: Systems where the working fluid in the refrigeration cycle goes through both subcritical and supercritical states (transcritical) or that use ammonia refrigerant are exempt.

Section C410.3.2 is amended to read as follows:

C410.3.2 Compressor systems. Refrigeration compressor systems shall comply with the following:

1. Compressors and multiple-compressor system suction groups shall include control systems that use floating suction pressure control logic to reset the target suction pressure temperature based on the temperature requirements of the attached refrigeration display cases or walk-ins.

Exception: Controls are not required for the following:

1. Single-compressor systems that do not have variable capacity capability.
2. Suction groups that have a design saturated suction temperature of 30°F (-1.1°C) or higher, suction groups that comprise the high stage of a two-stage or cascade system, or suction groups that primarily serve chillers for secondary cooling fluids.
2. Liquid subcooling shall be provided for all low-temperature compressor systems with a design cooling capacity equal to or greater than 100,000 Btu/hr (29.3 kW) with a design-saturated suction temperature of -10°F (-23°C) or lower. The subcooled liquid temperature shall be controlled at a maximum temperature set point of 50°F (10°C) at the exit of the subcooler using either compressor economizer (interstage) ports or a separate compressor suction group operating at a saturated suction temperature of 18°F (-7.8°C) or higher.
 - 2.1. Insulation for liquid lines with a fluid operating temperature less than 60°F (15.6°C) shall

comply with Table ~~C403.2.10~~ C403.10.3.

3. Compressors that incorporate internal or external crankcase heaters shall provide a means to cycle the heaters off during compressor operation.
4. Compressor systems utilized in refrigerated warehouses shall conform to the following:
 - 4.1. Compressors shall be designed to operate at a minimum condensing temperature of 70°F or less.
 - 4.2. The compressor speed of a screw compressor greater than 50 hp shall be controllable in response to the refrigeration load or the input power to the compressor shall be controlled to use no more than 60 percent of full load input power when operated at 50 percent of full refrigeration capacity.

EXCEPTION. Refrigeration plants with more than one dedicated compressor per suction group.

SECTION C411 SOLAR READINESS

Section C411.1 is amended to read as follows:

C411.1 General. A In addition to the requirements of Section C412, a solar zone shall be provided on ~~non-residential~~ buildings that are 20 stories or less in height above grade plane. The solar zone shall be located on the roof of the building or on another structure elsewhere on the site. The solar zone shall be in accordance with Sections C411.2 through C411.8 and the *International Fire Code*.

Exception. A solar zone is not required where the solar exposure of the building's roof area is less than 75 percent of that of an unshaded area, as defined in Section C411.5, in the same location, as measured by one of the following:

1. Incident solar radiation expressed in kWh/ft²-yr using typical meteorological year (TMY) data;
2. Annual sunlight exposure expressed in cumulative hours per year using TMY data;
3. Shadow studies indicating that the roof area is more than 25 percent in shadow, on September 21 at 10am, 11am, 12pm, 1pm, and 2pm solar time.

Section C411.2 is amended to read as follows:

C411.2 Minimum area. The minimum area of the solar zone shall be determined by one of the following methods, whichever results in the smaller area:

1. 40 percent of roof area. The roof area shall be calculated as the horizontally-projected gross roof area less the area covered by skylights, occupied roof decks, mechanical equipment, and planted areas.
2. 20 percent of electrical service size. The electrical service size is the rated capacity of the total of all electrical services to the building, and the required solar zone size shall be based upon 10 peak watts of photovoltaic per square foot.

Exception. Subject to the approval of the *code official*, buildings with extensive rooftop equipment that would make full compliance with this section impractical shall be permitted to reduce the size of the *solar zone* required by Section C411.2 to the maximum practicable area.

Example: A building with a 10,000 SF total roof area, 1,000 SF skylight area, and a 400 Amp, 240

volt single phase electrical service is required to provide a solar zone area of the smaller of the following:

1. $[40\% \times (10,000 \text{ SF roof area} - 1,000 \text{ SF skylights})] = 3,600 \text{ SF}$; or

2. $[400 \text{ Amp} \times 240 \text{ Volts} \times 20\% / 10 \text{ watts per SF}] = 1,920 \text{ SF}$

Therefore, a solar zone of 1,920 square feet is required.

Section C411.4 is amended to read as follows:

C411.4 Obstructions. The solar zone shall be free of pipes, vents, ducts, HVAC equipment, skylights and other obstructions, except those serving photovoltaic systems within the solar zone. The solar zone is permitted to be located above any such obstructions, provided that the racking for support of the future system is installed at the time of construction, the elevated solar zone does not shade other portions of the solar zone, and its height is permitted by the *International Building Code* and the *Shoreline Municipal Code Title 20*. Photovoltaic or solar water heating systems are permitted to be installed within the solar zone.

Section C411.8 is amended to read as follows:

C411.8 Photovoltaic interconnection. A minimum 2-inch diameter roof penetration conduit shall be provided, with threaded caps above and below the roof deck and minimum R-10 insulation wrapping the lower portion, within each 2,500 square foot section of the required solar zone area. Interconnection of the future photovoltaic system shall be provided for at the main service panel, either ahead of the service disconnecting means or at the end of the bus opposite the service disconnecting means, in one of the following forms:

1. A space for the mounting of a future overcurrent device, sized to accommodate the largest standard rated overcurrent device that is less than 20 percent of the bus rating.
2. Lugs sized to accommodate conductors with an ampacity of at least 20 percent of the bus rating, to enable the mounting of an external overcurrent device for interconnection.

The electrical construction documents shall indicate the following:

1. Solar zone boundaries and access pathways;
2. Location for future inverters and metering equipment; and
3. Route for future wiring between the photovoltaic panels and the inverter, and between the inverter and the main service panel.

A new Section, Section C412 Renewable Energy is added and shall read as follows:

SECTION C412
RENEWABLE ENERGY

C412.1 On-site renewable energy systems. Each new building or addition larger than 5,000 square feet of gross conditioned floor area shall include a renewable energy generation system consisting of not less than 0.25 watts rated peak photovoltaic energy production per square foot of conditioned space.

Exceptions:

1. Increased additional energy credits. Where 3.0 additional energy credits from Table C406.1 are provided in addition to those required by other sections of this code, the on-site renewable

energy generation system is not required.

- 1.1. Where 1.0 additional energy credits from Table C406.1 is provided in addition to those required by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 1/3.
- 1.2. Where 2.0 additional energy credits from Table C406.1 are provided in addition to those required by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 2/3.
- 1.3 Where approved by the City, interpolation between exceptions 1, 1.1, and 1.2 is permitted.
2. Reduced Building Performance Factor. For projects utilizing the Section C407 Total Building Performance compliance path, the on-site renewable energy generation system is not required where the building performance factor (BPF) is not less than 3 percent lower than the maximum BPF permitted cumulatively by all other sections of this code.

Example: To use this exception, a building with a required BPF of 50 would be required to provide a BPF of $(50 \times 0.97 =) 48.5$ instead.

- 2.1 Where the BPF is not less than 1 percent lower than the BPF required cumulatively by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 1/3.
- 2.2 Where the BPF is not less than 2 percent lower than the BPF required cumulatively by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 2/3.
3. Transfer to an *affordable housing* project. Where *approved* by the City, all or part of the required on-site renewable energy generation system is permitted to be replaced by construction of a system that is 50 percent of the required system size when located on an existing *affordable housing* project within the City, or 75 percent of the required system size when located on a new construction *affordable housing* project within the City. Documentation demonstrating that the renewable energy generation system has been installed on the *affordable housing* project site, the system is fully operational, and ownership has been transferred to the owner of the *affordable housing* project, must be submitted prior to issuance of the certificate of occupancy.

City Informative Note: Option 3 will only be available if an affordable housing project is available to accept the renewable energy system. There is no assurance that such a project location will be available. It is the owner's responsibility to locate and coordinate with the affordable housing project, and to ensure that the installation is completed in a timely manner.

4. Transfer to a Washington state agency program. Where *approved* by the City, all or part of the required renewable energy generation system is permitted to be replaced by a contribution of \$2.50 for each required watt of installed capacity, to a solar energy fund managed by a Washington state agency that will provide solar energy installations for *affordable housing* projects. Documentation demonstrating that the contribution has been received by the state agency must be submitted prior to issuance of the certificate of occupancy.

City Informative Note: Option 4 will only be available if a solar energy fund for affordable housing is created by the Housing Trust Fund, Washington State Housing Finance Commission, or another state agency program for which the project is qualified to participate. There is no assurance that such a program will be available.

5. *Affordable housing*. The on-site renewable energy generation system is not required for *affordable housing* projects.

AMENDMENTS TO CHAPTER 5 EXISTING BUILDINGS

SECTION C502 ADDITIONS

Section C502.1 is amended to read as follows:

C502.1 General. *Additions* to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. Additions shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building. Additions using the prescriptive path in Section C401.2, item 1, shall also comply with Sections C402, C403, C404, C405, C406, C409.5, C410 and C502.2.

A new section, Section C502.1.1, is added and shall read as follows:

C502.1.1 Additional efficiency package options. *Additions shall comply with Section C406, either for the addition only or for the total of the existing building plus addition.*

Exception: *Additions smaller than 500 square feet of conditioned floor area are not required to comply with Section C406.*

Section C502.2.2 is amended to read as follows:

C502.2.2 Skylight area. *Additions with skylights that result in a total building skylight area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.4. Additions with skylights that result in a total building skylight area greater than that specified in Section C402.4.1 shall comply with one of the following:*

- ~~1. Vertical fenestration alternate per Section C402.4.1.1 or C402.4.1.3 for the addition area of the building only~~
2. 1. Component performance alternative with the target area adjustment per Section C402.1.5 for the addition area of the building only.
3. 2. Existing building and addition area combined to demonstrate compliance with the component performance alternative for the whole building.
4. 3. Total building performance in accordance with Section C407 for the addition area of the building only.
5. 4. Total building performance for the whole building.

Section 502.2.6.2 shall be amended to read as follows:

C502.2.6.2 Exterior lighting power. The total exterior lighting power for the addition shall comply with Section C405.5.4 2for the addition alone, or the existing building and the addition shall comply as a single building.

SECTION C503 ALTERATIONS

Section C503.1 shall be amended to read as follows:

C503.1 General. Alterations to any building or structure shall comply with the requirements of Section C503 and the code for new construction. Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. Alterations shall be such that the existing building or structure is no less conforming to the provisions of this code than the existing building or structure was prior to the alteration.

Exceptions:

1. The following alterations need not comply with the requirements for new construction provided the energy use of the building is not increased:

- 1- a. Storm windows installed over existing fenestration.
- 2- b. Surface applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain provided the code does not require the glazing fenestration to be replaced.
- 3- c. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are insulated to full depth with insulation having a minimum nominal value of R-3.0 per inch installed per Section C402.
- 4- d. Construction where the existing roof, wall or floor cavity is not exposed.
- 5- e. *Roof recover.*
- 6- f. *Air barriers* shall not be required for roof recover and roof replacement where the alterations or renovations to the building do not include alterations, renovations or repairs to the remainder of the building envelope.
- 7- g. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided however that an existing vestibule that separates a conditioned space from the exterior shall not be removed.

2. *Alterations* are not required to comply with Section C406 except where specifically noted in Sections C503.2 and C505.1.

Section C503.2 is amended to read as follows:

C503.2 Change in space conditioning. Any low energy space in accordance with Section C402.1.1.1 that is altered to become *conditioned space* or *semi-heated* space shall be brought into full compliance with this code. Any *semi-heated* space in accordance with Section C402.1.1.2 that is altered to become *conditioned space*, or any heated but not cooled space that is altered to become both heated and cooled, shall be brought into full compliance with this code. Compliance shall include the provisions of Section C406, applied only to the portion of the building undergoing a change in space conditioning.

For buildings with more than one space conditioning category, the interior partition walls, ceilings, floors and fenestration that separate space conditioning areas shall comply with the thermal envelope requirements per the area with the highest level of space conditioning.

A change in space conditioning project shall be deemed to comply with this code if the project area alone complies or if the existing building and the project area combined comply with this code as a

whole building.

Exception: Buildings or spaces that were permitted prior to the 2009 WSEC, or were originally permitted as unconditioned, may comply with this section as follows:

1. Where the component performance alternative in Section C402.1.5 is used to demonstrate compliance with this section, the Proposed Total UA is allowed to be up to 110 percent of the Allowable Total UA. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
2. Where total building performance in Section C407 is used to demonstrate compliance with this section, the total annual carbon emissions from energy consumption of the proposed design is allowed to be up to 110 percent of the annual carbon emissions from energy consumption allowed by Section C407.3. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
3. The addition of cooling equipment serving rooms or spaces totaling less than 2000 square feet in floor area does not trigger the requirement to comply with this section.

Section C503.3 is amended to read as follows:

C503.3 Building envelope. New building envelope assemblies that are part of the alteration shall comply with Sections C402.1 through C402.5 as applicable. Where an opaque envelope assembly is altered or replaced, the new assembly shall in no case have a higher overall U-value than the existing.

Exception: Air leakage testing is not required for alterations and repairs, unless the project includes a change in space conditioning according to Section C503.2 or a change of occupancy or use according to Section C505.1.

Section C503.3.1 is amended to read as follows:

C503.3.1 Roof replacement. *Roof replacements* shall comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is part of the *building thermal envelope* and contains no insulation or contains insulation entirely above the roof deck.

Section C503.3.2 is amended to read as follows:

C503.3.2 Vertical fenestration. The addition of *vertical fenestration* that results in a total building vertical fenestration area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.4. Alterations that result in a total building vertical fenestration area greater than specified in Section C402.4.1 shall comply with one of the following:

1. Vertical fenestration alternate in accordance with Section C402.4.1.3 for the new vertical fenestration added, where the calculation of vertical fenestration area and gross above-grade wall area shall include either the entire building or, where approved, only those areas in the addition of the building involved in the alteration.
2. ~~Reserved~~ Vertical fenestration alternate in accordance with Section C402.4.1.1 for the area adjacent to the new vertical fenestration added.
3. Existing building and ~~alteration~~ alteration area are combined to demonstrate compliance with the component performance ~~alternative~~ alternative with target area adjustment in accordance with

Section C402.1.5 for the whole building. The Proposed Total UA is allowed to be up to 110 percent of the Allowed Total UA.

4. Total building performance in accordance with Section C407 for the whole building. The total annual carbon emissions from energy consumption of the proposed design is allowed to be up to 110 percent of the annual carbon emissions from energy consumption allowed in accordance with Section C407.3.

Exception: ~~Additional~~ Where approved by the code official, additional fenestration is permitted where sufficient envelope upgrades beyond those required by other sections of this code are included in the project so that the addition of vertical fenestration does not cause a reduction in overall building energy efficiency, as approved by the code official an increase in the overall energy use of the building.

Section C503.3.2.1 is amended to read as follows:

C503.3.2.1 Application to replacement fenestration products. Where some or all of an existing *fenestration* unit is replaced with a new *fenestration* product, including sash and glazing, the replacement *fenestration* unit shall meet the applicable requirements for *U*-factor and *SHGC* in Table C402.4. In addition, the area-weighted U-value of the new fenestration shall be equal to or lower than the U-value of the existing fenestration.

Exception: An area-weighted average of the *U*-factor of replacement fenestration products being installed in the building for each fenestration product category listed in Table C402.4 shall be permitted to satisfy the *U*-factor requirements for each fenestration product category listed in Table C402.4. Individual fenestration products from different product categories listed in Table C402.4 shall not be combined in calculating the area-weighted average *U*-factor.

Section C503.4 is amended to read as follows:

C503.4 Mechanical systems. Those parts of systems which are altered or replaced shall comply with Section C403. Additions or alterations shall not be made to an existing mechanical system that will cause the existing mechanical system to become out of compliance.

Exceptions:

1. Existing mechanical systems which are altered or where parts of the system are replaced are not required to be modified to comply with Section C403.3.5 as long as mechanical cooling capacity is not added to a system that did not have cooling capacity prior to the alteration.
2. Alternate mechanical system designs that are not in full compliance with this code may be approved when the *code official* determines that existing building constraints including, but not limited to, available mechanical space, limitations of the existing structure, or proximity to adjacent air intakes or exhausts make full compliance impractical. Alternate designs shall include additional energy saving strategies not prescriptively required by this code for the scope of the project including, but not limited to, demand control ventilation, energy recovery, or increased mechanical cooling or heating equipment efficiency above that required by Tables C403.3.2(1) through C403.3.2(42 ~~13~~).
3. Only those components of existing HVAC systems that are altered or replaced shall be required to meet the requirements of Section C403.8.1, Allowable fan motor horsepower. Components replaced or altered shall not exceed the fan power limitation pressure drop adjustment values in Table C403.8.1(2) ~~106~~ design conditions. Section C403.8.1 does not

require the removal and replacement of existing system ductwork.

Section C503.4.2 shall be amended to read as follows:

C503.4.2 Addition of cooling capacity. Where mechanical cooling is added to a space that was not previously cooled, the mechanical system shall comply with either Section C403.3.5 or C403.5.

Exceptions:

1. Qualifying small equipment: Economizers are not required for cooling units and split systems serving one zone with a total cooling capacity rated in accordance with Section C403.3.2 of less than 33,000 Btu/h (hereafter referred to as qualifying small systems) provided that these are high-efficiency cooling equipment with SEER and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.3.2 (1) through (3), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all qualifying small equipment without economizers shall not exceed 72,000 Btu/h per building, or 5 percent of the building total air economizer capacity, whichever is greater.

Notes and exclusions for Exception 1:

- 1.1. The portion of the equipment serving Group R occupancies is not included in determining the total capacity of all units without economizers in a building.
 - 1.2. Redundant units are not counted in the capacity limitations.
 - 1.3. This exception shall not be used for the initial tenant improvement of a shell-and-core building or space, or for total building performance in accordance with Section C407
 - 1.4. This exception shall not be used for unitary cooling equipment installed outdoors or in a mechanical room adjacent to the outdoors
2. Chilled water terminal units connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than minimum part load equipment efficiencies listed in Table C403.3.2(7), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all systems without economizers shall not exceed ~~480,000~~ 72,000 Btu/h (141 kW) per building, or 20 percent of the building total air economizer capacity, whichever is greater.

Notes and exclusions for Exception 4 2:

- 2.1. The portion of the equipment serving Group R occupancy is not included in determining the total capacity of all units without economizers in a building.
- 2.2. This exception shall not be used for the initial tenant improvement of a shell-and-core building or space, or for total building performance in accordance with Section C407.

Section C503.4.3 is amended to read as follows:

C503.4.3 Alterations or replacement of existing cooling systems. Alterations to, or replacement of, existing mechanical cooling systems shall not decrease the building total economizer capacity unless the system complies with either Section C403.3.5 or C403.5. System alterations or replacement shall comply with Table C503.4 when either the individual cooling unit capacity ~~and~~ or the building total capacity of all cooling equipment without economizer ~~do~~ does not comply with Sections C403.3.5 or C403.5.

Table C503.4 is amended to read as follows:

**TABLE C503.4
 ECONOMIZER COMPLIANCE OPTIONS FOR MECHANICAL ALTERATIONS**

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any <i>alteration</i> with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
1. Packaged Units	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: CC403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b
2. Split Systems	Efficiency: min. ^a Economizer: C403.5 ^b	For units ≤ 60,000 Btuh, comply with two of two measures: 1. Efficiency: + 10% ^e 2. Economizer: shall not decrease existing economizer capability For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	For units ≤ 60,000 Btuh replacing unit installed prior to 1991, comply with at least one of two measures: 1. Efficiency: + 10% ^e 2. Economizer: 50% ^f For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b
3. Water Source Heat Pump	Efficiency: min. ^a Economizer: C403.5 ^b	For units ≤72,000 Btuh, comply with at least two of three measures: 1. Efficiency: + 10% ^e 2. Flow control valve ^g 3. Economizer: 50% ^f For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	For units ≤72,000 Btuh, comply with at least two of three measures: 1. Efficiency: + 10% ^e 2. Flow control valve ^g 3. Economizer: 50% ^f (except for certain pre-1991 systems ^h) For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^g)
4. <i>Water Economizer</i> using Air-Cooled Heat Rejection Equipment (Dry Cooler)	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: +5% ^d Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b
5. Air-Handling Unit (including fan coil units) where the system has an air-cooled chiller	Efficiency: min. ^a Economizer: C403.5 ^b	Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^g)	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^g)
6. Air- Handling Unit (including fan coil units) and Water-cooled Process Equipment,	Efficiency: min. ^a Economizer: C403.5 ^b	Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^h and certain 1991-2016 systems ⁱ .)	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^h and certain 1991-2016 systems ⁱ)

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any <i>alteration</i> with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
where the system has a water-cooled chiller ^d				

TABLE C503.4 (Continued)
ECONOMIZER COMPLIANCE OPTIONS FOR MECHANICAL ALTERATIONS

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any <i>alteration</i> with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
7. Cooling Tower	Efficiency: min. ^a Economizer: C403.5 ^b	No requirements	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b
8. Air-Cooled Chiller	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: + 10% ^k Economizer: shall not decrease existing economizer capacity	Efficiency: Comply with two of two measures: 1. + 10% ^{k,l} 2. Multistage Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b
9. Water-Cooled Chiller	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: Comply with at least one of two measures: 1. Part load IPLV + 15% ⁿ 2. Plate frame heat exchanger ^o Economizer: shall not decrease existing economizer capacity	Efficiency: Comply with two of two measures: 1. Part load IPLV + 15% ⁿ 2. Plate frame heat exchanger ^o Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b

- a. Minimum equipment efficiency shall comply with Section C403.3.2 and Tables C403.3.2(1) through C403.3.2(42-13).
- b. All separate new equipment and replacement equipment shall have air economizer complying with Section C403.5 including both the individual unit size limits and the total building capacity limits on units without economizer. It is acceptable to comply using one of the exceptions to Section C403.5.
- c. **Reserved.**
- d. Equipment shall have a capacity-weighted average cooling system efficiency that is 5 percent better than the requirements in Tables C403.3.2(1) and C403.3.2(2) (1.05 x values in Tables C403.3.2(1) and C403.3.2(2)).
- e. Equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(1)A and C403.3.2(2) (1.10 x values in Tables C403.3.2(1)A and C403.3.2(2)).
- f. Minimum of 50 percent air economizer that is ducted in a fully enclosed path directly to every heat pump unit in each zone, except that ducts may terminate within 12 inches of the intake to an HVAC unit provided that they are physically fastened so that the outside air duct is directed into the unit intake. If this is an increase in the amount of outside air supplied to this unit, the outside air supply system shall be configured to provide this additional outside air and be equipped with economizer control.
- g. Water-source heat pump systems shall have a flow control valve to eliminate flow through the heat pumps that are not in operation and variable speed pumping control complying with Section C403.4.3 for that heat pump.
 - When the total capacity of all units with flow control valves exceeds 15 percent of the total system capacity, a variable frequency drive shall be installed on the main loop pump.
 - As an alternate to this requirement, the capacity-weighted average cooling system efficiency shall be 5 percent

- better than the requirements in footnote e for water-source heat pumps (i.e. a minimum of 15 percent better than the requirements in Table C403.3.2(2) (1.15 x values in Table C403.3.2(2)).
- h. Water economizer equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(8) and C403.3.2(9) (1.10 x values in Tables C403.3.2(8) and C403.3.2(9)).
 - i. Air economizer is not required for systems installed with water economizer plate and frame heat exchanger complying with previous codes between 1991 and June 2016, provided that the total fan coil load does not exceed the existing or added capacity of the heat exchangers.
 - j. For water-cooled process equipment where the manufacturers specifications require colder temperatures than available with water-side economizer, that portion of the load is exempt from the economizer requirements.
 - k. The air-cooled chiller shall have an IPLV efficiency that is a minimum of 10 percent greater than the IPLV requirements in EER in Table C403.3.2(7) (1.10 x IPLV values in EER in Table C403.3.2(7)).
 - l. The air-cooled chiller shall be multistage with a minimum of two compressors.
 - m. ~~Reserved. The water-cooled chiller shall have full load and part load IPLV efficiency that is a minimum of 5 percent greater than the IPLV requirements in Table C403.3.2(7) (1.05 x IPLV values in Table C403.3.2(7)).~~
 - n. The water-cooled chiller shall have an IPLV value that is a minimum of 15 percent lower than the IPLV requirements in Table C403.3.2(7), (~~4.45~~ 0.85 x IPLV values in Table C403.3.2(7)). Water-cooled centrifugal chillers designed for non-standard conditions shall have an NPLV value that is at least 15 percent lower than the adjusted maximum NPLV rating in kW per ton defined in Section C403.3.2.1 (~~4.45~~ 0.85 x NPLV).
 - o. Economizer cooling shall be provided by adding a plate-frame heat exchanger on the water-side with a capacity that is a minimum of 20% of the chiller capacity at standard AHRI rating conditions.
 - p. **Reserved.**
 - q. Systems installed prior to 1991 without fully utilized capacity are allowed to comply with Option B, provided that the individual unit cooling capacity does not exceed 90,000 Btuh.

Section C503.5 is amended to read as follows:

C503.5 Service hot water systems. New service hot water systems that are part of the alteration shall comply with Section C404.

Exception. Where only one service hot water appliance is failing and is replaced by another having the same or lesser heating capacity and the same or higher efficiency, no other alterations are made to the central service hot water system, and this exception has not been used within the same building in the previous 24-month period, this provision does not apply.

Section C503.6 is amended to read as follows:

C503.6 Lighting, ~~controlled~~ receptacles and motors. Alterations or the addition of lighting, ~~controlled~~ receptacles and motors shall comply with Sections C503.6.1 through C503.6.6.

Section C503.6.1 is amended to read as follows:

C503.6.1 Luminaire additions and alterations. Alterations that add, alter, or replace ~~50~~ 20 percent or more of the luminaires or of the lamps plus ballasts alone in a space enclosed by walls or ceiling-height partitions, replace ~~50~~ 20 percent or more of parking garage luminaires, or replace ~~50~~ 20 percent or more of the total installed wattage of exterior luminaires shall comply with Sections C405.4 and C405.5. Where less than ~~50~~ 20 percent of the fixtures in an interior space enclosed by walls or ceiling-height partitions or in a parking garage are added or replaced, or less than ~~50~~ 20 percent of the installed exterior wattage is replaced, the installed lighting wattage shall be maintained or reduced.

Section C503.6.3 is amended to read as follows:

C503.6.3 New or moved lighting panel. Where a new lighting panel (or a moved lighting panel) with all new raceway and conductor wiring from the panel to the fixtures is being installed, controls shall also comply with, in addition to the requirements of Section C503.6.2, all remaining requirements in Sections C405.2 and C408.3.

Section C503.6.5 is amended to read as follows:

C503.6.5 Motors. Those motors which are altered or replaced shall comply with Section C405.8. In no case shall the energy efficiency of the building be decreased.

Section C503.6.6 is amended to read as follows:

C503.6.6 Controlled receptacles. Where electric receptacles are added or replaced, controlled receptacles shall be provided in accordance with Section C405.10.

Exceptions:

1. Where an alteration project impacts an area smaller than 5,000 square feet, controlled receptacles are not required.
2. Where existing systems furniture or partial-height relocatable office cubicle partitions are reconfigured or relocated within the same area, controlled receptacles are not required in the existing systems furniture or office cubicle partitions.
3. Where new or altered receptacles meet the exception 1 to Section C405.10, they are not required to be controlled receptacles or be located within 12 inches of non-controlled receptacles.

**SECTION C504
REPAIRS**

Section C504.2 is amended to read as follows:

C504.2 Application. For the purposes of this code, the following shall be considered repairs.

1. Glass only replacements in an existing sash and frame.
2. *Roof repairs.*
3. ~~Air barriers shall not be required for roof repair where the repairs to the building do not include alterations, renovations or repairs to the remainder of the building envelope.~~
4. ~~Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided however that an existing vestibule that separates a conditioned space from the exterior shall not be removed.~~
5. ~~Repairs where only the bulb and/or ballast within the existing luminaires in a space are replaced provided that the replacement does not increase the installed interior lighting power.~~

City Informative Note: Exceptions 3 and 4 appear in the exceptions to Section C503.1.
For Exception 5, see Section C503.6.1.

**SECTION C505
CHANGE OF OCCUPANCY OR USE**

Section C505.1 is amended to read as follows:

C505.1 General. Spaces undergoing a change in occupancy shall be brought up to full compliance with this code in the following cases:

1. Any space that is converted from an F, S or U occupancy to an occupancy other than F, S or U.
2. Any space that is converted to a Group R dwelling unit or portion thereof, from another use or occupancy.
3. Any Group R dwelling unit or portion thereof permitted prior to July 1, 2002, that is converted to a commercial use or occupancy.

Exception: Buildings or spaces that were permitted prior to the 2009 WSEC, or were originally permitted as unconditioned, may comply with this section as follows:

1. Where the component performance alternative in Section C402.1.5 is used to demonstrate compliance with this section, the Proposed Total UA is allowed to be up to 110 percent of the Allowable Total UA. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
2. Where total building performance in Section C407 is used to demonstrate compliance with this section, the total annual carbon emissions from energy consumption of the proposed design is allowed to be 110 percent of the annual carbon emissions from energy consumption allowed by Section C407.3. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
3. Where the building or space is altered to become a bakery, commercial kitchen or commercial laundry, and the proposed design uses only all-electric Energy Star-rated process equipment and code compliant all-electric HVAC equipment, improvements to the building envelope immediately adjoining the spaces containing that use shall not be required. For the purposes of this exception, no fossil fuel burning equipment of any kind may be installed within the building or space undergoing the *change of occupancy*.

Compliance shall include the provisions of Section C406, applied only to the portion of the building undergoing a *change of occupancy* or use. Where the use in a space changes from one use in Table C405.4.2(1) or (2) to another use in Table C405.4.2(1) or (2), the installed lighting wattage shall comply with Section C405.4.

A NEW SECTION, Section C506 is added and shall read as follows:

**SECTION C506
METERING FOR EXISTING BUILDINGS**

City Informative Note: Section C506.1 was relocated from Section C409.5.

C506.1 Existing buildings that were constructed subject to the requirements of this section. Where new or replacement systems or equipment are installed in an existing building that was constructed subject to the requirements of this section, metering shall be provided for such new or replacement systems or equipment so that their energy use is included in the corresponding end-use

category defined in Section C409.3. This includes systems or equipment added in conjunction with additions or alterations to existing buildings.

C506.1.1 Small existing buildings. In buildings that were constructed subject to Section C409, metering and *data acquisition systems* shall be provided for *additions* over 10,000 square feet in accordance with the requirements of sections C409.2, C409.3 and C409.4.

C506.2 Metering for the addition or replacement of HVAC equipment in existing buildings. Where HVAC equipment is added or replaced, metering shall be provided according to Sections C506.2.1 or C506.2.2, as applicable.

C506.2.1 Addition or replacement of individual HVAC equipment pieces. Where HVAC equipment is added or replaced, but compliance with Section C506.2.2 is not required, metering shall be provided as follows, and the data from these meters is permitted to either be stored locally using a manual totalizing meter or other means at the meter or fed into a central data collection system.

1. Electrical metering shall be provided for all of the following:
 - a. Each new or existing branch circuit serving a new piece of HVAC equipment with minimum circuit ampacity (MCA) that equates to 50 kVA or more. A single meter is permitted to serve multiple circuits of the same submetering category from Section C409.3.
 - b. Each new or existing branch circuit supplied by a new electrical panel that is dedicated to serving HVAC equipment. It shall be permitted to meter the circuits individually or in aggregate.
 - c. Each new HVAC fan or pump on a variable speed drive, where the fan, pump, or variable speed drive are new, unless the variable speed drive is integral to a packaged HVAC unit or the existing variable speed drive does not have the capability to provide electric metering output.
2. Natural gas metering shall be provided for each new natural gas connection that is rated at 1,000 kBTU or higher. A single meter is permitted to serve multiple equipment pieces of the same sub-metering category from Section C409.3; HVAC, water heating or process.

C506.2.2 Addition or replacement of the majority of HVAC equipment in a building. Where permits are issued for new or replacement HVAC equipment that has a total heating and cooling capacity greater than 1,200 kBTU/hour and greater than 50 percent of the building's existing HVAC heating and cooling capacity, within any 12-month period, the following shall be provided for the building:

1. Energy source metering required by Section C409.2.
2. HVAC system end-use metering required by Section C409.3.1
3. Data acquisition and display system per the requirements of Section C409.4.

Each of the building's existing HVAC chillers, boilers, cooling towers, air handlers, packaged units and heat pumps that has a capacity larger than 5 tons or that represents more than 10 percent of the total heating and cooling capacity of the building shall be included in the calculation of the existing heating and cooling capacity of the building. Where heat pumps are configured to deliver both heating and cooling, the heating and cooling capacities shall both be included in the calculation of the total capacity.

Each of the building’s existing and new HVAC chillers, boilers, cooling towers, air handlers, packaged units and heat pumps that has a heating or cooling capacity larger than 5 tons or that represents more than 10 percent of the total heating and cooling capacity of the building shall be included in the HVAC system end-use metering.

Construction documents for new or replacement heating and cooling equipment projects shall indicate the total heating and cooling capacity of the building’s existing HVAC equipment and the total heating and cooling capacity of the new or replacement equipment. Where permits have been issued for new or replacement heating and cooling equipment within the 12-month period prior to the permit application date, the heating and cooling capacity of that equipment shall also be indicated. For the purpose of this tabulation, heating and cooling capacities of all equipment shall be expressed in kBTU / hour.

C506.3 Tenant space electrical sub-metering for existing buildings. For tenant improvements in which a single tenant will occupy a full floor or multiple floors of a building, the electrical consumption for the tenant space on that floor shall be separately metered, and the metering data provided to the tenant with a display system per the requirements of Section C409.4.3. For the purposes of this section, separate end use categories need not be segregated.

EXCEPTION: Where an existing branch circuit electrical panel serves tenant spaces on multiple full floors of a building, the floors served by that panel are not required to comply with this section.

C506.4 Metering for complete electrical system replacement. If all, or substantially all, of the existing electrical system is replaced under a single electrical permit or within a 12-month period, all of the provisions of Section C409 shall be met.

AMENDMENTS TO CHAPTER 6

**CHAPTER 6
 REFERENCED STANDARDS**

The following sections, ASHRAE and HVI, of the Referenced Standards Table is amended to read as follow:

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329-2305	Referenced in code section number
Standard reference number	Title	
ANSI/ASHRAE/ACCA Standard 127-2007	Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners	C403.4.1
Standard 183—2007	Peak Cooling and Heating Load Calculations in Buildings, Except Low-rise Residential Buildings.....	C403.1.2
ANSI/ASHRAE/ASHE Standard 170-2017	Ventilation of Health Care Facilities.....	C403.1.1
ASHRAE—2016	ASHRAE HVAC Systems and Equipment Handbook—2004.....	C403..1.2

ISO/AHRI/ASHRAE 13256-1 (2011)	Water-source Heat Pumps—Testing and Rating for Performance— Part 1: Water-to-air and Brine-to-air Heat Pumps Table C403.3.2(2)
ISO/AHRI/ASHRAE 13256-2 (2011)	Water-source Heat Pumps—Testing and Rating for Performance— Part 2: Water-to-water and Brine-to-water Heat Pumps Table C403.3.2(2)
90.1— 2016 <u>2019</u>	Energy Standard for Buildings Except Low-rise Residential Buildings C402.1.5.1, C407.3
90.4— 2016 <u>2019</u>	Energy Standard for Data Centers C403.1.3
146—2011	Testing and Rating Pool Heaters Table C404.2

HVI

Home Ventilating Institute
1740 Dell Range Blvd., Ste H.450
Cheyenne, WY 82009

Standard reference number	Title	Referenced in code section number
<u>HVI 916—2015</u>	<u>Home Ventilating Institute Airflow Test Procedure 916-2015</u>	<u>C403.8.4</u>
<u>HVI 920—2020</u>	<u>Product Performance Certification Procedure Including Verification and Challenge 920-2020</u>	<u>C403.3.6</u>

APPENDIX A is amended to read as follows:

**APPENDIX A
DEFAULT HEAT LOSS COEFFICIENTS**

**TABLE A102.2.6(1)
ASSEMBLY U-FACTORS FOR ROOFS WITH TAPERED INSULATION ENTIRELY ABOVE DECK
SINGLE SLOPE RECTANGULAR TO ONE-SIDE((d,f,g,h,i)) a,d,g,h,i,j
(UNINTERRUPTED BY FRAMING)
*[The remainder of the table is not shown]***

**TABLE A102.2.6(2)
ASSEMBLY U-FACTORS FOR ROOFS WITH TAPERED INSULATION ENTIRELY ABOVE DECK
SLOPED TRIANGLE (ROOF WITH CENTER DRAIN)((e,f,g,h,i)) a,b,e,g,h,i,j
(UNINTERRUPTED BY FRAMING)
*[The remainder of the table is not shown]***

**TABLE A102.2.6(3)
ASSEMBLY U-FACTORS FOR ROOFS WITH TAPERED INSULATION ENTIRELY ABOVE DECK
SLOPED TRIANGLE (ROOF WITH PERIMETER DRAINS)((e,f,g,h,i)) a,c,f,g,h,i,j
(UNINTERRUPTED BY FRAMING)
i**

Footnotes to Tables A102.2.6.1, A102.2.6.2, and A102.2.6.3:

- a. R_{max} and R_{min} are determined along the linearly tapered cross section for the respective ~~minimum and maximum~~ and minimum thickness values for the roof section being analyzed.
- b. For triangular roof sections with insulation sloping to the center, R_{max} refers to the insulation value along the long edge of the triangle and R_{min} to the insulation at the point of the triangle ~~which assumes that the insulation slopes to the center~~.
- c. For triangular roof sections with insulation sloping to the perimeter, R_{max} refers to the insulation value at the point of the triangle and R_{min} to the insulation along the long edge of the triangle which assumes that the insulation slopes to the perimeter.
- d. Effective U-factor for R-value of rectangular tapered insulation is calculated as follows:

$$R_{eff} = (R_{max} - R_{min}) / \ln \left[\frac{R_{max}}{R_{min}} \right]$$

- e. Effective U-factor for R-value of triangular tapered insulation sloping to the center is calculated as follows:

$$R_{eff} = \left[\frac{2}{R_{max} - R_{min}} \left[1 + \frac{R_{min}}{R_{max} - R_{min}} \ln \left[\frac{R_{min}}{R_{max}} \right] \right] \right]^{-1}$$

- f. Effective R-value of triangular tapered insulation sloping to the perimeter is calculated as follows:

$$R_{eff} = \left[\frac{2}{R_{min} - R_{max}} \left[1 + \frac{R_{max}}{R_{min} - R_{max}} \ln \left[\frac{R_{max}}{R_{min}} \right] \right] \right]^{-1}$$

- g. Assembly U-factors include the effective R-value of the tapered insulation, an exterior air film (R=0.17) and an interior air film, horizontal with heat flow up (R=0.61).
- h. For effective U-factors of roof assemblies with different R_{max} or R_{min} values not listed in the tables interpolation is allowed. For effective U-factors of roof assemblies with R_{max} greater than the values listed in the tables, the effective U-factor must be calculated using the effective R-value calculations above.
- i. This table shall only be applied to tapered insulation that is tapered along only one axis.
- j. In areas of differing insulation slopes/configurations, individual U-values U-factors shall be calculated and an area weighted U-value U-factor calculation shall be used to determine the effective value of the roof.

Appendix D is amended as follows:

**APPENDIX D
CALCULATION OF HVAC TOTAL SYSTEM PERFORMANCE RATIO**

Section D101 is amended to read as follows:

D101 Scope. This appendix establishes criteria for demonstrating compliance using the *HVAC total system performance ratio* (HVAC TSPR) for systems serving office, retail, library, and education occupancies and buildings, which are subject to the requirements of Section C403.3.5 without exception and dwelling units and common areas within multifamily buildings. Those HVAC systems shall comply with Section C403 and this appendix as required by Section C403.1.1.

Table C407.1 is amended to read as follows:

TABLE C407.1 CARBON EMISSIONS FACTORS

Type	CO ₂ e (lb/unit)	Unit
Electricity	0.70	kWh
Natural gas	11.70	Therm
Oil	19.2	Gallon
Propane	10.5	Gallon
Other ^a	195.00	mmBtu
On-site renewable energy ^b	0.00	

a. District energy systems may use alternative emissions factors supported by calculations approved by the *code official*.

b. The TSPR calculation does not separately account for the use of renewable energy.

Section D601.2.1 is amended to read as follows:

D601.2.1 Number of blocks. One or more *blocks* may be required per building based on the following restrictions:

1. Each *block* can have only one occupancy type (multifamily dwelling unit, multifamily common area, office, library, education, or retail). Therefore, at least one single *block* shall be created for each unique use type.
2. Each *block* can be served by only one type of HVAC system. Therefore, a single *block* shall be created for each unique HVAC system and use type combination. Multiple HVAC units of the same type may be represented in one *block*. Table D601.10.2 provides directions for combining multiple HVAC units or components of the same type into a single *block*.
3. Each *block* can have a single definition of floor to floor or floor to ceiling heights. Where floor heights differ by more than two feet, unique *blocks* should be created for the floors with varying heights.
4. Each *block* can include either above grade or below grade floors. For buildings with both above grade and below grade floors, separate *blocks* should be created for each. For buildings with floors partially above grade and partially below grade, if the total wall area of

the floor(s) in consideration is greater than or equal to 50 percent above grade, then it should be simulated as a completely above grade *block*, otherwise it should be simulated as a below grade *block*.

5. Each wall on a façade of a *block* shall have similar vertical fenestration. The product of the proposed design U-factor times the area of windows (UA) on each façade of a given floor cannot differ by more than 15 percent of the average UA for that façade in each *block*. The product of the proposed design SHGC times the area of windows (USHGC) on each façade of a given floor cannot differ by more than 15 percent of the average USHGC for that façade in each *block*. If either of these conditions are not met, additional *blocks* shall be created consisting of floors with similar fenestration.
6. For a building model with multiple *blocks*, the *blocks* should be configured together to have the same adjacencies as the actual building design.

Section D601.4.1 is amended to read as follows:

D601.4.1 Occupancy type. The occupancy type for each *block* shall be consistent with the building area type as determined in accordance with C405.4.2.1. Portions of the building that are building area types other than multifamily, office, school (education), library, or retail shall not be included in the simulation.

Section D601.4.2 is amended to read as follows:

D601.4.2 Occupancy schedule, density, and heat gain. The occupant density, heat gain, and schedule shall be for multifamily, office, retail, library, or school as specified by ASHRAE Standard 90.1 Normative Appendix C.

Section D601.06 is amended to read as follows:

D601.6 Lighting. Interior lighting power density shall be equal to the allowance in Table C405.4.2(1) for multifamily, office, retail, library, or school. The lighting schedule shall be for multifamily, office, retail, library, or school as specified by ASHRAE Standard 90.1 Normative Appendix C. The impact of lighting controls is assumed to be captured by the lighting schedule and no explicit controls shall be modeled. Exterior lighting shall not be modeled.

Section D601.7 is amended to read as follows:

D601.7 Miscellaneous equipment. The miscellaneous equipment schedule and power shall be for multifamily, office, retail, library, or school as specified by ASHRAE Standard 90.1 Normative Appendix C. The impact of miscellaneous equipment controls is assumed to be captured by the equipment schedule and no explicit controls shall be modeled.

Exceptions.

1. Multifamily dwelling units shall have a miscellaneous load density of 0.42 W/ft²
2. Multifamily common areas shall have a miscellaneous load density of 0 W/ft²

Table D601.11.2 is amended to read as follows:

**TABLE D601.11.2
 PROPOSED BUILDING SYSTEM PARAMETERS**

Category	Parameter	Fixed or User Defined	Required	Applicable Systems
HVAC System Type	System Type	User Defined	Selected from Table D601.11.1	All
System Sizing	Design Day Information	Fixed	99.6% heating design and 1% dry-bulb and 1% wet-bulb cooling design	All
	Zone Coil Capacity	Fixed	Sizing factors used are 1.25 for heating equipment and 1.15 for cooling equipment	All
	Supply Airflow	Fixed	Based on a supply-air-to-room-air temperature set-point difference of 20°F	1-11
		Fixed	Equal to required outdoor air ventilation	12
Outdoor Ventilation Air	Outdoor Ventilation Air Flow Rate	Fixed	As specified in ASHRAE Standard 90.1 Normative Appendix C, adjusted for proposed DCV control	All
System Operation	Space Temperature Setpoints	Fixed	As specified in ASHRAE Standard 90.1 Normative Appendix C, <u>except multifamily which shall use 68°F heating and 76°F cooling setpoints</u>	1-11
	Fan Operation – Occupied	User Defined	Runs continuously during occupied hours or cycled to meet load	1-11
	Fan Operation – Occupied	Fixed	Fan runs continuously during occupied hours	12
	Fan Operation – Night Cycle	Fixed	Fan cycles on to meet setback temperatures	1-11
Packaged Equipment Efficiency	DX Cooling Efficiency	User Defined	Cooling COP without fan energy calculated in accordance with ASHRAE Standard 90.1 Section 11.5.2c ^b	1, 2, 3, 4, 5, 7, 8, 9, 11, 12
	Heat Pump Efficiency	User Defined	Heating COP without fan energy calculated in accordance with ASHRAE Standard 90.1 Section 11.5.2c ^c	2, 4, 5, 7, 8
	Furnace Efficiency	User Defined	Furnace thermal efficiency ^c	3, 11
Heat Pump Supplemental Heat	Control	Fixed	Supplemental electric heat locked out above 40°F. Runs in conjunction with compressor between 40°F and 0°F.	2, 4
System Fan Power	Design Fan Power (W/cfm)	User Defined	Input electric power for all fans in required to operate at <i>fan system design conditions</i> divided by the supply airflow rate	All
	Single Zone System Fan Power During Dead band (W/cfm)	User Defined	W/cfm during dead band for VAV or multispeed single zone fans	3, 4, 5, 6, 7, 8
Variable Air Volume Systems	Part Load Fan Controls	User Defined	VFD included. User specifies presence of static pressure reset.	9, 10, 11
	Supply Air Temperature Controls	User Defined	If not SAT reset constant at 55°F. SAT reset results in 60°F SAT during low load conditions	9, 10, 11

	Minimum Terminal Unit airflow percentage	User Defined	Average minimum terminal unit airflow percentage for <i>block</i> weighted by cfm	9, 10, 11
	Terminal Unit Heating Source	User Defined	Electric or hydronic	9, 10, 11
	Fan Powered Terminal Unit (FPTU) Type	User Defined	Series or parallel FPTU	11
	Parallel FPTU Fan	Fixed	Sized for 50% peak primary air at 0.35 W/cfm	11
	Series FPTU Fan	Fixed	Sized for 50% peak primary air at 0.35 W/cfm	11
Economizer	Economizer Presence	User Defined	Yes or No	3, 4, 9, 10, 11
	Economizer ((High Limit)) Control Type	Fixed	((75°F fixed)) <u>Differential</u> dry-bulb	3, 4, 9, 10, 11

Table D602.11 is amended to read as follows:

**TABLE D602.11
 STANDARD REFERENCE DESIGN HVAC SYSTEMS**

Parameter	Building Type				
	Large Office ^a	Small Office and Libraries ^a	Retail	School	<u>Multifamily</u>
System Type	Water-source Heat Pump	Packaged air-source Heat Pump	Packaged air-source Heat Pump	Packaged air-source Heat Pump	<u>Packaged air-source Heat Pump</u>
Fan control ^b	Cycle on load	Cycle on load	Cycle on load	Cycle on load	<u>Cycle on load</u>
Space condition fan power (W/cfm)	0.528	0.528	0.522	0.528	<u>0.528</u>
Heating/Cooling sizing factor ^c	1.25/1.15	1.25/1.15	1.25/1.15	1.25/1.15	<u>1.25/1.15</u>
Supplemental heating availability	NA	<40°F	<40°F	<40°F	<u><40°F</u>
Modeled cooling COP (Net of fan) ^d	4.46	3.83	4.25	3.83	<u>3.83</u>
Modeled heating COP (Net of fan) ^d	4.61	3.81	3.57	3.81	<u>3.86</u>
Cooling Source	DX (heat pump)	DX (heat pump)	DX (heat pump)	DX (heat pump)	<u>DX (heat pump)</u>
Heat source	Heat Pump	Heat Pump	Heat Pump	Heat Pump	<u>Heat Pump</u>
OSA Economizere ^e	No	No	Yes	Yes	<u>Yes</u>
Occupied ventilation source ^f	DOAS	DOAS	DOAS	DOAS	<u>DOAS</u>
DOAS Fan Power (W/cfm of outside air)	0.819	0.819	0.730	0.742	<u>0.78</u>
DOAS temperature control ^{g, h}	Bypass	Wild	Bypass	Bypass	<u>Wild</u>
ERV efficiency (sensible only)	70%	70%	70%	70%	<u>70%</u>
WSHP Loop Heat Rejection	Cooling Tower ⁱ	NA	NA	NA	<u>NA</u>
WSHP Loop Heat Source	Gas Boiler ^j	NA	NA	NA	<u>NA</u>
WSHP Loop Temperature Control ^k	50°F to 70°F	NA	NA	NA	<u>NA</u>
WSHP circulation Pump W/gpm ^l	16	8a-121 NA	NA	NA	<u>NA</u>

Parameter	Building Type				
	Large Office ^a	Small Office and Libraries ^a	Retail	School	<u>Multifamily</u>
WSHP Loop Pumping Control ^m	HP Valves & pump VSD	NA	NA	NA	<u>NA</u>

Footnotes to Table D602.11

- a. Offices <50,000 ft² use “Small Office” parameters; otherwise use “Large Office” parameters.
- b. Space conditioning system shall cycle on to meet heating and cooling set point schedules as specified in ASHRAE Standard 90.1 Normative Appendix C. One space conditioning system is modeled in each zone. Conditioning system fan operation is not necessary for ventilation delivery.
- c. The equipment capacities (i.e. system coil capacities) for the *standard reference design* building design shall be based on design day sizing runs and shall be oversized by 15% for cooling and 25% for heating.
- d. COPs shown are direct heating or cooling performance and do not include fan energy use. See 90.1 appendix G (G3.1.2.1) for separation of fan from COP in packaged equipment for units where the efficiency rating includes fan energy (e.g., SEER, EER, HSPF, COP).
- e. Economizer on space conditioning systems shall be simulated when outdoor air conditions allow free cooling. Economizer high limit shall be based on differential dry-bulb control. DOAS system continues to operate during economizer mode.
- f. Airflow equal to the outside air ventilation requirements is supplied and exhausted through a separate DOAS system including a supply fan, exhaust fan, and sensible only heat exchanger. No additional heating or cooling shall be provided by the DOAS. A single DOAS system will be provided for each *block*. The DOAS supply and return fans shall run whenever the HVAC system is scheduled to operate in accordance with ASHRAE Standard 90.1 Normative Appendix C.
- g. “Wild” DOAS control indicates no active control of the supply air temperature leaving the DOAS system. Temperature will fluctuate based only on entering and leaving conditions and the effectiveness of ERV.
- h. “Bypass” DOAS control includes modulating dampers to bypass ERV with the intent to maintain supply air temperature at a maximum of 60°F when outside air is below 75°F. Once outside air is above 75°F bypass dampers will be fully closed.
- i. Includes a single axial fan cooling tower with variable-speed fans at 40.2 gpm/hp, sized for an approach of 10°F and a range of 10°F.
- j. Includes a single natural draft boiler with 80% Et.
- k. Loop boiler and heat rejection shall be controlled to maintain loop temperature entering heat pumps between 50°F and 70°F.
- l. Pump motor input power shall be 16 W/gpm.
- m. Loop flow shall be variable with variable speed drive pump and unit fluid flow shutoff at each heat pump when its compressor cycles off.

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Action on Ordinance No. 950 - Amending Shoreline Municipal Code Chapter 10.20 Speed Limits
DEPARTMENT:	Public Works
PRESENTED BY:	Kendra Dedinsky, City Traffic Engineer
ACTION:	<input checked="" type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

PROBLEM/ISSUE STATEMENT:

Fatal and serious injury collisions are on the rise in Shoreline. High vehicle speed is a key factor in these types of collisions, particularly for pedestrians and bicyclists. Recent research and associated updates to speed limit setting methods recognize that speed limits are an important tool for creating safer streets.

Therefore, as was discussed with the City Council at their November 22, 2021 regular meeting, staff recommends a speed limit reduction of five (5) miles per hour (mph), from 35 mph to 30 mph, for five of the six study corridors including:

- N/NE 175th Street from Aurora Avenue N to 15th Avenue NE,
- Meridian Avenue N from N 145th Street to NE 205th Street,
- 15th Avenue NE from NE 145th Street to NE 175th Street,
- Greenwood Avenue N from N 145th Street to NW Innis Arden Way, and
- N/NW Richmond Beach Road from 8th Avenue NW to Fremont Avenue N.

This recommendation is included in proposed Ordinance No. 950 (Attachment A). Tonight, Council is scheduled to take action on this proposed Ordinance. Also included in this staff report for Council’s consideration is amendatory language to add two corridors to proposed Ordinance No. 950 for a similar five (5) mph speed limit reduction, from 35 mph to 30 mph, as discussed by some Councilmembers on November 22nd.

RESOURCE/FINANCIAL IMPACT:

The financial impact of lowering speed limits on the five recommended corridors is estimated to be approximately \$12,000 and would be funded by the Traffic Safety Capital Improvement Program. The majority of this cost is associated with physical sign changes, although a very small portion will be used for public education efforts such as yard signs to highlight the changes and provide a link to more information. The Shoreline Police Department anticipates any emphasis efforts associated with these speed limit changes can be absorbed within their existing operating budget.

RECOMMENDATION

Staff recommends that the City Council move to adopt proposed Ordinance No. 950.

Approved By: City Manager ***DT*** City Attorney ***MK***

BACKGROUND

Shoreline Municipal Code (SMC) [Chapter 10.20 Speed Limits](#) adopts by reference Washington Administrative Code (WAC) 308-330-423 Speed Restrictions, which sets a base 25 mph speed limit for arterials. This WAC incorporates various provisions of the RCW including RCW 41.61.415. This RCW permits local jurisdictions to establish or alter speed limits established by the State Department of Transportation on the basis of an engineering and traffic investigation; determining the proper maximum speed for all arterial streets. Based on this authority, SMC 10.20.010 establishes a maximum speed limit of 30 mph, 35 mph, or 40 mph for various arterial roadways throughout the city.

Throughout 2020, staff worked on a speed limit study with traffic engineering consultant DKS, a leader and expert in evolving speed limit setting practices. The study and results were presented to the Council on January 4, 2021 and are available at the following link: [January 4, 2021 staff report on Discussion of the Arterial Speed Limit Study](#). Based on this meeting, staff prepared proposed amendments to SMC Chapter 10.20.

On November 22, 2021, staff presented the proposed amendments to SMC Chapter 10.20 Speed Limits (Attachment A, Exhibit A) for Council consideration. Specifically, staff proposed a speed limit reduction of five (5) miles per hour (mph), from 35 mph to 30 mph, for the following five corridors:

- N/NE 175th Street from Aurora Avenue N to 15th Avenue NE,
- Meridian Avenue N from N 145th Street to NE 205th Street,
- 15th Avenue NE from NE 145th Street to NE 175th Street,
- Greenwood Avenue N from N 145th Street to NW Innis Arden Way, and
- N/NW Richmond Beach Road from 8th Avenue NW to Fremont Avenue N

This recommendation is included in proposed Ordinance No. 950 (Attachment A). The Staff Report for the November 22nd Council discussion is available at the following link: [November 22, 2021 staff report on Discussion of Ord. No 950 Speed Limit Reductions](#).

DISCUSSION

At the November 22nd Council meeting, Council generally expressed support for the amendments in proposed Ordinance No. 950. Additionally, there was some interest expressed in reducing the speed limit from 35 mph to 30 mph at two (2) additional locations:

- On 15th Avenue NE between NE 180th Street and NE 196th Street, and
- On Dayton Avenue N between Westminster Way North and Carlyle Hall Road North.

If a Councilmember would like to include these locations for a speed limit reduction in proposed Ordinance No. 950, a councilmember would need to make the following motion:

I move to amend Exhibit A to Ordinance No. 950 to reduce the speed limit to 30 mph on 15th Avenue NE from NE 180th Street to NE 196th Street and Dayton Avenue North from Westminster Way North to Carlyle Hall Road N from the 35 mph currently shown in SMC 10.20.010(B).

Tonight, Council is scheduled to take action on proposed Ordinance 950.

COUNCIL GOAL(S) ADDRESSED

This item addresses the following City Council Goals:

- Goal 2: Continue to deliver highly-valued public services through management of the City's infrastructure and stewardship of the natural environment.
- Goal 4: Promote and enhance the City's safe community and neighborhood programs and initiatives.

RESOURCE/FINANCIAL IMPACT

The financial impact of lowering speed limits on the five recommended corridors is estimated to be approximately \$12,000 and would be funded by the Traffic Safety Capital Improvement Program. The majority of this cost is associated with physical sign changes, although a very small portion will be used for public education efforts such as yard signs to highlight the changes and provide a link to more information. The Shoreline Police Department anticipates any emphasis efforts associated with these speed limit changes can be absorbed within their existing operating budget.

RECOMMENDATION

Staff recommends that the City Council move to adopt proposed Ordinance No. 950.

ATTACHMENTS

Attachment A – Proposed Ordinance No. 950

Exhibit A – Amendments to SMC Chapter 10.20

ORDINANCE NO. 950

AN ORDINANCE OF THE CITY OF SHORELINE, WASHINGTON, AMENDING CHAPTER 10.20 SPEED LIMITS OF THE SHORELINE MUNICIPAL CODE TO LOWER SPEED LIMITS ON CERTAIN ARTERIAL CORRIDORS.

WHEREAS, RCW 41.61.415 authorizes the City of Shoreline to determine and declare a reasonable and safe maximum speed limit for all arterial streets; and

WHEREAS, based on the City's 2018 Annual Traffic Report, in 2020 City Staff worked on a speed limit study utilizing data from the National Cooperative Highway Research Program Project 17-76 to evaluate six arterial corridors; and

WHEREAS, these six arterial corridors were selected for study based on multiple factors including existing speed limit, collision history, recent changes to road cross section, or adjacent land use; and

WHEREAS, at its January 4, 2021, regular meeting, the City Council discussed the Arterial Speed Limit Study; and

WHEREAS, based on this discussion, City Staff proposed to reduce the speed limit by five (5) miles per hour on five (5) of the six (6) corridors studied; and

WHEREAS, the City Council discussed the proposed speed limit reduction at its November 22, 2021, regular meeting; and

WHEREAS, the City Council has determined that the amendments to SMC Chapter 10.20 are in the best interests of the City of Shoreline and the health, safety, and welfare of its residents;

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. Amendment – SMC 10.20 Speed Limits. SMC Chapter 10.20 is amended as set forth in Exhibit A to this Ordinance.

Section 2. Corrections by City Clerk or Code Reviser. Upon approval of the City Attorney, the City Clerk and/or the Code Reviser are authorized to make necessary corrections to this Ordinance, including the corrections of scrivener or clerical errors; references to other local, state, or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering and references.

Section 3. Severability. Should any section, subsection, paragraph, sentence, clause, or phrase of this Ordinance or its application to any person or situation be declared unconstitutional or invalid for any reason, such decision shall not affect the validity of the remaining portions of this Ordinance or its application to any person or situation.

Section 4. Publication and Effective Date. A summary of this Ordinance consisting of the title shall be published in the official newspaper as soon as practicable after passage. This Ordinance shall take effect at 12:01 am local time on June 1, 2022.

PASSED BY THE CITY COUNCIL ON DECEMBER 6, 2021.

Mayor Will Hall

ATTEST:

APPROVED AS TO FORM:

Jessica Simulcik Smith
City Clerk

Julie K Ainsworth-Taylor
Assistant City Attorney
on behalf of Margaret King, City Attorney

Date of Publication: _____, 2021
Effective Date: June 1, 2022

SMC 10.20.010 is amended to read as follows:

10.20.010 Speed limits.

WAC 308-330-423 is adopted to establish rules governing motor vehicle speed within the city; provided, that the speed limit for all streets within the city shall be 25 miles per hour, except as designated below:

A. 30 Miles Per Hour.

NW 196th Street from 23rd Avenue NW to 20th Avenue NW;

NW 195th Street from 20th Avenue NW to 15th Avenue NW;

NW Innis Arden Way from Greenwood Avenue North to 10th Avenue NW;

NW Richmond Beach Road from 15th Avenue NW to 8th Avenue NW;

North 160th Street from Greenwood Avenue North to Dayton Avenue North;

North 175th Street from Fremont Avenue North to Aurora Avenue North;

North 185th Street from Fremont Avenue North to 1st Avenue NE;

North 150th Street from 15th Avenue NE to 25th Avenue NE;

North 155th Street from Aurora Avenue North to 1st Avenue NE;

NE 155th Street from 1st Avenue NE to 15th Avenue NE;

NE 168th Street from 15th Avenue NE to 25th Avenue NE (south leg);

NE 175th Street from 15th Avenue NE to 22nd Avenue NE;

NE 185th Street from 1st Avenue NE to 10th Avenue NE;

8th Avenue NW from NW 180th Street to NW Richmond Beach Road;

8th Avenue NW from NW Richmond Beach Road to the northerly city limits (NW 205th Street);

Greenwood Avenue North from NW Innis Arden Way to North Carlyle Hall Road;

Dayton Avenue North from Carlyle Hall Road N to N Richmond Beach Road;

Fremont Avenue North from North 165th Street to the northerly city limits (North 205th Street);

Ashworth Avenue North from North 155th Street to North 200th Street;

1st Avenue NE from the southerly city limits (NE 145th Street) to NE 155th Street;

3rd Avenue NW from Richmond Beach Road NW to the northerly city limits (NW 205th Street);

5th Avenue NE from the southerly city limits (NE 145th Street) to the northerly city limits (NE 205th Street);

10th Avenue NE from NE 175th Street to NE 190th Street;

15th Avenue NE from NE 196th Street to Ballinger Way NE;

19th Avenue NE from 15th Avenue NE to NE 205th Street;

24th Avenue NE from 15th Avenue NE to 25th Avenue NE;

25th Avenue NE from the southerly city limits (NE 145th Street) to NE 178th Street;

25th Avenue NE from Ballinger Way NE to NE 205th Street.;

N/NE 175th Street from Aurora Avenue N to 15th Avenue NE;

Meridian Avenue North from the southerly city limits (North 145th Street) to the northerly city limits (North 205th Street);

15th Avenue NE from the southerly city limits (NE 145th Street) to NE 175th Street;

Greenwood Avenue N from the southerly city limits (North 145th Street) to NW Innis Arden Way;

N/NW Richmond Beach Road from 8th Avenue NW to Fremont Avenue North.

B. 35 Miles Per Hour.

~~NW Richmond Beach Road from 8th Avenue NW to Fremont Avenue North;~~

~~North 175th Street from Aurora Avenue North to Interstate 5;~~

~~NE 175th Street from Interstate 5 to 15th Avenue NE;~~

North 160th Street from Dayton Avenue North to Aurora Avenue North;

North 155th Street from Westminster Way North to Aurora Avenue North;

~~Greenwood Avenue North from the southerly city limits (North 145th Street) to NW Innis Arden Way;~~

Westminster Way North from Greenwood Avenue North to Aurora Avenue North;

Dayton Avenue North from Westminster Way North to Carlyle Hall Road N;

~~Meridian Avenue North from the southerly city limits (North 145th Street) to the northerly city limits (North 205th Street);~~

1st Avenue NE from NE 195th Street to the northerly city limits (NE 205th Street);

ORDINANCE NO. 950
SMC Chapter 10.20

~~15th Avenue NE from the southerly city limits (NE 145th Street) to NE 175th Street;~~

15th Avenue NE from NE 180th Street to NE 196th Street.

C. 40 Miles Per Hour.

Aurora Avenue North from the southerly city limits (North 145th Street) to the northerly city limits (North 205th Street).

D. 45 Miles Per Hour. [Reserved].

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Discussion of Utility Undergrounding for the 175 th Street (Stone to I-5) Project		
DEPARTMENT:	Public Works		
PRESENTED BY:	Tricia Juhnke, City Engineer		
ACTION:	<input type="checkbox"/> Ordinance	<input type="checkbox"/> Resolution	<input type="checkbox"/> Motion
	<input checked="" type="checkbox"/> Discussion	<input type="checkbox"/> Public Hearing	

PROBLEM/ISSUE STATEMENT:

The 2021-2026 Capital Improvement Plan identifies a project along N 175th Street from Stone Avenue N to Interstate 5. The project will maintain levels of service and promote safety by widening the roadway, constructing multi-modal improvements along the full length of the corridor, revising traffic channelization and providing intersection improvements at N 175th Street and Meridian Avenue N.

Staff is requesting direction from Council on the staff recommendation to include undergrounding of existing overhead utilities as part of the project. If Council supports this recommendation, the Project will advance with design and construction of utility undergrounding.

RESOURCE/FINANCIAL IMPACT:

The 2021 – 2026 Capital Improvements Program includes a summary of funding for the N 175th Street Project. The table below provides an updated project budget reflective of the most current engineers estimates (30% Complete). City expenditures for utility undergrounding are included in the table to support Council’s decision-making process. Impacts to City utility rate payers is discussed in depth in other sections of this report.

EXPENDITURES

Design

Staff and Other Direct Expenses	\$533,000.00
Design Contract	\$4,789,529.00

Right of Way \$7,100,000.00

Construction \$41,301,373.70

Utility Undergrounding (Design + Construction) \$1,870,000.00

TOTAL \$55,593,902.70

REVENUE

WSDOT Surface Transportation Program	\$3,546,500.00
Transportation Impact Fees	\$6,076,498.96
Future Funds	\$45,970,903.74
TOTAL	\$55,593,902.70

In addition to these project costs, the undergrounding of electrical system would result in an increase to rate payers of approximately \$1.00 per billing period (once every two months) for 25 years.

RECOMMENDATION

No action is required tonight; this item is for discussion purposes only. Staff is seeking Council direction on the staff recommendation to proceed with utility undergrounding as part of the 175th Street (Stone Avenue N to I-5) project.

Approved By: City Manager **DT** City Attorney **MK**

INTRODUCTION

On February 1, 2021, the City Council provided direction to proceed with the design of utility undergoing to the 30% design level. In summer 2021, 30% design was achieved. This staff report is a continuation of the discussion regarding the inclusion of utility undergrounding in the project scope with the additional information developed to date.

BACKGROUND

The N 175th Street Project, from Stone Avenue N to Interstate 5 (see Attachment A, Project Vicinity Map) is intended to support growth and promote safety by widening the roadway, constructing multi-modal improvements along the full length of the corridor, revising traffic channelization, and providing intersection improvements at N 175th Street and Meridian Avenue N. This project is also designated as one of seven growth projects in the City's Transportation Master Plan and is eligible to utilize Transportation Impact Fees (TIF) for local funding match against grant funds.

The N 175th Street Project will provide mobility and safety improvements to pedestrians, cyclists and drivers using this corridor. Planned improvements may include reconstruction of the existing street to provide two traffic lanes in each direction; medians and turn pockets; bicycle lanes; a multi-use path; curb, gutter, and sidewalk with planter strip where feasible; illumination; landscaping; and retaining walls. Intersections with high accident rates will also be improved as part of this project.

On July 13, 2020, staff presented a project update to the City Council which include a summary of the initial phase of project public outreach (Phase 1 Public Outreach) and presentation of the draft design concepts. The staff report for this Council presentation can be found at the following link:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2020/staffreport071320-9b.pdf>.

The City has policies supporting undergrounding of overhead power and communications utilities on City projects in the Comprehensive Plan (Comp Plan), the Shoreline Municipal Code (SMC), and the Seattle City Light (SCL) franchise agreement. The Comp Plan calls for the City to “promote the undergrounding of new and existing electric distribution lines... as streets are improved and/or areas are redeveloped...”

SMC Section 13.20.050 designates that undergrounding will occur when (portion relevant to this issue):

- A. The City Council designates for undergrounding a capital improvement or public works project, including sidewalk project and roadway projects, which will disturb existing facilities or will facilitate the installation of a trench for undergrounding facilities.

On March 16, 2020, the Council discussed and defined criteria to use in evaluating projects for undergrounding of overhead utilities. The March 16, 2020 staff report can be found at the following link:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2020/staffreport031620-9a.pdf>.

On February 1, 2021, staff presented a recommendation to include undergrounding of the existing overhead utilities as part of the Project. Guidance from Council included advancing the design of undergrounding to the 30% design level and continuing the discussion when the 30% design is available. The staff report for this discussion item can be found at the following link:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport020121-8a.pdf>.

DISCUSSION

The undergrounding criterion discussed with the City Council on March 16, 2020 has been applied for the N 175th Project with the Project separated into two segments – Stone Avenue N to Meridian Avenue N and Meridian Avenue N to I-5. The same discussion criteria was provided in the February 1, 2021 staff report; however, the data and tables below have been updated based on the 30% design. Table 1 below summarizes the information. The criteria are not weighted but provide a visual for discussion.

Takeaways from the criterion and project features include:

- The Project meets the City’s requirements for undergrounding.
- The Project is eligible to use the City’s SCL franchise agreement for undergrounding.
- The project will require relocation of the existing overhead utilities.
- The project will require trenching for (at a minimum) the installation of stormwater conveyance.
- The project is not within an area anticipating re-development, but the segment between Stone Avenue N and Meridian Avenue N has mix of uses including single and multi-family residential, a school, City property and a church.
- The project would continue the undergrounding completed as part of the Aurora project that terminates at Shoreline City Hall.

Table 1 – Evaluation of Undergrounding Criteria

Undergrounding Criterion N 175th Street (Stone Avenue N to I-5)		
1.	Meet City Code?	
	a. Is there an associated capital project?	Y
	b. Electrical carrying facilities over 35kV?	N
2.	Eligible for use of Seattle City Light Franchise Undergrounding Agreement?	Y
3.	Sufficient size?	
	a. Length greater than 500’ or one block?	Y
	b. Estimated cost over \$1.5M?	Y

4.	Estimated surcharge cost to Shoreline residents	
	a. Project surcharge less than \$1.00/2-mo.?	\$1.00 (\$0.0012/KWH)
	b. Cumulative surcharge less than \$10.00/2-mo.?	\$6.55 (\$0.0081/KWH)
5.	Support redevelopment?	
	a. Within or adjacent to a high-density zoning?	N
	b. Is the project on a principal or minor arterial?	Principal
	c. Facilitate structures closer to the property line?	N
	d. Will it support needed electrical system upgrades?	N/A
6.	Other reasons to support or preclude undergrounding?	
	a. Can the project schedule accommodate undergrounding?	Y
	b. Adjacent to roadways with no overhead utilities?	Y
	c. Opportunity to coordinate with other undergrounding projects	Y
	d. Other items for consideration?	None

Note 1: The coloring in the table provides a visual cue to help show where the criterion supports or does not support moving forward with undergrounding. Green color coding signifies strong support, yellow signifies medium support and red signifies low or no support.

Projected Undergrounding Cost

Undergrounding costs for utilities fall into two categories – Seattle City Light (SCL) and other overhead utilities, such as Comcast, Lumen and Zply.

Seattle City Light (SCL)

The City’s franchise agreement with SCL provides a framework for passing undergrounding costs to utility ratepayers in Shoreline’s city limits. The repayment schedule is generally a 25-year period with adjustable rates set by SCL. For this and previous discussions with Council, a 5% interest rate is assumed. Actual interest rates will not be determined until a later date. Staff will continue coordinating with SCL on design and rates.

The SCL franchise agreement reduces the total cost of SCL undergrounding by the cost if the utility were relocated overhead. Staff presented rate payer impacts of \$1.10 per billing period to Council in the February 1, 2021 Council presentation. Ratepayer impacts have been updated based on the 30% design and current SCL revenue projections. The total estimated cost to rate payers is now \$5,900,000, and the total increase on each ratepayer bill is estimated to be \$1.00 (rate payers are billed once every two months.) This estimated increase, when combined with existing undergrounding charges, would result in a cumulative surcharge of \$6.55 per billing cycle through December 2032 when the existing surcharge for the North City undergrounding project sunsets.

Table 2 below provides an overview of the SCL undergrounding cost estimates by undergrounding project:

Table 2 – Seattle City Light Undergrounding Project Cost Estimate

Project	Surcharge (\$/KWh)	Avg Residential Charge	Sunset Date
North City Undergrounding	0.0007	\$0.56	Dec-32
Aurora Phase 1 Undergrounding	0.0017	\$1.37	May-33
Aurora Phase 2 Undergrounding	0.0018	\$1.45	Dec-37
Aurora Phase 3A Undergrounding	0.0005	\$0.40	Jul-40
Aurora Phase 3B Undergrounding	0.0022	\$1.77	Dec-41
Current Total	0.0069	\$5.55	
<i>175th (Stone to I-5) Potential Undergrounding</i>	<i>0.0012</i>	<i>\$1.00</i>	
Total (at Implementation) if 175th Undergrounding Project is Added	0.0081	\$6.55	

Note 1: This table assumes average power consumption and forecasting provide by SCL in February 2021.

Note 2: The Sunset Date Estimated Average Cumulative Monthly Surcharge is the end of the 25-year financing period when the amount after the project rolls off rate payer bills. (e.g. with 175th Street included, in December 2032, the average surcharge will drop by \$0.56 from \$6.55 to \$5.99, then drop again to \$4.62 in May 2033, etc.).

Note 3: Future rate payer impacts from undergrounding on the 145th Street corridor are not included in this table.

Other Overhead Utilities

The City’s franchise agreements with Comcast and Lumen require that the City provide trenching, backfill, restoration, traffic control and service conversions. Each utility company is required to furnish and install the conduit and structures/vaults and wires. The utilities are also responsible for permitting costs. Other requirements are also included in the franchise; however, these items have a minimal cost impact and, thus, will not be discussed in greater detail. Costs of additional requirements are included in design and construction cost contingencies.

The City’s franchise agreement with Ziplly does not include a prescribed cost share agreement. Ziplly’s historic use of the right-of-way prior to statehood affords the company (Per RCW 80.36.040) the right to maintain their use of the right of way without providing compensation to the City. However, in the situation where utilities are required to relocate or underground for a City transportation project, court cases indicate that the Utility must pay for the cost of relocation overhead (relocation project) or the difference between relocating overhead and undergrounding (undergrounding project). For this project, it is assumed that the City will pay the difference between overhead relocation and undergrounding. The difference is assumed to be approximately 33% (1/3) of the total cost to underground Ziplly facilities.

The distribution or responsibility for costs between the City and utilities based on franchise agreement requirements are summarized in Table 3 below:

Table – 3 Franchise Summary of responsibility for costs

	Engineering by City	Engineering by Utility	Permits	Earthwork	Conduit, Vaults, & Wire	Service Conversions	Traffic Control
SCL	Rate Payers	Rate Payers	City	Rate Payers	Rate Payers	City	Rate Payers
Comcast	City	Utility	Utility	City	Utility	City	City
Lumen	City	Utility	Utility	City	Utility	City	City
Ziply	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1	See Note 1

Note 1 – Assumes that the City pays the difference in cost between overhead relocation and undergrounding.

Based on these cost responsibilities the City capital project will need to incur approximately \$1,870,000 in additional costs for undergrounding associated with Comcast, Lumen and Ziply. Undergrounding costs are summarized in Table 4 below:

TABLE 4 -City Expenditures by Franchise Utility

SCL	NA
Comcast	\$668,000
Lumen	\$668,000
Ziply	\$534,000
TOTAL	\$1,870,000

Based on the analysis of the City’s undergrounding criteria, SCL rate payer impacts, and City capital expenditures, staff recommends that undergrounding be included in N 175th Street Project.

COUNCIL GOAL(S) ADDRESSED

This project supports Council Goal 2: “Improve Shoreline’s infrastructure to continue the delivery of highly-valued public service,” and Council Goal 3: “Continue preparation for regional mass transit in Shoreline.”

RESOURCE/FINANCIAL IMPACT

The 2021 – 2026 Capital Improvements Program includes a summary of funding for the N 175th Street Project. The table below provides an updated project budget reflective of the most current engineers estimates (30% Complete). City expenditures for utility undergrounding are included in the table to support Council’s decision-making process. Impacts to City utility rate payers is discussed in depth in other sections of this report.

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RECOMMENDATION




No action is required tonight; this item is for discussion purposes only. Staff is seeking Council direction on the staff recommendation to proceed with utility undergrounding as part of the 175th Street (Stone Avenue N to I-5) project.

ATTACHMENTS













Attachment A: Project Vicinity Map

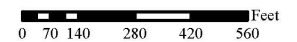
N 175th St Stone Ave N to I-5

Map Feature

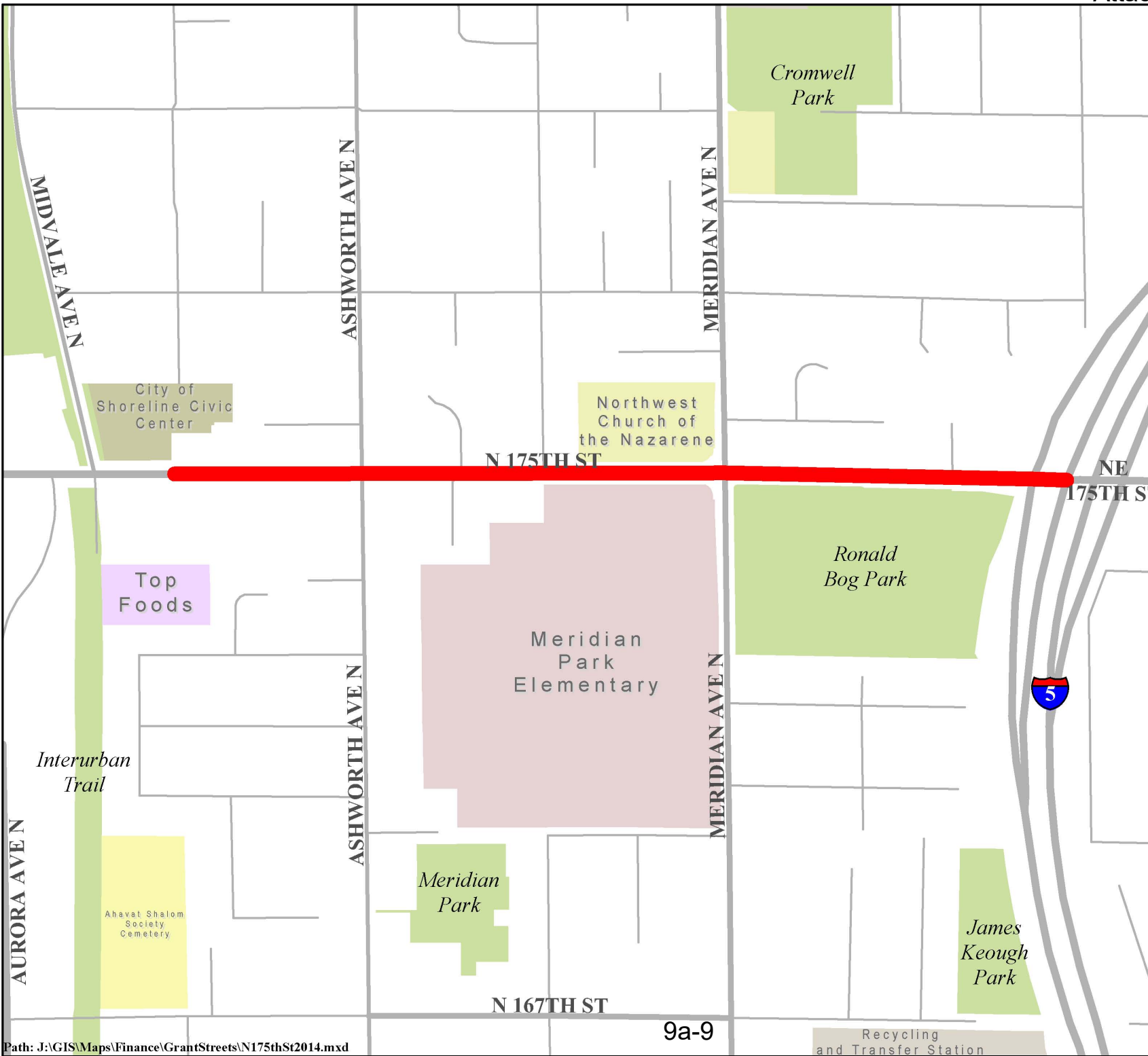
-  N 175th St Project
-  Other City Park
-  City of Shoreline Park

Landmark

-  Cemetery
-  Commercial
-  Facility
-  Golf Course
-  Government
-  Library
-  Open Space
-  Other
-  Recreation
-  Religious
-  School
-  Transportation



User: jclark
Date: 3/11/2014



Town of Woodway

City of Edmonds

City of Mountlake Terrace

Point Wells

Lake Ballinger

Echo Lake



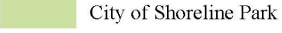
Puget Sound

City of Lake Forest Park


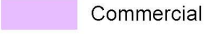

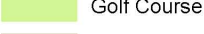
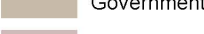

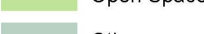





City of Seattle

N 175th St Stone Ave N to I-5

Map Feature

-  N175th St Project
-  Other City Park
-  City of Shoreline Park

Landmark

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0 485 970 1,940 2,910 3,880 Feet



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